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- (81) **Designated States** (*unless otherwise indicated, for every  
kind of national protection available*): AE, AG, AL, AM,  
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,  
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, 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, SC,  
SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN,  
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UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,  
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,  
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,  
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,

[Continued on next page]

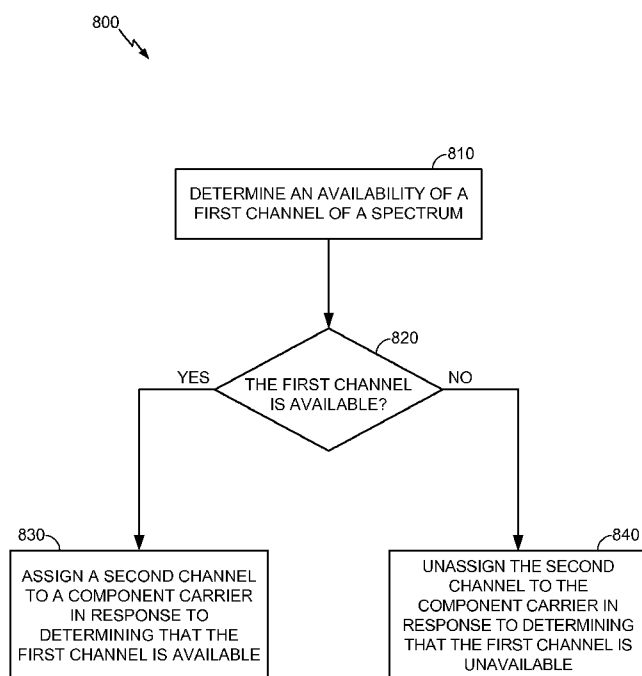
(54) **Title:** AUTHORIZED SHARED ACCESS CARRIER AGGREGATION WITH SENSING

FIG. 8

(57) **Abstract:** A method for managing spectrum resources by a network node in a wireless communication system may include determining an availability of a first channel of a spectrum, and assigning a second channel to a secondary carrier in response to determining that the first channel is available. In the alternative, or in addition, the method may include unassigning the second channel to the secondary carrier in response to determining that the first channel is unavailable. The spectrum may be, or include, Authorized Shared Access (ASA) spectrum. The method may be performed by one or more nodes of a network that is a secondary user of the spectrum. The channel may be deemed unavailable when in use by a primary user of the ASA spectrum. A wireless communication apparatus include a processor coupled to a memory holding instructions for execution by the processor to cause the apparatus to perform operations as described above.



TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

— *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))*

**Published:**

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6 February 2014

## INTERNATIONAL SEARCH REPORT

International application No

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## A. CLASSIFICATION OF SUBJECT MATTER

INV. H04W72/04 H04W74/08  
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)

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, 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<br>Y<br>A | EP 1 667 480 A1 (NIPPON TELEGRAPH & TELEPHONE [JP]) 7 June 2006 (2006-06-07) paragraph [0026] - paragraph [0038]; figures 1-9                                      | 1-4,6-8,<br>10-12<br>5,9<br>13-29 |
| Y<br>A      | GB 2 477 649 A (RENESAS MOBILE CORP [JP]) 10 August 2011 (2011-08-10) page 2, line 18 - page 3, line 17; figure 1 page 13, line 20 - page 16, line 20; figures 3,4 | 5,9<br><br>1-4,6-8,<br>10-29      |
|             | -----<br>-/--                                                                                                                                                      |                                   |

☒ 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

3 December 2013

Date of mailing of the international search report

13/12/2013

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2  
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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2013/043649

### 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.:

#### 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: 1-12

Method, apparatus and computer program product adapted to assign or unassign a component carrier to a second channel based on the availability or unavailability of a first channel.

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2. claims: 13-20

Method, apparatus and computer program product adapted to activate or deactivate carrier aggregation based on the availability or unavailability of a first channel.

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3. claims: 21-29

Method, apparatus and computer program product adapted to send a message to a network node on the availability or unavailability of a channel.

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## INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2013/043649

| C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT |                                                                                                                                                                                                                                                                                |                       |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Category*                                            | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                                                                                             | Relevant to claim No. |
| X                                                    | US 2010/246506 A1 (KRISHNASWAMY DILIP [US]) 30 September 2010 (2010-09-30)                                                                                                                                                                                                     | 13-29                 |
| A                                                    | paragraph [0007]<br>paragraph [0071] - paragraph [0074];<br>figure 6<br>paragraph [0080] - paragraph [0092];<br>figures 8,9<br>-----                                                                                                                                           | 1-12                  |
| X                                                    | EP 2 384 074 A1 (VODAFONE IP LICENSING LTD [GB]) 2 November 2011 (2011-11-02)                                                                                                                                                                                                  | 21-29                 |
| A                                                    | abstract<br>paragraph [0014]<br>paragraph [0046]<br>paragraph [0049] - paragraph [0059];<br>figures 4A,4B<br>-----                                                                                                                                                             | 1-20                  |
| E                                                    | WO 2013/087835 A1 (NOKIA SIEMENS NETWORKS OY [FI]) 20 June 2013 (2013-06-20)<br>paragraph [0009] - paragraph [0012]<br>paragraph [0023] - paragraph [0024]<br>paragraph [0034] - paragraph [0045];<br>figures 2-5<br>paragraph [0048] - paragraph [0057];<br>figure 8<br>----- | 1-29                  |

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2013/043649

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date         |
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