PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1 Stylesheet Version v1.2 EPAS ID: PAT4945585

| SUBMISSION TYPE: | NEW ASSIGNMENT |
|-----------------------|----------------|
| NATURE OF CONVEYANCE: | ASSIGNMENT |

CONVEYING PARTY DATA

| Name | Execution Date |
|-----------------|----------------|
| JIN-YOUNG OH | 05/03/2018 |
| SEUNG-HOON CHOI | 05/03/2018 |
| DONG-HAN KIM | 05/03/2018 |
| YOUNG-BUM KIM | 05/03/2018 |

RECEIVING PARTY DATA

| Name: | SAMSUNG ELECTRONICS CO., LTD. |
|-----------------|-------------------------------|
| Street Address: | 129, SAMSUNG-RO, YEONGTONG-GU |
| City: | SUWON-SI, GYEONGGI-DO |
| State/Country: | KOREA, REPUBLIC OF |
| Postal Code: | 16677 |

PROPERTY NUMBERS Total: 1

| Property Type | Number |
|---------------------|----------|
| Application Number: | 15773444 |

CORRESPONDENCE DATA

Fax Number:

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.

Phone: 202-293-0804

Email: usdocketing@jeffersonip.com
Correspondent Name: JEFFERSON IP LAW, LLP

Address Line 1: 1130 CONNECTICUT AVE., NW, SUITE 420

Address Line 4: WASHINGTON, D.C. 20036

| ATTORNEY DOCKET NUMBER: | 0201-1947 |
|-------------------------|---------------------|
| NAME OF SUBMITTER: | DONALD A. DIPAULA |
| SIGNATURE: | /Donald A. DIPAULA/ |
| DATE SIGNED: | 05/03/2018 |

Total Attachments: 7

source=0201-1947AssignmentAsFiled05-03-2018#page1.tif source=0201-1947AssignmentAsFiled05-03-2018#page2.tif source=0201-1947AssignmentAsFiled05-03-2018#page3.tif

PATENT 504898842 REEL: 045710 FRAME: 0042

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> PATENT REEL: 045710 FRAME: 0043

| RECORDATION FORM COVER SHEET | | | | | |
|---|--|--|--|--|--|
| PATENTS ONLY | | | | | |
| To the Director of the U.S. Patent and Trademark Office: Pleas | e record the attached documents or the new address(es) below. | | | | |
| 1. Name of conveying party(ies) | 2. Name and address of receiving party(ies) | | | | |
| 1) Jin-Young OH, 2) Seung-Hoon CHOI, 3) Dong-Han KIM, and 4) Young-Bum KIM | Name: Samsung Electronics Co., Ltd. | | | | |
| | Internal Address: | | | | |
| Additional name(s) of conveying party(ies) attached? Yes 🗹 No | | | | | |
| 3. Nature of conveyance/Execution Date(s): | Street Address: 129, Samsung-ro, Yeongtong-gu | | | | |
| Execution Date(s) May 3, 2018 | | | | | |
| Assignment Merger | 2" 2 | | | | |
| Security Agreement Change of Name | City: Suwon-si, Gyeonggi-do | | | | |
| Joint Research Agreement | State: | | | | |
| Government Interest Assignment | Country: Republic of Korea Zip: 16677 | | | | |
| Executive Order 9424, Confirmatory License | Courtil y. nepublic of Norea | | | | |
| Other | Additional name(s) & address(es) attached? Yes Vo | | | | |
| Additional numbers att | ached? Yes VNo | | | | |
| 5. Name and address to whom correspondence | 6. Total number of applications and patents | | | | |
| concerning document should be mailed: Name: Jefferson IP Law, LLP | involved: One | | | | |
| | 7. Total fee (37 CFR 1.21(h) & 3.41) \$ | | | | |
| Internal Address: Donald A. DiPaula | Authorized to be charged by credit card | | | | |
| | Authorized to be charged to deposit account | | | | |
| Street Address: 1130 Connecticut Ave., NW, Suite 420 | Enclosed None required (government interest not affecting title) | | | | |
| | None required (government interest not affecting title) | | | | |
| City: Washington | 8. Payment Information | | | | |
| State: District of Columbia Zip:20036 | a. Credit Card Last 4 Numbers Expiration Date | | | | |
| Phone Number: 202-293-0804 | b. Deposit Account Number | | | | |
| Fax Number: 202-403-3587 | Authorized User Name | | | | |
| Email Address: usdocketing@jeffersonip.com | | | | | |
| 9. Signature: /Donald A. DIPAULA/ Reg. # | 58,115 May 3, 2018 | | | | |
| Signature | Date | | | | |
| Donald A. DiPaula Name of Person Signing | Total number of pages including cover sheet, attachments, and documents: | | | | |

Documents to be recorded (including cover sheet) should be faxed to (571) 273-0140, or mailed to:
Mail Stop Assignment Recordation Services, Director of the USPTO, P.O.Box 1450, Alexandria, V.A. 22313-1450

REEL: 045710 FRAME: 0044

DOCKET NO.: 0201-1947

CLIENT REF.; P22324-US1/DMC

SAMSUNG REF.: MJ-201511-003-1-US1

Assignment

WHEREAS, the following inventors, namely 1) Jin-Young OH, 2) Seung-Hoon CHOI, 3) Dong-Han KIM, 4) Young-Bum KIM, all citizen of Republic of Korea, (hereinafter called "Assignors"), having made or discovered certain new, useful and non-obvious improvements in an invention having a working title of:

METHOD AND DEVICE FOR TRANSMITTING OR RECEIVING CONTROL INFORMATION IN WIRELESS COMMUNICATION SYSTEM

for which a United States Patent Application is being filed concurrently herewith or, if not being concurrently filed, was filed on <u>May 3, 2018</u>, and assigned Serial No. <u>15/773,444</u>; and,

WHEREAS, Samsung Electronics Co., Ltd., a corporation duly organized under the laws of the Republic of Korea, located and doing business at 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Republic of Korea, 16677 (hereinafter called "Assignee"), is desirous of acquiring the entire right, title and interest therein

NOW, THEREFORE, BE IT KNOWN that for and in good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignors do hereby sell, assign and transfer unto said Assignee the entire and exclusive worldwide right, title and interest in and to all said inventions and discoveries disclosed in said application, and in and to said application, any and all substitutions, divisions, provisionals, conversions of provisionals and continuations thereof, and in and to all Letters Patent, United States and foreign, that may be granted for said inventions and discoveries, and in and to all extensions, renewals and reissues thereof; and the right to file any foreign application and/or claim priority under the provisions of any international treaty or convention arising from this application or any divisional, continuing, substitute or reissue application therefrom. The aforesaid assignment includes the right in and to all income, royalties, damages and payments, now or hereafter due or payable with respect to any Letters Patent which may be granted, and in and to all causes of action (either in law or in equity), and the right to sue, counterclaim, and recover for past, present and future infringement of the rights assigned or to be assigned under this Assignment, as fully and entirely as the same would have been held and enjoyed by Assignors if this sale, assignment and transfer had not been made.

Assignors covenant and agree, without further compensation to said Assignors but at Assignce's expense:

a. lo execute:

DOCKET NO.: 0201-1947 CLIENT REF.: P22324-US1/DMC SAMSUNG REF.: MJ-201511-003-1-US1

- all papers to be used in connection with this application and any divisional, continuing, substitute or reissue application thereof, as the Assignee may deem necessary or expedient, and
- ii. all papers in connection with any interference, litigation, mediation, arbitration or other proceeding relating to this application or any divisional, continuing, substitute or reissue application thereof, as may be necessary or expedient;
- to cooperate with the Assignee in every way possible in obtaining evidence and going forward in any interference, litigation, mediation, arbitration or other proceeding relating to said invention, said application and any divisional, continuing, substitute or reissue application thereof;
- c. to communicate to the Assignee any facts relating to said invention, said application and any divisional, continuing, substitute or reissue application thereof, including evidence for any interference, litigation, mediation, arbitration or other proceeding relating to said invention, whenever requested;
- d. to testify in any interference, litigation, mediation, arbitration or other proceeding relating to said invention, said application and any divisional, continuing, substitute or reissue application thereof whenever requested; and
- e. to perform all other affirmative acts which may be necessary or desirable to secure full and complete protection of the inventions and discoveries or that may be necessary or desirable to vest in Assignee the complete title to the inventions and discoveries and Letters Patent hereby conveyed and to enable Assignee to record title.

Assignors hereby authorize and request the United States Patent and Trademark Office or any other issuing authority to issue any and all Letters Patent that may be granted upon this invention and/or this application or any divisional, continuing, substitute or reissue application thereof to the Assignee, its legal representatives, successors and assigns.

Assignors each hereby represents, covenants and warrants that he or she has the full right to convey the entire right, title and interest by this instrument, free of any encumbrances and that no other agreement has been or will be executed in conflict herewith.

The provisions of this Assignment are binding upon Assignors' heirs, legal representatives and/or administrators and assigns.

Assignors hereby grant to the law firm of Jefferson IP Law, LLP of Washington, DC and its attorneys and agents as associated with Customer No. 68103 the authority and power to insert on this instrument any further identification which may be necessary or desirable for purposes of recordation in the United States Patent and Trademark Office or a Patent Office of any foreign country.

DOCKET NO.: 0201-1947 CLIENT REF.: P22324-USI/DMC

Signature of Inventor:

Dong-Han KIM

Date

Signature of Inventor:

| May 03, 2018 | Date |

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DOCKET NO.: 0201-1947

CLIENT REF.; P22324-US1/DMC SAMSUNG REF.: MJ-201511-003-1-US1

Assignment

WHEREAS, the following inventors, namely 1) Jin-Young OH, 2) Seung-Hoon CHOI, 3) Dong-Han KIM, 4) Young-Bum KIM, all citizen of Republic of Korea, (hereinafter called "Assignors"), having made or discovered certain new, useful and non-obvious improvements in an invention having a working title of:

METHOD AND DEVICE FOR TRANSMITTING OR RECEIVING CONTROL INFORMATION IN WIRELESS COMMUNICATION SYSTEM

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NOW, THEREFORE, BE IT KNOWN that for and in good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignors do hereby sell, assign and transfer unto said Assignee the entire and exclusive worldwide right, title and interest in and to all said inventions and discoveries disclosed in said application, and in and to said application, any and all substitutions, divisions, provisionals, conversions of provisionals and continuations thereof, and in and to all Letters Patent, United States and foreign, that may be granted for said inventions and discoveries, and in and to all extensions, renewals and reissues thereof; and the right to file any foreign application and/or claim priority under the provisions of any international treaty or convention arising from this application or any divisional, continuing, substitute or reissue application therefrom. The aforesaid assignment includes the right in and to all income, royalties, damages and payments, now or hereafter due or payable with respect to any Letters Patent which may be granted, and in and to all causes of action (either in law or in equity), and the right to sue, counterclaim, and recover for past, present and future infringement of the rights assigned or to be assigned under this Assignment, as fully and entirely as the same would have been held and enjoyed by Assignors if this sale, assignment and transfer had not been made.

Assignors covenant and agree, without further compensation to said Assignors but at Assignce's expense:

a. lo execute:

5

DOCKET NO.: 0201-1947 CLIENT REF.: P22324-US1/DMC

SAMSUNG REF.: MJ-201511-003-1-US1

i. all papers to be used in connection with this application and any divisional, continuing, substitute or reissue application thereof, as the Assignee may deem necessary or expedient, and

ii. all papers in connection with any interference, litigation, mediation, arbitration or other proceeding relating to this application or any divisional, continuing, substitute or reissue application thereof, as may be necessary or expedient;

- to cooperate with the Assignee in every way possible in obtaining evidence and going forward in any interference, litigation, mediation, arbitration or other proceeding relating to said invention, said application and any divisional, continuing, substitute or reissue application thereof;
- c. to communicate to the Assignce any facts relating to said invention, said application and any divisional, continuing, substitute or reissue application thereof, including evidence for any interference, litigation, mediation, arbitration or other proceeding relating to said invention, whenever requested;
- d. to testify in any interference, litigation, mediation, arbitration or other proceeding relating to said invention, said application and any divisional, continuing, substitute or reissue application thereof whenever requested; and
- e. to perform all other affirmative acts which may be necessary or desirable to secure full and complete protection of the inventions and discoveries or that may be necessary or desirable to vest in Assignce the complete title to the inventions and discoveries and Letters Patent hereby conveyed and to enable Assignee to record title.

Assignors hereby authorize and request the United States Patent and Trademark Office or any other issuing authority to issue any and all Letters Patent that may be granted upon this invention and/or this application or any divisional, continuing, substitute or reissue application thereof to the Assignee, its legal representatives, successors and assigns.

Assignors each hereby represents, covenants and warrants that he or she has the full right to convey the entire right, title and interest by this instrument, free of any encumbrances and that no other agreement has been or will be executed in conflict herewith.

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DOCKET NO.: 0201-1947 CLIENT REF.: P22324-US1/DMC SAMSUNG REF.: MJ-201511-003-1-US1

| Signature of Inventor: | | |
|------------------------|-----------------|--------------------|
| | Jin-Young OH | Date |
| Signature of Inventor: | Seung-Hoon CHOI | Date |
| Signature of Inventor: | Dong-Han KIM | May 03, 2018 Date |
| Signature of Inventor: | Young-Bum KIM | Date |