**3GPP TSG-RAN WG4 Meeting # 104-e R4-22xxxxx**

**Electronic Meeting, August 15 – August 26, 2022**

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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 TS 38.104, Introduce performance requirements for UL TA for FR2 HST | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | CATT | | | | | | | | | |
| ***Source to TSG:*** | RAN4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_HST\_FR2-Perf | | | | |  | ***Date:*** | | | 2022-08-01 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | Performance requirements for UL TA should be introduced for FR2 HST based on agreements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Change Table [A.4-2x] to Tables A.10-4, A.10-5, and A.10-6. 2. Change TSRS =[10] to TSRS =80 in Table 11.2.2.8.1-1. 3. Add FRC in Table 11.2.2.8.2-1. 4. Remove [] for SNR in Table 11.2.2.8.2-1. 5. Add ‘for FR2-1’ in title of Table 11.2.2.8.1-1 and Table 11.2.2.8.2-1. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Performance requirements for UL TA for FR2 HST would be missing. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 11.2.2.8.1, 11.2.2.8.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 Change 1>**

#### 11.2.2.8 Requirements for UL timing adjustment

##### 11.2.2.8.1 General

The performance requirement of UL timing adjustment is determined by a minimum required throughput for the moving UE at given SNR. The performance requirements assume HARQ retransmissions. The performance requirements for UL timing adjustment scenario Y defined in Annex G.4 are optional and in FR2 only apply to FR2-1 below 30GHz.

In the tests for UL timing adjustment, two signals are configured, one being transmitted by a moving UE and the other being transmitted by a stationary UE. The transmission of SRS from UE is optional. FRC parameters in Tables A.10-4, A.10-5, and A.10-6 are applied for both UEs. The received power for both UEs is the same. The resource blocks allocated for both UEs are consecutive. In scenario Y, Doppler shift is not taken into account.

Table 11.2.2.8.1-1 Test parameters for testing UL timing adjustment for FR2-1

|  |  |  |
| --- | --- | --- |
| Parameter | | Value |
| Transform precoding | | Disabled |
| Uplink-downlink allocation for TDD | | 120 kHz SCS:  3D1S1U, S=10D:2G:2U |
| Channel bandwidth | | 120 kHz SCS: 50MHz, 200 MHz |
| 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 |
|  | DM-RS position (*l0*) | 2 |
|  | Additional DM-RS position | pos0, pos1, pos2 |
|  | Number of DM-RS CDM group(s) without data | 2 |
|  | Ratio of PUSCH EPRE to DM-RS EPRE | -3 dB |
|  | DM-RS port | {0} |
| Time domain resource assignment | DM-RS sequence generation | NID0=0, nSCID =0 for moving UE  NID0=1, nSCID =1 for stationary UE |
|  | PUSCH mapping type | B |
|  | Allocation length | 10 |
| Frequency domain resource assignment | RB assignment | 50 MHz CBW/120kHz SCS: 16 RB for each UE  200MHz CBW/120kHz SCS: 66 RB for each UE |
|  | Starting PRB index | Moving UE: 0  Stationary UE: 16 for 50MHz CBW, 66 for 200MHz CBW for SCS 120kHz |
|  | Frequency hopping | Disabled |
| SRS resource allocation | Slots in which sounding RS is transmitted (Note 1) | For TDD:  - last symbol in slot #3 in radio frames for 120KHz |
|  | SRS resource allocation | 120 kHz SCS:  - CSRS = 9, BSRS =0, for 32 RB  - CSRS = 33, BSRS =0, for 132 RB |
| NOTE 1. The transmission of SRS is optional. And the transmission comb and SRS periodic are configured as KTC = 2, and TSRS = 80 respectively. | | |

##### 11.2.2.8.2 Minimum requirements for high speed train

The throughput shall be ≥ 70% of the maximum throughput of the reference measurement channel as specified in Annex A for the moving UE at the SNR given in table 11.2.2.8.2-1 for mapping type B.

Table 11.2.2.8.2-1 Minimum requirements for UL timing adjustment with mapping type B for high speed train for FR2-1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Number of TX antennas | Number of RX antennas | Cyclic prefix | Channel Bandwidth [MHz] | SCS [kHz] | Moving propagation conditions and correlation matrix (Annex G) | FRC (Annex A) | SNR  [dB] |
| 1 | 2 | Normal | 50 | 120 | Scenario Y | G-FR2-A10-7 | 9.1 |
|  |  |  |  |  | Scenario Y | G-FR2-A10-9, G-FR2-A10-11 | 8.8 |
|  |  |  | 200 | 120 | Scenario Y | G-FR2-A10-8 | 9.0 |
|  |  |  |  |  | Scenario Y | G-FR2-A10-10, G-FR2-A10-12 | 8.9 |

## **<End of Change 1>**