

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT4373487

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT
CONVEYING PARTY DATA	
Name	Execution Date
YUN DU	04/04/2017
LIANG HAN	02/01/2017
LIN CHEN	01/03/2017
CHIHONG ZHANG	01/17/2017
HONGJIANG SHANG	01/25/2017
JING WU	01/05/2017
ZILIN YING	02/01/2017
CHUN YU	12/16/2016
GUOFANG JIAO	01/02/2017
ANDREW GRUBER	12/20/2016
ERIC DEMERS	01/18/2017
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:	15379195
CORRESPONDENCE DATA	
Fax Number:	(949)760-9502
<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:	9497600404
Email:	efiling@knobbe.com
Correspondent Name:	KNOBBE MARTENS OLSON & BEAR LLP
Address Line 1:	2040 MAIN STREET
Address Line 2:	14TH FLOOR
Address Line 4:	IRVINE, CALIFORNIA 92614

PATENT

ATTORNEY DOCKET NUMBER:	QCMLF.591A
NAME OF SUBMITTER:	BRIAN GRAHAM
SIGNATURE:	/Brian Graham/
DATE SIGNED:	04/18/2017

Total Attachments: 44

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ASSIGNMENT

WHEREAS, WE,

1. **Yun Du**, a citizen of United States, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
2. **Liang Han**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
3. **Lin Chen**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
4. **Chihong Zhang**, a citizen of United States, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
5. **Hongjiang Shang**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
6. **Jing Wu**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
7. **Zilin Ying**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
8. **Chun Yu**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of Rancho Santa Fe, California,
9. **Guofang Jiao**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
10. **Andrew Gruber**, a citizen of United States, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of Arlington, Massachusetts,
11. **Eric Demers**, a citizen of United States, 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 **GENERAL PURPOSE REGISTER ALLOCATION IN STREAMING PROCESSOR** (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). **15/379,195** filed **December 14, 2016**, Qualcomm Reference No. **163308**, 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 covenant that WE will not execute any writing or do any act whatsoever conflicting with these presents.

Done at San Diego, CA, on 4th of April, 2017, [Signature]
LOCATION DATE Yun Du

Done at _____, on _____, _____
LOCATION DATE Liang Han

Done at _____, on _____, _____
LOCATION DATE Lin Chen

Done at _____, on _____, _____
LOCATION DATE Chihong Zhang

Done at _____, on _____, _____
LOCATION DATE Hongjiang Shang

Done at _____, on _____, _____
LOCATION DATE Jing Wu

Done at _____, on _____, _____
LOCATION DATE Zilin Ying

Done at _____, on _____, _____
LOCATION DATE Chun Yu

Done at _____, on _____, _____
LOCATION DATE Guofang Jiao

Done at _____, on _____, _____
LOCATION DATE Andrew Gruber

Done at _____, on _____, _____
LOCATION DATE Eric Demers

24739767

ASSIGNMENT

WHEREAS, WE,

1. **Yun Du**, a citizen of United States, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
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11. **Eric Demers**, a citizen of United States, 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 **GENERAL PURPOSE REGISTER ALLOCATION IN STREAMING PROCESSOR** (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). **15/379,195** filed **December 14, 2016**, Qualcomm Reference No. **163308**, 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 covenant that WE will not execute any writing or do any act whatsoever conflicting with these presents.

Done at _____, on _____
LOCATION DATE Yun Du

Done at San Diego, CA, on 2/1/2017
LOCATION DATE Liang Han

Done at _____, on _____
LOCATION DATE Lin Chen

Done at _____, on _____
LOCATION DATE Chihong Zhang

Done at _____, on _____
LOCATION DATE Hongjiang Shang

Done at _____, on _____
LOCATION DATE Jing Wu

Done at _____, on _____
LOCATION DATE Zilin Ying

Done at _____, on _____
LOCATION DATE Chun Yu

Done at _____, on _____
LOCATION DATE Guofang Jiao

Done at _____, on _____
LOCATION DATE Andrew Gruber

Done at _____, on _____
LOCATION DATE Eric Demers

24739767

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WHEREAS, WE,

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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 **GENERAL PURPOSE REGISTER ALLOCATION IN STREAMING PROCESSOR** (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). **15/379,195** filed **December 14, 2016**, Qualcomm Reference No. **163308**, 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 covenant that WE will not execute any writing or do any act whatsoever conflicting with these presents.

Done at _____, on _____
LOCATION DATE Yun Du

Done at _____, on _____
LOCATION DATE Liang Han

Done at San Diego
California, on 4/3/2017
LOCATION DATE Lin Chen

Done at _____, on _____
LOCATION DATE Chihong Zhang

Done at _____, on _____
LOCATION DATE Hongjiang Shang

Done at _____, on _____
LOCATION DATE Jing Wu

Done at _____, on _____
LOCATION DATE Zilin Ying

Done at _____, on _____
LOCATION DATE Chun Yu

Done at _____, on _____
LOCATION DATE Guofang Jiao

Done at _____, on _____
LOCATION DATE Andrew Gruber

Done at _____, on _____
LOCATION DATE Eric Demers

24739767

ASSIGNMENT

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Done at _____, on _____
LOCATION DATE Yun Du

Done at _____, on _____
LOCATION DATE Liang Han

Done at _____, on _____
LOCATION DATE Lin Chen

Done at 5775 morehouse Dr.,
San Diego, CA 92129, on 1/17/2017
LOCATION DATE Chihong Zhang

Done at _____, on _____
LOCATION DATE Hongjiang Shang

Done at _____, on _____
LOCATION DATE Jing Wu

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LOCATION DATE Zilin Ying

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Done at _____, on _____
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ASSIGNMENT

WHEREAS, WE,

1. **Yun Du**, a citizen of United States, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
2. **Liang Han**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
3. **Lin Chen**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
4. **Chihong Zhang**, a citizen of United States, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
5. **Hongjiang Shang**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
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9. **Guofang Jiao**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
10. **Andrew Gruber**, a citizen of United States, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of Arlington, Massachusetts,
11. **Eric Demers**, a citizen of United States, 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 **GENERAL PURPOSE REGISTER ALLOCATION IN STREAMING PROCESSOR** (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). **15/379,195** filed **December 14, 2016**, Qualcomm Reference No. **163308**, 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;

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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 _____, on _____
LOCATION DATE Yun Du

Done at _____, on _____
LOCATION DATE Liang Han

Done at _____, on _____
LOCATION DATE Lin Chen

Done at _____, on _____
LOCATION DATE Chihong Zhang

Done at San Diego, on 4/25/2017
LOCATION DATE Hongjiang Shang
Hongjiang Shang

Done at _____, on _____
LOCATION DATE Jing Wu

Done at _____, on _____
LOCATION DATE Zilin Ying

Done at _____, on _____
LOCATION DATE Chun Yu

Done at _____, on _____
LOCATION DATE Guofang Jiao

Done at _____, on _____
LOCATION DATE Andrew Gruber

Done at _____, on _____
LOCATION DATE Eric Demers

24739767

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Done at _____, on _____
LOCATION DATE Yun Du

Done at _____, on _____
LOCATION DATE Liang Han

Done at _____, on _____
LOCATION DATE Lin Chen

Done at _____, on _____
LOCATION DATE Chihong Zhang

Done at _____, on _____
LOCATION DATE Hongjiang Shang

Done at US, on 01/05/2017
LOCATION DATE Jing Wu
Jing Wu

Done at _____, on _____
LOCATION DATE Zilin Ying

Done at _____, on _____
LOCATION DATE Chun Yu

Done at _____, on _____
LOCATION DATE Guofang Jiao

Done at _____, on _____
LOCATION DATE Andrew Gruber

Done at _____, on _____
LOCATION DATE Eric Demers

24738767

ASSIGNMENT

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Done at _____, on _____
LOCATION DATE Yun Du

Done at _____, on _____
LOCATION DATE Liang Han

Done at _____, on _____
LOCATION DATE Lin Chen

Done at _____, on _____
LOCATION DATE Chihong Zhang

Done at _____, on _____
LOCATION DATE Hongjiang Shang

Done at _____, on _____
LOCATION DATE Jing Wu

Done at San Diego, on 2/1/2017
LOCATION DATE Zilin Ying

Done at _____, on _____
LOCATION DATE Chun Yu

Done at _____, on _____
LOCATION DATE Guofang Jiao

Done at _____, on _____
LOCATION DATE Andrew Gruber

Done at _____, on _____
LOCATION DATE Eric Demers

24739767

ASSIGNMENT

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Done at _____, on _____
LOCATION DATE Chihong Zhang

Done at _____, on _____
LOCATION DATE Hongjiang Shang

Done at _____, on _____
LOCATION DATE Jing Wu

Done at _____, on _____
LOCATION DATE Zilin Ying

Done at San Diego, on 12/16/16
LOCATION DATE Chen Yu

Done at _____, on _____
LOCATION DATE Guofang Jiao

Done at _____, on _____
LOCATION DATE Andrew Gruber

Done at _____, on _____
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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 Yun Du

Done at _____, on _____
LOCATION DATE Liang Han

Done at _____, on _____
LOCATION DATE Lin Chen

Done at _____, on _____
LOCATION DATE Chihong Zhang

Done at _____, on _____
LOCATION DATE Hongjiang Shang

Done at _____, on _____
LOCATION DATE Jing Wu

Done at _____, on _____
LOCATION DATE Zilin Ying

Done at _____, on _____
LOCATION DATE Chun Yu

Done at San Diego, on 1/2/2017
LOCATION DATE Guofang Jiao

Done at _____, on _____
LOCATION DATE Andrew Gruber

Done at _____, on _____
LOCATION DATE Eric Demers

24739767

ASSIGNMENT

WHEREAS, WE,

1. **Yun Du**, a citizen of United States, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
2. **Liang Han**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
3. **Lin Chen**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
4. **Chihong Zhang**, a citizen of United States, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
5. **Hongjiang Shang**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
6. **Jing Wu**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
7. **Zilin Ying**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
8. **Chun Yu**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of Rancho Santa Fe, California,
9. **Guofang Jiao**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
10. **Andrew Gruber**, a citizen of United States, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of Arlington, Massachusetts,
11. **Eric Demers**, a citizen of United States, 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 **GENERAL PURPOSE REGISTER ALLOCATION IN STREAMING PROCESSOR** (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). **15/379,195** filed **December 14, 2016**, Qualcomm Reference No. **163308**, 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 covenant that WE will not execute any writing or do any act whatsoever conflicting with these presents.

Done at _____, on _____
LOCATION DATE Yun Du

Done at _____, on _____
LOCATION DATE Liang Han

Done at _____, on _____
LOCATION DATE Lin Chen

Done at _____, on _____
LOCATION DATE Chihong Zhang

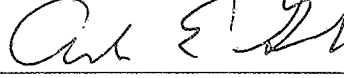
Done at _____, on _____
LOCATION DATE Hongjiang Shang

Done at _____, on _____
LOCATION DATE Jing Wu

Done at _____, on _____
LOCATION DATE Zilin Ying

Done at _____, on _____
LOCATION DATE Chun Yu

Done at _____, on _____
LOCATION DATE Guofang Jiao

Done at Boston, MA, on 12/20/16
LOCATION DATE 
Andrew Gruber

Done at _____, on _____
LOCATION DATE Eric Demers

24739767

ASSIGNMENT

WHEREAS, WE,

1. **Yun Du**, a citizen of United States, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
2. **Liang Han**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
3. **Lin Chen**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
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6. **Jing Wu**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
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8. **Chun Yu**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of Rancho Santa Fe, California,
9. **Guofang Jiao**, a citizen of China, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of San Diego, California,
10. **Andrew Gruber**, a citizen of United States, having a mailing address located at 5775 Morehouse Drive San Diego, California 92121 and a resident of Arlington, Massachusetts,
11. **Eric Demers**, a citizen of United States, 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 **GENERAL PURPOSE REGISTER ALLOCATION IN STREAMING PROCESSOR** (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). **15/379,195** filed **December 14, 2016**, Qualcomm Reference No. **163308**, 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 covenant that WE will not execute any writing or do any act whatsoever conflicting with these presents.

Done at _____, on _____
LOCATION DATE Yun Du

Done at _____, on _____
LOCATION DATE Liang Han

Done at _____, on _____
LOCATION DATE Lin Chen

Done at _____, on _____
LOCATION DATE Chihong Zhang

Done at _____, on _____
LOCATION DATE Hongjiang Shang

Done at _____, on _____
LOCATION DATE Jing Wu

Done at _____, on _____
LOCATION DATE Zilin Ying

Done at _____, on _____
LOCATION DATE Chun Yu

Done at _____, on _____
LOCATION DATE Guofang Jiao

Done at _____, on _____
LOCATION DATE Andrew Gruber

Done at San Diego, on 1/18/17
LOCATION DATE Eric Demers

24739767