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Papasakellariou et al.

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(54) **HARQ-ACK SIGNAL TRANSMISSION IN RESPONSE TO DETECTION OF CONTROL CHANNEL TYPE IN CASE OF MULTIPLE CONTROL CHANNEL TYPES**

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(58) **Field of Classification Search**

CPC ... **H04W 72/04**; **H04W 72/042**; **H04W 88/08**;
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See application file for complete search history.

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(57) **ABSTRACT**

Methods and apparatuses are provided for wireless communications. Configuration information including a resource start offset and information for a transmission type of an enhanced physical downlink control channel (EPDCCH) are transmitted. Downlink control information (DCI) is transmitted to a user equipment (UE) using at least one antenna port of a base station on the EPDCCH using at least one of control channel elements (CCEs). A resource of a physical uplink control channel (PUCCH) is determined based on a first CCE of the at least one of CCE, information in the DCI, and the resource start offset in the configuration information, if the transmission type of the EPDCCH is distributed transmission. A hybrid automatic repeat request acknowledgement (HARQ-ACK) signal is received on the determined resource.

18 Claims, 15 Drawing Sheets

