**3GPP TSG-RAN WG1 Meeting #106-eR1-210xxxx**

**e-Meeting, August 16th – 27th, 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **38.214** | **CR** | **xxxx** | **rev** | **-** | **Current version:** | **16.6.0** |  |
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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:***  | Clarification on back-to-back PUSCHs scheduling restriction |
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| ***Source to WG:*** | Moderator (MediaTek), Apple, CATT |
| ***Source to TSG:*** | RAN1 |
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| ***Work item code:*** | NR\_newRAT-Core  |  | ***Date:*** | 2021-08-25 |
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| ***Category:*** | **A** |  | ***Release:*** |  |
|  | *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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | In TS38.214 (V16.6.0) Clause 6.1, there is a restriction (referred to it here as “back-to-back PUSCHs scheduling restriction”) on scheduling the UE with another dynamic grant PUSCH before the first PUSCH with the same HARQ process ID has been transmitted, which is specified as follows:

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| The UE is not expected to be scheduled to transmit another PUSCH by DCI format 0\_0, 0\_1 or 0\_2 scrambled by C-RNTI or MCS-C-RNTI for a given HARQ process until after the end of the expected transmission of the last PUSCH for that HARQ process. |

However, the existing text of the restriction didn’t include all the cases of dynamic PUSCH scheduling as it listed only the PUSCHs that are scheduled with DCIs with CRC scrambled by C-RNTI or MCS-C-RNTI. DCI with CRC scrambled by CS-RNTI is not currently included in the restriction. These are dynamically scheduled PUSCHs and the UE behaviour is identical to PUSCHs scheduled by DCIs with CRC scrambled by C-RNTI/MCS-C-RNTI.Hence, based on email discussion [106-e-NR-7.1CRs-01], and as agreed in R1-210xxxx, DCI with CRC scrambled by CS-RNTI need to be included in the back-to-back PUSCHs scheduling restriction.In addition, the current text of the restriction creates some ambiguity on if the restriction meant “the DCI scheduling another PUSCH for a given HARQ process shall not occur before the end of the last PUSCH” or “another PUSCH for a given process shall not occur before the end of the last PUSCH”. This ambiguity was discussed in email discussion [104-e-NR-7.1CRs-03], and RAN1 concluded that “the common understanding is that the DCI is expected to be received after the end of the last PUSCH” [R1-2102225]. |
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| ***Summary of change:*** | In Clause 6.1, based on email discussion [106-e-NR-7.1CRs-01], and as agreed in R1-210xxxx:* DCI with CRC scrambled by CS-RNTI is added to the back-to-back PUSCHs scheduling restriction.
* The following conclusion from RAN1#104-e [R1-2102225] was integrated into the text of the back-to-back PUSCHs scheduling restriction by replacing “until after” with “with the DCI received before”.

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| ConclusionFor the sentence “The UE is not expected to be scheduled to transmit another PUSCH by DCI format 0\_0 or 0\_1 scrambled by C-RNTI or MCS-C-RNTI for a given HARQ process until after the end of the expected transmission of the last PUSCH for that HARQ process.” in TS 38.214 Clause 6.1, * The common understanding is that the DCI is expected to be received after the end of the last PUSCH.
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| ***Consequences if not approved:*** | Incomplete description of the back-to-back PUSCHs scheduling restriction in the specs. |
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| ***Clauses affected:*** | 6.1 |
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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:*** |  |

## 6.1 UE procedure for transmitting the physical uplink shared channel

< Unchanged parts are omitted >

A UE shall upon detection of a PDCCH with a configured DCI format 0\_0, 0\_1 or 0\_2 transmit the corresponding PUSCH as indicated by that DCI unless the UE does not generate a transport block as described in [10, TS38.321]. Upon detection of a DCI format 0\_1 or 0\_2 with '*UL-SCH indicator*' set to '0' and with a non-zero '*CSI request*' where the associated *reportQuantity* in *CSI-ReportConfig* set to '*none*' for all CSI report(s) triggered by '*CSI request*' in this DCI format 0\_1 or 0\_2, the UE ignores all fields in this DCI except the '*CSI request*' and the UE shall not transmit the corresponding PUSCH as indicated by this DCI format 0\_1 or 0\_2. When the UE is scheduled with multiple PUSCHs by a DCI, HARQ process ID indicated by this DCI applies to the first PUSCH, as described in clause 6.1.2.1, HARQ process ID is then incremented by 1 for each subsequent PUSCH(s) in the scheduled order, with modulo 16 operation applied. For any HARQ process ID(s) in a given scheduled cell, the UE is not expected to transmit a PUSCH that overlaps in time with another PUSCH. Except for the case when a UE is configured by higher layer parameter *PDCCH-Config* that contains two different values of *coresetPoolIndex* in *ControlResourceSet* for the active BWP of a serving cell and PDCCHs that schedule two non-overlapping in time domain PUSCHs are associated to different *ControlResourceSets* having different values of *coresetPoolIndex,* for any two HARQ process IDs in a given scheduled cell, if the UE is scheduled to start a first PUSCH transmission starting in symbol *j* by a PDCCH ending in symbol *i*, the UE is not expected to be scheduled to transmit a PUSCH starting earlier than the end of the first PUSCH by a PDCCH that ends later than symbol *i*. The UE is not expected to be scheduled to transmit another PUSCH by a DCI format 0\_0 with CRC scrambled by TC-RNTI, for a given HARQ process with the DCI received before the end of the expected transmission of the last PUSCH for that HARQ process if the latter is scheduled by a DCI format 0\_0 with CRC scrambled by TC-RNTI or by an UL grant in RA Response. The UE is not expected to be scheduled to transmit another PUSCH by DCI format 0\_0, 0\_1 or 0\_2 scrambled by C-RNTI, CS-RNTI or MCS-C-RNTI for a given HARQ process with the DCI received before the end of the expected transmission of the last PUSCH for that HARQ process if the latter is scheduled by a DCI with CRC scrambled by C-RNTI, CS-RNTI or MCS-C-RNTI.

< Unchanged parts are omitted >