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(54) Title: METHOD AND APPARATUS FOR ESTIMATING CELLULAR TOWER LOCATION

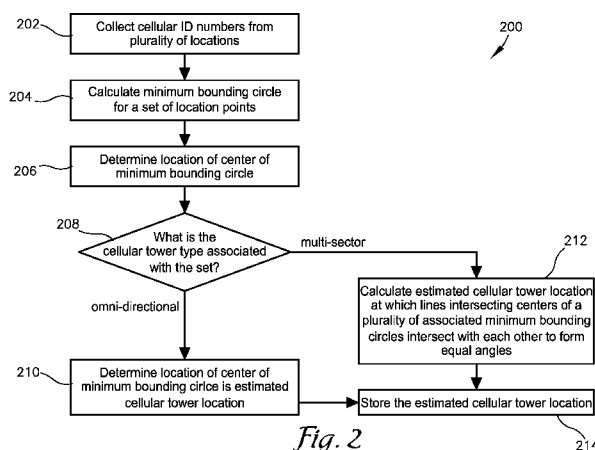


Fig. 2

(57) Abstract: A method and apparatus for collecting and analyzing cellular identification (ID) numbers at various geographic locations to estimate cellular tower locations. The method may include collecting cellular ID numbers obtained by collection mobile devices at a plurality of geographic locations then calculating minimum bounding circles encompassing a set of geographic location points with the same cellular identification numbers. If the cellular ID number of a set of location points indicates that the cellular tower is omni-directional, a center of the minimum bounding circle is an estimated cellular tower location. If the cellular ID number indicates that the cellular tower is multi-sector, the apparatus may calculate the estimated cellular tower location as the location at which lines that extend from the centers of a plurality of related minimum bounding circles intersect with each other to form equal angles.

**A. CLASSIFICATION OF SUBJECT MATTER****G01S 5/02(2010.01)i, H04W 64/00(2009.01)i**

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)

G01S 5/02; G01S 5/14; H04Q 7/38; H04W 24/00; H04Q 7/22; G01S 11/10

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) &amp; Keywords: "cellular, tower, location, estimat\*, omni\*, multi\*"

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0865223 A2 (NTT MOBILE COMMUNICATIONS NETWORK INC.) 16 September 1998 See the Abstract, Fig. 1,4	1-14
A	US 2009-0312036 A1 (ALIZADEH-SHABDIZ FARSHID) 17 December 2009 See the Abstract, Fig. 1,8, Claim 1	1-14
A	WO 2004-017660 A1 (SIEMENS AKTIENGESSELLSCHAFT et al.) 26 February 2004 See the Abstract, Fig. 1,2,4	1-14
A	WO 98-24251 A2 (TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)) 04 June 1998 See the Abstract, Fig. 1, Claim 1	1-14



Further documents are listed in the continuation of Box C.



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

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