

PATENT COOPERATION TREATY

PCT

From the INTERNATIONAL SEARCHING AUTHORITY

To:

Mobarhan, Ramin
Qualcomm Incorporated
5775 Morehouse Drive
San Diego, CA 92121
ETATS-UNIS D'AMERIQUE



NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT AND
THE WRITTEN OPINION OF THE INTERNATIONAL
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference 121973WO	Date of mailing (day/month/year) 2 October 2013 (02-10-2013)
International application No. PCT/US2013/042726	FOR FURTHER ACTION See paragraphs 1 and 4 below
International filing date (day/month/year) 24 May 2013 (24-05-2013)	
Applicant QUALCOMM INCORPORATED	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the International Search Report.

Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes
1211 Geneva 20, Switzerland, Facsimile No.: (41-22) 338.82.70

For more detailed instructions, see PCT Applicant's Guide, International Phase, paragraphs 9.004 - 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**


The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. Following the expiration of 30 months from the priority date, these comments will also be made available to the public.

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3).

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the *PCT Applicant's Guide, National Chapters*.

Name and mailing address of the International Searching Authority
 European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
Tel. (+31-70) 340-2040
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 121973WO	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/US2013/042726	International filing date (<i>day/month/year</i>) 24 May 2013 (24-05-2013)	(Earliest) Priority Date (<i>day/month/year</i>) 25 May 2012 (25-05-2012)
Applicant QUALCOMM INCORPORATED		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of:

- ☒ the international application in the language in which it was filed
☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6**bis**(a)).

c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (See Box No. II)

3. ☐ **Unity of invention is lacking** (see Box No III)

4. With regard to the **title**,

- ☒ the text is approved as submitted by the applicant
☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- ☒ the text is approved as submitted by the applicant
☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the **drawings**,

- a. the figure of the **drawings** to be published with the abstract is Figure No. 6a
☒ as suggested by the applicant
☐ as selected by this Authority, because the applicant failed to suggest a figure
☐ as selected by this Authority, because this figure better characterizes the invention
b. ☐ none of the figures is to be published with the abstract

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/042726

A. CLASSIFICATION OF SUBJECT MATTER

INV. H03F1/22 H03F3/193 H03F3/68 H03F3/72
 ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H03F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2012/056681 A1 (LEE CHIH-HUNG [TW]) 8 March 2012 (2012-03-08)	1-5, 7-11,14, 17-20
A	figures 2, 4, 7	6,12
X	US 2011/217945 A1 (UEHARA GREGORY [US] ET AL) 8 September 2011 (2011-09-08) figures 2b, 3	1,2,9, 10,13-19
X	US 2005/265084 A1 (CHOI YOUNG-HO [KR]) 1 December 2005 (2005-12-01) figure 3	1,9,10, 17,19
X	US 2008/116976 A1 (CHANG SUNG-HSIEN [US] ET AL) 22 May 2008 (2008-05-22) figure 1	1,9,10, 17,19



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

A document defining the general state of the art which is not considered to be of particular relevance

E earlier application or patent but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

& document member of the same patent family

Date of the actual completion of the international search

25 September 2013

Date of mailing of the international search report

02/10/2013

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040,
 Fax: (+31-70) 340-3016

Authorized officer

Agerbaek, Thomas

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2013/042726

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2012056681 A1	08-03-2012	CN 102386866 A	21-03-2012
		TW 201220682 A	16-05-2012
		US 2012056681 A1	08-03-2012
		US 2013043955 A1	21-02-2013
US 2011217945 A1	08-09-2011	CN 102844983 A	26-12-2012
		TW 201220683 A	16-05-2012
		US 2011217945 A1	08-09-2011
		WO 2011109475 A1	09-09-2011
US 2005265084 A1	01-12-2005	EP 1601194 A2	30-11-2005
		KR 20050113511 A	02-12-2005
		US 2005265084 A1	01-12-2005
US 2008116976 A1	22-05-2008	NONE	

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No:
PCT/US2013/042726

International filing date (day/month/year)
24.05.2013

Priority date (day/month/year)
25.05.2012

International Patent Classification (IPC) or both national classification and IPC
INV. H03F1/22 H03F3/193 H03F3/68 H03F3/72

Applicant
QUALCOMM INCORPORATED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1 (a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0
Fax: +49 89 2399 - 4465

Date of completion of
this opinion

see form
PCT/ISA/210

Authorized Officer

Agerbaek, Thomas

Telephone No. +49 89 2399-8692



**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2013/042726

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:
 - a. (means)
 - ☐ on paper
 - ☐ in electronic form
 - b. (time)
 - ☐ in the international application as filed
 - ☐ together with the international application in electronic form
 - ☐ subsequently to this Authority for the purposes of search
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>6, 9, 10, 12</u>
	No: Claims	<u>1-5, 7, 8, 11, 13-20</u>
Inventive step (IS)	Yes: Claims	<u>6, 12</u>
	No: Claims	<u>1-5, 7-11, 13-20</u>
Industrial applicability (IA)	Yes: Claims	<u>1-20</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 Reference is made to the following documents:

- D1 US 2012/056681 A1 (LEE) 8 March 2012
- D2 US 2011/217945 A1 (UEHARA) 8 September 2011
- D3 US 2005/265084 A1 (CHOI) 1 December 2005
- D4 US 2008/116976 A1 (CHANG) 22 May 2008.

2 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-5, 7, 8, 11, 13-20 is not new, Art. 33(2) PCT, while claims 9, 10 lack an inventive step, Art. 33(3) PCT:

- D1 (US2012/0056681) discloses (Fig. 2) an LNA for wireless, multi-carrier receivers (para. [0001-2]), including a plurality of input stages 204 receiving and amplifying the same RF input signal V_{in} , cascode selecting stages 206, and output stages 208 connected to inductive loads L. Inductive source degeneration may be used in the input stages (Fig. 7). The Fig. 4 circuit version has feedback paths 402 from output to input, including resistors R, according to claims 1-5, 7, 8, 11, 14, 17-20.
- D2 (US2011/0217945) discloses (Fig. 2B) a dual carrier amplifier having a first to eighth amplifier stages 201-204, 221-224 amplifying four RF input signals V_{N+} , V_{N-} , V_{P+} , V_{P-} , and routing via sixteen switchable cascode FETs 205-212, 225-232 the amplifier stage outputs to four output nodes OUT1, OUT2 (left and right-hand sides) coupled to mixer loads as shown in Fig. 3, according to claims 1, 2, 13-19.
- D3 (US2005/0265084) discloses (Fig. 3) a TV receiver with two LNA's 150, 160 receiving, amplifying, and selectably routing to two output ports 111, 112, an input multi-channel RF signal at 140, according to at least claims 1, 17, 19.

- D4 (US2008/0116976) discloses (Fig. 1) a multi-input, multi-output, satellite TV receiver according to at least claims 1, 17, 19.

- The skilled person adds attenuators at the inputs of the D1-D4 as necessary, per claims 9, 10 without inventive activity.

- 3 Claims 6 and 12 appear to meet the requirements of Art. 33(1) PCT: the use of saturated and linear stages in parallel, and tunable matching circuits, are not taught or fairly suggested in the cited art.