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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	112573P1
	Application Number	
Title of Invention	Robust Merge Candidate Selection in Video Coding	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
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☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1

Applicant Authority ◉ Inventor ◯ Legal Representative under 35 U.S.C. 117 ◯ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Yunfei		Zheng	

Residence Information (Select One) ◉ US Residency ◯ Non US Residency ◯ Active US Military Service

City	SAN DIEGO	State/Province	CA	Country of Residence	US

Citizenship under 37 CFR 1.41(b) CN

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State/Province	CA
Postal Code	92121
Country	US

Applicant 2

Applicant Authority ◉ Inventor ◯ Legal Representative under 35 U.S.C. 117 ◯ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Xianglin		Wang	

Residence Information (Select One) ◉ US Residency ◯ Non US Residency ◯ Active US Military Service

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Citizenship under 37 CFR 1.41(b) US

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State/Province	CA
Postal Code	92121
Country	US

Applicant 3

Applicant Authority ◉ Inventor ◯ Legal Representative under 35 U.S.C. 117 ◯ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
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Residence Information (Select One) ◉ US Residency ◯ Non US Residency ◯ Active US Military Service

City	SAN DIEGO	State/Province	CA	Country of Residence	US

Amazon.com, Inc., Amazon.com Services LLC - Ex. 1054, Page 000001
IPR2024-01505 (Amazon.com, Inc., Amazon.com Services LLC v. Nokia Technologies Oy)

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Title of Invention	Robust Merge Candidate Selection in Video Coding	

Citizenship under 37 CFR 1.41(b)	US		
Mailing Address of Applicant:			
Address 1	5775 MOREHOUSE DRIVE		
Address 2			
City	SAN DIEGO	**State/Province**	CA
Postal Code	92121	**Country**	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	23696		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	Robust Merge Candidate Selection in Video Coding		
Attorney Docket Number	112573P1	**Small Entity Status Claimed**	☐
Application Type	Provisional		
Subject Matter	Utility		
Suggested Class (if any)		**Sub Class (if any)**	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)		**Suggested Figure for Publication (if any)**	

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S. C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

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Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	112573P1
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Title of Invention	Robust Merge Candidate Selection in Video Coding	

Customer Number	23696

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)

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Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

			Remove
Application Number	Country[i]	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			◉ Yes ◯ No

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Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Assignee 1

If the Assignee is an Organization check here. ☒

Organization Name	QUALCOMM Incorporated		
Mailing Address Information:			
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Address 2			
City	San Diego	**State/Province**	CA
Country[i]	US	Postal Code	92121
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the **Add** button.

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	112573P1
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Title of Invention	Robust Merge Candidate Selection in Video Coding	

Signature	/John Rickenbrode/			Date (YYYY-MM-DD)	2011-06-20
First Name	JOHN	Last Name	RICKENBRODE	Registration Number	57067

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Robust Merge Candidate Selection in Video Coding

BACKGROUND

Field

[0001] The present application relates to the field of video coding, e.g. in video encoders and decoders.

DETAILED DESCRIPTION

[0002] In most hybrid video coding systems, motion estimation and motion compensation are used to reduce the temporal redundancy in a video in order to obtain good coding performance. The motion estimation is usually done at encoder. Motion information estimated, which includes motion vector (mv), reference frame index (refIdx), and prediction direction (pred_dir: forward or backward), can be transmitted to decoder as overhead. Since there are still some redundancy in the motion field, predictive coding of motion vector is also applied in most of the video coding standards. In H.264/AVC, the motion vector predictor (mvp) is derived by median of at most three neighboring with the same reference frame index. Motion vector difference (mvd=mv-mvp) is transmitted to decoder instead of the motion vector.

[0003] MERGE (MRG) mode was proposed to further reduce the information that is sent to decoder. In MRG mode, a candidate set is built by including the spatial and temporal neighoring blocks. Instead of only take the motion vectors of the canidate blocks as motion vector predictors, MRG mode inherits motion vector (mv), reference frame index(refIdx), and prediction direction (pred_dir: uni-pred/bi-pred). Encoder selects to use motion information (mv, refIdx, and pred_dir) all together from one neighboring block in the candidate set for coding the current block. The candidate index will be transmitted to decoder as overhead. Instead of transmitting motion vector difference(mvd), reference frame index (refIdx), and prediction direction (pred_dir: uni-pred/bi-pred), MRG mode directly use the selected motion information as the final motion information of current block. Figure 1 shows an example of the neighboring blocks that are included by the candidate set of MRG mode, L: left block, A: above block, BL: bottom left, RA: right above, T: temporal block (from other frame)

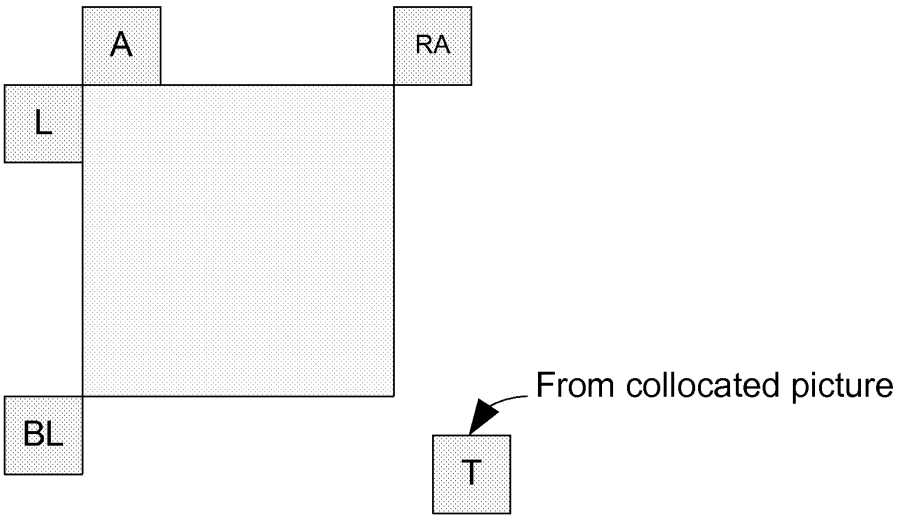

Figure 1 Spatial and temporal neighoring blocks for motion vector candidate set in MERGE mode

[0004] However, for 2NxN, Nx2N, and NxN partition modes as shown in Figure **2**, in the merge mode of the last PU, the motion information of the candidate will be compared with the previous PU(s) in one CU to avoid the whole block use the same motion information and duplicate with the 2Nx2N partition mode.

[0005] 2NxN/Nx2N cases: if the merge candidate of second PU has the same motion information as that of the first PU, this candidate will be set as not available.

[0006] NxN case:

[0007] PU_0 and PU1 have same motion information, if merge candidate of PU_3 has same motion information as PU_2, the candidate is set to unavailable;

[0008] PU_0 and PU2 have same motion information, if merge candidate of PU_3 has same motion information as PU_1, the candidate is set to unavailable.

[0009] The comparison of neighboring motion information may cause the parsing issue: for example, if the previous PU inherits motion information from previous frame, the previous frame can be corrupted or lost during transmission. So the comparison may not be correctly conducted, which may impact the total number of available merge candidates. If the total number of available merge candidates is not right, parsing the merge index cannot be done correctly.

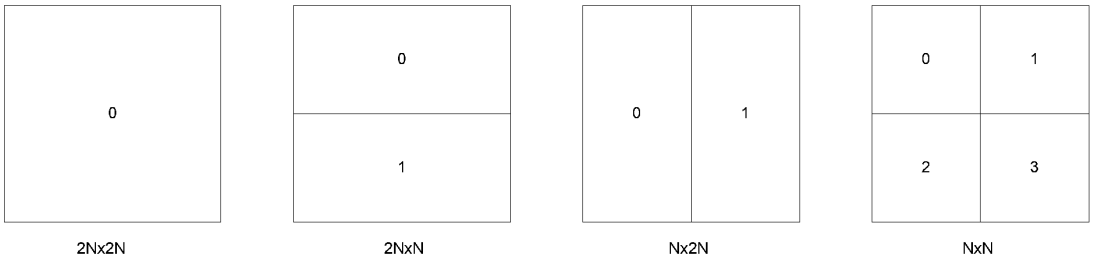

Figure 2 Example of prediction partition shapes and index

[0010] One embodiment includes a novel technique, not to compare the motion information of neighboring blocks, but make use of the merge index of neighboring blocks to decide the availability of a merge candidate. This technique can solve the parsing issue and increase the robustness of the decoder.

[0011] Proposed Solution

[0012] Figure **3** and Figure **4** show the merge candidates for PUs in partition mode Nx2N and 2NxN respectively.

[0013] Nx2N partition mode, when checking Left (L) candidate of PU_1, if Merge index of PU_0 is RA or T, L of PU_1 can be a valid candidate

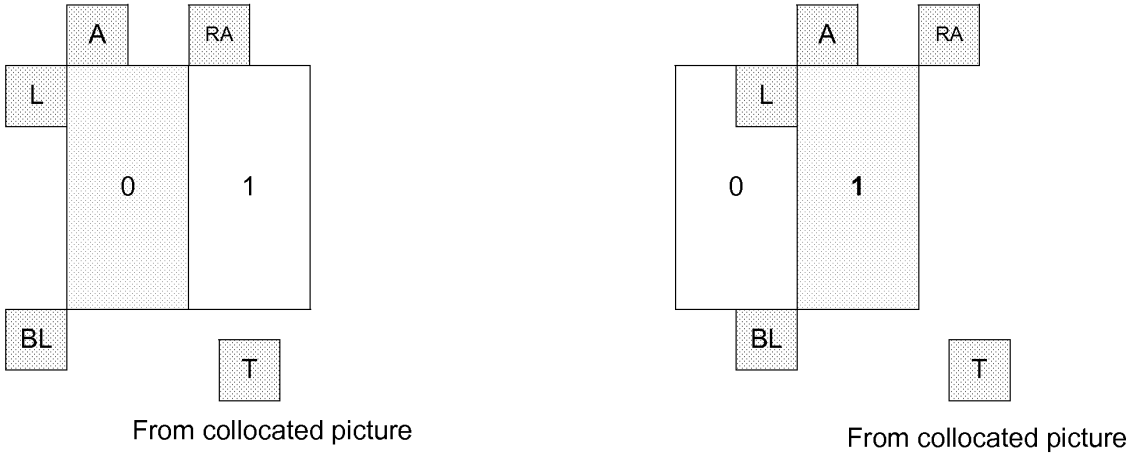

Figure 3 Merge candidates for PU in Nx2N partition mode

[0014] Nx2N partition mode, when checking Above (A) candidate of PU_1, if Merge index of PU_0 is BL or T, A of PU_1 can be a valid candidate.

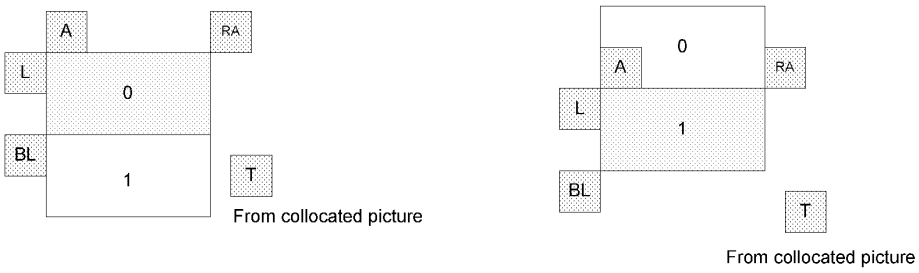

Figure 4 Merge candidates for PU in 2NxN partition mode

[0015] NxN partition mode, all candidate of all PUs can be looked as valid, the motion comparison is not conducted.

[0016] It is to be recognized that depending on the embodiment, certain acts or events of any of the methods described herein can be performed in a different sequence, may be added, merged, or left out all together (e.g., not all described acts or events are necessary for the practice of the method). Moreover, in certain embodiments, acts or events may be performed concurrently, e.g., through multi-threaded processing, interrupt processing, or multiple processors, rather than sequentially.

[0017] Those of skill will recognize that the various illustrative logical blocks, modules, circuits, and algorithm steps described in connection with the methods, systems, and apparatuses disclosed herein may be implemented as electronic hardware, computer software executed by a processor, or combinations of both. To clearly illustrate this interchangeability of hardware and software, various illustrative components, blocks, modules, circuits, and steps have been described above generally in terms of their functionality. Whether such functionality is implemented as hardware or software depends upon the particular application and design constraints imposed on the overall system. Skilled artisans may implement the described functionality in varying ways for each particular application, but such implementation decisions should not be interpreted as causing a departure from the scope of the present invention.

[0018] Moreover, embodiments disclosed herein may be implemented or performed with an electronic device or circuit such as a general purpose processor, a digital signal processor (DSP), an application specific integrated circuit (ASIC), a field programmable gate array (FPGA) or other programmable logic device, discrete gate or transistor logic, discrete hardware components, or any combination thereof designed to perform the functions described herein. A general purpose processor may be a microprocessor, but

in the alternative, the processor may be any conventional processor, controller, microcontroller, or state machine. A processor may also be implemented as a combination of computing devices, e.g., a combination of a DSP and a microprocessor, a plurality of microprocessors, one or more microprocessors in conjunction with a DSP core, or any other such configuration.

[0019] The steps of a method or algorithm described in connection with the embodiments disclosed herein may be embodied directly in hardware, in a software module executed by a processor, or in a combination of the two. A software module may reside in RAM memory, flash memory, ROM memory, EPROM memory, EEPROM memory, registers, hard disk, a removable disk, a CD-ROM, or any other form of storage medium known in the art. An exemplary storage medium is coupled to the processor such the processor can read information from, and write information to, the storage medium. In the alternative, the storage medium may be integral to the processor. The processor and the storage medium may reside in an ASIC. The ASIC may reside in a user terminal. In the alternative, the processor and the storage medium may reside as discrete components in a user terminal.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	Robust Merge Candidate Selection in Video Coding
First Named Inventor/Applicant Name:	Yunfei Zheng
Filer:	John Rickenbrode/OLIVIA FRIAS
Attorney Docket Number:	112573P1

Filed as Large Entity

Provisional Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Provisional application filing	1005	1	220	220
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**220**

Electronic Acknowledgement Receipt

EFS ID:	10346668
Application Number:	61499112
International Application Number:	
Confirmation Number:	2306
Title of Invention:	Robust Merge Candidate Selection in Video Coding
First Named Inventor/Applicant Name:	Yunfei Zheng
Customer Number:	23696
Filer:	John Rickenbrode/OLIVIA FRIAS
Filer Authorized By:	John Rickenbrode
Attorney Docket Number:	112573P1
Receipt Date:	20-JUN-2011
Filing Date:	
Time Stamp:	20:55:15
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$220
RAM confirmation Number	6480
Deposit Account	170026
Authorized User	

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	112573P1_2011-06-20_ADS_ESIGNED.pdf	55173 3b972586fd66171e860c68a2bfb7970bd4823044	no	5
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
2	Specification	112573P1_2011-06-20_APPLICATION.pdf	57426 60a2eb4a8814166e7c2f79c9d91773390a7702d3	no	5
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	29172 37e00413129589b05b52140e48502f4da7f90710	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	141771		

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
61/499,112	06/20/2011		220	112573P1		

CONFIRMATION NO. 2306

FILING RECEIPT

23696
QUALCOMM INCORPORATED
5775 MOREHOUSE DR.
SAN DIEGO, CA 92121

OC000000048507388

Date Mailed: 07/05/2011

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Yunfei Zheng, San Diego, CA;
Xianglin Wang, San Diego, CA;
Marta Karczewicz, San Diego, CA;

Power of Attorney:
John Rickenbrode--57067

If Required, Foreign Filing License Granted: 06/29/2011
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 61/499,112**
Projected Publication Date: None, application is not eligible for pre-grant publication
Non-Publication Request: No
Early Publication Request: No
Title

Robust Merge Candidate Selection in Video Coding

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Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international

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Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

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Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and

Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

PTO/SB/80 (11-08)
Approved for use through 11/30/2011. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☑ Practitioners associated with the Customer Number: 15150

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☑ The address associated with Customer Number: 15150

OR

☐ Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:

Qualcomm Incorporated
5775 Morehouse Drive
San Diego, CA 92121

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	MAY 23, 2011
Name	Katherine Umpleby	Telephone	(858) 651-7170
Title	Vice President, Chief Patent Counsel		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	13491860
Application Number:	61499112
International Application Number:	
Confirmation Number:	2306
Title of Invention:	Robust Merge Candidate Selection in Video Coding
First Named Inventor/Applicant Name:	Yunfei Zheng
Customer Number:	23696
Filer:	Matthew J. Evans/Tiffany Schuna
Filer Authorized By:	Matthew J. Evans
Attorney Docket Number:	112573P1
Receipt Date:	14-AUG-2012
Filing Date:	20-JUN-2011
Time Stamp:	14:03:16
Application Type:	Provisional

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Assignee showing of ownership per 37 CFR 3.73(b).	373b_PTO.pdf	3021398 0a4d9c2c359099098be9356853b0809373c8ecd8	no	6

Warnings:

Information:

2	Power of Attorney	POA.pdf	543662 d7e96b8a2e33619deffa51f40d968997419ec9f3	no	1
Warnings:					
Information:					
			Total Files Size (in bytes):	3565060	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/96 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: QUALCOMM Incorporated

Application No./Patent No.: 61/499,112 Filed/Issue Date: June 20, 2011

Titled: ROBUST MERGE CANDIDATE SELECTION IN VIDEO CODING

QUALCOMM Incorporated, a Corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. [X] the assignee of the entire right, title, and interest in;

2. [ ] an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____ %); or

3. [ ] the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. [X] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy therefore is attached.

OR

B. [ ] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____
   The document was recorded in the United States Patent and Trademark Office at
   Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____
   The document was recorded in the United States Patent and Trademark Office at
   Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____
   The document was recorded in the United States Patent and Trademark Office at
   Reel _____, Frame _____, or for which a copy thereof is attached.

[ ] Additional documents in the chain of title are listed on a supplemental sheet(s).

[X] As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Matthew J. Evans/	August 14, 2012
Signature	Date
Matthew J. Evans, Reg. No. 56,530	Patent Attorney
Printed or Typed Name	Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ASSIGNMENT

WHEREAS, WE,

1. **Yunfei Zheng,** a citizen of **China,** having a mailing address located at 20631 Forge Way, Suite 279, Cupertino, California 95014, and a resident of **Cupertino, CA,**

2. **Xianglin Wang,** a citizen of **The United States of America,** having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121-1714, and a resident of **San Diego, CA,**

3. **Marta Karczewicz,** a citizen of **The United States of America,** having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121-1714, and a resident of **San Diego, CA,**

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 **PARALLELIZATION FRIENDLY MERGE CANDIDATES FOR VIDEO CODING** (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). **13/526,261**, filed **June 18, 2012**, Qualcomm Reference No. **120072**, and all provisional applications relating thereto, together with U.S. Provisional Application No(s). **61/499,112**, filed **June 20, 2011**, Qualcomm Reference No. **112573P1**, and together with U.S. Provisional Application No(s). **61/543,043**, filed **October 4, 2011**, Qualcomm Reference No. **120072P1**, together with U.S. Provisional Application No(s). **61/543,059**, filed **October 4, 2011**, Qualcomm Reference No. **112573P2**, together with U.S. Provisional Application No(s). **61/556,761**, filed **November 7, 2011**, Qualcomm Reference No. **120469P1**, together with U.S. Provisional Application No(s). **61/562,387**, filed **November 21, 2011**, Qualcomm Reference No. **120469P2**, together with U.S. Provisional Application No(s). **61/562,953**, filed **November 22, 2011**, Qualcomm Reference No. **120469P3**, (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.

Done at Cupertino, CA, on 08/01/2012
LOCATION DATE

Yunfei Zheng

Done at _____, on _____
LOCATION DATE

Xianglin Wang

Done at _____, on _____
LOCATION DATE

Marta Karczewicz

ASSIGNMENT

WHEREAS, WE,

1. **Yunfei Zheng,** a citizen of **China,** having a mailing address located at 20631 Forge Way, Suite 279, Cupertino, California 95014, and a resident of **Cupertino, CA,**

2. **Xianglin Wang,** a citizen of **The United States of America,** having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121-1714, and a resident of **San Diego, CA,**

3. **Marta Karczewicz,** a citizen of **The United States of America,** having a mailing address located at 5775 Morehouse Drive, San Diego, California 92121-1714, and a resident of **San Diego, CA,**

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 **PARALLELIZATION FRIENDLY MERGE CANDIDATES FOR VIDEO CODING** (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). **13/526,261**, filed **June 18, 2012**, Qualcomm Reference No. **120072**, and all provisional applications relating thereto, together with U.S. Provisional Application No(s). **61/499,112**, filed **June 20, 2011**, Qualcomm Reference No. **112573P1**, and together with U.S. Provisional Application No(s). **61/543,043**, filed **October 4, 2011**, Qualcomm Reference No. **120072P1**, together with U.S. Provisional Application No(s). **61/543,059**, filed **October 4, 2011**, Qualcomm Reference No. **112573P2**, together with U.S. Provisional Application No(s). **61/556,761**, filed **November 7, 2011**, Qualcomm Reference No. **120469P1**, together with U.S. Provisional Application No(s). **61/562,387**, filed **November 21, 2011**, Qualcomm Reference No. **120469P2**, together with U.S. Provisional Application No(s). **61/562,953**, filed **November 22, 2011**, Qualcomm Reference No. **120469P3**, (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.

Done at _____, on _____ _____
LOCATION DATE **Yunfei Zheng**

Done at San Diego, CA, on 07/30/12 _____
LOCATION DATE **Xianglin Wang**

Done at San Diego, on 07/30/12 _____
LOCATION DATE **Marta Karczewicz**

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
61/499,112	06/20/2011	Yunfei Zheng	112573P1

CONFIRMATION NO. 2306

POA ACCEPTANCE LETTER

15150
Shumaker & Sieffert, P. A.
1625 Radio Drive, Suite 300
Woodbury, MN 55125

OC000000056028462

Date Mailed: 08/21/2012

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/14/2012.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/tpetros/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101