

PATENT ASSIGNMENT COVER SHEET

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SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT
CONVEYING PARTY DATA	
Name	Execution Date
JOHN KETCHUM	04/15/2018
MARK WALLACE	04/12/2018
J. RODNEY WALTON	04/16/2018
STEVEN HOWARD	04/19/2018
RECEIVING PARTY DATA	
Name:	QUALCOMM INCORPORATED
Street Address:	5775 MOREHOUSE DRIVE
City:	SAN DIEGO
State/Country:	CALIFORNIA
Postal Code:	92121-1714
PROPERTY NUMBERS Total: 1	
Property Type	Number
Application Number:	15939145
CORRESPONDENCE DATA	
Fax Number:	(202)857-6395
<i>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.</i>	
Phone:	2028576000
Email:	patentdocket@arentfox.com, rebecca.golden@arentfox.com
Correspondent Name:	ARENT FOX, LLP
Address Line 1:	1717 K STREET, NW
Address Line 4:	WASHINGTON, D.C. 20006-5344
ATTORNEY DOCKET NUMBER:	030284.16161/030031C1C1C1
NAME OF SUBMITTER:	REBECCA GOLDEN
SIGNATURE:	/REBECCA GOLDEN/
DATE SIGNED:	04/24/2018
Total Attachments: 5	
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ASSIGNMENT

WHEREAS, WE,

1. **John KETCHUM**, a citizen of the **United States of America**, having a mailing address located at **1421 Orleans Road, PMB 182, Harwich, MA 02645** and a resident of **Harwich, MA**;
2. **Mark WALLACE**, a citizen of the **United States of America**, having a mailing address located at **5775 Morehouse Drive, San Diego, CA 92121** and a resident of **Bedford, MA**;
3. **J. Rodney WALTON**, a citizen of the **United States of America**, having a mailing address located at **5775 Morehouse Drive, San Diego, CA 92121** and a resident of **Carlisle, MA**;
4. **Steven HOWARD**, a citizen of the **United States of America**, having a mailing address located at **75 Heritage Avenue, Ashland, MA 01721** and a resident of **Ashland, MA**,

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 **PILOTS FOR MIMO COMMUNICATION SYSTEMS** (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 Continuation of U.S. Application No(s). **15/939,145** filed **March 28, 2018** Qualcomm Reference No. **030031C1C1C1**, and all provisional applications relating thereto, together with Continuation U.S. Application No(s). **14/836,620** filed **August 26, 2015**, Qualcomm Reference No. **030031C1C1**, together with Continuation U.S. Application No(s). **13/155,916** filed **June 08, 2011** Qualcomm Reference No. **030031C1**, now U.S. Patent No. **9,312,935** together with U.S. Application No(s). **10/610,446** filed **June 30, 2003** Qualcomm Reference No. **030031**, now U.S. Patent No. **7,986,742** together with U.S. Provisional Application No(s). **60/421,309** filed **October 25, 2002** Qualcomm Reference No. **020554P1**, together with U.S. Provisional Application No(s). **60/421,462** filed **October 25, 2002** Qualcomm Reference No. **020621P1**, together with U.S. Provisional Application No(s). **60/421,428** filed **October 25, 2002** Qualcomm Reference No. **020613P1**, together with U.S. Provisional Application No(s). **60/432,617** filed

December 10, 2002 Qualcomm Reference No. **030031P1**, together with U.S. Provisional Application No(s). **60/438,601** filed **January 07, 2003** Qualcomm Reference No. **030121P1** (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 covenant that WE will not execute any writing or do any act whatsoever conflicting with these presents.

Done at Harwich, MA, on 4/15/2018
LOCATION DATE

John KETCHUM

Done at _____, on _____
LOCATION DATE
Mark WALLACE

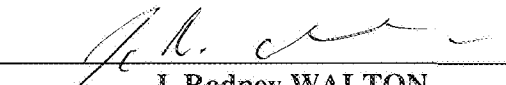
Done at _____, on _____
LOCATION DATE
J. Rodney WALTON

Done at _____, on _____
LOCATION DATE
Steven HOWARD

AND WE HEREBY covenant that WE will not execute any writing or do any act whatsoever conflicting with these presents.

Done at _____, on _____
LOCATION DATE John KETCHUM

Done at Boxborough, on 4/12/18
LOCATION DATE 
Mark WALLACE

Done at Boxborough, on 4/16/18
LOCATION DATE 
J. Rodney WALTON

Done at _____, on _____
LOCATION DATE Steven HOWARD

AND WE HEREBY covenant that WE will not execute any writing or do any act whatsoever conflicting with these presents.

Done at _____, on _____
LOCATION DATE John KETCHUM

Done at _____, on _____
LOCATION DATE Mark WALLACE

Done at _____, on _____
LOCATION DATE J. Rodney WALTON

Done at Ashland MA, on 4/19/2018
LOCATION DATE Steven Howard
Steven HOWARD