**3GPP TSG-RAN4 Meeting #104-e *R4-2214406***

**Online, 15th Aug- 26th Aug**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.104** | **CR** | **-** | **rev** | **-** | **Current version:** | **17.6.0** |  |
|  | | | | | | | | |
| *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:*** | draft CR for PUSCH requirement in TS 38.104 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Samsung | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_HST\_FR2-Perf | | | | |  | ***Date:*** | | | 2022-8-26 |
|  |  | | | |  | |  | | |  |
| ***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 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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Update FR2 HST PUSCH requirement applicabiltity rule based on last agreement. There is non more updated for simulation results based on the simulation results summary in the last meeting, the SNR with [] can be removed. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Remove [] for SNR requirement | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | HST FR2 PUSCH demodualtion performance requirements are not complete and can be not used | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 11.2.2.7 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **x** |  | Test specifications | | | | TS 38.141-2 | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

<Start of Change1>

#### 11.2.2.7 Requirements for PUSCH for high speed train

##### 11.2.2.7.1 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. The performance requirements for high speed train are optional and only applicable for FR2-1 below 30GHz..

The performance requirements for PUSCH high speed train apply to Wide Area Base Stations and Medium Range Base Stations (subject to declaration).

Table 11.2.2.7.1-1: Test parameters for testing high speed train

|  |  |  |
| --- | --- | --- |
| Parameter | | Value |
| Transform precoding | | Disabled |
| Default TDD UL-DL pattern (Note 1) | | 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 or Pos1 or Pos2 |
|  | 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 |
|  | DM-RS sequence generation | NID=0, nSCID =0 |
| Time domain | PUSCH mapping type | B |
| resource | Start symbol index | 0 |
|  | Allocation length | 10 |
| Frequency domain | RB assignment | Full applicable test bandwidth |
| resource | Frequency hopping | Disabled |
| Code block group based PUSCH transmission | | Disabled |
| PT-RS | Frequency density (*KPT-RS*) | 2 |
| configuration | Time density (*LPT-RS*) | 1 |
| NOTE 1: The same requirements are applicable to TDD with different UL-DL patterns | | |

##### 11.2.2.7.2 Minimum requirements

The throughput shall be equal to or larger than the fraction of maximum throughput for the FRCs stated in tables 11.2.2.7.2-1 to 11.2.2.7.2-4 at the given SNR for 1Tx. FRCs are defined in an annex A. Unless stated otherwise, the MIMO correlation matrices for the gNB are defined in annex G for low correlation.

Table 11.2.2.7.2-1: Minimum requirements for PUSCH, Type B, 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 | SNR  (dB) |
| 1 | 2 | Normal | Scenario 4-BI-NR350, FR2 | 70% | G-FR2-A10-1 | pos0 | 12.9 |
| 1 | 2 | Normal | Scenario 4-BI-NR350, FR2 | 70% | G-FR2-A10-3, G-FR2-A10-5 | pos1, pos2 | 12.5 |

Table 11.2.2.7.2-2: Minimum requirements for PUSCH, Type B, 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 | SNR  (dB) |
| 1 | 2 | Normal | Scenario 4-BI-NR350, FR2 | 70% | G-FR2-A10-2 | pos0 | 12.8 |
| 1 | 2 | Normal | Scenario 4-BI-NR350, FR2 | 70% | G-FR2-A10-4, G-FR2-A10-6 | pos1, pos2 | 12.3 |

<End of Change2>