**3GPP TSG-RAN4 Meeting #100-e *R4-2113789***

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

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **37.901-5** | **CR** |  | **rev** | **-** | **Current version:** | **16.4.0** |  |
|  | | | | | | | | |
| *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 |  | Core Network |  |

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|  | | | | | | | | | | |
| ***Title:*** | Draft CR: Introduction the simulation assumptions for ATP to TR.37.901-5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei,HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | FS\_UE\_5GNR\_App\_Data\_Perf | | | | |  | ***Date:*** | | | 2021-08-06 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***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:*** | | There are no simulation assumptions for link Adaptation Absolute Physical Layer Requirements | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Added simulation assumptions for the link adaptation physical layer test | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The simulation assumptions will still be missing. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.10.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | |  | | |
| ***affected:*** | |  | **X** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

<< Start of change 1 >>

5.9.2 Test System Uncertainty and Test Tolerance for FR2 testing

## 5.10 Feasibility of Defining Link Adaptation Absolute Physical Layer Requirements in RAN4

5.10.1 General

The purpose of this clause is to analyse whether it is feasible to define absolute physical layer throughput requirements under link adaptation in RAN4 using link-level simulation results based on the agreed set of simulation assumptions. As part of feasibility study, this clause will also conclude on test methodology which includes:

1. Alignment criteria for aligning the simulation results across companies and
2. Methodology to define the final requirements, if it is found to be feasible to define such requirements in RAN4.

5.10.2 Test Methodology

5.10.2.1 Simulation Alignment Criteria

5.10.3 Simulation Assumptions

The simulation assumptions are captured in Table 5.10.3-1. In this test, TE schedules the PDSCH transport block, rank, and precoding slot by slot, according to the reported CQI/PMI/RI.Throughput calculation is specified as follows:

* SS collects ACK, NACK and statDTX from the UE and records the time, elapsed from the beginning of the test. The payload size, received by the UE and acknowledged towards the SS, is determined according to TS38.214 Clause 5.1.3.2, where the MCS index is derived from the coding rate indicated by the reported CQI according to TS38.214 Clause 5.2.2.1, and the number of layers is set according to the reported RI. Throughput can be calculated in the SS by multiplying the payload size with the number of ACKs and dividing the accumulated payload in kilobits by the time in seconds, elapsed from the beginning of the test, being associated to the following ratio: ACK / (ACK+NACK + DTX).

**Table 5.10.3-1: Simulation assumptions for Absolute Physical Layer Throughput alignment with link adaptation**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Test 1** | **Test 2** | **Test 3** |
| Frequency range | |  | FR1 | FR1 | FR2 |
| Bandwidth | | MHz | 10 | 40 | 100 |
| Subcarrier spacing | | kHz | 15 | 30 | 120 |
| Duplex Mode | |  | FDD | TDD | TDD |
| TDD Slot Configuration | |  | N/A | 7D1S2U  S:6D+4G+4U | DDSU  S:11D+3G+0U |
| SNR | | dB | 0:2:20 | 0:2:20 | 0:2:16 |
| Propagation channel | |  | TDLA30-5 | TDLA30-5 | TDLA30-35 |
| Antenna configuration | |  | ULA Low 2x2,ULA Low 2x4 | ULA Low 2x2,ULA Low 2x4 | ULA Low 2x2 |
| Beamforming Model | |  | As defined in Annex B.4.1 in TS 38.101-4 | As defined in Annex B.4.1 in TS 38.101-4 | As defined in Annex B.4.1 in TS 38.101-4 |
| Receiver type | |  | MMSE-IRC | MMSE-IRC | MMSE-IRC |
| PDSCH configuration | Mapping type |  | Type A | Type A | Type A |
| Starting symbol (S) |  | 2 | 2 | 2 |
| Length (L) |  | 12 | 12 | 12 |
| PRB bundling size |  | 2 | 2 | 2 |
| PRB bundling type |  | Static | Static | Static |
| VRB-to-PRB mapping interleaver bundle size |  | Non-interleaved | Non-interleaved | Non-interleaved |
| PDSCH DMRS configuration | DMRS Type |  | Type 1 | Type 1 | Type 1 |
| Number of additional DMRS |  | 1 | 1 | 1 |
| Maximum number of OFDM symbols for DL front loaded DMRS |  | 1 | 1 | 1 |
| CSI measurement channels | |  | As specified in Table A.4-2 of TS 38.101-4:  Rank 1: TBS.2-1  Rank 2: TBS.2-2 | As specified in Table A.4-2 of TS 38.101-4:  Rank 1: TBS.2-3  Rank 2: TBS.2-4 | As specified in Table A.4-1 of TS 38.101-4:  Rank 1: TBS.1-1  Rank 2: TBS.1-2 |
| ZP CSI-RS configuration | CSI-RS resource Type |  | Periodic | Periodic | Periodic |
| Number of CSI-RS ports (*X*) |  | 4 | 4 | 4 |
| CDM Type |  | FD-CDM2 | FD-CDM2 | FD-CDM2 |
| Density (ρ) |  | 1 | 1 | 1 |
| First subcarrier index in the PRB used for CSI-RS (k0) |  | Row 5, (4) | Row 5, (4) | Row 5, (8) |
| First OFDM symbol in the PRB used for CSI-RS (l0) |  | (9) | (9) | (13) |
| CSI-RS  periodicity and offset | slot | 5/1 | 10/1 | 8/1 |
| NZP CSI-RS for CSI acquisition | CSI-RS resource Type |  | Periodic | Periodic | Aperiodic |
| Number of CSI-RS ports (*X*) |  | 2 | 2 | 2 |
| CDM Type |  | FD-CDM2 | FD-CDM2 | FD-CDM2 |
| Density (ρ) |  | 1 | 1 | 1 |
| First subcarrier index in the PRB used for CSI-RS (k0) |  | Row 3 (6) | Row 3 (6) | Row 3 (6) |
| First OFDM symbol in the PRB used for CSI-RS (l0) |  | (13) | (13) | (13) |
| NZP CSI-RS-timeConfig  periodicity and offset | slot | 5/1 | 10/1 | Not configured |
| CSI-IM configuration | CSI-IM resource Type |  | Periodic | Periodic | Periodic |
| CSI-IM RE pattern |  | Pattern 0 | Pattern 0 | Pattern 1 |
| CSI-IM Resource Mapping  (kCSI-IM,lCSI-IM) |  | (4,9) | (4,9) | (8,13) |
| CSI-IM timeConfig  periodicity and offset | slot | 5/1 | 10/1 | Not configured |
| ReportConfigType | |  | Aperiodic | Aperiodic | Aperiodic |
| CQI-table | |  | Table 2 | Table 2 | Table 2 |
| reportQuantity | |  | cri-RI-PMI-CQI | cri-RI-PMI-CQI | cri-RI-PMI-CQI |
| timeRestrictionForChannelMeasurements | |  | not configured | not configured | not configured |
| timeRestrictionForInterferenceMeasurements | |  | not configured | not configured | not configured |
| cqi-FormatIndicator | |  | Wideband | Wideband | Wideband |
| pmi-FormatIndicator | |  | Wideband | Wideband | Wideband |
| Sub-band Size | | RB | 8 | 16 | 8 |
| csi-ReportingBand | |  | 1111111 | 1111111 | 111111111 |
| CSI-Report periodicity and offset | | slot | Not configured | Not configured | Not configured |
| Aperiodic Report Slot Offset | |  | 5 | 9 | 7 |
| CSI request | |  | 1 in slots i, where mod(i, 5) = 0, otherwise it is equal to 0 | 1 in slots i, where mod(i, 10) = 0, otherwise it is equal to 0 | 1 in slots i, where mod(i, 8) = 1, otherwise it is equal to 0 |
| reportTriggerSize | |  | 1 | 1 | 1 |
| CSI-AperiodicTriggerStateList | |  | One State with one Associated Report Configuration  Associated Report Configuration contains pointers to NZP CSI-RS and CSI-IM | One State with one Associated Report Configuration  Associated Report Configuration contains pointers to NZP CSI-RS and CSI-IM | One State with one Associated Report Configuration  Associated Report Configuration contains pointers to NZP CSI-RS and CSI-IM |
| Codebook configuration | Codebook Type |  | typeI-SinglePanel | typeI-SinglePanel | typeI-SinglePanel |
| Codebook Mode |  | 1 | 1 | 1 |
| (CodebookConfig-N1,CodebookConfig-N2) |  | N/A | N/A | N/A |
| CodebookSubsetRestriction |  | Not configured | Not configured | Not configured |
| RI Restriction |  | N/A | N/A | N/A |
| Physical channel for CSI report | |  | PUSCH | PUSCH | PUSCH |
| CQI/RI/PMI delay | | ms | 6 | 5.5 | 1.375 |
| Maximum number of HARQ transmission | |  | 1 | 1 | 1 |
| Test metric | |  | Option 1: Absolute Physical Layer Throughput at fixed SNROption 2: Target SNR@ 70% of max troughput. | | |

### 5.10.4 Simulation Results

5.10.5 Summary

<< End of change 1 >>