**3GPP T****SG-RAN WG1 Meeting #109-e R1-22xxxxx**

**e-Meeting, May 9th – May 20th, 2022**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **38.213** | **CR** | **xxxx** | **rev** | **-** | **Current version:** | **17.1.0** |  |
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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:***  | CR on Interlace determination to support R17 intra-UE multiplexing in unlicensed band |
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| ***Source to WG:*** | Moderator (OPPO), Apple, [Intel, Samsung, Qualcomm, Nokia/NSB, Ericsson, Huawei/Hisilicon] |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | NR\_IIOT\_URLLC\_enh |  | ***Date:*** | 2022-05-19 |
|  |  |  |  |  |
| ***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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
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| ***Reason for change:*** | It has been agreed that R17 intra UE multiplexing is supported in unlicensed band. It is needed to extend PRB determination to interlace determination for PUCCH transmission to report UCI of different priorities.  |
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| ***Summary of change:*** | Clarify the UE procedure to determine the interlace for PUCCH transmission to report UCI of different priorities when the UE is provided *InterlaceAllocation*. |
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| ***Consequences if not approved:*** | UE does know how to determine the interlace for PUCCH transmission to report UCI of different priorities when the UE is provided *InterlaceAllocation*. |
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| ***Clauses affected:*** | 9.2.5.3 |
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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:*** | **Isolated impact analysis:**This CR is based on RAN1’s common understanding, which has no impact on UE behavior.  |
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| ***This CR's revision history:*** |  |

#### 9.2.5.3 UE procedure for reporting UCI of different priorities

<Unchanged parts are omitted>

If the PUCCH resource includes PUCCH format 2 or PUCCH format 3 and $M\_{RB}^{PUCCH}$ PRBs, the UE determines a number of $M\_{RB,min}^{PUCCH}\leq M\_{RB}^{PUCCH}$ PRBs for the PUCCH transmission to be the minimum number of PRBs that starts from the first PRB from the $M\_{RB}^{PUCCH}$ PRBs and results to

$$\left(O\_{ACK,0}+O\_{CRC,0}\right)⋅r\_{1}+\left(O\_{ACK,1}+O\_{CRC,1}\right)⋅r\_{0}\leq M\_{RB,min}^{PUCCH}⋅N\_{sc,ctrl}^{RB}⋅N\_{symb-UCI}^{PUCCH}⋅Q\_{m}⋅r\_{0}⋅r\_{1}$$

where $O\_{CRC,0}$ or $O\_{CRC,1}$ is a number of CRC bits, if any, for encoding the $O\_{ACK,0}$ or the $O\_{ACK,1}$ HARQ-ACK information bits, respectively, $r\_{0}$ is provided by *maxCodeRateLP*, and the remaining parameters are as defined in clause 9.2.5.2 with $r\_{1}=r$. For PUCCH format 3, if $M\_{RB,min}^{PUCCH}$ is not equal to $2^{α\_{2}}⋅3^{α\_{3}}⋅5^{α\_{5}}$ [4, TS 38.211], $M\_{RB,min}^{PUCCH}$ is increased to a nearest value that is equal to $2^{α\_{2}}⋅3^{α\_{3}}⋅5^{α\_{5}} $and does not exceed *nrofPRBs*.

If $\left(O\_{ACK,0}+O\_{CRC,0}\right)⋅r\_{1}+\left(O\_{ACK,1}+O\_{CRC,1}\right)⋅r\_{0}>M\_{RB}^{PUCCH}⋅N\_{sc,ctrl}^{RB}⋅N\_{symb-UCI}^{PUCCH}⋅Q\_{m}⋅r\_{0}⋅r\_{1}$, the UE transmits the PUCCH over the $M\_{RB}^{PUCCH}$ PRBs. If a UE transmits a PUCCH that includes HARQ-ACK information bits of priority 0 and 1 using PUCCH format 1, the UE determines a power for the PUCCH transmission, as described in clause 7.2.1, assuming that all HARQ-ACK information bits have priority 1.

If a UE is provided a first interlace of $M\_{Interlace,0}^{PUCCH}$ PRBs by *interlace0* in *InterlaceAllocation*,

If the UE is provided a second interlace of $M\_{Interlace,1}^{PUCCH}$ PRBs by *interlace1* in *InterlaceAllocation*,

- if $\left(O\_{ACK,0}+O\_{CRC,0}\right)⋅r\_{1}+\left(O\_{ACK,1}+O\_{CRC,1}\right)⋅r\_{0}\leq M\_{Interlace,0}^{PUCCH}⋅N\_{sc,ctrl}^{RB}⋅N\_{symb-UCI}^{PUCCH}⋅Q\_{m}⋅r\_{0}⋅r\_{1}$, the UE transmits the PUCCH over the first interlace

- else the UE transmits the PUCCH over both the first and second interlaces.

else the UE transmits the PUCCH over the first interlace.

<Unchanged parts are omitted>