**3GPP TSG-RAN WG4 Meeting #95-e R4-2008532**

**Electronic Meeting, 25 May – 5 June, 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **38.133** | **CR** | **0707** | **rev** | **1** | **Current version:** | **15.9.0** |  |
|  |
| *For* ***[HE](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)******[LP](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)*** *on using this form: comprehensive instructions can be found at <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:***  | [CR] TCI state switch delay |
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| ***Source to WG:*** | ZTE Corporation |
| ***Source to TSG:*** | R4 |
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| ***Work item code:*** | NR\_newRAT-Core |  | ***Date:*** | 2020-05-15 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** | Rel-15 |
|  | *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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
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| ***Reason for change:*** | According to the current spec, when the TCI state switching involves QCL-TypeD (with SSB based L1-RSRP measurement) and other types, the value of TOuk is unclear since this situation falls into both categories when judging the value of TOuk: (below is copy-paste from the current spec)TOuk = 1 for CSI-RS based L1-RSRP measurement, and 0 for SSB based L1-RSRP measurement when TCI state switching involves QCL-TypeDTOuk = 1 when TCI state switching involves other QCL types |
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| ***Summary of change:*** |  To make this clear, we propose to clarify that “TOuk = 1 when TCI state switching involves other QCL types only”. |
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| ***Consequences if not approved:*** | The description is not clear what the value of TOuk if TCI state switching involves both QCL-TypeD and other QCL types. |
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| ***Clauses affected:*** | 8.10.3 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  | TS/TR ... CR ... |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ... |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |

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| ***This CR's revision history:*** | Revised from R4-2006891 |

*<start of the change>*

8.10.3 MAC-CE based TCI state switch delay

If the target TCI state is known, upon receiving PDSCH carrying MAC-CE activation command in slot n, UE shall be able to receive PDCCH with target TCI state of the serving cell on which TCI state switch occurs no later than at slot n+ THARQ +(3 ms +TOk\*(Tfirst-SSB + TSSB-proc)) / *NR slot length*. The UE shall be able to receive PDCCH with the old TCI state until slot n+ THARQ +(3 ms +TOk\*(Tfirst-SSB)) / *NR slot length*.

Where THARQ is the timing between DL data transmission and acknowledgement as specified in TS 38.213 [3];

Tfirst-SSB is time to first SSB transmission after MAC CE command is decoded by the UE;

 TSSB-proc = 2 ms;

TOk = 1 if target TCI state is not in the active TCI state list for PDSCH, 0 otherwise.

If the target TCI state is unknown, upon receiving PDSCH carrying MAC-CE activation command in slot n, UE shall be able to receive PDCCH with target TCI state of the serving cell on which TCI state switch occurs no later than at slot n+ THARQ +(3 ms + TL1-RSRP +TOuk\*(Tfirst-SSB+ TSSB-proc)) / *NR slot length*. The UE shall be able to receive PDCCH with the old TCI state until slot n+ THARQ +(3 ms+ TL1-RSRP +TOuk\*(Tfirst-SSB)) / *NR slot length*.

Where T L1-RSRP is the time for L1-RSRP measurement for Rx beam refinement, defined as

- TL1-RSRP\_Measurement\_Period\_SSB for SSB as specified in clause 9.5.4.1,

- with the assumption of M=1

- with TReport = 0

- TL1-RSRP\_Measurement\_Period\_CSI-RS for CSI-RS as specified in clause 9.5.4.2

- with the assumption of M=1 for periodic CSI-RS

- for aperiodic CSI-RS if number of resources in resource set at least equal to *MaxNumberRxBeam*

- with TReport = 0

TOuk = 1 for CSI-RS based L1-RSRP measurement, and 0 for SSB based L1-RSRP measurement when TCI state switching involves QCL-TypeD

TOuk = 1 when TCI state switching involves other QCL types only

TL1-RSRP\_Measurement\_Period\_SSB = 0 for SSBin FR2 and TL1-RSRP\_Measurement\_Period\_CSI-RS = 0 for CSI-RSin FR2, provided that the TCI state switching involves QCL-TypeA, QCL-TypeB or QCL-TypeC only.

Tfirst-SSB is time to first SSB transmission after L1-RSRP measurement when TCI state switching involves QCL-TypeD;

Tfirst-SSB is time to first SSB transmission after MAC CE command is decoded by the UE for other QCL types;

The SSB shall be the QCL-TypeA or QCL-TypeC to target TCI state

During MAC-CE based TCI state switch the UE is allowed an interruption due to one shot timing adjustment on the serving or any activated serving cells as defined in clause 8.2.

*<end of the change>*