**3GPP TSG-RAN4 Meeting #112 *R4-24xxxxx***

**Maastricht, Netherlands, Aug 19 – 23, 2024**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** | **draftCR** | **rev** | **1** | **Current version:** | **18.6.0** |  |
|  | | | | | | | | |
| *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:*** | (11-1 11-2) Draft CR on RSTD measurement accuracy TCs for RRC\_IDLE mode | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | vivo | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_pos\_enh2-Perf | | | | |  | ***Date:*** | | | 8/X/2024 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***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:*** | | Add test cases to verify RSTD measurement accuracy requirements without eDRX in RRC\_IDLE. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Add the TC for RSTD measurement accuracy without eDRX in RRC\_IDLE state for non-RedCap UE in FR1 (clause A.6.11.1.1). 2. Add the TC for RSTD measurement accuracy without eDRX in RRC\_IDLE state for non-RedCap UE in FR2 (clause A.7.11.1.1). | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | There will be no TCs for verifying RSTD measurement accuracy requirements without eDRX in RRC\_IDLE. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | A.6.11.1.1, A.7.11.1.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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.6.11.1.1 NR RSTD measurement accuracy test case for single positioning frequency layer in FR1 SA in RRC\_IDLE state for non-RedCap UE

##### A.6.11.1.1.1 Test purpose and environment

The purpose of the test is to verify that the RSTD measurement in RRC\_IDLE state without eDRX meets the accuracy requirements specified in clause 10.1.23.2 in an environment with AWGN propagation conditions.

The supported test configurations are listed in Table A.6.11.1.1.1-1.

Table A.6.11.1.1.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | 15 kHz SSB SCS, 20 MHz bandwidth, FDD duplex mode |
| 2 | 15 kHz SSB SCS, 20 MHz bandwidth, TDD duplex mode |
| 3 | 30 kHz SSB SCS, 50 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations. | |

In the test there are two synchronous cells: Cell 1 and Cell 2. Cell 1 is the reference as well as the PCell. Cell 2 is a neighbour cell. Both cells are on the same NR RF channel in FR1. The UE is configured with DRX cycle of 1.28s. The *NR-TDOA-ProvideAssistanceData* and *NR-TDOA-RequestLocationInformation* message as defined in TS 37.355 shall be provided to the UE before the start of the test. The test duration should be larger than the UE measurement period as defined in clause 5.6.2.5.

The RSTD accuracy test parameters are listed in Table A.6.11.1.1.1-2.

Table A.6.11.1.1.1-2: RSTD accuracy test parameters

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | Test 1 | | | Test 2 | |
| Cell 1 | Cell 2 | | Cell 1 | Cell 2 |
| PRS ARFCN | 1~3 |  | freq1 | Freq1 | | freq1 | Freq1 |
| BWchannel | 1 | MHz | 20: NRB,c = 106 | | | 20: NRB,c = 106 | |
| 2 | 20: NRB,c = 106 | | | 20: NRB,c = 106 | |
| 3 | 50: NRB,c = 133 | | | 50: NRB,c = 133 | |
| Duplex mode | 1 |  | FDD | | | FDD | |
| 2 | TDD | | | TDD | |
| 3 | TDD | | | TDD | |
| TDD configuration | 1 |  | N/A | | | N/A | |
| 2 | TDDConf.1.1 | | | TDDConf.1.1 | |
| 3 | TDDConf.2.1 | | | TDDConf.2.1 | |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD | - | | SR.1.1 FDD | - |
| 2 | SR.1.1 TDD |  | | SR.1.1 TDD |  |
| 3 | SR.2.1 FDD |  | | SR.2.1 FDD |  |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD | - | | CR.1.1 FDD | - |
| 2 | CR.1.1 TDD | - | | CR.1.1 TDD | - |
| 3 | CR.2.1 FDD | - | | CR.2.1 FDD | - |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD | - | | CCR.1.1 FDD | - |
| 2 | CCR.1.1 TDD | - | | CCR.1.1 TDD | - |
| 3 | CCR.2.1 TDD | - | | CCR.2.1 TDD | - |
| SSB configuration | 1 |  | SSB.1 FR1 | | | SSB.1 FR1 | |
| 2 | SSB.1 FR1 | | | SSB.1 FR1 | |
| 3 | SSB.2 FR1 | | | SSB.2 FR1 | |
| OCNG Patterns | 1~3 |  | OP.1 | | | OP.1 | |
| TRS configuration | 1 |  | TRS.1.1 FDD | | - | TRS.1.1 FDD |  |
| 2 | TRS.1.1 TDD | |  | TRS.1.1 TDD |  |
| 3 | TRS.1.2 TDD | |  | TRS.1.2 TDD |  |
| Initial BWP Configuration | 1~3 |  | DLBWP.0.1  ULBWP.0.1 | | | DLBWP.0.1  ULBWP.0.1 | |
| Time offset with Cell 1 | 1 | μs | - | 3 | | - | 3 |
| 2,3 | - | 3 | | - | 3 |
| SMTC configuration | 1 |  | SMTC.2 | | | SMTC.2 | |
| 2,3 | SMTC.1 | | | SMTC.1 | |
| PRS configuration | 1 |  | PRS.1.3 FR1 | | | PRS.1.4 FR1 | |
| 2 | PRS.1.3 FR1 | | | PRS.1.4 FR1 | |
| 3 | PRS.2.3 FR1 | | | PRS.2.4 FR1 | |
| PRS muting info | 1~3 |  | ‘10’ | ‘01’ | | ‘10’ | ‘01’ |
| Expected RSTD | 1, 2, 3 | μs | N/A | 3 | | N/A | 3 |
| Expected RSTD uncertainty | 1, 2, 3 | μs | N/A | 5 | | N/A | 5 |
| EPRE ratio of PSS to SSS | 1~3 | dB | 0 | 0 | | 0 | 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 DMRS |
| EPRE ratio of OCNG DMRS to SSSNote 1 |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |
| Note2 | 1,2 | dBm/ SCS | -98 | | | -98 | |
| 3 | -95 | | | -95 | |
|  | 1~3 | dB | -6 | -13 | | -6 | -13 |
| PRS-RSRPNote3 | 1,2 | dBm/SCS | -103.7 | -109.9 | | -103.7 | -109.9 |
| 3 | -100.7 | -106.9 | | -100.7 | -106.9 |
| IoNote3 | 1,2 | dBm/  19.08MHz | -65.70 | -65.70 | | -65.70 | -65.70 |
| 3 | dBm/  47.88MHz | -61.72 | -61.72 | | -61.72 | -61.72 |
|  | 1~3 | dB | -5.7 | -11.9 | | -5.7 | -11.9 |
| Propagation condition | 1~3 | - | AWGN | | | AWGN | |
| Antenna configuration | 1~3 |  | 1x2 | | | 1x2 | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: Void. | | | | | | | |

##### A.6.11.1.1.2 Test requirements

The RSTD measurement accuracy for Cell 2 shall fulfil the absolute requirement in clause 10.1.23.2.

# **--- End of Change #1 ---**

# **--- Start of Change #2---**

#### A.7.11.1.1 NR RSTD measurement reporting delay test case for single positioning frequency layer in FR2 SA in RRC\_IDLE state for non-RedCap UE

##### A.7.11.1.1.1 Test purpose and environment

The purpose of the test is to verify that the RSTD measurement in RRC\_IDLE state without eDRX meets the accuracy requirements specified in clause 10.1.23.2 in an environment with AWGN propagation conditions.

The supported test configurations are specified in Table A.7.11.1.1.1-1.

Table A.7.11.1.1-1: Supported test configurations

|  |  |
| --- | --- |
| PCell configuration | Description |
| 1 | 120 kHz SSB SCS, 200 MHz bandwidth, TDD duplex mode |

In the test there are two synchronous cells: Cell 1 and Cell 2. Cell 1 is the reference as well as the PCell. Cell 2 is a neighbour cell. Both cells are on the same NR RF channel in FR2. The UE is configured with DRX cycle of 0.64s. The *NR-TDOA-ProvideAssistanceData* and *NR-TDOA-RequestLocationInformation* message as defined in TS 37.355 shall be provided to the UE before the start of the test. The test duration should be larger than the UE measurement period as defined in clause 5.6.2.5.

The RSTD accuracy test parameters are listed in Table A.7.11.1.1.1-2, and the RSTD accuracy OTA related test parameters are listed in Table A.7.11.1.1.1-3.

Table A.7.11.1.1.1-2: RSTD accuracy test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test 1 | | Test 2 | |
|  |  | Cell 1 | Cell 2 | Cell 1 | Cell 2 |
| PRS ARFCN |  | freq1 | | freq1 | |
| Duplex mode |  | TDD | | TDD | |
| TDD configuration |  | TDDConf.3.1 | | TDDConf.3.1 | |
| BWchannel | MHz | 200: NRB,c = 132 | | 200: NRB,c = 132 | |
| Downlink initial BWP configuration |  | DLBWP.0.1 | - | DLBWP.0.1 | - |
| Uplink initial BWP configuration |  | ULBWP.0.1 | - | ULBWP.0.1 | - |
| Uplink dedicated BWP configuration |  | ULBWP.1.1 | - | ULBWP.1.1 | - |
| TRS configuration |  | TRS.2.1 TDD | - | TRS.2.1 TDD | - |
| TCI state |  | TCI.State.0 | - | TCI.State.0 | - |
| PDSCH Reference measurement channel |  | SR.3.1 TDD | - | SR.3.1 TDD | - |
| RMSI CORESET Reference Channel |  | CR.3.1 TDD | - | CR.3.1 TDD | - |
| Control channel RMC |  | CCR.3.1 TDD | - | CCR.3.1 TDD | - |
| OCNG Patterns |  | OP.3 | OP.3 | OP.3 | OP.3 |
| SSB configuration |  | SSB.3 FR2 | SSB.3 FR2 | SSB.3 FR2 | SSB.3 FR2 |
| SMTC configuration |  | SMTC.1 | SMTC.1 | SMTC.1 | SMTC.1 |
| PRS configuration |  | PRS.1.1 FR2 | PRS.1.1 FR2 | PRS.1.2 FR2 | PRS.1.2 FR2 |
| PRS Resource slot offset | slot | 0 | 4 | 0 | 4 |
| Expected RSTD | μs | N/A | 3 | N/A | 3 |
| Expected RSTD uncertainty | μs | N/A | 5 | N/A | 5 |
| Time offset with Cell 1 | μs | - | 3 | - | 3 |
| PDSCH/PDCCH subcarrier spacing | kHz | 120 | 120 | 120 | 120 |
| EPRE ratio of PSS to SSS | dB | 0 | 0 | 0 | 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\_DMRS |  |  |  |  |  |
| EPRE ratio of OCNG DMRS to SSSNote 1 |  |  |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |  |  |  |  |  |
| Propagation conditions |  | AWGN | AWGN | AWGN | AWGN |
| Antenna configuration |  | 1x2 | 1x2 | 1x2 | 1x2 |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. | | | | | |

Table A.7.11.1.1.1-3: RSTD accuracy OTA related test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test 1 | | Test 2 | |
|  |  | Cell 1 | Cell 2 | Cell 1 | Cell 2 |
| Angle of arrival configuration |  | Setup 1 according to clause A.3.15.1 | | | |
| Assumption for UE beamsNote 5 |  | Rough | | Rough | |
| Note1 | dBm/SCSNote3 | -89 | | -89 | |
|  | dB | -5.7 | -11.9 | -5.7 | -11.9 |
| PRS-RSRPNote2 | dBm/SCS | -94.7 | -100.9 | -94.7 | -100.9 |
| BB Note4 | dB | -6 | -13 | -6 | -13 |
| IoNote2 | dBm/190.08 MHz Note3 | -55.75 | -55.75 | -55.75 | -55.75 |
| Note 1: Where used, interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 2: SSB\_RP, Es/Iot and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone  Note 4: 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 36.101-2 [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.  Note 5: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation | | | | | |

##### A.7.11.1.1.2 Test requirements

The RSTD measurement accuracy for Cell 2 shall fulfil the absolute requirement in clause 10.1.23.2.

# **--- End of Change #2 ---**