



## Location of terminals in a communications network.

**Ubeda Castellanos , Carlos; Jurado-Navas, Antonio; Garcia Fernandez, Juan Antonio; Fernandez Navarro, Mariano**

*Publication date:*  
2015

*Document Version*  
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*  
Ubeda Castellanos , C., Jurado-Navas, A., Garcia Fernandez, J. A., & Fernandez Navarro, M. (2015). Location of terminals in a communications network. (Patent No. WO2015135581).

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.



- (51) International Patent Classification:  
*G01S 5/10* (2006.01)
- (21) International Application Number:  
PCT/EP2014/054875
- (22) International Filing Date:  
12 March 2014 (12.03.2014)
- (25) Filing Language: English
- (26) Publication Language: English
- (71) Applicant: **TELEFONAKTIEBOLAGET L M ERICSSON (PUBL)** [SE/SE]; SE-164 83 Stockholm (SE).
- (72) Inventors: **UBEDA CASTELLANOS, Carlos**; C/ Via de los Poblados 13, E-28033 Madrid (ES). **JURADO NAVAS, Antonio**; C/ Severo Ochoa 51-Building 2, Andalusia Technology Park, E-29590 Campanillas - Malaga (ES). **GARCIA FERNANDEZ, Juan Antonio**; C/ Severo Ochoa 51-Building 2, Andalusia Technology Park, E-29590 Campanillas - Malaga (ES). **FERNANDEZ NAVARRO, Mariano**; C/ Severo Ochoa 51-Building 2, Andalusia Technology Park, E-29590 Campanillas - Malaga (ES).
- (74) Agent: **STASIEWSKI, Piotr**; Unit 4 Middleton Gate, Guildford Business Park, Guildford, Surrey GU2 8SG (GB).
- (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.
- (84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, 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, RS, SE, SI, SK, SM,

[Continued on next page]

(54) Title: LOCATION OF TERMINALS IN A COMMUNICATIONS NETWORK

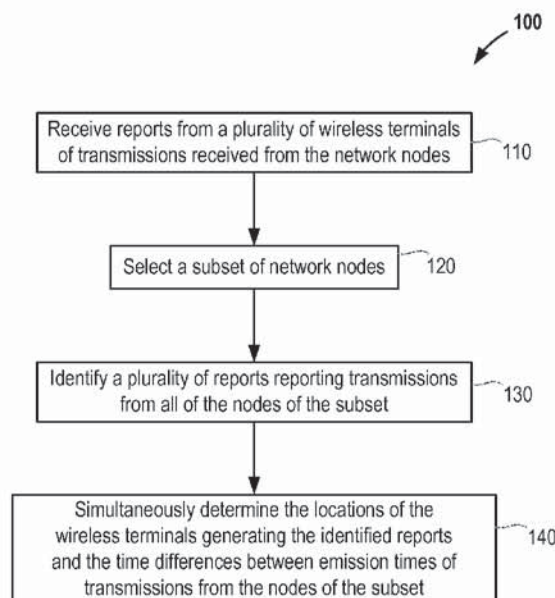


Figure 2

(57) Abstract: A method (400, 500) of identifying nodes in a communications network is disclosed, the nodes being for use in locating wireless terminals within the network based upon reports from the wireless terminals of transmissions received from the nodes. The method (400, 500) comprises prioritising combinations of nodes in which at least three nodes are located around a reference node in a configuration satisfying similarity criteria to an idealised star configuration, wherein an idealised star configuration comprises three nodes evenly angularly distributed around, and at the same distance from, a reference node. Also disclosed is a method (100, 200) for locating a plurality of wireless terminals in a communications network, the network comprising a plurality of network nodes at known locations, wherein the nodes emit wireless transmissions in an unsynchronised manner, such that a time difference exists between the emission time of corresponding transmissions from different nodes. The method comprises receiving reports from a plurality of wireless terminals of transmissions received from the network nodes (110, 210), selecting a subset of network nodes (120, 220) and identifying a plurality of reports reporting transmissions from all of the nodes of the subset (130, 230). The method further comprises simultaneously determining the locations of the wireless terminals generating the identified reports and the time differences between emission times of transmissions from the nodes of the subset (140, 240). Also disclosed are a computer program product for carrying out the above methods and a network element (300, 700, 800) configured to carry out the above methods.

**WO 2015/135581 A1**



---

TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, **Published:**  
KM, ML, MR, NE, SN, TD, TG).

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