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(71) Applicant (for all designated States except US): **QUALCOMM INCORPORATED** [US/US]; Attn: International Ip Administration, 5775 Morehouse Drive, San Diego, CA 92121 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **KHANDEKAR, Aamod, D.** [IN/US]; 5775 Morehouse Drive, San Diego,

CA 92121 (US). **MONTOJO, Juan** [ES/US]; 5775 Morehouse Drive, San Diego, CA 92121 (US). **BHUSHAN, Naga** [US/US]; 5775 Morehouse Drive, San Diego, CA 92121 (US). **PALANKI, Ravi** [IN/US]; 5775 Morehouse Drive, San Diego, CA 92121 (US). **JL, Tingfang** [CN/US]; 5775 Morehouse Drive, San Diego, CA 92121 (US).

(74) Agent: **CORIE, Florin C.**; Attn: International IP Administration, 5775 Morehouse Drive, San Diego, CA 92121 (US).

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[Continued on next page]

(54) Title: USING MULTICAST BROADCAST SINGLE FREQUENCY NETWORK (MBSFN) SUBFRAMES TO SEND UNICAST INFORMATION

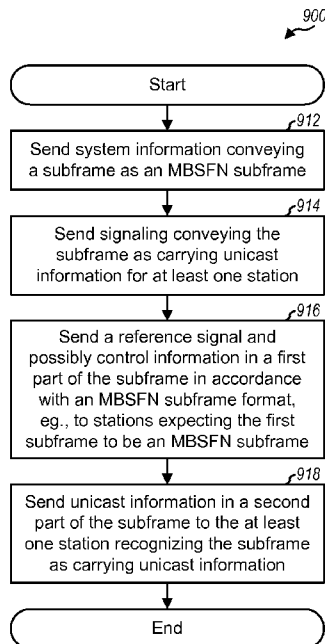


FIG. 9

(57) Abstract: Techniques for sending information in a wireless network are described. The network may support (i) regular subframes used to send unicast information and (ii) multicast/broadcast single frequency network (MBSFN) subframes used to send broadcast information and having lower overhead than the regular subframes. In an aspect, MBSFN subframes may be used to mitigate interference. A first base station may cause high interference to stations (e.g., UEs) served by a second base station. The first base station may reserve a subframe for the second base station, send system information conveying the reserved subframe as an MBSFN subframe to its stations, and transmit in a first part of the reserved subframe in accordance with an MBSFN subframe format. The second base station may skip the first part and may send unicast information to its stations in the remaining part of the reserved subframe. In another aspect, MBSFN subframes may be used to support additional base station capabilities.



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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))

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

Published:

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- 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))

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/039683

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04W72/08

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 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 | LG ELECTRONICS: "Multiplexing of MBMS and unicast transmission in E-UTRA downlink; R1-060054" 3GPP TSG-RAN WG1 MEETING AD HOC LTE, vol. R1-060054, 23 January 2006 (2006-01-23), pages 1-5, XP003016637 | 1,13,19, 24,29, 34.48,52 |
| Y | * Annex A * | 2-8,10, 11, 14-16, 18,20, 21,23, 25,26, 28,30, 31,33, 49,50, 53,54 |

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents :

| | |
|--|--|
| <p>*A* document defining the general state of the art which is not considered to be of particular relevance</p> <p>*E* earlier document but published on or after the international filing date</p> <p>*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)</p> <p>*O* document referring to an oral disclosure, use, exhibition or other means</p> <p>*P* document published prior to the international filing date but later than the priority date claimed</p> | <p>*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</p> <p>*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</p> <p>*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.</p> <p>*&* document member of the same patent family</p> |
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| Date of the actual completion of the international search 17 August 2009 | Date of mailing of the international search report 09/11/2009 |
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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 Goedhart, André |
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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|--|--|
| Y | <p>US 2007/104151 A1 (PAPASAKELLARIOU ARIS [US] ET AL) 10 May 2007 (2007-05-10)</p> <p>paragraphs [0044] - [0053] figures 5-8</p> | <p>2-5, 7, 8, 10, 11, 14, 15, 18, 20, 23, 25, 28, 30, 33, 49, 50, 53, 54</p> |
| Y | <p>3GPP: "3rd Generation Partnership Project; Technical Specification Group Radio Access network; Evolved Universal Terrestrial Radio access (E-UTRA); Physical channels and Modulation (Release 8)"</p> <p>INTERNET CITATION, March 2008 (2008-03), pages 1-65, XP002537575 * sections 6 to 6.2.4 *</p> | <p>6, 16, 21, 26, 31</p> |
| A | <p>* sections 6.10 to 6.10.3.2 *</p> | <p>1-5, 7-15, 17-20, 22-25, 27-30, 32-34, 48-54</p> |

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/039683

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 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.:

1-34, 48-54

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: 1-34,48-54

Sending unicast information in a multicast broadcast subframe

2. claims: 35-47

Sending no transmissions in a part of a subframe

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2009/039683

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---------------------|----------------------------|---------------------|
| US 2007104151 | A1 | NONE | |