(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
14 May 2010 (14.05.2010)

PCT

(10) International Publication Number
WO 2010/053863 A3

(51) **International Patent Classification**:
H04W 84/20 (2009.01) *G01S 5/00* (2006.01)

(21) **International Application Number**:
PCT/US2009/062960

(22) **International Filing Date**:
2 November 2009 (02.11.2009)

(25) **Filing Language**: English

(26) **Publication Language**: English

(30) **Priority Data**:
61/112,051 6 November 2008 (06.11.2008) US
12/604,625 23 October 2009 (23.10.2009) US

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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, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States** *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,

[Continued on next page]

(54) **Title**: STATIC NODES POSITIONING IN A WIRELESS NETWORK

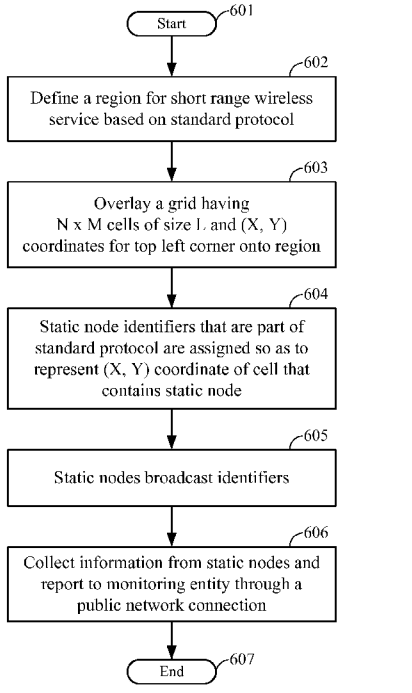


FIG. 6

(57) **Abstract**: Positions in a region serviced by a short range wireless network are established by defining a grid for the region. The grid is divided into a plurality of cells having a predetermined size. A plurality of static nodes can be placed in the cells. A network identifier that is associated with a standard protocol for the network is assigned to each of the static nodes. The identifier is assigned so as to identify the node and to represent a set of X, Y coordinates associated the cell where static node is located. The X,Y coordinate are assigned to the identifier without deviating from the standard protocol. The identifier is periodically broadcast from the static nodes. A cell of the grid within which a mobile node is located is estimated based on the identifier and an additional parameter received from one of the static nodes.

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ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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))*

— *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:
15 July 2010

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/062960

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04W84/20 G01S5/00
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 G01S

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	WO 2007/018296 A1 (MITSUBISHI) 15 February 2007 (2007-02-15) method for assigning address in ad hoc networks using a grid; the co-ordinates of the new node with respect to the grid form the assigned logical address (by the zone controller) n the grid are the logical address; Zigbee; the whole document --- -/--	1-32

[X] Further documents are listed in the continuation of Box C.

[X] 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.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12 May 2010	02/06/2010

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/062960

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 2007/060098 A1 (MCCOY) 15 March 2007 (2007-03-15) paragraph [0013] - paragraph [0036] Positioning method in ad hoc netwrok using deployed static nodes at known locations; exchange of node-to-node data which include node IDs and received RSSI (between nodes that are in communication) ; paragraph [0045] - paragraph [0048]	1-32
A	R. Grossmann, Jan Blumenthal, Frank Golatowksi, Dirk Timmermann: "Localization in Zigbee-based sensor netwroks" 15 November 2007 (2007-11-15), XP002566622 Retrieved from the Internet: URL:http://www.loms-itea.org/publications/LocalizationZigbee.pdf> [retrieved on 2010-02-03] Prior art doc: establish positions in zigbee networks,using beacons at know locations within a square grid; beacons transmit their know position and ID	1-32
A	US 2004/152471 A1 (MACDONALD) 5 August 2004 (2004-08-05) paragraph [0052] Prior art doc: method of positioning using a grid and RSS measurements at known locations within the grid; paragraph [0092] - paragraph [0094]	1-32
A	EP 1 936 889 A1 (HONEYWELL) 25 June 2008 (2008-06-25) Prior art node: location aware routing in adhoc nets; during configuration phase, each node receives its location info relative to the other nodes; paragraph [0044] - paragraph [0046]	1-32

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2009/062960

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2007018296 A1	15-02-2007	CN 101238700 A	06-08-2008
		EP 1913757 A1	23-04-2008
		JP 2009505445 T	05-02-2009
		US 2007060134 A1	15-03-2007
US 2007060098 A1	15-03-2007	NONE	
US 2004152471 A1	05-08-2004	US 2009221299 A1	03-09-2009
EP 1936889 A1	25-06-2008	US 2008151841 A1	26-06-2008