

PATENT ASSIGNMENT

Electronic Version v1.1
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SUBMISSION TYPE:	NEW ASSIGNMENT												
NATURE OF CONVEYANCE:	ASSIGNMENT												
CONVEYING PARTY DATA													
<table border="1"> <thead> <tr> <th>Name</th> <th>Execution Date</th> </tr> </thead> <tbody> <tr> <td>Manish JAIN</td> <td>10/10/2012</td> </tr> <tr> <td>Aditya DUA</td> <td>10/10/2012</td> </tr> <tr> <td>Manini SHAH</td> <td>10/18/2012</td> </tr> <tr> <td>Keith SAINTS</td> <td>12/13/2012</td> </tr> <tr> <td>Farrokh ABRISHAMKAR</td> <td>12/19/2012</td> </tr> </tbody> </table>		Name	Execution Date	Manish JAIN	10/10/2012	Aditya DUA	10/10/2012	Manini SHAH	10/18/2012	Keith SAINTS	12/13/2012	Farrokh ABRISHAMKAR	12/19/2012
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RECEIVING PARTY DATA													
<table border="1"> <tr> <td>Name:</td> <td>QUALCOMM Incorporated</td> </tr> <tr> <td>Street Address:</td> <td>5775 Morehouse Drive</td> </tr> <tr> <td>City:</td> <td>San Diego</td> </tr> <tr> <td>State/Country:</td> <td>CALIFORNIA</td> </tr> <tr> <td>Postal Code:</td> <td>92121-1714</td> </tr> </table>		Name:	QUALCOMM Incorporated	Street Address:	5775 Morehouse Drive	City:	San Diego	State/Country:	CALIFORNIA	Postal Code:	92121-1714		
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PROPERTY NUMBERS Total: 1													
<table border="1"> <thead> <tr> <th>Property Type</th> <th>Number</th> </tr> </thead> <tbody> <tr> <td>Application Number:</td> <td>13633762</td> </tr> </tbody> </table>		Property Type	Number	Application Number:	13633762								
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CORRESPONDENCE DATA													
<p>Fax Number: 8586582502 <i>Correspondence will be sent via US Mail when the fax attempt is unsuccessful.</i></p> <p>Phone: (858) 651-5205 Email: patent.docketing.us@qualcomm.com Correspondent Name: QUALCOMM Incorporated Address Line 1: 5775 Morehouse Drive Address Line 4: San Diego, CALIFORNIA 92121-1714</p>													
ATTORNEY DOCKET NUMBER:	120883												
NAME OF SUBMITTER:	Michelle Sanfilippo												
Total Attachments: 12													

CH \$40.00 13633762

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ASSIGNMENT

WHEREAS, WE,

1. **Manish JAIN**, a citizen of India, having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121, and a resident of Santa Clara, California,
2. **Aditya DUA**, a citizen of India, having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121, and a resident of San Jose, California,
3. **Manini SHAH**, a citizen of India, having a mailing address located at 3206 E Ridgeway Road, Orange, California 92867, and a resident of Orange, California,
4. **Keith SAINTS**, a citizen of United States of America, having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121, and a resident of San Diego, California,
5. **Farrokh ABRISHAMKAR**, a citizen of United States of America, having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121, and a resident of San Diego, California,

have conceived of one or more processes, methods, machines, articles of manufacture, designs, compositions of matter, inventions, discoveries or new or useful improvements relating to METHODS AND APPARATUSES FOR ENHANCED RECEIVED SIGNAL PROCESSING BASED ON A DATA-SIGNAL-AIDED CHANNEL IMPULSE RESPONSE ESTIMATION (collectively the "**INVENTIONS**") for which WE have executed and/or may execute one or more patent applications therefor; and

WHEREAS, QUALCOMM Incorporated (hereinafter "**ASSIGNEE**"), a Delaware corporation, having a place of business at 5775 Morehouse Drive, San Diego, California 92121-1714, U.S.A., desires to acquire or otherwise obtain the entire right, title, and interest in and to said INVENTIONS, including all inventions related thereto or thereof, all patent applications therefor, and all patents that have granted or may be granted hereafter thereon, including but not limited to those identified below.

NOW, THEREFORE, for good and valuable consideration, the receipt of which is hereby acknowledged, WE do hereby acknowledge that WE have sold, assigned, conveyed, and transferred, and by these presents do hereby sell, assign, convey, and transfer, unto ASSIGNEE, its successors, its legal representatives, and its assigns, the entire right, title, and interest throughout the world in and to said INVENTIONS, including all patent applications therefor that may have been filed or may be filed hereafter for said INVENTIONS in the United States, including but not limited to U.S. Application No(s). 13/633,762 filed October 2, 2012, Qualcomm Reference No. 120883, and all provisional applications relating thereto, (and do hereby authorize ASSIGNEE and its representative to hereafter add herein such application number(s) and/or filing date(s) when known), and all divisional applications, renewal applications, continuation applications, continuation-in-part applications, and design applications

thereof, and all issued patents of the United States which may have granted or may be granted hereafter thereon and all reissues, renewals, reexaminations, and extensions to any of the foregoing and all patents issuing thereon in the United States;

AND WE further do acknowledge and agree that WE have sold, assigned, conveyed, and transferred, and by these presents do hereby sell, assign, convey, and transfer, unto ASSIGNEE, its successors, its legal representatives, and its assigns, all rights of priority under International Conventions, Treaties, or Agreements, and the entire right, title, and interest throughout the world in said INVENTIONS, including all inventions related thereto or thereof, and all patent applications therefor that may have been filed or may be filed hereafter for said INVENTIONS in any foreign country, countries, or treaty/union organizations, and all divisional applications, renewal applications, continuation applications, continuation-in-part applications, patent of addition applications, confirmation applications, validation applications, utility model applications, and design applications thereof, and all issued patents which may have granted or may be granted hereafter for said INVENTIONS in any country or countries foreign to the United States, and all reissues, renewals, reexaminations, and extensions thereof;

AND WE DO HEREBY authorize and request the Commissioner of Patents of the United States, and any Official of any country or countries foreign to the United States, whose duty it is to issue patents on applications or registrations, to issue all patents for said INVENTIONS to said ASSIGNEE, its successors, its legal representatives and its assigns, in accordance with the terms of this instrument;

AND WE DO HEREBY sell, assign, transfer, and convey to said ASSIGNEE, its successors, its legal representatives, and its assigns all claims for damages and all remedies arising out of or relating to any violation(s) of any of the rights assigned hereby that have or may have accrued prior to the date of assignment to said ASSIGNEE, or may accrue hereafter, including, but not limited to the right to sue for, seek, obtain, collect, recover, and retain damages and any ongoing or prospective royalties to which WE may be entitled, or that WE may collect for any infringement or from any settlement or agreement related to any of said patents before or after issuance;

AND WE HEREBY covenant and agree that WE will communicate promptly to said ASSIGNEE, its successors, its legal representatives, and its assigns, any facts known to us respecting said INVENTIONS, and will testify in any legal proceeding, sign all lawful papers, execute all applications and certificates, make all rightful declarations and/or oaths, and provide all lawful assistance to said ASSIGNEE, its successors, its legal representatives and its assigns, to obtain and enforce patent protection for said INVENTIONS in all countries;

AND WE HEREBY represent that WE have full and exclusive, unencumbered right to sell, assign, convey and transfer all subject matter herein, and hereby covenant that WE have not and will not execute any writing or do any act whatsoever conflicting with these presents.

PATENT

QUALCOMM Ref. No. 120883

Page 3 of 3

Done at SANTA CLARA, on 10/10/2012
LOCATION DATE

Manish Jain

Manish JAIN

Done at SANTA CLARA, on 10/10/2012
LOCATION DATE

Aditya Dua

Aditya DUA

Done at _____, on _____
LOCATION DATE

Manini SHAH

Done at _____, on _____
LOCATION DATE

Keith SAINTS

Done at _____, on _____
LOCATION DATE

Farrokh ABRISHAMKAR

PATENT

REEL: 029521 FRAME: 0963

ASSIGNMENT

WHEREAS, WE,

1. **Manish JAIN**, a citizen of India, having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121, and a resident of Santa Clara, California,
2. **Aditya DUA**, a citizen of India, having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121, and a resident of San Jose, California,
3. **Manini SHAH**, a citizen of India, having a mailing address located at 3206 E Ridgeway Road, Orange, California 92867, and a resident of Orange, California,
4. **Keith SAINTS**, a citizen of United States of America, having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121, and a resident of San Diego, California,
5. **Farrokh ABRISHAMKAR**, a citizen of United States of America, having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121, and a resident of San Diego, California,

have conceived of one or more processes, methods, machines, articles of manufacture, designs, compositions of matter, inventions, discoveries or new or useful improvements relating to METHODS AND APPARATUSES FOR ENHANCED RECEIVED SIGNAL PROCESSING BASED ON A DATA-SIGNAL-AIDED CHANNEL IMPULSE RESPONSE ESTIMATION (collectively the "INVENTIONS") for which WE have executed and/or may execute one or more patent applications therefor; and

WHEREAS, QUALCOMM Incorporated (hereinafter "ASSIGNEE"), a Delaware corporation, having a place of business at 5775 Morehouse Drive, San Diego, California 92121-1714, U.S.A., desires to acquire or otherwise obtain the entire right, title, and interest in and to said INVENTIONS, including all inventions related thereto or thereof, all patent applications therefor, and all patents that have granted or may be granted hereafter thereon, including but not limited to those identified below.

NOW, THEREFORE, for good and valuable consideration, the receipt of which is hereby acknowledged, WE do hereby acknowledge that WE have sold, assigned, conveyed, and transferred, and by these presents do hereby sell, assign, convey, and transfer, unto ASSIGNEE, its successors, its legal representatives, and its assigns, the entire right, title, and interest throughout the world in and to said INVENTIONS, including all patent applications therefor that may have been filed or may be filed hereafter for said INVENTIONS in the United States, including but not limited to U.S. Application No(s). 13/633,762 filed October 2, 2012, Qualcomm Reference No. 120883, and all provisional applications relating thereto, (and do hereby authorize ASSIGNEE and its representative to hereafter add herein such application number(s) and/or filing date(s) when known), and all divisional applications, renewal applications, continuation applications, continuation-in-part applications, and design applications

thereof, and all issued patents of the United States which may have granted or may be granted hereafter thereon and all reissues, renewals, reexaminations, and extensions to any of the foregoing and all patents issuing thereon in the United States;

AND WE further do acknowledge and agree that WE have sold, assigned, conveyed, and transferred, and by these presents do hereby sell, assign, convey, and transfer, unto ASSIGNEE, its successors, its legal representatives, and its assigns, all rights of priority under International Conventions, Treaties, or Agreements, and the entire right, title, and interest throughout the world in said INVENTIONS, including all inventions related thereto or thereof, and all patent applications therefor that may have been filed or may be filed hereafter for said INVENTIONS in any foreign country, countries, or treaty/union organizations, and all divisional applications, renewal applications, continuation applications, continuation-in-part applications, patent of addition applications, confirmation applications, validation applications, utility model applications, and design applications thereof, and all issued patents which may have granted or may be granted hereafter for said INVENTIONS in any country or countries foreign to the United States, and all reissues, renewals, reexaminations, and extensions thereof;

AND WE DO HEREBY authorize and request the Commissioner of Patents of the United States, and any Official of any country or countries foreign to the United States, whose duty it is to issue patents on applications or registrations, to issue all patents for said INVENTIONS to said ASSIGNEE, its successors, its legal representatives and its assigns, in accordance with the terms of this instrument;

AND WE DO HEREBY sell, assign, transfer, and convey to said ASSIGNEE, its successors, its legal representatives, and its assigns all claims for damages and all remedies arising out of or relating to any violation(s) of any of the rights assigned hereby that have or may have accrued prior to the date of assignment to said ASSIGNEE, or may accrue hereafter, including, but not limited to the right to sue for, seek, obtain, collect, recover, and retain damages and any ongoing or prospective royalties to which WE may be entitled, or that WE may collect for any infringement or from any settlement or agreement related to any of said patents before or after issuance;

AND WE HEREBY covenant and agree that WE will communicate promptly to said ASSIGNEE, its successors, its legal representatives, and its assigns, any facts known to us respecting said INVENTIONS, and will testify in any legal proceeding, sign all lawful papers, execute all applications and certificates, make all rightful declarations and/or oaths, and provide all lawful assistance to said ASSIGNEE, its successors, its legal representatives and its assigns, to obtain and enforce patent protection for said INVENTIONS in all countries;

AND WE HEREBY represent that WE have full and exclusive, unencumbered right to sell, assign, convey and transfer all subject matter herein, and hereby covenant that WE have not and will not execute any writing or do any act whatsoever conflicting with these presents.

PATENT

QUALCOMM Ref. No. 120883

Page 3 of 3

Done at _____, on _____
LOCATION DATE

Manish JAIN

Done at _____, on _____
LOCATION DATE

Aditya DUA

Done at AHMEDABAD
INDIA, on 10/18/2012
LOCATION DATE

Manini Shah
Manini SHAH

Done at _____, on _____
LOCATION DATE

Keith SAINTS

Done at _____, on _____
LOCATION DATE

Farrokh ABRISHAMKAR

PATENT

REEL: 029521 FRAME: 0966

ASSIGNMENT

WHEREAS, WE,

1. **Manish JAIN**, a citizen of India, having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121, and a resident of Santa Clara, California,
2. **Aditya DUA**, a citizen of India, having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121, and a resident of San Jose, California,
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5. **Farrokh ABRISHAMKAR**, a citizen of United States of America, having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121, and a resident of San Diego, California,

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WHEREAS, QUALCOMM Incorporated (hereinafter "**ASSIGNEE**"), a Delaware corporation, having a place of business at 5775 Morehouse Drive, San Diego, California 92121-1714, U.S.A., desires to acquire or otherwise obtain the entire right, title, and interest in and to said INVENTIONS, including all inventions related thereto or thereof, all patent applications therefor, and all patents that have granted or may be granted hereafter thereon, including but not limited to those identified below.

NOW, THEREFORE, for good and valuable consideration, the receipt of which is hereby acknowledged, WE do hereby acknowledge that WE have sold, assigned, conveyed, and transferred, and by these presents do hereby sell, assign, convey, and transfer, unto ASSIGNEE, its successors, its legal representatives, and its assigns, the entire right, title, and interest throughout the world in and to said INVENTIONS, including all patent applications therefor that may have been filed or may be filed hereafter for said INVENTIONS in the United States, including but not limited to U.S. Application No(s). 13/633,762 filed October 2, 2012, Qualcomm Reference No. 120883, and all provisional applications relating thereto, (and do hereby authorize ASSIGNEE and its representative to hereafter add herein such application number(s) and/or filing date(s) when known), and all divisional applications, renewal applications, continuation applications, continuation-in-part applications, and design applications

thereof, and all issued patents of the United States which may have granted or may be granted hereafter thereon and all reissues, renewals, reexaminations, and extensions to any of the foregoing and all patents issuing thereon in the United States;

AND WE further do acknowledge and agree that WE have sold, assigned, conveyed, and transferred, and by these presents do hereby sell, assign, convey, and transfer, unto ASSIGNEE, its successors, its legal representatives, and its assigns, all rights of priority under International Conventions, Treaties, or Agreements, and the entire right, title, and interest throughout the world in said INVENTIONS, including all inventions related thereto or thereof, and all patent applications therefor that may have been filed or may be filed hereafter for said INVENTIONS in any foreign country, countries, or treaty/union organizations, and all divisional applications, renewal applications, continuation applications, continuation-in-part applications, patent of addition applications, confirmation applications, validation applications, utility model applications, and design applications thereof, and all issued patents which may have granted or may be granted hereafter for said INVENTIONS in any country or countries foreign to the United States, and all reissues, renewals, reexaminations, and extensions thereof;

AND WE DO HEREBY authorize and request the Commissioner of Patents of the United States, and any Official of any country or countries foreign to the United States, whose duty it is to issue patents on applications or registrations, to issue all patents for said INVENTIONS to said ASSIGNEE, its successors, its legal representatives and its assigns, in accordance with the terms of this instrument;

AND WE DO HEREBY sell, assign, transfer, and convey to said ASSIGNEE, its successors, its legal representatives, and its assigns all claims for damages and all remedies arising out of or relating to any violation(s) of any of the rights assigned hereby that have or may have accrued prior to the date of assignment to said ASSIGNEE, or may accrue hereafter, including, but not limited to the right to sue for, seek, obtain, collect, recover, and retain damages and any ongoing or prospective royalties to which WE may be entitled, or that WE may collect for any infringement or from any settlement or agreement related to any of said patents before or after issuance;

AND WE HEREBY covenant and agree that WE will communicate promptly to said ASSIGNEE, its successors, its legal representatives, and its assigns, any facts known to us respecting said INVENTIONS, and will testify in any legal proceeding, sign all lawful papers, execute all applications and certificates, make all rightful declarations and/or oaths, and provide all lawful assistance to said ASSIGNEE, its successors, its legal representatives and its assigns, to obtain and enforce patent protection for said INVENTIONS in all countries;

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QUALCOMM Ref. No. 120883

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Done at _____, on _____
LOCATION DATE

Manish JAIN

Done at _____, on _____
LOCATION DATE

Aditya DUA

Done at _____, on _____
LOCATION DATE

Manini SHAH

Done at San Diego, on 12/13/2012
LOCATION DATE

Keith Saints

Keith SAINTS

Done at _____, on _____
LOCATION DATE

Farrokh ABRISHAMKAR

PATENT

REEL: 029521 FRAME: 0969

ASSIGNMENT

WHEREAS, WE,

1. **Manish JAIN**, a citizen of India, having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121, and a resident of Santa Clara, California,
2. **Aditya DUA**, a citizen of India, having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121, and a resident of San Jose, California,
3. **Manini SHAH**, a citizen of India, having a mailing address located at 15 Shrimali Society, Navrangpura, Ahmedabad 38009, and a resident of Ahmedabad, India,
4. **Keith SAINTS**, a citizen of United States of America, having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121, and a resident of San Diego, California,
5. **Farrokh ABRISHAMKAR**, a citizen of United States of America, having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121, and a resident of San Diego, California,

have conceived of one or more processes, methods, machines, articles of manufacture, designs, compositions of matter, inventions, discoveries or new or useful improvements relating to METHODS AND APPARATUSES FOR ENHANCED RECEIVED SIGNAL PROCESSING BASED ON A DATA-SIGNAL-AIDED CHANNEL IMPULSE RESPONSE ESTIMATION (collectively the "INVENTIONS") for which WE have executed and/or may execute one or more patent applications therefor; and

WHEREAS, QUALCOMM Incorporated (hereinafter "ASSIGNEE"), a Delaware corporation, having a place of business at 5775 Morehouse Drive, San Diego, California 92121-1714, U.S.A., desires to acquire or otherwise obtain the entire right, title, and interest in and to said INVENTIONS, including all inventions related thereto or thereof, all patent applications therefor, and all patents that have granted or may be granted hereafter thereon, including but not limited to those identified below.

NOW, THEREFORE, for good and valuable consideration, the receipt of which is hereby acknowledged, WE do hereby acknowledge that WE have sold, assigned, conveyed, and transferred, and by these presents do hereby sell, assign, convey, and transfer, unto ASSIGNEE, its successors, its legal representatives, and its assigns, the entire right, title, and interest throughout the world in and to said INVENTIONS, including all patent applications therefor that may have been filed or may be filed hereafter for said INVENTIONS in the United States, including but not limited to U.S. Application No(s). 13/633,762 filed October 2, 2012, Qualcomm Reference No. 120883, and all provisional applications relating thereto, (and do hereby authorize ASSIGNEE and its representative to hereafter add herein such application number(s) and/or filing date(s) when known), and all divisional applications, renewal applications, continuation applications, continuation-in-part applications, and design applications

thereof, and all issued patents of the United States which may have granted or may be granted hereafter thereon and all reissues, renewals, reexaminations, and extensions to any of the foregoing and all patents issuing thereon in the United States;

AND WE further do acknowledge and agree that WE have sold, assigned, conveyed, and transferred, and by these presents do hereby sell, assign, convey, and transfer, unto ASSIGNEE, its successors, its legal representatives, and its assigns, all rights of priority under International Conventions, Treaties, or Agreements, and the entire right, title, and interest throughout the world in said INVENTIONS, including all inventions related thereto or thereof, and all patent applications therefor that may have been filed or may be filed hereafter for said INVENTIONS in any foreign country, countries, or treaty/union organizations, and all divisional applications, renewal applications, continuation applications, continuation-in-part applications, patent of addition applications, confirmation applications, validation applications, utility model applications, and design applications thereof, and all issued patents which may have granted or may be granted hereafter for said INVENTIONS in any country or countries foreign to the United States, and all reissues, renewals, reexaminations, and extensions thereof;

AND WE DO HEREBY authorize and request the Commissioner of Patents of the United States, and any Official of any country or countries foreign to the United States, whose duty it is to issue patents on applications or registrations, to issue all patents for said INVENTIONS to said ASSIGNEE, its successors, its legal representatives and its assigns, in accordance with the terms of this instrument;

AND WE DO HEREBY sell, assign, transfer, and convey to said ASSIGNEE, its successors, its legal representatives, and its assigns all claims for damages and all remedies arising out of or relating to any violation(s) of any of the rights assigned hereby that have or may have accrued prior to the date of assignment to said ASSIGNEE, or may accrue hereafter, including, but not limited to the right to sue for, seek, obtain, collect, recover, and retain damages and any ongoing or prospective royalties to which WE may be entitled, or that WE may collect for any infringement or from any settlement or agreement related to any of said patents before or after issuance;

AND WE HEREBY covenant and agree that WE will communicate promptly to said ASSIGNEE, its successors, its legal representatives, and its assigns, any facts known to us respecting said INVENTIONS, and will testify in any legal proceeding, sign all lawful papers, execute all applications and certificates, make all rightful declarations and/or oaths, and provide all lawful assistance to said ASSIGNEE, its successors, its legal representatives and its assigns, to obtain and enforce patent protection for said INVENTIONS in all countries;

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Page 3 of 3

Done at _____, on _____
LOCATION DATE **Manish JAIN**

Done at _____, on _____
LOCATION DATE **Aditya DUA**

Done at _____, on _____
LOCATION DATE **Manini SHAH**

Done at _____, on _____
LOCATION DATE **Keith SAINTS**

Done at San Diego, on December 19, 2012 
LOCATION DATE **Farrokh ABRISHAMKAR**

PATENT

RECORDED: 12/21/2012

REEL: 029521 FRAME: 0972