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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, 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, QA, RO, RS, RU, RW, 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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Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR ENABLING CHANNEL AND INTERFERENCE ESTIMATIONS IN MACRO/RRH SYSTEM

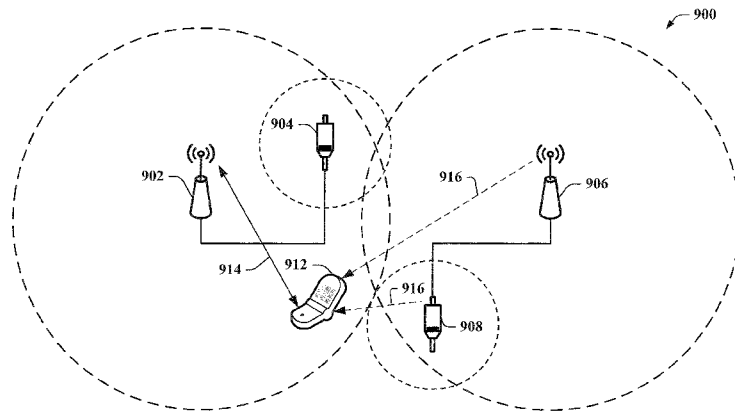
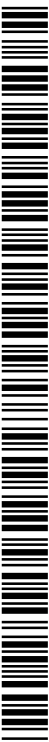


FIG. 9

(57) Abstract: Aspects disclosed herein relate to channel and interference estimations in a multiple transmission point environment including an eNB and RRHs. In the disclosed aspects, one or more transmission points can signal to a UE to measure channel state conditions based on a first and a second resource pattern. The UE may receive the signaling and perform interference estimation based at least in part on the first resource pattern, and channel estimation based at least in part on the second resource pattern. The UE may generate a channel state report based on the interference and channel estimations, and transmit the channel state report to a transmission point. The eNB may employ the received channel state report in scheduling one or more resources for use by the UE, and may select or adjust network traffic on the first and the second resource pattern, to affect the resulting channel and interference estimation.





— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

(88) Date of publication of the international search report:
31 January 2013

Published:

— *with international search report (Art. 21(3))*

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2011/067673

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04L25/02 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 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	WO 2010/106549 A2 (CT OF EXCELLENCE IN WIRELESS [IN]; KUCHI KIRAN KUMAR [IN]; KLUTTO MILL) 23 September 2010 (2010-09-23)	1,6,9, 10,15, 20,23, 24,29, 34,37, 38,43, 48,51,52
Y	title; figure 8 paragraphs [0013], [0024], [0034] paragraphs [0065], [0107]	2-5,7,8, 11-14, 16-19, 21,22, 25-28, 30-33, 35,36, 39-42, 44-47, 49,50, 53-56
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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 12 September 2012	Date of mailing of the international search report 21/09/2012
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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 Hanus, Pavol
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/067673

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.

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2011/067673

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2010/272032 A1 (SAYANA KRISHNA KAMAL [US] ET AL) 28 October 2010 (2010-10-28) figure 8 paragraphs [0011], [0029] paragraph [0054] - paragraph [0056] -----	2-5, 16-19, 30-33, 44-47
Y	ZTE: "Interference coordination for control channels under non-CA based heterogeneous deployments", 3GPP DRAFT; R1-104566, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG1, no. Madrid, Spain; 20100823, 17 August 2010 (2010-08-17), XP050449863, [retrieved on 2010-08-17] abstract; figure 4 sections 1, 4 -----	7,14,21, 28,35, 42,49,56
Y	NTT DOCOMO: "Throughput Performance Evaluation of RE Muting for Inter-cell CSI-RS", 3GPP DRAFT; R1-105433 CSIRS PDSCH MUTING EVALUATION, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG1, no. Xi'an; 20101011, 5 October 2010 (2010-10-05), XP050450566, [retrieved on 2010-10-05] figures 1,2 sections 1, 2.1 -----	8,11-13, 22, 25-27, 36, 39-41, 50,53-55
A	US 2010/067627 A1 (LINCOLN BO [SE] ET AL) 18 March 2010 (2010-03-18) paragraph [0036] -----	7,14,21, 28,35, 42,49,56
A	US 2010/285810 A1 (KO YOUNG-JO [KR] ET AL) 11 November 2010 (2010-11-11) abstract paragraph [0006] paragraph [0033] - paragraph [0048] paragraph [0090] - paragraph [0103] paragraph [0112] -----	2-5, 16-19, 30-33, 44-47
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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2011/067673

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>PANTECH: "Considerations on signalling for PDSCH muting in LTE-Advanced", 3GPP DRAFT; R1-105303, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG1, no. Xiâ an, China; 201010, 14 October 2010 (2010-10-14), XP050489302, [retrieved on 2010-10-14] section 2</p> <p style="text-align: center;">-----</p>	8,11-13, 22, 25-27, 36, 39-41, 50,53-55

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2011/067673

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2010106549 A2	23-09-2010	US 2012014476 A1 WO 2010106549 A2	19-01-2012 23-09-2010

US 2010272032 A1	28-10-2010	CN 102415176 A EP 2425668 A1 KR 20120018127 A US 2010272032 A1 WO 2010126711 A1	11-04-2012 07-03-2012 29-02-2012 28-10-2010 04-11-2010

US 2010067627 A1	18-03-2010	EP 2327178 A1 JP 2012503358 A US 2010067627 A1 WO 2010036173 A1	01-06-2011 02-02-2012 18-03-2010 01-04-2010

US 2010285810 A1	11-11-2010	KR 20100118534 A US 2010285810 A1	05-11-2010 11-11-2010

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-5, 15-19, 29-33, 43-47

Coordinating transmission points

2. claims: 1, 6, 7, 9, 10, 14, 15, 20, 21, 23, 24, 28, 29, 34, 35, 37, 38, 42, 43, 48, 49, 51, 52, 56

Pilot filtering, muting of resource patterns and semi-static configuration

3. claims: 1, 8, 10-13, 15, 22, 24-27, 29, 36, 38-41, 43, 50, 52-55

Using common reference signal, CRS and channel state information reference signal, CSI-RS patterns
