**3GPP TSG-RAN WG1 Meeting #112bis-e *R1-230xxxx***

 **E-Meeting, 17 – 26 April, 2023**

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| *CR-Form-v12.2* |
| **[DRAFT]CHANGE REQUEST** |
|  |
|  | **38.213** | **CR** | **xxx** | **rev** | **-** | **Current version:** | **17.5.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **x** | Radio Access Network | **x** | Core Network |  |

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| ***Title:***  | Draft CR on Type-1 HARQ-ACK codebook for multicast |
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| ***Source to WG:*** | Moderator (Huawei), HiSilicon, CBN |
| ***Source to TSG:*** | R1 |
|  |  |
| ***Work item code:*** | NR\_MBS-Core |  | ***Date:*** | 2023-04-17 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | The configuration of the parameter ‘*type1-Codebook-GenerationMode-r17*’ from TS38.331 is optional with ‘Need M’ and UE will accordingly maintain the configuration from the last time that could be either ‘mode1’ or ‘mode2’. RAN1 specification taking ‘mode2’ as the default configuration by stating ‘not provided *type1-Codebook-GenerationMode =* 'mode1'’ is not aligned with the ASN.1 Need code. *type1-Codebook-GenerationMode* should be corrected into *type1CodebookGenerationMode’.*  |
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| ***Summary of change:*** | ‘if the UE is not provided *type1-Codebook-GenerationMode =* 'mode1' is changed to ‘if the UE is provided *type1CodebookGenerationMode =* 'mode2'’.  |
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| ***Consequences if not approved:*** | UE behavior per TS38.213 when ‘UE is not provided *type1-Codebook-GenerationMode =* 'mode1'’ may be different from that per TS38.331. The parameter name *type1-Codebook-GenerationMode* is not aligned with TS38.331.  |
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| ***Clauses affected:*** | 9.1.2.1 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  |   |
| ***affected:*** |  | **X** |  Test specifications |   |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

9.1.2.1 Type-1 HARQ-ACK codebook in physical uplink control channel

For a serving cell $c$, an active DL BWP, and an active UL BWP, as described in clause 12, the UE determines a set of $M\_{A,c}$ occasions for candidate PDSCH receptions for which the UE can transmit corresponding HARQ-ACK information in a PUCCH in slot $n\_{U}$. If serving cell $c$ is deactivated, the UE uses as the active DL BWP for determining the set of $M\_{A,c}$ occasions for candidate PDSCH receptions a DL BWP provided by *firstActiveDownlinkBWP-Id*. The determination is based:

a) on a set of slot timing values $K\_{1}$ associated with the active UL BWP on the primary cell or, if the PUCCH transmission is indicated by a DCI format to be on the PUCCH-sSCell as described in clause 9A, on a set of slot timing values $K\_{1}$ associated with the active UL BWP on the PUCCH-sSCell

- If the UE is configured to monitor PDCCH for DCI format 1\_0 and is not configured to monitor PDCCH for either DCI format 1\_1 or DCI format 1\_2 for serving cell $c$, or the active DL BWP for serving cell $c$ is dormant BWP, $K\_{1}$ is provided by the slot timing values {1, 2, 3, 4, 5, 6, 7, 8} for SCS configuration of PUCCH transmission $μ\leq 3$, {7, 8, 12, 16, 20, 24, 28, 32} for $μ=5$, and {13, 16, 24, 32, 40, 48, 56, 64} for $μ=6$

- If the UE is configured to monitor PDCCH for DCI format 1\_1 and is not configured to monitor PDCCH for DCI format 1\_2 for serving cell $c$, $K\_{1}$ is provided by *dl-DataToUL-ACK* or *dl-DataToUL-ACK-r16* or *dl-DataToUL-ACK-r17*

- If the UE is configured to monitor PDCCH for DCI format 1\_2 and is not configured to monitor PDCCH for DCI format 1\_1 for serving cell $c$, $K\_{1}$ is provided by *dl-DataToUL-ACK-DCI-1-2* or *dl-DataToUL-ACK-DCI-1-2-r17*

- If the UE is configured to monitor PDCCH for DCI format 1\_1 and DCI format 1\_2 for serving cell $c$, $K\_{1}$ is provided by the union of *dl-DataToUL-ACK* or *dl-DataToUL-ACK-r16* or *dl-DataToUL-ACK-r17* and *dl-DataToUL-ACK-DCI-1-2* or *dl-DataToUL-ACK-DCI-1-2-r17*

- If an inapplicable value in *dl-DataToUL-ACK-r16* or *dl-DataToUL-ACK-r17* is provided, the value is excluded from $K\_{1}$

- If the UE is configured to monitor PDCCH for multicast DCI formats for serving cell $c$

- if the UE is provided *fdmed-ReceptionMulticast*, $K\_{1}$ for multicast is provided by the union of *dl-DataToUL-ACK* from *pucch-ConfigMulticast1/pucch-ConfigurationListMulticast1* or *pucch-ConfigMulticast2/pucch-ConfigurationListMulticast2* and *dl-DataToUL-ACK-MulticastDCI-Format4-1*

- if the UE is not provided *dl-DataToUL-ACK-ForDCI Format4-1*, $K\_{1}$ is provided by the union of *dl-DataToUL-ACK* from *pucch-ConfigurationListMulticast1* or *pucch-ConfigurationListMulticast2* and the slot timing values {1, 2, 3, 4, 5, 6, 7, 8}

- else if the UE is provided *type1CodebookGenerationMode =* 'mode2', $K\_{1}$ is additionally provided by the union of *dl-DataToUL-ACK* from *pucch-ConfigMulticast1/pucch-ConfigurationListMulticast1* or *pucch-ConfigMulticast2/pucch-ConfigurationListMulticast2* and *dl-DataToUL-ACK-MulticastDCI-Format4-1*

- if the UE is not provided *dl-DataToUL-ACK-MulticastDCI-Format4-1*, $K\_{1}$ is additionally provided by the union of *dl-DataToUL-ACK* from *pucch-ConfigurationListMulticast1 or pucch-ConfigurationListMulticast2* and the slot timing values {1, 2, 3, 4, 5, 6, 7, 8}

- else if the UE is provided *type1CodebookGenerationMode =* 'mode1', the UE

- determines a first $K\_{1,UM}$ set as $K\_{1}∩K\_{1,M}$, where $K\_{1,M}$ is a set of slot timing values for the multicast DCI formats, a second $K\_{1,U\M}$ set as $K\_{1}\K\_{1,UM}$, and a third $K\_{1,M\U}$ set as $K\_{1,M}\K\_{1,UM}$

b) on a set of row indexes $R$ of a table that is associated with the active DL BWP and defining respective sets of slot offsets $K\_{0}$, start and length indicators *SLIV*, and PDSCH mapping types for PDSCH reception as described in [6, TS 38.214], where the row indexes $R$ of the table are provided by

- the union of row indexes of time domain resource allocation tables for DCI formats the UE is configured to monitor PDCCH for serving cell $c$ if the UE is not configured to monitor PDCCH for multicast DCI formats for serving cell $c$, or is provided *type1CodebookGenerationMode =* 'mode2', or, if any, for the first $K\_{1,UM}$ set

- the union of row indexes of time domain resource allocation tables for DCI format 1\_0 and/or DCI format 1\_1 and/or DCI format 1\_2 for serving cell $c$ for the second $K\_{1,U\M}$ set, if any

- the union of row indexes of time domain resource allocation tables for multicast DCI formats the UE is configured to monitor PDCCH for serving cell $c$ for the third $K\_{1,M\U}$ set, if any

- if the UE is provided *referenceOfSLIVDCI-1-2*, for each row index with slot offset$K\_{0}=0$ and PDSCH mapping Type B in a set of row indexes of a table for DCI format 1\_2 [6, TS 38.214], for any PDCCH monitoring occasion in any slot where the UE monitors PDCCH for DCI format 1\_2 and with starting symbol $S\_{0}>0$, if $S+S\_{0}+L\leq 14$ for normal cyclic prefix and $S+S\_{0}+L\leq 12$ for extended cyclic prefix, add a new row index in the set of row indexes of the table by replacing the starting symbol $S$ of the row index by $S+S\_{0}$

< Unchanged parts are omitted >