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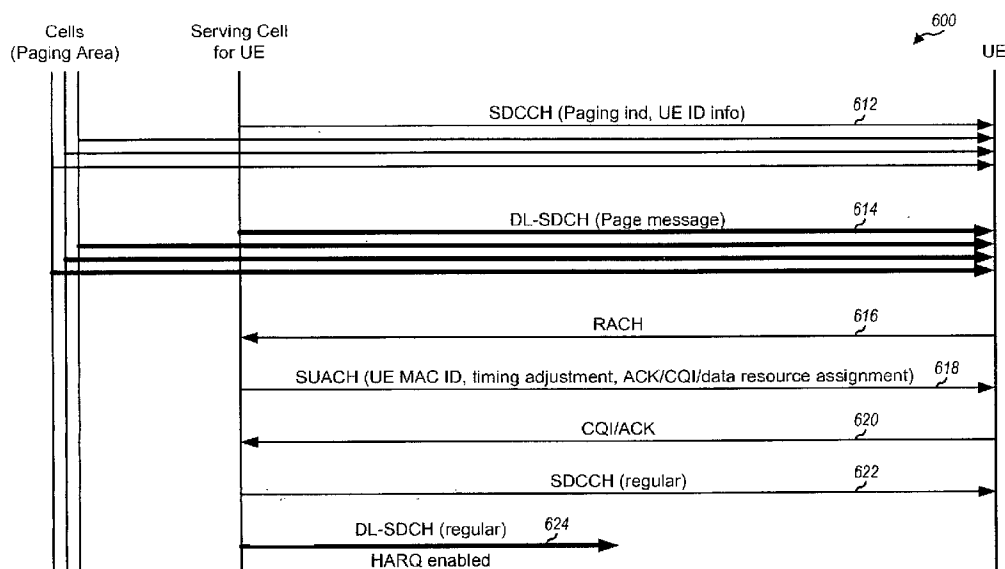
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[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR ENHANCED PAGING



(57) Abstract: Techniques for paging user equipments (UEs) in a wireless communication system are described. In one aspect, a cell sends a paging indicator to a UE, monitors for an acknowledgement from the UE, and sends a page message to the UE if an acknowledgement is received from the UE. The cell may receive channel quality information from the UE and may send the page message with link adaptation and/or HARQ to improve performance. In another aspect, a cell sends a paging indicator on a shared control channel to a UE and sends a page message on a shared data channel to the UE. The paging indicator and page message may be sent from multiple cells to the UE. Alternatively, the paging indicator may be sent from multiple cells to the UE, and the page message may be sent from a single cell to the UE.



FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL,
PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM,
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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, WPI Data, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 216 004 B1 (TIEDEMANN JR EDWARD G [US] ET AL) 10 April 2001 (2001-04-10)	1-4, 7-9, 11, 12, 15, 16, 19, 20, 22
Y	column 18, line 8 - column 19, line 47 column 25, line 15 - column 27, line 11 figures 8, 10, 11 ----- -/--	5, 6, 10, 13, 14, 17, 18, 21, 23

☒ Further documents are listed in the continuation of Box C.

X See patent family annex.

* Special categories of cited documents :

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"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

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2007/067682

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 6 421 540 B1 (GILHOUSEN KLEIN S [US] ET AL) 16 July 2002 (2002-07-16)	5,6,10, 13,14, 17,18, 21,23
A	column 2, line 66 - column 3, line 35 column 4, line 63 - column 7, line 14 column 10, line 11 - line 21 figure 2 -----	1,12,16, 20, 24-30, 37,38
Y	US 2004/091022 A1 (SARKAR SANDIP [US] ET AL SARKAR SANDIP [US] ET AL) 13 May 2004 (2004-05-13)	31-36
A	paragraph [0012] - paragraph [0014] paragraph [0040] - paragraph [0041] -----	24-30, 37,38
Y	US 6 307 846 B1 (WILLEY WILLIAM DANIEL [US]) 23 October 2001 (2001-10-23) column 3, line 53 - column 4, line 36 column 4, line 53 - column 5, line 30 -----	31-36
A	US 2003/063579 A1 (LEE JUNG-HYEONG [KR]) 3 April 2003 (2003-04-03) paragraph [0011] - paragraph [0014] paragraph [0023] paragraph [0029] - paragraph [0031] -----	1-23
A	EP 1 638 212 A (MOTOROLA INC [US]) 22 March 2006 (2006-03-22) paragraph [0002] - paragraph [0004] paragraph [0006] paragraph [0011] - paragraph [0013] paragraph [0020] - paragraph [0022] paragraph [0025] paragraph [0035] - paragraph [0036] -----	31-36

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2007/067682

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 allsearchable 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 reportcovers 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: 1-23

In order to save radio resources, the network uses a two-step quick paging procedure, wherein the paging message is based on an acknowledgement (feedback) message, which is sent by the user equipment UE in answer to the paging indicator. Thereby, the network may adapt the modulation, coding, power and/or area of the paging message to information indicated by the acknowledgement.

2. claims: 24-30

The paging indicator is sent on a shared control channel to the UE, and the page message is sent on a shared data channel.

3. claims: 31-36

A partial user equipment identifier (UE ID) (e.g. LSBs of RNTI, IMSI, MAC id) is sent with a paging indicator in a paging occasion to identify the UE being paged. The UEs are mapped to paging occasions such that no two UEs with the same partial UE ID are mapped to the same paging occasion. Thus, all UEs of a paging occasion can be uniquely identified by their partial UE ID.

4. claims: 37,38

In order to save radio resources, instead of sending an explicit paging indicator (on-off-keying), an implicit paging indicator is sent by masking a CRC value with a paging identifier.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6216004	B1	10-04-2001	NONE
US 6421540	B1	16-07-2002	NONE
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