**3GPP TSG-RAN WG1 Meeting #104-e *R1-210xxxx***

**E-meeting, January 25 – February 5, 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.213** | **CR** | **<CR#>** | **rev** | **-** | **Current version:** | **16.4.0** |  |
|  | | | | | | | | |
| *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:*** | Correction of Type-3 HARQ-ACK codebook generation for a PDSCH with one transport block for a configuration with a maximum number of two TBs | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Moderator (Huawei), CATT | | | | | | | | | |
| ***Source to TSG:*** | R1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_unlic-Core | | | | |  | ***Date:*** | | | 2021-01-27 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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 can be 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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | In Clause 9.1.4 for a Type-3 HARQ-ACK codebook, the HARQ-ACK feedback generation for a PDSCH with one transport block is missing if . | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Specify NACK as the default value for any instance of “= HARQ-ACK information bit for CBG of TB for HARQ process number of serving cell ” if a value is not available because the UE didn’t receive a scheduling DCI for the corresponding TB or CBG on serving cell *c* | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences ifnot approved:*** | | The Type-3 HARQ-ACK codebook construction is ambiguous if the UE receives a PDSCH with one transport block if . | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 9.1.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | **Impact Analysis:** | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

<Unchanged parts are omitted>

**9.1.4 Type-3 HARQ-ACK codebook determination**

If a UE is provided *pdsch-HARQ-ACK-OneShotFeedback*, the UE determines a Type-3 HARQ-ACK codebook according to the following procedure.

Set to the number of configured serving cells

Set to the value of *nrofHARQ-ProcessesForPDSCH* for serving cell , if provided; else, set

Set to the value of *maxNrofCodeWordsScheduledByDCI* for serving cell if *harq-ACK-SpatialBundlingPUCCH* is provided and , or if *harq-ACK-SpatialBundlingPUCCH* is not provided, or if *maxCodeBlockGroupsPerTransportBlock* is provided for serving cell ; else, set

Set to the number of HARQ-ACK information bits per TB for PDSCH receptions on serving cell as described in Clause 9.1.1 if *maxCodeBlockGroupsPerTransportBlock* is provided for serving cell and *pdsch-HARQ-ACK-OneShotFeedbackCBG* is provided; else, set

Set if *pdsch-HARQ-ACK-OneShotFeedbackNDI* is provided; else set

Set – serving cell index

Set – HARQ process number

Set – TB index

Set – CBG index

Set

while

while

if

if

while

while

= HARQ-ACK information bit for CBG of TB for HARQ process number of serving cell , if any; else, 

end while

= NDI value indicated in the DCI format corresponding to the HARQ-ACK information bit(s) for TB for HARQ process number on serving cell , if any; else, 

end while

else

while

= HARQ-ACK information bit for TB for HARQ process of serving cell , if any; else, 

= NDI value indicated in the DCI format corresponding to the HARQ-ACK information bit(s) for TB for HARQ process number on serving cell , if any; else, 

end while

end if

else

if

while

if UE has reported HARQ-ACK information for TB for HARQ process number on serving cell , and has not subsequently detected a DCI format scheduling a PDSCH reception, or received a SPS PDSCH, with TB for HARQ process number on serving cell

while



end while

end if

if UE has obtained HARQ-ACK information for TB for HARQ process number on serving cell corresponding to a PDSCH reception and has not reported the HARQ-ACK information corresponding to the PDSCH reception

while

= HARQ-ACK information bit for CBG of TB for HARQ process number of serving cell

end while

end if

end while

else

while

if UE has reported HARQ-ACK information for TB for HARQ process number on serving cell and has not subsequently detected a DCI format scheduling a PDSCH reception, or received a SPS PDSCH, with TB for HARQ process number on serving cell

= NACK

end if

if UE has obtained HARQ-ACK information for TB for HARQ process number on serving cell corresponding to a PDSCH reception and has not reported the HARQ-ACK information corresponding to the PDSCH reception

if *harq-ACK-SpatialBundlingPUCCH* is not provided

= HARQ-ACK information bit for TB for HARQ process of serving cell

else

= binary AND operation of the HARQ-ACK information bits corresponding to first and second transport blocks for HARQ process of serving cell . If the UE receives one transport block, the UE assumes ACK for the second transport block

end if

end if

end while

end if

end if

end while

end while

If , when a UE receives a PDSCH with one transport block, the HARQ-ACK information is associated with the first transport block

If a UE receives a SPS PDSCH, or a PDSCH that is scheduled by a DCI format 1\_0 for a serving cell and if *maxCodeBlockGroupsPerTransportBlock* is provided for serving cell , and *pdsch-HARQ-ACK-OneShotFeedbackCBG* is provided, the UE repeats times the HARQ-ACK information for the transport block in the PDSCH.

If a UE detects a DCI format that includes a One-shot HARQ-ACK request field with value 1, the UE determines a PUCCH or a PUSCH to multiplex a Type-3 HARQ-ACK codebook for transmission in a slot as described in Clauses 9.2.3 and 9.2.5. The UE multiplexes only the Type-3 HARQ-ACK codebook in the PUCCH or the PUSCH for transmission in the slot.

If

- a UE detects a DCI format that includes a One-shot HARQ-ACK request field with value 1, and

- the CRC of the DCI is scrambled by a C-RNTI or an MCS-C-RNTI, and

- *resourceAllocation* = *resourceAllocationType0* and all bits of the frequency domain resource assignment field in the DCI format are equal to 0, or

- *resourceAllocation* = *resourceAllocationType1* and all bits of the frequency domain resource assignment field in the DCI format are equal to 1, or

- *resourceAllocation = dynamicSwitch* and all bits of the frequency domain resource assignment field in the DCI format are equal to 0 or 1

the DCI format provides a request for a Type-3 HARQ-ACK codebook report and does not schedule a PDSCH reception. The UE is expected to provide HARQ-ACK information in response to the request for the Type-3 HARQ-ACK codebook after symbols from the last symbol of a PDCCH providing the DCI format, where the value of for is provided in Clause 10.2 by replacing "SPS PDSCH release" with "DCI format".

If a UE multiplexes HARQ-ACK information in a PUSCH transmission, the UE generates the HARQ-ACK codebook as described in this Clause except that *harq-ACK-SpatialBundlingPUCCH* is replaced by *harq-ACK-SpatialBundlingPUSCH*.

<Unchanged parts are omitted>