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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))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR MULTIPLEXING AND POWER CONTROL OF UPLINK CONTROL CHANNELS IN A WIRELESS COMMUNICATION SYSTEM

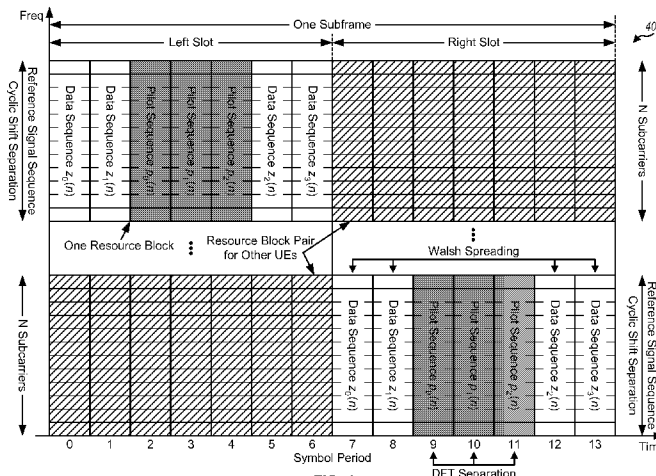


FIG. 4

(57) Abstract: Techniques for transmitting control information in a wireless communication system are described. The system may support acknowledgement (ACK) channels and channel quality indicator (CQI) channels, which may have different target signal-to-noise ratios (SNRs). The ACK and CQI channels from different user equipments (UEs) may be multiplexed on the same resource block. In one design, the transmit power of a CQI channel may be set to achieve a nominal target SNR for CQI when not multiplexed with the ACK channels and may be reduced to achieve a lower target SNR when multiplexed with the ACK channels. In another design, the transmit power of an ACK channel may be set to achieve a nominal target SNR for ACK when not multiplexed with the CQI channels and may be boosted to achieve a higher target SNR when multiplexed with the CQI channels. The CQI channel may randomly hop to mitigate performance degradation.

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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) H04B				
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, WPI Data				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	QUALCOMM EUROPE: "Joint Coding with CQI and ACK and Performance Evaluation" 3GPP DRAFT; R1-071811, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. tsg_ran\WG1_RL1\TSGR1_48b\Docs, no. St. Julian; 20070326, 29 March 2007 (2007-03-29), XP050105720 page 1, lines 15,20-22 page 2, lines 3-12,22,23 page 3, lines 10-15 page 4, lines 14,18-20 figures 3,4 page 6, lines 2-9 <div style="text-align: center;">----- -/--</div>	1,8,9, 11-13, 16-18, 21-24, 27,30,36		
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> <input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. </td> <td style="width: 50%; border: none;"> <input checked="" type="checkbox"/> See patent family annex. </td> </tr> </table>			<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> See patent family annex.
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> See patent family annex.			
* Special categories of cited documents :				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> *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 </td> <td style="width: 50%; border: none; vertical-align: top;"> *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 </td> </tr> </table>			*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
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 <div style="text-align: center; font-weight: bold;">30 January 2009</div>		Date of mailing of the international search report <div style="text-align: center; font-weight: bold;">05/02/2009</div>		
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 <div style="text-align: center; font-weight: bold;">van der Pol, Edwin</div>		

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2008/063650

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>QUALCOMM EUROPE: "Proposed Structure for UL ACK and CQI" 3GPP DRAFT; R1-070437, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. tsg_ran\WG1_RL1\TSGR1_47bis\Docs, no. Sorrento, Italy; 20070115, 9 January 2007 (2007-01-09), XP050104468 paragraph [0001]</p> <p style="text-align: center;">-----</p>	<p>1,8,13, 16,18, 21,23, 24,27, 30,36</p>
X	<p>US 2004/013103 A1 (ZHANG HANG [CA] ET AL) 22 January 2004 (2004-01-22) claims 1,2 paragraphs [0004] - [0006], [0008], [0011], [0012], [0014], [0031], [0033], [0043], [0044] figures 1,2</p> <p style="text-align: center;">-----</p>	<p>1,13,18, 23</p>
A	<p>TECHNICAL SPECIFICATION GROUP RADIO ACCESS NETWORK: "3GPP TS 36.300 V1.0.0: Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall Description; Stage 2 (Release 8)" 3RD GENERATION PARTNERSHIP PROJECT (3GPP); TECHNICALSPECIFICATION (TS), XX, XX, vol. 36.300, no. 1.0.0, 1 March 2007 (2007-03-01), pages 1-42, XP002447408 paragraphs [05.2], [5.3.1], [5.4.2]</p> <p style="text-align: center;">-----</p>	<p>1-41</p>

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2004013103	A1	NONE	