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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:**

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

[Continued on next page]

(54) Title: GEO-LOCATION IN A WIRELESS COMMUNICATION NETWORK

600

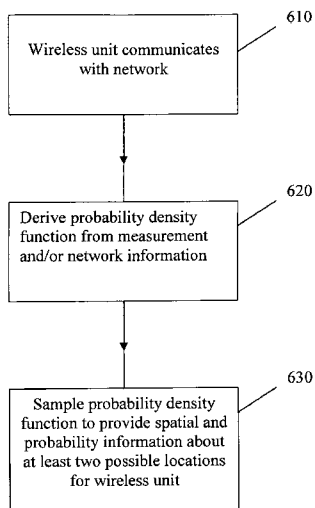


Fig. 6

(57) Abstract: A method for geo-location of a wireless communication unit (410) is provided. The communication unit (410) communicates with a wireless communication network (430) of a wireless communication system (400). A probability density function is derived for the location of the wireless communication unit (410), from measured information and/or information about the wireless communication network (430). The probability density function is sampled to provide spatial and probability information about each of at least two possible locations for the wireless communication unit (410). A wireless communication system (400) and a method of selecting enhancements to a wireless communication system (400) are also provided.



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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))*

**(88) Date of publication of the international search report:**  
30 September 2010

## INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2010/000072

## A. CLASSIFICATION OF SUBJECT MATTER

INV. H04W64/00  
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)

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 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         | US 2005/255854 A1 (SILLASTO EERO [FI] ET AL) 17 November 2005 (2005-11-17)  | 1                     |
| Y         | paragraphs 0020, 0021, 0040-0049, 0056-0061, 0067-0084<br>figures 3, 3A, 6  | 2-10                  |
| Y         | US 7 406 320 B1 (KUMAR MANIKANT [IN] ET AL) 29 July 2008 (2008-07-29)<br>* abstract<br>column 4, line 3 - line 24<br>column 4, line 60 - column 5, line 25<br>column 12, line 5 - line 32<br>column 13, line 31 - column 14, line 38<br>-----<br>-/-- | 2-10                  |

 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.

"&amp;" document member of the same patent family

Date of the actual completion of the international search

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Name and mailing address of the ISA/

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## INTERNATIONAL SEARCH REPORT

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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. |
| A  | US 2005/243936 A1 (AGRAWALA ASHOK K [US]<br>ET AL) 3 November 2005 (2005-11-03)<br>* abstract<br>paragraphs 0016, 0027, 0029, 0031-0033,<br>0039, 0041, 0096 and 0097<br>-----  | 11-17                 |
| A  | US 2007/121560 A1 (EDGE STEPHEN W [US])<br>31 May 2007 (2007-05-31)<br>paragraphs 0085-0091 and 0132<br>-----   | 11-17                 |
| A  | US 6 263 208 B1 (CHANG KIRK K [US] ET AL)<br>17 July 2001 (2001-07-17)<br>* abstract<br>column 1, line 21 - line 27<br>column 2, line 10 - line 22<br>column 2, line 52 - line 67<br>column 7, line 48 - line 59<br>----- | 11-17                 |
| A  | US 2005/131635 A1 (MYLLYMAKI PETRI [FI] ET<br>AL MYLLYMAEKI PETRI [FI] ET AL)<br>16 June 2005 (2005-06-16)<br>* abstract<br>paragraphs 0008-0018, 0039, 0065-0073<br>-----  | 11-17                 |
| A  | US 2006/290568 A1 (SILLASTO EERO [FI])<br>28 December 2006 (2006-12-28)<br>paragraphs 0070-0075<br>-----  | 11-17                 |
| A  | US 2007/168127 A1 (ZARUBA GERGELY V [US]<br>ET AL) 19 July 2007 (2007-07-19)<br>paragraphs 0036-0037<br>-----   | 11-17                 |
| A  | US 5 293 642 A (LO WING F [US])<br>8 March 1994 (1994-03-08)<br>column 2, line 24 - line 61<br>column 3, line 43 - column 4, line 4<br>-----  | 11-17                 |

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/EP2010/000072

## 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: 1-10

Geo-locating a wireless communication unit by sampling a probability density function to provide output information comprising spatial information and probability information about each of at least two possible locations.

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2. claims: 11-17

Selecting enhancements to a wireless communication system by deriving a quality rating for a wireless communication link between a wireless communication unit and a wireless communication network, and using an output information (comprising spatial information and probability information about a location of the wireless communication unit) and the quality rating in a decision on the enhancements to the wireless communication system.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

|   |
|---|
| International application No<br>PCT/EP2010/000072 |
|---|

| Patent document cited in search report | Publication date | Publication date | Patent family member(s)   | Publication date   |
|--|------------------|------------------|---|--|
| US 2005255854                          | A1               | 17-11-2005       | CN 1985538 A<br>EP 1757138 A1<br>WO 2005112501 A1   | 20-06-2007<br>28-02-2007<br>24-11-2005   |
| US 7406320                             | B1               | 29-07-2008       | NONE  |  |
| US 2005243936                          | A1               | 03-11-2005       | NONE  |  |
| US 2007121560                          | A1               | 31-05-2007       | NONE  |  |
| US 6263208                             | B1               | 17-07-2001       | NONE  |  |
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| US 2006290568                          | A1               | 28-12-2006       | NONE  |  |
| US 2007168127                          | A1               | 19-07-2007       | NONE  |  |
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