

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of Faxér)	
Serial No.: 15/105648)	
Filed: June 17, 2016)	Examiner: TBD
For: Codebook Subset Restriction Signaling)	Group Art Unit: TBD
Attorney's Docket No: 4015-9595/P45698-US2)	Confirmation No.: 5548
)	
)	

MS AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

In accordance with 37 C.F.R. 1.56, counsel wishes to make of record the attached items of information for the Examiner's consideration in connection with this application. Also attached is Form PTO/SB/08A for the Examiner's convenience in making such consideration of record. Inclusion herein of any particular item of information is not to be construed as an admission that same is prior art. Each item of information contained in the information disclosure statement:

- was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office, and this communication was not received by an individual designated in §1.56(c) more than thirty days prior to the filing of the information disclosure statement; or
- is a communication that was issued by a patent office in a counterpart foreign or international application or by the Office, and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of the information disclosure statement
- No statement re Patent Term Adjustment (PTA).

The Commissioner is hereby authorized to charge any fees that may be required or credit any overpayment to Deposit Account 18-1167.

Respectfully submitted,
COATS & BENNETT, P.L.L.C.



Dated: August 2, 2016

Justin J. Leonard
Registration No.: 60986
Telephone: (919) 854-1844

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number

15/105,648

APPLICATION AS FILED - PART I

(Column 1)		(Column 2)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	520
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760
TOTAL CLAIMS (37 CFR 1.16(i))	32 minus 20 =	12			OR	x 100 =	1200
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4 minus 3 =	1				x 460 =	460
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.							
			TOTAL			TOTAL	3240

APPLICATION AS AMENDED - PART II

AMENDMENT A	(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
AMENDMENT B	(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
 The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.



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

U.S. APPLICATION NUMBER NO. 15/105,648	FIRST NAMED INVENTOR Sebastian Faxér	ATTY. DOCKET NO. 4015-9595 / P45698-US2
INTERNATIONAL APPLICATION NO. PCT/SE2016/050009		
LA. FILING DATE 01/11/2016	PRIORITY DATE 01/14/2015	

24112
COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

CONFIRMATION NO. 5548
371 ACCEPTANCE LETTER



Date Mailed: 01/31/2018

NOTICE OF ACCEPTANCE OF APPLICATION UNDER 35 U.S.C 371 AND 37 CFR 1.495

The applicant is hereby advised that the United States Patent and Trademark Office, in its capacity as a Designated / Elected Office (37 CFR 1.495), has ACCEPTED the above identified international application for national patentability examination in the United States Patent and Trademark Office.

The United States Application Number assigned to the application is shown above. A Filing Receipt will be issued for the present application in due course. **THE DATE APPEARING ON THE FILING RECEIPT AS THE "FILING DATE or 371(c) DATE" IS THE DATE ON WHICH THE LAST OF THE 35 U.S.C. 371 (c)(1) and (c)(2) REQUIREMENTS HAS BEEN RECEIVED IN THE OFFICE. THIS DATE IS SHOWN BELOW.** The filing date of the above identified application is the international filing date of the international application (Article 11(3) and 35 U.S.C. 363)

06/17/2016
DATE OF RECEIPT OF 35 U.S.C.
371(c)(1) and (c)(2) REQUIREMENTS

The following items have been received:

- Copy of the International Application filed on 06/17/2016
- Copy of the International Search Report filed on 06/17/2016
- Copy of IPE Report filed on 06/17/2016
- Preliminary Amendments filed on 06/17/2016
- Information Disclosure Statements filed on 06/17/2016
- Inventor's Oath or Declaration filed on 06/17/2016
- Request for Immediate Examination filed on 06/17/2016
- U.S. Basic National Fees filed on 06/17/2016
- Assignment filed on 06/17/2016
- Authorize Access to Search Results filed on 06/17/2016
- Priority Documents filed on 06/17/2016
- Power of Attorney filed on 06/17/2016
- Authorization to Permit Access filed on 06/17/2016
- Application Data Sheet (37 CFR 1.76) filed on 06/17/2016

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

CHERRIE M HAYWOOD

Telephone: (703) 756-1144

page 2 of 2

MULTIPLE DEPENDENT CLAIM FEE CALCULATION SHEET							Application Number		Filing Date	
Substitute for Form PTO-1360 (For use with Form PTO/SB/06)							15105648			
							Applicant(s) Sebastian Faxer			
* May be used for additional claims or amendments										
CLAIMS	AS FILED		AFTER FIRST AMENDMENT		AFTER SECOND AMENDMENT					
	Indep	Depend	Indep	Depend	Indep	Depend	Indep	Depend	Indep	Depend
1	1		--	--						
2	1		--	--						
3		2	--	--						
4		(1)	--	--						
5		(1)	--	--						
6		(1)	--	--						
7		(1)	--	--						
8		(1)	--	--						
9		(1)	--	--						
10		(1)	--	--						
11		2	--	--						
12		(1)	--	--						
13	1		--	--						
14		1	--	--						
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Total Indep	8		4		0					
Total Depend	14		28		0					
Total Claims	32		32		0					
51							1			
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APPLICATION NUMBER	FILING or 371(e) DATE	GRP ART UNIT	FILED REC'D	ATTY DOCKET NO.	TOT CLAIMS	IND CLAIMS
15/105,648	06/17/2016		2860	4015-9595 / P45698-US2	32	4

CONFIRMATION NO. 5548

FILING RECEIPT



24112
COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

Date Mailed: 01/31/2018

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. 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**

Inventor(s)

Sebastian Faxér, Järfälla, SWEDEN;
Mattias Frenne, Uppsala, SWEDEN;
Simon Järmyr, Skarpnäck, SWEDEN;
George Jöngren, Sundbyberg, SWEDEN;
Niklas Wernersson, Solna, SWEDEN;

Applicant(s)

Telefonaktiebolaget LM Ericsson (publ), Stockholm, SWEDEN;

Power of Attorney: The patent practitioners associated with Customer Number 24112

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/SE2016/050009 01/11/2016
which claims benefit of 62/103,101 01/14/2015

Foreign Applications for which priority is claimed (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 01/30/2018

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/105,648**

Projected Publication Date: 05/10/2018

Non-Publication Request: No

Early Publication Request: No
Title

Codebook Subset Restriction Signaling

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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 patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

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>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER
Title 35, United States Code, Section 184
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 Assets Control, 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).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	15105648
	Filing Date	2016-06-17
	First Named Inventor	Faxér
	Art Unit	
	Examiner Name	
	Attorney Docket Number	4015-9595 / P45698-US2

U.S.PATENTS							Remove	
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1							
If you wish to add additional U.S. Patent citation information please click the Add button.							Add	
U.S.PATENT APPLICATION PUBLICATIONS							Remove	
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1	20120020434	A1	2012-01-26	Callard et al.	Corresponds to RU2011140068A cited herein		
If you wish to add additional U.S. Published Application citation information please click the Add button.							Add	
FOREIGN PATENT DOCUMENTS							Remove	
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	2011140068	RU	A	2013-04-27	Rockstar Bidco LP		
If you wish to add additional Foreign Patent Document citation information please click the Add button.							Add	
NON-PATENT LITERATURE DOCUMENTS							Remove	
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.					T ⁵	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		15105648
	Filing Date		2016-06-17
	First Named Inventor	Faxér	
	Art Unit		
	Examiner Name		
	Attorney Docket Number		4015-9595 / P45698-US2

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If you wish to add additional non-patent literature document citation information please click the Add button <input type="button" value="Add"/>			
EXAMINER SIGNATURE			
Examiner Signature			Date Considered
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
<small> ¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached. </small>			

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	15105648		
Filing Date	2016-06-17		
First Named Inventor	Faxér		
Art Unit			
Examiner Name			
Attorney Docket Number	4015-9595 / P45698-US2		

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/ Justin J. Leonard /	Date (YYYY-MM-DD)	2018-03-21
Name/Print	Justin Leonard	Registration Number	60986

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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.**

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 the Freedom of Information Act requires disclosure of these records.
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 inspections 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.



Espacenet

Bibliographic data: RU2011140068 (A) — 2013-04-27**TRANSMISSION USING COMMON AND DEDICATED PILOTS**

Inventor(s): КОЛЛАРД Аарон, ; ЮЙ Дун-Шень ; БЭЛАЙ Мохаммадхади, ;
МА Цзянлэй

Applicant(s): РОКСТАР БИДКО ЛП

Classification: - international: H04B1/76
- cooperative: H04L5/005; H04L5/0051; H04B7/0417;
H04B7/0478; H04B7/0639; H04B7/068

Application number: RU20110140068 20100316

Priority number (s): US20090160452P 20090316 ; US20090244185P 20090921 ;
WO2010CA00376 20100316

Also published as: BRPI1012727 (A2) CA2755574 (A1) CA2755574 (C) ;
CN102484501 (A) CN102484501 (B) more

Abstract not available for RU2011140068 (A)**Abstract of corresponding document: WO2010105345 (A1)**

A method, system, base station and wireless terminal are provided for transmission of a set of mixed pilots that includes both common and dedicated pilots. The method includes selecting a number D of dedicated pilots having regard to performance of the communication link, $D = 0$, selecting a first pre-coder for pre-coding D dedicated pilots based on some criteria, performing a first pre-coding of the D dedicated pilots with the first pre-coder to produce a set of pre-coded dedicated pilots, performing a second pre-coding of the set of pre-coded dedicated pilots and a set of common pilots to produce a set of mixed pilots, and transmitting data from the transmitter on the communication link with the set of mixed pilots.

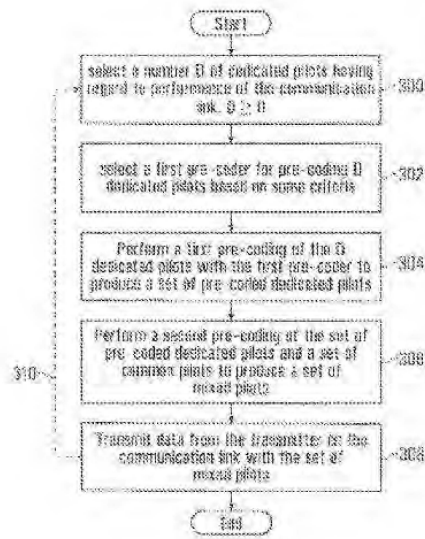


FIG. 11

РОССИЙСКАЯ ФЕДЕРАЦИЯ



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(54) СПОСОБ ПЕРЕДАЧИ СИГНАЛОВ, СИСТЕМА БЕСПРОВОДНОЙ СВЯЗИ, БАЗОВАЯ СТАНЦИЯ
И БЕСПРОВОДНОЙ ТЕРМИНАЛ

(57) Формула изобретения

1. Способ передачи сигналов от передатчика по каналу связи, указанный способ, содержащий следующие стадии:

- выбор числа D выделенных пилот-сигналов, принимая во внимание производительность канала связи, $D \geq 0$;
- выбор первого прекодера для предварительного кодирования D выделенных пилот-сигналов на основе некоторых критериев;
- выполнение первого предварительного кодирования D выделенных пилот-сигналов первым прекодером для создания набора предварительно кодированных выделенных пилот-сигналов;
- выполнение второго предварительного кодирования набора предварительно кодированных выделенных пилот-сигналов и набора общих пилот-сигналов для создания набора смешанных пилот-сигналов; и
- передачу данных с набором смешанных пилот-сигналов от передатчика по каналу связи.

2. Способ по п.1, в котором передатчик включает множество передающих антенн, и передача данных от передатчика включает передачу данных с набором смешанных пилот-сигналов от передатчика по каналу связи через множество передающих антенн.

3. Способ по п.2, в котором выполнение второго предварительного кодирования

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для создания набора смешанных пилот-сигналов содержит предварительное кодирование, основанное на сингулярном разложении (SVD) или его аппроксимации.

4. Способ по п.2, в котором выполнение второго предварительного кодирования для создания набора смешанных пилот-сигналов содержит выполнение предварительного кодирования, основанного на диверсификации передачи.

5. Способ по п.4, в котором выполнение предварительного кодирования, основанного на диверсификации передачи содержит выполнение предварительного кодирования, основанного на любом из пространственно-частотном блочном коде (SFBC) и диверсификации циклической задержки (CDD).

6. Способ по любому из пп.1-5, в котором выбор числа D выделенных пилот-сигналов с учетом производительности канала связи включает выбор числа D выделенных пилот-сигналов, относящихся к пропускной способности канала связи с учетом затрат на передачу сигналов, связанных с общими и выделенными пилот-сигналами.

7. Способ по любому из пп.1-5, в котором выбор первого прекодера для предварительного кодирования D выделенных пилот-сигналов на основе некоторых критериев содержит выбор первого прекодера, который максимизирует принятую мощность D выделенных пилот-сигналов согласно ограничению, по которому первый прекодер остается ортогональным второму прекодеру, используемому для предварительного кодирования набора общих пилот-сигналов.

8. Способ по п.7, дополнительно содержащий прием сигналов обратной связи, относящейся к первому предварительному кодированию D выделенных пилот-сигналов.

9. Способ по п.8, в котором выбор первого прекодера для предварительного кодирования D выделенных пилот-сигналов на основе некоторых критериев является итеративным процессом на основе обратной связи.

10. Способ по п.7, в котором выбор первого прекодера дополнительно содержит выбор первого прекодера для снижения помех, вызванных передачей данных с набором смешанных пилот-сигналов.

11. Способ по п.2, в котором выполнение второго предварительного кодирования для создания набора смешанных пилот-сигналов содержит:

предварительное кодирование набора предварительно кодированных выделенных пилот-сигналов с матрицей тождественного преобразования после первого предварительного кодирования с тем, чтобы набор смешанных пилот-сигналов содержал бы выделенные пилот-сигналы, выровненные с переданными данными; и

предварительное кодирование набора общих пилот-сигналов с кодовой книгой с тем, чтобы набор смешанных пилот-сигналов включал бы предварительно кодированные общие пилот-сигналы.

12. Способ по п.11, в котором передача данных по каналу связи с набором смешанных пилот-сигналов через множество передающих антенн содержит:

передачу выделенных пилот-сигналов в смешанном наборе пилот-сигналов через первую группу передающих антенн из множества передающих антенн; и

передачу предварительно кодированных общих пилот-сигналов в смешанном наборе пилот-сигналов через вторую группу передающих антенн из множества передающих антенн.

13. Способ по п.12, в котором передатчик содержит множество передатчиков, и первая группа передающих антенн расположена в первом множестве передатчиков, и вторая группа передающих антенн расположена во втором множестве передатчиков.

14. Способ по п.13, в котором передача данных с набором смешанных пилот-сигналов включает передачу данных, по меньшей мере, от первого передатчика и второго передатчика из множества передатчиков.

15. Система беспроводной связи, содержащая:

множество беспроводных терминалов; и базовую станцию, имеющую множество передающих антенн и предназначенную для передачи данных множеству беспроводных терминалов по соответствующим каналам связи, в которой для каждого канала связи базовая станция используется для выполнения следующих задач:

выбор числа D выделенных пилот-сигналов, принимая во внимание производительность канала связи, $D \geq 0$;

выбор первого прекодера для предварительного кодирования D выделенных пилот-сигналов на основе некоторых критериев;

выполнение первого предварительного кодирования D выделенных пилот-сигналов первым прекодером для создания набора предварительно кодированных выделенных пилот-сигналов;

выполнение второго предварительного кодирования набора предварительно кодированных выделенных пилот-сигналов и набора общих пилот-сигналов для создания набора смешанных пилот-сигналов; и

передачу данных от базовой станции соответствующему беспроводному терминалу по каналу связи с набором смешанных пилот-сигналов через множество передающих антенн.

16. Система по п.15, в которой базовая станция используется для выполнения предварительного кодирования и для создания набора смешанных пилот-сигналов путем выполнения предварительного кодирования на основе сингулярного разложения (SVD) или его аппроксимации.

17. Система по п.15, в которой базовая станция используется для выполнения предварительного кодирования и для создания набора смешанных пилот-сигналов, выполняя предварительное кодирование, основанное на диверсификации передачи.

18. Система по п.17, в которой базовая станция используется для выполнения предварительного кодирования, основанного на диверсификации передачи, выполнении любого пространственно-частотного блочного кода (SFBC) и на основе диверсификации циклической задержки (CDD) предварительного кодирования.

19. Система по любому из пп.15-18, в которой базовая станция используется для выбора числа D выделенных пилот-сигналов, относящихся к пропускной способности канала связи, с учетом затрат на передачу сигналов, связанных с общими и выделенными пилот-сигналами.

20. Система по любому из пп.15-18, в которой базовая станция используется для выбора первого прекодера, чтобы максимизировать принятую мощность D выделенных пилот-сигналов в соответствующем беспроводном терминале согласно ограничению, по которому первый прекодер остается ортогональным второму прекодеру, используемому для предварительного кодирования набора общих пилот-сигналов.

21. Система по п.20, в которой один или несколько из множества беспроводных терминалов конфигурируются, чтобы обеспечить обратную связь с базовой станцией, относящейся к первому предварительному кодированию D выделенных пилот-сигналов.

22. Система по п.21, в которой базовая станция используется для выбора первого прекодера для предварительного кодирования D выделенных пилот-сигналов, используя итеративный процесс на основе обратной связи.

23. Система по п.20, в которой базовая станция используется для выбора первого прекодера, снижающего помехи, создаваемые базовой станцией.

24. Система по п.15, в которой базовая станция дополнительно используется для выполнения следующих задач:

предварительного кодирования набора предварительно кодированных выделенных пилот-сигналов с матрицей тождественного преобразования после первого

предварительного кодирования с тем, чтобы набор смешанных пилот-сигналов содержал бы выделенные пилот-сигналы, выровненные с переданными данными; и

предварительного кодирования набора общих пилот-сигналов с кодовой книгой с тем, чтобы набор смешанных пилот-сигналов включая бы предварительно кодированные общие пилот-сигналы.

25. Система по п.24, в которой базовая станция дополнительно используется для выполнения следующих задач:

передачи выделенных пилот-сигналов смешанного набора пилот-сигналов через первую группу передающих антенн из множества передающих антенн; и

передачи предварительно кодированных общих пилот-сигналов смешанного набора пилот-сигналов через вторую группу передающих антенн из множества передающих антенн.

26. Система по п.25, в которой базовая станция содержит множество базовых станций, и первая группа передающих антенн расположена в первом множестве базовых станций, а вторая группа передающих антенн расположена во втором множестве базовых станций.

27. Система по п.26, в которой, по меньшей мере, первая базовая станция и вторая базовая станция из множества базовых станций используются для передачи данных вместе с набором смешанных пилот-сигналов.

28. Базовая станция, предназначенная для передачи данных по каналу связи, при этом базовая станция содержит:

множество передающих антенн;

прекодер, используемый для:

выбора числа D выделенных пилот-сигналов, принимаемая во внимание производительность канала связи, $D \geq 0$;

выбора первого прекодера для предварительного кодирования D выделенных пилот-сигналов на основе некоторых критериев;

выполнения первого предварительного кодирования D выделенных пилот-сигналов первым прекодером для создания набора предварительно кодированных выделенных пилот-сигналов;

выполнения второго предварительного кодирования набора предварительно кодированных выделенных пилот-сигналов и набора общих пилот-сигналов для создания набора смешанных пилот-сигналов; и

радиопередатчик, предназначенный для передачи данных по каналу связи с набором смешанных пилот-сигналов через множество передающих антенн.

29. Базовая станция по п.28, в которой прекодер служит для выполнения предварительного кодирования и для создания набора смешанных пилот-сигналов путем предварительного кодирования, основанного на сингулярном разложении (SVD) или его аппроксимации.

30. Базовая станция по п.28, в которой прекодер служит для выполнения предварительного кодирования и для создания набора смешанных пилот-сигналов, выполнения предварительное кодирование, основанное на диверсификации передачи.

31. Базовая станция по п.30, в которой прекодер служит для выполнения предварительного кодирования, основанного на диверсификации передачи, выполнении любого из пространственно-частотных блочных кодов (SFBC) и диверсификации циклической задержки (CDD) предварительного кодирования.

32. Базовая станция по любому из пп.28-31, в которой прекодер служит для выбора числа D выделенных пилот-сигналов, относящихся к пропускной способности канала связи, с учетом затрат на передачу сигналов, связанных с общими и выделенными пилот-сигналами.

33. Базовая станция по любому из пп.28-31, в которой прекодер служит для выбора первого прекодера, чтобы максимизировать принятую мощность D выделенных пилот-сигналов в соответствующем беспроводном терминале согласно ограничению, по которому первый прекодер остается ортогональным второму прекодеру, используемому для предварительного кодирования набора общих пилот-сигналов.

34. Базовая станция по п.33, в которой базовая станция дополнительно содержит беспроводной приемник, предназначенный для приема сигналов обратной связи, относящихся к первому предварительному кодированию D выделенных пилот-сигналов.

35. Базовая станция по п.34, в которой прекодер служит для выбора первого прекодера для предварительного кодирования D выделенных пилот-сигналов, используя итеративный процесс на основе обратной связи.

36. Базовая станция по п.33, в которой прекодер служит для выбора первого прекодера, снижающего помехи, созданные базовой станцией.

37. Базовая станция по п.28, в которой прекодер дополнительно используется для выполнения следующих задач:

предварительного кодирования набора предварительно кодированных выделенных пилот-сигналов с матрицей тождественного преобразования после первого предварительного кодирования с тем, чтобы набор смешанных пилот-сигналов содержал бы выделенные пилот-сигналы, выровненные с переданными данными; и

предварительное кодирование набора общих пилот-сигналов с кодовой книгой с тем, чтобы набор смешанных пилот-сигналов включал бы предварительно кодированные общие пилот-сигналы.

38. Базовая станция по п.37, в которой беспроводной передатчик дополнительно используется для выполнения следующих задач:

передачи выделенных пилот-сигналов из набора смешанных пилот-сигналов через первую группу передающих антенн из множества передающих антенн; и

передачи предварительно кодированных общих пилот-сигналов из набора смешанных пилот-сигналов через вторую группу передающих антенн из множества передающих антенн.

39. Базовая станция по п.38, в которой базовая станция содержит множество точек передачи, и первая группа передающих антенн расположена в первой точке из множества точек передачи, и вторая группа передающих антенн расположена во второй точке из множества точек передачи.

40. Базовая станция по п.38, в которой беспроводной передатчик используется для передачи данных вместе с набором смешанных пилот-сигналов, по меньшей мере, с одним другим беспроводным передатчиком.

41. Беспроводной терминал содержит беспроводной приемопередатчик, используемый для приема переданных сигналов, содержащих данные и набор смешанных пилот-сигналов, сформированных согласно способу по любому из пп.1-5.

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Application Number:	15105648
International Application Number:	
Confirmation Number:	5548
Title of Invention:	Codebook Subset Restriction Signaling
First Named Inventor/Applicant Name:	Sebastian Faxer
Customer Number:	24112
Filer:	Justin J. Leonard/Kristi Dunshee
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Application Type:	U.S. National Stage under 35 USC 371

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/105,648	06/17/2016	Sebastian Faxér	4015-9595 / P45698-US2	5548
24112	7590	04/13/2018	EXAMINER	
COATS & BENNETT, PLLC 1400 Crescent Green, Suite 300 Cary, NC 27518			NGUYEN, BRIAN D	
			ART UNIT	PAPER NUMBER
			2472	
			MAIL DATE	DELIVERY MODE
			04/13/2018	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 15/105,648	Applicant(s) FAXER ET AL.	
	Examiner BRIAN D. NGUYEN	Art Unit 2472	AIA (First Inventor to File) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 6/17/16.
 A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
- 4) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

- 5) Claim(s) 39-70 is/are pending in the application.
5a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 6) Claim(s) _____ is/are allowed.
- 7) Claim(s) 39,41-44,47,49-52,55,57-60,63 and 65-68 is/are rejected.
- 8) Claim(s) 40,45,46,48,53,54,56,61,62,64,69 and 70 is/are objected to.
- 9) Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

- 10) The specification is objected to by the Examiner.
- 11) The drawing(s) filed on 6/17/16 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

- a) All b) Some** c) None of the:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date 3/21/18, 8/2/16, 6/17/16
- 3) Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
- 4) Other: _____

DETAILED ACTION

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Claim Objections

2. Claim 45 is objected to because of the following informalities:
Claim 45, line 3, it is suggested to replace "polarization;" with "polarization.".

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

4. Claims 39, 41-42, 47, 49-50, 55, 57-58, 63, and 65-66 are rejected under 35 U.S.C. 102(a)(1) as being anticipated by Jing et al (2013/0163687).

Regarding claims 39 and 55, Jing discloses an apparatus and a method implemented by a network node for signaling to a wireless communication device which precoders in a codebook are restricted from being used, the method characterized by: generating codebook subset restriction signaling that, for each of one or more groups of precoders, jointly restricts the precoders in the group by restricting a certain component that the precoders in the group have in common (see a codebook subset restriction and grouping in paragraphs 0009 and 0017-001);

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and sending the generated signaling from the network node to the wireless communication device (see paragraph 0024).

Regarding claims 41 and 57, Jing discloses wherein a precoder comprising one or more beam precoders is restricted if at least one of its one or more beam precoders is restricted (see beam in paragraph 0018).

Regarding claims 42 and 58, Jing wherein the certain component comprises a beam precoder (see beam in paragraph 0018).

Regarding claims 47, 49, 50, 63, 65, and 66, claims 47, 49, 50, 63, 65, and 66 have substantially the same limitations as method claims 39, 41, 42, 55, 57, and 58 except that method claims 47, 49, 50, 63, 65, and 66 are reverse process of method claims 39, 41, 42, 55, 57, and 58. Therefore, they are subject to the same rejection.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 43-44, 51-52, 59-60, and 67-68 are rejected under 35 U.S.C. 103 as being unpatentable over Jing in view of Novlan et al (2014/0016549).

Regarding claims 43, 51, 59, and 67, Jing does not specifically disclose wherein a beam precoder is a Kronecker product. However, Novlan discloses Kronecker (see paragraphs 0042, 0069). The claim would have been obvious because a person of ordinary skill has good reason to

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pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.

Regarding claims 44, 52, 60, and 68, Novlan discloses wherein the different beamforming vectors comprise Discrete Fourier Transform (DFT) vectors (see DFT in paragraph 0032).

Allowable Subject Matter

7. Claims 40, 45-46, 48, 53-54, 56, 61-62, 64, and 69-70 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN D. NGUYEN whose telephone number is (571)272-3084. The examiner can normally be reached on 8-4:30 Monday-Friday.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on (571) 272-3088. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BRIAN D NGUYEN/
Primary Examiner, Art Unit 2472

Notice of References Cited	Application/Control No. 15/105,648	Applicant(s)/Patent Under Reexamination FAXÉR ET AL.	
	Examiner BRIAN D. NGUYEN	Art Unit 2472	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2013/0163687 A1	06-2013	Jing; Meifang	H04B7/0658	375/267
*	B	US-2014/0016549 A1	01-2014	Novlan; Thomas David	H04B7/0417	370/328
*	C	US-2016/0233939 A9	08-2016	Hammarwall; David	H04B7/0634	1/1
*	D	US-2014/0269577 A1	09-2014	Hammarwall; David	H04B7/0634	370/329
*	E	US-2014/0254508 A1	09-2014	Krishnamurthy; Sandeep H.	H04B7/0417	370/329
*	F	US-2014/0205031 A1	07-2014	NAMMI; Sairamesh	H04B7/0413	375/267
*	G	US-2014/0198868 A1	07-2014	Yang; Weidong	H04B7/0478	375/267
*	H	US-2014/0198751 A1	07-2014	Prasad; Narayan	H04B7/0452	370/329
	I	US-				
	J	US-				
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FOREIGN PATENT DOCUMENTS

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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	2	((("20130163687") or ("20140016549")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/03/28 21:05
S2	2	S1 and (codebook precod\$4 restrict\$4 group\$4)	US-PGPUB; USPAT	OR	ON	2018/03/28 21:07
S3	2	S1 and rank\$3	US-PGPUB; USPAT	OR	ON	2018/03/28 21:21
S4	2	S1 and rank\$3 and restrict\$4	US-PGPUB; USPAT	OR	ON	2018/03/28 21:23
S5	0	"15105648"	US-PGPUB; USPAT	OR	ON	2018/03/28 21:27
S6	2	((("20130163687") or ("20140016549")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/11 21:20
S7	122	beam\$4 adj2 precoder	US-PGPUB; USPAT	OR	ON	2018/04/11 21:20
S8	0	S6 and beam\$4 adj2 precoder	US-PGPUB; USPAT	OR	ON	2018/04/11 21:20
S9	1	S6 and precoder	US-PGPUB; USPAT	OR	ON	2018/04/11 21:21
S10	1	S6 and pre\$3coder	US-PGPUB; USPAT	OR	ON	2018/04/11 21:21
S11	1	S6 and beam\$4	US-PGPUB; USPAT	OR	ON	2018/04/11 21:25
S12	2	S6 and precod\$4 and codebook	US-PGPUB; USPAT	OR	ON	2018/04/11 21:26
S13	2	S6 and precod\$4 and codebook and restrict\$4	US-PGPUB; USPAT	OR	ON	2018/04/11 21:26
S14	2	((("20130163687") or ("20140016549")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/11 21:49
S15	2	S14 and precod\$4 and codebook and restrict\$4	US-PGPUB; USPAT	OR	ON	2018/04/11 21:49
S16	2	((("20130163687") or ("20140016549")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/04/12 11:15
S17	2	S16 and (scal\$4 vector transform\$4)	US-PGPUB; USPAT	OR	ON	2018/04/12 11:17
S18	1	S16 and kronecker	US-PGPUB; USPAT	OR	ON	2018/04/12 11:18
S19	2	S16 and (vector\$4 kronecker)	US-PGPUB; USPAT	OR	ON	2018/04/12 11:19
S20	11016327	@ad< "20150114"	US-PGPUB; USPAT	OR	ON	2018/04/12 12:15
S21	120	precoder with codebook with restriction	US-PGPUB; USPAT	OR	ON	2018/04/12 12:15
S22	86	S21 and S20	US-PGPUB; USPAT	OR	ON	2018/04/12 12:15

EAST Search History

S23	748	H04B7/0469.CPC.	US-PGPUB; USPAT	OR	ON	2018/04/12 12:26
S24	1073	H04B7/0478.CPC.	US-PGPUB; USPAT	OR	ON	2018/04/12 12:26
S25	3061	H04B7/0639.CPC.	US-PGPUB; USPAT	OR	ON	2018/04/12 12:26
S26	66	H03M7/3068.CPC.	US-PGPUB; USPAT	OR	ON	2018/04/12 12:27
S27	454	H03M7/3082.CPC.	US-PGPUB; USPAT	OR	ON	2018/04/12 12:27
S28	10	((("FAXER") near3 ("Sebastian")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/04/12 12:27
S29	227	((("FRENNE") near3 ("Mattias")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/04/12 12:27
S30	4	((("JARMYR") near3 ("Simon")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/04/12 12:28
S31	384	((("JONGREN") near3 ("George")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/04/12 12:28
S32	27	((("WERNERSSON") near3 ("Niklas")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/04/12 12:28
S33	615	S28 S29 S30 S31 S32	US-PGPUB; USPAT	OR	ON	2018/04/12 12:29
S34	82	S33 and codebook.clm.	US-PGPUB; USPAT	OR	ON	2018/04/12 12:29
S35	9	S33 and (restriction and codebook).clm.	US-PGPUB; USPAT	OR	ON	2018/04/12 12:30

EAST Search History (Interference)

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Receipt date: 03/21/2018

15/105,648 - GAU: 2472

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)

Approved for use through 07/31/2016. OMB 0651-0031

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	Filing Date	2016-06-17
	First Named Inventor	Faxér
	Art Unit	
	Examiner Name	
	Attorney Docket Number	4015-9595 / P45698-US2

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.D.N/

Receipt date: 03/21/2018

15/105,648 - GAU: 2472

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		15105648
	Filing Date		2016-06-17
	First Named Inventor	Faxér	
	Art Unit		
	Examiner Name		
	Attorney Docket Number		4015-9595 / P45698-US2

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EXAMINER SIGNATURE

Examiner Signature	/BRIAN D NGUYEN/	Date Considered	03/28/2018
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¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.