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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, BN, 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, IR, IS, JP, KE, KG, 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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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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))

**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))

[Continued on next page]

- (54) **Title:** METHODS AND APPARATUS FOR CELLULAR-BASED IDENTIFICATION OF INDIVIDUALS WITHIN A VICINITY

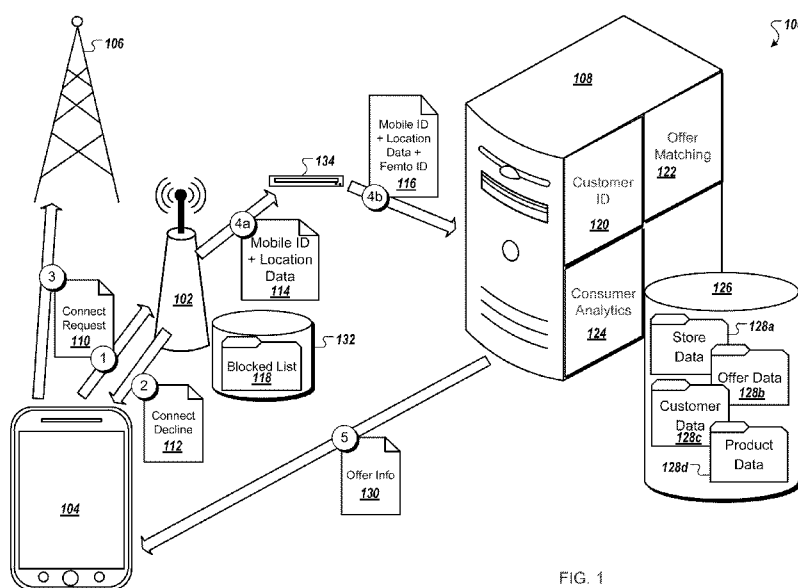


FIG. 1

- (57) **Abstract:** The present disclosure relates to systems and methods for identifying a plurality of mobile devices within a vicinity. The method include receiving, by a small cell base station, a connection request issued by a mobile device. The method include identifying a device identifier associated with the connection request and determining whether the device identifier is unique in light of a listing of previously recognized device identifiers.



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

26 March 2015

## INTERNATIONAL SEARCH REPORT

international application no.

PCT/US2014/047001

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - H04W 60/00 (2014.01)

CPC - H04W 60/00 (2014.11)

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)

IPC(8) - G06Q 30/02; H04W 60/00 (2014.01)

USPC - 455/435.1, 435.2; 705/14.49, 14.58

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
CPC - G06Q 30/0251, 30/0261; H04W 60/00 (2014.11) (keyword delimited)

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

PatBase, Orbit, Google Patents, Google Scholar.

Search terms used: femtocell, small cell, connection, request, device ID, block, list

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2011/0319079 A1 (NAKATA et al.) 29 December 2011 (29.12.2011) entire document	1-15, 24
Y	US 2011/0244857 A1 (HSIEH et al.) 06 October 2011 (06.10.2011) entire document	1-15, 24
Y	US 2012/0238301 A1 (MORRISON) 20 September 2012 (20.09.2012) entire document	2, 4-5, 7-12, 15, 24
Y	US 5,778,315 A (PROIETTI) 07 July 1998 (07.07.1998) entire document	12
A	US 2013/0095831 A1 (LEE et al.) 18 April 2013 (18.04.2013) entire document	1-15, 24

☐ Further documents are listed in the continuation of Box C.

## \* 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 application or patent 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

31 December 2014

Date of mailing of the international search report

30 JAN 2015

Name and mailing address of the ISA/US

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**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 Extera 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 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.:  
1-15, 24

**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.

## Continuation of Box No. III:

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-15,24, drawn to a method and device for identifying a plurality of mobile devices within a vicinity.

Group II, claims 16-23, drawn to a method and instructions comprising: receive, via a network, from a small cell base station, a communication comprising mobile device identification information of a mobile device having entered vicinity of the small cell base station.

The inventions listed as Groups I-II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature of the Group I invention: determine whether the device identifier is unique in light of a listing of previously recognized device identifiers as claimed therein is not present in the invention of Group II. The special technical feature of the Group II invention: identify one or more prior visit information corresponding to the mobile device or the customer associated with the mobile device as claimed therein is not present in the invention of Group I.

Groups I and II lack unity of invention because even though the inventions of these groups require the technical feature of : receiving, by a small cell base station a transmission; store, as visit information corresponding to a location associated with the location information, the customer information, this technical feature is not a special technical feature as it does not make a contribution over the prior art.

Specifically, US 2013/0095831 A1 (LEE et al) 18 April 2013 (18.04.2013) teaches: receiving, by a small cell base station a transmission (receiving a multiple receive times transmitted from at least the multi-mode mobile device or one or more of the other base stations from the multiple first base stations, Para. 29); store, as visit information corresponding to a location associated with the location information, the customer information (the GPS module 820 may provide GPS information regarding the location of the base station 105-b, Para. 117; the processor module 770 may include a speech encoder configured to receive audio from a user via a microphone, convert the audio into packets representative of the received audio, provide the audio packets to the transceiver module 750, and provide indications of whether a user is speaking, Para. 103).

Since none of the special technical features of the Group I or II inventions are found in more than one of the inventions, unity of invention is lacking.