**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 CB on PUSCH |
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| ***Source to WG:*** | Moderator (Huawei), ZTE |
| ***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:*** | For a PDSCH that is scheduled by DCI format 4\_1, the HARQ-ACK multiplexed on PUSCH should be the ones with enabled associated HARQ-ACK information report as described in clause 18, which is not reflected in the current specification.  |
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| ***Summary of change:*** | the UE generates the HARQ-ACK codebook as described in clause 9.1.2.1 when a value of the DAI field is $V\_{T-DAI}^{UL}=1$ except that *harq-ACK-SpatialBundlingPUCCH* is replaced by *harq-ACK-SpatialBundlingPUSCH*. The UE does not generate a HARQ-ACK codebook for multiplexing in the PUSCH transmission when $V\_{T-DAI}^{UL}=0$ unless the UE receives only a SPS PDSCH release, or only SPS PDSCH(s), or only a TCI state update, or only a PDSCH that is scheduled by a DCI format 1\_0 if the UE is provided *pdsch-HARQ-ACK-Codebook = 'semi-static'* for unicast HARQ-ACK information, or scheduled by a DCI format 4\_1 **having enabled associated HARQ-ACK information reports as described in clause 18** if the UE is provided *pdsch-HARQ-ACK-Codebook = 'semi-static'* for multicast HARQ-ACK information, with a counter DAI field value of 1 on the PCell in the $M\_{c}$ occasions for candidate PDSCH receptions in which case the UE generates HARQ-ACK information only for the SPS PDSCH release or only for the TCI state update or only for the PDSCH reception as described in clause 9.1.2.  |
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| ***Consequences if not approved:*** | UE may generate a HARQ-ACK CB to be multiplexed on PUSCH as long as a PDSCH scheduled by DCI format 4\_1 is received no matter whether the HARQ-ACK feedback is enabled, which may not be the same HARQ-ACK CB generated for transmission on PUCCH for which only enabled associated HARQ-ACK information report is included. |
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| ***Clauses affected:*** | 9.1.2.2 |
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|  | **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 ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

9.1.2.2 Type-1 HARQ-ACK codebook in physical uplink shared channel

< Unchanged parts are omitted >

A UE does not expect to detect a DCI format switching a DL BWP within $N\_{2}$ symbols prior to a first symbol of a PUSCH transmission where the UE multiplexes HARQ-ACK information, where $N\_{2}$ is defined in [6, TS 38.214].

If a UE multiplexes HARQ-ACK information in a PUSCH transmission that is scheduled by DCI format that includes a DAI field, and

- is not provided *fdmed-ReceptionMulticast* and is provided *pdsch-HARQ-ACK-Codebook = 'semi-static'* for both unicast and multicast HARQ-ACK information, or

- is provided *pdsch-HARQ-ACK-Codebook = 'semi-static'* only for one of unicast and multicast HARQ-ACK information

the UE generates the HARQ-ACK codebook as described in clause 9.1.2.1 when a value of the DAI field is $V\_{T-DAI}^{UL}=1$ except that *harq-ACK-SpatialBundlingPUCCH* is replaced by *harq-ACK-SpatialBundlingPUSCH*. The UE does not generate a HARQ-ACK codebook for multiplexing in the PUSCH transmission when $V\_{T-DAI}^{UL}=0$ unless the UE receives only a SPS PDSCH release, or only SPS PDSCH(s), or only a TCI state update, or only a PDSCH that is scheduled by a DCI format 1\_0 if the UE is provided *pdsch-HARQ-ACK-Codebook = 'semi-static'* for unicast HARQ-ACK information, or scheduled by a DCI format 4\_1 having enabled associated HARQ-ACK information reports as described in clause 18 if the UE is provided *pdsch-HARQ-ACK-Codebook = 'semi-static'* for multicast HARQ-ACK information, with a counter DAI field value of 1 on the PCell in the $M\_{c}$ occasions for candidate PDSCH receptions in which case the UE generates HARQ-ACK information only for the SPS PDSCH release or only for the TCI state update or only for the PDSCH reception as described in clause 9.1.2.

$V\_{T-DAI}^{UL}=0$ if the PUSCH is scheduled by a DCI format that includes a DAI field and the DAI field is set to '0'; otherwise, $V\_{T-DAI}^{UL}=1$.

If a UE is provided *fdmed-ReceptionMulticast* and is provided *pdsch-HARQ-ACK-Codebook = 'semi-static'* for both unicast and multicast HARQ-ACK information, the UE generates the HARQ-ACK codebook as described in clause 9.1.2.1, except that *harq-ACK-SpatialBundlingPUCCH* is replaced by *harq-ACK-SpatialBundlingPUSCH*

- for the first set $S\_{U}$ of $N\_{cells}^{DL,U}$ serving cells if a value $V\_{T-DAI}^{UL,U}$ of the DAI field associated with unicast HARQ-ACK information is $V\_{T-DAI}^{UL,U}=1$ [5, TS 38.212]

- for the second set $S\_{M}$ of $N\_{cells}^{DL,M}$ serving cells if a value $V\_{T-DAI}^{UL,M}$ of the DAI field associated with multicast HARQ-ACK information is $V\_{T-DAI}^{UL,M}=1$ [5, TS 38.212]

The UE does not generate unicast or multicast HARQ-ACK information for multiplexing in the PUSCH transmission when $V\_{T-DAI}^{UL,U}=0$ or $V\_{T-DAI}^{UL,M}=0$, respectively, unless the UE receives respectively

- only a unicast or a multicast SPS PDSCH release, or

- only unicast SPS PDSCH(s) or multicast SPS PDSCH(s) having enabled associated HARQ-ACK information reports as described in clause 18, or

- only a TCI state update or a PDSCH that is scheduled by a DCI format 1\_0 with a counter DAI field value of 1 on the PCell, or only a PDSCH that is scheduled by a DCI format 4\_1 having enabled associated HARQ-ACK information report, as described in clause 18, and counter DAI field value of 1 on the PCell

in the $M\_{c}$ occasions for candidate PDSCH receptions in which case the UE generates only the corresponding unicast or multicast HARQ-ACK information.

$V\_{T-DAI}^{UL,U}=0$ if the corresponding value of the DAI field is set to '0'; otherwise, $V\_{T-DAI}^{UL,U}=1$. $V\_{T-DAI}^{UL,M}=0$ if the corresponding value of the DAI field is set to '0'; otherwise, $V\_{T-DAI}^{UL,M}=1$ [5, TS 38.212].

< Unchanged parts are omitted >