**3GPP TSG-RAN WG1 Meeting #112bis-e *R1-2304209***

 **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, Qualcomm, Samsung |
| ***Source to TSG:*** | R1 |
|  |  |
| ***Work item code:*** | NR\_MBS-Core |  | ***Date:*** | 2023-04-25 |
|  |  |  |  |  |
| ***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 for SPS or 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. In addition, the simiar change for unicast SPS is also added for the case of disabled HARQ-ACK.  |
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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 **unicast** SPS PDSCH(s) **associated with transport blocks having enabled HARQ-ACK information report**, or only a TCI state update, or only a PDSCH that is scheduled by a DCI format 1\_0 **having enabled associated HARQ-ACK information report** if the UE is provided *pdsch-HARQ-ACK-Codebook = 'semi-static'* for unicast HARQ-ACK information, or
* **multicast SPS PDSCH(s) with transport blocks having enabled associated HARQ-ACK information report or** scheduled by a DCI format 4\_1 **having enabled associated HARQ-ACK information report** if the UE is provided *pdsch-HARQ-ACK-Codebook = 'semi-static'* for multicast HARQ-ACK information,
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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 or PDSCH SPS 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 unicast SPS PDSCH(s) associated with transport blocks having enabled HARQ-ACK information report, or only a TCI state update, or only a PDSCH that is scheduled by a DCI format 1\_0 having enabled associated HARQ-ACK information report if the UE is provided *pdsch-HARQ-ACK-Codebook = 'semi-static'* for unicast HARQ-ACK information, or
* multicast SPS PDSCH(s) with transport blocks having enabled associated HARQ-ACK information report or scheduled by a DCI format 4\_1 having enabled associated HARQ-ACK information report 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, 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 >