**3GPP TSG-RAN WG4 Meeting #102-e R4-22xxxxx**

**Electronic Meeting, 21st Feb – 3rd Mar, 2022**

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| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.101-4** | **CR** | **Draft** | **rev** | **-** | **Current version:** | **16.7.0** |  |
|  |
| *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 on updating to power saving requirements (TS38.101-4, Rel-16) |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_UE\_pow\_sav-PerfNR\_L1enh\_URLLC-Perf |  | ***Date:*** | 2022-02-25 |
|  |  |  |  |  |
| ***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 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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | Remove square brackets for Rel-16 power saving requirements. |
|  |  |
| ***Summary of change:*** | For removing square brackets, update clause 5.3.2.1.3, 5.2.2.1.7, 5.2.3.1.7. |
|  |  |
| ***Consequences if not approved:*** | There will be inconsistence between the specification 38.101-4 and RAN 4 agreements. |
|  |  |
| ***Clauses affected:*** | 5.3.2.1.3, 5.2.2.1.7, 5.2.3.1.7 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **X** |  |  Test specifications | TS 38.521-4 |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

*<START OF THE CHANGE 1>*

5.3.2.1.3 Minimum requirements for power saving

During the test the UE shall monitor the *DCI format 2\_6* PDCCH in DRX off state and decide whether to receive the following PDCCH in DRX on period.

The parameters specified in Table 5.3.2.1.3-1 are valid for FDD test unless otherwise stated.

**Table 5.3.2.1.3-1: Test Parameters**

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Unit** | **1 Tx Antenna** |
| CCE to REG mapping type |  | nonInterleaved |
| REG bundle size |  | 6 |
| Shift Index |  | 0 |
| DRX cycle | ms | 10 |
| ps-WakeUp-r16 |  | absent |
| Wake-up indication bit in DCI format 2\_6 |  | 1 |
| PDCCH DCI format 2\_6 configuration | PS-offset |  | $$(T\_{minimumTimeGap}+1)/2^{μ}/0.125$$ |
| Number of PDCCH candidates |  | 1 |
| Frequency domain resource allocation for CORESET |  | Start from RB = 0 with contiguous RB allocation |
| TCI state |  | TCI state #1 |
| PDCCH configuration | Slots for PDCCH monitoring |  | Each slot during DRX-on period |
|  |  |  |
| Note: TminimumTimeGap­ is signaled as a part of *drx-Adaptation-r16*UE capability. |

For the parameters specified in Table 5.3.2.1.3-1, the average probability of a missed downlink scheduling grant (Pm-dsg) observed on PDCCH during DRX on shall be below the specified value in Table 5.3.2.1.3-2. The downlink physical setup is in accordance with Annex C.3.1.

**Table 5.3.2.1.3-2: Minimum performance for PDCCH with 15 kHz SCS**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test number** | **Bandwidth (MHz)** | **CORESET RB** | **CORESET duration** | **Aggregation level** | **Reference Channel** | **Propagation Condition** | **Antenna configuration and correlation Matrix** | **Reference value** |
| **Pm-dsg (%)** | **SNR (dB)** |
| 1 | 10  | 48 | 2 | 4 | R.PDCCH. 1-2.4 FDD | TDLA30-10 | 1x2 Low | 1 | 5.5 |
| 2 | 8 | R.PDCCH. 1-2.7 FDD |

*<END OF THE CHANGE 1>*

*<START OF THE CHANGE 2>*

5.2.2.1.7 Minimum requirements for PDSCH Mapping Type B and UE processing capability 2

The performance requirements are specified in Table 5.2.2.1.7-3, with the addition of test parameters in Table 5.2.2.1.7-2 and the downlink physical channel setup according to Annex C.3.1.

The test purposes are specified in Table 5.2.2.1.7-1.

**Table 5.2.2.1.7-1: Tests purpose**

|  |  |
| --- | --- |
| **Purpose** | **Test index** |
| Verify PDSCH mapping Type B performance and UE processing capability 2 under two receive antenna conditions | 1-1 |

**Table 5.2.2.1.7-2: Test parameters**

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Unit** | **Value** |
| Duplex mode |  | FDD |
| Active DL BWP index |  | 1 |
| PDSCH configuration | Mapping type |  | Type B |
|  | k0 |  | 0 |
|  | Starting symbol (S)  |  | 2 |
|  | Length (L) |  | 2 |
|  | PDSCH aggregation factor |  | 1 |
|  | PRB bundling type |  | Static |
|  | PRB bundling size |  | 2 |
|  | Resource allocation type |  | Type 0 |
|  | RBG size |  | Config2 |
|  | VRB-to-PRB mapping type |  | Non-interleaved |
|  | VRB-to-PRB mapping interleaver bundle size |  | N/A |
| PDSCH DMRS configuration | DMRS Type |  | Type 1 |
|  | Number of additional DMRS |  | 0 |
|  | Maximum number of OFDM symbols for DL front loaded DMRS |  | 1 |
| Maximum number of HARQ transmission |  | 1 |
| Number of HARQ Processes |  | 2 |
| The number of slots between PDSCH and corresponding HARQ-ACK information |  | 0 |

**Table 5.2.2.1.7-3: Minimum performance for Rank 1**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Test num.** | **Reference channel** | **Bandwidth (MHz) / Subcarrier spacing (kHz)** | **Modulation format and code rate** | **Propagation condition** | **Correlation matrix and antenna configuration** | **Reference value** |
| **Fraction of maximum throughput (%)** | **SNR (dB)** |
| 1-1 | R.PDSCH.1-12.1 FDD | 10 / 15 | QPSK, 0.30 | TDLA30-10 | 2x2, ULA Low | 70 | 0.8 |

*<END OF THE CHANGE 2>*

*<START OF THE CHANGE 3>*

5.2.3.1.7 Minimum requirements for PDSCH Mapping Type B and UE processing capability 2

The performance requirements are specified in Table 5.2.3.1.7-3, with the addition of test parameters in Table 5.2.3.1.7-2 and the downlink physical channel setup according to Annex C.3.1.

The test purposes are specified in Table 5.2.3.1.7-1.

**Table 5.2.3.1.7-1: Tests purpose**

|  |  |
| --- | --- |
| **Purpose** | **Test index** |
| PDSCH mapping Type B performance and UE processing capability 2 under four receive antenna conditions | 1-1 |

**Table 5.2.3.1.7-2: Test parameters**

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Unit** | **Value** |
| Duplex mode |  | FDD |
| Active DL BWP index |  | 1 |
| PDSCH configuration | Mapping type |  | Type B |
| k0 |  | 0 |
| Starting symbol (S)  |  | 2 |
| Length (L) |  | 2 |
| PDSCH aggregation factor |  | 1 |
| PRB bundling type |  | Static |
| PRB bundling size |  | 2 |
| Resource allocation type |  | Type 0 |
| RBG size |  | Config2 |
| VRB-to-PRB mapping type |  | Non-interleaved |
| VRB-to-PRB mapping interleaver bundle size |  | N/A |
| PDSCH DMRS configuration | DMRS Type |  | Type 1 |
| Number of additional DMRS |  | 0 |
| Maximum number of OFDM symbols for DL front loaded DMRS |  | 1 |
| Maximum number of HARQ transmission |  | 1 |
| Number of HARQ Processes |  | 2 |
| The number of slots between PDSCH and corresponding HARQ-ACK information |  | 0 |

**Table 5.2.3.1.7-3: Minimum performance for Rank 1**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Test num.** | **Reference channel** | **Bandwidth (MHz) / Subcarrier spacing (kHz)** | **Modulation format and code rate** | **Propagation condition** | **Correlation matrix and antenna configuration** | **Reference value** |
| **Fraction of maximum throughput (%)** | **SNR (dB)** |
| 1-1 | R.PDSCH.1-12.1 FDD | 10 / 15 | QPSK, 0.30 | TDLA30-10 | 2x4, ULA Low | 70 | -2.3 |

*<END OF THE CHANGE 3>*