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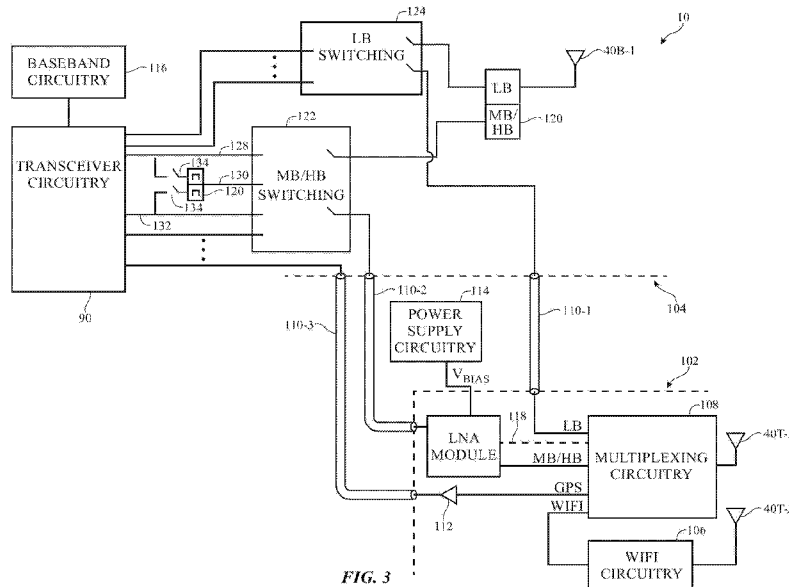
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Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

[Continued on next page]

(54) Title: ELECTRONIC DEVICE WITH LOW NOISE AMPLIFIER MODULE



(57) Abstract: An electronic device may include an antenna, a transceiver, and a low noise amplifier module that amplifies receive signals from the antenna to the transceiver circuitry in a first configuration and passes transmit signals from the transceiver to the antenna in a second configuration. The low noise amplifier module may include a first switching circuit coupled to the antenna, a second switching circuit coupled to the transceiver, at least one low noise amplifier coupled between the first and second switching circuits, and a transmit bypass path coupled between the first and second switching circuits. The transceiver may be located in a first electronic device region, whereas the low noise amplifier module and the antenna may be located in a second region. The low noise amplifier module may help compensate for signal loss between the first and second regions and allow for transmit signals to pass to the antenna.

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2015/040644

A. CLASSIFICATION OF SUBJECT MATTER
 INV. H01Q23/00 H04B1/48 H01Q21/28
 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)
 H04B H01Q H04W

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, COMPENDEX, INSPEC, 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	JP 2003 347957 A (SONY CORP) 5 December 2003 (2003-12-05)	1-5, 12, 15, 18-20
Y	paragraph [0019] - paragraph [0024]; figures 1-4, 6 paragraph [0027] paragraph [0031] paragraph [0049] - paragraph [0053] ----- -/--	6, 7, 13, 14

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p>
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Date of the actual completion of the international search 12 October 2015	Date of mailing of the international search report 25/01/2016
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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 Patrovsky, Andreas
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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2015/040644

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SSB-Electronic GmbH: "Data Sheet DBA-270 Mast Preamplifier", 26 January 2012 (2012-01-26), XP055219560, Retrieved from the Internet: URL: http://www.ssb.de/download/EN-1032_DBA270.pdf [retrieved on 2015-10-09]	18-20
Y	page 1, paragraph 1	7
A	Technical Data; page 2	1-6, 12-15

X	US 7 937 063 B1 (RAUSCH WALTER F [US] ET AL) 3 May 2011 (2011-05-03)	18-20
Y	column 5, line 45 - column 6, line 10;	6,13,14
A	figure 3	1-5,7, 12,15

A	US 2013/156080 A1 (CHENG ZHAOJUN [CA] ET AL) 20 June 2013 (2013-06-20)	1-7, 12-15, 18-20
	paragraph [0053] - paragraph [0086]; figures 3-8	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2015/040644

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-7, 12-15, 18-20

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-7, 12-15, 18-20

Electronic device with switching circuitry for antenna transmit diversity

2. claims: 8-11, 16

Electronic device with LNA module comprising additional filtering [and switching] circuitry

3. claim: 17

Method of adjusting the LNA circuitry in response to determining intermodulation conflicts

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2015/040644

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2003347957 A	05-12-2003	JP 3922099 B2 JP 2003347957 A	30-05-2007 05-12-2003

US 7937063 B1	03-05-2011	NONE	

US 2013156080 A1	20-06-2013	CN 104272526 A EP 2792019 A1 JP 2015507861 A US 2013156080 A1 WO 2013090716 A1	07-01-2015 22-10-2014 12-03-2015 20-06-2013 20-06-2013
