**3GPP TSG RAN WG1 #119 R1-24xxxxx**

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

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.212** | **CR** | **xxxx** | **rev** | **-** | **Current version:** | **18.4.0** |  |
|  | | | | | | | | |
| *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 Precoder Indication for 8 port CG-PUSCH | | | | | | | | | |
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| ***Source to WG:*** | Google | | | | | | | | | |
| ***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-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:*** | | 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 is unclear 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* applied to the 8TX CG-PUSCH is 4 | | | | | | | | |
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| ***Consequences if not approved:*** | | The determination of TPMI and SRI is unclear for 8TX CG-PUSCH is unclear when the *maxRank* or *maxMIMO-Layers* is configured to be above 4. | | | | | | | | |
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| ***Clauses affected:*** | | 7.3.1.1.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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. | | | | | | | | |

##### 7.3.1.1.2 Format 0\_1

<omitted text>

- SRS resource indicator -number of bits determined by the following:

-  bits according to Tables 7.3.1.1.2-28/28A/29/29B/30/30B/31/31B/31C/31D/31E/31F if the higher layer parameter *txConfig = nonCodebook*, where

-  is the number of configured SRS resources in the SRS resource set indicated by SRS resource set indicator field if present,

- is the number of configured SRS resources in the SRS resource set associated with the *coresetPoolIndex* value for the CORESET used for the PDCCH carrying the DCI format 0\_1, if the UE is not provided *coresetPoolIndex* or is provided *coresetPoolIndex* with value 0 for the first CORESETs, and is provided *coresetPoolIndex* with value 1 for the second CORESETs, and is provided *enableSTx2PofmDCI*,

- otherwise is the number of configured SRS resources in the SRS resource set configured by higher layer parameter *srs-ResourceSetToAddModList* and associated with the higher layer parameter *usage* of value '*nonCodeBook*',

- when *maxMIMO-Layers* is above 4, the determination of the *srs-ResourceIndicator* for configured grant PUSCH for 8 antenna ports is based on the table above corresponding to the case when *maxMIMO-Layers* is 4.<omitted text>

- Precoding information and number of layers - number of bits determined by the following:

<omitted text>

- 10 bits according to Table 7.3.1.1.2-5S for 8 antenna ports, if *CodebookTypeUL*=*codebook3*, transform precoder is disabled, *maxRank* = 5, 6, 7, or 8, *ul-FullPowerTransmission* is configured to *fullpowerMode1*, and according to *maxRank*;

For the higher layer parameter *txConfig=codebook*, if *ul-FullPowerTransmission* is configured to *fullpowerMode2*, maxRank is configured to be larger than 2, and at least one SRS resource with 4 antenna ports or 8 antenna ports is configured in the SRS resource set indicated by SRS resource set indicator field if present, otherwise in an SRS resource set with usage set to 'codebook', and an SRS resource with 2 antenna ports is indicated via SRI in the same SRS resource set, then Table 7.3.1.1.2-4 is used.

For the higher layer parameter *txConfig=codebook*, if *ul-FullPowerTransmission* is configured to *fullpowerMode2*, *maxRank* is configured to be larger than 4, and at least one SRS resource with 8 antenna ports is configured in the SRS resource set with usage set to 'codebook', and an SRS resource with 4 antenna ports is indicated via SRI in the same SRS resource set, then Table 7.3.1.1.2-2 is used.

For the higher layer parameter *txConfig = codebook*, if different SRS resources with different number of antenna ports are configured, the bitwidth is determined according to the maximum number of ports in an SRS resource among the configured SRS resources in all SRS resource set(s) with usage set to 'codebook'. If the number of ports for a configured SRS resource in the set is less than the maximum number of ports in an SRS resource among the configured SRS resources, a number of most significant bits with value set to '0' are inserted to the field.

When the UE is not provided *coresetPoolIndex* or is provided *coresetPoolIndex* with value 0 for the first CORESETs, and is provided *coresetPoolIndex* with value 1 for the second CORESETs, and is provided *enableSTx2PofmDCI*, and there are two SRS resource sets configured by *srs-ResourceSetToAddModList* and associated with *usage* of value '*codebook*' or '*nonCodeBook*', the Precoding information and number of layers field is associated with the SRS resource set that is associated with the *coresetPoolIndex* value for the CORESET used for the PDCCH carrying the DCI format 0\_1.

For the higher layer parameter *txConfig = codebook*, when the Transform precoder indicator field is present, if the bit width of the Precoding information and number of layers field for the case with transform precoder enabled is not equal to that for the case with transform precoder disabled, a number of most significant bits with value set to '0' are inserted to the Precoding information and number of layers field for the case with smaller bit width until the bit width of the Precoding information and number of layers field for the two cases are the same.

For the higher layer parameter *txConfig = codebook*, when *maxRank* is above 4, the determination of the *precodingAndNumberOfLayers* for configured grant PUSCH for 8 antenna ports is based on table above corresponding to the case when *maxRank* is 4.

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