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Published:

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

[Continued on next page]

(54) Title: MONITORING THE MOVEMENT OF A DEVICE ROAMING BETWEEN A PLURALITY OF WLANS AND DETERMINING ITS PROXIMITY TO OTHER DEVICES

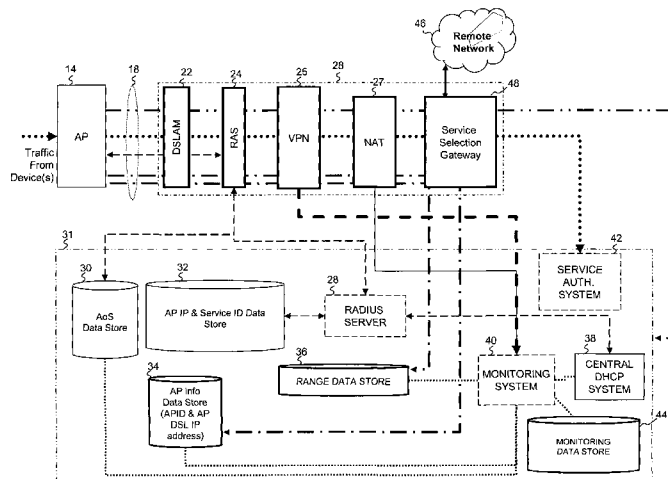


FIGURE 5

(57) Abstract: A device tracking and proximity service system are described which determine respectively location and proximity information for communications devices located in one or more WLANs. The system comprises a monitoring system arranged to receive signalling data to enable a device presence to be sensed within a WLAN which includes means for updating a data record for said device with location information for the device by accessing a series of data stores associated with network and service management. The monitoring system processes each data record when updated it to check if it includes one or more other device identifiers and if so, determines for each of said one or more other device identifiers a corresponding data record containing location information and processes the location information of each data record to determine proximity information between said sensed device and said one or more other devices.

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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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29 March 2012

INTERNATIONAL SEARCH REPORT

International application No  
PCT/GB2011/000993

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 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.
Y	KIM M ET AL: "Extracting a Mobility Model from Real User Traces", INFOCOM 2006. 25TH IEEE INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATIONS. PROCEEDINGS, IEEE, PISCATAWAY, NJ, 1 April 2006 (2006-04-01), pages 1-13, XP031072213, ISBN: 978-1-4244-0221-2 * II. COLLECTING USER TRACES * ----- -/- .	1-7

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.
- "&" document member of the same patent family

Date of the actual completion of the international search 13 October 2011	Date of mailing of the international search report 14/02/2012
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 Cremer, Jan

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/GB2011/000993

## 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. :

1-7

### 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.

## INTERNATIONAL SEARCH REPORT

International application No

PCT/GB2011/000993

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	YEN-CHENG CHEN ET AL: "Enabl ing locati on-based servi ces in wi rel ess LAN hotspots" , INTERNATIONAL JOURNAL OF NETWORK MANAGEMENT, vol . 15, no. 3, 1 May 2005 (2005-05-01) , pages 163-175 , XP055008415 , ISSN: 1055-7148, DOI : 10. 1002/nem.558 figures 2,4	1-7
A	wo 2009/016035 AI (NOKIA SI EMENS NETWORKS OY [FI] ; GOERGE JUERGEN [DE] ) 5 February 2009 (2009-02-05) page 3, line 17 - page 4, line 34; claims 1-3	1-7
A	US 7 590 418 BI (THOMSON ALLAN [US] ) 15 September 2009 (2009-09-15) col umn 8, line 56 - col umn 9, line 35; figures 5,6	1-7
A	"Ci sco Systems White Paper - Wi -Fi Based Real -Time Locati on Tracki ng: Sol uti ons and Technol ogy" , 1 January 2006 (2006-01-01) , pages 1-5 , XP055009255 , Retri eved from the Internet: URL: http://kaal .netechcorp. com/news-medi a/whi te-papers/downl oad-f ile?path=Wi rel ess%2FWi -Fi +Based+Real -Time+Locati on+Tracki ng.p df [retri eved on 2011-10-11] the whol e document	1-7
A	3GPP DRAFT; 08TD354R4 WI02021V100 NASS CLEAN, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBI LE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTI POLIS CEDEX ; FRANCE, vol . CT WG4, no. Berl in; 20051105 , 5 November 2005 (2005-11-05) , XP050034907 , * 5.2.3 * * 5.5.1 * * 7.1. * * 7.3 *	1-7
A	EP 2 161 955 AI (HUAWEI TECH co LTD [CN] ) 10 March 2010 (2010-03-10) abstract; f i g u r e 2	1-7
A	EP 2 051 473 AI (DEUTSCHE TELEKOM AG [DE] ; UNIV BERLIN TECH [DE] ) 22 Apri l 2009 (2009-04-22) paragraph [0026] - paragraph [0030]	1-7
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## INTERNATIONAL SEARCH REPORT

International application No  
PCT/GB2011/000993

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2008/089288 A2 (QUALCOMM INC [US]; WACHTER ANDREAS K [US]; LIN LE-HONG [US]) 24 July 2008 (2008-07-24) paragraph [0051] - paragraph [0063] -----	1-7

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No <b>PCT/GB2011/000993</b>
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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EP 2051473 A1	22-04-2009	NONE	
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WO 2008089288 A2	24-07-2008	BR PI0806603 A2 CA 2674531 A1 EP 2116088 A2 JP 2010517376 A TW 200843537 A US 2008227465 A1 WO 2008089288 A2	06-09-2011 24-07-2008 11-11-2009 20-05-2010 01-11-2008 18-09-2008 24-07-2008
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**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-7

Method of tracking a wireless communications-enabled device across a plurality of wireless communication networks by updating a data record associated with the device with the current location information and by processing this location information record comprising current and at least previous location information in order to determine device tracking information, in particular direction or speed of the device.

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2. claims: 8-11

Method and system for providing proximity location information by processing location information of one authenticated device and of one or more other devices.

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