

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
3 November 2011 (03.11.2011)

(10) International Publication Number  
**WO 2011/137455 A3**

(51) International Patent Classification:  
*H04L 5/00* (2006.01)

(21) International Application Number:  
PCT/US2011/034855

(22) International Filing Date:  
2 May 2011 (02.05.2011)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
61/330,157 30 April 2010 (30.04.2010) US

(71) Applicants (for all designated States except US): **RESEARCH IN MOTION LIMITED** [CA/CA]; 295 Phillip Street, Waterloo, Ontario N2L3W8 (CA). **RESEARCH IN MOTION CORPORATION** [US/US]; 1209 Orange Street, The Corporation Trust Center, Wilmington, Delaware 19801 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **MCBEATH, Sean Michael** [US/US]; 5000 Riverside Drive, Ext. 63994,

Brazos East, Suite 100, Irving, Texas 75039 (US). **FONG, Mo-Han** [CA/CA]; 95 Beech Street, Ottawa, Ontario K1S3J7 (CA). **CAI, Zhijun** [US/US]; 5000 Riverside Drive, Ext. 63775, Brazos East, Suite 100, Irving, Texas 75039 (US). **EARNSHAW, Andrew Mark** [CA/CA]; 4000 Innovation Drive, Ext. 13208, Ottawa, Ontario K2K3K1 (CA). **HEO, Youn Hyoung** [KR/CA]; 295 Phillip Street, Ext. 78357, Waterloo, Ontario N2L3W8 (CA).

(74) Agents: **GUPTA, Rishi R.** et al.; FISH & RICHARDSON P.C., P.O. Box 1022, Minneapolis, Minnesota 55440-1022 (US).

(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, 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, KM, 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, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD,

[Continued on next page]

(54) Title: SYSTEM AND METHOD FOR SHARING A CONTROL CHANNEL FOR CARRIER AGGREGATION

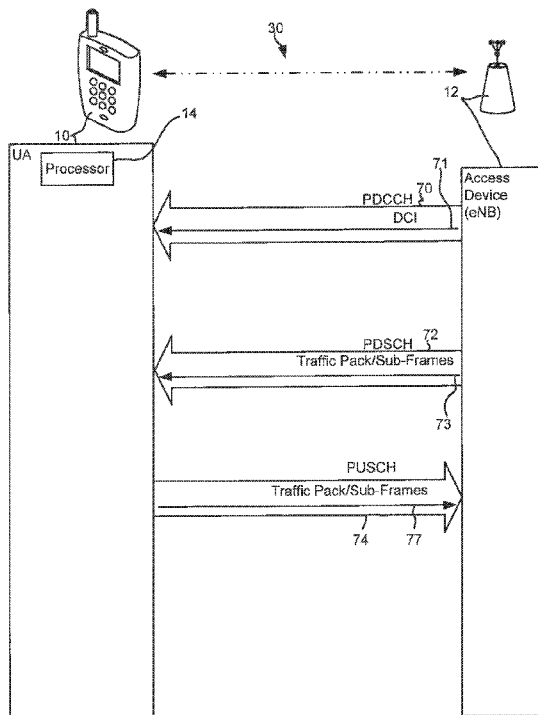
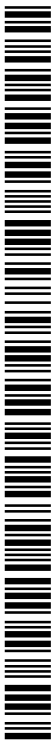


Fig. 1

(57) Abstract: A method for processing a control channel at a user agent (UA) to identify at least one of an uplink and a downlink resource allocated by a resource grant within a multi-carrier communication system wherein resource grants are specified by control channel element (CCE) subset candidates wherein the carriers used for data transmission and reception are configured carriers, the method comprising the steps of receiving activation signals specifying active and deactivated carriers from among the configured carriers, for active carriers (i) identifying a number of CCE subset candidates to decode and (ii) decoding up to the identified number of CCE subset candidates in an attempt to identify the resource grant; and for deactivated carriers, ignoring CCE subset candidates associated with the deactivated carriers.



WO 2011/137455 A3

SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

**(84) Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, 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, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

**Published:**

- with international search report (Art. 21(3))

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

19 January 2012

INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2011/034855

A. CLASSIFICATION OF SUBJECT MATTER  
INV. H04L5/00  
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)  
H04L  
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 practical, search terms used)  
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	NEC: "Component carrier configuration/activation for carrier aggregation", 3GPP DRAFT; R2-093697 CC CONFIGURATION ACTIVATION FOR CA, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, no. Los Angeles, USA; 20090622, 22 June 2009 (2009-06-22), XP050351934, [retrieved on 2009-06-22]	1,2
A	the whole document ----- -/--	3-5

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 document 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  20 October 2011	Date of mailing of the international search report  26/10/2011
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  Haas, Hans

## INTERNATIONAL SEARCH REPORT

International application No

PCT/US2011/034855

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	NOKIA SIEMENS NETWORKS ET AL: "DRX in Carrier Aggregation - Active Time", 3GPP DRAFT; R2-101527 DRX IN CARRIER AGGREGATION - ACTIVE TIME, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. San Francisco, USA; 20100222, 16 February 2010 (2010-02-16), XP050421871, [retrieved on 2010-02-16]	1,2
A	the whole document	3-5
X	CATT ET AL: "Design of DL Control Channel for LTE-A with Carrier Aggregation", 3GPP DRAFT; R1-093530, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, no. Shenzhen, China; 20090819, 19 August 2009 (2009-08-19), XP050351789, [retrieved on 2009-08-19]	1,2
A	the whole document	3-5
X	SAMSUNG: "Component carrier activation and deactivation", 3GPP DRAFT; R1-101144-CC ACTIVATION DEACTIVATION-SAMSUNG, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG1, no. San Francisco, USA; 20100222, 16 February 2010 (2010-02-16), XP050418688, [retrieved on 2010-02-16]	1,2
A	the whole document	3-5
X	PANASONIC: "Further discussion on PDCCH with cross carrier operation", 3GPP DRAFT; R1-100361, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG1, no. Valencia, Spain; 20100118, 12 January 2010 (2010-01-12), XP050418024, [retrieved on 2010-01-12]	3-5
A	the whole document	1,2
	----- -/--	

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2011/034855

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>LG ELECTRONICS: "Configuration and activation of carrier indicator field in PDCCH for multiple carrier aggregation", 3GPP DRAFT; R1-094468 LTEA CI CONFIGURATION AND ACTIVATION, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, no. Jeju; 20091109, 9 November 2009 (2009-11-09), XP050388891, [retrieved on 2009-11-02] the whole document</p> <p style="text-align: center;">-----</p>	1-5
A	<p>ALCATEL-LUCENT ET AL: "Discussion of Carrier Indicator signalling in carrier aggregation scenario", 3GPP DRAFT; R1-100410 DISCUSSION ON CI USAGE3, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG1, no. Valencia, Spain; 20100118, 12 January 2010 (2010-01-12), XP050418062, [retrieved on 2010-01-12] the whole document</p> <p style="text-align: center;">-----</p>	1-5

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2011/034855

## 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, 2

decoding CCE subset candidates only for active carriers

---

2. claims: 3-5

using CIF or a subset's location to identify carriers associated with CCE subset candidates

---