**3GPP TSG- Meeting # *draft***

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  |  | **CR** | **0159** | **rev** | **1** | **Current version:** | **16.2.0** |  |
|  |
| *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 |  | Radio Access Network | **x** | Core Network |  |

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|  |
| ***Title:***  | CR for 38.104: Performance requirements for FR2 PUSCH 2T2R 16QAM |
|  |  |
| ***Source to WG:*** |  |
| ***Source to TSG:*** | RAN4 |
|  |  |
| ***Work item code:*** | NR\_perf\_enh-Perf |  | ***Date:*** | 2020-03-02 |
|  |  |  |  |  |
| ***Category:*** |  |  | ***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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | SNR of performance requirements for FR2 PUSCH 2T2R 16QAM, in section 11 is unachievable. |
|  |  |
| ***Summary of change:*** | This draftCR changes the performance requirement tables for FR2, to implement the following agreements:[R4-1910006]:Agree to change all the existing FR2 2T2R MCS16 requirements with MCS12 in TS 38.104 and TS 38.141-2.Reuse the agreed simulation assumptions for FR2 2T2R cases with MCS 16 by referring to Slide#6 in [R4-1907241].[R4-1912722]:The PUSCH FR2 2T2R with MCS 12 requirements are applicable from Rel-16.[R4-1913188]:Simulation result delivery.[R4-1912671]:The requirements removed in this WF are re-introduced in R16. |
|  |  |
| ***Consequences if not approved:*** | Requirements remain incomplete. |
|  |  |
| ***Clauses affected:*** | 11.2.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  |  |
| ***affected:*** | **x** |  |  Test specifications | 38.141-2 |
| ***(show related CRs)*** |  | **x** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** | Agenda item: 8.18.2.2 |
|  |  |
| ***This CR's revision history:*** | R4-2001693 |

**<<Start of change>>**

### 11.2.2 Requirements for *BS type 2-O*

#### 11.2.2.1 Requirements for PUSCH with transform precoding disabled

##### 11.2.2.1.1 General

The performance requirement of PUSCH is determined by a minimum required throughput for a given SNR. The required throughput is expressed as a fraction of maximum throughput for the FRCs listed in annex A. The performance requirements assume HARQ retransmissions.

Table 11.2.2.1.1-1: Test parameters for testing PUSCH

|  |  |
| --- | --- |
| Parameter | Value |
| Transform precoding | Disabled |
| Default TDD UL-DL pattern (Note 1) | 60 kHz and 120kHz SCS:3D1S1U, S=10D:2G:2U |
| HARQ | Maximum number of HARQ transmissions | 4 |
| RV sequence | 0, 2, 3, 1 |
| DM-RS | DM-RS configuration type | 1 |
| DM-RS duration | single-symbol DM-RS |
| Additional DM-RS symbols | pos0, pos1 |
| Number of DM-RS CDM group(s) without data | 2 |
| Ratio of PUSCH EPRE to DM-RS EPRE | -3 dB |
| DM-RS port(s) | {0}, {0, 1} |
| DM-RS sequence generation | NID=0, nSCID =0 |
| Time domain resource | PUSCH mapping type | B |
| Start symbol index | 0  |
| Allocation length | 10  |
| Frequency domain resource | RB assignment | Full applicable test bandwidth |
| Frequency hopping | Disabled |
| TPMI index for 2Tx two-layer spatial multiplexing transmission  | 0 |
| Code block group based PUSCH transmission | Disabled |
| PT-RS configuration | Frequency density (*KPT-RS*) | 2 |
| Time density (*LPT-RS*) | 1 |
| NOTE 1: The same requirements are applicable to TDD with different UL-DL patterns |

##### 11.2.2.1.2 Minimum requirements

The throughput shall be equal to or larger than the fraction of maximum throughput stated in the tables 11.2.2.1.2-1 to 11.2.2.1.2-5 at the given SNR for 1Tx and for 2Tx two-layer spatial multiplexing transmission.

Table 11.2.2.1.2-1: Minimum requirements for PUSCH, 50 MHz channel bandwidth, 60 kHz SCS

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Number of TX antennas | Number of demodulation branches | Cyclic prefix | Propagation conditions and correlation matrix (Annex G) | Fraction of maximum throughput | FRC(Annex A) | Additional DM-RS position | PT-RS | SNR(dB) |
| 1 | 2 | Normal | TDLA30-300 Low | 70 % | G-FR2-A3-1 | pos0 | No | -2.0 |
| G-FR2-A3-13 | pos1 | No | -2.2 |
| Normal | TDLA30-300 Low | 70 % | G-FR2-A4-1 |  pos0 | Yes | 12.0 |
| No | 11.5 |
| G-FR2-A4-11 |  pos1 | Yes | 10.7 |
| No | 10.7 |
| Normal | TDLA30-75 Low | 70 % | G-FR2-A5-1 |  pos0 | Yes | 13.7 |
| No | 13.1 |
| G-FR2-A5-6 |  pos1 | Yes | 13.4 |
| No | 12.9 |
| 2 | Normal | TDLA30-300 Low | 70 % | G-FR2-A3-6 |  pos0 | No | 1.5 |
| G-FR2-A3-18 |  pos1 | No | 1.2 |
| Normal | TDLA30-300 Low | 70 % | G-FR2-A7-1 | pos0 | Yes | [15.2] |
| No | [14.3] |
| G-FR2-A7-6 |  pos1 | Yes | [13.8] |
| No | [13.0] |

Table 11.2.2.1.2-2: Minimum requirements for PUSCH, 100 MHz channel bandwidth, 60 kHz SCS

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Number of TX antennas | Number of demodulation branches | Cyclic prefix | Propagation conditions and correlation matrix (Annex G) | Fraction of maximum throughput | FRC(Annex A) | Additional DM-RS position  | PT-RS | SNR(dB) |
| 1 | 2 | Normal | TDLA30-300 Low | 70 % | G-FR2-A3-2 | pos0 | No | -2.1 |
| G-FR2-A3-14 | pos1 | No | -2.4 |
| Normal | TDLA30-300 Low | 70 % | G-FR2-A4-2 | pos0 | Yes | 12.2 |
| No | 11.2 |
| G-FR2-A4-12 | pos1 | Yes | 11.2 |
| No | 10.6 |
| Normal | TDLA30-75 Low | 70 % | G-FR2-A5-2 | pos0 | Yes | 14.2 |
| No | 13.3 |
| G-FR2-A5-7 | pos1 | Yes | 13.7 |
| No | 13.1 |
| 2 | Normal | TDLA30-300 Low | 70 % | G-FR2-A3-7 | pos0 | No | 1.5 |
| G-FR2-A3-19 | pos1 | No | 1.2 |
| Normal | TDLA30-300 Low | 70 % | G-FR2-A7-2 | pos0 | Yes | [16.0] |
| No | [14.9] |
| G-FR2-A7-7 | pos1 | Yes | [13.8] |
| No | [13.1] |

Table 11.2.2.1.2-3: Minimum requirements for PUSCH, 50 MHz channel bandwidth, 120 kHz SCS

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Number of TX antennas | Number of demodulation branches | Cyclic prefix | Propagation conditions and correlation matrix (Annex G) | Fraction of maximum throughput | FRC(Annex A) | Additional DM-RS position  | PT-RS | SNR(dB) |
| 1 | 2 | Normal | TDLA30-300 Low | 70 % | G-FR2-A3-3 |  pos0 | No | -1.8 |
| G-FR2-A3-15 |  pos1 | No | -2.1 |
| Normal | TDLA30-300 Low | 70 % | G-FR2-A4-3 |  pos0 | Yes | 11.6 |
| No | 10.9 |
| G-FR2-A4-13 |  pos1 | Yes | 10.9 |
| No | 10.5 |
| Normal | TDLA30-75 Low | 70 % | G-FR2-A5-3 |  pos0 | Yes | 13.7 |
| No | 13.1 |
| G-FR2-A5-8 |  pos1 | Yes | 13.2 |
| No | 13.0 |
| 2 | Normal | TDLA30-300 Low | 70 % | G-FR2-A3-8 |  pos0 | No | 1.4 |
| G-FR2-A3-20 |  pos1 | No | 1.3 |
| Normal | TDLA30-300 Low | 70 % |  G-FR2-A7-3 |  pos0 | Yes | [14.2] |
| No | [13.6] |
| G-FR2-A7-8 |  pos1 | Yes | [13.9] |
| No | [13.1] |

Table 11.2.2.1.2-4: Minimum requirements for PUSCH, 100 MHz channel bandwidth, 120 kHz SCS

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Number of TX antennas | Number of demodulation branches | Cyclic prefix | Propagation conditions and correlation matrix (Annex G) | Fraction of maximum throughput | FRC(Annex A) | Additional DM-RS position  | PT-RS | SNR(dB) |
| 1 | 2 | Normal | TDLA30-300 Low | 70 % | G-FR2-A3-4 |  pos0 | No | -2.4 |
| G-FR2-A3-16 |  pos1 | No | -2.5 |
| Normal | TDLA30-300 Low | 70 % | G-FR2-A4-4 |  pos0 | Yes | 11.9 |
| No | 10.5 |
| G-FR2-A4-14 |  pos1 | Yes | 11.1 |
| No | 10.5 |
| Normal | TDLA30-75 Low | 70 % | G-FR2-A5-4 |  pos0 | Yes | 13.5 |
| No | 12.9 |
| G-FR2-A5-9 |  pos1 | Yes | 13.4 |
| No | 12.8 |
| 2 | Normal | TDLA30-300 Low | 70 % | G-FR2-A3-9 |  pos0 | No | 1.4 |
| G-FR21-A3-21 |  pos1 | No | 1.2 |
| Normal | TDLA30-300 Low | 70 % | G-FR2-A7-4 | pos0 | Yes | [13.9] |
| No | [13.2] |
| G-FR2-A7-9 | pos1 | Yes | [13.5] |
| No | [12.9] |

Table 11.2.2.1.2-5: Minimum requirements for PUSCH, 200 MHz channel bandwidth, 120 kHz SCS

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Number of TX antennas | Number of demodulation branches | Cyclic prefix | Propagation conditions and correlation matrix (Annex G) | Fraction of maximum throughput | FRC(Annex A) | Additional DM-RS position | PT-RS | SNR(dB) |
| 1 | 2 | Normal | TDLA30-300 Low | 70 % | G-FR2-A3-5 |  pos0 | No | -2.1 |
| G-FR2-A3-17 |  pos1 | No | -2.4 |
| Normal | TDLA30-300 Low | 70 % | G-FR2-A4-5 |  pos0 | Yes | 11.3 |
| No | 10.9 |
| G-FR2-A4-15 |  pos1 | Yes | 11.2 |
| No | 10.7 |
| Normal | TDLA30-75 Low | 70 % | G-FR2-A5-5 |  pos0 | Yes | 14.1 |
| No | 13.4 |
| G-FR2-A5-10 |  pos1 | Yes | 13.7 |
| No | 13.3 |
| 2 | Normal | TDLA30-300 Low | 70 % | G-FR2-A3-10 |  pos0 | No | 1.4 |
| G-FR2-A3-22 |  pos1 | No | 1.1 |
| Normal | TDLA30-300 Low | 70 % |  G-FR2-A7-5 |  pos0 | Yes | [14.0] |
| No | [13.3] |
|  G-FR2-A7-10 |  pos1 | Yes | [13.6] |
| No | [13.0] |

**<<End of change>>**