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[Continued on next page]

(54) Title: APPARATUS AND METHODS FOR RESOURCE ELEMENT GROUP BASED TRAFFIC TO PILOT RATIO AIDED SIGNAL PROCESSING

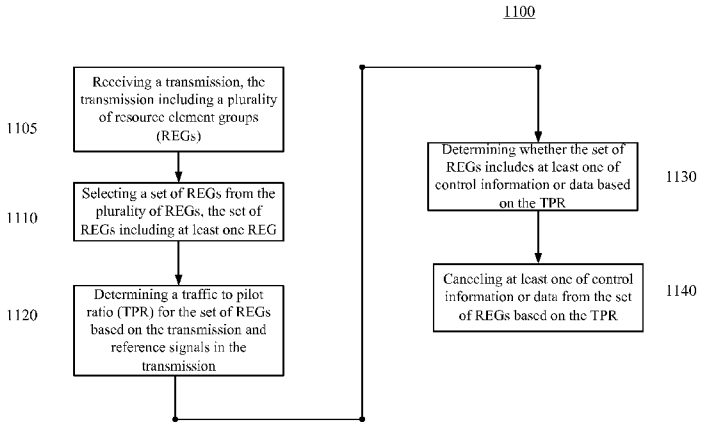


FIG. 11

(57) Abstract: A method, a computer program product, and an apparatus are provided. The methods and apparatus for wireless communication include receiving a transmission, the transmission including a plurality of resource element groups (REGs). Aspects of the methods and apparatus include selecting a set of REGs from the plurality of REGs, the set of REGs including at least one REG and determining a traffic to pilot ratio (TPR) for the set of REGs based on the transmission and reference signals in the transmission. Aspects of the methods and apparatus include determining whether the set of REGs includes at least one of control information or data based on the TPR and canceling at least one of control information or data from the set of REGs based on the TPR.

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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)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2012/018894 A1 (QUALCOMM INC [US]; YOO TAESANG [US]; LUO TAO [US]; WEI YONGBIN [US]; M) 9 February 2012 (2012-02-09) paragraphs [0060] - [0103] paragraphs [0035], [0036], [0038] - [0040] -----	1-40

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2012018894 A1	09-02-2012	CN 103069730 A	24-04-2013
		EP 2601751 A1	12-06-2013
		KR 20130045374 A	03-05-2013
		US 2012201152 A1	09-08-2012
		WO 2012018894 A1	09-02-2012