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- (71) Applicant (for all designated States except US): **BLACK-BERRY LIMITED** [CA/CA]; 2200 University Avenue East, Waterloo, Ontario N2K 0A7 (CA).
- (72) Inventors; and
- (71) Applicants (for US only): **KIM, Joon Beom** [KR/US]; 4645 Plano Parkway, Plano, Texas 75010 (US). **KOO, Changhoi** [KR/US]; 4008 White Porch Rd., Plano, Texas 75024 (US). **CAI, Zhijun** [US/US]; 5000 Riverside Drive, Brazos East, Suite 100, Ext. 63775, Irving, Texas 75039 (US).
- (74) Agent: **PAHNKE, Chad, A.**; Hanley, Flight & Zimmerman, LLC, 150 S. Wacker Drive, Suite 2200, Chicago, Illinois 60606 (US).
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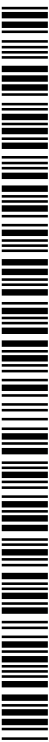
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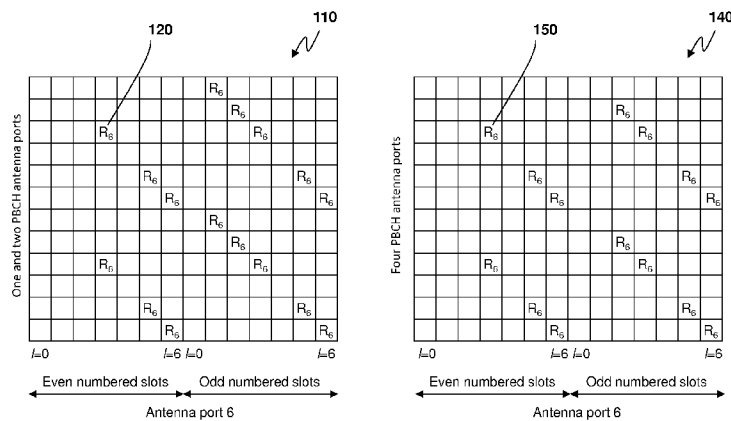


FIG. 1

(57) Abstract: A method, network node, and user equipments for providing parameters to a first user equipment served by the network element, the parameters describing at least a second user equipment for the purpose of the first user equipment initiating a device to device proximity discovery service with the second user equipment, the method collecting information for user equipments desiring device to device proximity discovery; creating a candidate user equipment list for a candidate tier based on the collected information at the network element, wherein each candidate tier comprises one or more thresholds based on timing advance values in use at the first or the at least the second user equipment; and providing the parameters describing at least a second user equipment to the first user equipment.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2014/032013

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC(8) - H04W 92/18 (2014.01) USPC - 370/310 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC(8) - H04W 4/00, 48/08, 48/10, 48/16, 72/04, 76/02, 8/00, 88/06, 92/18; H04L 29/02 (2014.01) USPC - 455/114.2, 452.1, 552.1, 63.1; 370/310, 328, 329 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched CPC - H04L 29/06714; H04W 72/082, 88/10, 88/06, 72/0413, 16/14, 8/24, 60/00, 72/0406, 76/02, 92/18, 76/023, 48/16 (2014.09) Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PatBase, Google Patents, Google Scholar		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2012/170794 A1 (DENG et al) 13 December 2012 (13.12.2012) entire document	1-5, 7, 10-11, 14-21
Y		6,8-9,12-13
Y	US 2012/0163235 A1 (HO et al) 28 June 2012 (28.06.2012) entire document	6,8-9,12-13
Y	US 2012/0213162 A1 (KOO et al) 23 August 2012 (23.08.2012) entire document	8,12
A	US 2013/0016629 A1 (MALLIK et al) 17 January 2013 (17.01.2013) entire document	1-21
A	US 2013/0064138 A1 (HAKOLA et al) 14 March 2013 (14.03.2013) entire document	1-21
A	US 7,412,518 B1 (DUIGOU et al) 12 August 2008 (12.08.2008) entire document	1-21
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/>		
* 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 "&" document member of the same patent family		
Date of the actual completion of the international search 08 October 2014		Date of mailing of the international search report <b>03 NOV 2014</b>
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201		Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

**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 Extra Seet

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.:  
1-21

**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 1-21, drawn to a network element for providing parameters.

Group II, claims 22-28, drawn to a method at a network node.

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: collecting information for user equipments desiring device to device proximity discovery; creating a candidate user equipment list for a candidate tier based on the collected information at the network element as claimed therein is not present in the invention of Group II. The special technical feature of the Group II invention: sending a request to the second user equipment; receiving a response from the second user equipment, including whether the second user equipment is willing to participate in proximity discovery as claimed therein is not present in the invention of Groups I.

Groups I and II lack unity of invention because even though the inventions of these groups require the technical feature of a network; provide to a first user equipment parameters describing a second user equipment for the purpose of the first user equipment initiating a device to device proximity discovery service with the second user equipment; and threshold or set of thresholds using timing advance values in use at the first or the at least the second user equipment; and a candidate user equipment list, this technical feature is not a special technical feature as it does not make a contribution over the prior art.

Specifically, US 7,412,518 B1 (DUIGOU et al) 12 August 2008 (12.08.2008) teaches a network (connecting network clients and services, col. 1, lines 20-30); provide to a first user equipment parameters describing a second user equipment for the purpose of the first user equipment initiating a device to device proximity discovery service with the second user equipment (Clients and services both are implemented on devices and connected over a dynamic proximity network utilizing a common discovery and communication methodology, col. 48, line 58-col. 49, line 7); and threshold or set of thresholds using timing advance values in use at the first or the at least the second user equipment (devices maintain a cache of gates to avoid constructing them each time the same service is run, col. 21, lines 35-40); and a candidate user equipment list (receive from listeners XML messages describing candidate spaces that those listeners represent, col. 35, lines 10-15).

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.