**3GPP TSG RAN WG1 #117** **R1-240xxxx**

**Fukuoka City, Fukuoka, Japan, May 20th – 24th, 2024**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  | **38.213** | **CR** |  | **rev** |  | **Current version:** | **18.2.0** |  |
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| *For* [***HELP***](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 on Type-2 HARQ-ACK codebook and DL BWP change |
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| ***Source to WG:*** | Samsung, ZTE |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | NR\_newRAT-Core, TEI18 |  | ***Date:*** | 2024-05-27 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** | Rel-18 |
|  | *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:*** | Existing specifications for Type-2 HARQ-ACK codebook in case of DL/UL BWP change do not properly capture associated agreements from RAN1#91, RAN1#92, and RAN1#92bis regarding the PUCCH transmission being after a DL/UL BWP change. Also, the condition refers to “an active DL BWP change” which can be ambigious and may be interpreted to imply a different DL BWP. Detailed discussion can be found at R1-2404070. |
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| ***Summary of change:*** | Capture the agreements from RAN1#91 and RAN1#92bis to clarify HARQ-ACK report in case of a DL/UL BWP change for Type-2 HARQ-ACK codebook * Add the condition that PUCCH transmission starts at or after a slot of the DL/UL BWP change
* Clarify that the condition is for the same DL BWP change
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| ***Consequences if not approved:*** | Incorrect/ambiguous specifications for Type-2 HARQ-ACK codebook construction in case of DL/UL BWP change. |
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| ***Clauses affected:*** | 9.1.3.1 |
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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:*** |  |

#### 9.1.3.1 Type-2 HARQ-ACK codebook in physical uplink control channel

\*\*\* Unchanged parts are omitted \*\*\*

Denote by $N\_{C-DAI}^{DL}$ the number of bits for the counter DAI and set $T\_{D}=2^{N\_{C-DAI}^{DL}}$. Denote by $V\_{C-DAI,c,m}^{DL}$ the value of the counter DAI in a DCI format scheduling PDSCH reception, or having associated HARQ-ACK information without scheduling PDSCH reception, on serving cell $c$ in PDCCH monitoring occasion $m$ according to Table 9.1.3-1 or Table 9.1.3-1A. Denote by $V\_{T-DAI,m}^{DL}$ the value of the total DAI in a DCI format in PDCCH monitoring occasion $m$ according to Table 9.1.3-1. The UE assumes a same value of total DAI in all DCI formats that include a total DAI field in PDCCH monitoring occasion $m$. A UE does not expect to multiplex, in a same Type-2 HARQ-ACK codebook, HARQ-ACK information that is in response to detection of DCI formats with different number of bits for the counter DAI field.

If the UE transmits HARQ-ACK information in a PUCCH in slot $n$ and for any PUCCH format, the UE determines the $\tilde{o}\_{0}^{ACK}, \tilde{o}\_{1}^{ACK},\cdots ,\tilde{o}\_{O\_{ACK}-1}^{ACK}$, for a total number of $O\_{ACK}$ HARQ-ACK information bits, according to the following pseudo-code:

Set $m=0$ – PDCCH, with DCI format scheduling PDSCH reception, or having associated HARQ-ACK information without scheduling a PDSCH reception, monitoring occasion index: lower index corresponds to earlier PDCCH monitoring occasion

Set $j=0$

Set $V\_{temp}=0$

Set $V\_{temp2}=0$

Set $V\_{s}=∅$

Set $N\_{cells}^{DL}$ to the number of serving cells configured by higher layers for the UE

- if, for an active DL BWP of a serving cell, the UE is not provided *coresetPoolIndex* or is provided *coresetPoolIndex* with value 0 for one or more first CORESETs and is provided *coresetPoolIndex* with value 1 for one or more second CORESETs, and is provided *ackNackFeedbackMode = joint,* the serving cell is counted two times where the first time corresponds to the first CORESETs and the second time corresponds to the second CORESETs

- if the UE indicates *type2-HARQ-ACK-Codebook* and receives a number $N\_{PDSCH, c}^{m}>1$ of PDSCHs on a serving cell *c* that are scheduled by DCI formats in PDCCH receptions at a same PDCCH monitoring occasion *m*, the serving cell *c* is counted $N\_{PDSCH, c}^{m}$ times for PDCCH monitoring occasion *m* in increasing order of the PDSCH reception starting time

Set $M$ to the number of PDCCH monitoring occasion(s)

while $m<M$

Set $c=0$ – serving cell index: lower indexes correspond to lower RRC indexes of corresponding cell

while $c<N\_{cells}^{DL}$

if PDCCH monitoring occasion $m$ is before an active DL BWP change on serving cell $c$ or an active UL BWP change on the serving cell of PUCCH transmission if the UE is provided *pucch-sSCellDyn* or *pucch-sSCellDynDCI-1-2*, or an active UL BWP change on the PCell if the UE is not provided *pucch-sSCellDyn* and *pucch-sSCellDynDCI-1-2,* and the active DL BWP change is not triggered in PDCCH monitoring occasion $m$, and the PUCCH transmission starts at or after a slot for the active DL BWP change or the active UL BWP change

$c=c+1$;

else

if there is a PDSCH providing a transport block for a HARQ process with enabled HARQ-ACK information on serving cell $c$ associated with PDCCH in PDCCH monitoring occasion $m$, or there is a PDCCH providing a DCI format associated with HARQ-ACK information without scheduling PDSCH reception on serving cell $c$

\*\*\* Unchanged parts are omitted \*\*\*