

<b>PATENT ASSIGNMENT COVER SHEET</b>
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EPAS ID: PAT5433591

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
PANASONIC INTELLECTUAL PROPERTY CORPORATION OF AMERICA	01/26/2018
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	INTERDIGITAL PATENT HOLDINGS, INC.
<b>Street Address:</b>	200 BELLEVUE PARKWAY
<b>Internal Address:</b>	SUITE 300
<b>City:</b>	WILMINGTON
<b>State/Country:</b>	DELAWARE
<b>Postal Code:</b>	19809
<b>PROPERTY NUMBERS Total: 39</b>	
<b>Property Type</b>	<b>Number</b>
Application Number:	10498052
Application Number:	12490231
Application Number:	13480300
Application Number:	14228692
Application Number:	14658075
Application Number:	11718495
Application Number:	13371155
Application Number:	11718468
Application Number:	13228227
Application Number:	11718500
Application Number:	13103220
Application Number:	10516181
Application Number:	12809701
Application Number:	12294804
Application Number:	10484032
Application Number:	10481783
Application Number:	10312870
Application Number:	10380222
Application Number:	11993014

Property Type	Number
Application Number:	12523280
Application Number:	12306294
Application Number:	11573174
Application Number:	10591707
Application Number:	12345455
Application Number:	10568450
Application Number:	11915724
Application Number:	12159376
Application Number:	13282207
Application Number:	11908100
Application Number:	11996901
Application Number:	12518787
Application Number:	12160193
Application Number:	13311292
Application Number:	12523481
Application Number:	11722831
Application Number:	10572033
Application Number:	11993967
Application Number:	11913475
Application Number:	13073736

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<b>ATTORNEY DOCKET NUMBER:</b>	IGEN 3R PANASONIC
<b>NAME OF SUBMITTER:</b>	ROBERT D. LEONARD
<b>SIGNATURE:</b>	/Robert D. Leonard/
<b>DATE SIGNED:</b>	03/21/2019

**Total Attachments: 17**  
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## PATENT ASSIGNMENT

This PATENT ASSIGNMENT, effective as of January 26, 2018, is made by and between **Panasonic Intellectual Property Corporation of America**, a Delaware corporation with its principal place of business located at 20000 Mariner Avenue, Suite 200, Torrance, California, 90503 (hereinafter "Assignor"), and **InterDigital Patent Holdings, Inc.**, a Delaware corporation having a place of business at 200 Bellevue Parkway, Suite 300, Wilmington, DE 19809 (hereinafter "Assignee").

### WHEREAS:

Assignor is the sole owner of the patents and patent applications listed in the attached Exhibit A (hereinafter "Patents"); and

Assignee is desirous of acquiring all of Assignor's right, title and interest in and to the Patents.

NOW, THEREFORE, for good and valuable consideration, receipt of which is hereby acknowledged, Assignor has sold, assigned and transferred, and does hereby sell, assign and transfer to Assignee all right, title and interest in and to:

- (i) the Patents, including any and all inventions, invention disclosures and discoveries disclosed or claimed therein;
- (ii) all United States, foreign and international patents and patent applications, certificates of invention, utility models and any other grants by any Governmental Entity for the protection of inventions resulting from the Patents, including any and all patents and patent applications disclosing said invention(s) and any patents issuing from such applications, including provisionals, non-provisionals, divisionals, continuations, continuations-in-part, reissues, extensions, and re-examinations of the Patents, along with the rights of priority created by such patents and patent applications under any treaty relating thereto; and
- (iii) all past, present and future causes of action and enforcement rights, whether currently pending, filed or otherwise, in connection with the Patents, the patents and patent applications resulting from the Patents and any of the inventions or discoveries described or claimed therein, including without limitation, all rights to sue for any past, present or future infringement of the Patents, including the rights to license and to collect and receive any damages, royalties, injunctive relief, and/or any other settlements or remedies for such infringements,

the same to be held and enjoyed by Assignee for its own use and enjoyment, and for the use and enjoyment of its successors, assigns and other legal representatives, to the end of the term or terms thereof as fully and entirely as the same would have been held and enjoyed by Assignor, if this Assignment and sale had not been made.

IN WITNESS WHEREOF, Assignor has caused these presents to be signed by its duly appointed officer having full authority in the circumstances.

SIGNED for and on behalf of **Panasonic Intellectual Property Corporation of America**

By Kazuki Kawakami (Signature) 03/23/2018 (Date)

Kazuki Kawakami (Print Name) President (Print Title)

State of \_\_\_\_\_ County of \_\_\_\_\_

On this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ before me, \_\_\_\_\_, personally appeared \_\_\_\_\_, who proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the instrument and acknowledged to me that he/she executed the same in his/her authorized capacity and that by his/her signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal.

\* see attached California All-Purpose Acknowledgment

\_\_\_\_\_  
(Notary Public)

SIGNED for and on behalf of **InterDigital Patent Holdings, Inc.**

By C. Ioannidi (Signature) 4 May 2018 (Date)

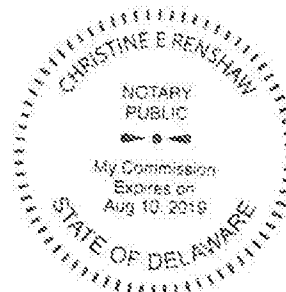
Christos A. Ioannidi (Print Name) Senior Patent Executive (Print Title)  
~~Deputy General Patent Counsel~~

State of Delaware County of NEW CASTLE

On this 4<sup>th</sup> day of May, 2018 before me, Christine E. Renshaw, personally appeared Christos A. Ioannidi, who proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the instrument and acknowledged to me that he/she executed the same in his/her authorized capacity and that by his/her signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal.

Christine E. Renshaw  
(Notary Public)



**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT**

**CIVIL CODE § 1189**

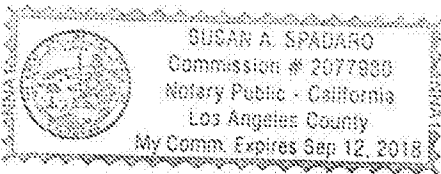
A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California )  
County of Los Angeles )  
On March 23, 2018 before me, Susan A. Spadaro, Notary Public  
Date Here Insert Name and Title of the Officer  
personally appeared Kazuki Kawakami  
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 Susan A. Spadaro  
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: Patent Assignment  
Document Date: March 23, 2018 Number of Pages: 2  
Signer(s) Other Than Named Above: \_\_\_\_\_

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

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

**EXHIBIT A**

<b>Country</b>	<b>Application No.</b>	<b>Patent or Publication No.</b>	<b>Filing Date</b>	<b>Title</b>	<b>Status</b>
CN	3801769	100392997	2003-08-11	Radio transmission device and radio transmission method	GRANTED
DE	60316933	60316933	2003-08-11	Funkübertragungseinrichtung und funkübertragungsverfahren	GRANTED
FR, GB	3795215	National Validations of EP 1501210	2003-08-11	Radio transmission device and radio transmission method	ACTIVE
DE, FR, GB	6008972	National Validations of EP 1684445	2003-08-11	Radio transmission device and radio transmission method	ACTIVE
IN	0771/KOLNP/2004	251190	2004-06-07	Radio transmission apparatus and radio transmission method	GRANTED
JP	2002268968	3679075	2002-09-13	Wireless transmission apparatus and wireless transmission method	GRANTED
JP	2005111862	4044942	2005-04-08	Wireless transmission apparatus and wireless transmission method	GRANTED
JP	2007245914	4669869	2007-09-21	Wireless transmission apparatus and wireless transmission method	GRANTED
US	10/498,052	7567583	2003-08-11	Radio transmission device and radio transmission method	GRANTED
US	12/490,231	8208488	2009-06-23	Radio transmission apparatus and radio transmission method	GRANTED
US	13/480,300	8750325	2012-05-24	Radio transmission apparatus and radio transmission method	GRANTED
US	14/228,692	9008115	2014-03-28	Integrated circuit for controlling radio transmission and reception	GRANTED



Country	Application No.	Patent or Publication No.	Filing Date	Title	Status
US	14/658,075	9197308	2015-03-13	Radio transmission apparatus and radio transmission method	GRANTED
AT	05776051T	407491	2005-07-20	Verfahren und senderstruktur zur verminderung der mehrdeutigkeit durch wiederholungsneuanordnung im bitbereich	LAPSED
CN	200580037495	101053195	2005-07-20	Method for transmitting signal in digital communication system, transmitter ,base station and mobile station	GRANTED
DE	602005009574T	602005009574	2005-07-20	Verfahren und senderstruktur zur verminderung der mehrdeutigkeit durch wiederholungsneuanordnung im bitbereich	GRANTED
DE, FR, GB	5776051	National Validations of EP 1817861	2005-07-20	Method and transmitter structure reducing ambiguity by repetition rearrangement in the bit domain	ACTIVE
JP	2007539474	4714743	2005-07-20	By reducing the ambiguity in the region bit repetition rearrangement method and transmitter structure	GRANTED
US	11/718,495	8139690	2005-07-20	Method and transmitter structure reducing ambiguity by repetition rearrangement in the bit domain	GRANTED
US	13/371,155	8391403	2012-02-10	Method for transmitting signals in a digital communication system and transmitter for a digital communication system	GRANTED
CA	2583358	2583358	2005-07-20	Method and transmitter structure reducing ambiguity by repetition rearrangement in the symbol domain	WITHDRAWN

Country	Application No.	Patent or Publication No.	Filing Date	Title	Status
DE, FR, GB	5761790	National Validations of EP 1834432	2005-07-20	Method and transmitter structure reducing ambiguity by repetition rearrangement in the symbol domain	ACTIVE
DE	5796388	National Validation of EP 1807960	2005-09-30	Method for reducing ambiguity levels of transmitted symbols	ACTIVE
JP	2007539475	4714744	2005-07-20	In the symbol region to reduce ambiguity by repetition rearrangement method and transmitter structure	GRANTED
JP	2007539480	4722135	2005-09-30	Method for transmitting data in a digital communication system	GRANTED
JP	2011008050	5048137	2011-01-18	Data transmitting method and data receiving method of digital communication system	GRANTED
JP	2011008055	5048138	2011-01-18	Method of transmitting data in digital communication system and data transmission device	GRANTED
JP	2012130804	5420718	2012-06-08	Data reception method in digital communication system	GRANTED
US	11/718,468	8036309	2005-07-20	Method and transmitter structure reducing ambiguity by repetition rearrangement in the symbol domain	GRANTED
US	11/718,500	7965793	2005-09-30	Method for reducing ambiguity levels of transmitted symbols	GRANTED
US	13/103,220	8422589	2011-05-09	Method and apparatus for transmitting data in a digital communication system, and computer-readable storage medium relating thereto	GRANTED

Country	Application No.	Patent or Publication No.	Filing Date	Title	Status
US	13/228,227	8428184	2011-09-08	Transmitter, receiver, data transmission method and data reception method	GRANTED
JP	2003125033	4290470	2003-04-30	Receiving method and apparatus for estimating quality of reception, and communication system utilizing the receiving apparatus	GRANTED
US	10/484,032	8934575	2003-05-08	Reception method and reception device estimating reception quality and communication system using the reception device	GRANTED
JP	2002111171	3679775	2002-04-12	Multicarrier transmitter, multicarrier receiver, and multicarrier transmitting method	GRANTED
JP	2002273569	3746029	2002-09-19	Apparatus and method for radio communications	GRANTED
US	10/481,783	7400687	2003-04-10	Multicarrier communication apparatus and multicarrier communication method	GRANTED
AU	2003262010	2003262010	2003-09-09	Radio transmission device, radio reception device, and method for selecting transmission cancel subcarriers	ABANDONED
CN	3813644	1659817	2003-09-09	Radio transmission device, radio reception device, and method for selecting transmission cancel subcarriers	GRANTED
DE	3795323	National Validation of EP 1533926	2003-09-09	Radio transmission device, radio reception device, and method for selecting transmission cancel subcarriers	ACTIVE

Country	Application No.	Patent or Publication No.	Filing Date	Title	Status
US	10/516,181	7583736	2003-09-09	Radio transmission device, radio reception device, and method for selecting transmission cancellation subcarriers	GRANTED
WO	PCT/JP2003/011476	2004025883	2003-09-09	Radio transmission device, radio reception device, and method for selecting transmission cancel subcarriers	EXPIRED
CN	2801710	1235435	2002-05-13	Radio base station and communication terminal	GRANTED
JP	2001146576	3628977	2001-05-16	Radio base station device and communication terminal device	GRANTED
KR	20037000679	100543281	2003-01-16	Radio base station and communication terminal	GRANTED
US	10/312,870	7298692	2002-05-13	Radio base station apparatus and communication terminal	GRANTED
CN	2802637	1278504	2002-07-03	Multi carrier transmission apparatus, multi carrier reception apparatus, and multi carrier radio communication method	GRANTED
EP	2743785	1411664	2002-07-03	Multi-carrier transmission apparatus, multi-carrier reception apparatus, and multi-carrier radio communication method	GRANTED
DE	2743785	National Validation of EP 1411664	2002-07-03	Multi-carrier transmission apparatus, multi-carrier reception apparatus, and multi-carrier radio communication method	ACTIVE
JP	2001214545	3607643	2001-07-13	Multi-carrier transmitter, multi-carrier receiver, and multi-carrier radio communication method	GRANTED

Country	Application No.	Patent or Publication No.	Filing Date	Title	Status
US	10/380,222	7200177	2002-07-03	Multi-carrier transmission apparatus, multi-carrier reception apparatus, and multi-carrier radio communication method	GRANTED
JP	2007522371	4836951	2006-06-22	Multicarrier communication base station apparatus and wireless communication in the wireless communication method	GRANTED
US	11/993,014	7756215	2006-06-22	Radio communication base station apparatus and radio communication method in multi-carrier communications	GRANTED
US	12/294,804	8229016	2007-03-30	MIMO receiver and MIMO communication system	GRANTED
JP	2009546924	5409388	2008-10-23	Wireless communication device, the wireless communication base station apparatus and the radio communication mobile station apparatus	GRANTED
US	12/809,701	8588321	2008-10-23	Wireless communication apparatus, wireless communication system and wireless communication method	GRANTED
JP	2008556076	5177892	2008-01-25	Wireless communication system, wireless communication apparatus and retransmission control method	GRANTED
US	12/523,280	8320828	2008-01-25	Radio communication system, radio communication apparatus, and retransmission control method	GRANTED
US	12/306,294	8126069	2006-06-23	Re-transmission in a MIMO communication system	GRANTED

Country	Application No.	Patent or Publication No.	Filing Date	Title	Status
US	11/573,174	8081688	2005-07-12	Radio transmitting apparatus and radio transmitting method in multicarrier communication	GRANTED
JP	2005056381	4652846	2005-03-01	Communication terminal device and communication relay method	GRANTED
RU	2006132334	2377727	2005-03-08	Terminal communication device and relay method	GRANTED
US	10/591,707	7505735	2005-03-08	Communication terminal device and communication relay method	GRANTED
US	12/345,455	8447244	2008-12-29	Communication terminal device and communication relay method	GRANTED
US	10/568,450	8014454	2004-08-16	Multicarrier communication apparatus, multicarrier communication system, and transmission power control method	GRANTED
CN	200680019126	101185274	2006-05-30	Transmitting apparatus, receiving apparatus and transmission power control method and wireless communication system	GRANTED
JP	2007519006	5052337	2006-05-30	Transmitting apparatus, receiving apparatus and the transmission power control method	GRANTED
US	11/915,724	7920889	2006-05-30	Transmitting apparatus, receiving apparatus and transmission power control method	GRANTED
JP	2007551960	4898707	2006-12-25	Wireless transmission apparatus and method for generating multi-carrier signal	GRANTED
JP	2011214675	5323158	9/29/2011	Radio transmitter and transmission signal generation method	GRANTED

Country	Application No.	Patent or Publication No.	Filing Date	Title	Status
US	12/159,376	8073065	2006-12-25	Radio transmitting apparatus and multicarrier signal generating method	GRANTED
US	13/282,207	8422578	2011-10-26	Radio transmission apparatus, radio communication base station apparatus, radio communication mobile station apparatus, and transmission signal generating method	GRANTED
CN	200680007654	101138180	2006-03-10	Radio transmitter apparatus and radio receiver apparatus	GRANTED
CN	201010607615	102088435	2006-03-10	Radio transmitter apparatus, radio transmission method and radio receiver apparatus	GRANTED
JP	2007507214	4881852	2006-03-10	Radio receiving apparatus	GRANTED
US	11/908,100	7949058	2006-03-10	Radio receiving apparatus and radio receiving method	GRANTED
CN	200580045236	101091341	2005-12-26	Wireless receiving apparatus, wireless transmitting apparatus, and interference signal removing method	GRANTED
CN	201110221794	102244637	2005-12-26	Sending apparatus and sending method	GRANTED
JP	2006550769	4836806	2005-12-26	Radio receiving apparatus, radio transmitting apparatus, and, the interference signal removal method	GRANTED
JP	2011176867	5349553	2011-08-12	Transmission device and transmission method	GRANTED
US	13/316,249	8401100	2011-12-09	Transmission apparatus and transmission method	GRANTED

Country	Application No.	Patent or Publication No.	Filing Date	Title	Status
CN	200680025214	101218845	2006-07-27	Wireless communication base station apparatus, wireless communication mobile station apparatus and pilot signal sequence allocating method in multicarrier communication	GRANTED
JP	2007526895	4827845	2006-07-27	In the multi-carrier communication radio communication base station apparatus, radio communication mobile station apparatus, and, pilot signal sequence allocation method	GRANTED
US	11/996,901	7940641	2006-07-27	Wireless communication base station apparatus, wireless communication mobile station apparatus and pilot signal sequence allocating method in multicarrier communication	GRANTED
JP	2008552072	5182884	2007-12-07	Wireless communication apparatus and retransmission control method	GRANTED
US	12/518,787	8374276	2007-12-07	Radio communication apparatus and resending controlling method	GRANTED
CN	200780002346	101371475	2007-01-10	Radio communication base station device and report channel signal transmission band setting method	GRANTED
JP	2007553920	5030795	2007-01-10	Wireless communication base station apparatus and a notification channel signal transmission band setting method	GRANTED
US	12/160,193	8094738	2007-01-10	Radio communication base station apparatus and report channel signal transmission band setting method	GRANTED



Country	Application No.	Patent or Publication No.	Filing Date	Title	Status
US	13/311,292	8401051	2011-12-05	Base station apparatus that communicates with mobile station apparatuses, mobile station apparatus that communicates with a base station and transmission band setting method performed in a base station	GRANTED
JP	2008010337	5073512	2008-01-21	Multi-antenna transmission device and reception device, multi-antenna transmission method and reception method, terminal device, and base station device	GRANTED
US	12/523,481	8422581	2008-01-21	Multi-antenna transmission device, multi-antenna reception device, multi-antenna transmission method, multi-antenna reception method, terminal device, and base station device	GRANTED
JP	2006550767	4671971	2005-12-26	Wireless communication apparatus and radio communication method of	GRANTED
US	11/722,831	7729443	2005-12-26	Wireless communication apparatus and wireless communication method	GRANTED
US	10/572,033	7804842	2004-09-06	Carrier sense multiple access method and wireless terminal apparatus	GRANTED
CN	200580050936	101213808	2005-06-29	Method for using a symbol mapper using a symbol mapping scheme to generate modulation symbols according to a different symbol mapping scheme and a method for generating a symbol mapping scheme	GRANTED

Country	Application No.	Patent or Publication No.	Filing Date	Title	Status
EP	5755459	1897316	2005-06-29	Method for using a symbol mapper using a symbol mapping scheme to generate modulation symbols according to a different symbol mapping scheme and a method for generating a symbol mapping scheme	GRANTED
DE	5755459	National Validation of EP 1897316	2005-06-29	Method for using a symbol mapper using a symbol mapping scheme to generate modulation symbols according to a different symbol mapping scheme and a method for generating a symbol mapping scheme	ACTIVE
JP	2008518636	4700107	2005-06-29	Method for generating modulation symbols and the signal transmission device, to generate modulation symbols as well as to a computer-readable medium storing instructions	GRANTED
JP	2010283131	5113897	2010-12-20	Method for generating modulation symbols and the signal transmission device, to generate modulation symbols as well as to a computer-readable medium storing instructions	GRANTED
US	11/993,967	7961814	2005-06-29	Method for using a symbol mapper using a symbol mapping scheme to generate modulation symbols according to a different symbol mapping scheme and a method for generating a symbol mapping scheme	GRANTED
WO	PCT/EP2005/007004	2007000180	2005-06-29	Method for using a symbol mapper using a symbol mapping scheme to generate modulation symbols according to a different symbol mapping scheme and a method for generating a symbol mapping scheme	EXPIRED

Country	Application No.	Patent or Publication No.	Filing Date	Title	Status
CN	200580050939	101213809	2005-05-04	Data transmission in a mobile communication system employing diversity and constellation rearrangement of a 16 QAM scheme	GRANTED
CN	201110032441	102148796	2005-05-04	Data transmission in a mobile communication system employing diversity and constellation rearrangement of a 16 QAM scheme	GRANTED
DE	602005016728T	602005016728	2005-05-04	Datenübertragungen in einem mobilkommunikationssysyes 16-qam-schemas	GRANTED
FR, GB	5739407	National Validations of EP 1878188	2005-05-04	Data transmissions in a mobile communication system employing diversity and constellation rearrangement of a 16 qam scheme	ACTIVE
DE, FR, GB	9164585	National Validations of EP 2106084	2005-05-04	Data transmissions in a mobile communication system employing diversity and constellation rearrangement of a 16 QAM scheme	ACTIVE
JP	2008509306	4719795	2005-05-04	16QAM The diversity method and the constellation re-arrangement of the mobile communication system using the data transmission of	GRANTED
US	11/913,475	7920645	2005-05-04	Data transmissions in a mobile communication system employing diversity and constellation rearrangement of a 16 QAM scheme	GRANTED
US	13/073,736	8270531	2011-03-28	Data transmissions in a mobile communication system employing diversity and constellation rearrangement of a 16 QAM scheme	GRANTED

<b>Country</b>	<b>Application No.</b>	<b>Patent or Publication No.</b>	<b>Filing Date</b>	<b>Title</b>	<b>Status</b>
WO	PCT/EP2005/004891	20060117014	2005-05-04	Data transmissions in a mobile communication system employing diversity and constellation rearrangement of a 16 qam scheme	EXPIRED