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(54) Title: DOWNLINK CONTROL CHANNEL SIGNALING FOR UL COEXISTENCE OF MULTIPLE SERVICE TYPES

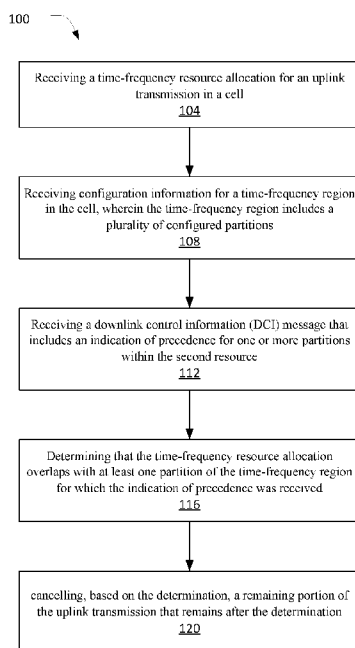


Figure 1

(57) Abstract: Various embodiments herein describe uplink (UL) multiplexing of transmissions with different reliability and/or latency requirements. In particular, how one or more indications of impacted resources may be conveyed to one or more user equipments so that an ongoing or imminent UL transmission may be adjusted in order to avoid adversely impacting other UL transmission that may occur in shared resources. Other embodiments may be described and claimed.



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— *of inventorship (Rule 4.17(iv))*

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**A. CLASSIFICATION OF SUBJECT MATTER****H04L 5/00(2006.01)i, H04W 72/04(2009.01)i, H04W 72/12(2009.01)i, H04W 52/14(2009.01)i**

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)  
H04L 5/00; H04J 11/00; H04L 5/14; H04W 72/12; H04W 74/08; H04W 72/04; H04W 52/14Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
Korean utility models and applications for utility models  
Japanese utility models and applications for utility modelsElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
eKOMPASS(KIPO internal) & Keywords: DCI (downlink control information), resource allocation, overlap, cancel uplink transmission**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	VIVO, `PUSCH enhancements for URLLC`, R1-1812314, 3GPP TSG RAN WG1 Meeting #95, Spokane, USA, 03 November 2018 sections 2-3, 3	1-25
A	`3GPP; TSG RAN; NR; Physical layer procedures for control (Release 15)`, 3GPP TS 38.213 V15.3.0, 01 October 2018 sections 8.2-11.1.1	1-25
A	US 2018-0076947 A1 (INTERDIGITAL PATENT HOLDINGS, INC.) 15 March 2018 claims 1-7	1-25
A	WO 2017-172333 A1 (QUALCOMM INCORPORATED) 05 October 2017 claims 1-15	1-25
A	KR 10-2018-0045016 A (QUALCOMM INCORPORATED) 03 May 2018 paragraphs [0039]-[0043]; and figure 1	1-25

 Further documents are listed in the continuation of Box C. See patent family annex.

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

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**PCT/US2019/060853**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2018-0076947 A1	15/03/2018	US 10476655 B2 WO 2016-154219 A1	12/11/2019 29/09/2016
WO 2017-172333 A1	05/10/2017	CN 108886453 A EP 3437234 A1 US 10201006 B2 US 2017-0290046 A1	23/11/2018 06/02/2019 05/02/2019 05/10/2017
KR 10-2018-0045016 A	03/05/2018	BR 112018003975 A2 CN 107926057 A EP 3345450 A1 JP 2018-529286 A RU 2018106899 A TW 201714466 A US 10299284 B2 US 2017-0064729 A1 US 2019-0239243 A1 WO 2017-040710 A1	25/09/2018 17/04/2018 11/07/2018 04/10/2018 03/10/2019 16/04/2017 21/05/2019 02/03/2017 01/08/2019 09/03/2017