**3GPP TSG-RAN WG4 Meeting #100-eR4-2115769**

**Electronic, 16th– 27th August, 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.176-2** | **CR** |  | **rev** | **1** | **Current version:** | **16.0.0** |  |
|  | | | | | | | | |
| *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 |  | Core Network |  |

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| ***Title:*** | Draft CR to TS 38.176-2: Correction of applicability rules for demodulation performance requirements | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Intel Corporation | | | | | | | | | |
| ***Source to TSG:*** | RAN4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_IAB-Perf | | | | |  | ***Date:*** | | | 2021-08-06 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Applicability rules agreed for IAB performacnce verification are not captured in specification. PMI test configuration contains paramers for two test cases while only one test were agreed. | | | | | | | | |
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| ***Summary of change:*** | | Clarification of Applicability rules for IAB-DU  Update of PMI test configuration | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Performance for IAB node cannot be guaranteed | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 8.1.1.3.3, 8.1.1.3.4, 8.2.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | |  | | |
| ***affected:*** | | **x** |  | Test specifications | | | | TS 38.174 | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | R4-2114032 | | | | | | | | |

**START OF 1st CHANGE**

#### 8.1.1.3 Applicability rule

##### 8.1.1.3.1 General

Unless otherwise stated, for a IAB-DU declared to support more than 2 demodulation branches (for *IAB type 1-O* and *IAB type 2-O*), the performance requirement tests for 2 demodulation branches shall apply, and the mapping between connectors and demodulation branches is up to BS implementation.

The tests requiring more than [20] dB SNR level are set to N/A in the test requirements.

##### 8.1.1.3.2 Applicability of PUSCH performance requirements

8.1.1.3.2.1 Applicability of requirements for different subcarrier spacings

Unless otherwise stated, PUSCH requirement tests shall apply only for each subcarrier spacing declared to be supported (see D.7 in table 4.6-1).

Unless otherwise stated, if IAB-DU supports more than one SCS then PUSCH requirement tests with highest modulation order shall apply only with lowest supported SCS and PUSCH requirement tests with other modulation orders shall apply only with highest supported SCS. Otherwise all modulation orders are tested on supported SCS.

8.1.1.3.2.2 Applicability of requirements for different channel bandwidths

For each subcarrier spacing declared to be supported, the test requirements for a specific channel bandwidth shall apply only if the IAB-DU supports it (see D.7 in table 4.6-1).

Unless otherwise stated, for each subcarrier spacing declared to be supported, the tests shall be done only for the widest supported channel bandwidth. If performance requirement is not specified for this widest supported channel bandwidth, the tests shall be done by using performance requirement for the closest channel bandwidth lower than this widest supported bandwidth; the tested PRBs shall then be centered in this widest supported channel bandwidth.

8.1.1.3.2.3 Applicability of requirements for different configurations

Unless otherwise stated, for *IAB type 1-O*, PUSCH requirement tests shall apply only for the mapping type declared to be supported (see D.100 in table 4.6-1). If both mapping type A and type B are declared to be supported, the tests shall be done for either type A or type B; the same chosen mapping type shall then be used for all tests.

Unless otherwise stated, for *IAB type 2-O*, PUSCH requirement tests shall apply only for the additional DM-RS position declared to be supported (see D.101 in table 4.6-1). If both options (i.e., pos0 and pos1) are declared to be supported, the tests shall be done for pos1.

Unless otherwise stated, for *IAB type 2-O*, PUSCH requirement tests with transform precoding disabled shall apply for the PT-RS option declared to be supported (see D.106 in table 4.6-1). If both PT-RS options (without and with PT-RS) are declared to be supported, the tests shall be done for either without or with PT-RS only; the same chosen option shall then be used for all tests.

Unless otherwise stated, for *IAB type 2-O*, PUSCH requirement tests with transform precoding enabled shall be done for without PT-RS.

8.1.1.3.2.4 Applicability of requirements for uplink carrier aggregation

The tests for uplink carrier aggregation shall be carried out according to the declaration (see D.108 in table 4.6-1).

Unless otherwise stated, the tests for uplink carrier aggregation shall apply only for PUSCH with transform precoding disabled, and shall be conducted on per component carrier basis.

8.1.1.3.2.5 Applicability of requirements for TDD with different UL-DL patterns

Unless otherwise stated, for each subcarrier spacing declared to be supported, if IAB-DU supports multiple TDD UL-DL patterns, only one of the supported TDD UL-DL patterns shall be used for all tests.

8.1.1.3.2.6 Applicability of requirements for transform precoding

Unless otherwise stated, the tests with transform precoding enabled shall apply only, if the IAB-DU supports it (see D.110 in table 4.6-1).

##### 8.1.1.3.3 Applicability of PUCCH performance requirements

8.1.1.3.3.1 Applicability of requirements for different formats

Unless otherwise stated, PUCCH requirement tests shall apply only for each PUCCH format declared to be supported (see D.102 in table 4.6-1).

8.1.1.3.3.2 Applicability of requirements for different subcarrier spacings

Unless otherwise stated, PUCCH requirement tests shall apply only for each subcarrier spacing declared to be supported (see D.7 in table 4.6-1). If multiple subcarrier spacings are declared to be supported, each supported PUCCH format can be tested on one subcarrier spacing.

8.1.1.3.3.3 Applicability of requirements for different channel bandwidths

For each subcarrier spacing declared to be supported by the IAB-DU, the test requirements for a specific channel bandwidth shall apply only if the IAB-DU supports it (see D.7 in table 4.6-1).

Unless otherwise stated, for each subcarrier spacing declared to be supported, the tests shall be done only for the widest supported channel bandwidth. If performance requirement is not specified for this widest supported channel bandwidth, the tests shall be done by using performance requirement for the closest channel bandwidth lower than this widest supported bandwidth; the tested PRBs shall then be centered in this widest supported channel bandwidth.

8.1.1.3.3.4 Applicability of requirements for different configurations

Unless otherwise stated, PUCCH format 3 requirement tests shall apply only for the additional DM-RS configuration declared to be supported (see D.104 in table 4.6-1). If both options (without and with additional DM-RS) are declared to be supported, the tests shall be done for either without or with additional DM-RS; the same chosen option shall then be used for all tests.

Unless otherwise stated, PUCCH format 4 requirement tests shall apply only for the additional DM-RS configuration declared to be supported (see D.105 in table 4.6-1). If both options (without and with additional DM-RS) are declared to be supported, the tests shall be done for either without or with additional DM-RS; the same chosen option shall then be used for all tests.

8.1.1.3.3.5 Applicability of requirements for multi-slot PUCCH

Unless otherwise stated, multi-slot PUCCH requirement tests shall apply only if the IAB-DU supports it (see D.107 in table 4.6-1).

##### 8.1.1.3.4 Applicability of PRACH performance requirements

8.1.1.3.4.1 Applicability of requirements for different formats

Unless otherwise stated, PRACH requirement tests shall apply only for PRACH formats declared to be supported (see D.103 in table 4.6-1).

For IAB-DU declares to support more than one PRACH formats, limit the number of tests to any two cases chosen by the manufacturer. If IAB-DU declares to support more than one PRACH formats where formats for both long and short PRACH sequences are presented, require choosing formats with different sequences (see D.103 in table 4.6-1).

8.1.1.3.4.2 Applicability of requirements for different subcarrier spacings

Unless otherwise stated, for each PRACH format with short sequence declared to be supported, for each FR, the tests shall apply only for the smallest supported subcarrier spacing in the FR (see D.103 in table 4.6-1).

8.1.1.3.4.3 Applicability of requirements for different channel bandwidths

Unless otherwise stated, for the subcarrier spacing to be tested, the test requirements shall apply only for anyone channel bandwidth declared to be supported (see D.7 in table 4.6-1).

**END OF 1st CHANGE**

**START OF 2nd CHANGE**

Table 8.2.3.3.4.2-1: Test parameters for testing PMI reporting requirements

| Parameter | | Unit | FR1 | FR2 |
| --- | --- | --- | --- | --- |
| Bandwidth | | MHz | 40 | 100 |
| Subcarrier spacing | | kHz | 30 | 120 |
| Duplex Mode | |  | TDD | TDD |
| TDD DL-UL configuration | |  | 7D1S2U, S=6D:4G:4U | 3D1S1U, S=10D:2G:2U |
| Propagation channel | |  | TDLA30-5 | TDLA30-35 |
| Antenna configuration | |  | High XP 4 x 2  (N1,N2) = (2,1)  High XP 8 x 2  (N1,N2) = (4,1) | 2 x 2 ULA Low |
| Beamforming Model | |  | As specified in Annex J.3.1 | As specified in Annex J.3.1 |
| NZP CSI-RS for CSI acquisition | CSI-RS resource Type |  | Periodic |  |
| Number of CSI-RS ports (*X*) |  | Test for 4 TX ports: 4  Test for 8 TX ports: 8 | 2 |
| CDM Type |  | Test for 4 TX ports: FD-CDM2  Test for 8 TX ports: CDM4 (FD2, TD2) | FD-CDM2 |
| Density (ρ) |  | 1 | 1 |
| First subcarrier index in the PRB used for CSI-RS (k0, k1) |  | Test for 4 TX ports: Row 4 (0,-)  Test for 8 TX ports: Row 8, (4,6) | Row 3, (6,-) |
| First OFDM symbol in the PRB used for CSI-RS (l0, l1) |  | Test for 4 TX ports, 2RX: (13,-)  Test for 8 TX ports: (5,-) | (13,-) |
| CSI-RS  interval and offset | Slot | 10/1 | 8/1 |
| ReportConfigType | |  | Periodic | Periodic |
| Sub-band Size | | RB | 16 | 8 |
| csi-ReportingBand | |  | 1111111 | 111111111 |
| CSI-Report periodicity and offset | | slot | 10/9 | 8/3 |
| pmi-FormatIndicator | |  | Wideband | Wideband |
| Codebook configuration | Codebook Type |  | typeI-SinglePanel | typeI-SinglePanel |
| Codebook Mode |  | 1 | 1 |
| (CodebookConfig-N1,CodebookConfig-N2) |  | Test for 4 TX ports: (2,1)  Test for 8 TX ports: (4,1) | NA |
| (CodebookConfig-O1,CodebookConfig-O2) |  | Test for 4 TX ports: (4,1)  Test for 8 TX ports: (4,1) | NA |
| CodebookSubsetRestriction |  | Test for 4 TX ports: 11111111  Test for 8 TX ports: 0x FFFF | 001111 |
| RI Restriction |  | Test for 4 TX ports: 00000001  Test for 8 TX ports: 00000010 | NA |
| Maximum number of HARQ transmission | |  | 4 | 4 |
| CQI/RI/PMI delay | | ms | 5.5 | 1.375 |
| Measurement channel | |  | Test for 4 TX ports: M-FR1-A.3.5-1  Test for 8 TX ports: M-FR1-A.3.5-2 | M-FR2-A.3.5-3 |
| Note 1: The same requirements are applicable for TDD with different UL-DL pattern.  Note 2: When Throughput is measured using random precoder selection, the precoder shall be updated in each slot (0.5 ms FR1 / 0.125 ms FR2 granularity) with equal probability of each applicable i1, i2 combination.  Note 3: If the IAB-MT reports in an available uplink reporting instance at slot #n based on PMI estimation at a downlink slot not later than slot#(n-4), this reported PMI cannot be applied at the gNB downlink before slot#(n+4).  Note 4: Randomization of the principle beam direction shall be used as specified in Annex J.2.3.2.3.  Note 5: SSB, TRS, CSI-RS and/or other unspecified test parameters with respect to TS 38.101-4 [18] are left up to test implementation, if transmitted or needed. | | | | |

**END OF 2nd CHANGE**