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[Continued on next page]

(54) Title: METHOD OF ROBUST TRANSMIT (TX) PROCESSING FOR RADIO FREQUENCY COEXISTENCE MANAGE-
MENT IN DUAL-SIM-DUAL-ACTIVE COMMUNICATION DEVICES

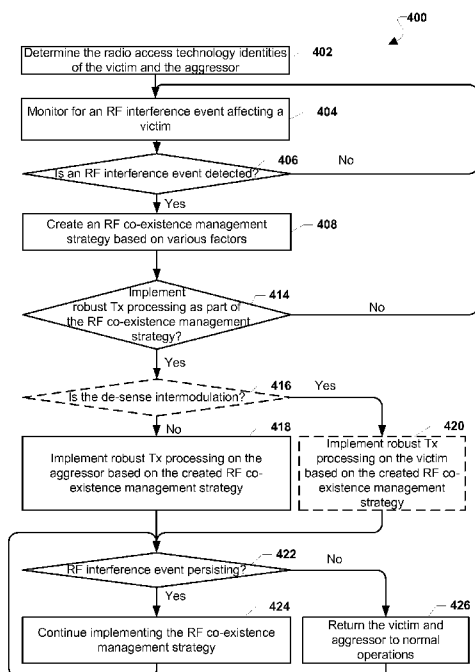


FIG. 4

(57) Abstract: The various embodiments include a dual-SIM-dual-active (DSDA) device and methods for implementing robust transmit (Tx) processing to resolve radio frequency coexistence interference between two subscriptions operating on the DSDA device. The DSDA device may detect when one subscription (the "aggressor") de-senses the other subscription (the "victim") as a result of the aggressor's transmissions, and in response, implement robust Tx processing to mitigate the effects of de-sense on the victim.

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BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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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))
- with information concerning request for restoration of the right of priority in respect of one or more priority claims (Rules 26bis.3 and 48.2(b)(vii))

(88) Date of publication of the international search report:

26 February 2015

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/032052

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04B15/04
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

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 2012/178386 A1 (PASCOLINI MATTIA [US] ET AL) 12 July 2012 (2012-07-12) paragraph [0068]; claims 1, 5, 10; figure 1 paragraph [0076] -----	1,2,16, 17,31, 32,46,47

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

8 October 2014

Date of mailing of the international search report

23/12/2014

Name and mailing address of the ISA/
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/032052

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, 2, 16, 17, 31, 32, 46, 47

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, 2, 16, 17, 31, 32, 46, 47

device (claim 16 and claim 31), method (claim 1), storage medium with instructions (claim 46), comprising:
- implementing a radio frequency co-existence management strategy between an aggressor communication activity and a victim communication activity and with adaptation of co-existence strategy to changing conditions

2. claims: 3, 18, 33, 48

device (claim 18 and claim 33), method (claim 3), storage medium with instructions (claim 48), comprising:
- implementing a radio frequency co-existence management strategy between an aggressor communication activity and a victim communication activity and with interference detection technique

3. claims: 4-9, 19-24, 34-39, 49-54

device (claim interval 19-24 and claim interval 34-39), method (claim interval 4-9), storage medium with instructions (claim interval 49-54), comprising:
- implementing a radio frequency co-existence management strategy between an aggressor communication activity and a victim communication activity and with cost function based RF interference reduction decision

4. claims: 10-15, 25-30, 40-45, 55-60

device (claim interval 25-30 and claim interval 40-45), method (claim interval 10-15), storage medium with instructions (claim interval 55-60), comprising:
- implementing a radio frequency co-existence management strategy between an aggressor communication activity and a victim communication activity and with robust TX-processing

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2014/032052

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2012178386 A1	12-07-2012	CN 102594390 A	18-07-2012
		EP 2661817 A2	13-11-2013
		KR 20130103786 A	24-09-2013
		TW 201234795 A	16-08-2012
		US 2012178386 A1	12-07-2012
		WO 2012094376 A2	12-07-2012
