

## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
 Stylesheet Version v1.2

EPAS ID: PAT6174424

|                              |                |
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| <b>SUBMISSION TYPE:</b>      | NEW ASSIGNMENT |
| <b>NATURE OF CONVEYANCE:</b> | ASSIGNMENT     |

**CONVEYING PARTY DATA**

| Name              | Execution Date |
|-------------------|----------------|
| INTEL CORPORATION | 11/30/2019     |

**RECEIVING PARTY DATA**

|                        |                    |
|------------------------|--------------------|
| <b>Name:</b>           | APPLE INC.         |
| <b>Street Address:</b> | ONE APPLE PARK WAY |
| <b>City:</b>           | CUPERTINO          |
| <b>State/Country:</b>  | CALIFORNIA         |
| <b>Postal Code:</b>    | 95014              |

**PROPERTY NUMBERS Total: 130**

| Property Type       | Number   |
|---------------------|----------|
| Application Number: | 15639444 |
| Application Number: | 15644327 |
| Application Number: | 16465121 |
| Application Number: | 15736416 |
| Application Number: | 16465453 |
| Application Number: | 16465515 |
| Application Number: | 15736453 |
| Application Number: | 15738449 |
| Application Number: | 16465978 |
| Application Number: | 16465996 |
| Application Number: | 16465998 |
| Application Number: | 15738468 |
| Application Number: | 16467185 |
| Application Number: | 15738993 |
| Application Number: | 15743800 |
| Application Number: | 16473563 |
| Application Number: | 16473577 |
| Application Number: | 16473586 |
| Application Number: | 16474036 |
| Application Number: | 16475621 |

PATENT

| Property Type       | Number   |
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| Application Number: | 16475670 |
| Application Number: | 15750825 |
| Application Number: | 15751127 |
| Application Number: | 16476011 |
| Application Number: | 16476657 |
| Application Number: | 15756516 |
| Application Number: | 16477497 |
| Application Number: | 15760450 |
| Application Number: | 16478813 |
| Application Number: | 15765764 |
| Application Number: | 16479161 |
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| Application Number: | 16480272 |
| Application Number: | 16480837 |
| Application Number: | 16481792 |
| Application Number: | 15765998 |
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| Application Number: | 16483393 |
| Application Number: | 16483561 |
| Application Number: | 16483568 |
| Application Number: | 16483982 |
| Application Number: | 16484040 |
| Application Number: | 16484438 |
| Application Number: | 16484790 |
| Application Number: | 16484802 |
| Application Number: | 16485088 |
| Application Number: | 16487390 |
| Application Number: | 16487406 |
| Application Number: | 16487706 |
| Application Number: | 16487778 |
| Application Number: | 16487788 |
| Application Number: | 16488175 |
| Application Number: | 16488187 |
| Application Number: | 16488200 |
| Application Number: | 15777537 |
| Application Number: | 16488552 |

| Property Type       | Number   |
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| Application Number: | 16488563 |
| Application Number: | 16488618 |
| Application Number: | 16489087 |
| Application Number: | 16489178 |
| Application Number: | 16489208 |
| Application Number: | 16489222 |
| Application Number: | 16489279 |
| Application Number: | 15887915 |
| Application Number: | 16490260 |
| Application Number: | 16490263 |
| Application Number: | 16490884 |
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| Application Number: | 15926360 |
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| Application Number: | 16496882 |
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| Application Number: | 16497750 |
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| Application Number: | 16055964 |
| Application Number: | 16060910 |
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| Application Number: | 16500890 |
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| Application Number: | 16508409 |
| Application Number: | 16512461 |
| Application Number: | 16516281 |
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| Application Number: | 16536818 |
| Application Number: | 16538887 |
| Application Number: | 16540656 |
| Application Number: | 16542310 |
| Application Number: | 16543756 |
| Application Number: | 16546334 |
| Application Number: | 16563766 |
| Application Number: | 16584651 |

| Property Type       | Number   |
|---------------------|----------|
| Application Number: | 16603914 |
| Application Number: | 16604141 |
| Application Number: | 16605784 |
| Application Number: | 16073997 |
| Application Number: | 16611638 |
| Application Number: | 16612333 |
| Application Number: | 16613541 |
| Application Number: | 16614106 |
| Application Number: | 16615337 |
| Application Number: | 09473454 |
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| Application Number: | 16140991 |
| Application Number: | 16142488 |
| Application Number: | 16247187 |
| Application Number: | 16299601 |
| Application Number: | 16327399 |
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| Application Number: | 16484422 |
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| Application Number: | 16488153 |
| Application Number: | 16488354 |
| Application Number: | 16489913 |
| Application Number: | 16497484 |
| Application Number: | 16500889 |
| Application Number: | 16616487 |

#### CORRESPONDENCE DATA

Fax Number: (216)579-6073

*Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.*

**PATENT**

**REEL: 053309 FRAME: 0143**



**Phone:** 216-579-1700  
**Email:** lhawkins@pearne.com  
**Correspondent Name:** JOHN P. MURTAUGH/PEARNE & GORDON LLP  
**Address Line 1:** 1801 EAST 9TH STREET, SUITE 1200  
**Address Line 4:** CLEVELAND, OHIO 44114-3108

|                                |                  |
|--------------------------------|------------------|
| <b>ATTORNEY DOCKET NUMBER:</b> | BRAQ-J8613       |
| <b>NAME OF SUBMITTER:</b>      | JOHN P. MURTAUGH |
| <b>SIGNATURE:</b>              | /johnpmurtaugh/  |
| <b>DATE SIGNED:</b>            | 06/26/2020       |

**Total Attachments: 168**

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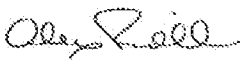
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# State of California Secretary of State

This Certificate is not valid for use anywhere within the United States of America, its territories or possessions.

|                                                                                                                  |  |                                                                                     |                                                                                      |
|------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>APOSTILLE</b><br>(Convention de La Haye du 5 octobre 1961)                                                    |  |                                                                                     |                                                                                      |
| <b>1. Country:</b><br>Pays / País:                                                                               |  | United States of America                                                            |                                                                                      |
| <b>This public document</b><br>Le présent acte public / El presente documento público                            |  |                                                                                     |                                                                                      |
| <b>2. has been signed by</b><br>a été signé par<br>ha sido firmado por                                           |  | Kathryn Frances Hall                                                                |                                                                                      |
| <b>3. acting in the capacity of</b><br>agissant en qualité de<br>quien actúa en calidad de                       |  | Notary Public, State of California                                                  |                                                                                      |
| <b>4. bears the seal / stamp of</b><br>est revêtu du sceau / timbre de<br>y está revestido del sello / timbre de |  | Kathryn Frances Hall, Notary Public, State of California                            |                                                                                      |
| <b>Certified</b><br>Attesté / Certificado                                                                        |  |                                                                                     |                                                                                      |
| <b>5. at</b><br>à / en                                                                                           |  | Sacramento, California                                                              | <b>6. the</b><br>le / el día                                                         |
|                                                                                                                  |  |                                                                                     | 28th day of February 2020                                                            |
| <b>7. by</b><br>par / por                                                                                        |  | Secretary of State, State of California                                             |                                                                                      |
| <b>8. No</b><br>sous n°<br>bajo el número                                                                        |  | 77171                                                                               |                                                                                      |
| <b>9. Seal / stamp:</b><br>Sceau / timbre:<br>Sello / timbre:                                                    |  |  | <b>10. Signature:</b><br>Signature:<br>Firma:                                        |
|                                                                                                                  |  |                                                                                     |  |



This Apostille only certifies the authenticity of the signature and the capacity of the person who has signed the public document, and, where appropriate, the identity of the seal or stamp which the public document bears.  
 This Apostille does not certify the content of the document for which it was issued.  
 To verify the issuance of this Apostille, see: [apostille.search.sos.ca.gov/](http://apostille.search.sos.ca.gov/).  
 This certificate does not constitute an Apostille under the Hague Convention of 5 October 1961, when it is presented in a country which is not a party to the Convention. In such cases, this certificate should be presented to the consular section of the mission representing that country.

Cette Apostille atteste uniquement la véracité de la signature, la qualité en laquelle le signataire de l'acte a agi et, le cas échéant, l'identité du sceau ou timbre dont l'acte public est revêtu.  
 Cette Apostille ne certifie pas le contenu de l'acte pour lequel elle a été émise.  
 Cette Apostille peut être vérifiée à l'adresse suivante: [apostille.search.sos.ca.gov/](http://apostille.search.sos.ca.gov/).  
 Ce certificat ne constitue pas une Apostille en vertu de la Convention de La Haye du 5 Octobre 1961, lorsque présenté dans un pays qui n'est pas partie à cette Convention. Dans ce cas, le certificat doit être présenté à la section consulaire de la mission qui représente ce pays.

Esta Apostille certifica únicamente la autenticidad de la firma, la calidad en que el signatario del documento haya actuado y, en su caso, la identidad del sello o timbre del que el documento público está revestido.  
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 Este certificado no constituye una Apostilla en virtud del Convenio de La Haya de 5 de octubre de 1961 cuando se presenta en un país que no es parte en el Convenio. En estos casos, el certificado debe ser presentado a la sección consular de la misión que representa a ese país.

orState Form NP-45 SAC (rev. 09/2019)

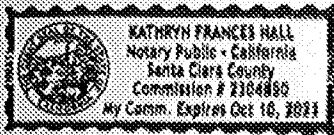
# CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

CIVIL CODE §1189

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California )  
County of Santa Clara )

On February 24, 2020 before me, Kathryn Frances Hall, Notary Public, personally appeared Leticia R. Block, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.



I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature

*Kathryn Frances Hall*

## OPTIONAL

Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

### Description of the attached document

Title or Type of Document: \_\_\_\_\_  
Document Date: \_\_\_\_\_  
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### Capacity(ies) Claimed by Signer(s)

Signer's Name: \_\_\_\_\_  
☐ Corporate Officer - Title(s): \_\_\_\_\_  
☐ Partner - ☐ Limited ☐ General  
☐ Individual ☐ Attorney in Fact  
☐ Trustee ☐ Guardian or Conservator  
☐ Other: \_\_\_\_\_

Signer's Name: \_\_\_\_\_  
☐ Corporate Officer - Title(s): \_\_\_\_\_  
☐ Partner - ☐ Limited ☐ General  
☐ Individual ☐ Attorney in Fact  
☐ Trustee ☐ Guardian or Conservator  
☐ Other: \_\_\_\_\_

Signer is Representing: \_\_\_\_\_

Signer is Representing: \_\_\_\_\_

**STATEMENT OF TRUE COPY**

I, Leticia R. Block, hereby state that the attached document is a true copy of the original assignment executed by and between and Apple Inc. and Intel Corporation.

*Leticia R. Block*

Leticia R. Block

Date: 02-24-2020

PATENT ASSIGNMENT

This PATENT ASSIGNMENT, dated as of November 30, 2019 (this "Assignment"), is by and between Apple Inc., a California corporation, with an address at One Apple Park Way, Cupertino, CA 95014 (the "Assignee") and Intel Corporation, a Delaware corporation, with an address at 2200 Mission College Boulevard, Santa Clara, CA 95054 (the "Assignor"). Each of the Assignee and the Assignor are referred to herein as a "Party." Unless otherwise specifically provided herein, each capitalized term used but not defined herein shall have the meaning given to such term in the Purchase Agreement (as defined below).

RECITALS

**WHEREAS**, the Assignee and Intel are parties to that certain Master Asset Purchase Agreement, dated as of July 25, 2019 (as it may be amended from time to time) (the "Purchase Agreement"), by and among the Assignee and Intel; and

**WHEREAS**, pursuant to the Purchase Agreement, Intel has agreed to, and has agreed to cause certain of its Affiliates to, assign, transfer and convey to the Assignee all of Intel's and certain of its Affiliates' right, title, and interest in and to the Transferred Patents, and the Assignee has agreed to purchase the Transferred Patents.

AGREEMENT

**NOW, THEREFORE**, in consideration of the premises and the mutual promises and conditions hereinafter set forth and set forth in the Purchase Agreement and the Ancillary Agreements, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties, intending to be legally bound, do hereby agree as follows:

1. Conveyance and Acceptance. In accordance with and subject to the provisions of the Purchase Agreement, the Assignor hereby sells, assigns, transfers, conveys and delivers to the Assignee, and the Assignee hereby purchases, all of the Assignor's right, title and interest in and to, the Transferred Patents, including those Patents set forth on Schedule 1 hereto, along with any and all rights to sue and recover for past, present and future infringement, misappropriation, misuse or violation with respect to the Transferred Patents, together with all rights under international treaties relating to the Transferred Patents. The foregoing rights include the right to claim priority to the Transferred Patents. Without limiting the foregoing, with respect to any Transferred Patents that are registered to or otherwise in the name of an Affiliate of the Assignor, including as indicated on Schedule 1 hereto, the Assignor shall cause such Affiliate to effect the assignment of such Transferred Patents to the Assignee in accordance herewith and subject to the terms and conditions hereof, it being understood and agreed that the Assignee shall own such Transferred Patents as if assigned to it by the Assignor hereunder as of the date hereof.
2. Acknowledgement. To the extent that Schedule 1 hereto contains any typographical or administrative error but it is clear which patent or patent application was intended to be included in the sale, assignment, transfer and conveyance under this Assignment, the Assignor and the Assignee each acknowledge and agree that the intended patent or patent application is hereby



sold, assigned, transferred and conveyed, along with all other rights, privileges and claims enumerated above with respect to such intended patent or patent application.

3. Recordation. The Assignor hereby authorizes the Commissioner of Patents and Trademarks in the United States Patent and Trademark Office, and the corresponding entities or agencies in any applicable foreign countries or multinational authorities, to record the Assignee as the assignee and owner of the Transferred Patents and to deliver to the Assignee, and to the Assignee's attorneys, agents, successors or assigns, all official documents and communications as may be warranted by this Assignment.

4. Disclaimer of Representations and Warranties. EXCEPT AS AND SOLELY TO THE EXTENT SET FORTH IN THE PURCHASE AGREEMENT, THE ASSIGNEE (ON BEHALF OF ITSELF AND EACH OF ITS SUBSIDIARIES) UNDERSTANDS AND AGREES THAT THE ASSIGNOR (ON BEHALF OF ITSELF AND ITS AFFILIATES) MAKES NO REPRESENTATIONS OR WARRANTIES IN ANY WAY PURSUANT TO OR IN CONNECTION WITH THIS ASSIGNMENT.

5. Purchase Agreement Controls. This Assignment is and shall be subject to and governed entirely by and in accordance with the terms and conditions of the Purchase Agreement. Notwithstanding any other provision of this Assignment to the contrary, nothing contained herein shall in any way supersede, modify, replace, amend, change, rescind, waive, exceed, expand, enlarge or in any way affect the provisions of the Purchase Agreement, including any representation, warranty, covenant, agreement, obligation or condition contained therein or the rights or remedies contemplated thereby. To the extent this Assignment conflicts with the Purchase Agreement, the Purchase Agreement will control.

6. Governing Law; Dispute Resolution.

(a) This Assignment, and all claims or causes of action based upon, arising out of, or related to this Assignment or the transactions contemplated hereby, shall be governed by and construed in accordance with the Laws of the State of Delaware applicable to contracts executed and to be performed wholly within such State and without reference to the choice-of-law principles that would result in the application of the Laws of a different jurisdiction.

(b) Sections 11.3(b) and 11.3(c) of the Purchase Agreement are hereby incorporated by reference, *mutatis mutandis*.

7. Further Assurances. The Assignor shall, and shall cause their Affiliates to, from time to time at the request of the Assignee, without any additional consideration, furnish the Assignee such further information or assurances, execute and deliver such additional documents, instruments and conveyances, and take such other actions and do such other things, as may be reasonably necessary or appropriate to carry out the provisions of this Assignment and give effect to the assignments herein, including all acts reasonably necessary to perfect, record or effectuate the assignment to the Assignee of ownership of the Transferred Patents.

8. Counterparts. This Assignment may be executed in multiple counterparts, and by any of the Parties in separate counterparts, each of which when executed shall be deemed to be an original but all of which taken together shall constitute one and the same Assignment. Delivery

of an executed counterpart of a signature page to this Assignment by .pdf, .tif, .gif or similar attachment to electronic mail shall be as effective as delivery of a manually executed counterpart of this Assignment.

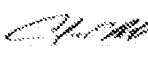
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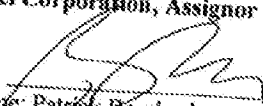
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IN WITNESS WHEREOF, the Parties have each caused this Assignment to be duly executed as of the date first written above.

|                                                                                   |            |
|-----------------------------------------------------------------------------------|------------|
| LEGAL OK                                                                          |            |
|  | 11/30/2019 |
| Carlos Rivas                                                                      |            |

Intel Corporation, Assignor

By:   
Name: Patrick Bombach  
Title: Authorized Signatory

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) ss.

On this \_\_\_\_\_ day of \_\_\_\_\_, 2019 before me \_\_\_\_\_

Personally appeared \_\_\_\_\_, proved to me on the basis of satisfactory evidence to the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of \_\_\_\_\_ that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

\_\_\_\_\_  
Signature of Notary Public

[Signature Page to Patent Assignment]

**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT**

**CIVIL CODE § 1169**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California )  
County of Santa Clara )

On November 30, 2019 before me, Kevin Marston, Notary Public

Date

Here Insert Name and Title of the Officer

personally appeared Patrick Bombach

Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.



Signature

*Kevin Marston*

Signature of Notary Public

Place Notary Seal Above

**OPTIONAL**

Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

**Description of Attached Document**

Title or Type of Document: \_\_\_\_\_

Document Date: \_\_\_\_\_

Number of Pages: \_\_\_\_\_

Signer(s) Other Than Named Above: \_\_\_\_\_

**Capacity(ies) Claimed by Signer(s)**

Signer's Name: \_\_\_\_\_

☐ Corporate Officer — Title(s): \_\_\_\_\_

☐ Partner — ☐ Limited ☐ General

☐ Individual ☐ Attorney in Fact

☐ Trustee ☐ Guardian or Conservator

☐ Other: \_\_\_\_\_

Signer is Representing: \_\_\_\_\_

Signer's Name: \_\_\_\_\_

☐ Corporate Officer — Title(s): \_\_\_\_\_

☐ Partner — ☐ Limited ☐ General

☐ Individual ☐ Attorney in Fact

☐ Trustee ☐ Guardian or Conservator

☐ Other: \_\_\_\_\_

Signer is Representing: \_\_\_\_\_

AGREED TO AND ACCEPTED:

Apple Inc., Assignee

By: [Signature]  
Name: ADRIAN E. PERICA  
Title: VP

STATE OF CALIFORNIA )  
COUNTY OF SANTA CLARA ) ss.

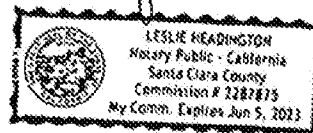
On this 2 day of DEC, 2019 before me LESLIE HEADINGTON, NOTARY PUBLIC

Personally appeared ADRIAN PERICA, proved to me on the basis of satisfactory evidence to the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/~~she~~/they executed the same in his/~~her~~/their authorized capacity(ies), and that by his/~~her~~/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of CA that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

[Signature]  
Signature of Notary Public



[Signature Page to Patent Assignment]

|      | A                                                                                                                                     | B      | C             | D    | E           | F       | G             | H            | I                  | J |
|------|---------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|------|-------------|---------|---------------|--------------|--------------------|---|
| 2    | TITLE                                                                                                                                 | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 9957 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9958 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9959 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9960 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9961 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9962 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9963 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9964 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9965 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9966 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9967 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9968 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9969 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9970 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9971 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9972 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9973 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9974 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9975 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9976 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9977 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9978 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9979 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9980 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9981 |                                                                                                                                       |        |               |      |             |         |               |              |                    |   |
| 9982 | TECHNIQUES TO PERFORM A RANDOM ACCESS CHANNEL PROCEDURE FOR HANDOVERS IN A WIRELESS COMMUNICATION ENVIRONMENT                         |        |               | PCT  | APP-Pending | US      | 16/464768     |              | US-2019-0313300-A1 |   |
| 9983 | CIRCUIT AND A METHOD FOR OPERATING A CIRCUIT                                                                                          |        |               | NP   | APP-Pending | US      | 15/937966     |              | US-2019-0305732-A1 |   |
| 9984 | UE (User Equipment) Assisted Measurement Gap in NR (New Radio)                                                                        |        |               | NP   | APP-Pending | US      | 16/136813     |              | US-2019-0097877-A1 |   |
| 9985 | GENERATION NODE-B (GNB) USER EQUIPMENT (UE) AND METHODS FOR INTERLEAVING IN MULTIPLE-INPUT MULTIPLE-OUTPUT (MIMO) ARRANGEMENTS        |        |               | PCT  | APP-Pending | US      | 16/475733     |              | US-2019-0334585-A1 |   |
| 9986 | SYSTEMS METHODS AND DEVICES FOR MEETING CELLULAR DATA TURNAROUND TIME                                                                 |        |               | PCT  | APP-Pending | US      | 16/475637     |              | US-2019-0327024-A1 |   |
| 9987 | CONNECTION POINT RELATED PERFORMANCE MEASUREMENTS IN A NETWORK FUNCTION VIRTUALIZATION ENVIRONMENT                                    |        |               | NP   | APP-Pending | US      | 16/126162     |              | US-2019-0044838-A1 |   |
| 9988 | POWER HEADROOM OF GRANTLESS UPLINK                                                                                                    |        |               | NP   | APP-Pending | US      | 15/139443     |              | US-2019-0045459-A1 |   |
| 9989 | NEXT GENERATION NODE-B (GNB) AND METHODS FOR MOBILITY MANAGEMENT WITH SEPARATE USER PLANE AND CONTROL PLANE IN NEW RADIO (NR) SYSTEMS |        |               | NP   | APP-Pending | US      | 16/141440     |              | US-2019-0055027-A1 |   |

|       | A                                                                                                                                                           | B      | C             | D    | E           | F       | G             | H            | I                  | J |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|------|-------------|---------|---------------|--------------|--------------------|---|
| 2     | TITLE                                                                                                                                                       | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 9990  | DEVICE REQUESTED PROTOCOL DATA UNIT SESSION MODIFICATION IN THE 5G SYSTEM                                                                                   |        |               | NP   | APP-Pending | US      | 16/158486     |              | US-2019-0118512-A1 |   |
| 9991  | Activation of Secondary Cell containing Bandwidth Parts                                                                                                     |        |               | NP   | APP-Pending | US      | 16/142488     |              | US-2019-0045491-A1 |   |
| 9992  | Bandwidth Part Signaling and Measurement Handling                                                                                                           |        |               | NP   | APP-Pending | US      | 16/146009     |              | US-2019-0044689-A1 |   |
| 9993  | SYSTEMS METHODS AND APPARATUSES FOR PROVIDING AND OBTAINING SCHEDULING INFORMATION FOR SIB3-RP DURING HANDOVER                                              |        |               | NP   | APP-Pending | US      | 16/142115     |              | US-2019-0045419-A1 |   |
| 9994  | SIGNALING RADIO BEARER TYPE 3 (SRB3) AND SECONDARY CELL GROUP (SCG) FAILURE HANDLING                                                                        |        |               | NP   | APP-Pending | US      | 16/132596     |              | US-2019-0045568-A1 |   |
| 9995  | VEHICLE TO EVERYTHING SYNCHRONIZATION REFERENCE SELECTION AND RESELECTION                                                                                   |        |               | NP   | APP-Pending | US      | 16/148785     |              | US-2019-0045470-A1 |   |
| 9996  | EVOLVED NODE-B (ENB) FOR MANAGEMENT OF LONG TERM EVOLUTION (LTE) WIRELESS LOCAL AREA NETWORK (WLAN) AGGREGATION (LWA) AND LTE WLAN INTERNET PROTOCOL (LWIP) |        |               | NP   | APP-Pending | US      | 16/151018     |              | US-2019-0045950-A1 |   |
| 9997  | RADIO LINK MONITORING (RLM) EVALUATION MECHANISM FOR NEW RADIO (NR) SYSTEMS                                                                                 |        |               | NP   | APP-Pending | US      | 16/154767     |              | US-2019-0052380-A1 |   |
| 9998  | MULTI-CARRIER OPERATION FOR ENHANCED MACHINE TYPE COMMUNICATIONS IN UNLICENSED MEDIUM (EMTC-U)                                                              |        |               | NP   | APP-Pending | US      | 16/160950     |              | US-2019-0053064-A1 |   |
| 9999  | APPARATUSES FOR SELECTING COMMUNICATION BEAMS BASED ON NORMALIZED TIME OF ARRIVAL (TOA) OF REFERENCE SIGNALS                                                |        |               | NP   | APP-Pending | US      | 16/163379     |              | US-2019-0053234-A1 |   |
| 10000 | ENABLING NETWORK SLICING IN A 5G NETWORK WITH CPE/UP SEPARATION                                                                                             |        |               | NP   | APP-Pending | US      | 16/175084     |              | US-2019-0075652-A1 |   |
| 10001 | ESTABLISHMENT OF RANDOM ACCESS CHANNEL COMMUNICATIONS                                                                                                       |        |               | PCT  | APP-Pending | US      | 16/476180     |              | US-2019-0357277-A1 |   |
| 10002 | FILTER COEFFICIENT CONFIGURATION IN NEW RADIO SYSTEMS                                                                                                       |        |               | NP   | PAT-Active  | US      | 16/162543     | #####        | US-2019-0058508-A1 |   |
| 10003 | FILTER COEFFICIENT CONFIGURATION IN NEW RADIO SYSTEMS                                                                                                       |        |               | CNT  | APP-Pending | US      | 16/407126     |              |                    |   |
| 10004 | TRANSPORT NETWORK LAYER ASSOCIATIONS ON THE F1 INTERFACE                                                                                                    |        |               | NP   | APP-Pending | US      | 16/182016     |              | US-2019-0075023-A1 |   |
| 10005 | TRANSPORT NETWORK LAYER ASSOCIATIONS ON THE F1 INTERFACE                                                                                                    |        |               | CNT  | APP-Pending | US      | 16/408296     |              |                    |   |
| 10006 | METHODS AND DEVICES FOR RADIO RESOURCE ALLOCATION                                                                                                           |        |               | NP   | APP-Pending | US      | 15/937943     |              | US-2019-0303903-A1 |   |
| 10007 | FLEXIBLE FLOW CONTROL MECHANISM FOR NG-RAN INTERFACES                                                                                                       |        |               | NP   | APP-Pending | US      | 16/191760     |              | US-2019-0156224-A1 |   |
| 10008 | SEMI-PERSISTENT SCHEDULING FOR AUTONOMOUS TRANSMISSION ACTIVATION AND RELEASE                                                                               |        |               | PCT  | APP-Pending | US      | 15/476038     |              | US-2019-0349508-A1 |   |
| 10009 | SYSTEMS METHODS AND DEVICES FOR USING S-MEASURE WITH NEW RADIO                                                                                              |        |               | NP   | PAT-Active  | US      | 16/173386     | #####        | US-2019-0074887-A1 |   |
| 10010 | SYSTEMS METHODS AND DEVICES FOR USING S-MEASURE WITH NEW RADIO                                                                                              |        |               | CNT  | APP-Pending | US      | 16/448951     |              |                    |   |
| 10011 | ANCHOR CHANNEL DESIGN FOR UNLICENSED INTERNET OF THINGS (IOT)                                                                                               |        |               | PCT  | APP-Pending | US      | 16/465978     |              |                    |   |
| 10012 | TRANSMISSION OF GROUP COMMON PDCCH (PHYSICAL DOWNLINK CONTROL CHANNEL) FOR NR (NEW RADIO)                                                                   |        |               | PCT  | APP-Pending | US      | 16/464814     |              | US-2019-0345904-A1 |   |
| 10013 | RESOURCE MAPPING AND MULTIPLEXING OF UPLINK CONTROL CHANNEL AND UPLINK DATA CHANNEL                                                                         |        |               | PCT  | APP-Pending | US      | 16/476040     |              | US-2019-0335449-A1 |   |
| 10014 | CONCATENATION OF SERVICE DATA UNITS ABOVE A PACKET DATA CONVERGENCE PROTOCOL LAYER                                                                          |        |               | PCT  | APP-Pending | US      | 16/475817     |              |                    |   |
| 10015 | GENERATION NODE-B (GNB) USER EQUIPMENT (UE) AND METHODS FOR HANDOVER BASED ON MULTI-CONNECTIVITY IN NEW RADIO (NR) SYSTEMS                                  |        |               | PCT  | APP-Pending | US      | 16/479176     |              |                    |   |

|       | A                                                                                                                                                                                | B      | C             | D    | E                  | F       | G             | H            | I                  | J |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|------|--------------------|---------|---------------|--------------|--------------------|---|
| 2     | TITLE                                                                                                                                                                            | FAMILY | FAMILY-MEMBER | TYPE | STATUS             | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10016 | USER EQUIPMENT (UE) INVOLVED NODE-B (NB) AND METHODS OF PAGING IN ACCORDANCE WITH A RELAY ARRANGEMENT                                                                            |        |               | PCT  | APP-Pending        | US      | 16/487778     |              |                    |   |
| 10017 | CONTROL RESOURCE BLOCK SET SEARCH SPACE DESIGN                                                                                                                                   |        |               | PCT  | APP-Pending        | US      | 16/473558     |              | US-2019-035049-A1  |   |
| 10018 | PHYSICAL DOWNLINK CONTROL CHANNEL (PDCCH) DEMODULATION REFERENCE SIGNAL (DMRS) TRANSMISSION AND RECEPTION                                                                        |        |               | PCT  | APP-Pending        | US      | 16/478456     |              |                    |   |
| 10019 | TECHNIQUES FOR CONTROLLING SPECIFIC ABSORPTION RATE OF RADIO ENERGY TRANSMISSION                                                                                                 |        |               | NP   | APP-Pending        | US      | 16/381354     |              | US-2019-0345017-A1 |   |
| 10020 | SYSTEM INFORMATION ACQUISITION ENHANCEMENTS FOR WIRELESS DEVICES                                                                                                                 |        |               | PCT  | APP-Pending        | US      | 16/480837     |              |                    |   |
| 10021 | EXIT CONDITIONS FOR CONDITIONAL HANDOVERS AND BEAM-BASED MOBILITY STATE ESTIMATION                                                                                               |        |               | PCT  | APP-Pending        | US      | 16/479482     |              |                    |   |
| 10022 | SINGLE REGISTRATION MODE SUPPORT FOR INTERWORKING BETWEEN 5G AND EPC                                                                                                             |        |               | NP   | PAT-Active         | US      | 16/195147     | #####        | US-2019-0156157-A1 |   |
| 10023 | PHASE MODULATION SYSTEMS AND METHODS                                                                                                                                             |        |               | NP   | APP-Pending        | US      | 16/035148     |              |                    |   |
| 10024 | BUFFER STATUS REPORT ENHANCEMENTS FOR TCP FLOW                                                                                                                                   |        |               | PCT  | APP-Pending        | US      | 16/481792     |              |                    |   |
| 10025 | ELECTROMAGNETIC INTERFERENCE SHIELDING FOR A CIRCUIT BOARD                                                                                                                       |        |               | NP   | APP-Pending        | US      | 16/146503     |              |                    |   |
| 10026 | APPARATUS DEVICE METHOD AND COMPUTER PROGRAM FOR CALIBRATING A TIME-INTERLEAVED ANALOG-TO-DIGITAL CONVERTER                                                                      |        |               | PSP  | APP-Pending        | US      | 62/826030     |              |                    |   |
| 10027 | Mobile Communication System User Equipment Base Station Base Band Circuitry Methods Machine Readable Media and Computer Programs to Communicate in a Mobile Communication System |        |               | NP   | APP-Pending        | US      | 16/243206     |              | US-2019-0215701-A1 |   |
| 10028 | DETERMINATION OF NEW RADIO (NR) PHYSICAL UPLINK CONTROL CHANNEL (PUCCH) RESOURCE FOR HYBRID AUTOMATIC REPEAT REQUEST ACKNOWLEDGEMENT (HARQ-ACK) FEEDBACK                         |        |               | PCT  | APP-Pending        | US      | 16/482758     |              |                    |   |
| 10029 | Techniques for Improved Beam Management                                                                                                                                          |        |               | PCT  | APP-Pending        | US      | 16/487155     |              |                    |   |
| 10030 | MONITORING CONTROL CHANNELS IN CONTROL RESOURCE SETS FOR NEW RADIO                                                                                                               |        |               | PCT  | APP-Pending        | US      | 16/463971     |              |                    |   |
| 10031 | TRANSMISSION OF SYNCHRONIZATION SIGNALS                                                                                                                                          |        |               | PCT  | APP-Pending        | US      | 16/490884     |              |                    |   |
| 10032 | DESIGN OF DOWNLINK CONTROL INFORMATION FOR WIDEBAND COVERAGE ENHANCEMENT                                                                                                         |        |               | PCT  | APP-Pending        | US      | 16/484438     |              |                    |   |
| 10033 | CHANNEL QUALITY INDICATOR TABLE DESIGN FOR WIDEBAND COVERAGE ENHANCEMENT IN MULTIFIRE SYSTEMS                                                                                    |        |               | PCT  | APP-Pending        | US      | 16/493739     |              |                    |   |
| 10034 | Method for Interference Measurement in New Radio (NR) Communication Systems                                                                                                      |        |               | PCT  | APP-Pending        | US      | 16/488039     |              |                    |   |
| 10035 | Beam Recovery Frame Structure and Recovery Request for Communication Systems                                                                                                     |        |               | PCT  | APP-Pending        | US      | 16/483252     |              |                    |   |
| 10036 | Techniques for Employing Polar Code in Connection with NR (New Radio)                                                                                                            |        |               | PCT  | APP-Pending        | US      | 16/488309     |              |                    |   |
| 10037 | PARTIAL UPLINK SUBFRAME TRANSMISSIONS ON UNLICENSED CARRIERS                                                                                                                     |        |               | PCT  | APP-Pending        | US      | 16/465121     |              | US-2019-0327117-A1 |   |
| 10038 | Design of Cell Specific Reference Signal (CRS) Muting for Even Further Enhanced Machine Type Communication (eMTC)                                                                |        |               | PCT  | APP-Pending        | US      | 16/487226     |              |                    |   |
| 10039 | BEAM MANAGEMENT PROCEDURE TRIGGERING AND SIGNALING DELIVERY IN FALL-BACK MODE                                                                                                    |        |               | PCT  | APP-Pending        | US      | 16/488913     |              |                    |   |
| 10040 | MAXIMUM CHANNEL OCCUPANCY TIME SHARING AND CO-EXISTENCE                                                                                                                          |        |               | PCT  | APP-Pending        | US      | 16/490260     |              |                    |   |
| 10041 | COMMON SEARCH SPACE DESIGN IN ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL                                                                                                         |        |               | PCT  | APP-Pending        | US      | 16/490263     |              |                    |   |
| 10042 | BANDWIDTH PART CONFIGURATION AND OPERATION FOR NEW RADIO (NR) WIDEBAND USER EQUIPMENT (UE)                                                                                       |        |               | PCT  | APP-Pending        | US      | 16/484802     |              |                    |   |
| 10043 | TIMING ADVANCE FOR GRANTLESS UPLINK TRANSMISSION                                                                                                                                 |        |               | PCT  | APP-in-Preparation | US      |               |              |                    |   |
| 10044 | NR RRC CONNECTION SETUP OPTIMISATION                                                                                                                                             |        |               | NP   | APP-Pending        | US      | 16/242715     |              | US-2019-0215887-A1 |   |
| 10045 | RESOLVING BIDIRECTIONAL ATTACKS FOR MULTI-CONNECTIVITY                                                                                                                           |        |               | NP   | PAT-Active         | US      | 16/245837     | #####        | US-2019-0145997-A1 |   |
| 10046 | ENHANCING F1 APPLICATION PROTOCOL (F1-AP) INTERFACES IN A MULTI-HOP RELAY NETWORK WITH CENTRALIZED UNIT (CU) AND DISTRIBUTED UNIT (DU)                                           |        |               | NP   | APP-Pending        | US      | 16/254172     |              | US-2019-0158277-A1 |   |



|       | A                                                                                                                                               | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                           | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10042 | Resource Set Configurations Using Automatic Repeat Request Information                                                                          |        |               | NP   | APP-Pending | US      | 16/245552     |              | US-2019-0146275-A1 |   |
| 10048 | NEXT GENERATION NODE-B (GNB) AND METHODS TO INDICATE A TYPE OF ACCESS FOR PAGING OF A USER EQUIPMENT (UE)                                       |        |               | NP   | APP-Pending | US      | 16/245089     |              | US-2019-0191909-A1 |   |
| 10049 | NEXT GENERATION NODE-B (GNB) AND METHODS TO INDICATE A TYPE OF ACCESS FOR PAGING OF A USER EQUIPMENT (UE)                                       |        |               | ENT  | APP-Pending | US      | 16/408265     |              | US-2019-0305418-A1 |   |
| 10050 | PADDING BITS FOR CSI REPORT CODING                                                                                                              |        |               | NP   | APP-Pending | US      | 16/245825     |              | US-2019-0146266-A1 |   |
| 10051 | Transmission Downlink Control Information for New Radio (NR) System                                                                             |        |               | NP   | APP-Pending | US      | 16/247187     |              | US-2019-0223160-A1 |   |
| 10052 | SCHEDULING AND HYBRID AUTOMATIC REPEAT REQUEST OPERATION FOR CARRIER AGGREGATION WITH MIXED NUMEROLOGIES                                        |        |               | PCT  | APP-Pending | US      | 15/466530     |              |                    |   |
| 10053 | USER EQUIPMENT (UE) AND METHODS FOR VEHICLE-TO-VEHICLE (V2V) SIDELINK COMMUNICATION IN ACCORDANCE WITH A SHORT TRANSMISSION TIME INTERVAL (TTI) |        |               | PCT  | APP-Pending | US      | 16/496321     |              |                    |   |
| 10054 | CARRIER AGGREGATION AND HIGH ORDER MODULATION IN VEHICLE-TO-VEHICLE (V2V) SIDELINK COMMUNICATION                                                |        |               | PCT  | APP-Pending | US      | 16/496346     |              |                    |   |
| 10055 | PRIORITIZED MESSAGING AND RESOURCE SELECTION IN VEHICLE-TO-VEHICLE (V2V) SIDELINK COMMUNICATION                                                 |        |               | PCT  | APP-Pending | US      | 16/488552     |              |                    |   |
| 10056 | NARROWBAND INTERNET-OF-THINGS (NB-IOT) ENHANCEMENTS                                                                                             |        |               | PCT  | APP-Pending | US      | 16/473586     |              |                    |   |
| 10057 | WAKE UP SIGNAL FOR MACHINE TYPE COMMUNICATION AND NARROWBAND-INTERNET-OF-THINGS DEVICES                                                         |        |               | PCT  | APP-Pending | US      | 16/495778     |              |                    |   |
| 10058 | DESIGN OF EARLY TERMINATION SIGNAL AND HARQ-ACK FEEDBACK FOR PUSCH                                                                              |        |               | PCT  | APP-Pending | US      | 16/496882     |              |                    |   |
| 10059 | SUB-PRIOR RESOURCE ALLOCATION FOR PUSCH IN EVEN FURTHER ENHANCED MTC                                                                            |        |               | PCT  | APP-Pending | US      | 16/488200     |              |                    |   |
| 10060 | ENHANCED CELL SEARCH AND SYSTEM INFORMATION ACQUISITION                                                                                         |        |               | PCT  | APP-Pending | US      | 16/496363     |              |                    |   |
| 10061 | CONTROL SIGNALING FOR DEMODULATION REFERENCE SIGNAL ANTENNA PORT INDICATION                                                                     |        |               | PCT  | APP-Pending | US      | 16/488563     |              |                    |   |
| 10062 | DM-RS GROUPING AND CSI REPORTING FOR COMP                                                                                                       |        |               | PCT  | APP-Pending | US      | 16/496753     |              |                    |   |
| 10063 | REG BUNDLING SIZE AND DM-RS PATTERN FOR PHYSICAL DOWNLINK CONTROL CHANNEL                                                                       |        |               | PCT  | APP-Pending | US      | 16/467185     |              |                    |   |
| 10064 | CQI AND PMI OFFSET FOR UNLICENSED EMBT TRANSMISSION                                                                                             |        |               | NP   | APP-Pending | US      | 16/259715     |              | US-2019-0229794-A1 |   |
| 10065 | UPLINK NON-ORTHOGONAL MULTIPLE ACCESS TRANSMISSION SCHEME                                                                                       |        |               | NP   | APP-Pending | US      | 16/264243     |              | US-2019-0173616-A1 |   |
| 10066 | CONTROL SIGNALING OF BEAM FAILURE DETECTION                                                                                                     |        |               | NP   | APP-Pending | US      | 16/267721     |              | US-2019-0173740-A1 |   |
| 10067 | CONTROL SIGNALING OF BEAM FAILURE DETECTION                                                                                                     |        |               | ENT  | APP-Pending | US      | 16/408037     |              |                    |   |
| 10068 | DESIGN OF SCHEDULING REQUEST FOR FURTHER ENHANCED NARROWBAND-INTERNET-OF-THINGS (eNB-IoT)                                                       |        |               | PCT  | APP-Pending | US      | 16/479188     |              |                    |   |
| 10069 | NEW RADIO (NR) SHORT AND LONG DURATION PHYSICAL UPLINK CONTROL CHANNEL (PUCCH) DESIGN                                                           |        |               | PCT  | APP-Pending | US      | 16/496904     |              |                    |   |
| 10070 | ADVANCED RADIO RESOURCE MANAGEMENT IN NEXT-GEN MULTI-HOP RELAYING CELLULAR NETWORK                                                              |        |               | PCT  | APP-Pending | US      | 16/487944     |              |                    |   |
| 10071 | ENHANCED CONDITIONAL HANDOVER                                                                                                                   |        |               | PCT  | APP-Pending | US      | 16/488175     |              |                    |   |
| 10072 | EVOLVED NODE-B (ENB) USER EQUIPMENT (UE) AND METHODS OF SWITCHING BETWEEN DIRECT AND INDIRECT COMMUNICATION FOR A RELAY ARRANGEMENT             |        |               | PCT  | APP-Pending | US      | 16/477454     |              | US-2019-0357101-A1 |   |
| 10073 | SYSTEMS AND METHODS FOR GROUP BASED SERVICES PROVISIONING                                                                                       |        |               | PCT  | APP-Pending | US      | 16/479557     |              |                    |   |
| 10074 | GROUP BASED CONTEXT AND SECURITY FOR MASSIVE INTERNET OF THINGS DEVICES                                                                         |        |               | PCT  | APP-Pending | US      | 16/480267     |              |                    |   |
| 10075 | MINIMIZATION OF PADDING AND RESOURCE WASTAGE IN MESSAGES 3 (MSG3) FOR EARLY DATA TRANSMISSION (EDT)                                             |        |               | NP   | APP-Pending | US      | 16/254988     |              | US-2019-0169197-A1 |   |
| 10076 | NR (New Radio) PRACH (Physical Random Access Channel) Configuration and Multi-Beam Operation                                                    |        |               | PCT  | APP-Pending | US      | 16/473382     |              |                    |   |

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| 2     | TITLE                                                                                                                                                              | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10077 | METHODS TO SIGNAL ANTENNA PANEL CAPABILITY OF USER EQUIPMENT (UE) FOR CARRIER AGGREGATION (CA) IN MILLIMETER-WAVE (MMWAVE) FREQUENCY BANDS                         |        |               | NP   | APP-Pending | US      | 16/276324     |              | US-2019-0182898-A1 |   |
| 10078 | DYNAMIC ADAPTATION OF MAXIMUM PACKET LOSS RATE (PLR) FOR SINGLE RADIO VOICE CALL CONTINUITY (SRVCC) HANDOVER OPTIMIZATION USING SESSION DESCRIPTION PROTOCOL (SDP) |        |               | NP   | APP-Pending | US      | 16/274981     |              | US-2019-0182741-A1 |   |
| 10079 | MANAGING BEARERS IN A RADIO ACCESS NETWORK                                                                                                                         |        |               | NP   | APP-Pending | US      | 16/277658     |              | US-2019-0182211-A1 |   |
| 10080 | MANAGING BEARERS IN A RADIO ACCESS NETWORK                                                                                                                         |        |               | CNT  | APP-Pending | US      | 16/408028     |              |                    |   |
| 10081 | METHODS TO HANDLE SCHEDULING REQUESTS FOR ULTRA-RELIABLE LOW LATENCY COMMUNICATION (URLLC) IN NEW RADIO (NR) SYSTEMS                                               |        |               | NP   | APP-Pending | US      | 16/273802     |              | US-2019-0182896-A1 |   |
| 10082 | TECHNIQUES TO ENABLE PHYSICAL DOWNLINK CONTROL CHANNEL COMMUNICATIONS                                                                                              |        |               | PCT  | APP-Pending | US      | 16/488153     |              |                    |   |
| 10083 | RELIABILITY MECHANISMS FOR PHYSICAL DOWNLINK CONTROL CHANNEL (PDCCH) TRANSMISSIONS IN NEW RADIO (NR) SYSTEMS                                                       |        |               | NP   | APP-Pending | US      | 16/277680     |              | US-2019-0182807-A1 |   |
| 10084 | DOWNLINK CONTROL INFORMATION FORMAT FOR ULTRA-RELIABLE PHYSICAL DOWNLINK CONTROL CHANNEL                                                                           |        |               | CIP  | APP-Pending | US      | 16/409427     |              | US-2019-0274092-A1 |   |
| 10085 | TRANSPORT BLOCK SELECTION FOR 1024 QUADRATURE AMPLITUDE MODULATION (QAM)                                                                                           |        |               | NP   | APP-Pending | US      | 16/277901     |              | US-2019-0260440-A1 |   |
| 10086 | TRANSPORT BLOCK SELECTION FOR 1024 QUADRATURE AMPLITUDE MODULATION (QAM)                                                                                           |        |               | CNT  | APP-Pending | US      | 16/408160     |              | US-2019-0341983-A1 |   |
| 10087 | STEERING OF ROAMING IN 5G SYSTEMS                                                                                                                                  |        |               | NP   | APP-Pending | US      | 16/276968     |              | US-2019-0182855-A1 |   |
| 10088 | ENVELOPE DETECTOR-BASED FEEDBACK FOR RADIO FREQUENCY (RF) TRANSMITTERS                                                                                             |        |               | NP   | PAT-Active  | US      | 16/018731     | #####        |                    |   |
| 10089 | Conformally Shielded Power Inductor and Other Passive Devices for 4/5G Envelope Tracker Modules and/or Other Power Management Modules                              |        |               | NP   | APP-Pending | US      | 16/299601     |              | US-2019-0297757-A1 |   |
| 10090 | MANAGEMENT OF 5G NR IN NETWORK FUNCTIONS                                                                                                                           |        |               | PCT  | APP-Pending | US      | 16/499044     |              |                    |   |
| 10091 | VIRTUALIZATION FRAMEWORK                                                                                                                                           |        |               | PCT  | APP-Pending | US      | 16/499067     |              |                    |   |
| 10092 | ACCESS CONTROL MECHANISM                                                                                                                                           |        |               | PCT  | APP-Pending | US      | 16/499067     |              |                    |   |
| 10093 | COMMON AND USER EQUIPMENT (UE)-SPECIFIC PHYSICAL UPLINK CONTROL CHANNEL (PUCCH) CONFIGURATION                                                                      |        |               | NP   | APP-Pending | US      | 16/293348     |              | US-2019-0235286-A1 |   |
| 10094 | MANAGEMENT SERVICES FOR 5G NETWORKS AND NETWORK FUNCTIONS                                                                                                          |        |               | NP   | APP-Pending | US      | 16/297017     |              |                    |   |
| 10095 | SIGNAL IMBALANCE DETECTION SYSTEMS AND METHODS                                                                                                                     |        |               | NP   | APP-Pending | US      | 16/144092     |              |                    |   |
| 10096 | BEAM INDICATION INFORMATION TRANSMISSION                                                                                                                           |        |               | NP   | APP-Pending | US      | 16/352255     |              | US-2019-0235093-A1 |   |
| 10097 | BEAM INDICATION INFORMATION TRANSMISSION                                                                                                                           |        |               | CNT  | APP-Pending | US      | 16/408319     |              |                    |   |
| 10098 | PHYSICAL DOWNLINK CONTROL CHANNEL (PDCCH) BLIND DECODING IN FIFTH GENERATION (5G) NEW RADIO (NR) SYSTEMS                                                           |        |               | NP   | APP-Pending | US      | 16/361981     |              | US-2019-0223164-A1 |   |
| 10099 | Inter-cell beam management                                                                                                                                         |        |               | NP   | APP-Pending | US      | 16/358138     |              | US-2019-0222286-A1 |   |
| 10100 | SYSTEM AND METHOD OF MANAGING PNF CONNECTIVITY IN A NETWORK SLICE INSTANCE                                                                                         |        |               | NP   | APP-Pending | US      | 16/296971     |              | US-2019-0208553-A1 |   |
| 10101 | DEVICES AND METHODS FOR NEXT GENERATION TECHNOLOGY INDICATORS                                                                                                      |        |               | NP   | APP-Pending | US      | 16/053926     |              |                    |   |
| 10102 | GAP PATTERN DESIGN FOR NEW RADIO (NR) SYSTEMS                                                                                                                      |        |               | PCT  | APP-Pending | US      | 16/499747     |              |                    |   |
| 10103 | ANCHOR CHANNEL DESIGN FOR UNLICENSED INTERNET OF THINGS (IoT)                                                                                                      |        |               | PCT  | APP-Pending | US      | 16/496375     |              |                    |   |
| 10104 | HYBRID AUTOMATIC REPEAT REQUEST (HARQ) FOR GRANT-LESS UPLINK (GLU) AND SCHEDULED UPLINK (SUL) IN LICENSED ASSISTED ACCESS (LAA) SYSTEMS                            |        |               | PCT  | APP-Pending | US      | 16/484544     |              |                    |   |
| 10105 | PHYSICAL DOWNLINK CONTROL CHANNELS (PDCCH) AND ENHANCED PDCCHS (EPDCCH) IN WIDEBAND COVERAGE ENHANCEMENT (WCE) ARRANGEMENTS                                        |        |               | PCT  | APP-Pending | US      | 16/497750     |              |                    |   |
| 10106 | TRANSPORT BLOCK DECODING OPERATION FOR HYBRID TRANSMISSION TIME INTERVAL (TTI) LENGTHS IN WIRELESS COMMUNICATION SYSTEMS                                           |        |               | PCT  | APP-Pending | US      | 16/497484     |              |                    |   |

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| 2     | TITLE                                                                                                                                                                                                                                                                    | FAMILY | FAMILY-MEMBER | TYPE | STATUS             | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10106 | UPLINK CONTROL INFORMATION (UCI) TRANSMISSION AND HYBRID AUTOMATIC REPEAT REQUEST (HARQ) PROCESS IDENTIFICATION FOR GRANT-FREE PHYSICAL UPLINK SHARED CHANNEL (PUSCH)                                                                                                    |        |               | PCT  | APP-Pending        | US      | 16/465977     |              |                    |   |
| 10107 | COLLISION HANDLING OF REFERENCE SIGNALS                                                                                                                                                                                                                                  |        |               | PCT  | APP-In-Preparation | US      |               |              |                    |   |
| 10108 | Codebook subset restriction for CSI                                                                                                                                                                                                                                      |        |               | PCT  | APP-Pending        | US      | 16/609204     |              |                    |   |
| 10109 | System and Method for Phase Noise Compensation                                                                                                                                                                                                                           |        |               | PCT  | APP-Pending        | US      | 16/500937     |              |                    |   |
| 10110 | RS (Reference Signal) Sequence Generation and Mapping and Precoder Assignment for NR (New Radio)                                                                                                                                                                         |        |               | PCT  | APP-Pending        | US      | 16/500971     |              |                    |   |
| 10111 | SUPPORT OF FLEXIBLE PDCCH MONITORING IN NEW RADIO (NR)                                                                                                                                                                                                                   |        |               | PCT  | APP-Pending        | US      | 16/462544     |              | US-2019-0305737-A1 |   |
| 10112 | INTERFERENCE COORDINATION FOR NETWORKS SERVING AERIAL VEHICLES                                                                                                                                                                                                           |        |               | PCT  | APP-Pending        | US      | 16/609171     |              |                    |   |
| 10113 | MULTI-RE DESIGN OF RANDOM ACCESS CHANNEL AND RANDOM ACCESS CHANNEL PROCEDURE FOR INTERNET OF THINGS DEVICE OPERATION IN UNLICENSED SPECTRUM                                                                                                                              |        |               | PCT  | APP-Pending        | US      | 16/604047     |              |                    |   |
| 10114 | SIGNALING OF A CHANNEL STATE INFORMATION REFERENCE SIGNAL (CSI-RS) MAPPING CONFIGURATION FOR A NEW RADIO (NR) SYSTEM                                                                                                                                                     |        |               | PCT  | APP-Pending        | US      | 16/463953     |              |                    |   |
| 10115 | DOWNLINK CONTROL INFORMATION (DCI) FORMAT FOR GRANT-LESS UPLINK TRANSMISSION (GLUL)                                                                                                                                                                                      |        |               | PCT  | APP-Pending        | US      | 16/605784     |              |                    |   |
| 10116 | GRANTLESS UPLINK (GLUL) CONFIGURATION                                                                                                                                                                                                                                    |        |               | PCT  | APP-Pending        | US      | 16/465996     |              |                    |   |
| 10117 | EMTC-U MEASUREMENT                                                                                                                                                                                                                                                       |        |               | PCT  | APP-Pending        | US      | 16/611638     |              |                    |   |
| 10118 | RESOURCE ELEMENT (RE) MAPPING IN NEW RADIO (NR)                                                                                                                                                                                                                          |        |               | PCT  | APP-Pending        | US      | 16/477376     |              |                    |   |
| 10119 | SOUNDING REFERENCE SIGNAL SEQUENCE DESIGN                                                                                                                                                                                                                                |        |               | PCT  | APP-Pending        | US      | 16/612331     |              |                    |   |
| 10120 | CHANNEL DESIGN FOR ENHANCED MACHINE TYPE COMMUNICATION IN AN UNLICENSED SPECTRUM (eMTC-U) SYSTEM                                                                                                                                                                         |        |               | PCT  | APP-Pending        | US      | 16/603914     |              |                    |   |
| 10121 | METHOD AND APPARATUS FOR COMMUNICATION IN LTE SYSTEM ON UNLICENSED SPECTRUM                                                                                                                                                                                              |        |               | PCT  | APP-Pending        | US      | 16/483561     |              |                    |   |
| 10122 | Fading and Essential System Information Block (SIB) Transmission in the Unlicensed Internet of Things (U-IOT) System                                                                                                                                                     |        |               | PCT  | APP-Pending        | US      | 16/478246     |              |                    |   |
| 10123 | ENHANCEMENT ON SCHEDULING AND HARQ-ACK FEEDBACK FOR ULLC MULTIPLEXING SCHEME FOR CONTROL/DATA CHANNEL AND DM-RS FOR NR AND ACTIVATION MECHANISM SCHEDULING ASPECTS AND SYNCHRONIZATION SIGNAL (SS) BLOCKS FOR NEW RADIO (NR) SYSTEM WITH MULTIPLE BANDWIDTH PARTS (BWPs) |        |               | PCT  | APP-Pending        | US      | 16/466446     |              |                    |   |
| 10124 | FREQUENCY DOMAIN RESOURCE ALLOCATION FOR DOWNLINK (DL) AND UPLINK (UL) IN NEW RADIO (NR)                                                                                                                                                                                 |        |               | PCT  | APP-Pending        | US      | 16/616487     |              |                    |   |
| 10125 | CHANNEL STATE INFORMATION CONCATENATION AND ANTENNA PORT MEASUREMENT                                                                                                                                                                                                     |        |               | PCT  | APP-Pending        | US      | 16/479195     |              | US-2019-0349157-A1 |   |
| 10126 | QUASI CO-LOCATION (QCL) FOR ANTENNA PORTS IN NEW RADIO (NR)                                                                                                                                                                                                              |        |               | PCT  | APP-Pending        | US      | 16/479556     |              |                    |   |
| 10127 | New Radio (NR) Physical Uplink Structures and Schemes                                                                                                                                                                                                                    |        |               | PCT  | APP-Pending        | US      | 16/478224     |              |                    |   |
| 10128 | CONFIGURABILITY AND SIGNALING FOR HALF-TONE SHIFT HANDLING COLLISION FOR MINI-SLOT-BASED AND SLOT-BASED TRANSMISSION                                                                                                                                                     |        |               | PCT  | APP-Pending        | US      | 16/614106     |              |                    |   |
| 10129 | POWER RAMPING AND CONTROL IN NEW RADIO (NR) DEVICES                                                                                                                                                                                                                      |        |               | PCT  | APP-In-Preparation | US      | 16/500772     |              |                    |   |
| 10131 | SYSTEM AND METHOD FOR PHASE TRACKING REFERENCE SIGNAL (PT-RS) MULTIPLEXING                                                                                                                                                                                               |        |               | PCT  | APP-Pending        | US      | 16/465994     |              | US-2019-0295877-A1 |   |
| 10132 | CONCURRENT TRANSMISSION OF ACKNOWLEDGMENT AND SCHEDULING REQUEST INFORMATION ON A CONTROL CHANNEL                                                                                                                                                                        |        |               | PCT  | APP-Pending        | US      | 16/500890     |              |                    |   |
| 10133 | TIME ADVANCE ADJUSTMENT DELAY FOR SHORTENED TRANSMISSION TIME INTERVAL UNDER CARRIER AGGREGATION OR DUAL CONNECTIVITY                                                                                                                                                    |        |               | PCT  | APP-Pending        | US      | 16/462877     |              |                    |   |
| 10134 | PDCP PACKET-BASED DDDS FRAME TRANSMISSION                                                                                                                                                                                                                                |        |               | NP   | APP-Pending        | US      | 16/299389     |              | US-2019-0246310-A1 |   |
| 10135 | Performance Measurements Related to Virtualized Resources                                                                                                                                                                                                                |        |               | PCT  | APP-Pending        | US      | 16/464840     |              |                    |   |
| 10136 | DEVICES AND METHODS FOR FLOW-CONTROL TRIGGERING AND FEEDBACK                                                                                                                                                                                                             |        |               | PCT  | APP-Pending        | US      | 16/615337     |              |                    |   |

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| 2     | TITLE                                                                                                                    | FAMILY | FAMILY-MEMBER | TYPE | STATUS             | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10132 | CONTROL CHANNEL DESIGN FOR WIDEBAND COVERAGE ENHANCEMENT (WCE) SYSTEM INFORMATION BLOCK (SIB) TRANSMISSION               |        |               | PCT  | APP-Pending        | US      | 16/462192     |              |                    |   |
| 10138 | MANAGEMENT OF MIMO COMMUNICATION SYSTEMS                                                                                 |        |               | PCT  | APP-Pending        | US      | 16/489087     |              |                    |   |
| 10139 | METHODS TO COMMUNICATE PARAMETERS ACROSS MULTIPLE COMPONENT CARRIERS OF A CARRIER AGGREGATION FOR SIDELINK COMMUNICATION |        |               | NP   | APP-Pending        | US      | 16/376523     |              | US-2019-0239178-A1 |   |
| 10140 | L2 HANDLING FOR BEARER TYPE CHANGE                                                                                       |        |               | PCT  | APP-Pending        | US      | 16/617973     |              |                    |   |
| 10141 | MULTIPLEXING OF MULTIPLE UPLINK CONTROL INFORMATION TYPES ON AN UPLINK PHYSICAL CONTROL CHANNEL IN NEW RADIO             |        |               | NP   | APP-Pending        | US      | 16/376534     |              | US-2019-0235216-A1 |   |
| 10142 | MULTIPLEXING OF MULTIPLE UPLINK CONTROL INFORMATION TYPES ON AN UPLINK PHYSICAL CONTROL CHANNEL IN NEW RADIO             |        |               | CNT  | APP-Pending        | US      | 16/408372     |              |                    |   |
| 10143 | NEW RADIO CONTROL CHANNEL RESOURCE SET DESIGN                                                                            |        |               | PCT  | APP-Pending        | US      | 16/477475     |              | US-2019-0237185-A1 |   |
| 10144 | TECHNIQUES FOR DATA COMPRESSION                                                                                          |        |               | NP   | APP-Pending        | US      | 16/037241     |              | US-2019-0238163-A1 |   |
| 10145 | COLLISION HANDLING OF SYNCHRONIZATION SIGNAL (SS) BLOCKS                                                                 |        |               | PCT  | APP-In-Preparation | US      |               |              |                    |   |
| 10146 | TECHNIQUES IN MEASUREMENT GAP CONFIGURATIONS IN NEW RADIO (NR)                                                           |        |               | NP   | APP-Pending        | US      | 16/392956     |              | US-2019-0233909-A1 |   |
| 10147 | TECHNIQUES IN MEASUREMENT GAP CONFIGURATIONS IN NEW RADIO (NR)                                                           |        |               | CNT  | APP-Pending        | US      | 16/408053     |              |                    |   |
| 10148 | E1 INTERFACE SETUP IN NG-RAN                                                                                             |        |               | NP   | APP-Pending        | US      | 16/393753     |              | US-2019-0297852-A1 |   |
| 10149 | CONFIGURED GIANT UPLINK (UL) TRANSMISSION IN NEW RADIO UNLICENSED (NR-U)                                                 |        |               | NP   | APP-Pending        | US      | 16/408337     |              | US-2019-0268935-A1 |   |
| 10150 | PRACH RESOURCE SELECTION                                                                                                 |        |               | NP   | APP-Pending        | US      | 16/409530     |              | US-2019-0268947-A1 |   |
| 10151 | DYNAMIC RESOURCE SCALING AND VM MIGRATION IN NG-RAN                                                                      |        |               | NP   | APP-Pending        | US      | 16/393709     |              | US-2019-0253090-A1 |   |
| 10152 | METHODS TO DETERMINE A HYBRID AUTOMATIC REPEAT REQUEST ACKNOWLEDGEMENT (HARQ-ACK) CODEBOOK IN NEW RADIO (NR) SYSTEMS     |        |               | NP   | APP-Pending        | US      | 16/408245     |              | US-2019-0268803-A1 |   |
| 10153 | Systems and Methods for Physical Channel Repetition for Low Latency Communication                                        |        |               | NP   | APP-Pending        | US      | 16/410095     |              | US-2019-0268807-A1 |   |
| 10154 | SUPPORT OF ADVANCED USER EQUIPMENT (UE) MINIMUM PROCESSING TIMES IN NEW RADIO (NR) SYSTEMS                               |        |               | NP   | APP-Pending        | US      | 16/407559     |              | US-2019-0249622-A1 |   |
| 10155 | METHODS AND DEVICES FOR BROADCAST CHANNEL DECODING                                                                       |        |               | NP   | APP-Pending        | US      | 16/118472     |              |                    |   |
| 10156 | BANDWIDTH PART (BWP) SWITCHING DELAYS FOR NEW RADIO (NR)                                                                 |        |               | NP   | APP-Pending        | US      | 16/410985     |              | US-2019-0268905-A1 |   |
| 10157 | SYSTEMS AND METHODS FOR APPLYING ARI CAPABLE UE TESTS TO AN BRI CAPABLE UE                                               |        |               | NP   | APP-Pending        | US      | 16/410562     |              | US-2019-0273569-A1 |   |
| 10158 | SYSTEMS AND METHODS FOR L1-RSRP MEASUREMENT ACCURACY FOR BEAM DETECTION                                                  |        |               | NP   | APP-Pending        | US      | 16/410498     |              | US-2019-0268061-A1 |   |
| 10159 | SESSION CONTINUITY IN MOBILE SYSTEMS USING USER PLANE FUNCTIONS WITH UPLINK CLASSIFIER                                   |        |               | NP   | APP-Pending        | US      | 16/417921     |              | US-2019-0274185-A1 |   |
| 10160 | BANDWIDTH PART (BWP) SWITCHING                                                                                           |        |               | NP   | APP-Pending        | US      | 16/417992     |              | US-2019-0337085-A1 |   |
| 10161 | Capacitor Compensated Dual of Polyphase Filter                                                                           |        |               | NP   | APP-Pending        | US      | 16/146095     |              |                    |   |
| 10162 | SCRAMBLING SEQUENCE INITIAL SEED CONFIGURATION FOR REFERENCE SIGNALS DATA AND CONTROL CHANNEL FOR NEW RADIO              |        |               | NP   | APP-Pending        | US      | 16/055964     |              | US-2019-0344669-A1 |   |
| 10163 | RESOURCE ALLOCATION FOR SYSTEM INFORMATION BLOCK (SIB) TRANSMISSION IN A MULTIPLEX SYSTEM                                |        |               | PCT  | APP-Pending        | US      | 16/463998     |              |                    |   |
| 10164 | PHYSICAL UPLINK SHARED CHANNEL (PUSCH) TRANSMISSION BASED ON ROBUST CODEBOOK                                             |        |               | PCT  | APP-Pending        | US      | 16/483568     |              |                    |   |
| 10165 | DEMODULATION REFERENCE SIGNAL FOR PHYSICAL BROADCAST CHANNEL IN NEW RADIO                                                |        |               | PCT  | APP-In-Preparation | US      |               |              |                    |   |

|       | A                                                                                                                                                                | B      | C             | D    | E                  | F       | G             | H            | I                  | J |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|------|--------------------|---------|---------------|--------------|--------------------|---|
| 2     | TITLE                                                                                                                                                            | FAMILY | FAMILY-MEMBER | TYPE | STATUS             | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10166 | CONFIGURATION OF GRANT-LESS UPLINK TRANSMISSIONS FOR A USER EQUIPMENT                                                                                            |        |               | PCT  | APP-Pending        | US      | 16/604143     |              |                    |   |
| 10167 | SUB-SAMPLING PHASE-LOCKED LOOP (SSPLL) WITH WIDE FREQUENCY ACQUISITION                                                                                           |        |               | NP   | APP-Pending        | US      | 16/126722     |              |                    |   |
| 10168 | METHODS TO ADAPT A FREQUENCY DENSITY OF CHANNEL STATE INFORMATION REFERENCE SIGNAL (CSI-RS) RESOURCES FOR BEAM FAILURE DETECTION (BFD) IN NEW RADIO (NR) SYSTEMS |        |               | NP   | APP-Pending        | US      | 16/422065     |              | US-2019-0281588-A1 |   |
| 10169 | MANAGING LINK QUALITY AND USING PARTIAL SUBFRAMES IN WIRELESS TELECOMMUNICATION NETWORKS                                                                         |        |               | PCT  | APP-Pending        | US      | 16/465225     |              |                    |   |
| 10170 | ENHANCED UPLINK BEAM MANAGEMENT                                                                                                                                  |        |               | NP   | APP-Pending        | US      | 16/419367     |              | US-2019-0281588-A1 |   |
| 10171 | NON-ORTHOGONAL MULTIPLE ACCESS HYBRID AUTOMATIC REPEAT REQUEST                                                                                                   |        |               | PSP  | APP-Closed         | US      | 62/748044     |              |                    |   |
| 10172 | FULL BANDWIDTH UPLINK TRANSMISSION FOR UNLICENSED NARROWBAND INTERNET OF THINGS                                                                                  |        |               | NP   | APP-Pending        | US      | 16/396441     |              | US-2019-0254013-A1 |   |
| 10173 | FULL BANDWIDTH UPLINK TRANSMISSION FOR UNLICENSED NARROWBAND INTERNET OF THINGS                                                                                  |        |               | CNT  | APP-Pending        | US      | 16/408367     |              |                    |   |
| 10174 | DEMODULATION REFERENCE SIGNAL AND PHASE-TRACKING REFERENCE SIGNAL PORT INDICATION                                                                                |        |               | NP   | APP-Pending        | US      | 16/440209     |              | US-2019-0296876-A1 |   |
| 10175 | METHODS TO MULTIPLEX CONTROL INFORMATION IN ACCORDANCE WITH MULTI-SLOT TRANSMISSIONS IN NEW RADIO (NR) SYSTEMS                                                   |        |               | NP   | APP-Pending        | US      | 16/443990     |              | US-2019-0306922-A1 |   |
| 10176 | Wideband Signal Buffer                                                                                                                                           |        |               | NP   | APP-Pending        | US      | 16/183320     |              |                    |   |
| 10177 | VEHICLE-TO-EVERYTHING (V2X) CONTROL FUNCTION BASED ON USER EQUIPMENT (UE) CAPABILITY                                                                             |        |               | NP   | APP-Pending        | US      | 16/431419     |              | US-2019-0289459-A1 |   |
| 10178 | VEHICLE-TO-EVERYTHING (V2X) COMMUNICATION AUTHORIZATION IN FIFTH GENERATION (5G) SYSTEMS                                                                         |        |               | NP   | APP-Pending        | US      | 16/446337     |              | US-2019-0306754-A1 |   |
| 10179 | NRACH CONFIGURATION AND FORMAT FOR UNLICENSED NB-IOT SYSTEM                                                                                                      |        |               | NP   | APP-Pending        | US      | 16/446177     |              |                    |   |
| 10180 | APPARATUS SYSTEM AND METHOD OF COMMUNICATION OVER COMMON CONTROL CHANNELS                                                                                        |        |               | NP   | APP-Pending        | US      | 16/446873     |              | US-2019-0306884-A1 |   |
| 10181 | SPLIT PRECODING AND SPLIT PREFILTERING BETWEEN A CENTRAL UNIT AND A DISTRIBUTED UNIT OF A GENERATION NODE-B (GNB)                                                |        |               | NP   | APP-Pending        | US      | 16/100773     |              | US-2019-0044680-A1 |   |
| 10182 | USER EQUIPMENT MEASUREMENTS FOR NEW RADIO                                                                                                                        |        |               | NP   | APP-Pending        | US      | 16/107475     |              | US-2019-0044602-A1 |   |
| 10183 | USER EQUIPMENT MEASUREMENTS FOR NEW RADIO                                                                                                                        |        |               | CNT  | APP-Pending        | US      | 16/408357     |              |                    |   |
| 10184 | TECHNIQUES IN SYSTEM FRAME NUMBER (SFN) AND FRAME TIMING DIFFERENCE MEASUREMENTS IN NEW RADIO (NR)                                                               |        |               | NP   | APP-Pending        | US      | 16/450715     |              | US-2019-0313272-A1 |   |
| 10185 | DISCOVERY REFERENCE SIGNAL PROPERTIES FOR DYNAMIC FREQUENCY SELECTION CHANNELS                                                                                   |        |               | PSP  | APP-Closed         | US      | 62/701390     |              |                    |   |
| 10186 | CHANNEL ACCESS MECHANISMS FOR SIDELINK NR V2X COMMUNICATION                                                                                                      |        |               | PSP  | APP-Closed         | US      | 62/701368     |              |                    |   |
| 10187 | METHOD TO DYNAMICALLY CHANGE CONNECTIVITY OF VIRTUAL NETWORK FUNCTION (VNF) AND PHYSICAL NETWORK FUNCTION (PNF) INSTANCES IN NEW RADIO (NR) NETWORKS             |        |               | NP   | APP-Pending        | US      | 16/508959     |              |                    |   |
| 10188 | TECHNIQUES FOR NR CELL/BY-IDENTIFICATION                                                                                                                         |        |               | NP   | APP-Pending        | US      | 16/127942     |              | US-2019-0045559-A1 |   |
| 10189 | TECHNIQUES IN NEW RADIO (NR) USER EQUIPMENT (UE) DEMODULATION OVER THE AIR (OTA) TESTS                                                                           |        |               | NP   | APP-Pending        | US      | 16/148905     |              | US-2019-0052376-A1 |   |
| 10190 | Systems and Methods for Mitigation of Nonlinearity Related Phase Noise Degradations                                                                              |        |               | NP   | APP-Pending        | US      | 16/204109     |              |                    |   |
| 10191 | FREQUENCY GENERATION AND SYNCHRONIZATION SYSTEMS AND METHODS                                                                                                     |        |               | PSP  | APP-Closed         | US      | 62/766596     |              |                    |   |
| 10192 | SENSING BASED DISTRIBUTED SCHEDULING FOR EVENT-BASED MISSION CRITICAL TRAFFIC IN DECENTRALIZED VEHICULAR NETWORK                                                 |        |               | PSP  | APP-Closed         | US      | 62/766594     |              |                    |   |
| 10193 | WI-FI SPECTRUM EFFICIENCY                                                                                                                                        |        |               | PSP  | APP-Closed         | US      | 62/770065     |              |                    |   |
| 10194 | MEASUREMENTS AND REPORTING FOR USER EQUIPMENT (UE) POSITIONING IN WIRELESS NETWORKS                                                                              |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |

|       | A                                                                                                                              | B      | C             | D    | E                  | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                          | FAMILY | FAMILY-MEMBER | TYPE | STATUS             | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10195 | MEASUREMENTS AND REPORTING FOR USER EQUIPMENT (UE) POSITIONING IN WIRELESS NETWORKS                                            |        |               | PSP  | APP-Closed         | US      | 62/713419     |              |                    |   |
| 10196 | EARLY DATA TRANSMISSION CONTROL PLANE AND USER PLANE OPTIMIZATION FOR NAE EARLY DATA TRANSMISSION                              |        |               | PSP  | APP-Closed         | US      | 62/703758     |              |                    |   |
| 10197 | MULTIPLE SUBSCRIBER MANAGEMENT IN USER DEVICE                                                                                  |        |               | PSP  | APP-Closed         | US      | 62/738008     |              |                    |   |
| 10198 | WAKE-UP SIGNAL ASSISTED C-DRX FOR POWER EFFICIENT COMMUNICATION                                                                |        |               | PSP  | APP-Closed         | US      | 62/708315     |              |                    |   |
| 10199 | CONFIGURATION OF MULTIPLE MEASUREMENT GAP PATTERNS                                                                             |        |               | NP   | APP-Pending        | US      | 16/518262     |              | US-2019-0342801-A1 |   |
| 10200 | UE CAPABILITY OF MULTIPLE MEASUREMENT GAP PATTERNS IN PARALLEL                                                                 |        |               | PSP  | APP-Closed         | US      | 62/702026     |              |                    |   |
| 10201 | DOWNLINK CONTROL CHANNEL SIGNALING FOR IMPROVING UE POWER CONSUMPTION                                                          |        |               | PSP  | APP-Closed         | US      | 62/702822     |              |                    |   |
| 10202 | RELIABILITY ENHANCEMENT OF RESOURCE ALLOCATION FOR PHYSICAL UPLINK CONTROL CHANNEL IN NR-UNLICENSED SYSTEMS                    |        |               | PSP  | APP-Closed         | US      | 62/703317     |              |                    |   |
| 10203 | TRIGGERING MULTIPLE HARQ-ACK TRANSMISSION IN A SLOT FOR NR SYSTEMS                                                             |        |               | PSP  | APP-Closed         | US      | 62/711325     |              |                    |   |
| 10204 | HYBRID AUTOMATIC REPEAT REQUEST (HARQ) BASED ON CODEBLOCK GROUPS IN NEW RADIO SYSTEMS                                          |        |               | NP   | APP-Pending        | US      | 16/126187     |              | US-2019-0045483-A1 |   |
| 10205 | Scheduling Request Transmission Opportunity and Resource Configuration in New Radio                                            |        |               | NP   | APP-Pending        | US      | 16/126556     |              | US-2019-0045529-A1 |   |
| 10206 | Downlink Control Channel Design in New Radio Systems                                                                           |        |               | NP   | APP-Pending        | US      | 16/126260     |              | US-2019-0045490-A1 |   |
| 10207 | SYSTEM AND METHOD FOR PUCCH TRANSMISSION SCHEME                                                                                |        |               | NP   | APP-Pending        | US      | 16/125506     |              | US-2019-0149379-A1 |   |
| 10208 | SYSTEM AND METHOD FOR PUCCH TRANSMISSION SCHEME                                                                                |        |               | CNT  | APP-Pending        | US      | 16/408063     |              | US-2019-0273644-A1 |   |
| 10209 | CHANNEL STATE INFORMATION (CSI) REPORTING FOR BANDWIDTH PARTS                                                                  |        |               | NP   | APP-Pending        | US      | 16/147204     |              | US-2019-0091679-A1 |   |
| 10210 | CHANNEL STATE INFORMATION (CSI) REPORTING FOR BANDWIDTH PARTS                                                                  |        |               | CNT  | APP-Pending        | US      | 16/408031     |              |                    |   |
| 10211 | POWER BOOSTING AND TRANSPORT BLOCK SIZE (TBS) DESIGN IN A NEW RADIO (NR) SYSTEM                                                |        |               | NP   | APP-Pending        | US      | 16/126999     |              | US-2019-0045390-A1 |   |
| 10212 | POWER BOOSTING AND TRANSPORT BLOCK SIZE (TBS) DESIGN IN A NEW RADIO (NR) SYSTEM                                                |        |               | CNT  | APP-Pending        | US      | 16/408319     |              |                    |   |
| 10213 | NARROWBAND REFERENCE SIGNAL (NRS) TRANSMISSION FOR RADIO RESOURCE MANAGEMENT (RRM) MEASUREMENT AND SYNCHRONIZATION CORRELATION |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10214 | NARROWBAND REFERENCE SIGNAL (NRS) TRANSMISSION FOR RADIO RESOURCE MANAGEMENT (RRM) MEASUREMENT AND SYNCHRONIZATION CORRELATION |        |               | PSP  | APP-Closed         | US      | 62/713380     |              |                    |   |
| 10215 | UPLINK TRANSMISSION FOR MULTI-TXP AND MULTI-PANEL OPERATION                                                                    |        |               | PSP  | APP-Closed         | US      | 62/713975     |              |                    |   |
| 10216 | CONFIGURATION SCHEMES FOR SECONDARY CELL BANDWIDTH PART AND PHYSICAL RESOURCE BLOCK INDEXING                                   |        |               | NP   | APP-Pending        | US      | 16/123722     |              | US-2019-0044811-A1 |   |
| 10217 | ENHANCEMENT OF PERFORMANCE OF ULTRA-RELIABLE LOW-LATENCY COMMUNICATION                                                         |        |               | NP   | APP-Pending        | US      | 16/126472     |              | US-2019-0045533-A1 |   |
| 10218 | SYSTEM AND METHOD FOR UPLINK POWER CONTROL FRAMEWORK                                                                           |        |               | NP   | APP-Pending        | US      | 16/127887     |              | US-2019-0044681-A1 |   |
| 10219 | INITIALIZATION OF PSEUDO NOISE SEQUENCES FOR REFERENCE SIGNALS AND DATA SCRAMBLING                                             |        |               | NP   | APP-Pending        | US      | 16/127825     |              | US-2019-0044763-A1 |   |
| 10220 | METHOD AND APPARATUS FOR CHANNEL CODING IN THE FIFTH GENERATION NEW RADIO SYSTEM                                               |        |               | NP   | APP-Pending        | US      | 16/126776     |              | US-2019-0097756-A1 |   |
| 10221 | APPARATUS AND METHOD FOR RSRP MEASUREMENT AND ALLOCATION OF DOWNLINK TRANSMISSION RESOURCES                                    |        |               | NP   | APP-Pending        | US      | 16/128111     |              | US-2019-0044631-A1 |   |

|       | A                                                                                                                                                | B      | C             | D    | E                  | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                            | FAMILY | FAMILY-MEMBER | TYPE | STATUS             | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10222 | DESIGN OF SYNCHRONIZATION SIGNAL BLOCK FOR UNLICENSED CARRIER AND LISTEN BEFORE TALK STRATEGIES FOR INITIAL ACCESS                               |        |               | NP   | APP-Pending        | US      | 16/148352     |              | US-2019-0953177-A1 |   |
| 10223 | DESIGN OF CSI MEASUREMENT AND FEEDBACK FOR EMTE-U SYSTEM                                                                                         |        |               | NP   | APP-Pending        | US      | 16/133208     |              | US-2019-0944588-A1 |   |
| 10224 | CHANNEL WHITELIST AND FLEXIBLE FRAME DESIGN FOR ENHANCED MACHINE-TYPE COMMUNICATIONS SYSTEMS IN UNLICENSED SPECTRUM                              |        |               | NP   | APP-Pending        | US      | 16/134124     |              | US-2019-0944810-A1 |   |
| 10225 | DESIGN OF EARLY DATA TRANSMISSION IN WIRELESS COMMUNICATION SYSTEM                                                                               |        |               | NP   | APP-Pending        | US      | 16/141202     |              | US-2019-0945554-A1 |   |
| 10226 | FRAMEWORK FOR COMMUNICATIONS IN UNLICENSED NARROW BAND INTERNET OF THINGS (NB-IOT) SYSTEM                                                        |        |               | NP   | APP-Pending        | US      | 16/157442     |              | US-2019-0945372-A1 |   |
| 10227 | UPLINK CONTROL SIGNALING FOR GRANT-FREE UPLINK TRANSMISSION                                                                                      |        |               | NP   | APP-Pending        | US      | 16/163785     |              | US-2019-0953226-A1 |   |
| 10228 | RACH PROCEDURE AND CONFIGURATION FOR UNLICENSED EMTC SYSTEM                                                                                      |        |               | NP   | APP-Pending        | US      | 16/163191     |              | US-2019-0916618-A1 |   |
| 10229 | DESIGN FOR A UE SPECIFIC SEARCH SPACE AND A COMMON SEARCH SPACE IN A WIDE COVERAGE ENHANCEMENT                                                   |        |               | NP   | APP-Pending        | US      | 16/133360     |              | US-2019-0948503-A1 |   |
| 10230 | DESIGN OF FREQUENCY HOPPING PATTERN FOR UNLICENSED INTERNET-OF-THINGS SYSTEM                                                                     |        |               | NP   | APP-Pending        | US      | 16/163160     |              | US-2019-0953308-A1 |   |
| 10231 | QUALITY REPORT IN FOR ENHANCED MACHINE-TYPE COMMUNICATIONS AND NARROWBAND INTERNET OF THINGS                                                     |        |               | PSP  | APP-Closed         | US      | 62/713978     |              |                    |   |
| 10232 | DL WAVEFORM TYPE AND GUARD INTERVAL ADAPTATION FOR SYSTEM OPERATING ABOVE 526GHZ CARRIER FREQUENCY                                               |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10233 | DL WAVEFORM TYPE AND GUARD INTERVAL ADAPTATION FOR SYSTEM OPERATING ABOVE 526GHZ CARRIER FREQUENCY                                               |        |               | PSP  | APP-Closed         | US      | 62/717566     |              |                    |   |
| 10234 | ASSOCIATION OF USER PLANE FUNCTION (UPF) AND EDGE COMPUTING APPLICATION SERVER                                                                   |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10235 | ASSOCIATION OF USER PLANE FUNCTION (UPF) AND EDGE COMPUTING APPLICATION SERVER                                                                   |        |               | PSP  | APP-Closed         | US      | 62/713980     |              |                    |   |
| 10236 | UE CAPABILITY INDICATION OF RX BEAMFORMING FOR CELL IDENTIFICATION                                                                               |        |               | PSP  | APP-Closed         | US      | 62/716687     |              |                    |   |
| 10237 | MANAGEMENT DATA ANALYTICAL KPIs                                                                                                                  |        |               | PSP  | APP-Closed         | US      | 62/714964     |              |                    |   |
| 10238 | ENHANCED PHYSICAL DOWNLINK SHARED CHANNEL REPEITION TRANSMISSION                                                                                 |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10239 | ENHANCED PHYSICAL DOWNLINK SHARED CHANNEL REPEITION TRANSMISSION                                                                                 |        |               | PSP  | APP-Closed         | US      | 62/715420     |              |                    |   |
| 10240 | END-TO-END PERFORMANCE MEASUREMENTS FOR 5G NETWORKS                                                                                              |        |               | PSP  | APP-Closed         | US      | 62/715583     |              |                    |   |
| 10241 | CONTENTION WINDOW SIZE UPDATE FOR CODE BLOCK GROUP (CBG) BASED RETRANSMISSION IN NEW RADIO (NR) SYSTEMS OPERATING ON UNLICENSED SPECTRUM         |        |               | PSP  | APP-Closed         | US      | 62/715780     |              |                    |   |
| 10242 | IN-DEVICE COEXISTENCE BETWEEN LONG TERM EVOLUTION (LTE) SIDELINK (PCS) AND NEW RADIO (NR) SIDELINK (PCS) TECHNOLOGIES IN VEHICULAR COMMUNICATION |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10243 | IN-DEVICE COEXISTENCE BETWEEN LONG TERM EVOLUTION (LTE) SIDELINK (PCS) AND NEW RADIO (NR) SIDELINK (PCS) TECHNOLOGIES IN VEHICULAR COMMUNICATION |        |               | PSP  | APP-Closed         | US      | 62/717562     |              |                    |   |
| 10244 | METHOD FOR LTE AND NEW RADIO PCS SIDELINK CONTROL THROUGH NEW RADIO UU LINK AND LTE UU LINK AIR-INTERFACES                                       |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10245 | METHOD FOR LTE AND NEW RADIO PCS SIDELINK CONTROL THROUGH NEW RADIO UU LINK AND LTE UU LINK AIR-INTERFACES                                       |        |               | PSP  | APP-Closed         | US      | 62/717316     |              |                    |   |
| 10246 | PCS SIDELINK SYNCHRONIZATION FOR EV2X USE CASES IN NEW RADIO (NR) SYSTEMS                                                                        |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10247 | PCS SIDELINK SYNCHRONIZATION FOR EV2X USE CASES IN NEW RADIO (NR) SYSTEMS                                                                        |        |               | PSP  | APP-Closed         | US      | 62/717672     |              |                    |   |
| 10248 | SECURITY FRAMEWORK FOR MESSAGE 3 (MSG3) AND MESSAGE 4 (MSG4) IN EARLY DATA TRANSMISSION                                                          |        |               | PSP  | APP-Closed         | US      | 62/716840     |              |                    |   |
| 10249 | PERFORMANCE MEASUREMENTS FOR 5G NETWORK FUNCTIONS                                                                                                |        |               | PSP  | APP-Closed         | US      | 62/716442     |              |                    |   |
| 10250 | RAN CONDITION AND CELL COMPOSITE LOAD KPIs                                                                                                       |        |               | PSP  | APP-Closed         | US      | 62/716443     |              |                    |   |

|       | A                                                                                                                                                                                                          | B      | C             | D    | E                  | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                                                                      | FAMILY | FAMILY-MEMBER | TYPE | STATUS             | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10251 | FLOW CONTROL FOR UPLINK TRAFFIC IN INTEGRATED ACCESS BACKHAUL NETWORK                                                                                                                                      |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10252 | FLOW CONTROL FOR UPLINK TRAFFIC IN INTEGRATED ACCESS BACKHAUL NETWORK                                                                                                                                      |        |               | PSP  | APP-Closed         | US      | 62/716447     |              |                    |   |
| 10253 | TECHNIQUES FOR MEASURING NEW RADIO (NR) RADIO RESOURCE MANAGEMENT (RRM) PERFORMANCE ACCURACY FOR FREQUENCY RANGE 2 (FR2)                                                                                   |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10254 | TECHNIQUES FOR MEASURING NEW RADIO (NR) RADIO RESOURCE MANAGEMENT (RRM) PERFORMANCE ACCURACY FOR FREQUENCY RANGE 2 (FR2)                                                                                   |        |               | PSP  | APP-Closed         | US      | 62/717677     |              |                    |   |
| 10255 | OVERHEAD REDUCTION FOR BEAM COMBINING BASED CHANNEL-STATE INFORMATION (CSI) FEEDBACK                                                                                                                       |        |               | PSP  | APP-Closed         | US      | 62/717187     |              |                    |   |
| 10256 | ENHANCED HARQ FEEDBACK FOR RELIABLE COMMUNICATIONS                                                                                                                                                         |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10257 | ENHANCED HARQ FEEDBACK FOR RELIABLE COMMUNICATIONS                                                                                                                                                         |        |               | PSP  | APP-Closed         | US      | 62/717542     |              |                    |   |
| 10258 | WAKE-UP SIGNAL SUB-GROUPING FOR REL-16 EMT-C AND NB-IOT                                                                                                                                                    |        |               | PSP  | APP-Closed         | US      | 62/717172     |              |                    |   |
| 10259 | CONTENTION WINDOW SIZE UPDATE FOR CODE BLOCK GROUP (CBG) BASED RETRANSMISSION IN NEW RADIO (NR) SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                                                   |        |               | PSP  | APP-Closed         | US      | 62/716846     |              |                    |   |
| 10260 | ENHANCED USER-PLANE CONTEXTS MANAGEMENT IN NEW RADIO (NR) SYSTEMS                                                                                                                                          |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10261 | ENHANCED USER-PLANE CONTEXTS MANAGEMENT IN NEW RADIO (NR) SYSTEMS                                                                                                                                          |        |               | PSP  | APP-Closed         | US      | 62/717161     |              |                    |   |
| 10262 | DOWNLINK (DL) SIGNAL-TO-NOISE RATIO (SNR) CONTROL FOR NEW RADIO (NR) MILLIMETER WAVE (MMWAVE) OVER-THE-AIR USER EQUIPMENT (UE) DEMODULATION AND CHANNEL STATE INFORMATION (CSI) REPORTING TEST METHODOLOGY |        |               | PSP  | APP-Closed         | US      | 62/717124     |              |                    |   |
| 10263 | STARTING POINT DEFINITION FOR MEASUREMENT GAP                                                                                                                                                              |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10264 | STARTING POINT DEFINITION FOR MEASUREMENT GAP                                                                                                                                                              |        |               | PSP  | APP-Closed         | US      | 62/716843     |              |                    |   |
| 10265 | MECHANISMS ON RANDOM ACCESS TRIGGERED BY PDCCH ORDER                                                                                                                                                       |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10266 | MECHANISMS ON RANDOM ACCESS TRIGGERED BY PDCCH ORDER                                                                                                                                                       |        |               | PSP  | APP-Closed         | US      | 62/717547     |              |                    |   |
| 10267 | SYSTEM AND METHODS ON PHYSICAL UPLINK SHARED CHANNEL ENHANCEMENTS FOR NEW RADIO ULTRA-RELIABLE LOW-LATENCY COMMUNICATION                                                                                   |        |               | PSP  | APP-Closed         | US      | 62/717689     |              |                    |   |
| 10268 | PHYSICAL BROADCAST CHANNEL CONTENT FOR NEW RADIO UNLICENSED                                                                                                                                                |        |               | PSP  | APP-Closed         | US      | 62/717663     |              |                    |   |
| 10269 | ENHANCED PDCCH MONITORING IN NR SYSTEMS                                                                                                                                                                    |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10270 | ENHANCED PDCCH MONITORING IN NR SYSTEMS                                                                                                                                                                    |        |               | PSP  | APP-Closed         | US      | 62/717342     |              |                    |   |
| 10271 | TC/QCL CONFIGURATION ENHANCEMENTS FOR NR                                                                                                                                                                   |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10272 | TC/QCL CONFIGURATION ENHANCEMENTS FOR NR                                                                                                                                                                   |        |               | PSP  | APP-Closed         | US      | 62/717347     |              |                    |   |
| 10273 | MEASUREMENT PERIOD FOR BEAM REPORTING                                                                                                                                                                      |        |               | PSP  | APP-Closed         | US      | 62/717708     |              |                    |   |
| 10274 | FLEXIBLE SCOPE OF PACKET FILTERS FOR REFLECTIVE QUALITY OF SERVICE (QOS)                                                                                                                                   |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10275 | FLEXIBLE SCOPE OF PACKET FILTERS FOR REFLECTIVE QUALITY OF SERVICE (QOS)                                                                                                                                   |        |               | PSP  | APP-Closed         | US      | 62/718258     |              |                    |   |
| 10276 | PAGING AND MEASUREMENT IN NR IDLE                                                                                                                                                                          |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10277 | PAGING AND MEASUREMENT IN NR IDLE                                                                                                                                                                          |        |               | PSP  | APP-Closed         | US      | 62/717550     |              |                    |   |
| 10278 | SYNCHRONIZATION SIGNAL BLOCK (SSB) INDEX SCHEDULING FOR NEW RADIO IN UNLICENSED SPECTRUM (NR-U)                                                                                                            |        |               | PSP  | APP-Closed         | US      | 62/717704     |              |                    |   |
| 10279 | DOWNLINK CONTROL CHANNEL SIGNALING FOR UL COEXISTENCE OF MULTIPLE SERVICE TYPES                                                                                                                            |        |               | PSP  | APP-Closed         | US      | 62/717568     |              |                    |   |
| 10280 | MEASUREMENTS AND REPORTING MECHANISMS FOR INTER-LAB NODE CROSS-LINK INTERFERENCE                                                                                                                           |        |               | PSP  | APP-Closed         | US      | 62/717669     |              |                    |   |
| 10281 | STANDALONE MODE FOR REL-16 EMT-C                                                                                                                                                                           |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10282 | STANDALONE MODE FOR REL-16 EMT-C                                                                                                                                                                           |        |               | PSP  | APP-Closed         | US      | 62/717670     |              |                    |   |
| 10283 | DATA AND CONTROL TRANSMISSION ENHANCEMENTS IN NR                                                                                                                                                           |        |               | PSP  | APP-Closed         | US      | 62/717596     |              |                    |   |
| 10284 | DESIGN OF UPLINK TRANSMISSION IN PRECONFIGURED RESOURCES FOR ENHANCED MACHINE TYPE COMMUNICATION AND NARROWBAND INTERNET OF THINGS                                                                         |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10285 | DESIGN OF UPLINK TRANSMISSION IN PRECONFIGURED RESOURCES FOR ENHANCED MACHINE TYPE COMMUNICATION AND NARROWBAND INTERNET OF THINGS                                                                         |        |               | PSP  | APP-Closed         | US      | 62/717566     |              |                    |   |



|       | A                                                                                                                                                         | B      | C             | D    | E                  | F       | G             | H            | I                  | J |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|------|--------------------|---------|---------------|--------------|--------------------|---|
| 2     | TITLE                                                                                                                                                     | FAMILY | FAMILY-MEMBER | TYPE | STATUS             | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10286 | MECHANISM ON GAP BASED MEASUREMENT                                                                                                                        |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10287 | MECHANISM ON GAP BASED MEASUREMENT                                                                                                                        |        |               | PSP  | APP-Closed         | US      | 62/717690     |              |                    |   |
| 10288 | SOUNDING REFERENCE SIGNAL (SRS) ENHANCEMENT FOR INCREASING COVERAGE AND CAPACITY                                                                          |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10289 | SOUNDING REFERENCE SIGNAL (SRS) ENHANCEMENT FOR INCREASING COVERAGE AND CAPACITY                                                                          |        |               | PSP  | APP-Closed         | US      | 62/717716     |              |                    |   |
| 10290 | PROVISIONING SERVICES FOR UNMANNED AERIAL SYSTEM IN 5GPP NETWORK                                                                                          |        |               | PSP  | APP-Closed         | US      | 62/717712     |              |                    |   |
| 10291 | FAST INITIAL ACQUISITION BY TRANSMITTING NON-ORTHOGONAL SYNCHRONIZATION SIGNAL BLOCKS IN 5G NEW RADIO                                                     |        |               | PSP  | APP-Closed         | US      | 62/720920     |              |                    |   |
| 10292 | USE OF UE IDENTIFIERS FOR REGISTRATION IN THE 5G SYSTEMS                                                                                                  |        |               | PSP  | APP-Closed         | US      | 62/718263     |              |                    |   |
| 10293 | EPC SOLUTION FOR RLOS ACCESS                                                                                                                              |        |               | PSP  | APP-Closed         | US      | 62/718266     |              |                    |   |
| 10294 | LOCAL AREA NETWORK SERVICE IN 5G SYSTEMS                                                                                                                  |        |               | PSP  | APP-Closed         | US      | 62/718270     |              |                    |   |
| 10295 | NETWORK DISCOVERY SELECTION AND ACCESS CONTROL IN VERTICAL DOMAIN                                                                                         |        |               | PSP  | APP-Closed         | US      | 62/718839     |              |                    |   |
| 10296 | ENHANCEMENT FOR SMT-C CONFIGURATION FOR NR SYSTEMS                                                                                                        |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10297 | ENHANCEMENT FOR SMT-C CONFIGURATION FOR NR SYSTEMS                                                                                                        |        |               | PSP  | APP-Closed         | US      | 62/765196     |              |                    |   |
| 10298 | Discovery reference signal for narrowband Internet of things (NB-IOT) systems operating on unlicensed spectrum                                            |        |               | PSP  | APP-Closed         | US      | 62/765197     |              |                    |   |
| 10299 | PHASE TRACKING REFERENCE SIGNAL (PT-RS) CONFIGURATION                                                                                                     |        |               | PCT  | APP-In-Preparation | US      |               |              |                    |   |
| 10300 | PROVISIONING OF VLAN IDS IN 5G SYSTEMS                                                                                                                    |        |               | PSP  | APP-Closed         | US      | 62/720924     |              |                    |   |
| 10301 | CORESET SELECTION FOR CSI-RS BASED RLM                                                                                                                    |        |               | PSP  | APP-Closed         | US      | 62/720925     |              |                    |   |
| 10302 | BANDWIDTH PART (BWP) SWITCHING DELAY REQUIREMENTS FOR UPLINK (UL) TRANSMISSION                                                                            |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10303 | BANDWIDTH PART (BWP) SWITCHING DELAY REQUIREMENTS FOR UPLINK (UL) TRANSMISSION                                                                            |        |               | PSP  | APP-Closed         | US      | 62/720931     |              |                    |   |
| 10304 | MECHANISMS FOR COLLISION HANDLING BETWEEN SINGLE-SLOT/MULTI-SLOT CSI PUCCHS                                                                               |        |               | PSP  | APP-Closed         | US      | 62/720936     |              |                    |   |
| 10305 | TRANSMISSION BANDWIDTH INDICATION FOR WIDEBAND TRANSMISSION IN NEW RADIO (NR) SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                    |        |               | PSP  | APP-Closed         | US      | 62/720481     |              |                    |   |
| 10306 | NETWORK ASSISTED BEAMFORMING FOR SIDELINK UNICAST COMMUNICATION                                                                                           |        |               | PSP  | APP-Closed         | US      | 62/723709     |              |                    |   |
| 10307 | TRANSMIT DIVERSITY MECHANISMS FOR POWER SAVING SIGNAL                                                                                                     |        |               | PSP  | APP-Closed         | US      | 62/724430     |              |                    |   |
| 10308 | APPARATUS FOR MULTIFIRE (MF) LTE                                                                                                                          |        |               | PSP  | APP-Closed         | US      | 62/723704     |              |                    |   |
| 10309 | Dual Connectivity Techniques for NR (New Radio)                                                                                                           |        |               | NP   | APP-Pending        | US      | 16/179421     |              | US-2019-0390151-A1 |   |
| 10310 | SIGNALING RADIO ACCESS NETWORK (RAN) ASSISTED CODEC ADAPTATION CAPABILITIES IN INTERNET PROTOCOL MULTIMEDIA SUBSYSTEM (IMS) MULTIMEDIA TELEPHONY SESSIONS |        |               | PSP  | APP-Closed         | US      | 62/728625     |              |                    |   |
| 10311 | UPLINK CONTROL INFORMATION (UCI) PIGGYBACKING ON MULTIPLE PHYSICAL UPLINK SHARED CHANNELS (PUSCHS) WITH SHORT DURATION                                    |        |               | PSP  | APP-Closed         | US      | 62/728629     |              |                    |   |
| 10312 | FLOW CONTROL IN INTEGRATED ACCESS AND BACKHAUL NETWORK                                                                                                    |        |               | PSP  | APP-Closed         | US      | 62/728649     |              |                    |   |
| 10313 | UE CAPABILITY FOR MULTIPLE MEASUREMENT GAP                                                                                                                |        |               | PSP  | APP-Closed         | US      | 62/732473     |              |                    |   |
| 10314 | EN-DC INTER-BAND AND INTRA-BAND DYNAMIC POWER SHARING                                                                                                     |        |               | PSP  | APP-Closed         | US      | 62/728653     |              |                    |   |
| 10315 | MEASUREMENT GAP (MG) CONFIGURATION DURING BANDWIDTH PART (BWP)                                                                                            |        |               | PSP  | APP-Closed         | US      | 62/732507     |              |                    |   |
| 10316 | HYBRID AUTOMATIC REPEAT REQUEST (HARQ) FEEDBACK FOR NEW RADIO (NR) VEHICLE-TO-VEHICLE (V2V) BROADCAST COMMUNICATION                                       |        |               | PSP  | APP-Closed         | US      | 62/730978     |              |                    |   |
| 10317 | MECHANISMS FOR COLLISION HANDLING BETWEEN SINGLE-SLOT/MULTI-SLOT CSI PUCCHS                                                                               |        |               | PSP  | APP-Closed         | US      | 62/731812     |              |                    |   |
| 10318 | CONTROL CHANNEL SIGNALING FOR UE POWER SAVING                                                                                                             |        |               | PSP  | APP-Closed         | US      | 62/732466     |              |                    |   |
| 10319 | CONDITIONAL HANDOVER                                                                                                                                      |        |               | PSP  | APP-Closed         | US      | 62/733920     |              |                    |   |
| 10320 | UNLICENSED NARROWBAND INTERNET-OF-THINGS SYSTEM                                                                                                           |        |               | PSP  | APP-Closed         | US      | 62/732504     |              |                    |   |
| 10321 | SSB PATTERN AND DMRS DESIGN FOR PBCH FOR ABOVE 526GHZ CARRIER FREQUENCY                                                                                   |        |               | PSP  | APP-Closed         | US      | 62/733953     |              |                    |   |
| 10322 | FULL PROTECTION OF INITIAL NON-ACCESS STRATUM PROTOCOL MESSAGE IN 5G SYSTEMS                                                                              |        |               | PSP  | APP-Closed         | US      | 62/733444     |              |                    |   |
| 10323 | COORDINATION SIGNALING FOR SSB TRANSMISSION CONFIGURATIONS IN 5G-NR IAB                                                                                   |        |               | PSP  | APP-Closed         | US      | 62/734722     |              |                    |   |

|       | A                                                                                                                                                                   | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                               | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10324 | END TO END MEASUREMENT AND PERFORMANCE DATA STREAMING                                                                                                               |        |               | PSP  | APP-Closed  | US      | 62/733947     |              |                    |   |
| 10325 | SIGNALING TO CHILD NODES FOR BACKHAUL BEAM FAILURE IN 5G-NR IAB                                                                                                     |        |               | PSP  | APP-Closed  | US      | 62/734726     |              |                    |   |
| 10326 | ENHANCED VEHICLE-TO EVERYTHING PCS RADIO ACCESS TECHNOLOGY NEGOTIATION                                                                                              |        |               | PSP  | APP-Closed  | US      | 62/735705     |              |                    |   |
| 10327 | MEASUREMENT CONFIGURATION FOR NEW RADIO - NEW RADIO DUAL CONNECTIVITY                                                                                               |        |               | PSP  | APP-Closed  | US      | 62/735713     |              |                    |   |
| 10328 | MULTI-CONNECTIVITY USING TIME DIVISION MULTIPLEXING (TDM) APPROACH                                                                                                  |        |               | PSP  | APP-Closed  | US      | 62/737075     |              |                    |   |
| 10329 | RADIO LINK FAILURE HANDLING WHEN CONNECTING TO BOTH SERVING CELL AND TARGET CELL                                                                                    |        |               | PSP  | APP-Closed  | US      | 62/736994     |              |                    |   |
| 10330 | USER EQUIPMENT CAPABILITY FOR MULTI-CONNECTIVITY HANDOVER                                                                                                           |        |               | PSP  | APP-Closed  | US      | 62/737506     |              |                    |   |
| 10331 | ENHANCED HYBRID AUTOMATIC RETRANSMISSION REQUEST (HARQ) FOR SEMI-PERSISTENT SCHEDULED (SPS) DATA TRANSMISSION                                                       |        |               | PSP  | APP-Closed  | US      | 62/736902     |              |                    |   |
| 10332 | RESOURCE ALLOCATION FOR 2-STEP RANDOM ACCESS PROCEDURE FOR PAYLOAD OF MSG1 AND FOR PHYSICAL DOWNLINK CONTROL CHANNEL AND PAYLOAD OF MSG2                            |        |               | PSP  | APP-Closed  | US      | 62/737644     |              |                    |   |
| 10333 | RADIO LINK MONITORING AND FAILURE FOR NEW RADIO-UNLICENSED OPERATION                                                                                                |        |               | PSP  | APP-Closed  | US      | 62/737480     |              |                    |   |
| 10334 | MANAGING AND MINIMIZING CONTROL PLANE LATENCY FOR INTEGRATED ACCESS AND BACKHAUL                                                                                    |        |               | PSP  | APP-Closed  | US      | 62/736761     |              |                    |   |
| 10335 | PACKET DATA CONVERGENCE PROTOCOL AND ROBUST HEADER COMPRESSION HANDLING FOR MULTI-CONNECTIVITY HANDOVER                                                             |        |               | PSP  | APP-Closed  | US      | 62/737683     |              |                    |   |
| 10336 | MULTIPLEXING OF MULTIPLE HARQ-ACK FEEDBACKS AND OTHER UCI ON PUCCH AND PUSCH                                                                                        |        |               | PSP  | APP-Closed  | US      | 62/739081     |              |                    |   |
| 10337 | BEAM FAILURE RECOVERY OPERATION                                                                                                                                     |        |               | NP   | APP-Pending | US      | 16/166523     |              | US-2019-0058519-A1 |   |
| 10338 | CONTROL RESOURCE SET INFORMATION IN PHYSICAL BROADCAST CHANNEL                                                                                                      |        |               | NP   | APP-Pending | US      | 16/171998     |              | US-2019-0069322-A1 |   |
| 10339 | CHANNEL STATE INFORMATION REPORT FOR PHASE TRACKING REFERENCE SIGNAL PORT SELECTION                                                                                 |        |               | NP   | APP-Pending | US      | 16/173602     |              | US-2019-0068268-A1 |   |
| 10340 | DETERMINING RESOURCES FOR UPLINK CONTROL INFORMATION ON PHYSICAL UPLINK SHARED CHANNEL AND PHYSICAL UPLINK CONTROL CHANNEL WITH FREQUENCY HOPPING                   |        |               | NP   | APP-Pending | US      | 16/213919     |              | US-2019-0118588-A1 |   |
| 10341 | PERFORMANCE MEASUREMENTS RELATED TO HANDOVER AND PDU SESSION RESOURCE SETUP IN NG-RAN                                                                               |        |               | PSP  | APP-Closed  | US      | 62/736748     |              |                    |   |
| 10342 | METHODS TO ACHIEVE UPLINK (UL) IN-ORDER DELIVERY FOR QUALITY OF SERVICE (QOS) FLOW OFFLOADED IN MULTI-RAT DUAL CONNECTIVITY (MR-DC) WITH 5GC                        |        |               | PSP  | APP-Closed  | US      | 62/737523     |              |                    |   |
| 10343 | METHOD FOR SPATIAL ASSUMPTION CONFIGURATION FOR NR DOWNLINK TRANSMISSION                                                                                            |        |               | PSP  | APP-Closed  | US      | 62/739080     |              |                    |   |
| 10344 | PAGING ENHANCEMENT FOR 5G UNLICENSED OPERATION                                                                                                                      |        |               | PSP  | APP-Closed  | US      | 62/737655     |              |                    |   |
| 10345 | ENCODING OF SECONDARY CELL GROUP FAILURE MEASUREMENT REPORT                                                                                                         |        |               | PSP  | APP-Closed  | US      | 62/736926     |              |                    |   |
| 10346 | OVERHEAD REDUCTION FOR BEAM COMBINING BASED CHANNEL-STATE INFORMATION (CSI) FEEDBACK                                                                                |        |               | PSP  | APP-Closed  | US      | 62/736986     |              |                    |   |
| 10347 | CONNECTION MANAGEMENT SOLUTION TO SUPPORT UNICAST AND GROUPCAST COMMUNICATION OVER SIDELINK FOR ENHANCED VEHICLE TO EVERYTHING (EV2X)                               |        |               | PSP  | APP-Closed  | US      | 62/737515     |              |                    |   |
| 10348 | RADIO ACCESS TECHNOLOGY SELECTION FOR NEW RADIO VEHICLE TO EVERYTHING                                                                                               |        |               | PSP  | APP-Closed  | US      | 62/737561     |              |                    |   |
| 10349 | QOS MANAGEMENT ASPECTS FOR NR SIDELINK TO SUPPORT ADVANCED V2X USE CASES                                                                                            |        |               | PSP  | APP-Closed  | US      | 62/737488     |              |                    |   |
| 10350 | TECHNIQUES FOR IMPROVING NEW RADIO (NR) POSITIONING PERFORMANCE                                                                                                     |        |               | PSP  | APP-Closed  | US      | 62/739026     |              |                    |   |
| 10351 | ENHANCEMENTS TO REDUCE RRM MEASUREMENTS AND UE POWER CONSUMPTION                                                                                                    |        |               | PSP  | APP-Closed  | US      | 62/739078     |              |                    |   |
| 10352 | NOTIFICATION AND ACQUISITION OF EARTHQUAKE AND TSUNAMI WARNING SYSTEM/COMMERCIAL MOBILE ALERT SYSTEM IN CONNECTED MODE FOR USER EQUIPMENT IN COVERAGE ENHANCED MODE |        |               | PSP  | APP-Closed  | US      | 62/737503     |              |                    |   |
| 10353 | RESOURCE ALLOCATION AND CONFIGURATION FOR BROADCAST AND UNICAST OPERATION OVER SIDELINK FOR NEW RADIO (NR) VEHICLE TO EVERYTHING (V2X)                              |        |               | PSP  | APP-Closed  | US      | 62/737731     |              |                    |   |

|       | A                                                                                                                                                                                      | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                                                  | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10354 | METHOD FOR PHYSICAL UPLINK SHARED CHANNEL (PUSCH) DEFAULT BEAM IN NEW RADIO (NR) WITH MULTI-TRANSMISSION RECEPTION POINT (TRP) MULTI-PANEL OPERATION                                   |        |               | PSP  | APP-Closed  | US      | 62/7390344    |              |                    |   |
| 10355 | MEASUREMENT PERIOD AND ACCURACY FOR BEAM REPORTING BASED ON L1-REFERENCE SIGNAL RECEIVED POWER                                                                                         |        |               | PSP  | APP-Closed  | US      | 62/738268     |              |                    |   |
| 10356 | NEXT GENERATION NODEB (GNB) SUPERVISED USER EQUIPMENT (UE) SOUNDING REFERENCE SIGNAL (SRS) TRANSMIT (TX) BEAM SWEEPING FOR FIFTH GENERATION (5G) NEW RADIO (NR) UPLINK BEAM MANAGEMENT |        |               | PSP  | APP-Closed  | US      | 62/738155     |              |                    |   |
| 10357 | PHYSICAL UPLINK SHARED CHANNEL ENHANCEMENTS FOR NEW RADIO ULTRA-RELIABLE LOW-LATENCY COMMUNICATION                                                                                     |        |               | PSP  | APP-Closed  | US      | 62/7375126    |              |                    |   |
| 10358 | NR VEHICLE TO EVERYTHING (V2X) UNICAST AND BROADCAST CHANNEL-STATE INFORMATION (CSI) FEEDBACK WITHOUT DEDICATED REFERENCE SIGNALS                                                      |        |               | PSP  | APP-Closed  | US      | 62/739047     |              |                    |   |
| 10359 | PAGING RECEPTION FOR USER EQUIPMENT IN IDLE AND INACTIVE STATE                                                                                                                         |        |               | PSP  | APP-Closed  | US      | 62/737671     |              |                    |   |
| 10360 | SYSTEM AND METHODS ON PUSCH REPETITION TERMINATION IN NR                                                                                                                               |        |               | PSP  | APP-Closed  | US      | 62/739042     |              |                    |   |
| 10361 | SUPPORT OF UNICAST AND GROUPCAST IN NEW RADIO VEHICLE-TO-EVERYTHING                                                                                                                    |        |               | PSP  | APP-Closed  | US      | 62/739055     |              |                    |   |
| 10362 | BEAM FAILURE RECOVERY AND RADIO LINK FAILURE ASSOCIATIONS IN 5G-NR                                                                                                                     |        |               | PSP  | APP-Closed  | US      | 62/739076     |              |                    |   |
| 10363 | SUPPORTING INFORMATION CENTRIC NETWORKING IN NEXT GENERATION CELLULAR NETWORKS (BEYOND 5G)                                                                                             |        |               | PSP  | APP-Closed  | US      | 62/755146     |              |                    |   |
| 10364 | WAKE-UP SIGNAL SUB-GROUPING FOR REL-16 EMBEDED NB-IOT                                                                                                                                  |        |               | PSP  | APP-Closed  | US      | 62/739063     |              |                    |   |
| 10365 | PRECONFIGURED SHARED RESOURCES FOR UPLINK TRANSMISSION                                                                                                                                 |        |               | PSP  | APP-Closed  | US      | 62/739057     |              |                    |   |
| 10366 | REFERENCE SIGNAL DESIGN WITH FLEXIBLE BANDWIDTH FOR REMOTE INTERFERENCE MANAGEMENT IN FIFTH GENERATION (5G) NETWORKS                                                                   |        |               | PSP  | APP-Closed  | US      | 62/739098     |              |                    |   |
| 10367 | QUALITY REPORT FOR ENHANCED MACHINE-TYPE COMMUNICATIONS AND NARROWBAND INTERNET OF THINGS                                                                                              |        |               | PSP  | APP-Closed  | US      | 62/739070     |              |                    |   |
| 10368 | DOWNLINK CONTROL CHANNEL SIGNALING FOR UL COEXISTENCE OF MULTIPLE SERVICE TYPES                                                                                                        |        |               | PSP  | APP-Closed  | US      | 62/739073     |              |                    |   |
| 10369 | DATA AND CONTROL TRANSMISSION ENHANCEMENTS IN NR                                                                                                                                       |        |               | PSP  | APP-Closed  | US      | 62/739071     |              |                    |   |
| 10370 | ROUTE ADAPTATION IN MULTI-HOP RELAY NETWORKS                                                                                                                                           |        |               | PSP  | APP-Closed  | US      | 62/739065     |              |                    |   |
| 10371 | SYSTEM AND METHODS OF TIME-DOMAIN RESOURCE ALLOCATION FOR REPEATED TRANSMISSIONS                                                                                                       |        |               | PSP  | APP-Closed  | US      | 62/739080     |              |                    |   |
| 10372 | SYSTEM AND METHOD OF SEQUENCE BASED UPLINK TRANSMISSION CANCELLATION INDICATION                                                                                                        |        |               | PSP  | APP-Closed  | US      | 62/739053     |              |                    |   |
| 10373 | ENHANCEMENT OF SOUNDING REFERENCE SIGNAL FOR NEW RADIO-UNLICENSED                                                                                                                      |        |               | PSP  | APP-Closed  | US      | 62/739031     |              |                    |   |
| 10374 | SYSTEM AND METHOD FOR PEAK-TO-AVERAGE POWER RATIO (PAPR) REDUCTION IN REFERENCE SIGNALS                                                                                                |        |               | PSP  | APP-Closed  | US      | 62/739049     |              |                    |   |
| 10375 | DEMODULATION REFERENCE SIGNAL TRANSMISSION FROM MULTIPLE BASE STATIONS                                                                                                                 |        |               | PSP  | APP-Closed  | US      | 62/739052     |              |                    |   |
| 10376 | ON SCALING FACTOR FOR NEW RADIO GAP BASED MEASUREMENT                                                                                                                                  |        |               | PSP  | APP-Closed  | US      | 62/739057     |              |                    |   |
| 10377 | ON SIMULTANEOUS TRANSMISSION OF PHYSICAL UPLINK CHANNELS AND SIGNALS FOR NEW RADIO BEAMFORMED SYSTEM                                                                                   |        |               | PSP  | APP-Closed  | US      | 62/742083     |              |                    |   |
| 10378 | NR-N-PUBLIC NETWORK DISCOVERY SELECTION AND ACCESS CONTROL IN VERTICAL DOMAIN                                                                                                          |        |               | PSP  | APP-Closed  | US      | 62/740594     |              |                    |   |
| 10379 | INTERFERENCE MITIGATION IN ULTRA-DENSE WIRELESS NETWORKS                                                                                                                               |        |               | NP   | APP-Pending | US      | 16/159236     |              | US-2019-0116560-A1 |   |
| 10380 | DOWNLINK (DL) TRANSMISSION TIMING OF INTEGRATED ACCESS AND BACKHAUL (IAB) NODE                                                                                                         |        |               | PSP  | APP-Closed  | US      | 62/742027     |              |                    |   |
| 10381 | ENABLING RELAY SERVICE FOR USER EQUIPMENT BEHIND RESIDENTIAL GATEWAY TO ACCESS FIFTH GENERATION CORE NETWORK VIA RESIDENTIAL GATEWAY                                                   |        |               | PSP  | APP-Closed  | US      | 62/740859     |              |                    |   |
| 10382 | POWER ALLOCATION IN NR AND LTE DUAL CONNECTIVITY SCENARIOS                                                                                                                             |        |               | PSP  | APP-Closed  | US      | 62/742039     |              |                    |   |
| 10383 | MOBILE DEVICE CONTEXT TRANSFER IN A 5G SYSTEM                                                                                                                                          |        |               | PSP  | APP-Closed  | US      | 62/742762     |              |                    |   |
| 10384 | ADDITIONAL DMBS FOR NR PUSCH CONSIDERING LTE-NR DL SHARING                                                                                                                             |        |               | PSP  | APP-Closed  | US      | 62/742129     |              |                    |   |
| 10385 | LOW PAPR REFERENCE SIGNAL FOR COVERAGE ENHANCEMENT WAVEFORMS                                                                                                                           |        |               | PSP  | APP-Closed  | US      | 62/742780     |              |                    |   |

|       | A                                                                                                                                                                       | B      | C             | D    | E           | F       | G             | H            | I                  | J |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|------|-------------|---------|---------------|--------------|--------------------|---|
| 2     | TITLE                                                                                                                                                                   | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10386 | PEAK-TO-AVERAGE POWER RATIO (PAPR) REDUCTION IN REFERENCE SIGNALS                                                                                                       |        |               | PSP  | APP-Closed  | US      | 62/743312     |              |                    |   |
| 10387 | TIME DOMAIN RESOURCE ALLOCATION FOR REPEATED TRANSMISSIONS                                                                                                              |        |               | PSP  | APP-Closed  | US      | 62/743305     |              |                    |   |
| 10388 | UE CAPABILITY TRANSFER AND STORAGE                                                                                                                                      |        |               | PSP  | APP-Closed  | US      | 62/744405     |              |                    |   |
| 10389 | RADIO LINK MONITORING (RLM) ENHANCEMENTS                                                                                                                                |        |               | PSP  | APP-Closed  | US      | 62/744022     |              |                    |   |
| 10390 | PHYSICAL UPLINK CONTROL CHANNEL (PUCCH) POWER CONTROL                                                                                                                   |        |               | PSP  | APP-Closed  | US      | 62/747088     |              |                    |   |
| 10391 | WAKE-UP SIGNAL DESIGN                                                                                                                                                   |        |               | PSP  | APP-Closed  | US      | 62/747086     |              |                    |   |
| 10392 | SECONDARY AUTHENTICATION FOR WIRELESS WIDE AREA NETWORK (WWAN) VIRTUAL PRIVATE NETWORK (VPN) IN LONG TERM EVOLUTION (LTE)                                               |        |               | PSP  | APP-Pending | US      | 62/779350     |              |                    |   |
| 10393 | ACCESS CONTROL FOR NETWORK SLICES IN DIFFERENT BUSINESS ROLE MODELS                                                                                                     |        |               | PSP  | APP-Closed  | US      | 62/747576     |              |                    |   |
| 10394 | TECHNOLOGIES FOR MANAGING AND MINIMIZING LATENCY FOR INTEGRATED ACCESS AND BACKHAUL                                                                                     |        |               | PSP  | APP-Closed  | US      | 62/747579     |              |                    |   |
| 10395 | DYNAMIC RADIO FREQUENCY SWITCHING FOR INTER-FREQUENCY RADIO RESOURCE MANAGEMENT (RRM) MEASUREMENTS IN RADIO RESOURCE CONTROL (RRC) CONNECTED STATE                      |        |               | PSP  | APP-Closed  | US      | 62/750464     |              |                    |   |
| 10396 | PEAK-TO-AVERAGE POWER RATIO (PAPR) REDUCTION IN REFERENCE SIGNALS                                                                                                       |        |               | PSP  | APP-Closed  | US      | 62/747582     |              |                    |   |
| 10397 | FURTHER MEASUREMENT GAP ENHANCEMENT                                                                                                                                     |        |               | PSP  | APP-Closed  | US      | 62/749542     |              |                    |   |
| 10398 | TECHNIQUES FOR USER PLANE EARLY DATA TRANSMISSION (EDT) MSG4 LOSS                                                                                                       |        |               | PSP  | APP-Closed  | US      | 62/750678     |              |                    |   |
| 10399 | ADDITIONAL TIMING ADVANCE SIGNALING IN 5G-NR IAB                                                                                                                        |        |               | PSP  | APP-Closed  | US      | 62/750563     |              |                    |   |
| 10400 | TECHNOLOGIES FOR PERFORMANCE DATA STREAMING                                                                                                                             |        |               | PSP  | APP-Closed  | US      | 62/749495     |              |                    |   |
| 10401 | ENHANCED EMERGENCY CALLING OVER LONG TERM EVOLUTION (LTE) AND FIFTH GENERATION (5G) NEW RADIO (NR)                                                                      |        |               | PSP  | APP-Closed  | US      | 62/768757     |              |                    |   |
| 10402 | CONNECTIVITY ENHANCEMENT                                                                                                                                                |        |               | PSP  | APP-Closed  | US      | 62/752245     |              |                    |   |
| 10403 | QUADRATURE LOCAL OSCILLATOR SIGNAL GENERATION SYSTEMS AND METHODS                                                                                                       |        |               | NP   | APP-Pending | US      | 15/352043     |              |                    |   |
| 10404 | SUPPORTING INFORMATION CENTRIC NETWORKING IN NEXT GENERATION CELLULAR NETWORKS POLICY AND CHARGING CONTROL (PCC)                                                        |        |               | PSP  | APP-Closed  | US      | 62/751150     |              |                    |   |
| 10405 | METHODS OF LIMITED BUFFER RATE-MATCHING (LBRM) PRE-EMPTION AND Sidelink SYNCHRONIZATION IN NEW RADIO (NR) SYSTEMS                                                       |        |               | NP   | APP-Pending | US      | 15/181808     |              | US-2019-0141547-A1 |   |
| 10406 | FIAP SIGNALING FOR IAB CENTRAL COORDINATION REGARDING NOT AVAILABLE RESOURCE                                                                                            |        |               | PSP  | APP-Closed  | US      | 62/752806     |              |                    |   |
| 10407 | DESIGN AND APPARATUS FOR NF-LITE                                                                                                                                        |        |               | PSP  | APP-Closed  | US      | 62/752248     |              |                    |   |
| 10408 | OFF-RASTER SSB DESIGN IN IAB                                                                                                                                            |        |               | PSP  | APP-Closed  | US      | 62/753640     |              |                    |   |
| 10409 | ADAPTIVE IN-SYNC AND OUT-OF-SYNC CLASSIFICATION BASED ON CHANNEL PARAMETER ESTIMATION TRACKING REFERENCE SIGNALS IN 5G RADIO LINK MONITORING AND BEAM FAILURE DETECTION |        |               | PSP  | APP-Closed  | US      | 62/757440     |              |                    |   |
| 10410 | MEDIUM ACCESS CONTROL (MAC) FORMAT FOR MSG4 AND MSG5 IN 2-PART RANDOM ACCESS PROCEDURE                                                                                  |        |               | PSP  | APP-Closed  | US      | 62/753487     |              |                    |   |
| 10411 | METHODS FOR ENHANCED PUCCH TRANSMISSION FOR HIGH RELIABILITY                                                                                                            |        |               | PSP  | APP-Closed  | US      | 62/753357     |              |                    |   |
| 10412 | ETHERNET HEADER COMPRESSION                                                                                                                                             |        |               | PSP  | APP-Closed  | US      | 62/753779     |              |                    |   |
| 10413 | MOBILITY MANAGEMENT IN INFORMATION CENTRIC NETWORKING FOR NEXT GENERATION CELLULAR NETWORKS (BEYOND 5G)                                                                 |        |               | PSP  | APP-Closed  | US      | 62/756262     |              |                    |   |
| 10414 | PERFORMANCE MEASUREMENTS RELATED TO PDU SESSION AND N4 SESSION MANAGEMENT                                                                                               |        |               | PSP  | APP-Closed  | US      | 62/753550     |              |                    |   |
| 10415 | ENABLING UAS COMMUNICATION FOR COMMANDS AND CONTROL IN THE 5G SYSTEM                                                                                                    |        |               | PSP  | APP-Closed  | US      | 62/755261     |              |                    |   |
| 10416 | SCHEDULING REQUEST ENHANCEMENT FOR NR UNLICENSED                                                                                                                        |        |               | PSP  | APP-Closed  | US      | 62/753830     |              |                    |   |
| 10417 | SECONDARY PHYSICAL RANDOM ACCESS CHANNEL (PRACH) CONFIGURATION FOR CONTENTION BASED RANDOM ACCESS IN NEW RADIO SYSTEMS                                                  |        |               | PSP  | APP-Closed  | US      | 62/754503     |              |                    |   |
| 10418 | SEMI-STATIC RESOURCE ALLOCATION FOR NEW RADIO INTEGRATED ACCESS AND BACKHAUL (IAB) NETWORK                                                                              |        |               | PSP  | APP-Closed  | US      | 62/754336     |              |                    |   |
| 10419 | ENABLING LIVE AUDIO/VIDEO MEDIA PRODUCTION SERVICES IN THE 5G SYSTEM                                                                                                    |        |               | PSP  | APP-Closed  | US      | 62/755386     |              |                    |   |
| 10420 | METHODS TO ENHANCE USER PLANE FLOW CONTROL FOR RETRANSMITTED PACKETS                                                                                                    |        |               | PSP  | APP-Closed  | US      | 62/754483     |              |                    |   |
| 10421 | SIGNALING FOR MAC4 VERIFICATION IN RRM4 WITHOUT ANCHOR RELOCATION                                                                                                       |        |               | PSP  | APP-Closed  | US      | 62/754454     |              |                    |   |
| 10422 | ROBUST HEADER COMPRESSION INDICATION AFTER PATH SWITCH DURING HANDOVER                                                                                                  |        |               | PSP  | APP-Closed  | US      | 62/753731     |              |                    |   |

|       | A                                                                                                                                                                                                                                 | B      | C             | D    | E           | F       | G             | H            | I                  | J |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|------|-------------|---------|---------------|--------------|--------------------|---|
| 2     | TITLE                                                                                                                                                                                                                             | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10423 | SECURITY FRAMEWORK FOR MESSAGE 3 (MSG3) AND MESSAGE 4 (MSG4) IN EARLY DATA TRANSMISSION                                                                                                                                           |        |               | PSP  | APP-Closed  | US      | 62/753843     |              |                    |   |
| 10424 | PAGING ENHANCEMENT FOR NR UNLICENSED                                                                                                                                                                                              |        |               | PSP  | APP-Closed  | US      | 62/753840     |              |                    |   |
| 10425 | METHOD TO CONTROL TRAFFIC ACCESSING PLMN SERVICE AT NON-PUBLIC NETWORK IN 5G SYSTEM                                                                                                                                               |        |               | PSP  | APP-Closed  | US      | 62/755044     |              |                    |   |
| 10426 | METHOD OF FREQUENCY DOMAIN CSI COMPRESSION                                                                                                                                                                                        |        |               | PSP  | APP-Closed  | US      | 62/754497     |              |                    |   |
| 10427 | METHODS FOR TRANSMISSION RETRANSMISSION AND HARQ PROCESE FOR PUR IN IDLE MODE                                                                                                                                                     |        |               | PSP  | APP-Closed  | US      | 62/754479     |              |                    |   |
| 10428 | METHODS OF QOS-AWARE CONGESTION CONTROL RESOURCE ALLOCATION AND IN-DEVICE COEXISTENCE SOLUTIONS FOR NR V2X SIDELINK COMMUNICATION                                                                                                 |        |               | PSP  | APP-Closed  | US      | 62/754476     |              |                    |   |
| 10429 | METHOD OF DATA-AIDED SIDELINK SYNCHRONIZATION FOR NR V2X COMMUNICATION                                                                                                                                                            |        |               | PSP  | APP-Closed  | US      | 62/754525     |              |                    |   |
| 10430 | SIDELINK PHYSICAL LAYER COLLISION AVOIDANCE HYBRID AUTOMATIC REPEAT REQUEST (HARQ) FEEDBACK AND CHANNEL-STATE INFORMATION (CSI) ACQUISITION                                                                                       |        |               | PSP  | APP-Closed  | US      | 62/754840     |              |                    |   |
| 10431 | DETECTING AND MITIGATING DRONE INTERFERENCE                                                                                                                                                                                       |        |               | NP   | APP-Pending | US      | 16/234273     |              | US-2019-0306675-A1 |   |
| 10432 | SIGNALING CODEC MODE NOTIFICATION FOR SPEECH IN IMS MULTIMEDIA TELEPHONY SESSIONS                                                                                                                                                 |        |               | PSP  | APP-Closed  | US      | 62/755149     |              |                    |   |
| 10433 | PHYSICAL UPLINK CONTROL CHANNEL (PUCCH) RESOURCE ALLOCATION AND HYBRID AUTOMATIC REPEAT REQUEST (HARQ) ACKNOWLEDGEMENT (ACK) CODEBOOK DETERMINATION ENHANCEMENTS IN CASE OF MULTIPLE DOWNLINK CONTROL INFORMATION (DCI) IN A SLOT |        |               | PSP  | APP-Closed  | US      | 62/754970     |              |                    |   |
| 10434 | RANDOM DMRS SEQUENCE GENERATION IN NR UPLINK                                                                                                                                                                                      |        |               | PSP  | APP-Closed  | US      | 62/754982     |              |                    |   |
| 10435 | MECHANISMS TO INDICATE CHANNEL OCCUPANCY TIME TO OTHER NODES FOR NR BASED UNLICENSED OPERATION                                                                                                                                    |        |               | PSP  | APP-Closed  | US      | 62/755343     |              |                    |   |
| 10436 | TIME SYNCHRONIZATION ACCURACY ENHANCEMENTS                                                                                                                                                                                        |        |               | PSP  | APP-Closed  | US      | 62/755349     |              |                    |   |
| 10437 | SIDELINK RESOURCE ALLOCATION AND USER EQUIPMENT PROCESSING BEHAVIORS FOR NEW RADIO VEHICLE TO ANYTHING SIDELINK COMMUNICATION                                                                                                     |        |               | PSP  | APP-Closed  | US      | 62/755344     |              |                    |   |
| 10438 | RADIO LINK MONITORING (RLM) ENHANCEMENTS FOR POWER SAVINGS                                                                                                                                                                        |        |               | PSP  | APP-Closed  | US      | 62/755188     |              |                    |   |
| 10439 | CSI MEASUREMENT AND REPORT QUALITY DEFINITION FOR 5G NR MULTI-TRP                                                                                                                                                                 |        |               | PSP  | APP-Closed  | US      | 62/755362     |              |                    |   |
| 10440 | RADIO LINK MONITORING (RLM) ENHANCEMENT FOR NEW RADIO                                                                                                                                                                             |        |               | PSP  | APP-Closed  | US      | 62/755346     |              |                    |   |
| 10441 | SYSTEM AND METHOD FOR UPLINK LOW-PAPR DMRS SEQUENCE DESIGN                                                                                                                                                                        |        |               | PSP  | APP-Closed  | US      | 62/755391     |              |                    |   |
| 10442 | FULL PROTECTION OF INITIAL NON-ACCESS STRATUM PROTOCOL MESSAGE IN 5G SYSTEMS                                                                                                                                                      |        |               | PSP  | APP-Closed  | US      | 62/755384     |              |                    |   |
| 10443 | TIME PATTERN OF REFERENCE SIGNAL FOR REMOTE INTERFERENCE MANAGEMENT IN 5G NR NETWORKS                                                                                                                                             |        |               | PSP  | APP-Closed  | US      | 62/755389     |              |                    |   |
| 10444 | ON THE REQUIREMENT FOR BWP SWITCHING                                                                                                                                                                                              |        |               | PSP  | APP-Closed  | US      | 62/755999     |              |                    |   |
| 10445 | DESIGN AND APPARATUS FOR MF-LTE                                                                                                                                                                                                   |        |               | PSP  | APP-Closed  | US      | 62/756039     |              |                    |   |
| 10446 | SIGNALING FOR RESOURCE ALLOCATION AND SCHEDULING IN 5G-NR INTEGRATED ACCESS AND BACKHAUL                                                                                                                                          |        |               | NP   | APP-Pending | US      | 16/189157     |              | US-2019-0222281-A1 |   |
| 10447 | SIGNALING FOR RESOURCE ALLOCATION AND SCHEDULING IN 5G-NR INTEGRATED ACCESS AND BACKHAUL                                                                                                                                          |        |               | ENT  | APP-Pending | US      | 15/408070     |              |                    |   |
| 10448 | DESIGN OF SYNCHRONIZATION SIGNALS FOR MULTIERFIRE NARROWBAND INTERNET-OF-THINGS (MF-NB-IOT) OPERATION IN UNLICENSED SPECTRUM                                                                                                      |        |               | NP   | APP-Pending | US      | 16/242850     |              | US-2019-0208574-A1 |   |
| 10449 | METHOD TO CONTROL TRAFFIC ACCESSING PLMN SERVICE AT NON-PUBLIC NETWORK IN 5G SYSTEM                                                                                                                                               |        |               | PSP  | APP-Closed  | US      | 62/757035     |              |                    |   |
| 10450 | VEHICLE-TO-EVERYTHING (V2X) POLICY AND PARAMETERS FOR NG-UU COMMUNICATION PROVISIONED TO USER EQUIPMENT (UE) BY POLICY CONTROL FUNCTION (PCF)                                                                                     |        |               | PSP  | APP-Closed  | US      | 62/757715     |              |                    |   |
| 10451 | METHOD TO DETERMINE SPATIAL QCL ASSUMPTION FOR CSI-RS IN NR                                                                                                                                                                       |        |               | PSP  | APP-Closed  | US      | 62/757965     |              |                    |   |
| 10452 | Redundant QCG Tuning with Overlapping Fractional Regions                                                                                                                                                                          |        |               | NP   | APP-Pending | US      | 16/366122     |              |                    |   |
| 10453 | PEAK-TO-AVERAGE POWER RATIO (PAPR) REDUCTION IN REFERENCE SIGNALS                                                                                                                                                                 |        |               | PSP  | APP-Closed  | US      | 62/757687     |              |                    |   |
| 10454 | BEAM MANAGEMENT FOR PARTIAL BEAM CORRESPONDENCE USER EQUIPMENT                                                                                                                                                                    |        |               | PSP  | APP-Closed  | US      | 62/758136     |              |                    |   |
| 10455 | ON BEAM SWITCH IN INTRA-BAND NON-CONTIGUOUS CARRIER AGGREGATION                                                                                                                                                                   |        |               | PSP  | APP-Closed  | US      | 62/760326     |              |                    |   |

|       | A                                                                                                                                                     | B      | C             | D    | E           | F       | G             | H            | I                  | J |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|------|-------------|---------|---------------|--------------|--------------------|---|
| 2     | TITLE                                                                                                                                                 | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10456 | SYNCHRONIZATION SIGNAL BLUETOOTH BASED BEAM FAILURE DETECTION                                                                                         |        |               | PSP  | APP-Closed  | US      | 62/760276     |              |                    |   |
| 10457 | Closed loop efficiency tracking in digital envelope tracking system                                                                                   |        |               | PSP  | APP-Pending | US      | 62/828771     |              |                    |   |
| 10458 | HANDOFF COMMAND HANDLING FOR SIMULTANEOUS CONNECTIVITY HANDOFF                                                                                        |        |               | PSP  | APP-Closed  | US      | 62/767399     |              |                    |   |
| 10459 | SYSTEM AND METHOD OF DOWNLINK CONTROL CHANNEL SIGNALING FOR DL COEXISTENCE OF MULTIPLE SERVICE TYPES                                                  |        |               | PSP  | APP-Closed  | US      | 62/760339     |              |                    |   |
| 10460 | DYNAMIC PROCESSING RESOURCE ALLOCATION ACROSS MULTIPLE CARRIERS                                                                                       |        |               | NP   | APP-Pending | US      | 16/423043     |              |                    |   |
| 10461 | SIGNALING FROM ACCESS AND BACKHAUL (AB) MOBILE TERMINAL (MT) REGARDING RELEASED RESOURCES                                                             |        |               | PSP  | APP-Closed  | US      | 62/767327     |              |                    |   |
| 10462 | ENHANCEMENT FOR TIME DOMAIN RESOURCE ALLOCATION IN IAB NETWORKS                                                                                       |        |               | PSP  | APP-Pending | US      | 62/773053     |              |                    |   |
| 10463 | NETWORK SELECTION AND SERVICE CONTINUITY IN NON-PUBLIC NETWORKS                                                                                       |        |               | PSP  | APP-Closed  | US      | 62/767384     |              |                    |   |
| 10464 | SELF-LEARNING UE CAPABILITY VERIFICATION FROM PARTIAL CAPABILITIES                                                                                    |        |               | PSP  | APP-Closed  | US      | 62/768363     |              |                    |   |
| 10465 | ENABLING CACHED CONTENT RETRIEVING USING INFORMATION CENTRIC NETWORKING (ICN) FOR FDU SESSIONS TO REDUCE LATENCY IN NEXT GENERATION CELLULAR NETWORKS |        |               | PSP  | APP-Closed  | US      | 62/768763     |              |                    |   |
| 10466 | METHOD FOR PHYSICAL LAYER SECURITY PROTECTION USING PUBLIC KEYS                                                                                       |        |               | NP   | PAT-Active  | US      | 16/245009     | #####        | US-2019-0145986-A1 |   |
| 10467 | APPARATUS AND METHOD OF LWA AND LWIP CONFIGURATION PERFORMANCE AND FAULT MANAGEMENT                                                                   |        |               | NP   | APP-Pending | US      | 16/240322     |              | US-2019-0141785-A1 |   |
| 10468 | PHASE TRACKING REFERENCE SIGNAL (PT-RS) POWER BOOSTING                                                                                                |        |               | NP   | APP-Pending | US      | 16/238232     |              | US-2019-0140729-A1 |   |
| 10469 | PAGING CAUSE DETERMINATION FOR INACTIVE DEVICE IN THE 5G SYSTEM                                                                                       |        |               | PSP  | APP-Closed  | US      | 62/769332     |              |                    |   |
| 10470 | DATABASE STRUCTURE AND USAGE OF WIRELESS SIGNAL ENVIRONMENT FOR DRONES                                                                                |        |               | PSP  | APP-Pending | US      | 62/772182     |              |                    |   |
| 10471 | SYSTEM AND METHOD FOR BEAM INDICATION FOR UPLINK AND DOWNLINK TRANSMISSIONS                                                                           |        |               | PSP  | APP-Closed  | US      | 62/770404     |              |                    |   |
| 10472 | TECHNIQUES IN MEASUREMENT PROCEDURE FOR EMTS SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                                                 |        |               | PSP  | APP-Closed  | US      | 62/771951     |              |                    |   |
| 10473 | INTEGRITY PROTECTION FOR FREQUENT SMALL DATA TRANSMISSION                                                                                             |        |               | PSP  | APP-Pending | US      | 62/785542     |              |                    |   |
| 10474 | DYNAMIC TRANSMIT POWER ADJUSTMENT                                                                                                                     |        |               | PSP  | APP-Pending | US      | 62/778798     |              |                    |   |
| 10475 | DESIGN AND APPARATUS FOR MF-LITE                                                                                                                      |        |               | PSP  | APP-Pending | US      | 62/773828     |              |                    |   |
| 10476 | MULTIRADIO INTERFACE (MURI) FOR MULTIPLE RADIO COMPUTERS                                                                                              |        |               | PSP  | APP-Pending | US      | 62/779170     |              |                    |   |
| 10477 | BEAM MANAGEMENT FOR CARRIER AGGREGATION (CA)                                                                                                          |        |               | NP   | APP-Pending | US      | 16/242821     |              | US-2019-0335245-A1 |   |
| 10478 | BEAM MANAGEMENT FOR CARRIER AGGREGATION (CA)                                                                                                          |        |               | CNT  | APP-Pending | US      | 16/408021     |              | US-2019-0357249-A1 |   |
| 10479 | BEAM INDICATION CONSIDERING BEAM FAILURE RECOVERY IN NEW RADIO                                                                                        |        |               | NP   | APP-Pending | US      | 15/245970     |              | US-2019-0239212-A1 |   |
| 10480 | SIZE DETERMINATION FOR CHANNEL STATE INFORMATION (CSI) PART ONE AND PART TWO TRANSMISSION OF CSI REPORT                                               |        |               | NP   | APP-Pending | US      | 16/243887     |              | US-2019-0146291-A1 |   |
| 10481 | TIME DENSITY AND FREQUENCY DENSITY DETERMINATION OF PHASE TRACKING REFERENCE SIGNALS (PT-RS) IN NEW RADIO (NR) SYSTEMS                                |        |               | NP   | APP-Pending | US      | 16/245410     |              | US-2019-0156615-A1 |   |
| 10482 | CSI-RS SEQUENCE GENERATION AND MAPPING AND DMRS SCRAMBLING ID CONFIGURATION                                                                           |        |               | NP   | APP-Pending | US      | 16/247171     |              | US-2019-0146294-A1 |   |
| 10483 | CSI-RS SEQUENCE GENERATION AND MAPPING AND DMRS SCRAMBLING ID CONFIGURATION                                                                           |        |               | CNT  | APP-Pending | US      | 16/407743     |              | US-2019-0327050-A1 |   |
| 10484 | TIME DOMAIN RESOURCE ALLOCATION FOR MOBILE COMMUNICATION                                                                                              |        |               | NP   | APP-Pending | US      | 16/246487     |              | US-2019-0149365-A1 |   |
| 10485 | CONTENTION WINDOW ADJUSTMENT MECHANISMS FOR FELAA SYSTEMS                                                                                             |        |               | NP   | APP-Pending | US      | 16/250360     |              | US-2019-0156256-A1 |   |

|       | A                                                                                                                                                                | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                            | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10486 | CONTENTION WINDOW ADJUSTMENT MECHANISMS FOR FELAA SYSTEMS                                                                                                        |        |               | CNT  | APP-Pending | US      | 16/407767     |              | US-2019-0335501-A1 |   |
| 10487 | CONTROL SIGNALING FOR UPLINK MULTIPLE INPUT MULTIPLE OUTPUT CHANNEL STATE INFORMATION REFERENCE SIGNAL CONFIGURATION AND SOUNDING REFERENCE SIGNAL CONFIGURATION |        |               | NP   | APP-Pending | US      | 16/252204     |              | US-2019-0174466-A1 |   |
| 10488 | HANDLING OVERLAPPING OF PUCCH AND PUSCH FOR NEW RADIO SYSTEMS                                                                                                    |        |               | NP   | APP-Pending | US      | 16/251762     |              | US-2019-0261391-A1 |   |
| 10489 | HANDLING OVERLAPPING OF PUCCH AND PUSCH FOR NEW RADIO SYSTEMS                                                                                                    |        |               | CNT  | APP-Pending | US      | 16/407775     |              | US-2019-0335485-A1 |   |
| 10490 | CHANNEL CONFIGURATION AND DLUL CONFIGURATION FOR NB-IOT-U SYSTEM                                                                                                 |        |               | NP   | APP-Pending | US      | 16/267810     |              | US-2019-0174476-A1 |   |
| 10491 | INDICATION TECHNIQUES FOR NARROWBAND SYSTEM INFORMATION BLOCK TYPE 1 (SIB1-NB) TRANSMISSION ON A CARRIER                                                         |        |               | NP   | APP-Pending | US      | 16/273566     |              | US-2019-0190686-A1 |   |
| 10492 | INDICATION TECHNIQUES FOR NARROWBAND SYSTEM INFORMATION BLOCK TYPE 1 (SIB1-NB) TRANSMISSION ON A CARRIER                                                         |        |               | CNT  | APP-Pending | US      | 16/408030     |              | US-2019-0273599-A1 |   |
| 10493 | TWO-TONE PHYSICAL UPLINK SHARED CHANNEL FOR MACHINE TYPE COMMUNICATIONS                                                                                          |        |               | NP   | APP-Pending | US      | 16/277870     |              | US-2019-0215849-A1 |   |
| 10494 | TWO-TONE PHYSICAL UPLINK SHARED CHANNEL FOR MACHINE TYPE COMMUNICATIONS                                                                                          |        |               | CNT  | APP-Pending | US      | 16/408298     |              |                    |   |
| 10495 | RESERVED RESOURCE ELEMENTS FOR HYBRID AUTOMATIC REPEAT REQUEST BITS                                                                                              |        |               | NP   | APP-Pending | US      | 16/246102     |              | US-2019-0166597-A1 |   |
| 10496 | METHODS FOR ENHANCED UPLINK BEAM OPERATIONS                                                                                                                      |        |               | PSP  | APP-Pending | US      | 62/777404     |              |                    |   |
| 10497 | SYSTEM AND METHOD FOR DL TRANSMISSION WITH LOW PEAK-TO-AVERAGE-POWER (PAPR)                                                                                      |        |               | PSP  | APP-Pending | US      | 62/788585     |              |                    |   |
| 10498 | FREQUENCY HOPPING PATTERN FOR NARROWBAND INTERNET-OF-THINGS IN UNLICENSED SPECTRUM                                                                               |        |               | NP   | APP-Pending | US      | 16/261130     |              | US-2019-0158139-A1 |   |
| 10499 | SIMULTANEOUS HARQ-ACK FEEDBACK AND UPLINK TRANSMISSION WITHOUT DYNAMIC GRANT                                                                                     |        |               | NP   | APP-Pending | US      | 16/274853     |              | US-2019-0327755-A1 |   |
| 10500 | SIMULTANEOUS HARQ-ACK FEEDBACK AND UPLINK TRANSMISSION WITHOUT DYNAMIC GRANT                                                                                     |        |               | CNT  | APP-Pending | US      | 16/407786     |              | US-2019-0335486-A1 |   |
| 10501 | METHODS FOR SIMULTANEOUS SUPPORT OF RESOURCE SELECTION MODES AND CONFIGURATION MECHANISMS FOR NR V2X SIDELINK                                                    |        |               | PSP  | APP-Pending | US      | 62/780876     |              |                    |   |
| 10502 | CONFIGURATION MANAGEMENT PERFORMANCE MANAGEMENT AND FAULT MANAGEMENT TO SUPPORT EDGE COMPUTING                                                                   |        |               | PSP  | APP-Pending | US      | 62/782074     |              |                    |   |
| 10503 | RANDOM ACCESS PROCEDURE FOR NR BASED SATELLITE COMMUNICATION                                                                                                     |        |               | PSP  | APP-Pending | US      | 62/788958     |              |                    |   |
| 10504 | COEXISTENCE SOLUTIONS FOR LTE E-V2X AND ITS-G5 / DSRC                                                                                                            |        |               | PSP  | APP-Pending | US      | 62/788552     |              |                    |   |
| 10505 | METHOD AND SYSTEM FOR THRESHOLD MONITORING                                                                                                                       |        |               | PSP  | APP-Pending | US      | 62/785355     |              |                    |   |
| 10506 | ANTENNA SYSTEM HAVING HINGE ANTENNA                                                                                                                              |        |               | PSP  | APP-Pending | US      | 62/851952     |              |                    |   |
| 10507 | METHODS FOR PHYSICAL DOWNLINK CONTROL CHANNEL WITH MULTI-TRP TRANSMISSION                                                                                        |        |               | PSP  | APP-Pending | US      | 62/788485     |              |                    |   |
| 10508 | PHASE TRACKING REFERENCE SIGNAL DESIGN FOR SINGLE CARRIER WAVEFORM                                                                                               |        |               | PSP  | APP-Pending | US      | 62/788282     |              |                    |   |
| 10509 | PERFORMANCE MEASUREMENTS RELATED TO QUALITY OF SERVICE FLOW AND SERVICE REQUEST                                                                                  |        |               | PSP  | APP-Pending | US      | 62/789363     |              |                    |   |
| 10510 | PRACH AND PUCCH DESIGN FOR MF-LITE                                                                                                                               |        |               | PSP  | APP-Pending | US      | 62/788077     |              |                    |   |
| 10511 | SIGNALING METHODS FOR SEMI-STATIC CONFIGURATION REGARDING NOT AVAILABLE HARD AND SOFT AND RESOURCES IN IAB                                                       |        |               | PSP  | APP-Pending | US      | 62/790386     |              |                    |   |
| 10512 | LOW-LATENCY UPLINK (UL) SCHEDULING REQUESTS                                                                                                                      |        |               | PSP  | APP-Pending | US      | 62/790800     |              |                    |   |
| 10513 | REFERENCE SIGNAL DESIGN FOR A SYSTEM OPERATING ABOVE 526 GIGAHERTZ (GHZ) CARRIER FREQUENCY                                                                       |        |               | PSP  | APP-Pending | US      | 62/790978     |              |                    |   |
| 10514 | METHOD AND APPARATUS FOR RACH OPTIMIZATION AND AUTOMATIC NEIGHBOR RELATION CREATION FOR 5G NETWORKS                                                              |        |               | PSP  | APP-Pending | US      | 62/789961     |              |                    |   |
| 10515 | ON THE CONTENTION WINDOW SIZE UPDATE FOR CAT4 LBT FOR CBG BASED RETRANSMISSION IN NR SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                    |        |               | PSP  | APP-Pending | US      | 62/790376     |              |                    |   |
| 10516 | SECURITY FRAMEWORK FOR MSG3 AND MSG4 IN EARLY DATA TRANSMISSION                                                                                                  |        |               | NP   | APP-Pending | US      | 16/294553     |              | US-2019-0208413-A1 |   |

|       | A                                                                                                                                                             | B      | C             | D    | E           | F       | G             | H            | I                  | J |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|------|-------------|---------|---------------|--------------|--------------------|---|
| 2     | TITLE                                                                                                                                                         | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10517 | SECURITY FRAMEWORK FOR MSG3 AND MSG4 IN EARLY DATA TRANSMISSION                                                                                               |        |               | ENT  | APP-Pending | US      | 16/407166     |              |                    |   |
| 10518 | DYNAMIC INDICATION OF SOFT RESOURCE AVAILABILITY VIA SR PROCEDURE IN IAB                                                                                      |        |               | PSP  | APP-Pending | US      | 62/790403     |              |                    |   |
| 10519 | FAILBACK PROCEDURE FOR 2-STEP RACH                                                                                                                            |        |               | PSP  | APP-Pending | US      | 62/790951     |              |                    |   |
| 10520 | CONTROLLING THE NUMBER OF BL-TO-UL AND UL-TO-DL SWITCHING POINTS WITHIN A SHARED COT IN NR SYSTEMS OPERATING ON UNLICENSED SPECTRUM                           |        |               | PSP  | APP-Pending | US      | 62/790766     |              |                    |   |
| 10521 | RESOURCE ALLOCATION FOR PHYSICAL UPLINK CONTROL CHANNEL DURING INITIAL ACCESS IN NR-UNLICENSED RACH RESOURCE COORDINATION MECHANISMS FOR ADJACENT HOPS IN IAB |        |               | PSP  | APP-Pending | US      | 62/790889     |              |                    |   |
| 10522 | ADJACENT HOPS IN IAB                                                                                                                                          |        |               | PSP  | APP-Pending | US      | 62/791417     |              |                    |   |
| 10523 | SIGNALING PROCEDURES FOR NR POSITIONING SUPPORT                                                                                                               |        |               | PSP  | APP-Pending | US      | 62/791486     |              |                    |   |
| 10524 | SIDELINK PHYSICAL LAYER PROCEDURES FOR COLLISION AVOIDANCE HARQ FEEDBACK AND CSI ACQUISITION                                                                  |        |               | PSP  | APP-Pending | US      | 62/791527     |              |                    |   |
| 10525 | METHOD FOR MEASUREMENT OF UE-TO-UE REFERENCE SIGNAL IN NEW RADIO (NR) NETWORKS WITH CROSS-LINK INTERFERENCE                                                   |        |               | PSP  | APP-Pending | US      | 62/791388     |              |                    |   |
| 10526 | METHOD OF RESOURCE ALLOCATION REFERENCE SIGNAL DESIGN AND BEAM MANAGEMENT FOR NR POSITIONING                                                                  |        |               | PSP  | APP-Pending | US      | 62/791569     |              |                    |   |
| 10527 | SIDELINK PROCEDURES AND STRUCTURES FOR TRANSMISSION AND RECEPTION OF NON-STANDALONE AND STANDALONE PSCCH                                                      |        |               | PSP  | APP-Pending | US      | 62/791572     |              |                    |   |
| 10528 | PORT MANAGEMENT FOR RELIABLE DATA SERVICE (RDS) PROTOCOL                                                                                                      |        |               | PSP  | APP-Pending | US      | 62/792080     |              |                    |   |
| 10529 | CORESET0 CONFIGURATION ENHANCEMENT FOR OFF-RASTER SSB IN IAB                                                                                                  |        |               | PSP  | APP-Pending | US      | 62/791446     |              |                    |   |
| 10530 | UE-TO-UE CROSSLINK INTERFERENCE MEASUREMENT AND REPORTING                                                                                                     |        |               | PSP  | APP-Pending | US      | 62/791653     |              |                    |   |
| 10531 | SYSTEM AND METHODS FOR SIGNALING MECHANISM FOR UE ASSISTANCE FEEDBACK                                                                                         |        |               | PSP  | APP-Pending | US      | 62/791689     |              |                    |   |
| 10532 | INTRA-UE MULTIPLEXING IN NEW RADIO SYSTEMS                                                                                                                    |        |               | PSP  | APP-Pending | US      | 62/791633     |              |                    |   |
| 10533 | PDCCH CANDIDATE SELECTION FOR MULTI-DCI NC JT FOR 5G NR                                                                                                       |        |               | PSP  | APP-Pending | US      | 62/791647     |              |                    |   |
| 10534 | METHOD FOR CONVEYING REMOTE INTERFERENCE MANAGEMENT INFORMATION VIA REFERENCE SIGNAL                                                                          |        |               | PSP  | APP-Pending | US      | 62/791703     |              |                    |   |
| 10535 | GRANT BASED PUSCH TRANSMISSION AND CONFIGURED GRANT BASED PUSCH TRANSMISSION IN NR SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                   |        |               | PSP  | APP-Pending | US      | 62/791701     |              |                    |   |
| 10536 | INFORMATION EXCHANGE FOR NETWORK COORDINATION OF UE-TO-UE CROSS-LINK INTERFERENCE MEASUREMENT                                                                 |        |               | PSP  | APP-Pending | US      | 62/791667     |              |                    |   |
| 10537 | USER EQUIPMENT PROCESSING TIME RELAXATION FOR MULTI-DCI NC JT PDSCH RECEPTION                                                                                 |        |               | PSP  | APP-Pending | US      | 62/791645     |              |                    |   |
| 10538 | COT SHARING PROCEDURE FOR CONFIGURED GRANTS IN NR SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                                                    |        |               | PSP  | APP-Pending | US      | 62/791690     |              |                    |   |
| 10539 | PRS DESIGN FOR QCL AND FRAME TIMING INFORMATION IN NR-U                                                                                                       |        |               | PSP  | APP-Pending | US      | 62/791697     |              |                    |   |
| 10540 | CROSS-CARRIER SCHEDULING WITH DIFFERENT NUMEROLOGIES                                                                                                          |        |               | PSP  | APP-Pending | US      | 62/791643     |              |                    |   |
| 10541 | NETWORK COORDINATION FOR CLI MITIGATION                                                                                                                       |        |               | PSP  | APP-Pending | US      | 62/791658     |              |                    |   |
| 10542 | OLUTION TO HANDLE V2X UE WITH DIFFERENT PCS RAT CAPABILITY IN 5GS                                                                                             |        |               | PSP  | APP-Pending | US      | 62/792268     |              |                    |   |
| 10543 | PHYSICAL DOWNLINK CONTROL CHANNEL DESIGN FOR DFT-S-OFDM WAVEFORM                                                                                              |        |               | PSP  | APP-Pending | US      | 62/795451     |              |                    |   |
| 10544 | FREQUENCY DOMAIN CHANNEL STATE INFORMATION (CSI) COMPRESSION                                                                                                  |        |               | PSP  | APP-Pending | US      | 62/794220     |              |                    |   |
| 10545 | AVOID USER EQUIPMENT TO TRIGGER MEASUREMENT REPORT AFTER EXIT CONDITIONAL HANDOVER                                                                            |        |               | PSP  | APP-Pending | US      | 62/793704     |              |                    |   |
| 10546 | METHODS FOR MULTI-TRP TRANSMISSION                                                                                                                            |        |               | PSP  | APP-Pending | US      | 62/793804     |              |                    |   |
| 10547 | SIDELINK CONNECTION ESTABLISHMENT DESIGN TO SUPPORT UNICAST AND GROUPCAST COMMUNICATION FOR NR V2X                                                            |        |               | PSP  | APP-Pending | US      | 62/793126     |              |                    |   |
| 10548 | METHODS FOR DATA REPETITION TRANSMISSION FOR HIGH RELIABLE COMMUNICATION                                                                                      |        |               | PSP  | APP-Pending | US      | 62/794285     |              |                    |   |
| 10549 | EVOLVED PACKET CORE (EPC) SOLUTION FOR RESTRICTED LOCAL OPERATOR SERVICES (RLOS) ACCESS USING DEVICE AUTHENTICATION                                           |        |               | PSP  | APP-Pending | US      | 62/794365     |              |                    |   |
| 10550 | SELECTION OF CORE NETWORK BASED ON SUPPORTED CELLULAR INTERNET OF THINGS (CIOT) FEATURES                                                                      |        |               | PSP  | APP-Pending | US      | 62/794099     |              |                    |   |
| 10551 | OPERATION OF EMTS AND NB-IOT UES WHEN CONNECTED TO 5G CN                                                                                                      |        |               | PSP  | APP-Pending | US      | 62/796487     |              |                    |   |
| 10552 | PRACH AND PUSCH DESIGN FOR MF-LITE                                                                                                                            |        |               | PSP  | APP-Pending | US      | 62/795214     |              |                    |   |



|       | A                                                                                                                  | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                              | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10553 | DATA TRANSFER OVER NAS CONTROL PLANE FOR CIOT IN 5GS                                                               |        |               | PSP  | APP-Pending | US      | 62/797012     |              |                    |   |
| 10554 | ENABLING UAS SERVICE FOR IDENTIFICATION AND OPERATION IN 3GPP SYSTEM                                               |        |               | PSP  | APP-Pending | US      | 62/802802     |              |                    |   |
| 10555 | DATA CHANNEL MAPPING TYPE AND DM-RS CONFIGURATION TO ENABLE L1 CL1 MEASUREMENT AND REPORTING                       |        |               | PSP  | APP-Pending | US      | 62/795771     |              |                    |   |
| 10556 | UE CAPABILITIES PROVISIONING AND RETRIEVAL IN CELLULAR NETWORKS                                                    |        |               | NP   | APP-Pending | US      | 16/376528     |              | US-2019-0239064-A1 |   |
| 10557 | RANDOM ACCESS RECEPTION AND MESSAGE 3 TRANSMISSION FOR NEW RADIO (NR) BASED SATELLITE COMMUNICATION                |        |               | PSP  | APP-Pending | US      | 62/796976     |              |                    |   |
| 10558 | TRANSPORT BLOCK SIZE (TBS) DETERMINATION IN FULL-DIMENSION MULTIPLE-INPUT MULTIPLE-OUTPUT (FD MIMO) NETWORKS       |        |               | NP   | APP-Pending | US      | 16/371970     |              | US-2019-0230699-A1 |   |
| 10559 | CONFIGURATION AND DESIGN OF CSI AND MCS TABLES FOR 5G COMMUNICATIONS                                               |        |               | NP   | APP-Pending | US      | 16/372877     |              | US-2019-0253121-A1 |   |
| 10560 | SYSTEM INFORMATION IN UNLICENSED NARROWBAND INTERNET OF THINGS (NB-IOT) SYSTEMS                                    |        |               | NP   | APP-Pending | US      | 16/384672     |              | US-2019-0246464-A1 |   |
| 10561 | CHANNEL CONFIGURATION AND DOWNLINK/ULINK CONFIGURATION FOR NARROW BAND INTERNET OF THINGS (NB-IOT) SYSTEMS         |        |               | NP   | APP-Pending | US      | 16/388128     |              | US-2019-0258013-A1 |   |
| 10562 | CHANNEL STATE INFORMATION REFERENCE SIGNAL (CSI-RS) AND SOUNDING REFERENCE SIGNAL (SRS) TRIGGERING                 |        |               | NP   | APP-Pending | US      | 16/397916     |              | US-2019-0273637-A1 |   |
| 10563 | CHANNEL STATE INFORMATION REFERENCE SIGNAL (CSI-RS) AND SOUNDING REFERENCE SIGNAL (SRS) TRIGGERING                 |        |               | CNT  | APP-Pending | US      | 16/408375     |              | US-2019-0327115-A1 |   |
| 10564 | DOWNLINK RECEPTION SIGNAL COLLISION AVOIDANCE                                                                      |        |               | PSP  | APP-Pending | US      | 62/798881     |              |                    |   |
| 10565 | SCHEDULING OF PDSCH TRANSMISSION WITH DFT-S-OFDM WAVEFORM                                                          |        |               | PSP  | APP-Pending | US      | 62/798942     |              |                    |   |
| 10566 | PUCCH AND PUSCH DEFAULT BEAM CONSIDERING BEAM FAILURE RECOVERY                                                     |        |               | NP   | APP-Pending | US      | 16/298416     |              | US-2019-0236730-A1 |   |
| 10567 | PUCCH AND PUSCH DEFAULT BEAM CONSIDERING BEAM FAILURE RECOVERY                                                     |        |               | CNT  | APP-Pending | US      | 16/407881     |              | US-2019-0335524-A1 |   |
| 10568 | MECHANISMS TO CONVERGE THE WI-FI ACCESS NETWORK WITH THE 5G NR ACCESS NETWORK WITHIN THE RADIO ACCESS NETWORK      |        |               | PSP  | APP-Pending | US      | 62/798380     |              |                    |   |
| 10569 | FAST RETURN TO 5GS AFTER HANDOVER TO EPS DUE TO EPS FALLBACK FROM 5GS                                              |        |               | PSP  | APP-Pending | US      | 62/798303     |              |                    |   |
| 10570 | V2X UE WITH DIFFERENT PCS RAT CAPABILITY IN 5GS                                                                    |        |               | PSP  | APP-Pending | US      | 62/798361     |              |                    |   |
| 10571 | SINGLE RADIO VOICE CALL CONTINUITY HANDOVER                                                                        |        |               | NP   | APP-Pending | US      | 16/273975     |              | US-2019-0182718-A1 |   |
| 10572 | PRACH AND PUSCH DESIGN FOR NF-LTE                                                                                  |        |               | PSP  | APP-Pending | US      | 62/798898     |              |                    |   |
| 10573 | METHODS FOR TIMING OFFSET SIGNALING FOR CROSS-LINK INTERFERENCE (CLI) MEASUREMENT                                  |        |               | PSP  | APP-Pending | US      | 62/800763     |              |                    |   |
| 10574 | SOLUTION FOR 5GC TO NOTIFY V2X UE WHETHER V2X SERVICE IS SUPPORTED OR AUTHORIZED                                   |        |               | PSP  | APP-Pending | US      | 62/800808     |              |                    |   |
| 10575 | ON THE FRAME STRUCTURE DESIGN FOR SINGLE CARRIER WAVEFORM                                                          |        |               | PSP  | APP-Pending | US      | 62/800360     |              |                    |   |
| 10576 | CROSS-LINK INTERFERENCE (CLI) MEASUREMENT REPORTING                                                                |        |               | PSP  | APP-Pending | US      | 62/801022     |              |                    |   |
| 10577 | TRS SETUP IN RRM TESTING                                                                                           |        |               | PSP  | APP-Pending | US      | 62/800957     |              |                    |   |
| 10578 | ENABLING INTERACTIVE SERVICE FOR CLOUD RENDERING GAMING IN 5GS                                                     |        |               | PSP  | APP-Pending | US      | 62/802153     |              |                    |   |
| 10579 | A NOVEL SCHEDULING RESTRICTION METHOD FOR INTRA-FREQUENCY MEASUREMENT                                              |        |               | PSP  | APP-Pending | US      | 62/800398     |              |                    |   |
| 10580 | NR RRM ENHANCEMENTS IN MEASUREMENT EVENT AND REPORTING AND CELL RESELECTION CRITERIA FOR UNLICENSED BAND OPERATION |        |               | PSP  | APP-Pending | US      | 62/805156     |              |                    |   |
| 10581 | MAC FORMAT FOR MSGA AND MSGB IN 2-STEP RA PROCEDURE                                                                |        |               | PSP  | APP-Pending | US      | 62/805158     |              |                    |   |
| 10582 | REPETITION CONFIGURATION FOR REMOTE INTERFERENCE MANAGEMENT-REFERENCE SIGNAL (RM-RS) TRANSMISSIONS                 |        |               | PSP  | APP-Pending | US      | 62/802626     |              |                    |   |
| 10583 | FRAME-BASED EQUIPMENT MODE OF OPERATION FOR NEW RADIO-UNLICENSED SYSTEMS AND NETWORKS                              |        |               | PSP  | APP-Pending | US      | 62/804532     |              |                    |   |
| 10584 | QUALITY REPORT IN MSG3 FOR REL-16 E-UTRA AND NB-IOT                                                                |        |               | PSP  | APP-Pending | US      | 62/804969     |              |                    |   |

|       | A                                                                                                                                                            | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                        | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10585 | Systems and Methods for Physical Random Access Channel Transmissions                                                                                         |        |               | NP   | APP-Pending | US      | 16/376333     |              | US-2019-0236283-A1 |   |
| 10586 | METHODS FOR PROVISIONING AUDIO-VIDEO MEDIA PRODUCTION SERVICES IN THE 5G SYSTEM                                                                              |        |               | PSP  | APP-Pending | US      | 62/803332     |              |                    |   |
| 10587 | REGISTRATION MANAGEMENT IN INFORMATION CENTRIC NETWORKING FOR NEXT GENERATION CELLULAR NETWORKS                                                              |        |               | PSP  | APP-Pending | US      | 62/805869     |              |                    |   |
| 10588 | SERVICE REQUEST PROCEDURES IN INFORMATION CENTRIC NETWORKING FOR NEXT GENERATION CELLULAR NETWORKS                                                           |        |               | PSP  | APP-Pending | US      | 62/805834     |              |                    |   |
| 10589 | PER-LINK SEMI-STATIC RESOURCE CONFIGURATION SCHEMES FOR AN INTEGRATED ACCESS AND BACKHAUL (IAB) DISTRIBUTED UNIT (DU)                                        |        |               | PSP  | APP-Pending | US      | 62/804632     |              |                    |   |
| 10590 | SLOT FORMATS FOR SEMI-STATIC DOWNLINK-UPLINK (DL-UL) CONFIGURATION AND DYNAMIC SLOT FORMAT INDICATION (SFI) IN INTEGRATED ACCESS AND BACKHAUL (IAB) NETWORKS |        |               | PSP  | APP-Pending | US      | 62/804674     |              |                    |   |
| 10591 | SUPPORT OF LOCATION MANAGEMENT FUNCTIONALITY IN RAN                                                                                                          |        |               | PSP  | APP-Pending | US      | 62/804485     |              |                    |   |
| 10592 | MEASUREMENT GAP DESIGN FOR NR-DC MODE                                                                                                                        |        |               | PSP  | APP-Pending | US      | 62/804110     |              |                    |   |
| 10593 | SYSTEM AND METHOD FOR EMISSION AND POWER AWARE BEAM SELECTION                                                                                                |        |               | PSP  | APP-Pending | US      | 62/805873     |              |                    |   |
| 10594 | ENHANCED BEAM RECOVERY                                                                                                                                       |        |               | PSP  | APP-Pending | US      | 62/804080     |              |                    |   |
| 10595 | CORE NETWORK SUPPORT FOR DELAY BUDGET INFORMATION (DBI) SIGNALING IN IMS MULTIMEDIA SESSIONS                                                                 |        |               | PSP  | APP-Pending | US      | 62/804592     |              |                    |   |
| 10596 | SIP REGISTRATION PROCEDURE FOR ANBR CAPABILITY SIGNALING                                                                                                     |        |               | PSP  | APP-Pending | US      | 62/805204     |              |                    |   |
| 10597 | ON THE CONTENTION WINDOW SIZE UPDATE FOR CAT4 LBT FOR CBG BASED RETRANSMISSION IN NR SYSTEMS                                                                 |        |               | PSP  | APP-Pending | US      | 62/804107     |              |                    |   |
| 10598 | OPERATING ON UNLICENSED SPECTRUM                                                                                                                             |        |               | PSP  | APP-Pending | US      | 62/805192     |              |                    |   |
| 10599 | BROADCASTING SCHEMES OF Delta INFORMATION IN FIFTH GENERATION (5G) NEW RADIO (NR) INTEGRATED ACCESS AND BACKHAUL (IAB) NETWORK                               |        |               | PSP  | APP-Pending | US      | 62/805192     |              |                    |   |
| 10600 | METHOD AND SYSTEM FOR PERFORMANCE THRESHOLD MONITORING SERVICE AND MANAGEMENT DATA STREAMING CONNECTION OPERATIONS                                           |        |               | PSP  | APP-Pending | US      | 62/804698     |              |                    |   |
| 10601 | SYSTEM AND METHOD TO DEPLOY OF UPF AND EDGE COMPUTING VNFs IN NFV ENVIRONMENT NETWORKS                                                                       |        |               | PSP  | APP-Pending | US      | 62/804695     |              |                    |   |
| 10602 | SYSTEM INFORMATION DESIGN FOR NEW RADIO (NR) VEHICLE-TO-EVERYTHING (V2X) SIDELINK OPERATION                                                                  |        |               | PSP  | APP-Pending | US      | 62/805234     |              |                    |   |
| 10603 | METHODS FOR TRANSMISSION RETRANSMISSION AND HARQ PROCESS FOR PUR IN IDLE MODE                                                                                |        |               | PSP  | APP-Pending | US      | 62/805162     |              |                    |   |
| 10604 | METHOD OF TYPE II CSI REPORTING FOR MULTIPLE SPATIAL LAYERS                                                                                                  |        |               | PSP  | APP-Pending | US      | 62/805892     |              |                    |   |
| 10605 | REDIRECTION FROM GSM EDGE RADIO ACCESS NETWORK (GERAN) BANDS TO EVOLVED UTM TERRESTRIAL RADIO ACCESS NETWORK (EUTRAN) BANDS                                  |        |               | PSP  | APP-Pending | US      | 62/824858     |              |                    |   |
| 10606 | METHOD FOR SCCELL BEAM FAILURE RECOVERY OPERATION IN NR                                                                                                      |        |               | PSP  | APP-Pending | US      | 62/805864     |              |                    |   |
| 10607 | MT ASSUMED SSB PERIODICITY FOR CELL RESELECTION IN 5G-NR IAB                                                                                                 |        |               | PSP  | APP-Pending | US      | 62/805203     |              |                    |   |
| 10608 | PERFORMANCE MEASUREMENTS RELATED TO REGISTRATION VIA UNTRUSTED NON-3GPP ACCESS AND INTER-RAT HANDOVERS                                                       |        |               | PSP  | APP-Pending | US      | 62/805242     |              |                    |   |
| 10609 | SYSTEM AND METHOD FOR 5G SON FOR MOBILITY ROBUSTNESS OPTIMIZATION AND AUTOMATIC NETWORK SLICE CREATION                                                       |        |               | PSP  | APP-Pending | US      | 62/805248     |              |                    |   |
| 10610 | SYSTEM AND METHOD FOR UE TRIGGERED CSRS                                                                                                                      |        |               | PSP  | APP-Pending | US      | 62/805517     |              |                    |   |
| 10611 | TECHNOLOGIES FOR DYNAMICALLY CONFIGURING UE SR5 RESOURCES                                                                                                    |        |               | PSP  | APP-Pending | US      | 62/805518     |              |                    |   |
| 10612 | MEASURING NR RSRP BY OTA                                                                                                                                     |        |               | PSP  | APP-Pending | US      | 62/805542     |              |                    |   |
| 10613 | CLI-RSSI MEASUREMENT RESOURCE CONFIGURATION                                                                                                                  |        |               | PSP  | APP-Pending | US      | 62/805575     |              |                    |   |
| 10614 | ON COLLISION HANDLING OF MSGA PUSCH IN 2-STEP RACH AND OTHER UPLINK CHANNELS                                                                                 |        |               | PSP  | APP-Pending | US      | 62/805912     |              |                    |   |
| 10615 | CHANNEL OCCUPANCY TIME (COT) STRUCTURE IN NEW RADIO (NR) SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                                            |        |               | PSP  | APP-Pending | US      | 62/805267     |              |                    |   |
| 10616 | GRANT BASED PUSCH TRANSMISSION AND CONFIGURED GRANT BASED PUSCH TRANSMISSION IN NR SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                  |        |               | PSP  | APP-Pending | US      | 62/805270     |              |                    |   |

|       | A                                                                                                                                                                                                 | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                                                             | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10616 | DOWNLINK (DL) POSITIONING REFERENCE SIGNAL (PRS) BANDWIDTH PART (BWP) CONFIGURATION REFERENCE SIGNAL DESIGN AND USER EQUIPMENT (UE) BASED POSITIONING ENHANCEMENTS FOR NEW RADIO (NR) POSITIONING |        |               | PSP  | APP-Pending | US      | 62/805834     |              |                    |   |
| 10617 | METHODS THAT MAKE THE NR CARRIER AGGREGATION MORE EFFECTIVE                                                                                                                                       |        |               | PSP  | APP-Pending | US      | 62/806230     |              |                    |   |
| 10618 | METHODS OF ENSURING FAIRNESS IN A MULTI-HOP RELAY NETWORK                                                                                                                                         |        |               | PSP  | APP-Pending | US      | 62/805723     |              |                    |   |
| 10619 | SYSTEMS AND METHODS FOR AUTONOMOUS VEHICLE COMMUNICATION                                                                                                                                          |        |               | NP   | APP-Pending | US      | 16/368560     |              |                    |   |
| 10620 | CONTIGUOUS CONFIGURED AND GRANT-BASED UL TRANSMISSIONS ON NR-U SYSTEMS                                                                                                                            |        |               | PSP  | APP-Pending | US      | 62/805555     |              |                    |   |
| 10621 | DESIGN OF NR SIDELINK SYNCHRONIZATION SIGNAL FOR V2X USE CASES WITH OPTIMIZED RX PROCESSING                                                                                                       |        |               | PSP  | APP-Pending | US      | 62/805818     |              |                    |   |
| 10622 | METHODS FOR SNR ES AND NOC SETUP FOR NR PERFORMANCE REQUIREMENTS                                                                                                                                  |        |               | PSP  | APP-Pending | US      | 62/805861     |              |                    |   |
| 10623 | RECEIVE ANTENNA RELATIVE PHASE MEASUREMENTS FOR NR                                                                                                                                                |        |               | PSP  | APP-Pending | US      | 62/805919     |              |                    |   |
| 10624 | APERIODIC QUALITY REPORT IN CONNECTED MODE USING QUALITY DEFINITION AS IN MSG3 FOR REL-16 5MTC                                                                                                    |        |               | PSP  | APP-Pending | US      | 62/805917     |              |                    |   |
| 10625 | METHODS FOR SIMULTANEOUS SUPPORT OF AND SWITCHING BETWEEN SCHEDULED AND UE AUTONOMOUS RESOURCE SELECTION MODES FOR NR V2X SIDELINK                                                                |        |               | PSP  | APP-Pending | US      | 62/805728     |              |                    |   |
| 10626 | SYSTEM AND METHOD OF ADAPTATION OF REFERENCE SIGNAL (RS) MONITORING FOR UE POWER SAVING                                                                                                           |        |               | PSP  | APP-Pending | US      | 62/806537     |              |                    |   |
| 10627 | 2-STEP RACH INITIATED BY PDCCH ORDER                                                                                                                                                              |        |               | PSP  | APP-Pending | US      | 62/806203     |              |                    |   |
| 10628 | INTER-GNB EXCHANGE FOR INTENDED UL/DL DIRECTIONS                                                                                                                                                  |        |               | PSP  | APP-Pending | US      | 62/806207     |              |                    |   |
| 10629 | NR - COT SHARING PROCEDURE FOR CONFIGURED GRANTS IN NR SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                                                                                   |        |               | PSP  | APP-Pending | US      | 62/806199     |              |                    |   |
| 10630 | WIDEBAND INTERLACE DESIGN FOR PHYSICAL UPLINK CHANNEL IN NR UNLICENSED                                                                                                                            |        |               | PSP  | APP-Pending | US      | 62/806701     |              |                    |   |
| 10631 | SECONDARY CELL BEAM RECOVERY                                                                                                                                                                      |        |               | PSP  | APP-Pending | US      | 62/807186     |              |                    |   |
| 10632 | TECHNOLOGIES FOR PROTECTING AGAINST VICTIM MASQUERADE ATTACK IN REMOTE INTERFERENCE MANAGEMENT                                                                                                    |        |               | PSP  | APP-Pending | US      | 62/806246     |              |                    |   |
| 10633 | MEASUREMENT TIMING ADJUSTMENT FOR SRS-PSP MEASUREMENT                                                                                                                                             |        |               | PSP  | APP-Pending | US      | 62/806515     |              |                    |   |
| 10634 | METHOD FOR INITIALIZATION SEED GENERATION FOR PN SEQUENCES IN REMOTE INTERFERENCE MANAGEMENT                                                                                                      |        |               | PSP  | APP-Pending | US      | 62/806566     |              |                    |   |
| 10635 | RESOURCE ALLOCATION FOR MULTI-TRP URLLC                                                                                                                                                           |        |               | PSP  | APP-Pending | US      | 62/806540     |              |                    |   |
| 10636 | DEMODULATION REFERENCE SIGNAL (DMRS) INDICATION FOR SINGLE DOWNLINK CONTROL INFORMATION (DCI) MULTI-TRANSMISSION RECEPTION POINT (TRP) TRANSMISSION                                               |        |               | PSP  | APP-Pending | US      | 62/806644     |              |                    |   |
| 10637 | SYSTEMS AND METHODS FOR INTRA-UE MULTIPLEXING IN NEW RADIO (NR)                                                                                                                                   |        |               | PSP  | APP-Pending | US      | 62/806701     |              |                    |   |
| 10638 | SYSTEM AND METHOD FOR UPLINK PANEL SELECTION WITH POWER SAVING                                                                                                                                    |        |               | PSP  | APP-Pending | US      | 62/807186     |              |                    |   |
| 10639 | LOCATION SERVICES (LCS) CLIENT IN A NEXT GENERATION (NG) RADIO ACCESS NETWORK (RAN)                                                                                                               |        |               | PSP  | APP-Pending | US      | 62/806576     |              |                    |   |
| 10640 | OPERATIONS AND NOTIFICATIONS FOR PERFORMANCE MANAGEMENT OF 5G NETWORKS AND NETWORK SLICING                                                                                                        |        |               | NP   | APP-Pending | US      | 16/396312     |              | US-2019-0253912-A1 |   |
| 10641 | OPERATIONS AND NOTIFICATIONS FOR PERFORMANCE MANAGEMENT OF 5G NETWORKS AND NETWORK SLICING                                                                                                        |        |               | CNT  | APP-Pending | US      | 15/408446     |              | US-2019-0395350-A1 |   |
| 10642 | MANAGING VIRTUAL LINKS IN A NETWORK SERVICE INSTANCE                                                                                                                                              |        |               | NP   | APP-Pending | US      | 15/357959     |              | US-2019-0280938-A1 |   |
| 10643 | MANAGING VIRTUAL LINKS IN A NETWORK SERVICE INSTANCE                                                                                                                                              |        |               | CNT  | APP-Pending | US      | 16/408446     |              | US-2019-0334763-A1 |   |
| 10644 | Enhancements on Random Access for NR-Unlicensed                                                                                                                                                   |        |               | NP   | APP-Pending | US      | 15/369187     |              | US-2019-0223255-A1 |   |
| 10645 | ON RADIO LINK MONITORING FOR HIGH SPEED SCENARIO                                                                                                                                                  |        |               | PSP  | APP-Pending | US      | 62/808725     |              |                    |   |
| 10646 | CELL ACTIVATION AND DEACTIVATION DELAY FOR CA IN HIGH SPEED SCENARIO                                                                                                                              |        |               | PSP  | APP-Pending | US      | 62/808726     |              |                    |   |

|       | A                                                                                                                                                                                                                                             | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                                                                                                         | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10647 | SYSTEM AND METHODS ON PUSCH REPETITION TERMINATION IN NR                                                                                                                                                                                      |        |               | PSP  | APP-Pending | US      | 62/808728     |              |                    |   |
| 10648 | RADIO RESOURCE MANAGEMENT (RRM) TESTING USING ARRIVAL OF ANGLES (AOA)                                                                                                                                                                         |        |               | PSP  | APP-Pending | US      | 62/809396     |              |                    |   |
| 10649 | UL RETRANSMISSION AND RLF RECOVERY IN A MULTI-HOP RELAY NETWORK                                                                                                                                                                               |        |               | PSP  | APP-Pending | US      | 62/810123     |              |                    |   |
| 10650 | ENHANCED CA RRM MEASUREMENT IN HIGH SPEED SCENARIO                                                                                                                                                                                            |        |               | PSP  | APP-Pending | US      | 62/809439     |              |                    |   |
| 10651 | PCDP DESIGN FOR REDUCTION OF HANDOVER INTERRUPTION                                                                                                                                                                                            |        |               | PSP  | APP-Pending | US      | 62/809441     |              |                    |   |
| 10652 | COMPRESSION AND DECOMPRESSION OF INFORMATION CENTRIC NETWORKING NAMES AT THE PCDP                                                                                                                                                             |        |               | PSP  | APP-Pending | US      | 62/811829     |              |                    |   |
| 10653 | DESIGN AND IMPLEMENTATION OF UCI ON PUSCH FOR MF-LITE                                                                                                                                                                                         |        |               | PSP  | APP-Pending | US      | 62/812166     |              |                    |   |
| 10654 | METHOD FOR DETERMINING THE CONTENT OF A RETRANSMISSION                                                                                                                                                                                        |        |               | PSP  | APP-Pending | US      | 62/820580     |              |                    |   |
| 10655 | DEFINING USER EQUIPMENT (UE) DOWNLINK (DL) MEASUREMENT AND DEMODULATION PERFORMANCE REQUIREMENTS AND MITIGATING AGAINST INTER-CARRIER INTERFERENCE (ICI) ISSUES DUE TO FREQUENCY DOMAIN MULTIPLEXED (FDM) DL CHANNELS WITH MIXED NUMEROLOGIES |        |               | PSP  | APP-Pending | US      | 62/815234     |              |                    |   |
| 10656 | BALANCING TIME RESOURCE ALLOCATION TO C-V2X AND ITS-55 OR DSRC DEPENDING ON USER CONFIGURATIONS                                                                                                                                               |        |               | PSP  | APP-Pending | US      | 62/820145     |              |                    |   |
| 10657 | METHODS FOR ENHANCED RANDOM ACCESS FOR RELAY NODE                                                                                                                                                                                             |        |               | PSP  | APP-Pending | US      | 62/815907     |              |                    |   |
| 10658 | ENHANCED AUTONOMOUS UPLINK TIMING ADJUSTMENT                                                                                                                                                                                                  |        |               | PSP  | APP-Pending | US      | 62/815213     |              |                    |   |
| 10659 | SSB PATTERN AND DMRS DESIGN FOR PBCH FOR ABOVE 526GHZ CARRIER FREQUENCY                                                                                                                                                                       |        |               | PSP  | APP-Pending | US      | 62/818369     |              |                    |   |
| 10660 | MEASUREMENT OBJECTS IN A NEW RADIO (NR) SYSTEM                                                                                                                                                                                                |        |               | NP   | APP-Pending | US      | 16/373065     |              | US-2019-0230550-A1 |   |
| 10661 | MEASUREMENT OBJECTS IN A NEW RADIO (NR) SYSTEM                                                                                                                                                                                                |        |               | CNT  | APP-Pending | US      | 16/408250     |              |                    |   |
| 10662 | INTER-RELAY NODE DISCOVERY AND MEASUREMENTS                                                                                                                                                                                                   |        |               | PSP  | APP-Pending | US      | 62/816697     |              |                    |   |
| 10663 | NEXT GENERATION NODE-B (gNB) FOR INTEGRATED ACCESS AND BACKHAUL (IAB) RELAY IN NEW RADIO (NR) NETWORKS                                                                                                                                        |        |               | NP   | APP-Pending | US      | 16/366739     |              | US-2019-0223978-A1 |   |
| 10664 | METHODS OF BEAM MANAGEMENT AND BEAM SELECTION BASED ON MEASUREMENT REPORTING IN NEW RADIO (NR) SYSTEMS                                                                                                                                        |        |               | NP   | APP-Pending | US      | 16/379047     |              | US-2019-0238208-A1 |   |
| 10665 | TECHNOLOGIES TO DETERMINE SUPPORT OF IMS VOICE OVER PS SESSIONS IN A 5G MOBILE NETWORK                                                                                                                                                        |        |               | PSP  | APP-Pending | US      | 62/819284     |              |                    |   |
| 10666 | HANDLING OF CONCURRENT 3GPP AND NON-3GPP ACCESS IN THE 5G SYSTEM                                                                                                                                                                              |        |               | PSP  | APP-Pending | US      | 62/821959     |              |                    |   |
| 10667 | HIGHER LAYER CONFIGURATION FOR MF-LITE SYSTEMS IN GLOBAL MODE OF OPERATION                                                                                                                                                                    |        |               | PSP  | APP-Pending | US      | 62/816772     |              |                    |   |
| 10668 | AUTOMATED REMOTE ID MONITORING NETWORK                                                                                                                                                                                                        |        |               | PSP  | APP-Pending | US      | 62/818526     |              |                    |   |
| 10669 | HIGHER LAYER CONFIGURATION FOR MF-LITE SYSTEMS IN GLOBAL MODE OF OPERATION                                                                                                                                                                    |        |               | PSP  | APP-Pending | US      | 62/817351     |              |                    |   |
| 10670 | CWS ADJUSTMENT FOR DL TRANSMISSIONS FOR STANDALONE MODE IN NR SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                                                                                                                        |        |               | PSP  | APP-Pending | US      | 62/818376     |              |                    |   |
| 10671 | SYSTEM AND METHOD OF PHASE TRACKING REFERENCE SIGNAL TRANSMISSION FOR OFDM                                                                                                                                                                    |        |               | PSP  | APP-Pending | US      | 62/818611     |              |                    |   |
| 10672 | RELAY NODE RESOURCE HANDLING                                                                                                                                                                                                                  |        |               | PSP  | APP-Pending | US      | 62/818343     |              |                    |   |
| 10673 | PHYSICAL RESOURCE BLOCK BUNDLING IN MULTI-TRIP OPERATION                                                                                                                                                                                      |        |               | PSP  | APP-Pending | US      | 62/821338     |              |                    |   |
| 10674 | PHYSICAL RANDOM ACCESS CHANNEL (PRACH) AND PHYSICAL UPLINK CONTROL CHANNEL (PUCCH) DESIGN FOR MF-LITE                                                                                                                                         |        |               | PSP  | APP-Pending | US      | 62/821922     |              |                    |   |
| 10675 | CONFIGURATIONS FOR MF-LITE SYSTEMS IN GLOBAL OPERATION MODE                                                                                                                                                                                   |        |               | PSP  | APP-Pending | US      | 62/821830     |              |                    |   |
| 10676 | ON COLLISION HANDLING OF MSGA PHYSICAL UPLINK SHARED CHANNEL (PUSCH) IN 2 STEP RANDOM ACCESS CHANNEL (RACH) AND OTHER UPLINK CHANNELS                                                                                                         |        |               | PSP  | APP-Pending | US      | 62/821585     |              |                    |   |
| 10677 | SIGNALING FOR INACTIVE SMALL DATA TRANSMISSION WITHOUT PATH SWITCHING                                                                                                                                                                         |        |               | PSP  | APP-Pending | US      | 62/820766     |              |                    |   |
| 10678 | DATA FORWARDING IN MR-DC WITH 5GC OPERATIONS INVOLVING SN CHANGE                                                                                                                                                                              |        |               | PSP  | APP-Pending | US      | 62/820143     |              |                    |   |
| 10679 | ON THE CONTENTION WINDOW SIZE UPDATE FOR CAT4 LBT FOR CBG BASED RETRANSMISSION IN NR SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                                                                                                 |        |               | PSP  | APP-Pending | US      | 62/821847     |              |                    |   |

|       | A                                                                                                                                                                        | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                                    | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10680 | UE BEHAVIOR AND RESTRICTIONS FOR GLOBAL MODE IN MF-LITE SYSTEM                                                                                                           |        |               | PSP  | APP-Pending | US      | 62/821588     |              |                    |   |
| 10681 | SIGNALING FOR PARENT DU REGARDING ITS CHILD DU RESOURCE ALLOCATION IN 5G-NR IAB                                                                                          |        |               | PSP  | APP-Pending | US      | 62/822373     |              |                    |   |
| 10682 | User Equipment (UE) Downlink Transmission Configuration Indication (TCI) State Selection                                                                                 |        |               | NP   | APP-Pending | US      | 16/406504     |              | US-2019-0281587-A1 |   |
| 10683 | SYMBOL PUNCTURE FOR UNLICENSED NARROWBAND INTERNET OF THINGS (NB-IOT)                                                                                                    |        |               | NP   | APP-Pending | US      | 16/406282     |              | US-2019-0268970-A1 |   |
| 10684 | MULTIPLEXING PHYSICAL UPLINK CONTROL CHANNELS IN A SLOT FOR A NEW RADIO (NR) SYSTEM                                                                                      |        |               | NP   | APP-Pending | US      | 16/404608     |              | US-2019-0261363-A1 |   |
| 10685 | UE USING UPLINK GRANT-BASED TRANSMISSIONS AND EXTENDED POWER GRANT-FREE NOMA TRANSMISSIONS                                                                               |        |               | NP   | APP-Pending | US      | 16/408924     |              | US-2019-0289628-A1 |   |
| 10686 | METHODS FOR DATA TRANSMISSION IN RELAY NODE                                                                                                                              |        |               | PSP  | APP-Pending | US      | 62/822584     |              |                    |   |
| 10687 | RESERVATION SIGNAL TO AVOID THE GAP FOR PUSCH TRANSMISSION IN THE MF-LITE SYSTEM                                                                                         |        |               | PSP  | APP-Pending | US      | 62/822366     |              |                    |   |
| 10688 | URL BT FAILURES HANDLING IN NR UNLICENSED                                                                                                                                |        |               | PSP  | APP-Pending | US      | 62/823460     |              |                    |   |
| 10689 | TIME-DOMAIN RESOURCE ALLOCATION FOR CONFIGURED GRANT TRANSMISSIONS IN NEW RADIO (NR) SYSTEMS                                                                             |        |               | PSP  | APP-Pending | US      | 62/821911     |              |                    |   |
| 10690 | SIGNALING DESIGN FOR REGIONAL OPERATION FOR MF-LITE                                                                                                                      |        |               | PSP  | APP-Pending | US      | 62/821595     |              |                    |   |
| 10691 | CROSS-LINK INTERFERENCE (CLI) RADIO RESOURCE MANAGEMENT (RRM) MEASUREMENT                                                                                                |        |               | PSP  | APP-Pending | US      | 62/822507     |              |                    |   |
| 10692 | COEFFICIENT REPORTING FOR TYPE II CHANNEL STATE INFORMATION (CSI)                                                                                                        |        |               | PSP  | APP-Pending | US      | 62/822334     |              |                    |   |
| 10693 | INTEGRITY PROTECTION OF UPLINK (UL) DATA                                                                                                                                 |        |               | PSP  | APP-Pending | US      | 62/824126     |              |                    |   |
| 10694 | ON THE APPLICATION OF TWO-STEP RACH FOR NR WITH UNLICENSED OPERATION                                                                                                     |        |               | PSP  | APP-Pending | US      | 62/824893     |              |                    |   |
| 10695 | LINK ESTABLISHMENT IN RELAY NODES                                                                                                                                        |        |               | PSP  | APP-Pending | US      | 62/824171     |              |                    |   |
| 10696 | NOTIFICATION AND ACQUISITION OF ETWS/CMAAS IN CONNECTED MODE FOR UES IN CE                                                                                               |        |               | PSP  | APP-Pending | US      | 62/824143     |              |                    |   |
| 10697 | SCHEDULING RESTRICTION DUE TO UE SIMULTANEOUS RX/TX CAPABILITY IN INTER-BAND CA OR DC                                                                                    |        |               | PSP  | APP-Pending | US      | 62/824143     |              |                    |   |
| 10698 | SYSTEM AND METHOD FOR BEAM FAILURE RECOVERY                                                                                                                              |        |               | PSP  | APP-Pending | US      | 62/822510     |              |                    |   |
| 10699 | METHODS FOR ETHERNET HEADER COMPRESSION                                                                                                                                  |        |               | PSP  | APP-Pending | US      | 62/824905     |              |                    |   |
| 10700 | GRANT BASED PHYSICAL UPLINK SHARED CHANNEL (PUSCH) TRANSMISSION AND CONFIGURED GRANT BASED PUSCH TRANSMISSION IN NEW RADIO (NR) SYSTEMS OPERATING ON UNLICENSED SPECTRUM |        |               | PSP  | APP-Pending | US      | 62/824986     |              |                    |   |
| 10701 | ASSISTANCE INFORMATION INDICATION FOR RAT AND INTERFACE SELECTION FOR NEW RADIO VEHICLE-TO-EVERYTHING (V2X)                                                              |        |               | PSP  | APP-Pending | US      | 62/824924     |              |                    |   |
| 10702 | SIDELINK ADMISSION CONTROL: MECHANISMS FOR NEW RADIO SYSTEMS                                                                                                             |        |               | PSP  | APP-Pending | US      | 62/824726     |              |                    |   |
| 10703 | INDICATION OF THE NUMBER OF REPETITIONS FOR DCI FORMAT 3/3A FOR EMTCC                                                                                                    |        |               | PSP  | APP-Pending | US      | 62/825623     |              |                    |   |
| 10704 | DESIGN OF USER EQUIPMENT GROUP PHYSICAL DOWNLINK CONTROL CHANNEL BASED WAKE UP SIGNAL OR CHANNEL                                                                         |        |               | PSP  | APP-Pending | US      | 62/826818     |              |                    |   |
| 10705 | ENABLING MULTIPLE STARTING SYMBOL OCCASIONS FOR CONFIGURED GRANTS IN NEW RADIO (NR) SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                             |        |               | PSP  | APP-Pending | US      | 62/825649     |              |                    |   |
| 10706 | METHODS FOR DISCONTINUOUS RECEPTION AND ENERGY SAVINGS IN NR BASED UNLICENSED CARRIER COMMUNICATION                                                                      |        |               | PSP  | APP-Pending | US      | 62/824961     |              |                    |   |
| 10707 | RSS BASED RSSI CALCULATION AND ACCURACY                                                                                                                                  |        |               | PSP  | APP-Pending | US      | 62/826706     |              |                    |   |
| 10708 | SSB MEASUREMENT ACCURACY TESTING                                                                                                                                         |        |               | PSP  | APP-Pending | US      | 62/826702     |              |                    |   |
| 10709 | METHODS TO ENHANCE PDCP DUPLICATION                                                                                                                                      |        |               | PSP  | APP-Pending | US      | 62/824965     |              |                    |   |
| 10710 | UE BASED PDCP DUPLICATION ACTIVATION/DEACTIVATION ON HANDLING OVERLAPPING BETWEEN PUSCH AND PUSCH                                                                        |        |               | PSP  | APP-Pending | US      | 62/841758     |              |                    |   |
| 10711 | FOR MULTI-TRP OPERATION                                                                                                                                                  |        |               | PSP  | APP-Pending | US      | 62/825688     |              |                    |   |
| 10712 | DYNAMIC INDICATION OF SOFT RESOURCE AVAILABILITY BASED ON MULTI-SLOT SCHEDULING MECHANISM                                                                                |        |               | PSP  | APP-Pending | US      | 62/825444     |              |                    |   |
| 10713 | PERFORMANCE MEASUREMENTS RELATED TO PDU SESSION RESOURCE MANAGEMENT AND SERVICE REQUEST VIA UNTRUSTED NON-3GPP ACCESS                                                    |        |               | PSP  | APP-Pending | US      | 62/825657     |              |                    |   |
| 10714 | DATA DUPLICATION OVER RADIO LINK CONTROL CHANNELS                                                                                                                        |        |               | PSP  | APP-Pending | US      | 62/825577     |              |                    |   |

|       | A                                                                                                                                                                         | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                                     | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10715 | SYNCHRONIZATION SIGNAL BLOCKS FOR INTER-INTEGRATED BACKHAUL ACCESS (IAB) DISCOVERY AND MEASUREMENTS                                                                       |        |               | PSP  | APP-Pending | US      | 62/825404     |              |                    |   |
| 10716 | PHYSICAL LAYER CELL IDENTIFIER (PCI) CONFIGURATION AND AUTOMATIC NEIGHBOR RELATIONS (ANR) FOR 5G NETWORKS                                                                 |        |               | PSP  | APP-Pending | US      | 62/825516     |              |                    |   |
| 10717 | HYBRID AUTOMATIC REPEAT REQUEST (HARQ) TRANSMISSIONS FOR NEW RADIO (NR)                                                                                                   |        |               | PSP  | APP-Pending | US      | 62/826627     |              |                    |   |
| 10718 | ENHANCED RACH-LESS HANDOVER AND SCG CHANGE                                                                                                                                |        |               | PSP  | APP-Pending | US      | 62/825595     |              |                    |   |
| 10719 | DESIGN AND APPARATUS FOR THE FBE FRAMEWORK FOR NR SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                                                                |        |               | PSP  | APP-Pending | US      | 62/825678     |              |                    |   |
| 10720 | RESOURCE ALLOCATION AND USER MULTIPLEXING CAPACITY ENHANCEMENTS FOR INTERLACE BASED PHYSICAL UPLINK CONTROL CHANNEL FORMATS IN NEW RADIO (NR)-UNLICENSED                  |        |               | PSP  | APP-Pending | US      | 62/826947     |              |                    |   |
| 10721 | MECHANISMS TO OPERATE WIDEBAND CARRIER IN UNLICENSED BAND                                                                                                                 |        |               | PSP  | APP-Pending | US      | 62/826948     |              |                    |   |
| 10722 | NR CELL ACTIVATION WITH FINE BEAM CSI                                                                                                                                     |        |               | PSP  | APP-Pending | US      | 62/826713     |              |                    |   |
| 10723 | NR-U RADIO LINK MONITORING                                                                                                                                                |        |               | PSP  | APP-Pending | US      | 62/826555     |              |                    |   |
| 10724 | TRANSMISSION CONFIGURATION INDICATION (TCI) STATE AND BEAM SWITCHING                                                                                                      |        |               | PSP  | APP-Pending | US      | 62/826851     |              |                    |   |
| 10725 | RX BEAM RELATED SCALE FACTOR IN FR2                                                                                                                                       |        |               | PSP  | APP-Pending | US      | 62/826849     |              |                    |   |
| 10726 | SCHEDULING NR SHARED CHANNEL TRANSMISSION OVER MULTIPLE SLOTS BY FALLBACK DCI                                                                                             |        |               | PSP  | APP-Pending | US      | 62/826799     |              |                    |   |
| 10727 | CHANNEL STATE INFORMATION REFERENCE SIGNAL (CSI-RS) AS PART OF DISCOVERY REFERENCE SIGNAL (DRS) CONFIGURATION AND INDICATION FOR NEW RADIO-UNLICENSED (NR-U)              |        |               | PSP  | APP-Pending | US      | 62/826946     |              |                    |   |
| 10728 | USER EQUIPMENT (UE) MEASUREMENT CAPABILITY IN HIGH SPEED SCENARIOS                                                                                                        |        |               | PSP  | APP-Pending | US      | 62/826950     |              |                    |   |
| 10729 | PDCCH MONITORING AND RATE-MATCHING FOR RMSI IN NR-U                                                                                                                       |        |               | PSP  | APP-Pending | US      | 62/826796     |              |                    |   |
| 10730 | PREEMPTION INDICATION FOR MULTI-TXP TRANSMISSION PER-QU AND PER-LINK CONFIGURATIONS FOR DYNAMIC INDICATION OF SOFT RESOURCE AVAILABILITY VIA TWO SFIS IN IAB              |        |               | PSP  | APP-Pending | US      | 62/826954     |              |                    |   |
| 10731 | ON CAPABILITY 2 AND MULTIPLE PDSCH/PUSCH PER SLOT IN NR                                                                                                                   |        |               | PSP  | APP-Pending | US      | 62/826890     |              |                    |   |
| 10732 | ON MEASUREMENT AND PROCEDURES FOR NR POSITIONING                                                                                                                          |        |               | PSP  | APP-Pending | US      | 62/827753     |              |                    |   |
| 10733 | NR UL FR2 DESIGN RESOURCE ALLOCATION AND MAPPING IN NR POSITIONING                                                                                                        |        |               | PSP  | APP-Pending | US      | 62/827755     |              |                    |   |
| 10734 | PDSCH CONTROL CHANNEL DESIGN FOR NR V2X SIDELINK COMMUNICATION AND PDSCH DMRS PHYSICAL STRUCTURE                                                                          |        |               | PSP  | APP-Pending | US      | 62/827748     |              |                    |   |
| 10735 | ON THE DELAY AND INTERRUPTION REQUIREMENT FOR BWP SWITCHING                                                                                                               |        |               | PSP  | APP-Pending | US      | 62/827766     |              |                    |   |
| 10736 | RESOURCE ALLOCATION FOR REPEATED UL TRANSMISSIONS                                                                                                                         |        |               | PSP  | APP-Pending | US      | 62/828304     |              |                    |   |
| 10737 | CROSS SLOT SCHEDULING POWER SAVING TECHNIQUES                                                                                                                             |        |               | PSP  | APP-Pending | US      | 62/828327     |              |                    |   |
| 10738 | SYSTEM AND METHOD OF DOWNLINK CONTROL CHANNEL SIGNALING FOR UL COEXISTENCE OF MULTIPLE SERVICE TYPES                                                                      |        |               | PSP  | APP-Pending | US      | 62/828383     |              |                    |   |
| 10739 | METHODS FOR ENHANCED NR-V2X SYNCHRONIZATION                                                                                                                               |        |               | PSP  | APP-Pending | US      | 62/828317     |              |                    |   |
| 10740 | PROCEDURE                                                                                                                                                                 |        |               | PSP  | APP-Pending | US      | 62/828317     |              |                    |   |
| 10741 | Digital Envelope Tracker for Multiple-TX Channels with Shared Resource Voltage Regulator and Sim Single Channel Digital Envelope Tracker for mmWave Symbol Power Tracking |        |               | PSP  | APP-Pending | US      | 62/828633     |              |                    |   |
| 10742 | METHODS FOR ENHANCED PDCCH MONITORING                                                                                                                                     |        |               | PSP  | APP-Pending | US      | 62/828358     |              |                    |   |
| 10743 | SYSTEM AND METHOD OF PROVIDING TIMING OF SL TRANSMISSION WHEN SCHEDULED BY NR GNB                                                                                         |        |               | PSP  | APP-Pending | US      | 62/828380     |              |                    |   |
| 10744 | CONNECTION RESUME PROCEDURE FOR UE IN EDRX AND RRC INACTIVE STATE FOR MT DATA                                                                                             |        |               | PSP  | APP-Pending | US      | 62/828344     |              |                    |   |
| 10745 | UE MODEM FOR DRONES WITH FLIGHT PATH AND 3D WIRELESS ENVIRONMENT SIGNAL QUALITY INFORMATION                                                                               |        |               | NP   | APP-Pending | US      | 16/457729     |              |                    |   |
| 10746 | UE CAPABILITY FOR DC-BASED HANDOVER                                                                                                                                       |        |               | PSP  | APP-Pending | US      | 62/829453     |              |                    |   |
| 10747 | WAKE-UP SIGNAL SUB-GROUPING FOR REL-16 EMTF AND NR-JDT                                                                                                                    |        |               | PSP  | APP-Pending | US      | 62/829588     |              |                    |   |
| 10748 | METHODS OF ADAPTIVE TRANSMISSION IN LOW LATENCY SCENARIOS IN NEW RADIO (NR) SYSTEMS                                                                                       |        |               | NP   | APP-Pending | US      | 16/418768     |              | US-2019-0273578-A1 |   |

|       | A                                                                                                                                                                        | B      | C             | D    | E           | F       | G             | H            | I                  | J |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|------|-------------|---------|---------------|--------------|--------------------|---|
| 2     | TITLE                                                                                                                                                                    | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10749 | Interlace-Based Uplink Physical Channel Design for New Radio Unlicensed (NR-U)                                                                                           |        |               | NP   | APP-Pending | US      | 16/402480     |              | US-2019-0342874-A1 |   |
| 10750 | CONFIGURABLE RESYNCHRONIZATION SIGNAL (RSS) FOR MACHINE TYPE COMMUNICATION (MTC) IN NEW RADIO (NR) SYSTEMS                                                               |        |               | NP   | APP-Pending | US      | 16/409183     |              | US-2019-0268904-A1 |   |
| 10751 | LIGHTWEIGHT SUPPORT OF INFORMATION CENTRIC NETWORK (ICN) SERVICES IN NEXT GENERATION CELLULAR NETWORK                                                                    |        |               | PSP  | APP-Pending | US      | 62/836479     |              |                    |   |
| 10752 | NETWORK CODING AT THE PACKET DATA CONVERGENCE PROTOCOL (PDCP) LAYER TO INCREASE COMMUNICATION RELIABILITY                                                                |        |               | PSP  | APP-Pending | US      | 62/833445     |              |                    |   |
| 10753 | NR V2X SIDELINK STRUCTURES FOR PSSCH COVERAGE ENHANCEMENT                                                                                                                |        |               | PSP  | APP-Pending | US      | 62/831086     |              |                    |   |
| 10754 | HANDLING INTRA USER EQUIPMENT (UE) UPLINK (UL) OVERLAPPING GRANTS                                                                                                        |        |               | PSP  | APP-Pending | US      | 62/833479     |              |                    |   |
| 10755 | UE INDICATION TO PCF WHETHER OR NOT TO SEND UE POLICY                                                                                                                    |        |               | NP   | APP-Pending | US      | 16/411701     |              | US-2019-0268935-A1 |   |
| 10756 | MECHANISM ON MEASUREMENT GAP BASED INTER-FREQUENCY MEASUREMENT                                                                                                           |        |               | NP   | APP-Pending | US      | 16/411717     |              | US-2019-0274196-A1 |   |
| 10757 | APPARATUS SYSTEM AND METHOD OF CONFIGURING NEW RADIO (NR) MEASUREMENTS                                                                                                   |        |               | NP   | APP-Pending | US      | 16/436951     |              | US-2019-0113271-A1 |   |
| 10758 | ENHANCED SIGNALING TO SUPPORT MULTIPLE CONFIGURED GRANTS                                                                                                                 |        |               | PSP  | APP-Pending | US      | 62/836017     |              |                    |   |
| 10759 | QAM-QM CONFIGURATION OF PACKET LOSS RATE (PLR) BASED ADAPTATION IN IMS SPEECH SESSIONS                                                                                   |        |               | PSP  | APP-Pending | US      | 62/865046     |              |                    |   |
| 10760 | MOBILITY MANAGEMENT FOR INTER-GNB (NEXT GENERATION NODE B) HANDOVER IN NEW RADIO (NR) SYSTEMS                                                                            |        |               | NP   | APP-Pending | US      | 16/419245     |              | US-2019-0342800-A1 |   |
| 10761 | LOW PAPR DMRS DESIGN FOR PUSCH                                                                                                                                           |        |               | PSP  | APP-Pending | US      | 62/836014     |              |                    |   |
| 10762 | SYSTEM AND METHOD OF OFT-F-OFDM TRANSMISSION WITH GUARD SUBCARRIERS AND PULSE SHAPING FILTERING                                                                          |        |               | PSP  | APP-Pending | US      | 62/837571     |              |                    |   |
| 10763 | HOME CONTROLLED REAUTHENTICATION PROCEDURE FOR KAUSF GENERATION AND SOR INFORMATION DELIVERY                                                                             |        |               | PSP  | APP-Pending | US      | 62/838184     |              |                    |   |
| 10764 | GRANT BASED PHYSICAL UPLINK SHARED CHANNEL (PUSCH) TRANSMISSION AND CONFIGURED GRANT BASED PUSCH TRANSMISSION IN NEW RADIO (NR) SYSTEMS OPERATING ON UNLICENSED SPECTRUM |        |               | PSP  | APP-Pending | US      | 62/839952     |              |                    |   |
| 10765 | METHOD FOR ENABLING SERVICE CONTINUITY IN AN EDGE COMPUTING ENVIRONMENT                                                                                                  |        |               | PSP  | APP-Pending | US      | 62/840296     |              |                    |   |
| 10766 | HANDOVER ENHANCEMENT WITH SIMULTANEOUS UE TX BEAMS                                                                                                                       |        |               | PSP  | APP-Pending | US      | 62/840533     |              |                    |   |
| 10767 | UPLINK (UL) TRANSMISSION IN WIDEBAND CARRIER AND CARRIER AGGREGATION IN NR SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                                      |        |               | PSP  | APP-Pending | US      | 62/840647     |              |                    |   |
| 10768 | SYSTEM AND METHOD FOR BEAM FAILURE RECOVERY REQUEST                                                                                                                      |        |               | PSP  | APP-Pending | US      | 62/842361     |              |                    |   |
| 10769 | SPLIT PROTOCOL DATA UNIT (PDU) SESSION INDICATION FOR MULTI-RAT DUAL CONNECTIVITY WITH EGC                                                                               |        |               | PSP  | APP-Pending | US      | 62/839295     |              |                    |   |
| 10770 | MULTIPLEXING CONFIGURED GRANT (CG) TRANSMISSIONS IN NEW RADIO (NR) SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                                              |        |               | PSP  | APP-Pending | US      | 62/842389     |              |                    |   |
| 10771 | METHODS OF IMPROVING THE ROBUSTNESS FOR DCI TRIGGERED BEAM UPDATE IN 5G NR                                                                                               |        |               | PSP  | APP-Pending | US      | 62/842306     |              |                    |   |
| 10772 | UPLINK LBT FAILURES HANDLING FOR NR SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                                                                             |        |               | PSP  | APP-Pending | US      | 62/841693     |              |                    |   |
| 10773 | CONFIGURED GRANT IMPROVEMENT FOR NR UNLICENSED                                                                                                                           |        |               | PSP  | APP-Pending | US      | 62/841699     |              |                    |   |
| 10774 | SIGNALING DESIGN FOR REGIONAL OPERATION FOR NF-LITE                                                                                                                      |        |               | PSP  | APP-Pending | US      | 62/841992     |              |                    |   |
| 10775 | HIGHER LAYER CONFIGURATION FOR NF-LITE SYSTEMS IN GLOBAL OPERATION MODE                                                                                                  |        |               | PSP  | APP-Pending | US      | 62/842235     |              |                    |   |
| 10776 | MOBILE-TERMINATED (MT) EARLY DATA TRANSMISSION (EDT) IN CONTROL PLANE AND USER PLANE SOLUTIONS                                                                           |        |               | PSP  | APP-Pending | US      | 62/841696     |              |                    |   |
| 10777 | CONTROL CHANNEL SIGNALING FOR USER EQUIPMENT (UE)                                                                                                                        |        |               | PSP  | APP-Pending | US      | 62/841766     |              |                    |   |
| 10778 | POWER SAVING                                                                                                                                                             |        |               | PSP  | APP-Pending | US      | 62/841764     |              |                    |   |
| 10779 | RADIO UNLICENSED (NR-U) IDLE MODE OPERATIONS                                                                                                                             |        |               | PSP  | APP-Pending | US      | 62/842754     |              |                    |   |
| 10779 | RADIO LINK MONITORING BEAM MANAGEMENT IN NR FOR URLLC                                                                                                                    |        |               | PSP  | APP-Pending | US      | 62/841688     |              |                    |   |

|       | A                                                                                                                    | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10780 | LAYER-2 ID TO SUPPORT UNICAST COMMUNICATION OVER SIDELINK FOR eV2X                                                   |        |               | PSP  | APP-Pending | US      | 62/841745     |              |                    |   |
| 10781 | METHODS FOR ENHANCED HANDOVER USING CONDITIONAL AND SIMULTANEOUS CONNECTIVITY HO                                     |        |               | PSP  | APP-Pending | US      | 62/841757     |              |                    |   |
| 10782 | POWER CONTROL FOR TWO-STEP RANDOM ACCESS PROCEDURE                                                                   |        |               | PSP  | APP-Pending | US      | 62/842314     |              |                    |   |
| 10783 | CHANNEL SENSING INDICATION WHEN COT SHARING IN NR SYSTEMS OPERATING IN UNLICENSED SPECTRUM                           |        |               | PSP  | APP-Pending | US      | 62/842370     |              |                    |   |
| 10784 | ENHANCING INTER-MODE HANDOVER SIGNALING FOR CONDITIONAL HO                                                           |        |               | PSP  | APP-Pending | US      | 62/842153     |              |                    |   |
| 10785 | METHOD AND SYSTEM FOR DL PRS TRANSMISSION FOR ACCURATE RAT-DEPENDENT NR POSITIONING                                  |        |               | PSP  | APP-Pending | US      | 62/842181     |              |                    |   |
| 10786 | ENHANCEMENTS OF FREQUENCY DOMAIN RESOURCE ALLOCATION SCHEMES FOR PHYSICAL UPLINK SHARED CHANNEL IN NR-UNLICENSED     |        |               | PSP  | APP-Pending | US      | 62/842432     |              |                    |   |
| 10787 | DOWNLINK CONTROL CHANNEL SIGNALING FOR UL COEXISTENCE OF MULTIPLE SERVICE TYPES                                      |        |               | PSP  | APP-Pending | US      | 62/842882     |              |                    |   |
| 10788 | SIGNALING MECHANISMS OF RACH CONFIGURATIONS FOR IAB NODES                                                            |        |               | PSP  | APP-Pending | US      | 62/842417     |              |                    |   |
| 10789 | MEASUREMENT GAP PATTERN USE AND MANAGEMENT SYSTEM AND METHODS FOR CLOSED-LOOP POWER CONTROL FOR PUSCH                |        |               | PSP  | APP-Pending | US      | 62/842416     |              |                    |   |
| 10790 | NR TIME-DOMAIN RESOURCE ALLOCATION FOR CONFIGURED GRANT TRANSMISSIONS IN NR SYSTEMS OPERATING ON UNLICENSED SPECTRUM |        |               | PSP  | APP-Pending | US      | 62/843196     |              |                    |   |
| 10791 | MECHANISMS TO OPERATE DOWNLINK WIDEBAND CARRIER IN UNLICENSED BAND                                                   |        |               | PSP  | APP-Pending | US      | 62/842977     |              |                    |   |
| 10792 | SYSTEM AND METHODS ON THE MAPPING BETWEEN PRACH PREAMBLE AND PUSCH RESOURCE UNIT FOR 2-STEP RACH                     |        |               | PSP  | APP-Pending | US      | 62/843064     |              |                    |   |
| 10793 | ENHANCEMENTS TO RANDOM ACCESS CHANNEL OCCASION CONFIGURATION IN TIME DOMAIN FOR NR-UNLICENSED                        |        |               | PSP  | APP-Pending | US      | 62/843276     |              |                    |   |
| 10794 | MECHANISM AND SIGNALING ON CORESET AND PUSCH RESOURCE GROUPING FOR MULTI-TRP OPERATION                               |        |               | PSP  | APP-Pending | US      | 62/843077     |              |                    |   |
| 10795 | ENHANCED PDCCH MONITORING                                                                                            |        |               | PSP  | APP-Pending | US      | 62/843269     |              |                    |   |
| 10796 | BEAM SWITCHING BASED ON DCI INDICATION FOR MULTI-TRP ULLC                                                            |        |               | PSP  | APP-Pending | US      | 62/843287     |              |                    |   |
| 10797 | SYSTEM AND METHOD FOR UE PROCESSING TIME RELAXATION FOR MULTI-TRP TRANSMISSION                                       |        |               | PSP  | APP-Pending | US      | 62/843280     |              |                    |   |
| 10798 | SYSTEM AND METHOD FOR DMPS ANTENNA PORT INDICATION FOR ULLC                                                          |        |               | PSP  | APP-Pending | US      | 62/843271     |              |                    |   |
| 10799 | SYNCHRONIZATION SIGNAL BLOCK (SSB) BASED BEAM MEASUREMENT AND REPORTING IN 5G NR                                     |        |               | PSP  | APP-Pending | US      | 62/843273     |              |                    |   |
| 10800 | HANDOVER FURTHER ENHANCEMENT WITH SIMULTANEOUS UE TRANSMISSION BEAMS                                                 |        |               | PSP  | APP-Pending | US      | 62/846254     |              |                    |   |
| 10801 | METHODS FOR ADAPTATION LAYER ENHANCEMENT IN RELAY NETWORK                                                            |        |               | PSP  | APP-Pending | US      | 62/846249     |              |                    |   |
| 10802 | CLOSED-LOOP POWER CONTROL FOR PUSCH                                                                                  |        |               | PSP  | APP-Pending | US      | 62/844974     |              |                    |   |
| 10803 | BEAM INFORMATION DELIVERY FOR SCCELL BEAM FAILURE RECOVERY OPERATION IN NR                                           |        |               | PSP  | APP-Pending | US      | 62/844658     |              |                    |   |
| 10804 | PUSCH DEFAULT BEAM IN NR WITH MULTI-TRP MULTI-PANEL OPERATION                                                        |        |               | PSP  | APP-Pending | US      | 62/846354     |              |                    |   |
| 10805 | METHOD OF SLOT OFFSET DETERMINATION FOR NON-TERRRESTRIAL NETWORKS                                                    |        |               | PSP  | APP-Pending | US      | 62/847060     |              |                    |   |
| 10806 | SYSTEM AND METHODS ON THE MAPPING BETWEEN PRACH PREAMBLE AND PUSCH RESOURCE UNIT FOR 2-STEP RACH                     |        |               | PSP  | APP-Pending | US      | 62/846332     |              |                    |   |
| 10807 | RADIO RESOURCE CONTROL (RRC) BASED TRANSMISSION CONFIGURATION INDICATOR (TCI) STATE SWITCHING                        |        |               | PSP  | APP-Pending | US      | 62/846496     |              |                    |   |
| 10808 | USER EQUIPMENT (UE) CAPABILITY FOR RADIO RESOURCE CONTROL (RRC) BASED BANDWIDTH PART (BWP) SWITCHING DELAY           |        |               | PSP  | APP-Pending | US      | 62/846514     |              |                    |   |
| 10809 | CHANNEL RASTER AND SYNCHRONIZATION SIGNAL RASTER FOR NR UNLICENSED SPECTRUM                                          |        |               | PSP  | APP-Pending | US      | 62/847120     |              |                    |   |
| 10810 | UE ASSISTANCE INFORMATION FOR VOICE OVER CELLULAR                                                                    |        |               | PSP  | APP-Pending | US      | 62/847770     |              |                    |   |
| 10811 | METHODS FOR RESOURCE CONFIGURATIONS IN RELAY NETWORK                                                                 |        |               | PSP  | APP-Pending | US      | 62/866222     |              |                    |   |
| 10812 | UNLICENSED BAND IOT SYSTEMS                                                                                          |        |               | NP   | APP-Pending | US      | 62/849681     |              |                    |   |
| 10813 |                                                                                                                      |        |               |      |             |         | 15/451292     |              | US-2019-0313481-A1 |   |



|       | A                                                                                                                                                                               | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                                           | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10814 | EMISSION AND PANEL AWARE BEAM SELECTION                                                                                                                                         |        |               | NP   | APP-Pending | US      | 16/447584     |              | US-2019-0306850-A1 |   |
| 10815 | BEAM INDICATION FOR SEMI-PERSISTENT AND GRANT-FREE TRANSMISSIONS                                                                                                                |        |               | NP   | APP-Pending | US      | 16/449294     |              | US-2019-0306924-A1 |   |
| 10816 | AVOIDING PAGING COLLISIONS IN A DEVICE WITH MULTIPLE SUBSCRIPTIONS                                                                                                              |        |               | PSP  | APP-Pending | US      | 62/853633     |              |                    |   |
| 10817 | SYSTEM AND METHOD FOR MULTIPLEXING OF PUCCH FOR BEAM FAILURE RECOVERY AND OTHER SIGNALS                                                                                         |        |               | PSP  | APP-Pending | US      | 62/854189     |              |                    |   |
| 10818 | 5G LOAD BALANCING AND MOBILITY ROBUSTNESS OPTIMIZATION                                                                                                                          |        |               | PSP  | APP-Pending | US      | 62/852829     |              |                    |   |
| 10819 | SOFT RESOURCE SIGNALING IN RELAY NETWORK                                                                                                                                        |        |               | PSP  | APP-Pending | US      | 62/853475     |              |                    |   |
| 10820 | DYNAMIC SOFT RESOURCE SIGNALING IN RELAY NETWORKS                                                                                                                               |        |               | PSP  | APP-Pending | US      | 62/855494     |              |                    |   |
| 10821 | WEBSOCKET AND RESTFUL SOLUTIONS FOR PERFORMANCE DATA STREAMING PERFORMANCE DATA FILE REPORTING AND PERFORMANCE THRESHOLD MONITORING SERVICES                                    |        |               | PSP  | APP-Pending | US      | 62/855220     |              |                    |   |
| 10822 | TWO STEP RANDOM ACCESS CHANNEL (RACH) PROCEDURE MSGB RESPONSES                                                                                                                  |        |               | PSP  | APP-Pending | US      | 62/858140     |              |                    |   |
| 10823 | CENTRALIZED AND DISTRIBUTED SELF-ORGANIZING NETWORKS (SON) FOR PHYSICAL-LAYER CELL IDENTIFIER (PCI) CONFIGURATION AND AUTOMATIC NEIGHBOR RELATION (ANR)                         |        |               | PSP  | APP-Pending | US      | 62/857173     |              |                    |   |
| 10824 | TECHNIQUES IN CONFIGURED GRANT UPLINK TRANSMISSION IN NEW RADIO (NR) SYSTEMS OPERATING IN UNLICENSED SPECTRUM                                                                   |        |               | NP   | APP-Pending | US      | 16/509847     |              | US-2019-0342911-A1 |   |
| 10825 | UPLINK TRANSMISSION FOR MULTI-PANEL OPERATION                                                                                                                                   |        |               | NP   | APP-Pending | US      | 16/502344     |              |                    |   |
| 10826 | USER EQUIPMENT TRANSMISSION POWER CONTROL                                                                                                                                       |        |               | NP   | APP-Pending | US      | 16/502477     |              | US-2019-0327691-A1 |   |
| 10827 | METHODS TO DETERMINE PARAMETERS RELATED TO PHASE TRACKING REFERENCE SIGNALS (PT-RS) BASED ON A TYPE OF RADIO NETWORK TEMPORARY IDENTIFIER (RNTI)                                |        |               | NP   | APP-Pending | US      | 16/510977     |              |                    |   |
| 10828 | DOWNLINK CONTROL CHANNEL SIGNALING FOR IMPROVING UE POWER CONSUMPTION                                                                                                           |        |               | NP   | APP-Pending | US      | 16/520522     |              |                    |   |
| 10829 | PBCH CONTENT FOR NR UNLICENSED                                                                                                                                                  |        |               | NP   | APP-Pending | US      | 16/515764     |              | US-2019-0142826-A1 |   |
| 10830 | REFERENCE SIGNAL AND CONTROL INFORMATION PROCESSING IN 5G-NR WIRELESS SYSTEMS                                                                                                   |        |               | NP   | APP-Pending | US      | 16/446320     |              | US-2019-0306923-A1 |   |
| 10831 | HIGHER LAYER CONFIGURATION FOR M-LTE SYSTEMS IN GLOBAL OPERATION MODE                                                                                                           |        |               | PSP  | APP-Pending | US      | 62/858842     |              |                    |   |
| 10832 | END-TO-END RADIO ACCESS NETWORK (RAN) DEPLOYMENT IN OPEN RAN (O-RAN)                                                                                                            |        |               | PSP  | APP-Pending | US      | 62/859559     |              |                    |   |
| 10833 | MECHANISMS TO SUPPORT MUTUAL ANCHORING AND TRAFFIC DISTRIBUTION FOR CONTROL PLANE AND USER PLANE OVER 5G NR AND WI-FI ACCESS IN A CONVERGED RAN INTEGRATING NR AND WI-FI ACCESS |        |               | PSP  | APP-Pending | US      | 62/861587     |              |                    |   |
| 10834 | RRM MEASUREMENT RESTRICTION ON CU MEASUREMENT                                                                                                                                   |        |               | PSP  | APP-Pending | US      | 62/861064     |              |                    |   |
| 10835 | PERFORMANCE MEASUREMENTS RELATED TO APPLICATION TRIGGERING AND SMS OVER NAS                                                                                                     |        |               | PSP  | APP-Pending | US      | 62/860647     |              |                    |   |
| 10836 | CHANNEL SENSING FOR PHYSICAL RANDOM ACCESS CHANNEL (PRACH) SIGNALS IN NEW RADIO (NR) SYSTEMS OPERATING IN THE UNLICENSED SPECTRUM                                               |        |               | PSP  | APP-Pending | US      | 62/863891     |              |                    |   |
| 10837 | METHODS FOR RRC CONNECTION RE-ESTABLISHMENT WHEN SECURITY IS NOT ACTIVATED AND UE IS CONNECTED TO S-GW                                                                          |        |               | PSP  | APP-Pending | US      | 62/861250     |              |                    |   |
| 10838 | METHOD OF SLOT OFFSET DETERMINATION FOR NON-TERRRESTRIAL NETWORKS                                                                                                               |        |               | PSP  | APP-Pending | US      | 62/864760     |              |                    |   |
| 10839 | METHODS FOR FAST SECONDARY CELL ACTIVATION AND DEACTIVATION                                                                                                                     |        |               | PSP  | APP-Pending | US      | 62/862508     |              |                    |   |
| 10840 | METHODS FOR MDT IN CONTROL PLANE AND USER PLANE SOLUTIONS                                                                                                                       |        |               | PSP  | APP-Pending | US      | 62/862325     |              |                    |   |
| 10841 | METHODS OF DETECTING FAKE BASE STATION BY UE DURING HANDOVER                                                                                                                    |        |               | PSP  | APP-Pending | US      | 62/862521     |              |                    |   |
| 10842 | HARQ-ACK TRANSMISSION AND RETRANSMISSION IN WIRELESS COMMUNICATION SYSTEM                                                                                                       |        |               | PSP  | APP-Pending | US      | 62/864291     |              |                    |   |
| 10843 | ADAPTIVE UPLINK (UL) TIMING ADJUSTMENT FOR BEAM SWITCHING IN FIFTH-GENERATION NEW RADIO (5G NR)                                                                                 |        |               | PSP  | APP-Pending | US      | 62/867746     |              |                    |   |

|       | A                                                                                                                                                     | B      | C             | D    | E                  | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                 | FAMILY | FAMILY-MEMBER | TYPE | STATUS             | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10844 | SESSION DESCRIPTION PROTOCOL (SDP)-BASED METHODS FOR IMMERSIVE TELECONFERENCING AND TELEPRESENCE                                                      |        |               | PSP  | APP-Pending        | US      | 62/866488     |              |                    |   |
| 10845 | METHODS FOR FAST SCELL ACTIVATION WITH SHORT CSI REPORTING                                                                                            |        |               | PSP  | APP-Pending        | US      | 62/866484     |              |                    |   |
| 10846 | DESIGN OF MULTIPLEXING RULES FOR CONFIGURED GRANT TRANSMISSIONS IN NR SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                        |        |               | PSP  | APP-Pending        | US      | 62/869258     |              |                    |   |
| 10847 | NR TIME-DOMAIN RESOURCE ALLOCATION FOR CONFIGURED GRANT TRANSMISSIONS IN NR SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                  |        |               | PSP  | APP-Pending        | US      | 62/870263     |              |                    |   |
| 10848 | FBE FRAMEWORK FOR NR SYSTEMS OPERATING ON UNLICENSED SPECTRUM                                                                                         |        |               | PSP  | APP-Pending        | US      | 62/871533     |              |                    |   |
| 10849 | RADIO LINK MONITORING FOR UNICAST SIDELINK COMMUNICATIONS                                                                                             |        |               | PSP  | APP-Pending        | US      | 62/872634     |              |                    |   |
| 10850 | RAN3 RAN2 Design of quality report in Msg3 for Rel-16 eMTC and NB-IoT Update of ID# A85725                                                            |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10851 | RAN3 NR - On The Contention Window Size Update for CBG Based Retransmission in NR Systems Operating on Unlicensed Spectrum (replacing ID# A89340)     |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10852 | RAN3 5G LTE Method of overhead reduction for beam combining based CSI feedback                                                                        |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10853 | Design of wake-up signal sub-grouping for Rel-16 eMTC and NB-IoT Update of ID# A85709                                                                 |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10854 | 5G RAN1 - System and methods on PUSCH enhancements for NR URLLC                                                                                       |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10855 | System and method of downlink control channel signaling for UL coexistence of multiple service types (update of A84305)                               |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10856 | 5G RAN1 - System and methods for data and control transmission enhancements in NR (update of ID# A84315)                                              |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10857 | METHODS OF TWO-STEP CELL RE-SELECTION FOR NR-U                                                                                                        |        |               | PSP  | APP-Pending        | US      | 62/874796     |              |                    |   |
| 10858 | LOCATION BASED SIDELINK (SL) HYBRID AUTOMATIC REPEAT REQUEST (HARQ) FEEDBACK TRANSMISSION                                                             |        |               | PSP  | APP-Pending        | US      | 62/874423     |              |                    |   |
| 10859 | Enabling UAS Service for Identification and operation in 3GPP System                                                                                  |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10860 | A method of DL SNR control for the NR miniWave over-the-air UE Demodulation and CSI reporting test methodology                                        |        |               | NP   | APP-In-Preparation | US      |               |              |                    |   |
| 10861 | UDP AND RTP-BASED METHODS FOR STREAMING OF VOLUMETRIC POINT CLOUD CONTENT                                                                             |        |               | PSP  | APP-Pending        | US      | 62/874873     |              |                    |   |
| 10862 | REDUCED CSI (CHANNEL STATE INFORMATION)-RS (REFERENCE SIGNAL) DENSITY SUPPORT FOR FD (FULL DIMENSIONAL)-MIMO (MULTIPLE INPUT MULTIPLE OUTPUT) SYSTEMS |        |               | PCT  | APP-Pending        | US      | 16/467566     |              | US-2019-0357221-A1 |   |
| 10863 | USER EQUIPMENT HYSTERESIS FOR SIGNAL BLOCKAGE DETECTION                                                                                               |        |               | PCT  | APP-Pending        | US      | 16/478166     |              |                    |   |
| 10864 | REFERENCE SIGNAL TIME DIFFERENCE (RSTD) MEASUREMENTS FOR OBSERVED TIME DIFFERENCE OF ARRIVAL (OTDOA) POSITIONING                                      |        |               | PCT  | APP-Pending        | US      | 16/347800     |              | US-2019-0257916-A1 |   |
| 10865 | SIGNALING TO SUPPORT REDUCED PROCESSING TIME                                                                                                          |        |               | PCT  | APP-Pending        | US      | 16/327775     |              | US-2019-0215906-A1 |   |
| 10866 | UE AND DEVICES FOR CODEC RATE ADAPTATION                                                                                                              |        |               | PCT  | APP-Pending        | US      | 16/339360     |              |                    |   |
| 10867 | DYNAMIC PROTOCOL STACK RESET DURING RADIO HANDOVER                                                                                                    |        |               | PCT  | APP-Pending        | US      | 16/348380     |              | US-2019-0313296-A1 |   |
| 10868 | COVERAGE ENHANCEMENT FOR UNLICENSED INTERNET OF THINGS (U-IoT)                                                                                        |        |               | PCT  | APP-Pending        | US      | 16/349963     |              | US-2019-0288811-A1 |   |
| 10869 | FAKE GNB/ENB DETECTION USING IDENTITY-BASED AUTHENTICATION AND ENCRYPTION                                                                             |        |               | PCT  | APP-Pending        | US      | 16/479885     |              | US-2019-0249765-A1 |   |
| 10870 | USER EQUIPMENT (UE) GENERATION NODE-B (GNB) AND METHODS FOR SIGNALING OF CONTROL INFORMATION FOR PRE-CODING                                           |        |               | PCT  | APP-Pending        | US      | 16/349556     |              |                    |   |
| 10871 | BEAMFORMING MEASUREMENTS BASED ON PSS/SSS APPARATUSES TO SWITCH BETWEEN LTE RAT AND NR RAT DURING TRANSITION FROM INACTIVE STATE TO ACTIVE STATE      |        |               | PCT  | APP-Pending        | US      | 16/471506     |              | US-2019-0327890-A1 |   |
| 10872 |                                                                                                                                                       |        |               | PCT  | APP-Pending        | US      | 16/462342     |              | US-2019-0320483-A1 |   |
| 10873 | MEASUREMENT OF BEAM REFINEMENT SIGNAL                                                                                                                 |        |               | PCT  | APP-Pending        | US      | 16/349957     |              | US-2019-0334611-A1 |   |

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| 2     | TITLE                                                                                                                             | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10874 | SYSTEMS METHODS AND DEVICES FOR CONGESTION CONTROL FOR TRANSPORT OF USER DATA VIA A CONTROL PLANE                                 |        |               | PCT  | APP-Pending | US      | 16/348219     |              |                    |   |
| 10875 | TRANSMISSION SCHEME FOR COMMON CONTROL MESSAGE WITH MULTI-BEAM OPERATION                                                          |        |               | PCT  | APP-Pending | US      | 16/475765     |              | US-2019-0357303-A1 |   |
| 10876 | LOW OVERHEAD SUBBAND PHYSICAL DOWNLINK CONTROL FOR COMMUNICATION SYSTEMS                                                          |        |               | PCT  | APP-Pending | US      | 16/475782     |              | US-2019-0349153-A1 |   |
| 10877 | INTER-NODE INTERFERENCE AVOIDANCE                                                                                                 |        |               | PCT  | APP-Pending | US      | 16/475867     |              |                    |   |
| 10878 | INSTANTIATION AND MANAGEMENT OF PHYSICAL AND VIRTUALIZED NETWORK FUNCTIONS OF A RADIO ACCESS NETWORK NODE                         |        |               | PCT  | APP-Pending | US      | 16/475821     |              | US-2019-0327623-A1 |   |
| 10879 | GENERATION NODE-B (GNB) USER EQUIPMENT (UE) AND METHODS FOR HANDOVER IN NEW RADIO (NR) SYSTEMS                                    |        |               | PCT  | APP-Pending | US      | 16/479235     |              | US-2019-0327651-A1 |   |
| 10880 | ACCESS CONTROL FOR WIRELESS CELLULAR COMMUNICATION SYSTEMS                                                                        |        |               | PCT  | APP-Pending | US      | 16/475670     |              | US-2019-0345843-A1 |   |
| 10881 | MEASUREMENT ROB SUSPENSION AND RESUMPTION IN NETWORK FUNCTION VIRTUALIZATION                                                      |        |               | PCT  | APP-Pending | US      | 16/465453     |              |                    |   |
| 10882 | UE TESTING SYSTEM FOR RF CHARACTERISTICS FOR THE NEW RADIO STANDARD                                                               |        |               | PCT  | APP-Pending | US      | 16/467102     |              |                    |   |
| 10883 | CODEBOOK DESIGN FOR NEW RADIO (NR) SYSTEMS                                                                                        |        |               | PCT  | APP-Pending | US      | 16/476537     |              | US-2019-0328959-A1 |   |
| 10884 | BANDWIDTH ADAPTATION FOR WIRELESS COMMUNICATION SYSTEMS                                                                           |        |               | PCT  | APP-Pending | US      | 16/349251     |              | US-2019-0285658-A1 |   |
| 10885 | SYNCHRONIZATION SIGNAL TRANSMISSION TECHNIQUES                                                                                    |        |               | PCT  | APP-Pending | US      | 16/349960     |              | US-2019-0319599-A1 |   |
| 10886 | LOCATION POSITIONING PROTOCOL BASED POSITIONING FOR UES IN IDLE MODE                                                              |        |               | PCT  | APP-Pending | US      | 16/477572     |              |                    |   |
| 10887 | ADVERTISEMENT OF NR CAPABILITY TO USER EQUIPMENT                                                                                  |        |               | PCT  | APP-Pending | US      | 16/473577     |              |                    |   |
| 10888 | MECHANISMS TO HANDLE DL (DOWNLINK) CONTROL AND DATA CHANNELS WITH DIFFERENT NUMEROLOGIES IN NR (NEW RADIO)                        |        |               | PCT  | APP-Pending | US      | 16/476127     |              | US-2019-0357198-A1 |   |
| 10889 | USER EQUIPMENT (UE) EVOLVED NODE-B (ENB) AND METHODS TO INDICATE PARAMETERS FOR A RELAY ARRANGEMENT                               |        |               | PCT  | APP-Pending | US      | 16/479161     |              | US-2019-0350047-A1 |   |
| 10890 | UPLINK TRANSMISSIONS USING PRECODED SOUNDING REFERENCE SIGNALS FOR COMMUNICATION SYSTEMS                                          |        |               | PCT  | APP-Pending | US      | 16/473579     |              |                    |   |
| 10891 | DEVICES FOR PER-CC MEASUREMENT GAP CONFIGURATION                                                                                  |        |               | PCT  | APP-Pending | US      | 16/479836     |              |                    |   |
| 10892 | NETWORK ASSISTED LTE CRS INTERFERENCE MITIGATION                                                                                  |        |               | PCT  | APP-Pending | US      | 16/482995     |              |                    |   |
| 10893 | POSITIONING ENHANCEMENTS FOR NARROWBAND INTERNET OF THINGS                                                                        |        |               | PCT  | APP-Pending | US      | 16/474149     |              | US-2019-0349881-A1 |   |
| 10894 | POWER HEADROOM REPORTING FOR SHORTENED TRANSMISSION TIME INTERVALS                                                                |        |               | PCT  | APP-Pending | US      | 16/476375     |              |                    |   |
| 10895 | NETWORK RESOURCE MODEL TO SUPPORT NEXT GENERATION NODE-B                                                                          |        |               | PCT  | APP-Pending | US      | 16/476028     |              | US-2019-0357084-A1 |   |
| 10896 | SYSTEMS METHODS AND APPARATUSES FOR DIAMETER BASED INTERFACES TO ENABLE RESTRICTIONS OF COVERAGE ENHANCEMENT IN WIRELESS NETWORKS |        |               | PCT  | APP-Pending | US      | 16/475824     |              |                    |   |
| 10897 | NETWORK CONTROLLED SMALL GAP CONFIGURATION                                                                                        |        |               | PCT  | APP-Pending | US      | 16/476381     |              |                    |   |
| 10898 | DOWNLINK CONTROL SIGNALING SEGMENTATION                                                                                           |        |               | PCT  | APP-Pending | US      | 16/476657     |              |                    |   |
| 10899 | QUALITY OF SERVICE FLOW TO DATA RADIO BEARER MAPPING OVERRIDE BIT                                                                 |        |               | PCT  | APP-Pending | US      | 16/475873     |              | US-2019-0357086-A1 |   |
| 10900 | Determining Timing Differences Between Primary and Secondary Component Carriers Having Variable Transmission Time Intervals       |        |               | PCT  | APP-Pending | US      | 16/476397     |              |                    |   |
| 10901 | Partial Sensing and Congestion Control for Long Term Evolution (LTE) Vehicular Communication                                      |        |               | PCT  | APP-Pending | US      | 16/476128     |              |                    |   |
| 10902 | SYSTEMS METHODS AND DEVICES FOR VIRTUAL RESOURCE METRIC MANAGEMENT                                                                |        |               | PCT  | APP-Pending | US      | 16/476017     |              | US-2019-0349272-A1 |   |
| 10903 | MANAGEMENT OF VOICE SERVICES FOR USER EQUIPMENTS IN COVERAGE ENHANCEMENT (CE) MODE B                                              |        |               | PCT  | APP-Pending | US      | 16/349587     |              | US-2019-0273762-A1 |   |

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| 2     | TITLE                                                                                                                                                   | FAMILY | FAMILY-MEMBER | TYPE | STATUS             | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10904 | SYSTEM INFORMATION DECODING IN WIRELESS NETWORKS                                                                                                        |        |               | PCT  | APP-Pending        | US      | 15/477487     |              |                    |   |
| 10905 | PHASE TRACKING REFERENCE SIGNAL INDICATION IN MULTI-USER SUPERPOSITION TRANSMISSION                                                                     |        |               | PCT  | APP-Pending        | US      | 16/479813     |              |                    |   |
| 10906 | REPORTING A NUMBER OF EFFECTIVE FREQUENCIES FOR RADIO RESOURCE MANAGEMENT PURPOSES                                                                      |        |               | PCT  | APP-Pending        | US      | 16/473663     |              | US-2019-0357068-A1 |   |
| 10907 | SYSTEMS METHODS AND APPARATUSES FOR MANAGING MULTIPLE ANCHORS FOR MULTI-HOMING                                                                          |        |               | PCT  | APP-Pending        | US      | 15/487766     |              |                    |   |
| 10908 | DEVICES AND METHODS FOR DYNAMIC RACH                                                                                                                    |        |               | PCT  | APP-Pending        | US      | 15/487390     |              |                    |   |
| 10909 | SYSTEMS METHODS AND APPARATUSES FOR CONFIGURING MEASUREMENT GAP PER FREQUENCY GROUP AND PER CELL                                                        |        |               | PCT  | APP-Pending        | US      | 16/487685     |              |                    |   |
| 10910 | High Speed train in New Radio (NR)                                                                                                                      |        |               | PCT  | APP-Pending        | US      | 16/483181     |              |                    |   |
| 10911 | METHOD AND APPARATUS FOR CROSS RETRANSMISSION BETWEEN GUL AND SUL                                                                                       |        |               | PCT  | APP-Pending        | US      | 15/483388     |              |                    |   |
| 10912 | EXPIRATION HANDLING OF TWO-STAGE GRANT VALIDITY DURATION                                                                                                |        |               | PCT  | APP-Pending        | US      | 15/487788     |              |                    |   |
| 10913 | TECHNOLOGY COORDINATION FOR DEVICE-TO-DEVICE DISCOVERY                                                                                                  |        |               | PCT  | APP-Pending        | US      | 16/474036     |              |                    |   |
| 10914 | SYSTEMS METHODS AND DEVICES FOR MEASUREMENT CONFIGURATION BY A SECONDARY NODE IN EN-DC                                                                  |        |               | PCT  | APP-Pending        | US      | 16/479487     |              |                    |   |
| 10915 | RE-TRANSMISSION OF PDCP PDUS BY CENTRALIZED NODES OF A RAN ARCHITECTURE                                                                                 |        |               | PCT  | APP-Pending        | US      | 15/487173     |              |                    |   |
| 10916 | METHODS AND SYSTEMS FOR INSTANTIATING AND CONNECTING RADIO ACCESS NETWORK VIRTUALIZED NETWORK FUNCTION AND CORE NETWORK VIRTUALIZED NETWORK FUNCTION    |        |               | PCT  | APP-Pending        | US      | 16/484790     |              |                    |   |
| 10917 | INSTANTIATION OF A VIRTUAL NETWORK FUNCTION (VNF) AS PART OF A GNCDB (GNB)                                                                              |        |               | PCT  | APP-Pending        | US      | 16/484422     |              |                    |   |
| 10918 | SUPPORTING SON FUNCTIONS ON NETWORK SLICE INSTANCES                                                                                                     |        |               | PCT  | APP-Pending        | US      | 15/485088     |              |                    |   |
| 10919 | MULTIPIRE ARCHITECTURE FOR CELLULAR INTERNET-OF-THINGS (CIOT)                                                                                           |        |               | PCT  | APP-Pending        | US      | 15/499016     |              |                    |   |
| 10920 | TIMING DETERMINATION TECHNIQUES FOR 5G RADIO ACCESS NETWORK CELLS                                                                                       |        |               | PCT  | APP-Pending        | US      | 16/488133     |              |                    |   |
| 10921 | HANDLING OF USER EQUIPMENT COVERAGE ENHANCEMENT MODE B RADIO CAPABILITY MISMATCH DUE TO CHANGE IN USER EQUIPMENT USAGE SETTING                          |        |               | PCT  | APP-Pending        | US      | 15/462339     |              |                    |   |
| 10922 | Robust Ultrasound Communication Signal Format                                                                                                           |        |               | PCT  | APP-In-Preparation | US      |               |              |                    |   |
| 10923 | DEVICE AND METHOD TO ALLOW CROSS-TRANSMISSION TIME INTERVAL (TTI) SWITCHING AND HYBRID AUTOMATIC REPEAT REQUEST (HARQ) OPERATION IN A NEW RADIO NETWORK |        |               | PCT  | APP-Pending        | US      | 16/476576     |              | US-2019-0356426-A1 |   |
| 10924 | FLEXIBLE BLOCK SIZE SUPPORT FOR POLAR CODE                                                                                                              |        |               | PCT  | APP-Pending        | US      | 16/488561     |              |                    |   |
| 10925 | TRACKING REFERENCE SIGNALS FOR NEW RADIO                                                                                                                |        |               | PCT  | APP-Pending        | US      | 15/473563     |              |                    |   |
| 10926 | SUPPORT OF 64 QAM FOR EREMTX POSCH TRANSMISSION                                                                                                         |        |               | PCT  | APP-Pending        | US      | 15/465998     |              |                    |   |
| 10927 | DOWNLINK CONTROL INFORMATION TO SUPPORT UPLINK PARTIAL SUBFRAME TRANSMISSION ON LICENSED ASSISTED ACCESS SECONDARY CELL                                 |        |               | PCT  | APP-Pending        | US      | 16/488187     |              |                    |   |
| 10928 | RADIO LINK MONITORING BEAM RECOVERY AND RADIO LINK FAILURE HANDLING                                                                                     |        |               | PCT  | APP-Pending        | US      | 16/487665     |              |                    |   |
| 10929 | METHODS AND ARRANGEMENTS FOR WIDE BANDWIDTH COMMUNICATIONS                                                                                              |        |               | PCT  | APP-Pending        | US      | 15/464927     |              |                    |   |
| 10930 | SYSTEMS METHODS AND DEVICES FOR SELECTING CELLULAR TIMING CONFIGURATIONS                                                                                |        |               | PCT  | APP-Pending        | US      | 16/480372     |              |                    |   |
| 10931 | SYSTEM AND METHOD FOR BEAM MANAGEMENT                                                                                                                   |        |               | PCT  | APP-Pending        | US      | 16/498805     |              |                    |   |
| 10932 | COMMON PHYSICAL DOWNLINK CONTROL CHANNEL (CPDCC) DESIGN FOR MULTIPLEX WIDEBAND COVERAGE ENHANCEMENT (WCE) SYSTEMS                                       |        |               | PCT  | APP-Pending        | US      | 16/463338     |              |                    |   |
| 10933 | AUTONOMOUS HANDOVER FOR WIRELESS NETWORKS                                                                                                               |        |               | PCT  | APP-Pending        | US      | 15/479893     |              |                    |   |
| 10934 | MECHANISMS FOR HANDLING UPLINK GRANTS INDICATING DIFFERENT PHYSICAL UPLINK SHARED CHANNEL STARTING POSITIONS IN A SAME SUBFRAME                         |        |               | PCT  | APP-Pending        | US      | 16/480196     |              |                    |   |
| 10935 | UE CAPABILITY INDICATION TO POSITIONING SERVER                                                                                                          |        |               | PCT  | APP-Pending        | US      | 16/487406     |              |                    |   |
| 10936 | METHOD AND APPARATUS FOR NUMEROLOGY CONFIGURATION IN NON-COHERENT JOINT TRANSMISSION                                                                    |        |               | PCT  | APP-Pending        | US      | 15/483393     |              |                    |   |
| 10937 | IMPROVED HANDLING OF TIMER EXPIRY FOR RAT CSFB                                                                                                          |        |               | PCT  | APP-Pending        | US      | 15/489222     |              |                    |   |
| 10938 | METHOD AND APPARATUS FOR INTERFERENCE MEASUREMENT USING BEAM MANAGEMENT REFERENCE SIGNAL                                                                |        |               | PCT  | APP-Pending        | US      | 16/484340     |              |                    |   |

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| 2     | TITLE                                                                                                                           | FAMILY | FAMILY-MEMBER | TYPE | STATUS             | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10939 | NETWORK FUNCTION VIRTUALIZATION INFRASTRUCTURE PERFORMANCE                                                                      |        |               | PCT  | APP-Pending        | US      | 16/499847     |              |                    |   |
| 10940 | CENTRALIZED UNIT AND DISTRIBUTED UNIT CONNECTION IN A VIRTUALIZED RADIO ACCESS NETWORK                                          |        |               | PCT  | APP-Pending        | US      | 16/499861     |              |                    |   |
| 10941 | ENHANCED NETWORK SLICE MANAGEMENT FOR WIRELESS COMMUNICATIONS                                                                   |        |               | PCT  | APP-Pending        | US      | 16/499857     |              |                    |   |
| 10942 | METHODS AND ARRANGEMENTS TO SIGNAL FOR AERIAL VEHICLES                                                                          |        |               | PCT  | APP-Pending        | US      | 16/500819     |              |                    |   |
| 10943 | UNIFYING SPLIT BEARERS IN LTE INTERWORKING                                                                                      |        |               | PCT  | APP-Pending        | US      | 16/466398     |              |                    |   |
| 10944 | ABSOLUTE POWER CONTROL TOLERANCE FOR NB-IOT/MTC                                                                                 |        |               | PCT  | APP-Pending        | US      | 16/479540     |              |                    |   |
| 10945 | MEASUREMENT CONFIGURATION TECHNIQUES FOR WIDEBAND COVERAGE ENHANCEMENT (WICE)-CAPABLE DEVICES                                   |        |               | PCT  | APP-Pending        | US      | 16/604836     |              |                    |   |
| 10946 | METHOD AND APPARATUS FOR RADIO LINK MONITORING                                                                                  |        |               | PCT  | APP-Pending        | US      | 16/483982     |              |                    |   |
| 10947 | MEASUREMENT DESIGN FOR NEXT RADIO (NR) AND LONG TERM EVOLUTION (LTE)                                                            |        |               | PCT  | APP-Pending        | US      | 16/604982     |              |                    |   |
| 10948 | PER UE NETWORK CONTROLLED SMALL GAP (NCSG) SIGNALING                                                                            |        |               | PCT  | APP-Pending        | US      | 16/613641     |              |                    |   |
| 10949 | SYSTEMS METHODS AND DEVICES FOR SELECTING A PUBLIC LAND MOBILE NETWORK USING COVERAGE ENHANCEMENT INDICATORS                    |        |               | PCT  | APP-Pending        | US      | 16/489178     |              |                    |   |
| 10950 | BEAMFORMED MEASUREMENT FOR NEW RADIO (NR)                                                                                       |        |               | PCT  | APP-Pending        | US      | 16/500351     |              |                    |   |
| 10951 | MULTIRADIO INTERFACE FOR SOFTWARE RECONFIGURATION                                                                               |        |               | PCT  | APP-In-Preparation | US      |               |              |                    |   |
| 10952 | SYSTEMS METHODS AND DEVICES FOR LEGACY SYSTEM FALLBACK IN A CELLULAR COMMUNICATIONS SYSTEM                                      |        |               | PCT  | APP-Pending        | US      | 16/489279     |              |                    |   |
| 10953 | Handling Multiple SR Configurations and Corresponding UL Grants                                                                 |        |               | PCT  | APP-Pending        | US      | 16/478905     |              |                    |   |
| 10954 | PHYSICAL RESOURCE BLOCK INDEXING FOR COEXISTENCE OF NARROW BAND CARRIER AGGREGATION AND WIDE BAND USER EQUIPMENT IN NEW RADIO   |        |               | PCT  | APP-Pending        | US      | 16/349584     |              | US-2019-0280843-A1 |   |
| 10955 | SEPARATION OF CONTROL PLANE AND USER PLANE IN NEW RADIO (NR) SYSTEMS                                                            |        |               | PCT  | APP-In-Preparation | US      |               |              |                    |   |
| 10956 | APPARATUS OF GNB TO ENABLE AN INACTIVE MODE IN DUAL CONNECTIVITY                                                                |        |               | PCT  | APP-Pending        | US      | 16/475056     |              |                    |   |
| 10957 | Access Control for User Equipment with Coverage Enhancement Level Support                                                       |        |               | PCT  | APP-Pending        | US      | 16/609312     |              |                    |   |
| 10958 | MULTIPIRE ARCHITECTURE SUPPORTING ACCESS CLASSES AND BARRING                                                                    |        |               | PCT  | APP-In-Preparation | US      |               |              |                    |   |
| 10959 | DEVICES AND METHODS FOR UE-SPECIFIC RAN-CN ASSOCIATIONS                                                                         |        |               | PCT  | APP-Pending        | US      | 16/615054     |              |                    |   |
| 10960 | ANTENNA BEAMWIDTH CONTROL                                                                                                       |        |               | NP   | APP-Pending        | US      | 15/942026     |              | US-2019-0305422-A1 |   |
| 10961 | HANDOVER FOR UNMANNED AERIAL VEHICLES                                                                                           |        |               | NP   | APP-Pending        | US      | 16/057979     |              | US-2019-0045406-A1 |   |
| 10962 | SCRAMBLING OF PHYSICAL BROADCAST CHANNEL (PBCH)                                                                                 |        |               | PCT  | APP-In-Preparation | US      |               |              |                    |   |
| 10963 | METHOD FOR ESTIMATING CRYSTAL COEFFICIENT VALUES FOR A SIGNAL GENERATOR                                                         |        |               | NP   | PAT-Active         | US      | 09/867571     | 6636121      | US-2002-0180835-A1 |   |
| 10964 | WIRELESS LINK CONTROL AND RECOVERY USING POSITIONAL DATA                                                                        |        |               | NP   | PAT-Active         | US      | 15/279490     | #####        | US-2018-0091202-A1 |   |
| 10965 | WIRELESS LINK CONTROL AND RECOVERY USING POSITIONAL DATA                                                                        |        |               | NP   | APP-Pending        | US      | 16/542310     |              |                    |   |
| 10966 | SCHEDULING REQUEST TRANSMISSIONS IN THE UNLICENSED SPECTRUM                                                                     |        |               | PCT  | APP-Pending        | US      | 16/092673     |              | US-2019-0192860-A1 |   |
| 10967 | INTERFERENCE AWARE BEAM SELECTION FOR NR (NEW RADIO)                                                                            |        |               | PCT  | APP-Pending        | US      | 16/306986     |              | US-2019-0305838-A1 |   |
| 10968 | CHANNEL STATE AND BEAM RELATED INFORMATION REPORTING                                                                            |        |               | PCT  | APP-Pending        | US      | 16/309856     |              | US-2019-0173622-A1 |   |
| 10969 | END-TO-END TECHNIQUES TO CREATE PM (PERFORMANCE MEASUREMENT) THRESHOLDS AT NFV (NETWORK FUNCTION VIRTUALIZATION) INFRASTRUCTURE |        |               | PCT  | APP-Pending        | US      | 16/303298     |              | US-2019-0215235-A1 |   |
| 10970 | UPLINK SOUNDING REFERENCE SIGNAL (SRS) TRANSMISSION IN CARRIER AGGREGATION SYSTEM                                               |        |               | PCT  | APP-Pending        | US      | 16/303759     |              |                    |   |

|       | A                                                                                                                             | B      | C             | D    | E                  | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                         | FAMILY | FAMILY-MEMBER | TYPE | STATUS             | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10971 | APPARATUSES TO AUTHORIZE AND ENABLE/DISABLE ENHANCED COVERAGE FUNCTIONALITY                                                   |        |               | PCT  | APP-Pending        | US      | 16/093912     |              | US-2019-0110241-A1 |   |
| 10972 | APPARATUSES TO AUTHORIZE AND ENABLE/DISABLE ENHANCED COVERAGE FUNCTIONALITY                                                   |        |               | CNT  | APP-Pending        | US      | 16/907004     |              | US-2019-0274088-A1 |   |
| 10973 | CONFIGURING DOWNLINK LISTEN-BEFORE-TALK PRIORITY CLASS FOR UPLINK GRANT TRANSMISSION IN LICENSED ASSISTED ACCESS              |        |               | PCT  | APP-Pending        | US      | 15/766556     |              | US-2018-0288805-A1 |   |
| 10974 | AMPLITUDE-MODULATION SIGNAL AND PHASE-MODULATION SIGNAL DELAY ADJUSTMENT FOR POLAR TRANSMITTER                                |        |               | NP   | PAT-Active         | US      | 15/268955     | 9867155      |                    |   |
| 10975 | PAPR reduction for IQ-RF DAC                                                                                                  |        |               | NP   | PAT-Active         | US      | 15/274721     | 9985811      | US-2018-0091338-A1 |   |
| 10976 | OCL (OBTAIN CO-LOCATION) INDICATION FOR BEAMFORMING MANAGEMENT                                                                |        |               | PCT  | APP-Pending        | US      | 16/312645     |              | US-2019-0345998-A1 |   |
| 10977 | CAMPING APPROACH IN MULTI-SIM USER EQUIPMENT WHEN PRESENT IN COVERAGE HOLES OF RESPECTIVE NETWORK OPERATORS                   |        |               | NP   | PAT-Active         | US      | 15/281117     | #####        | US-2018-0098262-A1 |   |
| 10978 | CAMPING APPROACH IN MULTI-SIM USER EQUIPMENT WHEN PRESENT IN COVERAGE HOLES OF RESPECTIVE NETWORK OPERATORS                   |        |               | CNT  | APP-In-Preparation | US      |               |              |                    |   |
| 10979 | APPARATUSES AND METHODS FOR MEASURING NEIGHBORING INTER-FREQUENCY OR INTER-RAT CELLS                                          |        |               | PCT  | APP-Pending        | US      | 16/328741     |              | US-2019-0306270-A1 |   |
| 10980 | MOBILE TERMINAL DEVICES AND METHODS IN MOBILE COMMUNICATION DEVICES                                                           |        |               | PCT  | APP-Pending        | US      | 16/323261     |              | US-2019-0215783-A1 |   |
| 10981 | MOBILE DEVICE MANAGEMENT BASED ON PREDICTED BASE STATION BEHAVIOR                                                             |        |               | PCT  | APP-Pending        | US      | 16/327878     |              | US-2019-0223098-A1 |   |
| 10982 | PROCESSING REQUESTS FOR MEASUREMENT OF SIGNAL QUALITY AT THE LOCATION OF A USER EQUIPMENT WITH MULTIPLE SIMS OR SUBSCRIPTIONS |        |               | NP   | PAT-Active         | US      | 15/688910     | #####        | US-2018-0098238-A1 |   |
| 10983 | PROCESSING REQUESTS FOR MEASUREMENT OF SIGNAL QUALITY AT THE LOCATION OF A USER EQUIPMENT WITH MULTIPLE SIMS                  |        |               | CNT  | APP-Pending        | US      | 16/546334     |              |                    |   |
| 10984 | METHODS AND DEVICES FOR SELF-INTERFERENCE CANCELLATION                                                                        |        |               | PCT  | APP-Pending        | US      | 16/327986     |              | US-2019-0225884-A1 |   |
| 10985 | DISCOVERY AND NETWORK ACCESS PROCEDURES FOR 5G THINGS COMMUNICATION SYSTEM                                                    |        |               | PCT  | APP-Pending        | US      | 16/079756     |              | US-2019-0857123-A1 |   |
| 10986 | TESTING OF USER EQUIPMENTS FOR IDLE PERIODS DISTRIBUTION                                                                      |        |               | PCT  | APP-Pending        | US      | 16/307346     |              | US-2019-0141553-A1 |   |
| 10987 | METHOD OF UPLINK CONTROL SIGNALING FOR NON-SCHEDULED UPLINK OPERATION OVER UNLICENSED SPECTRUM                                |        |               | PCT  | APP-Pending        | US      | 16/071893     |              | US-2019-0037598-A1 |   |
| 10988 | TRANSMISSION OF PHASE TRACKING REFERENCE SIGNALS (PTRS)                                                                       |        |               | PCT  | APP-Pending        | US      | 16/323465     |              |                    |   |
| 10989 | TRANSMISSION OF PHASE TRACKING REFERENCE SIGNALS (PTRS) FOR BANDWIDTH PARTS                                                   |        |               | CNT  | APP-Pending        | US      | 15/408003     |              | US-2019-0356463-A1 |   |
| 10990 | STATION (STA) AND METHOD FOR USAGE OF PHASE NOISE COMPENSATION BASED ON OPERATIONAL PARAMETERS                                |        |               | NP   | APP-Pending        | US      | 15/281722     |              | US-2018-0097533-A1 |   |
| 10991 | A TRANSMITTER AND A METHOD FOR GENERATING AN ANALOG RADIO FREQUENCY TRANSMIT SIGNAL                                           |        |               | PCT  | APP-Pending        | US      | 16/321082     |              | US-2019-0181895-A1 |   |
| 10992 | HYBRID DISPLAY INTEGRATABLE ANTENNAS USING TOUCH SENSOR TRACE AND EDGE DISCONTINUITY STRUCTURES                               |        |               | NP   | PAT-Active         | US      | 15/465261     | #####        | US-2018-0275788-A1 |   |
| 10993 | HYBRID DISPLAY INTEGRATABLE ANTENNAS USING TOUCH SENSOR TRACE AND EDGE DISCONTINUITY STRUCTURES                               |        |               | CNT  | APP-Pending        | US      | 16/274851     |              | US-2019-0346946-A1 |   |
| 10994 | LOW COMPLEXITY CHANNEL DECODERS                                                                                               |        |               | NP   | PAT-Active         | US      | 05/880767     | 7243295      | US-2002-0198567-A1 |   |
| 10995 | LOW COMPLEXITY CHANNEL DECODERS                                                                                               |        |               | DIV  | PAT-Active         | US      | 10/829075     | 7240274      | US-2004-0185856-A1 |   |

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| 2     | TITLE                                                                                                                                                    | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 10996 | AUDIO SIGNAL PROCESSING FOR SPEECH COMMUNICATION                                                                                                         |        |               | NP   | PAT-Active  | US      | 08/851389     | 6820054      | US-2003-0923433-A1 |   |
| 10997 | REDUCED COMPLEXITY MMSE MULTISER DETECTION FOR A MULTIRATE CDMA LINK                                                                                     |        |               | NP   | PAT-Active  | US      | 10/291188     | 7333466      | US-2004-0990906-A1 |   |
| 10998 | CONTROL CHANNEL TRANSMISSION IN NEW RADIO ACCESS TECHNOLOGIES USING COMMON SEARCH SPACE                                                                  |        |               | PCT  | APP-Pending | US      | 16/467549     |              | US-2019-0313888-A1 |   |
| 10999 | SYSTEMS AND METHODS FOR DELIVERING RADIO APPLICATIONS TO RECONFIGURABLE RADIO EQUIPMENT                                                                  |        |               | PCT  | APP-Pending | US      | 16/481180     |              |                    |   |
| 11000 | INDOOR POSITIONING ENHANCEMENTS                                                                                                                          |        |               | PCT  | APP-Pending | US      | 16/316494     |              | US-2019-0297595-A1 |   |
| 11001 | PRC COORDINATION BETWEEN A PLURALITY OF NODES                                                                                                            |        |               | PCT  | APP-Pending | US      | 16/316489     |              | US-2019-0297662-A1 |   |
| 11002 | SYSTEMS AND METHOD FOR SELECTING CARRIER RESOURCES FOR NARROWBAND PHYSICAL RANDOM ACCESS CHANNEL PROCEDURES                                              |        |               | PCT  | APP-Pending | US      | 16/316842     |              |                    |   |
| 11003 | BEAM MEASUREMENT AND REPORTING IN CELLULAR NETWORKS                                                                                                      |        |               | PCT  | APP-Pending | US      | 16/324667     |              | US-2019-0182896-A1 |   |
| 11004 | OPTIMIZED RESOURCE SELECTION PROCEDURES IN VEHICLE-TO-VEHICLE COMMUNICATIONS                                                                             |        |               | PCT  | APP-Pending | US      | 16/316744     |              |                    |   |
| 11005 | SUPPORT OF SC-PTM BASED MULTICASTING FOR BL/CE AND NB-IOT UEs                                                                                            |        |               | PCT  | APP-Pending | US      | 16/316771     |              | US-2019-0245254-A1 |   |
| 11006 | NETWORK PROFILE SYSTEM AND METHOD                                                                                                                        |        |               | NP   | APP-Pending | US      | 15/393553     |              | US-2018-0193572-A1 |   |
| 11007 | USING A MANAGED OBJECT OPERATION TO CONTROL A LIFECYCLE MANAGEMENT OPERATION                                                                             |        |               | PCT  | APP-Pending | US      | 16/319886     |              | US-2019-0266012-A1 |   |
| 11008 | METHODS AND DEVICES FOR COMPENSATING MISADJUSTMENT OF A GNSS DEVICE                                                                                      |        |               | NP   | PAT-Active  | US      | 15/282501     | 8828888      | US-2018-0295178-A1 |   |
| 11009 | BANDWIDTH UTILIZATION DURING SILENCE FRAMES                                                                                                              |        |               | PCT  | APP-Pending | US      | 16/505581     |              |                    |   |
| 11010 | SCHEDULING UPLINK TRANSMISSIONS FOR A USER EQUIPMENT (UE)                                                                                                |        |               | PCT  | APP-Pending | US      | 16/761387     |              | US-2018-0270860-A1 |   |
| 11011 | DEVICES AND METHODS FOR E-RAA MULTI-CARRIER LBT                                                                                                          |        |               | PCT  | APP-Pending | US      | 16/321812     |              | US-2019-0174546-A1 |   |
| 11012 | TRANSMITTER AND RECEIVER FOR MASTER INFORMATION BLOCK OVER PHYSICAL BROADCAST CHANNEL                                                                    |        |               | PCT  | APP-Pending | US      | 16/060401     |              | US-2019-0007896-A1 |   |
| 11013 | 5G MMWAVE WIRELESS REMOTE RADIO HEAD SYSTEM                                                                                                              |        |               | PCT  | APP-Pending | US      | 16/461727     |              | US-2019-0320498-A1 |   |
| 11014 | DEVICE AND METHOD FOR ULTRASONIC COMMUNICATION                                                                                                           |        |               | NP   | APP-Pending | US      | 15/378298     |              | US-2018-0167147-A1 |   |
| 11015 | DEVICES AND METHODS FOR PROCESSING TRANSMISSIONS FROM MULTIPLE NETWORK ACCESS NODES BASED ON DISTINGUISHING FEATURES                                     |        |               | NP   | PAT-Active  | US      | 15/393363     | 8888888      | US-2018-0192449-A1 |   |
| 11016 | SYSTEM AND METHOD OF CONTROLLING A TRANSMISSION                                                                                                          |        |               | CNT  | APP-Pending | US      | 16/454066     |              |                    |   |
| 11017 | DOWNLINK CONTROL CHANNEL DESIGN FOR BEAMFORMING SYSTEMS                                                                                                  |        |               | PCT  | APP-Pending | US      | 16/326168     |              | US-2019-0182095-A1 |   |
| 11018 | SYSTEMS METHODS AND DEVICES FOR USER PLANE TRAFFIC FORWARDING                                                                                            |        |               | PCT  | APP-Pending | US      | 16/479432     |              |                    |   |
| 11019 | CELLULAR WAKEUP RECEIVER FOR REDUCING POWER CONSUMPTION OF USER EQUIPMENT EMPLOYING LTE-WLAN AGGREGATION                                                 |        |               | PCT  | APP-Pending | US      | 16/475913     |              | US-2019-0327679-A1 |   |
| 11020 | IoT goes Unlicensed                                                                                                                                      |        |               | PCT  | APP-Pending | US      | 16/489475     |              |                    |   |
| 11021 | CSI (CHANNEL STATE INFORMATION)-RS (REFERENCE SIGNAL) OVERHEAD REDUCTION FOR CLASS B FD (FULL DIMENSIONAL) MIMO (MULTIPLE INPUT MULTIPLE OUTPUT) SYSTEMS |        |               | PCT  | APP-Pending | US      | 16/067929     |              | US-2019-0273187-A1 |   |
| 11022 | FREQUENCY HOPPING FOR UNLICENSED INTERNET OF THINGS                                                                                                      |        |               | PCT  | APP-Pending | US      | 16/328456     |              |                    |   |

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| 2     | TITLE                                                                                                                                                                            | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11023 | SYSTEM AND METHOD FOR BEAMED REFERENCE SIGNAL WITH HYBRID BEAM                                                                                                                   |        |               | PCT  | APP-Pending | US      | 15/767113     |              | US-2019-0974890-A1 |   |
| 11024 | LINK MONITORING REPETITION LEVEL FEEDBACK FOR COMMUNICATION SYSTEMS                                                                                                              |        |               | PCT  | APP-Pending | US      | 16/328543     |              | US-2019-0215909-A1 |   |
| 11025 | INTRA- AND INTER-RAT CO-EXISTENCE AND CONGESTION CONTROL FOR LTE PCS-BASED VEHICLE-TO-VEHICLE (V2V) COMMUNICATION                                                                |        |               | PCT  | APP-Pending | US      | 16/322412     |              | US-2019-0174547-A1 |   |
| 11026 | SYSTEMS METHODS AND DEVICES FOR UPLINK BEARER AND ACCESS CATEGORY MAPPING                                                                                                        |        |               | PCT  | APP-Pending | US      | 16/326662     |              |                    |   |
| 11027 | DMRS FOR 5G THINGS COMMUNICATION SYSTEM USER EQUIPMENT (UE) AND METHOD OF SIDELINK DATA COMMUNICATION IN FIFTH GENERATION (5G) NEW RADIO (NR) THINGS NETWORKS                    |        |               | PCT  | APP-Pending | US      | 16/079470     |              | US-2019-0052442-A1 |   |
| 11028 | RANDOM ACCESS AND SCHEDULING REQUEST IN NEW RADIO THINGS SIDELINK                                                                                                                |        |               | PCT  | APP-Pending | US      | 16/078989     |              | US-2019-0090220-A1 |   |
| 11029 | MULTIPLE RADIO RESOURCE RESERVATION FOR VEHICLE-TO-EVERYTHING COMMUNICATIONS                                                                                                     |        |               | PCT  | APP-Pending | US      | 16/323957     |              | US-2019-0182890-A1 |   |
| 11030 | USER EQUIPMENT (UE) EVOLVED NODE-B (ENB) AND METHODS FOR DYNAMIC HYBRID AUTOMATIC REPEAT REQUEST (HARQ)                                                                          |        |               | PCT  | APP-Pending | US      | 16/322068     |              | US-2019-0191487-A1 |   |
| 11031 | USER EQUIPMENT (UE) EVOLVED NODE-B (ENB) AND METHODS FOR DYNAMIC HYBRID AUTOMATIC REPEAT REQUEST (HARQ)                                                                          |        |               | CNT  | APP-Pending | US      | 16/408016     |              | US-2019-0335336-A1 |   |
| 11032 | METHOD AND APPARATUS FOR A HIGH ISOLATION DUAL PORT ANTENNA SYSTEM                                                                                                               |        |               | NP   | PAT-Active  | US      | 10/005738     | 6608602      | US-2003-0085647-A1 |   |
| 11033 | SPARSE CHANNEL ESTIMATION FOR ORTHOGONAL FREQUENCY DIVISION MULTIPLEXED SIGNALS                                                                                                  |        |               | CNT  | PAT-Active  | US      | 11/750033     | 7605616      | US-2007-0223610-A1 |   |
| 11034 | CELL SELECTION TECHNIQUES FOR DIRECTIONAL COMMUNICATIONS                                                                                                                         |        |               | PCT  | APP-Pending | US      | 16/497496     |              |                    |   |
| 11035 | USER EQUIPMENT (UE) EVOLVED NODE-B (ENB) AND METHODS FOR MULTIPLEXING NEW RADIO (NR) PHYSICAL UPLINK SHARED CHANNEL (NR PUSCH) AND NR PHYSICAL UPLINK CONTROL CHANNEL (NR PUCCH) |        |               | PCT  | APP-Pending | US      | 16/322040     |              | US-2019-0191453-A1 |   |
| 11036 | USER EQUIPMENT (UE) EVOLVED NODE-B (ENB) AND METHODS FOR MULTIPLEXING NEW RADIO (NR) PHYSICAL UPLINK SHARED CHANNEL (NR PUSCH) AND NR PHYSICAL UPLINK CONTROL CHANNEL (NR PUCCH) |        |               | CNT  | APP-Pending | US      | 16/407961     |              | US-2019-0335483-A1 |   |
| 11037 | ANGULAR ELECTRODE                                                                                                                                                                |        |               | NP   | PAT-Active  | US      | 15/473941     | #####        | US-2018-0247715-A1 |   |
| 11038 | FREQUENCY DEPENDENT ENVELOPE TRACKING                                                                                                                                            |        |               | NP   | APP-Pending | US      | 15/443260     |              | US-2018-0246570-A1 |   |
| 11039 | ANTENNA INCORPORATED INTO DEVICE HINGE AND METHOD                                                                                                                                |        |               | NP   | PAT-Active  | US      | 15/477054     | #####        | US-2018-0287241-A1 |   |
| 11040 | RF TRANSMIT ARCHITECTURE METHODS                                                                                                                                                 |        |               | NP   | PAT-Active  | US      | 15/476014     | #####        | US-2018-0287821-A1 |   |
| 11041 | RF TRANSMIT ARCHITECTURE METHODS                                                                                                                                                 |        |               | CNT  | APP-Pending | US      | 16/193431     |              | US-2019-0327118-A1 |   |
| 11042 | BINARY STOCHASTIC TIME-TO-DIGITAL CONVERTER AND METHOD                                                                                                                           |        |               | NP   | PAT-Active  | US      | 15/477057     | 9917775      |                    |   |
| 11043 | DOWNLINK CONTROL INFORMATION DESIGN WITH SHORTER TTI                                                                                                                             |        |               | PCT  | APP-Pending | US      | 16/346335     |              | US-2019-0268931-A1 |   |
| 11044 | LIFECYCLE MANAGEMENT PARAMETER MODELING FOR VIRTUAL NETWORK FUNCTIONS                                                                                                            |        |               | PCT  | APP-Pending | US      | 16/338987     |              |                    |   |
| 11045 | RADAR METHODS AND APPARATUS USING IN PHASED ARRAY COMMUNICATION SYSTEMS                                                                                                          |        |               | NP   | APP-Pending | US      | 15/389426     |              | US-2018-0180713-A1 |   |
| 11046 | SYSTEMS AND METHODS TO REPORT BAND COMBINATION CAPABILITIES IN A TELECOMMUNICATION NETWORK                                                                                       |        |               | PCT  | APP-Pending | US      | 16/339143     |              | US-2019-0306925-A1 |   |
| 11047 | SIGNALING OF SUPPORT FOR NETWORK CONTROLLED SMALL GAP WGS FOR INTERRUPTION CONTROL                                                                                               |        |               | PCT  | APP-Pending | US      | 16/339500     |              |                    |   |



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| 2     | TITLE                                                                                                                              | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11049 | Frequency domain based digital cancellation of modulated spur interference in LTE-LA transceivers                                  |        |               | NP   | APP-Pending | US      | 15/474243     |              | US-2018-0287719-A1 |   |
| 11050 | DEVICE FOR AND METHOD OF RADIO ACCESS TECHNOLOGY SELECTION AMONG MULTIPLE RADIO ACCESS TECHNOLOGIES                                |        |               | PCT  | APP-Pending | US      | 16/310407     |              | US-2019-015082-A1  |   |
| 11051 | SPUR CANCELLATION USING INVERSE SPUR INJECTION                                                                                     |        |               | NP   | PAT-Active  | US      | 15/448078     | #####        | US-2018-0254852-A1 |   |
| 11052 | Feed-Forward Envelope Tracking                                                                                                     |        |               | NP   | PAT-Active  | US      | 15/474186     | #####        | US-2018-0287563-A1 |   |
| 11053 | Feed-Forward Envelope Tracking                                                                                                     |        |               | CNT  | APP-Pending | US      | 16/140291     |              | US-2019-0096486-A1 |   |
| 11054 | POLAR TRANSMITTER WITH JOINED MODULATOR                                                                                            |        |               | NP   | PAT-Active  | US      | 15/639444     | #####        |                    |   |
| 11055 | DEVICE AND METHOD FOR RADIO CELL SELECTION                                                                                         |        |               | NP   | PAT-Active  | US      | 15/720447     | #####        | US-2019-0104451-A1 |   |
| 11056 | DEVICE AND METHOD FOR RADIO CELL SELECTION                                                                                         |        |               | CNT  | APP-Pending | US      | 16/530752     |              |                    |   |
| 11057 | USER EQUIPMENT WITH ADAPTIVE TRANSMISSION POWER SCALING BASED ON DECODING CONFIDENCE                                               |        |               | PCT  | APP-Pending | US      | 16/484325     |              |                    |   |
| 11058 | EFFICIENT BEAM SEARCH METHODS FOR THREE-DIMENSIONAL BEAMFORMING WITH NON-PRECODED REFERENCE SIGNALS                                |        |               | PCT  | APP-Pending | US      | 16/488618     |              |                    |   |
| 11059 | TRANSMISSION POWER CONTROL METHODS AND DEVICES                                                                                     |        |               | NP   | PAT-Active  | US      | 15/476361     | #####        | US-2018-0288709-A1 |   |
| 11060 | METHODS AND DEVICES FOR PROCESSING A DATA SIGNAL FOR TRANSMISSION TO MULTI-STREAM TERMINALS                                        |        |               | PCT  | APP-Pending | US      | 16/494474     |              |                    |   |
| 11061 | APPARATUS AND METHOD FOR INTERPOLATING BETWEEN A FIRST AND A SECOND SIGNAL                                                         |        |               | PCT  | APP-Pending | US      | 16/474560     |              | US-2019-0356305-A1 |   |
| 11062 | OFFSET SYSTEM AND METHOD FOR MULTI-BIT DIGITAL-TO-ANALOG CONVERTERS                                                                |        |               | PCT  | APP-Pending | US      | 16/349390     |              | US-2019-0341923-A1 |   |
| 11063 | METHOD FOR TRANSMISSION OF UNICAST CONTROL IN BROADCAST/MULTICAST TRANSMISSION TIME INTERVALS                                      |        |               | NP   | PAT-Active  | US      | 11/554989     | 8175021      | US-2007-0169151-A1 |   |
| 11064 | Method for Transmission of Unicast Control in Broadcast/Multicast Transmission Time Intervals                                      |        |               | CNT  | PAT-Active  | US      | 13/446492     | 9147133      | US-2012-0195246-A1 |   |
| 11065 | METHOD FOR TRANSMISSION OF UNICAST CONTROL IN BROADCAST/MULTICAST TRANSMISSION TIME INTERVALS                                      |        |               | DIV  | PAT-Active  | US      | 14/840933     | 9802789      | US-2015-0373738-A1 |   |
| 11066 | METHOD FOR TRANSMISSION OF UNICAST CONTROL IN BROADCAST/MULTICAST TRANSMISSION TIME INTERVALS                                      |        |               | CNT  | PAT-Active  | US      | 15/795628     | #####        | US-2018-0220445-A1 |   |
| 11067 | WIDEBAND REFERENCE SIGNAL TRANSMISSION IN SC-FDMA COMMUNICATION SYSTEMS                                                            |        |               | NP   | PAT-Active  | US      | 11/927146     | 7957759      | US-2008-0139237-A1 |   |
| 11068 | WIDEBAND REFERENCE SIGNAL TRANSMISSION IN SC-FDMA COMMUNICATION SYSTEMS                                                            |        |               | DIV  | PAT-Active  | US      | 13/104862     | 9838980      | US-2011-0212745-A1 |   |
| 11069 | Signaling of Random Access Preamble Sequences in Wireless Networks                                                                 |        |               | NP   | PAT-Active  | US      | 12/184239     | 8773968      | US-2009-0046629-A1 |   |
| 11070 | SIGNALING OF RANDOM ACCESS PREAMBLE SEQUENCES IN WIRELESS NETWORKS                                                                 |        |               | CNT  | PAT-Active  | US      | 14/326354     | 9774424      | US-2014-0341010-A1 |   |
| 11071 | SIGNALING OF RANDOM ACCESS PREAMBLE SEQUENCES IN WIRELESS NETWORKS                                                                 |        |               | CNT  | PAT-Active  | US      | 15/713893     | #####        | US-2018-0131481-A1 |   |
| 11072 | SECONDARY SYNCHRONIZATION SIGNAL MAPPING                                                                                           |        |               | NP   | PAT-Active  | US      | 12/234362     | 8025586      | US-2009-0080407-A1 |   |
| 11073 | SECONDARY SYNCHRONIZATION SIGNAL MAPPING                                                                                           |        |               | DIV  | PAT-Active  | US      | 14/458515     | 9806859      | US-2014-0345145-A1 |   |
| 11074 | SECONDARY SYNCHRONIZATION SIGNAL MAPPING                                                                                           |        |               | CNT  | PAT-Active  | US      | 15/729064     | #####        | US-2018-0123750-A1 |   |
| 11075 | CODE DIVISION MULTIPLE ACCESS WIRELESS SYSTEM WITH CLOSED LOOP MODE USING NINETY DEGREE PHASE ROTATION AND BEAMFORMER VERIFICATION |        |               | NP   | PAT-Active  | US      | 09/635715     | 6831943      |                    |   |

|       | A                                                                                                                                  | B      | C             | D    | E          | F       | G             | H            | I                  | J |
|-------|------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|------|------------|---------|---------------|--------------|--------------------|---|
| 2     | TITLE                                                                                                                              | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11076 | CODE DIVISION MULTIPLE ACCESS WIRELESS SYSTEM WITH CLOSED LOOP MODE USING NINETY DEGREE PHASE ROTATION AND BEAMFORMER VERIFICATION |        |               | DIV  | PAT-Active | US      | 10/781472     | 7384867      | US-2004-0186627-A1 |   |
| 11077 | CODE DIVISION MULTIPLE ACCESS WIRELESS SYSTEM WITH CLOSED LOOP MODE USING NINETY DEGREE PHASE ROTATION AND BEAMFORMER VERIFICATION |        |               | DIV  | PAT-Active | US      | 10/919470     | 7346121      | US-2005-0202656-A1 |   |
| 11078 | CODE DIVISION MULTIPLE ACCESS WIRELESS SYSTEM WITH CLOSED LOOP MODE USING NINETY DEGREE PHASE ROTATION AND BEAMFORMER VERIFICATION |        |               | ENT  | PAT-Active | US      | 11/681088     | 7463706      | US-2007-0165689-A1 |   |
| 11079 | CODE DIVISION MULTIPLE ACCESS WIRELESS SYSTEM WITH CLOSED LOOP MODE USING NINETY DEGREE PHASE ROTATION AND BEAMFORMER VERIFICATION |        |               | DIV  | PAT-Active | US      | 12/331279     | 7711034      | US-2009-0103590-A1 |   |
| 11080 | Broadcast multicast mode                                                                                                           |        |               | NP   | PAT-Active | US      | 11/117820     | 9825977      | US-2005-0276238-A1 |   |
| 11081 | UPLINK SYNCHRONIZATION MAINTENANCE PRINCIPLES IN WIRELESS NETWORKS                                                                 |        |               | NP   | PAT-Active | US      | 12/111810     | 8218526      | US-2008-0267185-A1 |   |
| 11082 | UPLINK SYNCHRONIZATION MAINTENANCE PRINCIPLES IN WIRELESS NETWORKS                                                                 |        |               | ENT  | PAT-Active | US      | 13/531006     | 9185717      | US-2013-0242973-A1 |   |
| 11083 | TRANSMISSION OF BUNDLED FEEDBACK IN WIRELESS NETWORKS                                                                              |        |               | NP   | PAT-Active | US      | 12/389486     | 8345605      | US-2009-0213769-A1 |   |
| 11084 | DOWNLINK SYNCHRONIZATION CHANNEL AND METHODS FOR CELLULAR SYSTEMS                                                                  |        |               | NP   | PAT-Active | US      | 11/737554     | 8031745      | US-2007-0348068-A1 |   |
| 11085 | WIRELESS COMMUNICATIONS SYSTEM WITH SECONDARY SYNCHRONIZATION CODE BASED ON VALUES IN PRIMARY SYNCHRONIZATION CODE                 |        |               | DIV  | PAT-Active | US      | 11/438149     | 7656934      | US-2006-0286230-A1 |   |
| 11086 | WIRELESS COMMUNICATIONS SYSTEM WITH SECONDARY SYNCHRONIZATION CODE BASED ON VALUES IN PRIMARY SYNCHRONIZATION CODE                 |        |               | DIV  | PAT-Active | US      | 12/638468     | 7860152      | US-2010-0091821-A1 |   |
| 11087 | PRIMARY AND SECONDARY SYNCHRONIZATION CODES FROM FIRST SECONDTHIRD SEQUENCES                                                       |        |               | DIV  | PAT-Active | US      | 12/949413     | 8144747      | US-2011-0064073-A1 |   |
| 11088 | WIRELESS COMMUNICATIONS SYSTEM WITH SECONDARY SYNCHRONIZATION CODE BASED ON VALUES IN PRIMARY SYNCHRONIZATION CODE                 |        |               | DIV  | PAT-Active | US      | 13/403201     | 8913362      | US-2012-0147877-A1 |   |
| 11089 | WIRELESS COMMUNICATIONS SYSTEM WITH SECONDARY SYNCHRONIZATION CODE BASED ON VALUES IN PRIMARY SYNCHRONIZATION CODE                 |        |               | DIV  | PAT-Active | US      | 13/403223     | 8917756      | US-2012-0154184-A1 |   |
| 11090 | WIRELESS COMMUNICATIONS SYSTEM WITH SECONDARY SYNCHRONIZATION CODE BASED ON VALUES IN PRIMARY SYNCHRONIZATION CODE                 |        |               | DIV  | PAT-Active | US      | 13/403236     | 8681834      | US-2012-0147730-A1 |   |
| 11091 | WIRELESS COMMUNICATIONS SYSTEM WITH CYCLING OF UNIQUE CELL BIT SEQUENCES IN STATION COMMUNICATIONS                                 |        |               | NP   | PAT-Active | US      | 09/605610     | 7372825      |                    |   |
| 11092 | WIRELESS COMMUNICATIONS SYSTEM WITH CYCLING OF UNIQUE CELL BIT SEQUENCES IN STATION COMMUNICATIONS                                 |        |               | ENT  | PAT-Active | US      | 12/034534     | 8107420      | US-2008-0170638-A1 |   |
| 11093 | RECEIVER ALGORITHM FOR THE LENGTH 4 CPC                                                                                            |        |               | NP   | PAT-Active | US      | 09/649390     | 6891862      |                    |   |
| 11094 | METHOD AND APPARATUS FOR PRIORITIZING INFORMATION PROTECTION IN HIGH ORDER MODULATION SYMBOL MAPPING                               |        |               | NP   | PAT-Active | US      | 09/948893     | 6476734      | US-2002-0126763-A1 |   |
| 11095 | MULTIPLYING SYMBOL STREAMS BY RECTANGULAR MATRIX OF $[P/M] \times 1$ VECTORS                                                       |        |               | DIV  | PAT-Active | US      | 11/468394     | 7713798      | US-2006-0281581-A1 |   |
| 11096 | HIGH DATA RATE CLOSED LOOP MIMO SCHEME COMBINING TRANSMIT DIVERSITY AND DATA MULTIPLEXING                                          |        |               | DIV  | PAT-Active | US      | 12/970167     | 8138678      | US-2011-0080976-A1 |   |
| 11097 | WIRELESS SYSTEM WITH HYBRID AUTOMATIC RETRANSMISSION REQUEST IN INTERFERENCE-LIMITED COMMUNICATIONS                                |        |               | NP   | PAT-Active | US      | 10/260763     | 7295624      | US-2004-0203456-A1 |   |
| 11098 | TIME-FREQUENCY INTERLEAVED ORTHOGONAL FREQUENCY DIVISION MULTIPLEXING ULTRA WIDE BAND PHYSICAL LAYER                               |        |               | NP   | PAT-Active | US      | 10/688169     | 7756002      | US-2004-0151109-A1 |   |
| 11099 | Wireless Precoding Methods                                                                                                         |        |               | ENT  | PAT-Active | US      | 13/237543     | 8693575      | US-2012-0088718-A1 |   |
| 11100 | WIRELESS PRECODING METHODS                                                                                                         |        |               | ENT  | PAT-Active | US      | 14/095470     | 9197306      | US-2014-0293006-A1 |   |
| 11101 | SLOW UPLINK POWER CONTROL                                                                                                          |        |               | NP   | PAT-Active | US      | 11/425202     | 7668564      | US-2006-0285985-A1 |   |

|       | A                                                                                                          | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                      | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11102 | LOW COMPLEXITY DESIGN OF PRIMARY SYNCHRONIZATION SEQUENCE FOR OFDMA                                        |        |               | NP   | PAT-Active  | US      | 11/835744     | 7948866      | US-2008-0931185-A1 |   |
| 11103 | CODEBOOK AND PRE-CODER SELECTION FOR CLOSED-LOOP MIMO                                                      |        |               | NP   | PAT-Active  | US      | 11/893045     | 7948064      | US-2008-0937675-A1 |   |
| 11104 | ADAPTIVE SELECTION OF TRANSMISSION PARAMETERS FOR REFERENCE SIGNALS                                        |        |               | NP   | PAT-Active  | US      | 11/839421     | 8084638      | US-2008-0931125-A1 |   |
| 11105 | ADAPTIVE SELECTION OF TRANSMISSION PARAMETERS FOR REFERENCE SIGNALS                                        |        |               | CNT  | PAT-Active  | US      | 13/314405     | 8717933      | US-2012-0113921-A1 |   |
| 11106 | NETWORK-BASED INTER-CELL POWER CONTROL FOR MULTI-CHANNEL WIRELESS NETWORKS                                 |        |               | NP   | PAT-Active  | US      | 12/067343     | 8072918      | US-2008-0247375-A1 |   |
| 11107 | BLOCK SCRAMBLING FOR ORTHOGONAL FREQUENCY DIVISION MULTIPLE ACCESS                                         |        |               | NP   | PAT-Active  | US      | 12/061878     | 8111731      | US-2008-0247477-A1 |   |
| 11108 | PRE-SYNCHRONIZATION METHOD FOR HARD HANDOVERS IN WIRELESS NETWORKS                                         |        |               | NP   | PAT-Active  | US      | 12/112472     | 8218500      | US-2008-0267131-A1 |   |
| 11109 | RANDOM ACCESS PREAMBLE DETECTION FOR LONG TERM EVOLUTION WIRELESS NETWORKS                                 |        |               | NP   | PAT-Active  | US      | 12/139814     | 8084546      | US-2009-0040918-A1 |   |
| 11110 | TIME-SHARING OF SOUNDING RESOURCES                                                                         |        |               | NP   | PAT-Active  | US      | 12/142135     | 8102809      | US-2009-0934468-A1 |   |
| 11111 | DOWNLINK SIGNALING OF SOUNDING RESOURCES IN A WIRELESS COMMUNICATIONS SYSTEM                               |        |               | CNT  | PAT-Active  | US      | 13/331038     | 8718011      | US-2012-0320870-A1 |   |
| 11112 | TRANSMISSION OF ACK/NACK BITS AND THEIR EMBEDDING IN THE CQI REFERENCE SIGNAL                              |        |               | NP   | PAT-Active  | US      | 12/183242     | 8149938      | US-2009-0042558-A1 |   |
| 11113 | TRANSMISSION OF ACK/NACK BITS AND THEIR EMBEDDING IN THE CQI REFERENCE SIGNAL                              |        |               | CNT  | PAT-Active  | US      | 13/438584     | 8254483      | US-2012-0236773-A1 |   |
| 11114 | Transmission Using Nested QFDMA                                                                            |        |               | DE/  | PAT-Active  | US      | 12/055944     | 8714542      | US-2010-0309775-A1 |   |
| 11115 | ACK/NAK REPETITION SCHEMES IN WIRELESS NETWORKS                                                            |        |               | NP   | PAT-Active  | US      | 12/368583     | 8184579      | US-2009-0207793-A1 |   |
| 11116 | INTERLEAVER DESIGN WITH UNEQUAL ERROR PROTECTION FOR CONTROL INFORMATION                                   |        |               | NP   | PAT-Active  | US      | 12/357500     | 8140944      | US-2009-0198055-A1 |   |
| 11117 | SOUNDING REFERENCE SIGNAL CELL SPECIFIC SUB-FRAME CONFIGURATION                                            |        |               | NP   | PAT-Active  | US      | 12/411886     | 7965657      | US-2009-0290514-A1 |   |
| 11118 | CELL SPECIFIC SOUNDING REFERENCE SIGNAL SUB-FRAME CONFIGURATION                                            |        |               | NP   | PAT-Active  | US      | 12/432031     | 7993916      | US-2009-0275459-A1 |   |
| 11119 | DEVICE RADAR SENSING                                                                                       |        |               | PCT  | APP-Pending | US      | 16/480218     |              |                    |   |
| 11120 | DESIGN OF IN-BAND BACKHAUL FOR WIRELESS RELAYS IN WIRELESS NETWORKS                                        |        |               | NP   | PAT-Active  | US      | 12/683291     | 8259637      | US-2010-0272006-A1 |   |
| 11121 | PROTOCOL STACK AND SCHEDULER FOR LS RELAY                                                                  |        |               | NP   | PAT-Active  | US      | 12/683300     | 8305965      | US-2010-0272037-A1 |   |
| 11122 | Layer Mapping for Up Link Single User Multiple Input Multiple Output Wireless Telephony                    |        |               | NP   | PAT-Active  | US      | 12/693028     | 8971448      | US-2010-0215109-A1 |   |
| 11123 | Coordinated Multi-Point Transmission in a Cellular Network                                                 |        |               | NP   | PAT-Active  | US      | 12/773481     | 8712396      | US-2010-0285792-A1 |   |
| 11124 | SECURITY FOR PAGING MESSAGES                                                                               |        |               | PCT  | APP-Pending | US      | 15/488556     |              |                    |   |
| 11125 | CSI (CHANNEL STATE INFORMATION) ENHANCEMENTS FOR FD (FULL DIMENSION) MIMO (MULTIPLE INPUT MULTIPLE OUTPUT) |        |               | PCT  | APP-Pending | US      | 16/081172     |              | US-2019-0068266-A1 |   |
| 11126 | FREQUENCY TRACKING FOR BEAMFORMED SYSTEMS                                                                  |        |               | PCT  | APP-Pending | US      | 16/085124     |              |                    |   |
| 11127 | DEBUGGING TRANSLATION BLOCK AND DEBUGGING ARCHITECTURE                                                     |        |               | NP   | PAT-Active  | US      | 15/591161     | 8898888      | US-2018-0228866-A1 |   |
| 11128 | GESTURE RECOGNITION RADAR SYSTEMS AND METHODS                                                              |        |               | PCT  | APP-Pending | US      | 16/500230     |              |                    |   |

|       | A                                                                                                                              | B      | C             | D    | E                  | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                          | FAMILY | FAMILY-MEMBER | TYPE | STATUS             | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11129 | APPARATUS AND METHOD FOR DETERMINING A DISTANCE TO AN OBJECT                                                                   |        |               | NP   | APP-Pending        | US      | 15/951202     |              | US-2018-0341000-A1 |   |
| 11130 | PEAK-TO-AVERAGE POWER RATIO REDUCTION FOR IQ TRANSMITTERS                                                                      |        |               | PCT  | APP-Pending        | US      | 15/607893     |              |                    |   |
| 11131 | SMART BEAMWIDTH ADAPTATION IN WIRELESS HEAD-MOUNTED DISPLAYS                                                                   |        |               | NP   | PAT-Active         | US      | 15/719057     | #####        |                    |   |
| 11132 | REAL-TIME CO-CHANNEL INTERFERENCE SUPPRESSION                                                                                  |        |               | NP   | PAT-Active         | US      | 15/640479     | #####        | US-2019-0007845-A1 |   |
| 11133 | SERVER- AND NETWORK-ASSISTED DYNAMIC ADAPTIVE STREAMING OVER HYPertext TRANSPORT PROTOCOL SIGNALING                            |        |               | PCT  | APP-Pending        | US      | 15/680148     |              |                    |   |
| 11134 | RF SIGNAL REPEATER MOBILE UNIT POSITION DETERMINATION SYSTEM USING THE RF SIGNAL REPEATER AND METHOD OF COMMUNICATION THEREFOR |        |               | NP   | PAT-Active         | US      | 09/598653     | 6501955      |                    |   |
| 11135 | RF SIGNAL REPEATER IN MOBILE COMMUNICATIONS SYSTEMS                                                                            |        |               | CNT  | PAT-Active         | US      | 10/173912     | 6439539      | US-2002-0155838-A1 |   |
| 11136 | HIGH-SPEED MOBILITY COMMUNICATION SYSTEMS AND METHODS                                                                          |        |               | PCT  | APP-Pending        | US      | 18/500362     |              |                    |   |
| 11137 | DYNAMIC OFFLOADING OF V2X SERVICES TO DSRC APPARATUS FOR PARTIALLY OFFLOADING PROTOCOL PROCESSING                              |        |               | PCT  | APP-Pending        | US      | 15/306561     |              | US-2019-0178344-A1 |   |
| 11138 | 5G RAN1 SYSTEM AND METHOD FOR PHASE NOISE COMPENSATION FOR DIVERSITY BASED TRANSMISSION                                        |        |               | PSP  | APP-in-Preparation | US      |               |              |                    |   |
| 11139 | TELEPHONE CALL PROCEDURES FOR POWER EFFICIENT MOBILE TERMINATING PACKET SWITCHED SERVICES                                      |        |               | NP   | PAT-Active         | US      | 15/692477     | #####        | US-2019-0059161-A1 |   |
| 11140 | DEVICES AND METHODS FOR NORMAL AND ENHANCED COVERAGE COMPATABILITY                                                             |        |               | NP   | APP-Pending        | US      | 15/718048     |              | US-2019-0098564-A1 |   |
| 11141 | NETWORK CONTROLLER AND METHOD FOR CONTROLLING A COMMUNICATION                                                                  |        |               | NP   | APP-Pending        | US      | 15/700205     |              | US-2019-0081690-A1 |   |
| 11142 | MULTIUSER UPLINK POWER CONTROL WITH USER GROUPING                                                                              |        |               | NP   | PAT-Active         | US      | 15/708165     | #####        | US-2019-0090200-A1 |   |
| 11143 | TXOP WITH CONTINUED LBT AFTER A PAUSE                                                                                          |        |               | PCT  | APP-Pending        | US      | 16/488722     |              |                    |   |
| 11144 | SYSTEMS AND METHODS FOR UPLINK TRANSMISSION POWER CONTROL                                                                      |        |               | PCT  | APP-Pending        | US      | 16/323475     |              | US-2019-0174423-A1 |   |
| 11145 | SYSTEMS AND METHODS FOR UPLINK TRANSMISSION POWER CONTROL                                                                      |        |               | LNT  | APP-Pending        | US      | 16/407952     |              | US-2019-0137151-A1 |   |
| 11146 | PAID POWER MODE FOR AN OSCILLATOR                                                                                              |        |               | PCT  | APP-Pending        | US      | 15/080464     |              |                    |   |
| 11147 | DEVICES AND METHODS FOR POWER ALLOCATION                                                                                       |        |               | NP   | APP-Pending        | US      | 15/719585     |              | US-2019-0104480-A1 |   |
| 11148 | ANTENNA ARRANGEMENT FOR WIRELESS VIRTUAL REALITY HEADSET                                                                       |        |               | PCT  | APP-Pending        | US      | 16/325661     |              | US-2019-0214709-A1 |   |
| 11149 | DEVICES AND METHODS FOR RESOURCE SELECTION IN WIRELESS COMMUNICATIONS                                                          |        |               | NP   | PAT-Active         | US      | 15/718598     | #####        | US-2019-0104512-A1 |   |
| 11150 | WIDEBAND CARRIER CONFIGURATION                                                                                                 |        |               | PCT  | APP-Pending        | US      | 16/393693     |              |                    |   |
| 11151 | ADAPTIVE FILTERING WITH TAP LEAKAGE USING ERROR FILTERING                                                                      |        |               | NP   | PAT-Active         | US      | 13/037656     | 6865588      | US-2003-0126170-A1 |   |
| 11152 | INTERFERENCE REDUCTION USING LOW COMPLEXITY ANTENNA ARRAY                                                                      |        |               | NP   | PAT-Active         | US      | 09/976200     | 7039135      | US-2003-0072396-A1 |   |
| 11153 | METHOD FOR DISCOVERY AND ROUTING USING A PRIORI KNOWLEDGE IN THE FORM OF APPLICATION PROGRAMME WITHIN MOBILE AD-HOC NETWORKS   |        |               | NP   | PAT-Active         | US      | 10/035463     | 7668958      | US-2003-0075033-A1 |   |
| 11154 | METHOD FOR DISCOVERY AND ROUTING USING A PRIORI KNOWLEDGE IN THE FORM OF APPLICATION PROGRAMME WITHIN MOBILE AD-HOC NETWORKS   |        |               | CNT  | PAT-Active         | US      | 12/709987     | 8321587      | US-2010-0153562-A1 |   |
| 11155 | METHOD AND APPARATUS FOR FAST CONVERGING AFFINE PROJECTION BASED ECHO CANCELLER                                                |        |               | NP   | PAT-Active         | US      | 08/947804     | 6700978      | US-2002-0071547-A1 |   |

|       | A                                                                                             | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                         | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11152 | NETWORK ECHO CANCELLER FOR INTEGRATED TELECOMMUNICATIONS PROCESSING                           |        |               | NP   | PAT-Active | US      | 08/948501     | 6738358      | US-2002-0064139-A1 |   |
| 11158 | PULSE AMPLITUDE MODULATED SYSTEM WITH REDUCED INTERSYMBOL INTERFERENCE                        |        |               | NP   | PAT-Active | US      | 10/261574     | 7391834      | US-2004-0062319-A1 |   |
| 11159 | PULSE AMPLITUDE MODULATED SYSTEM WITH REDUCED INTERSYMBOL INTERFERENCE                        |        |               | ENT  | PAT-Active | US      | 12/077987     | 7653165      | US-2008-0181331-A1 |   |
| 11160 | SYSTEM AND METHOD FOR CONTROLLING SIGNAL PROCESSING IN A VOICE OVER PACKET (VOIP) ENVIRONMENT |        |               | NP   | PAT-Active | US      | 09/960886     | 6928076      | US-2002-0054588-A1 |   |
| 11161 | FAST CONVERGING AFFINE PROJECTION BASED ECHO CANCELLER FOR SPARSE MULTI-PATH CHANNELS         |        |               | NP   | PAT-Active | US      | 05/947887     | 6908782      | US-2002-0093919-A1 |   |
| 11162 | HIGH ISOLATION LOW LOSS PRINTED BALUN FEED FOR A CROSS DIPOLE STRUCTURE                       |        |               | NP   | PAT-Active | US      | 09/993187     | 6567056      | US-2003-0090430-A1 |   |
| 11163 | APPARATUS AND METHOD TO REDUCE QUANTIZATION ERROR                                             |        |               | NP   | PAT-Active | US      | 10/195783     | 7324588      | US-2004-0008791-A1 |   |
| 11164 | TRANSFERRING MULTIPLE DATA UNITS OVER A WIRELESS COMMUNICATION LINK                           |        |               | NP   | PAT-Active | US      | 10/113039     | 7376435      | US-2003-0186715-A1 |   |
| 11165 | ADAPTIVELY EXTENDING TUNABLE RANGE OF FREQUENCY IN A CLOSED LOOP                              |        |               | NP   | PAT-Active | US      | 10/324886     | 6885873      | US-2004-0115547-A1 |   |
| 11166 | INPUT JITTER ATTENUATION IN A PHASE-LOCKED LOOP                                               |        |               | NP   | PAT-Active | US      | 10/206778     | 6703878      | US-2004-0017261-A1 |   |
| 11167 | APPARATUS TO SPECULATIVELY IDENTIFY PACKETS FOR TRANSMISSION AND METHOD THEREFOR              |        |               | NP   | PAT-Active | US      | 10/304391     | 7385926      | US-2004-0100981-A1 |   |
| 11168 | METHOD AND APPARATUS OF GENERATING A QUALITY INDICATOR                                        |        |               | NP   | PAT-Active | US      | 10/218117     | 7010731      | US-2004-0034821-A1 |   |
| 11169 | METHOD AND SYSTEM FOR ALLOCATION OF RESOURCES WITHIN WIRELESS SYSTEMS                         |        |               | DIV  | PAT-Active | US      | 11/418673     | 7447532      | US-2006-0295425-A1 |   |
| 11170 | FREQUENCY SELECTIVE SURFACE AND METHOD OF MANUFACTURE                                         |        |               | NP   | PAT-Active | US      | 10/328479     | 6985738      | US-2004-0115658-A1 |   |
| 11171 | ON CHIP LOGIC ANALYZER DEBUG BUS                                                              |        |               | NP   | PAT-Active | US      | 10/334311     | 6822474      | US-2004-0124903-A1 |   |
| 11172 | APPARATUS AND METHOD FOR DATA COMPRESSIBILITY TEST                                            |        |               | NP   | PAT-Active | US      | 10/328167     | 7263233      | US-2004-0126026-A1 |   |
| 11173 | REFERENCE IMPEDANCE APPARATUS SYSTEMS AND METHODS                                             |        |               | NP   | PAT-Active | US      | 10/336233     | 6998931      | US-2004-0130408-A1 |   |
| 11174 | PROGRAMMABLE GAIN AMPLIFIER WITH SELF-ADJUSTING OFFSET CORRECTION                             |        |               | NP   | PAT-Active | US      | 10/329187     | 7302246      | US-2004-0121735-A1 |   |
| 11175 | TRANSMIT/RECEIVER COMBINER USING SHUNT ADMITTANCE ELEMENTS FOR ISOLATION                      |        |               | NP   | PAT-Active | US      | 10/330386     | 6798314      | US-2004-0124944-A1 |   |
| 11176 | WIRELESS COMMUNICATION DEVICE HAVING VARIABLE GAIN DEVICE AND METHOD THEREFOR                 |        |               | NP   | PAT-Active | US      | 10/328956     | 7684776      | US-2004-0121750-A1 |   |
| 11177 | SPATIAL MULTIPLEXING IN A CELLULAR NETWORK                                                    |        |               | NP   | PAT-Closed | US      | 09/364146     | 6067290      |                    |   |
| 11178 | SUBSCRIBER UNIT INCORPORATING SPATIAL MULTIPLEXING                                            |        |               | EXP  | PAT-Closed | US      | 09/545434     | 6678253      |                    |   |
| 11179 | SUBSCRIBER UNIT IN A HYBRID LINK INCORPORATING SPATIAL MULTIPLEXING                           |        |               | DIV  | PAT-Closed | US      | 09/564770     | 6757265      |                    |   |
| 11180 | SUBSCRIBER UNIT IN A HYBRID LINK INCORPORATING SPATIAL MULTIPLEXING                           |        |               | DIV  | PAT-Active | US      | 10/322244     | 7606204      | US-2003-0169720-A1 |   |
| 11181 | SUBSCRIBER UNIT IN A HYBRID LINK INCORPORATING SPATIAL MULTIPLEXING                           |        |               | ENT  | PAT-Active | US      | 10/929015     | 7773564      | US-2005-0025099-A1 |   |
| 11182 | SPATIAL MULTIPLEXING IN A CELLULAR NETWORK                                                    |        |               | ENT  | PAT-Active | US      | 12/823057     | 8339934      | US-2010-0360134-A1 |   |

|       | A                                                                                                                           | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                       | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11183 | SPATIAL MULTIPLEXING IN A CELLULAR NETWORK                                                                                  |        |               | CNT  | PAT-Active | US      | 13/684010     | 9137799      | US-2013-0163526-A1 |   |
| 11184 | SPATIAL MULTIPLEXING IN A CELLULAR NETWORK                                                                                  |        |               | CNT  | PAT-Active | US      | 13/780995     | 9144074      | US-2013-0176966-A1 |   |
| 11185 | SPATIAL MULTIPLEXING IN A CELLULAR NETWORK                                                                                  |        |               | CNT  | PAT-Active | US      | 13/781048     | 9210709      | US-2013-0176968-A1 |   |
| 11186 | SPATIAL MULTIPLEXING IN A CELLULAR NETWORK                                                                                  |        |               | CNT  | PAT-Closed | US      | 14/952804     | 9447821      | US-2016-0081057-A1 |   |
| 11187 | DIVERSITY TRANSMITTER BASED ON LINEAR TRANSFORM PROCESSING OF TRANSMITTED INFORMATION                                       |        |               | NP   | PAT-Active | US      | 09/574498     | 6442214      |                    |   |
| 11188 | WIRELESS COMMUNICATIONS SYSTEM THAT SUPPORTS MULTIPLE MODES OF OPERATION                                                    |        |               | NP   | PAT-Active | US      | 08/653060     | 6937592      |                    |   |
| 11189 | WIRELESS COMMUNICATIONS SYSTEM THAT SUPPORTS MULTIPLE MODES OF OPERATION                                                    |        |               | CNT  | PAT-Active | US      | 11/101813     | 7586873      | US-2005-0174981-A1 |   |
| 11190 | WIRELESS COMMUNICATIONS SYSTEM THAT SUPPORTS MULTIPLE MODES OF OPERATION                                                    |        |               | CNT  | PAT-Active | US      | 12/496922     | 8345637      | US-2010-0045429-A1 |   |
| 11191 | WIRELESS COMMUNICATIONS SYSTEM THAT SUPPORTS MULTIPLE MODES OF OPERATION                                                    |        |               | CNT  | PAT-Active | US      | 12/604350     | 8428037      | US-2010-0142636-A1 |   |
| 11192 | WIRELESS COMMUNICATIONS SYSTEM THAT SUPPORTS MULTIPLE MODES OF OPERATION                                                    |        |               | CNT  | PAT-Active | US      | 13/858784     | 9288800      | US-2013-0285962-A1 |   |
| 11193 | WIRELESS COMMUNICATIONS SYSTEM THAT SUPPORTS MULTIPLE MODES OF OPERATION                                                    |        |               | CNT  | PAT-Active | US      | 15/066129     | 9736832      | US-2016-0262134-A1 |   |
| 11194 | MODE SELECTION FOR DATA TRANSMISSION IN WIRELESS COMMUNICATION CHANNELS BASED ON STATISTICAL PARAMETERS                     |        |               | NP   | PAT-Active | US      | 09/665149     | 6760882      |                    |   |
| 11195 | MODE SELECTION FOR DATA TRANSMISSION IN WIRELESS COMMUNICATION CHANNELS BASED ON STATISTICAL PARAMETERS                     |        |               | CNT  | PAT-Active | US      | 13/076999     | 8418033      | US-2011-0179336-A1 |   |
| 11196 | SYSTEM AND METHOD OF DYNAMICALLY OPTIMIZING A TRANSMISSION MODE OF WIRELESSLY TRANSMITTED INFORMATION                       |        |               | EXP  | PAT-Active | US      | 10/072359     | 6802035      | US-2002-0147953-A1 |   |
| 11197 | SYSTEM AND METHOD OF DYNAMICALLY OPTIMIZING A TRANSMISSION MODE OF WIRELESSLY TRANSMITTED INFORMATION                       |        |               | CNT  | PAT-Active | US      | 10/990676     | 7583609      | US-2005-0099975-A1 |   |
| 11198 | SYSTEM AND METHOD FOR DATA TRANSMISSION FROM MULTIPLE WIRELESS BASE TRANSCEIVER STATIONS TO A SUBSCRIBER UNIT               |        |               | NP   | PAT-Active | US      | 03/708170     | 6567387      |                    |   |
| 11199 | SYSTEM AND METHOD FOR DATA TRANSMISSION FROM MULTIPLE WIRELESS BASE TRANSCEIVER STATIONS TO A SUBSCRIBER UNIT               |        |               | CNT  | PAT-Active | US      | 10/388176     | 6934266      | US-2003-0161283-A1 |   |
| 11200 | SYSTEM AND METHOD FOR SYNCHRONIZING DATA TRANSMISSION FROM MULTIPLE WIRELESS BASE TRANSCEIVER STATIONS TO A SUBSCRIBER UNIT |        |               | CIP  | PAT-Active | US      | 09/729886     | 6862272      | US-2002-0055356-A1 |   |
| 11201 | SYSTEM AND METHOD FOR SYNCHRONIZING DATA TRANSMISSION FROM MULTIPLE WIRELESS BASE TRANSCEIVER STATIONS TO A SUBSCRIBER UNIT |        |               | CNT  | PAT-Active | US      | 15/989909     | 7397804      | US-2005-0137679-A1 |   |
| 11202 | SYSTEM AND METHOD FOR TRANSMIT DIVERSITY BASE UPON TRANSMISSION CHANNEL DELAY SPREAD                                        |        |               | NP   | PAT-Active | US      | 09/999438     | 7336719      | US-2003-0096304-A1 |   |
| 11203 | SYSTEM AND METHOD FOR ADJUSTING A POWER LEVEL OF A TRANSMISSION SIGNAL                                                      |        |               | NP   | PAT-Active | US      | 10/189755     | 6891902      | US-2004-0005014-A1 |   |
| 11204 | INTEGRATED ANTENNA AND PC CARD CARRYING CASE                                                                                |        |               | NP   | PAT-Active | US      | 10/403432     | 7277738      | US-2005-0263927-A1 |   |
| 11205 | APPARATUS AND METHOD TO PROVIDE POWER AMPLIFICATION                                                                         |        |               | NP   | PAT-Active | US      | 10/463725     | 6952344      | US-2004-0251954-A1 |   |
| 11206 | STRAINED-SILICON VOLTAGE CONTROLLED OSCILLATOR (VCO)                                                                        |        |               | NP   | PAT-Active | US      | 10/676387     | 7049898      | US-2005-0068117-A1 |   |
| 11207 | PULSE SHAPING SIGNALS FOR ULTRA WIDEBAND COMMUNICATION                                                                      |        |               | NP   | PAT-Active | US      | 10/815171     | 7415245      | US-2005-021760-A1  |   |

|       | A                                                                                                          | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                      | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11208 | ADAPTIVE MULTICARRIER WIRELESS COMMUNICATION SYSTEM APPARATUS AND ASSOCIATED METHODS                       |        |               | NP   | PAT-Active  | US      | 10/738689     | 7286609      | US-2005-0931047-A1 |   |
| 11209 | APPARATUS AND METHOD TO EXTEND COMMUNICATION RANGE                                                         |        |               | NP   | PAT-Active  | US      | 10/646448     | 7443486      | US-2005-0265482-A1 |   |
| 11210 | METHOD AND APPARATUS FOR PATH SEARCHING                                                                    |        |               | NP   | PAT-Active  | US      | 10/608129     | 7324607      | US-2004-0266357-A1 |   |
| 11211 | LOW POWER DISPLAY REFRESH                                                                                  |        |               | NP   | PAT-Active  | US      | 10/407758     | 7734943      | US-2004-0139798-A1 |   |
| 11212 | MODULATION SCHEME FOR ORTHOGONAL FREQUENCY DIVISION MULTIPLEXING SYSTEMS OR THE LIKE                       |        |               | NP   | PAT-Active  | US      | 10/664218     | 7688766      | US-2005-0058057-A1 |   |
| 11213 | MODULATION SCHEME FOR ORTHOGONAL FREQUENCY DIVISION MULTIPLEXING SYSTEMS OR THE LIKE                       |        |               | CNT  | PAT-Active  | US      | 12/645914     | 8218464      | US-2010-0135426-A1 |   |
| 11214 | MODULATION SCHEME FOR ORTHOGONAL FREQUENCY DIVISION MULTIPLEXING SYSTEMS OR THE LIKE                       |        |               | CNT  | PAT-Active  | US      | 13/494233     | 8913533      | US-2012-0156778-A1 |   |
| 11215 | ADAPTIVE CHANNELIZATION SCHEME FOR HIGH THROUGHPUT MULTICARRIER SYSTEMS                                    |        |               | NP   | PAT-Active  | US      | 10/812284     | 7345889      | US-2005-0152328-A1 |   |
| 11216 | TRAINED DATA TRANSMISSION FOR COMMUNICATION SYSTEMS                                                        |        |               | NP   | PAT-Active  | US      | 10/719208     | 7373112      | US-2005-0932478-A1 |   |
| 11217 | TRAINED DATA TRANSMISSION FOR COMMUNICATION SYSTEMS                                                        |        |               | DIV  | PAT-Active  | US      | 12/109002     | 7826798      | US-2008-0198760-A1 |   |
| 11218 | TRAINED DATA TRANSMISSION FOR COMMUNICATION SYSTEMS                                                        |        |               | CNT  | PAT-Active  | US      | 12/894495     | 8478201      | US-2011-0013524-A1 |   |
| 11219 | TRAINED DATA TRANSMISSION FOR COMMUNICATION SYSTEMS                                                        |        |               | CNT  | PAT-Active  | US      | 13/912402     | 9992764      | US-2013-0336247-A1 |   |
| 11220 | TRAINED DATA TRANSMISSION FOR COMMUNICATION SYSTEMS                                                        |        |               | CNT  | APP-Pending | US      | 15/996081     |              | US-2018-0279263-A1 |   |
| 11221 | SLAVE-LESS EDGE-TRIGGERED FLIP-FLOP                                                                        |        |               | NP   | PAT-Active  | US      | 10/616810     | 6986421      |                    |   |
| 11222 | TECHNIQUE TO SELECT TRANSMISSION PARAMETERS                                                                |        |               | NP   | PAT-Active  | US      | 10/636765     | 7903538      | US-2005-0936887-A1 |   |
| 11223 | PARALLEL WIRELESS COMMUNICATION APPARATUS METHOD AND SYSTEM                                                |        |               | NP   | PAT-Active  | US      | 10/745123     | 8139723      | US-2005-0138199-A1 |   |
| 11224 | PARALLEL WIRELESS COMMUNICATION APPARATUS METHOD AND SYSTEM                                                |        |               | CNT  | PAT-Active  | US      | 13/338855     | 8948139      | US-2012-0099576-A1 |   |
| 11225 | PARALLEL WIRELESS COMMUNICATION APPARATUS METHOD AND SYSTEM                                                |        |               | CNT  | PAT-Active  | US      | 14/600154     | 9432355      | US-2015-0139179-A1 |   |
| 11226 | PARALLEL WIRELESS COMMUNICATION APPARATUS METHOD AND SYSTEM                                                |        |               | CNT  | PAT-Active  | US      | 15/198328     | #####        | US-2016-0309515-A1 |   |
| 11227 | HIGH EFFICIENCY RF POWER AMPLIFIER                                                                         |        |               | NP   | PAT-Active  | US      | 10/688705     | 6888409      | US-2005-0083123-A1 |   |
| 11228 | SERVICE DISCOVERY ARCHITECTURE AND METHOD FOR WIRELESS NETWORKS                                            |        |               | NP   | PAT-Active  | US      | 10/685111     | 7403512      | US-2005-0078644-A1 |   |
| 11229 | COMMUNICATION SYSTEM AND METHOD FOR CHANNEL ESTIMATION AND BEAMFORMING USING A MULTI-ELEMENT ARRAY ANTENNA |        |               | NP   | PAT-Active  | US      | 10/654037     | 7463846      | US-2005-0047322-A1 |   |
| 11230 | MULTI-ELEMENT ANTENNA BEAMFORMING IN A WIRELESS ACCESS NETWORK                                             |        |               | CNT  | PAT-Active  | US      | 12/245950     | 8165239      | US-2009-0034640-A1 |   |
| 11231 | FREQUENCY PRESCALER APPARATUS METHOD AND SYSTEM                                                            |        |               | NP   | PAT-Active  | US      | 10/608051     | 6822491      |                    |   |
| 11232 | SOFT BITS NORMALIZATION APPARATUS METHOD AND SYSTEM                                                        |        |               | NP   | PAT-Active  | US      | 10/670982     | 7349495      | US-2005-0069057-A1 |   |
| 11233 | DYNAMIC EMI (ELECTROMAGNETIC INTERFERENCE) MANAGEMENT                                                      |        |               | NP   | PAT-Active  | US      | 10/692965     | 7522928      | US-2005-0101359-A1 |   |

|       | A                                                                                                                                                        | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                    | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11234 | DYNAMIC EMI (ELECTROMAGNETIC INTERFERENCE) MANAGEMENT                                                                                                    |        |               | CNT  | PAT-Active | US      | 12/386535     | 7884888      | US-2009-0270040-A1 |   |
| 11235 | APPARATUS AND ASSOCIATED METHODS TO PERFORM INTELLIGENT TRANSMIT POWER CONTROL WITH SUBCARRIER PUNCTURING                                                |        |               | NP   | PAT-Active | US      | 10/750561     | 7245879      | US-2005-0032514-A1 |   |
| 11236 | METHOD AND APPARATUS FOR TRANSMITTING WIRELESS SIGNALS ON MULTIPLE FREQUENCY CHANNELS IN A FREQUENCY AGILE NETWORK                                       |        |               | NP   | PAT-Active | US      | 10/744318     | 7039432      | US-2005-0136933-A1 |   |
| 11237 | APPARATUS AND METHODS FOR COMMUNICATING USING SYMBOL-MODULATED SUBCARRIERS                                                                               |        |               | NP   | PAT-Active | US      | 10/675292     | 7321614      | US-2005-0062916-A1 |   |
| 11238 | APPARATUS AND METHODS FOR COMMUNICATING USING SYMBOL-MODULATED SUBCARRIERS                                                                               |        |               | CNT  | PAT-Active | US      | 11/847156     | 7672365      | US-2007-0291639-A1 |   |
| 11239 | METHOD AND MOBILE COMMUNICATION STATION FOR COMMUNICATING OFDM SYMBOLS USING TWO OR MORE ANTENNAS                                                        |        |               | CNT  | PAT-Active | US      | 12/643389     | 8315321      | US-2010-0098181-A1 |   |
| 11240 | BASE STATION AND METHOD FOR CHANNEL CODING AND LINK ADAPTATION                                                                                           |        |               | CNT  | PAT-Active | US      | 13/680387     | 8824582      | US-2013-0077661-A1 |   |
| 11241 | METHOD AND ADAPTIVE BIT INTERLEAVER FOR WIDEBAND SYSTEMS USING ADAPTIVE BIT LOADING                                                                      |        |               | NP   | PAT-Active | US      | 10/740170     | 7570895      | US-2005-0135493-A1 |   |
| 11242 | OFDM TRANSMITTER WITH ADAPTIVE BIT INTERLEAVER FOR ADAPTIVE BIT LOADING AND METHOD FOR OFDM COMMUNICATIONS                                               |        |               | CNT  | PAT-Active | US      | 12/492466     | 8218674      | US-2009-0257454-A1 |   |
| 11243 | OFDM TRANSMITTER WITH VARIABLE CODE BLOCK INTERLEAVER AND METHOD FOR OFDM COMMUNICATIONS WITH VARIABLE CODE BLOCK SIZES                                  |        |               | CNT  | PAT-Active | US      | 13/944120     | 9166741      | US-2012-0275339-A1 |   |
| 11244 | SYSTEMS AND METHODS FOR ADAPTIVE BIT LOADING IN A MULTIPLE ANTENNA ORTHOGONAL FREQUENCY DIVISION MULTIPLEXED COMMUNICATION SYSTEM                        |        |               | NP   | PAT-Active | US      | 10/750587     | 7384858      | US-2005-0147076-A1 |   |
| 11245 | SYSTEMS AND METHODS FOR ADAPTIVE BIT LOADING IN A MULTIPLE ANTENNA ORTHOGONAL FREQUENCY DIVISION MULTIPLEXED COMMUNICATION SYSTEM                        |        |               | CNT  | PAT-Active | US      | 12/118338     | 7738579      | US-2008-0253473-A1 |   |
| 11246 | MIMO TRANSMITTER AND METHOD FOR TRANSMITTING AN OFDM SYMBOL IN ACCORDANCE WITH AN IEEE 80211 COMMUNICATION STANDARD OVER A PLURALITY OF SPATIAL CHANNELS |        |               | CNT  | PAT-Active | US      | 12/482673     | 7822135      | US-2009-0252257-A1 |   |
| 11247 | MIMO TRANSMITTER AND METHOD FOR TRANSMITTING A GROUP OF SEQUENTIAL OFDM SYMBOLS IN ACCORDANCE WITH AN IEEE 80216 COMMUNICATION STANDARD                  |        |               | CNT  | PAT-Active | US      | 12/482689     | 7885346      | US-2009-0245405-A1 |   |
| 11248 | MIMO TRANSMITTER FOR TRANSMITTING A GROUP OF SEQUENTIAL OFDM SYMBOLS USING A PLURALITY OF ANTENNAS                                                       |        |               | CNT  | PAT-Active | US      | 12/757117     | 8395147      | US-2010-0195545-A1 |   |
| 11249 | OFDM TRANSMITTER AND METHOD FOR MULTI-USER MIMO TRANSMISSIONS                                                                                            |        |               | CNT  | PAT-Active | US      | 12/982161     | 8019010      | US-2011-0086956-A1 |   |
| 11250 | MIMO TRANSMITTER AND METHOD FOR TRANSMITTING OFDM SYMBOLS                                                                                                |        |               | CNT  | PAT-Active | US      | 13/489595     | 8705645      | US-2012-0236911-A1 |   |
| 11251 | TRANSMITTER AND METHOD THEREON                                                                                                                           |        |               | NP   | PAT-Active | US      | 10/745673     | 6946961      |                    |   |
| 11252 | APPARATUS AND METHOD OF MULTI-USER DETECTION                                                                                                             |        |               | NP   | PAT-Active | US      | 10/748180     | 7340034      | US-2005-0143653-A1 |   |
| 11253 | SDMA COMMUNICATIONS WITH NON-IMMEDIATE BLOCK ACKNOWLEDGEMENT                                                                                             |        |               | CNT  | PAT-Active | US      | 11/923631     | 7567617      | US-2008-0181162-A1 |   |
| 11254 | ADAPTIVE SIGNALING IN MULTIPLE ANTENNA SYSTEMS                                                                                                           |        |               | NP   | PAT-Active | US      | 10/689151     | 7480494      | US-2005-0041611-A1 |   |
| 11255 | ADAPTIVE SIGNALING IN MULTIPLE ANTENNA SYSTEMS                                                                                                           |        |               | CNT  | PAT-Active | US      | 12/324580     | 8565253      | US-2009-0147879-A1 |   |
| 11256 | TRANSMISSION OF DATA WITH FEEDBACK TO THE TRANSMITTER IN A WIRELESS LOCAL AREA NETWORK OR THE LIKE                                                       |        |               | NP   | PAT-Active | US      | 10/738522     | 7515541      | US-2005-0030897-A1 |   |
| 11257 | METHOD AND APPARATUS FOR VARYING LENGTHS OF LOW DENSITY PARTIAL CHECK CODEWORDS                                                                          |        |               | NP   | PAT-Active | US      | 10/815317     | 7263651      | US-2005-0154952-A1 |   |
| 11258 | VOLTAGE CONTROLLED OSCILLATOR APPARATUS METHOD AND SYSTEM                                                                                                |        |               | NP   | PAT-Active | US      | 10/729629     | 7034623      | US-2005-0122180-A1 |   |



|       | A                                                                                                                                | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                            | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11259 | METHOD APPARATUS AND SYSTEM TO MANAGE DISTRIBUTED CHANNEL ACCESS WITH TIME RESERVATION                                           |        |               | NP   | PAT-Active | US      | 10/745898     | 8625497      | US-2005-0147055-A1 |   |
| 11260 | METHOD APPARATUS AND SYSTEM TO MANAGE DISTRIBUTED CHANNEL ACCESS WITH TIME RESERVATION                                           |        |               | CNT  | PAT-Active | US      | 14/097307     | 9332564      | US-2014-0092843-A1 |   |
| 11261 | METHOD APPARATUS AND SYSTEM TO MANAGE DISTRIBUTED CHANNEL ACCESS WITH TIME RESERVATION                                           |        |               | CNT  | PAT-Active | US      | 15/144532     | 9775173      | US-2016-0138100-A1 |   |
| 11262 | MULTICARRIER RECEIVERS AND METHODS FOR SEPARATING TRANSMITTED SIGNALS IN A MULTIPLE ANTENNA SYSTEM                               |        |               | NP   | PAT-Active | US      | 10/814095     | 7289585      | US-2005-0152482-A1 |   |
| 11263 | MULTIPLE ANTENNA SYSTEMS AND METHODS USING HIGH-THROUGHPUT SPACE-FREQUENCY BLOCK CODES                                           |        |               | NP   | PAT-Active | US      | 10/814113     | 7315577      | US-2005-0058212-A1 |   |
| 11264 | SYSTEM AND METHOD FOR SELECTING DATA RATES TO PROVIDE UNIFORM BIT LOADING OF SUBCARRIERS OF A MULTICARRIER COMMUNICATION CHANNEL |        |               | NP   | PAT-Active | US      | 10/815035     | 7333556      | US-2005-0152465-A1 |   |
| 11265 | MULTICARRIER TRANSMITTER MULTICARRIER RECEIVER AND METHODS FOR COMMUNICATING MULTIPLE SPATIAL SIGNAL STREAMS                     |        |               | NP   | PAT-Active | US      | 10/880158     | 7440510      | US-2005-0058217-A1 |   |
| 11266 | CIRCUIT TO ADD AND SUBTRACT TWO DIFFERENTIAL SIGNALS                                                                             |        |               | NP   | PAT-Active | US      | 10/734122     | 7299032      | US-2005-0130800-A1 |   |
| 11267 | LOOP FILTER WITH ACTIVE CAPACITOR AND METHOD FOR GENERATING A REFERENCE                                                          |        |               | NP   | PAT-Active | US      | 10/726166     | 7005929      | US-2005-0116782-A1 |   |
| 11268 | RESPONSE SCHEDULING FOR MULTIPLE RECEIVERS                                                                                       |        |               | CIP  | PAT-Active | US      | 10/969589     | 8699508      | US-2005-0135410-A1 |   |
| 11269 | VARIABLE SDMA ACK TIMEOUT                                                                                                        |        |               | NP   | PAT-Active | US      | 10/759473     | 7408908      | US-2005-0157734-A1 |   |
| 11270 | AMPLIFIER DISTORTION MANAGEMENT APPARATUS SYSTEMS AND METHODS                                                                    |        |               | NP   | PAT-Active | US      | 10/786677     | 7251815      | US-2005-0148402-A1 |   |
| 11271 | SYSTEMS AND METHODS TO CONVEY ADDITIONAL SIGNALING INFORMATION IN A WIRELESS LOCAL AREA NETWORK                                  |        |               | NP   | PAT-Active | US      | 10/806893     | 7423968      | US-2005-0152357-A1 |   |
| 11272 | CHANNEL SPECIFICATION APPARATUS SYSTEMS AND METHODS                                                                              |        |               | NP   | PAT-Active | US      | 10/806988     | 7440423      | US-2005-0152299-A1 |   |
| 11273 | BANDPASS AMPLIFIER METHOD AND SYSTEM                                                                                             |        |               | NP   | PAT-Active | US      | 10/813992     | 7519344      | US-2005-0218974-A1 |   |
| 11274 | ACCESS POINT HAVING AT LEAST ONE OR MORE CONFIGURABLE RADIOS                                                                     |        |               | NP   | PAT-Active | US      | 10/812648     | 7817579      | US-2005-0213516-A1 |   |
| 11275 | METHOD AND APPARATUS TO SELECT CODING MODE                                                                                       |        |               | NP   | PAT-Active | US      | 10/822829     | 7684507      | US-2005-0226343-A1 |   |
| 11276 | METHOD AND APPARATUS TO SELECT CODING MODE                                                                                       |        |               | CNT  | PAT-Active | US      | 12/542941     | 8503562      | US-2009-0304105-A1 |   |
| 11277 | METHOD AND APPARATUS TO SELECT CODING MODE                                                                                       |        |               | CNT  | PAT-Active | US      | 12/542949     | 7929634      | US-2009-0304106-A1 |   |
| 11278 | METHOD AND APPARATUS TO SELECT CODING MODE                                                                                       |        |               | CNT  | PAT-Active | US      | 13/089043     | 8755452      | US-2011-0194640-A1 |   |
| 11279 | METHOD AND APPARATUS FOR DECODING FORWARD ERROR CORRECTION CODES                                                                 |        |               | NP   | PAT-Active | US      | 10/798643     | 7395495      | US-2005-0154957-A1 |   |
| 11280 | ADAPTIVE TRANSMIT POWER CONTROL IN WIRELESS DEVICES                                                                              |        |               | NP   | PAT-Active | US      | 10/796756     | 7583975      | US-2008-0197147-A1 |   |
| 11281 | CALIBRATION AND TESTING ARCHITECTURE FOR RECEIVERS                                                                               |        |               | NP   | PAT-Active | US      | 10/812834     | 7409189      | US-2005-0221763-A1 |   |
| 11282 | REMOTE OPERATIONS USING WIRELESS PERSONAL AREA NETWORK                                                                           |        |               | NP   | PAT-Active | US      | 10/814047     | 7580101      | US-2005-0226178-A1 |   |
| 11283 | POWER AMPLIFIER LINEARIZATION METHODS AND APPARATUS USING PREDISTORTION IN THE FREQUENCY DOMAIN                                  |        |               | NP   | PAT-Active | US      | 10/881731     | 7336716      | US-2006-0006028-A1 |   |

|       | A                                                                                                                     | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                 | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11284 | MULTI-THRESHOLD RELIABILITY DECODING OF LOW-DENSITY PARITY CHECK CODES                                                |        |               | CNT  | PAT-Active | US      | 11/466292     | 7718561      | US-2007-0911586-A1 |   |
| 11285 | SIGNAL GENERATION APPARATUS SYSTEMS AND METHODS                                                                       |        |               | NP   | PAT-Active | US      | 10/815030     | 7570702      | US-2005-0220214-A1 |   |
| 11286 | RECONFIGURABLE VITERBI/TURBO DECODER                                                                                  |        |               | NP   | PAT-Active | US      | 10/936372     | 7536630      | US-2005-0034051-A1 |   |
| 11287 | MINIATURIZED PLANAR MICROSHIP BALUN                                                                                   |        |               | NP   | PAT-Active | US      | 10/860968     | 6998930      | US-2006-0001502-A1 |   |
| 11288 | METHOD AND APPARATUS FOR PERFORMING SEQUENTIAL CLOSED LOOP MULTIPLE INPUT MULTIPLE OUTPUT (MIMO)                      |        |               | NP   | PAT-Active | US      | 10/954582     | 7608780      | US-2006-0071897-A1 |   |
| 11289 | METHOD AND APPARATUS FOR PERFORMING SEQUENTIAL CLOSED LOOP MULTIPLE INPUT MULTIPLE OUTPUT (MIMO)                      |        |               | CNT  | PAT-Active | US      | 12/584637     | 8204145      | US-2010-0046665-A1 |   |
| 11290 | MULTICARRIER COMMUNICATION SYSTEM AND METHODS FOR LINK ADAPTATION USING UNIFORM BIT LOADING AND SUBCARRIER PUNCTURING |        |               | NP   | PAT-Active | US      | 10/862535     | 7570953      | US-2005-0152466-A1 |   |
| 11291 | METHOD FOR SIGNALING INFORMATION BY MODIFYING MODULATION CONSTELLATIONS                                               |        |               | NP   | PAT-Active | US      | 11/018414     | 7474808      | US-2005-0178927-A1 |   |
| 11292 | METHOD FOR SIGNALING INFORMATION BY MODIFYING MODULATION CONSTELLATIONS                                               |        |               | CNT  | PAT-Active | US      | 12/319191     | 8001686      | US-2009-0122694-A1 |   |
| 11293 | METHOD FOR SIGNALING INFORMATION BY MODIFYING MODULATION CONSTELLATIONS                                               |        |               | CNT  | PAT-Active | US      | 13/929142     | 9270429      | US-2013-0290887-A1 |   |
| 11294 | METHOD FOR SIGNALING INFORMATION BY MODIFYING MODULATION CONSTELLATIONS                                               |        |               | CNT  | PAT-Active | US      | 14/075004     | 9379863      | US-2014-0064223-A1 |   |
| 11295 | METHOD FOR SIGNALING INFORMATION BY MODIFYING MODULATION CONSTELLATIONS                                               |        |               | CNT  | PAT-Active | US      | 15/190594     | 8954716      | US-2017-0116061-A1 |   |
| 11296 | METHOD FOR SIGNALING INFORMATION BY MODIFYING MODULATION CONSTELLATIONS                                               |        |               | CNT  | PAT-Active | US      | 15/623201     | #####        | US-2017-0288934-A1 |   |
| 11297 | LINK ADAPTION BASED MMSE EQUALIZATION ELIMINATES NOISE POWER ESTIMATION                                               |        |               | NP   | PAT-Active | US      | 10/977004     | 7583606      | US-2006-0088006-A1 |   |
| 11298 | METHOD AND APPARATUS TO ENABLE MULTIPLE RECEIVERS                                                                     |        |               | NP   | PAT-Active | US      | 10/833276     | 7408909      | US-2005-0243780-A1 |   |
| 11299 | METHOD AND APPARATUS TO ENABLE MULTIPLE RECEIVERS                                                                     |        |               | CNT  | PAT-Active | US      | 12/185158     | 8254354      | US-2008-0116887-A1 |   |
| 11300 | METHOD AND APPARATUS TO ENABLE MULTIPLE RECEIVERS                                                                     |        |               | CNT  | PAT-Active | US      | 12/653529     | 8457067      | US-2010-0097999-A1 |   |
| 11301 | WIRELESS APPARATUS HAVING MULTIPLE COORDINATED TRANCEIVERS FOR MULTIPLE WIRELESS COMMUNICATION PROTOCOLS              |        |               | REL  | PAT-Closed | US      | 11/283478     | RE41735      |                    |   |
| 11302 | MULTIPLE WIRELESS COMMUNICATION PROTOCOL METHODS AND APPARATUSES                                                      |        |               | EXP  | PAT-Closed | US      | 09/439946     | 6690726      |                    |   |
| 11303 | MULTIPLE WIRELESS COMMUNICATION PROTOCOL METHODS AND APPARATUSES INCLUDING QUALITY OF SERVICE CONSIDERATIONS          |        |               | CNT  | PAT-Active | US      | 11/004210     | 7420936      | US-2005-0078616-A1 |   |
| 11304 | MULTIPLE WIRELESS COMMUNICATION PROTOCOL METHODS AND APPARATUSES INCLUDING PROACTIVE REDUCTION OF INTERFERENCE        |        |               | EXP  | PAT-Closed | US      | 09/560672     | 6891857      |                    |   |
| 11305 | MULTIPLE WIRELESS COMMUNICATION PROTOCOL METHODS AND APPARATUSES                                                      |        |               | CNT  | PAT-Active | US      | 10/464888     | 7239615      | US-2003-0214961-A1 |   |
| 11306 | WIRELESS APPARATUS INTERFERENCE AVOIDANCE/RESOLUTION METHOD AND APPARATUSES                                           |        |               | NP   | PAT-Active | US      | 09/498215     | 6928266      |                    |   |
| 11307 | GFSK RECEIVER                                                                                                         |        |               | EXP  | PAT-Active | US      | 10/621056     | 7239675      | US-2004-0013209-A1 |   |
| 11308 | INTERLEAVER                                                                                                           |        |               | NP   | PAT-Active | US      | 11/093743     | 7529807      | US-2006-0242475-A1 |   |
| 11309 | POWER EFFICIENT SIGNAL ACQUISITION WITH MULTIPLE RECEIVE ANTENNAS                                                     |        |               | NP   | PAT-Active | US      | 10/955933     | 7345720      | US-2006-0068854-A1 |   |

|       | A                                                                                                               | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                           | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11310 | DIFFERENTIAL CLOCK CORRECTION                                                                                   |        |               | NP   | PAT-Active | US      | 11/020984     | 7265597      | US-2006-0132207-A1 |   |
| 11311 | Using the dynamic beacon to enhance power saving capabilities for low power UWB devices                         |        |               | NP   | PAT-Active | US      | 11/025700     | 7706804      | US-2006-0146215-A1 |   |
| 11312 | TRANSMITTING AND PROTECTING LONG FRAMES IN A WIRELESS LOCAL AREA NETWORK                                        |        |               | NP   | PAT-Active | US      | 11/029325     | 7447185      | US-2006-0146172-A1 |   |
| 11313 | APPARATUS AND METHOD FOR VOLTAGE CONVERSION                                                                     |        |               | NP   | PAT-Active | US      | 10/957319     | 7198555      | US-2006-0066361-A1 |   |
| 11314 | METHOD AND APPARATUS TO VARY POWER LEVEL OF TRAINING SIGNAL                                                     |        |               | CNT  | PAT-Active | US      | 12/627353     | 8331872      | US-2010-0075710-A1 |   |
| 11315 | MULTIPLE ANTENNA MULTICARRIER TRANSMITTER AND METHOD FOR ADAPTIVE BEAMFORMING WITH TRANSMIT-POWER NORMALIZATION |        |               | NP   | PAT-Active | US      | 11/004720     | 7822128      | US-2006-0120468-A1 |   |
| 11316 | RECURSIVE REDUCTION OF CHANNEL STATE FEEDBACK                                                                   |        |               | NP   | PAT-Active | US      | 10/937097     | 7362827      | US-2006-0092054-A1 |   |
| 11317 | Method and apparatus to provide low cost transmit beamforming for network devices                               |        |               | NP   | PAT-Active | US      | 11/076195     | 8515359      | US-2006-0238645-A1 |   |
| 11318 | TRAINING SYMBOL FORMAT FOR ADAPTIVELY POWER LOADED MIMO                                                         |        |               | NP   | PAT-Active | US      | 11/024587     | 7542515      | US-2006-0146290-A1 |   |
| 11319 | TRAINING SYMBOL FORMAT FOR ADAPTIVELY POWER LOADED MIMO                                                         |        |               | CNT  | PAT-Active | US      | 12/820470     | 7953171      | US-2010-0254476-A1 |   |
| 11320 | CALIBRATION IN MIMO SYSTEMS                                                                                     |        |               | NP   | PAT-Active | US      | 10/939162     | 7366245      | US-2006-0056532-A1 |   |
| 11321 | INTERPOLATION IN CHANNEL STATE FEEDBACK                                                                         |        |               | NP   | PAT-Active | US      | 10/938421     | 7535253      | US-2006-0056531-A1 |   |
| 11322 | INTERPOLATION IN CHANNEL STATE FEEDBACK                                                                         |        |               | DIV  | PAT-Active | US      | 12/424259     | 7961802      | US-2010-0232527-A1 |   |
| 11323 | MULTIPLE INTERMEDIATE FREQUENCIES RECEIVER AND A METHOD THEREOF                                                 |        |               | NP   | PAT-Active | US      | 11/081535     | 7388067      | US-2006-0211398-A1 |   |
| 11324 | DISTRIBUTED VOICE NETWORK                                                                                       |        |               | NP   | PAT-Active | US      | 11/027915     | 7593890      | US-2006-0146787-A1 |   |
| 11325 | METHOD AND NETWORK ELEMENT FOR ESTABLISHING A IP COMMUNICATIONS SESSION BETWEEN MOBILE COMMUNICATION DEVICES    |        |               | CNT  | PAT-Active | US      | 13/493084     | 8605714      | US-2012-0230624-A1 |   |
| 11326 | METHOD AND NETWORK ELEMENT FOR VOICE-OVER-IP (VoIP) COMMUNICATIONS IN A MOBILE IP NETWORK                       |        |               | DIV  | PAT-Active | US      | 12/563555     | 8204044      | US-2010-0068345-A1 |   |
| 11327 | METHOD AND SYSTEM TO SUPPORT FAST HAND-OVER OF MOBILE SUBSCRIBER STATIONS IN BROADBAND WIRELESS NETWORKS        |        |               | NP   | PAT-Active | US      | 10/997356     | 7369856      | US-2006-0113111-A1 |   |
| 11328 | PACKET TRAFFIC MANAGEMENT APPARATUS SYSTEMS AND METHODS                                                         |        |               | NP   | PAT-Active | US      | 11/082368     | 7551607      | US-2006-0205790-A1 |   |
| 11329 | ANTENNA SYSTEM USING COMPLEMENTARY METAL OXIDE SEMICONDUCTOR TECHNIQUES                                         |        |               | NP   | PAT-Active | US      | 11/095326     | 7256740      | US-2006-0220961-A1 |   |
| 11330 | ANTENNA SYSTEM USING COMPLEMENTARY METAL OXIDE SEMICONDUCTOR TECHNIQUES                                         |        |               | CNT  | PAT-Active | US      | 11/782445     | 7492317      | US-2007-0262904-A1 |   |
| 11331 | ON-DIE COUPLED INDUCTOR STRUCTURES FOR IMPROVING QUALITY FACTOR                                                 |        |               | NP   | PAT-Active | US      | 11/130596     | 7456726      | US-2006-0262573-A1 |   |
| 11332 | METHOD AND SYSTEM FOR MULTICARRIER COMMUNICATION BETWEEN A BASE STATION AND SUBSCRIBERS OF DIFFERENT BANDWIDTHS |        |               | PCT  | PAT-Active | US      | 10/572125     | 7613242      | US-2008-0304581-A1 |   |
| 11333 | METHOD AND SYSTEM OF NETWORK MANAGEMENT SOFTWARE ARCHITECTURES FOR MOBILE BROADBAND WIRELESS NETWORKS           |        |               | NP   | PAT-Active | US      | 11/051000     | 7305246      | US-2006-0172742-A1 |   |
| 11334 | LOW NOISE HIGH-LINEARITY RF FRONT END RECEIVER                                                                  |        |               | NP   | PAT-Active | US      | 11/072212     | 7529529      | US-2006-0189562-A1 |   |

|       | A                                                                                                                                                             | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                         | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11335 | TECHNIQUES TO MANAGE CHANNEL PREDICTION                                                                                                                       |        |               | NP   | PAT-Active | US      | 11/040935     | 7522555      | US-2006-0165008-A1 |   |
| 11336 | TECHNIQUES TO MANAGE CHANNEL PREDICTION                                                                                                                       |        |               | CNT  | PAT-Active | US      | 12/426716     | 8396029      | US-2009-0257393-A1 |   |
| 11337 | TECHNIQUES FOR BEAMFORMING USING PREDICTED CHANNEL STATE INFORMATION                                                                                          |        |               | ENT  | PAT-Active | US      | 12/908637     | 8442468      | US-2011-0032893-A1 |   |
| 11338 | TECHNIQUES TO MANAGE CHANNEL PREDICTION                                                                                                                       |        |               | CNT  | PAT-Active | US      | 13/893136     | 9037039      | US-2013-0251009-A1 |   |
| 11339 | TECHNIQUES TO MANAGE CHANNEL PREDICTION                                                                                                                       |        |               | CNT  | PAT-Active | US      | 14/681275     | 9634742      | US-2015-0333896-A1 |   |
| 11340 | TECHNIQUES TO MANAGE CHANNEL PREDICTION                                                                                                                       |        |               | CNT  | PAT-Active | US      | 15/463461     | #####        | US-2018-0041294-A1 |   |
| 11341 | BEAMFORMING CODEBOOK GENERATION SYSTEM AND ASSOCIATED METHODS                                                                                                 |        |               | NP   | PAT-Active | US      | 11/036806     | 7778826      | US-2006-0155533-A1 |   |
| 11342 | BEAMFORMING CODEBOOK GENERATION SYSTEM AND ASSOCIATED METHODS                                                                                                 |        |               | CNT  | PAT-Active | US      | 12/584009     | 8428937      | US-2009-0326333-A1 |   |
| 11343 | TECHNIQUES TO GENERATE A PRECODING MATRIX FOR A WIRELESS SYSTEM                                                                                               |        |               | CNT  | PAT-Active | US      | 12/583994     | 8682656      | US-2010-0157921-A1 |   |
| 11344 | BEAMFORMING CODEBOOK GENERATION SYSTEM AND ASSOCIATED METHODS                                                                                                 |        |               | CNT  | PAT-Active | US      | 12/583960     | 8417517      | US-2010-0067594-A1 |   |
| 11345 | BEAMFORMING CODEBOOK GENERATION SYSTEM AND ASSOCIATED METHODS                                                                                                 |        |               | ENT  | PAT-Active | US      | 12/583954     | 8340961      | US-2009-0323844-A1 |   |
| 11346 | CODEBOOK GENERATION SYSTEM AND ASSOCIATED METHODS                                                                                                             |        |               | CNT  | PAT-Active | US      | 13/648003     | #####        | US-2013-0056204-A1 |   |
| 11347 | CODEBOOK GENERATION SYSTEM AND ASSOCIATED METHODS                                                                                                             |        |               | CNT  | PAT-Active | US      | 13/648585     | #####        | US-2013-0093977-A1 |   |
| 11348 | BEAMFORMING CODEBOOK GENERATION SYSTEM AND ASSOCIATED METHODS                                                                                                 |        |               | CIP  | PAT-Active | US      | 11/058963     | 7885044      | US-2006-0155534-A1 |   |
| 11349 | TECHNIQUES TO ENHANCE DIVERSITY FOR A WIRELESS SYSTEM                                                                                                         |        |               | NP   | PAT-Active | US      | 11/085207     | 7538463      | US-2006-0223460-A1 |   |
| 11350 | TECHNIQUES TO ENHANCE DIVERSITY FOR A WIRELESS SYSTEM                                                                                                         |        |               | ENT  | PAT-Active | US      | 12/454726     | 8060131      | US-2010-0041351-A1 |   |
| 11351 | TECHNIQUES TO ENHANCE DIVERSITY FOR A WIRELESS SYSTEM                                                                                                         |        |               | CNT  | PAT-Active | US      | 13/294812     | 8412129      | US-2012-0087398-A1 |   |
| 11352 | TECHNIQUES TO ENHANCE DIVERSITY FOR A WIRELESS SYSTEM                                                                                                         |        |               | CNT  | PAT-Active | US      | 13/611610     | 8682266      | US-2013-0010866-A1 |   |
| 11353 | 5G7 GATEWAY FOR WIRELESS COMMUNICATION NETWORKS                                                                                                               |        |               | EXP  | PAT-Active | US      | 15/302589     | 7298751      |                    |   |
| 11354 | WIRELESS COMMUNICATION DEVICE AND METHOD FOR COORDINATED CHANNEL ACCESS WITH REDUCED LATENCY IN A WIRELESS NETWORK                                            |        |               | NP   | PAT-Active | US      | 11/172440     | 7466964      | US-2007-0004347-A1 |   |
| 11355 | WIRELESS COMMUNICATION DEVICE AND METHOD FOR REDUCING CARRIER FREQUENCY OFFSETS OVER A SIMULTANEOUS MULTI-USER UPLINK IN A MULTICARRIER COMMUNICATION NETWORK |        |               | NP   | PAT-Active | US      | 11/172451     | 7426195      | US-2007-0002800-A1 |   |
| 11356 | APPARATUS AND METHOD REDUCING NON-LINEARITY IN AN OUTPUT SIGNAL OF AN AMPLIFIER DEVICE                                                                        |        |               | NP   | PAT-Active | US      | 11/186296     | 7288936      | US-2007-0018730-A1 |   |
| 11357 | MEDIA DISTRIBUTION SYSTEM                                                                                                                                     |        |               | NP   | PAT-Active | US      | 11/167979     | 7573847      | US-2006-0294573-A1 |   |
| 11358 | CONSTRUCTION AND USE OF SHORTENED EG-8QPC CODES                                                                                                               |        |               | PCT  | PAT-Active | US      | 10/572116     | 7628334      | US-2008-0250304-A1 |   |
| 11359 | TRANSMITTER CONTROL                                                                                                                                           |        |               | NP   | PAT-Active | US      | 11/206447     | 7853147      | US-2007-0041470-A1 |   |

|       | A                                                                                                                                                                                                      | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                                                                  | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11360 | METHODS AND APPARATUS WITH LOGIC TO DETERMINE A RELATIVE CHANGE RELATIONSHIP BETWEEN MODEM AND FRAME CLOCKS                                                                                            |        |               | NP   | PAT-Active | US      | 11/131660     | 7577222      | US-2006-0262882-A1 |   |
| 11361 | METHODS AND APPARATUS FOR RESOLVING ADDRESS MAPPING ASSOCIATED WITH A WIRELESS MESH NETWORK                                                                                                            |        |               | NP   | PAT-Active | US      | 11/139265     | 7623501      | US-2006-0268766-A1 |   |
| 11362 | SCALABLE SYSTEM TO ADAPTIVELY TRANSMIT AND RECEIVE INCLUDING ADAPTIVE ANTENNA SIGNAL AND BACK-END PROCESSORS                                                                                           |        |               | NP   | PAT-Active | US      | 11/234581     | 7738585      | US-2007-0071118-A1 |   |
| 11363 | SCALABLE SYSTEM TO ADAPTIVELY TRANSMIT AND RECEIVE INCLUDING ADAPTIVE ANTENNA SIGNAL AND BACK-END PROCESSORS                                                                                           |        |               | CNT  | PAT-Active | US      | 13/197752     | 8306144      | US-2011-0286441-A1 |   |
| 11364 | MULTI-TAP MICROELECTROMECHANICAL INDUCTOR                                                                                                                                                              |        |               | NP   | PAT-Active | US      | 11/137748     | 7362203      | US-2006-0267717-A1 |   |
| 11365 | BROADBAND MULTICARRIER TRANSMITTER WITH SUBCHANNEL FREQUENCY DIVERSITY FOR TRANSMITTING A PLURALITY OF SPATIAL STREAMS                                                                                 |        |               | NP   | PAT-Active | US      | 11/075030     | 7616704      | US-2006-0203935-A1 |   |
| 11366 | MULTICARRIER RECEIVER AND METHOD FOR CARRIER FREQUENCY OFFSET CORRECTION AND CHANNEL ESTIMATION FOR RECEIPT OF SIMULTANEOUS TRANSMISSIONS OVER A MULTI-USER UPLINK                                     |        |               | NP   | PAT-Active | US      | 11/171643     | 7480487      | US-2007-0004337-A1 |   |
| 11367 | SYSTEMS AND METHODS FOR NEGOTIATING SECURITY PARAMETERS FOR PROTECTING MANAGEMENT FRAMES IN WIRELESS NETWORKS                                                                                          |        |               | NP   | PAT-Active | US      | 11/131951     | 7381475      | US-2006-0262932-A1 |   |
| 11368 | ORDERED AND DUPLICATE-FREE DELIVERY OF WIRELESS DATA FRAMES                                                                                                                                            |        |               | NP   | PAT-Active | US      | 11/129957     | 7746866      | US-2006-0256722-A1 |   |
| 11369 | ORDERED AND DUPLICATE-FREE DELIVERY OF WIRELESS DATA FRAMES                                                                                                                                            |        |               | CNT  | PAT-Active | US      | 12/774457     | 8638797      | US-2010-0220858-A1 |   |
| 11370 | DEVICE SYSTEM AND METHOD OF MULTIPLE ACCESS TRANSMISSION                                                                                                                                               |        |               | NP   | PAT-Active | US      | 11/136476     | 7574214      | US-2006-0270416-A1 |   |
| 11371 | METHODS AND APPARATUS FOR PROVIDING INTEGRITY PROTECTION FOR MANAGEMENT AND CONTROL TRAFFIC OF WIRELESS COMMUNICATION NETWORKS                                                                         |        |               | NP   | PAT-Active | US      | 11/155148     | 7647508      | US-2006-0286204-A1 |   |
| 11372 | COMPACT MULTI-BAND MULTI-PORT ANTENNA                                                                                                                                                                  |        |               | NP   | PAT-Active | US      | 11/209218     | 7289064      | US-2007-0052587-A1 |   |
| 11373 | SYSTEM AND METHOD FOR AUTOMATICALLY CONFIGURING AND INTEGRATING A RADIO BASE STATION INTO AN EXISTING WIRELESS CELLULAR COMMUNICATION NETWORK WITH FULL BI-DIRECTIONAL ROAMING AND HANDOVER CAPABILITY |        |               | NP   | PAT-Active | US      | 10/913877     | 7477920      | US-2005-0148368-A1 |   |
| 11374 | METHOD AND SCHEME FOR SPACE-TIME CODED CO-CHANNEL INTERFERENCE CANCELLATION                                                                                                                            |        |               | PCT  | PAT-Active | US      | 12/088496     | 8064532      | US-2009-0175366-A1 |   |
| 11375 | WIRELESS COMMUNICATION DEVICE AND METHODS FOR PROTECTING BROADCASTED MANAGEMENT CONTROL MESSAGES IN WIRELESS NETWORKS                                                                                  |        |               | NP   | PAT-Active | US      | 11/208426     | 7392037      | US-2007-0061043-A1 |   |
| 11376 | SINGULAR VALUE DECOMPOSITION BEAMFORMING FOR A MULTIPLE-INPUT-MULTIPLE-OUTPUT COMMUNICATION SYSTEM                                                                                                     |        |               | NP   | PAT-Active | US      | 11/334329     | 8483761      | US-2007-0167192-A1 |   |
| 11377 | APPARATUS AND METHOD OF CONTROLLING TRANSMISSION IN REVERSE DIRECTION                                                                                                                                  |        |               | NP   | PAT-Active | US      | 11/394215     | 7706397      | US-2007-0237169-A1 |   |
| 11378 | APPARATUS AND METHOD OF CONTROLLING TRANSMISSION IN REVERSE DIRECTION                                                                                                                                  |        |               | CNT  | PAT-Active | US      | 12/703847     | 8644293      | US-2010-0182930-A1 |   |
| 11379 | SLEEP-MODE WIRELESS CELL RESELECTION APPARATUS SYSTEMS AND METHODS                                                                                                                                     |        |               | NP   | PAT-Active | US      | 11/551421     | 7693955      | US-2007-0160179-A1 |   |
| 11380 | SLEEP-MODE WIRELESS CELL RESELECTION APPARATUS SYSTEMS AND METHODS                                                                                                                                     |        |               | CNT  | PAT-Active | US      | 12/650157     | 8255634      | US-2011-0103279-A1 |   |
| 11381 | COMMUNICATION WITHIN A WIRELESS NETWORK USING MULTIPLE FREQUENCY BANDS                                                                                                                                 |        |               | NP   | PAT-Active | US      | 11/394570     | 7720036      | US-2007-0098668-A1 |   |
| 11382 | GENERALIZED MULTI-THRESHOLD DECODER FOR LOW-DENSITY PARITY CHECK CODES                                                                                                                                 |        |               | PCT  | PAT-Active | US      | 12/087179     | 8209579      | US-2009-0222711-A1 |   |
| 11383 | UPLINK THROUGHPUT FOR WIRELESS NETWORK INTERFACES                                                                                                                                                      |        |               | NP   | PAT-Active | US      | 11/267717     | 7499426      | US-2007-0104130-A1 |   |

|       | A                                                                                                   | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                               | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11384 | DYNAMIC PACKET ERROR MANAGEMENT FOR WIRELESS COMMUNICATIONS                                         |        |               | INV  | PAT-Active | US      | 11/267763     | 7826404      | US-2007-0104131-A1 |   |
| 11385 | TECHNIQUES FOR LOCATION MANAGEMENT AND PAGING IN A COMMUNICATION SYSTEM                             |        |               | NP   | PAT-Active | US      | 11/270765     | 8145243      | US-2007-0105567-A1 |   |
| 11386 | MULTIPLE INPUT MULTIPLE OUTPUT WIRELESS COMMUNICATION SYSTEM ASSOCIATED METHODS AND DATA STRUCTURES |        |               | CIP  | PAT-Active | US      | 11/313532     | 7672387      | US-2007-0149181-A1 |   |
| 11387 | MULTIPLE INPUT MULTIPLE OUTPUT WIRELESS COMMUNICATION SYSTEM ASSOCIATED METHODS AND DATA STRUCTURES |        |               | CNT  | PAT-Active | US      | 12/715317     | 8068554      | US-2010-0202549-A1 |   |
| 11388 | MULTIPLE INPUT MULTIPLE OUTPUT WIRELESS COMMUNICATION SYSTEM ASSOCIATED METHODS AND DATA STRUCTURES |        |               | CIP  | PAT-Active | US      | 13/292528     | 8665981      | US-2012-0057643-A1 |   |
| 11389 | MULTIPLE INPUT MULTIPLE OUTPUT WIRELESS COMMUNICATION SYSTEM ASSOCIATED METHODS AND DATA STRUCTURES |        |               | CNT  | PAT-Active | US      | 14/160870     | 8934567      | US-2014-0146808-A1 |   |
| 11390 | MULTIPLE INPUT MULTIPLE OUTPUT WIRELESS COMMUNICATION SYSTEM ASSOCIATED METHODS AND DATA STRUCTURES |        |               | CNT  | PAT-Active | US      | 14/594325     | 9083403      | US-2015-0124898-A1 |   |
| 11391 | WIRELESS COMMUNICATION SYSTEM ASSOCIATED METHODS AND DATA STRUCTURES                                |        |               | NP   | PAT-Active | US      | 11/292909     | 8200164      | US-2007-0129018-A1 |   |
| 11392 | WIRELESS COMMUNICATION SYSTEM ASSOCIATED METHODS AND DATA STRUCTURES                                |        |               | CNT  | PAT-Active | US      | 13/535768     | 8711779      | US-2012-0363116-A1 |   |
| 11393 | PURGING OF AUTHENTICATION KEY CONTEXTS BY BASE STATIONS ON HANDOFF                                  |        |               | CNT  | PAT-Active | US      | 12/710325     | 8126144      | US-2010-0150345-A1 |   |
| 11394 | SIGNAL-TO-NOISE RATIO (SNR) DETERMINATION IN THE TIME DOMAIN                                        |        |               | NP   | PAT-Active | US      | 11/480163     | 7454136      | US-2008-0022162-A1 |   |
| 11395 | RADIO RECEIVER AND A METHOD THEREOF                                                                 |        |               | NP   | PAT-Active | US      | 11/452330     | 7653368      | US-2007-0291880-A1 |   |
| 11396 | DIFFERENTIAL AMPLIFIER WITH TWO LONG-TAILED PAIRS OF TRANSISTORS                                    |        |               | NP   | PAT-Active | US      | 09/526832     | 6642787      |                    |   |
| 11397 | LOW RETURN LOSS RESISTIVE FEEDBACK AMPLIFIER                                                        |        |               | NP   | PAT-Active | US      | 11/435397     | 7423488      | US-2007-0268072-A1 |   |
| 11398 | IMPROVEMENTS IN OR RELATING TO DEMODULATOR ALIGNMENT CORRECTION IN TUNERS                           |        |               | NP   | PAT-Active | US      | 09/454842     | 6567488      |                    |   |
| 11399 | RADIO FREQUENCY TUNER                                                                               |        |               | NP   | PAT-Active | US      | 10/604786     | 7356321      | US-2003-0086854-A1 |   |
| 11400 | CONTROLLABLE ATTENUATOR                                                                             |        |               | NP   | PAT-Active | US      | 10/229906     | 6683511      | US-2003-0071697-A1 |   |
| 11401 | RADIO FREQUENCY TUNER FRONT END AND TUNER                                                           |        |               | NP   | PAT-Active | US      | 10/247952     | 7437333      | US-2003-0076018-A1 |   |
| 11402 | AMPLIFIER AND TUNER                                                                                 |        |               | NP   | PAT-Active | US      | 10/389712     | 6742512      | US-2003-0179038-A1 |   |
| 11403 | DIGITAL TELEVISION TUNER WITH DIGITAL TO ANALOG CONVERTER EMBEDDED IN A CONNECTOR                   |        |               | NP   | PAT-Active | US      | 10/691753     | 7611382      | US-2004-0130662-A1 |   |
| 11404 | MIXER CIRCUIT OFFSET COMPENSATION                                                                   |        |               | NP   | PAT-Active | US      | 10/825601     | 7012457      | US-2005-0001669-A1 |   |
| 11405 | DIGITAL TELEVISION DISPLAY CONTROL APPARATUS AND METHOD                                             |        |               | NP   | PAT-Active | US      | 10/825588     | 7295246      | US-2004-0263690-A1 |   |
| 11406 | VARIABLE CAPACITANCE CIRCUIT ARRANGEMENT                                                            |        |               | INV  | PAT-Active | US      | 11/545940     | 7358824      | US-2007-0030086-A1 |   |
| 11407 | VARIABLE CAPACITANCE CIRCUIT ARRANGEMENT                                                            |        |               | NP   | PAT-Active | US      | 10/989857     | 7209016      | US-2005-0134395-A1 |   |
| 11408 | CIRCUIT ARRANGEMENT                                                                                 |        |               | INV  | PAT-Active | US      | 11/545987     | 7411469      | US-2007-0057744-A1 |   |
| 11409 | COOPERATIVE INTER-CARRIER CHANNEL CODING APPARATUS SYSTEMS AND METHODS                              |        |               | NP   | PAT-Active | US      | 11/400757     | 7615687      | US-2007-0237251-A1 |   |

|       | A                                                                                                                                                   | B      | C             | D    | E           | F       | G             | H            | I                  | J |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|------|-------------|---------|---------------|--------------|--------------------|---|
| 2     | TITLE                                                                                                                                               | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11410 | GERAN TRANSCEIVER AND METHOD FOR COOPERATIVE CHANNEL ENCODING ACROSS MULTIPLE GERAN TONAL CARRIERS                                                  |        |               | CNT  | PAT-Active  | US      | 12/563267     | 8194769      | US-2010-0908408-A1 |   |
| 11411 | MULTI-BAND DIELECTRIC RESONATOR ANTENNA                                                                                                             |        |               | NP   | PAT-Active  | US      | 11/964774     | 7718325      | US-2008-0042903-A1 |   |
| 11412 | DOWNLINK CHANNEL PARAMETERS DETERMINATION FOR A MULTIPLE-INPUT-MULTIPLE-OUTPUT (MIMO) SYSTEM                                                        |        |               | NP   | PAT-Active  | US      | 11/617313     | 7918013      | US-2007-0254601-A1 |   |
| 11413 | DOWNLINK CHANNEL PARAMETERS DETERMINATION FOR A MULTIPLE-INPUT-MULTIPLE-OUTPUT (MIMO) SYSTEM                                                        |        |               | CNT  | PAT-Active  | US      | 12/862957     | 8225452      | US-2011-0002372-A1 |   |
| 11414 | DOWNLINK CHANNEL PARAMETERS DETERMINATION FOR A MULTIPLE-INPUT-MULTIPLE-OUTPUT (MIMO) SYSTEM                                                        |        |               | CNT  | PAT-Active  | US      | 13/543371     | 8611918      | US-2012-0275487-A1 |   |
| 11415 | DOWNLINK CHANNEL PARAMETERS DETERMINATION FOR A MULTIPLE-INPUT-MULTIPLE-OUTPUT (MIMO) SYSTEM                                                        |        |               | CNT  | PAT-Active  | US      | 14/108207     | 9379875      | US-2014-0185542-A1 |   |
| 11416 | DOWNLINK CHANNEL PARAMETERS DETERMINATION FOR A MULTIPLE-INPUT-MULTIPLE-OUTPUT (MIMO) SYSTEM                                                        |        |               | CNT  | PAT-Active  | US      | 15/169247     | #####        | US-2016-0277080-A1 |   |
| 11417 | PROVIDING CQI FEEDBACK WITH COMMON CODE RATE TO A TRANSMITTER STATION                                                                               |        |               | NP   | PAT-Active  | US      | 11/617586     | 7830977      | US-2007-0254803-A1 |   |
| 11418 | PROVIDING CQI FEEDBACK WITH COMMON CODE RATE TO A TRANSMITTER STATION                                                                               |        |               | CNT  | PAT-Active  | US      | 12/871361     | 8488709      | US-2011-0005076-A1 |   |
| 11419 | PROVIDING CQI FEEDBACK WITH COMMON CODE RATE TO A TRANSMITTER STATION                                                                               |        |               | CNT  | PAT-Active  | US      | 13/205589     | 8422583      | US-2011-0294438-A1 |   |
| 11420 | SYSTEMS AND METHODS FOR FLAME TUNNELING IN WIRELESS COMMUNICATIONS                                                                                  |        |               | NP   | PAT-Active  | US      | 11/432129     | 8088689      | US-2007-0254841-A1 |   |
| 11421 | SYSTEMS AND METHODS FACILITATING HIGH THROUGHPUT CONTROL IN WIRELESS COMMUNICATIONS                                                                 |        |               | CNT  | PAT-Active  | US      | 13/211301     | 8189469      | US-2011-0299517-A1 |   |
| 11422 | SYSTEMS AND METHODS FACILITATING HIGH THROUGHPUT CONTROL IN WIRELESS COMMUNICATIONS                                                                 |        |               | CNT  | PAT-Active  | US      | 13/463240     | 8798098      | US-2013-0044703-A1 |   |
| 11423 | SYSTEMS AND METHODS FACILITATING HIGH THROUGHPUT CONTROL IN WIRELESS COMMUNICATIONS                                                                 |        |               | CNT  | PAT-Active  | US      | 14/304881     | 9706416      | US-2014-0262791-A1 |   |
| 11424 | SYSTEMS AND METHODS FACILITATING HIGH THROUGHPUT CONTROL IN WIRELESS COMMUNICATIONS                                                                 |        |               | CNT  | APP-Pending | US      | 15/645746     |              | US-2017-0815481-A1 |   |
| 11425 | QUALITY OF SERVICE RESOURCE NEGOTIATION                                                                                                             |        |               | NP   | PAT-Active  | US      | 11/462657     | 7911997      | US-2008-0031204-A1 |   |
| 11426 | QUALITY OF SERVICE RESOURCE NEGOTIATION                                                                                                             |        |               | CNT  | PAT-Active  | US      | 13/011821     | 8094612      | US-2011-0110222-A1 |   |
| 11427 | QUALITY OF SERVICE RESOURCE NEGOTIATION                                                                                                             |        |               | CNT  | PAT-Active  | US      | 13/330612     | 8331293      | US-2012-0087344-A1 |   |
| 11428 | WIRELESS ACCESS NETWORK AND METHOD FOR HANDOVER OF MOBILE TERMINALS IN IDLE MODE                                                                    |        |               | NP   | PAT-Active  | US      | 11/419455     | 7633904      | US-2007-0268863-A1 |   |
| 11429 | SYSTEM AND METHOD FOR RELOCATING A FOREIGN AGENT FOR AN IDLE MODE MOBILE STATION IN A PROXY MOBILE INTERNET PROTOCOL ENABLED ACCESS SERVICE NETWORK |        |               | CNT  | PAT-Active  | US      | 12/615378     | 8126466      | US-2010-0056154-A1 |   |
| 11430 | Wireless access network and method for allocating data subcarriers within a downlink subframe based on grouping of user stations                    |        |               | NP   | PAT-Active  | US      | 11/687393     | 8131306      | US-2007-0223440-A1 |   |
| 11431 | BASE STATION AND METHOD FOR RESOURCE ALLOCATION USING LOCALIZED AND DISTRIBUTED RESOURCE BLOCKS                                                     |        |               | CNT  | PAT-Active  | US      | 13/400762     | 8301355      | US-2012-0147846-A1 |   |
| 11432 | BASE STATION AND METHOD FOR RESOURCE ALLOCATION USING LOCALIZED AND DISTRIBUTED RESOURCE BLOCKS                                                     |        |               | CNT  | PAT-Active  | US      | 13/662844     | 9167571      | US-2013-0286999-A1 |   |
| 11433 | MIMO RECEIVER AND METHOD FOR BEAMFORMING USING CORDIC OPERATIONS                                                                                    |        |               | NP   | PAT-Active  | US      | 11/618122     | 7649985      | US-2007-0226287-A1 |   |

|       | A                                                                                                                                                 | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                             | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11434 | WIRELESS ACCESS NETWORK BASE STATION AND METHOD FOR DETERMINING LOCATION INFORMATION FOR A MOBILE STATION USING UPLINK TIME-DIFFERENCE OF ARRIVAL |        |               | NP   | PAT-Active | US      | 11/457011     | 7570962      | US-2008-0314960-A1 |   |
| 11435 | WIMAX BASE STATION AND METHOD FOR DETERMINING LOCATION INFORMATION FOR A MOBILE STATION IN A WIMAX NETWORK                                        |        |               | ENT  | PAT-Active | US      | 12/507634     | 8340693      | US-2009-0280836-A1 |   |
| 11436 | TRANSMISSION POWER NORMALIZATION                                                                                                                  |        |               | NP   | PAT-Active | US      | 11/540225     | 7620416      | US-2008-0081654-A1 |   |
| 11437 | CHANNEL QUALITY INFORMATION FEEDBACK TECHNIQUES FOR A WIRELESS SYSTEM                                                                             |        |               | NP   | PAT-Active | US      | 11/613983     | 8462758      | US-2008-0153506-A1 |   |
| 11438 | CHANNEL QUALITY INFORMATION FEEDBACK TECHNIQUES FOR A WIRELESS SYSTEM                                                                             |        |               | ENT  | PAT-Active | US      | 13/757025     | 9066360      | US-2013-0136026-A1 |   |
| 11439 | HIGH SPEED COMPARATOR OFFSET CORRECTION                                                                                                           |        |               | NP   | PAT-Active | US      | 11/518105     | 7362246      | US-2008-0062032-A1 |   |
| 11440 | TECHNIQUES TO DETERMINISTICALLY REDUCE SIGNAL INTERFERENCE                                                                                        |        |               | NP   | PAT-Active | US      | 11/614284     | 7693501      | US-2008-0153447-A1 |   |
| 11441 | REDUNDANT MULTICAST SERVICE IN WIRELESS NETWORK                                                                                                   |        |               | NP   | PAT-Active | US      | 11/714371     | 8179869      | US-2008-0219189-A1 |   |
| 11442 | LOCAL OSCILLATOR CONTROL IN RADIO RECEIVERS                                                                                                       |        |               | NP   | PAT-Active | US      | 11/714307     | 7630697      | US-2008-0219329-A1 |   |
| 11443 | CMOS IC AND HIGH-GAIN ANTENNA INTEGRATION FOR POINT-TO-POINT WIRELESS COMMUNICATION                                                               |        |               | NP   | PAT-Active | US      | 11/807987     | 7737894      | US-2008-0297429-A1 |   |
| 11444 | CMOS IC AND HIGH-GAIN ANTENNA INTEGRATION FOR POINT-TO-POINT WIRELESS COMMUNICATION                                                               |        |               | DIV  | PAT-Active | US      | 12/775137     | 7862278      | US-2010-0214186-A1 |   |
| 11445 | MAPPING OF PREAMBLE SEQUENCE SETS WITH FRAME CONTROL HEADER (FCH) LOCATION FOR MULTI-HOP WIRELESS BROADBAND ACCESS COMMUNICATIONS                 |        |               | NP   | PAT-Active | US      | 11/923586     | 8168925      | US-2008-0117846-A1 |   |
| 11446 | METHODS AND ARRANGEMENTS TO DETERMINE A RECEPTION OF A SIGNAL                                                                                     |        |               | NP   | PAT-Active | US      | 11/796856     | 7843872      | US-2008-0267058-A1 |   |
| 11447 | POWER AMPLIFIER EFFICIENCY USING ERROR ESTIMATE AND DATA RATE                                                                                     |        |               | NP   | PAT-Active | US      | 11/699096     | 7792505      | US-2008-0182530-A1 |   |
| 11448 | POWER SAVING OPERATION OF ALWAYS-CONNECTED WIRELESS ROAMING                                                                                       |        |               | NP   | PAT-Active | US      | 11/864682     | 8149747      | US-2009-0086660-A1 |   |
| 11449 | POWER SAVING OPERATION OF ALWAYS-CONNECTED WIRELESS ROAMING                                                                                       |        |               | ENT  | PAT-Active | US      | 13/334648     | 8717958      | US-2012-0272079-A1 |   |
| 11450 | SLEEP OPTIMIZATION FOR MOBILE DEVICES IN A WIRELESS NETWORK                                                                                       |        |               | ENT  | PAT-Active | US      | 12/955060     | 8306581      | US-2011-0070849-A1 |   |
| 11451 | MOBILE CHANNEL ESTIMATION FOR DVB-T COFDM DEMODULATOR                                                                                             |        |               | NP   | PAT-Active | US      | 11/986897     | 7970068      | US-2009-0135823-A1 |   |
| 11452 | CASCADING PHASE PULSE POSITION AND PULSE WIDTH MODULATION BASED DIGITAL TRANSMITTER                                                               |        |               | NP   | PAT-Active | US      | 11/837043     | 7773669      | US-2009-0041108-A1 |   |
| 11453 | SUBRANGING FOR A PULSE POSITION AND PULSE WIDTH MODULATION BASED TRANSMITTER                                                                      |        |               | NP   | PAT-Active | US      | 12/176546     | 8098726      | US-2009-0034603-A1 |   |
| 11454 | POLAR AMPLIFIER                                                                                                                                   |        |               | NP   | PAT-Active | US      | 11/807987     | 7541867      | US-2008-0297246-A1 |   |
| 11455 | METHOD AND APPARATUS FOR ANTENNA ALLOCATION ON A MULTI-RADIO PLATFORM                                                                             |        |               | NP   | PAT-Active | US      | 11/890713     | 8213844      | US-2009-0042555-A1 |   |
| 11456 | MILLIMETER-WAVE PHASE-LOCKED LOOP WITH INJECTION-LOCKED FREQUENCY DIVIDER USING QUARTER-WAVELENGTH TRANSMISSION LINE AND METHOD OF CALIBRATION    |        |               | NP   | PAT-Active | US      | 11/835330     | 7856212      | US-2009-0042528-A1 |   |
| 11457 | METHOD AND APPARATUS FOR MULTICARRIER COMMUNICATION IN WIRELESS SYSTEMS                                                                           |        |               | NP   | PAT-Active | US      | 11/748310     | 8036702      | US-2008-0387068-A1 |   |



|       | A                                                                                                                                                            | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                        | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11458 | MULTICARRIER TECHNIQUES FOR WIRELESS SYSTEMS                                                                                                                 |        |               | CNT  | PAT-Active  | US      | 13/268013     | 856009       | US-2012-0927116-A1 |   |
| 11459 | MULTICARRIER TECHNIQUES FOR WIRELESS SYSTEMS                                                                                                                 |        |               | CNT  | PAT-Active  | US      | 13/706275     | 9497762      | US-2013-0107766-A1 |   |
| 11460 | MULTICARRIER TECHNIQUES FOR WIRELESS SYSTEMS                                                                                                                 |        |               | CNT  | APP-Pending | US      | 15/351341     |              | US-2017-0127418-A1 |   |
| 11461 | RECURSIVE REDUCTION OF CHANNEL STATE FEEDBACK                                                                                                                |        |               | NP   | PAT-Active  | US      | 12/004923     | 8254359      | US-2009-0161646-A1 |   |
| 11462 | RECURSIVE REDUCTION OF CHANNEL STATE FEEDBACK                                                                                                                |        |               | Div  | PAT-Active  | US      | 13/532966     | 8743857      | US-2012-0269260-A1 |   |
| 11463 | MILLIMETER-WAVE COMMUNICATION STATIONS WITH DIRECTIONAL ANTENNAS AND METHODS FOR FAST LINK RECOVERY                                                          |        |               | NP   | PAT-Active  | US      | 11/682658     | 7652624      | US-2008-0218413-A1 |   |
| 11464 | UNIFIED MULTI-MODE RECEIVER DETECTOR                                                                                                                         |        |               | NP   | PAT-Active  | US      | 11/888228     | 8068566      | US-2009-034662-A1  |   |
| 11465 | HIERARCHICAL CELL DEPLOYMENT                                                                                                                                 |        |               | NP   | PAT-Active  | US      | 12/043343     | 8355378      | US-2008-0219216-A1 |   |
| 11466 | ARCHITECTURE AND METHODS FOR COEXISTENCE OF WIRELESS RADIOS HAVING DIFFERING PROTOCOLS                                                                       |        |               | NP   | PAT-Active  | US      | 11/697369     | 8189710      | US-2008-0247445-A1 |   |
| 11467 | TECHNIQUES FOR TIMING OPTIMIZATION IN WIRELESS NETWORKS THAT UTILIZE A UNIVERSAL SERVICES INTERFACE                                                          |        |               | CNT  | PAT-Active  | US      | 13/082505     | 8224973      | US-2011-0191411-A1 |   |
| 11468 | ESTIMATING STATISTICAL PROPERTIES OF NOISE IN MODULATED DATA CARRIER SIGNALS                                                                                 |        |               | NP   | PAT-Active  | US      | 11/959347     | 7979032      | US-2009-0270944-A1 |   |
| 11469 | DIVERSITY RECEIVER AND METHOD FOR CONTROLLING POWER THEREOF                                                                                                  |        |               | NP   | PAT-Active  | US      | 11/870928     | 8116404      | US-2009-0097600-A1 |   |
| 11470 | DIRECT CONVERSION RECEIVER AND METHOD FOR CORRECTING PHASE IMBALANCE THEREIN                                                                                 |        |               | NP   | PAT-Active  | US      | 11/933579     | 8036335      | US-2009-0116586-A1 |   |
| 11471 | RECEIVER SYSTEM FOR MULTIPLE BANDWIDTH TELEVISION CHANNELS                                                                                                   |        |               | NP   | PAT-Active  | US      | 11/863748     | 8237870      | US-2009-0086107-A1 |   |
| 11472 | SYSTEM AND METHOD FOR CONTROLLING RESONANCE FREQUENCY OF FILM BULK ACOUSTIC RESONATOR DEVICES                                                                |        |               | NP   | PAT-Active  | US      | 11/836538     | 7718369      | US-2009-038961-A1  |   |
| 11473 | COMPRESSED MEDIUM ACCESS CONTROL (MAC) HEADER STRUCTURE FOR MAC OVERHEAD REDUCTION IN MOBILE WORLDWIDE INTEROPERABILITY FOR MICROWAVE ACCESS (WiMAX) SYSTEMS |        |               | NP   | PAT-Active  | US      | 11/831299     | 7974312      | US-2009-0034526-A1 |   |
| 11474 | FIELD PROGRAMING OF A MOBILE STATION WITH SUBSCRIBER IDENTIFICATION AND RELATED INFORMATION                                                                  |        |               | NP   | PAT-Active  | US      | 11/763978     | 8331989      | US-2008-0311956-A1 |   |
| 11475 | EMERGENCY CALL SERVICES FOR WIRELESS NETWORK ROAMING                                                                                                         |        |               | NP   | PAT-Active  | US      | 12/130358     | 8094661      | US-2008-0311881-A1 |   |
| 11476 | DEVICE SYSTEM AND METHOD OF CHANNEL QUALITY INDICATION                                                                                                       |        |               | NP   | PAT-Active  | US      | 11/823781     | 7974242      | US-2009-0111475-A1 |   |
| 11477 | ADAPTIVE PAGING AREA                                                                                                                                         |        |               | NP   | PAT-Active  | US      | 12/165280     | 8094633      | US-2009-0003295-A1 |   |
| 11478 | ADAPTIVE SLEEP AREA                                                                                                                                          |        |               | NP   | PAT-Active  | US      | 12/165438     | 8359037      | US-2009-0003255-A1 |   |
| 11479 | CHANNEL AWARE MULTIPLE USER MIMO SCHEME UNIFIED WITH SINGLE USER CLOSED LOOP MIMO                                                                            |        |               | NP   | PAT-Active  | US      | 12/183317     | 8179844      | US-2009-0074039-A1 |   |
| 11480 | SIGMA-DELTA CONVERTER NOISE CANCELLATION                                                                                                                     |        |               | NP   | PAT-Active  | US      | 12/239254     | 7812750      | US-2010-0079324-A1 |   |
| 11481 | BEAM SELECTION IN OPEN LOOP MU-MIMO                                                                                                                          |        |               | NP   | PAT-Active  | US      | 12/057727     | 8290639      | US-2009-0042617-A1 |   |
| 11482 | METHOD AND APPARATUS FOR SCHEDULING TRANSMISSIONS IN A WIRELESS COMMUNICATION SYSTEM                                                                         |        |               | NP   | PAT-Active  | US      | 11/966859     | 8103218      | US-2009-0040936-A1 |   |

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| 2     | TITLE                                                                                                                         | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11483 | EFFICIENT CQICH TRANSPORT FORMAT                                                                                              |        |               | NP   | PAT-Active  | US      | 12/057678     | 8315643      | US-2009-0941138-A1 |   |
| 11484 | ASSIGNING NONCES FOR SECURITY KEYS                                                                                            |        |               | NP   | PAT-Active  | US      | 12/006265     | 8504439      | US-2009-0172394-A1 |   |
| 11485 | ADAPTIVE ANTENNA BEAMFORMING                                                                                                  |        |               | ENT  | PAT-Active  | US      | 12/898087     | 8508410      | US-2011-0018767-A1 |   |
| 11486 | TRANSISTOR AND ROUTING LAYOUT FOR A RADIO FREQUENCY INTEGRATED CMOS POWER AMPLIFIER DEVICE                                    |        |               | NP   | PAT-Active  | US      | 12/164219     | 7705664      | US-2009-0322427-A1 |   |
| 11487 | AVOIDING COLLISIONS BETWEEN USERS IF MAP CONTAINING PERSISTENT SCHEDULING INFORMATION IS LOST                                 |        |               | NP   | PAT-Active  | US      | 11/945274     | 8072875      | US-2009-0138598-A1 |   |
| 11488 | SYSTEM AIDED PAPR REDUCTION SCHEME BASED ON TR ALGORITHM                                                                      |        |               | NP   | PAT-Active  | US      | 12/113175     | 8169959      | US-2009-0274103-A1 |   |
| 11489 | LOOP DELAY COMPENSATION FOR CONTINUOUS TIME SIGMA DELTA ANALOG TO DIGITAL CONVERTER                                           |        |               | NP   | PAT-Active  | US      | 12/215874     | 8195221      | US-2009-0325632-A1 |   |
| 11490 | NOVEL DOUBLE-FEEDBACK FLEXIBLE NON-INTEGFER FREQUENCY DIVISION CIRCUIT                                                        |        |               | NP   | PAT-Active  | US      | 12/254080     | 7804932      | US-2010-0097106-A1 |   |
| 11491 | RESOURCE MANAGEMENT AND INTERFERENCE MITIGATION TECHNIQUES FOR RELAY-BASED WIRELESS NETWORKS                                  |        |               | NP   | PAT-Active  | US      | 12/049207     | 7962091      | US-2009-0335444-A1 |   |
| 11492 | RESOURCE MANAGEMENT AND INTERFERENCE MITIGATION TECHNIQUES FOR RELAY-BASED WIRELESS NETWORKS                                  |        |               | ENT  | PAT-Active  | US      | 13/094523     | 8265547      | US-2011-0199957-A1 |   |
| 11493 | RESOURCE MANAGEMENT AND INTERFERENCE MITIGATION TECHNIQUES FOR RELAY-BASED WIRELESS NETWORKS                                  |        |               | ENT  | PAT-Active  | US      | 13/105222     | 8422940      | US-2011-0211618-A1 |   |
| 11494 | INTERFERENCE AVOIDANCE WITH SYNCHRONOUS HARD AND PERSISTENT SCHEDULING                                                        |        |               | NP   | PAT-Active  | US      | 12/347462     | 8354512      | US-2010-0003355-A1 |   |
| 11495 | METHOD AND APPARATUS FOR EFFICIENT SCHEDULING IN BROADBAND WIRELESS ACCESS NETWORKS                                           |        |               | NP   | PAT-Active  | US      | 12/419250     | 8570958      | US-2009-0257389-A1 |   |
| 11496 | USER EQUIPMENT AND METHOD FOR PERSISTENT SUBFRAME SCHEDULING                                                                  |        |               | ENT  | PAT-Active  | US      | 14/052936     | 9749995      | US-2014-0036843-A1 |   |
| 11497 | RADIO FREQUENCY INTERFERENCE SENSING SYSTEM AND METHOD                                                                        |        |               | NP   | PAT-Active  | US      | 12/166168     | 8483621      | US-2010-0003924-A1 |   |
| 11498 | MULTI-TRANSCIVER WIRELESS COMMUNICATION DEVICE AND METHODS FOR OPERATING DURING DEVICE DISCOVERY AND CONNECTION ESTABLISHMENT |        |               | NP   | PAT-Active  | US      | 12/062707     | 8149804      | US-2009-0292128-A1 |   |
| 11499 | PILOT METHOD FOR 80216M                                                                                                       |        |               | NP   | PAT-Active  | US      | 12/415938     | 7974178      | US-2010-0346696-A1 |   |
| 11500 | SYSTEM AND METHOD FOR PROVIDING LOCATION BASED SERVICES (LBS) TO ROAMING SUBSCRIBERS IN A WIRELESS ACCESS NETWORK             |        |               | NP   | PAT-Active  | US      | 12/201048     | 8064928      | US-2010-0056162-A1 |   |
| 11501 | DYNAMIC INTERFERENCE AVOIDANCE WITH ASYNCHRONOUS HARD                                                                         |        |               | NP   | PAT-Active  | US      | 12/317112     | 8261151      | US-2010-0162069-A1 |   |
| 11502 | BANDWIDTH ALLOCATION BASE STATION AND METHOD FOR ALLOCATING UPLINK BANDWIDTH USING SDMA                                       |        |               | NP   | PAT-Active  | US      | 12/169731     | 8243680      | US-2010-0008331-A1 |   |
| 11503 | VIRTUAL MULTICARRIER DESIGN FOR ORTHOGONAL FREQUENCY DIVISION MULTIPLE ACCESS COMMUNICATIONS                                  |        |               | NP   | PAT-Active  | US      | 12/242755     | 8295373      | US-2010-0080908-A1 |   |
| 11504 | VIRTUAL MULTICARRIER DESIGN FOR ORTHOGONAL FREQUENCY DIVISION MULTIPLE ACCESS COMMUNICATIONS                                  |        |               | ENT  | PAT-Active  | US      | 13/658735     | 8934554      | US-2013-0114527-A1 |   |
| 11505 | VIRTUAL MULTICARRIER DESIGN FOR ORTHOGONAL FREQUENCY DIVISION MULTIPLE ACCESS COMMUNICATIONS                                  |        |               | ENT  | PAT-Active  | US      | 14/963956     | 9548879      | US-2015-0172085-A1 |   |
| 11506 | VIRTUAL MULTICARRIER DESIGN FOR ORTHOGONAL FREQUENCY DIVISION MULTIPLE ACCESS COMMUNICATIONS                                  |        |               | ENT  | APP-Pending | US      | 15/021877     |              | US-2018-0210314-A1 |   |
| 11507 | VIRTUAL MULTICARRIER DESIGN FOR ORTHOGONAL FREQUENCY DIVISION MULTIPLE ACCESS COMMUNICATIONS                                  |        |               | ENT  | PAT-Active  | US      | 15/366903     | ###88888     | US-2017-0086198-A1 |   |

|       | A                                                                                                                         | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                     | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11508 | RESOURCE ALLOCATION IN A WIRELESS NETWORK                                                                                 |        |               | CNT  | PAT-Active | US      | 11/704027     | 7424002      | US-2007-0133496-A1 |   |
| 11509 | CALCULATING SPATIAL WEIGHTS IN A RADIO COMMUNICATIONS SYSTEM                                                              |        |               | NP   | PAT-Active | US      | 09/727261     | 6653881      |                    |   |
| 11510 | CHANNEL ALLOCATION BASED ON RANDOM PLUS PLANNED PROCESSES                                                                 |        |               | NP   | PAT-Active | US      | 09/753266     | 7978673      |                    |   |
| 11511 | RADIO COMMUNICATIONS SYSTEM WITH A MINIMAL BROADCAST CHANNEL                                                              |        |               | NP   | PAT-Active | US      | 09/675748     | 7158493      |                    |   |
| 11512 | RADIO COMMUNICATIONS SYSTEM WITH A MINIMAL BROADCAST CHANNEL                                                              |        |               | CNT  | PAT-Active | US      | 11/583754     | 8085925      |                    |   |
| 11513 | RADIO COMMUNICATIONS SYSTEM WITH A MINIMAL BROADCAST CHANNEL                                                              |        |               | CNT  | PAT-Active | US      | 13/342175     | 8532048      | US-2012-0099459-A1 |   |
| 11514 | HOPPING ON RANDOM ACCESS CHANNELS                                                                                         |        |               | CSP  | PAT-Active | US      | 10/175707     | 7630346      | US-2003-0067801-A1 |   |
| 11515 | SELECTING RANDOM ACCESS CHANNELS                                                                                          |        |               | CSP  | PAT-Active | US      | 10/218770     | 7349371      | US-2003-0133426-A1 |   |
| 11516 | METHOD AND APPARATUS FOR INCREASING THE EFFECTIVE RANGE OF A COMMUNICATION LINK IN A WIRELESS COMMUNICATION SYSTEM        |        |               | NP   | PAT-Active | US      | 09/817731     | 7386781      | US-2002-0165097-A1 |   |
| 11517 | ADAPTIVE ANTENNA ARRAY WITH PROGRAMMABLE SENSITIVITY                                                                      |        |               | NP   | PAT-Active | US      | 09/967896     | 7039363      |                    |   |
| 11518 | METHOD AND APPARATUS FOR PROVIDING SPATIAL PROCESSING IN A REMOTE UNIT                                                    |        |               | NP   | PAT-Active | US      | 09/967863     | 6965788      |                    |   |
| 11519 | REMOTE UNIT FOR PROVIDING MULTIPLE-MODE SPATIAL PROCESSING                                                                |        |               | CNT  | PAT-Active | US      | 13/205553     | 8326374      | US-2011-0294554-A1 |   |
| 11520 | CALIBRATION OF WIDEBAND RADIOS AND ANTENNAS USING A NARROWBAND CHANNEL                                                    |        |               | NP   | PAT-Active | US      | 09/967127     | 7039036      |                    |   |
| 11521 | SYSTEM AND RELATED METHODS FOR BEAMFORMING IN A MULTI-POINT COMMUNICATIONS ENVIRONMENT                                    |        |               | CNT  | PAT-Active | US      | 11/717933     | 7661276      | US-2007-0163552-A1 |   |
| 11522 | SYSTEM AND RELATED METHODS FOR CLUSTERING MULTI-POINT COMMUNICATION TARGETS                                               |        |               | NP   | PAT-Active | US      | 09/967058     | 6973314      | US-2003-0064754-A1 |   |
| 11523 | SYSTEM AND RELATED METHODS FOR CLUSTERING MULTI-POINT COMMUNICATION TARGETS                                               |        |               | CNT  | PAT-Active | US      | 11/254599     | 7299073      | US-2006-0040672-A1 |   |
| 11524 | METHOD AND APPARATUS FOR EFFICIENT STORAGE OF TRAINING SEQUENCES FOR PEAK TO AVERAGE POWER CONSTRAINED MODULATION FORMATS |        |               | NP   | PAT-Active | US      | 09/967208     | 7433418      |                    |   |
| 11525 | METHOD AND APPARATUS FOR EFFICIENT STORAGE OF TRAINING SEQUENCES FOR PEAK TO AVERAGE POWER CONSTRAINED MODULATION FORMATS |        |               | CNT  | PAT-Active | US      | 12/245623     | 8315847      | US-2010-0086078-A1 |   |
| 11526 | ESTIMATION OF DOWNLINK TRANSMISSION PARAMETERS IN A RADIO COMMUNICATIONS SYSTEM WITH AN ADAPTIVE ANTENNA ARRAY            |        |               | NP   | PAT-Active | US      | 10/153515     | 6738020      |                    |   |
| 11527 | BROADCAST BURST USING SPATIAL DIVERSITY FOR A RADIO COMMUNICATIONS SYSTEM                                                 |        |               | CNT  | PAT-Active | US      | 11/581192     | 7430246      |                    |   |
| 11528 | SELECTIVE POWER CONTROL MESSAGING                                                                                         |        |               | NP   | PAT-Active | US      | 10/189709     | 7269382      | US-2004-0005803-A1 |   |
| 11529 | SELECTIVE POWER CONTROL MESSAGING                                                                                         |        |               | CSP  | PAT-Active | US      | 10/262336     | 7257301      | US-2004-0004944-A1 |   |
| 11530 | EFFICIENT BROADCAST CHANNEL STRUCTURE AND USE FOR SPATIAL DIVERSITY COMMUNICATIONS                                        |        |               | NP   | PAT-Active | US      | 10/187023     | 6928287      | US-2004-0132454-A1 |   |
| 11531 | SYMBOL ESTIMATION-BASED DECORRELATOR FOR DIRECTING BEAMS AND S TO REMOTE USERS IN A WIRELESS COMMUNICATIONS SYSTEM        |        |               | DIV  | PAT-Active | US      | 11/249903     | 7310538      | US-2006-0040708-A1 |   |
| 11532 | PHASE ERROR DETECTION WITH CONDITIONAL PROBABILITIES                                                                      |        |               | NP   | PAT-Active | US      | 12/317970     | 8204156      | US-2010-0166115-A1 |   |
| 11533 | DETECTION AND RECOVERY OF HARQ NAK-TO-ACK FEEDBACK ERROR IN WIRELESS COMMUNICATIONS SYSTEMS                               |        |               | DIV  | PAT-Active | US      | 14/606864     | 9344228      | US-2015-0149849-A1 |   |
| 11534 | METHOD AND APPARATUS FOR ACTIVATING A WIRELESS COMMUNICATION DEVICE                                                       |        |               | NP   | PAT-Active | US      | 12/536788     | 8509096      | US-2011-0032869-A1 |   |
| 11535 | ANTENNA STRUCTURE                                                                                                         |        |               | NP   | PAT-Active | US      | 12/237724     | 8085418      | US-2010-0141533-A1 |   |

|       | A                                                                                                                                                | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                            | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11536 | METHOD AND APPARATUS OF SUBCHANNELIZATION OF WIRELESS COMMUNICATION SYSTEM                                                                       |        |               | NP   | PAT-Active  | US      | 12/327838     | 8095176      | US-2010-0144340-A1 |   |
| 11537 | PARTIALLY RANDOM PERMUTATION SEQUENCE GENERATOR                                                                                                  |        |               | NP   | PAT-Active  | US      | 12/345528     | 8518358      | US-2010-0169400-A1 |   |
| 11538 | TECHNIQUES TO SUPPORT MULTIPLE RADIO-ACCESS TECHNOLOGIES                                                                                         |        |               | NP   | PAT-Active  | US      | 12/384562     | 8391252      | US-2010-0113047-A1 |   |
| 11539 | TECHNIQUES FOR FEMTO CELL SYNCHRONIZATION IN WIRELESS NETWORKS                                                                                   |        |               | NP   | PAT-Active  | US      | 12/653816     | 8398050      | US-2010-0157906-A1 |   |
| 11540 | GPS ASSISTED NETWORK ADMINISTRATION                                                                                                              |        |               | NP   | PAT-Active  | US      | 12/4859145    | 8538434      | US-2010-0300991-A1 |   |
| 11541 | MACRO-TO-FEMTO CELL RESELECTION                                                                                                                  |        |               | NP   | PAT-Active  | US      | 12/456987     | 8311545      | US-2010-0330500-A1 |   |
| 11542 | METHOD AND SYSTEM TO IMPROVE LINK BUDGET OF A WIRELESS SYSTEM                                                                                    |        |               | NP   | PAT-Active  | US      | 12/502857     | 8782482      | US-2011-0016369-A1 |   |
| 11543 | METHOD AND SYSTEM TO IMPROVE LINK BUDGET OF A WIRELESS SYSTEM                                                                                    |        |               | DIV  | PAT-Active  | US      | 14/296313     | 9356741      | US-2014-0289580-A1 |   |
| 11544 | METHOD AND SYSTEM TO IMPROVE LINK BUDGET OF A WIRELESS SYSTEM                                                                                    |        |               | CNT  | PAT-Active  | US      | 15/144510     | 8900327      | US-2016-0323069-A1 |   |
| 11545 | METHOD AND SYSTEM TO IMPROVE LINK BUDGET OF A WIRELESS SYSTEM                                                                                    |        |               | CNT  | APP-Pending | US      | 15/264809     |              | US-2018-0133475-A1 |   |
| 11546 | MULTI RADIO COMMUNICATION DEVICE AND METHOD FOR ENABLING COEXISTENCE BETWEEN A BLUETOOTH TRANSCIVER AND A WIMAX TRANSCIVER OPERATING IN FDD MODE |        |               | NP   | PAT-Active  | US      | 12/425795     | 8563592      | US-2010-0265856-A1 |   |
| 11547 | ALIGNMENT OF CHANNEL FILTERS FOR MULTIPLE-TUNER APPARATUSES                                                                                      |        |               | NP   | PAT-Active  | US      | 12/460811     | 8435279      | US-2011-0015765-A1 |   |
| 11548 | DELAY LINE CALIBRATION                                                                                                                           |        |               | NP   | PAT-Active  | US      | 12/769886     | 8736384      | US-2011-0287120-A1 |   |
| 11549 | POLAR CAP RESET METHOD FOR DIFFERENTIAL CODEBOOK FOR WIRELESS COMMUNICATIONS                                                                     |        |               | NP   | PAT-Active  | US      | 12/567364     | 8654740      | US-2011-0075650-A1 |   |
| 11550 | METHODS AND SYSTEMS TO DIGITALLY SWITCH BETWEEN FREQUENCIES AND CORRESPONDING BANDWIDTHS IN A TRANSCIVER                                         |        |               | NP   | PAT-Active  | US      | 12/565306     | 8300731      | US-2011-0068740-A1 |   |
| 11551 | EFFICIENT PAGING OPERATION FOR FEMTOCELL DEPLOYMENT                                                                                              |        |               | NP   | PAT-Active  | US      | 12/614586     | 8301177      | US-2010-0226311-A1 |   |
| 11552 | HARQ FEEDBACK CHANNEL INDEXING SCHEME IN WIRELESS COMMUNICATION SYSTEMS                                                                          |        |               | NP   | PAT-Active  | US      | 12/624048     | 8316269      | US-2010-0275081-A1 |   |
| 11553 | TRANSMISSION OF ADVANCED-MAP INFORMATION ELEMENTS IN MOBILE NETWORKS                                                                             |        |               | NP   | PAT-Active  | US      | 12/615629     | 8560696      | US-2010-0274892-A1 |   |
| 11554 | TRANSMISSION OF ADVANCED-MAP INFORMATION ELEMENTS IN MOBILE NETWORKS                                                                             |        |               | DIV  | PAT-Active  | US      | 14/031295     | 9253761      | US-2014-0016606-A1 |   |
| 11555 | TAIL-BITTING CONVOLUTIONAL CODES FOR UPLINK FAST FEEDBACK CONTROL CHANNEL                                                                        |        |               | NP   | PAT-Active  | US      | 12/799634     | 8677223      | US-2010-0287452-A1 |   |
| 11556 | FRAME STRUCTURE FOR SUPPORT OF LARGE DELAY SPREAD DEPLOYMENT SCENARIOS                                                                           |        |               | NP   | PAT-Active  | US      | 12/611487     | 8462676      | US-2011-0183494-A1 |   |
| 11557 | BASE STATION AND METHOD FOR CONFIGURING SUB-FRAMES FOR RELAY-NODE OPERATIONS                                                                     |        |               | CNT  | PAT-Active  | US      | 13/530986     | 8634834      | US-2012-0263135-A1 |   |
| 11558 | BASE STATION AND METHOD FOR CONFIGURING SUB-FRAMES FOR RELAY-NODE OPERATIONS                                                                     |        |               | CNT  | PAT-Active  | US      | 14/044070     | 8917638      | US-2014-0195075-A1 |   |
| 11559 | BASE STATION AND METHOD FOR CONFIGURING SUB-FRAMES FOR RELAY-NODE OPERATIONS                                                                     |        |               | CNT  | PAT-Active  | US      | 14/577934     | 9219681      | US-2015-0183733-A1 |   |
| 11560 | COEXISTENCE INTERFACE FOR MULTIPLE RADIO MODULES USING A REDUCED NUMBER OF CONNECTIONS                                                           |        |               | NP   | PAT-Active  | US      | 12/533888     | 8412368      | US-2010-0142500-A1 |   |

|       | A                                                                                                                        | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                    | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11561 | GROUP RESOURCE ALLOCATION TECHNIQUES FOR IEEE 802.16M                                                                    |        |               | NP   | PAT-Active | US      | 12/651338     | 8351533      | US-2010-0266057-A1 |   |
| 11562 | MOBILE STATION AND METHOD FOR DYNAMICALLY SWITCHING SLEEP CYCLES WITHOUT DEACTIVATING A CURRENT POWER SAVING CLASS (PSC) |        |               | NP   | PAT-Active | US      | 12/497196     | 8233418      | US-2010-0002615-A1 |   |
| 11563 | MULTIPROTOCOL ANTENNA STRUCTURE AND METHOD FOR SYNTHESIZING A MULTIPROTOCOL ANTENNA PATTERN                              |        |               | NP   | PAT-Active | US      | 12/536132     | 8368601      | US-2011-0032157-A1 |   |
| 11564 | METHOD AND APPARATUS TO SUPPORT MULTI-CHANNEL RECEPTION                                                                  |        |               | NP   | PAT-Active | US      | 12/567670     | 8179355      | US-2011-0075034-A1 |   |
| 11565 | CALIBRATION OF QUADRATURE IMBALANCE VIA LOOPBACK PHASE SHIFTS                                                            |        |               | NP   | PAT-Active | US      | 12/586726     | 8953663      | US-2011-0075715-A1 |   |
| 11566 | CALIBRATION OF QUADRATURE IMBALANCE VIA LOOPBACK PHASE SHIFTS                                                            |        |               | CNT  | PAT-Active | US      | 14/457811     | 9509355      | US-2015-0036727-A1 |   |
| 11567 | UPLINK FEEDBACK CHANNEL REPORTING MECHANISM IN WIRELESS SYSTEMS                                                          |        |               | NP   | PAT-Active | US      | 12/646862     | 8417180      | US-2010-0273435-A1 |   |
| 11568 | WIRELESS BROADBAND RESOURCE ALLOCATION INDEXING                                                                          |        |               | NP   | PAT-Active | US      | 12/638417     | 8300586      | US-2011-0143380-A1 |   |
| 11569 | TECHNIQUES TO NEGOTIATE CAPABILITIES BETWEEN NETWORKED DEVICES                                                           |        |               | NP   | PAT-Active | US      | 12/589938     | 8284725      | US-2011-0103314-A1 |   |
| 11570 | BEAMFORMING USING BASE AND DIFFERENTIAL CODEBOOKS                                                                        |        |               | NP   | PAT-Active | US      | 12/639540     | 8315204      | US-2011-0002263-A1 |   |
| 11571 | BEAMFORMING USING BASE AND DIFFERENTIAL CODEBOOKS                                                                        |        |               | CNT  | PAT-Active | US      | 13/652061     | 9042522      | US-2013-0180898-A1 |   |
| 11572 | BEAMFORMING USING BASE AND DIFFERENTIAL CODEBOOKS                                                                        |        |               | CNT  | PAT-Active | US      | 14/593957     | 9419694      | US-2015-0162962-A1 |   |
| 11573 | BEAMFORMING USING BASE AND DIFFERENTIAL CODEBOOKS                                                                        |        |               | CNT  | PAT-Active | US      | 15/303606     | 9680543      | US-2016-0315678-A1 |   |
| 11574 | BEAMFORMING USING BASE AND DIFFERENTIAL CODEBOOKS                                                                        |        |               | CNT  | PAT-Active | US      | 15/496969     | #####        | US-2017-0230097-A1 |   |
| 11575 | Systems and methods for channel coding of wireless communication                                                         |        |               | NP   | PAT-Active | US      | 12/655274     | 8397126      | US-2011-0004804-A1 |   |
| 11576 | METHOD AND APPARATUS OF DERIVING SECURITY KEY(S)                                                                         |        |               | NP   | PAT-Active | US      | 12/643675     | 8566593      | US-2011-0004760-A1 |   |
| 11577 | UPLINK OPEN LOOP POWER CONTROL SYSTEM                                                                                    |        |               | NP   | PAT-Active | US      | 12/638707     | 8599769      | US-2011-0002279-A1 |   |
| 11578 | DEVICE SYSTEM AND METHOD OF SIMULTANEOUSLY COMMUNICATING WITH A GROUP OF WIRELESS COMMUNICATION UNITS                    |        |               | NP   | PAT-Active | US      | 12/639061     | 8542696      | US-2011-0143892-A1 |   |
| 11579 | ARTICLE OF SIMULTANEOUSLY COMMUNICATING WITH A GROUP OF WIRELESS COMMUNICATION UNITS                                     |        |               | CNT  | PAT-Active | US      | 13/892395     | 9060366      | US-2013-0250887-A1 |   |
| 11580 | APPARATUS AND ARTICLE OF SIMULTANEOUSLY TRANSMITTING TO A GROUP OF WIRELESS COMMUNICATION STATIONS                       |        |               | CNT  | PAT-Active | US      | 14/710714     | 9877223      | US-2015-0257033-A1 |   |
| 11581 | FEMTOCELL DISCOVERY AND ASSOCIATION IN CELLULAR NETWORKS                                                                 |        |               | NP   | PAT-Active | US      | 12/646560     | 8400985      | US-2011-0149878-A1 |   |
| 11582 | FEMTOCELL DISCOVERY AND ASSOCIATION IN CELLULAR NETWORKS                                                                 |        |               | CNT  | PAT-Active | US      | 13/768703     | 9237435      | US-2013-0157657-A1 |   |
| 11583 | BASE STATION DISCOVERY AND ASSOCIATION IN CELLULAR NETWORKS                                                              |        |               | CNT  | PAT-Active | US      | 14/992523     | #####        | US-2016-0174143-A1 |   |
| 11584 | ALLOCATING GROUP RESOURCES FOR WIRELESS COMMUNICATIONS                                                                   |        |               | NP   | PAT-Active | US      | 12/644090     | 8351384      | US-2011-0044266-A1 |   |
| 11585 | SHORT USER MESSAGES IN SYSTEM CONTROL SIGNALING                                                                          |        |               | NP   | PAT-Active | US      | 12/646706     | 8283417      | US-2010-0279717-A1 |   |

|       | A                                                                                                      | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                  | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11586 | DEVICE SYSTEM AND METHOD OF POWER-SAVING FOR WIRELESS COMMUNICATION                                    |        |               | NP   | PAT-Active | US      | 12/645502     | 8351848      | US-2011-0945763-A1 |   |
| 11587 | INITIALIZING FEMTOCELLS                                                                                |        |               | NP   | PAT-Active | US      | 12/644080     | 8255677      | US-2011-0904747-A1 |   |
| 11588 | INITIALIZING FEMTOCELLS                                                                                |        |               | ENT  | PAT-Active | US      | 13/555228     | #####        | US-2012-0289222-A1 |   |
| 11589 | FEMTOCELL ARCHITECTURE AND NETWORK                                                                     |        |               | NP   | PAT-Active | US      | 12/645045     | 8638731      | US-2011-0145876-A1 |   |
| 11590 | HANDOVER FOR CELLULAR RADIO COMMUNICATIONS                                                             |        |               | NP   | PAT-Active | US      | 12/646718     | 8275378      | US-2011-0902799-A1 |   |
| 11591 | DISTRIBUTING GROUP SIZE INDICATIONS TO MOBILE STATIONS                                                 |        |               | NP   | PAT-Active | US      | 12/636892     | 8599766      | US-2011-0944285-A1 |   |
| 11592 | ZONE SWITCHING IN MIXED-ZONE AIR INTERFACE                                                             |        |               | NP   | PAT-Active | US      | 12/646284     | 8301348      | US-2010-0277618-A1 |   |
| 11593 | TRANSMISSION OF PREAMBLE CODE FOR MOBILE WIMAX SYSTEMS                                                 |        |               | NP   | PAT-Active | US      | 12/660295     | 8351322      | US-2010-0226322-A1 |   |
| 11594 | MAC/PHY IDENTIFICATION OF BASE STATION TYPES AND THEIR PREFERRED AND RESTRICTED ACCESS                 |        |               | NP   | PAT-Active | US      | 12/820966     | 8588139      | US-2011-0944244-A1 |   |
| 11595 | LOCATION DETERMINATION IN WIRELESS COMMUNICATION SYSTEMS                                               |        |               | NP   | PAT-Active | US      | 12/844435     | 8477690      | US-2011-0115338-A1 |   |
| 11596 | TECHNIQUES USING DIFFERENTIAL PRECODING FOR HIGHLY CORRELATED CHANNELS IN WIRELESS NETWORKS            |        |               | NP   | PAT-Active | US      | 12/757169     | 8737199      | US-2011-0249655-A1 |   |
| 11597 | TECHNIQUES USING DIFFERENTIAL PRECODING FOR HIGHLY CORRELATED CHANNELS IN WIRELESS NETWORKS            |        |               | ENT  | PAT-Active | US      | 13/591613     | 8873417      | US-2013-0223495-A1 |   |
| 11598 | GROUP RESOURCE ALLOCATION SYSTEMS AND TECHNIQUES                                                       |        |               | NP   | PAT-Active | US      | 12/655159     | 9438404      | US-2011-0149760-A1 |   |
| 11599 | APPARATUS AND METHODS FOR MINIMIZING PERFORMANCE LOSS IN MULTIPLE TUNER SOLUTIONS                      |        |               | NP   | PAT-Active | US      | 12/752569     | 8280446      | US-2011-0244812-A1 |   |
| 11600 | CALIBRATION OF QUADRATURE IMBALANCES USING WIDEBAND SIGNALS                                            |        |               | NP   | PAT-Active | US      | 12/800895     | 8713905      | US-2011-0292978-A1 |   |
| 11601 | METHOD AND APPARATUS FOR ADAPTIVE MITIGATION OF NOISE INTERFERENCE                                     |        |               | NP   | PAT-Active | US      | 13/192255     | 8830972      | US-2013-0328244-A1 |   |
| 11602 | METHOD AND APPARATUS FOR ENHANCED MULTICAST BROADCAST SERVICES                                         |        |               | NP   | PAT-Active | US      | 12/846533     | 8472380      | US-2011-0944229-A1 |   |
| 11603 | SYSTEM METHOD AND APPARATUS FOR AN EFFICIENT INFORMATION BROADCAST IN A MULTI-CARRIER WIRELESS NETWORK |        |               | NP   | PAT-Active | US      | 12/789058     | 8472425      | US-2011-0944213-A1 |   |
| 11604 | COVERAGE LOSS RECOVERY IN A WIRELESS COMMUNICATION NETWORK                                             |        |               | NP   | PAT-Active | US      | 12/826639     | 8638751      | US-2011-0986737-A1 |   |
| 11605 | NEIGHBOR LIST BROADCASTING TECHNIQUES                                                                  |        |               | ENT  | PAT-Active | US      | 14/282826     | 9501939      | US-2015-0904977-A1 |   |
| 11606 | APPARATUS AND METHODS FOR UPGRADING AN AIRLINK IN A WIRELESS SYSTEM                                    |        |               | NP   | PAT-Active | US      | 12/890179     | 8483132      | US-2011-0134896-A1 |   |
| 11607 | TECHNIQUES TO CONTROL UPLINK POWER                                                                     |        |               | NP   | PAT-Active | US      | 12/782800     | 8295335      | US-2011-0158304-A1 |   |
| 11608 | UPLINK POWER CONTROL IN WIRELESS NETWORKS                                                              |        |               | NP   | PAT-Active | US      | 12/843940     | 8224373      | US-2011-0159913-A1 |   |
| 11609 | DIFFERENTIAL FEEDBACK SCHEME FOR CLOSED-LOOP MIMO BEAMFORMING                                          |        |               | NP   | PAT-Active | US      | 12/770620     | 8340207      | US-2011-0964152-A1 |   |
| 11610 | MANAGING INTERFERENCE DUE TO LOW POWER BSS                                                             |        |               | NP   | PAT-Active | US      | 12/889525     | 8526984      | US-2011-0159898-A1 |   |

|       | A                                                                                                              | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                          | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11611 | POWER LOADING IN MU-MIMO                                                                                       |        |               | NP   | PAT-Active | US      | 12/845482     | 8554261      | US-2012-0928671-A1 |   |
| 11612 | POWER LOADING IN MU-MIMO                                                                                       |        |               | CNT  | PAT-Active | US      | 14/579321     | 9549378      | US-2015-0271762-A1 |   |
| 11613 | PLATFORM NOISE ESTIMATION AND MITIGATION FOR WIRELESS RECEIVERS                                                |        |               | NP   | PAT-Active | US      | 12/886316     | 8509364      | US-2012-0069940-A1 |   |
| 11614 | METHOD AND APPARATUS FOR TRANSFORMER POWER COMBINER AND DYNAMIC POWER CONTROL FOR QUADRAPHASE POWER AMPLIFIERS |        |               | NP   | PAT-Active | US      | 12/879252     | 8472896      | US-2012-0062318-A1 |   |
| 11615 | BASE STATION AND METHOD FOR REDUCING ASYNCHRONOUS INTERFERENCE IN A MULTI-TIER OFDMA OVERLAY NETWORK           |        |               | NP   | PAT-Active | US      | 12/822925     | 8630229      | US-2011-0002770-A1 |   |
| 11616 | OFDM TRANSMITTER AND METHODS FOR REDUCING THE EFFECTS OF SEVERE INTERFERENCE WITH SYMBOL LOADING               |        |               | NP   | PAT-Active | US      | 12/889651     | 8462864      | US-2011-0158337-A1 |   |
| 11617 | MOBILE DEVICE TRANSMITTER AND METHODS FOR TRANSMITTING SIGNALS IN DIFFERENT SIGNAL DIMENSIONS FOR 3GPP LTE     |        |               | CNT  | PAT-Active | US      | 13/895555     | 9300504      | US-2013-0243118-A1 |   |
| 11618 | MOBILE DEVICE TRANSMITTER AND METHODS FOR TRANSMITTING SIGNALS IN DIFFERENT SIGNAL DIMENSIONS FOR 3GPP LTE     |        |               | CNT  | PAT-Active | US      | 15/003549     | 9712683      | US-2016-0142120-A1 |   |
| 11619 | FREQUENCY AND TIMING OFFSET ESTIMATION ALGORITHM FOR DTV (DVB-T2) RECEIVERS                                    |        |               | NP   | PAT-Active | US      | 12/956565     | 8472540      | US-2012-0134398-A1 |   |
| 11620 | DYNAMIC INTERFERENCE MITIGATION FOR CELLULAR NETWORKS                                                          |        |               | NP   | PAT-Active | US      | 12/996662     | 8700085      | US-2012-0135763-A1 |   |
| 11621 | MULTI-RADIO COMMUNICATION BETWEEN WIRELESS DEVICES                                                             |        |               | CNT  | PAT-Active | US      | 14/321688     | 9215186      | US-2014-0313979-A1 |   |
| 11622 | MULTI-RADIO COMMUNICATION BETWEEN WIRELESS DEVICES                                                             |        |               | CNT  | PAT-Active | US      | 14/968838     | 9912602      | US-2016-0337256-A1 |   |
| 11623 | ESTIMATING QUALITY OF A SIGNAL IN MOBILE WIRELESS COMMUNICATION SYSTEMS                                        |        |               | NP   | PAT-Active | US      | 12/958235     | 8730827      | US-2012-0140713-A1 |   |
| 11624 | UPLINK POWER HEADROOM CALCULATION AND REPORTING FOR OFDMA CARRIER AGGREGATION COMMUNICATION SYSTEM             |        |               | NP   | PAT-Active | US      | 12/889318     | 8584718      | US-2011-0312366-A1 |   |
| 11625 | ALLOCATING A CONTROL CHANNEL FOR CARRIER AGGREGATION                                                           |        |               | NP   | PAT-Active | US      | 12/967652     | 8625218      | US-2011-0288487-A1 |   |
| 11626 | ALLOCATING A CONTROL CHANNEL FOR CARRIER AGGREGATION                                                           |        |               | CNT  | PAT-Active | US      | 13/275608     | 8843168      | US-2012-0034945-A1 |   |
| 11627 | MONITORING A CONTROL CHANNEL FOR CARRIER AGGREGATION                                                           |        |               | CNT  | PAT-Active | US      | 13/969966     | 8983516      | US-2013-0336263-A1 |   |
| 11628 | ALLOCATING A CONTROL CHANNEL FOR CARRIER AGGREGATION                                                           |        |               | CNT  | PAT-Active | US      | 14/482107     | 9591642      | US-2015-0029964-A1 |   |
| 11629 | ALLOCATING A CONTROL CHANNEL FOR CARRIER AGGREGATION                                                           |        |               | CNT  | PAT-Active | US      | 15/405050     | #####        | US-2017-0127391-A1 |   |
| 11630 | CONFIGURING COMPONENT CARRIERS IN CARRIER AGGREGATION                                                          |        |               | NP   | PAT-Active | US      | 12/975725     | 8537718      | US-2011-0287978-A1 |   |
| 11631 | CONFIGURING COMPONENT CARRIERS IN CARRIER AGGREGATION                                                          |        |               | CNT  | PAT-Active | US      | 13/299765     | 8743734      | US-2012-0063357-A1 |   |
| 11632 | CONFIGURING COMPONENT CARRIERS IN CARRIER AGGREGATION                                                          |        |               | CNT  | PAT-Active | US      | 13/299800     | 9338772      | US-2012-0063358-A1 |   |
| 11633 | CONFIGURING COMPONENT CARRIERS IN CARRIER AGGREGATION                                                          |        |               | CNT  | PAT-Active | US      | 15/150286     | #####        | US-2016-0255630-A1 |   |
| 11634 | BASE STATION SELECTION METHOD FOR HETEROGENEOUS OVERLAY NETWORKS                                               |        |               | NP   | PAT-Active | US      | 12/977797     | 8519654      | US-2012-0035226-A1 |   |
| 11635 | CONFIGURABLE COMMON REFERENCE SIGNAL PORT FOR ANTENNA SYSTEMS                                                  |        |               | NP   | PAT-Active | US      | 12/928758     | 8708077      | US-2012-0035221-A1 |   |

|       | A                                                                                                                                                 | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                             | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11636 | CABLE ANTENNA APPARATUS AND SYSTEM                                                                                                                |        |               | NP   | PAT-Active  | US      | 12/957208     | 9799943      | US-2012-0135565-A1 |   |
| 11637 | DYNAMIC BANDWIDTH CONTROL IN INTERFERENCE SITUATIONS                                                                                              |        |               | NP   | PAT-Active  | US      | 12/969771     | 8619640      | US-2012-0155294-A1 |   |
| 11638 | DYNAMIC BANDWIDTH CONTROL IN INTERFERENCE SITUATIONS                                                                                              |        |               | ENT  | PAT-Active  | US      | 14/045484     | 9608795      | US-2014-0098760-A1 |   |
| 11639 | TECHNIQUES FOR MANAGING MOBILITY MANAGEMENT SIGNALING IN A WIRELESS NETWORK                                                                       |        |               | NP   | PAT-Active  | US      | 12/975827     | 8787337      | US-2012-0039313-A1 |   |
| 11640 | TECHNIQUES FOR UPDATE PROCEDURE SIGNALING IN A WIRELESS NETWORK                                                                                   |        |               | CNT  | PAT-Active  | US      | 14/219240     | 9781543      | US-2014-0204931-A1 |   |
| 11641 | TECHNIQUES FOR UPDATE PROCEDURE SIGNALING IN A WIRELESS NETWORK                                                                                   |        |               | CNT  | PAT-Active  | US      | 15/992576     | #####        | US-2018-0279102-A1 |   |
| 11642 | TECHNIQUES FOR UPDATE PROCEDURE SIGNALING IN A WIRELESS NETWORK                                                                                   |        |               | CNT  | PAT-Active  | US      | 15/687313     | #####        | US-2017-0358673-A1 |   |
| 11643 | TECHNIQUES FOR INITIATING COMMUNICATION IN A WIRELESS NETWORK                                                                                     |        |               | NP   | PAT-Active  | US      | 12/976217     | 8532030      | US-2011-0288052-A1 |   |
| 11644 | TECHNIQUES FOR DYNAMIC SPECTRUM MANAGEMENT ALLOCATION AND SHARING                                                                                 |        |               | NP   | PAT-Active  | US      | 13/029439     | 8973480      | US-2012-0082100-A1 |   |
| 11645 | APPARATUS AND METHODS OF TIME DOMAIN MULTIPLEXING SOLUTIONS FOR IN-DEVICE COEXISTENCE                                                             |        |               | NP   | PAT-Active  | US      | 13/077745     | 9872307      | US-2012-0082077-A1 |   |
| 11646 | APPARATUS AND METHODS OF TIME DOMAIN MULTIPLEXING SOLUTIONS FOR IN-DEVICE COEXISTENCE                                                             |        |               | ENT  | APP-Pending | US      | 14/582110     |              | US-2015-0109976-A1 |   |
| 11647 | COORDINATED MULTIPoint COMMUNICATION NETWORK WITH MULTIPLE COOPERATING eNBs AND METHOD FOR BEAMFORMING COORDINATION WITH INTERFERENCE SUPPRESSION |        |               | PCT  | PAT-Active  | US      | 13/883390     | 9197371      | US-2013-0250865-A1 |   |
| 11648 | PMI FEEDBACK WITH CODEBOOK INTERPOLATION                                                                                                          |        |               | NP   | PAT-Active  | US      | 13/077905     | 8713807      | US-2012-0082190-A1 |   |
| 11649 | ENHANCED NODE B AND METHOD FOR PRECODING WITH REDUCED QUANTIZATION ERROR                                                                          |        |               | NP   | PAT-Active  | US      | 13/075320     | 8644289      | US-2012-0113830-A1 |   |
| 11650 | ENHANCED NODE B AND METHOD FOR PRECODING WITH REDUCED QUANTIZATION ERROR                                                                          |        |               | CNT  | PAT-Active  | US      | 14/160931     | 9197372      | US-2014-0133445-A1 |   |
| 11651 | ENHANCED NODE B AND METHOD FOR PRECODING WITH REDUCED QUANTIZATION ERROR                                                                          |        |               | CNT  | PAT-Active  | US      | 14/887499     | 9525471      | US-2016-0094283-A1 |   |
| 11652 | ENHANCED NODE B AND METHOD FOR PRECODING WITH REDUCED QUANTIZATION ERROR                                                                          |        |               | CNT  | PAT-Active  | US      | 15/373366     | 9843367      | US-2017-0155435-A1 |   |
| 11653 | APPARATUS SYSTEMS AND METHODS UTILIZING ADJACENT-CHANNEL POWER DEPENDENT AUTOMATIC GAIN CONTROL FOR DIGITAL TELEVISION DEMODULATION               |        |               | NP   | PAT-Active  | US      | 13/032079     | 8582035      | US-2012-0212675-A1 |   |
| 11654 | APPARATUS SYSTEMS AND METHODS UTILIZING ADJACENT-CHANNEL POWER DEPENDENT AUTOMATIC GAIN CONTROL FOR DIGITAL TELEVISION DEMODULATION               |        |               | CNT  | PAT-Active  | US      | 14/047098     | 8817395      | US-2014-0036157-A1 |   |
| 11655 | COORDINATED MULTI-POINT TRANSMISSION USING INTERFERENCE FEEDBACK                                                                                  |        |               | NP   | PAT-Active  | US      | 13/075023     | 8687727      | US-2012-0114028-A1 |   |
| 11656 | CONTENTION-BASED TRANSMISSION WITH CONTENTION-FREE FEEDBACK FOR REDUCING LATENCY IN LTE ADVANCED NETWORKS AND ENHANCED PUSCH                      |        |               | NP   | PAT-Active  | US      | 13/044125     | 8638736      | US-2011-0216722-A1 |   |
| 11657 | USER EQUIPMENT AND METHOD FOR CONTENTION-BASED COMMUNICATIONS OVER ALLOCATED PUSCH RESOURCES                                                      |        |               | CNT  | PAT-Active  | US      | 14/165038     | 9578659      | US-2014-0140304-A1 |   |
| 11658 | DELIVERY OF MULTICAST AND BROADCAST SERVICES CONCURRENTLY WITH UNICAST DATA                                                                       |        |               | NP   | PAT-Active  | US      | 13/154809     | 8780876      | US-2012-0035279-A1 |   |
| 11659 | DELIVERY OF MULTICAST AND BROADCAST SERVICES CONCURRENTLY WITH UNICAST DATA                                                                       |        |               | CNT  | PAT-Active  | US      | 14/244355     | 9883432      | US-2014-0293862-A1 |   |



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| 2     | TITLE                                                                                            | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11660 | DELIVERY OF MULTICAST AND BROADCAST SERVICES CONCURRENTLY WITH UNICAST DATA                      |        |               | ENT  | PAT-Active | US      | 14/335179     | 9107124      | US-2014-0328243-A1 |   |
| 11661 | DELIVERY OF MULTICAST AND BROADCAST SERVICES CONCURRENTLY WITH UNICAST DATA                      |        |               | ENT  | PAT-Active | US      | 15/814126     | #####        | US-2018-0146105-A1 |   |
| 11662 | DELIVERY OF MULTICAST AND BROADCAST SERVICES CONCURRENTLY WITH UNICAST DATA                      |        |               | ENT  | PAT-Active | US      | 14/788709     | 9693274      | US-2015-0304917-A1 |   |
| 11663 | FRAMEWORK FOR COORDINATED MULTIPOINT TRANSMISSION BASED ON A MULTICELL MAC/RRC DESIGN            |        |               | NP   | PAT-Active | US      | 13/165946     | 8604593      | US-2012-0082082-A1 |   |
| 11664 | MULTI USER MIMO DETECTION UTILIZING AVERAGED SPATIAL WHITENING                                   |        |               | NP   | PAT-Active | US      | 13/175055     | 8711965      | US-2013-0003896-A1 |   |
| 11665 | METHOD AND APPARATUS FOR INTERFERENCE MITIGATION IN WIRELESS SYSTEMS                             |        |               | NP   | PAT-Active | US      | 13/174382     | 8768393      | US-2013-0005376-A1 |   |
| 11666 | RECEIVER WITH IMPROVED NOISE VARIANCE ESTIMATION                                                 |        |               | PCT  | PAT-Active | US      | 13/993486     | 9614560      | US-2016-0191068-A1 |   |
| 11667 | HIGHER ORDER MU-MIMO FOR LTE-A                                                                   |        |               | PCT  | PAT-Active | US      | 13/995155     | 9807617      | US-2013-0285380-A1 |   |
| 11668 | HIGHER ORDER MU-MIMO FOR LTE-A                                                                   |        |               | ENT  | PAT-Active | US      | 15/717687     | #####        | US-2018-0035302-A1 |   |
| 11669 | CO-PHASING OF TRANSMISSIONS FROM MULTIPLE INFRASTRUCTURE NODES                                   |        |               | PCT  | PAT-Active | US      | 13/995158     | 9559864      | US-2013-0288728-A1 |   |
| 11670 | MOBILE DEVICE AND METHOD FOR AUTOMATIC CONNECTIVITY DATA OFFLOADING AND ROAMING BETWEEN NETWORKS |        |               | NP   | PAT-Active | US      | 13/173338     | 8590623      | US-2013-0007953-A1 |   |
| 11671 | MOBILE DEVICE AND METHOD FOR AUTOMATIC CONNECTIVITY DATA OFFLOADING AND ROAMING BETWEEN NETWORKS |        |               | ENT  | PAT-Active | US      | 14/083028     | 9084081      | US-2014-0081450-A1 |   |
| 11672 | MOBILE DEVICE AND METHOD FOR AUTOMATIC CONNECTIVITY DATA OFFLOADING AND ROAMING BETWEEN NETWORKS |        |               | ENT  | PAT-Active | US      | 14/731668     | 9906840      | US-2015-0350871-A1 |   |
| 11673 | MOBILE DEVICE AND METHOD FOR AUTOMATIC CONNECTIVITY DATA OFFLOADING AND ROAMING BETWEEN NETWORKS |        |               | ENT  | PAT-Active | US      | 15/873537     | #####        | US-2018-0242137-A1 |   |
| 11674 | TECHNIQUES TO TRAIN A PERSONAL AREA NETWORK COMPONENT                                            |        |               | PCT  | PAT-Active | US      | 13/997272     | 9078271      | US-2013-0815217-A1 |   |
| 11675 | TECHNIQUES TO TRAIN A PERSONAL AREA NETWORK COMPONENT                                            |        |               | ENT  | PAT-Active | US      | 14/792387     | 9661646      | US-2016-0195618-A1 |   |
| 11676 | DIGITALLY SCALABLE TRANSFORMER COMBINING POWER AMPLIFIER                                         |        |               | NP   | PAT-Active | US      | 13/250983     | 8502598      | US-2013-0082772-A1 |   |
| 11677 | VOLTAGE-CONTROLLED OSCILLATOR WITH REDUCED SINGLE-ENDED CAPACITANCE                              |        |               | PCT  | PAT-Active | US      | 13/997592     | 9093950      | US-2013-0309963-A1 |   |
| 11678 | VOLTAGE-CONTROLLED OSCILLATOR WITH REDUCED SINGLE-ENDED CAPACITANCE                              |        |               | ENT  | PAT-Active | US      | 14/754108     | 9473066      | US-2015-0372643-A1 |   |
| 11679 | DUAL MODE VOLTAGE REGULATOR WITH RECONFIGURATION CAPABILITY                                      |        |               | PCT  | PAT-Active | US      | 13/997306     | 9577523      | US-2015-0042295-A1 |   |
| 11680 | CONTROL AND DATA PLANE SOLUTIONS FOR CARRIER-AGGREGATION BASED WLAN OFFLOAD                      |        |               | ENT  | PAT-Active | US      | 14/675098     | 9426685      | US-2015-0268274-A1 |   |
| 11681 | SYSTEM AND METHOD OF RANK ADAPTATION IN MIMO COMMUNICATION SYSTEM                                |        |               | PCT  | PAT-Active | US      | 13/976298     | 9445239      | US-2013-0287139-A1 |   |
| 11682 | SYSTEM AND METHOD OF RANK ADAPTATION IN MIMO COMMUNICATION SYSTEM                                |        |               | ENT  | PAT-Active | US      | 15/205964     | #####        | US-2016-0323027-A1 |   |
| 11683 | SYSTEM AND METHOD OF RANK ADAPTATION IN MIMO COMMUNICATION SYSTEM                                |        |               | ENT  | PAT-Active | US      | 15/037893     | #####        | US-2018-0224629-A1 |   |
| 11684 | SYSTEM AND METHOD OF CHANNEL CONTROL IN A WIRELESS COMMUNICATION SYSTEM                          |        |               | PCT  | PAT-Active | US      | 13/998900     | 9998944      | US-2014-0161034-A1 |   |

|       | A                                                                                                                                    | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11685 | METHODS AND SYSTEM FOR COMMUNICATING CONTROL INFORMATION USING CARRIER AGGREGATION                                                   |        |               | PCT  | PAT-Active  | US      | 13/976005     | 8817755      | US-2013-0294423-A1 |   |
| 11686 | METHODS AND SYSTEM FOR COMMUNICATING CONTROL INFORMATION USING CARRIER AGGREGATION                                                   |        |               | ENT  | PAT-Active  | US      | 14/955099     | 9473972      | US-2014-0348115-A1 |   |
| 11687 | METHODS AND SYSTEM FOR COMMUNICATING CONTROL INFORMATION USING CARRIER AGGREGATION                                                   |        |               | ENT  | APP-Pending | US      | 15/295934     |              | US-2019-0037432-A1 |   |
| 11688 | SYSTEM AND METHOD OF MANAGING WIRELESS COMMUNICATIONS WITH MULTIPLE TRANSMISSION POINTS                                              |        |               | PCT  | PAT-Active  | US      | 13/976464     | 8888888      | US-2014-0355529-A1 |   |
| 11689 | TECHNIQUES FOR MACHINE-TO-MACHINE DEVICE MANAGEMENT                                                                                  |        |               | PCT  | APP-Pending | US      | 13/976466     |              | US-2013-0265932-A1 |   |
| 11690 | MACHINE-TO-MACHINE (M2M) COMMUNICATIONS USING SHORT MESSAGE SERVICES (SMS)                                                           |        |               | PCT  | PAT-Active  | US      | 13/994115     | 9344835      | US-2014-0073367-A1 |   |
| 11691 | MULTI-HOP SINGLE SIGN-ON (SSO) FOR IDENTITY PROVIDER (IdP) ROAMING/PROXY                                                             |        |               | PCT  | PAT-Active  | US      | 13/995118     | 9258344      | US-2013-0275085-A1 |   |
| 11692 | METHOD FOR CONTROLLING OPERATION ACTIVITY MODES OF A WIRELESS TELECOMMUNICATIONS TERMINAL                                            |        |               | NP   | PAT-Active  | US      | 13/158690     | 9107163      | US-2011-0305215-A1 |   |
| 11693 | EXTENDED ACCESS BARRING                                                                                                              |        |               | PCT  | PAT-Active  | US      | 13/994117     | 8264979      | US-2014-0128029-A1 |   |
| 11694 | EXTENDED ACCESS BARRING                                                                                                              |        |               | ENT  | PAT-Active  | US      | 14/924364     | 9615314      | US-2016-0050615-A1 |   |
| 11695 | EXTENDED ACCESS BARRING                                                                                                              |        |               | ENT  | PAT-Active  | US      | 15/439390     | 9974004      | US-2017-0164269-A1 |   |
| 11696 | EXTENDED ACCESS BARRING                                                                                                              |        |               | PCT  | PAT-Active  | US      | 14/992734     | 9653029      | US-2016-0127980-A1 |   |
| 11697 | EXTENDED ACCESS BARRING                                                                                                              |        |               | ENT  | PAT-Active  | US      | 15/486916     | 8888888      | US-2017-0223809-A1 |   |
| 11698 | PROCESSOR EXTENSIONS FOR ACCELERATING SPECTRAL BAND REPLICATION                                                                      |        |               | ENT  | PAT-Active  | US      | 13/491229     | 8589634      | US-2012-0265329-A1 |   |
| 11699 | TIMESLOT SCHEDULING IN DIGITAL AUDIO AND HYBRID AUDIO RADIO SYSTEMS                                                                  |        |               | NP   | PAT-Active  | US      | 12/154882     | 8198769      | US-2008-0293857-A1 |   |
| 11700 | TIMESLOT SCHEDULING IN DIGITAL AUDIO AND HYBRID AUDIO RADIO SYSTEMS                                                                  |        |               | ENT  | PAT-Active  | US      | 13/463725     | 8824447      | US-2012-0213217-A1 |   |
| 11701 | DIGITAL RADIO BROADCAST TRANSMISSION USING A TABLE OF CONTENTS                                                                       |        |               | NP   | PAT-Active  | US      | 12/773835     | 8323823      | US-2010-0330900-A1 |   |
| 11702 | WIRELESS WIDE AREA NETWORK (WWAN) ASSISTED PROXIMITY WIRELESS LOCAL AREA NETWORK (WLAN) PEER-TO-PEER (P2P) CONNECTION AND OFFLOADING |        |               | PCT  | PAT-Active  | US      | 13/997253     | 9813841      | US-2014-0115058-A1 |   |
| 11703 | STRUCTURED CODEBOOK FOR UNIFORM CIRCULAR ARRAY (UCA)                                                                                 |        |               | PCT  | PAT-Active  | US      | 13/993629     | 9313747      | US-2013-0336152-A1 |   |
| 11704 | METHOD TO SUPPORT AN ASYMMETRIC TIME-DIVISION DUPLEX (TDD) CONFIGURATION IN A HETEROGENEOUS NETWORK (HETNET)                         |        |               | PCT  | PAT-Active  | US      | 13/994108     | 9504084      | US-2013-0343243-A1 |   |
| 11705 | WIRELESS MODULE AND METHOD FOR LOCAL IP ACCESS PACKET DATA NETWORK RELEASE                                                           |        |               | PCT  | PAT-Active  | US      | 13/991362     | 9398503      | US-2014-0177590-A1 |   |
| 11706 | TECHNIQUES FOR MANAGING IDLE STATE ACTIVITY IN MOBILE DEVICES                                                                        |        |               | PCT  | PAT-Active  | US      | 13/976955     | 9338748      | US-2014-0051485-A1 |   |
| 11707 | TECHNIQUES FOR MANAGING IDLE STATE ACTIVITY IN MOBILE DEVICES                                                                        |        |               | ENT  | PAT-Active  | US      | 14/951285     | 9942850      | US-2016-0081029-A1 |   |
| 11708 | TECHNIQUES FOR MANAGING IDLE STATE ACTIVITY IN MOBILE DEVICES                                                                        |        |               | ENT  | APP-Pending | US      | 15/948907     |              | US-2018-0227852-A1 |   |
| 11709 | DISTRIBUTED ANTENNA SYSTEM AND METHOD FOR ENHANCED POSITIONING                                                                       |        |               | PCT  | PAT-Active  | US      | 13/992917     | 9402233      | US-2013-0336224-A1 |   |

|       | A                                                                                                                      | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                  | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11710 | SYSTEM AND METHOD FOR ADAPTING VIDEO COMMUNICATIONS                                                                    |        |               | PCT  | PAT-Active  | US      | 13/976445     | 9860296      | US-2013-0275615-A1 |   |
| 11711 | REFERENCE SIGNAL GENERATION AND DETERMINING REFERENCE SIGNAL RESOURCE ALLOCATION                                       |        |               | PCT  | PAT-Active  | US      | 13/519312     | ###88888     | US-2015-0138079-A1 |   |
| 11712 | SYSTEM AND METHOD FOR MANAGING MULTIRADIO COMMUNICATIONS IN A SINGLE DEVICE                                            |        |               | PCT  | PAT-Active  | US      | 13/976395     | 9388604      | US-2013-0273857-A1 |   |
| 11713 | USER EQUIPMENT INITIATED DISCONTINUOUS OPERATION IN A WIRELESS COMMUNICATIONS NETWORK                                  |        |               | PCT  | PAT-Active  | US      | 14/127805     | 8713164      | US-2014-0226542-A1 |   |
| 11714 | USER EQUIPMENT INITIATED DISCONTINUOUS OPERATION IN A WIRELESS COMMUNICATIONS NETWORK                                  |        |               | CNT  | PAT-Active  | US      | 15/062572     | 9538547      | US-2016-0192435-A1 |   |
| 11715 | DUAL MODE VOLTAGE REGULATOR WITH DYNAMIC RECONFIGURATION CAPABILITY                                                    |        |               | PCT  | PAT-Active  | US      | 13/994810     | 9343963      | US-2015-0035507-A1 |   |
| 11716 | METHOD AND DEVICE FOR TRANSMITTING A CHANNEL QUALITY INFORMATION                                                       |        |               | NP   | PAT-Active  | US      | 13/213283     | 9077480      | US-2013-0044616-A1 |   |
| 11717 | TRANSMITTER CIRCUIT AND METHOD                                                                                         |        |               | NP   | PAT-Active  | US      | 13/173488     | 8917636      | US-2013-0003570-A1 |   |
| 11718 | RADIO RECEIVER APPARATUS OF A CELLULAR RADIO NETWORK                                                                   |        |               | NP   | PAT-Active  | US      | 13/306081     | 8938243      | US-2013-0137440-A1 |   |
| 11719 | DYNAMIC ACTIVATION OF RECEIVE DIVERSITY                                                                                |        |               | NP   | PAT-Active  | US      | 13/248117     | 8682256      | US-2013-0084808-A1 |   |
| 11720 | COMMUNICATION DEVICES AND FLOW RESTRICTION DEVICES                                                                     |        |               | NP   | PAT-Active  | US      | 13/633228     | 9756527      | US-2013-0094360-A1 |   |
| 11721 | VOLTAGE REGULATOR WITH ADAPTIVE CONTROL                                                                                |        |               | PCT  | PAT-Active  | US      | 13/997712     | 9504214      | US-2014-0321102-A1 |   |
| 11722 | DTC System with High Resolution Phase Alignment                                                                        |        |               | PCT  | PAT-Active  | US      | 13/976677     | 9077375      | US-2014-0002288-A1 |   |
| 11723 | METHOD AND FACILITY TO MEASURE AND COMPENSATE DCD FREQUENCY DISTORTIONS USING A DPLL                                   |        |               | NP   | PAT-Active  | US      | 13/326712     | 8638878      | US-2013-0156129-A1 |   |
| 11724 | Method and Facility to Measure and Compensate DCD Frequency Distortions using a DPLL                                   |        |               | CNT  | PAT-Active  | US      | 14/105846     | 8923461      | US-2014-0112423-A1 |   |
| 11725 | DC/DC CONVERTER METHOD FOR PROVIDING AN OUTPUT VOLTAGE ON THE BASIS OF AN INPUT VOLTAGE AND COMPUTER PROGRAM           |        |               | NP   | PAT-Active  | US      | 13/231482     | 9219411      | US-2013-0063100-A1 |   |
| 11726 | COMMON MODE REJECTION CIRCUIT                                                                                          |        |               | NP   | PAT-Active  | US      | 13/304438     | 8773211      | US-2013-0135057-A1 |   |
| 11727 | METHOD FOR RECEIVING INFORMATION AND COMMUNICATION TERMINAL                                                            |        |               | NP   | PAT-Active  | US      | 13/316708     | 9743343      | US-2013-0150105-A1 |   |
| 11728 | CHANGING THE MACHINE-TO-MACHINE (M2M) GROUP OF AN M2M DEVICE                                                           |        |               | PCT  | PAT-Active  | US      | 13/995173     | 9210532      | US-2014-0256324-A1 |   |
| 11729 | RESOURCE SCHEDULING FOR MACHINE-TO-MACHINE DEVICES                                                                     |        |               | PCT  | PAT-Active  | US      | 13/995174     | 9451386      | US-2014-0010187-A1 |   |
| 11730 | METHODS FOR SWITCHING BETWEEN A MBMS DOWNLOAD AND AN HTTP-BASED DELIVERY OF DASH FORMATTED CONTENT OVER AN IMS NETWORK |        |               | PCT  | PAT-Active  | US      | 13/994118     | 9387852      | US-2015-0288530-A1 |   |
| 11731 | METHODS FOR SWITCHING BETWEEN A MBMS DOWNLOAD AND AN HTTP-BASED DELIVERY OF DASH FORMATTED CONTENT OVER AN IMS NETWORK |        |               | CNT  | PAT-Active  | US      | 14/581747     | 8960926      | US-2015-0131657-A1 |   |
| 11732 | METHODS FOR SWITCHING BETWEEN A MBMS DOWNLOAD AND AN HTTP-BASED DELIVERY OF DASH FORMATTED CONTENT OVER AN IMS NETWORK |        |               | CNT  | APP-Pending | US      | 15/881620     |              | US-2018-0152309-A1 |   |
| 11733 | ASSOCIATION BIASING FOR A HETEROGENEOUS NETWORK (HetNet)                                                               |        |               | PCT  | PAT-Active  | US      | 13/994119     | 9271249      | US-2014-0185523-A1 |   |
| 11734 | MAPPING AN ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL                                                                  |        |               | PCT  | PAT-Active  | US      | 13/994113     | 9642180      | US-2014-0126487-A1 |   |

|       | A                                                                                                      | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                  | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11735 | MAPPING AN ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL                                                  |        |               | CNT  | PAT-Active | US      | 15/582354     | 9936495      | US-2017-0236288-A1 |   |
| 11736 | MAPPING AN ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL                                                  |        |               | CNT  | PAT-Active | US      | 15/908708     | #####        | US-2018-0192407-A1 |   |
| 11737 | TECHNOLOGY FOR CSI FEEDBACK IN A MIMO COMMUNICATION SYSTEM                                             |        |               | PCT  | PAT-Active | US      | 13/994745     | 9319118      | US-2014-0112406-A1 |   |
| 11738 | FORMING CARRIER AGGREGATION TIMING ADVANCE GROUPS IN A HETEROGENEOUS NETWORK                           |        |               | PCT  | PAT-Active | US      | 13/994111     | 9578616      | US-2014-0219185-A1 |   |
| 11739 | FORMING CARRIER AGGREGATION TIMING ADVANCE GROUPS IN A HETEROGENEOUS NETWORK                           |        |               | CNT  | PAT-Active | US      | 15/099628     | 9999018      | US-2016-0227594-A1 |   |
| 11740 | FORMING CARRIER AGGREGATION TIMING ADVANCE GROUPS IN A HETEROGENEOUS NETWORK                           |        |               | CNT  | PAT-Active | US      | 15/613818     | #####        | US-2017-0275045-A1 |   |
| 11741 | METHOD AND SYSTEM FOR COEXISTENCE OF MULTIPLE COLLOCATED RADIOS                                        |        |               | PCT  | PAT-Active | US      | 13/976896     | 9510306      | US-2014-0185484-A1 |   |
| 11742 | NEAR FIELD COMMUNICATIONS (NFC) AND PROXIMITY SENSOR FOR PORTABLE DEVICES                              |        |               | PCT  | PAT-Active | US      | 13/977576     | 9048882      | US-2014-0220887-A1 |   |
| 11743 | NEAR FIELD COMMUNICATIONS (NFC) COIL AND PROXIMITY SENSOR FOR PORTABLE DEVICES                         |        |               | CNT  | PAT-Active | US      | 14/717093     | 9444522      | US-2015-0333802-A1 |   |
| 11744 | NEAR FIELD COMMUNICATIONS (NFC) AND PROXIMITY SENSOR FOR PORTABLE DEVICES                              |        |               | CNT  | PAT-Active | US      | 15/092334     | 9553637      | US-2016-0218773-A1 |   |
| 11745 | DETERMINING AN ORDER OF MODULATION FOR EACH TRANSPORT BLOCK BASED ON INITIAL CHANNEL STATE INFORMATION |        |               | PCT  | PAT-Active | US      | 13/992726     | 9807723      | US-2013-0265972-A1 |   |
| 11746 | TECHNIQUES TO SIMULTANEOUSLY TRANSMIT AND RECEIVE OVER THE SAME RADIOFREQUENCY CARRIER                 |        |               | PCT  | PAT-Active | US      | 13/976423     | 9537543      | US-2014-0376416-A1 |   |
| 11747 | DISCONTINUOUS RECEPTION (DRX) CONTROLLER AND METHOD FOR DRX OPERATION                                  |        |               | CNT  | PAT-Active | US      | 14/321015     | 9560590      | US-2014-0362754-A1 |   |
| 11748 | ACCURATE UPLINK POWER CONTROL FOR COMP AND C-RAN                                                       |        |               | PCT  | PAT-Active | US      | 13/993833     | 9487713      | US-2015-0304860-A1 |   |
| 11749 | METHOD AND APPARATUS FOR M2M DEVICE SUBSCRIPTION                                                       |        |               | PCT  | PAT-Active | US      | 13/977124     | 9491673      | US-2013-0272257-A1 |   |
| 11750 | METHOD AND APPARATUS FOR M2M DEVICE SUBSCRIPTION                                                       |        |               | CNT  | PAT-Active | US      | 15/345429     | 9883321      | US-2017-0118579-A1 |   |
| 11751 | METHOD AND SYSTEM FOR NETWORK ACCESS CONTROL                                                           |        |               | PCT  | PAT-Active | US      | 13/976455     | 9749377      | US-2013-0291075-A1 |   |
| 11752 | WIRELESS COMMUNICATION DEVICE USING TIME-VARIANT ANTENNA MODULE                                        |        |               | PCT  | PAT-Active | US      | 13/996516     | 9350394      | US-2014-0018020-A1 |   |
| 11753 | WIRELESS COMMUNICATION DEVICE USING TIME-VARIANT ANTENNA MODULE                                        |        |               | PCT  | PAT-Active | US      | 15/150104     | 9705536      | US-2016-0254829-A1 |   |
| 11754 | WIRELESS COMMUNICATION DEVICE USING TIME-VARIANT ANTENNA MODULE                                        |        |               | CNT  | PAT-Active | US      | 15/341242     | #####        | US-2017-0085280-A1 |   |
| 11755 | SMALL DATA COMMUNICATIONS IN A WIRELESS COMMUNICATION NETWORK                                          |        |               | PCT  | PAT-Active | US      | 13/880962     | 8867476      | US-2013-0308564-A1 |   |
| 11756 | SMALL DATA COMMUNICATIONS IN A WIRELESS COMMUNICATION NETWORK                                          |        |               | CNT  | PAT-Active | US      | 14/285725     | 8923210      | US-2014-0254490-A1 |   |
| 11757 | REPORTING POWER DISRUPTIONS OF MACHINE-TO-MACHINE DEVICES                                              |        |               | PCT  | PAT-Active | US      | 13/995119     | 9369822      | US-2013-0266000-A1 |   |
| 11758 | ONE METHOD OF DELEGATE-BASED GROUP CHANNEL ACCESS                                                      |        |               | PCT  | PAT-Active | US      | 13/997240     | 9544716      | US-2015-0189452-A1 |   |
| 11759 | SYSTEM AND METHOD OF UPLINK POWER CONTROL IN A WIRELESS COMMUNICATION SYSTEM                           |        |               | PCT  | PAT-Active | US      | 13/976452     | 9363780      | US-2013-0294390-A1 |   |

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| 2     | TITLE                                                                                                                    | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number  |   |
| 11760 | SYSTEM AND METHOD FOR IMPROVING NETWORK ACCESS IN MACHINE TO MACHINE COMMUNICATION                                       |        |               | PCT  | PAT-Active  | US      | 13/977004     | 9525960      | US-2014-0274082-A1  |   |
| 11761 | DECOUPLING ARRANGEMENT                                                                                                   |        |               | NP   | PAT-Active  | US      | 13/331500     | 8913364      | US-2013-0157382-A1  |   |
| 11762 | DECOUPLING ARRANGEMENT                                                                                                   |        |               | ENT  | PAT-Active  | US      | 14/534979     | 9225164      | US-2015-0131190-A1  |   |
| 11763 | DECOUPLING ARRANGEMENT                                                                                                   |        |               | CNT  | PAT-Active  | US      | 14/945762     | #####        | US-2016-0305580-A1  |   |
| 11764 | DECOUPLING ARRANGEMENT                                                                                                   |        |               | CNT  | APP-Pending | US      | 15/675883     |              | US-2018-0270948-A1  |   |
| 11765 | DATABASE COORDINATOR PROCESSOR AND METHOD FOR PROVIDING CERTIFICATION INFORMATION                                        |        |               | NP   | PAT-Active  | US      | 13/294214     | 9674706      | US-2013-0122888-A1  |   |
| 11766 | OPTIMIZATION OF DATA HANDOVER TO WIRELESS WIDE AREA NETWORKS                                                             |        |               | NP   | PAT-Active  | US      | 13/336024     | 8923246      | US-2013-0163450-A1  |   |
| 11767 | DISTORTION ESTIMATION APPARATUS AND METHOD                                                                               |        |               | NP   | PAT-Active  | US      | 13/408553     | 9026391      | US-2013-0226483-A1  |   |
| 11768 | DISTORTION ESTIMATION APPARATUS AND METHOD                                                                               |        |               | CNT  | PAT-Active  | US      | 14/677454     | 8568521      | US-2015-0276834-A1  |   |
| 11769 | SECOND-ORDER FILTER WITH NOTCH FOR USE IN RECEIVERS TO EFFECTIVELY SUPPRESS THE TRANSMITTER BLOCKERS                     |        |               | NP   | PAT-Active  | US      | 13/405673     | 9112476      | US-2013-0225101-A1  |   |
| 11770 | SECOND-ORDER FILTER WITH NOTCH FOR USE IN RECEIVERS TO EFFECTIVELY SUPPRESS THE TRANSMITTER BLOCKERS                     |        |               | ENT  | PAT-Active  | US      | 14/793129     | 9413526      | US-2015-0318836-A1  |   |
| 11771 | TECHNIQUES TO MANAGE GROUP CONTROLLING SIGNALING FOR MACHINE-TO-MACHINE DEVICES                                          |        |               | NP   | PAT-Active  | US      | 13/434495     | 9131480      | US-2013-0254953-A1  |   |
| 11772 | WIRELESS COMMUNICATION SYSTEM WITH COMMON CELL ID                                                                        |        |               | PCT  | PAT-Active  | US      | 13/995175     | 9300509      | US-2013-0266997-A1  |   |
| 11773 | RANDOM BACKOFF FOR EXTENDED ACCESS BARRING                                                                               |        |               | NP   | PAT-Active  | US      | 13/538865     | 9078257      | US-2013-0170479-A1  |   |
| 11774 | PATCH-BASED PROXIMITY SENSORS ANTENNAS AND CONTROL SYSTEMS TO CONTROL ANTENNAS BASED ON CORRESPONDING PROXIMITY MEASURES |        |               | NP   | PAT-Active  | US      | 13/538892     | 9705182      | US-2014-03002305-A1 |   |
| 11775 | TRANSMITTERS AND METHODS                                                                                                 |        |               | NP   | PAT-Active  | US      | 13/835693     | 8891681      | US-2013-0231168-A1  |   |
| 11776 | GEOGRAPHICALLY ISOLATED ANTENNAS                                                                                         |        |               | CNT  | PAT-Active  | US      | 14/806974     | 9854524      | US-2016-0304843-A1  |   |
| 11777 | IMPROVING CARRIER AGGREGATION PERFORMANCE                                                                                |        |               | PCT  | PAT-Active  | US      | 13/997219     | #####        | US-2015-0223265-A1  |   |
| 11778 | UPLINK POWER CONTROL SIGNALING WITH CARRIER AGGREGATION                                                                  |        |               | PCT  | PAT-Active  | US      | 13/997221     | 9635610      | US-2015-0331039-A1  |   |
| 11779 | TECHNIQUES FOR UPLINK POWER CONTROL                                                                                      |        |               | PCT  | PAT-Active  | US      | 13/977008     | 9370018      | US-2013-0272173-A1  |   |
| 11780 | METHODS TO TRANSPORT INTERNET TRAFFIC OVER MULTIPLE WIRELESS NETWORKS SIMULTANEOUSLY                                     |        |               | PCT  | PAT-Active  | US      | 13/995154     | 9402264      | US-2013-0268628-A1  |   |
| 11781 | MAPPING AN ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL                                                                    |        |               | PCT  | PAT-Active  | US      | 13/977523     | 9351311      | US-2014-0356279-A1  |   |
| 11782 | MAPPING AN ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL                                                                    |        |               | CNT  | PAT-Active  | US      | 15/130875     | #####        | US-2016-0234815-A1  |   |
| 11783 | INTER-NODE INTERFERENCE CANCELLATION                                                                                     |        |               | PCT  | PAT-Active  | US      | 13/997230     | 9689731      | US-2014-0318090-A1  |   |
| 11784 | RESCHEDULING OF A RESOURCE COMPONENT OF LOW POWER NODES (LPNs) IN A COORDINATION SET                                     |        |               | PCT  | PAT-Active  | US      | 13/997256     | 9893304      | US-2014-0226575-A1  |   |

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| 2     | TITLE                                                                        | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11785 | DISCONTINUOUS RECEPTION IN A WIRELESS DEVICE FOR IN-DEVICE COEXISTENCE       |        |               | PCT  | PAT-Active  | US      | 13/997223     | 9992742      | US-2015-0971179-A1 |   |
| 11786 | CHANNEL STATE INFORMATION FEEDBACK IN COORDINATED MULTI-POINT SYSTEM         |        |               | NP   | PAT-Active  | US      | 13/655184     | 8737514      | US-2013-0114658-A1 |   |
| 11787 | TRANSMISSION POINT INDICATION IN COORDINATED MULTI-POINT SYSTEM              |        |               | PCT  | PAT-Active  | US      | 13/997588     | 9320035      | US-2014-0003324-A1 |   |
| 11788 | TRANSMISSION POINT INDICATION IN COORDINATED MULTI-POINT SYSTEM              |        |               | CNT  | PAT-Active  | US      | 15/061833     | 8735938      | US-2016-0192415-A1 |   |
| 11789 | TRANSMISSION POINT INDICATION IN COORDINATED MULTI-POINT SYSTEM              |        |               | CNT  | PAT-Active  | US      | 15/645888     | #####        | US-2017-0310524-A1 |   |
| 11790 | DOWNLINK RESOURCE SCHEDULING                                                 |        |               | PCT  | PAT-Active  | US      | 13/995468     | 9497742      | US-2013-0279462-A1 |   |
| 11791 | DOWNLINK RESOURCE SCHEDULING                                                 |        |               | CNT  | PAT-Active  | US      | 15/277856     | #####        | US-2017-0086173-A1 |   |
| 11792 | SELECTION OF ACKNOWLEDGMENT TIMING IN WIRELESS COMMUNICATIONS                |        |               | PCT  | PAT-Active  | US      | 13/997973     | 9220085      | US-2014-0010128-A1 |   |
| 11793 | SELECTION OF ACKNOWLEDGMENT TIMING IN WIRELESS COMMUNICATIONS                |        |               | CNT  | PAT-Active  | US      | 14/247189     | 8247527      | US-2014-0215143-A1 |   |
| 11794 | SELECTION OF ACKNOWLEDGMENT TIMING IN WIRELESS COMMUNICATIONS                |        |               | CNT  | PAT-Active  | US      | 14/970035     | 9614709      | US-2016-0183210-A1 |   |
| 11795 | SELECTION OF ACKNOWLEDGMENT TIMING IN WIRELESS COMMUNICATIONS                |        |               | CNT  | PAT-Active  | US      | 15/385361     | 9762575      | US-2017-0104575-A1 |   |
| 11796 | SELECTION OF ACKNOWLEDGMENT TIMING IN WIRELESS COMMUNICATIONS                |        |               | CNT  | PAT-Active  | US      | 15/646985     | 9893872      | US-2017-0310454-A1 |   |
| 11797 | SELECTION OF ACKNOWLEDGMENT TIMING IN WIRELESS COMMUNICATIONS                |        |               | CNT  | PAT-Active  | US      | 15/851345     | #####        | US-2018-0167190-A1 |   |
| 11798 | LINK ADAPTATION IN COORDINATED MULTIPPOINT SYSTEM                            |        |               | PCT  | PAT-Active  | US      | 13/976370     | 9388559      | US-2013-0336269-A1 |   |
| 11799 | DYNAMIC POINT SELECTION VIA A COORDINATING SET OF BASE STATIONS              |        |               | NP   | PAT-Active  | US      | 13/538070     | 9008018      | US-2013-0114524-A1 |   |
| 11800 | DYNAMIC POINT SELECTION VIA A COORDINATING SET OF BASE STATIONS              |        |               | CNT  | PAT-Active  | US      | 14/642215     | 9432093      | US-2015-0100555-A1 |   |
| 11801 | COORDINATION OF SELF-OPTIMIZATION OPERATIONS IN A SELF ORGANIZING NETWORK    |        |               | PCT  | PAT-Active  | US      | 13/976374     | #####        | US-2013-0279368-A1 |   |
| 11802 | INDIVIDUAL AND GROUP PAGING IN A WIRELESS NETWORK                            |        |               | PCT  | PAT-Active  | US      | 13/997253     | 9825797      | US-2015-0098179-A1 |   |
| 11803 | SMALL DATA TECHNIQUES AND CONFIGURATIONS IN A WIRELESS COMMUNICATION NETWORK |        |               | PCT  | PAT-Active  | US      | 13/996320     | 9755882      | US-2013-0279372-A1 |   |
| 11804 | SMALL DATA TECHNIQUES AND CONFIGURATIONS IN A WIRELESS COMMUNICATION NETWORK |        |               | CNT  | APP-Pending | US      | 15/659462     |              | US-2017-0338935-A1 |   |
| 11805 | TECHNIQUES FOR TRAFFIC DELIVERY TO A GROUP OF DEVICES                        |        |               | PCT  | PAT-Active  | US      | 13/976386     | 9232498      | US-2013-0272186-A1 |   |
| 11806 | HYBRID CODEBOOK DESIGN FOR WIRELESS SYSTEMS                                  |        |               | NP   | PAT-Active  | US      | 13/529280     | 9088872      | US-2013-0156075-A1 |   |
| 11807 | OPERATOR-ASSISTED DEVICE-TO-DEVICE (D2D) DISCOVERY                           |        |               | PCT  | PAT-Active  | US      | 13/997736     | 9594262      | US-2014-0219251-A1 |   |
| 11808 | OPERATOR-ASSISTED DEVICE-TO-DEVICE (D2D) DISCOVERY                           |        |               | CNT  | PAT-Active  | US      | 15/413320     | 9955325      | US-2017-0134626-A1 |   |
| 11809 | OPERATOR-ASSISTED DEVICE-TO-DEVICE (D2D) DISCOVERY                           |        |               | CNT  | PAT-Active  | US      | 15/944968     | #####        | US-2018-0227741-A1 |   |

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| 2     | TITLE                                                                                                                                                                 | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11810 | OPERATOR-ASSISTED DEVICE-TO-DEVICE (D2D) DISCOVERY                                                                                                                    |        |               | ENT  | APP-Pending | US      | 15/409677     |              |                    |   |
| 11811 | TECHNIQUES FOR COORDINATED UPLINK POWER CONTROL                                                                                                                       |        |               | NP   | PAT-Active  | US      | 13/532841     | 9301219      | US-2013-0188501-A1 |   |
| 11812 | TECHNIQUES FOR COORDINATED UPLINK POWER CONTROL                                                                                                                       |        |               | ENT  | PAT-Active  | US      | 15/083016     | 9998999      | US-2017-0055228-A1 |   |
| 11813 | METHOD FOR CONTROLLING RECEIVING DIVERSITY OF A RECEIVER AND A MOBILE STATION                                                                                         |        |               | PCT  | PAT-Active  | US      | 13/976784     | 9077418      | US-2014-0016685-A1 |   |
| 11814 | SAMPLING RECEIVER WITH INHERENT MIXER FUNCTIONALITY                                                                                                                   |        |               | NP   | PAT-Active  | US      | 13/443394     | 8848847      | US-2013-0265191-A1 |   |
| 11815 | DIGITAL EVENT GENERATOR, COMPARATOR SWITCHED MODE ENERGY CONVERTER AND METHOD                                                                                         |        |               | NP   | PAT-Active  | US      | 13/473213     | 9190906      | US-2013-0307509-A1 |   |
| 11816 | COMMUNICATION DEVICES AND METHODS FOR SELECTING A RADIO ACCESS MODE                                                                                                   |        |               | NP   | PAT-Active  | US      | 13/463854     | 8855709      | US-2013-0295986-A1 |   |
| 11817 | COMMUNICATION DEVICES AND METHODS FOR OPERATING A COMMUNICATION DEVICE                                                                                                |        |               | NP   | PAT-Active  | US      | 13/455205     | 8929934      | US-2013-0288727-A1 |   |
| 11818 | DYNAMIC UPLINK AND DOWNLINK CONFIGURATION USING FLEXIBLE SUBFRAMES                                                                                                    |        |               | NP   | PAT-Active  | US      | 13/608369     | 9544823      | US-2013-0188516-A1 |   |
| 11819 | DYNAMIC UPLINK AND DOWNLINK CONFIGURATION USING FLEXIBLE SUBFRAMES                                                                                                    |        |               | ENT  | PAT-Active  | US      | 15/400106     | 9877317      | US-2017-0223671-A1 |   |
| 11820 | INTER-RAT (RADIO ACCESS TECHNOLOGY) ENERGY SAVING MANAGEMENT                                                                                                          |        |               | PCT  | PAT-Active  | US      | 13/991544     | 9263989      | US-2014-0187234-A1 |   |
| 11821 | METHOD FOR OPERATING A TRANSCEIVER CIRCUIT AND TRANSCEIVER CIRCUIT                                                                                                    |        |               | NP   | PAT-Active  | US      | 13/597480     | 9071339      | US-2014-0064067-A1 |   |
| 11822 | METHODS AND APPARATUS FOR RATE ADAPTATION OF QUALITY OF SERVICE BASED APPLICATION                                                                                     |        |               | NP   | PAT-Active  | US      | 13/568165     | 8914537      | US-2014-0343975-A1 |   |
| 11823 | MOBILE COMMUNICATION APPARATUS METHOD FOR PERFORMING SIGNAL RECEPTION QUALITY MEASUREMENTS AND METHOD FOR ASCERTAINING A MOVEMENT BY A MOBILE COMMUNICATION APPARATUS |        |               | NP   | PAT-Active  | US      | 13/910159     | 9473951      | US-2013-0337848-A1 |   |
| 11824 | CIRCUIT AND METHOD                                                                                                                                                    |        |               | PCT  | PAT-Active  | US      | 13/976649     | 9041576      | US-2014-0302287-A1 |   |
| 11825 | CIRCUIT AND METHOD                                                                                                                                                    |        |               | ENT  | PAT-Active  | US      | 14/720155     | 9692443      | US-2016-0380645-A1 |   |
| 11826 | AGILE AND ADAPTIVE TRANSMITTER-RECEIVER ISOLATION                                                                                                                     |        |               | NP   | PAT-Active  | US      | 13/423513     | 8874047      | US-2013-0244583-A1 |   |
| 11827 | AGILE AND ADAPTIVE WIDEBAND MIMO ANTENNA ISOLATION                                                                                                                    |        |               | EXP  | PAT-Active  | US      | 13/598683     | 8805300      | US-2013-0244594-A1 |   |
| 11828 | CARE-OF-ADDRESS HANDOVER                                                                                                                                              |        |               | NP   | PAT-Active  | US      | 13/758240     | 9271393      | US-2013-0273404-A1 |   |
| 11829 | ENHANCED POWER MANAGEMENT IN COMMUNICATION DEVICE                                                                                                                     |        |               | NP   | PAT-Active  | US      | 13/758213     | 9294996      | US-2013-0225215-A1 |   |
| 11830 | COOPERATIVE RADIO ACCESS NETWORK WITH CENTRALIZED BASE STATION BASEBAND UNIT (BBU) PROCESSING POOL                                                                    |        |               | PCT  | PAT-Active  | US      | 13/998255     | 9301198      | US-2014-0269322-A1 |   |
| 11831 | METHOD FOR PROVIDING A COMMUNICATION SESSION AND DEVICE                                                                                                               |        |               | ENT  | APP-Pending | US      | 15/970941     |              | US-2018-0253141-A1 |   |
| 11832 | REMOTE MANAGEMENT AND CONTROL OF VEHICULAR FUNCTIONS VIA MULTIPLE NETWORKS                                                                                            |        |               | NP   | PAT-Active  | US      | 13/539352     | 9031712      | US-2014-0005859-A1 |   |
| 11833 | DEVICE SYSTEM AND METHOD OF CONTROLLING ACCESS TO LOCATION SOURCES                                                                                                    |        |               | NP   | PAT-Active  | US      | 13/533006     | 9073884      | US-2013-0238857-A1 |   |
| 11834 | DISTRIBUTION OF AN ELECTRONIC REFERENCE CLOCK SIGNAL THAT INCLUDES DELAY AND VALIDITY INFORMATION                                                                     |        |               | NP   | PAT-Active  | US      | 13/632230     | 9365225      | US-2014-0294218-A1 |   |

|       | A                                                                                                                                              | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                          | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11835 | CIRCUIT FOR SIGNAL PROCESSING AND METHOD PERFORMED BY SUCH CIRCUIT                                                                             |        |               | NP   | PAT-Active  | US      | 13/597404     | 8848775      | US-2014-0964335-A1 |   |
| 11836 | Receiver Receiver Circuits and Methods for Providing an Interference-Reduced Signal                                                            |        |               | NP   | PAT-Active  | US      | 13/707338     | 8693971      |                    |   |
| 11837 | INTERFERENCE AND NOISE ESTIMATION OF A COMMUNICATIONS CHANNEL                                                                                  |        |               | NP   | PAT-Active  | US      | 13/596305     | 9298345      | US-2014-0064106-A1 |   |
| 11838 | MULTICAST/BROADCAST SERVICE CONTINUITY IN MULTI-CARRIER NETWORKS                                                                               |        |               | NP   | PAT-Active  | US      | 13/531848     | 9144085      | US-2013-0083715-A1 |   |
| 11839 | MULTICAST/BROADCAST SERVICE CONTINUITY IN MULTI-CARRIER NETWORKS                                                                               |        |               | CNT  | PAT-Active  | US      | 14/489327     | 9894608      | US-2015-0035581-A1 |   |
| 11840 | MULTICAST/BROADCAST SERVICE CONTINUITY IN MULTI-CARRIER NETWORKS                                                                               |        |               | CNT  | APP-Pending | US      | 15/861538     |              | US-2018-0132179-A1 |   |
| 11841 | PHYSICAL-LAYER CELL IDENTITY (PCI) PARTITION FOR HETEROGENEOUS NETWORKS                                                                        |        |               | NP   | PAT-Active  | US      | 13/538775     | 9456415      | US-2013-0083744-A1 |   |
| 11842 | TIMING SYNCHRONIZATION FOR DOWNLINK (DL) TRANSMISSIONS IN COORDINATED MULTIPOINT (CoMP) SYSTEMS                                                |        |               | PCT  | PAT-Active  | US      | 13/997232     | 9351277      | US-2014-0085221-A1 |   |
| 11843 | TIMING SYNCHRONIZATION FOR DOWNLINK (DL) TRANSMISSIONS IN COORDINATED MULTIPOINT (CoMP) SYSTEMS                                                |        |               | CNT  | PAT-Active  | US      | 15/140389     | #####        | US-2016-0254938-A1 |   |
| 11844 | TIMING SYNCHRONIZATION FOR DOWNLINK (DL) TRANSMISSIONS IN COORDINATED MULTIPOINT (CoMP) SYSTEMS                                                |        |               | CNT  | APP-Pending | US      | 16/035468     |              | US-2018-0343157-A1 |   |
| 11845 | PATH-LOSS ESTIMATION FOR UPLINK POWER CONTROL IN A CARRIER AGGREGATION ENVIRONMENT                                                             |        |               | NP   | PAT-Active  | US      | 13/537967     | 9642134      | US-2013-0142113-A1 |   |
| 11846 | NARROW BANDWIDTH DEVICE IN A BROADBAND NETWORK                                                                                                 |        |               | NP   | PAT-Active  | US      | 13/538762     | 9596069      | US-2013-0114587-A1 |   |
| 11847 | USER EQUIPMENT (UE)-SPECIFIC ASSIGNMENT OF DEMODULATION REFERENCE SIGNAL (DMRS) SEQUENCES TO SUPPORT UPLINK (UL) COORDINATED MULTIPOINT (CoMP) |        |               | NP   | PAT-Active  | US      | 13/537879     | 8811344      | US-2013-0118523-A1 |   |
| 11848 | TRUSTED WLAN CONNECTIVITY TO 3GPP EVOLVED PACKET CORE                                                                                          |        |               | PCT  | PAT-Active  | US      | 13/992029     | 9526027      | US-2014-0101726-A1 |   |
| 11849 | TRUSTED WLAN CONNECTIVITY TO 3GPP EVOLVED PACKET CORE                                                                                          |        |               | CNT  | PAT-Active  | US      | 15/350388     | 9948105      | US-2017-0289587-A1 |   |
| 11850 | TRUSTED WLAN CONNECTIVITY TO 3GPP EVOLVED PACKET CORE                                                                                          |        |               | CNT  | APP-Pending | US      | 15/910044     |              | US-2018-0292943-A1 |   |
| 11851 | AUTOMATIC UPLINK-DOWNLINK RATIO RECONFIGURATION SETTING IN WIRELESS COMMUNICATION SYSTEM                                                       |        |               | NP   | PAT-Active  | US      | 13/526767     | 8942122      | US-2013-0186500-A1 |   |
| 11852 | TECHNIQUES FOR MITIGATING INTERFERENCE ASSOCIATED WITH DOWNLINK TRANSMISSIONS FROM A BASE STATION                                              |        |               | NP   | PAT-Active  | US      | 13/531717     | 8862176      | US-2013-0115999-A1 |   |
| 11853 | TIME-VARIANT ANTENNA ENABLED BY SWITCHED CAPACITOR ARRAY ON SILICON                                                                            |        |               | NP   | PAT-Active  | US      | 13/534377     | 8824982      | US-2014-0004804-A1 |   |
| 11854 | SOUNDING REFERENCE SIGNAL ENHANCEMENT TO SUPPORT UPLINK COORDINATED MULTIPOINT                                                                 |        |               | NP   | PAT-Active  | US      | 13/595540     | 9635664      | US-2013-0195028-A1 |   |
| 11855 | IP MULTIMEDIA SUBSYSTEM AND METHOD FOR MBMS FILE REPAIR USING HTTP SERVERS                                                                     |        |               | NP   | PAT-Active  | US      | 13/613902     | 9213605      | US-2013-0246846-A1 |   |
| 11856 | IP MULTIMEDIA SUBSYSTEM AND METHOD FOR MBMS FILE REPAIR USING HTTP SERVERS                                                                     |        |               | CNT  | PAT-Active  | US      | 14/859451     | 9888045      | US-2016-0036866-A1 |   |
| 11857 | IP MULTIMEDIA SUBSYSTEM AND METHOD FOR MBMS FILE REPAIR USING HTTP SERVERS                                                                     |        |               | CNT  | APP-Pending | US      | 15/888593     |              | US-2018-0227334-A1 |   |
| 11858 | TECHNIQUES FOR IMPROVED MULTICAST CONTENT DELIVERY                                                                                             |        |               | CNT  | PAT-Active  | US      | 14/605742     | 9565672      | US-2015-0134787-A1 |   |
| 11859 | PACKET STREAMING SERVICE CAPABILITY EXCHANGE FOR ENHANCED PERIPHERAL DEVICE SUPPORT                                                            |        |               | NP   | PAT-Active  | US      | 13/598301     | 8963453      | US-2013-0190048-A1 |   |



|       | A                                                                                                               | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                           | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11860 | IDENTIFIERS FOR MTC GROUP IN 3GPP SYSTEMS                                                                       |        |               | NP   | PAT-Active | US      | 13/58090      | 8942627      | US-2013-0196704-A1 |   |
| 11861 | COORDINATED MULTIPPOINT CONFIGURATION BASED ON CHANNEL STATE INFORMATION REFERENCE SIGNALS                      |        |               | NP   | PAT-Active | US      | 13/534313     | 8843100      | US-2013-0196699-A1 |   |
| 11862 | INTERFERENCE MANAGEMENT FOR DYNAMIC UPLINK AND DOWNLINK CONFIGURATION                                           |        |               | NP   | PAT-Active | US      | 13/612318     | 9197683      | US-2013-0194982-A1 |   |
| 11863 | INTERFERENCE MANAGEMENT FOR DYNAMIC UPLINK AND DOWNLINK CONFIGURATION                                           |        |               | CNT  | PAT-Active | US      | 14/926418     | 9775149      | US-2016-0157216-A1 |   |
| 11864 | SIGNALING FOR CONFIGURATION OF DOWNLINK COORDINATED MULTIPPOINT COMMUNICATIONS                                  |        |               | PCT  | PAT-Active | US      | 13/996150     | 9385791      | US-2013-0343317-A1 |   |
| 11865 | UPLINK COORDINATED MULTI-POINT                                                                                  |        |               | NP   | PAT-Active | US      | 13/536722     | 8917618      | US-2013-0195025-A1 |   |
| 11866 | UPLINK COORDINATED MULTI-POINT                                                                                  |        |               | CNT  | PAT-Active | US      | 14/543758     | 9154279      | US-2015-0371235-A1 |   |
| 11867 | UPLINK COORDINATED MULTI-POINT                                                                                  |        |               | CNT  | PAT-Active | US      | 14/812927     | 9591638      | US-2015-0341149-A1 |   |
| 11868 | UPLINK COORDINATED MULTI-POINT                                                                                  |        |               | CNT  | PAT-Active | US      | 15/408123     | #####        | US-2017-0126375-A1 |   |
| 11869 | HANDLING WAIT TIME IN A CONGESTED WIRELESS COMMUNICATION NETWORK                                                |        |               | NP   | PAT-Active | US      | 13/526302     | 9055477      | US-2013-0201823-A1 |   |
| 11870 | HANDLING WAIT TIME IN A CONGESTED WIRELESS COMMUNICATION NETWORK                                                |        |               | CNT  | PAT-Active | US      | 13/917324     | 9125103      | US-2013-0272124-A1 |   |
| 11871 | HANDLING USER PLANE CONGESTION IN A WIRELESS COMMUNICATION NETWORK                                              |        |               | NP   | PAT-Active | US      | 13/563508     | 9071999      | US-2013-0201824-A1 |   |
| 11872 | HANDLING USER PLANE CONGESTION IN A WIRELESS COMMUNICATION NETWORK                                              |        |               | CNT  | PAT-Active | US      | 14/754173     | 9736074      | US-2015-0321497-A1 |   |
| 11873 | LTE ENHANCEMENTS FOR SMALL PACKET TRANSMISSIONS                                                                 |        |               | NP   | PAT-Active | US      | 13/528985     | 9241327      | US-2013-0188566-A1 |   |
| 11874 | TIME AND FREQUENCY SYNCHRONIZATION FOR LTE-ADVANCED NEW CARRIER TYPE                                            |        |               | NP   | PAT-Active | US      | 13/537271     | 9355979      | US-2013-0195070-A1 |   |
| 11875 | METHOD AND APPARATUS FOR HOST-CONTROLLED PACKET DATA SUPPRESSION                                                |        |               | NP   | PAT-Active | US      | 13/465076     | #####        | US-2013-0294238-A1 |   |
| 11876 | CIRCUIT ARRANGEMENT AND METHOD FOR LOW POWER MODE MANAGEMENT WITH DELAYABLE REQUEST                             |        |               | NP   | PAT-Active | US      | 13/602394     | 9021267      | US-2014-0068303-A1 |   |
| 11877 | RADIO COMMUNICATION DEVICES AND METHODS FOR CONTROLLING A RADIO COMMUNICATION DEVICE                            |        |               | CIP  | PAT-Active | US      | 13/564915     | 9319177      | US-2013-0329720-A1 |   |
| 11878 | METHODS AND DEVICES FOR CONTROLLING RECEIVE CONFIGURATIONS IN WIRELESS COMMUNICATIONS                           |        |               | CNT  | PAT-Active | US      | 15/067260     | #####        | US-2017-0305692-A1 |   |
| 11879 | DEVICE FOR PROVIDING A DIFFERENTIAL OUTPUT SIGNAL AND METHOD FOR PROVIDING A DIFFERENTIAL OUTPUT SIGNAL         |        |               | NP   | PAT-Active | US      | 13/837986     | 9246727      | US-2013-0251052-A1 |   |
| 11880 | COMMUNICATION NETWORK DEVICES BASE STATION AND WIRELESS COMMUNICATION DEVICE                                    |        |               | NP   | PAT-Active | US      | 13/472564     | 9078124      | US-2013-0310996-A1 |   |
| 11881 | COMMUNICATION NETWORK DEVICE COMMUNICATION RESOURCE ALLOCATION AND METHOD FOR COMMUNICATION RESOURCE ALLOCATION |        |               | NP   | PAT-Active | US      | 13/484350     | 9071976      | US-2013-0324174-A1 |   |
| 11882 | RADIO COMMUNICATION DEVICES AND METHODS FOR CONTROLLING A RADIO COMMUNICATION DEVICE                            |        |               | NP   | PAT-Active | US      | 13/707688     | 9084123      | US-2014-0162567-A1 |   |
| 11883 | METHOD AND APPARATUS FOR ITERATIVELY CALCULATING A VALUE                                                        |        |               | NP   | PAT-Active | US      | 13/709450     | 9354844      | US-2014-0164461-A1 |   |

|       | A                                                                                                     | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                 | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11884 | DIFFERENTIAL DELAY LINE RING OSCILLATOR AND MOBILE COMMUNICATION DEVICE                               |        |               | NP   | PAT-Active  | US      | 13/631176     | 8797079      | US-2014-0981847-A1 |   |
| 11885 | ANTENNA SYSTEM METHOD AND MOBILE COMMUNICATION DEVICE                                                 |        |               | NP   | PAT-Active  | US      | 13/570327     | 8884835      | US-2014-0943201-A1 |   |
| 11886 | Push-Pull Amplifier and Differential Push-Pull Amplifier                                              |        |               | NP   | PAT-Active  | US      | 13/617386     | 8947685      | US-2014-0077873-A1 |   |
| 11887 | RADIO COMMUNICATION DEVICES AND METHODS FOR CONTROLLING A RADIO COMMUNICATION DEVICE                  |        |               | NP   | PAT-Active  | US      | 13/776804     | 9158771      | US-2014-0342987-A1 |   |
| 11888 | DETERMINATION OF A NOISE AND INTERFERENCE COVARIANCE MEASURE                                          |        |               | NP   | PAT-Active  | US      | 13/707738     | 9276729      | US-2014-0160949-A1 |   |
| 11889 | METHOD AND DEVICE FOR CONTROLLING A TRANSMIT POWER IN A USER EQUIPMENT                                |        |               | NP   | PAT-Active  | US      | 13/658004     | 9338751      | US-2014-0113675-A1 |   |
| 11890 | DEVICE SYSTEM AND METHOD OF COMMUNICATING VIA A DUAL DIRECTIONAL ANTENNA                              |        |               | NP   | PAT-Active  | US      | 13/528897     | 9058502      | US-2013-0344907-A1 |   |
| 11891 | DEVICE SYSTEM AND METHOD OF COMMUNICATING VIA A DUAL DIRECTIONAL ANTENNA                              |        |               | CNT  | PAT-Active  | US      | 14/718367     | 9225034      | US-2015-0255852-A1 |   |
| 11892 | METHODS AND SYSTEMS TO MITIGATE IMPULSE INTERFERENCE                                                  |        |               | NP   | PAT-Active  | US      | 13/661837     | 8925871      | US-2014-0115820-A1 |   |
| 11893 | AUTOMATIC FREQUENCY CONTROL                                                                           |        |               | PCT  | PAT-Active  | US      | 14/233352     | 9680485      | US-2016-0142064-A1 |   |
| 11894 | SYSTEMS AND METHODS FOR PROCESSING ENCODED DATA STREAMS                                               |        |               | NP   | PAT-Active  | US      | 13/488887     | 9432489      | US-2013-0326080-A1 |   |
| 11895 | PLUG-AND-PLAY TIME-VARIANT ANTENNA MODULE FOR WIRELESS COMMUNICATION DEVICES                          |        |               | CNT  | PAT-Active  | US      | 14/629244     | 9444511      | US-2015-0172915-A1 |   |
| 11896 | TIME-VARIANT ANTENNA MODULE FOR WIRELESS COMMUNICATION DEVICES                                        |        |               | CNT  | PAT-Active  | US      | 15/236050     | 9947994      | US-2017-0040874-A1 |   |
| 11897 | TIME-VARIANT ANTENNA MODULE FOR WIRELESS COMMUNICATION DEVICES                                        |        |               | CNT  | APP-Pending | US      | 15/912937     |              | US-2018-0261808-A1 |   |
| 11898 | PASSIVE RADIO LINK CONTROL ENTITY WITH UNIFIED INTERFACE                                              |        |               | PCT  | PAT-Active  | US      | 13/985708     | 9247452      | US-2014-0386267-A1 |   |
| 11899 | METHOD AND APPARATUS FOR MODIFYING A COMPLEX-VALUED SIGNAL AND MOBILE COMMUNICATION DEVICE            |        |               | NP   | PAT-Active  | US      | 13/763760     | 8923434      | US-2014-0226756-A1 |   |
| 11900 | SIGNAL DELAY ESTIMATOR WITH ABSOLUTE DELAY AMOUNT AND DIRECTION ESTIMATION                            |        |               | NP   | PAT-Active  | US      | 13/727908     | 8781049      | US-2014-0185723-A1 |   |
| 11901 | SIGNAL DELAY ESTIMATOR WITH ABSOLUTE DELAY AMOUNT AND DIRECTION ESTIMATION                            |        |               | CNT  | PAT-Active  | US      | 14/312074     | 9106402      | US-2014-0303514-A1 |   |
| 11902 | COMMUNICATION STATE TRANSITIONING CONTROL                                                             |        |               | NP   | PAT-Active  | US      | 13/528492     | 9007972      | US-2013-0003577-A1 |   |
| 11903 | COMMUNICATION STATE TRANSITIONING CONTROL                                                             |        |               | CNT  | APP-Pending | US      | 14/231487     |              | US-2014-0211679-A1 |   |
| 11904 | NETWORK VETTING OF WIRELESS MOBILE DEVICE INITIATED DISCONNECT                                        |        |               | NP   | PAT-Active  | US      | 13/592621     | 9210950      | US-2013-0293120-A1 |   |
| 11905 | USER EQUIPMENT AND METHOD FOR APPLICATION AGNOSTIC DISCONTINUOUS RECEPTION (DRX) TRIGGERING           |        |               | PCT  | PAT-Active  | US      | 13/993023     | 9549243      | US-2014-0105087-A1 |   |
| 11906 | SUPPORT FOR ASYNCHRONOUS TIME DIVISION DUPLEXING IN ADJACENT CELLS OF A WIRELESS COMMUNICATION SYSTEM |        |               | PCT  | PAT-Active  | US      | 13/994744     | 9820250      | US-2014-0003270-A1 |   |
| 11907 | SCHEDULING REQUESTS FOR WIRELESS COMMUNICATION DEVICES RUNNING BACKGROUND APPLICATIONS                |        |               | NP   | PAT-Active  | US      | 13/568508     | 9439208      | US-2013-0115890-A1 |   |
| 11908 | TECHNIQUES AND CONFIGURATIONS FOR TRIGGERING A PLURALITY OF WIRELESS DEVICES                          |        |               | NP   | PAT-Active  | US      | 13/610772     | 9241351      | US-2013-0115993-A1 |   |

|       | A                                                                                                     | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                 | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11908 | MOBILE PROXY FOR CLOUD RADIO ACCESS NETWORK                                                           |        |               | NP   | PAT-Active  | US      | 13/587759     | 8817733      | US-2014-0956103-A1 |   |
| 11910 | EXTENDED ACCESS BARRING (EAB) SIGNALING FOR A CORE NETWORK (CN) AND NODE                              |        |               | NP   | PAT-Active  | US      | 13/591552     | 9948166      | US-2013-0215742-A1 |   |
| 11911 | OPPORTUNISTIC DEVICE-TO-DEVICE COMMUNICATION                                                          |        |               | NP   | PAT-Active  | US      | 13/563583     | 8902855      | US-2013-0034082-A1 |   |
| 11912 | OPPORTUNISTIC DEVICE-TO-DEVICE COMMUNICATION                                                          |        |               | CNT  | PAT-Active  | US      | 14/335338     | 9351209      | US-2014-0328287-A1 |   |
| 11913 | USER EQUIPMENT AND METHOD FOR ADAPTIVE SELECTION OF HANDOVER PARAMETERS IN WIRELESS-ACCESS NETWORKS   |        |               | NP   | PAT-Active  | US      | 13/569443     | 8818376      | US-2013-0196664-A1 |   |
| 11914 | TECHNIQUES FOR IMPROVED ENERGY-SAVINGS MANAGEMENT                                                     |        |               | NP   | PAT-Active  | US      | 13/627288     | ###8888      | US-2013-0258923-A1 |   |
| 11915 | USER EQUIPMENT AND METHOD FOR DISCONTINUOUS RECEPTION (DRX) MODE IN WIRELESS COMMUNICATION NETWORKS   |        |               | NP   | PAT-Active  | US      | 13/626408     | 9225759      | US-2013-0194981-A1 |   |
| 11916 | HARQ/ACK CODEBOOK SIZE DETERMINATION                                                                  |        |               | NP   | PAT-Active  | US      | 13/593044     | 8885526      | US-2013-0242816-A1 |   |
| 11917 | HARQ/ACK CODEBOOK SIZE DETERMINATION                                                                  |        |               | CNT  | PAT-Active  | US      | 14/314296     | 8258805      | US-2014-0307596-A1 |   |
| 11918 | ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL (ePDCCH) INTER-CELL INTERFERENCE COORDINATION (ICIC)       |        |               | NP   | PAT-Active  | US      | 13/591573     | 9398572      | US-2013-0242885-A1 |   |
| 11919 | ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL (ePDCCH) WITH PHYSICAL RESOURCE BLOCK (PRB) BUNDLING       |        |               | NP   | PAT-Active  | US      | 13/591865     | 9655086      | US-2013-0242886-A1 |   |
| 11920 | Enhanced physical downlink control channel (ePDCCH)                                                   |        |               | NP   | PAT-Active  | US      | 13/598320     | 9226278      | US-2013-0242770-A1 |   |
| 11921 | DOWNLINK CONTROL INFORMATION (DCI) VALIDATION FOR ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL (ePDCCH) |        |               | CIP  | PAT-Active  | US      | 13/646223     | 9544876      | US-2013-0242947-A1 |   |
| 11922 | SUPPORT FOR ASYNCHRONOUS ADAPTATION TO UPLINK AND DOWNLINK TRAFFIC DEMANDS FOR WIRELESS COMMUNICATION |        |               | NP   | PAT-Active  | US      | 13/592588     | 9288797      | US-2013-0242812-A1 |   |
| 11923 | SUPPORT FOR ASYNCHRONOUS ADAPTATION TO UPLINK AND DOWNLINK TRAFFIC DEMANDS FOR WIRELESS COMMUNICATION |        |               | CNT  | PAT-Active  | US      | 15/014770     | 9615378      | US-2016-0164856-A1 |   |
| 11924 | TECHNIQUES FOR FRACTIONAL WIRELESS BROADBAND USAGE                                                    |        |               | NP   | PAT-Active  | US      | 13/627343     | 9397899      | US-2014-0086103-A1 |   |
| 11925 | INTRA-QCI SCHEDULER AND METHOD FOR INTRA-QCI SCHEDULING IN A WIRELESS ACCESS NETWORK                  |        |               | CNT  | APP-Pending | US      | 15/164885     |              | US-2016-0270104-A1 |   |
| 11926 | RANDOM ACCESS CHANNEL ENHANCEMENTS FOR LTE DEVICES                                                    |        |               | NP   | PAT-Active  | US      | 13/629828     | 9215701      | US-2013-0242735-A1 |   |
| 11927 | METHOD AND APPARATUS FOR COORDINATION OF SELF-OPTIMIZATION FUNCTIONS IN A WIRELESS NETWORK            |        |               | NP   | PAT-Active  | US      | 13/570941     | 9526091      | US-2013-0242720-A1 |   |
| 11928 | METHOD AND APPARATUS FOR COORDINATION OF SELF-OPTIMIZATION FUNCTIONS IN A WIRELESS NETWORK            |        |               | CNT  | PAT-Active  | US      | 14/165311     | 9516628      | US-2014-0146278-A1 |   |
| 11929 | UPLINK CONTROL CHANNEL RESOURCE MAPPING FOR AN ENHANCED PDCCH IN LTE SYSTEMS                          |        |               | NP   | PAT-Active  | US      | 13/629546     | 8989118      | US-2013-0242817-A1 |   |
| 11930 | USER EQUIPMENT AND METHOD FOR REDUCING DELAY IN A RADIO ACCESS NETWORK                                |        |               | CNT  | PAT-Active  | US      | 14/536111     | 9326276      | US-2015-0063104-A1 |   |
| 11931 | MULTICAST BROADCAST MULTIMEDIA SERVICE-ASSISTED CONTENT DISTRIBUTION                                  |        |               | NP   | PAT-Active  | US      | 13/626661     | 8793743      | US-2013-0247118-A1 |   |
| 11932 | MULTICAST BROADCAST MULTIMEDIA SERVICE-ASSISTED CONTENT DISTRIBUTION                                  |        |               | CNT  | PAT-Active  | US      | 14/318435     | 9432978      | US-2014-0378440-A1 |   |
| 11933 | MULTICAST BROADCAST MULTIMEDIA SERVICE-ASSISTED CONTENT DISTRIBUTION                                  |        |               | CNT  | PAT-Active  | US      | 15/216993     | ###8888      | US-2017-0019263-A1 |   |

|       | A                                                                                                                                                  | B      | C             | D    | E           | F       | G             | H            | I                  | J |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|------|-------------|---------|---------------|--------------|--------------------|---|
| 2     | TITLE                                                                                                                                              | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11934 | PHYSICAL UPLINK SHARED CHANNEL (PUSCH) TRANSMISSION TIME INTERVAL (TTI) BUNDLING                                                                   |        |               | NP   | PAT-Active  | US      | 13/620093     | 8817734      | US-2013-0242889-A1 |   |
| 11935 | TECHNIQUES FOR TIMERS ASSOCIATED WITH POWERING RECEIVER CIRCUITRY AT A WIRELESS DEVICE                                                             |        |               | NP   | PAT-Active  | US      | 13/629582     | 8923323      | US-2013-0242818-A1 |   |
| 11936 | RF CHAIN USAGE IN A DUAL NETWORK ARCHITECTURE                                                                                                      |        |               | NP   | PAT-Active  | US      | 13/631341     | 9271278      | US-2013-0244656-A1 |   |
| 11937 | DISCOVERY AND OPERATION OF HYBRID WIRELESS WIDE AREA AND WIRELESS LOCAL AREA NETWORKS                                                              |        |               | NP   | PAT-Active  | US      | 13/631037     | 8917708      | US-2014-0092885-A1 |   |
| 11938 | DISCOVERY AND OPERATION OF HYBRID WIRELESS WIDE AREA AND WIRELESS LOCAL AREA NETWORKS                                                              |        |               | CNT  | PAT-Active  | US      | 14/579131     | 9386617      | US-2015-0110052-A1 |   |
| 11939 | METHOD AND APPARATUS FOR POWER CONTROL IN FULL-DUPLEX WIRELESS SYSTEMS WITH SIMULTANEOUS TRANSMISSION/RECEPTION                                    |        |               | NP   | PAT-Active  | US      | 13/623294     | 8861443      | US-2014-0078830-A1 |   |
| 11940 | ENHANCEMENTS TO WIRELESS NETWORKS TO SUPPORT SHORT MESSAGE SERVICE (SMS) COMMUNICATION IN THE PACKET SWITCHED DOMAIN                               |        |               | NP   | PAT-Active  | US      | 13/631378     | 9641297      | US-2013-0265938-A1 |   |
| 11941 | ENHANCEMENTS TO WIRELESS NETWORKS TO SUPPORT SHORT MESSAGE SERVICE (SMS) COMMUNICATION IN THE PACKET SWITCHED DOMAIN                               |        |               | CNT  | PAT-Active  | US      | 14/259423     | 9634830      | US-2014-0235283-A1 |   |
| 11942 | ENHANCEMENTS TO WIRELESS NETWORKS TO SUPPORT SHORT MESSAGE SERVICE (SMS) COMMUNICATION IN THE PACKET SWITCHED DOMAIN                               |        |               | CNT  | PAT-Active  | US      | 15/460152     | 8954416      | US-2017-0188210-A1 |   |
| 11943 | FRAME STRUCTURE DESIGN FOR NEW CARRIER TYPE (NCT)                                                                                                  |        |               | NP   | PAT-Active  | US      | 13/628129     | 9078109      | US-2013-0265945-A1 |   |
| 11944 | FRAME STRUCTURE DESIGN FOR NEW CARRIER TYPE (NCT)                                                                                                  |        |               | CNT  | PAT-Active  | US      | 14/725550     | 9712502      | US-2015-0263839-A1 |   |
| 11945 | SIGNALING THREE-DIMENSIONAL VIDEO INFORMATION IN COMMUNICATION NETWORKS                                                                            |        |               | NP   | PAT-Active  | US      | 13/626767     | 9584793      | US-2013-0266289-A1 |   |
| 11946 | SIGNALING THREE-DIMENSIONAL VIDEO INFORMATION IN COMMUNICATION NETWORKS                                                                            |        |               | CNT  | PAT-Active  | US      | 14/581756     | 9787967      | US-2015-0113572-A1 |   |
| 11947 | SIGNALING THREE-DIMENSIONAL VIDEO INFORMATION IN COMMUNICATION NETWORKS                                                                            |        |               | CNT  | PAT-Active  | US      | 15/693682     | #####        | US-2017-0353709-A1 |   |
| 11948 | QUALITY OF EXPERIENCE REPORTING FOR COMBINED UNICAST-MULTICAST/BROADCAST STREAMING OF MEDIA CONTENT                                                |        |               | NP   | PAT-Active  | US      | 13/628340     | 9438883      | US-2013-0268577-A1 |   |
| 11949 | QUALITY OF EXPERIENCE REPORTING FOR COMBINED UNICAST-MULTICAST/BROADCAST STREAMING OF MEDIA CONTENT                                                |        |               | CNT  | PAT-Active  | US      | 14/053495     | 9161013      | US-2014-0047123-A1 |   |
| 11950 | QUALITY OF EXPERIENCE REPORTING FOR COMBINED UNICAST-MULTICAST/BROADCAST STREAMING OF MEDIA CONTENT                                                |        |               | DIV  | PAT-Active  | US      | 15/220256     | #####        | US-2016-0337676-A1 |   |
| 11951 | DYNAMIC RX/DIV FOR IDLE MODE IN A USER EQUIPMENT                                                                                                   |        |               | NP   | PAT-Active  | US      | 13/423719     | 9144020      | US-2013-0244665-A1 |   |
| 11952 | DYNAMIC RX/DIV FOR IDLE MODE IN A USER EQUIPMENT                                                                                                   |        |               | CNT  | PAT-Active  | US      | 14/808421     | 9883456      | US-2016-0329306-A1 |   |
| 11953 | SWITCHED MODE POWER SUPPLY AND A METHOD FOR OPERATING A SWITCHED MODE POWER SUPPLY                                                                 |        |               | NP   | PAT-Active  | US      | 13/495067     | 9048730      | US-2013-0335013-A1 |   |
| 11954 | SWITCHED-MODE POWER SUPPLY AND A TWO-PHASE DC TO DC CONVERTER HAVING SWITCHES AND A FILTER THAT DELIVER CURRENT FROM A NODE AMONG CONVERTER STAGES |        |               | NP   | PAT-Active  | US      | 13/495089     | 9118241      | US-2013-0336012-A1 |   |
| 11955 | SWITCHED-MODE POWER SUPPLY EMPLOYING FIRST AND SECOND FEEDBACK SIGNALS AND A METHOD OF OPERATING THEREOF                                           |        |               | NP   | PAT-Active  | US      | 13/495108     | 9035627      | US-2013-0335048-A1 |   |
| 11956 | RADIO COMMUNICATION DEVICES AND METHODS FOR CONTROLLING A RADIO COMMUNICATION DEVICE                                                               |        |               | NP   | PAT-Active  | US      | 13/674123     | 9332452      | US-2013-0324050-A1 |   |
| 11957 | COMMUNICATION DEVICES AND METHODS FOR OPERATING A COMMUNICATION DEVICE                                                                             |        |               | NP   | PAT-Active  | US      | 13/803023     | 9954904      | US-2013-0332615-A1 |   |
| 11958 | COMMUNICATION DEVICES AND METHODS FOR OPERATING A COMMUNICATION DEVICE                                                                             |        |               | CNT  | APP-Pending | US      | 15/919051     |              | US-2018-0205768-A1 |   |

|       | A                                                                                                                              | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                          | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11359 | DEVICE FOR GENERATING A VECTOR-MODULATED OUTPUT SIGNAL AND METHOD FOR GENERATING A VECTOR-MODULATED OUTPUT SIGNAL              |        |               | NP   | PAT-Active | US      | 13/834736     | 9225565      | US-2013-0239152-A1 |   |
| 11360 | DEVICE FOR GENERATING A VECTOR-MODULATED OUTPUT SIGNAL AND METHOD FOR GENERATING A VECTOR-MODULATED OUTPUT SIGNAL              |        |               | CNT  | PAT-Active | US      | 14/942336     | 9444666      | US-2016-0142234-A1 |   |
| 11361 | MOBILE WIRELESS DEVICES AND METHODS OF OPERATION                                                                               |        |               | NP   | PAT-Active | US      | 13/688244     | 9072070      | US-2014-0148178-A1 |   |
| 11362 | RADIO COMMUNICATION DEVICES AND METHODS FOR CONTROLLING A RADIO COMMUNICATION DEVICE                                           |        |               | NP   | PAT-Active | US      | 13/762408     | 9420475      | US-2014-0226560-A1 |   |
| 11363 | CELL TRANSFER CONTROLLER AND METHOD FOR SELECTING A RADIO CELL                                                                 |        |               | NP   | PAT-Active | US      | 13/671639     | 8892106      | US-2014-0126083-A1 |   |
| 11364 | METHODS AND ARRANGEMENTS FOR HIGH-SPEED ANALOG-TO-DIGITAL CONVERSION                                                           |        |               | NP   | PAT-Active | US      | 13/631949     | 8754800      | US-2014-0091960-A1 |   |
| 11365 | QoS-AWARE RADIO ACCESS NETWORK ARCHITECTURE FOR HTTP-BASED VIDEO STREAMING                                                     |        |               | NP   | PAT-Active | US      | 13/688423     | 9246842      | US-2013-0285868-A1 |   |
| 11366 | APPARATUS AND METHOD TO ENABLE DEVICE-TO-DEVICE (D2D) DISCOVERY IN CELLULAR NETWORKS                                           |        |               | NP   | PAT-Active | US      | 13/756013     | 9325485      | US-2013-0273923-A1 |   |
| 11367 | EVOLVED NODE B USER EQUIPMENT AND METHOD FOR OPERATION OF NARROW BANDWIDTH USER EQUIPMENT IN WIDE BANDWIDTH BROADBAND NETWORKS |        |               | NP   | PAT-Active | US      | 13/682950     | 9232437      | US-2013-0272215-A1 |   |
| 11368 | ADAPTIVE UL-DL TDD CONFIGURATIONS IN A HETEROGENEOUS NETWORK                                                                   |        |               | NP   | PAT-Active | US      | 13/734355     | 9119097      | US-2013-0272170-A1 |   |
| 11369 | ADAPTIVE UL-DL TDD CONFIGURATIONS IN A HETEROGENEOUS NETWORK                                                                   |        |               | CNT  | PAT-Active | US      | 14/823818     | 9736861      | US-2015-0349842-A1 |   |
| 11370 | ADAPTIVE UL-DL TDD CONFIGURATIONS IN A HETEROGENEOUS NETWORK                                                                   |        |               | CNT  | PAT-Active | US      | 15/643237     | #####        | US-2017-0311350-A1 |   |
| 11371 | SMALL DATA COMMUNICATIONS IN A WIRELESS COMMUNICATION NETWORK                                                                  |        |               | CNT  | PAT-Active | US      | 14/794731     | 9814070      | US-2015-0327301-A1 |   |
| 11372 | USER EQUIPMENT AND METHODS FOR HANDOVER ENHANCEMENT USING REFERENCE SIGNAL RECEIVED QUALITY (RSRQ)                             |        |               | NP   | PAT-Active | US      | 13/631213     | 9130688      | US-2013-0303231-A1 |   |
| 11373 | USER EQUIPMENT AND METHODS FOR HANDOVER ENHANCEMENT USING REFERENCE SIGNAL RECEIVED QUALITY (RSRQ)                             |        |               | CNT  | PAT-Active | US      | 14/800130     | 9496973      | US-2016-0314862-A1 |   |
| 11374 | METHOD SYSTEM AND APPARATUS OF TIME-DIVISION-DUPLEX (TDD) UPLINK-DOWNLINK (UL-DL) CONFIGURATION MANAGEMENT                     |        |               | NP   | PAT-Active | US      | 13/681508     | 8982741      | US-2013-0301489-A1 |   |
| 11375 | METHOD SYSTEM AND APPARATUS OF TIME-DIVISION-DUPLEX (TDD) UPLINK-DOWNLINK (UL-DL) CONFIGURATION MANAGEMENT                     |        |               | CNT  | PAT-Active | US      | 14/532370     | 9673928      | US-2015-0055524-A1 |   |
| 11376 | METHOD SYSTEM AND APPARATUS OF TIME-DIVISION-DUPLEX (TDD) UPLINK-DOWNLINK (UL-DL) CONFIGURATION MANAGEMENT                     |        |               | CNT  | PAT-Active | US      | 15/614189     | #####        | US-2018-0063792-A1 |   |
| 11377 | SIGNAL INTERFERENCE MEASUREMENTS IN A WIRELESS COMMUNICATION NETWORK                                                           |        |               | NP   | PAT-Active | US      | 13/681315     | 8854981      | US-2013-0286867-A1 |   |
| 11378 | INTRACELL DEVICE-TO-DEVICE COMMUNICATION CONTROL                                                                               |        |               | NP   | PAT-Active | US      | 14/588090     | 9572186      | US-2016-0192418-A1 |   |
| 11379 | SCHEDULING SYNCHRONIZATION SIGNALS IN A NEW CARRIER TYPE                                                                       |        |               | CNT  | PAT-Active | US      | 14/887103     | #####        | US-2016-0044615-A1 |   |
| 11380 | SCHEDULING AND HYBRID AUTOMATIC REPEAT REQUEST (HARQ) TIMING INDICATION FOR AN UPLINK-DOWNLINK (UL-DL) RECONFIGURATION         |        |               | NP   | PAT-Active | US      | 13/741776     | 9014064      | US-2013-0301490-A1 |   |
| 11381 | USER EQUIPMENT POWER SAVINGS FOR MACHINE TYPE COMMUNICATIONS                                                                   |        |               | NP   | PAT-Active | US      | 13/718334     | 9407391      | US-2013-0301499-A1 |   |
| 11382 | COORDINATED DYNAMIC POINT SELECTION (DPS) WITH CELL RANGE EXPANSION IN A COORDINATED MULTIPOINT (CoMP) SYSTEM                  |        |               | NP   | PAT-Active | US      | 13/725370     | 9231729      | US-2013-0303167-A1 |   |
| 11383 | RADIO COEXISTENCE IN WIRELESS NETWORKS                                                                                         |        |               | NP   | PAT-Active | US      | 13/756563     | 9681362      | US-2013-0301420-A1 |   |

|       | A                                                                                                                               | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                           | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 11984 | PERFORMING A HANDOVER IN A HETEROGENEOUS WIRELESS NETWORK                                                                       |        |               | NP   | PAT-Active  | US      | 13/756665     | 9225449      | US-2013-0301439-A1 |   |
| 11985 | PACKET DATA NETWORK CONNECTIONS FOR MULTI PRIORITY WIRELESS DEVICES                                                             |        |               | NP   | PAT-Active  | US      | 13/729568     | 9294213      | US-2013-0301547-A1 |   |
| 11986 | DETERMINING PROXIMITY OF USER EQUIPMENT FOR DEVICE-TO-DEVICE COMMUNICATION                                                      |        |               | NP   | PAT-Active  | US      | 13/681361     | 8874103      | US-2013-0303160-A1 |   |
| 11987 | DETERMINING PROXIMITY OF USER EQUIPMENT FOR DEVICE-TO-DEVICE COMMUNICATION                                                      |        |               | CNT  | PAT-Active  | US      | 14/525100     | 9270400      | US-2015-0045060-A1 |   |
| 11988 | MULTI-ACCESS SCHEME AND SIGNAL STRUCTURE FOR D2D COMMUNICATIONS                                                                 |        |               | NP   | PAT-Active  | US      | 13/729164     | 9661658      | US-2013-0272262-A1 |   |
| 11989 | USER EQUIPMENT CONFIGURED TO PROVIDE SYNCHRONIZATION INFORMATION FOR SIDELINK D2D COMMUNICATIONS USING ALLOCATED RESOURCE UNITS |        |               | CNT  | PAT-Active  | US      | 15/261439     | 8936521      | US-2016-0381708-A1 |   |
| 11990 | USER EQUIPMENT CONFIGURED TO PROVIDE SYNCHRONIZATION INFORMATION FOR SIDELINK D2D COMMUNICATIONS USING ALLOCATED RESOURCE UNITS |        |               | CNT  | PAT-Active  | US      | 15/290580     | #####        | US-2016-0167974-A1 |   |
| 11991 | D2D CONNECTION RECOVERY SCHEMES                                                                                                 |        |               | NP   | PAT-Active  | US      | 13/751252     | 9066256      | US-2013-0272182-A1 |   |
| 11992 | EXCHANGING CONFIGURATION DATA                                                                                                   |        |               | NP   | PAT-Active  | US      | 13/681370     | 9345024      | US-2013-0272181-A1 |   |
| 11993 | INTERFERENCE NOTIFICATION IN DEVICE-TO-DEVICE COMMUNICATION                                                                     |        |               | NP   | PAT-Active  | US      | 13/665715     | 8942173      | US-2013-0272196-A1 |   |
| 11994 | ADAPTIVE UL-DL CONFIGURATIONS IN A TDD HETEROGENEOUS NETWORK                                                                    |        |               | NP   | PAT-Active  | US      | 13/688437     | 9185620      | US-2013-0322235-A1 |   |
| 11995 | DUAL-BAND FOLDED META-INSPIRED ANTENNA WITH USER EQUIPMENT EMBEDDED WIDEBAND CHARACTERISTICS                                    |        |               | NP   | PAT-Active  | US      | 13/692186     | 9287630      | US-2014-0152518-A1 |   |
| 11996 | TRANSMISSION POWER CONTROL SCHEMES FOR D2D COMMUNICATIONS                                                                       |        |               | NP   | PAT-Active  | US      | 13/743652     | 9030984      | US-2014-0198694-A1 |   |
| 11997 | HANDLING SIGNAL QUALITY MEASUREMENTS IN A WIRELESS COMMUNICATION NETWORK                                                        |        |               | PCT  | PAT-Active  | US      | 13/996699     | 9286098      | US-2015-0146545-A1 |   |
| 11998 | HANDLING SIGNAL QUALITY MEASUREMENTS IN A WIRELESS COMMUNICATION NETWORK                                                        |        |               | CNT  | PAT-Active  | US      | 15/001013     | #####        | US-2016-0135071-A1 |   |
| 11999 | HANDLING SIGNAL QUALITY MEASUREMENTS IN A WIRELESS COMMUNICATION NETWORK                                                        |        |               | CNT  | APP-Pending | US      | 16/038956     |              | US-2018-0324615-A1 |   |
| 12000 | PUCCH RESOURCE ALLOCATION WITH ENHANCED PDCCH                                                                                   |        |               | NP   | PAT-Active  | US      | 13/673791     | 8743820      | US-2013-0322352-A1 |   |
| 12001 | PUCCH RESOURCE ALLOCATION WITH ENHANCED PDCCH                                                                                   |        |               | CNT  | PAT-Active  | US      | 14/257709     | 9072088      | US-2014-0241278-A1 |   |
| 12002 | PUCCH RESOURCE ALLOCATION WITH ENHANCED PDCCH                                                                                   |        |               | CNT  | PAT-Active  | US      | 14/711441     | 9743387      | US-2015-0257143-A1 |   |
| 12003 | PUCCH RESOURCE ALLOCATION WITH ENHANCED PDCCH                                                                                   |        |               | CNT  | PAT-Active  | US      | 15/645162     | #####        | US-2017-0311396-A1 |   |
| 12004 | METHOD SYSTEM AND APPARATUS OF WIRELESS LOCAL AREA NETWORK (WLAN) COMMUNICATION IN CONJUNCTION WITH CELLULAR COMMUNICATION      |        |               | NP   | PAT-Active  | US      | 13/681541     | 8988999      | US-2013-0322238-A1 |   |
| 12005 | METHOD SYSTEM AND APPARATUS OF WIRELESS LOCAL AREA NETWORK (WLAN) COMMUNICATION IN CONJUNCTION WITH CELLULAR COMMUNICATION      |        |               | CNT  | PAT-Active  | US      | 14/583143     | 9883421      | US-2015-0189549-A1 |   |
| 12006 | METHOD SYSTEM AND APPARATUS OF WIRELESS LOCAL AREA NETWORK (WLAN) COMMUNICATION IN CONJUNCTION WITH CELLULAR COMMUNICATION      |        |               | CNT  | PAT-Active  | US      | 15/846581     | #####        | US-2018-0192326-A1 |   |
| 12007 | METHOD SYSTEM AND APPARATUS OF WIRELESS LOCAL AREA NETWORK (WLAN) COMMUNICATION IN CONJUNCTION WITH CELLULAR COMMUNICATION      |        |               | CNT  | APP-Pending | US      | 16/515348     |              |                    |   |

|       | A                                                                                                                                                | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                            | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12008 | DYNAMIC INTERFERENCE AVOIDANCE IN INTEGRATED MULTI-RADIO ACCESS TECHNOLOGIES (RAT) HETEROGENEOUS NETWORKS                                        |        |               | NP   | PAT-Active  | US      | 13/753795     | 9198184      | US-2014-0213310-A1 |   |
| 12009 | SUPPORTING MEASUREMENTS AND FEEDBACK FOR 3D MIMO WITH DATA TRANSMISSION OPTIMIZATION                                                             |        |               | NP   | PAT-Active  | US      | 13/728778     | 9225478      | US-2014-0203240-A1 |   |
| 12010 | DEVICES AND METHODS FOR RADIO COMMUNICATION NETWORK GUIDED TRAFFIC OFFLOAD                                                                       |        |               | NP   | PAT-Active  | US      | 13/687442     | 9203563      | US-2014-0203239-A1 |   |
| 12011 | MECHANISMS FOR ROAMING BETWEEN 3GPP OPERATORS AND WLAN SERVICE PROVIDERS                                                                         |        |               | NP   | PAT-Active  | US      | 13/665761     | 8417707      | US-2014-0203059-A1 |   |
| 12012 | MECHANISMS FOR ROAMING BETWEEN 3GPP OPERATORS AND WLAN SERVICE PROVIDERS                                                                         |        |               | CNT  | PAT-Active  | US      | 14/334097     | 9113402      | US-2014-0348643-A1 |   |
| 12013 | MECHANISMS FOR ROAMING BETWEEN 3GPP OPERATORS AND WLAN SERVICE PROVIDERS                                                                         |        |               | CNT  | PAT-Active  | US      | 14/794701     | 9402228      | US-2015-0312747-A1 |   |
| 12014 | MECHANISMS FOR ROAMING BETWEEN 3GPP OPERATORS AND WLAN SERVICE PROVIDERS                                                                         |        |               | CNT  | PAT-Active  | US      | 15/189958     | 9723547      | US-2016-0302138-A1 |   |
| 12015 | MECHANISMS FOR ROAMING BETWEEN 3GPP OPERATORS AND WLAN SERVICE PROVIDERS                                                                         |        |               | CNT  | PAT-Active  | US      | 15/633519     | #####        | US-2017-0295540-A1 |   |
| 12016 | SIMULTANEOUS TRANSMIT AND RECEIVE                                                                                                                |        |               | PCT  | PAT-Active  | US      | 14/125253     | 8397795      | US-2015-0304565-A1 |   |
| 12017 | TECHNIQUES FOR ROAMING BETWEEN HETEROGENEOUS WIRELESS NETWORKS                                                                                   |        |               | NP   | PAT-Active  | US      | 13/691215     | 9282456      | US-2014-0133555-A1 |   |
| 12018 | SIMULTANEOUS TRANSMIT AND RECEIVE                                                                                                                |        |               | PCT  | PAT-Active  | US      | 14/125256     | 9580772      | US-2014-0301217-A1 |   |
| 12019 | APPARATUS SYSTEM AND METHOD OF SIMULTANEOUS CONNECTIVITY TO LOCATION ORIGIN TRANSCEIVERS                                                         |        |               | NP   | PAT-Active  | US      | 13/710552     | 9807815      | US-2014-0161951-A1 |   |
| 12020 | LOCATION-AWARE MOBILE APPLICATION MANAGEMENT                                                                                                     |        |               | CNT  | APP-Pending | US      | 15/813182     |              | US-2018-0167766-A1 |   |
| 12021 | LOCATION-AWARE MOBILE APPLICATION MANAGEMENT                                                                                                     |        |               | DIV  | APP-Pending | US      | 16/237776     |              | US-2019-0141471-A1 |   |
| 12022 | COMMUNICATION DEVICE MOBILE TERMINAL METHOD FOR REQUESTING INFORMATION AND METHOD FOR PROVIDING INFORMATION                                      |        |               | NP   | PAT-Active  | US      | 13/658840     | 8891386      | US-2014-0113856-A1 |   |
| 12023 | Frequency-stabilized transceiver configuration                                                                                                   |        |               | REL  | PAT-Active  | US      | 11/657379     | 8E41583      |                    |   |
| 12024 | METHOD AND ARRANGEMENT FOR MINIMIZING THE AUTOCORRELATION ERROR IN THE DEMODULATION OF A SPREAD-SPECTRUM SIGNAL SUBJECT TO MULTIPATH PROPAGATION |        |               | NP   | PAT-Closed  | US      | 08/395304     | 6532255      |                    |   |
| 12025 | METHOD AND CIRCUIT FOR COMPENSATION CONTROL OF OFFSET VOLTAGES OF A RADIO RECEIVING CIRCUIT INTEGRATED IN A CIRCUIT MODULE                       |        |               | CIP  | PAT-Active  | US      | 09/680050     | 6436593      |                    |   |
| 12026 | Differential amplifier                                                                                                                           |        |               | NP   | PAT-Active  | US      | 05/606524     | 6373337      |                    |   |
| 12027 | METHOD FOR ESTIMATING THE CHANNEL IMPULSE RESPONSE OF A MOBILE RADIO CHANNEL                                                                     |        |               | CNT  | PAT-Active  | US      | 10/047614     | 6765951      | US-2002-0150073-A1 |   |
| 12028 | Modulator-Demodulator                                                                                                                            |        |               | CNT  | PAT-Active  | US      | 10/078127     | 6486737      | US-2002-0140514-A1 |   |
| 12029 | METHOD AND DEVICE FOR CHANNEL ENCODING IN AN INFORMATION TRANSFER SYSTEM                                                                         |        |               | CNT  | PAT-Active  | US      | 10/112270     | 6885705      | US-2002-0131392-A1 |   |
| 12030 | DIGITAL FILTER COMBINATION                                                                                                                       |        |               | PCT  | PAT-Active  | US      | 10/110423     | 6950643      |                    |   |
| 12031 | Power Control During Inter-Generation Soft Handoffs                                                                                              |        |               | NP   | PAT-Active  | US      | 09/473777     | 6584087      |                    |   |
| 12032 | Modulator circuit configuration                                                                                                                  |        |               | NP   | PAT-Active  | US      | 08/718895     | 6365666      |                    |   |
| 12033 | Circuit configuration for the offset compensation of a signal                                                                                    |        |               | CNT  | PAT-Active  | US      | 10/174283     | 6944220      | US-2002-0191720-A1 |   |
| 12034 | CIRCUIT CONFIGURATION FOR CONTROLLING NONLINEAR PATHS                                                                                            |        |               | NP   | PAT-Active  | US      | 08/809787     | 6515543      | US-2001-0028190-A1 |   |
| 12035 | AMPLIFIER CIRCUIT WITH OFFSET COMPENSATION IN PARTICULAR FOR DIGITAL MODULATION DEVICES                                                          |        |               | NP   | PAT-Active  | US      | 08/853471     | 6719645      | US-2001-0048344-A1 |   |

|       | A                                                                                                                                                                      | B      | C             | D    | E          | F       | G             | H            | I                  | J |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|------|------------|---------|---------------|--------------|--------------------|---|
| 2     | TITLE                                                                                                                                                                  | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12036 | Method and device for diversity transmission of coded information                                                                                                      |        |               | CNT  | PAT-Active | US      | 10/347540     | 7295625      | US-2003-0135799-A1 |   |
| 12037 | ANALOG-TO-DIGITAL CONVERTER AND METHOD FOR CONVERTING AN ANALOG SIGNAL INTO A DIGITAL SIGNAL                                                                           |        |               | PCT  | PAT-Active | US      | 10/493711     | 6812880      | US-2004-0061636-A1 |   |
| 12038 | Determination of a differential offset in a radio device and radio device                                                                                              |        |               | CNT  | PAT-Active | US      | 10/352831     | 6973295      | US-2003-0134604-A1 |   |
| 12039 | ANALOG-TO-DIGITAL CONVERTER WITH COMPLEMENTARY TRANSISTORS                                                                                                             |        |               | NP   | PAT-Active | US      | 09/943337     | 6580381      | US-2002-0067288-A1 |   |
| 12040 | Telephone for connection to a public telephone network                                                                                                                 |        |               | CNT  | PAT-Active | US      | 10/410861     | 6978159      | US-2003-0179879-A1 |   |
| 12041 | DIGITAL/ANALOG CONVERTER                                                                                                                                               |        |               | NP   | PAT-Active | US      | 10/002334     | 6550785      | US-2002-0121996-A1 |   |
| 12042 | Trimming method and trimming device for a pll circuit for two-point modulation                                                                                         |        |               | CNT  | PAT-Active | US      | 10/646175     | 6933788      | US-2004-0036539-A1 |   |
| 12043 | Receiver circuit in particular for a mobile radio                                                                                                                      |        |               | CNT  | PAT-Active | US      | 10/384996     | 7336717      | US-2003-0156863-A1 |   |
| 12044 | METHOD AND DEVICE FOR TRANSMITTING AND IDENTIFYING A MODULATION TYPE IN DIGITAL COMMUNICATION SYSTEMS BY WAY OF A PHASE ROTATION FACTOR APPLIED TO A TRAINING SEQUENCE |        |               | CNT  | PAT-Active | US      | 10/706779     | 7313204      | US-2004-0096012-A1 |   |
| 12045 | CIRCUIT CONFIGURATION FOR PRODUCING EXPONENTIAL PREDISTORTION FOR A VARIABLE AMPLIFIER                                                                                 |        |               | CNT  | PAT-Active | US      | 10/639400     | 6788145      | US-2004-0032298-A1 |   |
| 12046 | Demodulator and demodulation method for demodulating received signals                                                                                                  |        |               | PCT  | PAT-Active | US      | 10/488975     | 7317766      | US-2005-0063490-A1 |   |
| 12047 | MOBILE STATION IN A MOBILE COMMUNICATION SYSTEM AND METHOD FOR ACCESSING A SERVICE AND/OR A DATA RECORD IN THE MOBILE STATIONS STANDBY MODE                            |        |               | PCT  | PAT-Active | US      | 10/483561     | 7657287      | US-2004-0248550-A1 |   |
| 12048 | Optimization of the operating point of power amplifiers in mobile stations                                                                                             |        |               | NP   | PAT-Active | US      | 09/895595     | 7031677      | US-2003-0003540-A1 |   |
| 12049 | Transmission Configuration in Particular for Mobile Radio Communication and Mobile Station with the Transmission Configuration                                         |        |               | CNT  | PAT-Active | US      | 10/705514     | 7308038      | US-2004-0097250-A1 |   |
| 12050 | DEVICE AND METHOD FOR REGULATING THE OUTPUT POWER OF MOBILE                                                                                                            |        |               | CNT  | PAT-Active | US      | 10/715070     | 7418055      | US-2004-0192207-A1 |   |
| 12051 | Interface for data transmission                                                                                                                                        |        |               | CNT  | PAT-Active | US      | 10/734441     | 7295619      | US-2004-0141563-A1 |   |
| 12052 | TRANSMISSION ARRANGEMENT WITH POWER REGULATION                                                                                                                         |        |               | PCT  | PAT-Active | US      | 10/482506     | 7277689      | US-2004-0253996-A1 |   |
| 12053 | Transmitting arrangement for mobile radio                                                                                                                              |        |               | CNT  | PAT-Active | US      | 10/797468     | 7499008      | US-2004-0228421-A1 |   |
| 12054 | Transmission arrangement for transmitting data continuously in the time domain                                                                                         |        |               | CNT  | PAT-Active | US      | 10/872815     | 7553272      | US-2005-0032489-A1 |   |
| 12055 | DIGITAL/ANALOG CONVERTER CIRCUIT WITH A DEVICE FOR COMPENSATING NONLINEAR DISTORTIONS                                                                                  |        |               | CNT  | PAT-Active | US      | 10/844072     | 6993872      | US-2004-0212907-A1 |   |
| 12056 | Single Point Modulator Having a PLL Circuit                                                                                                                            |        |               | CNT  | PAT-Active | US      | 10/917501     | 7453325      | US-2005-0025276-A1 |   |
| 12057 | CLOCK CONTROL OF TRANSMISSION-SIGNAL PROCESSING DEVICES IN MOBILE RADIO TERMINAL DEVICES                                                                               |        |               | PCT  | PAT-Active | US      | 10/503547     | 8064559      | US-2005-0201503-A1 |   |
| 12058 | Control system and method for operating a transceiver                                                                                                                  |        |               | CNT  | PAT-Active | US      | 10/920150     | 8073439      | US-2005-0085193-A1 |   |
| 12059 | Frequency conversion circuit arrangement and mobile radio comprising said circuit arrangement                                                                          |        |               | CNT  | PAT-Active | US      | 10/940114     | 7030667      | US-2005-0107063-A1 |   |



|       | A                                                                                                                                                                                | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                                            | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12060 | Method and device for controlling combined UMTS/GSM/EDGE radio systems                                                                                                           |        |               | CNT  | PAT-Active | US      | 11/423911     | 7515932      | US-2006-0217139-A1 |   |
| 12061 | Mobile radio receiver device                                                                                                                                                     |        |               | CNT  | PAT-Active | US      | 11/020747     | 7356324      | US-2005-0170805-A1 |   |
| 12062 | Transmitting and receiving arrangement with a channel-oriented link                                                                                                              |        |               | CNT  | PAT-Active | US      | 12/687021     | 8189694      | US-2010-0165868-A1 |   |
| 12063 | Transmitting and receiving arrangement with a channel-oriented link                                                                                                              |        |               | PCI  | PAT-Active | US      | 10/514332     | 7711056      | US-2006-0235362-A1 |   |
| 12064 | METHOD AND DEVICE FOR CARRYING OUT A PLURALITY OF CORRELATION PROCEDURES IN A MOBILE TELEPHONY ENVIRONMENT                                                                       |        |               | CNT  | PAT-Active | US      | 11/075848     | 7522655      | US-2005-0207479-A1 |   |
| 12065 | Method and device for passing parameters to a rake receiver                                                                                                                      |        |               | CNT  | PAT-Active | US      | 11/045651     | 7675963      | US-2005-0207472-A1 |   |
| 12066 | CIRCUIT ARRANGEMENT WITH RADIO-FREQUENCY MIXER AND RECEIVER ARRANGEMENT WITH THE CIRCUIT ARRANGEMENT                                                                             |        |               | DIV  | PAT-Active | US      | 12/852445     | 8521118      | US-2010-0323649-A1 |   |
| 12067 | Reception arrangement with preamplifier circuit                                                                                                                                  |        |               | CNT  | PAT-Active | US      | 11/066533     | 7643814      | US-2005-0192087-A1 |   |
| 12068 | Transmission arrangement particularly for mobile radio                                                                                                                           |        |               | CNT  | PAT-Active | US      | 11/046510     | 7415077      | US-2005-0186856-A1 |   |
| 12069 | Methods and Apparatuses for Detecting the TX Diversity Mode for Mobile Radio Receivers                                                                                           |        |               | CNT  | PAT-Active | US      | 11/119483     | 7542726      | US-2005-0260950-A1 |   |
| 12070 | Estimation of asymmetries between inphase and quadrature branches in multicarrier transmission systems                                                                           |        |               | CNT  | PAT-Active | US      | 11/075268     | 7529306      | US-2005-0180518-A1 |   |
| 12071 | Method and device for correcting signal distortions in an amplifier device                                                                                                       |        |               | PCI  | PAT-Active | US      | 10/536653     | 7355472      | US-2007-0006031-A1 |   |
| 12072 | Integrated transceiver circuit with low interference production and sensitivity                                                                                                  |        |               | NP   | PAT-Active | US      | 10/822544     | 7398074      | US-2004-0229574-A1 |   |
| 12073 | Method and apparatus for correlative estimation of a mobile radio channel                                                                                                        |        |               | NP   | PAT-Active | US      | 10/833579     | 7310395      | US-2004-0218703-A1 |   |
| 12074 | Channel qualification for an adaptive frequency hopping method by means of bit or packet error rate measurement and simultaneous field strength measurement                      |        |               | NP   | PAT-Active | US      | 10/832685     | 7529288      | US-2004-0258137-A1 |   |
| 12075 | CHANNEL QUALIFICATION FOR AN ADAPTIVE FREQUENCY HOPPING METHOD BY MEANS OF BIT OR PACKET ERROR RATE MEASUREMENT AND SIMULTANEOUS FIELD STRENGTH MEASUREMENT                      |        |               | CNT  | PAT-Active | US      | 12/416203     | 8537877      | US-2009-0185601-A1 |   |
| 12076 | CIRCUIT ARRANGEMENT AND METHOD FOR REDUCING AN ALIGNMENT ERROR IN A SIGMA-DELTA MODULATOR                                                                                        |        |               | NP   | PAT-Active | US      | 10/869704     | 6927718      | US-2005-0307472-A1 |   |
| 12077 | Method and device for calculating zero-crossing reference sequences for signal detection of angle-modulated signals based on zero crossings of the received signal               |        |               | CNT  | PAT-Active | US      | 11/373463     | 7564926      | US-2006-0222107-A1 |   |
| 12078 | Determination and selection of transmission paths as a function of the operating situation for setting up rake fingers for rake receiver units in mobile communication terminals |        |               | NP   | PAT-Active | US      | 10/957408     | 7508862      | US-2005-0111526-A1 |   |
| 12079 | Method for prediction of a channel coefficient                                                                                                                                   |        |               | NP   | PAT-Active | US      | 10/974322     | 7577196      | US-2005-0118955-A1 |   |
| 12080 | Method for converting an analog input signal and analog-to-digital converter                                                                                                     |        |               | CNT  | PAT-Active | US      | 11/352803     | 7280065      | US-2006-0187104-A1 |   |
| 12081 | Method and apparatus for identification of transmission antenna diversity in a receiver                                                                                          |        |               | NP   | PAT-Active | US      | 10/965341     | 8102957      | US-2005-0123082-A1 |   |
| 12082 | Method and circuit arrangement for determining a charge consumed within a period in mobile devices                                                                               |        |               | CNT  | PAT-Active | US      | 11/371828     | 8068885      | US-2006-0252467-A1 |   |
| 12083 | Devices with reciprocal wake-up function from the standby mode                                                                                                                   |        |               | NP   | PAT-Active | US      | 10/925565     | 7408567      | US-2005-0085550-A1 |   |

|       | A                                                                                                                                                                  | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                              | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12084 | Signal conditioning circuit                                                                                                                                        |        |               | NP   | PAT-Active | US      | 10/947963     | 7433667      | US-2005-0113056-A1 |   |
| 12085 | METHOD AND ARRANGEMENT FOR DETECTING A COLLISION IN A COMMUNICATION NETWORK                                                                                        |        |               | NP   | PAT-Active | US      | 10/868408     | 7434143      | US-2005-0034011-A1 |   |
| 12086 | Method and apparatus for adapting threshold values in electronic signal processing devices                                                                         |        |               | NP   | PAT-Active | US      | 10/970905     | 7720648      | US-2005-0117666-A1 |   |
| 12087 | Apparatus for Production of Scrambling Codes and Preambles                                                                                                         |        |               | NP   | PAT-Active | US      | 11/014274     | 7489722      | US-2005-0152265-A1 |   |
| 12088 | Transmission/reception arrangement and method for reducing nonlinearities in output signals from a transmission/reception arrangement                              |        |               | NP   | PAT-Active | US      | 11/049258     | 7539268      | US-2006-0034356-A1 |   |
| 12089 | EFFICIENT SOFTWARE DOWNLOAD TO CONFIGURABLE COMMUNICATION DEVICE                                                                                                   |        |               | CNT  | PAT-Active | US      | 11/675313     | 7870233      | US-2007-0168477-A1 |   |
| 12090 | Efficient Software Download to Configurable Communication Device                                                                                                   |        |               | DIV  | PAT-Active | US      | 12/908613     | 8078708      | US-2011-0035475-A1 |   |
| 12091 | CONFIGURABLE ALL-DIGITAL COHERENT DEMODULATOR SYSTEM FOR SPREAD SPECTRUM APPLICATIONS                                                                              |        |               | DIV  | PAT-Active | US      | 12/708847     | 8204161      | US-2010-0168396-A1 |   |
| 12092 | CONFIGURABLE CODE GENERATOR SYSTEM FOR SPREAD SPECTRUM APPLICATIONS                                                                                                |        |               | NP   | PAT-Active | US      | 09/751782     | 6567017      | US-2001-0048380-A1 |   |
| 12093 | GENERIC FINGER ARCHITECTURE FOR SPREAD SPECTRUM APPLICATIONS                                                                                                       |        |               | NP   | PAT-Active | US      | 09/920094     | 6458863      | US-2002-0018518-A1 |   |
| 12094 | APPARATUS AND METHOD FOR A PROGRAMMABLE SECURITY PROCESSOR                                                                                                         |        |               | DIV  | PAT-Active | US      | 11/435010     | 7996684      | US-2006-0206726-A1 |   |
| 12095 | APPARATUS AND METHOD FOR CONTROLLING A THREE-STATE BUS                                                                                                             |        |               | NP   | PAT-Active | US      | 09/565553     | 6686767      |                    |   |
| 12096 | FLEXIBLE PREAMBLE PROCESSING FOR DETECTING A CODE SEQUENCE                                                                                                         |        |               | NP   | PAT-Active | US      | 09/927406     | 6694496      | US-2002-0016949-A1 |   |
| 12097 | Power amplifier arrangement having two or more antennas coupling respective amplifiers to a supply potential                                                       |        |               | NP   | PAT-Active | US      | 11/029853     | 7548732      | US-2006-0181751-A1 |   |
| 12098 | Interleaving Circuit for a Multiband OFDM Transceiver                                                                                                              |        |               | NP   | PAT-Active | US      | 10/987191     | 7376117      | US-2006-0152327-A1 |   |
| 12099 | Device for transmitting data between memories                                                                                                                      |        |               | CNT  | PAT-Active | US      | 11/460888     | 7631153      | US-2007-0028030-A1 |   |
| 12100 | Measuring circuit for the output of a power amplifier and a power amplifier comprising the measuring circuit                                                       |        |               | CNT  | PAT-Active | US      | 11/534938     | 7345586      | US-2007-0105042-A1 |   |
| 12101 | Method and apparatus for adaptive activation or deactivation of the coordination of the radio activities of two mobile-radio transmitting and/or receiving devices |        |               | CNT  | PAT-Active | US      | 11/532666     | 7697897      | US-2007-0006127-A1 |   |
| 12102 | METHOD AND APPARATUS FOR ADAPTIVE ACTIVATION OR DEACTIVATION OF THE COORDINATION OF THE RADIO ACTIVITIES OF TWO MOBILE-RADIO TRANSMITTING AND/OR RECEIVING DEVICES |        |               | CNT  | PAT-Active | US      | 12/582681     | 7945211      | US-2010-0040121-A1 |   |
| 12103 | Computer system for electronic data processing                                                                                                                     |        |               | PCT  | PAT-Active | US      | 10/992925     | 8145822      | US-2009-0235047-A1 |   |
| 12104 | Phase locked loop and method for phase correction of a frequency controllable oscillator                                                                           |        |               | NP   | PAT-Active | US      | 11/088039     | 7391276      | US-2006-0082417-A1 |   |
| 12105 | Transmitting arrangement/receiving arrangement/transceiver and method for operation of a transmitting arrangement                                                  |        |               | NP   | PAT-Active | US      | 11/193951     | 7502598      | US-2005-0277399-A1 |   |
| 12106 | Device for processing radio transmission data with digital predistortion                                                                                           |        |               | NP   | PAT-Active | US      | 11/112057     | 8155238      | US-2005-0249309-A1 |   |
| 12107 | Transceiver with interference signal rejection and method for interference signal rejection                                                                        |        |               | NP   | PAT-Active | US      | 11/309514     | 7412217      | US-2005-0245216-A1 |   |
| 12108 | TRANSCIVER CIRCUIT AND METHOD FOR PROVIDING LOCAL OSCILLATOR SIGNALS IN A TRANSCIVER CIRCUIT                                                                       |        |               | NP   | PAT-Active | US      | 11/101946     | 7684768      | US-2005-0238417-A1 |   |

|       | A                                                                                                                                   | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                               | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12109 | DUAL CARRIER MODULATOR FOR A MULTIBAND OFDM UWB TRANSCIVER                                                                          |        |               | NP   | PAT-Active  | US      | 11/040475     | 7512185      | US-2005-0195765-A1 |   |
| 12110 | POWER REGULATION IN RADIO-FREQUENCY TRANSMITTERS                                                                                    |        |               | GP   | PAT-Active  | US      | 11/594567     | 9648572      | US-2007-0109863-A1 |   |
| 12111 | CIRCUIT ARRANGEMENT RECEIVING DIFFERENT SUPPLY VOLTAGES                                                                             |        |               | NP   | PAT-Active  | US      | 11/249810     | 7279943      | US-2006-0382396-A1 |   |
| 12112 | Transmitting and receiving arrangement with interference signal suppression control                                                 |        |               | NP   | PAT-Active  | US      | 11/129990     | 7305216      | US-2005-0266819-A1 |   |
| 12113 | Amplifier arrangement having an adjustable gain and use thereof                                                                     |        |               | NP   | PAT-Active  | US      | 11/240686     | 7397307      | US-2006-0066399-A1 |   |
| 12114 | Radio receiver for the reception of data bursts which are modulated with two modulation types                                       |        |               | NP   | PAT-Active  | US      | 11/261008     | 7567626      | US-2006-0116091-A1 |   |
| 12115 | Polar modulator and method for determining an amplitude offset in a polar modulator                                                 |        |               | NP   | PAT-Active  | US      | 11/255438     | 7489130      | US-2006-0089113-A1 |   |
| 12116 | Digital programming interface between a baseband processor and an integrated radio-frequency module                                 |        |               | NP   | PAT-Active  | US      | 11/220453     | 7587533      | US-2006-0059280-A1 |   |
| 12117 | RADIO TRANSMITTER WITH VARIABLE AMPLIFIER UNITS IN THE BASEBAND SECTION AND IN THE RADIO-FREQUENCY SECTION OF THE TRANSMISSION PATH |        |               | NP   | PAT-Active  | US      | 11/300244     | 7596185      | US-2006-0159137-A1 |   |
| 12118 | EMBEDDED COMMUNICATION TERMINAL                                                                                                     |        |               | NP   | PAT-Active  | US      | 11/432712     | 8365269      | US-2007-0011727-A1 |   |
| 12119 | Voltage-controlled oscillator circuit with analogue and digital actuation                                                           |        |               | NP   | PAT-Active  | US      | 11/298010     | 7301411      | US-2006-0152292-A1 |   |
| 12120 | METHOD FOR COMPUTER-BASED DETERMINATION OF A POSITION IN A MAP NAVIGATION DEVICE AND MOBILE RADIO TELEPHONE                         |        |               | NP   | PAT-Active  | US      | 11/536499     | 8712689      | US-2007-0101542-A1 |   |
| 12121 | Method for automatically setting up and/or controlling a telecommunication conference                                               |        |               | NP   | PAT-Active  | US      | 11/264679     | 8428634      | US-2007-0097886-A1 |   |
| 12122 | METHOD FOR AUTOMATICALLY SETTING UP AND/OR CONTROLLING A TELECOMMUNICATION CONFERENCE                                               |        |               | CNT  | PAT-Active  | US      | 13/868018     | 9571291      | US-2013-0235767-A1 |   |
| 12123 | Method for predistortion of a signal and a transmitting device having digital predistortion in particular for mobile radio          |        |               | NP   | PAT-Active  | US      | 11/389383     | 7377408      | US-2006-0228036-A1 |   |
| 12124 | CONTROLLABLE AMPLIFIER AND ITS USE                                                                                                  |        |               | NP   | PAT-Active  | US      | 11/360720     | 7501887      | US-2006-0202752-A1 |   |
| 12125 | Fast starting circuit for crystal oscillators                                                                                       |        |               | NP   | PAT-Active  | US      | 11/329572     | 7554414      | US-2006-0170509-A1 |   |
| 12126 | MOBILE RADIO COMMUNICATION SYSTEM                                                                                                   |        |               | NP   | PAT-Active  | US      | 11/346997     | 8023491      | US-2006-0194560-A1 |   |
| 12127 | Mobile radio communication system                                                                                                   |        |               | CNT  | PAT-Active  | US      | 12/504962     | 8254906      | US-2009-0275327-A1 |   |
| 12128 | MOBILE RADIO COMMUNICATION SYSTEM                                                                                                   |        |               | CNT  | PAT-Active  | US      | 13/211946     | 8432890      | US-2011-0301864-A1 |   |
| 12129 | MOBILE RADIO COMMUNICATION SYSTEM                                                                                                   |        |               | CNT  | PAT-Active  | US      | 13/542689     | 8737995      | US-2012-0289229-A1 |   |
| 12130 | MOBILE RADIO COMMUNICATION SYSTEM                                                                                                   |        |               | CNT  | PAT-Active  | US      | 15/860282     | 8888888      | US-2018-0124668-A1 |   |
| 12131 | MOBILE RADIO COMMUNICATION SYSTEM                                                                                                   |        |               | CNT  | APP-Pending | US      | 16/523576     |              |                    |   |
| 12132 | MOBILE RADIO COMMUNICATION SYSTEM                                                                                                   |        |               | CNT  | PAT-Active  | US      | 14/259113     | 9894577      | US-2014-0321426-A1 |   |
| 12133 | DIGITAL FILTER AND METHOD OF DETERMINING ITS COEFFICIENTS                                                                           |        |               | NP   | PAT-Active  | US      | 11/410395     | 8775492      | US-2006-0250287-A1 |   |
| 12134 | METHOD AND APPARATUS FOR CONTROLLING A TRANSMITTER                                                                                  |        |               | NP   | PAT-Active  | US      | 11/301741     | 7725086      | US-2006-0154626-A1 |   |

|       | A                                                                                                                                                | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                            | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12135 | Amplifier arrangement and method of signal amplification                                                                                         |        |               | NP   | PAT-Active | US      | 11/482921     | 7453321      | US-2007-0918729-A1 |   |
| 12136 | Amplifier arrangement polar transmitter having the amplifier arrangement and method for amplifying signals                                       |        |               | NP   | PAT-Active | US      | 11/490787     | 7570940      | US-2007-0926823-A1 |   |
| 12137 | Transmitting arrangement transceiver with a transmitting arrangement and method for signal processing                                            |        |               | NP   | PAT-Active | US      | 11/482559     | 7599669      | US-2007-0921078-A1 |   |
| 12138 | COMPUTER-AIDED MAPPING OF SYSTEM INFORMATION MEDIUM ACCESS CONTROL PROTOCOL MESSAGES                                                             |        |               | DIV  | PAT-Active | US      | 13/102750     | 8380204      | US-2011-0211552-A1 |   |
| 12139 | COMPUTER-AIDED MAPPING OF SYSTEM INFORMATION MEDIUM ACCESS CONTROL PROTOCOL MESSAGES                                                             |        |               | CNT  | PAT-Active | US      | 13/741703     | 8977271      | US-2013-0126841-A1 |   |
| 12140 | COMPUTER-AIDED MAPPING OF SYSTEM INFORMATION MEDIUM ACCESS CONTROL PROTOCOL MESSAGES                                                             |        |               | CNT  | PAT-Active | US      | 14/622614     | 9730032      | US-2015-0245278-A1 |   |
| 12141 | COMPUTER-AIDED MAPPING OF SYSTEM INFORMATION MEDIUM ACCESS CONTROL PROTOCOL MESSAGES                                                             |        |               | CNT  | PAT-Active | US      | 15/071754     | #####        | US-2016-0198312-A1 |   |
| 12142 | TRANSCIVER WITH CASCADED PHASE-LOCKED LOOPS                                                                                                      |        |               | NP   | PAT-Active | US      | 11/685288     | 8880605      | US-2007-0275672-A1 |   |
| 12143 | FREQUENCY GENERATOR                                                                                                                              |        |               | CNT  | PAT-Active | US      | 15/176706     | 8948450      | US-2016-0385618-A1 |   |
| 12144 | Transmission path and method for signal processing in a transmission path                                                                        |        |               | NP   | PAT-Active | US      | 11/581507     | 7693499      | US-2007-0105511-A1 |   |
| 12145 | Transmitting output stage with adjustable output power and process for amplifying a signal in a transmitting output stage                        |        |               | NP   | PAT-Active | US      | 11/584319     | 7486133      | US-2007-0096804-A1 |   |
| 12146 | Frequency tuning circuit use of the tuning circuit and method for frequency tuning                                                               |        |               | NP   | PAT-Active | US      | 11/641330     | 7847642      | US-2007-0222527-A1 |   |
| 12147 | Phase locked loop circuitry                                                                                                                      |        |               | NP   | PAT-Active | US      | 11/699111     | 7787581      | US-2007-0195917-A1 |   |
| 12148 | MIXER CIRCUIT AND RF TRANSMITTER USING SUCH MIXER CIRCUIT                                                                                        |        |               | CNT  | PAT-Active | US      | 12/143613     | 8260218      | US-2008-0254754-A1 |   |
| 12149 | MODULATION DEVICE FOR A TRANSMISSION PATH METHOD FOR SIGNAL PROCESSING IN A TRANSMISSION PATH AND TRANSMISSION PATH HAVING THE MODULATION DEVICE |        |               | NP   | PAT-Active | US      | 11/709004     | 8374279      | US-2007-0295792-A1 |   |
| 12150 | CIRCUIT ARRANGEMENT AND METHOD FOR SETTING AN ANALOG OUTPUT SIGNAL                                                                               |        |               | NP   | PAT-Active | US      | 11/831580     | 8116701      | US-2008-0048781-A1 |   |
| 12151 | CIRCUIT ARRANGEMENT AND METHOD FOR SETTING AN ANALOG OUTPUT SIGNAL                                                                               |        |               | CNT  | PAT-Active | US      | 13/369795     | 8494462      | US-2012-0142289-A1 |   |
| 12152 | TRANSCIVER ARRANGEMENT AND METHOD FOR PROCESSING A SIGNAL                                                                                        |        |               | NP   | PAT-Active | US      | 11/705258     | 8254866      | US-2007-0197170-A1 |   |
| 12153 | TRANSCIVER ARRANGEMENT AND METHOD FOR PROCESSING A SIGNAL                                                                                        |        |               | CNT  | PAT-Active | US      | 13/548952     | 8843090      | US-2012-0382867-A1 |   |
| 12154 | APPARATUS AND METHOD FOR IDENTIFYING SIGNAL FRAMES AS AUDIO SIGNAL FRAMES                                                                        |        |               | NP   | PAT-Active | US      | 11/673133     | 8065137      | US-2007-0192096-A1 |   |
| 12155 | Digitally controlled oscillator device and method for generating an oscillating signal with a digitally controlled phase locked loop             |        |               | NP   | PAT-Active | US      | 11/401393     | 7573347      | US-2007-0222526-A1 |   |
| 12156 | TRANSMITTER AND METHOD OF TRANSMITTING A SIGNAL                                                                                                  |        |               | NP   | PAT-Active | US      | 11/544319     | 7702032      | US-2007-0237256-A1 |   |
| 12157 | Regulation of an Amplification Apparatus                                                                                                         |        |               | NP   | PAT-Active | US      | 11/479075     | 7456693      | US-2008-0091674-A1 |   |
| 12158 | Oscillator and method for generating an oscillator signal                                                                                        |        |               | NP   | PAT-Active | US      | 11/474825     | 7423495      | US-2008-0207366-A1 |   |
| 12159 | DATA TRANSMISSION IN A TELECOMMUNICATION CONFERENCE                                                                                              |        |               | NP   | PAT-Active | US      | 11/775888     | 8243684      | US-2008-0313466-A1 |   |

|       | A                                                                                                                              | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                          | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12160 | Amplifier stage operational amplifier and method for amplifying a signal                                                       |        |               | NP   | PAT-Active  | US      | 11/501266     | 7443238      | US-2008-0924218-A1 |   |
| 12161 | Arrangement and method for determining a gradient factor for a digitally controlled oscillator and phase locked loop           |        |               | NP   | PAT-Active  | US      | 11/840408     | 7573348      | US-2008-0942753-A1 |   |
| 12162 | MESSAGE GENERATING ARRANGEMENT                                                                                                 |        |               | NP   | PAT-Active  | US      | 11/765849     | 8406228      | US-2007-0293251-A1 |   |
| 12163 | MESSAGE GENERATING ARRANGEMENT                                                                                                 |        |               | CNT  | PAT-Active  | US      | 13/776113     | 9001738      | US-2013-0170436-A1 |   |
| 12164 | MESSAGE GENERATING ARRANGEMENT                                                                                                 |        |               | CNT  | PAT-Active  | US      | 14/330173     | 9380629      | US-2014-0343627-A1 |   |
| 12165 | MESSAGE GENERATING ARRANGEMENT                                                                                                 |        |               | CNT  | APP-Pending | US      | 15/171923     |              | US-2017-0118790-A1 |   |
| 12166 | Generating a traffic encryption key                                                                                            |        |               | NP   | PAT-Active  | US      | 12/026225     | 8259936      | US-2010-0277767-A1 |   |
| 12167 | Method for compensation for any phase and/or amplitude error in a receiver                                                     |        |               | NP   | PAT-Active  | US      | 11/773213     | 8218683      | US-2008-0085263-A1 |   |
| 12168 | DIVERSITY RECEIVER WITH CHANNEL ESTIMATOR                                                                                      |        |               | NP   | PAT-Active  | US      | 11/510318     | 7925230      | US-2008-0051046-A1 |   |
| 12169 | DIVERSITY RECEIVER AND METHOD PERFORMED BY A DIVERSITY RECEIVER                                                                |        |               | CNT  | PAT-Active  | US      | 13/078174     | 8385866      | US-2011-0195682-A1 |   |
| 12170 | DIVERSITY RECEIVER AND METHOD PERFORMED BY A DIVERSITY RECEIVER                                                                |        |               | CNT  | PAT-Active  | US      | 13/747944     | 8811924      | US-2013-0182501-A1 |   |
| 12171 | DIVERSITY RECEIVER BASED ON DOPPLER FREQUENCY SHIFT VALUE                                                                      |        |               | DIV  | PAT-Active  | US      | 13/076112     | 8498594      | US-2012-0076242-A1 |   |
| 12172 | GROUPING OF USER TERMINAL CELL ACCESS INFORMATION IN A SYSTEM INFORMATION BLOCK                                                |        |               | PCT  | PAT-Active  | US      | 12/441820     | 9226194      | US-2009-0318142-A1 |   |
| 12173 | GROUPING OF USER TERMINAL CELL ACCESS INFORMATION IN A SYSTEM INFORMATION BLOCK                                                |        |               | CNT  | PAT-Active  | US      | 14/942751     | 9974002      | US-2016-0127879-A1 |   |
| 12174 | GROUPING OF USER TERMINAL CELL ACCESS INFORMATION IN A SYSTEM INFORMATION BLOCK                                                |        |               | CNT  | PAT-Active  | US      | 15/948696     | #####        | US-2018-0227831-A1 |   |
| 12175 | AMPLIFIER ARRANGEMENT WITH CONTROLLABLE GAIN AND METHOD FOR CONTROLLING AN AMPLIFIER GAIN                                      |        |               | NP   | PAT-Active  | US      | 11/528254     | 7446605      | US-2008-0074184-A1 |   |
| 12176 | PHASE LOCKED LOOP TRANSCIVER DEVICE AND METHOD FOR GENERATING AN OSCILLATOR SIGNAL                                             |        |               | REI  | PAT-Active  | US      | 13/440521     | 8644879      |                    |   |
| 12177 | Phase/frequency detector phase locked loop method for phase/frequency detection and method for generating an oscillator signal |        |               | NP   | PAT-Active  | US      | 11/925539     | 7592874      | US-2008-0190386-A1 |   |
| 12178 | METHOD FOR THE TRANSMISSION OF DATA FIELD OF TECHNOLOGY                                                                        |        |               | CNT  | PAT-Active  | US      | 13/273256     | 8493909      | US-2012-0026921-A1 |   |
| 12179 | METHOD FOR THE TRANSMISSION OF DATA FIELD OF TECHNOLOGY                                                                        |        |               | CNT  | PAT-Active  | US      | 13/713905     | 9743388      | US-2013-0142145-A1 |   |
| 12180 | METHOD FOR THE TRANSMISSION OF DATA FIELD OF TECHNOLOGY                                                                        |        |               | CNT  | PAT-Active  | US      | 15/453558     | #####        | US-2017-0181025-A1 |   |
| 12181 | Method for the Transmission of Data                                                                                            |        |               | PCT  | PAT-Active  | US      | 10/595245     | 8040833      | US-2007-0014274-A1 |   |
| 12182 | METHOD FOR THE TRANSMISSION OF DATA FIELD OF TECHNOLOGY                                                                        |        |               | CNT  | APP-Pending | US      | 15/984155     |              | US-2018-0276701-A1 |   |
| 12183 | SHARED LINEARITY MAINTENANCE IN POWER AMPLIFIERS                                                                               |        |               | NP   | PAT-Active  | US      | 11/876484     | 7557653      | US-2008-0186092-A1 |   |
| 12184 | SHARED LINEARITY MAINTENANCE IN POWER AMPLIFIERS                                                                               |        |               | CNT  | PAT-Active  | US      | 12/358256     | 7688136      | US-2009-0128233-A1 |   |

|       | A                                                                                                                         | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                     | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12185 | COMMUNICATION TERMINAL DEVICE                                                                                             |        |               | NP   | PAT-Active | US      | 11/857291     | 8095078      | US-2008-0976504-A1 |   |
| 12186 | Data transfer in a computing device                                                                                       |        |               | NP   | PAT-Active | US      | 11/780504     | 8077644      | US-2009-0922077-A1 |   |
| 12187 | LOOP FILTER AND PHASE-LOCKED LOOP                                                                                         |        |               | NP   | PAT-Active | US      | 11/704544     | 8674754      | US-2008-0191753-A1 |   |
| 12188 | DETECTION ARRANGEMENT, COUNTER UNIT, PHASE-LOCKED LOOP, DETECTION METHOD AND METHOD FOR GENERATING AN OSCILLATOR SIGNAL   |        |               | NP   | PAT-Active | US      | 11/705924     | 7804925      | US-2008-0191921-A1 |   |
| 12189 | POLAR MODULATOR WITH SIGNED AMPLITUDE REDUCING PHASE TRANSITIONS                                                          |        |               | DIV  | PAT-Active | US      | 13/085501     | 8180302      | US-2011-0182373-A1 |   |
| 12190 | Amplifier-transmitter arrangement having an amplifier and method for amplifying a signal                                  |        |               | NP   | PAT-Active | US      | 11/698404     | 7538609      | US-2008-0180168-A1 |   |
| 12191 | CIRCUIT AND METHOD                                                                                                        |        |               | NP   | PAT-Active | US      | 11/743864     | 7848715      | US-2008-0274793-A1 |   |
| 12192 | CIRCUIT AND METHOD                                                                                                        |        |               | DIV  | PAT-Active | US      | 12/954872     | 8406705      | US-2011-0088835-A1 |   |
| 12193 | INTERFERENCE SUPPRESSION PROCESSING UNIT AND A METHOD OF SUPPRESSING INTERFERENCE IN WIRELESS DATA COMMUNICATION          |        |               | CNT  | PAT-Active | US      | 13/099844     | 8553755      | US-2011-0306171-A1 |   |
| 12194 | REGULATION OF AN AMPLIFICATION APPARATUS                                                                                  |        |               | NP   | PAT-Active | US      | 11/599529     | 9407227      | US-2008-0113635-A1 |   |
| 12195 | INTEGRATED CIRCUIT MEMORY DEVICE, METHOD OF OPERATING AN INTEGRATED CIRCUIT AND METHOD OF DESIGNING AN INTEGRATED CIRCUIT |        |               | NP   | PAT-Active | US      | 11/688357     | 8882806      | US-2008-0219037-A1 |   |
| 12196 | CIRCUIT ARRANGEMENT WITH INTERFERENCE PROTECTION                                                                          |        |               | CNT  | PAT-Active | US      | 12/778109     | 9673913      | US-2010-0219882-A1 |   |
| 12197 | GENERATION OF A TRANSMISSION SIGNAL                                                                                       |        |               | NP   | PAT-Active | US      | 12/136078     | 8888888      | US-2008-0317167-A1 |   |
| 12198 | DISTANCE MEASUREMENT IN A RADIO COMMUNICATION DEVICE                                                                      |        |               | NP   | PAT-Active | US      | 11/698934     | 7639182      | US-2008-0246651-A1 |   |
| 12199 | RADIO COMMUNICATION DEVICE AND METHOD FOR BOOTING A RADIO COMMUNICATION DEVICE                                            |        |               | NP   | PAT-Active | US      | 11/964338     | 9674176      | US-2009-0170473-A1 |   |
| 12200 | RADIO COMMUNICATION DEVICE AND METHOD FOR BOOTING A RADIO COMMUNICATION DEVICE                                            |        |               | CNT  | PAT-Active | US      | 15/161577     | 9753740      | US-2016-0266809-A1 |   |
| 12201 | MULTIBAND RF DEVICE                                                                                                       |        |               | CNT  | PAT-Active | US      | 14/526804     | 9374056      | US-2015-0119115-A1 |   |
| 12202 | CIRCUIT ARRANGEMENT WITH IMPROVED DECOUPLING                                                                              |        |               | NP   | PAT-Active | US      | 11/731398     | 7983627      | US-2008-0242235-A1 |   |
| 12203 | CIRCUIT ARRANGEMENT WITH IMPROVED DECOUPLING                                                                              |        |               | CNT  | PAT-Active | US      | 13/607063     | 8718578      | US-2013-0302370-A1 |   |
| 12204 | CIRCUIT ARRANGEMENT WITH IMPROVED DECOUPLING                                                                              |        |               | DIV  | PAT-Active | US      | 13/165942     | 8265571      | US-2011-0248792-A1 |   |
| 12205 | MULTI-MODE AMPLIFIER ARRANGEMENT AND METHOD FOR CONTROLLING AN AMPLIFIER ARRANGEMENT                                      |        |               | NP   | PAT-Active | US      | 11/751946     | 7605657      | US-2008-0290943-A1 |   |
| 12206 | Saturation Handling                                                                                                       |        |               | NP   | PAT-Active | US      | 11/768172     | 7551034      | US-2008-0315956-A1 |   |
| 12207 | TRANSMISSION UNIT AND A METHOD FOR TRANSMITTING DATA                                                                      |        |               | NP   | PAT-Active | US      | 12/014641     | 9385804      | US-2009-0180462-A1 |   |
| 12208 | POLAR MODULATOR ARRANGEMENT AND POLAR MODULATION METHOD                                                                   |        |               | NP   | PAT-Active | US      | 11/768855     | 7545232      | US-2008-0317168-A1 |   |
| 12209 | CONFIGURABLE TRANSCEIVER                                                                                                  |        |               | NP   | PAT-Active | US      | 12/051789     | 8279913      | US-2009-0238249-A1 |   |

|       | A                                                                                                   | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                               | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12210 | CIRCUIT ARRANGEMENT FOR PROCESSING A RADIO-FREQUENCY SIGNAL                                         |        |               | NP   | PAT-Active | US      | 12/238315     | 9486907      | US-2009-0088109-A1 |   |
| 12211 | MULTI-MODE MODULATOR                                                                                |        |               | NP   | PAT-Active | US      | 11/766558     | 7853212      | US-2008-0318620-A1 |   |
| 12212 | Compensation of nonlinearity of single ended digital to analog converters                           |        |               | NP   | PAT-Active | US      | 11/941811     | 7489261      |                    |   |
| 12213 | Compensation of nonlinearity of single ended digital to analog converters                           |        |               | CNT  | PAT-Active | US      | 12/358254     | 7675442      | US-2009-0128383-A1 |   |
| 12214 | Compensation of nonlinearity of single ended digital to analog converters                           |        |               | CNT  | PAT-Active | US      | 12/705705     | 7944381      | US-2010-0141327-A1 |   |
| 12215 | COMPENSATION OF NONLINEARITY OF SINGLE ENDED DIGITAL TO ANALOG CONVERTERS                           |        |               | CSP  | PAT-Active | US      | 13/103917     | 8663995      | US-2011-0285453-A1 |   |
| 12216 | REUSE OF DIGITAL INTERFACE FOR MULTIPLE COMPONENTS                                                  |        |               | NP   | PAT-Active | US      | 11/845448     | 8958507      | US-2009-0061011-A1 |   |
| 12217 | Communication device and method for setting device resources                                        |        |               | NP   | PAT-Active | US      | 11/853974     | 8135444      | US-2009-0070508-A1 |   |
| 12218 | METHOD FOR SETTING DATA TRANSMISSION PARAMETERS AND COMMUNICATION DEVICE                            |        |               | NP   | PAT-Active | US      | 11/985417     | 8180091      | US-2009-0137235-A1 |   |
| 12219 | METHOD FOR SETTING DATA TRANSMISSION PARAMETERS AND COMMUNICATION DEVICE                            |        |               | CNT  | PAT-Active | US      | 13/466546     | 8588700      | US-2012-0221719-A1 |   |
| 12220 | Polar Modulation without Analog Filtering                                                           |        |               | NP   | PAT-Active | US      | 11/855782     | 7619487      | US-2009-0072521-A1 |   |
| 12221 | Setting an Output Level of an Amplifier Apparatus                                                   |        |               | NP   | PAT-Active | US      | 12/554534     | 8193858      | US-2010-0075209-A1 |   |
| 12222 | Amplitude Attenuation Estimation and Recovery Systems for OFDM Signal used in Communication Systems |        |               | NP   | PAT-Active | US      | 11/865393     | 7970462      | US-2009-0086618-A1 |   |
| 12223 | HIGH BANDWIDTH MODULATION AND TRANSMISSION                                                          |        |               | NP   | PAT-Active | US      | 12/241082     | 8254493      | US-2010-0080319-A1 |   |
| 12224 | HIGH BANDWIDTH MODULATION AND TRANSMISSION                                                          |        |               | CNT  | PAT-Active | US      | 13/570220     | 8566338      | US-2012-0300879-A1 |   |
| 12225 | COMMUNICATION DEVICE PERFORMING MEASUREMENTS USING ASSIGNED TIME SLOTS                              |        |               | NP   | PAT-Active | US      | 11/835192     | 9271174      | US-2009-0042559-A1 |   |
| 12226 | SYSTEMS AND METHODS FOR PERFORMING MEASUREMENTS IN TRANSMISSION GAPS                                |        |               | CNT  | PAT-Active | US      | 14/702222     | 9603043      | US-2015-0245237-A1 |   |
| 12227 | SYSTEMS AND METHODS FOR PERFORMING MEASUREMENTS IN TRANSMISSION GAPS                                |        |               | CNT  | PAT-Active | US      | 15/428492     | #####        | US-2017-0156074-A1 |   |
| 12228 | DETERMINING A RECEIVING QUALITY IN A RADIO COMMUNICATION DEVICE                                     |        |               | NP   | PAT-Active | US      | 11/836844     | 8532605      | US-2009-0042532-A1 |   |
| 12229 | DETERMINING A RECEIVING QUALITY IN A RADIO COMMUNICATION DEVICE                                     |        |               | CNT  | PAT-Active | US      | 13/963300     | 9380470      | US-2013-0322284-A1 |   |
| 12230 | Systems and Methods for Self-Calibrating Transceivers                                               |        |               | NP   | PAT-Active | US      | 11/947630     | 8176452      | US-2009-0143015-A1 |   |
| 12231 | DIGITAL FILTER                                                                                      |        |               | NP   | PAT-Active | US      | 12/201465     | 8271568      | US-2010-0057821-A1 |   |
| 12232 | DIGITAL FILTER                                                                                      |        |               | CNT  | PAT-Active | US      | 13/591316     | 9190983      | US-2012-0331026-A1 |   |
| 12233 | DIGITAL FILTER                                                                                      |        |               | CNT  | PAT-Active | US      | 14/925895     | #####        | US-2016-0049923-A1 |   |
| 12234 | APPARATUS AND METHOD USING FIRST AND SECOND CLOCKS                                                  |        |               | NP   | PAT-Active | US      | 12/201505     | 8510589      | US-2010-0058103-A1 |   |

|       | A                                                                         | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                     | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12235 | APPARATUS AND METHOD USING FIRST AND SECOND CLOCKS                        |        |               | CNT  | PAT-Active | US      | 13/924526     | 9201447      | US-2014-0906839-A1 |   |
| 12236 | APPARATUS AND METHOD USING FIRST AND SECOND CLOCKS                        |        |               | CNT  | PAT-Active | US      | 14/925887     | 9921605      | US-2016-0948154-A1 |   |
| 12237 | RADIO COMMUNICATION DEVICE AND METHOD FOR CONTROLLING FREQUENCY SELECTION |        |               | NP   | PAT-Active | US      | 11/876234     | 8548482      | US-2009-0104913-A1 |   |
| 12238 | RADIO COMMUNICATION DEVICE AND METHOD FOR CONTROLLING FREQUENCY SELECTION |        |               | CNT  | PAT-Active | US      | 14/013200     | 9408189      | US-2014-0923017-A1 |   |
| 12239 | FREQUENCY SYNTHESIS USING UPCONVERSION PLL PROCESSES                      |        |               | NP   | PAT-Active | US      | 12/022957     | 8428212      | US-2009-0190798-A1 |   |
| 12240 | Highly optimized digital IQ transmitter chain                             |        |               | NP   | PAT-Active | US      | 12/044814     | 8213542      | US-2009-0225803-A1 |   |
| 12241 | HIGHLY OPTIMIZED DIGITAL IQ TRANSMITTER CHAIN                             |        |               | CNT  | PAT-Active | US      | 13/535827     | 8842777      | US-2012-0263260-A1 |   |
| 12242 | MULTIMODE RECEIVER WITH ACTIVE BLOCKER SUPPRESSION                        |        |               | NP   | PAT-Active | US      | 12/114264     | 8086205      | US-2009-0275304-A1 |   |
| 12243 | MULTIMODE RECEIVER WITH ACTIVE BLOCKER SUPPRESSION                        |        |               | CNT  | PAT-Active | US      | 13/325234     | 8678143      | US-2012-0083236-A1 |   |
| 12244 | Retransmission of erroneous data                                          |        |               | NP   | PAT-Active | US      | 12/018932     | 8082478      | US-2009-0193311-A1 |   |
| 12245 | WIRELESS COMMUNICATION DEVICE ANTENNA WITH TUNING ELEMENTS                |        |               | NP   | PAT-Active | US      | 12/475379     | 8405568      | US-2010-0302123-A1 |   |
| 12246 | VARIABLE-SIZE MIXER FOR HIGH GAIN RANGE TRANSMITTER                       |        |               | NP   | PAT-Active | US      | 12/416404     | 8422588      | US-2010-0254490-A1 |   |
| 12247 | VARIABLE-SIZE MIXER FOR HIGH GAIN RANGE TRANSMITTER                       |        |               | CNT  | PAT-Active | US      | 13/029820     | 9059661      | US-2013-0290925-A1 |   |
| 12248 | VARIABLE-SIZE MIXER FOR HIGH GAIN RANGE TRANSMITTER                       |        |               | CNT  | PAT-Active | US      | 13/828975     | 9184699      | US-2013-0203366-A1 |   |
| 12249 | METHODS FOR CALIBRATING A TRANSMITTER AND RADIO TRANSMITTER               |        |               | NP   | PAT-Active | US      | 12/389155     | 8218047      | US-2009-0163155-A1 |   |
| 12250 | Methods for calibrating a transmitter and radio transmitter               |        |               | CNT  | PAT-Active | US      | 13/543959     | 9231714      | US-2012-0275862-A1 |   |
| 12251 | HIGH-FREQUENCY PRESTAGE AND RECEIVER                                      |        |               | NP   | PAT-Active | US      | 12/563607     | 8663512      | US-2010-0081407-A1 |   |
| 12252 | CONTINUOUS OPEN LOOP CONTROL TO CLOSED LOOP CONTROL TRANSITION            |        |               | NP   | PAT-Active | US      | 12/170207     | 8792579      | US-2010-0008410-A1 |   |
| 12253 | RADIO FREQUENCY COMMUNICATION DEVICES AND METHODS                         |        |               | NP   | PAT-Active | US      | 12/116576     | 8175554      | US-2009-0280755-A1 |   |
| 12254 | ADAPTATION TECHNIQUES IN MIMO                                             |        |               | NP   | PAT-Active | US      | 12/186368     | 8855257      | US-2009-0702014-A1 |   |
| 12255 | ADAPTATION TECHNIQUES IN MIMO                                             |        |               | CNT  | PAT-Active | US      | 14/479066     | 9154201      | US-2015-0092895-A1 |   |
| 12256 | TRANSMITTER WITH HYBRID CLOSED LOOP POWER CONTROL                         |        |               | NP   | PAT-Active | US      | 12/233360     | 8315581      | US-2010-0065026-A1 |   |
| 12257 | TRANSMITTER WITH HYBRID CLOSED LOOP POWER CONTROL                         |        |               | CNT  | PAT-Active | US      | 13/644823     | 8699976      | US-2013-0029616-A1 |   |
| 12258 | DIVERSITY RECEIVER                                                        |        |               | NP   | PAT-Active | US      | 12/052527     | 8351489      | US-2009-0238246-A1 |   |
| 12259 | Device and Method for Generating an Output Signal                         |        |               | NP   | PAT-Active | US      | 12/491520     | 8098096      | US-2009-0273400-A1 |   |



|       | A                                                                                                                                                       | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                   | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12260 | CQI TABLE FOR WIRELESS MIMO NETWORKS                                                                                                                    |        |               | NP   | PAT-Active  | US      | 12/248739     | 8144797      | US-2009-0245408-A1 |   |
| 12261 | CQI TABLE FOR WIRELESS MIMO NETWORK                                                                                                                     |        |               | CNT  | PAT-Active  | US      | 13/428784     | 8611453      | US-2012-0182899-A1 |   |
| 12262 | PARTITIONED BLUETOOTH SYSTEM                                                                                                                            |        |               | NP   | PAT-Active  | US      | 12/192160     | 9195628      | US-2010-0041336-A1 |   |
| 12263 | Circuit with single-ended input and differential output                                                                                                 |        |               | NP   | PAT-Active  | US      | 12/174857     | 7777575      | US-2010-0013562-A1 |   |
| 12264 | Jumpless Phase Modulation In A Polar Modulation Environment                                                                                             |        |               | NP   | PAT-Active  | US      | 12/233318     | 7872545      | US-2010-0067617-A1 |   |
| 12265 | JUMPLESS PHASE MODULATION IN A POLAR MODULATION ENVIRONMENT                                                                                             |        |               | CNT  | PAT-Active  | US      | 12/972513     | 8502615      | US-2011-0084777-A1 |   |
| 12266 | RADIO FREQUENCY COMMUNICATION DEVICES AND METHODS                                                                                                       |        |               | NP   | PAT-Active  | US      | 12/200132     | 8568814      | US-2010-0056294-A1 |   |
| 12267 | CHANNEL ESTIMATOR                                                                                                                                       |        |               | NP   | PAT-Active  | US      | 12/170149     | 8428536      | US-2010-0099549-A1 |   |
| 12268 | METHOD FOR DETERMINING ACTIVE COMMUNICATION SESSIONS AND COMMUNICATION SESSION INFORMATION SERVER                                                       |        |               | CNT  | PAT-Active  | US      | 14/253761     | 9686327      | US-2014-0244758-A1 |   |
| 12269 | Decoder of Error Correction Codes                                                                                                                       |        |               | NP   | PAT-Active  | US      | 12/199414     | 8190977      | US-2010-0058149-A1 |   |
| 12270 | METHODS FOR CONTROLLING AN UPLINK SIGNAL TRANSMISSION POWER AND COMMUNICATION DEVICES                                                                   |        |               | NP   | PAT-Active  | US      | 12/210571     | 8311053      | US-2010-0067496-A1 |   |
| 12271 | Method for Determining the Type of a Mobile Radio Base Station; Radio Communication Terminal and Network Devices; Radio Communication Smart Card Device |        |               | NP   | PAT-Active  | US      | 12/233119     | 8180580      | US-2010-0069119-A1 |   |
| 12272 | METHOD FOR DETERMINING THE TYPE OF A MOBILE RADIO BASE STATION; RADIO COMMUNICATION TERMINAL AND NETWORK DEVICES; RADIO COMMUNICATION SMART CARD DEVICE |        |               | CNT  | PAT-Active  | US      | 13/419136     | 8989748      | US-2012-0172032-A1 |   |
| 12273 | METHODS AND APPARATUSES FOR DETERMINING CELL ACCESS DURING A CELL SEARCH                                                                                |        |               | CNT  | PAT-Active  | US      | 14/615124     | 9681288      | US-2015-0156621-A1 |   |
| 12274 | METHODS AND APPARATUSES FOR DETERMINING CELL ACCESS DURING A CELL SEARCH                                                                                |        |               | CNT  | APP-Pending | US      | 15/585358     |              | US-2017-0237514-A1 |   |
| 12275 | IQ-MODULATION                                                                                                                                           |        |               | NP   | PAT-Active  | US      | 12/397093     | 7989629      | US-2010-0225409-A1 |   |
| 12276 | METHOD AND DEVICE FOR TRANSFERRING DATA                                                                                                                 |        |               | NP   | PAT-Active  | US      | 12/353029     | 8363767      | US-2010-0177808-A1 |   |
| 12277 | MULTIBAND-OPERATION IN WIRELESS COMMUNICATION SYSTEMS                                                                                                   |        |               | CNT  | PAT-Active  | US      | 14/179717     | 9788308      | US-2014-0161577-A1 |   |
| 12278 | MULTIBAND-OPERATION IN WIRELESS COMMUNICATION SYSTEMS                                                                                                   |        |               | CNT  | APP-Pending | US      | 15/729206     |              | US-2018-0255533-A1 |   |
| 12279 | FILTERING USING IMPEDANCE TRANSLATOR                                                                                                                    |        |               | NP   | PAT-Active  | US      | 12/419873     | 8180318      | US-2010-0255791-A1 |   |
| 12280 | FILTERING USING IMPEDANCE TRANSLATOR                                                                                                                    |        |               | CNT  | PAT-Active  | US      | 13/451389     | 8644785      | US-2012-0201175-A1 |   |
| 12281 | METHODS OF PREPARING A POWER SAVING STATE UNIVERSAL SERIAL BUS DEVICE AND UNIVERSAL SERIAL BUS HOST                                                     |        |               | NP   | PAT-Active  | US      | 12/565797     | 8332676      | US-2011-0072264-A1 |   |
| 12282 | APPARATUS AND METHOD FOR MAPPING PHYSICAL CONTROL CHANNELS                                                                                              |        |               | NP   | PAT-Active  | US      | 12/501588     | 8583128      | US-2011-0097895-A1 |   |
| 12283 | Minimizing Mutual Coupling                                                                                                                              |        |               | NP   | PAT-Active  | US      | 12/475352     | 8170510      | US-2010-0304688-A1 |   |

|       | A                                                                                                                                                                                                      | B      | C             | D    | E          | F       | G             | H            | I                   | J |
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| 2     | TITLE                                                                                                                                                                                                  | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number  |   |
| 12284 | MINIMIZING MUTUAL COUPLING                                                                                                                                                                             |        |               | CNT  | PAT-Active | US      | 13/425084     | 8521107      | US-2012-0178388-A1  |   |
| 12285 | PHASE-LOCK IN ALL-DIGITAL PHASE-LOCKED LOOPS                                                                                                                                                           |        |               | CNT  | PAT-Active | US      | 13/770083     | 9214947      | US-2013-0162355-A1  |   |
| 12286 | COMPENSATION OF PHASE LOCK LOOP (PLL) PHASE DISTRIBUTION CAUSED BY POWER AMPLIFIER RAMPING                                                                                                             |        |               | NP   | PAT-Active | US      | 12/488768     | 8058917      | US-2010-0315140-A1  |   |
| 12287 | TIME-TO-DIGITAL CONVERTER WITH BUILT-IN SELF TEST                                                                                                                                                      |        |               | NP   | PAT-Active | US      | 12/684771     | 8072361      | US-2011-01659673-A1 |   |
| 12288 | TIME-TO-DIGITAL CONVERTER WITH BUILT-IN SELF TEST                                                                                                                                                      |        |               | CNT  | PAT-Active | US      | 13/287788     | 8754793      | US-2012-0044192-A1  |   |
| 12289 | Digital to Analog Converter Comprising Mixer                                                                                                                                                           |        |               | NP   | PAT-Active | US      | 12/578301     | 8111182      | US-2011-0085616-A1  |   |
| 12290 | PREDISTORTION OF AMPLIFIER INPUT SIGNALS                                                                                                                                                               |        |               | NP   | PAT-Active | US      | 12/846416     | 8577311      | US-2011-0025414-A1  |   |
| 12291 | Method for Transmitting a Data Signal in a MIMO System                                                                                                                                                 |        |               | CNT  | PAT-Active | US      | 13/767088     | 8885753      | US-2013-0183891-A1  |   |
| 12292 | METHOD FOR TRANSMITTING A DATA SIGNAL IN A MIMO SYSTEM                                                                                                                                                 |        |               | CNT  | PAT-Active | US      | 14/515726     | 8997739      | US-2015-0071377-A1  |   |
| 12293 | Oscillator with capacitance array                                                                                                                                                                      |        |               | NP   | PAT-Active | US      | 12/642806     | 8154356      | US-2011-0148530-A1  |   |
| 12294 | OSCILLATOR WITH CONTROLLABLE FREQUENCY                                                                                                                                                                 |        |               | NP   | PAT-Active | US      | 12/721730     | 9413565      | US-2011-0221539-A1  |   |
| 12295 | TEMPERATURE COMPENSATION FOR AN OSCILLATOR CRYSTAL                                                                                                                                                     |        |               | NP   | PAT-Active | US      | 12/697285     | 9344095      | US-2011-0187422-A1  |   |
| 12296 | On-Chip Self-Calibrating Delay Monitoring Circuitry                                                                                                                                                    |        |               | NP   | PAT-Active | US      | 12/696731     | 8228106      | US-2011-0127433-A1  |   |
| 12297 | ON-CHIP SELF CALIBRATING DELAY MONITORING CIRCUITRY                                                                                                                                                    |        |               | DIV  | PAT-Active | US      | 13/535440     | 8461043      | US-2012-0262213-A1  |   |
| 12298 | RADIO COMMUNICATION DEVICES INFORMATION PROVIDERS, METHODS FOR CONTROLLING A RADIO COMMUNICATION DEVICE AND METHODS FOR CONTROLLING AN INFORMATION PROVIDER                                            |        |               | NP   | PAT-Active | US      | 12/845800     | 8521109      | US-2012-0028638-A1  |   |
| 12299 | RADIO COMMUNICATION DEVICES INFORMATION PROVIDERS, METHODS FOR CONTROLLING A RADIO COMMUNICATION DEVICE AND METHODS FOR CONTROLLING AN INFORMATION PROVIDER                                            |        |               | CNT  | PAT-Active | US      | 14/841471     | 9622320      | US-2015-0373592-A1  |   |
| 12300 | SUPPRESSION OF LOW-FREQUENCY NOISE FROM PHASE DETECTOR IN PHASE CONTROL LOOP                                                                                                                           |        |               | NP   | PAT-Active | US      | 12/758393     | 8330509      | US-2011-0248753-A1  |   |
| 12301 | SATELLITE-BASED POSITION DETERMINATION                                                                                                                                                                 |        |               | NP   | PAT-Active | US      | 12/869726     | 8988282      | US-2012-0050102-A1  |   |
| 12302 | SATELLITE-BASED POSITION DETERMINATION                                                                                                                                                                 |        |               | CNT  | PAT-Active | US      | 14/693178     | 9933524      | US-2015-0276933-A1  |   |
| 12303 | METHOD AND APPARATUS FOR REQUESTING MEDIA REPLICATION IN A COLLABORATIVE COMMUNICATION SESSION AND METHOD AND APPARATUS FOR ASSIGNING A COMMUNICATION MEDIUM FOR A COLLABORATIVE COMMUNICATION SESSION |        |               | NP   | PAT-Active | US      | 13/117213     | 8832186      | US-2011-0295954-A1  |   |
| 12304 | METHOD AND APPARATUS FOR REQUESTING MEDIA REPLICATION IN A COLLABORATIVE COMMUNICATION SESSION AND METHOD AND APPARATUS FOR ASSIGNING A COMMUNICATION MEDIUM FOR A COLLABORATIVE COMMUNICATION SESSION |        |               | CNT  | PAT-Active | US      | 14/451258     | 9225779      | US-2014-0344368-A1  |   |
| 12305 | METHOD AND APPARATUS FOR REQUESTING MEDIA REPLICATION IN A COLLABORATIVE COMMUNICATION SESSION AND METHOD AND APPARATUS FOR ASSIGNING A COMMUNICATION MEDIUM FOR A COLLABORATIVE COMMUNICATION SESSION |        |               | CNT  | PAT-Active | US      | 14/462423     | 9178941      | US-2014-0355020-A1  |   |

|       | A                                                                                                                                                                                                      | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                                                                  | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12306 | METHOD AND APPARATUS FOR REQUESTING MEDIA REPLICATION IN A COLLABORATIVE COMMUNICATION SESSION AND METHOD AND APPARATUS FOR ASSIGNING A COMMUNICATION MEDIUM FOR A COLLABORATIVE COMMUNICATION SESSION |        |               | CNT  | PAT-Active | US      | 13/942437     | 8531806      | US-2016-0072884-A1 |   |
| 12307 | COMMUNICATION TERMINAL METHOD FOR RECEIVING DATA AND COMPUTER PROGRAM PRODUCT                                                                                                                          |        |               | NP   | PAT-Active | US      | 13/178528     | 9198228      | US-2012-0098721-A1 |   |
| 12308 | USER EQUIPMENT AND METHOD FOR PERFORMING DOWNLINK AND/OR UPLINK POWER CONTROL                                                                                                                          |        |               | NP   | PAT-Active | US      | 12/967180     | 8538472      | US-2012-0145424-A1 |   |
| 12309 | USER EQUIPMENT AND METHOD FOR PERFORMING DOWNLINK AND/OR UPLINK POWER CONTROL                                                                                                                          |        |               | CNT  | PAT-Active | US      | 13/955481     | 9307501      | US-2013-0315170-A1 |   |
| 12310 | DC POWER CONTROL FOR POWER AMPLIFIERS                                                                                                                                                                  |        |               | NP   | PAT-Active | US      | 12/871094     | 8463208      | US-2012-0092823-A1 |   |
| 12311 | DC POWER CONTROL FOR POWER AMPLIFIERS                                                                                                                                                                  |        |               | CNT  | PAT-Active | US      | 13/913659     | 8755759      | US-2013-0273979-A1 |   |
| 12312 | CALIBRATION CIRCUIT AND METHOD FOR CALIBRATING CAPACITIVE COMPENSATION IN DIGITAL-TO-ANALOG CONVERTERS                                                                                                 |        |               | NP   | PAT-Active | US      | 12/987314     | 8325072      | US-2012-0175258-A1 |   |
| 12313 | METHOD FOR PROCESSING DATA                                                                                                                                                                             |        |               | NP   | PAT-Active | US      | 12/939327     | 8273678      | US-2012-0114016-A1 |   |
| 12314 | RF FEEDBACK RECEIVER ARRANGEMENT RF TRANSMIT ARRANGEMENT AND RF TRANSCEIVER ARRANGEMENT                                                                                                                |        |               | NP   | PAT-Active | US      | 13/941058     | 8639182      | US-2012-0214426-A1 |   |
| 12315 | PA BIAS OPTIMIZATION FOR MODULATION SCHEMES WITH VARIABLE BANDWIDTH                                                                                                                                    |        |               | NP   | PAT-Active | US      | 12/882544     | 8655293      | US-2012-0065849-A1 |   |
| 12316 | PA BIAS OPTIMIZATION FOR MODULATION SCHEMES WITH VARIABLE BANDWIDTH                                                                                                                                    |        |               | CNT  | PAT-Active | US      | 14/179861     | 8938205      | US-2014-0162578-A1 |   |
| 12317 | RESOURCE ALLOCATION IN A MOBILE COMMUNICATION SYSTEM                                                                                                                                                   |        |               | PCT  | PAT-Active | US      | 13/920157     | 9247479      | US-2013-0273257-A1 |   |
| 12318 | RESOURCE ALLOCATION IN A MOBILE COMMUNICATION SYSTEM                                                                                                                                                   |        |               | INV  | PAT-Active | US      | 14/943855     | 9980206      | US-2016-0073320-A1 |   |
| 12319 | COEFFICIENT BOOST MULTIPLY ACCUMULATE UNIT                                                                                                                                                             |        |               | NP   | PAT-Active | US      | 12/978826     | 8819100      | US-2012-0165504-A1 |   |
| 12320 | RECEIVER FOR RECEIVING RF-SIGNALS IN A PLURALITY OF DIFFERENT COMMUNICATION BANDS AND TRANSCEIVER                                                                                                      |        |               | NP   | PAT-Active | US      | 13/027497     | 8649302      | US-2012-0297064-A1 |   |
| 12321 | RECEIVER FOR RECEIVING RF-SIGNALS IN A PLURALITY OF DIFFERENT COMMUNICATION BANDS AND TRANSCEIVER                                                                                                      |        |               | CNT  | PAT-Active | US      | 14/176221     | 8953502      | US-2014-0153016-A1 |   |
| 12322 | RECEIVER WITH WIDE DYNAMIC RANGE AND LOW POWER CONSUMPTION                                                                                                                                             |        |               | NP   | PAT-Active | US      | 12/984864     | 8971835      | US-2012-0169419-A1 |   |
| 12323 | AMPLIFIER CIRCUIT MOBILE COMMUNICATION DEVICE AND METHOD FOR ADJUSTING A BIAS OF A POWER AMPLIFIER                                                                                                     |        |               | NP   | PAT-Active | US      | 13/073067     | 8497737      | US-2012-0249236-A1 |   |
| 12324 | DIGITAL-TO-ANALOG CONVERSION ARRANGEMENT WITH POWER RANGE DEPENDENT D/A CONVERTER SELECTION                                                                                                            |        |               | NP   | PAT-Active | US      | 13/106992     | 8462035      | US-2012-0286984-A1 |   |
| 12325 | JOINT ADAPTIVE BIAS POINT ADJUSTMENT AND DIGITAL PRE-DISTORTION FOR POWER AMPLIFIER                                                                                                                    |        |               | NP   | PAT-Active | US      | 13/036758     | 8908751      | US-2012-0219048-A1 |   |
| 12326 | COMMUNICATION DEVICES AND METHODS FOR NETWORK SIGNALING                                                                                                                                                |        |               | NP   | PAT-Active | US      | 13/043806     | 9374787      | US-2012-0236244-A1 |   |
| 12327 | COMMUNICATION DEVICES AND METHODS FOR NETWORK SIGNALING                                                                                                                                                |        |               | CNT  | PAT-Active | US      | 15/150557     | 9632567      | US-2016-0277945-A1 |   |
| 12328 | COMMUNICATION DEVICES AND METHODS FOR NETWORK SIGNALING                                                                                                                                                |        |               | CNT  | PAT-Active | US      | 15/453552     | 8888888      | US-2017-0180974-A1 |   |
| 12329 | SIGNAL PROCESSING CIRCUIT AND METHOD                                                                                                                                                                   |        |               | NP   | PAT-Active | US      | 13/403240     | 8767868      | US-2012-0215088-A1 |   |

|       | A                                                                                                                             | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                         | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12330 | SIGNAL PROCESSING CIRCUIT AND METHOD                                                                                          |        |               | CNT  | PAT-Active | US      | 14/278938     | 8934574      | US-2014-0247905-A1 |   |
| 12331 | METHOD FOR TRANSMITTING A SIGNAL                                                                                              |        |               | NP   | PAT-Active | US      | 13/083575     | 8711977      | US-2012-0257686-A1 |   |
| 12332 | METHOD FOR TRANSMITTING A SIGNAL                                                                                              |        |               | CNT  | PAT-Active | US      | 14/217889     | 8989309      | US-2014-0198782-A1 |   |
| 12333 | MOBILE COMMUNICATION TERMINAL AND METHOD FOR REGISTERING A MOBILE COMMUNICATION TERMINAL IN A COMMUNICATION NETWORK           |        |               | NP   | PAT-Active | US      | 13/040286     | 8463265      | US-2012-0226651-A1 |   |
| 12334 | MOBILE COMMUNICATION TERMINAL AND METHOD FOR REGISTERING A MOBILE COMMUNICATION TERMINAL IN A COMMUNICATION NETWORK           |        |               | CNT  | PAT-Active | US      | 13/913528     | 9175171      | US-2013-0286660-A1 |   |
| 12335 | MOBILE COMMUNICATIONS RADIO RECEIVER FOR MULTIPLE NETWORK OPERATION                                                           |        |               | NP   | PAT-Active | US      | 13/105069     | 8611952      | US-2012-0286285-A1 |   |
| 12336 | MOBILE COMMUNICATIONS RADIO RECEIVER FOR MULTIPLE NETWORK OPERATION                                                           |        |               | DIV  | PAT-Active | US      | 14/083553     | 9735819      | US-2014-0294131-A1 |   |
| 12337 | MOBILE COMMUNICATIONS RADIO RECEIVER FOR PROCESSING SIGNALS FROM MULTIPLE NETWORKS                                            |        |               | CNT  | PAT-Active | US      | 15/855143     | #####        | US-2018-0086674-A1 |   |
| 12338 | RF DAC WITH CONFIGURABLE DAC MIXER INTERFACE AND CONFIGURABLE MIXER                                                           |        |               | NP   | PAT-Active | US      | 13/106963     | 8604958      | US-2012-0286983-A1 |   |
| 12339 | RF DAC WITH CONFIGURABLE DAC MIXER INTERFACE AND CONFIGURABLE MIXER                                                           |        |               | CNT  | PAT-Active | US      | 14/100227     | 9143155      | US-2014-0291959-A1 |   |
| 12340 | MOBILE COMMUNICATIONS RADIO RECEIVER FOR MULTIPLE NETWORK OPERATION                                                           |        |               | NP   | PAT-Active | US      | 13/108925     | 8738074      | US-2012-0289176-A1 |   |
| 12341 | MOBILE COMMUNICATIONS RADIO RECEIVER FOR MULTIPLE NETWORK OPERATION                                                           |        |               | DIV  | PAT-Active | US      | 14/265423     | 9526126      | US-2014-0235292-A1 |   |
| 12342 | RECEIVER OF A MOBILE COMMUNICATION DEVICE                                                                                     |        |               | NP   | PAT-Active | US      | 13/108508     | 9088328      | US-2012-0295604-A1 |   |
| 12343 | ADAPTIVE FILTERING OF BLOCKER SIGNALS IN DEMODULATORS                                                                         |        |               | NP   | PAT-Active | US      | 13/328388     | 8610495      | US-2013-0154728-A1 |   |
| 12344 | MIXER CELL MODULATOR AND METHOD                                                                                               |        |               | NP   | PAT-Active | US      | 13/464163     | 8704606      | US-2012-0286891-A1 |   |
| 12345 | ANTENNA TUNER IN COMBINATION WITH MODIFIED FEEDBACK RECEIVER FOR IMPROVED ANTENNA MATCHING                                    |        |               | NP   | PAT-Active | US      | 13/081694     | 8452246      | US-2012-0286675-A1 |   |
| 12346 | TRANSMIT CIRCUIT METHOD FOR ADJUSTING A BIAS OF A POWER AMPLIFIER AND METHOD FOR ADAPTING THE PROVISION OF A BIAS INFORMATION |        |               | NP   | PAT-Active | US      | 13/191685     | 8761698      | US-2013-0027129-A1 |   |
| 12347 | TRANSMIT CIRCUIT METHOD FOR ADJUSTING A BIAS OF A POWER AMPLIFIER AND METHOD FOR ADAPTING THE PROVISION OF A BIAS INFORMATION |        |               | DIV  | PAT-Active | US      | 14/273672     | 9124316      | US-2014-0246844-A1 |   |
| 12348 | TRANSMIT CIRCUIT METHOD FOR ADJUSTING A BIAS OF A POWER AMPLIFIER AND METHOD FOR ADAPTING THE PROVISION OF A BIAS INFORMATION |        |               | CNT  | PAT-Active | US      | 14/808140     | 9520841      | US-2015-0333711-A1 |   |
| 12349 | FEEDBACK RECEIVER FOR ANTENNA TUNER CALCULATIONS                                                                              |        |               | NP   | PAT-Active | US      | 13/273563     | 8601319      | US-2013-0294556-A1 |   |
| 12350 | FEEDBACK RECEIVER FOR ANTENNA TUNER CALCULATIONS                                                                              |        |               | CNT  | PAT-Active | US      | 14/065762     | 8954022      | US-2014-0057579-A1 |   |
| 12351 | RADIO DEVICES REGULATION SERVERS AND VERIFICATION SERVERS                                                                     |        |               | CNT  | PAT-Active | US      | 14/296337     | 9094337      | US-2014-0287719-A1 |   |
| 12352 | RADIO DEVICES REGULATION SERVERS AND VERIFICATION SERVERS                                                                     |        |               | CIP  | PAT-Active | US      | 13/219745     | 8779890      | US-2012-0182121-A1 |   |
| 12353 | SPLIT VARACTOR ARRAY WITH IMPROVED MATCHING AND VARACTOR SWITCHING SCHEME                                                     |        |               | NP   | PAT-Active | US      | 13/281871     | 8779867      | US-2013-0107978-A1 |   |
| 12354 | ADJUSTABLE DELAYER METHOD FOR DELAYING AN INPUT SIGNAL AND POLAR TRANSMITTER                                                  |        |               | NP   | PAT-Active | US      | 13/184171     | 8909065      | US-2013-0016982-A1 |   |

|       | A                                                                                                                                                                                                     | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                                                                 | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12355 | ADJUSTABLE DELAYER METHOD FOR DELAYING AN INPUT SIGNAL AND POLAR TRANSMITTER                                                                                                                          |        |               | CNT  | PAT-Active  | US      | 14/560863     | 9438351      | US-2015-0195041-A1 |   |
| 12356 | HIGH-SPEED LEVEL SHIFTER BETWEEN LOW-SIDE LOGIC AND HIGH-SIDE LOGIC                                                                                                                                   |        |               | NP   | PAT-Active  | US      | 13/222215     | 8581627      | US-2013-0049808-A1 |   |
| 12357 | DETECTION OF BINARY SIGNALING IN COMMUNICATIONS RADIO RECEIVER                                                                                                                                        |        |               | NP   | PAT-Active  | US      | 13/455576     | 8862085      | US-2013-0288629-A1 |   |
| 12358 | ADAPTIVE COMPENSATION OF NONLINEAR FREQUENCY DISTORTION IN POLAR TRANSMITTERS BASED ON A LEAST SQUARES ESTIMATION                                                                                     |        |               | NP   | PAT-Active  | US      | 13/326749     | 8798134      | US-2013-0156083-A1 |   |
| 12359 | METHOD FOR PROCESSING A DATA SIGNAL AND RECEIVER CIRCUIT                                                                                                                                              |        |               | NP   | PAT-Active  | US      | 13/544045     | 9210006      | US-2014-0010275-A1 |   |
| 12360 | MODEM DEVICES APPLICATION PROCESSORS COMMUNICATION DEVICES METHODS FOR CONTROLLING A MODEM DEVICE METHODS FOR CONTROLLING AN APPLICATION PROCESSOR AND METHODS FOR CONTROLLING A COMMUNICATION DEVICE |        |               | PCT  | PAT-Active  | US      | 13/977163     | 9124585      | US-2015-0010045-A1 |   |
| 12361 | MODEM DEVICES APPLICATION PROCESSORS COMMUNICATION DEVICES METHODS FOR CONTROLLING A MODEM DEVICE METHODS FOR CONTROLLING AN APPLICATION PROCESSOR AND METHODS FOR CONTROLLING A COMMUNICATION DEVICE |        |               | CNT  | PAT-Active  | US      | 14/316978     | 9144119      | US-2014-0308943-A1 |   |
| 12362 | METHODS AND SYSTEMS TO PROVIDE LOW NOISE AMPLIFICATION                                                                                                                                                |        |               | NP   | PAT-Active  | US      | 13/800811     | 9124229      | US-2014-0266439-A1 |   |
| 12363 | ENVELOPE TRACKING SYSTEM AND METHOD FOR CALIBRATING A SUPPLY VOLTAGE OF AN ENVELOPE TRACKING POWER AMPLIFIER                                                                                          |        |               | NP   | PAT-Active  | US      | 13/779843     | 8737940      |                    |   |
| 12364 | COMMUNICATION SYSTEMS AND METHODS SUPPORTING MULTIPLE MODULATION TECHNIQUES                                                                                                                           |        |               | NP   | PAT-Active  | US      | 13/755511     | 8867665      | US-2014-0211870-A1 |   |
| 12365 | BIPOLAR TIME-TO-DIGITAL CONVERTER                                                                                                                                                                     |        |               | NP   | PAT-Active  | US      | 13/843763     | 8970420      | US-2014-0266848-A1 |   |
| 12366 | BIPOLAR TIME-TO-DIGITAL CONVERTER                                                                                                                                                                     |        |               | CNT  | PAT-Active  | US      | 14/638149     | 9282007      | US-2015-0241850-A1 |   |
| 12367 | COMMUNICATION DEVICES AND METHODS FOR RECEIVING DATA                                                                                                                                                  |        |               | NP   | PAT-Active  | US      | 13/682758     | 8873665      | US-2014-0140424-A1 |   |
| 12368 | COMMUNICATIONS TERMINAL A NETWORK COMPONENT A METHOD FOR TRANSMITTING A SIGNAL AND A METHOD FOR PROVIDING FEEDBACK INFORMATION TO A COMMUNICATIONS TERMINAL                                           |        |               | NP   | PAT-Active  | US      | 13/834421     | #####        | US-2014-0273874-A1 |   |
| 12369 | SCHEDULING TIMING DESIGN FOR A TDD SYSTEM                                                                                                                                                             |        |               | NP   | PAT-Active  | US      | 13/716975     | 9686089      | US-2013-0242819-A1 |   |
| 12370 | SCHEDULING TIMING DESIGN FOR A TDD SYSTEM                                                                                                                                                             |        |               | CNT  | PAT-Active  | US      | 15/594267     | #####        | US-2017-0250790-A1 |   |
| 12371 | SCHEDULING TIMING DESIGN FOR A TDD SYSTEM                                                                                                                                                             |        |               | CNT  | APP-Pending | US      | 15/408724     |              |                    |   |
| 12372 | INTER-RAT COVERAGE DETERMINATION FOR ENERGY SAVING MANAGEMENT                                                                                                                                         |        |               | NP   | PAT-Active  | US      | 13/730248     | 8805364      | US-2013-0288690-A1 |   |
| 12373 | INTER-RAT COVERAGE DETERMINATION FOR ENERGY SAVING MANAGEMENT                                                                                                                                         |        |               | CNT  | PAT-Active  | US      | 14/104633     | 9100911      | US-2014-0106731-A1 |   |
| 12374 | INTER-RAT COVERAGE DETERMINATION FOR ENERGY SAVING MANAGEMENT                                                                                                                                         |        |               | CNT  | PAT-Active  | US      | 14/753869     | 9288755      | US-2015-0304942-A1 |   |
| 12375 | INTER-RAT COVERAGE DETERMINATION FOR ENERGY SAVING MANAGEMENT                                                                                                                                         |        |               | CNT  | APP-Pending | US      | 15/903284     |              | US-2018-0192368-A1 |   |
| 12376 | INTER-RAT COVERAGE DETERMINATION FOR ENERGY SAVING MANAGEMENT                                                                                                                                         |        |               | CNT  | PAT-Active  | US      | 15/003299     | 9942841      | US-2016-0157174-A1 |   |
| 12377 | DEVICE ORIENTATION CAPABILITY EXCHANGE SIGNALING AND SERVER ADAPTATION OF MULTIMEDIA CONTENT IN RESPONSE TO DEVICE ORIENTATION                                                                        |        |               | NP   | PAT-Active  | US      | 13/719402     | 8357272      | US-2014-0040959-A1 |   |

|       | A                                                                                                                        | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                    | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12378 | QUALITY-AWARE ADAPTIVE STREAMING OVER HYPERTEXT TRANSFER PROTOCOL USING QUALITY ATTRIBUTES IN MANIFEST FILE              |        |               | NP   | PAT-Active  | US      | 13/711316     | 9125073      | US-2014-0946498-A1 |   |
| 12379 | METHODS FOR QUALITY-AWARE ADAPTIVE STREAMING OVER HYPERTEXT TRANSFER PROTOCOL                                            |        |               | CNT  | APP-Pending | US      | 14/801199     |              | US-2015-0334157-A1 |   |
| 12380 | METHOD AND APPARATUS FOR FEEDBACK IN 3D MIMO WIRELESS SYSTEMS                                                            |        |               | NP   | PAT-Active  | US      | 13/719343     | 8885752      | US-2014-0029684-A1 |   |
| 12381 | METHOD AND APPARATUS FOR FEEDBACK IN 3D MIMO WIRELESS SYSTEMS                                                            |        |               | DIV  | PAT-Active  | US      | 14/511792     | 9344170      | US-2015-0139121-A1 |   |
| 12382 | IDENTIFYING COVERAGE HOLES USING INTER-RAT HANDOVER MEASUREMENTS                                                         |        |               | NP   | PAT-Active  | US      | 13/730266     | 8868067      | US-2014-0031030-A1 |   |
| 12383 | IDENTIFYING COVERAGE HOLES USING INTER-RAT HANDOVER MEASUREMENTS                                                         |        |               | CNT  | PAT-Active  | US      | 14/475256     | 9660710      | US-2014-0376885-A1 |   |
| 12384 | IDENTIFYING COVERAGE HOLES USING INTER-RAT HANDOVER MEASUREMENTS                                                         |        |               | CNT  | PAT-Active  | US      | 15/488306     | #####        | US-2017-0231554-A1 |   |
| 12385 | COMMUNICATION PATH SWITCHING FOR MOBILE DEVICES                                                                          |        |               | CNT  | PAT-Active  | US      | 14/620089     | 9369932      | US-2015-0156702-A1 |   |
| 12386 | COVERAGE ADJUSTMENT IN E-UTRA NETWORKS                                                                                   |        |               | NP   | PAT-Active  | US      | 13/733110     | 8995255      | US-2014-0036656-A1 |   |
| 12387 | COVERAGE ADJUSTMENT IN E-UTRA NETWORKS                                                                                   |        |               | CNT  | PAT-Active  | US      | 14/634626     | 9154978      | US-2015-0189521-A1 |   |
| 12388 | COVERAGE ADJUSTMENT IN E-UTRA NETWORKS                                                                                   |        |               | CNT  | PAT-Active  | US      | 14/843547     | 9538433      | US-2016-0007216-A1 |   |
| 12389 | COVERAGE ADJUSTMENT IN E-UTRA NETWORKS                                                                                   |        |               | CNT  | PAT-Active  | US      | 15/356405     | 9794809      | US-2017-0071900-A1 |   |
| 12390 | COVERAGE ADJUSTMENT IN E-UTRA NETWORKS                                                                                   |        |               | CNT  | PAT-Active  | US      | 15/702089     | #####        | US-2018-0007572-A1 |   |
| 12391 | APPARATUS AND METHOD FOR CELL INFORMATION INDICATION IN A WIRELESS NETWORK                                               |        |               | NP   | PAT-Active  | US      | 13/728740     | 9232509      | US-2013-0286672-A1 |   |
| 12392 | SYSTEMS AND METHODS FOR ENHANCED USER EQUIPMENT ASSISTANCE INFORMATION IN WIRELESS COMMUNICATION SYSTEMS                 |        |               | NP   | PAT-Active  | US      | 13/719362     | 9513757      | US-2013-0801500-A1 |   |
| 12393 | SYSTEMS AND METHODS FOR ENHANCED USER EQUIPMENT ASSISTANCE INFORMATION IN WIRELESS COMMUNICATION SYSTEMS                 |        |               | CNT  | PAT-Active  | US      | 15/276427     | #####        | US-2017-0013557-A1 |   |
| 12394 | ESTABLISHING OPERATING SYSTEM AND APPLICATION BASED ROUTING POLICIES IN MULTI-MODE USER EQUIPMENT                        |        |               | NP   | PAT-Active  | US      | 13/711338     | 9526022      | US-2014-0040504-A1 |   |
| 12395 | ESTABLISHING APPLICATION-BASED ROUTING POLICIES IN MULTI-MODE USER EQUIPMENT USING OPERATING SYSTEM-SPECIFIC IDENTIFIERS |        |               | CNT  | PAT-Active  | US      | 15/373654     | #####        | US-2017-0094025-A1 |   |
| 12396 | HARQ-ACK HANDLING FOR UNINTENDED DOWNLINK SUB-FRAMES                                                                     |        |               | NP   | PAT-Active  | US      | 13/721458     | 8958331      | US-2014-0003302-A1 |   |
| 12397 | HARQ-ACK HANDLING FOR UNINTENDED DOWNLINK SUB-FRAMES                                                                     |        |               | CNT  | PAT-Active  | US      | 14/605311     | 9105420      | US-2015-0131496-A1 |   |
| 12398 | HARQ-ACK HANDLING FOR UNINTENDED DOWNLINK SUB-FRAMES                                                                     |        |               | CNT  | PAT-Active  | US      | 14/729809     | 9673939      | US-2015-0263826-A1 |   |
| 12399 | HARQ-ACK HANDLING FOR UNINTENDED DOWNLINK SUB-FRAMES                                                                     |        |               | CNT  | PAT-Active  | US      | 15/614192     | #####        | US-2017-0338916-A1 |   |
| 12400 | APPARATUS AND METHOD TO EFFICIENTLY SEND DEVICE TRIGGER MESSAGES                                                         |        |               | NP   | PAT-Active  | US      | 13/755166     | 8989070      | US-2014-0003313-A1 |   |
| 12401 | APPARATUS AND METHOD TO EFFICIENTLY SEND DEVICE TRIGGER MESSAGES                                                         |        |               | CNT  | PAT-Active  | US      | 14/666160     | 9432156      | US-2015-0249952-A1 |   |
| 12402 | DEVICE-TO-DEVICE ON-DEMAND ADVERTISEMENT                                                                                 |        |               | NP   | PAT-Active  | US      | 13/713242     | 9059830      | US-2014-0036792-A1 |   |

|       | A                                                                                                          | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                      | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12403 | HIGH EFFICIENCY DISTRIBUTED DEVICE-TO-DEVICE (D2D) CHANNEL ACCESS                                          |        |               | NP   | PAT-Active  | US      | 13/687838     | 9191828      | US-2014-0936876-A1 |   |
| 12404 | HIGH EFFICIENCY DISTRIBUTED DEVICE-TO-DEVICE (D2D) CHANNEL ACCESS                                          |        |               | CNT  | PAT-Active  | US      | 14/883410     | #####        | US-2016-0102441-A1 |   |
| 12405 | HIGH EFFICIENCY DISTRIBUTED DEVICE-TO-DEVICE (D2D) CHANNEL ACCESS                                          |        |               | CNT  | APP-Pending | US      | 15/523272     |              |                    |   |
| 12406 | REFERENCE SIGNAL CONFIGURATION FOR COORDINATED MULTIPOINT                                                  |        |               | NP   | PAT-Active  | US      | 13/796720     | 9106386      | US-2014-0936796-A1 |   |
| 12407 | REFERENCE SIGNAL CONFIGURATION FOR COORDINATED MULTIPOINT                                                  |        |               | CNT  | PAT-Active  | US      | 14/798830     | 9572063      | US-2016-0100394-A1 |   |
| 12408 | APPARATUS FOR IMPROVED MOBILITY IN A WIRELESS HETEROGENEOUS NETWORK                                        |        |               | NP   | PAT-Active  | US      | 13/705624     | 9095474      | US-2013-0273878-A1 |   |
| 12409 | SELECTIVE JOINER OF MACHINE-TYPE COMMUNICATION USER EQUIPMENT WITH WIRELESS CELL                           |        |               | NP   | PAT-Active  | US      | 13/795952     | 9246618      | US-2013-030166-A1  |   |
| 12410 | SELECTIVE JOINER OF MACHINE-TYPE COMMUNICATION USER EQUIPMENT WITH WIRELESS CELL                           |        |               | CNT  | PAT-Active  | US      | 14/528747     | #####        | US-2016-0956994-A1 |   |
| 12411 | SIGNALING FOR DOWNLINK COORDINATED MULTIPOINT IN A WIRELESS COMMUNICATION SYSTEM                           |        |               | NP   | PAT-Active  | US      | 13/730289     | 9083479      | US-2013-0301548-A1 |   |
| 12412 | SIGNALING FOR DOWNLINK COORDINATED MULTIPOINT IN A WIRELESS COMMUNICATION SYSTEM                           |        |               | CNT  | PAT-Active  | US      | 14/054260     | 9154251      | US-2014-0044076-A1 |   |
| 12413 | SIGNALING FOR DOWNLINK COORDINATED MULTIPOINT IN A WIRELESS COMMUNICATION SYSTEM                           |        |               | CNT  | PAT-Active  | US      | 14/834292     | 9356724      | US-2016-0365917-A1 |   |
| 12414 | SIGNALING FOR DOWNLINK COORDINATED MULTIPOINT IN A WIRELESS COMMUNICATION SYSTEM                           |        |               | CNT  | PAT-Active  | US      | 15/144117     | 9736780      | US-2016-0261387-A1 |   |
| 12415 | COMMUNICATION DEVICES AND CELLULAR WIDE AREA RADIO BASE STATION                                            |        |               | NP   | PAT-Active  | US      | 13/803241     | 9344885      | US-2014-0273954-A1 |   |
| 12416 | COMMUNICATION DEVICES AND CELLULAR WIDE AREA RADIO BASE STATION                                            |        |               | CNT  | PAT-Active  | US      | 15/131958     | 9622083      | US-2016-0234687-A1 |   |
| 12417 | FAST HANDOVER METHOD FOR CROSS SECTOR SCENARIO IN MOBILE COMMUNICATION SYSTEMS                             |        |               | NP   | PAT-Active  | US      | 13/832947     | 9313706      | US-2014-0274052-A1 |   |
| 12418 | FAST HANDOVER METHOD FOR CROSS SECTOR SCENARIO IN MOBILE COMMUNICATION SYSTEMS                             |        |               | CNT  | PAT-Active  | US      | 15/064904     | 9526042      | US-2016-0302111-A1 |   |
| 12419 | COMMUNICATION TERMINAL DEVICE COMMUNICATION DEVICE COMMUNICATION NETWORK SERVER AND METHOD FOR CONTROLLING |        |               | NP   | PAT-Active  | US      | 13/779864     | 8989807      | US-2014-0243039-A1 |   |
| 12420 | COMMUNICATION TERMINAL DEVICE COMMUNICATION DEVICE COMMUNICATION NETWORK SERVER AND METHOD FOR CONTROLLING |        |               | CNT  | PAT-Active  | US      | 14/609364     | 9380625      | US-2016-0215984-A1 |   |
| 12421 | COMMUNICATION TERMINAL DEVICE COMMUNICATION DEVICE COMMUNICATION NETWORK SERVER AND METHOD FOR CONTROLLING |        |               | CNT  | PAT-Active  | US      | 15/145370     | 9948306      | US-2016-0278154-A1 |   |
| 12422 | COMMUNICATION TERMINAL DEVICE COMMUNICATION DEVICE COMMUNICATION NETWORK SERVER AND METHOD FOR CONTROLLING |        |               | CNT  | PAT-Active  | US      | 15/905423     | #####        | US-2018-0249522-A1 |   |
| 12423 | HYBRID AUTOMATIC REPEAT REQUEST (HARQ) MAPPING FOR CARRIER AGGREGATION (CA)                                |        |               | NP   | PAT-Active  | US      | 13/853404     | 9094960      | US-2013-0322358-A1 |   |
| 12424 | DYNAMIC SELECTION OF SPECTRUM ACCESS IN A SPECTRUM SHARING CONTEXT                                         |        |               | NP   | PAT-Active  | US      | 13/736177     | 9565658      | US-2014-0192685-A1 |   |
| 12425 | ENHANCED NODE B USER EQUIPMENT AND METHODS FOR DISCONTINUOUS RECEPTION IN INTER-ENB CARRIER AGGREGATION    |        |               | NP   | PAT-Active  | US      | 13/729117     | 8913578      | US-2014-0185467-A1 |   |
| 12426 | ENHANCED NODE B USER EQUIPMENT AND METHODS FOR DISCONTINUOUS RECEPTION IN INTER-ENB CARRIER AGGREGATION    |        |               | CNT  | PAT-Active  | US      | 14/570555     | 9374783      | US-2016-0173016-A1 |   |

|       | A                                                                                                                      | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                  | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12427 | APPARATUS OF USER EQUIPMENT (UE) CONFIGURABLE FOR CONNECTIVITY WITH MULTIPLE CELL GROUPS                               |        |               | CNT  | PAT-Active  | US      | 15/176433     | 9686817      | US-2016-0286604-A1 |   |
| 12428 | ENHANCED NODE B USER EQUIPMENT AND METHODS FOR DISCONTINUOUS RECEPTION IN INTER-ENB CARRIER AGGREGATION                |        |               | CNT  | PAT-Active  | US      | 15/588126     | #####        | US-2017-0245320-A1 |   |
| 12429 | ENHANCED NODE B USER EQUIPMENT AND METHODS FOR DISCONTINUOUS RECEPTION IN INTER-ENB CARRIER AGGREGATION                |        |               | CNT  | APP-Pending | US      | 16/519689     |              |                    |   |
| 12430 | TECHNIQUES FOR SENDING OR RECEIVING CHANNEL STATE INFORMATION REPORTS ASSOCIATED WITH A COORDINATED MULTI-POINT SCHEME |        |               | NP   | PAT-Active  | US      | 13/828781     | #####        | US-2014-0038623-A1 |   |
| 12431 | PERIODIC CHANNEL STATE INFORMATION REPORTING FOR COORDINATED MULTIPPOINT (CoMP) SYSTEMS                                |        |               | NP   | PAT-Active  | US      | 13/688794     | 9544801      | US-2014-0036664-A1 |   |
| 12432 | PERIODIC CHANNEL STATE INFORMATION (CSI) REPORTING USING A PHYSICAL UPLINK CONTROL CHANNEL (PUCCH)                     |        |               | CNT  | PAT-Active  | US      | 14/145112     | 9554297      | US-2014-0112300-A1 |   |
| 12433 | PERIODIC CHANNEL STATE INFORMATION (CSI) REPORTING USING A PHYSICAL UPLINK CONTROL CHANNEL (PUCCH)                     |        |               | CNT  | PAT-Active  | US      | 15/391313     | #####        | US-2017-0111898-A1 |   |
| 12434 | NETWORK ASSISTANCE FOR DEVICE-TO-DEVICE DISCOVERY                                                                      |        |               | NP   | PAT-Active  | US      | 13/718745     | 9036603      | US-2014-0036793-A1 |   |
| 12435 | NETWORK ASSISTANCE FOR DEVICE-TO-DEVICE DISCOVERY                                                                      |        |               | CNT  | PAT-Active  | US      | 14/695930     | #####        | US-2015-0305077-A1 |   |
| 12436 | NETWORK ASSISTANCE FOR DEVICE-TO-DEVICE DISCOVERY                                                                      |        |               | CNT  | PAT-Active  | US      | 15/868247     | #####        | US-2018-0234866-A1 |   |
| 12437 | USER EQUIPMENT EVOLVED NODE B AND METHOD FOR MULTICAST DEVICE-TO-DEVICE COMMUNICATIONS                                 |        |               | NP   | PAT-Active  | US      | 13/716919     | 9544099      | US-2014-0003319-A1 |   |
| 12438 | DOWN-SAMPLING OF CELL-SPECIFIC REFERENCE SIGNALS (CRS) FOR A NEW CARRIER TYPE (NCT)                                    |        |               | PCT  | PAT-Active  | US      | 13/997741     | 9681428      | US-2014-0254504-A1 |   |
| 12439 | HYBRID AUTOMATIC REPEAT REQUEST (HARQ) MAPPING FOR CARRIER AGGREGATION (CA)                                            |        |               | NP   | PAT-Active  | US      | 13/853390     | 9088977      | US-2013-0322357-A1 |   |
| 12440 | MEASUREMENT OF NODES IN COORDINATED MULTIPPOINT (CoMP) SYSTEMS                                                         |        |               | NP   | PAT-Active  | US      | 13/853388     | 9084855      | US-2013-0322273-A1 |   |
| 12441 | COMMUNICATION CONTROLLER AND METHOD FOR TRANSMITTING DATA                                                              |        |               | NP   | PAT-Active  | US      | 13/792595     | 9591617      | US-2014-0254488-A1 |   |
| 12442 | EPHEMERAL IDENTITY FOR DEVICE AND SERVICE DISCOVERY                                                                    |        |               | NP   | PAT-Active  | US      | 13/712304     | 9883388      | US-2014-0192601-A1 |   |
| 12443 | PREVENTING DROPPED CALLS THROUGH BEHAVIOR PREDICTION                                                                   |        |               | NP   | PAT-Active  | US      | 13/721776     | 9462436      | US-2014-0179279-A1 |   |
| 12444 | CELLULAR NETWORK SCANNING CONTROL BASED ON AMBIENT IDENTIFIABLE WIRELESS SIGNAL SOURCES                                |        |               | NP   | PAT-Active  | US      | 13/728186     | 9526083      | US-2014-0187272-A1 |   |
| 12445 | CELLULAR NETWORK SCANNING CONTROL BASED ON AMBIENT IDENTIFIABLE WIRELESS SIGNAL SOURCES                                |        |               | CNT  | APP-Pending | US      | 15/371120     |              | US-2017-0238241-A1 |   |
| 12446 | LOCATION-BASED SELECTION OF WIRELESS PERIPHERAL DEVICES                                                                |        |               | NP   | PAT-Active  | US      | 13/726375     | #####        | US-2014-0175230-A1 |   |
| 12447 | CURRENT RE-USING WIDEBAND LOW-NOISE ACTIVE BALUN                                                                       |        |               | NP   | PAT-Active  | US      | 13/795957     | 9048785      | US-2014-0266469-A1 |   |
| 12448 | CURRENT RE-USING WIDEBAND LOW-NOISE ACTIVE BALUN                                                                       |        |               | CNT  | PAT-Active  | US      | 14/727262     | 9281787      | US-2015-0263682-A1 |   |
| 12449 | SYSTEMS AND METHODS UTILIZING ADAPTIVE ENVELOPE TRACKING                                                               |        |               | NP   | PAT-Active  | US      | 13/945096     | 9166830      | US-2015-0023445-A1 |   |
| 12450 | SYSTEMS AND METHODS UTILIZING ADAPTIVE ENVELOPE TRACKING                                                               |        |               | CNT  | PAT-Active  | US      | 14/842104     | 9413299      | US-2015-0372647-A1 |   |
| 12451 | RADIO FREQUENCY DIGITAL TO ANALOG CONVERTER                                                                            |        |               | NP   | PAT-Active  | US      | 13/893031     | 8854242      | US-2014-0269976-A1 |   |



|       | A                                                                                                                                                                               | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                                           | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12452 | RADIO FREQUENCY DIGITAL TO ANALOG CONVERTER                                                                                                                                     |        |               | CNT  | PAT-Active | US      | 14/446534     | 9024796      | US-2014-0341322-A1 |   |
| 12453 | PROTOCOL CONVERSION AND BANDWIDTH REDUCTION TECHNIQUE PROVIDING MULTIPLE NBD ISDN BASIC RATE INTERFACE LINKS OVER A WIRELESS CODE DIVISION MULTIPLE ACCESS COMMUNICATION SYSTEM |        |               | REX  | PAT-Active | US      | 93/008990     | 6151332      |                    |   |
| 12454 | FAST ACQUISITION OF TRAFFIC CHANNELS FOR A HIGHLY VARIABLE DATA RATE REVERSE LINK OF A CDMA WIRELESS COMMUNICATION SYSTEM                                                       |        |               | CNT  | PAT-Active | US      | 10/179121     | 7602749      | US-2002-0163898-A1 |   |
| 12455 | SYSTEM AND METHOD FOR MAINTAINING TIMING OF SYNCHRONIZATION MESSAGES OVER A REVERSE LINK OF A CDMA WIRELESS COMMUNICATION SYSTEM                                                |        |               | CIP  | PAT-Active | US      | 03/997732     | 7936728      | US-2002-0080742-A1 |   |
| 12456 | SYSTEM AND METHOD FOR CONTROLLING SIGNAL STRENGTH OVER A REVERSE LINK OF A CDMA WIRELESS COMMUNICATION SYSTEM                                                                   |        |               | CIP  | PAT-Active | US      | 08/997733     | 7496072      | US-2002-0071409-A1 |   |
| 12457 | SYSTEM AND METHOD FOR MAINTAINING TIMING OF SYNCHRONIZATION MESSAGES OVER A REVERSE LINK OF A CDMA WIRELESS COMMUNICATION SYSTEM                                                |        |               | CNT  | PAT-Active | US      | 10/895591     | 7771566      | US-2005-0013284-A1 |   |
| 12458 | VARIABLE RATE CODING FOR ENABLING HIGH PERFORMANCE COMMUNICATION                                                                                                                |        |               | CNT  | PAT-Active | US      | 13/259254     | 9306705      | US-2013-0223429-A1 |   |
| 12459 | VARIABLE RATE CODING FOR FORWARD LINK                                                                                                                                           |        |               | NP   | PAT-Active | US      | 09/447022     | 6785323      |                    |   |
| 12460 | VARIABLE RATE CODING FOR FORWARD LINK                                                                                                                                           |        |               | CNT  | PAT-Active | US      | 10/890485     | 7426241      | US-2005-0018635-A1 |   |
| 12461 | VARIABLE RATE CODING FOR A FORWARD AND REVERSE LINK                                                                                                                             |        |               | CNT  | PAT-Active | US      | 12/210754     | 8194783      | US-2009-0016368-A1 |   |
| 12462 | SUBSCRIBER UNIT AND METHOD FOR VARIABLE FORWARD ERROR CORRECTION (FEC) DECODING                                                                                                 |        |               | CNT  | PAT-Active | US      | 12/326487     | 8204140      | US-2009-0135950-A1 |   |
| 12463 | VARIABLE RATE CODING FOR FORWARD AND REVERSE LINK                                                                                                                               |        |               | CNT  | PAT-Active | US      | 14/183181     | 9294222      | US-2014-0181622-A1 |   |
| 12464 | MAXIMIZING DATA RATE BY ADJUSTING CODES AND CODE RATES IN CDMA SYSTEM                                                                                                           |        |               | CIP  | PAT-Active | US      | 05/773253     | 6973140      | US-2001-0048709-A1 |   |
| 12465 | COMBINED CLOSED LOOP/OPEN LOOP POWER CONTROL IN A TIME DIVISION DUPLEX COMMUNICATION SYSTEM                                                                                     |        |               | NP   | PAT-Active | US      | 08/531359     | 6600772      |                    |   |
| 12466 | USER EQUIPMENT USING COMBINED CLOSED LOOP/OPEN LOOP POWER CONTROL                                                                                                               |        |               | CNT  | PAT-Active | US      | 10/831902     | 6928102      | US-2004-0196880-A1 |   |
| 12467 | MAINTENANCE OF CHANNEL USAGE IN A WIRELESS COMMUNICATION SYSTEM                                                                                                                 |        |               | CNT  | PAT-Closed | US      | 13/211853     | 8908652      | US-2013-0299506-A1 |   |
| 12468 | WEIGHTED OPEN LOOP POWER CONTROL IN A TIME DIVISION DUPLEX COMMUNICATION SYSTEM                                                                                                 |        |               | NP   | PAT-Active | US      | 08/532349     | 6587723      |                    |   |
| 12469 | USER EQUIPMENT UTILIZING WEIGHTED OPEN LOOP POWER CONTROL                                                                                                                       |        |               | CNT  | PAT-Active | US      | 10/082885     | 6577668      | US-2002-0080762-A1 |   |
| 12470 | METHOD OF EMPLOYING WEIGHTED OPEN LOOP POWER CONTROL IN A BASE STATION                                                                                                          |        |               | CNT  | PAT-Active | US      | 15/083212     | 6584139      | US-2002-0080766-A1 |   |
| 12471 | METHOD OF EMPLOYING WEIGHTED OPEN LOOP POWER CONTROL FOR A USER EQUIPMENT                                                                                                       |        |               | CNT  | PAT-Active | US      | 10/083230     | 6590927      | US-2002-0080853-A1 |   |
| 12472 | BASE STATION UTILIZING A WEIGHTED OPEN LOOP POWER CONTROL                                                                                                                       |        |               | CNT  | PAT-Active | US      | 13/083240     | 6577669      | US-2002-0085504-A1 |   |
| 12473 | USER EQUIPMENT UTILIZING WEIGHTED OPEN LOOP POWER CONTROL                                                                                                                       |        |               | CNT  | PAT-Active | US      | 10/446539     | 6845122      | US-2003-0193916-A1 |   |
| 12474 | WEIGHTED OPEN LOOP POWER CONTROL                                                                                                                                                |        |               | CNT  | PAT-Active | US      | 10/755645     | 6956889      | US-2004-0141467-A1 |   |
| 12475 | WEIGHTED OPEN LOOP POWER CONTROL TRANSMITTER CROSS REFERENCE TO RELATED APPLICATIONS                                                                                            |        |               | CNT  | PAT-Active | US      | 11/978298     | 7532659      | US-2008-0063029-A1 |   |
| 12476 | USER EQUIPMENT METHOD EMPLOYING A TIME DIVISION DUPLEX TECHNIQUE                                                                                                                |        |               | CNT  | PAT-Active | US      | 10/080482     | 6597724      | US-2002-0080764-A1 |   |

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| 2     | TITLE                                                                                       | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12477 | METHOD FOR OUTER LOOP/WEIGHTED OPEN LOOP POWER CONTROL APPARATUS EMPLOYED BY A BASE STATION |        |               | CNT  | PAT-Active | US      | 10/081809     | 6600773      | US-2002-0980765-A1 |   |
| 12478 | OUTER LOOP/WEIGHTED OPEN LOOP POWER CONTROL                                                 |        |               | CNT  | PAT-Active | US      | 10/756758     | 6993063      | US-2004-0141983-A1 |   |
| 12479 | USER EQUIPMENT FOR CONTROLLING TRANSMISSION POWER LEVELS                                    |        |               | CNT  | PAT-Active | US      | 12/330912     | 8942711      | US-2009-0380496-A1 |   |
| 12480 | MINIMAL MAINTENANCE LINK TO SUPPORT SYNCHRONIZATION                                         |        |               | NP   | PAT-Active | US      | 09/778474     | 8175120      | US-2001-0036200-A1 |   |
| 12481 | MINIMAL MAINTENANCE LINK TO SUPPORT SYNCHRONIZATION                                         |        |               | CNT  | PAT-Active | US      | 13/335575     | 8508268      | US-2012-0093131-A1 |   |
| 12482 | MINIMAL MAINTENANCE LINK TO SUPPORT SYNCHRONIZATION                                         |        |               | CNT  | PAT-Active | US      | 13/938500     | 9301274      | US-2013-0301636-A1 |   |
| 12483 | MINIMAL MAINTENANCE LINK TO SUPPORT SYNCHRONIZATION                                         |        |               | CNT  | PAT-Active | US      | 15/081747     | 9807714      | US-2016-0212720-A1 |   |
| 12484 | RECEIVER FOR TIME DIVISION MULTIPLEX SYSTEM WITHOUT EXPLICIT TIME SLOT ASSIGNMENT           |        |               | NP   | PAT-Active | US      | 09/594112     | 6463074      |                    |   |
| 12485 | RECEIVER FOR TIME DIVISION MULTIPLEX SYSTEM WITHOUT EXPLICIT TIME SLOT ASSIGNMENT           |        |               | CIP  | PAT-Active | US      | 10/266079     | 6445104      | US-2003-0165155-A1 |   |
| 12486 | RECEIVER FOR TIME DIVISION MULTIPLEX SYSTEM WITHOUT EXPLICIT TIME SLOT ASSIGNMENT           |        |               | CNT  | PAT-Active | US      | 11/022353     | 8462689      | US-2005-0105547-A1 |   |
| 12487 | TIME-SLOTTED DATA PACKETS WITH A PREAMBLE                                                   |        |               | NP   | PAT-Active | US      | 09/845240     | 6925070      | US-2002-0013135-A1 |   |
| 12488 | TIME-SLOTTED DATA PACKETS WITH A PREAMBLE                                                   |        |               | CNT  | PAT-Active | US      | 11/189529     | 7885702      | US-2005-0271028-A1 |   |
| 12489 | TIME-SLOTTED DATA PACKETS WITH A PREAMBLE                                                   |        |               | CNT  | PAT-Active | US      | 13/026865     | 8467353      | US-2011-0194537-A1 |   |
| 12490 | TIME-SLOTTED DATA PACKETS WITH A PREAMBLE                                                   |        |               | CNT  | PAT-Active | US      | 13/891427     | 9237206      | US-2013-0242950-A1 |   |
| 12491 | TIME-SLOTTED DATA PACKETS WITH A PREAMBLE                                                   |        |               | CNT  | PAT-Active | US      | 14/095446     | 9398120      | US-2015-0229743-A1 |   |
| 12492 | ANTENNA CONTROL SYSTEM AND METHOD                                                           |        |               | NP   | PAT-Active | US      | 09/999172     | 8155086      |                    |   |
| 12493 | ANTENNA CONTROL SYSTEM AND METHOD                                                           |        |               | CNT  | PAT-Active | US      | 13/442513     | 8437330      | US-2012-0201199-A1 |   |
| 12494 | ANTENNA CONTROL SYSTEM AND METHOD                                                           |        |               | CNT  | PAT-Active | US      | 13/862149     | 9225395      | US-2013-0330025-A1 |   |
| 12495 | ANTENNA CONTROL SYSTEM AND METHOD                                                           |        |               | CNT  | PAT-Active | US      | 14/877687     | 9924468      | US-2016-0029327-A1 |   |
| 12496 | ANTENNA CONTROL SYSTEM AND METHOD                                                           |        |               | CNT  | PAT-Active | US      | 15/170565     | 9775115      | US-2016-0278020-A1 |   |
| 12497 | ALTERNATE CHANNEL FOR CARRYING SELECTED MESSAGE TYPES                                       |        |               | NP   | PAT-Active | US      | 09/775304     | 6954448      | US-2002-0101839-A1 |   |
| 12498 | ALTERNATE CHANNEL FOR CARRYING SELECTED MESSAGE TYPES                                       |        |               | CNT  | PAT-Active | US      | 11/235725     | 7502351      | US-2006-0018293-A1 |   |
| 12499 | ALTERNATE CHANNEL FOR CARRYING SELECTED MESSAGE TYPES                                       |        |               | CNT  | PAT-Active | US      | 12/400872     | 8274954      | US-2009-0175249-A1 |   |
| 12500 | ALTERNATE CHANNEL FOR CARRYING SELECTED MESSAGE TYPES                                       |        |               | CNT  | PAT-Active | US      | 14/201455     | 9325477      | US-2014-0185570-A1 |   |
| 12501 | ALTERNATE CHANNEL FOR CARRYING SELECTED MESSAGE TYPES                                       |        |               | CNT  | PAT-Active | US      | 15/130706     | 8898888      | US-2016-0234001-A1 |   |
| 12502 | USE OF CORRELATION COMBINATION TO ACHIEVE CHANNEL DETECTION                                 |        |               | CIP  | PAT-Active | US      | 10/119522     | 7551663      |                    |   |

|       | A                                                                                                                      | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                  | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12503 | METHODS, APPARATUSES AND SYSTEMS FOR SELECTIVE TRANSMISSION OF TRAFFIC DATA USING ORTHOGONAL SEQUENCES                 |        |               | CNT  | PAT-Active | US      | 13/306547     | 8638877      | US-2012-0218985-A1 |   |
| 12504 | USE OF CORRELATION COMBINATION TO ACHIEVE CHANNEL DETECTION                                                            |        |               | CNT  | PAT-Active | US      | 14/137099     | 9247510      | US-2014-0177608-A1 |   |
| 12505 | USE OF CORRELATION COMBINATION TO ACHIEVE CHANNEL DETECTION                                                            |        |               | CNT  | PAT-Active | US      | 14/952474     | #####        | US-2016-0081048-A1 |   |
| 12506 | APPARATUS AND METHOD FOR PERFORMING INITIAL CELL SEARCH IN WIRELESS COMMUNICATION SYSTEMS                              |        |               | NP   | PAT-Active | US      | 09/998885     | 6494935      | US-2003-0031162-A1 |   |
| 12507 | FAST SWITCHING OF FORWARD LINK IN WIRELESS SYSTEM                                                                      |        |               | NP   | PAT-Active | US      | 09/847860     | 6853646      | US-2002-0163894-A1 |   |
| 12508 | FAST SWITCHING OF FORWARD LINK IN WIRELESS SYSTEM                                                                      |        |               | CNT  | PAT-Active | US      | 11/053082     | 7289469      | US-2005-0136923-A1 |   |
| 12509 | FAST SWITCHING OF FORWARD LINK IN WIRELESS SYSTEM                                                                      |        |               | CNT  | PAT-Active | US      | 11/978309     | 8218562      | US-2008-0156185-A1 |   |
| 12510 | FAST SWITCHING OF FORWARD LINK IN WIRELESS SYSTEM                                                                      |        |               | CNT  | PAT-Active | US      | 13/533768     | 8718004      | US-2017-0289177-A1 |   |
| 12511 | FAST SWITCHING OF FORWARD LINK IN WIRELESS SYSTEM                                                                      |        |               | CNT  | PAT-Active | US      | 14/245366     | 8363806      | US-2014-0215258-A1 |   |
| 12512 | FAST SWITCHING OF FORWARD LINK IN WIRELESS SYSTEM                                                                      |        |               | CNT  | PAT-Active | US      | 14/618712     | 9648602      | US-2015-0156755-A1 |   |
| 12513 | TRANSMISSION OF HEARTBEAT SIGNAL AT A LOWER LEVEL THAN HEARTBEAT REQUEST                                               |        |               | CIP  | PAT-Active | US      | 10/171080     | 7221664      | US-2003-0086399-A1 |   |
| 12514 | TRANSMISSION OF HEARTBEAT SIGNAL AT A LOWER LEVEL THAN HEARTBEAT REQUEST                                               |        |               | CNT  | PAT-Active | US      | 11/805013     | 8134980      | US-2007-023426-A1  |   |
| 12515 | SIGNALING FOR WIRELESS COMMUNICATIONS                                                                                  |        |               | CNT  | PAT-Active | US      | 13/751608     | 9014118      | US-2013-0196111-A1 |   |
| 12516 | MULTI-DETECTION OF HEARTBEAT TO REDUCE ERROR PROBABILITY                                                               |        |               | CIP  | PAT-Active | US      | 10/171378     | 7384791      | US-2003-0095517-A1 |   |
| 12517 | MULTI-DETECTION OF HEARTBEAT TO REDUCE ERROR PROBABILITY                                                               |        |               | CNT  | PAT-Active | US      | 12/165472     | 9042400      | US-2009-0086680-A1 |   |
| 12518 | SYSTEM FOR IMPROVED POWER SAVINGS DURING FULL DTX MODE OF OPERATION IN THE DOWNLINK                                    |        |               | NP   | PAT-Active | US      | 10/273478     | 7768953      | US-2003-0086381-A1 |   |
| 12519 | MAC ARCHITECTURE IN WIRELESS COMMUNICATION SYSTEMS SUPPORTING H-ARQ                                                    |        |               | NP   | PAT-Active | US      | 10/270822     | 7376879      | US-2003-0086391-A1 |   |
| 12520 | MEDIUM ACCESS CONTROL-HIGH SPEED                                                                                       |        |               | CNT  | PAT-Active | US      | 11/365148     | 7392452      | US-2006-0242520-A1 |   |
| 12521 | MAC ARCHITECTURE IN WIRELESS COMMUNICATION SYSTEMS SUPPORTING H-ARQ                                                    |        |               | CNT  | PAT-Active | US      | 12/144415     | 8271844      | US-2008-0253346-A1 |   |
| 12522 | MAC ARCHITECTURE IN WIRELESS COMMUNICATION SYSTEMS SUPPORTING H-ARQ                                                    |        |               | CNT  | PAT-Active | US      | 13/588775     | 8484525      | US-2012-0307622-A1 |   |
| 12523 | MAC ARCHITECTURE IN WIRELESS COMMUNICATION SYSTEMS SUPPORTING H-ARQ                                                    |        |               | CNT  | PAT-Active | US      | 13/892759     | 9072115      | US-2013-0250920-A1 |   |
| 12524 | MAC ARCHITECTURE IN WIRELESS COMMUNICATION SYSTEMS SUPPORTING H-ARQ                                                    |        |               | CNT  | PAT-Active | US      | 14/722380     | 9596056      | US-2015-0356123-A1 |   |
| 12525 | SYSTEM FOR EFFICIENT RECOVERY OF MODE B BUFFERED DATA FOLLOWING SERVING HIGH SPEED DOWNLINK SHARED CHANNEL CELL CHANGE |        |               | NP   | PAT-Active | US      | 10/334489     | 6717927      | US-2003-0189909-A1 |   |
| 12526 | HIGH SPEED DOWNLINK SHARED CHANNEL CELL CHANGE                                                                         |        |               | CNT  | PAT-Active | US      | 10/787800     | 8085726      | US-2004-0165054-A1 |   |
| 12527 | HIGH SPEED DOWNLINK SHARED CHANNEL CELL CHANGE                                                                         |        |               | CNT  | PAT-Active | US      | 11/352556     | 8085728      | US-2006-0153137-A1 |   |

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| 2     | TITLE                                                                                                                                                                | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12528 | HIGH SPEED DOWNLINK SHARED CONTROL CHANNEL CELL CHANGE                                                                                                               |        |               | CNT  | PAT-Active | US      | 11/352569     | 8085729      | US-2006-0126567-A1 |   |
| 12529 | HS-DSCH INTER-NODE B CELL CHANGE                                                                                                                                     |        |               | CNT  | PAT-Active | US      | 11/489975     | 8130721      | US-2006-0256745-A1 |   |
| 12530 | HS-DSCH INTER-NODE B CELL CHANGE                                                                                                                                     |        |               | CNT  | PAT-Active | US      | 13/412143     | 8837431      | US-2012-0170550-A1 |   |
| 12531 | HS-DSCH INTER-NODE B CELL CHANGE                                                                                                                                     |        |               | CNT  | PAT-Active | US      | 14/460631     | 9220037      | US-2014-0362826-A1 |   |
| 12532 | HS-DSCH INTER-NODE B CELL CHANGE                                                                                                                                     |        |               | CNT  | PAT-Active | US      | 14/977504     | 9565603      | US-2016-0112912-A1 |   |
| 12533 | METHOD AND APPARATUS FOR REDUCING UPLINK AND DOWNLINK TRANSMISSION ERRORS BY SUPPORTING ADAPTIVE MODULATION AND CODING AND HYBRID AUTOMATIC REPEAT REQUEST FUNCTIONS |        |               | NP   | PAT-Active | US      | 10/434870     | 7408904      | US-2004-0305786-A1 |   |
| 12534 | MOBILE UNIT HAVING INTERNET PROTOCOL FUNCTIONALITY                                                                                                                   |        |               | NP   | PAT-Active | US      | 10/441432     | 7640038      | US-2004-0343791-A1 |   |
| 12535 | MOBILE UNIT HAVING INTERNET PROTOCOL FUNCTIONALITY                                                                                                                   |        |               | CNT  | PAT-Active | US      | 12/646491     | 8364198      | US-2010-0094454-A1 |   |
| 12536 | MOBILE UNIT HAVING INTERNET PROTOCOL FUNCTIONALITY                                                                                                                   |        |               | CNT  | PAT-Active | US      | 13/744258     | 8909232      | US-2013-0137437-A1 |   |
| 12537 | MOBILE UNIT HAVING INTERNET PROTOCOL FUNCTIONALITY                                                                                                                   |        |               | CNT  | PAT-Active | US      | 14/561168     | 9264086      | US-2015-0141078-A1 |   |
| 12538 | MOBILE UNIT HAVING INTERNET PROTOCOL FUNCTIONALITY                                                                                                                   |        |               | CNT  | PAT-Active | US      | 14/991781     | 9509356      | US-2016-0119008-A1 |   |
| 12539 | METHOD AND APPARATUS FOR INTERCONNECTION OF PERSONAL AREA NETWORKS (PANS)                                                                                            |        |               | CNT  | PAT-Active | US      | 11/127577     | 8116773      | US-2005-0201348-A1 |   |
| 12540 | FAST HARQ ACKNOWLEDGEMENT GENERATION METHOD USING A STOPPING RULE FOR TURBO DECODING                                                                                 |        |               | CNT  | PAT-Active | US      | 11/491310     | 7467345      | US-2007-0158630-A1 |   |
| 12541 | INFORMATION STORAGE FOR RADIO RESOURCE MANAGEMENT                                                                                                                    |        |               | NP   | PAT-Active | US      | 10/681026     | 7248878      | US-2004-0192317-A1 |   |
| 12542 | BIAS ERROR COMPENSATED INITIAL TRANSMISSION POWER CONTROL FOR DATA SERVICES                                                                                          |        |               | NP   | PAT-Active | US      | 10/721482     | 7274947      | US-2004-0105426-A1 |   |
| 12543 | INITIAL CELL SEARCH IN WIRELESS COMMUNICATION SYSTEMS                                                                                                                |        |               | NP   | PAT-Active | US      | 10/772644     | 7444144      | US-2004-0248602-A1 |   |
| 12544 | METHOD FOR IDENTIFYING A CODE GROUP REPRESENTATIVE OF A NUMBER OF BASE STATIONS                                                                                      |        |               | CNT  | PAT-Active | US      | 12/258877     | 8086228      | US-2009-0054084-A1 |   |
| 12545 | METHOD AND SYSTEM FOR MANAGING RADIO RESOURCES IN A TIME-SLOTTED COMMUNICATION SYSTEM                                                                                |        |               | NP   | PAT-Active | US      | 10/886735     | 7170877      | US-2005-0041623-A1 |   |
| 12546 | METHOD AND SYSTEM FOR MANAGING RADIO RESOURCES IN A TIME-SLOTTED COMMUNICATION SYSTEM                                                                                |        |               | CNT  | PAT-Active | US      | 11/654765     | 9456451      | US-2007-0115893-A1 |   |
| 12547 | SYSTEM FOR EFFICIENT RECOVERY OF NODE-B BUFFERED DATA FOLLOWING MAC LAYER RESET                                                                                      |        |               | NP   | PAT-Active | US      | 10/616331     | 7706405      | US-2004-0052229-A1 |   |
| 12548 | METHOD AND APPARATUS FOR STORING MOBILE STATION PHYSICAL MEASUREMENTS AND MAC PERFORMANCE STATISTICS IN A MANAGEMENT INFORMATION BASE OF AN ACCESS POINT             |        |               | NP   | PAT-Active | US      | 10/890790     | 6958982      | US-2005-0050422-A1 |   |
| 12549 | METHOD AND APPARATUS FOR STORING MOBILE STATION PHYSICAL MEASUREMENTS AND MAC PERFORMANCE STATISTICS IN A MANAGEMENT INFORMATION BASE OF AN ACCESS POINT             |        |               | CNT  | PAT-Active | US      | 11/183549     | 8340051      | US-2006-0018284-A1 |   |
| 12550 | METHOD AND APPARATUS FOR STORING MOBILE STATION PHYSICAL MEASUREMENTS AND MAC PERFORMANCE STATISTICS IN A MANAGEMENT INFORMATION BASE OF AN ACCESS POINT             |        |               | CNT  | PAT-Active | US      | 14/248169     | 9319994      | US-2014-0293876-A1 |   |

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| 2     | TITLE                                                                                                                                                    | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12551 | METHOD AND APPARATUS FOR STORING MOBILE STATION PHYSICAL MEASUREMENTS AND MAC PERFORMANCE STATISTICS IN A MANAGEMENT INFORMATION BASE OF AN ACCESS POINT |        |               | CNT  | PAT-Active | US      | 15/192093     | 9048438      | US-2016-0234056-A1 |   |
| 12552 | TRANSPORT FORMAT COMBINATION SELECTION IN A WIRELESS TRANSMIT/RECEIVE UNIT                                                                               |        |               | NP   | PAT-Active | US      | 11/019489     | 7215655      | US-2005-0169293-A1 |   |
| 12553 | TFC AND E-TFC SELECTION FOR A USER EQUIPMENT                                                                                                             |        |               | CNT  | PAT-Active | US      | 11/705638     | 7522557      | US-2007-0140179-A1 |   |
| 12554 | TRANSPORT FORMAT COMBINATION SELECTION IN A WIRELESS TRANSMIT/RECEIVE UNIT                                                                               |        |               | CNT  | PAT-Active | US      | 12/632516     | 8483348      | US-2009-0195248-A1 |   |
| 12555 | TRANSPORT FORMAT COMBINATION SELECTION IN A WIRELESS TRANSMIT/RECEIVE UNIT                                                                               |        |               | CNT  | PAT-Active | US      | 14/511096     | 9942878      | US-2015-0023310-A1 |   |
| 12556 | SYSTEM AND METHOD FOR CALL ROUTING AND PAGING ACROSS DIFFERENT TYPES OF NETWORKS                                                                         |        |               | CNT  | PAT-Active | US      | 12/839506     | 8385330      | US-2011-0164024-A1 |   |
| 12557 | SYSTEM AND METHOD FOR CALL ROUTING AND PAGING ACROSS DIFFERENT TYPES OF NETWORKS                                                                         |        |               | CNT  | PAT-Active | US      | 14/187062     | 9088960      | US-2014-0171131-A1 |   |
| 12558 | ORTHOGONAL FREQUENCY DIVISION MULTIPLEXING-CODE DIVISION MULTIPLE ACCESS SYSTEM                                                                          |        |               | NP   | PAT-Active | US      | 11/385168     | 7876806      | US-2006-0245472-A1 |   |
| 12559 | ORTHOGONAL FREQUENCY DIVISION MULTIPLEXING-CODE DIVISION MULTIPLE ACCESS SYSTEM                                                                          |        |               | CNT  | PAT-Active | US      | 12/984101     | 8705641      | US-2011-0142094-A1 |   |
| 12560 | ORTHOGONAL FREQUENCY DIVISION MULTIPLEXING-CODE DIVISION MULTIPLE ACCESS SYSTEM                                                                          |        |               | CNT  | PAT-Active | US      | 14/197440     | 9614578      | US-2014-0185654-A1 |   |
| 12561 | HYBRID ORTHOGONAL FREQUENCY DIVISION MULTIPLE ACCESS SYSTEM AND METHOD                                                                                   |        |               | NP   | PAT-Active | US      | 11/406878     | 7715460      | US-2006-0256839-A1 |   |
| 12562 | HYBRID ORTHOGONAL FREQUENCY DIVISION MULTIPLE ACCESS WTRU AND METHOD                                                                                     |        |               | CNT  | PAT-Active | US      | 12/775769     | 8073551      | US-2010-0270664-A1 |   |
| 12563 | HYBRID ORTHOGONAL FREQUENCY DIVISION MULTIPLE ACCESS WTRU AND METHOD                                                                                     |        |               | CNT  | PAT-Active | US      | 13/236147     | 8340153      | US-2012-0098617-A1 |   |
| 12564 | HYBRID ORTHOGONAL FREQUENCY DIVISION MULTIPLE ACCESS WTRU AND METHOD                                                                                     |        |               | CNT  | PAT-Active | US      | 13/706811     | 8767795      | US-2013-0100895-A1 |   |
| 12565 | HYBRID ORTHOGONAL FREQUENCY DIVISION MULTIPLE ACCESS WTRU AND METHOD                                                                                     |        |               | CNT  | PAT-Active | US      | 14/164670     | 9077468      | US-2014-0204899-A1 |   |
| 12566 | HYBRID ORTHOGONAL FREQUENCY DIVISION MULTIPLE ACCESS SYSTEM AND METHOD                                                                                   |        |               | CNT  | PAT-Active | US      | 14/791113     | #####        | US-2015-0326357-A1 |   |
| 12567 | FREQUENCY DOMAIN JOINT DETECTION FOR WIRELESS COMMUNICATION SYSTEMS                                                                                      |        |               | NP   | PAT-Active | US      | 11/441881     | 7548577      | US-2006-0274842-A1 |   |
| 12568 | METHOD AND APPARATUS FOR PROVIDING EFFICIENT PRECODING FEEDBACK IN A MIMO WIRELESS COMMUNICATION SYSTEM                                                  |        |               | NP   | PAT-Active | US      | 11/840328     | 7881247      | US-2008-0049702-A1 |   |
| 12569 | METHOD AND APPARATUS FOR CONTROLLING DISCONTINUOUS TRANSMISSION AND RECEPTION                                                                            |        |               | NP   | PAT-Active | US      | 11/948148     | 7941626      | US-2008-0132230-A1 |   |
| 12570 | DYNAMIC CHANNEL QUALITY MEASUREMENT PROCEDURE FOR ADAPTIVE MODULATION AND CODING TECHNIQUES                                                              |        |               | NP   | PAT-Active | US      | 10/029569     | 6810236      | US-2002-0168944-A1 |   |
| 12571 | DYNAMIC CHANNEL QUALITY MEASUREMENT PROCEDURE IMPLEMENTED BY A BASE STATION FOR ADAPTIVE MODULATION AND CODING TECHNIQUES                                |        |               | CNT  | PAT-Active | US      | 10/768213     | 6999501      | US-2004-0185788-A1 |   |
| 12572 | DYNAMIC CHANNEL QUALITY MEASUREMENT PROCEDURE IMPLEMENTED IN A WIRELESS DIGITAL COMMUNICATION SYSTEM TO PRIORITIZE THE FORWARDING OF DOWNLINK DATA       |        |               | CNT  | PAT-Active | US      | 15/012746     | 9686803      | US-2016-0150551-A1 |   |
| 12573 | DYNAMIC CHANNEL QUALITY MEASUREMENT PROCEDURE IMPLEMENTED BY USER EQUIPMENT FOR ADAPTIVE MODULATION AND CODING TECHNIQUES                                |        |               | CNT  | PAT-Active | US      | 10/768223     | 7117256      | US-2004-0185789-A1 |   |
| 12574 | DYNAMIC CHANNEL QUALITY MEASUREMENT PROCEDURE IMPLEMENTED IN A WIRELESS DIGITAL COMMUNICATION SYSTEM TO PRIORITIZE THE FORWARDING OF DOWNLINK DATA       |        |               | CNT  | PAT-Active | US      | 10/768312     | 7171163      | US-2004-0185866-A1 |   |

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| 2     | TITLE                                                                                                                                              | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12575 | DYNAMIC CHANNEL QUALITY MEASUREMENT PROCEDURES FOR OPTIMIZING DATA TRANSMISSION IN A WIRELESS DIGITAL COMMUNICATION SYSTEM                         |        |               | CNT  | PAT-Active  | US      | 10/768313     | 7209711      | US-2004-0185862-A1 |   |
| 12576 | WIRELESS COMMUNICATION METHOD AND APPARATUS FOR MINIMIZING OVERHEAD SIGNALING AND OPTIMIZING RADIO RESOURCE UTILIZATION                            |        |               | CNT  | PAT-Active  | US      | 11/656647     | 7639989      | US-2007-0117519-A1 |   |
| 12577 | DYNAMIC CHANNEL QUALITY MEASUREMENT PROCEDURE IMPLEMENTED IN A WIRELESS DIGITAL COMMUNICATION SYSTEM TO PRIORITIZE THE FORWARDING OF DOWNLINK DATA |        |               | CNT  | PAT-Active  | US      | 12/648470     | 7904026      | US-2010-0105337-A1 |   |
| 12578 | DYNAMIC CHANNEL QUALITY MEASUREMENT PROCEDURE IMPLEMENTED IN A WIRELESS DIGITAL COMMUNICATION SYSTEM TO PRIORITIZE THE FORWARDING OF DOWNLINK DATA |        |               | CNT  | PAT-Active  | US      | 13/042134     | 8213036      | US-2011-0159908-A1 |   |
| 12579 | DYNAMIC CHANNEL QUALITY MEASUREMENT PROCEDURE IMPLEMENTED IN A WIRELESS DIGITAL COMMUNICATION SYSTEM TO PRIORITIZE THE FORWARDING OF DOWNLINK DATA |        |               | CNT  | PAT-Active  | US      | 13/534561     | 8437702      | US-2012-0263151-A1 |   |
| 12580 | DYNAMIC CHANNEL QUALITY MEASUREMENT PROCEDURE IMPLEMENTED IN A WIRELESS DIGITAL COMMUNICATION SYSTEM TO PRIORITIZE THE FORWARDING OF DOWNLINK DATA |        |               | CNT  | PAT-Active  | US      | 13/782664     | 9253789      | US-2013-0176970-A1 |   |
| 12581 | APPARATUS SYSTEM AND METHOD OF BEAM SELECTION FOR BEAMFORMED DIVERSITY WIRELESS COMMUNICATION                                                      |        |               | NP   | PAT-Active  | US      | 13/798852     | 9091879      | US-2014-0126620-A1 |   |
| 12582 | APPARATUS SYSTEM AND METHOD OF BEAM SELECTION FOR BEAMFORMED DIVERSITY WIRELESS COMMUNICATION                                                      |        |               | CNT  | PAT-Active  | US      | 14/619293     | 9531450      | US-2015-0222333-A1 |   |
| 12583 | APPARATUS SYSTEM AND METHOD OF CONTROLLING DATA FLOW OVER A COMMUNICATION NETWORK USING A TRANSFER RESPONSE                                        |        |               | NP   | PAT-Active  | US      | 13/798504     | 9654604      | US-2014-0140197-A1 |   |
| 12584 | Apparatus system and method of controlling data flow over a communication network                                                                  |        |               | CNT  | PAT-Active  | US      | 14/998744     | 9813530      | US-2016-0134728-A1 |   |
| 12585 | Apparatus system and method of controlling data flow over a communication network                                                                  |        |               | CNT  | PAT-Active  | US      | 15/782768     | #####        | US-2018-0334946-A1 |   |
| 12586 | Apparatus system and method of controlling data flow over a communication network                                                                  |        |               | CNT  | APP-Pending | US      | 16/231790     |              | US-2019-0335923-A1 |   |
| 12587 | COMMUNICATION TERMINAL DEVICE AND METHOD FOR CONTROLLING                                                                                           |        |               | NP   | PAT-Active  | US      | 13/759162     | 9228338      | US-2014-0219181-A1 |   |
| 12588 | COMMUNICATION TERMINAL DEVICE AND METHOD FOR CONTROLLING                                                                                           |        |               | CNT  | PAT-Active  | US      | 14/924919     | 9571532      | US-2016-0305949-A1 |   |
| 12589 | COMMUNICATION TERMINAL COMMUNICATION DEVICE METHOD FOR PROCESSING A PAGING MESSAGE AND METHOD FOR CONTROLLING A COMMUNICATION TERMINAL             |        |               | NP   | PAT-Active  | US      | 13/787965     | 9584986      | US-2014-0256385-A1 |   |
| 12590 | COMMUNICATION DEVICE AND METHOD FOR RECEIVING INFORMATION                                                                                          |        |               | NP   | PAT-Active  | US      | 13/743380     | 9883515      | US-2014-0198732-A1 |   |
| 12591 | COMMUNICATION DEVICE AND METHOD FOR RECEIVING INFORMATION                                                                                          |        |               | NP   | PAT-Active  | US      | 13/781872     | 9554361      | US-2014-0247813-A1 |   |
| 12592 | RADIO COMMUNICATION DEVICES AND CELLULAR WIDE AREA RADIO BASE STATION                                                                              |        |               | NP   | PAT-Active  | US      | 13/779835     | 9532400      | US-2014-0243038-A1 |   |
| 12593 | COMMUNICATION TERMINAL NETWORK COMPONENT BASE STATION AND METHOD FOR COMMUNICATING                                                                 |        |               | PCT  | PAT-Active  | US      | 13/977055     | 9516624      | US-2013-0272251-A1 |   |
| 12594 | METHOD AND APPARATUS FOR GENERATING A PLURALITY OF MODULATED SIGNALS                                                                               |        |               | NP   | PAT-Active  | US      | 13/790853     | 9054921      | US-2014-0260993-A1 |   |
| 12595 | CAPACITIVE DIGITAL TO ANALOG CONVERTER                                                                                                             |        |               | NP   | PAT-Active  | US      | 13/688867     | 8836559      | US-2014-0146913-A1 |   |
| 12596 | CAPACITIVE DIGITAL TO ANALOG CONVERTER                                                                                                             |        |               | REV  | PAT-Active  | US      | 14/457184     | 9184763      | US-2014-0347203-A1 |   |
| 12597 | DIGITAL TO ANALOG CONVERTER COMPRISING MIXER                                                                                                       |        |               | NP   | PAT-Active  | US      | 13/688980     | 8947806      | US-2014-0146914-A1 |   |

|       | A                                                                                                                               | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                           | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12598 | DIGITAL TO ANALOG CONVERTER COMPRISING MIXER                                                                                    |        |               | CNT  | PAT-Active  | US      | 14/336088     | 9444485      | US-2014-0328429-A1 |   |
| 12599 | COMMUNICATIONS TERMINAL AND A METHOD FOR SELECTING A TRANSMIT ANTENNA FOR A TRANSMISSION TO A RADIO COMMUNICATIONS NETWORK      |        |               | NP   | PAT-Active  | US      | 13/772529     | 9379798      | US-2014-0233665-A1 |   |
| 12600 | COMMUNICATIONS TERMINAL AND A METHOD FOR SELECTING A TRANSMIT ANTENNA FOR A TRANSMISSION TO A RADIO COMMUNICATIONS NETWORK      |        |               | CNT  | PAT-Active  | US      | 15/162651     | 9660711      | US-2016-0365086-A1 |   |
| 12601 | COMMUNICATIONS TERMINAL AND A METHOD FOR SELECTING A TRANSMIT ANTENNA FOR A TRANSMISSION TO A RADIO COMMUNICATIONS NETWORK      |        |               | CNT  | APP-Pending | US      | 15/490256     |              | US-2018-0062718-A1 |   |
| 12602 | METHOD FOR USING CODEBOOK INDEXING TO ACHIEVE HIGH BIT DENSITIES IN A DIRECT-SEQUENCE CDMA SPREAD SPECTRUM COMMUNICATION SYSTEM |        |               | NP   | PAT-Active  | US      | 09/002747     | 7301983      |                    |   |
| 12603 | RADIO COMMUNICATION DEVICES AND CELLULAR WIDE AREA RADIO BASE STATION                                                           |        |               | NP   | PAT-Active  | US      | 13/779884     | 8855643      | US-2014-0243040-A1 |   |
| 12604 | DEVICE AND METHOD FOR FREQUENCY OFFSET ESTIMATION                                                                               |        |               | PCT  | PAT-Active  | US      | 14/233366     | 9584355      | US-2015-0319027-A1 |   |
| 12605 | WIRELESS STATION AND METHODS FOR TOF POSITIONING USING REVERSE-DIRECTION GRANT                                                  |        |               | PCT  | PAT-Active  | US      | 14/124444     | 8313811      | US-2014-0365549-A1 |   |
| 12606 | AMPLIFIER STAGE                                                                                                                 |        |               | NP   | PAT-Active  | US      | 13/773852     | 9590575      | US-2014-0246045-A1 |   |
| 12607 | TRANSFORMER AND ELECTRICAL CIRCUIT                                                                                              |        |               | NP   | PAT-Active  | US      | 14/183618     | 9837199      | US-2014-0240063-A1 |   |
| 12608 | TRANSFORMER AND ELECTRICAL CIRCUIT                                                                                              |        |               | CNT  | APP-Pending | US      | 15/019980     |              | US-2016-0181005-A1 |   |
| 12609 | USING MULTIPLE SOURCES OF LOCATION-AID DATA TO DETERMINE POSITION INFORMATION                                                   |        |               | NP   | PAT-Active  | US      | 13/797599     | 9110157      | US-2014-0278077-A1 |   |
| 12610 | APPARATUS SYSTEM AND METHOD OF WIRELESS BACKHAUL AND ACCESS COMMUNICATION VIA A COMMON ANTENNA ARRAY                            |        |               | NP   | PAT-Active  | US      | 13/868541     | 9231681      | US-2014-0204846-A1 |   |
| 12611 | APPARATUS SYSTEM AND METHOD OF WIRELESS BACKHAUL AND ACCESS COMMUNICATION VIA A COMMON ANTENNA ARRAY                            |        |               | CNT  | PAT-Active  | US      | 14/953664     | 9621248      | US-2016-0094286-A1 |   |
| 12612 | APPARATUS SYSTEM AND METHOD OF WIRELESS BACKHAUL AND ACCESS COMMUNICATION VIA A COMMON ANTENNA ARRAY                            |        |               | CNT  | PAT-Active  | US      | 15/447420     | #####        | US-2017-0180128-A1 |   |
| 12613 | INTERFERENCE CANCELLATION RADIO RECEIVER                                                                                        |        |               | NP   | PAT-Active  | US      | 13/929228     | 9042429      | US-2015-0003509-A1 |   |
| 12614 | APPARATUS SYSTEM AND METHOD OF WIRELESS BACKHAUL COMMUNICATION BETWEEN WIRELESS COMMUNICATION NODES                             |        |               | NP   | PAT-Active  | US      | 13/865675     | 9326273      | US-2014-0206368-A1 |   |
| 12615 | DUAL COMMUNICATION CIRCUIT DEVICE SELECTING COMMUNICATION CIRCUIT BASED ON COMMUNICATION ACTIVITY HISTORY                       |        |               | NP   | PAT-Active  | US      | 13/870010     | 9544416      | US-2014-0323175-A1 |   |
| 12616 | SELECTING FIRST OR SECOND SUBSCRIBER IDENTITY MODULE BASED ON PRIORITY                                                          |        |               | CNT  | PAT-Active  | US      | 15/376776     | 9832783      | US-2017-0127432-A1 |   |
| 12617 | METHOD AND APPARATUS FOR AUTONOMOUS CLUSTER HEAD SELECTION FOR MACHINE-TYPE-COMMUNICATIONS (MTC)                                |        |               | NP   | PAT-Active  | US      | 14/012062     | 9578635      | US-2014-0092833-A1 |   |
| 12618 | USER EQUIPMENT AND METHOD FOR ENHANCED UPLINK POWER CONTROL                                                                     |        |               | NP   | PAT-Active  | US      | 13/971971     | 9264963      | US-2015-0055454-A1 |   |
| 12619 | USER EQUIPMENT AND METHOD FOR ENHANCED UPLINK POWER CONTROL                                                                     |        |               | CNT  | PAT-Active  | US      | 14/995227     | 9538487      | US-2016-0174170-A1 |   |
| 12620 | USER EQUIPMENT AND METHOD FOR ENHANCED UPLINK POWER CONTROL                                                                     |        |               | CNT  | PAT-Active  | US      | 15/385632     | #####        | US-2017-0265150-A1 |   |
| 12621 | DEVICE-TO-DEVICE CONTENTION MANAGEMENT SCHEME FOR MOBILE BROADBAND NETWORKS                                                     |        |               | NP   | PAT-Active  | US      | 13/931415     | 9277439      | US-2015-0003322-A1 |   |

|       | A                                                                                                          | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                      | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12622 | PHASE INTERPOLATOR                                                                                         |        |               | NP   | PAT-Active  | US      | 13/873826     | 9077511      | US-2014-0321513-A1 |   |
| 12623 | CIRCUIT AND METHOD FOR SOFTWARE TRACING                                                                    |        |               | NP   | PAT-Active  | US      | 13/833392     | 9438428      | US-2013-0246676-A1 |   |
| 12624 | POWER SENSING IN WIRELESS SYSTEM                                                                           |        |               | NP   | PAT-Active  | US      | 14/155374     | 9537518      | US-2015-0372723-A1 |   |
| 12625 | DISTRIBUTED MOBILITY ANCHORING FOR WIRELESS NETWORKS                                                       |        |               | DIV  | PAT-Active  | US      | 14/806353     | 9629075      | US-2015-0327051-A1 |   |
| 12626 | STATISTICS FOR OPTIMIZING DISTRIBUTED MOBILITY ANCHORING FOR WIRELESS NETWORKS                             |        |               | NP   | PAT-Active  | US      | 13/942252     | 9247490      | US-2014-0273039-A1 |   |
| 12627 | METHOD AND DEVICE FOR PROCESSING A SIGNAL BASED ON A FIRST AND A SECOND COVARIANCE MEASURE                 |        |               | NP   | PAT-Active  | US      | 13/927715     | 9461757      | US-2015-0003260-A1 |   |
| 12628 | PROVIDING ASSISTANCE TO A BASE STATION FROM USER EQUIPMENT                                                 |        |               | NP   | PAT-Active  | US      | 13/845328     | 8948475      | US-2013-0242837-A1 |   |
| 12629 | PROVIDING ASSISTANCE TO A BASE STATION FROM USER EQUIPMENT                                                 |        |               | CNT  | PAT-Active  | US      | 14/070243     | #####        | US-2014-0056200-A1 |   |
| 12630 | SWITCHING DISCONTINUOUS RECEPTION PARAMETERS                                                               |        |               | NP   | PAT-Active  | US      | 13/845178     | 8386571      | US-2013-0265928-A1 |   |
| 12631 | SYSTEMS AND METHODS FOR DEVICE-TO-DEVICE COMMUNICATION IN THE ABSENCE OF NETWORK COVERAGE                  |        |               | NP   | PAT-Active  | US      | 13/930565     | 9288756      | US-2014-0094119-A1 |   |
| 12632 | HYBRID AUTOMATIC REPEAT REQUEST (HARQ) MAPPING FOR CARRIER AGGREGATION (CA)                                |        |               | NP   | PAT-Active  | US      | 13/867018     | 9681326      | US-2014-0092824-A1 |   |
| 12633 | METHOD OF ENHANCED INTERFERENCE MEASUREMENTS FOR CHANNEL STATE INFORMATION (CSI) FEEDBACK                  |        |               | NP   | PAT-Active  | US      | 14/027401     | 9781638      | US-2014-0092878-A1 |   |
| 12634 | METHOD OF ENHANCED INTERFERENCE MEASUREMENTS FOR CHANNEL STATE INFORMATION (CSI) FEEDBACK                  |        |               | CNT  | PAT-Active  | US      | 15/579778     | #####        | US-2017-0347286-A1 |   |
| 12635 | MANAGEMENT APPARATUS AND METHOD TO SUPPORT WLAN OFFLOADING                                                 |        |               | NP   | PAT-Active  | US      | 13/830981     | 9516556      | US-2014-0092742-A1 |   |
| 12636 | MANAGEMENT APPARATUS AND METHOD TO SUPPORT WLAN OFFLOADING                                                 |        |               | CNT  | APP-Pending | US      | 15/298546     |              | US-2017-0041827-A1 |   |
| 12637 | ANDSF POLICIES FOR WLAN AND PLMN SELECTION                                                                 |        |               | NP   | PAT-Active  | US      | 13/895261     | 9083775      | US-2014-0092886-A1 |   |
| 12638 | ANDSF PARAMETERS FOR WLAN NETWORK SELECTION                                                                |        |               | NP   | PAT-Active  | US      | 13/830465     | 9497740      | US-2014-0092731-A1 |   |
| 12639 | ANDSF PARAMETERS FOR WLAN NETWORK SELECTION                                                                |        |               | CNT  | PAT-Active  | US      | 15/286236     | 9324401      | US-2017-0026868-A1 |   |
| 12640 | SELECTIVE JOINER OF USER EQUIPMENT WITH WIRELESS CELL                                                      |        |               | NP   | PAT-Active  | US      | 13/802491     | 8923880      | US-2014-0094185-A1 |   |
| 12641 | DETERMINATION OF ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL CANDIDATES IN A WIRELESS COMMUNICATION NETWORK |        |               | NP   | PAT-Active  | US      | 13/830277     | 9107362      | US-2014-0092823-A1 |   |
| 12642 | DETERMINATION OF ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL CANDIDATES IN A WIRELESS COMMUNICATION NETWORK |        |               | CNT  | PAT-Active  | US      | 14/743205     | 9386487      | US-2015-0289240-A1 |   |
| 12643 | DETERMINATION OF ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL CANDIDATES IN A WIRELESS COMMUNICATION NETWORK |        |               | CNT  | PAT-Active  | US      | 15/171402     | 9603095      | US-2016-0278060-A1 |   |
| 12644 | DETERMINATION OF ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL CANDIDATES IN A WIRELESS COMMUNICATION NETWORK |        |               | CNT  | PAT-Active  | US      | 15/426987     | #####        | US-2017-0150484-A1 |   |
| 12645 | METHOD AND DEVICE FOR REDUCING POWER DRAIN WHILE CAMPED ON A WIRELESS LOCAL AREA NETWORK                   |        |               | NP   | PAT-Active  | US      | 13/070518     | 8780775      | US-2013-0292853-A1 |   |
| 12646 | METHOD AND APPARATUS FOR CELL DETECTION IN A WIRELESS COMMUNICATION SYSTEM                                 |        |               | NP   | PAT-Active  | US      | 12/842469     | 8663063      | US-2012-0020335-A1 |   |



|       | A                                                                                                                                                                              | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                                          | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12647 | METHOD FOR FACILITATING SYNCHRONISATION BETWEEN A COMMUNICATIONS NETWORK AND A WIRELESS COMMUNICATIONS DEVICE OPERATING IN A CPC DTX MODE AND A WIRELESS COMMUNICATIONS DEVICE |        |               | NP   | PAT-Active  | US      | 13/540576     | 8088940      | US-2013-0021932-A1 |   |
| 12648 | WIRELESS COMMUNICATION DEVICE AND METHOD FOR PERFORMING NEIGHBOR CELL ANALYSIS DURING CONTINUOUS PACKET CONNECTIVITY MODE                                                      |        |               | NP   | PAT-Active  | US      | 12/941786     | 8675554      | US-2012-0113825-A1 |   |
| 12649 | SELF-CORRECTING MULTIRATE FILTER                                                                                                                                               |        |               | NP   | PAT-Active  | US      | 13/342258     | 8693601      | US-2013-0170531-A1 |   |
| 12650 | MINIMALISTIC LTE MAINTENANCE TIMING ADVANCE METHOD                                                                                                                             |        |               | CNT  | PAT-Active  | US      | 14/216912     | 9344986      | US-2014-0198757-A1 |   |
| 12651 | IMS BASED P2P STREAMING AND DOWNLOAD SERVICES                                                                                                                                  |        |               | NP   | PAT-Active  | US      | 14/041363     | 9388498      | US-2014-0095730-A1 |   |
| 12652 | ENHANCED VIDEO DECODING WITH APPLICATION LAYER FORWARD ERROR CORRECTION                                                                                                        |        |               | NP   | PAT-Active  | US      | 14/032719     | #####        | US-2014-0119459-A1 |   |
| 12653 | ENERGY-AWARE MULTIMEDIA ADAPTATION FOR STREAMING AND CONVERSATIONAL SERVICES                                                                                                   |        |               | NP   | PAT-Active  | US      | 14/041476     | 9629131      | US-2014-0095670-A1 |   |
| 12654 | PERIODIC CHANNEL STATE INFORMATION REPORTING FOR COORDINATED MULTIPPOINT (CoMP) SYSTEMS                                                                                        |        |               | NP   | PAT-Active  | US      | 13/886619     | 9369922      | US-2014-0038704-A1 |   |
| 12655 | PERIODIC CHANNEL STATE INFORMATION REPORTING FOR TIME DIVISION DUPLEX (TDD) CARRIER AGGREGATION SYSTEMS                                                                        |        |               | NP   | PAT-Active  | US      | 13/886795     | 9161254      | US-2014-0092767-A1 |   |
| 12656 | PERIODIC CHANNEL STATE INFORMATION REPORTING FOR TIME DIVISION DUPLEX (TDD) CARRIER AGGREGATION SYSTEMS                                                                        |        |               | CNT  | PAT-Active  | US      | 14/473292     | 9848351      | US-2014-0369244-A1 |   |
| 12657 | PERIODIC CHANNEL STATE INFORMATION REPORTING FOR TIME DIVISION DUPLEX (TDD) CARRIER AGGREGATION SYSTEMS                                                                        |        |               | CNT  | PAT-Active  | US      | 14/946576     | 9848353      | US-2016-0080134-A1 |   |
| 12658 | PERIODIC CHANNEL STATE INFORMATION REPORTING FOR TIME DIVISION DUPLEX (TDD) CARRIER AGGREGATION SYSTEMS                                                                        |        |               | CNT  | APP-Pending | US      | 15/727869     |              | US-2018-0027442-A1 |   |
| 12659 | SYSTEMS AND METHODS FOR WIRELESS SIGNAL MEASUREMENT AND REPORTING FOR DEVICE-TO-DEVICE COMMUNICATION                                                                           |        |               | DIV  | PAT-Active  | US      | 14/875894     | 9743390      | US-2016-0029262-A1 |   |
| 12660 | TRANSMISSION OF UPLINK CONTROL INFORMATION IN INTER-ENB CARRIER AGGREGATION                                                                                                    |        |               | NP   | PAT-Active  | US      | 13/927823     | 9301183      | US-2014-0092865-A1 |   |
| 12661 | HYBRID AUTOMATIC REPEAT REQUEST (HARQ) MAPPING FOR CARRIER AGGREGATION (CA)                                                                                                    |        |               | NP   | PAT-Active  | US      | 13/867020     | 9439095      | US-2014-0092786-A1 |   |
| 12662 | MACHINE TYPE COMMUNICATION MONITORING FRAMEWORK FOR 3GPP SYSTEMS                                                                                                               |        |               | NP   | PAT-Active  | US      | 13/928628     | 9025445      | US-2014-0092808-A1 |   |
| 12663 | MACHINE TYPE COMMUNICATION MONITORING FRAMEWORK FOR 3GPP SYSTEMS                                                                                                               |        |               | CNT  | PAT-Active  | US      | 14/684155     | 9386486      | US-2015-0215801-A1 |   |
| 12664 | MACHINE TYPE COMMUNICATION MONITORING FRAMEWORK FOR 3GPP SYSTEMS                                                                                                               |        |               | CNT  | PAT-Active  | US      | 14/955933     | 9942791      | US-2016-0088509-A1 |   |
| 12665 | MACHINE TYPE COMMUNICATION MONITORING FRAMEWORK FOR 3GPP SYSTEMS                                                                                                               |        |               | CNT  | APP-Pending | US      | 15/906100     |              | US-2018-0192318-A1 |   |
| 12666 | SYSTEMS AND METHODS FOR LOW POWER CONSUMPTION IN WIRELESS COMMUNICATION SYSTEMS                                                                                                |        |               | NP   | PAT-Active  | US      | 13/928690     | 9462555      | US-2014-0092799-A1 |   |
| 12667 | SYSTEMS AND METHODS FOR LOW POWER CONSUMPTION IN WIRELESS COMMUNICATION SYSTEMS                                                                                                |        |               | DIV  | PAT-Active  | US      | 15/259319     | #####        | US-2016-0081730-A1 |   |
| 12668 | SYSTEMS AND METHODS FOR SEMI-PERSISTENT SCHEDULING OF WIRELESS COMMUNICATIONS                                                                                                  |        |               | NP   | PAT-Active  | US      | 13/928722     | 9973319      | US-2014-0092829-A1 |   |
| 12669 | SYSTEMS AND METHODS FOR SEMI-PERSISTENT SCHEDULING OF WIRELESS COMMUNICATIONS                                                                                                  |        |               | CNT  | APP-Pending | US      | 15/941564     |              | US-2018-0227104-A1 |   |
| 12670 | COMMUNICATION DEVICE/MOBILE TERMINAL METHOD FOR REQUESTING INFORMATION AND METHOD FOR PROVIDING INFORMATION                                                                    |        |               | NP   | PAT-Active  | US      | 13/803042     | 9407302      | US-2014-0153482-A1 |   |

|       | A                                                                                                                                                   | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                               | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12671 | METHOD AND RELATED MOBILE DEVICE FOR SEARCHING FOR A MOBILE NETWORK                                                                                 |        |               | NP   | PAT-Active  | US      | 13/937046     | 9185640      | US-2015-0911207-A1 |   |
| 12672 | SYNCHRONIZING PHASES BETWEEN LOCAL LO GENERATION CIRCUITS                                                                                           |        |               | NP   | PAT-Active  | US      | 14/047117     | 9054855      | US-2015-0998543-A1 |   |
| 12673 | APPARATUS AND METHOD FOR DETERMINING INFORMATION ON A POWER VARIATION OF A TRANSMIT SIGNAL                                                          |        |               | NP   | PAT-Active  | US      | 14/341115     | 9588158      | US-2015-0935543-A1 |   |
| 12674 | APPARATUS AND METHOD FOR DETERMINING INFORMATION ON A POWER VARIATION OF A TRANSMIT SIGNAL                                                          |        |               | CNT  | PAT-Active  | US      | 15/415854     | #####        | US-2017-0295547-A1 |   |
| 12675 | DEVICE AND METHOD FOR CHANNEL ESTIMATION AND SIGNAL DEMODULATION                                                                                    |        |               | NP   | PAT-Active  | US      | 14/099766     | 9338032      | US-2015-0156036-A1 |   |
| 12676 | METHOD AND RELATED MOBILE DEVICE FOR CELL SEARCH IN MULTI RADIO ACCESS TECHNOLOGY SYSTEMS                                                           |        |               | NP   | PAT-Active  | US      | 13/954563     | 9360940      | US-2015-0938137-A1 |   |
| 12677 | POWER SAVING TECHNIQUE FOR DIGITAL TO TIME CONVERTERS                                                                                               |        |               | NP   | PAT-Active  | US      | 14/038996     | 9847676      | US-2015-0991364-A1 |   |
| 12678 | METHOD FOR NOISE SHAPING AND A NOISE SHAPING FILTER                                                                                                 |        |               | NP   | APP-Pending | US      | 13/946437     |              | US-2015-0923413-A1 |   |
| 12679 | MOBILE RADIO COMMUNICATION DEVICES MOBILE RADIO COMMUNICATION NETWORKS AND METHODS FOR CONTROLLING THE SAME                                         |        |               | NP   | PAT-Active  | US      | 14/025901     | 9301331      | US-2015-0975971-A1 |   |
| 12680 | MOBILE RADIO COMMUNICATION DEVICES MOBILE RADIO COMMUNICATION NETWORKS AND METHODS FOR CONTROLLING THE SAME                                         |        |               | CNT  | PAT-Active  | US      | 15/047733     | #####        | US-2016-0323929-A1 |   |
| 12681 | COMMUNICATION TERMINAL DEVICE AND METHOD FOR OPERATING A COMMUNICATION TERMINAL DEVICE                                                              |        |               | NP   | PAT-Active  | US      | 14/028583     | 9246637      | US-2015-0978251-A1 |   |
| 12682 | METHOD TO IDENTIFY AND DIFFERENTIATE BACKGROUND TRAFFIC                                                                                             |        |               | PCT  | PAT-Active  | US      | 14/124536     | 9444569      | US-2015-0936569-A1 |   |
| 12683 | NETWORK SELECTION IN A HETEROGENEOUS NETWORK                                                                                                        |        |               | PCT  | PAT-Active  | US      | 14/786145     | 9872197      | US-2015-0973287-A1 |   |
| 12684 | APPARATUS AND A METHOD FOR DETERMINING INFORMATION ON AN AMPLITUDE ERROR OF A TRANSMIT SIGNAL                                                       |        |               | NP   | PAT-Active  | US      | 14/591210     | 9264180      | US-2015-0244604-A1 |   |
| 12685 | PLATFORM INDEPENDENT ANTENNA                                                                                                                        |        |               | NP   | PAT-Active  | US      | 14/134632     | #####        | US-2015-0180123-A1 |   |
| 12686 | COMMUNICATION DEVICE AND METHOD FOR PERFORMING RADIO COMMUNICATION                                                                                  |        |               | NP   | APP-Pending | US      | 14/062982     |              | US-2014-0149584-A1 |   |
| 12687 | COMMUNICATION DEVICE AND METHOD FOR PERFORMING RADIO COMMUNICATION                                                                                  |        |               | CNT  | APP-Pending | US      | 15/197621     |              | US-2016-0901456-A1 |   |
| 12688 | HYBRID BEAMFORMING FOR DATA TRANSMISSION                                                                                                            |        |               | PCT  | PAT-Active  | US      | 14/125258     | 9275404      | US-2015-0199292-A1 |   |
| 12689 | ORTHOGONAL BEAMFORMING FOR MULTIPLE USER MULTIPLE-INPUT AND MULTIPLE-OUTPUT (MU-MIMO)                                                               |        |               | PCT  | PAT-Active  | US      | 14/125330     | 9461723      | US-2014-0343048-A1 |   |
| 12690 | REPORTING OF USER PLANE CONGESTION                                                                                                                  |        |               | PCT  | PAT-Active  | US      | 14/125324     | #####        | US-2015-0103664-A1 |   |
| 12691 | PHYSICAL UPLINK CONTROL CHANNEL (PUCCH) RESOURCE ALLOCATION (RA) FOR A HYBRID AUTOMATIC RETRANSMISSION RE-QUEST-ACKNOWLEDGE (HARQ-ACK) TRANSMISSION |        |               | PCT  | PAT-Active  | US      | 14/125325     | 9397945      | US-2015-0916311-A1 |   |
| 12692 | PHYSICAL UPLINK CONTROL CHANNEL (PUCCH) RESOURCE ALLOCATION (RA) FOR A HYBRID AUTOMATIC RETRANSMISSION RE-QUEST-ACKNOWLEDGE (HARQ-ACK) TRANSMISSION |        |               | CNT  | PAT-Active  | US      | 14/555317     | 9191326      | US-2015-0987723-A1 |   |
| 12693 | PHYSICAL UPLINK CONTROL CHANNEL (PUCCH) RESOURCE ALLOCATION (RA) FOR A HYBRID AUTOMATIC RETRANSMISSION RE-QUEST-ACKNOWLEDGE (HARQ-ACK) TRANSMISSION |        |               | CNT  | PAT-Active  | US      | 14/927089     | 9608916      | US-2016-0966302-A1 |   |
| 12694 | PHYSICAL UPLINK CONTROL CHANNEL (PUCCH) RESOURCE ALLOCATION (RA) FOR A HYBRID AUTOMATIC RETRANSMISSION RE-QUEST-ACKNOWLEDGE (HARQ-ACK) TRANSMISSION |        |               | CNT  | PAT-Active  | US      | 15/403004     | 9794919      | US-2017-0135091-A1 |   |

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| 2     | TITLE                                                                                                                                              | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12695 | PHYSICAL UPLINK CONTROL CHANNEL (PUCCH) RESOURCE ALLOCATION (RA) FOR A HYBRID AUTOMATIC RETRANSMISSION REQUEST-ACKNOWLEDGE (HARQ-ACK) TRANSMISSION |        |               | CNT  | PAT-Active  | US      | 15/725203     | #####        | US-2018-0098318-A1 |   |
| 12696 | COMMUNICATION OF POWER CONSUMPTION CONFIGURATIONS DURING HANDOVER                                                                                  |        |               | PCT  | PAT-Active  | US      | 14/125481     | 9515699      | US-2015-0195800-A1 |   |
| 12697 | ADAPTIVE SECTORIZATION OF A SPATIAL REGION FOR PARALLEL MULTI-USER TRANSMISSIONS                                                                   |        |               | PCT  | PAT-Active  | US      | 14/126037     | 9461727      | US-2015-0131750-A1 |   |
| 12698 | SEQUENCE GENERATION FOR CELL SPECIFIC REFERENCE SIGNAL (CRS)                                                                                       |        |               | PCT  | PAT-Active  | US      | 13/125642     | 9265068      | US-2015-0185677-A1 |   |
| 12699 | CARRIER TYPE (NCT) INFORMATION EMBEDDED IN SYNCHRONIZATION SIGNAL                                                                                  |        |               | PCT  | PAT-Active  | US      | 14/128343     | 9516656      | US-2014-0254567-A1 |   |
| 12700 | SIMULTANEOUS TRANSMIT AND RECEIVE (STR) STRUCTURES IMMUNE TO PHASE AND AMPLITUDE IMBALANCES                                                        |        |               | PCT  | PAT-Active  | US      | 14/128278     | 9387564      | US-2015-0005867-A1 |   |
| 12701 | CSI-RS ANTENNA PORTS EXTENSION AND 3D CODEBOOK DESIGN                                                                                              |        |               | PCT  | PAT-Active  | US      | 14/128338     | 9438451      | US-2015-0180684-A1 |   |
| 12702 | TECHNIQUES FOR BEAMFORMING TO MITIGATE MULTI-USER LEAKAGE AND INTERFERENCE                                                                         |        |               | PCT  | PAT-Active  | US      | 14/128614     | 9252853      | US-2015-0200718-A1 |   |
| 12703 | TECHNIQUES FOR USER PLANE CONGESTION MITIGATION                                                                                                    |        |               | PCT  | PAT-Active  | US      | 14/129952     | 9603104      | US-2015-0201352-A1 |   |
| 12704 | CHANNEL QUALITY INFORMATION FEEDBACK TECHNIQUES                                                                                                    |        |               | PCT  | PAT-Active  | US      | 14/411409     | 9986477      | US-2015-0163039-A1 |   |
| 12705 | CHANNEL QUALITY INFORMATION FEEDBACK TECHNIQUES                                                                                                    |        |               | CNT  | APP-Pending | US      | 15/990643     |              | US-2019-0007878-A1 |   |
| 12706 | RANK INDICATOR INHERITANCE FOR SUBFRAME RESTRICTED CHANNEL STATE INFORMATION REPORTING                                                             |        |               | PCT  | PAT-Active  | US      | 14/759109     | 9854480      | US-2015-0344817-A1 |   |
| 12707 | APPARATUS AND METHOD FOR CROSS-CARRIER QUASI CO-LOCATION SIGNALING IN A NEW CARRIER TYPE (NCT) WIRELESS NETWORK                                    |        |               | PCT  | PAT-Active  | US      | 14/759116     | 9763154      | US-2015-0343882-A1 |   |
| 12708 | APPARATUS AND METHOD FOR CONTROL CHANNEL MONITORING IN A NEW CARRIER TYPE (NCT) WIRELESS NETWORK                                                   |        |               | PCT  | PAT-Active  | US      | 14/759119     | #####        | US-2015-0343818-A1 |   |
| 12709 | PERFORMANCE MONITORING OF WIRELESS LOCAL AREA NETWORK (WLAN) OFFLOADING IN WIRELESS CELLULAR NETWORKS                                              |        |               | PCT  | PAT-Active  | US      | 14/128018     | 9936431      | US-2015-0103648-A1 |   |
| 12710 | MAPPING SPECIAL SUBFRAMES IN A WIRELESS COMMUNICATION NETWORK                                                                                      |        |               | PCT  | PAT-Active  | US      | 14/127891     | 9503892      | US-2015-0005870-A1 |   |
| 12711 | RESOURCE MANAGEMENT IN MULTIPLE RADIO ACCESS NETWORKS                                                                                              |        |               | PCT  | PAT-Active  | US      | 14/122961     | 9258734      | US-2015-0043336-A1 |   |
| 12712 | MANAGING COMMUNICATIONS IN MULTIPLE RADIO ACCESS NETWORKS                                                                                          |        |               | PCT  | PAT-Active  | US      | 14/122963     | 9277493      | US-2015-0043342-A1 |   |
| 12713 | INTERFERENCE AVERAGING AND INTERFERENCE RESOURCE GROUPS IN A WIRELESS COMMUNICATION SYSTEM                                                         |        |               | PCT  | PAT-Active  | US      | 14/127900     | 9525446      | US-2015-0264694-A1 |   |
| 12714 | INTERFERENCE AVERAGING AND INTERFERENCE RESOURCE GROUPS IN A WIRELESS COMMUNICATION SYSTEM                                                         |        |               | CNT  | PAT-Active  | US      | 15/343196     | 9908033      | US-2017-0078909-A1 |   |
| 12715 | INTERFERENCE AVERAGING AND INTERFERENCE RESOURCE GROUPS IN A WIRELESS COMMUNICATION SYSTEM                                                         |        |               | CNT  | PAT-Active  | US      | 15/852986     | #####        | US-2018-0191388-A1 |   |
| 12716 | CENTRALIZED PARTITIONING OF USER DEVICES IN A HETEROGENEOUS WIRELESS NETWORK                                                                       |        |               | PCT  | PAT-Active  | US      | 14/129197     | 9226211      | US-2015-0201374-A1 |   |
| 12717 | ENERGY-HARVESTING DEVICES IN WIRELESS NETWORKS                                                                                                     |        |               | PCT  | PAT-Active  | US      | 14/127928     | 9271242      | US-2015-0201342-A1 |   |
| 12718 | ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL SCRAMBLING AND DEMODULATION REFERENCE SIGNAL SEQUENCE GENERATION                                        |        |               | PCT  | PAT-Active  | US      | 14/127118     | 9402251      | US-2014-0355531-A1 |   |
| 12719 | ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL SCRAMBLING AND DEMODULATION REFERENCE SIGNAL SEQUENCE GENERATION                                        |        |               | PCT  | PAT-Active  | US      | 15/183742     | #####        | US-2016-0295567-A1 |   |

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| 2     | TITLE                                                                                                                           | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12720 | BLIND DECODING FOR AN ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL (EPDCCH)                                                       |        |               | NP   | PAT-Active  | US      | 13/931102     | 9167574      | US-2014-0982830-A1 |   |
| 12721 | BLIND DECODING FOR AN ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL (EPDCCH)                                                       |        |               | ENT  | PAT-Active  | US      | 14/882289     | 9549404      | US-2016-0037388-A1 |   |
| 12722 | BLIND DECODING FOR AN ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL (EPDCCH)                                                       |        |               | ENT  | PAT-Active  | US      | 15/374623     | 9872289      | US-2017-0127388-A1 |   |
| 12723 | BLIND DECODING FOR AN ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL (EPDCCH)                                                       |        |               | ENT  | PAT-Active  | US      | 15/861385     | #####        | US-2018-0132213-A1 |   |
| 12724 | ADVANCED WIRELESS COMMUNICATION SYSTEMS AND TECHNIQUES                                                                          |        |               | PSP  | APP-Closed  | US      | 61/821635     |              |                    |   |
| 12725 | CHANNEL STATE INFORMATION FEEDBACK SCHEME FOR COOPERATIVE MULTI-POINT TRANSMISSION AND CARRIER AGGREGATION SCENARIO             |        |               | PCT  | PAT-Active  | US      | 14/126654     | 9277471      | US-2014-0269383-A1 |   |
| 12726 | CHANNEL STATE INFORMATION FEEDBACK SCHEME FOR COOPERATIVE MULTI-POINT TRANSMISSION AND CARRIER AGGREGATION SCENARIO             |        |               | ENT  | PAT-Active  | US      | 15/013658     | 9674753      | US-2016-0157241-A1 |   |
| 12727 | LONG-TERM EVOLUTION DEVICE-TO-DEVICE DISCOVERY USING CONTROL CHANNEL                                                            |        |               | PCT  | PAT-Active  | US      | 14/126998     | 9324432      | US-2015-0043438-A1 |   |
| 12728 | SIGNALING QoS REQUIREMENTS AND UE POWER PREFERENCE IN LTE-A NETWORKS                                                            |        |               | PCT  | PAT-Active  | US      | 14/127092     | 9420511      | US-2015-0230179-A1 |   |
| 12729 | EXTENDED DISCONTINUOUS RECEPTION (DRX) CYCLE LENGTH IN WIRELESS COMMUNICATION NETWORKS                                          |        |               | PCT  | PAT-Active  | US      | 14/127521     | 9998971      | US-2014-0285215-A1 |   |
| 12730 | COVERAGE BOOSTING TRANSMISSION METHOD FOR LTE TECHNOLOGY                                                                        |        |               | PCT  | PAT-Active  | US      | 14/124964     | 9585075      | US-2014-0286302-A1 |   |
| 12731 | SYSTEM AND METHOD OF CELL OUTAGE COMPENSATION IN CELLULAR SYSTEMS                                                               |        |               | PCT  | PAT-Active  | US      | 14/124457     | 9363727      | US-2014-0293856-A1 |   |
| 12732 | FREQUENCY OFFSET MEASUREMENT ENHANCEMENTS FOR LONG TERM EVOLUTION (LTE)                                                         |        |               | PCT  | PAT-Active  | US      | 14/125767     | 9332499      | US-2015-0329874-A1 |   |
| 12733 | INTER-RAT MOBILITY OF IN-DEVICE COEXISTENCE                                                                                     |        |               | PCT  | PAT-Active  | US      | 14/119228     | 9253698      | US-2015-0249547-A1 |   |
| 12734 | INTER-RAT MOBILITY OF IN-DEVICE COEXISTENCE                                                                                     |        |               | ENT  | PAT-Active  | US      | 14/990239     | 9572077      | US-2016-0119842-A1 |   |
| 12735 | FAST MODULATION AND CODING SCHEME ADAPTATION PROTOCOL FOR LONG TERM EVOLUTION WITH MULTIPLE-USER MULTIPLE INPUT MULTIPLE OUTPUT |        |               | PCT  | PAT-Active  | US      | 14/125472     | 9609364      | US-2015-0171939-A1 |   |
| 12736 | SPECTRUM SHARING BASED ON SELF-ORGANIZING NETWORKS                                                                              |        |               | PCT  | PAT-Active  | US      | 14/766873     | 9821260      | US-2015-0382201-A1 |   |
| 12737 | SPECTRUM SHARING BASED ON SELF-ORGANIZING NETWORKS                                                                              |        |               | ENT  | PAT-Active  | US      | 15/810832     | #####        | US-2018-0098305-A1 |   |
| 12738 | SPECTRUM SHARING BASED ON SELF-ORGANIZING NETWORKS                                                                              |        |               | ENT  | APP-Pending | US      | 15/540656     |              |                    |   |
| 12739 | METHOD AND SYSTEM FOR THE MANAGEMENT OF CELL INTERFERENCE IN A WIRELESS COMMUNICATION NETWORK                                   |        |               | PCT  | PAT-Active  | US      | 14/125726     | 9204401      | US-2015-0036597-A1 |   |
| 12740 | PUCCH RESOURCE COMPRESSION FOR EPDCCH IN TDD MODE                                                                               |        |               | PCT  | PAT-Active  | US      | 14/652590     | 9532316      | US-2015-0341922-A1 |   |
| 12741 | PUCCH RESOURCE COMPRESSION FOR EPDCCH IN TDD MODE                                                                               |        |               | ENT  | PAT-Active  | US      | 15/386404     | 9872282      | US-2017-0201977-A1 |   |
| 12742 | PUCCH RESOURCE COMPRESSION FOR EPDCCH IN TDD MODE                                                                               |        |               | ENT  | PAT-Active  | US      | 15/867065     | #####        | US-2018-0132213-A1 |   |
| 12743 | PUCCH RESOURCE COMPRESSION FOR EPDCCH IN TDD MODE                                                                               |        |               | ENT  | PAT-Active  | US      | 15/037752     | #####        | US-2018-0343648-A1 |   |
| 12744 | APPARATUS SYSTEM AND METHOD OF LAWFUL INTERCEPTION (LI) IN A CELLULAR NETWORK                                                   |        |               | PCT  | PAT-Active  | US      | 14/129296     | #####        | US-2015-0016413-A1 |   |

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| 2     | TITLE                                                                                                                         | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12745 | APPARATUS SYSTEM AND METHOD OF COMMUNICATING NON-CELLULAR ACCESS NETWORK INFORMATION OVER A CELLULAR NETWORK                  |        |               | PCT  | PAT-Active  | US      | 14/129295     | 9525538      | US-2015-0382281-A1 |   |
| 12746 | APPARATUS SYSTEM AND METHOD OF COMMUNICATING NON-CELLULAR ACCESS NETWORK INFORMATION OVER A CELLULAR NETWORK                  |        |               | CNT  | PAT-Active  | US      | 15/294731     | #####        | US-2017-0142691-A1 |   |
| 12747 | CONTENT URL AUTHENTICATION FOR DASH                                                                                           |        |               | PCT  | PAT-Active  | US      | 14/653451     | 9419973      | US-2015-0350205-A1 |   |
| 12748 | CONTENT URL AUTHENTICATION FOR DASH                                                                                           |        |               | CNT  | PAT-Active  | US      | 15/221499     | 9413404      | US-2017-0134356-A1 |   |
| 12749 | PRESENCE SERVICE USING IMS BASED DASH SERVICE                                                                                 |        |               | PCT  | PAT-Active  | US      | 14/653455     | 9801054      | US-2015-0334152-A1 |   |
| 12750 | PRESENCE SERVICE USING IMS BASED DASH SERVICE                                                                                 |        |               | CNT  | PAT-Active  | US      | 15/725205     | #####        | US-2018-0035450-A1 |   |
| 12751 | LINK-AWARE STREAMING ADAPTATION                                                                                               |        |               | PCT  | APP-Pending | US      | 14/763123     |              | US-2015-0373077-A1 |   |
| 12752 | DYNAMIC CONFIGURATION OF UPLINK (UL) AND DOWNLINK (DL) FRAME RESOURCES FOR A TIME DIVISION DUPLEX (TDD) TRANSMISSION          |        |               | PCT  | PAT-Active  | US      | 14/125605     | 9282571      | US-2015-0188890-A1 |   |
| 12753 | DYNAMIC CONFIGURATION OF UPLINK (UL) AND DOWNLINK (DL) FRAME RESOURCES FOR A TIME DIVISION DUPLEX (TDD) TRANSMISSION          |        |               | CNT  | PAT-Active  | US      | 15/013520     | 8860912      | US-2016-0156454-A1 |   |
| 12754 | DYNAMIC CONFIGURATION OF UPLINK (UL) AND DOWNLINK (DL) FRAME RESOURCES FOR A TIME DIVISION DUPLEX (TDD) TRANSMISSION          |        |               | CNT  | APP-Pending | US      | 16/148990     |              | US-2019-0059095-A1 |   |
| 12755 | DYNAMIC CONFIGURATION OF UPLINK (UL) AND DOWNLINK (DL) FRAME RESOURCES FOR A TIME DIVISION DUPLEX (TDD) TRANSMISSION          |        |               | CNT  | PAT-Active  | US      | 15/722889     | #####        | US-2018-0027581-A1 |   |
| 12756 | COMMUNICATION OF SECURITY KEY INFORMATION                                                                                     |        |               | PCT  | PAT-Active  | US      | 14/125806     | 9313802      | US-2014-0307872-A1 |   |
| 12757 | COMMUNICATION OF SECURITY KEY INFORMATION                                                                                     |        |               | CNT  | PAT-Active  | US      | 15/070461     | 9942914      | US-2016-0198343-A1 |   |
| 12758 | COMMUNICATION OF SECURITY KEY INFORMATION                                                                                     |        |               | CNT  | APP-Pending | US      | 16/893212     |              | US-2018-0167963-A1 |   |
| 12759 | LAWFUL INTERCEPTION FOR DEVICE-TO-DEVICE (D2D) COMMUNICATION                                                                  |        |               | PCT  | PAT-Active  | US      | 14/125608     | 9532213      | US-2015-0138087-A1 |   |
| 12760 | METHOD APPARATUS AND SYSTEM FOR HANDLING IN-DEVICE COEXISTENCE INTERFERENCE IN A WIRELESS NETWORK                             |        |               | PCT  | PAT-Active  | US      | 14/126809     | #####        | US-2014-0247759-A1 |   |
| 12761 | METHOD APPARATUS AND SYSTEM FOR MANAGING BEARERS IN A WIRELESS COMMUNICATION SYSTEM                                           |        |               | PCT  | PAT-Active  | US      | 14/653221     | 9448322      | US-2015-0351139-A1 |   |
| 12762 | METHOD APPARATUS AND SYSTEM FOR MANAGING BEARERS IN A WIRELESS COMMUNICATION SYSTEM                                           |        |               | CNT  | APP-Pending | US      | 15/804786     |              | US-2018-0063861-A1 |   |
| 12763 | CHANNEL STATE INFORMATION-REFERENCE SIGNAL PATTERNS FOR TIME DIVISION DUPLEX SYSTEMS IN LONG TERM EVOLUTION WIRELESS NETWORKS |        |               | PCT  | PAT-Active  | US      | 14/126599     | 9455811      | US-2014-0198675-A1 |   |
| 12764 | SYSTEMS AND METHODS FOR MOBILITY OPTIMIZATION IN A HETEROGENEOUS NETWORK                                                      |        |               | PCT  | PAT-Active  | US      | 14/127923     | 9973986      | US-2014-0198767-A1 |   |
| 12765 | SYSTEMS AND METHODS FOR GENERATING A DISCOVERY SIGNAL IN A DEVICE-TO-DEVICE OR NETWORK COMMUNICATION                          |        |               | PCT  | PAT-Active  | US      | 14/127929     | 9203568      | US-2014-0198764-A1 |   |
| 12766 | SYSTEMS AND METHODS FOR EFFICIENT TRAFFIC OFFLOAD WITHOUT SERVICE DISRUPTION                                                  |        |               | PCT  | PAT-Active  | US      | 14/128217     | 9313803      | US-2015-0223133-A1 |   |
| 12767 | SYSTEMS AND METHODS FOR EFFICIENT TRAFFIC OFFLOAD WITHOUT SERVICE DISRUPTION                                                  |        |               | CNT  | PAT-Active  | US      | 15/060390     | 9788201      | US-2016-0183149-A1 |   |
| 12768 | SYSTEMS AND METHODS FOR EFFICIENT TRAFFIC OFFLOAD WITHOUT SERVICE DISRUPTION                                                  |        |               | CNT  | PAT-Active  | US      | 15/697862     | #####        | US-2018-0110064-A1 |   |
| 12769 | SYSTEMS AND METHODS FOR EFFICIENT TRAFFIC OFFLOAD WITHOUT SERVICE DISRUPTION                                                  |        |               | CNT  | APP-Pending | US      | 16/448906     |              |                    |   |

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| 2     | TITLE                                                                                                                                                                   | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12770 | FAST SMALL CELL DISCOVERY                                                                                                                                               |        |               | PCT  | PAT-Active  | US      | 14/127479     | 9743305      | US-2014-0198676-A1 |   |
| 12771 | DEVICE-TO-DEVICE DISCOVERY WITH DIRECT RADIO SIGNALS                                                                                                                    |        |               | PCT  | PAT-Active  | US      | 14/122546     | 9526001      | US-2014-0378123-A1 |   |
| 12772 | TECHNIQUES AND SYSTEMS FOR EXTENDED DISCONTINUOUS RECEPTION                                                                                                             |        |               | PCT  | PAT-Active  | US      | 14/125871     | 9357463      | US-2015-0215889-A1 |   |
| 12773 | TECHNIQUES AND SYSTEMS FOR EXTENDED DISCONTINUOUS RECEPTION                                                                                                             |        |               | CNT  | PAT-Active  | US      | 15/141341     | #####        | US-2016-0245406-A1 |   |
| 12774 | MANAGER FOR DASH MEDIA STREAMING                                                                                                                                        |        |               | NP   | PAT-Active  | US      | 14/140764     | 9444863      | US-2014-0365566-A1 |   |
| 12775 | DATA PROCESSING DEVICE AND METHOD FOR DETERMINING A CLOCK RELATIONSHIP                                                                                                  |        |               | NP   | PAT-Active  | US      | 14/474332     | 9898034      | US-2015-0074444-A1 |   |
| 12776 | TECHNIQUES FOR FILTERING CANDIDATE CELLS                                                                                                                                |        |               | NP   | PAT-Active  | US      | 14/480307     | #####        | US-2015-0071193-A1 |   |
| 12777 | SUBSCRIBER IDENTITY MODULE DATA ROUTING DEVICES, METHODS FOR ROUTING SUBSCRIBER IDENTITY MODULE DATA CONTROL CIRCUITS AND METHODS FOR CONTROLLING A CHANGE OF A ROUTING |        |               | NP   | PAT-Active  | US      | 14/045955     | 9615232      | US-2015-0099559-A1 |   |
| 12778 | MOBILE TERMINALS AND METHODS FOR PERFORMING A MEASUREMENT                                                                                                               |        |               | NP   | PAT-Active  | US      | 14/474331     | #####        | US-2015-0071191-A1 |   |
| 12779 | MULTIPLEXING OF CHANNEL STATE INFORMATION AND HYBRID AUTOMATIC REPEAT REQUEST - ACKNOWLEDGEMENT INFORMATION                                                             |        |               | NP   | PAT-Active  | US      | 13/934095     | 9294230      | US-2014-0003452-A1 |   |
| 12780 | MULTIPLEXING OF CHANNEL STATE INFORMATION AND HYBRID AUTOMATIC REPEAT REQUEST - ACKNOWLEDGEMENT INFORMATION                                                             |        |               | CNT  | PAT-Active  | US      | 15/019915     | 9661619      | US-2016-0165692-A1 |   |
| 12781 | MULTIPLEXING OF CHANNEL STATE INFORMATION AND HYBRID AUTOMATIC REPEAT REQUEST - ACKNOWLEDGEMENT INFORMATION                                                             |        |               | CNT  | PAT-Active  | US      | 15/479555     | 9974064      | US-2017-0208565-A1 |   |
| 12782 | MULTIPLEXING OF CHANNEL STATE INFORMATION AND HYBRID AUTOMATIC REPEAT REQUEST - ACKNOWLEDGEMENT INFORMATION                                                             |        |               | CNT  | APP-Pending | US      | 15/909471     |              | US-2018-0199336-A1 |   |
| 12783 | UPLINK POWER CONTROL FOR PHYSICAL UPLINK CONTROL CHANNEL                                                                                                                |        |               | NP   | PAT-Active  | US      | 13/953906     | 9338768      | US-2014-0029532-A1 |   |
| 12784 | UPLINK CONTROL INFORMATION TRANSMISSION WITH LARGE NUMBER OF BITS                                                                                                       |        |               | NP   | PAT-Active  | US      | 13/953521     | 9313779      | US-2014-0029533-A1 |   |
| 12785 | UPLINK CONTROL INFORMATION TRANSMISSION WITH LARGE NUMBER OF BITS                                                                                                       |        |               | CNT  | PAT-Active  | US      | 15/061612     | #####        | US-2016-0192352-A1 |   |
| 12786 | SYSTEMS AND METHODS FOR TRACKING ELAPSED TIME                                                                                                                           |        |               | NP   | PAT-Active  | US      | 14/084946     | 9317059      | US-2015-0143156-A1 |   |
| 12787 | USER EQUIPMENT WITH REDUCED POWER CONSUMPTION OPERATIONAL MODES                                                                                                         |        |               | PCT  | PAT-Active  | US      | 14/126723     | 9042279      | US-2014-0269452-A1 |   |
| 12788 | SYSTEMS AND METHODS FOR ACCESS NETWORK SELECTION AND TRAFFIC ROUTING                                                                                                    |        |               | PCT  | PAT-Active  | US      | 14/128184     | 8967727      | US-2015-0105076-A1 |   |
| 12789 | SYSTEMS AND METHODS FOR ACCESS NETWORK SELECTION AND TRAFFIC ROUTING                                                                                                    |        |               | CNT  | APP-Pending | US      | 15/941467     |              | US-2018-0227738-A1 |   |
| 12790 | SYSTEMS AND METHODS FOR WLAN NETWORK SELECTION                                                                                                                          |        |               | PCT  | PAT-Active  | US      | 14/126900     | 9380444      | US-2014-0295913-A1 |   |
| 12791 | SHARED SPECTRUM REASSIGNMENT IN A SPECTRUM SHARING CONTEXT                                                                                                              |        |               | PCT  | PAT-Active  | US      | 14/128993     | 9554416      | US-2014-0321425-A1 |   |
| 12792 | MEASURING LINK PERFORMANCE USING MULTIPLE RADIO ACCESS NETWORKS                                                                                                         |        |               | PCT  | PAT-Active  | US      | 14/365492     | 9456368      | US-2015-0215795-A1 |   |
| 12793 | NETWORK ASSISTED DEVICE TO DEVICE DISCOVERY                                                                                                                             |        |               | PCT  | PAT-Active  | US      | 14/267671     | #####        | US-2016-0014589-A1 |   |
| 12794 | NETWORK ASSISTED DEVICE TO DEVICE DISCOVERY                                                                                                                             |        |               | CNT  | PAT-Active  | US      | 15/722382     | #####        | US-2018-0027401-A1 |   |

|       | A                                                                                                                                             | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                         | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12795 | WIRELESS LOCAL AREA NETWORK (WLAN) TRAFFIC OFFLOADING                                                                                         |        |               | PCT  | PAT-Active  | US      | 14/125610     | 9706522      | US-2014-0386159-A1 |   |
| 12796 | RADIO ACCESS TECHNOLOGY SELECTION IN A HETEROGENEOUS NETWORK                                                                                  |        |               | PCT  | PAT-Active  | US      | 14/769187     | 9814021      | US-2015-0382224-A1 |   |
| 12797 | NETWORK SELECTION IN A HETEROGENEOUS NETWORK                                                                                                  |        |               | PCT  | PAT-Active  | US      | 14/766728     | #####        | US-2015-0373604-A1 |   |
| 12798 | REPORTING OF USER PLANE CONGESTION (UPCON) USING A UPCON CONTAINER                                                                            |        |               | PCT  | PAT-Active  | US      | 14/125800     | 9560512      | US-2015-0036896-A1 |   |
| 12799 | END-TO-END (E2E) TUNNELING FOR MULTI-RADIO ACCESS TECHNOLOGY (MULTI-RAT)                                                                      |        |               | PCT  | PAT-Active  | US      | 14/125601     | 9456378      | US-2015-0383459-A1 |   |
| 12800 | NETWORK ASSISTED DEVICE-TO-DEVICE DISCOVERY FOR PEER-TO-PEER APPLICATIONS                                                                     |        |               | PCT  | APP-Pending | US      | 14/128301     |              | US-2014-0206348-A1 |   |
| 12801 | MULTIMEDIA ADAPTATION BASED ON VIDEO ORIENTATION                                                                                              |        |               | PCT  | PAT-Active  | US      | 14/125595     | 9782938      | US-2015-0256861-A1 |   |
| 12802 | MULTIMEDIA ADAPTATION BASED ON VIDEO ORIENTATION                                                                                              |        |               | ENT  | APP-Pending | US      | 15/685812     |              | US-2017-0353743-A1 |   |
| 12803 | SIGNALING AND CHANNEL DESIGNS FOR D2D COMMUNICATIONS                                                                                          |        |               | PCT  | PAT-Active  | US      | 14/125973     | 9451604      | US-2015-0046732-A1 |   |
| 12804 | COOPERATIVE MULTIPLE BEAM TRANSMISSION                                                                                                        |        |               | NP   | PAT-Active  | US      | 14/142293     | 9473276      | US-2015-0043439-A1 |   |
| 12805 | ADAPTIVE CELL RANGE EXPANSION MECHANISMS FOR LTE CELLS                                                                                        |        |               | NP   | PAT-Active  | US      | 14/105957     | 9683271      | US-2015-0172977-A1 |   |
| 12806 | ADJUSTING TUNING SEGMENTS IN A DIGITALLY-CONTROLLED OSCILLATOR                                                                                |        |               | NP   | PAT-Active  | US      | 13/901481     | 9490825      | US-2014-0347137-A1 |   |
| 12807 | CALIBRATED TEMPERATURE MEASUREMENT SYSTEM                                                                                                     |        |               | NP   | PAT-Active  | US      | 13/904743     | 9470585      | US-2014-0355851-A1 |   |
| 12808 | CONTINUOUS-TIME INCREMENTAL ANALOG-TO-DIGITAL CONVERTER                                                                                       |        |               | NP   | PAT-Active  | US      | 13/363884     | 8688664      | US-2013-0184116-A1 |   |
| 12809 | COMMON-MODE FEEDBACK CIRCUIT                                                                                                                  |        |               | NP   | PAT-Active  | US      | 13/078490     | 8427237      | US-2012-0154049-A1 |   |
| 12810 | DIGITAL VOLTAGE-CONTROLLED ATTENUATOR                                                                                                         |        |               | NP   | PAT-Active  | US      | 13/207649     | 8447256      | US-2013-0040591-A1 |   |
| 12811 | METHOD AND SYSTEM FOR CONTROLLING SIGNAL TRANSMISSION OF A WIRELESS COMMUNICATION DEVICE                                                      |        |               | NP   | PAT-Active  | US      | 13/079473     | 8538354      | US-2012-0352520-A1 |   |
| 12812 | HYBRID AUTOMATIC REPEAT REQUEST-ACKNOWLEDGE (HARQ-ACK) CODEBOOK GENERATION FOR INTER-BAND TIME DIVISION DUPLEX (TDD) CARRIER AGGREGATION (CA) |        |               | PCT  | PAT-Active  | US      | 14/129128     | 9362998      | US-2015-0133494-A1 |   |
| 12813 | RADIO-FREQUENCY TRANSMITTER AND AMPLIFIER                                                                                                     |        |               | NP   | PAT-Active  | US      | 12/718692     | 8515364      | US-2011-0217940-A1 |   |
| 12814 | RADIO-FREQUENCY TRANSMITTER AND AMPLIFIER                                                                                                     |        |               | ENT  | PAT-Active  | US      | 13/968995     | 8942649      | US-2014-0051374-A1 |   |
| 12815 | RADIO-FREQUENCY TRANSMITTER AND AMPLIFIER                                                                                                     |        |               | ENT  | PAT-Active  | US      | 14/570882     | 9838047      | US-2015-0173900-A1 |   |
| 12816 | RECONFIGURABLE DIVERSITY RECEIVER                                                                                                             |        |               | NP   | PAT-Active  | US      | 12/748915     | 8606196      | US-2011-0237211-A1 |   |
| 12817 | REDUCING TRANSMISSION SIGNAL ARTIFACT SPACING                                                                                                 |        |               | NP   | PAT-Active  | US      | 13/912673     | 9055594      | US-2014-0384132-A1 |   |
| 12818 | SELF-CALIBRATED DAC WITH REDUCED GLITCH MAPPING                                                                                               |        |               | NP   | PAT-Active  | US      | 13/192950     | 8493251      | US-2013-0027235-A1 |   |
| 12819 | SIGNAL DUTY CYCLE REDUCTION                                                                                                                   |        |               | NP   | PAT-Active  | US      | 13/907796     | 9008231      | US-2014-0385701-A1 |   |

|       | A                                                                                                                              | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                          | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12820 | SYSTEM AND METHOD FOR MULTIPLE BAND TRANSMISSION                                                                               |        |               | NP   | PAT-Active | US      | 12/895086     | 8198968      | US-2012-0981203-A1 |   |
| 12821 | SYSTEM AND METHOD FOR A DUAL-PATH TRANSMITTER                                                                                  |        |               | NP   | PAT-Active | US      | 13/207776     | 8494460      | US-2013-0938434-A1 |   |
| 12822 | SYSTEM AND METHOD FOR A MULTI-BAND TRANSMITTER                                                                                 |        |               | NP   | PAT-Active | US      | 13/207786     | 8447246      | US-2013-0939438-A1 |   |
| 12823 | SYSTEM AND METHOD FOR CONTROLLING CURRENT TO CERTAIN COMPONENTS OF A WIRELESS COMMUNICATION DEVICE                             |        |               | NP   | PAT-Active | US      | 13/184180     | 9059766      | US-2013-0918619-A1 |   |
| 12824 | SYSTEM AND METHOD FOR CRYSTAL OSCILLATOR FREQUENCY TUNING                                                                      |        |               | NP   | PAT-Active | US      | 12/879525     | 8138844      | US-2012-0963594-A1 |   |
| 12825 | SYSTEM AND METHOD FOR ESTIMATING AND CORRECTING PHASE SHIFT IN A WIRELESS COMMUNICATION DEVICE                                 |        |               | NP   | PAT-Active | US      | 13/173972     | 8891668      | US-2013-0903891-A1 |   |
| 12826 | SYSTEM AND METHOD FOR FREQUENCY-AGILE TRANSMISSION IN A WIRELESS COMMUNICATION DEVICE                                          |        |               | NP   | PAT-Active | US      | 13/208698     | 8934504      | US-2013-0939368-A1 |   |
| 12827 | SYSTEM AND METHOD FOR IMPROVING POWER EFFICIENCY OF A TRANSMITTER                                                              |        |               | NP   | PAT-Active | US      | 13/207712     | 8693961      | US-2013-0940586-A1 |   |
| 12828 | SYSTEM AND METHOD FOR LINEARIZATION OF A MIXER                                                                                 |        |               | NP   | PAT-Active | US      | 13/419150     | 8483127      |                    |   |
| 12829 | SYSTEM AND METHOD FOR PRESERVING INPUT IMPEDANCE OF A CURRENT-MODE CIRCUIT                                                     |        |               | NP   | PAT-Active | US      | 13/207672     | 8463206      | US-2013-0943695-A1 |   |
| 12830 | SYSTEM AND METHOD FOR REDUCING LOCK ACQUISITION TIME OF A PHASE LOCKED LOOP                                                    |        |               | NP   | PAT-Active | US      | 13/080196     | 8599985      | US-2012-0257791-A1 |   |
| 12831 | SYSTEM AND METHOD FOR REDUCING OR ELIMINATING TEMPERATURE DEPENDENCE OF A COHERENT RECEIVER IN A WIRELESS COMMUNICATION DEVICE |        |               | NP   | PAT-Active | US      | 13/208180     | 8489044      | US-2013-0939394-A1 |   |
| 12832 | SYSTEM AND METHOD FOR SUPPORTING DIFFERENT TYPES OF OSCILLATOR CIRCUITS                                                        |        |               | NP   | PAT-Active | US      | 13/100656     | 8486752      | US-2012-0280847-A1 |   |
| 12833 | SYSTEM AND METHOD FOR SUPPORTING DIFFERENT TYPES OF OSCILLATOR CIRCUITS                                                        |        |               | NP   | PAT-Active | US      | 13/911876     | 8952761      | US-2013-0285755-A1 |   |
| 12834 | SYSTEM AND METHOD FOR SWITCH LEAKAGE CANCELLATION                                                                              |        |               | NP   | PAT-Active | US      | 12/882306     | 8451046      | US-2012-0962307-A1 |   |
| 12835 | SYSTEM AND METHOD FOR TUNING AN ANTENNA IN A WIRELESS COMMUNICATION DEVICE                                                     |        |               | NP   | PAT-Active | US      | 13/352083     | 9203138      | US-2013-0183910-A1 |   |
| 12836 | SYSTEM AND METHOD FOR TUNING AN ANTENNA IN A WIRELESS COMMUNICATION DEVICE                                                     |        |               | NP   | PAT-Active | US      | 13/053966     | 8938026      | US-2012-0243579-A1 |   |
| 12837 | SYSTEMS AND METHODS FOR SPURIOUS EMISSION CANCELLATION                                                                         |        |               | NP   | PAT-Active | US      | 12/882495     | 8204456      | US-2012-0964847-A1 |   |
| 12838 | TECHNIQUE TO GENERATE DIVIDE BY TWO AND 25 DUTY CYCLE                                                                          |        |               | NP   | PAT-Active | US      | 13/079516     | 8442472      | US-2012-0252393-A1 |   |
| 12839 | TEMPERATURE DEPENDENT VOLTAGE REGULATOR                                                                                        |        |               | NP   | PAT-Active | US      | 12/905241     | 8922178      | US-2012-0984613-A1 |   |
| 12840 | TEMPERATURE COMPENSATION CIRCUIT                                                                                               |        |               | NP   | PAT-Active | US      | 13/181287     | 8535932      | US-2013-0915895-A1 |   |
| 12841 | TEMPERATURE COMPENSATION CIRCUIT                                                                                               |        |               | NP   | PAT-Active | US      | 13/971025     | 8893588      | US-2013-0235136-A1 |   |
| 12842 | TEMPERATURE MEASUREMENT SYSTEM                                                                                                 |        |               | NP   | PAT-Active | US      | 13/904649     | 9488529      | US-2014-0953650-A1 |   |
| 12843 | DIFFERENTIAL TRANSMISSION LINE SHIELDED BY TWO OR MORE SPACED GROUPS OF SHIELDS                                                |        |               | NP   | PAT-Active | US      | 13/467447     | 8912291      | US-2013-0390514-A1 |   |
| 12844 | TUNABLE WIDE-BAND DISTRIBUTION CIRCUIT                                                                                         |        |               | NP   | PAT-Active | US      | 13/594640     | 8954018      | US-2014-0955218-A1 |   |
| 12845 | VARIABLE INDUCTOR FOR LC OSCILLATOR                                                                                            |        |               | NP   | PAT-Active | US      | 13/720705     | 8867521      | US-2014-0167867-A1 |   |



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| 2     | TITLE                                                                                    | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12846 | MULTI-STANDARD SYSTEMS AND METHODS WITH INTERFERER MITIGATION                            |        |               | NP   | PAT-Active  | US      | 14/230275     | 9659058      | US-2015-0282098-A1 |   |
| 12847 | SYSTEMS AND METHODS FOR FREQUENCY DOMAIN CALIBRATION AND CHARACTERIZATION                |        |               | NP   | PAT-Active  | US      | 14/143116     | 9148153      | US-2015-0188547-A1 |   |
| 12848 | SYSTEMS AND METHODS FOR FREQUENCY DOMAIN CALIBRATION AND CHARACTERIZATION                |        |               | ENT  | PAT-Active  | US      | 14/857145     | 9537495      | US-2016-0079892-A1 |   |
| 12849 | SYSTEMS AND METHODS FOR FREQUENCY DOMAIN CALIBRATION AND CHARACTERIZATION                |        |               | CNT  | PAT-Active  | US      | 15/354066     | #####        | US-2017-0070232-A1 |   |
| 12850 | SYSTEMS AND METHODS FOR FREQUENCY DOMAIN CALIBRATION AND CHARACTERIZATION                |        |               | CNT  | APP-Pending | US      | 16/458609     |              |                    |   |
| 12851 | SYSTEMS AND METHODS FOR FREQUENCY DOMAIN CALIBRATION AND CHARACTERIZATION                |        |               | ENT  | PAT-Active  | US      | 15/441603     | #####        | US-2017-0170833-A1 |   |
| 12852 | SYSTEMS AND METHODS TO COMPENSATE FOR MEMORY EFFECTS USING ENHANCED MEMORY POLYNOMIALS   |        |               | NP   | PAT-Active  | US      | 14/178930     | 9628305      | US-2015-0229498-A1 |   |
| 12853 | METHOD AND SYSTEM FOR ENABLING DEVICE-TO-DEVICE COMMUNICATION                            |        |               | PCT  | PAT-Active  | US      | 14/126983     | 9363702      | US-2015-0195197-A1 |   |
| 12854 | DEVICE TRIGGER RECALL/REPLACE FEATURE FOR 3GPP/M2M SYSTEMS                               |        |               | PCT  | PAT-Active  | US      | 14/124984     | 9554296      | US-2015-0181564-A1 |   |
| 12855 | DISCONTINUOUS RECEPTION (DRX) RECONFIGURATION                                            |        |               | PCT  | PAT-Active  | US      | 14/125592     | 9237478      | US-2015-0201375-A1 |   |
| 12856 | ALWAYS-ON BEARER FOR SMALL DATA TRANSFERS IN LTE SYSTEMS                                 |        |               | PCT  | PAT-Active  | US      | 14/126252     | 9609802      | US-2015-0223284-A1 |   |
| 12857 | ENHANCED NODE B CONFIGURED FOR USER PLANE EPS OPTIMIZATION                               |        |               | CNT  | PAT-Active  | US      | 15/086358     | #####        | US-2016-0212638-A1 |   |
| 12858 | EBG DESIGNS FOR MITIGATING RADIO FREQUENCY INTERFERENCE                                  |        |               | NP   | PAT-Active  | US      | 14/258583     | #####        | US-2015-0303562-A1 |   |
| 12859 | EBG DESIGNS FOR MITIGATING RADIO FREQUENCY INTERFERENCE                                  |        |               | ENT  | APP-Pending | US      | 15/556886     |              |                    |   |
| 12860 | METHOD AND RELATED MOBILE DEVICE FOR REFERENCE SIGNAL TIME DIFFERENCE BASED LOCALIZATION |        |               | NP   | PAT-Active  | US      | 14/580685     | 9702965      | US-2015-0215884-A1 |   |
| 12861 | METHOD AND DEVICE FOR DETECTING INTERFERENCE SCENARIO                                    |        |               | NP   | PAT-Active  | US      | 14/546183     | #####        | US-2015-0156724-A1 |   |
| 12862 | POSITIONING APPARATUS AND METHOD                                                         |        |               | ENT  | PAT-Active  | US      | 10/172801     | 6738713      | US-2003-0005283-A1 |   |
| 12863 | POSITIONING APPARATUS AND METHOD                                                         |        |               | CNT  | PAT-Active  | US      | 10/074993     | 6538308      | US-2002-0183925-A1 |   |
| 12864 | RECEIVER                                                                                 |        |               | NP   | PAT-Active  | US      | 09/473454     | 6795487      |                    |   |
| 12865 | PCI PARTITION AND ALLOCATION FOR CELLULAR NETWORK                                        |        |               | PCT  | PAT-Active  | US      | 14/433815     | 9838932      | US-2015-0245221-A1 |   |
| 12866 | METHOD TO ENABLE OPTIMIZATION FOR SMALL DATA IN AN EVOLVED PACKET CORE (EPC)             |        |               | PCT  | PAT-Active  | US      | 14/126611     | 9223309      | US-2014-0265779-A1 |   |
| 12867 | TECHNIQUES FOR DEPLOYING SMALL CELLS AS SECONDARY CELLS FOR USER EQUIPMENT               |        |               | PCT  | PAT-Active  | US      | 14/652478     | 9686677      | US-2015-0341838-A1 |   |
| 12868 | IMPROVED HANDOVER WITH PING-PONG AVOIDANCE IN A WIRELESS NETWORK                         |        |               | PCT  | PAT-Active  | US      | 14/763204     | 9973915      | US-2015-0373596-A1 |   |
| 12869 | UE-BASED D2D DISCOVERY                                                                   |        |               | PCT  | PAT-Active  | US      | 14/763205     | 9973916      | US-2015-0367942-A1 |   |
| 12870 | UE-BASED D2D DISCOVERY                                                                   |        |               | ENT  | APP-Pending | US      | 15/947323     |              | US-2018-0234829-A1 |   |
| 12871 | TARGETED GROUP-BASED DISCOVERY FOR WIRELESS COMMUNICATION DEVICES                        |        |               | PCT  | PAT-Active  | US      | 14/762762     | 9738672      | US-2015-0355023-A1 |   |

|       | A                                                                                                      | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                  | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12872 | PATH SWITCHING PROCEDURE FOR DEVICE-TO-DEVICE COMMUNICATION                                            |        |               | PCT  | PAT-Active  | US      | 14/762764     | 9756497      | US-2015-0336033-A1 |   |
| 12873 | COORDINATION OF CAPACITY AND COVERAGE OPTIMIZATION OF SELF-ORGANIZING NETWORKS                         |        |               | PCT  | PAT-Active  | US      | 14/765524     | 9998023      | US-2015-0373563-A1 |   |
| 12874 | COORDINATION OF CAPACITY AND COVERAGE OPTIMIZATION OF SELF-ORGANIZING NETWORKS                         |        |               | ENT  | APP-Pending | US      | 15/977780     |              | US-2016-0263016-A1 |   |
| 12875 | MULTICAST-BASED GROUP COMMUNICATIONS IN AD-HOC ARRANGEMENTS OF WIRELESS DEVICES                        |        |               | PCT  | PAT-Active  | US      | 14/765285     | 9788303      | US-2015-0373510-A1 |   |
| 12876 | MULTICAST-BASED GROUP COMMUNICATIONS IN AD-HOC ARRANGEMENTS OF WIRELESS DEVICES                        |        |               | ENT  | APP-Pending | US      | 15/691723     |              | US-2017-0367072-A1 |   |
| 12877 | TECHNIQUES FOR CONNECTIONLESS SMALL DATA TRANSMISSION                                                  |        |               | PCT  | PAT-Active  | US      | 14/129951     | 9693336      | US-2014-0334380-A1 |   |
| 12878 | METHOD AND APPARATUS FOR CONFIGURING AND USING SMALL DATA RADIO BEARERS                                |        |               | PCT  | PAT-Active  | US      | 14/768350     | 9967858      | US-2015-0373733-A1 |   |
| 12879 | ESTABLISHMENT OF CONNECTION TO THE INTERNET IN CELLULAR NETWORK                                        |        |               | PCT  | PAT-Active  | US      | 14/770880     | 9807591      | US-2016-0097346-A1 |   |
| 12880 | ESTABLISHMENT OF CONNECTION TO THE INTERNET                                                            |        |               | PCT  | PAT-Active  | US      | 15/711839     | #####        | US-2018-0014177-A1 |   |
| 12881 | APPARATUS SYSTEM AND METHOD OF USER-EQUIPMENT (UE) CENTRIC TRAFFIC ROUTING                             |        |               | PCT  | PAT-Active  | US      | 14/772495     | #####        | US-2016-0020890-A1 |   |
| 12882 | QUALITY OF EXPERIENCE AWARE MULTIMEDIA ADAPTIVE STREAMING                                              |        |               | PCT  | PAT-Active  | US      | 14/768298     | #####        | US-2016-0014184-A1 |   |
| 12883 | QUALITY OF EXPERIENCE AWARE MULTIMEDIA ADAPTIVE STREAMING                                              |        |               | ENT  | PAT-Active  | US      | 16/174128     | #####        | US-2019-0075446-A1 |   |
| 12884 | WIRELESS LOCAL AREA NETWORK (WLAN) TRAFFIC LOAD MEASUREMENT PROVISIONING TO WIRELESS CELLULAR NETWORKS |        |               | PCT  | APP-Pending | US      | 14/771839     |              | US-2016-0029249-A1 |   |
| 12885 | INTERNET PROTOCOL (IP) MULTIMEDIA SUBSYSTEM (IMS) BASED PEER-TO-PEER (P2P) CONTENT DISTRIBUTION        |        |               | PCT  | APP-Pending | US      | 14/776625     |              | US-2016-0046099-A1 |   |
| 12886 | TECHNIQUES TO FACILITATE DUAL CONNECTIVITY                                                             |        |               | PCT  | PAT-Active  | US      | 14/770141     | 9807590      | US-2016-0014836-A1 |   |
| 12887 | CONTROL OF WLAN SELECTION POLICIES IN ROAMING SCENARIOS                                                |        |               | PCT  | PAT-Active  | US      | 14/770069     | 9743268      | US-2016-0021606-A1 |   |
| 12888 | USER EQUIPMENT AND METHOD FOR DISTRIBUTED CHANNEL ACCESS FOR D2D COMMUNICATIONS                        |        |               | PCT  | PAT-Active  | US      | 14/124217     | 9343046      | US-2014-0395858-A1 |   |
| 12889 | NETWORK-ASSISTED LTE CHANNEL ACQUISITION                                                               |        |               | PCT  | PAT-Active  | US      | 14/771853     | 9807743      | US-2016-0021593-A1 |   |
| 12890 | NETWORK SCHEDULED DEVICE-TO-DEVICE COMMUNICATION                                                       |        |               | PCT  | PAT-Active  | US      | 14/781497     | #####        | US-2016-0044704-A1 |   |
| 12891 | METHOD AND APPARATUS FOR CONTROLLING SMALL DATA TRANSMISSION ON THE UPLINK                             |        |               | PCT  | PAT-Active  | US      | 14/124938     | 9930596      | US-2015-0230234-A1 |   |
| 12892 | SPECTRUM RECLAIMING IN A LEASED SPECTRUM SYSTEM                                                        |        |               | PCT  | PAT-Active  | US      | 14/361745     | 9326156      | US-2015-0354852-A1 |   |
| 12893 | USER EQUIPMENT AND METHOD FOR ASSISTED THREE-DIMENSIONAL BEAMFORMING                                   |        |               | PCT  | PAT-Active  | US      | 14/368597     | 9564957      | US-2016-0191131-A1 |   |
| 12894 | APPARATUS SYSTEM AND METHOD OF USER-EQUIPMENT (UE) CENTRIC ACCESS NETWORK SELECTION                    |        |               | NP   | PAT-Active  | US      | 14/093476     | 9414392      | US-2014-0153511-A1 |   |
| 12895 | APPARATUS SYSTEM AND METHOD OF USER-EQUIPMENT (UE) CENTRIC ACCESS NETWORK SELECTION                    |        |               | ENT  | PAT-Active  | US      | 15/006270     | #####        | US-2016-0142163-A1 |   |
| 12896 | APPARATUS SYSTEM AND METHOD OF CELLULAR NETWORK COMMUNICATIONS CORRESPONDING TO A NON-CELLULAR NETWORK |        |               | NP   | PAT-Active  | US      | 14/068221     | #####        | US-2014-0161103-A1 |   |

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| 2     | TITLE                                                                                                                            | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12887 | APPARATUS SYSTEM AND METHOD OF CELLULAR NETWORK COMMUNICATIONS CORRESPONDING TO A NON-CELLULAR NETWORK                           |        |               | CNT  | PAT-Active  | US      | 15/607607     | #####        | US-2017-0332291-A1 |   |
| 12888 | APPARATUS SYSTEM AND METHOD OF CELLULAR NETWORK COMMUNICATIONS CORRESPONDING TO A NON-CELLULAR NETWORK                           |        |               | CNT  | PAT-Active  | US      | 15/715463     | #####        | US-2018-0320383-A1 |   |
| 12889 | EXTENDED PAGING DISCONTINUOUS RECEPTION (DRX) CYCLES IN WIRELESS COMMUNICATION NETWORKS                                          |        |               | PCT  | PAT-Active  | US      | 14/779024     | 9754876      | US-2016-0057701-A1 |   |
| 12890 | EXTENDED PAGING DISCONTINUOUS RECEPTION (DRX) CYCLES IN WIRELESS COMMUNICATION NETWORKS                                          |        |               | PCT  | PAT-Active  | US      | 15/730313     | #####        | US-2018-0398280-A1 |   |
| 12901 | COMMUNICATION OF PREFERRED POWER CONSUMPTION CONFIGURATIONS                                                                      |        |               | PCT  | PAT-Active  | US      | 14/125593     | 9277440      | US-2015-0392841-A1 |   |
| 12902 | COMMUNICATION OF PREFERRED POWER CONSUMPTION CONFIGURATIONS                                                                      |        |               | CNT  | PAT-Active  | US      | 15/013386     | 9843958      | US-2016-0157178-A1 |   |
| 12903 | COMMUNICATION OF PREFERRED POWER CONSUMPTION CONFIGURATIONS                                                                      |        |               | CNT  | PAT-Active  | US      | 15/697385     | #####        | US-2017-0374577-A1 |   |
| 12904 | DYNAMIC HYBRID AUTOMATIC REPEAT REQUEST-ACKNOWLEDGEMENT (HARQ-ACK) TRANSMISSION WITH ENHANCED PHYSICAL DOWNLINK CONTROL CHANNELS |        |               | PCT  | PAT-Active  | US      | 14/125706     | 9378806      | US-2015-0195822-A1 |   |
| 12905 | DYNAMIC HYBRID AUTOMATIC REPEAT REQUEST-ACKNOWLEDGEMENT (HARQ-ACK) TRANSMISSION WITH ENHANCED PHYSICAL DOWNLINK CONTROL CHANNELS |        |               | CNT  | PAT-Active  | US      | 15/182392     | 9603132      | US-2016-0374087-A1 |   |
| 12906 | DISCONTINUOUS RECEPTION (DRX) ENHANCEMENTS IN LTE SYSTEMS                                                                        |        |               | PCT  | PAT-Active  | US      | 14/125749     | 9332456      | US-2015-0395083-A1 |   |
| 12907 | DISCONTINUOUS RECEPTION (DRX) ENHANCEMENTS IN LTE SYSTEMS                                                                        |        |               | CNT  | PAT-Active  | US      | 14/757660     | 9943164      | US-2016-0128127-A1 |   |
| 12908 | DISCONTINUOUS RECEPTION (DRX) ENHANCEMENTS IN LTE SYSTEMS                                                                        |        |               | CNT  | PAT-Active  | US      | 15/244576     | #####        | US-2016-0366722-A1 |   |
| 12909 | DISCONTINUOUS RECEPTION (DRX) ENHANCEMENTS IN LTE SYSTEMS                                                                        |        |               | CNT  | APP-Pending | US      | 16/015810     |              | US-2018-0302820-A1 |   |
| 12910 | STREAMING WITH COORDINATION OF VIDEO ORIENTATION (CVO)                                                                           |        |               | PCT  | PAT-Active  | US      | 14/125598     | 9215262      | US-2015-0085074-A1 |   |
| 12911 | STREAMING WITH COORDINATION OF VIDEO ORIENTATION (CVO)                                                                           |        |               | CNT  | PAT-Active  | US      | 14/956130     | 9438658      | US-2016-0080553-A1 |   |
| 12912 | STREAMING WITH COORDINATION OF VIDEO ORIENTATION (CVO)                                                                           |        |               | CNT  | PAT-Active  | US      | 15/232331     | #####        | US-2016-0352799-A1 |   |
| 12913 | APPARATUS FOR RECEIVING RANGING SIGNALS                                                                                          |        |               | NP   | PAT-Active  | US      | 09/731167     | 6664921      | US-2002-0332766-A1 |   |
| 12914 | TIME REFERENCE SYSTEM                                                                                                            |        |               | NP   | PAT-Active  | US      | 12/562099     | 8184046      | US-2019-0186286-A1 |   |
| 12915 | RETROSPECTIVE EPHEMERIS COLLECTION                                                                                               |        |               | NP   | PAT-Active  | US      | 14/273741     | 3885786      | US-2015-0363342-A1 |   |
| 12916 | METHOD APPARATUS AND COMPUTER PROGRAM FOR DETERMINING AN INTERPOLATED COMPLEX VALUED SAMPLE                                      |        |               | NP   | PAT-Active  | US      | 14/708431     | 9871882      | US-2015-0363362-A1 |   |
| 12917 | HYBRID REFERENCE SIGNALS FOR WIRELESS COMMUNICATION                                                                              |        |               | PCT  | PAT-Active  | US      | 14/778037     | #####        | US-2016-0284514-A1 |   |
| 12918 | PHYSICAL RESOURCE BLOCK (PRB)-RESTRICTED INTERFERENCE AVERAGING IN A WIRELESS COMMUNICATION SYSTEM                               |        |               | PCT  | PAT-Active  | US      | 14/764547     | #####        | US-2015-0365960-A1 |   |
| 12919 | QUASI CO-LOCATION AND PDSCH RESOURCE ELEMENT MAPPING SIGNALING FOR NETWORK ASSISTED INTERFERENCE MITIGATION                      |        |               | PCT  | PAT-Active  | US      | 14/764540     | #####        | US-2015-0365154-A1 |   |
| 12920 | MOBILE-TERMINATED EMERGENCY CALL                                                                                                 |        |               | PCT  | PAT-Active  | US      | 14/358880     | 8763072      | US-2015-0172895-A1 |   |

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| 2     | TITLE                                                                                         | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12921 | ENODEB REFERENCE SIGNAL REDUCTION                                                             |        |               | PCT  | PAT-Active  | US      | 14/766932     | 9730050      | US-2016-0926843-A1 |   |
| 12922 | LOW POWER DEVICE TO DEVICE TRANSMISSION                                                       |        |               | PCT  | PAT-Active  | US      | 14/769411     | 9826391      | US-2015-0382365-A1 |   |
| 12923 | USER EQUIPMENT HANDOVER ERROR REPORTING                                                       |        |               | PCT  | PAT-Active  | US      | 14/359874     | 9763127      | US-2015-0237516-A1 |   |
| 12924 | REDUCTION OF BUFFER OVERFLOW                                                                  |        |               | PCT  | PAT-Active  | US      | 14/762783     | #####        | US-2016-0057042-A1 |   |
| 12925 | SMALL DATA COMMUNICATIONS                                                                     |        |               | PCT  | PAT-Active  | US      | 14/782784     | 9900772      | US-2016-0079417-A1 |   |
| 12926 | MULTIPLE-INPUT MULTIPLE-OUTPUT CELLULAR NETWORK COMMUNICATIONS                                |        |               | PCT  | PAT-Active  | US      | 14/784257     | 9954587      | US-2016-0065290-A1 |   |
| 12927 | SMALL DATA COMMUNICATIONS                                                                     |        |               | PCT  | PAT-Active  | US      | 14/782781     | #####        | US-2016-0057797-A1 |   |
| 12928 | DASH-AWARE NETWORK APPLICATION FUNCTION (D-NAF)                                               |        |               | PCT  | PAT-Active  | US      | 14/853779     | 9908526      | US-2015-0328572-A1 |   |
| 12929 | DASH-AWARE NETWORK APPLICATION FUNCTION (D-NAF)                                               |        |               | CNT  | APP-Pending | US      | 15/808748     |              | US-2018-0065856-A1 |   |
| 12930 | MULTIPLE RADIO LINK CONTROL (RLC) GROUPS                                                      |        |               | PCT  | PAT-Active  | US      | 14/785116     | #####        | US-2016-0094446-A1 |   |
| 12931 | HYBRID DIGITAL AND ANALOG BEAMFORMING FOR LARGE ANTENNA ARRAYS                                |        |               | PCT  | PAT-Active  | US      | 14/784256     | 9647735      | US-2016-0080051-A1 |   |
| 12932 | NETWORK-LEVEL DEVICE PROXIMITY DETECTION                                                      |        |               | NP   | PAT-Active  | US      | 14/138175     | 9462567      | US-2014-0248931-A1 |   |
| 12933 | WIRELESS TRANSMISSION PRECODING                                                               |        |               | PCT  | PAT-Active  | US      | 14/778040     | #####        | US-2016-0398593-A1 |   |
| 12934 | RSRP MOBILITY STATE ESTIMATION FOR CELLULAR DEVICE                                            |        |               | PCT  | PAT-Active  | US      | 14/127930     | 9591581      | US-2015-0225050-A1 |   |
| 12935 | SYSTEMS METHODS AND DEVICES FOR TRAFFIC OFFLOADING                                            |        |               | NP   | PAT-Active  | US      | 14/318098     | 9380484      | US-2015-0092503-A1 |   |
| 12936 | SYSTEMS METHODS AND DEVICES FOR TRAFFIC OFFLOADING                                            |        |               | CNT  | PAT-Active  | US      | 15/137974     | 9832677      | US-2016-0255531-A1 |   |
| 12937 | SYSTEMS METHODS AND DEVICES FOR TRAFFIC OFFLOADING                                            |        |               | CNT  | PAT-Active  | US      | 15/804670     | #####        | US-2018-0132127-A1 |   |
| 12938 | BANG-BANG TIME TO DIGITAL CONVERTER SYSTEMS AND METHODS                                       |        |               | NP   | PAT-Active  | US      | 14/513348     | 9395698      | US-2016-0103423-A1 |   |
| 12939 | SYSTEMS AND METHODS USING A CENTRALIZED NODE TO COLLECT RAN USER PLANE CONGESTION INFORMATION |        |               | PCT  | APP-Pending | US      | 14/771859     |              | US-2016-0025247-A1 |   |
| 12940 | DIAMETER/XML PROTOCOL CONVERSION                                                              |        |               | PCT  | APP-Pending | US      | 14/778983     |              | US-2016-0056932-A1 |   |
| 12941 | REMOVAL OF IRRELEVANCE IN PHASE-MODULATED DIGITAL CARRIER SIGNALS                             |        |               | NP   | PAT-Active  | US      | 14/139166     | 9325351      | US-2015-0172083-A1 |   |
| 12942 | COLLABORATIVE RADIO RESOURCES ALLOCATIONS TO APPLICATIONS OF MOBILE UNITS                     |        |               | NP   | PAT-Active  | US      | 12/966868     | 8478320      | US-2012-0149310-A1 |   |
| 12943 | COLLABORATIVE RADIO RESOURCES ALLOCATIONS TO APPLICATIONS OF MOBILE UNITS                     |        |               | CNT  | PAT-Active  | US      | 13/908673     | 9204446      | US-2013-0258984-A1 |   |
| 12944 | COLLABORATIVE RADIO RESOURCES ALLOCATIONS TO APPLICATIONS OF MOBILE UNITS                     |        |               | CNT  | PAT-Active  | US      | 14/927460     | #####        | US-2016-0080656-A1 |   |
| 12945 | WIRELESS INTERFERENCE MITIGATION                                                              |        |               | PCT  | PAT-Active  | US      | 14/440701     | 9683669      | US-2015-0256279-A1 |   |

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| 2     | TITLE                                                                                                   | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12946 | WIRELESS INTERFERENCE MITIGATION                                                                        |        |               | PCT  | PAT-Active  | US      | 14/440335     | 9654313      | US-2015-0303958-A1 |   |
| 12947 | PACKET DATA CONNECTIONS IN A WIRELESS COMMUNICATION SYSTEM USING A WIRELESS LOCAL AREA NETWORK          |        |               | PCT  | APP-Pending | US      | 14/440338     |              | US-2015-0282026-A1 |   |
| 12948 | INFORMATION SIGNALLING FOR NETWORK ASSISTED INTERFERENCE MITIGATION                                     |        |               | PCT  | PAT-Active  | US      | 14/440337     | #####        | US-2015-0295695-A1 |   |
| 12949 | INFORMATION SIGNALLING FOR NETWORK ASSISTED INTERFERENCE MITIGATION                                     |        |               | CNT  | PAT-Active  | US      | 15/056033     | #####        | US-2018-0316371-A1 |   |
| 12950 | USE OF SCHEDULING REQUEST AND RANDOM ACCESS FOR LTE ADVANCED NETWORKS                                   |        |               | PCT  | PAT-Active  | US      | 14/440430     | 9671209      | US-2015-0289261-A1 |   |
| 12951 | WIRELESS INTERFERENCE MITIGATION                                                                        |        |               | PCT  | PAT-Active  | US      | 14/646524     | 9723506      | US-2015-0286280-A1 |   |
| 12952 | NOTIFICATION OF RECEIVER CAPABILITIES                                                                   |        |               | PCT  | APP-Pending | US      | 14/440863     |              | US-2015-0304063-A1 |   |
| 12953 | SELECTION OF ACKNOWLEDGMENT TIMING IN WIRELESS COMMUNICATIONS                                           |        |               | PCT  | PAT-Active  | US      | 14/440860     | #####        | US-2015-0304087-A1 |   |
| 12954 | SELECTION OF ACKNOWLEDGMENT TIMING IN WIRELESS COMMUNICATIONS                                           |        |               | CNT  | PAT-Active  | US      | 15/683549     | #####        | US-2017-0353204-A1 |   |
| 12955 | DEVICE-TO-DEVICE COMMUNICATION                                                                          |        |               | PCT  | PAT-Active  | US      | 14/440429     | 9674847      | US-2015-0289282-A1 |   |
| 12956 | MEASUREMENT REPORTING IN D2D COMMUNICATION                                                              |        |               | PCT  | PAT-Active  | US      | 14/440444     | 9763128      | US-2015-0271959-A1 |   |
| 12957 | METHOD OF PROCESSING RECEIVED DIGITIZED SIGNALS AND MOBILE RADIO COMMUNICATION TERMINAL DEVICE          |        |               | NP   | PAT-Active  | US      | 14/580243     | 9736852      | US-2016-0182272-A1 |   |
| 12958 | METHOD OF PROCESSING RECEIVED DIGITIZED SIGNALS AND MOBILE RADIO COMMUNICATION TERMINAL DEVICE          |        |               | CNT  | APP-Pending | US      | 15/659674     |              | US-2018-0070366-A1 |   |
| 12959 | COMMUNICATION TERMINAL AND METHOD FOR DETERMINING A POWER SCALING FACTOR                                |        |               | NP   | PAT-Active  | US      | 14/556863     | 9665059      | US-2015-0288362-A1 |   |
| 12960 | CALIBRATING RF PATH DELAY AND IQ PHASE IMBALANCE FOR POLAR TRANSMIT SYSTEM                              |        |               | NP   | PAT-Active  | US      | 14/575793     | 9413563      | US-2016-0182167-A1 |   |
| 12961 | CALIBRATING RF PATH DELAY AND IQ PHASE IMBALANCE FOR POLAR TRANSMIT SYSTEM                              |        |               | CNT  | PAT-Active  | US      | 15/231379     | 9954626      | US-2016-0352439-A1 |   |
| 12962 | METHODS AND DEVICES FOR DETERMINING INTERMODULATION DISTORTIONS                                         |        |               | NP   | PAT-Active  | US      | 14/935416     | 9608743      | US-2016-0134311-A1 |   |
| 12963 | TRANSCIVER DEVICE AND A METHOD FOR GENERATING A COMPENSATION SIGNAL                                     |        |               | NP   | PAT-Active  | US      | 14/550277     | 9680671      | US-2015-0180685-A1 |   |
| 12964 | METHOD BASEBAND SIGNAL GENERATOR AND COMPUTER PROGRAM FOR PROVIDING A BASEBAND SIGNAL                   |        |               | NP   | PAT-Active  | US      | 14/550412     | 9363117      | US-2015-0180690-A1 |   |
| 12965 | ACCESS POINT POSITION DETERMINATION BY MOBILE DEVICES CROWD SOURCING                                    |        |               | PCT  | PAT-Active  | US      | 15/113481     | #####        | US-2017-0034657-A1 |   |
| 12966 | COMMUNICATION DEVICE AND METHOD FOR RECEIVING A SIGNAL                                                  |        |               | NP   | PAT-Active  | US      | 14/565454     | 9595988      | US-2016-0173154-A1 |   |
| 12967 | COMMUNICATION TERMINAL AND A METHOD FOR REPORTING A CHANNEL QUALITY                                     |        |               | NP   | PAT-Active  | US      | 14/593024     | 9398575      | US-2015-0236237-A1 |   |
| 12968 | APPARATUS FOR PROVIDING A CONTROL SIGNAL FOR A VARIABLE IMPEDANCE MATCHING CIRCUIT AND A METHOD THEREOF |        |               | DIV  | APP-Pending | US      | 16/119207     |              | US-2018-0375538-A1 |   |
| 12969 | CIRCUIT TRANSMISSION SYSTEM AND METHOD FOR DETERMINING PROXIMITY OF AN OBJECT                           |        |               | NP   | PAT-Active  | US      | 14/594235     | 9964087      | US-2015-0234077-A1 |   |
| 12970 | CIRCUIT TRANSMISSION SYSTEM AND METHOD FOR DETERMINING PROXIMITY OF AN OBJECT                           |        |               | CNT  | PAT-Active  | US      | 15/251092     | #####        | US-2016-0375487-A1 |   |

|       | A                                                                                                                    | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12971 | CIRCUIT TRANSMISSION SYSTEM AND METHOD FOR DETERMINING PROXIMITY OF AN OBJECT                                        |        |               | CNT  | APP-Pending | US      | 16/258349     |              | US-2019-0215720-A1 |   |
| 12972 | COMMUNICATION TERMINAL AND METHOD FOR CONTROLLING POWER CONSUMPTION OF A COMMUNICATION TERMINAL                      |        |               | NP   | PAT-Active  | US      | 14/530893     | 9693312      | US-2016-0127988-A1 |   |
| 12973 | METHOD AND RELATED MOBILE DEVICE FOR DETERMINING A REFERENCE SIGNAL RECEIVED POWER                                   |        |               | NP   | PAT-Active  | US      | 14/661552     | 9769687      | US-2015-0281988-A1 |   |
| 12974 | METHOD AND RELATED MOBILE DEVICE FOR CELL SEARCHING WITH LOW MEMORY REQUIREMENT                                      |        |               | NP   | PAT-Active  | US      | 14/661439     | 9414304      | US-2015-0382055-A1 |   |
| 12975 | ADJACENT CHANNEL LEAKAGE REDUCTION IN SCALABLE WIRELESS COMMUNICATION NETWORK                                        |        |               | NP   | PAT-Active  | US      | 14/142594     | 9572047      | US-2015-0189518-A1 |   |
| 12976 | HARQ TIMING DESIGN FOR A TDD SYSTEM                                                                                  |        |               | NP   | PAT-Active  | US      | 14/141265     | 9331759      | US-2014-0295842-A1 |   |
| 12977 | TIMING SYNCHRONIZATION IN DISCOVERY SIGNALS                                                                          |        |               | NP   | PAT-Active  | US      | 14/142572     | 9398052      | US-2014-0293988-A1 |   |
| 12978 | NETWORK ASSISTED INTERFERENCE CANCELLATION AND SUPPRESSION WITH RESPECT TO INTERFERING CONTROL CHANNEL TRANSMISSIONS |        |               | NP   | PAT-Active  | US      | 14/141220     | 9380090      | US-2014-0293890-A1 |   |
| 12979 | USER EQUIPMENT AND METHODS FOR CELL RESELECTION USING SCALED TIME-TO-TRIGGER AND A3 OFFSET VALUES                    |        |               | CNT  | PAT-Active  | US      | 14/845019     | 8674757      | US-2016-0066243-A1 |   |
| 12980 | PATTERN INDICATOR SIGNAL FOR NEW DMRS PATTERN                                                                        |        |               | NP   | PAT-Active  | US      | 14/137500     | 9258104      | US-2014-0302887-A1 |   |
| 12981 | RECONFIGURATION CONTROL CHANNEL RESOURCE MAPPING COLLISION AVOIDANCE                                                 |        |               | NP   | PAT-Active  | US      | 14/141876     | 9445338      | US-2014-0301290-A1 |   |
| 12982 | NETWORK-ASSISTED TO DIRECT DEVICE DISCOVERY SWITCH                                                                   |        |               | NP   | PAT-Active  | US      | 14/141222     | 9781556      | US-2014-0301289-A1 |   |
| 12983 | USER EQUIPMENT AND METHOD FOR CELL ASSOCIATION AND BEAMFORMING TRAINING WITH A MMWAVE CAPABLE SMALL CELL             |        |               | PCT  | PAT-Active  | US      | 15/026803     | #####        | US-2016-0249269-A1 |   |
| 12984 | METHOD FOR CERTIFICATION OF RECONFIGURABLE RADIO EQUIPMENT WHEN RECONFIGURATION SOFTWARE DEVELOPED BY THIRD PARTY    |        |               | NP   | PAT-Active  | US      | 14/138782     | 9354910      | US-2015-0178112-A1 |   |
| 12985 | APPARATUS AND METHOD FOR SINGLE-TONE DEVICE DISCOVERY IN WIRELESS COMMUNICATION NETWORKS                             |        |               | NP   | PAT-Active  | US      | 14/142071     | 9647818      | US-2014-0182550-A1 |   |
| 12986 | APPARATUS AND METHOD FOR SINGLE-TONE DEVICE DISCOVERY IN WIRELESS COMMUNICATION NETWORKS                             |        |               | CNT  | APP-Pending | US      | 15/589255     |              | US-2017-0173815-A1 |   |
| 12987 | USER EQUIPMENT AND METHODS FOR ADAPTING SYSTEM PARAMETERS BASED ON EXTENDED PAGING CYCLES                            |        |               | NP   | PAT-Active  | US      | 14/132974     | 9294714      | US-2014-0321343-A1 |   |
| 12988 | USER EQUIPMENT AND METHODS FOR ADAPTING SYSTEM PARAMETERS BASED ON EXTENDED PAGING CYCLES                            |        |               | CNT  | PAT-Active  | US      | 15/076500     | #####        | US-2017-0055239-A1 |   |
| 12989 | USER EQUIPMENT AND METHODS FOR ADAPTING SYSTEM PARAMETERS BASED ON EXTENDED PAGING CYCLES                            |        |               | CNT  | APP-Pending | US      | 16/530732     |              |                    |   |
| 12990 | ARCHITECTURE FOR WEB-BASED REAL-TIME COMMUNICATIONS (WEBRTC) TO ACCESS INTERNET PROTOCOL MULTIMEDIA SUBSYSTEM (IMS)  |        |               | NP   | PAT-Active  | US      | 14/141034     | 9621845      | US-2014-0325078-A1 |   |
| 12991 | RESUMING PACKET SERVICES IN A MOBILE NETWORK                                                                         |        |               | NP   | PAT-Active  | US      | 14/141067     | 9320061      | US-2015-0093326-A1 |   |
| 12992 | RESUMING PACKET SERVICES IN A MOBILE NETWORK                                                                         |        |               | CNT  | PAT-Active  | US      | 14/990054     | 9750017      | US-2016-0115967-A1 |   |
| 12993 | RESUMING PACKET SERVICES IN A MOBILE NETWORK                                                                         |        |               | CNT  | PAT-Active  | US      | 15/688159     | #####        | US-2017-0359823-A1 |   |
| 12994 | RESUMING PACKET SERVICES IN A MOBILE NETWORK                                                                         |        |               | CNT  | APP-Pending | US      | 16/536254     |              |                    |   |
| 12995 | INTERACTIVE ZOOMING IN VIDEO CONFERENCING                                                                            |        |               | NP   | PAT-Active  | US      | 14/109121     | 9307192      | US-2014-0320587-A1 |   |
| 12996 | RTSP-BASED UE CONFIGURABLE FOR VIDEO REGION-OF-INTEREST (ROI) SIGNALING                                              |        |               | CNT  | PAT-Active  | US      | 15/083997     | 9743360      | US-2016-0227166-A1 |   |

|       | A                                                                                                                  | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                              | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 12997 | MTSI BASED UE CONFIGURABLE FOR VIDEO REGION-OF-INTEREST (ROI) SIGNALING                                            |        |               | CNT  | PAT-Active  | US      | 15/682168     | #####        | US-2017-0374647-A1 |   |
| 12998 | RADIO ACCESS TECHNOLOGY INFORMATION STORAGE IN A MOBILE NETWORK                                                    |        |               | NP   | PAT-Active  | US      | 14/132525     | 9325947      | US-2014-0323128-A1 |   |
| 12999 | USER EQUIPMENT AND METHOD FOR FEEDBACK OF USER EQUIPMENT PERFORMANCE METRICS DURING DYNAMIC RADIO SWITCHING        |        |               | NP   | PAT-Active  | US      | 14/107480     | 9392539      | US-2014-0323133-A1 |   |
| 13000 | DEVICE-TO-DEVICE (D2D) PREAMBLE DESIGN                                                                             |        |               | NP   | PAT-Active  | US      | 14/140823     | 9414306      | US-2014-0321360-A1 |   |
| 13001 | APPARATUS AND METHOD FOR CONGESTION CONTROL IN WIRELESS COMMUNICATION NETWORKS                                     |        |               | NP   | PAT-Active  | US      | 14/141985     | 9288434      | US-2014-0321272-A1 |   |
| 13002 | DEVICE AND METHOD FOR PUBLIC LAND MOBILE NETWORK SEARCHING                                                         |        |               | NP   | PAT-Active  | US      | 14/144856     | 9357474      | US-2015-0189575-A1 |   |
| 13003 | USER EQUIPMENT AND METHODS FOR CODEBOOK SUBSAMPLING FOR ENHANCED 4TX CODEBOOKS                                     |        |               | NP   | PAT-Active  | US      | 14/108648     | 9071297      | US-2014-0352795-A1 |   |
| 13004 | USER EQUIPMENT AND METHODS FOR CODEBOOK SUBSAMPLING FOR ENHANCED 4TX CODEBOOKS                                     |        |               | CNT  | PAT-Active  | US      | 14/739815     | 9553643      | US-2016-0086493-A1 |   |
| 13005 | USER EQUIPMENT AND METHODS FOR CODEBOOK SUBSAMPLING FOR ENHANCED 4TX CODEBOOKS                                     |        |               | CNT  | PAT-Active  | US      | 15/413182     | #####        | US-2017-0372136-A1 |   |
| 13006 | PROXIMITY-BASED SERVICES DISCOVERY PRIVACY                                                                         |        |               | NP   | PAT-Active  | US      | 14/141843     | 9559761      | US-2014-0357228-A1 |   |
| 13007 | USER EQUIPMENT AND METHOD FOR USER EQUIPMENT FEEDBACK OF FLOW-TO-RAT MAPPING PREFERENCES                           |        |               | NP   | PAT-Active  | US      | 14/136554     | 9794870      | US-2015-0084980-A1 |   |
| 13008 | ENHANCED NODE B AND METHOD FOR RRC CONNECTION ESTABLISHMENT FOR SMALL DATA TRANSFERS                               |        |               | NP   | PAT-Active  | US      | 14/140932     | 9191378      | US-2014-0191288-A1 |   |
| 13009 | ENHANCED NODE B AND METHOD FOR RRC CONNECTION ESTABLISHMENT FOR SMALL DATA TRANSFERS                               |        |               | CNT  | PAT-Active  | US      | 14/918990     | 9930647      | US-2016-0192410-A1 |   |
| 13010 | MOVING AD HOC NETWORK SMALL CELL RELAY HANDOVER                                                                    |        |               | NP   | PAT-Active  | US      | 14/138315     | 9351229      | US-2015-0181502-A1 |   |
| 13011 | MOVING AD HOC NETWORK SMALL CELL RELAY HANDOVER                                                                    |        |               | CNT  | PAT-Active  | US      | 15/162075     | #####        | US-2016-0269966-A1 |   |
| 13012 | METHOD FOR EFFICIENT CHANNEL ESTIMATION AND BEAMFORMING IN FDD SYSTEM BY EXPLOITING UPLINK-DOWNLINK CORRESPONDENCE |        |               | NP   | PAT-Active  | US      | 14/109211     | 9814037      | US-2015-0083338-A1 |   |
| 13013 | METHOD FOR EFFICIENT CHANNEL ESTIMATION AND BEAMFORMING IN FDD SYSTEM BY EXPLOITING UPLINK-DOWNLINK CORRESPONDENCE |        |               | CNT  | APP-Pending | US      | 15/804360     |              | US-2018-0110049-A1 |   |
| 13014 | LICENSE SHARED ACCESS IN CELLULAR NETWORK                                                                          |        |               | NP   | PAT-Active  | US      | 14/136755     | 9713147      | US-2015-0183601-A1 |   |
| 13015 | SUBSPACE TRACKING IN FULL DIMENSION MIMO                                                                           |        |               | NP   | PAT-Active  | US      | 14/141206     | 9655107      | US-2015-0083543-A1 |   |
| 13016 | APPARATUS SYSTEM AND METHOD OF CONTROLLING A WIRELESS DOCKING DEVICE                                               |        |               | NP   | PAT-Active  | US      | 14/227395     | 9315981      | US-2015-0282073-A1 |   |
| 13017 | METHOD AND DEVICE FOR INTERFERER SCHEDULING DETECTION AND NOISE AND INTERFERER PARAMETER ESTIMATION                |        |               | NP   | PAT-Active  | US      | 14/660094     | 9832667      | US-2015-0271687-A1 |   |
| 13018 | DECODER AND METHOD FOR DECODING AN ENCODED SEQUENCE OF BITS                                                        |        |               | NP   | PAT-Active  | US      | 14/445146     | 9419656      | US-2016-0036465-A1 |   |
| 13019 | RADIO COMMUNICATION DEVICES AND METHODS FOR CONTROLLING A RADIO COMMUNICATION DEVICE                               |        |               | NP   | PAT-Active  | US      | 14/801872     | 9673850      | US-2016-0048970-A1 |   |
| 13020 | METHOD AND DEVICE FOR PROCESSING RESOURCE BLOCKS                                                                   |        |               | NP   | PAT-Active  | US      | 14/680029     | 9787446      | US-2015-0270834-A1 |   |
| 13021 | QUANTIZATION CIRCUIT AND METHOD FOR QUANTIZING AN INPUT QUANTITY                                                   |        |               | NP   | PAT-Active  | US      | 14/630953     | 9432039      | US-2015-0280724-A1 |   |

|       | A                                                                                                                      | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                  | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13012 | ENVELOPE TRACKING PATH DELAY FINE TUNING AND CALIBRATION                                                               |        |               | NP   | PAT-Active  | US      | 14/564162     | 9692366      | US-2016-0164550-A1 |   |
| 13023 | APPARATUS AND METHOD FOR GENERATING A TRANSMIT SIGNAL                                                                  |        |               | NP   | PAT-Active  | US      | 14/858133     | 9722645      | US-2016-0182101-A1 |   |
| 13024 | SYSTEMS AND METHODS FOR COMBINING POWER THROUGH A TRANSFORMER                                                          |        |               | NP   | PAT-Active  | US      | 14/165152     | 9306503      | US-2015-0214896-A1 |   |
| 13025 | SYSTEMS AND METHODS FOR ENHANCING PROBABILITY OF INTERNAL MEASUREMENTS IN CROWDED ENVIRONMENTS                         |        |               | NP   | PAT-Active  | US      | 14/276355     | 9356631      | US-2015-0335779-A1 |   |
| 13026 | MANAGEMENT TECHNIQUES FOR WIRELESS NETWORK MOBILITY PROCEDURES                                                         |        |               | PCT  | PAT-Active  | US      | 14/411498     | 9826390      | US-2015-0146532-A1 |   |
| 13027 | MANAGEMENT TECHNIQUES FOR WIRELESS NETWORK MOBILITY PROCEDURES                                                         |        |               | CNT  | APP-Pending | US      | 15/436693     |              | US-2018-0020341-A1 |   |
| 13028 | MANAGEMENT TECHNIQUES FOR WIRELESS NETWORK MOBILITY PROCEDURES                                                         |        |               | CNT  | APP-Pending | US      | 16/418273     |              | US-2019-0313237-A1 |   |
| 13029 | PROVISIONING OF APPLICATION CATEGORIES AT A USER EQUIPMENT DURING NETWORK CONGESTION                                   |        |               | PCT  | PAT-Active  | US      | 14/770566     | #####        | US-2016-0014832-A1 |   |
| 13030 | PROVISIONING OF APPLICATION CATEGORIES AT A USER EQUIPMENT DURING NETWORK CONGESTION                                   |        |               | CIP  | PAT-Active  | US      | 14/590772     | 8743341      | US-2015-0117213-A1 |   |
| 13031 | PROVISIONING OF APPLICATION CATEGORIES AT A USER EQUIPMENT DURING NETWORK CONGESTION                                   |        |               | CNT  | PAT-Active  | US      | 15/644327     | #####        | US-2017-0311229-A1 |   |
| 13032 | TECHNIQUES FOR ADJACENT CHANNEL INTERFERENCE MITIGATION                                                                |        |               | PCT  | PAT-Active  | US      | 14/771269     | 9988558      | US-2016-0007302-A1 |   |
| 13033 | TECHNIQUES FOR ADJACENT CHANNEL INTERFERENCE MITIGATION                                                                |        |               | CNT  | APP-Pending | US      | 16/005519     |              | US-2018-0359601-A1 |   |
| 13034 | PROXIMITY DETECTION IN A DEVICE TO DEVICE NETWORK                                                                      |        |               | PCT  | PAT-Active  | US      | 14/771130     | 9883338      | US-2016-0007152-A1 |   |
| 13035 | PROXIMITY DETECTION IN A DEVICE TO DEVICE NETWORK                                                                      |        |               | CNT  | PAT-Active  | US      | 15/861510     | #####        | US-2018-0146331-A1 |   |
| 13036 | SYSTEMS METHODS AND DEVICES FOR DISTRIBUTED SCHEDULING FOR DEVICE-TO-DEVICE INTERFERENCE MITIGATION                    |        |               | PCT  | PAT-Active  | US      | 14/771866     | 9974048      | US-2016-0037547-A1 |   |
| 13037 | SYSTEMS METHODS AND DEVICES TO SUPPORT INTRA-CELL COO-AWARE RADIO RESOURCE ALLOCATION                                  |        |               | NP   | PAT-Active  | US      | 14/227775     | 9642034      | US-2015-0281999-A1 |   |
| 13038 | SYSTEMS METHODS AND DEVICES FOR DISTRIBUTED SETUP FOR A DEVICE-TO-DEVICE SESSION                                       |        |               | NP   | PAT-Active  | US      | 14/226556     | 9474095      | US-2015-0382228-A1 |   |
| 13039 | METHODS APPARATUSES AND SYSTEMS FOR RETRIEVING DATA FROM A WIRELESS LOCAL AREA NETWORK (WLAN) ACCESS POINT             |        |               | PCT  | PAT-Active  | US      | 14/779548     | #####        | US-2016-0044660-A1 |   |
| 13040 | USER EQUIPMENT GENERATION AND SIGNALING OF FEEDBACK FOR SUPPORTING ADAPTIVE DEMODULATION REFERENCE SIGNAL TRANSMISSION |        |               | NP   | PAT-Active  | US      | 14/229529     | 9337974      | US-2015-0282123-A1 |   |
| 13041 | TIME DIVISION DUPLEX (TDD) UPLINK DOWNLINK (UL-DL) RECONFIGURATION                                                     |        |               | NP   | PAT-Active  | US      | 14/226264     | 9385608      | US-2015-0003301-A1 |   |
| 13042 | TIME DIVISION DUPLEX (TDD) UPLINK DOWNLINK (UL-DL) RECONFIGURATION                                                     |        |               | INV  | PAT-Active  | US      | 15/136743     | 9844054      | US-2016-0255628-A1 |   |
| 13043 | TIME DIVISION DUPLEX (TDD) UPLINK DOWNLINK (UL-DL) RECONFIGURATION                                                     |        |               | CNT  | PAT-Active  | US      | 15/801126     | #####        | US-2018-0070356-A1 |   |
| 13044 | TECHNIQUES FOR WIRELESS NETWORK DISCOVERY AND SELECTION SUPPORT                                                        |        |               | NP   | PAT-Active  | US      | 14/227937     | 9451535      | US-2014-0293982-A1 |   |
| 13045 | TECHNIQUES FOR WIRELESS NETWORK DISCOVERY AND SELECTION SUPPORT                                                        |        |               | CNT  | PAT-Active  | US      | 14/951295     | 9648555      | US-2016-0081013-A1 |   |
| 13046 | TECHNIQUES FOR WIRELESS NETWORK DISCOVERY AND SELECTION SUPPORT                                                        |        |               | CNT  | PAT-Active  | US      | 15/589912     | #####        | US-2018-0063776-A1 |   |



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| 2     | TITLE                                                                                                                                                                                            | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13042 | PAGING REPETITION FOR INCREASED ROBUSTNESS FOR EXTENDED PAGING CYCLES                                                                                                                            |        |               | PCT  | PAT-Active  | US      | 14/773296     | 9763235      | US-2016-092934A-A1 |   |
| 13048 | WIRELESS LOCAL AREA NETWORK (WLAN) SELECTION RULES                                                                                                                                               |        |               | PCT  | PAT-Active  | US      | 14/779228     | #####        | US-2016-0950619-A1 |   |
| 13049 | QUEUING MECHANISM FOR CLIENT SIDE NETWORK TRAFFIC TO REDUCE RADIO POWER CONSUMPTION ON MOBILE CLIENTS                                                                                            |        |               | NP   | PAT-Active  | US      | 14/226690     | 9420537      | US-2015-0282086-A1 |   |
| 13050 | DYNAMICAL TIME DIVISION DUPLEX UPLINK AND DOWNLINK CONFIGURATION IN A COMMUNICATIONS NETWORK                                                                                                     |        |               | NP   | PAT-Active  | US      | 14/247675     | 8991653      | US-2015-0029910-A1 |   |
| 13051 | DYNAMICAL TIME DIVISION DUPLEX UPLINK AND DOWNLINK CONFIGURATION IN A COMMUNICATIONS NETWORK                                                                                                     |        |               | CNT  | PAT-Active  | US      | 15/256105     | 9756649      | US-2016-0374141-A1 |   |
| 13052 | DYNAMICAL TIME DIVISION DUPLEX UPLINK AND DOWNLINK CONFIGURATION IN A COMMUNICATIONS NETWORK                                                                                                     |        |               | CNT  | PAT-Active  | US      | 15/456125     | #####        | US-2017-0188373-A1 |   |
| 13053 | DYNAMICAL TIME DIVISION DUPLEX UPLINK AND DOWNLINK CONFIGURATION IN A COMMUNICATIONS NETWORK                                                                                                     |        |               | CNT  | APP-Pending | US      | 16/034177     |              | US-2018-0338313-A1 |   |
| 13054 | DOWNLINK SELECTION IN A FULL DIMENSIONAL MULTIPLE-INPUT MULTIPLE-OUTPUT SYSTEM                                                                                                                   |        |               | NP   | PAT-Active  | US      | 14/231158     | 9585174      | US-2015-0029875-A1 |   |
| 13055 | NETWORK COVERAGE HOLE DETECTION                                                                                                                                                                  |        |               | NP   | PAT-Active  | US      | 14/255216     | 8265076      | US-2015-0031308-A1 |   |
| 13056 | NETWORK COVERAGE HOLE DETECTION                                                                                                                                                                  |        |               | CNT  | PAT-Active  | US      | 15/006758     | 9549421      | US-2016-0142961-A1 |   |
| 13057 | NETWORK COVERAGE HOLE DETECTION                                                                                                                                                                  |        |               | CNT  | PAT-Active  | US      | 15/394468     | 9775081      | US-2017-0113830-A1 |   |
| 13058 | GENERATION AND USE OF A USER EQUIPMENT LOCATION DISTRIBUTION IN A WIRELESS COMMUNICATION NETWORK                                                                                                 |        |               | PCT  | PAT-Active  | US      | 14/779557     | 9699081      | US-2016-0044453-A1 |   |
| 13059 | METHOD FOR CLOSED-LOOP TUNER IN A RECEIVER ANTENNA                                                                                                                                               |        |               | NP   | PAT-Active  | US      | 14/569116     | 9559434      | US-2016-0172768-A1 |   |
| 13060 | CIRCUIT INTEGRATED CIRCUIT RECEIVER TRANSCIVER AND A METHOD FOR AMPLIFYING AN INPUT SIGNAL                                                                                                       |        |               | NP   | PAT-Active  | US      | 14/698135     | 9366556      | US-2015-0381114-A1 |   |
| 13061 | CIRCUIT AN INTEGRATED CIRCUIT A TRANSMITTER A RECEIVER A TRANSCIVER A METHOD FOR OBTAINING CALIBRATION DATA AND A METHOD FOR GENERATING A LOCAL OSCILLATOR SIGNAL                                |        |               | NP   | PAT-Active  | US      | 14/620488     | 9537585      | US-2015-0280842-A1 |   |
| 13062 | APPARATUS AND METHOD FOR GENERATING AN OSCILLATOR SIGNAL                                                                                                                                         |        |               | NP   | PAT-Active  | US      | 14/718248     | 9431958      | US-2015-0372644-A1 |   |
| 13063 | APPARATUS AND METHOD FOR GENERATING AN OSCILLATOR SIGNAL                                                                                                                                         |        |               | CNT  | PAT-Active  | US      | 15/243343     | 9803208      | US-2016-0358457-A1 |   |
| 13064 | SYSTEMS METHODS AND DEVICES FOR IMPROVED INTER-FREQUENCY MEASUREMENT                                                                                                                             |        |               | NP   | PAT-Active  | US      | 14/497514     | 9973958      | US-2015-0215803-A1 |   |
| 13065 | ENABLING D2D FUNCTIONALITY FOR PUBLIC SAFETY APPLICATIONS                                                                                                                                        |        |               | NP   | PAT-Active  | US      | 14/497913     | 9674682      | US-2015-0215757-A1 |   |
| 13066 | SYSTEMS METHODS AND DEVICES FOR SELECTIVE INTERFERENCE COORDINATION IN A CELLULAR PROTOCOL MEASUREMENT GAP REPETITION PATTERNS FOR INTER-FREQUENCY OFFLOADING IN HETEROGENEOUS WIRELESS NETWORKS |        |               | NP   | PAT-Active  | US      | 14/498679     | 9774436      | US-2015-0215100-A1 |   |
| 13067 | MEASUREMENT GAP REPETITION PATTERNS FOR INTER-FREQUENCY OFFLOADING IN HETEROGENEOUS WIRELESS NETWORKS                                                                                            |        |               | NP   | PAT-Active  | US      | 14/488774     | 9867073      | US-2015-0215837-A1 |   |
| 13068 | MEASUREMENT GAP REPETITION PATTERNS FOR INTER-FREQUENCY OFFLOADING IN HETEROGENEOUS WIRELESS NETWORKS                                                                                            |        |               | CNT  | PAT-Active  | US      | 15/895173     | #####        | US-2018-0227785-A1 |   |
| 13069 | MEASUREMENT GAP REPETITION PATTERNS FOR INTER-FREQUENCY OFFLOADING IN HETEROGENEOUS WIRELESS NETWORKS                                                                                            |        |               | CNT  | APP-Pending | US      | 16/595637     |              |                    |   |
| 13070 | EFFICIENT RECEIVER YIELDING FOR DISTRIBUTED D2D COMMUNICATIONS                                                                                                                                   |        |               | NP   | PAT-Active  | US      | 14/496842     | 9661652      | US-2015-0215088-A1 |   |
| 13071 | APPARATUS SYSTEM AND METHOD OF CONTROLLING RADIO ACCESS TECHNOLOGY (RAT) COMMUNICATION MANAGERS                                                                                                  |        |               | NP   | PAT-Active  | US      | 14/492342     | 9344939      | US-2015-0215835-A1 |   |

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| 2     | TITLE                                                                                                                                                  | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13072 | APPARATUS METHOD AND SYSTEM OF INTER-NODE COMMUNICATION                                                                                                |        |               | NP   | PAT-Active  | US      | 14/492333     | 9736834      | US-2015-0215834-A1 |   |
| 13073 | MECHANISM FOR 256-QAM CAPABLE USER EQUIPMENT TO OPERATE SEAMLESSLY WITH A NODE                                                                         |        |               | PCT  | PAT-Active  | US      | 14/443998     | 9986544      | US-2017-0270978-A1 |   |
| 13074 | MECHANISM FOR 256-QAM CAPABLE USER EQUIPMENT TO OPERATE SEAMLESSLY WITH A NODE                                                                         |        |               | ENT  | PAT-Active  | US      | 14/716846     | #####        | US-2015-0256287-A1 |   |
| 13075 | PERIODIC CHANNEL STATUS INFORMATION (CSI) REPORTING FOR ENHANCED INTERFERENCE MANAGEMENT AND TRAFFIC ADAPTATION (EIMTA) SYSTEMS WITH CSI SUBFRAME SETS |        |               | NP   | PAT-Active  | US      | 14/495641     | 9571251      | US-2015-0215928-A1 |   |
| 13076 | PERIODIC CHANNEL STATUS INFORMATION (CSI) REPORTING FOR ENHANCED INTERFERENCE MANAGEMENT AND TRAFFIC ADAPTATION (EIMTA) SYSTEMS WITH CSI SUBFRAME SETS |        |               | ENT  | PAT-Active  | US      | 14/700428     | 9749892      | US-2015-0237521-A1 |   |
| 13077 | PERIODIC CHANNEL STATUS INFORMATION (CSI) REPORTING FOR ENHANCED INTERFERENCE MANAGEMENT AND TRAFFIC ADAPTATION (EIMTA) SYSTEMS WITH CSI SUBFRAME SETS |        |               | ENT  | PAT-Active  | US      | 15/675258     | #####        | US-2018-0254752-A1 |   |
| 13078 | RANDOM ACCESS PROCEDURE FOR DUAL CONNECTIVITY                                                                                                          |        |               | NP   | PAT-Active  | US      | 14/495292     | 9544920      | US-2015-0215267-A1 |   |
| 13079 | APPARATUS SYSTEM AND METHOD OF SECURING COMMUNICATIONS OF A USER EQUIPMENT (UE) IN A WIRELESS LOCAL AREA NETWORK                                       |        |               | NP   | PAT-Active  | US      | 14/492356     | 9426649      | US-2015-0215777-A1 |   |
| 13080 | USER EQUIPMENT AND METHOD FOR TRANSMIT POWER CONTROL FOR D2D TRANSMISSIONS                                                                             |        |               | NP   | PAT-Active  | US      | 14/482060     | 9560574      | US-2015-0223141-A1 |   |
| 13081 | USER EQUIPMENT UPLINK TOGGING FOR DUAL CONNECTIVITY NETWORKS                                                                                           |        |               | NP   | PAT-Active  | US      | 14/517362     | 9689802      | US-2015-0215861-A1 |   |
| 13082 | USER EQUIPMENT AND METHODS FOR DEVICE-TO-DEVICE COMMUNICATION OVER AN LTE AIR INTERFACE                                                                |        |               | NP   | PAT-Active  | US      | 14/493030     | 9491725      | US-2015-0215882-A1 |   |
| 13083 | DISCONTINUOUS RECEPTION ALIGNMENT IN DUAL CONNECTIVITY NETWORKS                                                                                        |        |               | NP   | PAT-Active  | US      | 14/528755     | 9872334      | US-2015-0215912-A1 |   |
| 13084 | DISCONTINUOUS RECEPTION ALIGNMENT IN DUAL CONNECTIVITY NETWORKS                                                                                        |        |               | ENT  | PAT-Active  | US      | 15/332754     | #####        | US-2017-0241983-A1 |   |
| 13085 | DISCONTINUOUS RECEPTION ALIGNMENT IN DUAL CONNECTIVITY NETWORKS                                                                                        |        |               | ENT  | APP-Pending | US      | 15/988280     |              | US-2018-0352803-A1 |   |
| 13086 | RADIO RESOURCE CONTROL MESSAGING FOR DUAL CONNECTIVITY NETWORKS                                                                                        |        |               | NP   | PAT-Active  | US      | 14/528860     | 9578544      | US-2015-0215923-A1 |   |
| 13087 | RADIO RESOURCE CONTROL MESSAGING FOR DUAL CONNECTIVITY NETWORKS                                                                                        |        |               | ENT  | PAT-Active  | US      | 15/437249     | #####        | US-2017-0230864-A1 |   |
| 13088 | APPLICATION SPECIFIC CONGESTION CONTROL IN A WIRELESS NETWORK                                                                                          |        |               | NP   | PAT-Active  | US      | 14/517698     | 9392531      | US-2015-0215845-A1 |   |
| 13089 | SYSTEMS METHODS AND DEVICES FOR SYNCHRONIZATION AND RESOURCE ALLOCATION FOR DEVICE-TO-DEVICE COMMUNICATION                                             |        |               | PCT  | APP-Pending | US      | 15/032078     |              | US-2016-0374039-A1 |   |
| 13090 | METHOD AND APPARATUS FOR WI-FI LOCATION DETERMINATION                                                                                                  |        |               | PCT  | APP-Pending | US      | 15/123797     |              | US-2017-0215876-A1 |   |
| 13091 | DYNAMIC SHARED ACCESS SPECTRUM SELECTION                                                                                                               |        |               | NP   | PAT-Active  | US      | 14/229742     | 9462478      | US-2015-0233971-A1 |   |
| 13092 | SECURITY KEY REFRESH FOR DUAL CONNECTIVITY                                                                                                             |        |               | ENT  | APP-Pending | US      | 15/197118     |              | US-2019-0385425-A1 |   |
| 13093 | USER EQUIPMENT AND METHOD FOR RESOURCE ALLOCATION AND DEVICE-TO-DEVICE DISCOVERY HOPPING                                                               |        |               | PCT  | APP-Pending | US      | 14/778528     |              | US-2016-0100401-A1 |   |
| 13094 | USER EQUIPMENT DISCOVERY RESOURCE POOL SIGNALING FOR USER EQUIPMENTS CONFIGURED FOR PRO-SE DIRECT DISCOVERY                                            |        |               | ENT  | APP-Pending | US      | 15/110729     |              | US-2018-0268144-A1 |   |
| 13095 | POWER SAVING AND DEVICE TRAFFIC OFFLOAD                                                                                                                |        |               | NP   | PAT-Active  | US      | 14/227943     | 9408142      | US-2015-0282067-A1 |   |

|       | A                                                                                                                                                         | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                     | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13096 | NETWORK ASSISTED DEVICE-TO-DEVICE DISCOVERY FOR PEER-TO-PEER APPLICATIONS                                                                                 |        |               | PCT  | APP-Pending | US      | 14/783573     |              | US-2016-0956703-A1 |   |
| 13097 | SYSTEMS AND METHODS FOR MOBILITY STATE ESTIMATION FRAMEWORK FOR LTE NETWORK                                                                               |        |               | PCT  | PAT-Active  | US      | 14/902292     | 9847823      | US-2016-0373994-A1 |   |
| 13098 | DEVICE SYSTEM AND METHOD OF CONFIGURING A RADIO TRANSCEIVER                                                                                               |        |               | NP   | PAT-Active  | US      | 14/506194     | 9614951      | US-2015-0244400-A1 |   |
| 13099 | USER EQUIPMENT COMPUTER READABLE MEDIUM AND METHOD TO DETERMINE THE MOBILITY OF USER EQUIPMENT IN A LONG-TERM EVOLUTION NETWORK                           |        |               | PCT  | PAT-Active  | US      | 15/111880     | #####        | US-2016-0338032-A1 |   |
| 13100 | ENHANCEMENT TO THE BUFFER STATUS REPORT FOR COORDINATED UPUNK GRANT ALLOCATION IN DUAL CONNECTIVITY IN AN LTE NETWORK                                     |        |               | NP   | PAT-Active  | US      | 14/582384     | 9635655      | US-2015-0245349-A1 |   |
| 13101 | INTERFERENCE REDUCTION USING HYBRID SIGNALING                                                                                                             |        |               | NP   | PAT-Active  | US      | 14/582346     | 9577778      | US-2015-0245366-A1 |   |
| 13102 | SCHEDULING FOR AN UNLICENSED CARRIER TYPE                                                                                                                 |        |               | NP   | PAT-Active  | US      | 14/582378     | 9838049      | US-2015-0245376-A1 |   |
| 13103 | MECHANISMS TO OPTIMIZE AND ALIGN DISCONTINUOUS RECEPTION CONFIGURATION OF DEVICE-TO-DEVICE CAPABLE USER EQUIPMENT                                         |        |               | NP   | PAT-Active  | US      | 14/581285     | 9992744      | US-2015-0245295-A1 |   |
| 13104 | USER EQUIPMENT AND EVOLVED NODE-B AND METHODS FOR RANDOM ACCESS FOR MACHINE TYPE COMMUNICATION                                                            |        |               | PCT  | PAT-Active  | US      | 15/111762     | 8907095      | US-2016-0338111-A1 |   |
| 13105 | ARRAY SYNCHRONISATION WITH COUNTERS                                                                                                                       |        |               | PCT  | PAT-Active  | US      | 10/539337     | 7603541      | US-2006-0168423-A1 |   |
| 13106 | INJECTION LOCKED RING OSCILLATOR BASED DIGITAL-TO-TIME CONVERTER AND METHOD FOR PROVIDING A FILTERED INTERPOLATED PHASE SIGNAL                            |        |               | NP   | PAT-Active  | US      | 14/570299     | 9813556      | US-2016-0173119-A1 |   |
| 13107 | METHOD OF PROCESSING RECEIVED DIGITIZED SIGNALS AND MOBILE RADIO COMMUNICATION TERMINAL DEVICE                                                            |        |               | NP   | PAT-Active  | US      | 14/580296     | 9407490      | US-2016-0182271-A1 |   |
| 13108 | CELL SEARCH METHOD AND COMMUNICATION TERMINAL                                                                                                             |        |               | NP   | PAT-Active  | US      | 14/387086     | 9456373      | US-2015-0343813-A1 |   |
| 13109 | METHOD FOR DETERMINING A PERFORMANCE OF A MIMO COMMUNICATION AND COMMUNICATION DEVICE                                                                     |        |               | NP   | PAT-Active  | US      | 14/284468     | 9577768      | US-2015-0341127-A1 |   |
| 13110 | PROCESSOR ARRAY INCLUDING DELAY ELEMENTS ASSOCIATED WITH PRIMARY BUS NODES                                                                                |        |               | PCT  | PAT-Active  | US      | 10/543370     | 7374582      | US-2006-0155956-A1 |   |
| 13111 | PROCESSOR ARRAY                                                                                                                                           |        |               | PCT  | PAT-Active  | US      | 10/521889     | 7549081      | US-2005-0257105-A1 |   |
| 13112 | Method and Device in a Communication Network                                                                                                              |        |               | NP   | PAT-Active  | US      | 12/794128     | 8463312      | US-2010-0311449-A1 |   |
| 13113 | METHOD AND DEVICE IN A COMMUNICATION NETWORK                                                                                                              |        |               | ENT  | PAT-Active  | US      | 13/907753     | 8892154      | US-2013-0260776-A1 |   |
| 13114 | METHOD AND DEVICE IN A COMMUNICATION NETWORK                                                                                                              |        |               | ENT  | PAT-Active  | US      | 14/538353     | 9807771      | US-2015-0173081-A1 |   |
| 13115 | POWER CONTROL                                                                                                                                             |        |               | NP   | PAT-Active  | US      | 12/264531     | 8555998      | US-2009-0149213-A1 |   |
| 13116 | ACCESSING A BASE STATION                                                                                                                                  |        |               | NP   | PAT-Active  | US      | 13/472267     | 8712468      | US-2012-0295803-A1 |   |
| 13117 | BEARER MOBILITY AND SPLITTING IN A RADIO ACCESS NETWORK-BASED 3RD GENERATION PARTNERSHIP PROJECT NETWORK HAVING AN INTEGRATED WIRELESS LOCAL AREA NETWORK |        |               | NP   | PAT-Active  | US      | 14/583172     | 9596707      | US-2015-0264726-A1 |   |
| 13118 | BEARER MOBILITY AND SPLITTING IN A RADIO ACCESS NETWORK-BASED 3RD GENERATION PARTNERSHIP PROJECT NETWORK HAVING AN INTEGRATED WIRELESS LOCAL AREA NETWORK |        |               | ENT  | PAT-Active  | US      | 15/394954     | #####        | US-2017-0215173-A1 |   |
| 13119 | BEARER MOBILITY AND SPLITTING IN A RADIO ACCESS NETWORK-BASED 3RD GENERATION PARTNERSHIP PROJECT NETWORK HAVING AN INTEGRATED WIRELESS LOCAL AREA NETWORK |        |               | ENT  | APP-Pending | US      | 16/409350     |              |                    |   |

|       | A                                                                                                                                    | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13120 | METHOD APPARATUS AND COMPUTER READABLE MEDIUM FOR SWITCHING BETWEEN LOWER ENERGY AND HIGHER ENERGY WIRELESS COMMUNICATION TECHNIQUES |        |               | NP   | PAT-Active  | US      | 14/565368     | 9874643      | US-2015-0264512-A1 |   |
| 13121 | METHOD APPARATUS AND COMPUTER READABLE MEDIUM FOR SWITCHING BETWEEN LOWER ENERGY AND HIGHER ENERGY WIRELESS COMMUNICATION TECHNIQUES |        |               | CNT  | PAT-Active  | US      | 15/496567     | 9998905      | US-2017-0230814-A1 |   |
| 13122 | METHOD APPARATUS AND COMPUTER READABLE MEDIUM FOR SWITCHING BETWEEN LOWER ENERGY AND HIGHER ENERGY WIRELESS COMMUNICATION TECHNIQUES |        |               | CNT  | PAT-Active  | US      | 15/981135     | #####        | US-2018-0359625-A1 |   |
| 13123 | METHOD APPARATUS AND COMPUTER READABLE MEDIUM FOR SWITCHING BETWEEN LOWER ENERGY AND HIGHER ENERGY WIRELESS COMMUNICATION TECHNIQUES |        |               | CNT  | APP-Pending | US      | 15/548528     |              |                    |   |
| 13124 | SYSTEMS METHODS AND DEVICES FOR OPPORTUNISTIC NETWORKING                                                                             |        |               | NP   | PAT-Active  | US      | 14/580735     | 8794033      | US-2015-0264699-A1 |   |
| 13125 | SYSTEMS METHODS AND DEVICES FOR OPPORTUNISTIC NETWORKING                                                                             |        |               | CNT  | APP-Pending | US      | 15/708560     |              | US-2018-0006776-A1 |   |
| 13126 | SYSTEMS AND METHODS FOR JOINT HANDOVER OF USER EQUIPMENT AND SECONDARY CELL GROUP IN 3GPP LTE DUAL CONNECTIVITY                      |        |               | NP   | PAT-Active  | US      | 14/581689     | 9936427      | US-2015-0264621-A1 |   |
| 13127 | EFFICIENT COORDINATION BETWEEN A 3GPP NODE AND MTC DEVICES FOR COVERAGE ENHANCEMENT MODE                                             |        |               | NP   | PAT-Active  | US      | 14/582540     | 8708336      | US-2015-0264511-A1 |   |
| 13128 | UPLINK CHANNEL TRANSMISSION IN DUAL CONNECTIVITY                                                                                     |        |               | PCT  | PAT-Active  | US      | 15/254932     | #####        | US-2017-0222694-A1 |   |
| 13129 | UPLINK CHANNEL TRANSMISSION IN DUAL CONNECTIVITY                                                                                     |        |               | CNT  | APP-Pending | US      | 16/412299     |              |                    |   |
| 13130 | SYSTEMS METHODS AND DEVICES FOR DEVICE-TO-DEVICE COMMUNICATION MODE SELECTION                                                        |        |               | NP   | PAT-Active  | US      | 14/582911     | 8769644      | US-2015-0264677-A1 |   |
| 13131 | APPARATUSES SYSTEMS AND METHODS FOR MEASURING QUALITY OF CELL DISCOVERY SIGNAL                                                       |        |               | NP   | PAT-Active  | US      | 14/577419     | 9838951      | US-2015-0264636-A1 |   |
| 13132 | APPARATUSES SYSTEMS AND METHODS FOR MEASURING QUALITY OF CELL DISCOVERY SIGNAL                                                       |        |               | CNT  | PAT-Active  | US      | 15/798504     | #####        | US-2018-0049314-A1 |   |
| 13133 | CONVEYANCE OF APPLICATION COMMUNICATION PATTERNS FROM AN EXTERNAL APPLICATION SERVER TO A 3RD GENERATION PARTNERSHIP PROJECT SYSTEM  |        |               | NP   | PAT-Active  | US      | 14/583188     | 8894464      | US-2015-0264517-A1 |   |
| 13134 | METHOD OF PROCESSING RECEIVED DIGITIZED SIGNALS AND MOBILE RADIO COMMUNICATION TERMINAL DEVICE                                       |        |               | NP   | PAT-Active  | US      | 14/566736     | 9967807      | US-2016-0174138-A1 |   |
| 13135 | METHODS AND DEVICES FOR CHANNEL ESTIMATION AND OFDM RECEIVER                                                                         |        |               | NP   | PAT-Active  | US      | 14/692267     | 8806912      | US-2016-0315791-A1 |   |
| 13136 | FINE TIMING MEASUREMENT BURST MANAGEMENT                                                                                             |        |               | NP   | PAT-Active  | US      | 14/448805     | 9320009      | US-2015-0271776-A1 |   |
| 13137 | ENHANCED NODE B UE AND METHOD FOR SELECTING CELL DISCOVERY SIGNALS IN LTE NETWORKS                                                   |        |               | NP   | PAT-Active  | US      | 14/583281     | 9888430      | US-2015-0264638-A1 |   |
| 13138 | ENHANCED NODE B UE AND METHOD FOR SELECTING CELL DISCOVERY SIGNALS IN LTE NETWORKS                                                   |        |               | CNT  | APP-Pending | US      | 15/824121     |              | US-2018-0084458-A1 |   |
| 13139 | METHODS SYSTEMS AND DEVICES FOR MODULATION AND CODING SCHEME SIGNALING FOR COMMON CONTROL CHANNEL                                    |        |               | NP   | PAT-Active  | US      | 14/581619     | #####        | US-2015-0271606-A1 |   |
| 13140 | TECHNIQUES AND CONFIGURATIONS ASSOCIATED WITH OPERATION OF AN EVOLVED NODE B AT MULTIPLE COVERAGE ENHANCEMENT LEVELS                 |        |               | NP   | PAT-Active  | US      | 14/563923     | 9439084      | US-2015-0271686-A1 |   |
| 13141 | TECHNIQUES AND CONFIGURATIONS ASSOCIATED WITH OPERATION OF AN EVOLVED NODE B AT MULTIPLE COVERAGE ENHANCEMENT LEVELS                 |        |               | CNT  | PAT-Active  | US      | 15/230228     | #####        | US-2017-0034818-A1 |   |
| 13142 | APPARATUSES SYSTEMS AND METHODS FOR DIFFERENTIATION OF PAYLOAD SIZE FOR O2D DISCOVERY                                                |        |               | NP   | PAT-Active  | US      | 14/570457     | 9578484      | US-2015-0271657-A1 |   |
| 13143 | TECHNIQUES FOR COORDINATED APPLICATION OF WIRELESS NETWORK SELECTION AND TRAFFIC ROUTING RULES                                       |        |               | PCT  | APP-Pending | US      | 15/129372     |              | US-2017-0181070-A1 |   |

|       | A                                                                                                                          | B      | C             | D    | E          | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                      | FAMILY | FAMILY-MEMBER | TYPE | STATUS     | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13144 | REDUCTION OF USER PLANE CONGESTION                                                                                         |        |               | PCT  | PAT-Active | US      | 14/783043     | 9935694      | US-2016-093685-A1  |   |
| 13145 | SIGNALING MESSAGE SYNCHRONIZATION                                                                                          |        |               | NP   | PAT-Active | US      | 14/316412     | 9924521      | US-2015-029955-A1  |   |
| 13146 | USER EQUIPMENT AND EVOLVED NODE B SUPPORTING MACHINE TYPE COMMUNICATION AND SMALL DATA COMMUNICATION                       |        |               | NP   | PAT-Active | US      | 14/313818     | 9313812      | US-2015-029918-A1  |   |
| 13147 | APPARATUS SYSTEM AND METHOD OF STEERING DATA RADIO BEARER TRAFFIC TO A WIRELESS LOCAL AREA NETWORK LINK                    |        |               | NP   | PAT-Active | US      | 14/314256     | 9650794      | US-2015-004344-A1  |   |
| 13148 | METHOD APPARATUS AND SYSTEM FOR ELECTRICAL DOWNTILT ADJUSTMENT IN A MULTIPLE INPUT MULTIPLE OUTPUT SYSTEM                  |        |               | PCT  | PAT-Active | US      | 14/911262     | 9762306      | US-2016-019135-A1  |   |
| 13149 | SELECTING A RADIO NODE FOR DATA TRAFFIC OFFLOADING                                                                         |        |               | NP   | PAT-Active | US      | 14/338638     | 9554403      | US-2015-0025879-A1 |   |
| 13150 | COVERAGE EXTENSION LEVEL FOR COVERAGE LIMITED DEVICE                                                                       |        |               | NP   | PAT-Active | US      | 14/300837     | 9498995      | US-2015-0043445-A1 |   |
| 13151 | COVERAGE EXTENSION LEVEL FOR COVERAGE LIMITED DEVICE                                                                       |        |               | CNT  | PAT-Active | US      | 15/357032     | 9900786      | US-2017-0195127-A1 |   |
| 13152 | COVERAGE EXTENSION LEVEL FOR COVERAGE LIMITED DEVICE                                                                       |        |               | CNT  | PAT-Active | US      | 15/842528     | #####        | US-2018-0184306-A1 |   |
| 13153 | USER EQUIPMENT REALLOCATION BETWEEN NODES                                                                                  |        |               | NP   | PAT-Active | US      | 14/332561     | 9357513      | US-2015-0043404-A1 |   |
| 13154 | TECHNIQUES FOR DEVICE-TO-DEVICE COMMUNICATIONS                                                                             |        |               | NP   | PAT-Active | US      | 14/454639     | 9608710      | US-2015-0043398-A1 |   |
| 13155 | SIGNALING FOR PROXIMITY SERVICES AND O2D DISCOVERY IN AN LTE NETWORK                                                       |        |               | NP   | PAT-Active | US      | 14/314957     | 9788186      | US-2015-0043448-A1 |   |
| 13156 | SIGNALING FOR PROXIMITY SERVICES AND O2D DISCOVERY IN AN LTE NETWORK                                                       |        |               | CNT  | PAT-Active | US      | 15/186779     | #####        | US-2016-0392251-A1 |   |
| 13157 | SIGNALING RADIO BEARER OPTIMIZATIONS AND OTHER TECHNIQUES FOR SUPPORTING SMALL DATA TRANSMISSIONS                          |        |               | NP   | PAT-Active | US      | 14/318008     | 9681354      | US-2015-0043449-A1 |   |
| 13158 | POWER SAVING MODE OPTIMIZATIONS AND RELATED PROCEDURES                                                                     |        |               | NP   | PAT-Active | US      | 14/318085     | 9564958      | US-2015-0043403-A1 |   |
| 13159 | LICENSED SHARED ACCESS FOR LONG TERM EVOLUTION                                                                             |        |               | NP   | PAT-Active | US      | 14/280363     | 9374827      | US-2015-0134717-A1 |   |
| 13160 | REDUCED HANDOVER LATENCY FOR LICENSED SHARED ACCESS                                                                        |        |               | NP   | PAT-Active | US      | 14/280149     | 9563558      | US-2015-0334610-A1 |   |
| 13161 | ADAPTIVE QUALITY OF SERVICE FOR WIRELESS NETWORKS                                                                          |        |               | NP   | PAT-Active | US      | 14/293240     | 9615260      | US-2015-0350918-A1 |   |
| 13162 | IDLE MODE CELL SELECTION FOR LICENSED SHARED ACCESS                                                                        |        |               | NP   | PAT-Active | US      | 14/308427     | 9485664      | US-2015-0373552-A1 |   |
| 13163 | APPARATUS SYSTEM AND METHOD OF SELECTIVELY PROVIDING INTERNET PROTOCOL (IP) SESSION CONTINUITY                             |        |               | NP   | PAT-Active | US      | 14/316825     | #####        | US-2015-0025956-A1 |   |
| 13164 | TECHNIQUES FOR COMMUNICATION BETWEEN SERVICE CAPABILITY SERVER AND INTERWORKING FUNCTION FOR DEVICE TRIGGER RECALL/REPLACE |        |               | NP   | PAT-Active | US      | 14/488620     | 9391081      | US-2015-0195672-A1 |   |
| 13165 | TECHNIQUES FOR COMMUNICATION BETWEEN SERVICE CAPABILITY SERVER AND INTERWORKING FUNCTION FOR DEVICE TRIGGER RECALL/REPLACE |        |               | CNT  | PAT-Active | US      | 15/060120     | 9936026      | US-2016-0191630-A1 |   |
| 13166 | TECHNIQUES FOR COMMUNICATION BETWEEN SERVICE CAPABILITY SERVER AND INTERWORKING FUNCTION FOR DEVICE TRIGGER RECALL/REPLACE |        |               | CNT  | PAT-Active | US      | 15/872863     | #####        | US-2018-0295796-A1 |   |
| 13167 | TECHNIQUES FOR EFFICIENT SMALL CELL DISCOVERY                                                                              |        |               | NP   | PAT-Active | US      | 14/318452     | 9480007      | US-2015-0025919-A1 |   |
| 13168 | CONGESTION MEASUREMENT AND REPORTING FOR REAL-TIME DELAY-SENSITIVE APPLICATIONS                                            |        |               | NP   | PAT-Active | US      | 14/314850     | 9516541      | US-2015-0072171-A1 |   |

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| 2     | TITLE                                                                                              | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13169 | USER EQUIPMENT AND METHODS FOR FAST HANDOVER FAILURE RECOVERY IN 3GPP LTE NETWORK                  |        |               | NP   | PAT-Active  | US      | 14/279562     | 9258747      | US-2015-0978335-A1 |   |
| 13170 | COVERAGE EXTENSION LEVEL FOR COVERAGE LIMITED DEVICE                                               |        |               | NP   | PAT-Active  | US      | 14/311938     | 9374151      | US-2015-0043420-A1 |   |
| 13171 | COVERAGE EXTENSION LEVEL FOR COVERAGE LIMITED DEVICE                                               |        |               | CNT  | PAT-Active  | US      | 15/186832     | #####        | US-2016-0392548-A1 |   |
| 13172 | USER EQUIPMENT AND METHOD FOR PACKET BASED DEVICE-TO-DEVICE (D2D) DISCOVERY IN AN LTE NETWORK      |        |               | NP   | PAT-Active  | US      | 14/280799     | 9326122      | US-2015-0045016-A1 |   |
| 13173 | USER EQUIPMENT AND METHOD FOR PACKET BASED DEVICE-TO-DEVICE (D2D) DISCOVERY IN AN LTE NETWORK      |        |               | CNT  | PAT-Active  | US      | 15/096504     | 9860732      | US-2016-0337835-A1 |   |
| 13174 | EARLY TTT TERMINATION                                                                              |        |               | PCT  | APP-Pending | US      | 14/912588     |              | US-2016-0205601-A1 |   |
| 13175 | DEVICES AND METHODS FOR SENDING OR RECEIVING ASSISTANCE DATA                                       |        |               | PCT  | APP-Pending | US      | 14/912587     |              | US-2016-0205651-A1 |   |
| 13176 | DRX OPERATION FOR UL/DL RECONFIGURATION                                                            |        |               | NP   | PAT-Active  | US      | 14/316188     | 9264933      | US-2015-0078349-A1 |   |
| 13177 | DRX OPERATION FOR UL/DL RECONFIGURATION                                                            |        |               | CNT  | PAT-Active  | US      | 14/991696     | 8867078      | US-2016-0128131-A1 |   |
| 13178 | DRX OPERATION FOR UL/DL RECONFIGURATION                                                            |        |               | CNT  | PAT-Active  | US      | 15/659425     | #####        | US-2017-0332271-A1 |   |
| 13179 | HIGH-SPEED DIGITAL SIGNAL PROCESSING SYSTEMS                                                       |        |               | NP   | PAT-Active  | US      | 14/575939     | 9337874      |                    |   |
| 13180 | FREQUENCY GENERATOR METHOD AND COMPUTER PROGRAM                                                    |        |               | NP   | PAT-Active  | US      | 14/861056     | 9748936      | US-2016-0182026-A1 |   |
| 13181 | COMMUNICATIONS IN AN AD-HOC MULTICAST NETWORK                                                      |        |               | PCT  | PAT-Active  | US      | 14/892158     | #####        | US-2016-0113036-A1 |   |
| 13182 | ENABLING DIRECT TRANSPORT LAYER CONNECTIVITY                                                       |        |               | NP   | PAT-Active  | US      | 14/332533     | 9426836      | US-2015-0029936-A1 |   |
| 13183 | USER EQUIPMENT DISTRIBUTION INFORMATION COLLECTION                                                 |        |               | NP   | PAT-Active  | US      | 14/451894     | 9398465      | US-2015-0045043-A1 |   |
| 13184 | USER EQUIPMENT DISTRIBUTION INFORMATION COLLECTION                                                 |        |               | CNT  | PAT-Active  | US      | 15/088959     | 9918298      | US-2016-0219445-A1 |   |
| 13185 | DELIVERY OF TARGETED MEDIA CONTENT                                                                 |        |               | NP   | PAT-Active  | US      | 14/487349     | 9796443      | US-2015-0081951-A1 |   |
| 13186 | DELIVERY OF TARGETED MEDIA CONTENT                                                                 |        |               | CNT  | PAT-Active  | US      | 15/613785     | #####        | US-2017-0272963-A1 |   |
| 13187 | TRANSMISSION OF PHYSICAL BROADCAST CHANNEL (PBCH) CONTENTS                                         |        |               | NP   | PAT-Active  | US      | 14/316180     | 9386476      | US-2015-0078348-A1 |   |
| 13188 | TRANSMISSION OF PHYSICAL BROADCAST CHANNEL (PBCH) CONTENTS                                         |        |               | CNT  | PAT-Active  | US      | 15/202164     | #####        | US-2016-0315739-A1 |   |
| 13189 | TRANSMISSION OF PHYSICAL BROADCAST CHANNEL (PBCH) CONTENTS                                         |        |               | CNT  | APP-Pending | US      | 16/153584     |              | US-2019-0053093-A1 |   |
| 13190 | REDUCTION OF PACKET RETRANSMISSIONS IN DUAL CONNECTIVITY SYSTEMS                                   |        |               | NP   | PAT-Active  | US      | 14/317837     | 9462629      | US-2015-0085646-A1 |   |
| 13191 | SYSTEMS METHODS AND DEVICES FOR DEVICE-TO-DEVICE DISCOVERY                                         |        |               | NP   | PAT-Active  | US      | 14/316156     | 9504088      | US-2015-0085764-A1 |   |
| 13192 | SYSTEMS METHODS AND DEVICES WITH DIFFERENT RADIO LINK FAILURE TIMERS BASED ON USER EQUIPMENT SPEED |        |               | NP   | PAT-Active  | US      | 14/317184     | 9258725      | US-2015-0087317-A1 |   |
| 13193 | SYSTEMS METHODS AND DEVICES WITH DIFFERENT RADIO LINK FAILURE TIMERS BASED ON USER EQUIPMENT SPEED |        |               | CNT  | PAT-Active  | US      | 14/986245     | 9420627      | US-2016-0128134-A1 |   |
| 13194 | EMERGENCY CALL HANDLING                                                                            |        |               | NP   | PAT-Active  | US      | 14/495468     | 9615234      | US-2015-0111517-A1 |   |

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| 2     | TITLE                                                                                           | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13195 | EMERGENCY CALL HANDLING                                                                         |        |               | CNT  | PAT-Active  | US      | 15/477725     | #####        | US-2017-0208180-A1 |   |
| 13196 | MITIGATION OF TRAFFIC CONGESTION IN DUAL CONNECTIVITY SYSTEMS                                   |        |               | NP   | PAT-Active  | US      | 14/317900     | 9560684      | US-2015-0085667-A1 |   |
| 13197 | BEARER SPLIT RATION FOR DUAL CONNECTIVITY SYSTEMS                                               |        |               | NP   | PAT-Active  | US      | 14/496152     | 9572185      | US-2015-0085800-A1 |   |
| 13198 | HARD TIMELINES FOR TDD-FDD CARRIER AGGREGATION                                                  |        |               | NP   | PAT-Active  | US      | 14/318143     | 9538565      | US-2015-0085713-A1 |   |
| 13199 | SYSTEMS METHODS AND DEVICES TO SUPPORT INTRA-APPLICATION FLOW PRIORITIZATION                    |        |               | NP   | PAT-Active  | US      | 14/316819     | 9917786      | US-2015-0381592-A1 |   |
| 13200 | SYSTEMS METHODS AND DEVICES TO SUPPORT INTRA-APPLICATION FLOW PRIORITIZATION                    |        |               | CNT  | PAT-Active  | US      | 15/880213     | #####        | US-2018-0152388-A1 |   |
| 13201 | SCHEDULING IN A MULTIPLE USER MULTIPLE-INPUT AND MULTIPLE OUTPUT COMMUNICATIONS NETWORK         |        |               | NP   | PAT-Active  | US      | 14/494857     | 9698889      | US-2016-0088648-A1 |   |
| 13202 | SYSTEMS METHODS AND DEVICES FOR CONTROLLING TRANSPORT OF RATELESSLY CODED MESSAGES              |        |               | NP   | PAT-Active  | US      | 14/316929     | 9615395      | US-2015-0146815-A1 |   |
| 13203 | SYSTEMS METHODS AND DEVICES FOR EFFICIENT DEVICE-TO-DEVICE CHANNEL CONTENTION                   |        |               | NP   | PAT-Active  | US      | 14/316175     | 9572371      | US-2015-0117332-A1 |   |
| 13204 | METRICS FOR TRAFFIC STEERING IN A WIRELESS NETWORK                                              |        |               | NP   | PAT-Active  | US      | 14/339710     | 9479915      | US-2015-0111569-A1 |   |
| 13205 | METRICS FOR TRAFFIC STEERING IN A WIRELESS NETWORK                                              |        |               | CNT  | PAT-Active  | US      | 15/272383     | #####        | US-2017-0013496-A1 |   |
| 13206 | USER EQUIPMENT POSITIONING IN LONG-TERM EVOLUTION COORDINATED MULTIPPOINT COMMUNICATION SYSTEMS |        |               | PCT  | APP-Pending | US      | 15/301352     |              | US-2017-0164143-A1 |   |
| 13207 | FEEDBACK CONTROL DURING PLANNED GAPS IN DATA STREAMS                                            |        |               | NP   | PAT-Active  | US      | 14/315201     | 9590787      | US-2015-0381332-A1 |   |
| 13208 | TCP TRAFFIC ADAPTATION IN WIRELESS SYSTEMS                                                      |        |               | NP   | PAT-Active  | US      | 14/314387     | 9661657      | US-2015-0146614-A1 |   |
| 13209 | GENERATION OF RANDOM ACCESS PREAMBLES                                                           |        |               | NP   | PAT-Active  | US      | 14/317450     | 9730114      | US-2015-0078264-A1 |   |
| 13210 | THROUGHPUT CHARACTERIZATION                                                                     |        |               | PCT  | PAT-Active  | US      | 14/779243     | 9800486      | US-2016-0090131-A1 |   |
| 13211 | SYSTEM AND METHOD FOR GENERATING A DATA DEPENDENT CLOCK FOR A DAC IN A MODULATOR                |        |               | NP   | PAT-Active  | US      | 14/303945     | 9197258      | US-2015-0365113-A1 |   |
| 13212 | PHASE TRACKER FOR A PHASE LOCKED LOOP                                                           |        |               | NP   | PAT-Active  | US      | 14/494718     | 9584135      | US-2016-0087639-A1 |   |
| 13213 | HIGH-ORDER SIGMA DELTA FOR A DIVIDER-LESS DIGITAL PHASE-LOCKED LOOP                             |        |               | NP   | PAT-Active  | US      | 14/317435     | 9571107      | US-2015-0381188-A1 |   |
| 13214 | DIGITAL-TO-TIME CONVERTER SPUR REDUCTION                                                        |        |               | NP   | PAT-Active  | US      | 14/318829     | 9768809      | US-2015-0381214-A1 |   |
| 13215 | APPARATUS AND METHODS FOR A CAPACITIVE DIGITAL-TO-ANALOG CONVERTER BASED POWER AMPLIFIER        |        |               | NP   | PAT-Active  | US      | 14/570879     | 9525381      | US-2016-0173032-A1 |   |
| 13216 | COARSE TUNING SELECTION FOR PHASE LOCKED LOOPS                                                  |        |               | NP   | PAT-Active  | US      | 14/578773     | 9548746      | US-2016-0182065-A1 |   |
| 13217 | LOAD BALANCING IN A WIRELESS CELLULAR NETWORK BASED ON USER EQUIPMENT MOBILITY                  |        |               | NP   | PAT-Active  | US      | 14/535651     | 9736705      | US-2015-0312826-A1 |   |
| 13218 | NON-ORTHOGONAL MULTIPLE ACCESS (NOMA) WIRELESS SYSTEMS AND METHODS                              |        |               | NP   | PAT-Active  | US      | 14/632291     | #####        | US-2015-0312974-A1 |   |
| 13219 | METHOD APPARATUS AND SYSTEM FOR MEASURING A POSITION OF A USER EQUIPMENT IN A WIRELESS NETWORK  |        |               | PCT  | PAT-Active  | US      | 15/125561     | #####        | US-2017-0223655-A1 |   |

|       | A                                                                                                   | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                               | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13220 | USER EQUIPMENT AND METHODS FOR MEASUREMENT OF REFERENCE SIGNAL RECEIVED QUALITY                     |        |               | NP   | PAT-Active  | US      | 14/571053     | 9713049      | US-2015-0312817-A1 |   |
| 13221 | USER EQUIPMENT AND METHODS FOR MEASUREMENT OF REFERENCE SIGNAL RECEIVED QUALITY                     |        |               | CNT  | PAT-Active  | US      | 15/639547     | #####        | US-2017-0311215-A1 |   |
| 13222 | LISTEN BEFORE TALK PROTOCOL SELECTION                                                               |        |               | PCT  | PAT-Active  | US      | 15/124953     | #####        | US-2017-0304851-A1 |   |
| 13223 | CHANNEL RESERVATION FOR OPERATION IN AN UNLICENSED SPECTRUM                                         |        |               | NP   | PAT-Active  | US      | 14/543670     | 8794821      | US-2015-0312793-A1 |   |
| 13224 | USER EQUIPMENT AND METHODS FOR HANDOVER USING MEASUREMENT REPORTING BASED ON MULTIPLE EVENTS        |        |               | NP   | PAT-Active  | US      | 14/578861     | 9560560      | US-2015-0312818-A1 |   |
| 13225 | UE ENB AND METHOD FOR CHANNEL ACCESS PRIORITY FOR DISTRIBUTED D2D                                   |        |               | NP   | PAT-Active  | US      | 14/572309     | 9398484      | US-2015-0312915-A1 |   |
| 13226 | STORING A VALUE OF A COUNTER FOR A WIRELESS LOCAL AREA NETWORK                                      |        |               | NP   | PAT-Active  | US      | 14/575876     | 9698669      | US-2015-0308853-A1 |   |
| 13227 | STORING A VALUE OF A COUNTER FOR A WIRELESS LOCAL AREA NETWORK                                      |        |               | CNT  | PAT-Active  | US      | 15/601786     | #####        | US-2017-0257783-A1 |   |
| 13228 | SIMULTANEOUS SCHEDULING REQUEST TRANSMISSION IN DUAL CONNECTIVITY                                   |        |               | NP   | PAT-Active  | US      | 14/696587     | 8867207      | US-2015-0312930-A1 |   |
| 13229 | REFERENCE SIGNAL ENHANCEMENT FOR SHARED CELL                                                        |        |               | NP   | PAT-Active  | US      | 14/555255     | #####        | US-2015-0270936-A1 |   |
| 13230 | REFERENCE SIGNAL ENHANCEMENT FOR SHARED CELL                                                        |        |               | CNT  | PAT-Active  | US      | 15/392826     | #####        | US-2017-0111150-A1 |   |
| 13231 | APPARATUS AND METHODS FOR REDUCING SOFT BUFFER SIZE IN MTC DEVICES                                  |        |               | NP   | PAT-Active  | US      | 14/582512     | 9654584      | US-2015-0312371-A1 |   |
| 13232 | APPARATUS AND METHODS FOR REDUCING SOFT BUFFER SIZE IN MTC DEVICES                                  |        |               | DEV  | PAT-Active  | US      | 15/484898     | 9918184      | US-2017-023480-A1  |   |
| 13233 | APPARATUS METHOD AND SYSTEM OF ESTABLISHING A CONNECTION BETWEEN A CELLULAR NODE AND A CORE NETWORK |        |               | NP   | PAT-Active  | US      | 14/582879     | 9467926      | US-2015-0312841-A1 |   |
| 13234 | RADIO COMMUNICATION DEVICE AND METHOD FOR OPERATION THEREOF                                         |        |               | NP   | PAT-Active  | US      | 14/571414     | 9980313      | US-2016-0174289-A1 |   |
| 13235 | SYSTEMS METHODS AND DEVICES FOR PRIORITIZING INTER-FREQUENCY MEASUREMENTS                           |        |               | NP   | PAT-Active  | US      | 14/583263     | 9743289      | US-2015-0327286-A1 |   |
| 13236 | DEMODULATION REFERENCE SIGNAL (DMRS) SEQUENCE DESIGN FOR DEVICE-TO-DEVICE (D2D) DISCOVERY           |        |               | CNT  | APP-Pending | US      | 15/791308     |              | US-2018-0109938-A1 |   |
| 13237 | SYSTEMS METHODS AND DEVICES FOR CELL SELECTION BASED ON PRIORITIZED MODES                           |        |               | NP   | PAT-Active  | US      | 14/580779     | 9398500      | US-2015-0327133-A1 |   |
| 13238 | TENTATIVE GRANT FOR EFFICIENT DEVICE-TO- DEVICE COMMUNICATIONS                                      |        |               | NP   | PAT-Active  | US      | 14/581770     | 9860906      | US-2015-0327296-A1 |   |
| 13239 | SYSTEMS AND METHODS FOR IN-DEVICE CO-EXISTENCE INTERFERENCE AVOIDANCE FOR DUAL CONNECTIVITY         |        |               | NP   | PAT-Active  | US      | 14/582777     | 9503485      | US-2015-0327280-A1 |   |
| 13240 | SYSTEMS METHODS AND DEVICES FOR SYNCHRONIZATION SOURCE SELECTION FOR DEVICE-TO-DEVICE COMMUNICATION |        |               | NP   | APP-Pending | US      | 14/582580     |              | US-2015-0327201-A1 |   |
| 13241 | LAWFUL INTERCEPT REPORTING IN WIRELESS NETWORKS USING PUBLIC SAFETY RELAYS                          |        |               | NP   | APP-Pending | US      | 14/671728     |              | US-2018-0326302-A1 |   |
| 13242 | MOBILITY MANAGEMENT ENTITY USER EQUIPMENT AND METHODS FOR MACHINE TYPE COMMUNICATION                |        |               | NP   | PAT-Active  | US      | 14/571025     | 9603186      | US-2015-0327327-A1 |   |
| 13243 | TECHNIQUES TO MANAGE RADIO FREQUENCY CHAINS                                                         |        |               | NP   | PAT-Active  | US      | 14/581889     | 9729175      | US-2015-0327103-A1 |   |
| 13244 | PRIORITIZED CELL IDENTIFICATION AND MEASUREMENT METHOD                                              |        |               | PCT  | PAT-Active  | US      | 15/122495     | 9843956      | US-2017-0072904-A1 |   |



|       | A                                                                                                                                                         | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                     | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13245 | PRIORITIZED CELL IDENTIFICATION AND MEASUREMENT METHOD                                                                                                    |        |               | CNT  | PAT-Pending | US      | 15/827221     |              | US-2018-0981996-A1 |   |
| 13246 | USER EQUIPMENT AND METHODS TO INDICATE POWER SAVING MODE CONFIGURATION TO RAN NODES                                                                       |        |               | PCT  | PAT-Active  | US      | 15/115770     | 9877236      | US-2017-0913515-A1 |   |
| 13247 | APPARATUS SYSTEM AND METHOD OF COMMUNICATING WIRELESS LOCAL AREA NETWORK (WLAN) OFFLOADING INFORMATION BETWEEN CELLULAR MANAGERS                          |        |               | NP   | PAT-Active  | US      | 14/562730     | 9538418      | US-2015-0327117-A1 |   |
| 13248 | SYSTEMS METHODS AND DEVICES FOR FLEXIBLE RETRANSMISSIONS                                                                                                  |        |               | NP   | PAT-Active  | US      | 14/582492     | 9725283      | US-2015-0327275-A1 |   |
| 13249 | SYSTEMS DEVICES AND METHODS FOR INTERWORKING BETWEEN A UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM (UMTS) NETWORK AND A WIRELESS LOCAL AREA NETWORK (WLAN) |        |               | NP   | PAT-Active  | US      | 14/583057     | 9877256      | US-2015-0273729-A1 |   |
| 13250 | SYSTEMS DEVICES AND METHODS FOR INTERWORKING BETWEEN A UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM (UMTS) NETWORK AND A WIRELESS LOCAL AREA NETWORK (WLAN) |        |               | CNT  | PAT-Active  | US      | 15/822368     | #####        | US-2018-0776223-A1 |   |
| 13251 | SYSTEMS DEVICES AND METHODS FOR LONG TERM EVOLUTION AND WIRELESS LOCAL AREA INTERWORKING                                                                  |        |               | NP   | PAT-Active  | US      | 14/583027     | 9467921      | US-2015-0327129-A1 |   |
| 13252 | SYSTEMS DEVICES AND METHODS FOR LONG TERM EVOLUTION AND WIRELESS LOCAL AREA INTERWORKING                                                                  |        |               | CNT  | PAT-Active  | US      | 15/260920     | 8994586      | US-2016-0381617-A1 |   |
| 13253 | SYSTEMS DEVICES AND METHODS FOR LONG TERM EVOLUTION AND WIRELESS LOCAL AREA INTERWORKING                                                                  |        |               | CNT  | PAT-Active  | US      | 15/820280     | #####        | US-2018-0776222-A1 |   |
| 13254 | METHOD FOR DETERMINING A CHANNEL ESTIMATE AND COMMUNICATION DEVICE                                                                                        |        |               | NP   | PAT-Active  | US      | 14/495908     | 9313002      |                    |   |
| 13255 | COMMUNICATION DEVICE AND METHOD FOR TRANSMITTING DATA IN ACCORDANCE WITH A RETRANSMISSION PROTOCOL                                                        |        |               | NP   | PAT-Active  | US      | 14/314542     | #####        | US-2015-0381321-A1 |   |
| 13256 | APPARATUS AND METHOD FOR PROVIDING OSCILLATOR SIGNALS                                                                                                     |        |               | NP   | PAT-Active  | US      | 14/580952     | 9484854      | US-2016-0156310-A1 |   |
| 13257 | TRAFFIC ENGINEERING IN HETEROGENEOUS MILLIMETER-WAVE AND LTE SMALL CELL SYSTEMS                                                                           |        |               | NP   | PAT-Active  | US      | 14/577766     | 9713129      | US-2016-0183242-A1 |   |
| 13258 | USER EQUIPMENT AND PROTOCOL AND METHODS FOR DEVICE-TO-DEVICE COMMUNICATION                                                                                |        |               | PCT  | PAT-Active  | US      | 14/914331     | 9985447      | US-2016-0234702-A1 |   |
| 13259 | USER EQUIPMENT AND PROTOCOL AND METHODS FOR DEVICE-TO-DEVICE COMMUNICATION                                                                                |        |               | CNT  | PAT-Active  | US      | 15/858429     | #####        | US-2018-0192309-A1 |   |
| 13260 | USER EQUIPMENT AND MOBILITY MANAGEMENT ENTITY AND METHODS FOR PERIODIC UPDATE IN CELLULAR NETWORKS                                                        |        |               | PCT  | PAT-Active  | US      | 14/916843     | #####        | US-2016-0255602-A1 |   |
| 13261 | CIRCUIT SWITCHED FALL BACK IMPROVEMENTS                                                                                                                   |        |               | NP   | PAT-Active  | US      | 14/472569     | 9749905      | US-2016-0066218-A1 |   |
| 13262 | METHODS FOR APERIODIC CSI REPORT TRIGGERING FOR FLEXIBLE SUBFRAMES IN LTE TDD EIMTA SYSTEMS WITH DYNAMIC UL-DL RECONFIGURATION                            |        |               | PCT  | PAT-Active  | US      | 14/583595     | #####        | US-2016-0381587-A1 |   |
| 13263 | COMMUNICATION SYSTEMS AND METHODS                                                                                                                         |        |               | NP   | PAT-Active  | US      | 14/697360     | #####        | US-2015-0350992-A1 |   |
| 13264 | RADIO RESOURCE CONTROL (RRC) PROTOCOL FOR INTEGRATED WLAN/3GPP RADIO ACCESS TECHNOLOGIES                                                                  |        |               | NP   | PAT-Active  | US      | 14/583222     | 9609566      | US-2015-0350988-A1 |   |
| 13265 | INTERWORKING/CO-EXISTENCE OF INTEGRATED WLAN/3GPP RAT ARCHITECTURES WITH LEGACY WLAN/3GPP INTERWORKING SOLUTIONS                                          |        |               | NP   | PAT-Active  | US      | 14/583336     | #####        | US-2015-0350989-A1 |   |
| 13266 | IN-BAND CONTROL SIGNALING FOR INTEGRATED WLAN/3GPP RAT ARCHITECTURES                                                                                      |        |               | NP   | PAT-Active  | US      | 14/583347     | 9860872      | US-2015-0351079-A1 |   |
| 13267 | AUTONOMOUS ENHANCED NODE B                                                                                                                                |        |               | NP   | PAT-Active  | US      | 14/318351     | 9888376      | US-2015-0195796-A1 |   |
| 13268 | METHOD AND ENHANCED NODE B FOR GEOGRAPHIC BIN DATA COLLECTION AND REPORTING                                                                               |        |               | NP   | PAT-Active  | US      | 14/318076     | 9510314      | US-2015-0185805-A1 |   |

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| 2     | TITLE                                                                                                                    | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13269 | TRAJECTORY MODIFICATION TECHNIQUE FOR POLAR TRANSMITTER                                                                  |        |               | NP   | PAT-Active  | US      | 14/496519     | 9425834      | US-2016-0984251-A1 |   |
| 13270 | TRAJECTORY MODIFICATION TECHNIQUE FOR POLAR TRANSMITTER                                                                  |        |               | DIY  | PAT-Active  | US      | 15/243132     | #####        | US-2017-0247955-A1 |   |
| 13271 | TRAJECTORY MODIFICATION TECHNIQUE FOR POLAR TRANSMITTER                                                                  |        |               | ENT  | APP-Pending | US      | 16/134210     |              | US-2019-0260404-A1 |   |
| 13272 | USER EQUIPMENT (UE) SUPPORTING PACKET-SWITCHED EMERGENCY CALLS OVER IP MULTIMEDIA SUBSYSTEM (IMS)                        |        |               | NP   | PAT-Active  | US      | 14/340936     | 9633530      | US-2015-0105965-A1 |   |
| 13273 | CONTROLLING SUBSCRIBER IDENTITY MODULE (SIM) ACTIVE STATE IN A MULTIPLE SIMs RADIO                                       |        |               | NP   | PAT-Active  | US      | 14/517868     | 9461695      | US-2016-0112064-A1 |   |
| 13274 | COMMUNICATION TERMINAL AND METHOD FOR CONTROLLING A DATA TRANSMISSION                                                    |        |               | NP   | PAT-Active  | US      | 14/472396     | 9716667      | US-2016-0066335-A1 |   |
| 13275 | WIRELESS FIDELITY (WI-FI) CLEAR CHANNEL ASSESSMENT (CCA) DETECTION AND TRANSMISSION DECISION MAKING IN A PORTABLE DEVICE |        |               | NP   | PAT-Active  | US      | 14/757315     | 9673921      | US-2017-0187473-A1 |   |
| 13276 | APPARATUS METHOD AND SYSTEM OF CONTROLLING COMMUNICATIONS OF A MULTIRADIO DEVICE                                         |        |               | NP   | PAT-Active  | US      | 14/472464     | 9532370      | US-2016-0086339-A1 |   |
| 13277 | USER EQUIPMENT AND METHODS FOR CSI ENHANCEMENTS USING INTERFERENCE CANCELLATION AND SUPPRESSION RECEIVERS                |        |               | NP   | PAT-Active  | US      | 14/573164     | 8590713      | US-2015-0373732-A1 |   |
| 13278 | LTE-LI COMMUNICATION DEVICES AND METHODS FOR APERIODIC BEACON AND REFERENCE SIGNAL TRANSMISSION                          |        |               | NP   | PAT-Active  | US      | 14/669366     | #####        | US-2015-0373674-A1 |   |
| 13279 | COMMUNICATION SYSTEMS AND METHODS                                                                                        |        |               | NP   | PAT-Active  | US      | 14/581938     | 9680678      | US-2015-0373682-A1 |   |
| 13280 | GROUP CARRIER SCHEDULING FOR UNLICENSED LONG TERM EVOLUTION NETWORK                                                      |        |               | NP   | PAT-Active  | US      | 14/575866     | 9603164      | US-2016-0007373-A1 |   |
| 13281 | GROUP CARRIER SCHEDULING FOR UNLICENSED LONG TERM EVOLUTION NETWORK                                                      |        |               | ENT  | PAT-Active  | US      | 15/463400     | #####        | US-2017-0213727-A1 |   |
| 13282 | SYSTEM AND METHOD ON MEASUREMENT REPORT FOR LTE UNLICENSED SYSTEM                                                        |        |               | PSP  | APP-Closed  | US      | 62/020316     |              |                    |   |
| 13283 | METHOD APPARATUS AND SYSTEM FOR USING A USER EQUIPMENT AS A SMALL EVOLVED NODEB FOR A SMALL CELL                         |        |               | PCT  | PAT-Active  | US      | 15/511571     | #####        | US-2017-0302763-A1 |   |
| 13284 | PREVENTING A MOBILE DEVICE FROM REPEATING A REQUEST TOWARD A MOBILE NETWORK                                              |        |               | PCT  | PAT-Active  | US      | 15/112116     | 9900828      | US-2016-0345243-A1 |   |
| 13285 | PREVENTING A MOBILE DEVICE FROM REPEATING A REQUEST TOWARD A MOBILE NETWORK                                              |        |               | ENT  | PAT-Active  | US      | 15/816472     | #####        | US-2018-0082570-A1 |   |
| 13286 | AN APPARATUS AND METHOD ENHANCING QUALITY OF SERVICE ARCHITECTURE FOR LTE                                                |        |               | PCT  | PAT-Active  | US      | 15/900817     | #####        | US-2017-0195227-A1 |   |
| 13287 | TECHNIQUES FOR SECURELY RECEIVING CRITICAL COMMUNICATION CONTENT ASSOCIATED WITH A CRITICAL COMMUNICATION SERVICE        |        |               | NP   | PAT-Active  | US      | 14/670233     | #####        | US-2016-0344726-A1 |   |
| 13288 | SYSTEMS AND METHODS FOR ADJUSTING WIRELESS SCAN RATES                                                                    |        |               | NP   | PAT-Active  | US      | 14/498961     | 9654915      | US-2016-0094939-A1 |   |
| 13289 | SYSTEMS AND METHODS FOR ADJUSTING WIRELESS SCAN RATES                                                                    |        |               | ENT  | APP-Pending | US      | 15/591851     |              | US-2017-0374590-A1 |   |
| 13290 | METHOD AND SYSTEM OF ADVANCED INTERFERENCE CANCELLATION ON PDSCH AT THE UE                                               |        |               | PCT  | PAT-Active  | US      | 14/903575     | #####        | US-2016-0173262-A1 |   |
| 13291 | METHOD AND APPARATUS FOR VOICE DATA TRANSMISSION                                                                         |        |               | PCT  | APP-Pending | US      | 15/505542     |              | US-2017-0286389-A1 |   |
| 13292 | CONTENT ACCESS AUTHENTICATION FOR DYNAMIC ADAPTIVE STREAMING OVER HYPERTEXT TRANSFER PROTOCOL                            |        |               | NP   | PAT-Active  | US      | 14/487714     | 9497180      | US-2015-0113804-A1 |   |
| 13293 | CONTENT ACCESS AUTHENTICATION FOR DYNAMIC ADAPTIVE STREAMING OVER HYPERTEXT TRANSFER PROTOCOL                            |        |               | ENT  | PAT-Active  | US      | 15/335307     | 8980136      | US-2017-0303121-A1 |   |

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| 2     | TITLE                                                                                                                                                     | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13294 | RADIO LINK FAILURE HANDLING FOR DUAL CONNECTIVITY                                                                                                         |        |               | NP   | PAT-Active  | US      | 14/491639     | 9674852      | US-2015-0117183-A1 |   |
| 13295 | RADIO LINK FAILURE HANDLING FOR DUAL CONNECTIVITY                                                                                                         |        |               | ENT  | PAT-Active  | US      | 15/614208     | #####        | US-2017-0273095-A1 |   |
| 13296 | RADIO LINK FAILURE HANDLING FOR DUAL CONNECTIVITY                                                                                                         |        |               | ENT  | PAT-Active  | US      | 16/008019     | #####        | US-2018-0288778-A1 |   |
| 13297 | CELLULAR UP-LINK HARMONIC SPURS MITIGATION IN WI-FI AND BLUETOOTH RECEIVERS                                                                               |        |               | NP   | PAT-Active  | US      | 14/571827     | 9369217      | US-2016-0173209-A1 |   |
| 13298 | DIGITAL TO ANALOG CONVERTER CIRCUITS APPARATUS AND METHOD FOR GENERATING A HIGH FREQUENCY TRANSMISSION SIGNAL AND METHODS OF DIGITAL TO ANALOG CONVERSION |        |               | NP   | PAT-Active  | US      | 14/835033     | 9571120      | US-2016-0094235-A1 |   |
| 13299 | NETWORK MANAGEMENT                                                                                                                                        |        |               | PCT  | PAT-Active  | US      | 14/903576     | #####        | US-2016-0156440-A1 |   |
| 13300 | RESOURCE SELECTION IN DEVICE TO DEVICE COMMUNICATION                                                                                                      |        |               | PCT  | PAT-Active  | US      | 15/023069     | #####        | US-2016-0234853-A1 |   |
| 13301 | CONTENT DISTRIBUTION                                                                                                                                      |        |               | NP   | PAT-Active  | US      | 14/499029     | 9912985      | US-2016-0094872-A1 |   |
| 13302 | WIRELESS LOCAL AREA NETWORK (WLAN) CONNECTIVITY OPTION DISCOVERY                                                                                          |        |               | NP   | PAT-Active  | US      | 14/485902     | #####        | US-2015-0117423-A1 |   |
| 13303 | WIRELESS LOCAL AREA NETWORK (WLAN) CONNECTIVITY OPTION DISCOVERY                                                                                          |        |               | ENT  | APP-Pending | US      | 16/444416     |              | US-2019-0306868-A1 |   |
| 13304 | SYMBOL CONSTELLATION DESIGN                                                                                                                               |        |               | NP   | PAT-Active  | US      | 14/573984     | 9584351      | US-2016-0182267-A1 |   |
| 13305 | HANDOVER AT SPECTRUM RELEASE FOR LICENSED SHARED ACCESS                                                                                                   |        |               | NP   | PAT-Active  | US      | 14/495517     | 9538431      | US-2016-0088533-A1 |   |
| 13306 | HANDOVER AT SPECTRUM RELEASE FOR LICENSED SHARED ACCESS                                                                                                   |        |               | ENT  | PAT-Active  | US      | 15/384537     | #####        | US-2017-0295525-A1 |   |
| 13307 | PRINCIPAL EIGEN BEAM QUANTIZATION FOR MIMO SYSTEMS                                                                                                        |        |               | NP   | PAT-Active  | US      | 14/798820     | 9906280      | US-2016-0013838-A1 |   |
| 13308 | DEVICES FOR PACKET SYSTEM BEARER SPLITTING                                                                                                                |        |               | PCT  | PAT-Active  | US      | 15/121709     | #####        | US-2016-0366813-A1 |   |
| 13309 | EVOLVED NODE-B AND METHODS FOR SUPPORTING CO-EXISTENCE WITH WI-FI NETWORKS IN AN UNLICENSED FREQUENCY BAND                                                |        |               | NP   | PAT-Active  | US      | 14/473008     | 9801207      | US-2015-0146645-A1 |   |
| 13310 | SIGNAL DESIGNS FOR D2D SUBFRAMES                                                                                                                          |        |               | NP   | PAT-Active  | US      | 14/498276     | 9681487      | US-2015-0146647-A1 |   |
| 13311 | SIGNAL DESIGNS FOR D2D SUBFRAMES                                                                                                                          |        |               | ENT  | PAT-Active  | US      | 15/492844     | #####        | US-2017-0273106-A1 |   |
| 13312 | SIGNAL DESIGNS FOR D2D SUBFRAMES                                                                                                                          |        |               | ENT  | APP-Pending | US      | 15/408378     |              |                    |   |
| 13313 | ABORTING AN EXTENDED SERVICE REQUEST PROCEDURE                                                                                                            |        |               | PCT  | APP-Pending | US      | 15/325398     |              | US-2017-0202049-A1 |   |
| 13314 | RADIO LINK MONITORING                                                                                                                                     |        |               | NP   | PAT-Active  | US      | 14/498993     | 9974095      | US-2015-0146562-A1 |   |
| 13315 | RADIO LINK MONITORING                                                                                                                                     |        |               | ENT  | PAT-Active  | US      | 15/826730     | #####        | US-2018-0160450-A1 |   |
| 13316 | APPARATUS SYSTEM AND METHOD OF PROVIDING OFFLOADABILITY INFORMATION TO A USER-EQUIPMENT (UE)                                                              |        |               | NP   | PAT-Active  | US      | 14/492035     | 9906963      | US-2015-0195743-A1 |   |
| 13317 | APPARATUS SYSTEM AND METHOD OF PROVIDING OFFLOADABILITY INFORMATION TO A USER-EQUIPMENT (UE)                                                              |        |               | ENT  | PAT-Active  | US      | 14/871499     | 9820187      | US-2016-0021570-A1 |   |
| 13318 | APPARATUS SYSTEM AND METHOD OF PROVIDING OFFLOADABILITY INFORMATION TO A USER-EQUIPMENT (UE)                                                              |        |               | ENT  | APP-Pending | US      | 15/724282     |              | US-2018-0027450-A1 |   |

|       | A                                                                                                                                                                                              | B      | C             | D    | E           | F       | G             | H            | I                  | J |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|------|-------------|---------|---------------|--------------|--------------------|---|
| 2     | TITLE                                                                                                                                                                                          | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13319 | APPARATUS SYSTEM AND METHOD OF ACCESS NETWORK DISCOVERY AND SELECTION FUNCTION (ANDSF) FOR TRAFFIC OFFLOADING                                                                                  |        |               | NP   | PAT-Active  | US      | 14/492035     | 9894581      | US-2015-0195759-A1 |   |
| 13320 | APPARATUS SYSTEM AND METHOD OF ACCESS NETWORK DISCOVERY AND SELECTION FUNCTION (ANDSF) FOR TRAFFIC OFFLOADING                                                                                  |        |               | CNT  | APP-Pending | US      | 15/864352     |              | US-2018-0132154-A1 |   |
| 13321 | POWER HEADROOM REPORTING WITH DUAL CONNECTIVITY                                                                                                                                                |        |               | NP   | PAT-Active  | US      | 14/495729     | 9480029      | US-2015-0195796-A1 |   |
| 13322 | POWER HEADROOM REPORTING WITH DUAL CONNECTIVITY                                                                                                                                                |        |               | CNT  | PAT-Active  | US      | 15/276091     | #####        | US-2017-0013571-A1 |   |
| 13323 | POWER HEADROOM REPORTING WITH DUAL CONNECTIVITY                                                                                                                                                |        |               | CNT  | APP-Pending | US      | 16/162972     |              |                    |   |
| 13324 | SYSTEM AND METHOD FOR CONTROLLING A LICENSED SHARED ACCESS RADIO                                                                                                                               |        |               | NP   | PAT-Active  | US      | 14/538575     | 9512376      | US-2016-0135220-A1 |   |
| 13325 | SYSTEM AND METHOD FOR CONTROLLING A LICENSED SHARED ACCESS RADIO                                                                                                                               |        |               | CNT  | PAT-Active  | US      | 15/342584     | 9801225      | US-2017-0055309-A1 |   |
| 13326 | APPARATUS SYSTEMS AND METHODS FOR PAGING ENHANCEMENTS FOR LOW COMPLEXITY USER EQUIPMENT COORDINATION TECHNIQUES FOR RADIO RESOURCE CONTROL STATE MANAGEMENT IN DUAL-CONNECTIVITY ARCHITECTURES |        |               | PCT  | APP-Pending | US      | 13/126560     |              | US-2017-0085165-A1 |   |
| 13327 | COORDINATION TECHNIQUES FOR DISCONTINUOUS RECEPTION (DRX) OPERATIONS IN DUAL-CONNECTIVITY ARCHITECTURES                                                                                        |        |               | NP   | PAT-Active  | US      | 14/497010     | #####        | US-2015-0148599-A1 |   |
| 13328 | COORDINATION TECHNIQUES FOR DISCONTINUOUS RECEPTION (DRX) OPERATIONS IN DUAL-CONNECTIVITY ARCHITECTURES                                                                                        |        |               | PCT  | PAT-Active  | US      | 15/026548     | #####        | US-2016-0248405-A1 |   |
| 13329 | SYSTEMS AND METHODS FOR MODULATION AND CODING SCHEME SELECTION AND CONFIGURATION                                                                                                               |        |               | NP   | PAT-Active  | US      | 14/496970     | 9467269      | US-2015-0195818-A1 |   |
| 13330 | SYSTEMS AND METHODS FOR MODULATION AND CODING SCHEME SELECTION AND CONFIGURATION                                                                                                               |        |               | CNT  | PAT-Active  | US      | 15/241361     | #####        | US-2016-0373287-A1 |   |
| 13331 | SYSTEMS METHODS AND DEVICES FOR HYBRID FULL-DIMENSIONAL MULTIPLE-INPUT MULTIPLE-OUTPUT                                                                                                         |        |               | NP   | PAT-Active  | US      | 14/498517     | 9787376      | US-2015-0195020-A1 |   |
| 13332 | SYSTEMS METHODS AND DEVICES FOR APPLICATION AWARE ACCESS CONTROL FOR COMMUNICATION ON A MOBILE NETWORK                                                                                         |        |               | NP   | PAT-Active  | US      | 14/494169     | #####        | US-2015-0195712-A1 |   |
| 13333 | SYSTEMS AND METHODS FOR MODULATION AND CODING SCHEME SELECTION AND CONFIGURATION                                                                                                               |        |               | NP   | APP-Pending | US      | 14/498502     |              | US-2015-0195819-A1 |   |
| 13334 | SYSTEMS AND METHODS FOR MODULATION AND CODING SCHEME SELECTION AND CONFIGURATION                                                                                                               |        |               | CNT  | APP-Pending | US      | 16/457387     |              |                    |   |
| 13335 | DISCONTINUOUS RECEPTION (DRX) ALIGNMENT TECHNIQUES FOR DUAL-CONNECTIVITY ARCHITECTURES                                                                                                         |        |               | NP   | PAT-Active  | US      | 14/583653     | #####        | US-2015-0195867-A1 |   |
| 13336 | DISCONTINUOUS RECEPTION (DRX) ALIGNMENT TECHNIQUES FOR DUAL-CONNECTIVITY ARCHITECTURES                                                                                                         |        |               | CNT  | PAT-Active  | US      | 15/396477     | #####        | US-2017-0111956-A1 |   |
| 13337 | SYSTEMS METHODS AND DEVICES FOR ENHANCING SPECTRAL EFFICIENCY WITH NETWORK-ASSISTED ADVANCED RECEIVERS                                                                                         |        |               | NP   | PAT-Active  | US      | 14/499178     | 9629143      | US-2015-0195820-A1 |   |
| 13338 | INTERACTIVE VIDEO CONFERENCING                                                                                                                                                                 |        |               | NP   | PAT-Active  | US      | 14/582376     | 9386275      | US-2015-0195490-A1 |   |
| 13339 | INTERACTIVE VIDEO CONFERENCING                                                                                                                                                                 |        |               | CNT  | PAT-Active  | US      | 15/180510     | 9794515      | US-2016-0295166-A1 |   |
| 13340 | INTERACTIVE VIDEO CONFERENCING                                                                                                                                                                 |        |               | CNT  | PAT-Active  | US      | 15/710589     | #####        | US-2018-0013980-A1 |   |
| 13341 | CLIENT/SERVER SIGNALING COMMANDS FOR DASH                                                                                                                                                      |        |               | NP   | PAT-Active  | US      | 14/583936     | #####        | US-2015-0195328-A1 |   |
| 13342 | CLIENT/SERVER SIGNALING COMMANDS FOR DASH                                                                                                                                                      |        |               | CNT  | APP-Pending | US      | 16/408101     |              |                    |   |
| 13343 | STRUCTURED SUPER-POSITIONING CODING TO ENHANCE CONTROL CHANNEL CAPACITY                                                                                                                        |        |               | NP   | PAT-Active  | US      | 14/498427     | #####        | US-2016-0095090-A1 |   |
| 13344 | OPTIMIZING SYNCHRONIZATION OF AUDIO AND NETWORK TASKS IN VOICE OVER PACKET SWITCHED NETWORKS                                                                                                   |        |               | NP   | PAT-Active  | US      | 14/500119     | 9787742      | US-2016-0084605-A1 |   |

|       | A                                                                                                                  | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                              | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13345 | USER EQUIPMENT AND METHODS FOR OPERATION IN COVERAGE ENHANCEMENT MODE WITH PHYSICAL RANDOM ACCESS CHANNEL PREAMBLE |        |               | NP   | PAT-Active  | US      | 14/498874     | 9456405      | US-2015-0215911-A1 |   |
| 13346 | USER EQUIPMENT AND METHODS FOR OPERATION IN COVERAGE ENHANCEMENT MODE WITH PHYSICAL RANDOM ACCESS CHANNEL PREAMBLE |        |               | CNT  | PAT-Active  | US      | 15/264956     | 9973944      | US-2017-0134967-A1 |   |
| 13347 | USER EQUIPMENT AND METHODS FOR OPERATION IN COVERAGE ENHANCEMENT MODE WITH PHYSICAL RANDOM ACCESS CHANNEL PREAMBLE |        |               | CNT  | APP-Pending | US      | 15/935462     |              | US-2018-0213418-A1 |   |
| 13348 | EVOLVED NODE-B AND USER EQUIPMENT AND METHODS FOR OPERATION IN A COVERAGE ENHANCEMENT MODE                         |        |               | NP   | PAT-Active  | US      | 14/461396     | 8763210      | US-2015-0213910-A1 |   |
| 13349 | EVOLVED NODE-B AND USER EQUIPMENT AND METHODS FOR OPERATION IN A COVERAGE ENHANCEMENT MODE                         |        |               | CNT  | PAT-Active  | US      | 15/701090     | #####        | US-2018-0027516-A1 |   |
| 13350 | EVOLVED NODE-B AND USER EQUIPMENT AND METHODS FOR OPERATION IN A COVERAGE ENHANCEMENT MODE                         |        |               | CNT  | APP-Pending | US      | 15/538823     |              |                    |   |
| 13351 | TECHNIQUES AND CONFIGURATIONS ASSOCIATED WITH MACHINE TYPE COMMUNICATION IN ENHANCED COVERAGE MODE                 |        |               | NP   | PAT-Active  | US      | 14/479825     | #####        | US-2015-0076224-A1 |   |
| 13352 | USER EQUIPMENT AND METHOD FOR TRANSMITTING A DATA STREAM TO AN EVOLVED NODE B                                      |        |               | NP   | PAT-Active  | US      | 14/575448     | 9572130      | US-2016-0183218-A1 |   |
| 13353 | TECHNIQUES AND CONFIGURATIONS ASSOCIATED WITH USER EQUIPMENT-INITIATED CONGESTION REPORTING                        |        |               | NP   | PAT-Active  | US      | 14/495704     | 8832782      | US-2015-0117187-A1 |   |
| 13354 | GATEWAY ARRANGEMENTS FOR WIRELESS COMMUNICATION NETWORKS                                                           |        |               | NP   | PAT-Active  | US      | 14/513041     | 9596628      | US-2015-0117408-A1 |   |
| 13355 | GATEWAY ARRANGEMENTS FOR WIRELESS COMMUNICATION NETWORKS                                                           |        |               | CNT  | APP-Pending | US      | 15/418493     |              | US-2017-0142762-A1 |   |
| 13356 | METHODS DEVICES AND COMPUTER READABLE MEDIA FOR DYNAMIC SCHEDULING                                                 |        |               | NP   | PAT-Active  | US      | 14/497934     | 9467260      | US-2016-0094322-A1 |   |
| 13357 | USER EQUIPMENT AND METHODS OF BEARER OPERATION FOR CARRIER AGGREGATION                                             |        |               | PCT  | PAT-Active  | US      | 14/917154     | #####        | US-2016-0234847-A1 |   |
| 13358 | USER EQUIPMENT AND METHODS OF BEARER OPERATION FOR CARRIER AGGREGATION                                             |        |               | CNT  | APP-Pending | US      | 15/994154     |              | US-2018-0317237-A1 |   |
| 13359 | USER EQUIPMENT AND METHODS OF BEARER OPERATION FOR CARRIER AGGREGATION                                             |        |               | CNT  | APP-Pending | US      | 16/406791     |              |                    |   |
| 13360 | SIGNALING FOR INTER-CELL E2D DISCOVERY IN AN LTE NETWORK                                                           |        |               | PCT  | PAT-Active  | US      | 15/026174     | 9992781      | US-2016-0219541-A1 |   |
| 13361 | SIGNALING FOR INTER-CELL E2D DISCOVERY IN AN LTE NETWORK                                                           |        |               | CNT  | PAT-Active  | US      | 15/717540     | #####        | US-2018-0026459-A1 |   |
| 13362 | RESOURCE ALLOCATION FOR E2D DISCOVERY IN AN LTE NETWORK                                                            |        |               | PCT  | PAT-Active  | US      | 15/026753     | 9826539      | US-2016-0255615-A1 |   |
| 13363 | RESOURCE ALLOCATION FOR E2D DISCOVERY IN AN LTE NETWORK                                                            |        |               | CNT  | PAT-Active  | US      | 15/730287     | 9999063      | US-2018-0035441-A1 |   |
| 13364 | RESOURCE ALLOCATION FOR E2D DISCOVERY IN AN LTE NETWORK                                                            |        |               | CNT  | PAT-Active  | US      | 15/942974     | #####        | US-2018-0227932-A1 |   |
| 13365 | COMMUNICATION TERMINAL AND METHOD FOR CONTROLLING A CELL RESELECTION                                               |        |               | NP   | PAT-Active  | US      | 14/459379     | 9990588      | US-2016-0050597-A1 |   |
| 13366 | INTERPOLATOR SYSTEMS AND METHODS                                                                                   |        |               | NP   | PAT-Active  | US      | 14/551266     | 9387689      | US-2016-0149584-A1 |   |
| 13367 | CIRCUIT AND METHOD FOR PROVIDING A RADIO FREQUENCY SIGNAL                                                          |        |               | NP   | PAT-Active  | US      | 14/856781     | 9450627      | US-2016-0182100-A1 |   |
| 13368 | TECHNIQUES FOR IDENTIFYING PHYSICAL HYBRID AUTOMATIC REQUEST INDICATOR CHANNEL RESOURCES                           |        |               | PCT  | PAT-Active  | US      | 15/022484     | #####        | US-2016-0234809-A1 |   |
| 13369 | DEVICES AND METHOD FOR RETRIEVING AND UTILIZING NEIGHBORING WLAN INFORMATION FOR LTE LAA OPERATION                 |        |               | NP   | PAT-Active  | US      | 14/670769     | 8872283      | US-2015-0351115-A1 |   |

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| 2     | TITLE                                                                                                                                                                                                     | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13370 | NEIGHBOR CELL SYSTEM INFORMATION PROVISIONING                                                                                                                                                             |        |               | NP   | PAT-Active  | US      | 14/704195     | #####        | US-2016-0921584-A1 |   |
| 13371 | SYSTEMS APPARATUSES AND METHODS FOR LIGHTWEIGHT OVER-THE-AIR SIGNALING MECHANISMS IN DATA COMMUNICATIONS                                                                                                  |        |               | NP   | PAT-Active  | US      | 14/669908     | 9801228      | US-2016-0929426-A1 |   |
| 13372 | SYSTEMS AND METHODS FOR VARYED CELL BARRING TIMES                                                                                                                                                         |        |               | PCT  | PAT-Active  | US      | 15/119941     | #####        | US-2017-0135024-A1 |   |
| 13373 | APPARATUS COMPUTER-READABLE MEDIUM AND METHOD TO DETERMINE A USER EQUIPMENT LOCATION IN A CELLULAR NETWORK USING SIGNALS FROM A WIRELESS LOCAL AREA NETWORK (WLAN)                                        |        |               | NP   | PAT-Active  | US      | 14/669243     | 9668099      | US-2016-0303703-A1 |   |
| 13374 | APPARATUS COMPUTER-READABLE MEDIUM AND METHOD TO DETERMINE A USER EQUIPMENT LOCATION IN A CELLULAR NETWORK USING SIGNALS FROM A WIRELESS LOCAL AREA NETWORK (WLAN)                                        |        |               | ENT  | PAT-Active  | US      | 15/591252     | #####        | US-2017-0378517-A1 |   |
| 13375 | METHOD FOR TRANSMITTING A PLURALITY OF UPLINK MESSAGES AND MOBILE RADIO COMMUNICATION TERMINAL DEVICE                                                                                                     |        |               | NP   | PAT-Active  | US      | 14/670519     | 9621307      | US-2016-0385591-A1 |   |
| 13376 | COMMUNICATION DEVICE AND METHOD FOR PROCESSING A RECEIVED SIGNAL                                                                                                                                          |        |               | NP   | PAT-Active  | US      | 14/844044     | 9698837      | US-2016-0112080-A1 |   |
| 13377 | MAXIMUM LIKELIHOOD SEQUENCE DETECTION IN THE PHASE DOMAIN                                                                                                                                                 |        |               | NP   | PAT-Active  | US      | 14/570566     | 9276704      |                    |   |
| 13378 | PACKET DATA UNIT MAPPING INTO TIME RESOURCE PATTERNS FOR EFFICIENT DEVICE-TO-DEVICE COMMUNICATIONS                                                                                                        |        |               | PCT  | PAT-Active  | US      | 15/324574     | #####        | US-2017-0215187-A1 |   |
| 13379 | SYSTEMS METHODS AND DEVICES FOR PROXIMITY SERVICES FOR MULTI-CARRIER CAPABLE MOBILE DEVICES                                                                                                               |        |               | NP   | APP-Pending | US      | 14/671908     |              | US-2016-0044552-A1 |   |
| 13380 | LOAD BALANCING SCHEMES FOR IDLE MODE USER EQUIPMENT                                                                                                                                                       |        |               | NP   | PAT-Active  | US      | 14/668662     | 9683278      | US-2016-0044638-A1 |   |
| 13381 | LOAD BALANCING SCHEMES FOR IDLE MODE USER EQUIPMENT                                                                                                                                                       |        |               | ENT  | PAT-Active  | US      | 15/631947     | #####        | US-2017-0288849-A1 |   |
| 13382 | PDCCCH DESIGN FOR NARROWBAND DEPLOYMENT                                                                                                                                                                   |        |               | PCT  | APP-Pending | US      | 15/324441     |              | US-2017-0223725-A1 |   |
| 13383 | VIRTUALIZED NETWORK FUNCTION MANAGEMENT                                                                                                                                                                   |        |               | PCT  | APP-Pending | US      | 15/323905     |              | US-2017-0150399-A1 |   |
| 13384 | METHODS AND APPARATUS OF EVOLVED NODE B AND USER EQUIPMENT FOR CAPABILITY INFORMATION SETTING                                                                                                             |        |               | PCT  | PAT-Active  | US      | 13/328419     | 9813899      | US-2017-0215065-A1 |   |
| 13385 | APPARATUS METHOD AND SYSTEM OF CONTROLLING COMMUNICATIONS OF A MULTI-RADIO DEVICE                                                                                                                         |        |               | NP   | PAT-Active  | US      | 14/494672     | 9586659      | US-2016-0088572-A1 |   |
| 13386 | RANDOM ACCESS PROCEDURE FOR HANDOVER                                                                                                                                                                      |        |               | NP   | PAT-Active  | US      | 14/582364     | 9939524      | US-2016-0192389-A1 |   |
| 13387 | RANDOM ACCESS PROCEDURE FOR HANDOVER                                                                                                                                                                      |        |               | ENT  | APP-Pending | US      | 15/877268     |              | US-2019-0029048-A1 |   |
| 13388 | CONTEXT-AWARE RESOURCE MANAGEMENT FOR VIDEO STREAMING SERVICES                                                                                                                                            |        |               | NP   | PAT-Active  | US      | 14/540312     | 9807592      | US-2016-0142902-A1 |   |
| 13389 | TECHNIQUES AND CONFIGURATIONS ASSOCIATED WITH PARTITIONING OF A COMMUNICATION BAND                                                                                                                        |        |               | NP   | PAT-Active  | US      | 14/563930     | 9602953      | US-2016-0165606-A1 |   |
| 13390 | APPARATUS AND A METHOD FOR PREDICTING A FUTURE STATE OF AN ELECTRONIC COMPONENT                                                                                                                           |        |               | PCT  | APP-Pending | US      | 15/751268     |              | US-2018-0231601-A1 |   |
| 13391 | A RECEIVER AND A METHOD FOR REDUCING A DISTORTION COMPONENT WITHIN A BASEBAND RECEIVE SIGNAL                                                                                                              |        |               | PCT  | PAT-Active  | US      | 15/575867     | #####        | US-2018-0159585-A1 |   |
| 13392 | NOISE-SHAPING CIRCUIT DIGITAL-TO-TIME CONVERTER ANALOG-TO-DIGITAL CONVERTER DIGITAL-TO-ANALOG CONVERTER FREQUENCY SYNTHESIZER TRANSMITTER RECEIVER TRANSCIVER METHOD FOR SHAPING NOISE IN AN INPUT SIGNAL |        |               | NP   | PAT-Active  | US      | 14/856854     | 9580647      | US-2016-0182072-A1 |   |
| 13393 | SYSTEMS AND METHODS FOR SKEWING DC/DC CONVERTER PHASES TO MITIGATE SPURS                                                                                                                                  |        |               | NP   | PAT-Active  | US      | 14/572679     | 9502964      | US-2016-0172966-A1 |   |

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| 2     | TITLE                                                                                                                            | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13394 | METHODS AND DEVICES FOR MULTI-DEVICE LINK AGGREGATION                                                                            |        |               | NP   | PAT-Active  | US      | 14/670967     | #####        | US-2016-0285746-A1 |   |
| 13395 | ANTENNA SYSTEM                                                                                                                   |        |               | NP   | PAT-Active  | US      | 14/671470     | #####        | US-2016-0285159-A1 |   |
| 13396 | MODIFIED ARCHITECTURE FOR CLOUD RADIO ACCESS NETWORKS AND APPROACH FOR COMPRESSION OF FRONT-HAUL DATA                            |        |               | PCT  | PAT-Active  | US      | 15/501467     | #####        | US-2017-0238361-A1 |   |
| 13397 | GENERATING BROADCASTING AND RECEIVING SYSTEM INFORMATION BLOCKS                                                                  |        |               | NP   | PAT-Active  | US      | 14/578171     | 9893173      | US-2016-0073326-A1 |   |
| 13398 | SUBSCRIBER IDENTITY MODULE PROVIDER APPARATUS FOR OVER-THE-AIR PROVISIONING OF SUBSCRIBER IDENTITY MODULE CONTAINERS AND METHODS |        |               | NP   | PAT-Active  | US      | 14/573132     | 9439069      | US-2016-0183066-A1 |   |
| 13399 | EVOLVED NODE-B USER EQUIPMENT AND METHODS FOR MISSION-CRITICAL MACHINE TYPE COMMUNICATION                                        |        |               | NP   | PAT-Active  | US      | 14/548762     | 9894553      | US-2016-0150437-A1 |   |
| 13400 | SYSTEMS APPARATUSES AND METHODS FOR MANAGING USER EQUIPMENT MOBILITY INFORMATION                                                 |        |               | NP   | PAT-Active  | US      | 14/569295     | 9913180      | US-2016-0173358-A1 |   |
| 13401 | EVOLVED NODE-B USER EQUIPMENT AND METHODS FOR TRANSITION BETWEEN UNLICENSED AND LICENSED FREQUENCY BANDS                         |        |               | NP   | PAT-Active  | US      | 14/575589     | 9930652      | US-2016-0183220-A1 |   |
| 13402 | SYSTEMS METHODS AND DEVICES FOR LTE WI-FI AND BLUETOOTH COEXISTENCE                                                              |        |               | NP   | PAT-Active  | US      | 14/579402     | 8730014      | US-2016-0183282-A1 |   |
| 13403 | SOFT BUFFER MANAGEMENT                                                                                                           |        |               | NP   | PAT-Active  | US      | 14/579974     | 9577793      | US-2016-0088635-A1 |   |
| 13404 | RESOURCE ALLOCATION                                                                                                              |        |               | NP   | PAT-Active  | US      | 14/581520     | 9603140      | US-2016-0088593-A1 |   |
| 13405 | APPARATUS AND METHOD FOR DIGITAL TO-TIME CONVERTER SPUR DITHERING                                                                |        |               | NP   | PAT-Active  | US      | 14/577885     | 9803439      | US-2016-0182262-A1 |   |
| 13406 | DIGITAL TO ANALOG CONVERTER CELL FOR SIGNED OPERATION                                                                            |        |               | NP   | PAT-Active  | US      | 14/571531     | 9379883      | US-2016-0173269-A1 |   |
| 13407 | ADJUSTING POWER AMPLIFIER STIMULI BASED ON OUTPUT SIGNALS                                                                        |        |               | NP   | PAT-Active  | US      | 14/663640     | 9571135      | US-2016-0277045-A1 |   |
| 13408 | SYSTEMS AND METHODS FOR MANAGING CIRCUIT SWITCHED FALLBACK CALLS                                                                 |        |               | NP   | PAT-Active  | US      | 14/686506     | #####        | US-2016-0100336-A1 |   |
| 13409 | METHOD AND APPARATUS FOR CORRECTING INCONVENIENT POWER AMPLIFIER LOAD CHARACTERISTICS IN AN ENVELOPE TRACKING BASED SYSTEM       |        |               | NP   | PAT-Active  | US      | 14/565617     | 9425742      | US-2016-0173030-A1 |   |
| 13410 | HYSTERETIC CURRENT CONTROL WITH EVENT DITHERING                                                                                  |        |               | NP   | PAT-Active  | US      | 14/643235     | 9800343      | US-2016-0268889-A1 |   |
| 13411 | MOBILE COMMUNICATION IN MACRO-CELL ASSISTED SMALL CELL NETWORKS                                                                  |        |               | PCT  | PAT-Active  | US      | 15/508331     | #####        | US-2017-0311217-A1 |   |
| 13412 | APPARATUS SYSTEM AND METHOD OF RELAY BACKHAULING WITH MILLIMETER WAVE CARRIER AGGREGATION                                        |        |               | PCT  | PAT-Active  | US      | 15/503477     | #####        | US-2017-0236893-A1 |   |
| 13413 | SYSTEM AND METHOD OF MTC DEVICE OPERATIONS                                                                                       |        |               | NP   | PAT-Active  | US      | 14/711847     | 9961657      | US-2016-0095076-A1 |   |
| 13414 | INTERACTIVE VIDEO CONFERENCING                                                                                                   |        |               | NP   | PAT-Active  | US      | 14/704437     | 9516226      | US-2016-0180999-A1 |   |
| 13415 | INTERACTIVE VIDEO CONFERENCING                                                                                                   |        |               | CNT  | PAT-Active  | US      | 15/365746     | 9832369      | US-2017-0085782-A1 |   |
| 13416 | INTERACTIVE VIDEO CONFERENCING                                                                                                   |        |               | CNT  | PAT-Active  | US      | 15/801100     | #####        | US-2018-0054563-A1 |   |
| 13417 | INTERACTIVE VIDEO CONFERENCING                                                                                                   |        |               | CNT  | APP-Pending | US      | 16/152295     |              | US-2019-0037131-A1 |   |
| 13418 | SYSTEM AND METHOD OF HANDLING UPLINK TRANSMISSION COLLISION FOR ENHANCED COVERAGE MODE UES                                       |        |               | NP   | PAT-Active  | US      | 14/718975     | 9957356      | US-2016-0094986-A1 |   |

|       | A                                                                                                                   | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                               | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13419 | DEVICE-TO-DEVICE ASSISTED POSITIONING IN WIRELESS CELLULAR TECHNOLOGIES                                             |        |               | NP   | PAT-Active  | US      | 14/671803     | 9713117      | US-2016-095080-A1  |   |
| 13420 | USER EQUIPMENT AND SYNCHRONIZATION METHODS FOR DEVICE TO DEVICE (D2D) COMMUNICATION                                 |        |               | PCT  | PAT-Active  | US      | 15/505387     | #####        | US-2017-0273042-A1 |   |
| 13421 | APPARATUS SYSTEM AND METHOD OF WIRELESS LOCAL AREA NETWORK (WLAN) SETTING OF A USER EQUIPMENT (UE)                  |        |               | PCT  | PAT-Active  | US      | 15/506013     | #####        | US-2017-0245208-A1 |   |
| 13422 | CONSTRUCTION OF TRANSMISSION PATTERNS FOR D2D COMMUNICATION                                                         |        |               | NP   | PAT-Active  | US      | 14/671315     | 9488471      | US-2016-095112-A1  |   |
| 13423 | CONSTRUCTION OF TRANSMISSION PATTERNS FOR D2D COMMUNICATION                                                         |        |               | CNT  | APP-Pending | US      | 15/839596     |              | US-2018-0184423-A1 |   |
| 13424 | TRANSMISSION OF COMMON CONTROL MESSAGES FOR MACHINE-TYPE COMMUNICATION (MTC) USER EQUIPMENTS WITH REDUCED BANDWIDTH |        |               | PCT  | APP-Pending | US      | 15/501152     |              | US-2017-0230851-A1 |   |
| 13425 | CODEBOOK FOR FULL-DIMENSION MULTIPLE INPUT MULTIPLE OUTPUT COMMUNICATIONS                                           |        |               | NP   | PAT-Active  | US      | 14/668655     | 9425875      | US-2016-094280-A1  |   |
| 13426 | CODEBOOK FOR FULL-DIMENSION MULTIPLE INPUT MULTIPLE OUTPUT COMMUNICATIONS                                           |        |               | CNT  | PAT-Active  | US      | 15/216378     | #####        | US-2016-0329934-A1 |   |
| 13427 | CODEBOOK FOR FULL-DIMENSION MULTIPLE INPUT MULTIPLE OUTPUT COMMUNICATIONS                                           |        |               | CNT  | APP-Pending | US      | 16/031438     |              | US-2018-0351607-A1 |   |
| 13428 | DOWNLINK CONTROL INFORMATION (DCI) DESIGN FOR LTE DEVICES                                                           |        |               | NP   | PAT-Active  | US      | 14/723284     | 9955465      | US-2016-0106382-A1 |   |
| 13429 | INCREASED CARRIER MONITORING                                                                                        |        |               | PCT  | PAT-Active  | US      | 15/512822     | #####        | US-2017-0251511-A1 |   |
| 13430 | INCREASED CARRIER MONITORING                                                                                        |        |               | CNT  | APP-Pending | US      | 16/222904     |              | US-2019-0141469-A1 |   |
| 13431 | NETWORK FUNCTIONS VIRTUALIZATION                                                                                    |        |               | PCT  | APP-Pending | US      | 15/510898     |              | US-2017-0257276-A1 |   |
| 13432 | NETWORK FUNCTIONS VIRTUALIZATION                                                                                    |        |               | CNT  | APP-Pending | US      | 16/408231     |              | US-2019-0334777-A1 |   |
| 13433 | METHOD FOR MITIGATING INTERFERENCE AND INTERFERENCE MITIGATING RECEIVER                                             |        |               | PCT  | APP-Pending | US      | 15/738468     |              | US-2019-0818605-A1 |   |
| 13434 | MECHANISMS FOR CO-EXISTENCE OF LTE-U NETWORK WITH ITSELF AND WITH OTHER TECHNOLOGIES                                |        |               | PCT  | APP-Pending | US      | 14/917931     |              | US-2016-0249978-A1 |   |
| 13435 | APPARATUS SYSTEM AND METHOD OF DIFFERENTIATING BETWEEN AN IMS CONNECTION AND A NON-IMS CONNECTION                   |        |               | NP   | PAT-Active  | US      | 14/864976     | #####        | US-2016-0127422-A1 |   |
| 13436 | SYSTEM AND METHOD FOR TDD COMMUNICATIONS                                                                            |        |               | NP   | PAT-Active  | US      | 14/580074     | 9775151      | US-2016-0020891-A1 |   |
| 13437 | SMOOTH UE TRANSFER WITHIN AN EVOLVED PACKET CORE                                                                    |        |               | NP   | PAT-Active  | US      | 14/671829     | #####        | US-2016-0095036-A1 |   |
| 13438 | OPPORTUNISTIC SIGNAL TRANSMISSION FOR INTER-RAT CO-EXISTENCE                                                        |        |               | NP   | PAT-Active  | US      | 14/718042     | 9867056      | US-2016-0103404-A1 |   |
| 13439 | OPPORTUNISTIC SIGNAL TRANSMISSION FOR INTER-RAT CO-EXISTENCE                                                        |        |               | CNT  | PAT-Active  | US      | 15/864824     | #####        | US-2018-0317994-A1 |   |
| 13440 | COVERAGE CONSTRAINED DEVICES AND PAGING METHOD                                                                      |        |               | NP   | PAT-Active  | US      | 14/706152     | 9769780      | US-2016-0100380-A1 |   |
| 13441 | METHODS AND APPARATUSES OF WLAN ALARM NOTIFICATION IN CELLULAR NETWORKS                                             |        |               | NP   | PAT-Active  | US      | 14/668663     | #####        | US-2016-0105809-A1 |   |
| 13442 | CARRIAGE OF MEDIA CONTENT QUANTITY INFORMATION                                                                      |        |               | NP   | PAT-Active  | US      | 14/701380     | #####        | US-2016-0105478-A1 |   |
| 13443 | SIGNALING EXTENDED EARFCN AND E-UTRA BANDS IN UMTS NETWORKS                                                         |        |               | PCT  | PAT-Active  | US      | 15/026786     | 9867206      | US-2016-0255640-A1 |   |



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| 2     | TITLE                                                                                                                      | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13444 | SIGNALING EXTENDED EARFCN AND E-UTRA BANDS IN UMTS NETWORKS                                                                |        |               | CNT  | PAT-Active  | US      | 15/862181     | #####        | US-2018-0196352-A1 |   |
| 13445 | DATA THROUGHPUT FOR CELL-EDGE USERS IN A LTE NETWORK USING DOWN-LINK REPEATERS AND UP-LINK HARQ RELAYS                     |        |               | NP   | PAT-Active  | US      | 13/324598     | 8918692      | US-2012-0158279-A1 |   |
| 13446 | RELAY NODE AND METHOD FOR RELAY NODE OPERATION WITH IMPROVED DATA THROUGHPUT FOR CELL-EDGE USERS                           |        |               | CNT  | PAT-Active  | US      | 14/565181     | 9300440      | US-2015-0163021-A1 |   |
| 13447 | DATA THROUGHPUT FOR CELL-EDGE USERS IN A LTE NETWORK USING DOWN-LINK REPEATERS AND UP-LINK HARQ RELAYS                     |        |               | CNT  | PAT-Active  | US      | 15/067302     | 9674766      | US-2016-0265969-A1 |   |
| 13448 | RELAY NODE OPERATION WITH IMPROVED DATA THROUGHPUT                                                                         |        |               | CNT  | PAT-Active  | US      | 15/614214     | #####        | US-2017-0325152-A1 |   |
| 13449 | IMPROVING DATA THROUGHPUT FOR CELL-EDGE USERS IN AN LTE NETWORK                                                            |        |               | CNT  | PAT-Active  | US      | 15/823656     | #####        | US-2018-0092023-A1 |   |
| 13450 | DATA THROUGHPUT FOR CELL-EDGE USERS IN AN LTE NETWORK                                                                      |        |               | CNT  | APP-Pending | US      | 16/513938     |              |                    |   |
| 13451 | CONNECTION CONTROL FOR MACHINE TYPE COMMUNICATION (MTC) DEVICES                                                            |        |               | PCT  | APP-Pending | US      | 15/514444     |              | US-2017-0251516-A1 |   |
| 13452 | SYSTEMS METHODS AND APPARATUSES FOR BEARER SPLITTING IN MULTI-RADIO HETNET                                                 |        |               | NP   | PAT-Active  | US      | 14/705669     | 9698800      | US-2016-0119839-A1 |   |
| 13453 | APPARATUSES SYSTEMS AND METHODS FOR PROBABILISTIC TRANSMISSION OF DEVICE-TO-DEVICE (D2D) DISCOVERY MESSAGES                |        |               | PCT  | APP-Pending | US      | 15/505387     |              | US-2017-0280482-A1 |   |
| 13454 | OPTIMIZING APPLICATIONS BEHAVIOR IN A DEVICE FOR POWER AND PERFORMANCE                                                     |        |               | NP   | APP-Pending | US      | 14/671954     |              | US-2016-0286430-A1 |   |
| 13455 | POWER CONSERVATION VIA GNSS-WIRELESS ACTIVITY SYNCHRONIZATION                                                              |        |               | NP   | PAT-Active  | US      | 14/721938     | #####        | US-2016-0345378-A1 |   |
| 13456 | DISCRETE FILTER HAVING A TAP SELECTION CIRCUIT                                                                             |        |               | DIV  | PAT-Active  | US      | 11/488566     | 7412471      | US-2006-0259532-A1 |   |
| 13457 | SQUARE ROOT RAISED COSINE SYMMETRIC FILTER FOR MOBILE TELECOMMUNICATIONS                                                   |        |               | NP   | PAT-Closed  | US      | 03/429058     | 6731706      |                    |   |
| 13458 | SQUARE ROOT RAISED COSINE SYMMETRIC FILTER FOR MOBILE TELECOMMUNICATIONS                                                   |        |               | CNT  | PAT-Active  | US      | 10/793978     | 9178404      | US-2004-0172433-A1 |   |
| 13459 | INTER-CELL INTERFERENCE COORDINATION IN WIRELESS NETWORKS                                                                  |        |               | NP   | PAT-Active  | US      | 13/556126     | 8971801      | US-2013-0390120-A1 |   |
| 13460 | APPARATUS FOR AN ENHANCED NODE B FOR INTER-CELL INTERFERENCE COORDINATION IN WIRELESS NETWORKS                             |        |               | CNT  | PAT-Active  | US      | 14/621775     | 9635676      | US-2015-0237637-A1 |   |
| 13461 | HIGH SPEED HANDOVERS IN A WIRELESS NETWORK                                                                                 |        |               | NP   | PAT-Active  | US      | 13/556131     | 9883431      | US-2013-0095839-A1 |   |
| 13462 | COMMUNICATION TERMINAL AND METHOD FOR ESTABLISHING A CSFB CALL                                                             |        |               | NP   | PAT-Active  | US      | 14/706020     | 9913306      | US-2016-0330778-A1 |   |
| 13463 | SYSTEM AND METHOD FOR MEASUREMENT REPORTING IN AN UNLICENSED SPECTRUM                                                      |        |               | NP   | PAT-Active  | US      | 14/693653     | #####        | US-2016-0307350-A1 |   |
| 13464 | SYSTEM AND METHOD TO ADDRESS RESOURCE COLLISION FOR ASYMMETRIC REGION ALLOCATION                                           |        |               | NP   | PAT-Active  | US      | 14/692510     | 9887822      | US-2016-0128055-A1 |   |
| 13465 | ENHANCED PHYSICAL DOWNLINK CONTROL CHANNEL IN MACHINE-TYPE COMMUNICATION                                                   |        |               | PCT  | PAT-Active  | US      | 15/520981     | #####        | US-2018-0026759-A1 |   |
| 13466 | D2D COMMUNICATION DEVICES AND METHOD OF TRANSMISSION FOR OVERLAPPED D2D RESOURCE POOLS                                     |        |               | NP   | PAT-Active  | US      | 14/669340     | 9888508      | US-2016-0135239-A1 |   |
| 13467 | APPARATUS SYSTEM AND METHOD OF SELECTING A MOBILITY MODE OF A USER EQUIPMENT (UE)                                          |        |               | NP   | PAT-Active  | US      | 14/670438     | 9838957      | US-2016-0135120-A1 |   |
| 13468 | APPARATUS SYSTEM AND METHOD OF COMMUNICATING BETWEEN A CELLULAR MANAGER AND A USER EQUIPMENT (UE) VIA A WLAN ACCESS DEVICE |        |               | NP   | PAT-Active  | US      | 14/747085     | #####        | US-2016-0128110-A1 |   |

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| 2     | TITLE                                                                                                                                         | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13469 | EARLY TERMINATION OF REPEATED TRANSMISSIONS FOR MTC                                                                                           |        |               | PCT  | PAT-Active  | US      | 15/517430     | #####        | US-2017-0303248-A1 |   |
| 13470 | EARLY TERMINATION OF REPEATED TRANSMISSIONS FOR MTC                                                                                           |        |               | CNT  | APP-Closed  | US      | 16/192271     |              |                    |   |
| 13471 | COMPUTING APPARATUS WITH CROSS-SUBFRAME SCHEDULING                                                                                            |        |               | NP   | PAT-Active  | US      | 14/711781     | 9800387      | US-2016-0134403-A1 |   |
| 13472 | RAN PAGING MECHANISM TO ENABLE ENHANCED COVERAGE MODE                                                                                         |        |               | NP   | PAT-Active  | US      | 14/753158     | 9648582      | US-2016-0135141-A1 |   |
| 13473 | EVOLVED NODE-B USER EQUIPMENT AND METHODS FOR CHANNEL QUALITY INDICATOR (CQI) FEEDBACK                                                        |        |               | NP   | PAT-Active  | US      | 14/670692     | 9450662      | US-2016-0142123-A1 |   |
| 13474 | SYSTEMS APPARATUSES AND METHODS FOR PROCESSING RANDOM ACCESS RESPONSE MESSAGES FOR COVERAGE CONSTRAINED DEVICES                               |        |               | NP   | PAT-Active  | US      | 14/698165     | 9730249      | US-2016-0143059-A1 |   |
| 13475 | SYSTEMS AND METHODS FOR SIGNALING IN AN INCREASED CARRIER MONITORING WIRELESS COMMUNICATION ENVIRONMENT                                       |        |               | NP   | PAT-Active  | US      | 14/704448     | 9635574      | US-2016-0142926-A1 |   |
| 13476 | SYSTEMS AND METHODS FOR SIGNALING IN AN INCREASED CARRIER MONITORING WIRELESS COMMUNICATION ENVIRONMENT                                       |        |               | CNT  | PAT-Active  | US      | 15/452153     | 9800395      | US-2017-0180106-A1 |   |
| 13477 | SYSTEMS AND METHODS FOR SIGNALING IN AN INCREASED CARRIER MONITORING WIRELESS COMMUNICATION ENVIRONMENT                                       |        |               | CNT  | PAT-Active  | US      | 15/694617     | 9942023      | US-2018-0313537-A1 |   |
| 13478 | SYSTEMS AND METHODS FOR SIGNALING IN AN INCREASED CARRIER MONITORING WIRELESS COMMUNICATION ENVIRONMENT                                       |        |               | CNT  | PAT-Active  | US      | 15/902345     | #####        | US-2018-0183562-A1 |   |
| 13479 | SYSTEMS AND METHODS FOR SIGNALING IN AN INCREASED CARRIER MONITORING WIRELESS COMMUNICATION ENVIRONMENT                                       |        |               | CNT  | PAT-Active  | US      | 16/103773     | #####        | US-2019-0307184-A1 |   |
| 13480 | METHOD FOR PERFORMING MOBILE COMMUNICATIONS AND MOBILE RADIO COMMUNICATION TERMINAL DEVICE                                                    |        |               | NP   | PAT-Active  | US      | 14/670498     | 9560571      | US-2016-0286454-A1 |   |
| 13481 | METHOD AND DEVICE FOR CANCELING A BIAS OF A RADIO CHANNEL SEQUENCE                                                                            |        |               | NP   | PAT-Active  | US      | 14/993157     | #####        | US-2016-0248612-A1 |   |
| 13482 | METHOD FOR PERFORMING MOBILE COMMUNICATIONS AND MOBILE TERMINAL DEVICE                                                                        |        |               | NP   | PAT-Active  | US      | 14/656813     | 9277836      |                    |   |
| 13483 | APPARATUS AND A METHOD FOR PROVIDING OSCILLATOR SIGNALS                                                                                       |        |               | NP   | PAT-Active  | US      | 15/045783     | 9467158      | US-2016-0285489-A1 |   |
| 13484 | DIGITAL-TO-ANALOG CONVERTER CIRCUIT AN APPARATUS FOR PROVIDING A RADIO FREQUENCY TRANSMIT SIGNAL AND A METHOD OF DIGITAL-TO-ANALOG CONVERSION |        |               | NP   | PAT-Active  | US      | 15/048143     | 9490834      | US-2016-0285470-A1 |   |
| 13485 | HIGH LINEARITY PUSH-PULL COMMON-GATE AMPLIFIER                                                                                                |        |               | NP   | PAT-Active  | US      | 14/629793     | 9537457      | US-2016-0248390-A1 |   |
| 13486 | ENVELOPE TRACKING IN CONNECTION WITH SIMULTANEOUS TRANSMISSION IN ONE OR MORE FREQUENCY BANDS                                                 |        |               | NP   | PAT-Active  | US      | 14/568313     | 9461590      | US-2016-0173031-A1 |   |
| 13487 | TERMINAL DEVICE AND MOBILE RADIO COMMUNICATION BY TERMINAL DEVICE                                                                             |        |               | NP   | APP-Pending | US      | 14/661074     |              | US-2016-0278072-A1 |   |
| 13488 | A MOBILE COMMUNICATIONS DEVICE AND A METHOD FOR CONTROLLING A MOBILE COMMUNICATIONS DEVICE RECEIVER                                           |        |               | PCT  | PAT-Active  | US      | 15/738805     | #####        | US-2018-0167884-A1 |   |
| 13489 | METHOD AND DEVICE FOR PROTECTING A DATA TRANSPORT BLOCK AGAINST MEMORY ERRORS AND TRANSMISSION ERRORS                                         |        |               | NP   | PAT-Active  | US      | 14/993311     | #####        | US-2016-0277148-A1 |   |
| 13490 | SIGNAL BUFFERING FOR LICENSED SHARED ACCESS (LSA) TECHNOLOGY                                                                                  |        |               | NP   | PAT-Active  | US      | 14/580723     | 9491634      | US-2016-0183267-A1 |   |
| 13491 | METHODS AND DEVICES FOR CONTROLLING SPEECH QUALITY                                                                                            |        |               | NP   | PAT-Active  | US      | 15/007335     | #####        | US-2016-0285573-A1 |   |
| 13492 | APPARATUSES AND METHODS FOR SHIFTING A DIGITAL SIGNAL BY A SHIFT TIME TO PROVIDE A SHIFTED SIGNAL                                             |        |               | PCT  | PAT-Active  | US      | 15/811851     | #####        | US-2018-0167056-A1 |   |
| 13493 | APPARATUSES AND METHODS FOR SHIFTING A DIGITAL SIGNAL BY A SHIFT TIME TO PROVIDE A SHIFTED SIGNAL                                             |        |               | CNT  | APP-Pending | US      | 16/543756     |              |                    |   |
| 13494 | RECEIVER AND A METHOD FOR REDUCING A DISTORTION COMPONENT RELATED TO A BASEBAND TRANSMIT SIGNAL IN A BASEBAND RECEIVE SIGNAL                  |        |               | NP   | PAT-Active  | US      | 15/046935     | 9698840      | US-2016-0285487-A1 |   |

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| 2     | TITLE                                                                                                                           | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13495 | APPARATUS AND A METHOD FOR PROCESSING A SIGNAL DEPENDING ON A RECEIVED RADIO FREQUENCY SIGNAL                                   |        |               | NP   | PAT-Active  | US      | 15/045786     | #####        | US-2016-0285587-A1 |   |
| 13496 | FREQUENCY CORRECTION IN A MULTI-CARRIER COMMUNICATION SYSTEM                                                                    |        |               | PCT  | PAT-Active  | US      | 11/908253     | 7957341      | US-2009-0279476-A1 |   |
| 13497 | FREQUENCY CORRECTION IN A MULTI-CARRIER COMMUNICATION SYSTEM                                                                    |        |               | ENT  | PAT-Active  | US      | 13/154331     | 8526431      | US-2011-0235590-A1 |   |
| 13498 | FREQUENCY CORRECTION IN A MULTI-CARRIER COMMUNICATION SYSTEM                                                                    |        |               | CNT  | PAT-Active  | US      | 14/017145     | 9326262      | US-2014-0003403-A1 |   |
| 13499 | FREQUENCY CORRECTION IN A MULTI-CARRIER COMMUNICATION SYSTEM                                                                    |        |               | CNT  | PAT-Active  | US      | 14/992903     | #####        | US-2016-0126014-A1 |   |
| 13500 | FREQUENCY CORRECTION IN A MULTI-CARRIER COMMUNICATION SYSTEM                                                                    |        |               | CNT  | APP-Pending | US      | 15/036752     |              | US-2018-0324734-A1 |   |
| 13501 | APPARATUS METHOD AND COMPUTER PROGRAM FOR TRANSCEIVERS OF A MOBILE COMMUNICATION SYSTEM                                         |        |               | PCT  | PAT-Active  | US      | 15/572844     | #####        | US-2018-0160363-A1 |   |
| 13502 | APPARATUS METHOD AND COMPUTER PROGRAM FOR TRANSCEIVERS OF A MOBILE COMMUNICATION SYSTEM                                         |        |               | ENT  | APP-Pending | US      | 16/508409     |              |                    |   |
| 13503 | REFERENCE SIGNAL POWER MEASUREMENT FILTERING                                                                                    |        |               | PCT  | APP-Pending | US      | 15/736453     |              | US-2019-0342812-A1 |   |
| 13504 | QUANTIZED EIGEN BEAMS FOR CONTROLLING ANTENNA ARRAY ELEMENTS IN A WIRELESS NETWORK                                              |        |               | NP   | PAT-Active  | US      | 14/695300     | 9397736      | US-2016-0148617-A1 |   |
| 13505 | QUANTIZED EIGEN BEAMS FOR CONTROLLING ANTENNA ARRAY ELEMENTS IN A WIRELESS NETWORK                                              |        |               | ENT  | PAT-Active  | US      | 15/210977     | #####        | US-2016-0352395-A1 |   |
| 13506 | INTERACTIVE VIDEO CONFERENCING                                                                                                  |        |               | NP   | PAT-Active  | US      | 14/807294     | #####        | US-2016-0165185-A1 |   |
| 13507 | INTERACTIVE VIDEO CONFERENCING                                                                                                  |        |               | CNT  | APP-Pending | US      | 15/668150     |              | US-2017-0332042-A1 |   |
| 13508 | DEVICE AND METHOD FOR PROCESSING AUDIO DATA                                                                                     |        |               | NP   | PAT-Active  | US      | 14/670441     | 9713192      | US-2016-0286594-A1 |   |
| 13509 | PHASED ARRAY WEIGHTING FOR POWER EFFICIENCY IMPROVEMENT WITH HIGH PEAK-TO-AVERAGE POWER RATIO SIGNALS                           |        |               | NP   | PAT-Active  | US      | 14/668274     | #####        | US-2016-0285481-A1 |   |
| 13510 | A METHOD AND AN APPARATUS FOR DETERMINING A NOISE SHAPED QUANTIZED PARAMETER CONTRIBUTING TO THE GENERATION OF AN OUTPUT SIGNAL |        |               | PCT  | PAT-Active  | US      | 15/750257     | #####        | US-2018-0262384-A1 |   |
| 13511 | METHOD AND AN APPARATUS FOR DETERMINING A NOISE SHAPED QUANTIZED PARAMETER CONTRIBUTING TO THE GENERATION OF AN OUTPUT SIGNAL   |        |               | CNT  | APP-Pending | US      | 16/516281     |              |                    |   |
| 13512 | NETWORK-INITIATED DISCOVERY AND PATH SELECTION PROCEDURES FOR MULTI-HOP UNDERLAY NETWORKS                                       |        |               | NP   | PAT-Active  | US      | 14/729511     | 9942944      | US-2016-0192432-A1 |   |
| 13513 | REFERENCE SIGNAL PRESENCE DETECTION BASED LICENSE ASSISTED ACCESS AND REFERENCE SIGNAL SEQUENCE DESIGN                          |        |               | NP   | PAT-Active  | US      | 14/747663     | 8900134      | US-2016-0173249-A1 |   |
| 13514 | CIRCUIT INTEGRATED CIRCUIT RECEIVER TRANSMITTER AND METHOD FOR RECEIVING A SIGNAL                                               |        |               | NP   | PAT-Active  | US      | 15/077197     | 8974024      | US-2016-0316434-A1 |   |
| 13515 | TECHNIQUES TO SUPPORT INTEGRATED BLUETOOTH/BGPP RADIO ACCESS TECHNOLOGIES                                                       |        |               | NP   | PAT-Active  | US      | 14/671788     | 9503842      | US-2016-0286340-A1 |   |
| 13516 | USER EQUIPMENT PORT CONTROL PROTOCOL SERVER AND METHODS FOR SIGNALING DEVICE AND APPLICATION FEEDBACK                           |        |               | NP   | PAT-Active  | US      | 14/659655     | 8554305      | US-2015-0195750-A1 |   |
| 13517 | CIRCUIT SWITCHED FALLBACK                                                                                                       |        |               | PCT  | PAT-Active  | US      | 15/114718     | #####        | US-2016-0345210-A1 |   |
| 13518 | AT COMMAND FOR SECURE ESM INFORMATION                                                                                           |        |               | NP   | PAT-Active  | US      | 14/701520     | 9730062      | US-2016-0323739-A1 |   |
| 13519 | AT COMMAND FOR SECURE ESM INFORMATION                                                                                           |        |               | CNT  | PAT-Active  | US      | 15/628246     | 8924360      | US-2017-0388807-A1 |   |

|       | A                                                                                                                        | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                    | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13520 | AT COMMAND FOR SECURE FSM INFORMATION                                                                                    |        |               | CNT  | PAT-Active  | US      | 15/884549     | #####        | US-2018-0152844-A1 |   |
| 13521 | ELECTRONIC DEVICES AND METHOD OF CONTROLLING AN ELECTRONIC DEVICE                                                        |        |               | NP   | APP-Pending | US      | 14/623574     |              | US-2016-0238057-A1 |   |
| 13522 | METHODS AND DEVICES FOR PROVIDING A ROBUST DATA COMMUNICATION BETWEEN A CLIENT AND A SERVER                              |        |               | PCT  | APP-Pending | US      | 15/738060     |              | US-2018-0234207-A1 |   |
| 13523 | USER EQUIPMENT AND BASE STATION FOR DYNAMIC CSI-RS AND CSI-M TRANSMISSION IN LTE SYSTEMS                                 |        |               | NP   | PAT-Active  | US      | 14/707142     | #####        | US-2016-0212733-A1 |   |
| 13524 | USER EQUIPMENT AND BASE STATION CONFIGURED FOR APERIODIC CSI REFERENCES SIGNALS(CSI-RS) WITH APERIODIC REPORT TRIGGERING |        |               | CNT  | APP-Pending | US      | 16/032704     |              | US-2019-0014569-A1 |   |
| 13525 | LTE-A SYSTEMS AND METHOD OF DRS BASED POSITIONING                                                                        |        |               | NP   | PAT-Active  | US      | 14/662886     | 9886373      | US-2016-0205498-A1 |   |
| 13526 | TECHNIQUES FOR MONITORING VIRTUALIZED NETWORK FUNCTIONS OR NETWORK FUNCTIONS VIRTUALIZATION INFRASTRUCTURE               |        |               | NP   | PAT-Active  | US      | 14/751498     | 8912558      | US-2016-0205034-A1 |   |
| 13527 | TECHNIQUES FOR MONITORING VIRTUALIZED NETWORK FUNCTIONS OR NETWORK FUNCTIONS VIRTUALIZATION INFRASTRUCTURE               |        |               | CNT  | APP-Pending | US      | 15/887915     |              | US-2018-0183892-A1 |   |
| 13528 | SYSTEMS METHODS AND DEVICES FOR DIRECT COMMUNICATION                                                                     |        |               | NP   | PAT-Active  | US      | 14/751436     | 8699353      | US-2016-0212108-A1 |   |
| 13529 | SYSTEMS METHODS AND DEVICES FOR DIRECT COMMUNICATION                                                                     |        |               | CNT  | PAT-Active  | US      | 15/608772     | #####        | US-2018-0013737-A1 |   |
| 13530 | SYSTEMS METHODS AND DEVICES FOR DIRECT COMMUNICATION                                                                     |        |               | CNT  | APP-Pending | US      | 16/516804     |              |                    |   |
| 13531 | PUBLIC SAFETY DISCOVERY AND COMMUNICATION USING A UE-TO-UE RELAY                                                         |        |               | NP   | PAT-Active  | US      | 14/812833     | 9992806      | US-2016-0212780-A1 |   |
| 13532 | USER EQUIPMENT AND CODEBOOK SEARCH METHOD FOR 4TX DUAL CODEBOOK (RANK1)                                                  |        |               | PCT  | PAT-Active  | US      | 15/575276     | #####        | US-2018-0167115-A1 |   |
| 13533 | RES-GCD ADAPTATION HARDWARE ACCELERATOR FOR INTERFERENCE CANCELLATION IN FULL-DUPLEX WIRELESS SYSTEMS                    |        |               | NP   | PAT-Active  | US      | 14/861421     | 9935635      | US-2017-0085252-A1 |   |
| 13534 | POWER OPTIMIZATION FOR CHANNEL STATE REPORTS IN A WIRELESS COMMUNICATION NETWORK                                         |        |               | PCT  | APP-Pending | US      | 15/745999     |              | US-2018-0213482-A1 |   |
| 13535 | DEVICE AND METHOD FOR MITIGATING LOWPASS FILTER GROUP DELAY                                                              |        |               | PCT  | PAT-Active  | US      | 15/760450     | #####        | US-2018-0262369-A1 |   |
| 13536 | METHOD FOR PROCESSING RADIO SIGNALS AND MOBILE TERMINAL DEVICE                                                           |        |               | NP   | APP-Pending | US      | 14/751149     |              | US-2016-0381610-A1 |   |
| 13537 | METHOD AND DEVICE FOR DETERMINING CHANNEL STATE INFORMATION                                                              |        |               | PCT  | APP-Pending | US      | 15/738086     |              | US-2018-0234155-A1 |   |
| 13538 | ENCODING CIRCUIT METHOD FOR TRANSMITTING DATA OVER A DATA BUS AND RADIO COMMUNICATION DEVICE                             |        |               | NP   | PAT-Active  | US      | 14/748293     | #####        | US-2016-0380721-A1 |   |
| 13539 | METHOD AND DEVICE FOR DETECTING A TRANSMISSION FROM AN INTERFERING RADIO CELL                                            |        |               | PCT  | PAT-Active  | US      | 15/738390     | #####        | US-2018-0179959-A1 |   |
| 13540 | METHODS AND DEVICES FOR CHANNEL ESTIMATION FOR MOBILE SYSTEMS OF INSUFFICIENT CYCLIC PREFIX LENGTH                       |        |               | PCT  | PAT-Active  | US      | 15/565557     | #####        | US-2018-0123837-A1 |   |
| 13541 | COMMUNICATION DEVICE AND METHOD FOR STORING DATA                                                                         |        |               | PCT  | APP-Pending | US      | 15/738817     |              | US-2018-0183547-A1 |   |
| 13542 | MULTI-TRANSMISSION CAPABLE DATA TRANSMISSION SYSTEM AND METHOD OF OPERATING THE SAME                                     |        |               | PCT  | APP-Pending | US      | 15/796416     |              |                    |   |
| 13543 | TRANSCIVER DEVICE AND METHOD OF PROCESSING SIGNALS                                                                       |        |               | NP   | PAT-Active  | US      | 14/751181     | 9537530      | US-2016-0380866-A1 |   |
| 13544 | TRANSCIVER DEVICE AND METHOD OF PROCESSING SIGNALS                                                                       |        |               | CNT  | PAT-Active  | US      | 15/393309     | 9866264      | US-2017-0113079-A1 |   |
| 13545 | ARCHITECTURE AND CONTROL OF ANALOG SELF-INTERFERENCE CANCELLATION                                                        |        |               | NP   | PAT-Active  | US      | 14/751779     | 8722718      | US-2016-0380706-A1 |   |

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| 2     | TITLE                                                                                                        | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13546 | ENHANCED LISTEN-BEFORE-TALK (LBT) FOR UNLICENSED BAND OPERATION WITH CELL SPLITTING                          |        |               | NP   | PAT-Active  | US      | 14/740563     | 9615279      | US-2016-0215448-A1 |   |
| 13547 | DEVICES AND METHODS FOR EPDOCH MONITORING IN WIRELESS COMMUNICATION SYSTEMS                                  |        |               | NP   | PAT-Active  | US      | 14/748802     | #####        | US-2016-0219557-A1 |   |
| 13548 | DEVICES AND METHODS FOR HARQ-ACK FEEDBACK SCHEME ON PUSCH IN WIRELESS COMMUNICATION SYSTEMS                  |        |               | NP   | PAT-Active  | US      | 14/751054     | 9686064      | US-2016-0212734-A1 |   |
| 13549 | DEVICES AND METHODS FOR HARQ-ACK FEEDBACK SCHEME ON PUSCH IN WIRELESS COMMUNICATION SYSTEMS                  |        |               | CNT  | PAT-Active  | US      | 15/624324     | #####        | US-2018-0034610-A1 |   |
| 13550 | DEVICES AND METHODS FOR HARQ-ACK FEEDBACK SCHEME ON PUSCH IN WIRELESS COMMUNICATION SYSTEMS                  |        |               | CNT  | APP-Pending | US      | 16/536818     |              |                    |   |
| 13551 | OTDOA (OBSERVED TIME DIFFERENCE OF ARRIVAL) POSITIONING ENHANCEMENT BY USING HETEROGENEOUS REFERENCE SIGNALS |        |               | PCT  | APP-Pending | US      | 15/539896     |              | US-2018-0011163-A1 |   |
| 13552 | DEVICE AND METHOD TO IMPROVE HORIZONTAL AND VERTICAL POSITIONING ACCURACY                                    |        |               | PCT  | PAT-Active  | US      | 15/524842     | #####        | US-2017-0374638-A1 |   |
| 13553 | DEVICE AND METHOD TO IMPROVE HORIZONTAL AND VERTICAL POSITIONING ACCURACY                                    |        |               | CNT  | APP-Pending | US      | 16/407148     |              |                    |   |
| 13554 | APERIODIC CHANNEL STATE INFORMATION (CSI) REPORTING FOR CARRIER AGGREGATION                                  |        |               | NP   | PAT-Active  | US      | 14/708545     | 9483491      | US-2016-0227530-A1 |   |
| 13555 | APERIODIC CHANNEL STATE INFORMATION (CSI) REPORTING FOR CARRIER AGGREGATION                                  |        |               | CNT  | PAT-Active  | US      | 15/877579     | #####        | US-2018-0302894-A1 |   |
| 13556 | PRECODING RESOURCE BLOCK GROUP BUNDLING ENHANCEMENT FOR FULL DIMENSION MULTI-IN-MULTI-OUTPUT                 |        |               | NP   | PAT-Active  | US      | 14/820879     | #####        | US-2016-0227520-A1 |   |
| 13557 | PRECODING RESOURCE BLOCK GROUP BUNDLING ENHANCEMENT FOR FULL DIMENSION MULTI-IN-MULTI-OUTPUT                 |        |               | CNT  | APP-Pending | US      | 16/399731     |              | US-2019-0260436-A1 |   |
| 13558 | ADAPTIVE PAGING TECHNIQUES FOR EXTENDED COVERAGE-CAPABLE DEVICES                                             |        |               | NP   | PAT-Active  | US      | 14/976736     | 9974049      | US-2016-0227514-A1 |   |
| 13559 | ADAPTIVE PAGING TECHNIQUES FOR EXTENDED COVERAGE-CAPABLE DEVICES                                             |        |               | CNT  | APP-Pending | US      | 15/979013     |              | US-2018-0263015-A1 |   |
| 13560 | POWER HEADROOM REPORTING WITH CHANNEL SELECTION                                                              |        |               | PCT  | PAT-Active  | US      | 15/540923     | #####        | US-2018-0007643-A1 |   |
| 13561 | POWER HEADROOM REPORTING WITH CHANNEL SELECTION                                                              |        |               | CNT  | APP-Pending | US      | 16/243856     |              | US-2019-0349869-A1 |   |
| 13562 | SYSTEM AND METHODS FOR SUPPORT OF FREQUENCY HOPPING FOR UES WITH REDUCED BANDWIDTH SUPPORT                   |        |               | NP   | APP-Pending | US      | 14/748814     |              | US-2016-0228639-A1 |   |
| 13563 | UPLINK SCHEDULING FOR LICENSE ASSISTED ACCESS                                                                |        |               | PCT  | PAT-Active  | US      | 15/537024     | #####        | US-2017-0366308-A1 |   |
| 13564 | CHIP RATE SELECTABLE SQUARE ROOT RAISED COSINE FILTER FOR MOBILE TELECOMMUNICATIONS                          |        |               | NP   | PAT-Active  | US      | 09/467487     | 6650688      |                    |   |
| 13565 | OUTAGE NOTIFICATION AND CONTEXT PRESERVATION FOR ENERGY-HARVESTING DEVICES                                   |        |               | NP   | APP-Pending | US      | 14/817679     |              | US-2017-0041915-A1 |   |
| 13566 | DOWNLINK SIGNALING FOR UE SPECIFIC CYCLIC PREFIX TRANSMISSION                                                |        |               | NP   | PAT-Active  | US      | 14/928820     | #####        | US-2017-0127411-A1 |   |
| 13567 | CARRIER MEASUREMENTS FOR MULTI-CARRIER DEVICES                                                               |        |               | NP   | PAT-Active  | US      | 14/794724     | #####        | US-2017-0013630-A1 |   |
| 13568 | UPLINK SYNCHRONIZATION WITH ASSISTED mmWAVE ENHANCED MODE B                                                  |        |               | NP   | PAT-Active  | US      | 14/827976     | #####        | US-2017-0055298-A1 |   |
| 13569 | CELL SEARCH AND SYNCHRONIZATION IN MILLIMETER-WAVE CAPABLE SMALL CELLS                                       |        |               | NP   | PAT-Active  | US      | 14/977412     | 9930656      | US-2017-0181134-A1 |   |
| 13570 | MOBILE TERMINAL DEVICES AND METHODS OF PERFORMING RADIO MEASUREMENTS                                         |        |               | NP   | PAT-Active  | US      | 14/251177     | 9961580      | US-2016-0381588-A1 |   |
| 13571 | DOCKING STATION AND METHOD TO CONNECT TO A DOCKING STATION                                                   |        |               | NP   | PAT-Active  | US      | 14/963372     | 9827320      | US-2017-0171884-A1 |   |

|       | A                                                                                                                              | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                          | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13572 | ENERGY EFFICIENT POLYNOMIAL KERNEL GENERATION IN FULL-DUPLEX RADIO COMMUNICATION                                               |        |               | NP   | PAT-Active  | US      | 14/748766     | 9893745      | US-2016-0380653-A1 |   |
| 13573 | METHOD FOR POWER SAVING AND POWER SAVING CIRCUIT FOR A MOBILE DEVICE                                                           |        |               | PCT  | APP-Pending | US      | 15/738449     |              |                    |   |
| 13574 | METHOD FOR FEEDBACK REPORTING AND A MOBILE COMMUNICATIONS DEVICE                                                               |        |               | NP   | PAT-Active  | US      | 14/751217     | 9729221      | US-2016-0380687-A1 |   |
| 13575 | METHOD AND RELATED MOBILE DEVICE FOR FAST BLIND DECODING                                                                       |        |               | PCT  | APP-Pending | US      | 15/738677     |              | US-2018-0234112-A1 |   |
| 13576 | SYSTEM AND A METHOD FOR DETERMINING A CORRECTION FOR AN OUTPUT VALUE OF A TIME-TO-DIGITAL CONVERTER WITHIN A PHASE-LOCKED LOOP |        |               | PCT  | PAT-Active  | US      | 15/575830     | #####        | US-2018-0131390-A1 |   |
| 13577 | SYSTEMS AND METHODS FOR AGGREGATING AN ENHANCED MULTIMEDIA BROADCAST MULTICAST SERVICE OVER MULTIPLE FREQUENCY CARRIERS        |        |               | NP   | PAT-Active  | US      | 14/976240     | #####        | US-2016-0243412-A1 |   |
| 13578 | DEVICE SYSTEM AND METHOD EMPLOYING UNIFIED FLEXIBLE 5G AIR INTERFACE                                                           |        |               | PCT  | APP-Pending | US      | 15/542716     |              | US-2018-0007673-A1 |   |
| 13579 | SYSTEMS METHODS AND DEVICES FOR RADIO ACCESS TECHNOLOGY COORDINATION                                                           |        |               | PCT  | PAT-Active  | US      | 15/542032     | #####        | US-2018-0020462-A1 |   |
| 13580 | SYSTEMS METHODS AND DEVICES FOR RADIO ACCESS TECHNOLOGY COORDINATION                                                           |        |               | ENT  | APP-Pending | US      | 16/418703     |              | US-2019-0274148-A1 |   |
| 13581 | SYSTEMS AND METHODS FOR ENHANCED MBMS WITH MIMO SUPPORT                                                                        |        |               | NP   | PAT-Active  | US      | 14/865238     | #####        | US-2016-0254920-A1 |   |
| 13582 | ARCHITECTURE FOR WIRELESS NETWORK ACCESS                                                                                       |        |               | PCT  | APP-Pending | US      | 15/765540     |              | US-2018-0310230-A1 |   |
| 13583 | LOW-POWER WAKEUP RADIO FOR MOBILE DEVICES                                                                                      |        |               | PCT  | APP-Pending | US      | 15/758902     |              | US-2018-0255515-A1 |   |
| 13584 | APPARATUS SYSTEM AND METHOD OF OFFLOADING TRAFFIC OF A SECONDARY CELL GROUP (SCG)                                              |        |               | PCT  | APP-Pending | US      | 15/550123     |              | US-2018-0349062-A1 |   |
| 13585 | SYSTEMS METHODS AND DEVICES FOR DEVICE-TO-DEVICE RELAY COMMUNICATION                                                           |        |               | NP   | PAT-Active  | US      | 14/835944     | 9936530      | US-2016-0270134-A1 |   |
| 13586 | TIME SYNCHRONIZATION FOR NODES IN A WIRELESS PERSONAL AREA NETWORK (WPAN)                                                      |        |               | PCT  | APP-Pending | US      | 15/575746     |              | US-2018-0124731-A1 |   |
| 13587 | POWER SAVE IN MACHINE TYPE COMMUNICATION DEVICE                                                                                |        |               | PCT  | APP-Pending | US      | 15/738979     |              | US-2019-0268845-A1 |   |
| 13588 | TRANSMISSION TOGGLE UPLINK COMPENSATION                                                                                        |        |               | PCT  | APP-Pending | US      | 15/738993     |              | US-2019-0334963-A1 |   |
| 13589 | COMMUNICATION TERMINAL AND METHOD FOR HANDLING UPLOAD TRAFFIC CONGESTION                                                       |        |               | PCT  | PAT-Active  | US      | 15/739177     | #####        | US-2018-0175818-A1 |   |
| 13590 | METHOD FOR DETERMINING A PRECODING MATRIX AND PRECODING MODULE                                                                 |        |               | PCT  | APP-Pending | US      | 15/571348     |              | US-2019-0089427-A1 |   |
| 13591 | SIGNAL PROCESSING APPARATUS AND METHOD FOR PROCESSING A SIGNAL                                                                 |        |               | NP   | PAT-Active  | US      | 14/751195     | 9312875      |                    |   |
| 13592 | A CIRCUIT AND A METHOD FOR GENERATING A RADIO FREQUENCY SIGNAL                                                                 |        |               | PCT  | APP-Pending | US      | 15/811860     |              | US-2018-0234060-A1 |   |
| 13593 | FRAMEWORK FOR UNLICENSED SPECTRUM USAGE MONITORING AND REPORTING IN LTE NETWORKS                                               |        |               | NP   | PAT-Active  | US      | 14/998068     | 9699324      | US-2017-0187886-A1 |   |
| 13594 | SYSTEMS AND METHODS FOR CROSS-LAYER BEARER SPLITTING AND CROSS-RADIO ACCESS TECHNOLOGY RETRANSMISSION                          |        |               | NP   | APP-Pending | US      | 14/851771     |              | US-2017-0076890-A1 |   |
| 13595 | SYSTEMS AND METHODS FOR ELIMINATION OF PDCCH IN RESOURCE ALLOCATION SIGNALING FOR MTC DEVICES                                  |        |               | NP   | PAT-Active  | US      | 14/856483     | #####        | US-2017-0079012-A1 |   |
| 13596 | SYSTEMS METHODS AND DEVICES FOR SECURE DEVICE-TO-DEVICE DISCOVERY AND COMMUNICATION                                            |        |               | NP   | PAT-Active  | US      | 14/863168     | 9693894      | US-2016-0269185-A1 |   |
| 13597 | PROCEDURES TO PROVISION AND ATTACH A CELLULAR INTERNET OF THINGS DEVICE TO A CLOUD SERVICE PROVIDER                            |        |               | NP   | PAT-Active  | US      | 14/927965     | 9693178      | US-2016-0275147-A1 |   |

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| 2     | TITLE                                                                                                                        | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13598 | PROCEDURES TO PROVISION AND ATTACH A CELLULAR INTERNET OF THINGS DEVICE TO A CLOUD SERVICE PROVIDER                          |        |               | DIV  | PAT-Active  | US      | 15/632790     | #####        | US-2017-0311115-A1 |   |
| 13599 | MME OVERLOAD OR UNDERLOAD MITIGATION BY MME VNF APPARATUS AND METHOD                                                         |        |               | NP   | PAT-Active  | US      | 14/881019     | 9768694      | US-2016-0269925-A1 |   |
| 13600 | MME OVERLOAD OR UNDERLOAD MITIGATION BY MME VNF APPARATUS AND METHOD                                                         |        |               | ENT  | PAT-Active  | US      | 15/676790     | #####        | US-2018-0063741-A1 |   |
| 13601 | METHOD AND APPARATUS FOR EFFECTIVELY PERFORMING LINEAR TRANSFORMATIONS                                                       |        |               | DIV  | PAT-Active  | US      | 11/099838     | 7337204      | US-2005-0177607-A1 |   |
| 13602 | CONTROL OF TRANSMISSION POWER IN A COMMUNICATION SYSTEM                                                                      |        |               | NP   | PAT-Closed  | US      | 03/412077     | 6751448      |                    |   |
| 13603 | SYSTEMS METHODS AND DEVICES FOR UPLINK TRANSMISSIONS WITH REDUCED SIGNALING OVERHEAD                                         |        |               | PCT  | PAT-Active  | US      | 15/546257     | #####        | US-2018-0203665-A1 |   |
| 13604 | DEVICE SYSTEM AND METHOD OF QUASI-ORTHOGONAL MULTIPLE ACCESS                                                                 |        |               | PCT  | PAT-Active  | US      | 15/553363     | #####        | US-2018-0124684-A1 |   |
| 13605 | ANTENNA SYSTEM                                                                                                               |        |               | NP   | APP-Pending | US      | 14/865829     |              | US-2017-0093091-A1 |   |
| 13606 | RECEIVER AND A METHOD FOR REDUCING A DISTORTION COMPONENT WITHIN A BASEBAND RECEIVE SIGNAL                                   |        |               | PCT  | APP-Pending | US      | 15/747771     |              | US-2018-0219573-A1 |   |
| 13607 | COLLAPSING PARABOLOID DISH AND METHOD                                                                                        |        |               | NP   | PAT-Active  | US      | 08/540649     | 6625288      |                    |   |
| 13608 | RESOLVING CONCURRENT COMMUNICATIONS AT A RELAY USER EQUIPMENT (UE)                                                           |        |               | PCT  | PAT-Active  | US      | 15/957062     | #####        | US-2018-0069664-A1 |   |
| 13609 | CARRIER-SENSING TECHNIQUES FOR LTE-BASED TRANSMISSIONS OVER UNLICENSED CARRIERS                                              |        |               | PCT  | APP-Pending | US      | 15/558083     |              | US-2018-0049241-A1 |   |
| 13610 | METHODS APPARATUSES AND SYSTEMS FOR ENHANCEMENT OF EVOLVED PHYSICAL DOWNLINK CONTROL CHANNEL FOR MACHINE TYPE COMMUNICATIONS |        |               | NP   | PAT-Active  | US      | 14/828071     | #####        | US-2016-0302174-A1 |   |
| 13611 | USER EQUIPMENT CONTROLLED MOBILITY IN AN EVOLVED RADIO ACCESS NETWORK                                                        |        |               | PCT  | PAT-Active  | US      | 15/542262     | #####        | US-2017-0374612-A1 |   |
| 13612 | USER EQUIPMENT CONTROLLED MOBILITY IN AN EVOLVED RADIO ACCESS NETWORK                                                        |        |               | PCT  | APP-Pending | US      | 16/454546     |              |                    |   |
| 13613 | RANDOM ACCESS PROCEDURE FOR ENHANCED COVERAGE SUPPORT                                                                        |        |               | NP   | PAT-Active  | US      | 14/861878     | 9918344      | US-2016-0302234-A1 |   |
| 13614 | RANDOM ACCESS PROCEDURE FOR ENHANCED COVERAGE SUPPORT                                                                        |        |               | ENT  | APP-Pending | US      | 15/881082     |              | US-2018-0152968-A1 |   |
| 13615 | USER EQUIPMENT RADIO FREQUENCY AND BAND CAPABILITY FOR CARRIER AGGREGATION MEASUREMENT GAP                                   |        |               | PCT  | APP-Pending | US      | 15/542260     |              | US-2018-0006774-A1 |   |
| 13616 | DEVICE SYSTEM AND METHOD OF CELL SPECIFIC PROBABILITY LOAD BALANCING                                                         |        |               | NP   | PAT-Active  | US      | 14/859633     | 9854591      | US-2016-0302118-A1 |   |
| 13617 | USER EQUIPMENT AND METHODS FOR PHYSICAL UPLINK CONTROL CHANNEL (PUCCH) RESOURCE ALLOCATION AND COMMUNICATION                 |        |               | PCT  | PAT-Active  | US      | 15/559991     | #####        | US-2018-0069675-A1 |   |
| 13618 | USER EQUIPMENT AND METHODS FOR PHYSICAL UPLINK CONTROL CHANNEL (PUCCH) RESOURCE ALLOCATION AND COMMUNICATION                 |        |               | ENT  | APP-Pending | US      | 16/446860     |              |                    |   |
| 13619 | COMMUNICATION TERMINAL AND METHOD FOR PERFORMING A CELL SEARCH                                                               |        |               | NP   | PAT-Active  | US      | 15/357751     | #####        | US-2017-0183068-A1 |   |
| 13620 | METHODS OF PERFORMING COMMUNICATIONS MOBILE TERMINAL DEVICES AND BASEBAND MODEMS                                             |        |               | PCT  | PAT-Active  | US      | 15/758746     | #####        | US-2019-0036738-A1 |   |
| 13621 | RECEIVER WITH TUNABLE RECEIVING CHAIN                                                                                        |        |               | PCT  | APP-Pending | US      | 15/760959     |              |                    |   |
| 13622 | METHODS FOR RADIO COMMUNICATION AND COMMUNICATION DEVICES                                                                    |        |               | PCT  | APP-Pending | US      | 15/753996     |              | US-2018-0248810-A1 |   |
| 13623 | COMMUNICATION DEVICE AND METHOD FOR COMMUNICATING USING A FREQUENCY RANGE                                                    |        |               | NP   | APP-Pending | US      | 14/828537     |              | US-2017-0059193-A1 |   |
| 13624 | TRANSMISSION DESIGNS FOR RADIO ACCESS TECHNOLOGIES                                                                           |        |               | PCT  | APP-Pending | US      | 15/560472     |              | US-2018-0063820-A1 |   |

|       | A                                                                                             | B      | C             | D    | E           | F       | G             | H            | I                  | J |
|-------|-----------------------------------------------------------------------------------------------|--------|---------------|------|-------------|---------|---------------|--------------|--------------------|---|
| 2     | TITLE                                                                                         | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13625 | APPARATUS FOR CORRECTING LINEARITY OF A DIGITAL-TO-ANALOG CONVERTER                           |        |               | NP   | PAT-Active  | US      | 14/736155     | 9509326      | US-2016-0365867-A1 |   |
| 13626 | APPARATUS FOR CORRECTING LINEARITY OF A DIGITAL-TO-ANALOG CONVERTER                           |        |               | CNT  | PAT-Active  | US      | 15/334218     | #####        | US-2017-0063388-A1 |   |
| 13627 | APPARATUS FOR CORRECTING LINEARITY OF A DIGITAL-TO-ANALOG CONVERTER                           |        |               | CNT  | APP-Pending | US      | 16/218334     |              | US-2019-0123751-A1 |   |
| 13628 | DYNAMIC LOW IF INJECTION SIDE SELECTION                                                       |        |               | NP   | PAT-Active  | US      | 14/750640     | 9413402      |                    |   |
| 13629 | INTEGRATED ANTENNA WITH DISPLAY UNIFORMITY                                                    |        |               | NP   | PAT-Active  | US      | 13/863742     | #####        | US-2017-0090038-A1 |   |
| 13630 | BASE STATION FRONT END PREPROCESSING                                                          |        |               | NP   | APP-Pending | US      | 15/074951     |              | US-2016-0315674-A1 |   |
| 13631 | SOFTWARE DEFINED CELLULAR SYSTEM WITH DISTRIBUTED ANTENNAS                                    |        |               | NP   | PAT-Active  | US      | 14/971915     | #####        | US-2016-0316356-A1 |   |
| 13632 | SOFTWARE DEFINED CELLULAR SYSTEM WITH DISTRIBUTED ANTENNAS                                    |        |               | CNT  | APP-Pending | US      | 16/552897     |              |                    |   |
| 13633 | EVOLVED NODE-B USER EQUIPMENT AND METHODS FOR PAGING USING A BITMAP OF PAGING INDICATORS      |        |               | NP   | PAT-Active  | US      | 14/834963     | 9955463      | US-2017-0058871-A1 |   |
| 13634 | SENSE AMPLIFIER HAVING INTEGRATED $\gamma$ MULTIPLEXOR AND METHOD THEREFOR                    |        |               | NP   | PAT-Active  | US      | 09/543131     | 6643206      | US-2002-0145928-A1 |   |
| 13635 | EVOLVED NODE-B SHARED SPECTRUM CONTROLLER AND METHOD FOR COMMUNICATION IN SHARED SPECTRUM     |        |               | PCT  | PAT-Active  | US      | 15/566190     | #####        | US-2018-0115993-A1 |   |
| 13636 | EVOLVED NODE-B SHARED SPECTRUM CONTROLLER AND METHOD FOR COMMUNICATION IN SHARED SPECTRUM     |        |               | CNT  | APP-Pending | US      | 16/563766     |              |                    |   |
| 13637 | EVOLVED NODE-B LOCAL CONTROLLER AND METHOD FOR ALLOCATION OF SPECTRUM FOR SECONDARY USAGE     |        |               | PCT  | APP-Pending | US      | 15/760570     |              | US-2019-0045367-A1 |   |
| 13638 | PERFORMING PRIMARY CELL FUNCTIONS IN A SECONDARY CELL                                         |        |               | NP   | PAT-Active  | US      | 14/957488     | 9894702      | US-2016-0338137-A1 |   |
| 13639 | TECHNIQUES FOR DETERMINING POWER OFFSETS OF A PHYSICAL DOWNLINK SHARED CHANNEL                |        |               | PCT  | APP-Pending | US      | 15/567820     |              | US-2018-0124708-A1 |   |
| 13640 | METHODS APPARATUS OF ENB AND UE FOR MTC WITH NARROWBAND DEPLOYMENT                            |        |               | PCT  | PAT-Active  | US      | 15/129263     | #####        | US-2017-0180086-A1 |   |
| 13641 | METHODS FOR PERFORMING RADIO MEASUREMENTS AND MOBILE TERMINAL DEVICES                         |        |               | NP   | PAT-Active  | US      | 14/930702     | #####        | US-2017-0127505-A1 |   |
| 13642 | CELL CHANGE IN A MULTI-CARRIER OPERATING CELLULAR RADIO NETWORK                               |        |               | NP   | APP-Closed  | US      | 15/346778     |              | US-2017-0171790-A1 |   |
| 13643 | DEVICE SYSTEM AND GLOBAL NAVIGATION SATELLITE SYSTEM METHOD USING LOCAL FINE TIME INFORMATION |        |               | NP   | APP-Pending | US      | 14/879251     |              | US-2017-0102462-A1 |   |
| 13644 | COMMUNICATION DEVICE AND A METHOD FOR OPERATING A COMMUNICATION DEVICE                        |        |               | NP   | PAT-Active  | US      | 14/855411     | 9768971      | US-2017-0079009-A1 |   |
| 13645 | COMMUNICATION DEVICE AND METHOD FOR RECEIVING SIGNALS IN A FREQUENCY RANGE                    |        |               | PCT  | PAT-Active  | US      | 15/757375     | #####        | US-2018-0242340-A1 |   |
| 13646 | COMMUNICATION DEVICE AND METHOD FOR RECEIVING SIGNALS IN A FREQUENCY RANGE                    |        |               | CNT  | APP-Pending | US      | 16/512461     |              |                    |   |
| 13647 | COMMUNICATION TERMINAL AND METHOD FOR COMMUNICATING DATA                                      |        |               | PCT  | PAT-Active  | US      | 15/758740     | #####        | US-2019-0037386-A1 |   |
| 13648 | BEAMFORMING DEVICE                                                                            |        |               | PCT  | APP-Pending | US      | 15/745141     |              | US-2018-0212653-A1 |   |
| 13649 | COMMUNICATION TERMINAL AND METHOD FOR TRANSMITTING A SIGNALING MESSAGE                        |        |               | PCT  | APP-Pending | US      | 15/762612     |              | US-2018-0288824-A1 |   |
| 13650 | RADIO RECEIVER AND METHOD FOR DETECTING A LAYER OF A MULTI-LAYERED SIGNAL                     |        |               | PCT  | PAT-Active  | US      | 15/755352     | #####        | US-2018-0248719-A1 |   |



|       | A                                                                                                      | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                  | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13651 | METHODS OF PROCESSING SIGNALS APPARATUS AND BASE STATION                                               |        |               | PCT  | APP-Pending | US      | 15/756981     |              | US-2018-0287673-A1 |   |
| 13652 | MEASUREMENT GAP ENHANCEMENT TO REDUCE MEASUREMENT DELAY                                                |        |               | PCT  | PAT-Active  | US      | 15/566138     | #####        | US-2018-0298253-A1 |   |
| 13653 | MEASUREMENT GAP CONFIGURATION IN DUAL CONNECTIVITY ENHANCEMENT                                         |        |               | PCT  | APP-Pending | US      | 15/565726     |              | US-2018-0377596-A1 |   |
| 13654 | PAGING ENHANCEMENT FOR EXTENDED DRX IN CELLULAR SYSTEMS                                                |        |               | PCT  | PAT-Active  | US      | 15/566201     | #####        | US-2018-0338281-A1 |   |
| 13655 | CARRIER AGGREGATION ENHANCEMENT                                                                        |        |               | PCT  | APP-Pending | US      | 15/565644     |              | US-2018-0383664-A1 |   |
| 13656 | REDUCTION OF CONCURRENT SIGNALING IN A RELAY USER EQUIPMENT (UE)                                       |        |               | PCT  | PAT-Active  | US      | 15/566543     | #####        | US-2018-0146494-A1 |   |
| 13657 | REDUCTION OF CONCURRENT SIGNALING IN A RELAY USER EQUIPMENT (UE)                                       |        |               | CNT  | APP-Pending | US      | 16/448256     |              |                    |   |
| 13658 | CONTENTION FREE PHYSICAL UPLINK SHARED CONTROL CHANNEL (PUSCH) TRANSMISSION USING LISTEN BEFORE TALK   |        |               | PCT  | APP-Pending | US      | 15/566511     |              | US-2018-0302858-A1 |   |
| 13659 | UE-TO-NETWORK RELAY INITIATION AND CONFIGURATION                                                       |        |               | PCT  | APP-Pending | US      | 15/566850     |              | US-2018-0398370-A1 |   |
| 13660 | UE-TO-NETWORK RELAY INITIATION AND CONFIGURATION                                                       |        |               | CNT  | APP-Pending | US      | 16/408392     |              |                    |   |
| 13661 | MEASUREMENT METHOD IN CARRIER AGGREGATION AND ASYNCHRONOUS DUAL CONNECTIVITY                           |        |               | PCT  | APP-Pending | US      | 15/565574     |              | US-2018-0082748-A1 |   |
| 13662 | ATTENTION (AT) COMMANDS FOR PACKET DATA NETWORK CONNECTION OFFLOAD                                     |        |               | PCT  | PAT-Active  | US      | 15/567300     | #####        | US-2018-0150481-A1 |   |
| 13663 | ATTENTION (AT) COMMANDS FOR PACKET DATA NETWORK CONNECTION OFFLOAD                                     |        |               | CNT  | APP-Pending | US      | 16/408166     |              |                    |   |
| 13664 | APPARATUS SYSTEM AND METHOD OF PROCESSING PDCP PDUS OF AN E-RAB                                        |        |               | PCT  | PAT-Active  | US      | 15/537890     | #####        | US-2017-0367007-A1 |   |
| 13665 | DISPLAY INTEGRATED ANTENNA                                                                             |        |               | NP   | APP-Pending | US      | 14/751707     |              | US-2016-0328057-A1 |   |
| 13666 | APPARATUS FOR OVERLOAD RECOVERY OF AN INTEGRATOR IN A SIGMA-DELTA MODULATOR                            |        |               | NP   | PAT-Active  | US      | 14/751083     | 9680486      | US-2016-0380646-A1 |   |
| 13667 | APPARATUS FOR OVERLOAD RECOVERY OF AN INTEGRATOR IN A SIGMA-DELTA MODULATOR                            |        |               | CNT  | PAT-Active  | US      | 15/494408     | #####        | US-2017-0248692-A1 |   |
| 13668 | APPARATUS FOR OVERLOAD RECOVERY OF AN INTEGRATOR IN A SIGMA-DELTA MODULATOR                            |        |               | CNT  | APP-Pending | US      | 16/271727     |              | US-2019-0173485-A1 |   |
| 13669 | APPARATUS FOR OVERLOAD RECOVERY OF AN INTEGRATOR IN A SIGMA-DELTA MODULATOR                            |        |               | CNT  | APP-Pending | US      | 16/457058     |              | US-2019-0326925-A1 |   |
| 13670 | SYSTEMS METHODS AND DEVICES FOR DIRECT COMMUNICATION USING A PCS PROTOCOL                              |        |               | NP   | PAT-Active  | US      | 14/751546     | 9693154      | US-2016-0212244-A1 |   |
| 13671 | NON-CONTENTION BASED LOW LATENCY SCHEDULING REQUEST TRANSMISSION                                       |        |               | PCT  | APP-Pending | US      | 15/565436     |              | US-2018-0132258-A1 |   |
| 13672 | NON-CONTENTION BASED LOW LATENCY SCHEDULING REQUEST TRANSMISSION                                       |        |               | CNT  | APP-Pending | US      | 16/408456     |              | US-2019-0357246-A1 |   |
| 13673 | TRANSMITTING SYSTEM INFORMATION CHANGE NOTIFICATIONS TO MTC DEVICES                                    |        |               | PCT  | APP-Pending | US      | 15/567473     |              | US-2018-0124685-A1 |   |
| 13674 | EVOLVED NODE-B SPECTRUM ACCESS SYSTEM (SAS) CONTROLLER AND METHOD FOR COMMUNICATION IN SHARED SPECTRUM |        |               | PCT  | PAT-Active  | US      | 15/566695     | #####        | US-2018-0132111-A1 |   |
| 13675 | EVOLVED NODE-B SPECTRUM ACCESS SYSTEM (SAS) CONTROLLER AND METHOD FOR COMMUNICATION IN SHARED SPECTRUM |        |               | CNT  | APP-Pending | US      | 15/529403     |              |                    |   |
| 13676 | SEAMLESS MOBILITY FOR 5G AND LTE SYSTEMS AND DEVICES                                                   |        |               | PCT  | PAT-Active  | US      | 15/569505     | #####        | US-2018-0302834-A1 |   |

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| 2     | TITLE                                                                                                                                                                   | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13677 | SEAMLESS MOBILITY FOR 5G AND LTE SYSTEMS AND DEVICES                                                                                                                    |        |               | ENT  | APP-Pending | US      | 15/584653     |              |                    |   |
| 13678 | RF POWER AMPLIFIER AND METHODS FOR IMPROVING THE EFFICIENCY THEREOF                                                                                                     |        |               | NP   | PAT-Active  | US      | 09/579528     | 6825719      |                    |   |
| 13679 | USER EQUIPMENT (UE) AND METHODS FOR DYNAMIC MILLIMETER WAVE PENCIL CELL COMMUNICATION                                                                                   |        |               | PCT  | APP-Pending | US      | 15/747273     |              | US-2018-0220308-A1 |   |
| 13680 | MOBILE COMMUNICATIONS DEVICE AND A METHOD FOR CONTROLLING A MOBILE COMMUNICATIONS DEVICE                                                                                |        |               | NP   | PAT-Active  | US      | 14/864883     | 9980105      | US-2017-0094485-A1 |   |
| 13681 | METHODS FOR PERFORMING WIRELESS COMMUNICATIONS MOBILE TERMINAL DEVICES AND SERVERS                                                                                      |        |               | NP   | PAT-Active  | US      | 18/860760     | 9807679      | US-2017-0085133-A1 |   |
| 13682 | METHOD FOR PERFORMING MOBILE COMMUNICATIONS MOBILE TERMINAL DEVICE AND MOBILE BASEBAND PROCESSING CIRCUIT                                                               |        |               | PCT  | APP-Pending | US      | 15/757378     |              | US-2019-0029501-A1 |   |
| 13683 | RADIO RECEIVER AND METHOD FOR PROCESSING AN UPLINK TRANSPORT BLOCK                                                                                                      |        |               | NP   | PAT-Active  | US      | 15/238242     | #####        | US-2017-0086171-A1 |   |
| 13684 | MOBILE TERMINAL DEVICE AND METHOD FOR PROCESSING SIGNALS                                                                                                                |        |               | NP   | APP-Pending | US      | 14/865067     |              | US-2017-0094886-A1 |   |
| 13685 | METHODS FOR PERFORMING MOBILE COMMUNICATIONS BETWEEN MOBILE TERMINAL DEVICES BASE STATIONS AND NETWORK CONTROL DEVICES                                                  |        |               | PCT  | APP-Pending | US      | 15/758759     |              | US-2019-0045397-A1 |   |
| 13686 | METHODS AND DEVICES FOR SHARED SPECTRUM ALLOCATION                                                                                                                      |        |               | PCT  | APP-Pending | US      | 16/305931     |              | US-2019-0191314-A1 |   |
| 13687 | UPLINK INTERFERENCE MANAGEMENT IN SHARED SPECTRUM NETWORKS                                                                                                              |        |               | ENT  | PAT-Active  | US      | 15/041943     | #####        | US-2019-0097509-A1 |   |
| 13688 | UPLINK INTERFERENCE MANAGEMENT IN SHARED SPECTRUM NETWORKS                                                                                                              |        |               | ENT  | APP-Pending | US      | 15/590381     |              |                    |   |
| 13689 | IDENTIFYING VICTIMS AND AGGRESSORS IN FULL DUPLEX COMMUNICATION SYSTEMS                                                                                                 |        |               | PCT  | PAT-Active  | US      | 15/751093     | #####        | US-2018-0241493-A1 |   |
| 13690 | LOW OVERHEAD SYSTEM INFORMATION ACQUISITION FOR WIRELESS COMMUNICATION                                                                                                  |        |               | PCT  | APP-Pending | US      | 15/571332     |              | US-2018-0288683-A1 |   |
| 13691 | METHOD AND A SYSTEM FOR CONTROLLING A PLURALITY OF ELECTRONIC COMPONENTS ARBITRARILY ASSIGNABLE TO A PLURALITY OF INTEGRATED CIRCUITS OF A MOBILE COMMUNICATIONS DEVICE |        |               | NP   | PAT-Active  | US      | 15/223521     | 9755867      | US-2017-0062583-A1 |   |
| 13692 | MOBILE TERMINAL DEVICES MOBILE PROCESSING CIRCUITS AND METHODS OF PROCESSING SIGNALS                                                                                    |        |               | NP   | PAT-Active  | US      | 14/864995     | #####        | US-2017-0093538-A1 |   |
| 13693 | SYSTEM AND METHOD FOR DYNAMIC MARKING FOR INTERNET PROTOCOL BEARER SPLITTING                                                                                            |        |               | PCT  | PAT-Active  | US      | 15/568768     | #####        | US-2018-0146487-A1 |   |
| 13694 | SYSTEM AND METHOD FOR DYNAMIC MARKING FOR INTERNET PROTOCOL BEARER SPLITTING                                                                                            |        |               | ENT  | APP-Pending | US      | 16/508251     |              |                    |   |
| 13695 | LOW LATENCY CONTENTION BASED SCHEDULING REQUEST                                                                                                                         |        |               | PCT  | APP-Pending | US      | 15/575320     |              | US-2018-0152950-A1 |   |
| 13696 | UPLINK RESOURCE COLLISION REDUCTION IN FD-MIMO                                                                                                                          |        |               | PCT  | PAT-Active  | US      | 15/572984     | #####        | US-2018-0145794-A1 |   |
| 13697 | ADAPTIVE VIDEO STREAMING USING DYNAMIC RADIO ACCESS NETWORK INFORMATION                                                                                                 |        |               | PCT  | APP-Pending | US      | 15/570826     |              | US-2018-0139254-A1 |   |
| 13698 | ADAPTIVE VIDEO CONTENT FOR CELLULAR COMMUNICATION                                                                                                                       |        |               | PCT  | APP-Pending | US      | 15/569168     |              | US-2018-0152499-A1 |   |
| 13699 | ENHANCED SUPPORT VEHICLE-TO-ANYTHING (V2X) COMMUNICATION                                                                                                                |        |               | PCT  | APP-Pending | US      | 15/577292     |              | US-2018-0152819-A1 |   |
| 13700 | ENHANCED OVERLAP CODE DIVISION MULTIPLE ACCESS (CDMA)                                                                                                                   |        |               | PCT  | APP-Pending | US      | 15/573377     |              | US-2018-0109346-A1 |   |
| 13701 | PDCH STATUS REPORTING FOR MULTI-RAT OFFLOADING                                                                                                                          |        |               | PCT  | PAT-Active  | US      | 15/565458     | #####        | US-2018-0124642-A1 |   |
| 13702 | LATENCY REDUCTION TECHNIQUES FOR RADIO ACCESS NETWORKS                                                                                                                  |        |               | PCT  | APP-Pending | US      | 15/571700     |              | US-2018-0310324-A1 |   |

|       | A                                                                                                                           | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                       | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13703 | METHODS IN SHORT RANGE RADIO COMMUNICATION MASTER SUBSYSTEMS MOBILE DEVICES AND MULTI-MODE RADIO COMMUNICATION SYSTEMS      |        |               | NP   | PAT-Active  | US      | 14/934257     | 9832598      | US-2017-0134882-A1 |   |
| 13704 | AN APPARATUS AND A METHOD FOR GENERATING A RADIO FREQUENCY SIGNAL                                                           |        |               | PCT  | PAT-Active  | US      | 15/754043     | #####        | US-2018-0248740-A1 |   |
| 13705 | USER EQUIPMENT (UE) AND METHODS FOR COMMUNICATION USING DIRECTIONAL TRANSMISSION AND RECEPTION                              |        |               | PCT  | APP-Pending | US      | 15/741619     |              | US-2018-0198504-A1 |   |
| 13706 | DISTRIBUTED LINK SCHEDULING TECHNIQUE FOR DEVICE TO DEVICE COMMUNICATION                                                    |        |               | PCT  | APP-Pending | US      | 15/575344     |              | US-2018-0132190-A1 |   |
| 13707 | DYNAMIC PARTITION RESOURCE ALLOCATION IN 5G NETWORKS                                                                        |        |               | PCT  | APP-Pending | US      | 15/574765     |              | US-2018-0152269-A1 |   |
| 13708 | PROXY COORDINATED WIRELESS COMMUNICATION OPERATION FOR VEHICULAR ENVIRONMENTS                                               |        |               | PCT  | APP-Pending | US      | 15/577885     |              | US-2018-0167790-A1 |   |
| 13709 | METHODS APPARATUS AND SYSTEMS FOR MULTI-POINT MULTI-CELL SINGLE-USER BASED MULTIPLE INPUT AND MULTIPLE OUTPUT TRANSMISSIONS |        |               | NP   | PAT-Active  | US      | 14/928758     | 9905344      | US-2016-0248561-A1 |   |
| 13710 | METHODS APPARATUS AND SYSTEMS FOR MULTI-POINT MULTI-CELL SINGLE-USER BASED MULTIPLE INPUT AND MULTIPLE OUTPUT TRANSMISSIONS |        |               | CNT  | PAT-Active  | US      | 15/873629     | #####        | US-2018-0212727-A1 |   |
| 13711 | METHODS APPARATUS AND SYSTEMS FOR MULTI-POINT MULTI-CELL SINGLE-USER BASED MULTIPLE INPUT AND MULTIPLE OUTPUT TRANSMISSIONS |        |               | CNT  | APP-Pending | US      | 16/408107     |              |                    |   |
| 13712 | PREAMBLE-BASED TRANSMISSION POWER DETECTION                                                                                 |        |               | NP   | PAT-Active  | US      | 14/872065     | #####        | US-2017-0093504-A1 |   |
| 13713 | METHODS AND APPARATUS FOR FLEXIBLE MOBILE STEERING IN CELLULAR NETWORKS                                                     |        |               | PCT  | APP-Pending | US      | 15/512511     |              | US-2018-0375759-A1 |   |
| 13714 | COMMUNICATION DEVICE AND METHOD FOR SIGNAL DETERMINATION IN RADIO COMMUNICATION                                             |        |               | NP   | PAT-Active  | US      | 15/229898     | 9705713      | US-2017-0070375-A1 |   |
| 13715 | AN APPARATUS AND A METHOD FOR GENERATING A RADIO FREQUENCY SIGNAL                                                           |        |               | PCT  | APP-Pending | US      | 15/753551     |              | US-2018-0262383-A1 |   |
| 13716 | HYBRID IQ AND POLAR TRANSMITTER                                                                                             |        |               | NP   | PAT-Active  | US      | 14/861085     | 9418657      |                    |   |
| 13717 | CLOSED-LOOP POWER CONTROL IN MULTI-TRANSMISSION WIRELESS SYSTEMS                                                            |        |               | NP   | PAT-Active  | US      | 14/865362     | #####        | US-2017-0094608-A1 |   |
| 13718 | ENABLING RADIO FREQUENCY MULTIPLEXING IN A WIRELESS SYSTEM                                                                  |        |               | NP   | PAT-Active  | US      | 14/835828     | #####        | US-2017-0063404-A1 |   |
| 13719 | WIRELESS CIRCUITRY WITH SCALABLE ACCURACY                                                                                   |        |               | NP   | PAT-Active  | US      | 14/872015     | #####        | US-2017-0094606-A1 |   |
| 13720 | WIRELESS CIRCUITRY WITH SCALABLE ACCURACY                                                                                   |        |               | CNT  | APP-Pending | US      | 16/542821     |              |                    |   |
| 13721 | SECURE FIRMWARE UPGRADE FOR CELLULAR IOT                                                                                    |        |               | PCT  | APP-Pending | US      | 15/575906     |              | US-2018-0150289-A1 |   |
| 13722 | OFDMA-BASED MULTIPLEXING OF UPLINK CONTROL INFORMATION                                                                      |        |               | PCT  | PAT-Active  | US      | 15/573314     | #####        | US-2018-0110541-A1 |   |
| 13723 | OFDMA-BASED MULTIPLEXING OF UPLINK CONTROL INFORMATION                                                                      |        |               | CNT  | APP-Pending | US      | 16/406808     |              |                    |   |
| 13724 | NETWORK DISCOVERY AND BEAM ACQUISITION IN 5G RAT BEAM CELL OPERATION                                                        |        |               | PCT  | APP-Pending | US      | 15/747409     |              | US-2018-0243458-A1 |   |
| 13725 | DYNAMIC SPECTRUM ACCESS WITH FLEXIBLE BANDWIDTH FOR LICENSED SHARED ACCESS SYSTEMS                                          |        |               | PCT  | APP-Pending | US      | 15/742481     |              | US-2018-0206214-A1 |   |
| 13726 | RECEIVE BEAM INDICATION FOR 5G SYSTEMS                                                                                      |        |               | PCT  | PAT-Active  | US      | 15/747397     | #####        | US-2018-0215605-A1 |   |
| 13727 | RECEIVE BEAM INDICATION FOR 5G SYSTEMS                                                                                      |        |               | CNT  | APP-Pending | US      | 16/562111     |              |                    |   |
| 13728 | PHYSICAL BROADCAST CHANNEL DESIGN                                                                                           |        |               | PCT  | APP-Pending | US      | 15/565466     |              | US-2018-0131491-A1 |   |
| 13729 | PHYSICAL BROADCAST CHANNEL DESIGN                                                                                           |        |               | CNT  | APP-Pending | US      | 16/408461     |              | US-2019-0349913-A1 |   |

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| 2     | TITLE                                                                                                             | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13730 | SYSTEM AND METHODS FOR SYSTEM OPERATION FOR NARROWBAND-LTE FOR CELLULAR IOT                                       |        |               | PCT  | APP-Pending | US      | 15/746771     |              | US-2018-0213468-A1 |   |
| 13731 | VIRTUAL MOBILE MANAGEMENT ENTITY MANAGEMENT                                                                       |        |               | PCT  | APP-Pending | US      | 15/741285     |              | US-2018-0206108-A1 |   |
| 13732 | SYNCHRONIZATION SIGNALS AND CHANNEL STRUCTURE FOR NARROWBAND-LTE DEPLOYMENTS                                      |        |               | PCT  | APP-Pending | US      | 15/741282     |              | US-2018-0184390-A1 |   |
| 13733 | CONVERGENCE LAYER FOR 5G COMMUNICATION SYSTEMS                                                                    |        |               | PCT  | APP-Pending | US      | 15/745290     |              | US-2018-0227219-A1 |   |
| 13734 | CHANNEL QUALITY INDEX (CQI) REPORTING FOR SUPERPOSITION TRANSMISSIONS SCHEMES                                     |        |               | PCT  | APP-Pending | US      | 15/742435     |              | US-2018-0220399-A1 |   |
| 13735 | ENHANCED RACH (RANDOM ACCESS CHANNEL) DESIGN FOR 5G CIOI (CELLULAR INTERNET OF THINGS)                            |        |               | PCT  | APP-Pending | US      | 15/747221     |              | US-2018-0220452-A1 |   |
| 13736 | BEARER SPLITTING                                                                                                  |        |               | PCT  | APP-Pending | US      | 15/743403     |              | US-2018-0206262-A1 |   |
| 13737 | LAYER 2 RELAY PROTOCOLS AND MOBILITY RELAY METHOD                                                                 |        |               | PCT  | APP-Pending | US      | 15/745868     |              | US-2018-0213577-A1 |   |
| 13738 | PERFORMING MISSION CRITICAL COMMUNICATIONS AT A USER EQUIPMENT (UE)                                               |        |               | PCT  | APP-Pending | US      | 15/748157     |              | US-2018-0227958-A1 |   |
| 13739 | APPARATUS SYSTEM AND METHOD OF COMMUNICATING BETWEEN A CELLULAR MANAGER AND A USER EQUIPMENT (UE) VIA A WLAN NODE |        |               | PCT  | PAT-Active  | US      | 15/746865     | #####        | US-2019-0124511-A1 |   |
| 13740 | RMS EMERGENCY CALL ROUTING TECHNIQUES                                                                             |        |               | PCT  | APP-Pending | US      | 15/750825     |              | US-2018-0227419-A1 |   |
| 13741 | UCI FOR CARRIER AGGREGATION                                                                                       |        |               | PCT  | APP-Pending | US      | 15/741911     |              | US-2018-0205525-A1 |   |
| 13742 | ENHANCED PHYSICAL SIGNAL STRUCTURE FOR LTE V2V COMMUNICATIONS                                                     |        |               | PCT  | APP-Pending | US      | 15/751262     |              | US-2018-0227155-A1 |   |
| 13743 | DEMODULATION IN WIRELESS COMMUNICATIONS                                                                           |        |               | PCT  | APP-Pending | US      | 15/744009     |              | US-2018-0212733-A1 |   |
| 13744 | ENHANCED SOUNDING REFERENCE SIGNALING FOR UPLINK BEAM TRACKING                                                    |        |               | PCT  | APP-Pending | US      | 15/743094     |              | US-2019-0084751-A1 |   |
| 13745 | MEASUREMENT FOR DEVICE-TO-DEVICE (D2D) COMMUNICATION                                                              |        |               | PCT  | APP-Pending | US      | 15/742806     |              | US-2018-0206140-A1 |   |
| 13746 | CODEBOOK DESIGN FOR BEAMFORMED CSI-RS FOR FD-MIMO                                                                 |        |               | PCT  | APP-Pending | US      | 15/743800     |              | US-2018-0205438-A1 |   |
| 13747 | MULTI-USER MULTIPLE INPUT MULTIPLE OUTPUT COMMUNICATION SYSTEMS AND METHODS                                       |        |               | PCT  | PAT-Active  | US      | 15/744007     | #####        | US-2018-0198495-A1 |   |
| 13748 | HARQ FEEDBACK CONFIGURATION TECHNIQUES FOR BROADBAND WIRELESS COMMUNICATION NETWORKS                              |        |               | PCT  | APP-Pending | US      | 15/751453     |              |                    |   |
| 13749 | CONFIGURATION OF MEASUREMENT SUBFRAMES FOR A USER EQUIPMENT (UE)                                                  |        |               | PCT  | APP-Pending | US      | 15/749487     |              | US-2018-0220386-A1 |   |
| 13750 | METHODS TO ENABLE HIGH DATA RATE RELAY OPERATION USING D2D AIR-INTERFACE                                          |        |               | PCT  | PAT-Active  | US      | 15/742801     | #####        | US-2018-0206176-A1 |   |
| 13751 | RESOURCE ACCESS IN DEVICE TO DEVICE COMMUNICATION                                                                 |        |               | PCT  | PAT-Active  | US      | 15/743548     | #####        | US-2018-0206260-A1 |   |
| 13752 | RESOURCE ACCESS IN DEVICE TO DEVICE COMMUNICATION                                                                 |        |               | CNY  | APP-Pending | US      | 16/515319     |              |                    |   |
| 13753 | LIGHTWEIGHT 5-1 LITE PROTOCOL DESIGN FOR CELLULAR INTERNET OF THINGS                                              |        |               | PCT  | APP-Pending | US      | 15/743168     |              | US-2019-0098531-A1 |   |
| 13754 | METHOD OF MEASUREMENT GAP ENHANCEMENT                                                                             |        |               | PCT  | APP-Pending | US      | 15/743915     |              | US-2018-0213425-A1 |   |
| 13755 | AUTOMATIC GAIN CONTROL GAIN ADJUSTMENT                                                                            |        |               | NP   | PAT-Active  | US      | 15/186563     | 9844012      | US-2017-0348808-A1 |   |

|       | A                                                                                                                          | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                      | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13756 | USER EQUIPMENT CAPABILITY REPORTING                                                                                        |        |               | PCT  | APP-Pending | US      | 15/743562     |              | US-2018-0206113-A1 |   |
| 13757 | ENERGY DETECTION THRESHOLD ADAPTATION FOR LICENSED ASSISTED ACCESS OF LTE IN UNLICENSED BAND                               |        |               | PCT  | APP-Pending | US      | 15/751127     |              | US-2018-0234886-A1 |   |
| 13758 | METHODS FOR CQI FEEDBACK AND RRM MEASUREMENTS WITH DYNAMIC POWER SHARING AMONG MULTIPLE LAA CELLS FOR DL-ONLY TRANSMISSION |        |               | PCT  | APP-Pending | US      | 15/745409     |              | US-2018-0212740-A1 |   |
| 13759 | BEAMFORMING TRAINING REFERENCE SIGNAL DESIGN                                                                               |        |               | PCT  | APP-Pending | US      | 15/746983     |              | US-2019-0013848-A1 |   |
| 13760 | TRANSMIT BEAMFORMING                                                                                                       |        |               | PCT  | PAT-Active  | US      | 15/747080     | #####        | US-2019-0212659-A1 |   |
| 13761 | MACHINE TYPE COMMUNICATION RELAYING                                                                                        |        |               | PCT  | PAT-Active  | US      | 15/745572     | #####        | US-2018-0213379-A1 |   |
| 13762 | FLEXIBLE CSI RS CONFIGURATION FOR FD-MIMO SYSTEMS                                                                          |        |               | PCT  | PAT-Active  | US      | 15/753960     | #####        | US-2018-0219601-A1 |   |
| 13763 | RADIO RESOURCE CONTROL IN CELLULAR/WLAN AGGREGATION                                                                        |        |               | PCT  | APP-Pending | US      | 15/746341     |              | US-2018-0234869-A1 |   |
| 13764 | COMMUNICATION DEVICE AND METHOD FOR SIGNAL DETERMINATION IN RADIO COMMUNICATION                                            |        |               | PCT  | APP-Pending | US      | 15/778240     |              | US-2018-0351590-A1 |   |
| 13765 | ELECTRICAL SYSTEMS AND METHODS FOR PERFORMING OUT-OF-BAND COMMUNICATIONS                                                   |        |               | PCT  | APP-Pending | US      | 15/771426     |              | US-2018-0342150-A1 |   |
| 13766 | RADIO COMMUNICATION DEVICES AND METHODS FOR PERFORMING WIRELESS PEER-TO-PEER DISCOVERY                                     |        |               | NP   | PAT-Active  | US      | 14/948488     | 9832680      | US-2017-0150337-A1 |   |
| 13767 | COMMUNICATION DEVICE AND METHOD FOR PERFORMING RADIO COMMUNICATION                                                         |        |               | NP   | APP-Pending | US      | 14/864874     |              | US-2017-0294678-A1 |   |
| 13768 | CIRCUIT ARRANGEMENT MOBILE DEVICE AND METHOD FOR AMPLIFYING A SIGNAL                                                       |        |               | PCT  | PAT-Active  | US      | 15/758736     | #####        | US-2018-0302052-A1 |   |
| 13769 | Communication device and method for signal determination in radio communication                                            |        |               | NP   | PAT-Active  | US      | 14/998117     | 9808921      | US-2017-0187554-A1 |   |
| 13770 | METHOD FOR SOLVING CONFLICTS IN SCHEDULING CELL BROADCAST MESSAGE RECEPTION AND IDLE MODE TASKS OF A MOBILE DEVICE         |        |               | NP   | PAT-Active  | US      | 15/354452     | #####        | US-2017-0181184-A1 |   |
| 13771 | HYBRID I-Q POLAR TRANSMITTER WITH QUADRATURE LOCAL OSCILLATOR (LO) PHASE CORRECTION                                        |        |               | NP   | PAT-Active  | US      | 15/071867     | 9565043      |                    |   |
| 13772 | APPARATUS FOR REDUCING A MAGNETIC COUPLING BETWEEN A FIRST ELECTRONIC CIRCUIT AND A SECOND ELECTRONIC CIRCUIT              |        |               | PCT  | PAT-Active  | US      | 15/776983     | #####        | US-2018-0331769-A1 |   |
| 13773 | MULTI-HARMONIC MATCHING NETWORKS                                                                                           |        |               | NP   | PAT-Active  | US      | 14/978251     | 9979375      | US-2017-0179917-A1 |   |
| 13774 | MULTI-HARMONIC MATCHING NETWORKS                                                                                           |        |               | ENT  | APP-Pending | US      | 15/926360     |              | US-2018-0243368-A1 |   |
| 13775 | BEAMFORMED PHYSICAL DOWNLINK CONTROL CHANNELS (BPDCCHs) FOR NARROW BEAM BASED WIRELESS COMMUNICATION                       |        |               | PCT  | APP-Pending | US      | 15/753953     |              | US-2018-0254853-A1 |   |
| 13776 | MANAGING ASPECTS OF RECEIVE BEAMFORMING                                                                                    |        |               | PCT  | APP-Pending | US      | 15/747010     |              | US-2018-0219594-A1 |   |
| 13777 | INTER-BEAM MOBILITY CONTROL IN MIMO COMMUNICATION SYSTEMS                                                                  |        |               | PCT  | PAT-Active  | US      | 15/747027     | #####        | US-2019-0013857-A1 |   |
| 13778 | INDICATION OF TDD UPLINK AND DOWNLINK CONFIGURATIONS                                                                       |        |               | PCT  | APP-Pending | US      | 15/747270     |              | US-2018-0220407-A1 |   |
| 13779 | CIOT ARCHITECTURE FOR EFFICIENT DATA TRANSMISSION                                                                          |        |               | PCT  | APP-Pending | US      | 15/743574     |              | US-2018-0206093-A1 |   |
| 13780 | APPARATUS AND METHOD FOR REPORTING SYSTEM FRAME NUMBER (SFN) AND SUBFRAME OFFSET IN DUAL CONNECTIVITY (DC) ENHANCEMENT     |        |               | PCT  | APP-Pending | US      | 15/755529     |              | US-2018-0245463-A1 |   |

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| 2     | TITLE                                                                                                                                                       | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13781 | MULTI-USER BASED SPLITTING FOR MULTI-RAT AGGREGATION                                                                                                        |        |               | PCT  | PAT-Active  | US      | 15/742878     | #####        | US-2018-0378365-A1 |   |
| 13782 | RECEIVED SIGNAL STRENGTH INDICATOR MEASUREMENT FOR LICENSED ASSISTED ACCESS                                                                                 |        |               | PCT  | APP-Pending | US      | 15/751838     |              | US-2018-0241985-A1 |   |
| 13783 | DUAL CONNECTIVITY FOR RELIABILITY                                                                                                                           |        |               | PCT  | APP-Pending | US      | 15/748717     |              | US-2018-0235022-A1 |   |
| 13784 | WIRELESS PERSONAL AREA NETWORK UNDERLYING CELLULAR NETWORKS                                                                                                 |        |               | PCT  | APP-Pending | US      | 15/755330     |              | US-2018-0253611-A1 |   |
| 13785 | GRANT-LESS PUSCH UPLINK                                                                                                                                     |        |               | PCT  | APP-Pending | US      | 15/750121     |              | US-2018-0167161-A1 |   |
| 13786 | METHODS AND APPARATUSES FOR CHANNEL ESTIMATION FOR NB-PBCH IN NB-LTE SYSTEMS                                                                                |        |               | PCT  | APP-Pending | US      | 15/749307     |              | US-2018-0227142-A1 |   |
| 13787 | BEAM INTERPOLATION IN MASSIVE MIMO SYSTEMS                                                                                                                  |        |               | PCT  | PAT-Active  | US      | 15/758305     | #####        | US-2018-0268945-A1 |   |
| 13788 | METHODS AND DEVICES FOR CELL SEARCH                                                                                                                         |        |               | NP   | APP-Pending | US      | 15/086252     |              | US-2017-0289360-A1 |   |
| 13789 | EQUALIZER AND METHOD FOR EQUALIZING A RECEIVE SIGNAL                                                                                                        |        |               | PCT  | APP-Pending | US      | 15/777537     |              | US-2018-0337804-A1 |   |
| 13790 | DEVICE AND METHOD FOR RADIO ACCESS TECHNOLOGY SEARCH                                                                                                        |        |               | NP   | PAT-Active  | US      | 14/964606     | 9748941      | US-2017-0171799-A1 |   |
| 13791 | METHOD FOR SHARING A WIRELESS TRANSMISSION MEDIUM IN A TERMINAL DEVICE AND WIRELESS COMMUNICATION DEVICE AND WIRELESS COMMUNICATION CIRCUIT RELATED THERETO |        |               | NP   | PAT-Active  | US      | 15/357778     | #####        | US-2017-0181148-A1 |   |
| 13792 | COMMUNICATION DEVICE AND METHOD FOR SIGNAL DETERMINATION                                                                                                    |        |               | NP   | PAT-Active  | US      | 15/356806     | 9825727      | US-2017-0180066-A1 |   |
| 13793 | CIRCUIT AND A METHOD FOR ATTACHING A TIME STAMP TO A TRACE MESSAGE                                                                                          |        |               | NP   | APP-Pending | US      | 15/350318     |              | US-2017-0180236-A1 |   |
| 13794 | MOBILE COMMUNICATIONS DEVICE AND A METHOD FOR CONTROLLING A MOBILE COMMUNICATIONS DEVICE                                                                    |        |               | NP   | APP-Pending | US      | 15/356092     |              | US-2017-0180550-A1 |   |
| 13795 | COMMUNICATION DEVICE AND METHOD FOR PERFORMING RADIO COMMUNICATION                                                                                          |        |               | PCT  | APP-Pending | US      | 15/775845     |              | US-2018-0331878-A1 |   |
| 13796 | COMMUNICATION TERMINAL AND METHOD FOR CHANNEL ESTIMATION                                                                                                    |        |               | PCT  | PAT-Active  | US      | 15/776098     | #####        | US-2019-0074899-A1 |   |
| 13797 | METHOD AND DEVICE FOR TEMPERATURE CONTROL IN A RADIO RECEIVER                                                                                               |        |               | NP   | APP-Pending | US      | 15/347886     |              | US-2017-0167745-A1 |   |
| 13798 | DEVICE AND METHOD FOR DEVICE TO DEVICE COMMUNICATION                                                                                                        |        |               | PCT  | APP-Pending | US      | 15/776800     |              | US-2018-0332491-A1 |   |
| 13799 | COMMUNICATION DEVICE AND METHOD FOR PERFORMING RADIO COMMUNICATION                                                                                          |        |               | NP   | PAT-Active  | US      | 15/356767     | 9883479      | US-2017-0181107-A1 |   |
| 13800 | MOBILE TERMINAL DEVICE AND METHOD FOR PROCESSING SIGNALS                                                                                                    |        |               | NP   | PAT-Active  | US      | 15/356776     | #####        | US-2017-0180159-A1 |   |
| 13801 | RANDOM ACCESS PROCEDURE FOR BEAM BASED CELL-LESS OPERATION IN 5G RAT                                                                                        |        |               | PCT  | PAT-Active  | US      | 15/751676     | #####        | US-2018-0235013-A1 |   |
| 13802 | RADIO NETWORK ACCESS OF WEARABLE DEVICES                                                                                                                    |        |               | PCT  | APP-Pending | US      | 15/749728     |              | US-2018-0213582-A1 |   |
| 13803 | DEVICE AND METHOD FOR ENHANCED SEAMLESS MOBILITY                                                                                                            |        |               | PCT  | APP-Pending | US      | 15/756189     |              | US-2018-0248736-A1 |   |
| 13804 | EVOLVED NODE-B (ENB) USER EQUIPMENT (UE) AND METHODS FOR FLEXIBLE DUPLEX COMMUNICATION                                                                      |        |               | PCT  | PAT-Active  | US      | 15/256210     | #####        | US-2018-0359762-A1 |   |
| 13805 | EVOLVED NODE-B (ENB) USER EQUIPMENT (UE) AND METHODS FOR FLEXIBLE DUPLEX COMMUNICATION                                                                      |        |               | PCT  | APP-Pending | US      | 16/4071A3     |              | US-2019-0335478-A1 |   |

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| 2     | TITLE                                                                                                      | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13806 | REFERENCE SIGNALS FOR INITIAL ACQUISITION IN 5G SYSTEMS                                                    |        |               | PCT  | PAT-Active  | US      | 15/758670     | #####        | US-2018-0306495-A1 |   |
| 13807 | REFERENCE SIGNALS FOR INITIAL ACQUISITION IN 5G SYSTEMS                                                    |        |               | CNT  | APP-Pending | US      | 16/407154     |              |                    |   |
| 13808 | TRANSMISSION OF UPLINK CONTROL INFORMATION IN WIRELESS SYSTEMS                                             |        |               | PCT  | APP-Pending | US      | 15/759034     |              |                    |   |
| 13809 | TRANSMISSION OF UPLINK CONTROL INFORMATION IN WIRELESS SYSTEMS                                             |        |               | PCT  | APP-Pending | US      | 15/760975     |              | US-2018-0263021-A1 |   |
| 13810 | TRANSMISSION OF UPLINK CONTROL INFORMATION IN WIRELESS SYSTEMS                                             |        |               | CNT  | APP-Pending | US      | 15/963482     |              | US-2018-0245958-A1 |   |
| 13811 | ARCHITECTURE AND CONTROL OF HYBRID COUPLER BASED ANALOG SELF-INTERFERENCE CANCELLATION                     |        |               | NP   | PAT-Active  | US      | 14/976647     | 9602149      |                    |   |
| 13812 | BYPASS RING TO IMPROVE NOISE ISOLATION OF COILS AND INDUCTORS                                              |        |               | NP   | PAT-Active  | US      | 14/958365     | 9496231      |                    |   |
| 13813 | ANTENNA ARRANGEMENT                                                                                        |        |               | NP   | PAT-Active  | US      | 14/757569     | #####        | US-2017-0187113-A1 |   |
| 13814 | DEVICE AND METHOD OF CONFIGURABLE SYNCHRONIZATION SIGNAL AND CHANNEL DESIGN                                |        |               | PCT  | PAT-Active  | US      | 15/564859     | #####        | US-2018-0091249-A1 |   |
| 13815 | DEVICE AND METHOD OF CONFIGURABLE SYNCHRONIZATION SIGNAL AND CHANNEL DESIGN                                |        |               | CNT  | APP-Pending | US      | 16/408193     |              | US-2019-0334646-A1 |   |
| 13816 | ACK/NACK SIGNALS FOR NEXT GENERATION LTE DEVICES AND SYSTEMS                                               |        |               | PCT  | APP-Pending | US      | 15/574581     |              | US-2018-0135014-A1 |   |
| 13817 | ACK/NACK SIGNALS FOR NEXT GENERATION LTE DEVICES AND SYSTEMS                                               |        |               | CNT  | APP-Pending | US      | 16/408223     |              |                    |   |
| 13818 | USER EQUIPMENT (UE) AND METHODS FOR REGISTRATION OF CIRCUIT-SWITCHED (CS) SERVICES IN MULTI-MODE OPERATION |        |               | PCT  | APP-Pending | US      | 15/768329     |              | US-2018-0310190-A1 |   |
| 13819 | SECURE DIRECT DISCOVERY AMONG USER EQUIPMENT                                                               |        |               | PCT  | APP-Pending | US      | 15/749704     |              | US-2018-0234827-A1 |   |
| 13820 | SYSTEMS METHODS AND DEVICES FOR V2X SERVICES OVER WIRELESS WIDE AREA NETWORKS                              |        |               | PCT  | PAT-Active  | US      | 15/741684     | #####        | US-2018-0206288-A1 |   |
| 13821 | SYSTEMS METHODS AND DEVICES FOR RESOURCE ALLOCATION ADJUSTMENTS FOR WIRELESS TRANSMISSIONS                 |        |               | PCT  | APP-Pending | US      | 15/742406     |              | US-2018-0376474-A1 |   |
| 13822 | SYSTEMS METHODS AND DEVICES FOR CELLULAR SYNCHRONIZATION REFERENCES                                        |        |               | PCT  | APP-Pending | US      | 15/742416     |              | US-2018-0213498-A1 |   |
| 13823 | SYSTEMS METHODS AND DEVICES FOR SHARING A WIRELESS MEDIUM USING LISTEN BEFORE TALK                         |        |               | PCT  | APP-Pending | US      | 15/742388     |              | US-2018-0206269-A1 |   |
| 13824 | DETERMINATION OF NUMBER OF PHYSICAL UPLINK CONTROL CHANNEL REPETITIONS FOR MACHINE TYPE COMMUNICATIONS     |        |               | PCT  | APP-Pending | US      | 15/749757     |              | US-2019-0182824-A1 |   |
| 13825 | CONFIGURATION OF NON-UE-SPECIFIC SEARCH SPACE FOR M-PDCCH                                                  |        |               | PCT  | APP-Pending | US      | 15/743589     |              | US-2018-0212736-A1 |   |
| 13826 | V2X PERFORMANCE ENHANCEMENTS IN HIGH SPEED ENVIRONMENTS                                                    |        |               | PCT  | APP-Pending | US      | 15/754260     |              | US-2018-0241508-A1 |   |
| 13827 | SYSTEM INFORMATION CHANGE NOTIFICATION TECHNIQUES FOR WIRELESS COMMUNICATIONS NETWORKS                     |        |               | PCT  | APP-Pending | US      | 15/751843     |              | US-2018-0270738-A1 |   |
| 13828 | CONGESTION CONTROL FOR VEHICULAR-TO-ANYTHING SERVICES                                                      |        |               | PCT  | APP-Pending | US      | 15/754531     |              | US-2018-0242190-A1 |   |
| 13829 | RADIO COMMUNICATION DEVICE AND METHOD OF MOBILE RADIO CELL MEASUREMENT REPORTING                           |        |               | PCT  | APP-Pending | US      | 15/776801     |              | US-2018-0332492-A1 |   |
| 13830 | LATTICE REDUCTION-AIDED SYMBOL DETECTION                                                                   |        |               | PCT  | APP-Pending | US      | 15/763880     |              | US-2018-0287675-A1 |   |
| 13831 | METHOD AND DEVICE FOR SCHEDULING CELL QUALITY MEASUREMENTS IN A MOBILE RECEIVER                            |        |               | NP   | PAT-Active  | US      | 15/357366     | #####        | US-2017-0188274-A1 |   |
| 13832 | METHOD AND DEVICE FOR SCHEDULING CELL QUALITY MEASUREMENTS IN A MOBILE RECEIVER                            |        |               | CNT  | APP-Pending | US      | 16/507501     |              |                    |   |

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| 2     | TITLE                                                                                                                           | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13833 | COMMUNICATION TERMINAL AND METHOD FOR SELECTING A COMMUNICATION ANTENNA                                                         |        |               | NP   | APP-Pending | US      | 15/357824     |              | US-2017-0181071-A1 |   |
| 13834 | FAST FOURIER TRANSFORM ARCHITECTURE                                                                                             |        |               | PCT  | APP-Pending | US      | 15/777248     |              | US-2018-0336161-A1 |   |
| 13835 | METHOD AND APPARATUS FOR REDUCING POWER OF A CDMA MOBILE STATION BY CONTROLLED TRANSITION FROM CONTROL HOLD TO ACTIVE STATE     |        |               | NP   | PAT-Active  | US      | 15/431646     | 7203527      | US-2003-0227882-A1 |   |
| 13836 | POWER CONTROL OF PLURAL PACKET DATA CONTROL CHANNELS                                                                            |        |               | NP   | PAT-Active  | US      | 10/455783     | 7353039      | US-2004-0043784-A1 |   |
| 13837 | AIR INTERFACE RESOURCE UTILIZATION TECHNIQUES FOR WIRELESS COMMUNICATION NETWORKS                                               |        |               | PCT  | APP-Pending | US      | 15/756516     |              | US-2018-0262975-A1 |   |
| 13838 | DEVICES AND METHODS OF USING NETWORK FUNCTION VIRTUALIZATION AND VIRTUALIZED RESOURCES PERFORMANCE DATA TO IMPROVE PERFORMANCE  |        |               | PCT  | APP-Pending | US      | 15/764469     |              | US-2018-0262410-A1 |   |
| 13839 | DEVICES AND METHODS OF USING NETWORK FUNCTION VIRTUALIZATION AND VIRTUALIZED RESOURCES PERFORMANCE DATA TO IMPROVE PERFORMANCE  |        |               | INT  | APP-Pending | US      | 16/408234     |              | US-2019-0334796-A1 |   |
| 13840 | ENHANCED PAGING MECHANISM FOR CELLULAR INTERNET OF THINGS                                                                       |        |               | PCT  | PAT-Active  | US      | 15/758246     | #####        | US-2018-0263013-A1 |   |
| 13841 | DETERMINING THE RECEIVED DATA RATE IN A VARIABLE RATE COMMUNICATIONS SYSTEM                                                     |        |               | NP   | PAT-Active  | US      | 08/430994     | 6370672      |                    |   |
| 13842 | METHOD AND APPARATUS FOR CONTROLLING FORWARD LINK POWER DURING AN INTERGENERATIONAL SOFT HANDOFF IN A CDMA COMMUNICATION SYSTEM |        |               | NP   | PAT-Active  | US      | 03/783729     | 6937583      |                    |   |
| 13843 | FREQUENCY DIVISION MULTIPLE ACCESS SYSTEM SEARCHING                                                                             |        |               | NP   | PAT-Active  | US      | 08/588840     | 6775261      |                    |   |
| 13844 | FORWARD PACKET DATA CHANNEL WITH PARALLEL SUB-PACKETS                                                                           |        |               | NP   | PAT-Active  | US      | 10/099815     | 7379416      | US-2003-0174642-A1 |   |
| 13845 | FAST FEEDBACK CHANNEL WITH FLEXIBLE BIT RELIABILITY FOR WIRELESS COMMUNICATIONS                                                 |        |               | NP   | PAT-Active  | US      | 03/834317     | 6876641      | US-2001-0048694-A1 |   |
| 13846 | ADAPTIVE ANTENNA METHOD AND APPARATUS                                                                                           |        |               | NP   | PAT-Active  | US      | 09/632081     | 6952455      |                    |   |
| 13847 | METHOD AND APPARATUS FOR GENERATING TRANSMIT ADAPTIVE ANTENNA WEIGHTS WITH INQ USING BINARY GRADIENT FEEDBACK                   |        |               | CIP  | PAT-Active  | US      | 10/080751     | 7433416      |                    |   |
| 13848 | SYNCHRONIZATION OF MOBILE STATION LOCATION MEASUREMENT WITH CDMA SERVICE                                                        |        |               | NP   | PAT-Active  | US      | 10/264021     | 7035648      | US-2003-0100314-A1 |   |
| 13849 | FRAME MATCHING METHOD                                                                                                           |        |               | NP   | PAT-Active  | US      | 03/687780     | 6891853      |                    |   |
| 13850 | METHOD AND APPARATUS FOR PROCESSING INTERRUPTS AT DYNAMICALLY SELECTABLE PRIORITIZATION LEVELS                                  |        |               | NP   | PAT-Active  | US      | 10/356130     | 6928502      | US-2004-0153596-A1 |   |
| 13851 | METHOD AND APPARATUS ESTIMATING CELL INTERFERENCE AND NOISE FOR CDMA PACKET DATA CHANNELS                                       |        |               | NP   | PAT-Active  | US      | 10/618079     | 7450556      | US-2005-0007975-A1 |   |
| 13852 | PILOT SIGNAL ENHANCEMENTS FOR A WIRELESS COMMUNICATION SYSTEM                                                                   |        |               | NP   | PAT-Active  | US      | 15/903029     | 7450549      | US-2005-0030926-A1 |   |
| 13853 | PILOT SIGNAL ENHANCEMENTS FOR A WIRELESS COMMUNICATION SYSTEM                                                                   |        |               | DIV  | PAT-Active  | US      | 12/151017     | 8208447      | US-2008-0205374-A1 |   |
| 13854 | TRISTATE REQUESTS FOR FLEXIBLE PACKET RETRANSMISSION                                                                            |        |               | NP   | PAT-Active  | US      | 10/947825     | 7590084      | US-2005-0068908-A1 |   |
| 13855 | TRISTATE REQUESTS FOR FLEXIBLE PACKET RETRANSMISSION                                                                            |        |               | DIV  | PAT-Active  | US      | 12/537086     | 8254363      | US-2009-0310854-A1 |   |
| 13856 | LEGACY-COMPATIBLE SIGNALING EXTENSION METHOD FOR BROADCAST/MULTICAST SERVICE INDICATIONS                                        |        |               | NP   | PAT-Active  | US      | 10/955241     | 7486643      | US-2005-0258623-A1 |   |
| 13857 | MOBILE STATION CONNECTION MANAGEMENT UTILIZING SUITABLE PARAMETER INFORMATION                                                   |        |               | NP   | PAT-Active  | US      | 10/965080     | 7312917      | US-2005-0136937-A1 |   |
| 13858 | METHOD AND/OR ARCHITECTURE IMPLEMENTED IN HARDWARE FOR THE ADJUSTMENT OF MESSAGES WITH INDETERMINISTIC LENGTH                   |        |               | NP   | PAT-Active  | US      | 10/812810     | 7378352      | US-2005-0220151-A1 |   |



|       | A                                                                                                                                        | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                    | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13859 | METHOD AND/OR APPARATUS IMPLEMENTED IN HARDWARE TO DISCARD BAD LOGICAL TRANSMISSION UNITS (LTUS)                                         |        |               | NP   | PAT-Active  | US      | 10/842376     | 7340667      | US-2005-0251717-A1 |   |
| 13860 | METHOD AND/OR APPARATUS FOR GENERATING A WHITE GATED CLOCK SIGNAL                                                                        |        |               | NP   | PAT-Active  | US      | 10/867899     | 7048066      | US-2005-0275441-A1 |   |
| 13861 | ACTIVE ACKNOWLEDGMENT SOURCE SELECTION                                                                                                   |        |               | NP   | PAT-Active  | US      | 11/302959     | 7567936      | US-2006-0034241-A1 |   |
| 13862 | ENHANCED SELF-CONTAINED TIME-DIVISION DUPLEX SUBFRAME STRUCTURE                                                                          |        |               | PCT  | APP-Pending | US      | 15/762534     |              |                    |   |
| 13863 | DUAL RADIO OPERATION BETWEEN ACCESS SYSTEMS USING 3GPP RADIO ACCESS TECHNOLOGY                                                           |        |               | PCT  | APP-Pending | US      | 15/766052     |              | US-2018-0288657-A1 |   |
| 13864 | BEARER-LESS ARCHITECTURE FOR A WIRELESS CELLULAR NETWORK                                                                                 |        |               | PCT  | APP-Pending | US      | 15/762998     |              | US-2018-0288784-A1 |   |
| 13865 | RRM REQUIREMENT FOR DTD INTER-CARRIER DISCOVERY GAP                                                                                      |        |               | PCT  | PAT-Active  | US      | 15/756943     | #####        | US-2018-0279109-A1 |   |
| 13866 | SIGNALING METHODS FOR FLEXIBLE RADIO RESOURCE MANAGEMENT                                                                                 |        |               | PCT  | APP-Pending | US      | 15/761390     |              | US-2018-0279398-A1 |   |
| 13867 | NETWORK INITIATED PACKET DATA NETWORK CONNECTION                                                                                         |        |               | PCT  | APP-Pending | US      | 15/765542     |              | US-2018-0310350-A1 |   |
| 13868 | NETWORK UTILITY MAXIMIZATION WITH MULTI-RAT AGGREGATION                                                                                  |        |               | PCT  | APP-Pending | US      | 15/765594     |              | US-2018-0352477-A1 |   |
| 13869 | WALSH MASK TEST IN CDMA CELLULAR WIRELESS COMMUNICATION SYSTEMS WITH PACKET DATA SERVICE                                                 |        |               | NP   | PAT-Active  | US      | 11/142773     | 7303892      | US-2006-0274639-A1 |   |
| 13870 | MEMORY EFFICIENT STREAMLINED TRANSMITTER WITH A MULTIPLE INSTANCE HYBRID ARQ                                                             |        |               | NP   | PAT-Active  | US      | 11/078751     | 7340669      | US-2006-0206777-A1 |   |
| 13871 | MOBILE PHONE HAVING A DIRECTED BEAM ANTENNA                                                                                              |        |               | DIV  | PAT-Active  | US      | 11/703426     | 7576699      | US-2007-0159404-A1 |   |
| 13872 | SYSTEM AND METHOD FOR DIGITAL MULTIMEDIA BROADCASTING                                                                                    |        |               | NP   | PAT-Active  | US      | 11/280999     | 7529221      | US-2006-0114857-A1 |   |
| 13873 | METHOD AND SYSTEM FOR A LOCK DETECTOR FOR A PHASE-LOCKED LOOP                                                                            |        |               | NP   | PAT-Active  | US      | 11/101985     | 7157978      | US-2006-0226914-A1 |   |
| 13874 | POWER-EFFICIENT SIGNALING FOR ASYMMETRIC MULTI-CARRIER COMMUNICATIONS                                                                    |        |               | EXP  | PAT-Active  | US      | 11/488909     | 7564828      | US-2007-0060360-A1 |   |
| 13875 | INTER-LAYER COMMUNICATION OF RECEIPT CONFIRMATION FOR RELEASING RETRANSMISSION BUFFER CONTENTS                                           |        |               | NP   | PAT-Active  | US      | 11/266913     | 7567915      | US-2007-0113823-A1 |   |
| 13876 | DYNAMICALLY BEAMFORMED CONTROL CHANNEL FOR BEAMFORMED CELLS                                                                              |        |               | PCT  | APP-Pending | US      | 15/766561     |              | US-2018-0294859-A1 |   |
| 13877 | COMMUNICATION DEVICE AND METHOD FOR PERFORMING RADIO COMMUNICATION                                                                       |        |               | NP   | PAT-Active  | US      | 15/356787     | 9867133      | US-2017-0181996-A1 |   |
| 13878 | JOINT NONCOHERENT DEMODULATION AND CARRIER FREQUENCY OFFSET CORRECTION BASED ON NON-LINEAR FILTERING                                     |        |               | PCT  | PAT-Active  | US      | 15/777570     | #####        | US-2019-0028322-A1 |   |
| 13879 | DEVICE AND METHOD FOR USER ORIGINATED MULTIPLE CONNECTION MANAGEMENT TRANSACTIONS VIA CIRCUIT SWITCHED FALLBACK                          |        |               | NP   | PAT-Active  | US      | 14/975884     | 9788241      | US-2017-0181042-A1 |   |
| 13880 | METHOD AND MIGRATION MANAGER COMPONENT FOR TRANSFERRING AN APPLICATION AND SYSTEM FOR MANAGING TERMINAL DEVICE COMMUNICATION CONNECTIONS |        |               | PCT  | APP-Pending | US      | 15/777246     |              | US-2018-0332654-A1 |   |
| 13881 | COMMUNICATION TERMINAL AND METHOD FOR PERFORMING A CELL SELECTION OR RESELECTION                                                         |        |               | PCT  | APP-Pending | US      | 15/776807     |              | US-2018-0332521-A1 |   |
| 13882 | A Successive Joint Channel Estimation based Interference Cancellation Scheme against Colliding Interferences                             |        |               | PCT  | APP-Pending | US      | 15/775161     |              | US-2018-0275689-A1 |   |
| 13883 | VARIABLE BANDWIDTH AUTOMATIC GAIN CONTROL                                                                                                |        |               | NP   | PAT-Active  | US      | 11/369313     | 7596193      | US-2007-0147956-A1 |   |

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| 2     | TITLE                                                                                                                  | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13884 | VARIABLE BANDWIDTH AUTOMATIC GAIN CONTROL                                                                              |        |               | CNT  | PAT-Active  | US      | 12/398740     | 8160186      | US-2010-0172451-A1 |   |
| 13885 | SAS INTERFERENCE MITIGATION OPTIONS                                                                                    |        |               | PCT  | APP-Pending | US      | 15/761016     |              | US-2018-0279316-A1 |   |
| 13886 | APPARATUSES FOR DMRS DESIGN OR PROCESSING FOR GUARD INTERVAL OR ZERO TAIL OFT SPREAD OFDM SYSTEMS                      |        |               | PCT  | APP-Pending | US      | 15/747089     |              | US-2018-0219709-A1 |   |
| 13887 | FLEXIBLE UNIVERSAL EXTENDED FRAME STRUCTURE                                                                            |        |               | PCT  | APP-Pending | US      | 15/765240     |              | US-2018-0254851-A1 |   |
| 13888 | ENHANCED RESOURCE MAPPING SCHEME                                                                                       |        |               | PCT  | APP-Pending | US      | 15/764294     |              | US-2019-0068352-A1 |   |
| 13889 | FREQUENCY RECONFIGURABLE ANTENNA DECOUPLING FOR WIRELESS COMMUNICATION                                                 |        |               | NP   | APP-Pending | US      | 15/193958     |              | US-2017-0373393-A1 |   |
| 13890 | NAX MESSAGE TRANSMISSION WITH QUICKNAX INDICATION                                                                      |        |               | NP   | PAT-Active  | US      | 11/622086     | 8051190      | US-2008-0170565-A1 |   |
| 13891 | ACCESS TERMINAL PAGING IMPROVEMENTS                                                                                    |        |               | NP   | PAT-Active  | US      | 12/152835     | 8081591      | US-2008-0293440-A1 |   |
| 13892 | SYSTEMS AND METHODS FOR DETERMINING SLOTTED MODE OPERATION TIMING IN A HYBRID ACCESS TERMINAL                          |        |               | NP   | PAT-Active  | US      | 11/862029     | 7994393      | US-2008-0075039-A1 |   |
| 13893 | ACCESS TERMINAL WHICH HANDLES MULTIPLE USER CONNECTIONS                                                                |        |               | NP   | PAT-Active  | US      | 11/748042     | 8058592      | US-2008-0285508-A1 |   |
| 13894 | FEMTOCELL BASE STATION WITH MOBILE STATION CAPABILITY                                                                  |        |               | NP   | PAT-Active  | US      | 11/861772     | 8193267      | US-2009-0082010-A1 |   |
| 13895 | DEVICES AND METHODS FOR ROBUST MEASUREMENT AND DATA RECEIVING                                                          |        |               | PCT  | APP-Pending | US      | 15/770948     |              | US-2018-0309526-A1 |   |
| 13896 | CONTENTION WINDOW SIZE ADAPTATION                                                                                      |        |               | PCT  | APP-Pending | US      | 15/760010     |              | US-2018-0254858-A1 |   |
| 13897 | METHOD APPARATUS AND SYSTEM FOR REPORTING BEAM REFERENCE SIGNAL RECEIVING POWER                                        |        |               | PCT  | APP-Pending | US      | 15/752553     |              | US-2019-0028167-A1 |   |
| 13898 | FAMILY OF LINEAR MULTI-USER DETECTORS (MUDS)                                                                           |        |               | NP   | PAT-Active  | US      | 09/633131     | 6618433      |                    |   |
| 13899 | CHANNEL ESTIMATION METHODS AND APPARATUS UTILIZING THE SAME                                                            |        |               | NP   | PAT-Active  | US      | 12/400169     | 8391427      | US-2009-0296836-A1 |   |
| 13900 | APPARATUS AND METHOD FOR HANDLING RETRANSMISSION FAILURE ACCORDING TO ACTIVATION STATUS OF SECURITY MODE               |        |               | NP   | PAT-Active  | US      | 12/269204     | 8737294      | US-2010-0035599-A1 |   |
| 13901 | APPARATUS AND METHOD FOR ALLEVIATING BARRED ACCESS IN MOBILE COMMUNICATION SYSTEM                                      |        |               | NP   | PAT-Active  | US      | 12/409748     | 8121088      | US-2010-0074170-A1 |   |
| 13902 | WIRELESS HIGH-RATE RATE COMMUNICATIONS                                                                                 |        |               | NP   | PAT-Active  | US      | 12/626767     | 8295251      | US-2010-0135258-A1 |   |
| 13903 | SYNCHRONIZATION METHOD AND APPARATUS FOR ORTHOGONAL FREQUENCY DIVISION MULTIPLEXING SYSTEM                             |        |               | NP   | PAT-Active  | US      | 12/468073     | 8320481      | US-2010-0246698-A1 |   |
| 13904 | APPARATUS AND METHOD FOR REVERSE LINK TRANSMISSION IN AN ACCESS TERMINAL                                               |        |               | NP   | PAT-Active  | US      | 12/420554     | 8265490      | US-2010-0262881-A1 |   |
| 13905 | WIRELESS COMMUNICATION BETWEEN A BASE STATION AND A MOBILE DEVICE                                                      |        |               | NP   | PAT-Active  | US      | 12/434003     | 8213933      | US-2010-0279683-A1 |   |
| 13906 | APPARATUS METHOD AND SYSTEM FOR REDUCED ACTIVE SET MANAGEMENT                                                          |        |               | NP   | PAT-Active  | US      | 12/704794     | 8472921      | US-2010-0210246-A1 |   |
| 13907 | APPARATUS FOR REDUCING AN AMPLITUDE IMBALANCE AND A PHASE IMBALANCE BETWEEN AN IN-PHASE SIGNAL AND A QUADRATURE SIGNAL |        |               | NP   | PAT-Active  | US      | 15/349008     | #####        | US-2017-0170915-A1 |   |
| 13908 | MIMO OFDMA WITH ANTENNA SELECTION AND SUBBAND HANDOFF                                                                  |        |               | NP   | PAT-Active  | US      | 12/730426     | 8274943      | US-2010-0246489-A1 |   |
| 13909 | CIRCUIT SERVICE TUNNELING SYSTEMS METHODS AND INTERWORKING SYSTEMS AND MOBILITY MANAGEMENT ENTITIES THEREOF            |        |               | NP   | PAT-Active  | US      | 12/775521     | 8473434      | US-2010-0290436-A1 |   |

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| 2     | TITLE                                                                                                     | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13910 | CIRCUIT SERVICE TUNNELING METHODS AND USER EQUIPMENT THEREOF                                              |        |               | NP   | PAT-Active  | US      | 12/775535     | 8432901      | US-2010-0296437-A1 |   |
| 13911 | DISCOVERY REFERENCE SIGNAL TRANSMISSION FOR LTE IN UNLICENSED BAND                                        |        |               | PCT  | APP-Pending | US      | 15/745424     |              | US-2018-0213561-A1 |   |
| 13912 | USER PLANE RESOURCE ALLOCATION                                                                            |        |               | PCT  | APP-Pending | US      | 15/766331     |              | US-2018-0295659-A1 |   |
| 13913 | DOWNLINK DATA HANDLING FOR IDLE MODE UE WHEN THE SGW IS SPLIT INTO CONTROL PLANE NODE AND USER PLANE NODE |        |               | PCT  | APP-Pending | US      | 15/767562     |              | US-2018-0302857-A1 |   |
| 13914 | DESIGN AND TRANSMISSION OF EPDCCH WITHIN PARTIAL SUBFRAME IN LICENSED ASSISTED ACCESS (LAA)               |        |               | PCT  | APP-Pending | US      | 15/765764     |              | US-2018-0295649-A1 |   |
| 13915 | APPARATUSES SYSTEMS AND METHODS FOR PRIORITIZED LOAD BALANCING                                            |        |               | NP   | PAT-Active  | US      | 12/792917     | 8428612      | US-2011-0006126-A1 |   |
| 13916 | REVERSE LINK MOBILE TRANSMIT DIVERSITY                                                                    |        |               | NP   | PAT-Active  | US      | 12/840473     | 8472892      | US-2011-0026141-A1 |   |
| 13917 | REVERSE LINK MOBILE TRANSMIT DIVERSITY                                                                    |        |               | ENT  | PAT-Active  | US      | 13/905903     | 8699909      | US-2013-0259147-A1 |   |
| 13918 | PERSONAL AREA NETWORK COMMUNICATION FOR WEARABLE DEVICES                                                  |        |               | PCT  | APP-Pending | US      | 15/771192     |              | US-2018-0317070-A1 |   |
| 13919 | QUALITY OF SERVICE PROVISIONING FRAMEWORK FOR A SDN-BASED CELLULAR NETWORK ARCHITECTURE                   |        |               | PCT  | APP-Pending | US      | 15/768945     |              | US-2018-0317121-A1 |   |
| 13920 | DISCOVERY REFERENCE SIGNALING FOR DYNAMICALLY-TIMED TRANSMISSIONS                                         |        |               | PCT  | APP-Pending | US      | 15/770853     |              | US-2018-0331774-A1 |   |
| 13921 | REFERENCE SIGNAL FOR RECEIVE BEAM REFINEMENT IN CELLULAR SYSTEMS                                          |        |               | PCT  | APP-Pending | US      | 15/752764     |              | US-2019-0007116-A1 |   |
| 13922 | DISTINGUISHING SUBFRAMES IN A DOWNLINK TRANSMISSION BURST                                                 |        |               | PCT  | APP-Pending | US      | 15/764301     |              | US-2018-0288715-A1 |   |
| 13923 | SHORT TRANSMISSION TIME INTERVAL (TTI)                                                                    |        |               | PCT  | APP-Pending | US      | 15/767983     |              | US-2018-0302800-A1 |   |
| 13924 | ANTENNA PORT MULTIPLEXING                                                                                 |        |               | PCT  | APP-Pending | US      | 15/765692     |              | US-2018-0278437-A1 |   |
| 13925 | RESTORING VIRTUAL NETWORK FUNCTION (VNF) PERFORMANCE VIA VNF RESET OF LIFECYCLE MANAGEMENT                |        |               | PCT  | APP-Pending | US      | 15/767203     |              | US-2019-0073269-A1 |   |
| 13926 | LISTEN BEFORE TALK FOR DISCOVERY REFERENCE SIGNAL TRANSMISSION IN UNLICENSED SPECTRUM                     |        |               | PCT  | APP-Pending | US      | 15/767219     |              | US-2019-0075596-A1 |   |
| 13927 | Apparatuses Systems and Methods for Managing Operation Status of Wireless Transmissions and Receptions    |        |               | NP   | PAT-Active  | US      | 12/851764     | 8743859      | US-2011-0092924-A1 |   |
| 13928 | CHANNEL STATE INFORMATION (CSI) MEASUREMENTS AND CSI REPORTING IN LICENSED ASSISTED ACCESS (LAA)          |        |               | PCT  | APP-Pending | US      | 15/767861     |              | US-2018-0310193-A1 |   |
| 13929 | SYNCHRONIZATION SIGNAL DESIGN FOR NARROWBAND INTERNET OF THINGS COMMUNICATIONS                            |        |               | PCT  | APP-Pending | US      | 15/766772     |              | US-2018-0295037-A1 |   |
| 13930 | METHOD AND SYSTEM FOR DOUBLE-END TALK DETECTION AND METHOD AND SYSTEM FOR ECHO ELIMINATION                |        |               | NP   | PAT-Active  | US      | 12/792884     | 8271051      | US-2011-0124380-A1 |   |
| 13931 | FULL DIMENSION MULTIPLE INPUT MULTIPLE OUTPUT COMMUNICATION SYSTEMS AND METHODS                           |        |               | PCT  | APP-Pending | US      | 15/765595     |              | US-2019-0085423-A1 |   |
| 13932 | APPARATUS SYSTEM AND METHOD FOR ACCESS PROCEDURE ENHANCEMENTS                                             |        |               | INV  | PAT-Active  | US      | 14/675950     | 9699808      | US-2015-0208437-A1 |   |
| 13933 | Distributed Scheduling Method for Fronthaul-Based C-RAN Wireless Network Architecture                     |        |               | PCT  | APP-Pending | US      | 15/777430     |              | US-2018-0339770-A1 |   |
| 13934 | USER EQUIPMENT AND METHOD FOR MEASUREMENT OF SIDE-LINK REFERENCE SIGNAL RECEIVED POWER (S-RSRP)           |        |               | NP   | PAT-Active  | US      | 14/977463     | 8974039      | US-2017-0181011-A1 |   |

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| 2     | TITLE                                                                                                                              | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13935 | MULTIBAND DATA DELIVERY DEVICE AND METHOD                                                                                          |        |               | PCT  | APP-Pending | US      | 16/064056     |              | US-2018-037637A-1  |   |
| 13936 | METHODS AND DEVICES FOR MANAGING PACKET DATA NETWORK CONNECTIONS                                                                   |        |               | PCT  | APP-Pending | US      | 16/071977     |              |                    |   |
| 13937 | TIME GRID WITH TIME DIVISION DUPLEX SWITCHING INTERVALS                                                                            |        |               | PCT  | APP-Pending | US      | 15/759745     |              | US-2019-005235A-1  |   |
| 13938 | COMMUNICATION TRANSMISSION SYSTEM AND METHOD FOR XHRPD                                                                             |        |               | NP   | PAT-Active  | US      | 14/790545     | 9930686      | US-2016-0312726-A1 |   |
| 13939 | METHOD FOR UPDATING PREFERRED ROAMING LIST OF UIM CARD                                                                             |        |               | NP   | PAT-Active  | US      | 15/183907     | 9930521      | US-2017-001344A-1  |   |
| 13940 | AFC/TXAGC PDA INL                                                                                                                  |        |               | NP   | PAT-Active  | US      | 15/194672     | #####        | US-2017-001908A-1  |   |
| 13941 | BATCH NOTIFICATION IN ONE2M2M ENVIRONMENTS                                                                                         |        |               | NP   | PAT-Active  | US      | 14/789445     | #####        | US-2016-036663-A1  |   |
| 13942 | METHODS FOR CONTROLLING MOBILE PHONES AND INSTRUMENTS AND SYSTEMS USING THE SAME                                                   |        |               | NP   | APP-Pending | US      | 15/183980     |              | US-2017-001951A-1  |   |
| 13943 | MOBILE DEVICE RADIO TRANSCEIVER CIRCUIT AND IMPEDANCE ADJUSTMENT DEVICE                                                            |        |               | NP   | PAT-Active  | US      | 15/184096     | #####        | US-2017-031913A-1  |   |
| 13944 | M2M DEVICES AND COMMUNICATION METHODS THEREOF                                                                                      |        |               | NP   | PAT-Active  | US      | 14/472580     | 9510281      | US-2015-006512A-1  |   |
| 13945 | PHASE LOCKED LOOP CIRCUIT WITH IMPROVED PERFORMANCE                                                                                |        |               | NP   | PAT-Active  | US      | 14/332614     | 9294104      | US-2016-0020773-A1 |   |
| 13946 | AMPLIFIER APPARATUS AND SOFT-START METHOD THEREOF                                                                                  |        |               | NP   | PAT-Active  | US      | 14/449163     | 9438379      | US-2015-0244330-A1 |   |
| 13947 | LTEFDDMA 1X HYBRID                                                                                                                 |        |               | NP   | PAT-Active  | US      | 14/168679     | 9773646      | US-2014-0219247-A1 |   |
| 13948 | APPARATUS AND METHOD FOR TUNNELED GPM                                                                                              |        |               | NP   | PAT-Active  | US      | 13/948485     | 9451466      | US-2014-0022992-A1 |   |
| 13949 | DEEP SLEEP IN 1X M2M DEVICES                                                                                                       |        |               | NP   | PAT-Active  | US      | 13/909529     | 9344967      | US-2013-0324122-A1 |   |
| 13950 | MOBILE COMMUNICATION DEVICES CELLULAR ACCESS STATIONS AND OPERATION MANAGEMENT METHODS FOR MACHINE-TO-MACHINE (M2M) COMMUNICATIONS |        |               | NP   | PAT-Active  | US      | 13/849053     | 9049538      | US-2013-0265952-A1 |   |
| 13951 | MECHANISMS FOR SINGLE FREQUENCY NETWORKS IN HIGH-SPEED MOBILE SCENARIOS                                                            |        |               | PCT  | APP-Pending | US      | 15/772473     |              | US-2018-0316409-A1 |   |
| 13952 | INTRA-FREQUENCY AND INTER-FREQUENCY MEASUREMENT FOR NARROW BAND MACHINE-TYPE COMMUNICATION                                         |        |               | PCT  | APP-Pending | US      | 15/767123     |              | US-2019-0074918-A1 |   |
| 13953 | QUANTITY OF SERVICE CONTROL OF REVERSE TRAFFIC CHANNEL FOR A MOBILE COMMUNICATION DEVICE                                           |        |               | NP   | PAT-Active  | US      | 12/754684     | 8228817      | US-2011-0242998-A1 |   |
| 13954 | FAST RESELECTION TO OTHER RADIO ACCESS TECHNOLOGY AFTER CIRCUIT SWITCHED FALLBACK                                                  |        |               | NP   | PAT-Active  | US      | 12/973344     | 8565187      | US-2011-0222509-A1 |   |
| 13955 | METHODS AND DEVICES FOR REDUCING SIGNALING OVERHEAD                                                                                |        |               | NP   | PAT-Active  | US      | 13/159271     | 9497662      | US-2011-0360889-A1 |   |
| 13956 | BUFFER STATUS REPORTING METHODS FOR MACHINE TYPE COMMUNICATION DATA TRANSMISSION AND RELATED MOBILE COMMUNICATION DEVICES          |        |               | NP   | PAT-Active  | US      | 13/153160     | 8547836      | US-2011-0300858-A1 |   |
| 13957 | MOBILE COMMUNICATIONS DEVICES AND TRANSMISSION METHODS FOR TRANSMITTING MACHINE TYPE COMMUNICATION DATA THEREOF                    |        |               | NP   | PAT-Active  | US      | 13/153210     | 8681701      | US-2011-0298492-A1 |   |
| 13958 | APPARATUSES AND METHODS FOR SAVING POWER IN PAGING OPERATIONS                                                                      |        |               | NP   | PAT-Active  | US      | 13/215867     | 8797933      | US-2012-0163259-A1 |   |
| 13959 | CLASS IDENTIFICATION METHODS FOR MACHINE-TO-MACHINE (M2M) APPLICATIONS AND APPARATUSES AND SYSTEMS USING THE SAME                  |        |               | NP   | PAT-Active  | US      | 13/291256     | 9628940      | US-2012-0117140-A1 |   |

|       | A                                                                                                                            | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                        | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13960 | MOBILE-TERMINATED PACKET TRANSMISSION                                                                                        |        |               | PCT  | PAT-Pending | US      | 15/775094     |              | US-2018-0376373-A1 |   |
| 13961 | COMMUNICATION METHOD ACCESS NETWORK DEVICE AND COMMUNICATION DEVICE USING THE SAME AND COMMUNICATION SYSTEM                  |        |               | NP   | PAT-Active  | US      | 13/344517     | 9894597      | US-2012-0178444-A1 |   |
| 13962 | 1X MESSAGE PROCESSING                                                                                                        |        |               | NP   | PAT-Active  | US      | 12/986331     | 8565223      | US-2011-0164629-A1 |   |
| 13963 | POWER CONTROL DEVICE FOR MOBILE COMMUNICATION AND METHOD THEREOF                                                             |        |               | NP   | PAT-Active  | US      | 13/564277     | 9072048      | US-2013-0034034-A1 |   |
| 13964 | ANALOG-TO-DIGITAL CONVERTER WITH DELTA-SIGMA MODULATION AND MODULATION UNIT THEREOF                                          |        |               | NP   | PAT-Active  | US      | 13/418232     | 8497793      | US-2013-0169459-A1 |   |
| 13965 | ELECTRONIC CHIPS WITH SLEW-RATE CONTROL AT OUTPUT SIGNALS                                                                    |        |               | NP   | PAT-Active  | US      | 13/397087     | 8648638      | US-2013-0176064-A1 |   |
| 13966 | METHOD FOR DETECTING DOUBLE-TALK CONDITION AND SYSTEM USING THE SAME                                                         |        |               | NP   | PAT-Active  | US      | 13/632163     | 8934627      | US-2014-0093066-A1 |   |
| 13967 | SIGNAL AMPLIFYING CIRCUIT AND SIGNAL AMPLIFYING METHOD                                                                       |        |               | NP   | PAT-Active  | US      | 12/837754     | 8547173      | US-2011-0283376-A1 |   |
| 13968 | COMMUNICATION TRANSMISSION METHODS AND SYSTEMS                                                                               |        |               | NP   | PAT-Active  | US      | 13/739121     | 9001834      | US-2013-0182642-A1 |   |
| 13969 | APPARATUS SYSTEMS AND METHODS FOR ACCESS CONFIGURATIONS                                                                      |        |               | NP   | PAT-Active  | US      | 14/025364     | 9253800      | US-2014-0078984-A1 |   |
| 13970 | APPARATUS SYSTEMS AND METHODS FOR ACCESS CONFIGURATIONS                                                                      |        |               | ENT  | PAT-Active  | US      | 14/980143     | 9820306      | US-2016-0135228-A1 |   |
| 13971 | METHODS FOR ACCESSING TO BASE STATION THAT USES SACK MECHANISM AND APPARATUSES USING THE SAME                                |        |               | NP   | PAT-Active  | US      | 14/028730     | 9301204      | US-2014-0078962-A1 |   |
| 13972 | METHODS FOR ACCESSING TO BASE STATION THAT USES SACK MECHANISM AND APPARATUSES USING THE SAME                                |        |               | ENT  | PAT-Active  | US      | 15/079902     | 9699687      | US-2017-0026875-A1 |   |
| 13973 | REFERENCE VOLTAGE GENERATING DEVICE AND METHOD                                                                               |        |               | NP   | PAT-Active  | US      | 14/631852     | 9304526      | US-2015-0241889-A1 |   |
| 13974 | REFERENCE VOLTAGE GENERATING DEVICE AND METHOD                                                                               |        |               | ENT  | PAT-Active  | US      | 15/090546     | 9787308      | US-2016-0358485-A1 |   |
| 13975 | METHODS FOR ACCESSING TO BASE STATION THAT USES SACK MECHANISM AND APPARATUSES USING THE SAME                                |        |               | NP   | PAT-Active  | US      | 14/028743     | 9789704      | US-2014-0078963-A1 |   |
| 13976 | APPARATUS AND METHOD FOR ACCESS PROBE HANDOFF                                                                                |        |               | NP   | PAT-Active  | US      | 14/079345     | 9642061      | US-2014-0146793-A1 |   |
| 13977 | METHODS FOR RETRANSMITTING REVERSE LINK DATA AND APPARATUSES USING THE SAME                                                  |        |               | NP   | PAT-Active  | US      | 14/029835     | 9584384      | US-2014-0078883-A1 |   |
| 13978 | COMMUNICATION SYSTEM AND METHOD OF DATA TRANSMISSION FOR A MEDIUM ACCESS CONTROL LAYER                                       |        |               | NP   | PAT-Active  | US      | 14/054362     | 9295085      | US-2014-0105137-A1 |   |
| 13979 | LTE-1X HYBRID DEVICE AND SYSTEM                                                                                              |        |               | NP   | PAT-Active  | US      | 13/853119     | ###          | US-2014-0095912-A1 |   |
| 13980 | FREQUENCY CALIBRATION METHOD FOR A VOLTAGE-CONTROLLED OSCILLATOR                                                             |        |               | NP   | PAT-Active  | US      | 14/709712     | 9621174      | US-2016-0336945-A1 |   |
| 13981 | CALL CONTROL METHOD BASED ON APPLICATION PRIORITY                                                                            |        |               | NP   | PAT-Active  | US      | 14/802214     | 9955020      | US-2016-0021257-A1 |   |
| 13982 | ADAPTABLE MULTIMODE LOCATION PROTOCOL MANAGER                                                                                |        |               | NP   | PAT-Active  | US      | 14/620675     | ###          | US-2015-0304808-A1 |   |
| 13983 | MULTI-PHASE SIGNAL GENERATOR AND MULTI-PHASE SIGNAL GENERATING METHOD THEREOF                                                |        |               | NP   | PAT-Active  | US      | 14/449161     | 9331674      | US-2015-0244350-A1 |   |
| 13984 | RADIO FREQUENCY RECEIVER CIRCUIT AND THE INDUCTOR-COUPLED SINGLE-ENDED INPUT DIFFERENTIAL-OUTPUT LOW-NOISE AMPLIFIER THEREOF |        |               | NP   | PAT-Active  | US      | 14/849584     | 9397714      |                    |   |

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| 2     | TITLE                                                                                                                                                                           | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 13985 | Apparatuses and Methods for Coordinating Operations of Multiple Wireless Communications Modules with Multiple Subscriber Numbers                                                |        |               | NP   | PAT-Active  | US      | 13/075045     | 9932417      | US-2011-0235587-A1 |   |
| 13986 | MOBILE DEVICE AND METHOD OF INFORMATION TRANSMISSION                                                                                                                            |        |               | NP   | PAT-Active  | US      | 14/641594     | 9918182      | US-2015-0264633-A1 |   |
| 13987 | MOBILE DEVICE AND METHOD OF INFORMATION TRANSMISSION                                                                                                                            |        |               | NP   | PAT-Active  | US      | 14/656333     | 9936379      | US-2015-0264561-A1 |   |
| 13988 | SYSTEMS METHODS AND DEVICES FOR ADDING NON-PROVISIONED CELLULAR DEVICES TO A SUBSCRIPTION                                                                                       |        |               | PCT  | APP-Pending | US      | 16/074389     |              |                    |   |
| 13989 | PARTIAL SUBFRAME TRANSMISSION IN LICENSED ASSISTED ACCESS                                                                                                                       |        |               | PCT  | APP-Pending | US      | 15/767812     |              | US-2018-0302926-A1 |   |
| 13990 | SYNCHRONIZATION SIGNALS FOR LICENSE ASSISTED ACCESS                                                                                                                             |        |               | PCT  | PAT-Active  | US      | 15/771868     | #####        | US-2018-0316453-A1 |   |
| 13991 | MULTI-SUBFRAME UPLINK SCHEDULING IN UNLICENSED SPECTRUM                                                                                                                         |        |               | PCT  | APP-Pending | US      | 15/775745     |              | US-2018-0352564-A1 |   |
| 13992 | Digital Pre-Emphasis Quadrature Imbalance Compensating Filter                                                                                                                   |        |               | NP   | APP-Pending | US      | 15/168552     |              | US-2017-0345509-A1 |   |
| 13993 | TRANSMIT AMPLITUDE AND PHASE MODULATION BASED ON TWO CONSTANT-AMPLITUDE PHASORS                                                                                                 |        |               | NP   | PAT-Active  | US      | 15/064020     | 9614713      |                    |   |
| 13994 | TRANSMISSION POWER CONTROL METHODS AND DEVICES                                                                                                                                  |        |               | NP   | PAT-Active  | US      | 15/088496     | #####        | US-2017-0285929-A1 |   |
| 13995 | APPARATUSES AND METHODS FOR COMPENSATING PHASE FLUCTUATIONS                                                                                                                     |        |               | PCT  | APP-Pending | US      | 16/076710     |              | US-2019-0052452-A1 |   |
| 13996 | COMMUNICATION TERMINAL AND METHOD FOR USING A SHARED RADIO COMMUNICATION COMPONENT                                                                                              |        |               | NP   | PAT-Active  | US      | 15/602184     | #####        | US-2017-0374544-A1 |   |
| 13997 | METHODS AND DEVICES FOR CIRCUIT-SWITCHED FALLBACK PROCEDURES                                                                                                                    |        |               | NP   | PAT-Active  | US      | 15/480430     | #####        | US-2017-0332267-A1 |   |
| 13998 | APPARATUS OF A USER EQUIPMENT ADAPTED FOR RECEIVING EMERGENCY NOTIFICATION INFORMATION USED IN MOBILE COMMUNICATION AND METHOD FOR RECEIVING EMERGENCY NOTIFICATION INFORMATION |        |               | NP   | APP-Pending | US      | 15/607769     |              | US-2018-0007525-A1 |   |
| 13999 | METHODS AND DEVICES FOR PERFORMING CIRCUIT-SWITCHED FALLBACK                                                                                                                    |        |               | NP   | PAT-Active  | US      | 15/145829     | #####        | US-2017-0325130-A1 |   |
| 14000 | DEVICES AND METHOD FOR CELL SEARCH AND DETECTION                                                                                                                                |        |               | NP   | PAT-Active  | US      | 13/084521     | 9609585      |                    |   |
| 14001 | BEAMFORMING ARCHITECTURE FOR MULTI-BEAM MULTIPLE-INPUT-MULTIPLE-OUTPUT (MIMO)                                                                                                   |        |               | PCT  | APP-Pending | US      | 15/081470     |              | US-2019-0260457-A1 |   |
| 14002 | METHODS AND COMMUNICATION DEVICES FOR PERFORMING CELL SEARCH AND DETECTION                                                                                                      |        |               | NP   | PAT-Active  | US      | 15/079135     | 9877270      | US-2017-0285374-A1 |   |
| 14003 | METHOD APPARATUS AND SYSTEM FOR BEAM ACQUISITION IN A WIRELESS SYSTEM                                                                                                           |        |               | PCT  | APP-Pending | US      | 16/068110     |              | US-2019-0028173-A1 |   |
| 14004 | ARRANGEMENT FOR CONCURRENT DETECTION OF SIGNALS IN A RECEIVER                                                                                                                   |        |               | NP   | PAT-Active  | US      | 15/252707     | #####        | US-2018-0063873-A1 |   |
| 14005 | Transceiver transmitter receiver and method for determining a minimum supply voltage for receivers and transmitters                                                             |        |               | PCT  | APP-Pending | US      | 16/078567     |              | US-2019-0090196-A1 |   |
| 14006 | DETERMINATION OF AN ADVANCED PHYSICAL UPLINK CHANNEL RESOURCE                                                                                                                   |        |               | PCT  | APP-Pending | US      | 15/781462     |              |                    |   |
| 14007 | TECHNIQUES FOR INSTANTIATION AND TERMINATION OF VIRTUALIZED NETWORK FUNCTIONS                                                                                                   |        |               | PCT  | APP-Pending | US      | 16/060910     |              | US-2018-0367372-A1 |   |
| 14008 | SECTOR SWEEPS FOR ESTABLISHING TWO-WAY DATA COMMUNICATIONS WITH DIRECTIONAL ANTENNAS                                                                                            |        |               | PCT  | APP-Pending | US      | 16/078549     |              | US-2019-0052326-A1 |   |
| 14009 | APPARATUS AND METHOD FOR RDT CONTROL CHANNEL                                                                                                                                    |        |               | PCT  | APP-Pending | US      | 15/068882     |              | US-2019-0029005-A1 |   |
| 14010 | APPARATUS AND METHOD FOR RDT CONTROL CHANNEL                                                                                                                                    |        |               | ONY  | APP-Pending | US      | 16/407159     |              | US-2019-0335428-A1 |   |

|       | A                                                                                              | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                          | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 14011 | NB-IOT SYNCHRONIZATION SIGNALS WITH OFFSET INFORMATION                                         |        |               | PCT  | APP-Pending | US      | 15/777641     |              | US-2018-0376405-A1 |   |
| 14012 | PERFORMANCE MONITORING TECHNIQUES FOR VIRTUALIZED RESOURCES                                    |        |               | PCT  | APP-Pending | US      | 16/060912     |              | US-2018-0367373-A1 |   |
| 14013 | DYNAMIC HARQ CONFIGURATION AND BITMAP BASED ACK/NACK                                           |        |               | PCT  | APP-Pending | US      | 15/766466     |              | US-2018-0294924-A1 |   |
| 14014 | CELLULAR INTERNET OF THINGS (CIOT) OPTIMIZATIONS FOR NARROWBAND (NB) AND NON-NB IOT NETWORKS   |        |               | PCT  | APP-Pending | US      | 16/064181     |              | US-2018-0376531-A1 |   |
| 14015 | 5G FDD LOW LATENCY TRANSMISSION SUBFRAME STRUCTURE SYSTEM AND METHOD OF USE                    |        |               | PCT  | APP-Pending | US      | 16/060819     |              | US-2019-0037640-A1 |   |
| 14016 | A MULTIPLE BEAM MULTIPLE-INPUT-MULTIPLE-OUTPUT SYSTEM                                          |        |               | PCT  | APP-Pending | US      | 15/082365     |              | US-2019-0081672-A1 |   |
| 14017 | CORE NETWORK DESIGN FOR MISSION-CRITICAL IOT                                                   |        |               | PCT  | APP-Pending | US      | 16/305380     |              |                    |   |
| 14018 | NETWORK SLICE SELECTION IN NETWORK SYSTEMS                                                     |        |               | PCT  | APP-Pending | US      | 16/063048     |              | US-2018-0368060-A1 |   |
| 14019 | SAS CONTROLLED INTERFERENCE MANAGEMENT                                                         |        |               | PCT  | APP-Pending | US      | 16/308172     |              | US-2019-0222339-A1 |   |
| 14020 | SYSTEM AND METHOD FOR SYSTEM INFORMATION TRANSMISSION IN STAND-ALONE 5MWAVE SYSTEMS            |        |               | PCT  | APP-Pending | US      | 16/065968     |              | US-2019-0013842-A1 |   |
| 14021 | METHOD AND DEVICE FOR MITIGATING INTERFERENCE DUE TO A WIRELESS CHARGING SIGNAL                |        |               | NP   | PAT-Active  | US      | 15/491123     | 9998238      | US-2017-0324464-A1 |   |
| 14022 | LOW POWER RADAR DETECTION SYSTEM                                                               |        |               | NP   | APP-Pending | US      | 15/198527     |              | US-2018-0003797-A1 |   |
| 14023 | METHODS AND DEVICES FOR SPUR CANCELLATION IN DIGITAL PHASE LOCKED LOOPS                        |        |               | NP   | PAT-Active  | US      | 15/088386     | 9780945      | US-2017-0286853-A1 |   |
| 14024 | WIRELESS POWER TRANSMISSION                                                                    |        |               | NP   | APP-Pending | US      | 15/088319     |              | US-2017-0286446-A1 |   |
| 14025 | METHODS AND MOBILE COMMUNICATION DEVICES FOR PERFORMING SPUR RELOCATION FOR PHASE-LOCKED LOOPS |        |               | NP   | APP-Pending | US      | 15/087398     |              | US-2017-0286850-A1 |   |
| 14026 | IMPEDANCE MATCHING MULTIPLE COILS IN AN ELECTRONIC DEVICE                                      |        |               | NP   | APP-Pending | US      | 15/086837     |              | US-2017-0286444-A1 |   |
| 14027 | COMMUNICATION DEVICE AND A METHOD FOR OPERATING A COMMUNICATION DEVICE                         |        |               | NP   | PAT-Active  | US      | 15/088179     | #####        | US-2017-0289958-A1 |   |
| 14028 | COMMUNICATION DEVICE AND METHOD FOR TRANSMITTING DATA                                          |        |               | PCT  | APP-Pending | US      | 16/080597     |              | US-2019-0085573-A1 |   |
| 14029 | COMMUNICATION DEVICE AND A METHOD FOR DETERMINING AN INFORMATION FROM ANOTHER APPARATUS        |        |               | PCT  | APP-Pending | US      | 16/080027     |              | US-2019-0020393-A1 |   |
| 14030 | COMMUNICATION DEVICE AND METHOD FOR REDUCING INTERFERENCE                                      |        |               | PCT  | APP-Pending | US      | 16/080025     |              | US-2019-0052340-A1 |   |
| 14031 | METHOD AND DEVICE FOR MITIGATING INTERFERENCE IN COLLOCATED TRANSCIEVERS                       |        |               | NP   | PAT-Active  | US      | 15/611021     | #####        | US-2018-0007697-A1 |   |
| 14032 | NAVIGATION DEVICE AND METHOD FOR DETERMINING NAVIGATION INFORMATION                            |        |               | NP   | APP-Pending | US      | 15/088115     |              | US-2017-0285175-A1 |   |
| 14033 | METHOD AND DEVICE FOR GAIN ADJUSTMENT IN MOBILITY MEASUREMENTS                                 |        |               | NP   | APP-Pending | US      | 15/496531     |              | US-2017-0323116-A1 |   |
| 14034 | SPREADING OPTIONS FOR NON-ORTHOGONAL MULTIPLE ACCESS                                           |        |               | PCT  | APP-Pending | US      | 16/068754     |              | US-2019-0029031-A1 |   |
| 14035 | SYSTEM AND METHOD FOR CONTROL CHANNEL BEAM ASSUMPTION                                          |        |               | PCT  | APP-Pending | US      | 16/067806     |              | US-2019-0028176-A1 |   |
| 14036 | RATE MATCHING USING LOW-DENSITY PARITY-CHECK CODES                                             |        |               | PCT  | APP-Pending | US      | 16/066555     |              | US-2019-0013903-A1 |   |

|       | A                                                                                                                                                       | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                   | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 14037 | CROSS TRANSMISSION OPPORTUNITY (XTOPI) SCHEDULING                                                                                                       |        |               | PCT  | APP-Pending | US      | 16/068853     |              | US-2019-0921105-A1 |   |
| 14038 | DYNAMIC RESOURCE ALLOCATIONS AND TRANSMISSION SCHEMES FOR XPUCCH (5G PUCCH)                                                                             |        |               | PCT  | APP-Pending | US      | 16/067577     |              | US-2019-0913908-A1 |   |
| 14039 | TECHNIQUES FOR CHANNEL STATE DETERMINATION                                                                                                              |        |               | PCT  | APP-Pending | US      | 16/488354     |              |                    |   |
| 14040 | TIMER CONFIGURATION TECHNIQUES FOR COVERAGE ENHANCEMENT                                                                                                 |        |               | PCT  | APP-Pending | US      | 16/074040     |              | US-2019-0945581-A1 |   |
| 14041 | SYSTEMS METHODS AND DEVICES FOR REDUCED HANDOVER DATA INTERRUPTION                                                                                      |        |               | PCT  | APP-Pending | US      | 16/077455     |              | US-2019-0975498-A1 |   |
| 14042 | DEVICE AND METHOD FOR CSI FEEDBACK TO ENABLE JOINT DL-UL SCHEDULING IN FULL DUPLEX SYSTEMS                                                              |        |               | PCT  | APP-Pending | US      | 16/086390     |              | US-2019-0349945-A1 |   |
| 14043 | SYSTEMS AND METHODS FOR UPLINK DMRS ENHANCEMENT IN FD-RMIMO                                                                                             |        |               | PCT  | APP-Pending | US      | 16/067680     |              | US-2019-0926451-A1 |   |
| 14044 | IN-BAND FULL DUPLEX RELAY TO ENHANCE UPLINK PERFORMANCE IN HETEROGENEOUS NETWORK                                                                        |        |               | PCT  | APP-Pending | US      | 16/094830     |              | US-2019-0173806-A1 |   |
| 14045 | AMPLIFICATION CIRCUIT APPARATUS FOR AMPLIFYING LOW NOISE AMPLIFIER RADIO RECEIVER MOBILE TERMINAL BASE STATION AND METHOD FOR AMPLIFYING                |        |               | NP   | PAT-Active  | US      | 15/593347     | #####        | US-2017-0359040-A1 |   |
| 14046 | AMPLIFICATION CIRCUIT APPARATUS FOR AMPLIFYING LOW NOISE AMPLIFIER RADIO RECEIVER MOBILE TERMINAL BASE STATION AND METHOD FOR AMPLIFYING                |        |               | NP   | APP-Pending | US      | 16/538887     |              |                    |   |
| 14047 | SUPPORTING SEMI-PERSISTENT SCHEDULING FOR VARIED TRANSMISSION TIME INTERVALS                                                                            |        |               | PCT  | APP-Pending | US      | 15/754476     |              | US-2018-0242389-A1 |   |
| 14048 | SCHEDULING REQUEST FOR STANDALONE DEPLOYMENT OF A SYSTEM USING BEAMFORMING                                                                              |        |               | PCT  | APP-Pending | US      | 16/071439     |              |                    |   |
| 14049 | SIGNALING FOR PER CARRIER-COMPONENT BASED ENHANCED MEASUREMENT GAP CONFIGURATION                                                                        |        |               | PCT  | PAT-Active  | US      | 15/553071     | #####        | US-2018-0334598-A1 |   |
| 14050 | PHYSICAL LAYER PROTOCOL AND SUBFRAME STRUCTURE FOR WEARABLE USER EQUIPMENT DEVICES                                                                      |        |               | PCT  | APP-Pending | US      | 16/067669     |              | US-2019-0021053-A1 |   |
| 14051 | INTERFERENCE DETECTION DEVICE INTERFERENCE DETECTION APPARATUS INTERFERENCE DETECTION METHOD COMPUTER PROGRAM RECEIVER MOBILE TERMINAL AND BASE STATION |        |               | NP   | PAT-Active  | US      | 15/590073     | #####        | US-2017-0358087-A1 |   |
| 14052 | INTERLEAFS ALLOCATION AND INDICATION                                                                                                                    |        |               | PCT  | APP-Pending | US      | 16/072112     |              | US-2019-0968347-A1 |   |
| 14053 | CIRCUIT ARRANGEMENT FOR CLOCK SYNCHRONIZATION                                                                                                           |        |               | NP   | PAT-Active  | US      | 15/000862     | #####        | US-2017-0367060-A1 |   |
| 14054 | FRAME STRUCTURE FOR UPLINK SCHEDULING                                                                                                                   |        |               | PCT  | APP-Pending | US      | 15/758853     |              | US-2019-0945541-A1 |   |
| 14055 | COORDINATED BLUETOOTH - WIFI SCHEDULING WITH BLUETOOTH SLOT AVAILABILITY MASK                                                                           |        |               | NP   | PAT-Active  | US      | 15/280187     | #####        | US-2018-0391929-A1 |   |
| 14056 | DECODING DEVICE AND METHOD USING CONTEXT REDUNDANCY                                                                                                     |        |               | NP   | PAT-Active  | US      | 15/611525     | #####        | US-2018-0918243-A1 |   |
| 14057 | DEVICE AND METHOD FOR CANCELING INTERFERENCE CAUSED BY NON-LINEAR DEVICE                                                                                |        |               | NP   | APP-Pending | US      | 15/171641     |              | US-2017-0353286-A1 |   |
| 14058 | COMMUNICATION DEVICE AND A METHOD FOR LOCALIZATION                                                                                                      |        |               | PCT  | APP-Pending | US      | 16/304148     |              | US-2019-0346554-A1 |   |
| 14059 | CONTROL SIGNALING FOR FIFTH GENERATION CHANNEL STATE INFORMATION REFERENCE SIGNALS (XCSI-RS)                                                            |        |               | PCT  | APP-Pending | US      | 16/070916     |              | US-2019-0928071-A1 |   |
| 14060 | CHANNEL CODING AND INTERLEAVING FOR CONTROL AND USER DATA IN THE PHYSICAL UPLINK SHARED CHANNEL                                                         |        |               | PCT  | PAT-Active  | US      | 15/072981     | #####        | US-2019-0936586-A1 |   |
| 14061 | ENABLING A SECONDARY CELL IN A MASSIVE MIMO SYSTEM                                                                                                      |        |               | PCT  | APP-Pending | US      | 16/080580     |              | US-2019-0922150-A1 |   |



|       | A                                                                                                                                                           | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                                                       | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 14062 | ANTENNA                                                                                                                                                     |        |               | NP   | APP-Pending | US      | 15/198782     |              | US-2018-0906360-A1 |   |
| 14063 | FREQUENCY BASED BIAS VOLTAGE SCALING FOR PHASE LOCKED LOOPS                                                                                                 |        |               | NP   | APP-Pending | US      | 15/194998     |              | US-2017-0373684-A1 |   |
| 14064 | TRANSMITTING AND RECEIVING RADIO SIGNALS WITH TUNABLE ANTENNAS TUNED BASED ON THROUGHPUT PERFORMANCE                                                        |        |               | NP   | APP-Pending | US      | 15/195859     |              | US-2017-0173898-A1 |   |
| 14065 | DEVICE AND METHOD FOR SYNCHRONOUS BEAM SWITCHING                                                                                                            |        |               | PCT  | APP-Pending | US      | 16/079805     |              | US-2019-0052331-A1 |   |
| 14066 | DEVICE AND METHOD OF USING BRRS CONFIGURATION                                                                                                               |        |               | PCT  | APP-Pending | US      | 16/079034     |              | US-2019-0044691-A1 |   |
| 14067 | SYSTEM AND METHOD FOR BEAM INFORMATION AND CSI REPORT                                                                                                       |        |               | PCT  | APP-Pending | US      | 16/076666     |              | US-2019-0052220-A1 |   |
| 14068 | SYSTEM AND METHOD FOR CHANNEL QUALITY REPORTING                                                                                                             |        |               | PCT  | APP-Pending | US      | 16/077018     |              | US-2019-0036564-A1 |   |
| 14069 | PHYSICAL UPLINK CONTROL CHANNEL PROCEDURES                                                                                                                  |        |               | PCT  | APP-Pending | US      | 16/071838     |              |                    |   |
| 14070 | SLICING ARCHITECTURE FOR WIRELESS COMMUNICATION                                                                                                             |        |               | NP   | PAT-Active  | US      | 15/056965     | 9775045      | US-2017-0079059-A1 |   |
| 14071 | SLICING ARCHITECTURE FOR WIRELESS COMMUNICATION                                                                                                             |        |               | ENT  | PAT-Active  | US      | 15/670923     | #####        | US-2017-0339567-A1 |   |
| 14072 | BEAMFORMED PHYSICAL DOWNLINK CONTROL CHANNEL                                                                                                                |        |               | PCT  | APP-Pending | US      | 16/083141     |              |                    |   |
| 14073 | TRANSMISSION CIRCUIT                                                                                                                                        |        |               | NP   | PAT-Active  | US      | 11/041360     | 7383027      | US-2005-0164660-A1 |   |
| 14074 | TRANSMISSION CIRCUIT                                                                                                                                        |        |               | CIP  | PAT-Active  | US      | 12/000982     | 7925226      | US-2008-0139138-A1 |   |
| 14075 | UPLINK POWER CONTROL FOR 5G SYSTEMS                                                                                                                         |        |               | PCT  | APP-Pending | US      | 16/079494     |              |                    |   |
| 14076 | CHIP-ENHANCED BATTERY                                                                                                                                       |        |               | PCT  | APP-Pending | US      | 16/327398     |              | US-2019-0280198-A1 |   |
| 14077 | RADIO LINK FAILURE HANDLING IN HIGH-FREQUENCY BAND NETWORKS                                                                                                 |        |               | PCT  | APP-Pending | US      | 16/078792     |              | US-2019-0053315-A1 |   |
| 14078 | DRIVING CIRCUITS FOR SWITCH MODE RF POWER AMPLIFIERS                                                                                                        |        |               | NP   | PAT-Closed  | US      | 09/362880     | 6198347      |                    |   |
| 14079 | HIGH-EFFICIENCY MODULATING RF AMPLIFIER                                                                                                                     |        |               | CIP  | PAT-Closed  | US      | 09/637269     | 6636112      |                    |   |
| 14080 | HIGH-EFFICIENCY MODULATING RF AMPLIFIER                                                                                                                     |        |               | ENT  | PAT-Active  | US      | 10/688444     | 6816036      | US-2004-0080364-A1 |   |
| 14081 | RF POWER AMPLIFIER HAVING HIGH POWER-ADDED EFFICIENCY                                                                                                       |        |               | NP   | PAT-Active  | US      | 09/564546     | 7263618      |                    |   |
| 14082 | HIGH-EFFICIENCY MODULATING RF AMPLIFIER                                                                                                                     |        |               | ENT  | PAT-Closed  | US      | 10/094104     | 7098635      | US-2002-0090920-A1 |   |
| 14083 | METHOD AND SYSTEM OF AMPLITUDE MODULATION USING DUAL/SPLIT CHANNEL UNEQUAL AMPLIFICATION                                                                    |        |               | NP   | PAT-Active  | US      | 09/661167     | 6751265      |                    |   |
| 14084 | SCHEDULING ACKNOWLEDGEMENTS TO RECEIVED SUB-FRAMES IN A MULTI-SIM USER EQUIPMENT USING A SHARED TRANSMIT CHAIN WHEN RECEIVING DATA CONTINUOUSLY ON EACH SIM |        |               | NP   | APP-Pending | US      | 15/688912     |              | US-2018-0097585-A1 |   |
| 14085 | POWER ESTIMATION SYSTEM AND METHOD                                                                                                                          |        |               | NP   | PAT-Active  | US      | 15/274394     | #####        | US-2018-0091984-A1 |   |
| 14086 | WAKE UP RADIO DEVICE CIRCUIT CONFIGURATION AND METHOD                                                                                                       |        |               | NP   | PAT-Active  | US      | 15/196070     | 8967820      | US-2018-0007629-A1 |   |
| 14087 | COMMUNICATION DEVICE AND METHOD FOR SELECTING A BEAM DIRECTION                                                                                              |        |               | PCT  | APP-Pending | US      | 16/305916     |              |                    |   |
| 14088 | METHODS AND DEVICES FOR USER DETECTION IN SPECTRUM SHARING                                                                                                  |        |               | NP   | APP-Pending | US      | 15/190223     |              | US-2017-0374557-A1 |   |
| 14089 | SHORT RANGE RADIO COMMUNICATION DEVICE AND A METHOD OF CONTROLLING A SHORT RANGE RADIO COMMUNICATION DEVICE                                                 |        |               | NP   | PAT-Active  | US      | 15/200159     | 8948351      | US-2018-0006681-A1 |   |
| 14090 | METHODS AND DEVICES FOR PERFORMING DUPLEX MODE DETECTION                                                                                                    |        |               | NP   | PAT-Active  | US      | 15/183866     | 9825273      |                    |   |

|       | A                                                                                                                                  | B      | C             | D    | E           | F       | G             | H            | I                  | J |
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| 2     | TITLE                                                                                                                              | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 14091 | APPARATUS SYSTEM AND METHOD OF INTERNET CONNECTIVITY VIA A RELAY STATION                                                           |        |               | PCT  | APP-Pending | US      | 15/305190     |              |                    |   |
| 14092 | COMMUNICATION DEVICE AND A METHOD FOR OPERATING A COMMUNICATION DEVICE                                                             |        |               | PCT  | APP-Pending | US      | 16/305067     |              | US-2019-0357376-A1 |   |
| 14093 | APPARATUS ADAPTED FOR MAINTAINING RECEIVING DATA QUALITY AND METHOD FOR RECEIVING DATA                                             |        |               | NP   | APP-Pending | US      | 15/607556     |              | US-2018-0097113-A1 |   |
| 14094 | COMMUNICATION DEVICE AND A METHOD FOR OPERATING A COMMUNICATION DEVICE                                                             |        |               | NP   | PAT-Active  | US      | 15/187863     | 9716558      |                    |   |
| 14095 | COMMUNICATION DEVICE AND METHOD FOR DECODING DATA FROM A NETWORK                                                                   |        |               | NP   | APP-Pending | US      | 15/191564     |              | US-2017-0374653-A1 |   |
| 14096 | CHANNEL ESTIMATION AND COMPENSATION IN HIGH SPEED SCENARIOS                                                                        |        |               | NP   | APP-Pending | US      | 15/170712     |              | US-2017-0096175-A1 |   |
| 14097 | REDUCTION OF AVERAGE-TO-MINIMUM POWER RATIO IN COMMUNICATIONS SIGNALS                                                              |        |               | NP   | PAT-Active  | US      | 10/037870     | 7054385      | US-2008-0281360-A1 |   |
| 14098 | METHODS AND APPARATUS FOR CONDITIONING COMMUNICATIONS SIGNALS BASED ON DETECTION OF HIGH-FREQUENCY EVENTS IN POLAR DOMAIN          |        |               | ClP  | PAT-Active  | US      | 12/395981     | 8331480      | US-2009-0257526-A1 |   |
| 14099 | HYBRID POLAR MODULATOR DIFFERENTIAL PHASE CARTESIAN FEEDBACK CORRECTION CIRCUIT FOR POWER AMPLIFIER LINEARIZATION                  |        |               | NP   | PAT-Active  | US      | 09/885811     | 7403004      | US-2002-0196864-A1 |   |
| 14100 | SELECTIVE ENVELOPE MODULATION ENABLING REDUCED CURRENT CONSUMPTION                                                                 |        |               | NP   | PAT-Active  | US      | 12/079353     | 7688157      | US-2008-0246550-A1 |   |
| 14101 | VSWR NORMALIZING ENVELOPE MODULATOR                                                                                                |        |               | NP   | PAT-Active  | US      | 11/821301     | 8331862      |                    |   |
| 14102 | REAL TIME VCO GAIN NON LINEARITY CALIBRATION                                                                                       |        |               | NP   | PAT-Active  | US      | 11/704883     | 7557671      | US-2008-0193631-A1 |   |
| 14103 | FULL DUPLEX SUPPORT IN FIFTH GENERATION (5G) SYSTEMS                                                                               |        |               | PCT  | APP-Pending | US      | 16/079854     |              | US-2019-0055039-A1 |   |
| 14104 | HIGH-EFFICIENCY ENVELOPE TRACKING SYSTEMS AND METHODS FOR RADIO FREQUENCY POWER AMPLIFIERS                                         |        |               | NP   | PAT-Active  | US      | 12/027141     | 7949316      | US-2009-0191826-A1 |   |
| 14105 | ADAPTIVE IMPEDANCE CONVERTER ADAPTIVELY CONTROLS LOAD IMPEDANCE                                                                    |        |               | NP   | PAT-Active  | US      | 12/209981     | 8140030      | US-2010-0069025-A1 |   |
| 14106 | MULTI-MODE TRANSMITTER HAVING ADAPTIVE OPERATING MODE CONTROL                                                                      |        |               | NP   | PAT-Active  | US      | 12/203361     | 8095093      | US-2010-0056068-A1 |   |
| 14107 | METHODS AND APPARATUS FOR REDUCING AVERAGE-TO-MINIMUM POWER RATIO IN COMMUNICATIONS SIGNALS                                        |        |               | NP   | PAT-Active  | US      | 12/482913     | 8385464      | US-2010-0316164-A1 |   |
| 14108 | TRANSMITTER UTILIZING A DUTY CYCLE ENVELOPE REDUCTION AND RESTORATION MODULATOR                                                    |        |               | NP   | PAT-Active  | US      | 12/508464     | 8131284      | US-2011-0018640-A1 |   |
| 14109 | METHODS AND APPARATUS FOR REDUCING THE AVERAGE-TO-MINIMUM MAGNITUDE RATIO OF COMMUNICATIONS SIGNALS IN COMMUNICATIONS TRANSMITTERS |        |               | NP   | PAT-Active  | US      | 12/551929     | 8363752      | US-2011-0051836-A1 |   |
| 14110 | METHODS AND APPARATUS FOR REDUCING THE AVERAGE-TO-MINIMUM MAGNITUDE RATIO OF COMMUNICATIONS SIGNALS IN COMMUNICATIONS TRANSMITTERS |        |               | ClP  | PAT-Active  | US      | 12/850847     | 8483312      | US-2011-0116535-A1 |   |
| 14111 | FRAME STRUCTURES FOR BEAM SWITCHING AND REFINEMENT IN CELLULAR SYSTEMS                                                             |        |               | PCT  | APP-Pending | US      | 16/084505     |              | US-2019-0089446-A1 |   |
| 14112 | SYSTEMS METHODS AND DEVICES FOR UPLINK BEARER SPLIT USING WIRELESS LOCAL AREA NETWORK AGGREGATION                                  |        |               | PCT  | APP-Pending | US      | 16/067685     |              | US-2019-0021026-A1 |   |
| 14113 | AUTONOMOUS RESOURCE SELECTION FOR VEHICLE-TO-VEHICLE SIDELINK COMMUNICATIONS                                                       |        |               | PCT  | APP-Pending | US      | 16/080559     |              | US-2019-0059071-A1 |   |
| 14114 | DUPLEXER STRUCTURE FOR COUPLING A TRANSMITTER AND A RECEIVER TO A COMMON ANTENNA                                                   |        |               | NP   | PAT-Active  | US      | 09/711344     | 6721544      |                    |   |
| 14115 | ELECTRICALLY TUNED INTEGRATED AMPLIFIER FOR WIRELESS COMMUNICATIONS                                                                |        |               | NP   | PAT-Active  | US      | 09/711332     | 6509799      |                    |   |
| 14116 | ELECTRICALLY TUNED INTEGRATED AMPLIFIER FOR WIRELESS COMMUNICATIONS                                                                |        |               | Div  | PAT-Active  | US      | 10/277935     | 6653904      | US-2003-0036495-A1 |   |

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| 2     | TITLE                                                                                                              | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 14117 | USER-PLANE PATH SELECTION FOR THE EDGE SERVICE                                                                     |        |               | PCT  | APP-Pending | US      | 16/084674     |              | US-2019-0975046-A1 |   |
| 14118 | CSI FEEDBACK FOR OPEN LOOP FD-MIMO TRANSMISSION                                                                    |        |               | PCT  | APP-Pending | US      | 16/073298     |              | US-2019-0936574-A1 |   |
| 14119 | DUAL BEAM OPERATION FOR MOBILITY                                                                                   |        |               | PCT  | APP-Pending | US      | 16/073363     |              | US-2019-0952317-A1 |   |
| 14120 | REFERENCE SIGNAL PATH FOR CLOCK GENERATION WITH AN INJECTION LOCKED MULTIPLIER (ILM)                               |        |               | NP   | PAT-Active  | US      | 15/171373     | #####        | US-2017-0953159-A1 |   |
| 14121 | Performance Indicator for Phase Locked Loops                                                                       |        |               | NP   | PAT-Active  | US      | 15/198175     | 9832011      |                    |   |
| 14122 | DIGITAL-CENTRIC FULL-DUPLEX ARCHITECTURE                                                                           |        |               | NP   | APP-Pending | US      | 15/197528     |              | US-2018-0986795-A1 |   |
| 14123 | MULTIPLE MODULATED SPUR CANCELLATION APPARATUS                                                                     |        |               | NP   | APP-Pending | US      | 15/179211     |              | US-2017-0356136-A1 |   |
| 14124 | METHODS AND TRANSCEIVERS FOR REDUCING A DISTORTION COMPONENT WITHIN A BASEBAND RECEIVE SIGNAL                      |        |               | PCT  | APP-Pending | US      | 16/095761     |              |                    |   |
| 14125 | DIGITAL TIME CONVERTER SYSTEMS AND METHOD                                                                          |        |               | NP   | PAT-Active  | US      | 15/199217     | 9641185      |                    |   |
| 14126 | DIGITAL TIME CONVERTER SYSTEMS AND METHODS                                                                         |        |               | ENT  | PAT-Active  | US      | 15/583063     | #####        | US-2018-0308658-A1 |   |
| 14127 | DPLL WITH ADJUSTABLE DELAY IN INTEGER OPERATION MODE                                                               |        |               | PCT  | APP-Pending | US      | 16/465315     |              |                    |   |
| 14128 | HARMONIC SUPPRESSING LOCAL OSCILLATOR SIGNAL GENERATION                                                            |        |               | NP   | PAT-Active  | US      | 15/188267     | 9935722      | US-2017-0366280-A1 |   |
| 14129 | FREQUENCY DIFFERENCE DETERMINATION                                                                                 |        |               | NP   | PAT-Active  | US      | 15/295073     | 9722734      |                    |   |
| 14130 | EVOLVED NODE-B (ENB) RADIO ACCESS NETWORK (RAN) CENTRAL UNIT (RUC) AND METHODS FOR RADIO RESOURCE CONTROL (RRC)    |        |               | PCT  | APP-Pending | US      | 16/088233     |              |                    |   |
| 14131 | DOWNLINK HYBRID AUTOMATIC REPEAT REQUEST FEEDBACK FOR NARROWBAND INTERNET OF THINGS DEVICES                        |        |               | PCT  | APP-Pending | US      | 16/060916     |              | US-2018-0367278-A1 |   |
| 14132 | MULTIPLEXING TRANSMISSION TIME INTERVALS (TTIs) WITH PHYSICAL DOWNLINK SHARED CHANNEL (PDSCH) PUNCTURING DETECTION |        |               | PCT  | APP-Pending | US      | 15/765778     |              | US-2018-0288745-A1 |   |
| 14133 | FWP ENHANCEMENTS FOR RELIABLE DRB SWITCHING                                                                        |        |               | PCT  | APP-Pending | US      | 16/098141     |              |                    |   |
| 14134 | LOW LATENCY PHYSICAL RANDOM ACCESS CHANNEL DESIGN                                                                  |        |               | PCT  | APP-Pending | US      | 16/085532     |              |                    |   |
| 14135 | DEVICE AND METHOD FOR RECOVERING SERVICES FROM NETWORK REJECTIONS TO WIRELESS COMMUNICATION DEVICES                |        |               | NP   | PAT-Active  | US      | 15/584103     | #####        | US-2017-0353939-A1 |   |
| 14136 | METHODS AND DEVICES FOR SELF-INTERFERENCE CANCELLATION                                                             |        |               | NP   | PAT-Active  | US      | 15/214531     | #####        | US-2018-0926775-A1 |   |
| 14137 | COMMUNICATION DEVICE AND A METHOD FOR HYBRID BEAMFORMING                                                           |        |               | PCT  | APP-Pending | US      | 16/323777     |              |                    |   |
| 14138 | COMMUNICATION DEVICE AND METHOD FOR WIRELESS COMMUNICATIONS                                                        |        |               | NP   | APP-Pending | US      | 15/252242     |              | US-2018-0063817-A1 |   |
| 14139 | COMMUNICATION SYSTEM AND METHOD                                                                                    |        |               | NP   | PAT-Active  | US      | 15/385086     | #####        | US-2018-0176887-A1 |   |
| 14140 | PUSHING BACK PACKET NOT ACKNOWLEDGED BY BASE STATION                                                               |        |               | NP   | PAT-Active  | US      | 15/390211     | #####        | US-2018-0184322-A1 |   |
| 14141 | BEAM MANAGEMENT FOR DUAL TRANSMISSION POINT HYBRID BEAMFORMING SYSTEMS IN 5G                                       |        |               | PCT  | APP-Pending | US      | 16/081787     |              | US-2019-0089435-A1 |   |
| 14142 | METHOD AND APPARATUS FOR DECODING DATA                                                                             |        |               | NP   | PAT-Active  | US      | 10/002405     | 6928599      | US-2003-0106037-A1 |   |
| 14143 | INCREASE OF SPECTRAL CAPACITY OF EMBMS-CELL WHEN DEPLOYED AS A SUPPLEMENTARY DOWNLINK CARRIER                      |        |               | PCT  | APP-Pending | US      | 16/093242     |              | US-2019-0090103-A1 |   |
| 14144 | CELLULAR IOT CONTROL AND USER PLANE SWITCHING                                                                      |        |               | PCT  | APP-Pending | US      | 16/073997     |              | US-2019-0345561-A1 |   |
| 14145 | SAS PDCCH SAA co-channel interference mitigation                                                                   |        |               | NP   | APP-Pending | US      | 15/499953     |              | US-2017-0315470-A1 |   |

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| 2     | TITLE                                                                                                                                                                               | FAMILY | FAMILY-MEMBER | TYPE | STATUS      | COUNTRY | Filing Number | Grant Number | Publication Number |   |
| 14146 | ANTENNA PANEL SWITCHING AND BEAM INDICATION                                                                                                                                         |        |               | PCT  | APP-Pending | US      | 16/098792     |              | US-2019-0132851-A1 |   |
| 14147 | DISCRETE LEVELS ENVELOPE TRACKING                                                                                                                                                   |        |               | NP   | PAT-Active  | US      | 15/371768     | 9991913      | US-2018-0159566-A1 |   |
| 14148 | DETERMINATION CIRCUIT AND APPARATUS MOBILE TRANSCIVER COMMUNICATION DEVICE METHOD FOR DETERMINING COMPUTER PROGRAM AND STORAGE TO DETERMINE A SPATIAL TRANSMISSION MODE             |        |               | PCT  | APP-Pending | US      | 16/066343     |              | US-2019-0115657-A1 |   |
| 14149 | TRANSMITTER PERFORMANCE CALIBRATION SYSTEMS AND METHODS                                                                                                                             |        |               | NP   | PAT-Active  | US      | 15/275608     | 8988888      | US-2018-0091243-A1 |   |
| 14150 | PRE-DISTORTION CIRCUIT APPARATUS METHOD AND COMPUTER PROGRAM FOR PRE-DISTORTING TRANSMITTER RADIO TRANSCIVER MOBILE TRANSCIVER BASE STATION TRANSCIVER COMMUNICATION DEVICE STORAGE |        |               | PCT  | APP-Pending | US      | 16/095977     |              |                    |   |
| 14151 | EXTENDED PHYSICAL BROADCAST CHANNEL DESIGN FOR 5G STANDALONE SYSTEM                                                                                                                 |        |               | PCT  | APP-Pending | US      | 16/089628     |              | US-2019-0148276-A1 |   |
| 14152 | APPARATUS OF A USER EQUIPMENT (UE) TO SELECT RESOURCES IN A VEHICLE TO VEHICLE (V2V) COMMUNICATION SYSTEM                                                                           |        |               | PCT  | APP-Pending | US      | 16/094853     |              | US-2019-0150157-A1 |   |
| 14153 | CELLULAR TELEPHONE NETWORK TO NARROW BAND - INTERNET OF THINGS NETWORK SWITCHING METHOD AND APPARATUS                                                                               |        |               | NP   | PAT-Active  | US      | 15/279634     | 8908901      |                    |   |
| 14154 | SYSTEMS METHODS AND DEVICES FOR NON-ADAPTIVE RETRANSMISSION USING SEMI-PERSISTENT SCHEDULING RESOURCES                                                                              |        |               | PCT  | APP-Pending | US      | 16/093093     |              | US-2019-0215907-A1 |   |
| 14155 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14156 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14157 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14158 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14159 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14160 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14161 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14162 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14163 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14164 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14165 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14166 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14167 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14168 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14169 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14170 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14171 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14172 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14173 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |
| 14174 |                                                                                                                                                                                     |        |               |      |             |         |               |              |                    |   |