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(54) Title: APPLICATION OF TIMING ADVANCE COMMAND IN WIRELESS COMMUNICATION DEVICE IN ENHANCED COVERAGE MODE

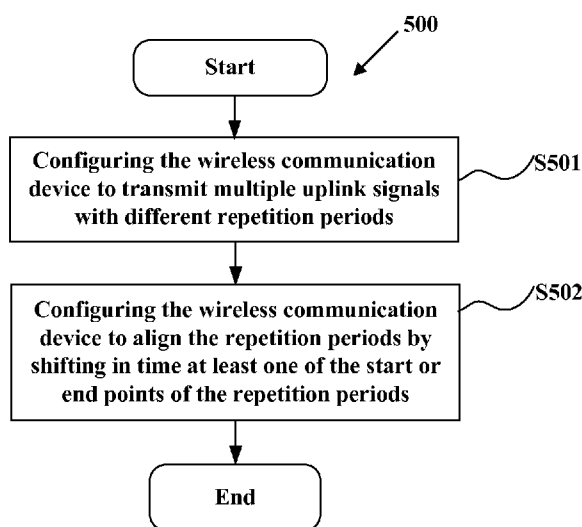


Fig. 5

(57) Abstract: Embodiments disclosed herein relate to a method in a wireless communication device that operates in an enhanced coverage mode, the enhanced coverage mode comprising sequential repetition of messages sent from the wireless communication device to a network node. An example method includes: receiving a Timing Advance Command TAC from the network node; and adapting a time at which the TAC is applied, wherein a time difference between the time at which the TAC is applied and a time at which the TAC is received shall be greater than or equal to a specified time depending on a type of the used Radio Access Technology, such that application of the TAC does not occur during a period after a first subframe of a repeated uplink transmission till the end of the repeated uplink transmission.



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/057269

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04W56/00
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
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 practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2016/025638 A1 (INTERDIGITAL PATENT HOLDINGS [US]) 18 February 2016 (2016-02-18) figures 1, 4 paragraph [0060] ----- -/--	1-28, 32-43

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 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 25 September 2017	Date of mailing of the international search report 06/10/2017
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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 Akhertouz Moreno, Y
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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/057269

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>"Timing advance for NB-IoT", 3GPP DRAFT; R1-162052 TIMING ADVANCE IN NB-IOT, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE</p> <p>, vol. RAN WG1, no. Sophia Antipolis, FRANCE; 20160322 - 20160324 25 March 2016 (2016-03-25), XP051081159, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/tsg_ran/WG1_RL 1/TSGR1_AH/LTE_NB-IoT_1603/Docs/ [retrieved on 2016-03-25] the whole document</p>	1-28, 32-43
A,P	<p>ERICSSON: "Analysis of Uplink Transmit Timing in NB-IoT", 3GPP DRAFT; R4-161945 UPLINK TRANSMISSION TIMING IN NB-IOT, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE</p> <p>, vol. RAN WG4, no. San José del Cabo, Mexico; 20160411 - 20160415 1 April 2016 (2016-04-01), XP051083881, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/tsg_ran/WG4_Ra dio/TSGR4_78Bis/Docs/ [retrieved on 2016-04-01] page 4 - page 6</p>	1-28, 32-43
A	<p>WO 2015/062470 A1 (CHINA ACAD TELECOM TECHNOLOGY MII) 7 May 2015 (2015-05-07) figure 2</p>	29-31, 44-46
A,P	<p>& EP 3 065 496 A1 (CHINA ACADEMY OF TELECOMM TECH [CN]) 7 September 2016 (2016-09-07) paragraph [0004] - paragraph [0005] paragraph [0072] - paragraph [0073]</p>	29-31, 44-46
A	<p>WO 2015/116732 A1 (INTERDIGITAL PATENT HOLDINGS [US]) 6 August 2015 (2015-08-06) paragraph [0003] - paragraph [0004]</p>	29-31, 44-46
A	<p>WO 2015/109607 A1 (PANASONIC IP CORP AMERICA [US]) 30 July 2015 (2015-07-30) figure 2 page 8, line 17 - line 22</p>	29-31, 44-46

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2017/057269

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.:

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-28, 32-43

A wireless communication system and method to apply a timing advance.

2. claims: 29-31, 44-46

A wireless communication node and method to align uplink repetitions signals.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2017/057269

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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