**3GPP TSG- RAN4 Meeting #112R4-241x**

**Maastricht, Netherlands, 19th – 23rd August, 2024**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** | **4808** | **rev** | **1** | **Current version:** | **18.6.0** |  |
|  | | | | | | | | |
| *For* [***HELP***](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:*** | CR on test cases for m-DCI based TCI dual states switch for multi-Rx | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | vivo | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_FR2\_multiRX\_DL-Perf | | | | |  | ***Date:*** | | | 2024-8-22 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | There are missing part in the test case for m-DCI based TCI dual states switch for multi-Rx. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | * Corrected erros in test enviorment. * Added OTA test parameters and figures for time multiplexed downlink transmissions during T1 and T2 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The test case for DCI based TCI dual states switch triggered with m-DCI is not completed. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | A.7.5.8.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS 38.533 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

# <Start of Change #1>

#### A.7.5.8.4 DCI based active TCI state switch with m-DCI for simultaneous reception

##### A.7.5.8.4.1 Test Purpose and Environment

The purpose of this test is to verify the active TCI state switch delay requirement defined in clause 8.10E.4.2. Supported test configuration is shown in Table A.7.5.8.4.1-1.

The test scenario comprises of one NR PCell (Cell 1) as given in Table A.7.5.8.4.1-2. Cell-specific parameters of NR PCell are specified in Table A.7.5.8.4.1-3 below. The OTA related test parameters for FR2 are shown in Table A.7.5.8.4.1-4.

PDCCHs indicating new transmissions shall be sent continuously on PCell to ensure that the UE would have ACK/NACK sending.

Before the test starts,

- UE is connected to Cell 1 (PCell) on radio channel 1 (PCC).

- UE is configured with 2 different TCI states for PCell, PDCCH TCI state 0 (QCL’d to SSB0) for CoresetpoolIndex 0 and PDCCH TCIstate 1 (QCL’d to SSB1) for CoresetpoolIndex 1, in Cell 1 before starting the test.

- UE is configured with *groupBasedBeamReporting-r17* for SSB index 3 and SSB index 4.

- *tci-PresentInDCI* is configured in the PDSCH configuration, i.e., TCI state for the PDSCHs is indiatcated as SSB index 3 and SSB index 4 pair.

The test consists of two time periods, T1 and T2. During T1, the time multiplexed (allocation in Frequency is symbolic) downlink transmissions from each Angle of Arrival is shown in Figure A.7.5.8.4.1-1. UE transmits periodic L1-RSRP group-based beam reports for SSB index 3 and SSB index 4. After UE transmits first valid L1-RSRP group-based beam report, both TCI state 3 and TCI state 4 are activated for CORESET index 0 and CORSET index 1.

At the beginning of T2, at slot n, UE receives DCI based PDSCH TCI state switch on CoresetpoolIndex 0 for indicating the TCI state switch of PDSCH to TCI state 3. At slot n+1, UE receives DCI based PDSCH TCI state switch on CoresetpoolIndex 1 for indicating the TCI state switch of PDSCH to TCI state 4. During T2, the time multiplexed (allocation in Frequency is symbolic) downlink transmissions from each Angle of Arrival is shown in Figure A.7.5.8.4.1-2.

The test equipment verifies the TCI state switch time in PCell by scheduling the UE on TCI state 3 and TCI state 4 simultaneously after slot n + 1 + *timeDurationForQCL*.

Table A.7.5.8.4.1-1: Supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |

Table A.7.5.8.4.1-2: General test parameters for TCI state switch

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| NR RF Channel Number |  | 1 | One NR radio channel is used for this test |
| Active PCell |  | Cell 1 | PCell on RF channel number 1. |
| CP length |  | Normal |  |
| DRX |  | OFF |  |
| T1 | s | 0.8 |  |
| T2 | s | 0.2 |  |

Table A.7.5.8.4.1-3: NR Cell specific test parameters for TCI state switch

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Cell 1 |
| Frequency Range |  | FR2 |
| Duplex mode |  | TDD |
| TDD configuration |  | TDDConf.3.1 |
| BWchannel |  | 100 MHz: NRB,c = 66 |
| Data RBs allocated |  | 24 |
| Initial DL BWP Configuration |  | DLBWP.0.2 |
| Dedicated DL BWP Configuration |  | DLBWP.1.1 |
| Initial UL BWP Configuration |  | ULBWP.0.2 |
| Dedicated UL BWP Configuration |  | ULBWP.1.1 |
| PDSCH Reference measurement channel |  | SR.3. 2 TDD |
| RMSI CORESET parameters |  | CR.3.1 TDD |
| Dedicated CORESET parameters |  | CCR.3.1 TDD |
| OCNG Patterns |  | OP. 5 |
| SSB Configuration |  | SSB.1 FR2 |
| SMTC Configuration |  | SMTC.1 |
| TCI State 0 |  | TCI. State.2 |
| TCI State 1 |  | TCI.State.3 |
| TCI State 3 |  | TCI. State.2 |
| TCI State 4 |  | TCI.State.3 |
| TRS Configuration |  | TRS.2.1 TDD  TRS.2.2 TDD |
| Correlation Matrix and Antenna Configuration |  | 1x2 Low |
| EPRE ratio of PSS to SSS | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS |  |  |
| EPRE ratio of PBCH to PBCH DMRS |  |  |
| EPRE ratio of PDCCH DMRS to SSS |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |
| EPRE ratio of PDSCH DMRS to SSS |  |  |
| EPRE ratio of PDSCH to PDSCH |  |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) |  |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) |  |  |
| Propagation Condition |  | No external noise (Note 2) |
| Note 1: OCNG shall be used such that a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The downlink connection between the System Simulator and the UE is without Additive White Gaussian Noise, and has no fading or multipath effects as specified in TS 38.521-2 B.0 [40]. | | |

Table A.7.5.8.4.1-4: OTA related test parameters for TCI state switch

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Cell 1 | | | | | | |
|  |  | SSB2 | | SSB3 | | | SSB4 | |
|  |  | T1 | T2 | T1 | | T2 | T1 | T2 |
| Angle of arrival configuration |  | Setup 6 according to clause A.3.15.3 | | | | | | |
|  |  | AoA1 | | | AoA2 | | AoA3 | |
| Assumption for UE beams Note 6 |  | Rough | | | | | | |
| Ês | dBm/SCS | -80.6 | -80.6 | -80.6 | | -80.6 | -80.6 | -80.6 |
| SS B\_RP Note 2 | dBm/ SCS | -80.6 | -80.6 | -80.6 | | -80.6 | -80.6 | -80.6 |
| BB Note 7 | dB | 8.3 | 8.3 | 8.3 | | 8.3 | 8.3 | 8.3 |
| IoNote2 | dBm/95.04 MHz Note4 | -55.41 | -55.41 | -55.41 | | -55.41 | -55.41 | -55.41 |
| Note 1: Void  Note 2: SS B\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: Void  Note 4: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone  Note 5: As observed with 0dBi gain antenna at the center of the quiet zone.  Note 6: Information about types of UE beam is given in B.2.1.3 and does not limit UE implementation or test system implementation.  Note 7: Calculation of Es/IotBB includes the effect of UE internal noise up to the value assumed for the associated Refsens requirement in clause 7.3.2 of TS 38.101-2 [19], and an allowance of 1dB for UE multi-band relaxation factor ΔMBP from TS 38.101-2 [19] Table 6.2.1.3-4. | | | | | | | | |



Figure A.7.5.8.4.1-1: Time multiplexed downlink transmissions during T1



Figure A.7.5.8.4.1-2: Time multiplexed downlink transmissions during T2

##### A.7.5.8.4.2 Test Requirements

After receiving two DCIs in slot n and slot n+1 during T2, UE shall:

- be able to start receiving on TCI state 3 and TCI state 4 simultaneously after slot n + *timeDurationForQCL*

The rate of correct events observed during repeated tests shall be at least 90%.

# <End of Change #1>