**3GPP TSG RAN WG1 #119 R1-2410882**

**Orlando, US, November 18th – 22nd, 2024**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.214** | **CR** | **0653** | **rev** | **-** | **Current version:** | **18.4.0** |  |
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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 Precoder Indication for 8 port CG-PUSCH | | | | | | | | | |
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| ***Source to WG:*** | Moderator (Google), Google, ZTE, Sanechips, Ericsson, Nokia, Nokia Shanghai Bell, Huawei, HiSilicon, Samsung | | | | | | | | | |
| ***Source to TSG:*** | R1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_MIMO\_evo\_DL\_UL-Core | | | | |  | ***Date:*** | | | 2024-11-20 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | 8 |
|  | *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 can be 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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
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| ***Reason for change:*** | | For 8TX CG-PUSCH, only 1 codeword is supported. But for 8TX DG-PUSCH, up to 2 codewords is supported. It is agreed that the RRC parameter *maxRank* and *maxMIMO-Layers* are applied to both 8TX CG-PUSCH and 8TX DG-PUSCH. Then the determination of TPMI and SRI for 8TX CG-PUSCH is unclear when the *maxRank* or *maxMIMO-Layers* is configured to be above 4. | | | | | | | | |
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| ***Summary of change:*** | | Clarify the TPMI and SRI determination as follows:   * For determination of TPMI: For 8TX CG-PUSCH, when *maxRank* is configured to be more than 4, the value of *maxRank* applied to the 8TX CG-PUSCH is 4 * For determination of SRI: For 8TX CG-PUSCH, when *maxMIMO-Layers* is configured to be more than 4, the value of *maxMIMO-Layers* used in determination of Lmax applied to the 8TX CG-PUSCH is 4 | | | | | | | | |
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| ***Consequences if not approved:*** | | The determination of TPMI and SRI for 8TX CG-PUSCH is unclear when the *maxRank* or *maxMIMO-Layers* is configured to be above 4. | | | | | | | | |
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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:*** | | **Isolated impact analysis:**  No impact as this is common understanding. | | | | | | | | |
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| ***This CR's revision history:*** | | This is the first version for this CR. | | | | | | | | |

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

PUSCH transmission(s) can be dynamically scheduled by an UL grant in a DCI, or the transmission can correspond to a configured grant Type 1 or Type 2. The configured grant Type 1 PUSCH transmission is semi-statically configured to operate upon the reception of higher layer parameter of *configuredGrantConfig* including *rrc-ConfiguredUplinkGrant* without the detection of an UL grant in a DCI. The configured grant Type 2 PUSCH transmission is semi-persistently scheduled by an UL grant in a valid activation DCI according to clause 10.2 of [6, TS 38.213] after the reception of higher layer parameter *configuredGrantConfig* not including *rrc-ConfiguredUplinkGrant*. If *configuredGrantConfigToAddModList* is configured, more than one configured grant configuration of configured grant Type 1 and/or configured grant Type 2 may be active at the same time on an active BWP of a serving cell.

The UE can be configured with a list of up to 64 *TCI-UL-State* configurations within the higher layer parameter *BWP-UplinkDedicated.* Each *TCI-UL-State* configuration contains a parameter for configuring one reference signal, if applicable, for determining UL TX spatial filter for dynamic-grant and configured-grant based PUSCH and PUCCH resource in a CC, and SRS.

If a UE is configured by higher layer parameter *PDCCH-Config* that contains *ControlResourceSets* with two different values of *coresetPoolIndex* for the active BWP of a serving cell, or if a UE is configured with *SSB-MTC-AddtionalPCI* and with *PDCCH-Config* that contains two different values of *coresetPoolIndex* in *ControlResourceSet*, and if the UE is configured with [*twoTAGs*] and is configured with *dl-OrJointTCI-StateList* or *TCI-UL-State* for a serving cell, each *TCI-State* or *TCI-UL-State* is associated with a [*TAG-ID*]for determining timing adjustment for a corresponding UL transmission as described in Clause 4.2 of [6, TS 38.213]. The UE does not expect that *TCI-states* or *TCI-UL-States* associated with one *coresetPoolIndex* to correspond to two TAGs.

For the PUSCH transmission corresponding to a Type 1 configured grant or a Type 2 configured grant activated by DCI format 0\_0 or 0\_1, the parameters applied for the transmission are provided by *configuredGrantConfig* except for *dataScramblingIdentityPUSCH*, *txConfig*, *codebookSubset*, *maxRank*, *scaling* of *UCI-OnPUSCH,* which are provided by *pusch-Config*. A configured grant PUSCH can be transmitted with at most 4 layers. For the PUSCH transmission corresponding to a Type 2 configured grant activated by DCI format 0\_2, the parameters applied for the transmission are provided by *configuredGrantConfig* except for *dataScramblingIdentityPUSCH*, *txConfig*, *codebookSubsetDCI-0-2*, *maxRankDCI-0-2*, *scaling* of *UCI-OnPUSCH*, *resourceAllocationType1GranularityDCI-0-2* provided by *pusch-Config*.If the UE is provided with *transformPrecoder* in *configuredGrantConfig*, the UE applies the higher layer parameter *tp-pi2BPSK*, if provided in *pusch-Config*, according to the procedure described in clause 6.1.4 for the PUSCH transmission corresponding to a configured grant.

For PUSCH transmissions corresponding to a Type 1 configured grant based on eight antenna ports, when the higher layer parameter *txConfig* is set to *‘*codebook*’* and when *maxRank* is greater than 4, the determination of the *precodingAndNumberOfLayers* is based on the configuration of *maxRank* equal to 4; when the higher layer parameter *txConfig* is set to *‘*nonCodebook*’* and when *Lmax* [5, TS38.212] is greater than 4, the determination of the *srs-ResourceIndicator* is based on the configuration of *Lmax* equal to 4.

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