**3GPP TSG-RAN WG4 Meeting # 112-bis *R4-241xxxx***

**Hefei, CN, 14 – 18 October, 2024**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** | **draftCR** | **rev** | **1** | **Current version:** | **18.7.0** |  |
|  | | | | | | | | |
| *For* ***[HE](http://www.3gpp.org/3G_Specs/CRs.htm" \l "_blank)******[LP](http://www.3gpp.org/3G_Specs/CRs.htm" \l "_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 | **X** | Radio Access Network |  | Core Network |  |

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|  | | | | | | | | | | |
| ***Title:*** | draftCR on test cases for LPHAP | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_pos\_enh2-Perf | | | | |  | ***Date:*** | | | 2024-10-18 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | To make corrections to LPHAP test cases. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | - corrections based on agreement from RAN4#112 are made.  - Removal of brackets from parameters that were endorsed in RAN4#112. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The performance part is not complete. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | New clauses: A.6.8.1.4, A.6.8.2.3, A.6.8.3.3, A.6.8.4.3, A.6.10.2.2, A.6.11.1.1, A.6.11.2.2, A.7.8.1.4, A.7.8.2.3, A.7.8.3.4, A.7.8.4.3, A.7.10.1.1, A.7.10.1.2, A.7.10.2.2, A.7.11.1.1, A.7.11.1.2, A.16.8.1.3, A.16.8.2.3, A.16.8.3.3, A.16.8.4.3, A.16.10.1.2, A.16.10.2.2, A.16.11.2.2, A.17.8.1.3, A.17.8.2.3, A.17.8.3.3, A.17.8.4.3, A.17.10.1.2, A.17.10.2.2, A.17.11.1.2, A.17.11.2.2. | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | | Corrections based on updated version of big draftCR endorsed in RAN4#112. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | R4-2416322 | | | | | | | | |

## **--- Start of Change # 1 ---**

#### A.6.8.1.4 NR RSTD measurement reporting delay test case for single positioning frequency layer in FR1 SA in RRC\_INACTIVE state when eDRX cycle > 10.24s for non-RedCap UE

##### A.6.8.1.4.1 Test Purpose and Environment

The purpose of the test is to verify that the RSTD measurement meets the requirements specified in Clause 5.6.2.5 when the configured eDRX cycle is longer than 10.24s in an environment with AWGN propagation conditions in FR1 in standalone scenario when single positioning frequency layer is configured.

The supported test configurations are specified in Table A.6.8.1.4.1-1.

Table A.6.8.1.4.1-1: 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 three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is the reference as well as the PCell. Cell 2 and Cell 3 are the neighbour cells. All 3 cells are on the same RF channel in FR1.

The test consists of two consecutive time intervals, with duration of T1 and T2. During time duration T1, the UE shall be in RRC\_CONNECTED state and shall not have any timing information of Cell 2 and Cell 3. During T2 UE shall be in RRC\_INACTIVE state and all three cells transmit PRS resources within initial DL BWP of the UE and with the same numerology as the initial DL BWP.

***Note****: The information on when PRS is muted is conveyed to the UE using PRS muting information.*

The *NR-DL-TDOA-ProvideAssistanceData* and *nr-DL-TDOA-RequestLocationInformation* as defined in TS 37.355 [34, clause 6.5.10], shall be provided to the UE during T1. The UE is configured to report positioning measurements every 20s via *reportingInterval* in *nr-DL-TDOA-RequestLocationInformation* such the value of *reportingInterval* is set to "*ri20*". The last TTI containing the two messages shall be provided to the UE ΔT ms before the start of T2, where ΔT = 50 ms is the maximum processing time of the DL-TDOA assistance data and location information request.

The beginning of the time interval T2 is not limited to PTW.

The UE is configured with eDRX cycle of 40.96s.

The general test parameters are listed in Table A.6.8.1.4.1-2, and cell specific test parameters are listed in Table A.6.8.1.4.1-3 and Table A.6.8.1.4.1-4.

Table A.6.8.1.4.1-2: General test parameters for RSTD measurement reporting delay

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| Reference cell | |  | Cell 1 | Reference cell is the cell in the DL-TDOA assistance data with respect to which the RSTD measurement is defined, as specified in TS 38.215 [4] and TS 37.355 [34]. The reference cell is the PCell in this test case. |
| Neighbor cells | |  | Cell 2 and Cell 3 | Cell 2 and Cell 3 appear at the first and second places in the neighbour cell list in the DL-TDOA assistance data. |
| SSB configuration | Config 1 |  | SSB.1 FR1 |  |
| Config 2 |  | SSB.1 FR1 |
| Config 3 |  | SSB.2 FR1 |
| SMTC configuration | Config 1 |  | SMTC.2 |  |
| Config 2 |  | SMTC.1 |
| Config 3 |  | SMTC.1 |
| PDSCH RMC configuration | Config 1 |  | SR.1.1 FDD |  |
| Config 2 |  | SR.1.1 TDD |  |
| Config 3 |  | SR.2.1 TDD |  |
| RMSI CORESET RMC configuration | Config 1 |  | CR.1.1 FDD | As specified in clause A.3.1.2.1 |
| Config 2 |  | CR.1.1 TDD |  |
| Config 3 |  | CR.2.1 TDD |  |
| Dedicated CORESET RMC configuration | Config 1 |  | CR.1.1 FDD |  |
| Config 2 |  | CR.1.1 TDD |  |
| Config 3 |  | CR.2.1 TDD |  |
| Initial BWP configuration | Config 1,2,3 |  | DLBWP.0.1  ULBWP.0.1 |  |
| Active UL BWP configuration | Config 1,2,3 |  | ULBWP.1.1 |  |
| PRS Configuration | Config 1 |  | PRS.1.1 FR1 | As specified in clause A.3.31 |
| Config 2 |  | PRS.1.2 FR1 |
| Config 3 |  | PRS.2.1 FR1 |
| Physical cell ID PCI | |  | (PCI of Cell 1 – PCI of Cell 2) mod 6 = 0  and  (PCI of Cell 1 – PCI of Cell 3) mod 6 = 0 | The cell PCIs are selected such that the relative shifts of PRS patterns among cells are as given by the test parameters |
| CP length | |  | Normal |  |
| DRX | | s | 1.28 |  |
| CN and RAN eDRX configuration | | s | eDRX length = 40.96  PTW length = 10.24 |  |
| Radio frame receive time offset between the cells at the UE antenna connector | | μs | Cell 2 to Cell 1: 0  Cell 3 to Cell 1: 3 | PRS are transmitted from synchronous cells |
| Expected RSTD | | μs | Cell 2: 3  Cell 3: 3  Other neighbour cells: randomly between -3 and 3 | The expected RSTD is what is expected at the receiver. The corresponding parameter in the DL-TDOA assistance data specified in TS 37.355 [34] is the expectedRSTD indicator |
| Expected RSTD uncertainty for all neighbour cells | | μs | 5 | The corresponding parameter in the DL-TDOA assistance ta specified in TS 37.355 [34] is the expectedRSTD-Uncertainty index |
| Number of cells provided in DL-TDOA assistance data | |  | 4 | Including the reference cell |
| PRS muting info | |  | Cell 1: ‘10’  Cell 2: ‘01’  Cell 3: ‘10’ | Correponds to *NR-MutingPattern* defined in TS 37.355 [34] |
| PRS resource RE offset | |  | Cell 1: 0  Cell 2: 0  Cell 3: 1 | Cell 1 and Cell 3 are configured with different resource offsets |
| T1 | | s | 3 | The length of the time interval from the beginning of each test |
| T2 | | s | 5 | The length of the time interval that follows immediately after time interval T1. |

Table A.6.8.1.4.1-3: Cell-specific test parameters for RSTD measurement reporting delay during T1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 | Cell 2 | Cell 3 |
| NR RF Channel Number | |  | 1 | 1 | 1 |
| Positiong frequency layer | |  | 1 | 1 | 1 |
| Correlation Matrix and Antenna Configuration | |  | 12 Low | 12 Low | 12 Low |
| OCNG patterns defined in A.3.2.1 | |  | OP.1 | N/A | N/A |
| Note 3 | Config 1 | dBm/SCS | -98 | | |
| Config 2 | dBm/SCS | -98 | | |
| Config 3 | dBm/SCS | -95 | | |
| PRS | | dB | -Infinity | -Infinity | -Infinity |
| SSB | | dB | 10 | -Infinity | -Infinity |
| Io Note 4 | Config 1 | dBm/  19.08MHz | -56.54 | -56.54 | -56.54 |
| Config 2 | dBm/  19.08MHz | -56.54 | -56.54 | -56.54 |
| Config 3 | dBm/  47.88MHz | -52.56 | -52.56 | -52.56 |
| SSB RP Note4 | Config 1 | dBm/SCS | -88 | -Infinity | -Infinity |
| Config 2 | dBm/SCS | -88 | -Infinity | -Infinity |
| Config 3 | dBm/SCS | -85 | -Infinity | -Infinity |
| Propagation Condition | |  | AWGN | | |
| Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The resources for uplink transmission are assigned after the end of time period T2 to UEs that do not support SDT for measurement reporting.  Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled.  Note 4: SSB RP and Io levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. | | | | | |

Table A.6.8.1.4.1-4: Cell-specific test parameters for RSTD measurement reporting delay during T2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 | Cell 2 | Cell 3 |
| T2 | T2 | T2 |
| NR RF Channel Number | |  | 1 | 1 | 1 |
| Correlation Matrix and Antenna Configuration | |  | 12 Low | 12 Low | 12 Low |
| OCNG patterns defined in A.3.2.1 | |  | OP.1 | OP.1 | OP.1 |
| PRACH configuration | |  | FR1 PRACH configuration 1 | FR1 PRACH configuration 1 | FR1 PRACH configuration 1 |
| Note 3 | Config 1 | dBm/SCS | -98 | -98 | -98 |
| Config 2 | dBm/SCS | -98 | -98 | -98 |
| Config 3 | dBm/SCS | -95 | -95 | -95 |
| PRS | Config 1 | dB | -5.45 | -11.67 | -11.67 |
| Config 2 | dB | -5.45 | -11.67 | -11.67 |
| Config 3 | dB | -5.45 | -11.67 | -11.67 |
| Io Note 4 | Config 1 | dBm/  19.08MHz | -65.43 | -65.43 | -65.43 |
| Config 2 | dBm/  96.48MHz | -65.43 | -65.43 | -65.43 |
| Config 3 | dBm/  47.88MHz | -61.44 | -61.44 | -61.44 |
| PRS | | dB | -6 | -13 | -13 |
| Propagation Condition | |  | AWGN | | |
| Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T2) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS.  Note 2: The resources for uplink transmission are assigned after the end of time period T2 to UEs that do not support SDT for measurement reporting.  Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled. | | | | | |

##### A.6.8.1.4.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 5.6.2.5.

The UE shall perform and report the RSTD measurements for Cell 2 and Cell 3 with respect to the reference cell in the DL-TDOA assistance data, Cell 1, within the time duration specified in section 5.6.2.5 starting from the beginning of time interval T2.

***NOTE****: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.*

A test is considered complete after the UE reports the first set of positioning measurements based on the configured *reportingInterval*. The rate of the correct events for each neighbour cell observed during the repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in the Clause 10.1.23.3, i.e., between RSTD\_000000000 and RSTD\_126083073.

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

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

#### A.6.8.2.3 PRS-RSRP reporting delay test case in RRC\_INACTIVE state in FR1 with eDRX cycle > 10.24s

##### A.6.8.2.3.1 Test purpose and Environment

The purpose of the test is to verify that the PRS-RSRP measurement in RRC\_INACTIVE with eDRX meets the delay requirements specified in clause 5.6.3.5 in an environment with AWGN propagation conditions.

The supported test configurations are specified in Table A.6.8.2.3.1-1.

Table A.6.8.2.3.1-1: 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 test consists of two consecutive time intervals, with duration of T1 and T2. Both cells transmit PRS during T2.

During T1 UE is in RRC\_CONNECTED, the *NR-DL-AoD-RequestLocationInformation* message and *NR-DL-AoD-ProvideAssistanceData* message as defined in TS 37.355 shall be provided to the UE during T1. The last slot containing the two messages for the assistance data and location information request is denoted as #n. In the next DL slot after slot #n, UE is released into RRC\_INACTIVE.

The beginning of the time interval T2 is the first PRS resource occasion occurring ΔT after the slot #n, where ΔT = 50 ms is the maximum processing time of the assistance data and location information request.

The general test parameters are listed in Table A.6.8.2.3.1-2, and cell specific test parameters are listed in Table A.6.8.2.3.1-3.

Table A.6.8.2.3.1-2: General test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Value** | **Comment** |
| Reference cell |  | 1, 2, 3 | Cell 1 | Cell 1 is the PCell and the DL-AoD reference cell in the positioning assistance data. |
| Neighbour cell |  | 1, 2, 3 | Cell 2 | Cell 2 is a neighbour cell in the positioning assistance data. |
| RF Channel Number |  | 1, 2, 3 | 1: Cell 1 and Cell 2 |  |
| BWchannel | MHz | 1 | 20: NRB,c = 106 |  |
| 2 | 20: NRB,c = 106 |  |
| 3 | 50: NRB,c = 133 |  |
| SSB configuration |  | 1 | SSB.1 FR1 |  |
|  |  | 2 | SSB.1 FR1 |  |
|  |  | 3 | SSB.2 FR1 |  |
| SMTC configuration |  | 1 | SMTC.2 |  |
|  |  | 2 | SMTC.1 |  |
|  |  | 3 | SMTC.1 |  |
| CP length |  | 1, 2, 3 | Normal |  |
| DRX | s | 1, 2, 3 | 1.28 |  |
| eDRX cycle length (for both RAN and CN) | s | 1, 2, 3 | 40.96 |  |
| PTW window length | s | 1, 2, 3 | 1.28 |  |
| Reporting periodicity | s | 1, 2, 3 | 20 | *reportingInterval* for periodic reporting defined in TS 37.355 [4]. |
| Time offset between serving and neighbour cells | μs | 1, 2, 3 | 3 | Synchronous cells |
| Expected RSTD | μs | 1, 2, 3 | 3 |  |
| Expected RSTD uncertainty | μs | 1, 2, 3 | 5 |  |
| T1 | s | 1, 2, 3 | 5 |  |
| T2 | s | 1, 2, 3 | 10 |  |

Table A.6.8.2.3.1-3: Cell specific test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Cell 1** | | **Cell 2** | |
| **T1** | **T2** | **T1** | **T2** |
| TDD configuration |  | 1 | N/A | | N/A | |
|  |  | 2 | TDDConf.1.1 | | TDDConf.1.1 | |
|  |  | 3 | TDDConf.2.1 | | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | N/A | |
|  | 2 | SR.1.1 TDD | |  | |
|  | 3 | SR.2.1 TDD | |  | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | N/A | |
|  | 2 | CR.1.1 TDD | |
|  | 3 | CR.2.1 TDD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | | N/A | |
|  | 2 | CCR.1.1 TDD | |
|  | 3 | CCR.2.1 TDD | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | OP.1 | |
| Initial BWP configuration |  | 1, 2, 3 | DLBWP.0.1 ULBWP.0.1 | | N/A | |
| PRS configuration |  | 1 | PRS.1.4 FR1 | | PRS.1.4 FR1 | |
|  | 2 | PRS.1.4 FR1 | | PRS.1.4 FR1 | |
|  | 3 | PRS.2.4 FR1 | | PRS.2.4 FR1 | |
| PRS muting info |  | 1, 2, 3 | ‘10’ | | ‘01’ | |
| Note 2 | dBm/SCS | 1 | -98 | | | |
|  | 2 | -98 | | | |
|  | 3 | -95 | | | |
| Note 2 | dBm/15 kHz | 1 | -98 | | | |
|  | 2 |  | | | |
|  | 3 |  | | | |
| PRS | dB | 1 | -Infinity | -2.41 | -Infinity | -12.12 |
|  | 2 |  |  |  |  |
|  | 3 |  |  |  |  |
| PRS | dB | 1 | -Infinity | -2 | -Infinity | -10 |
|  | 2 |  |  |  |  |
|  | 3 |  |  |  |  |
| PRS-RSRP Note 3 | dBm/SCS kHz | 1 | -Infinity | -100 | -Infinity | -108 |
|  |  | 2 | -Infinity | -100 | -Infinity | -108 |
|  |  | 3 | -Infinity | -97 | -Infinity | -105 |
| SS-RSRP Note 3 | dBm/SCS kHz | 1 | -88 | -88 | -Infinity | -88 |
| 2 | -88 | -88 | -Infinity | -88 |
| 3 | -85 | -85 | -Infinity | -85 |
| Io | dBm/19.08 MHz | 1 | N/A | -64.57 | N/A | -64.57 |
|  | dBm/19.08 MHz | 2 | -64.57 | -64.57 |
|  | dBm/47.88 MHz | 3 | -60.59 | -60.59 |
| Propagation Condition |  | 1, 2, 3 | AWGN | | | |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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: SS-RSRP/PRS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | |

##### A.6.8.2.3.2 Test Requirements

The UE shall perform and report the PRS-RSRP measurements for Cell 1 and Cell 2, within the time limit specified in clause 5.6.3.5, starting from the beginning of time interval T2.

NOTE: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.

A test is considered complete after the UE reports the first set of positioning measurements based on the configured *reportingInterval*. The rate of correct events observed during repeated tests shall be at least 90%.

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

## **--- Start of Change # 3 ---**

#### A.6.8.3.3 UE Rx-Tx time difference measurement for single positioning frequency layer with eDRX > 10.24s in FR1 SA

##### A.6.8.3.3.1 Test purpose and environment

The purpose of the test is to verify the measurement requirements specified in clause 5.6.4.5 for UE Rx-Tx measurements in RRC\_INACTIVE with eDRX. The tests are conducted under AWGN propagation condition with the UE operating in FR1 stand-alone mode and configured to perform UE Rx-Tx measurements on a single positioning frequency layer (PFL) in FR1.

The supported test configuration in listed in Table A.6.8.3.3.1-1.

Table A.6.8.3.3.1-1: Supported test configurations

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

There are two cells in the test: PCell (Cell 1) and a neighbour cell (Cell 2). Both cells are on the same RF channel in FR1.

The test consists of two consecutive time intervals, with duration of T1 and T2. The UE shall be in RRC\_CONNECTED state during T1 and in RRC\_INACTIVE state during T2. Cell 1 and Cell 2 transmit PRS only during the second time interval of duration T2. Similarly, the UE is configured to transmit positioning SRS during only during the second time interval of duration T2.

The *NR-Multi-RTT-ProvideAssistanceData* and *nr-Multi-RTT-RequestLocationInformation* as defined in TS 37.355 [34, clause 6.5.12.1], shall be provided to the UE during T1. The last TTI of the last message shall be provided to the UE ΔT ms before the start of T2, where ΔT = 50 ms is the maximum processing time of the multi-RTT assistance data and location information request.

The beginning of the time interval T2 shall be aligned with the beginning of the first DRX cycle in RRC\_INACTIVE.

The general test parameters and cell specific test parameters are as given in Table A.6.8.3.3.1-2 and Table A.6.8.3.3.1-3, respectively.

Table A.6.8.3.3.1-2: General test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Value** | **Comment** |
| Active cell |  | 1, 2, 3 | Cell 1 | Cell 1 is the PCell in *NR-Multi-RTT-ProvideAssistanceData* [34]. |
| Neighbour cell |  | 1, 2, 3 | Cell 2 | Cell 2 is a neighbour cell in *NR-Multi-RTT-ProvideAssistanceData* [34]. |
| RF Channel Number |  | 1, 2, 3 | 1 | For both Cell 1 and Cell 2 |
| BWchannel | MHz | 1 | 20: NRB,c = 106 |  |
| 2 | 20: NRB,c = 106 |  |
| 3 | 50: NRB,c = 133 |  |
| SSB configuration |  | 1 | SSB.1 FR1 |  |
|  |  | 2 | SSB.1 FR1 |  |
|  |  | 3 | SSB.2 FR1 |  |
| SMTC configuration |  | 1 | SMTC.2 |  |
|  |  | 2 | SMTC.1 |  |
|  |  | 3 | SMTC.1 |  |
| CP length |  | 1, 2, 3 | Normal |  |
| DRX cycle |  | 1, 2, 3 | 1.28s |  |
| eDRX cycle length (for both RAN and CN) | s | 1,2, 3 | 40.96 |  |
| PTW window length | s | 1, 2, 3 | 1.28 |  |
| Reporting periodicity | s | 1, 2, 3 | 20 | *reportingInterval* for periodic reporting defined in TS 37.355 [4]. |
| Time offset between serving and neighbour cells | μs | 1, 2, 3 | 3 | Synchronous cells |
| Expected RSTD | μs | 1, 2, 3 | 3 |  |
| Expected RSTD uncertainty | μs | 1, 2, 3 | 5 |  |
| T1 | s | 1, 2, 3 | 5 |  |
| T2 | s | 1, 2, 3 | 10 |  |

Table A.6.8.3.3.1-3: Cell specific test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Cell 1** | | **Cell 2** | |
|  |  | **T1** | **T2** | **T1** | **T2** |
| TDD configuration |  | 1 | N/A | | N/A | |
|  | 2 | TDDConf.1.1 | | TDDConf.1.1 | |
|  |  | 3 | TDDConf.2.1 | | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | N/A | |
|  | 2 | SR.1.1 TDD | |  | |
|  | 3 | SR.2.1 TDD | |  | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | N/A | |
|  | 2 | CR.1.1 TDD | |
|  |  | 3 | CR.2.1 TDD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | | N/A | |
|  | 2 | CCR.1.1 TDD | |
|  | 3 | CCR.2.1 TDD | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | OP.1 | |
| EPRE ratio of PSS to SSS | dB | 1, 2, 3 | 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 |
| EPRE ratio of PRS to SSS |
| TRS Configuration |  | 1 | TRS.1.1 FDD | | N/A | |
|  | 2 | TRS.1.1 TDD | |
|  |  | 3 | TRS.1.2 TDD | |
| Initial BWP configuration |  | 1, 2, 3 | DLBWP.0.1 ULBWP.0.1 | | N/A | |
| Active DL BWP configuration |  | 1 | DLBWP.1.1 | | N/A | |
| Active UL BWP configuration |  | 1 | ULBWP.1.1 | | N/A | |
| PRS configuration |  | 1 | PRS.1.2 FR1 | | PRS.1.2 FR1 | |
|  | 2 | PRS.1.2 FR1 | | PRS.1.2 FR1 | |
|  | 3 | PRS.2.2 FR1 | | PRS.2.2 FR1 | |
| PRS muting info |  | 1, 2, 3 | ‘10’ | | ‘01’ | |
| SRS configuration |  | 1 | POS-SRS.1 | | N/A | |
|  |  | 2 | POS-SRS.1 | | N/A | |
|  |  | 3 | POS-SRS.2 | | N/A | |
| Note 2 | dBm/SCS | 1 | -98 | | | |
|  | 2 | -98 | | | |
|  | 3 | -95 | | | |
| Note 2 | dBm/15 kHz | 1 | -98 | | | |
|  | 2 |  | | | |
|  | 3 |  | | | |
| PRS | dB | 1 | -Infinity | -2.41 | -Infinity | -12.12 |
|  | 2 |  |  |  |  |
|  |  | 3 |  |  |  |  |
| PRS | dB | 1 | -Infinity | -2 | -Infinity | -10 |
|  | 2 |  |  |  |  |
|  |  | 3 |  |  |  |  |
| PRP Note 3 | dBm/SCS kHz | 1 | -Infinity | -100 | -Infinity | -108 |
|  | 2 | -Infinity | -100 | -Infinity | -108 |
|  | 3 | -Infinity | -97 | -Infinity | -105 |
| Io | dBm/19.08 MHz | 1 | N/A | -64.57 | N/A | -64.57 |
| dBm/19.08 MHz | 2 | -64.57 | -64.57 |
| dBm/47.88 MHz | 3 | -60.59 | -60.59 |
| Propagation Condition |  | 1, 2, 3 | AWGN | | | |
| 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: PRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. | | | | | | |

##### A.6.8.3.3.2 Test requirements

The UE Rx-Tx time difference measurement time fulfils the requirements specified in clause 5.6.4.5.

The UE shall perform and report the UE Rx-Tx time difference measurements for Cell 1 and Cell 2 within the specified UE Rx-Tx time difference measurement time starting from the beginning of time interval T2.

NOTE: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the time duration above because of TTI insertion uncertainty of the measurement report in DCCH.

A test is considered complete after the UE reports the first set of positioning measurements based on the configured *reportingInterval*. The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported UE Rx-Tx measurement for each correct event shall be within the UE Rx-Tx reporting range specified in clause 10.1.25.3.1.

## **--- End of Change # 3 ---**

## **--- Start of Change # 4 ---**

A.6.8.4.3 PRS-RSRPP reporting delay in RRC\_INACTIVE with eDRX

A.6.8.4.3.1 Test purpose and Environment

The purpose of the test is to verify that the PRS-RSRPP measurement meets the delay requirements specified in clause 5.6.5.5 in an environment with a 2-tap channel propagation conditions in RRC\_INACTIVE when configured with eDRX. The supported test configurations are specified in Table A.6.8.4.3.1-1.

**Table A.6.8.4.3.1-1: 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. | |

There are two cells in the test, PCell (Cell 1) and a FR2 neighbour cell (Cell 2) on the same frequency as the PCell.

The test consists of two consecutive time intervals, with duration of T1 and T2. During time duration T1, the UE shall be in RRC\_CONNECTED state and shall not have any timing information of Cell 2. During T2 UE shall be in RRC\_INACTIVE state and all both cells transmit PRS resources within initial DL BWP of the UE and with the same numerology as the initial DL BWP.

The *NR-DL-AoD-RequestLocationInformation* message and *NR-DL-AoD-ProvideAssistanceData* message as defined in TS 37.355 shall be provided to the UE during T1. The last slot containing the two messages for the assistance data and location information request is denoted as #n.

The beginning of the time interval T2 shall be aligned with the beginning of the first DRX cycle containing the PRS resources that is ΔT after slot #n, where ΔT = 50 ms is the maximum processing time of the assistance data and location information request.

The general test parameters are listed in Table A.6.8.4.3.1-2, and cell specific test parameters are listed in Table A.6.8.4.3.1-3.

**Table A.6.8.4.3.1-2: General test parameters**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Value** | **Comment** |
| Reference cell |  | 1, 2, 3 | Cell 1 | Cell 1 is the PCell and the DL-AoD reference cell in the positioning assistance data. |
| Neighbour cell |  | 1, 2, 3 | Cell 2 | Cell 2 is a neighbour cell in the positioning assistance data. |
| RF Channel Number |  | 1, 2, 3 | 1: Cell 1 and Cell 2 |  |
| BWchannel | MHz | 1 | 20: NRB,c = 106 |  |
| 2 | 20: NRB,c = 106 |  |
| 3 | 50: NRB,c = 133 |  |
| SSB configuration |  | 1 | SSB.1 FR1 |  |
|  |  | 2 | SSB.1 FR1 |  |
|  |  | 3 | SSB.2 FR1 |  |
| SMTC configuration |  | 1 | SMTC.2 |  |
|  |  | 2 | SMTC.1 |  |
|  |  | 3 | SMTC.1 |  |
| CP length |  | 1, 2, 3 | Normal |  |
| DRX | s | 1, 2, 3 | 1.28 | ON |
| CN and RAN eDRX configuration |  | 1, 2, 3 | eDRX cycle = 40.96s  PTW length = 1.28s |  |
| reportingInterval | s | 1, 2, 3 | 20 | PRS measurement reporting periodicity |
| Time offset between serving and neighbour cells | μs | 1, 2, 3 | 3 | Synchronous cells |
| Expected RSTD | μs | 1, 2, 3 | 3 |  |
| Expected RSTD uncertainty | μs | 1, 2, 3 | 5 |  |
| T1 | s | 1, 2, 3 | 2 |  |
| T2 | s | 1, 2, 3 | 5 |  |

**Table A.6.8.4.3.1-3: Cell specific test parameters**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Cell 1** | | **Cell 2** | |
| **T1** | **T2** | **T1** | **T2** |
| TDD configuration |  | 1 | N/A | | N/A | |
|  |  | 2 | TDDConf.1.1 | | TDDConf.1.1 | |
|  |  | 3 | TDDConf.2.1 | | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | N/A | |
|  | 2 | SR.1.1 TDD | |  | |
|  | 3 | SR.2.1 TDD | |  | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | N/A | |
|  | 2 | CR.1.1 TDD | |
|  | 3 | CR.2.1 TDD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | | N/A | |
|  | 2 | CCR.1.1 TDD | |
|  | 3 | CCR.2.1 TDD | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | OP.1 | |
| TRS Configuration |  | 1 | TRS.1.1 FDD | | N/A | |
|  | 2 | TRS.1.1 TDD | |
|  | 3 | TRS.1.2 TDD | |
| Initial BWP configuration |  | 1, 2, 3 | DLBWP.0.1 ULBWP.0.1 | | N/A | |
| Active UL BWP configuration |  | 1, 2, 3 | ULBWP.1.1 | | N/A | |
| PRS configuration |  | 1 | PRS.1.4 FR1 | | PRS.1.4 FR1 | |
|  | 2 | PRS.1.4 FR1 | | PRS.1.4 FR1 | |
|  | 3 | PRS.2.4 FR1 | | PRS.2.4 FR1 | |
| PRS muting info |  | 1, 2, 3 | ‘10’ | | ‘01’ | |
| Note 2 | dBm/SCS | 1 | -98 | | | |
|  | 2 | -98 | | | |
|  | 3 | -95 | | | |
| Note 2 | dBm/15 kHz | 1 | -98 | | | |
|  | 2 |  | | | |
|  | 3 |  | | | |
| PRS | dB | 1 | -Infinity | -3 | -Infinity | -10 |
|  | 2 |  |  |  |  |
|  | 3 |  |  |  |  |
| PRS | dB | 1 | -Infinity | -2 | -Infinity | -10 |
|  | 2 |  |  |  |  |
|  | 3 |  |  |  |  |
| PRS-RSRP Note 3 | dBm/SCS kHz | 1 | -Infinity | -100 | -Infinity | -108 |
|  |  | 2 | -Infinity | -100 | -Infinity | -108 |
|  |  | 3 | -Infinity | -97 | -Infinity | -105 |
| SS-RSRP Note 3 | dBm/SCS kHz | 1 | -88 | -88 | -Infinity | -88 |
| 2 | -88 | -88 | -Infinity | -88 |
| 3 | -85 | -85 | -Infinity | -85 |
| Io | dBm/19.08 MHz | 1 | N/A | -64.57 | N/A | -64.57 |
|  | dBm/19.08 MHz | 2 | -64.57 | -64.57 |
|  | dBm/47.88 MHz | 3 | -60.59 | -60.59 |
| Propagation Condition |  | 1, 2, 3 | Two-tap channel defined in 38.101-4 Annex B.2.4,  *a* = 1, µs and Hz | | | |
| Note 1: The resources for uplink transmission are assigned after the end of time period T2 to UEs that do not support SDT for measurement reporting.  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: SS-RSRP/PRS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | |

A.6.8.4.3.2 Test Requirements

The UE shall perform and report the PRS-RSRPP measurements for Cell 1 and Cell 2, within the time limit specified in clause 5.6.5.5 with Tavailable\_PRS = 1.28s, starting from the beginning of time interval T2.

NOTE 1: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.

NOTE 2: The test is considered complete after the UE reports the first set of positioning measurements based on the configured reportingInterval.

A test is considered complete after the UE reports the first set of positioning measurements based on the configured *reportingInterval*. The rate of correct events observed during repeated tests shall be at least 90%.

## **--- End of Change # 4 ---**

## **--- Start of Change # 5 ---**

#### 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 | 1,2,3 |  | 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 | 1,2,3 |  | 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 | 1,2,3 |  | 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 | 1,2,3 |  | ‘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 | 1,2,3 | 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 | |
|  | 1,2,3 | 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 |
|  | 1,2,3 | dB | -5.7 | -11.9 | | -5.7 | -11.9 |
| Propagation condition | 1,2,3 | - | AWGN | | | AWGN | |
| Antenna configuration | 1,2,3 |  | 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. | | | | | | | |

##### 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 # 5 ---**

## **--- Start of Change # 6 ---**

#### A.6.11.2.2 PRS-RSRP measurement accuracy test case in RRC\_IDLE state in FR1 when eDRX cycle > 10.24s

##### A.6.11.2.2.1 Test purpose and Environment

The purpose of the test is to verify that the PRS-RSRP measurement in RRC\_IDLE with eDRX meets the accuracy requirements specified in clause 10.1.24.2.1 and 10.1.24.2.2 in an environment with AWGN propagation conditions.

##### A.6.11.2.2.1 Test parameters

The supported test configurations in Table A.6.9.2.1.2-1 apply for this test.

The test procedure in clause A.6.9.2.1.2 apply for this test, except that UE is in RRC\_IDLE state.

The test parameters as specified in Table A.6.9.2.1.2-2 apply for this test, except those additionally specified in Table A.6.11.2.2.1-1.

Table A.6.11.2.2.1-1: PRS-RSRP test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Value** | **Comment** |
| eDRX cycle length (for CN eDRX) | s | 1, 2, 3 | 40.96 |  |
| PTW window length | s | 1, 2, 3 | 1.28 |  |

##### A.6.11.2.2.2 Test Requirements

The test requirements in clause A.6.9.2.1.3 apply for this test.

## **--- End of Change # 6 ---**

## **--- Start of Change # 7 ---**

#### A.7.8.1.4 NR RSTD measurement reporting delay test case for single positioning frequency layer in FR2 SA in RRC\_INACTIVE state with eDRX > 10.24s

##### A.7.8.1.4.1 Test purpose and environment

The purpose of the test is to verify the measurement requirements specified in clause 5.6.2.5 for RSTD measurements in RRC\_INACTIVE with eDRX and periodic reporting. The tests are conducted under AWGN propagation condition with the UE operating in FR2 stand-alone mode and configured to perform RSTD measurements on a single positioning frequency layer (PFL) in FR2.

The supported test configurations are listed in Table A.7.8.1.4.1-1.

Table A.7.8.1.4.1-1: Supported test configurations

|  |  |
| --- | --- |
| PCell configuration | Description |
| 1 | 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |

There are three cells in the test: Cell 1 (PCell and RSTD reference cell), Cell 2 (neighbor cell) and Cell 3 (neighbor cell). All cells are on the same RF channel in FR2.

The test consists of two consecutive time intervals, with duration of T1 and T2. The UE shall be in RRC\_CONNECTED state during T1 and released to RRC\_INACTIVE state before the start of T2. All cells transmit PRS only during the second time interval of duration T2.

Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The *NR-DL-TDOA-ProvideAssistanceData* and *NR-DL-TDOA-RequestLocationInformation* as defined in TS 37.355 [34, clause 6.5.12], shall be provided to the UE during T1. The last TTI of the last message shall be provided to the UE at least ΔT ms before the start of T2, where ΔT = 50 ms is the maximum processing time of the DL-TDOA assistance data and location information request.

The beginning of the time interval T2 shall be aligned with the start of the first PRS resource instance received after the UE has transitioned to RRC\_INACTIVE.

The test concludes after the UE reports the first set of measurements based on the configured reporting periodicity.

The general test parameters and cell specific test parameters are as given in Table A.7.8.1.4.1-2 and Table A.7.8.1.4.1-3 respectively.

Table A.7.8.1.4.1-2: General test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Reference cell |  | 1 | Cell 1 | Reference cell is the cell in the DL-TDOA assistance data with respect to which the RSTD measurement is defined, as specified in TS 38.215 [4] and TS 37.355 [34]. The reference cell is the PCell in this test case. |
| Neighbour cells |  | 1 | Cell 2 and Cell 3 | Cell 2 and Cell 3 appear at the first and second places in the neighbour cell list in the DL-TDOA assistance data. |
| RF Channel Number |  | 1 | 1 | For Cell 1, Cell 2 and Cell 3 |
| BWchannel | MHz | 1 | 100: NRB,c = 66 |  |
| SSB configuration |  | 1 | SSB.3 FR2 |  |
| SMTC configuration |  | 1 | SMTC.1 |  |
| CP length |  | 1 | Normal |  |
| DRX | s | 1 | 0.64 |  |
| eDRX cycle length (for both RAN and CN) | s | 1 | 40.96 |  |
| PTW length (for both RAN and CN) | s | 1 | 1.28 |  |
| Reporting periodicity | s | 1 | 20 | *reportingInterval* for periodic reporting defined in TS 37.355 [4]. |
| Time offset between serving and neighbour cells | μs | 1 | Cell 2 to Cell 1: 0  Cell 3 to Cell 1: 3 | Synchronous cells |
| Expected RSTD | μs | 1 | Cell 2: 3  Cell 3: 3  Other neighbour cells: randomly between -3 and 3 | The expected RSTD is what is expected at the receiver. The corresponding parameter in the DL-TDOA assistance data specified in TS 37.355 [34] is the expectedRSTD indicator |
| Expected RSTD uncertainty | μs | 1 | 5 |  |
| Number of cells provided in DL-TDOA assistance data |  | 1 | 4 | Including the reference cell |
| PRS muting info |  | 1 | Cell 1: ‘10’  Cell 2: ‘01’  Cell 3: ‘10’ | Correponds to NR-MutingPattern-r16 in DL-PRS-MutingOption1-r16 defined in TS 37.355 [24] |
| PRS resource RE offset |  | 1 | Cell 1: 0  Cell 2: 0  Cell 3: 1 | Cell 1 and Cell 3 are configured with different resource offsets |
| T1 | s | 1 | 5 |  |
| T2 | s | 1 | 41 |  |

Table A.7.8.1.4.1-3: Cell specific test parameters

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | | |
|  |  | T1 | T2 | T1 | T2 | | T1 | T2 |
| AoA setup |  | 1 | Setup 1 as specified in clause A.3.15 | | | | | | |
| Beam AssumptionNote 5 |  | 1 | Rough | | Rough | | | Rough | |
| TDD configuration |  | 1 | TDDConf.3.1 | | TDDConf.3.1 | | | TDDConf.3.1 | |
| PDSCH RMC configuration |  | 1 | SR.3.1 TDD | | N/A | | | N/A | |
| RMSI CORESET RMC configuration |  | 1 | CR.3.1 TDD | | N/A | | | N/A | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.3.1 TDD | | N/A | | | N/A | |
| OCNG PatternsNote 1 |  | 1 | OP.1 | | OP.1 | | | OP.1 | |
| EPRE ratio of PSS to SSS | dB | 1 | 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, 4 |
| EPRE ratio of OCNG to OCNG DMRS Note 1, 4 |
| EPRE ratio of PRS to SSS |
| TRS Configuration |  | 1 | TRS.2.1 TDD | | N/A | | | N/A | |
| Initial BWP configuration |  | 1 | DLBWP.0.1 ULBWP.0.1 | | N/A | | | N/A | |
| Active DL BWP configuration |  | 1 | DLBWP.1.1 | | N/A | | | N/A | |
| Active UL BWP configuration |  | 1 | ULBWP.1.1 | | N/A | | | N/A | |
| PRS configuration |  | 1 | PRS.1.1 FR2 | | PRS.1.1 FR2 | | | PRS.1.1 FR2 | |
| PRS muting info (*dl-PRS-MutingOption1*) |  | 1 | ‘10’ | | ‘01’ | | | ‘10’ | |
| Note 2 | dBm/SCS | 1 | -89 | | | | | | |
| PRS | dB | 1 | -Infinity | -6 | -Infinity | -13 | | -Infinity | -13 |
| PRS | dB | 1 | -Infinity | -6 | -Infinity | -13 | | -Infinity | -13 |
| PRP Note 3 | dBm/SCS kHz | 1 | -Infinity | -95 | -Infinity | -102 | | -Infinity | -102 |
| Io Note 3 (on symbols where PRS is not allocated) | dBm/95.04 MHz | 1 | N/A | -58.7 | N/A | -58.7 | | N/A | -58.7 |
| Propagation Condition |  | 1 | AWGN | | | | | | |
| Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved on all OFDM symbols except those in which PRS is allocated.  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: PRP and Io levels have been derived from other parameters and they are provided for information only. They are not settable parameters themselves.  Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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  Note 6: Calculation of Es/Iot 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.  Note 7: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone.  Note 8: As observed with 0 dBi gain antenna at the centre of the quiet zone. | | | | | | | | | |

##### A.7.8.1.4.2 Test requirements

The RSTD measurement time shall fulfill the requirements specified in clause 5.6.2.5.

The UE shall perform and report the RSTD measurements for Cell 1, Cell 2 and Cell 3 within the specified measurement period duration starting from the beginning of time interval T2. The requirement shall be evaluated based on the first measurement report received from the UE.

NOTE: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the time duration above because of TTI insertion uncertainty of the measurement report in DCCH.

A test is considered complete after the UE has reported the first set of measurements based on the configured reporting interval. The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in clause 10.1.23.3.

## **--- End of Change # 7 ---**

## **--- Start of Change # 8 ---**

#### A.7.8.2.3 PRS-RSRP reporting delay in RRC\_INACTIVE with eDRX

##### A.7.8.2.3.1 Test Purpose and Environment

The purpose of the test is to verify the PRS RSRP measurement requirements specified in Clause 5.6.3.5 for single positioning frequency layer under AWGN propagation conditions in RRC\_INACTIVE when configured with eDRX. Supported test configurations are shown in table A.7.8.2.3.1-1.

There are two cells in the test, PCell (Cell 1) and a FR2 neighbour cell (Cell 2) on the same frequency as the PCell.

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2. Both cells transmit PRS during T2.

During T1 UE is in RRC\_CONNECTED, the *NR-DL-AoD-RequestLocationInformation* message and *NR-DL-AoD-ProvideAssistanceData* message as defined in TS 37.355 shall be provided to the UE during T1. The last slot containing the two messages for the assistance data and location information request is denoted as #n. In the next DL slot after slot #n, UE is released into RRC\_INACTIVE.

The beginning of the time interval T2 is the first PRS resource occasion occurring ΔT after the slot #n, where ΔT = 50 ms is the maximum processing time of the assistance data and location information request.

The test parameters are as given in table A.7.8.2.3.1-2 and table A.7.8.2.3.1-3.

Table A.7.8.2.3.1-1: Supported test configurations.

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

Table A.7.8.2.3.1-2: General test parameters for PRS RSRP measurement reporting delay

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| NR RF Channel Number |  | Config 1 | 1: Cell 1 and Cell 2 | One TDD carrier frequency is used for the NR cells. |
| Active cell |  | Config 1 | NR cell 1 (Pcell) | Cell 1 is the PCell and the DL-AoD reference cell in the positioning assistance data. |
| Neighbour cell |  | Config 1 | NR cell 2 | Cell 2 is a neighbour cell in the positioning assistance data. |
| SMTC parameters |  | Config 1 | SMTC.1 | As specified in clause A.3.11 |
| SSB parameters |  | Config 1 | SSB.3 FR2 | As specified in clause A.3.10.2 |
| CP length |  | Config 1 | Normal |  |
| DRX |  | Config 1 | 0.64s |  |
| CN and RAN eDRX configuration |  | Config 1 | eDRX cycle = 40.96s  PTW length = 1.28s |  |
| Reporting periodicity | s | 1 | 20 | *reportingInterval* for periodic reporting defined in TS 37.355 [4]. |
| Time offset between serving and neighbour cells |  | Config 1 | 3μs | Synchronous cells. |
| Expected RSTD | μs | Config 1 | 3 |  |
| Expected RSTD uncertainty | μs | Config 1 | 5 |  |
| T1 | s | Config 1 | 5 |  |
| T2 | s | Config 1 | 41 |  |

Table A.7.8.2.3.1-3: Cell-specific test parameters for PRS RSRP measurement reporting delay

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  | |  | T1 | T2 | T1 | T2 |
| AoA setup | |  | Config 1 | Setup 1 as specified in clause A.3.15 | | | |
| Beam AssumptionNote 7 | |  | Config 1 | Rough | | Rough | |
| TDD configuration | |  | Config 1 | TDDConf.3.1 | | TDDConf.3.1 | |
| Duplex mode | |  | Config 1 | TDD | | TDD | |
| BWchannel | | MHz | Config 1 | 200: NRB,c = 132 | | 200: NRB,c = 132 | |
| BWP BW | | MHz | Config 1 | 200: NRB,c = 132 | | 200: NRB,c = 132 | |
| BWP configuration | Initial DL BWP |  | Config 1 | DLBWP.0.1 | | N/A | |
|  | Initial UL BWP |  |  | ULBWP.0.1 | | N/A | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1 | OP.1 | | OP.1 | |
| PDSCH Reference measurement channel | |  | Config 1 | SR.3.1 TDD | | - | |
| CORESET Reference Channel | |  | Config 1 | CR.3.1 TDD | | - | |
| Dedicated CORESET RMC configuration | |  | Config 1 | CCR.3.1 TDD | | - | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1 | 120 | | 120 | |
| PRS configuration | |  | Config 1 | PRS.1.2 FR2 | | PRS.1.2 FR2 | |
| PRS muting configuration | |  | Config 1 | ‘10’ | | ‘01’ | |
| EPRE ratio of PSS to SSS | |  |  |  | |  | |
| 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 | |  | Config 1 | 0 | | 0 | |
| 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) | |  |  |  | |  | |
| Note2 | | dBm/15kHz Note5 |  | -98 | | -98 | |
| Note2 | | dBm/SCS Note4 | Config 1 | -89 | | -89 | |
| SS-RSRP Note 3 | | dBm/SCS Note5 | Config 1 | -91 | -91 | -Infinity | -99 |
| PRS-RSRP Note 3 | | dBm/SCS Note5 | Config 1 | -Infinity | -91 | -Infinity | -99 |
| PRS | | dB | Config 1 | -Infinity | -2.41 | -Infinity | -12.12 |
| PRS | | dB | Config 1 | -Infinity | -2 | -Infinity | -10 |
| IoNote3 | | dBm/190.08 MHz Note5 | Config 1 | -54.62 | | -54.62 | |
| Propagation Condition | |  | Config 1 | AWGN | | | |
| 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: SS-RSRP/PRS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: PRS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone  Note 6: As observed with 0 dBi gain antenna at the centre of the quiet zone  Note 7: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation | | | | | | | |

##### A.7.8.2.3.2 Test Requirements

The PRS RSRP measurement time fulfils the requirements specified in Clause 5.6.3.5. The UE shall perform and report the PRS RSRP measurements for Cell 2 with respect to the reference cell in the DL-AoD assistance data, Cell 1, within the time duration specified in section 5.6.3.5 with Tavailable\_PRS = 0.64s starting from the beginning of time interval T2.

NOTE: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.

A test is complete after the UE has reported the first set of results based on the configured reporting interval. The rate of the correct events for the neighbour cell observed during repeated tests shall be at least 90%, where the reported PRS RSRP measurement for each correct event shall be within the PRS RSRP reporting range specified in Clause 10.1.24.3, i.e., between PRS RSRP\_0 and PRS RSRP\_126.

## **--- End of Change # 8 ---**

## **--- Start of Change # 9 ---**

### A.7.8.3.4 UE Rx-Tx time difference measurements for single positioning frequency layer with eDRX > 10.24s in FR2 SA

#### A.7.8.3.4.1 Test purpose and environment

The purpose of the test is to verify the measurement requirements specified in clause 5.6.4.5 for UE Rx-Tx measurements in RRC\_INACTIVE with eDRX. The tests are conducted under AWGN propagation condition with the UE operating in FR2 stand-alone mode and configured to perform UE Rx-Tx measurements on a single positioning frequency layer (PFL) in FR2.

The supported test configurations in listed in Table A.7.8.3.4.1-1.

Table A.7.8.3.4.1-1: Supported test configurations

|  |  |
| --- | --- |
| PCell configuration | Description |
| 1 | 120 kHz SSB and PRS SCS, 100 MHz bandwidth, TDD duplex mode |

There are two cells in the test: Cell 1 (PCell) and Cell 2 (neighbor cell). Both cells are on the same RF channel in FR2.

The test consists of two consecutive time intervals, with duration of T1 and T2. The UE shall be in RRC\_CONNECTED state during T1 and in RRC\_INACTIVE state during T2. Cell 1 and Cell 2 transmit PRS only during the second time interval of duration T2. Similarly, the UE is configured to transmit positioning SRS during only during the second time interval of duration T2.

The *NR-Multi-RTT-ProvideAssistanceData* and *NR-Multi-RTT-RequestLocationInformation* as defined in TS 37.355 [34, clause 6.5.12], shall be provided to the UE during T1. The last TTI of the last message shall be provided to the UE ΔT ms before the start of T2, where ΔT = 50 ms is the maximum processing time of the multi-RTT assistance data and location information request.

The beginning of the time interval T2 shall be aligned with the beginning of the first DRX cycle in RRC\_INACTIVE.

The general test parameters and cell specific test parameters are as given in Table A.7.8.3.4.1-2 and Table A.7.8.3.4.1-3 respectively.

Table A.7.8.3.4.1-2: General test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Active cell |  | 1 | Cell 1 | Cell 1 is the PCell in *NR-Multi-RTT-ProvideAssistanceData* [34]. |
| Neighbour cell |  | 1 | Cell 2 | Cell 2 is a neighbour cell in *NR-Multi-RTT-ProvideAssistanceData* [34]. |
| RF Channel Number |  | 1 | 1 | For both Cell 1 and Cell 2 |
| BWchannel | MHz | 1 | 100: NRB,c = 66 |  |
| SSB configuration |  | 1 | SSB.3 FR2 |  |
| SMTC configuration |  | 1 | SMTC.1 |  |
| CP length |  | 1 | Normal |  |
| DRX | s | 1 | 0.64 |  |
| eDRX cycle length (for both RAN and CN) | s | 1 | 40.96 |  |
| PTW length (for both RAN and CN) | s | 1 | 1.28 |  |
| Reporting periodicity | s | 1 | 20 | *reportingInterval* for periodic reporting defined in TS 37.355 [4]. |
| Time offset between serving and neighbour cells | μs | 1 | 3 | Synchronous cells |
| Expected RSTD | μs | 1 | 3 |  |
| Expected RSTD uncertainty | μs | 1 | 5 |  |
| T1 | s | 1 | 5 |  |
| T2 | s | 1 | 20 |  |

Table A.7.8.3.4.1-3: Cell specific test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  |  | T1 | T2 | T1 | T2 |
| AoA setup |  | 1 | Setup 1 as specified in clause A.3.15 | | | |
| Beam AssumptionNote 5 |  | 1 | Rough | | Rough | |
| TDD configuration |  | 1 | TDDConf.3.1 | | TDDConf.3.1 | |
| PDSCH RMC configuration |  | 1 | SR.3.1 TDD | | N/A | |
| RMSI CORESET RMC configuration |  | 1 | CR.3.1 TDD | | N/A | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.3.1 TDD | | N/A | |
| OCNG PatternsNote 1 |  | 1 | OP.1 | | OP.1 | |
| EPRE ratio of PSS to SSS | dB | 1 | 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, 4 |
| EPRE ratio of OCNG to OCNG DMRS Note 1, 4 |
| EPRE ratio of PRS to SSS |
| TRS Configuration |  | 1 | TRS.2.1 TDD | | N/A | |
| Initial BWP configuration |  | 1 | DLBWP.0.1 ULBWP.0.1 | | N/A | |
| Active DL BWP configuration |  | 1 | DLBWP.1.1 | | N/A | |
| Active UL BWP configuration |  | 1 | ULBWP.1.1 | | N/A | |
| PRS configuration |  | 1 | PRS.1.1 FR2 | | PRS.1.1 FR2 | |
| PRS muting info (*dl-PRS-MutingOption1*) |  | 1 | ‘10’ | | ‘01’ | |
| SRS configuration |  | 1 | POS-SRS.3 | | N/A | |
| Note 2 | dBm/SCS | 1 | -89 | | | |
| PRS | dB | 1 | -Infinity | -3 | -Infinity | -13 |
| PRS | dB | 1 | -Infinity | -3 | -Infinity | -13 |
| PRP Note 3 | dBm/SCS kHz | 1 | -Infinity | -92 | -Infinity | -102 |
| Io Note 3 (on symbols where PRS is not allocated) | dBm/95.04 MHz | 1 | N/A | -58.11 | N/A | -58.11 |
| Propagation Condition |  | 1 | AWGN | | | |
| Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved on all OFDM symbols except those in which PRS is allocated.  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: PRP and Io levels have been derived from other parameters and they are provided for information only. They are not settable parameters themselves.  Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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  Note 6: Calculation of Es/Iot 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.  Note 7: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone.  Note 8: As observed with 0 dBi gain antenna at the centre of the quiet zone. | | | | | | |

#### A.7.8.3.4.2 Test requirements

The UE Rx-Tx time difference measurement time fulfils the requirements specified in clause 5.6.4.5.

The UE shall perform and report the UE Rx-Tx time difference measurements for Cell 1 and Cell 2 within the specified UE Rx-Tx time difference measurement time starting from the beginning of time interval T2.

NOTE: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the time duration above because of TTI insertion uncertainty of the measurement report in DCCH.

A test is complete after the UE has reported the first set of results based on the configured reporting interval. The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported UE Rx-Tx measurement for each correct event shall be within the UE Rx-Tx reporting range specified in clause 10.1.25.3.1.

## **--- End of Change # 9 ---**

## **--- Start of Change # 10 ---**

#### A.7.8.4.3 PRS-RSPP reporting delay in RRC\_INACTIVE state with eDRX > 10.24s in FR2

##### A.7.8.4.3.1 Test purpose and environment

The purpose of the test is to verify the measurement requirements specified in clause 5.6.5.5 for PRS-RSRPP measurements in RRC\_INACTIVE with eDRX and periodic reporting. The tests are conducted under AWGN propagation condition with the UE operating in FR2 stand-alone mode and configured to perform PRS-RSRPP measurements on a single positioning frequency layer (PFL) in FR2.

The supported test configurations are listed in Table A.7.8.4.3.1-1.

Table A.7.8.4.3.1-1: Supported test configurations

|  |  |
| --- | --- |
| PCell configuration | Description |
| 1 | 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |

There are two cells in the test: Cell 1 (PCell) and Cell 2 (neighbor cell). Both cells are on the same RF channel in FR2.

The test consists of two consecutive time intervals, with duration of T1 and T2. The UE shall be in RRC\_CONNECTED state during T1 and released to RRC\_INACTIVE state before the start of T2. Both cells transmit PRS only during the second time interval of duration T2.

The *NR-DL-AoD-ProvideAssistanceData* and *NR-DL-AoD-RequestLocationInformation* as defined in TS 37.355 [34, clause 6.5.12], shall be provided to the UE during T1. The last TTI of the last message shall be provided to the UE at least ΔT ms before the start of T2, where ΔT = 50 ms is the maximum processing time of the DL-AoD assistance data and location information request.

The beginning of the time interval T2 shall be aligned with the start of the first PRS resource instance received after the UE has transitioned to RRC\_INACTIVE.

The test concludes after the UE reports the first set of measurements based on the configured reporting periodicity.

The general test parameters and cell specific test parameters are as given in Table A.7.8.4.3.1-2 and Table A.7.8.4.3.1-3, respectively.

Table A.7.8.4.3.1-2: General test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Active cell |  | 1 | Cell 1 | Cell 1 is the PCell and the DL-AoD reference cell in the positioning assistance data. |
| Neighbour cell |  | 1 | Cell 2 | Cell 2 is a neighbour cell in the positioning assistance data. |
| RF Channel Number |  | 1 | 1 | For Cell 1 and Cell 2 |
| BWchannel | MHz | 1 | 100: NRB,c = 66 |  |
| SSB configuration |  | 1 | SSB.3 FR2 |  |
| SMTC configuration |  | 1 | SMTC.1 |  |
| CP length |  | 1 | Normal |  |
| DRX | S | 1 | 0.64 |  |
| eDRX cycle length (for both RAN and CN) | S | 1 | 40.96 |  |
| PTW length (for both RAN and CN) | S | 1 | 1.28 |  |
| Reporting periodicity | S | 1 | 20 | *reportingInterval* for periodic reporting defined in TS 37.355 [4]. |
| Time offset between serving and neighbour cells | μs | 1 | 3 | Synchronous cells |
| Expected RSTD | μs | 1 | 3 |  |
| Expected RSTD uncertainty | μs | 1 | 5 |  |
| T1 | S | 1 | 5 |  |
| T2 | S | 1 | 41 |  |

Table A.7.8.4.3.1-3: Cell specific test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  |  | T1 | T2 | T1 | T2 |
| AoA setup |  | 1 | Setup 1 as specified in clause A.3.15 | | | |
| Beam AssumptionNote 5 |  | 1 | Rough | | Rough | |
| TDD configuration |  | 1 | TDDConf.3.1 | | TDDConf.3.1 | |
| PDSCH RMC configuration |  | 1 | SR.3.1 TDD | | N/A | |
| RMSI CORESET RMC configuration |  | 1 | CR.3.1 TDD | | N/A | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.3.1 TDD | | N/A | |
| OCNG PatternsNote 1 |  | 1 | OP.1 | | OP.1 | |
| EPRE ratio of PSS to SSS | dB | 1 | 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, 4 |
| EPRE ratio of OCNG to OCNG DMRS Note 1, 4 |
| EPRE ratio of PRS to SSS |
| TRS Configuration |  | 1 | TRS.2.1 TDD | | N/A | |
| Initial BWP configuration |  | 1 | DLBWP.0.1 ULBWP.0.1 | | N/A | |
| Active DL BWP configuration |  | 1 | DLBWP.1.1 | | N/A | |
| Active UL BWP configuration |  | 1 | ULBWP.1.1 | | N/A | |
| PRS configuration |  | 1 | PRS.1.1 FR2 | | PRS.1.1 FR2 | |
| PRS muting info (*dl-PRS-MutingOption1*) |  | 1 | ‘10’ | | ‘01’ | |
| Note 2 | dBm/SCS | 1 | -89 | | | |
| PRS | dB | 1 | -Infinity | -3 | -Infinity | -13 |
| PRS | dB | 1 | -Infinity | -3 | -Infinity | -13 |
| PRP Note 3 | dBm/SCS kHz | 1 | -Infinity | -92 | -Infinity | -102 |
| Io Note 3 (on symbols where PRS is not allocated) | dBm/95.04 MHz | 1 | N/A | -58.11 | N/A | -58.11 |
| Propagation Condition |  | 1 | AWGN | | | |
| Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved on all OFDM symbols except those in which PRS is allocated.  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: PRP and Io levels have been derived from other parameters and they are provided for information only. They are not settable parameters themselves.  Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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  Note 6: Calculation of Es/Iot 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.  Note 7: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone.  Note 8: As observed with 0 dBi gain antenna at the centre of the quiet zone. | | | | | | |

##### A.7.8.4.3.2 Test requirements

The PRS-RSRPP measurement time shall fulfill the requirements specified in clause 5.6.5.5.

The UE shall perform and report the PRS-RSRPP measurements for Cell 1 and Cell 2 within the specified measurement period duration starting from the beginning of time interval T2. The requirement shall be evaluated based on the first measurement report received from the UE.

NOTE: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the time duration above because of TTI insertion uncertainty of the measurement report in DCCH.

A test is complete after the UE has reported the first set of results based on the configured reporting interval. The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported PRS-RSRPP measurement for each correct event shall be within the PRS-RSRPP reporting range specified in clause 10.1.38.3.

## **--- End of Change # 10 ---**

## **--- Start of Change # 11 ---**

#### A.7.10.1.1 NR RSTD measurement reporting delay test case for single positioning frequency layer in FR2 SA in RRC\_IDLE state for non-RedCap UE

##### A.7.10.1.1.1 Test purpose and environment

The purpose of the test is to verify the measurement requirements specified in clause 4.5.2.5 for RSTD measurements in RRC\_IDLE without eDRX. The tests are conducted under AWGN propagation condition with the UE operating in FR2 stand-alone mode and configured to perform RSTD measurements on a single positioning frequency layer (PFL) in FR2.

The supported test configurations are listed in Table A.7.10.1.1.1-1.

Table A.7.10.1.1-1: Supported test configurations

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

There are three cells in the test: Cell 1 (PCell and RSTD reference cell), Cell 2 (neighbor cell) and Cell 3 (neighbor cell). All cells are on the same RF channel in FR2.

The test consists of two consecutive time intervals, with duration of T1 and T2. The UE shall be in RRC\_CONNECTED state during T1 and released to RRC\_IDLE state before the start of T2. All cells transmit PRS only during the second time interval of duration T2.

Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The *NR-DL-TDOA-ProvideAssistanceData* and *NR-DL-TDOA-RequestLocationInformation* as defined in TS 37.355 [34, clause 6.5.12], shall be provided to the UE during T1. The last TTI of the last message shall be provided to the UE at least ΔT ms before the start of T2, where ΔT = 50 ms is the maximum processing time of the DL-TDOA assistance data and location information request.

The beginning of the time interval T2 shall be aligned with the first DRX cycle containing a DL PRS resource(s).

The UE is configured with DRX cycle of 0.64 s.

The general test parameters are listed in Table A.7.10.1.1.1-2, and cell specific test parameters are listed in Table A.7.10.1.1.1-2, Table A.7.10.1.1.1-3, and Table A.7.10.1.1.1-4.

Table A.7.10.1.1.1-2: General test parameters for RSTD measurement reporting delay

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| Reference cell | |  | Cell 1 | Reference cell is the cell in the DL-TDOA assistance data with respect to which the RSTD measurement is defined, as specified in TS 38.215 [4] and TS 37.355 [34]. The reference cell is the PCell in this test case. |
| Neighbor cells | |  | Cell 2 and Cell 3 | Cell 2 and Cell 3 appear at the first and second places in the neighbour cell list in the DL-TDOA assistance data. |
| BWchannel | | MHz | 200: NRB,c = 132 |  |
| SSB configuration | Config 1 |  | SSB.2 FR2 |  |
| SMTC configuration | Config 1 |  | SMTC.1 |  |
| PDSCH RMC configuration | Config 1 |  | SR.1.1 FDD |  |
| RMSI CORESET RMC configuration | Config 1 |  | CR.3.1 TDD | As specified in clause A.3.1.2.1 |
| Dedicated CORESET RMC configuration | Config 1 |  | CR.1.1 FDD |  |
| PRS Configuration | Config 1 |  | PRS.1.4. FR2 | As specified in clause A.3. 31 |
| Physical cell ID PCI | |  | (PCI of Cell 1 – PCI of Cell 2)mod6=0  and  (PCI of Cell 1 – PCI of Cell 3)mod6=0 | The cell PCIs are selected such that the relative shifts of PRS patterns among cells are as given by the test parameters |
| CP length | |  | Normal |  |
| DRX | | s | 0.64 |  |
| Radio frame receive time offset between the cells at the UE antenna connector | | μs | Cell 2 to Cell 1: 0  Cell 3 to Cell 1: 3 | PRS are transmitted from synchronous cells |
| Expected RSTD | | μs | Cell 2: 3  Cell 3: 3  Other neighbour cells: randomly between -3 and 3 | The expected RSTD is what is expected at the receiver. The corresponding parameter in the DL-TDOA assistance data specified in TS 37.355 [34] is the expectedRSTD indicator |
| Expected RSTD uncertainty for all neighbour cells | | μs | 5 | The corresponding parameter in the DL-TDOA assistance data specified in TS 37.355 [34] is the expectedRSTD-Uncertainty index |
| Number of cells provided in DL-TDOA assistance data | |  | 4 | Including the reference cell |
| PRS muting info | |  | Cell 1: ‘10’  Cell 2: ‘01’  Cell 3: ‘10’ | Correponds to prs-MutingInfo defined in TS 37.355 [24] |
| PRS resource RE offset | |  | Cell 1: 0  Cell 2: 0  Cell 3: 1 | Cell 1 and Cell 3 are configured with different resource offsets |
| T1 | | s | 3 | The length of the time interval from the beginning of each test |
| T2 | | s | 1.28 | The length of the time interval that follows immediately after time interval T1 |
| AoA setup | |  | Setup 1 | As defined in A.3.15.1 |
| Beam assumption | |  | Rough | Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation |

Table A.7.10.1.1.1-2-3: Cell-specific test parameters for RSTD measurement reporting delay during T1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 | Cell 2 | Cell 3 |
| NR RF Channel Number | |  | 1 | 1 | 1 |
| Positiong frequency layer | |  | 1 | 1 | 1 |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low | 1x2 Low | 1x2 Low |
| OCNG patterns defined in A.3.2.1 | |  | OP.5 FDD | N/A | N/A |
| Note 3 | Config 1 | dBm/SCS | -89 | | |
| PRS | | dB | -Infinity | -Infinity | -Infinity |
| Io Note 4 | Config 1 | dBm/  190.08MHz | -54.00 | -54.00 | -54.00 |
| SSB RP Note4 | Config 1 | dBm/SCS | -89 | -Infinity | -Infinity |
|  |  | dB | 0 | -Infinity | -Infinity |
| Propagation Condition | |  | AWGN | | |
| Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The resources for uplink transmission are assigned after the end of time period T2 to UEs that do not support SDT for measurement reporting.  Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 4: SSB RP and Io levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. | | | | | |

Table A.7.10.1.1.1-2-4: Cell-specific test parameters for RSTD measurement reporting delay during T2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 | Cell 2 | Cell 3 |
|  | |  | T2 | T2 | T2 |
| RF Channel Number | |  | 1 | 1 | 1 |
| Positiong frequency layer | |  | 1 | 1 | 1 |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low | 1x2 Low | 1x2 Low |
| OCNG patterns defined in A.3.2.1 | |  | OP.1 | OP.1 | OP.1 |
| PRACH configuration | |  | FR2 PRACH configuration 1 | FR2 PRACH configuration 1 | FR2 PRACH configuration 1 |
| Note 3 | Config 1 | dBm/SCS | -89 | -89 | -89 |
| PRS | Config 1 | dB | -5.44 | -11.67 | -11.67 |
| Io | Config 1 | dBm/  19.08MHz | -55.48 | -55.48 | -55.48 |
| PRS | | dB | -6 | -13 | -13 |
| Propagation Condition | |  | AWGN | | |
| Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the slots with transmitted PRS.  Note 2: The resources for uplink transmission are assigned after the end of time period T2 to UEs that do not support SDT for measurement reporting.  Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled. | | | | | |

##### A.7.10.1.1.2 Test requirements

The RSTD measurement time shall fulfill the requirements specified in clause 4.5.2.5.

The UE shall perform and report the RSTD measurements for Cell 1, Cell 2 and Cell 3 within the specified measurement period duration starting from the beginning of time interval T2.

NOTE 1: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.

NOTE 2: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the time duration above because of TTI insertion uncertainty of the measurement report in DCCH.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in clause 10.1.23.3.

## **--- End of Change # 11 ---**

## **--- Start of Change # 12 ---**

#### A.7.10.1.2 NR RSTD measurement reporting delay test case for single positioning frequency layer in FR2 SA in RRC\_IDLE state with eDRX > 10.24s

##### A.7.10.1.2.1 Test purpose and environment

The purpose of the test is to verify the measurement requirements specified in clause 4.5.2.5 for RSTD measurements in RRC\_IDLE with eDRX and periodic reporting. The tests are conducted under AWGN propagation condition with the UE operating in FR2 stand-alone mode and configured to perform RSTD measurements on a single positioning frequency layer (PFL) in FR2.

The supported test configurations are listed in Table A.7.10.1.2.1-1.

Table A.7.10.1.2.1-1: Supported test configurations

|  |  |
| --- | --- |
| PCell configuration | Description |
| 1 | 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |

There are three cells in the test: Cell 1 (PCell and RSTD reference cell), Cell 2 (neighbor cell) and Cell 3 (neighbor cell). All cells are on the same RF channel in FR2.

The test consists of two consecutive time intervals, with duration of T1 and T2. The UE shall be in RRC\_CONNECTED state during T1 and released to RRC\_IDLE state before the start of T2. All cells transmit PRS only during the second time interval of duration T2.

Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The *NR-DL-TDOA-ProvideAssistanceData* and *NR-DL-TDOA-RequestLocationInformation* as defined in TS 37.355 [34, clause 6.5.12], shall be provided to the UE during T1. The last TTI of the last message shall be provided to the UE at least ΔT ms before the start of T2, where ΔT = 50 ms is the maximum processing time of the DL-TDOA assistance data and location information request.

The beginning of the time interval T2 shall be aligned with the start of the first PRS resource instance received after the UE has transitioned to RRC\_IDLE.

The test concludes after the UE reports the first set of measurements based on the configured reporting periodicity.

The general test parameters and cell specific test parameters are as given in Table A.7.10.1.2.1-2 and Table A.7.10.1.2.1-3, respectively.

Table A.7.10.1.2.1-2: General test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Reference cell |  | 1 | Cell 1 | Reference cell is the cell in the DL-TDOA assistance data with respect to which the RSTD measurement is defined, as specified in TS 38.215 [4] and TS 37.355 [34]. The reference cell is the PCell in this test case. |
| Neighbour cells |  | 1 | Cell 2 and Cell 3 | Cell 2 and Cell 3 appear at the first and second places in the neighbour cell list in the DL-TDOA assistance data. |
| RF Channel Number |  | 1 | 1 | For Cell 1, Cell 2 and Cell 3 |
| BWchannel | MHz | 1 | 100: NRB,c = 66 |  |
| SSB configuration |  | 1 | SSB.3 FR2 |  |
| SMTC configuration |  | 1 | SMTC.1 |  |
| CP length |  | 1 | Normal |  |
| DRX | s | 1 | 0.64 |  |
| eDRX cycle length (for both RAN and CN) | s | 1 | 40.96 |  |
| PTW length (for both RAN and CN) | s | 1 | 1.28 |  |
| Reporting periodicity | s | 1 | 20 | *reportingInterval* for periodic reporting defined in TS 37.355 [4]. |
| Time offset between serving and neighbour cells | μs | 1 | Cell 2 to Cell 1: 0  Cell 3 to Cell 1: 3 | Synchronous cells |
| Expected RSTD | μs | 1 | Cell 2: 3  Cell 3: 3  Other neighbour cells: randomly between -3 and 3 | The expected RSTD is what is expected at the receiver. The corresponding parameter in the DL-TDOA assistance data specified in TS 37.355 [34] is the expectedRSTD indicator |
| Expected RSTD uncertainty | μs | 1 | 5 |  |
| Number of cells provided in DL-TDOA assistance data |  | 1 | 4 | Including the reference cell |
| PRS muting info |  | 1 | Cell 1: ‘10’  Cell 2: ‘01’  Cell 3: ‘10’ | Correponds to NR-MutingPattern-r16 in DL-PRS-MutingOption1-r16 defined in TS 37.355 [24] |
| PRS resource RE offset |  | 1 | Cell 1: 0  Cell 2: 0  Cell 3: 1 | Cell 1 and Cell 3 are configured with different resource offsets |
| T1 | s | 1 | 5 |  |
| T2 | s | 1 | 41 |  |

Table A.7.10.1.2.1-3: Cell specific test parameters

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | | |
|  |  | T1 | T2 | T1 | T2 | | T1 | T2 |
| AoA setup |  | 1 | Setup 1 as specified in clause A.3.15 | | | | | | |
| Beam AssumptionNote 5 |  | 1 | Rough | | Rough | | | Rough | |
| TDD configuration |  | 1 | TDDConf.3.1 | | TDDConf.3.1 | | | TDDConf.3.1 | |
| PDSCH RMC configuration |  | 1 | SR.3.1 TDD | | N/A | | | N/A | |
| RMSI CORESET RMC configuration |  | 1 | CR.3.1 TDD | | N/A | | | N/A | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.3.1 TDD | | N/A | | | N/A | |
| OCNG PatternsNote 1 |  | 1 | OP.1 | | OP.1 | | | OP.1 | |
| EPRE ratio of PSS to SSS | dB | 1 | 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, 4 |
| EPRE ratio of OCNG to OCNG DMRS Note 1, 4 |
| EPRE ratio of PRS to SSS |
| TRS Configuration |  | 1 | TRS.2.1 TDD | | N/A | | | N/A | |
| Initial BWP configuration |  | 1 | DLBWP.0.1 ULBWP.0.1 | | N/A | | | N/A | |
| Active DL BWP configuration |  | 1 | DLBWP.1.1 | | N/A | | | N/A | |
| Active UL BWP configuration |  | 1 | ULBWP.1.1 | | N/A | | | N/A | |
| PRS configuration |  | 1 | PRS.1.1 FR2 | | PRS.1.1 FR2 | | | PRS.1.1 FR2 | |
| PRS muting info (*dl-PRS-MutingOption1*) |  | 1 | ‘10’ | | ‘01’ | | | ‘10’ | |
| Note 2 | dBm/SCS | 1 | -89 | | | | | | |
| PRS | dB | 1 | -Infinity | -6 | -Infinity | -13 | | -Infinity | -13 |
| PRS | dB | 1 | -Infinity | -6 | -Infinity | -13 | | -Infinity | -13 |
| PRP Note 3 | dBm/SCS kHz | 1 | -Infinity | -95 | -Infinity | -102 | | -Infinity | -102 |
| Io Note 3 (on symbols where PRS is not allocated) | dBm/95.04 MHz | 1 | N/A | -58.7 | N/A | -58.7 | | N/A | -58.7 |
| Propagation Condition |  | 1 | AWGN | | | | | | |
| Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved on all OFDM symbols except those in which PRS is allocated.  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: PRP and Io levels have been derived from other parameters and they are provided for information only. They are not settable parameters themselves.  Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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  Note 6: Calculation of Es/Iot 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.  Note 7: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone.  Note 8: As observed with 0 dBi gain antenna at the centre of the quiet zone. | | | | | | | | | |

##### A.7.10.1.2.2 Test requirements

The RSTD measurement time shall fulfill the requirements specified in clause 4.5.2.5.

The UE shall perform and report the RSTD measurements for Cell 1, Cell 2 and Cell 3 within the specified measurement period duration starting from the beginning of time interval T2. The requirement shall be evaluated based on the first measurement report received from the UE.

NOTE 1: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.

NOTE 2: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the time duration above because of TTI insertion uncertainty of the measurement report in DCCH.

A test is considered complete after the UE has reported first set of measurement based on the configured reporting periodicity. The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in clause 10.1.23.3.

## **--- End of Change # 12 ---**

## **--- Start of Change # 13 ---**

#### A.7.11.1.1 NR RSTD measurement accuracy 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.7.11.1.1.1-1: 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 # 13 ---**

## **--- Start of Change # 14 ---**

#### A.7.11.1.2 RSTD measurement accuracy test case for single positioning frequency layer in FR2 SA in RRC\_IDLE state with eDRX > 10.24s

##### A.7.11.1.2.1 Test purpose and environment

The purpose of this test is to verify that RSTD measurements performed in RRC\_IDLE with eDRX and periodic reporting satisfy the measurement accuracy requirements specified in clause 10.1.23.2. The tests are conducted under AWGN propagation condition with the UE operating in FR2 stand-alone mode and configured to perform RSTD measurements on a single positioning frequency layer (PFL) in FR2.

The supported test configurations are listed in Table A.7.11.1.2.1-1.

Table A.7.11.1.2.1-1: Supported test configurations

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

There are two synchronous cells in the test: 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 *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 4.5.2.5.

The general test parameters and cell specific test parameters are as given in Table A.7.11.1.2.1-2 and Table A.7.11.1.2.1-3 respectively.

Table A.7.11.1.2.1-2: General test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Reference cell |  | 1 | Cell 1 |  |
| Neighbour cell |  | 1 | Cell 2 |  |
| RF Channel Number |  | 1 | 1 | For Cell 1 and Cell 2 |
| BWchannel | MHz | 1 | 200: NRB,c = 132 |  |
| SSB configuration |  | 1 | SSB.3 FR2 |  |
| SMTC configuration |  | 1 | SMTC.1 |  |
| CP length |  | 1 | Normal |  |
| DRX | s | 1 | 0.64 |  |
| eDRX cycle length | s | 1 | 40.96 |  |
| PTW length | s | 1 | 1.28 |  |
| Reporting periodicity | s | 1 | 20 | *reportingInterval* for periodic reporting defined in TS 37.355 [4]. |
| Time offset between serving and neighbour cell | μs | 1 | 3 | Synchronous cells |
| Expected RSTD | μs | 1 | 3 |  |
| Expected RSTD uncertainty | μs | 1 | 5 |  |

Table A.7.11.1.2.1-3: Cell specific test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test 1 | | Test 2 | |
|  |  | Cell 1 | Cell 2 | Cell 1 | Cell 2 |
| AoA setup |  | Setup 1 as specified in clause A.3.15 | | | |
| Beam AssumptionNote 4 |  | Rough | | Rough | |
| TDD configuration |  | TDDConf.3.1 | | TDDConf.3.1 | |
| PDSCH RMC configuration |  | SR.3.1 TDD | - | SR.3.1 TDD | - |
| RMSI CORESET RMC configuration |  | CR.3.1 TDD | - | CR.3.1 TDD | - |
| Dedicated CORESET RMC configuration |  | CR.3.1 TDD | - | CR.3.1 TDD | - |
| Control channel RMC |  | CCR.3.1 TDD | - | CCR.3.1 TDD | - |
| OCNG Patterns |  | OP.1 | OP.1 | OP.1 | OP.1 |
| 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 |
| TRS configuration |  | TRS.2.1 TDD | - | TRS.2.1 TDD | - |
| Initial BWP configuration |  | DLBWP.0.1  ULBWP.0.1 | - | DLBWP.0.1  ULBWP.0.1 | - |
| Dedicated BWP configuration |  | DLBWP.1.1  ULBWP.1.1 | - | DLBWP.1.1  ULBWP.1.1 | - |
| 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 |
| Note 2 | dBm/SCS | -89 | | | |
| PRS | dB | -6 | -13 | -6 | -13 |
| PRS | dB | -6 | -13 | -6 | -13 |
| PRP Note 3 | dBm/SCS kHz | -95 | -102 | -95 | -102 |
| Io Note 3 (on symbols where PRS is not allocated) | dBm/190.08 MHz | -55.86 | -55.86 | -55.86 | -55.86 |
| Propagation conditions |  | AWGN | | | |
| Antenna configuration |  | 1x2 | 1x2 | 1x2 | 1x2 |
| Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved on all OFDM symbols except those in which PRS is allocated.  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: PRP and Io levels have been derived from other parameters and they are provided for information only. They are not settable parameters themselves.  Note 4: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation.  Note 5: Calculation of Es/Iot 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.  Note 6: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone.  Note 7: As observed with 0 dBi gain antenna at the centre of the quiet zone. | | | | | |

##### A.7.11.1.2.2 Test requirements

The reported RSTD measurements shall fulfill the absolute accuracy requirements specified in clause 10.1.23.2.

## **--- End of Change # 14 ---**

## **--- Start of Change # 15 ---**

#### A.16.8.1.3 NR RSTD measurement reporting delay test case for single positioning frequency layer in FR1 SA in RRC\_INACTIVE state when eDRX cycle > 10.24s for RedCap UE

##### A.16.8.1.3.1 Test Purpose and Environment

The purpose of the test is to verify that the RSTD measurement, reported by RedCap UE with 1Rx or 2Rx branches, meets the requirements specified in Clause 5.6A.4.5 when the RedCap UE is configured with eDRX cycle longer than 10.24 s in an environment with AWGN propagation conditions in FR1 in standalone scenario when single positioning frequency layer is configured.

The supported test configurations are specified in Table A.16.8.1.3.1-1.

Table A.16.8.1.3.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | 30 kHz SSB SCS, 20 MHz bandwidth, TDD duplex mode |
| 4 | 15 kHz SSB SCS, 10 MHz bandwidth, HD-FDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations. | |

In the test there are three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is the reference as well as the PCell. Cell 2 and Cell 3 are the neighbour cells. All 3 cells are on the same RF channel in FR1.

The test consists of two consecutive time intervals, with duration of T1 and T2. During time duration T1, the UE shall be in RRC\_CONNECTED state and shall not have any timing information of Cell 2 and Cell 3. During T2 UE shall be in RRC\_INACTIVE state and all three cells transmit PRS resources within initial DL BWP of the UE and with the same numerology as the initial DL BWP.

***Note****: The information on when PRS is muted is conveyed to the UE using PRS muting information.*

The *NR-DL-TDOA-ProvideAssistanceData* and *nr-DL-TDOA-RequestLocationInformation* as defined in TS 37.355 [34, clause 6.5.10], shall be provided to the UE during T1. The UE is configured to report positioning measurements every 20s via *reportingInterval* in *nr-DL-TDOA-RequestLocationInformation* such the value of *reportingInterval* is set to "*ri20*". The last TTI containing the two messages shall be provided to the UE ΔT ms before the start of T2, where ΔT = 50 ms is the maximum processing time of the DL-TDOA assistance data and location information request.

The beginning of the time interval T2 is not limited to PTW.

The UE is configured with eDRX cycle of 40.96 s.

The general test parameters are listed in Table A.16.8.1.3.1-2, and cell specific test parameters are listed in Table A.16.8.1.3.1-3 and Table A.16.8.1.3.1-4.

Table A.16.8.1.3.1-2: General test parameters for RSTD measurement reporting delay

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| Reference cell | |  | Cell 1 | Reference cell is the cell in the DL-TDOA assistance data with respect to which the RSTD measurement is defined, as specified in TS 38.215 [4] and TS 37.355 [34]. The reference cell is the PCell in this test case. |
| Neighbor cells | |  | Cell 2 and Cell 3 | Cell 2 and Cell 3 appear at the first and second places in the neighbour cell list in the DL-TDOA assistance data. |
| SSB configuration | Config 1,4 |  | SSB.4 RedCap FR1 |  |
| Config 2 |  | SSB.4 RedCap FR1 |
| Config 3 |  | SSB.5 RedCap FR1 |
| SMTC configuration | Config 1,4 |  | SMTC.1 RedCap |  |
| Config 2 |  | SMTC.1 RedCap |
| Config 3 |  | SMTC.1 RedCap |
| PDSCH RMC configuration | Config 1,4 |  | SR.1.1 FDD |  |
| Config 2 |  | SR.1.1 TDD |  |
| Config 3 |  | SR.2.1 TDD |  |
| RMSI CORESET RMC configuration | Config 1,4 |  | CR.1.1 FDD | As specified in clause A.3.1.2.1 |
| Config 2 |  | CR.1.1 TDD |  |
| Config 3 |  | CR.2.1 TDD |  |
| Dedicated CORESET RMC configuration | Config 1,4 |  | CR.1.1 FDD |  |
| Config 2 |  | CR.1.1 TDD |  |
| Config 3 |  | CR.2.1 TDD |  |
| Initial BWP configuration | Config 1,2,3,4 |  | DLBWP.0.1  ULBWP.0.1 |  |
| Active UL BWP configuration | Config 1,2,3,4 |  | ULBWP.1.1 |  |
| PRS Configuration | Config 1,4 |  | PRS.1.1 FR1 | As specified in clause A.3.31 |
| Config 2 |  | PRS.1.1 FR1 |
| Config 3 |  | PRS.2.1 FR1 |
| Physical cell ID PCI | |  | (PCI of Cell 1 – PCI of Cell 2) mod 6 = 0  and  (PCI of Cell 1 – PCI of Cell 3) mod 6 = 0 | The cell PCIs are selected such that the relative shifts of PRS patterns among cells are as given by the test parameters |
| CP length | |  | Normal |  |
| DRX | | s | 1.28 |  |
| CN and RAN eDRX configuration | | s | eDRX length = 40.96  PTW length = 10.24 |  |
| Radio frame receive time offset between the cells at the UE antenna connector | | μs | Cell 2 to Cell 1: 0  Cell 3 to Cell 1: 3 | PRS are transmitted from synchronous cells |
| Expected RSTD | | μs | Cell 2: 3  Cell 3: 3  Other neighbour cells: randomly between -3 and 3 | The expected RSTD is what is expected at the receiver. The corresponding parameter in the DL-TDOA assistance data specified in TS 37.355 [34] is the expectedRSTD indicator |
| Expected RSTD uncertainty for all neighbour cells | | μs | 5 | The corresponding parameter in the DL-TDOA assistance ta specified in TS 37.355 [34] is the expectedRSTD-Uncertainty index |
| Number of cells provided in DL-TDOA assistance data | |  | 4 | Including the reference cell |
| PRS muting info | |  | Cell 1: ‘10’  Cell 2: ‘01’  Cell 3: ‘10’ | Correponds to *NR-MutingPattern* defined in TS 37.355 [34] |
| PRS resource RE offset | |  | Cell 1: 0  Cell 2: 0  Cell 3: 1 | Cell 1 and Cell 3 are configured with different resource offsets |
| T1 | | s | 3 | The length of the time interval from the beginning of each test |
| T2 | | s | 5 | The length of the time interval that follows immediately after time interval T1. |

Table A.16.8.1.3.1-3: Cell-specific test parameters for RSTD measurement reporting delay during T1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 | Cell 2 | Cell 3 |
| NR RF Channel Number | |  | 1 | 1 | 1 |
| Positiong frequency layer | |  | 1 | 1 | 1 |
| Correlation Matrix and Antenna Configuration | |  | 12 Low | 12 Low | 12 Low |
| OCNG patterns defined in A.3.2.1 | |  | OP.1 | N/A | N/A |
| Note 3 | Config 1 | dBm/SCS | -98 | | |
| Config 2 | dBm/SCS | -98 | | |
| Config 3 | dBm/SCS | -95 | | |
| PRS | | dB | -Infinity | -Infinity | -Infinity |
| SSB | | dB | 10 | -Infinity | -Infinity |
| Io Note 4 | Config 1 | dBm/  9.36 MHz | -56.54 | -56.54 | -56.54 |
| Config 2 | dBm/  9.36 MHz | -56.54 | -56.54 | -56.54 |
| Config 3 | dBm/  18.72 MHz | -56.54 | -56.54 | -56.54 |
| SSB RP Note4 | Config 1 | dBm/SCS | -82 | -Infinity | -Infinity |
| Config 2 | dBm/SCS | -88 | -Infinity | -Infinity |
| Config 3 | dBm/SCS | -85 | -Infinity | -Infinity |
| Propagation Condition | |  | AWGN | | |
| Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The resources for uplink transmission are assigned after the end of time period T2 to UEs that do not support SDT for measurement reporting.  Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled.  Note 4: SSB RP and Io levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. | | | | | | |

Table A.16.8.1.3.1-4: Cell-specific test parameters for RSTD measurement reporting delay during T2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 | Cell 2 | Cell 3 |
| T2 | T2 | T2 |
| NR RF Channel Number | |  | 1 | 1 | 1 |
| Correlation Matrix and Antenna Configuration | |  | 12 Low | 12 Low | 12 Low |
| OCNG patterns defined in A.3.2.1 | |  | OP.1 | OP.1 | OP.1 |
| PRACH configuration | |  | FR1 PRACH configuration 1 | FR1 PRACH configuration 1 | FR1 PRACH configuration 1 |
| Note 3 | Config 1 | dBm/SCS | -98 | -98 | -98 |
| Config 2 | dBm/SCS | -98 | -98 | -98 |
| Config 3 | dBm/SCS | -95 | -95 | -95 |
| PRS | Config 1 | dB | -5 | -11 | -11 |
| Config 2 | dB | -5 | -11 | -11 |
| Config 3 | dB | -5 | -11 | -11 |
| Io Note 4 | Config 1 | dBm/  9.36MHz | -69.26 | -69.26 | -69.26 |
| Config 2 | dBm/  9.36MHz | -69.26 | -69.26 | -69.26 |
| Config 3 | dBm/  18.72MHz | -66.63 | -66.63 | -66.63 |
| PRS | | dB | -5.33 | -12.19 | -12.19 |
| Propagation Condition | |  | AWGN | | |
| NOTE 1: OCNG shall be used such that active cells (all, except Cell 3 in T2) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS.  NOTE 2: The resources for uplink transmission are assigned after the end of time period T2 to UEs that do not support SDT for measurement reporting.  NOTE 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled. | | | | | |

##### A.16.8.1.3.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 5.6A.4.5.

The UE shall perform and report the RSTD measurements for Cell 2 and Cell 3 with respect to the reference cell in the DL-TDOA assistance data, Cell 1, within the time duration specified in section 5.6A.4.5 starting from the beginning of time interval T2.

***NOTE****: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.*

The rate of the correct events for each neighbour cell observed during the repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in the Clause 10.1A.16.3, i.e., between RSTD\_000000000 and RSTD\_126083073.

## **--- End of Change # 15 ---**

## **--- Start of Change # 16 ---**

#### A.16.8.2.3 UE Rx-Tx time difference measurement for single positioning frequency layer with eDRX > 10.24s in FR1 SA

##### A.16.8.2.3.1 Test purpose and environment

The purpose of the test is to verify the measurement requirements specified in clause 5.6A.6.5 for UE Rx-Tx measurements in RRC\_INACTIVE with eDRX. The tests are conducted under AWGN propagation condition with the UE operating in FR1 stand-alone mode and configured to perform UE Rx-Tx measurements on a single positioning frequency layer (PFL) in FR1.

The supported test configuration in listed in Table A.16.8.2.3.1-1.

Table A.16.8.2.3.1-1: Supported test configurations

|  |  |
| --- | --- |
| **Config** | **Description** |
| 1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30 kHz SSB SCS, 20 MHz bandwidth, TDD duplex mode |
| 4 | NR 15 kHz SSB SCS, 10 MHz bandwidth, HD-FDD duplex mode |
| NOTE: The UE is only required to be tested in one of the supported test configurations in each supported band | |

There are two cells in the test: PCell (Cell 1) and a neighbour cell (Cell 2). Both cells are on the same RF channel in FR1.

The test consists of two consecutive time intervals, with duration of T1 and T2. The UE shall be in RRC\_CONNECTED state during T1 and in RRC\_INACTIVE state during T2. Cell 1 and Cell 2 transmit PRS only during the second time interval of duration T2. Similarly, the UE is configured to transmit positioning SRS during only during the second time interval of duration T2.

The *NR-Multi-RTT-ProvideAssistanceData* and *nr-Multi-RTT-RequestLocationInformation* as defined in TS 37.355 [34, clause 6.5.12.1], shall be provided to the UE during T1. The last TTI of the last message shall be provided to the UE ΔT ms before the start of T2, where ΔT = 50 ms is the maximum processing time of the multi-RTT assistance data and location information request.

The beginning of the time interval T2 shall be aligned with the beginning of the first DRX cycle in RRC\_INACTIVE.

The general test parameters and cell specific test parameters are as given in Table A.16.8.2.3.1-2 and Table A.16.8.2.3.1-3, respectively.

Table A.16.8.2.3.1-2: General test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Value** | **Comment** |
| Active cell |  | 1, 2, 3, 4 | Cell 1 | Cell 1 is the PCell in *NR-Multi-RTT-ProvideAssistanceData* [34]. |
| Neighbour cell |  | 1, 2, 3, 4 | Cell 2 | Cell 2 is a neighbour cell in *NR-Multi-RTT-ProvideAssistanceData* [34]. |
| RF Channel Number |  | 1, 2, 3, 4 | 1 | For both Cell 1 and Cell 2 |
| BWchannel | MHz | 1, 2, 4 | 10: NRB,c = 52 |  |
| 3 | 20: NRB,c = 51 |  |
| SSB configuration |  | 1, 2, 4 | SSB.4 RedCap FR1 |  |
|  | 3 | SSB.5 RedCap FR1 |  |
| SMTC configuration |  | 1, 4 | SMTC.1 RedCap |  |
| 2, 3 | SMTC.1 RedCap |  |
| CP length |  | 1, 2, 3, 4 | Normal |  |
| DRX cycle |  | 1, 2, 3, 4 | 1.28s |  |
| eDRX cycle length (for both RAN and CN) | s | 1, 2, 3, 4 | 40.96 |  |
| PTW window length | s | 1, 2, 3, 4 | 1.28 |  |
| Reporting periodicity | s | 1, 2, 3, 4 | 20 | *reportingInterval* for periodic reporting defined in TS 37.355 [4]. |
| Time offset between serving and neighbour cells | μs | 1, 2, 3, 4 | 3 | Synchronous cells |
| Expected RSTD | μs | 1, 2, 3, 4 | 3 |  |
| Expected RSTD uncertainty | μs | 1, 2, 3, 4 | 5 |  |
| T1 | s | 1, 2, 3, 4 | 5 |  |
| T2 | s | 1, 2, 3, 4 | 10 |  |

Table A.16.8.2.3.1-2: Cell specific test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Cell 1** | | **Cell 2** | |
|  |  | **T1** | **T2** | **T1** | **T2** |
| TDD configuration |  | 1, 4 | N/A | | N/A | |
|  | 2 | TDDConf.1.1 | | TDDConf.1.1 | |
|  |  | 3 | TDDConf.2.1 | | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1, 4 | SR.1.1 FDD | | N/A | |
|  | 2 | SR.1.1 TDD | |  | |
|  | 3 | SR.2.1 TDD | |  | |
| RMSI CORESET RMC configuration |  | 1, 4 | CR.1.1 FDD | | N/A | |
|  | 2 | CR.1.1 TDD | |
|  |  | 3 | CR.2.1 TDD | |
| Dedicated CORESET RMC configuration |  | 1, 4 | CCR.1.1 FDD | | N/A | |
|  | 2 | CCR.1.1 TDD | |
|  | 3 | CCR.2.1 TDD | |
| OCNG Patterns |  | 1, 2, 3, 4 | OP.1 | | OP.1 | |
| EPRE ratio of PSS to SSS | dB | 1, 2, 3, 4 | 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 |
| EPRE ratio of PRS to SSS |
| TRS Configuration |  | 1, 4 | TRS.1.1 FDD | | N/A | |
|  | 2 | TRS.1.1 TDD | |
|  |  | 3 | TRS.1.2 TDD | |
| Initial BWP configuration |  | 1, 2, 3, 4 | DLBWP.0.1 RedCap  ULBWP.0.1 RedCap | | N/A | |
| Active DL BWP configuration |  | 1 | DLBWP.1.1 RedCap | | N/A | |
| Active UL BWP configuration |  | 1 | ULBWP.1.1 RedCap | | N/A | |
| PRS configuration |  | 1, 4 | PRS.1.2 FR1 | | PRS.1.2 FR1 | |
|  | 2 | PRS.1.2 FR1 | | PRS.1.2 FR1 | |
|  | 3 | PRS.2.1 FR1 | | PRS.2.1 FR1 | |
| PRS muting info |  | 1, 2, 3, 4 | ‘10’ | | ‘01’ | |
| SRS configuration |  | 1, 4 | POS-SRS.1 | | N/A | |
|  |  | 2 | POS-SRS.1 | | N/A | |
|  |  | 3 | POS-SRS.2 | | N/A | |
| Note 2 | dBm/SCS | 1, 4 | -98 | | | |
|  | 2 | -98 | | | |
|  | 3 | -95 | | | |
| Note 2 | dBm/15 kHz | 1, 4 | -98 | | | |
|  | 2 |  | | | |
|  | 3 |  | | | |
| PRS | dB | 1, 4 | -Infinity | -2.41 | -Infinity | -12.12 |
|  | 2 |  |  |  |  |
|  |  | 3 |  |  |  |  |
| PRS | dB | 1, 4 | -Infinity | -2 | -Infinity | -10 |
|  | 2 |  |  |  |  |
|  |  | 3 |  |  |  |  |
| PRP Note 3 | dBm/SCS kHz | 1, 4 | -Infinity | -100 | -Infinity | -108 |
|  | 2 | -Infinity | -100 | -Infinity | -108 |
|  | 3 | -Infinity | -97 | -Infinity | -105 |
| Io | dBm/9.36 MHz | 1, 4 | N/A | -67.92 | N/A | -69.63 |
| dBm/9.36 MHz | 2 | -67.92 | -69.63 |
| dBm/18.36 MHz | 3 | -65.01 | -.66.72 |
| Propagation Condition |  | 1, 2, 3, 4 | AWGN | | | |
| 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: PRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. | | | | | | |

##### A.16.8.2.3.2 Test requirements

The UE Rx-Tx time difference measurement time fulfils the requirements specified in clause 5.6A.6.5.

The UE shall perform and report the UE Rx-Tx time difference measurements for Cell 1 and Cell 2 within the specified UE Rx-Tx time difference measurement time starting from the beginning of time interval T2.

NOTE 1: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.

NOTE 2: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the time duration above because of TTI insertion uncertainty of the measurement report in DCCH.

A test is considered complete after the UE has reported first set of measurement based on the configured reporting periodicity. The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported UE Rx-Tx measurement for each correct event shall be within the UE Rx-Tx reporting range specified in clause 10.1A.18.3.

## **--- End of Change # 16 ---**

## **--- Start of Change # 17 ---**

#### A.16.8.3.3 PRS-RSRP reporting delay test case in RRC\_INACTIVE state in FR1 when eDRX cycle > 10.24s

##### A.16.8.3.3.1 Test purpose and Environment

The purpose of the test is to verify that the PRS-RSRP measurement for RedCap UE in RRC\_INACTIVE with eDRX meets the delay requirements specified in clause 5.6A.3.5 in an environment with AWGN propagation conditions.

The supported test configurations are specified in Table A.16.8.3.3.1-1.

Table A.16.8.3.3.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | 30 kHz SSB SCS, 20 MHz bandwidth, TDD duplex mode |
| 4 | 15 kHz SSB SCS, 10 MHz bandwidth, HD-FDD 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 test consists of two consecutive time intervals, with duration of T1 and T2. Both cells transmit PRS during T2.

During T1 UE is in RRC\_CONNECTED, the *NR-DL-AoD-RequestLocationInformation* message and *NR-DL-AoD-ProvideAssistanceData* message as defined in TS 37.355 shall be provided to the UE during T1. The last slot containing the two messages for the assistance data and location information request is denoted as #n. In the next DL slot after slot #n, UE is released into RRC\_INACTIVE.

The beginning of the time interval T2 is the first PRS resource occasion occurring ΔT after the slot #n, where ΔT = 50 ms is the maximum processing time of the assistance data and location information request.

The general test parameters are listed in Table A.16.8.3.3.1-2, and cell specific test parameters are listed in Table A.16.8.3.3.1-3.

Table A.16.8.3.3.1-2: General test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Value** | **Comment** |
| Reference cell |  | 1, 2, 3, 4 | Cell 1 | Cell 1 is the PCell and the DL-AoD reference cell in the positioning assistance data. |
| Neighbour cell |  | 1, 2, 3, 4 | Cell 2 | Cell 2 is a neighbour cell in the positioning assistance data. |
| RF Channel Number |  | 1, 2, 3, 4 | 1: Cell 1 and Cell 2 |  |
| BWchannel | MHz | 1, 4 | 10: NRB,c = 52 |  |
| 2 | 10: NRB,c = 52 |  |
| 3 | 20: NRB,c = 51 |  |
| SSB configuration |  | 1, 4 | SSB.1 FR1 |  |
|  |  | 2 | SSB.1 FR1 |  |
|  |  | 3 | SSB.2 RedCap FR1 |  |
| SMTC configuration |  | 1, 4 | SMTC.1 |  |
|  |  | 2 | SMTC.1 |  |
|  |  | 3 | SMTC.1 |  |
| CP length |  | 1, 2, 3, 4 | Normal |  |
| DRX | s | 1, 2, 3, 4 | 1.28 |  |
| eDRX cycle length (for both RAN and CN) | s | 1, 2, 3, 4 | 40.96 |  |
| PTW window length | s | 1, 2, 3, 4 | 1.28 |  |
| Reporting periodicity | s | 1, 2, 3, 4 | 20 | *reportingInterval* for periodic reporting defined in TS 37.355 [4]. |
| Time offset between serving and neighbour cells | μs | 1, 2, 3, 4 | 3 | Synchronous cells |
| Expected RSTD | μs | 1, 2, 3, 4 | 3 |  |
| Expected RSTD uncertainty | μs | 1, 2, 3, 4 | 5 |  |
| T1 | s | 1, 2, 3, 4 | 5 |  |
| T2 | s | 1, 2, 3, 4 | 10 |  |

Table A.16.8.3.3.1-3: Cell specific test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Cell 1** | | **Cell 2** | |
| **T1** | **T2** | **T1** | **T2** |
| TDD configuration |  | 1, 4 | N/A | | N/A | |
|  |  | 2 | TDDConf.1.1 | | TDDConf.1.1 | |
|  |  | 3 | TDDConf.2.1 | | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1, 4 | SR.1.1 FDD | | N/A | |
|  | 2 | SR.1.1 TDD | |  | |
|  | 3 | SR.2.1 TDD | |  | |
| RMSI CORESET RMC configuration |  | 1, 4 | CR.1.1 FDD | | N/A | |
|  | 2 | CR.1.1 TDD | |
|  | 3 | CR.2.1 TDD | |
| Dedicated CORESET RMC configuration |  | 1, 4 | CCR.1.1 FDD | | N/A | |
|  | 2 | CCR.1.1 TDD | |
|  | 3 | CCR.2.1 TDD | |
| OCNG Patterns |  | 1, 2, 3, 4 | OP.1 | | OP.1 | |
| Initial BWP configuration |  | 1, 2, 3, 4 | DLBWP.0.1 ULBWP.0.1 | | N/A | |
| PRS configuration |  | 1 | PRS.1.3 FR1 | | PRS.1.3 FR1 | |
|  | 2 | PRS.1.3 FR1 | | PRS.1.3 FR1 | |
|  | 3 | PRS.2.3 FR1 | | PRS.2.3 FR1 | |
| PRS muting info |  | 1, 2, 3, 4 | ‘10’ | | ‘01’ | |
| Note 2 | dBm/SCS | 1, 4 | -98 | | | |
|  | 2 | -98 | | | |
|  | 3 | -95 | | | |
| Note 2 | dBm/15 kHz | 1, 4 | -98 | | | |
|  | 2 |  | | | |
|  | 3 |  | | | |
| PRS | dB | 1, 4 | -Infinity | -2.41 | -Infinity | -12.12 |
|  | 2 |  |  |  |  |
|  | 3 |  |  |  |  |
| PRS | dB | 1, 4 | -Infinity | -2 | -Infinity | -10 |
|  | 2 |  |  |  |  |
|  | 3 |  |  |  |  |
| PRS-RSRP Note 3 | dBm/SCS kHz | 1, 4 | -Infinity | -100 | -Infinity | -108 |
|  |  | 2 | -Infinity | -100 | -Infinity | -108 |
|  |  | 3 | -Infinity | -97 | -Infinity | -105 |
| SS-RSRP Note 3 | dBm/SCS kHz | 1, 4 | -88 | -88 | -Infinity | -88 |
| 2 | -88 | -88 | -Infinity | -88 |
| 3 | -85 | -85 | -Infinity | -85 |
| Io | dBm/9.36 MHz | 1, 4 | N/A | -67.92 | N/A | -69.63 |
|  | dBm/9.36 MHz | 2 | -67.92 | -69.63 |
|  | dBm/18.36 MHz | 3 | -65.01 | -66.72 |
| Propagation Condition |  | 1, 2, 3, 4 | AWGN | | | |
| NOTE 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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: SS-RSRP/PRS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | |

##### A.16.8.3.3.2 Test Requirements

The UE shall perform and report the PRS-RSRP measurements for Cell 1 and Cell 2, within the time limit specified in clause 5.6A.5.5, starting from the beginning of time interval T2.

NOTE: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.

A test is considered complete after the UE has reported first set of measurement based on the configured reporting periodicity. The rate of correct events observed during repeated tests shall be at least 90%, where the reported PRS-RSRP measurement for each correct event shall be within the reporting range specified in clause 10.1A.17.3.

## **--- End of Change # 17 ---**

## **--- Start of Change # 18 ---**

A.16.8.4.3 PRS-RSRPP reporting delay in RRC\_INACTIVE with eDRX

A.16.8.4.3.1 Test purpose and Environment

The purpose of the test is to verify that the PRS-RSRPP measurement by a RedCap UE meets the delay requirements specified in clause 5.6A.7.5 in an environment with a 2-tap channel propagation condition in RRC\_INACTIVE, when configured with eDRX and without FH.

The supported test configurations are specified in Table A.16.8.4.3.1-1.

**Table A.16.8.4.3.1-1: Supported test configurations**

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | 30 kHz SSB SCS, 20 MHz bandwidth, TDD duplex mode |
| 4 | 15 kHz SSB SCS, 10 MHz bandwidth, HD-FDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations. | |

The test consists of two consecutive time intervals, with duration of T1 and T2. During time duration T1, the UE shall be in RRC\_CONNECTED state and shall not have any timing information of Cell 2. During T2 UE shall be in RRC\_INACTIVE state and all both cells transmit PRS resources within initial DL BWP of the UE and with the same numerology as the initial DL BWP.

The *NR-DL-AoD-RequestLocationInformation* message and *NR-DL-AoD-ProvideAssistanceData* message as defined in TS 37.355 shall be provided to the UE during T1. The last slot containing the two messages for the assistance data and location information request is denoted as #n.

The beginning of the time interval T2 shall be aligned with the beginning of the first DRX cycle containing the PRS resources that is ΔT after slot #n, where ΔT = 50 ms is the maximum processing time of the assistance data and location information request.

The general test parameters are listed in Table A.16.8.4.3.1-2, and cell specific test parameters are listed in Table A.16.8.4.3.1-3.

**Table A.16.8.4.3.1-2: General test parameters**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Value** | **Comment** |
| Reference cell |  | 1, 2, 3, 4 | Cell 1 | Cell 1 is the PCell and the DL-AoD reference cell in the positioning assistance data. |
| Neighbour cell |  | 1, 2, 3, 4 | Cell 2 | Cell 2 is a neighbour cell in the positioning assistance data. |
| RF Channel Number |  | 1, 2, 3, 4 | 1: Cell 1 and Cell 2 |  |
| BWchannel | MHz | 1, 2, 4 | 10: NRB,c = 52 |  |
| 3 | 20: NRB,c = 51 |  |
| SSB configuration |  | 1, 2, 4 | SSB.1 FR1 |  |
|  |  | 3 | SSB.1 RedCap FR1 |  |
| SMTC configuration |  | 1, 2, 3, 4 | SMTC.1 RedCap |  |
| CP length |  | 1, 2, 3, 4 | Normal |  |
| DRX | s | 1, 2, 3, 4 | 1.28 | ON |
| CN and RAN eDRX configuration |  | 1, 2, 3, 4 | eDRX cycle = 40.96s  PTW length = 1.28s |  |
| reportingInterval | s | 1, 2, 3 | 20 | PRS measurement reporting periodicity |
| Time offset between serving and neighbour cells | μs | 1, 2, 3, 4 | 3 | Synchronous cells |
| Expected RSTD | μs | 1, 2, 3, 4 | 3 |  |
| Expected RSTD uncertainty | μs | 1, 2, 3, 4 | 5 |  |
| PRS RX hopping request |  | 1, 2, 3, 4 | NOT present |  |
| T1 | s | 1, 2, 3, 4 | 2 |  |
| T2 | s | 1, 2, 3, 4 | 5 |  |

**Table A.16.8.4.3.1-3: Cell specific test parameters**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Cell 1** | | **Cell 2** | |
| **T1** | **T2** | **T1** | **T2** |
| TDD configuration |  | 1, 4 | N/A | | N/A | |
|  |  | 2 | TDDConf.1.1 | | TDDConf.1.1 | |
|  |  | 3 | TDDConf.2.1 | | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1, 4 | SR.1.1 FDD | | N/A | |
|  | 2 | SR.1.1 TDD | |  | |
|  | 3 | SR.2.1 TDD | |  | |
| RMSI CORESET RMC configuration |  | 1, 4 | CR.1.1 FDD | | N/A | |
|  | 2 | CR.1.1 TDD | |
|  | 3 | CR.2.1 TDD | |
| Dedicated CORESET RMC configuration |  | 1, 4 | CCR.1.1 FDD | | N/A | |
|  | 2 | CCR.1.1 TDD | |
|  | 3 | CCR.2.1 TDD | |
| OCNG Patterns |  | 1, 2, 3, 4 | OP.1 | | OP.1 | |
| TRS Configuration |  | 1, 4 | TRS.1.1 FDD | | N/A | |
|  | 2 | TRS.1.1 TDD | |
|  | 3 | TRS.1.2 TDD | |
| Initial BWP configuration |  | 1, 2, 3, 4 | DLBWP.0.1 ULBWP.0.1 | | N/A | |
| PRS configuration |  | 1, 4 | PRS.1.3 FR1 | | PRS.1.3 FR1 | |
|  | 2 | PRS.1.3 FR1 | | PRS.1.3 FR1 | |
|  | 3 | PRS.2.3 FR1 | | PRS.2.3 FR1 | |
| PRS muting info |  | 1, 2, 3, 4 | ‘10’ | | ‘01’ | |
| Note 2 | dBm/SCS | 1, 4 | -98 | | | |
|  | 2 | -98 | | | |
|  | 3 | -95 | | | |
| Note 2 | dBm/15 kHz | 1, 4 | -98 | | | |
|  | 2 |  | | | |
|  | 3 |  | | | |
| PRS | dB | 1, 4 | -Infinity | -3 | -Infinity | -10 |
|  | 2 |  |  |  |  |
|  | 3 |  |  |  |  |
| PRS | dB | 1, 4 | -Infinity | -2 | -Infinity | -10 |
|  | 2 |  |  |  |  |
|  | 3 |  |  |  |  |
| PRS-RSRP Note 3 | dBm/SCS kHz | 1, 4 | -Infinity | -100 | -Infinity | -108 |
|  |  | 2 | -Infinity | -100 | -Infinity | -108 |
|  |  | 3 | -Infinity | -97 | -Infinity | -105 |
| SS-RSRP Note 3 | dBm/SCS kHz | 1, 4 | -88 | -88 | -Infinity | -88 |
| 2 | -88 | -88 | -Infinity | -88 |
| 3 | -85 | -85 | -Infinity | -85 |
| Io | dBm/9.36 MHz | 1, 4 | -70.05 | -67.67 | -70.05 | -67.67 |
|  | dBm/9.36 MHz | 2 | -70.05 | -67.67 | -70.05 | -67.67 |
|  | dBm/18.36 MHz | 3 | -67.13 | -64.75 | -67.13 | -64.75 |
| Propagation Condition |  | 1, 2, 3, 4 | Two-tap channel defined in 38.101-4 Annex B.2.4,  *a* = 1, µs and Hz | | | |
| NOTE 1: The resources for uplink transmission are assigned after the end of time period T2 to UEs that do not support SDT for measurement reporting.  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: SS-RSRP/PRS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 4: OCNG shall be used such that active cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS. | | | | | | |

A.16.8.4.3.2 Test Requirements

The UE shall perform and report the PRS-RSRPP measurements for Cell 1 and Cell 2, within the time limit specified in clause 5.6A.7.5 with Tavailable\_PRS = 1.28s, starting from the beginning of time interval T2.

NOTE 1: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.

NOTE 2: The test is considered complete after the UE reports the first set of positioning measurements based on the configured reportingInterval.

A test is considered complete after the UE has reported first set of results based on the configured reporting periodicity. The rate of correct events observed during repeated tests shall be at least 90%, where the reported PRS-RSRPP measurement for each correct event shall be within the PRS-RSRPP reporting range specified in Clause 10.1A.19.3.

## **--- End of Change # 18 ---**

## **--- Start of Change # 19 ---**

#### A.16.10.1.2 NR RSTD measurement reporting delay test case for RedCap UE without RX FH in FR1 SA in RRC\_IDLE state when eDRX > 10.24s

##### A.16.10.1.2.1 Test Purpose and Environment

The purpose of the test is to verify that the RSTD measurement, reported by RedCap UE with 1Rx or 2Rx branches, meets the requirements specified in Clause 4.6.2.5 when the RedCap UE is configured with eDRX cycle longer than 10.24 s in an environment with AWGN propagation conditions in FR1 in standalone scenario when single positioning frequency layer is configured.

The supported test configurations are specified in Table A.16.10.1.2.1-1.

Table A.16.10.1.2.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | 30 kHz SSB SCS, 20 MHz bandwidth, TDD duplex mode |
| 4 | 15 kHz SSB SCS, 10 MHz bandwidth, HD-FDD duplex mode |
| NOTE: The UE is only required to be tested in one of the supported test configurations. | |

In the test there are three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is the reference as well as the PCell. Cell 2 and Cell 3 are the neighbour cells. All 3 cells are on the same RF channel in FR1.

The test consists of two consecutive time intervals, with duration of T1 and T2. During time duration T1, the UE shall be in RRC\_CONNECTED state and shall not have any timing information of Cell 2 and Cell 3. During T2 UE shall be in RRC\_IDLE state and all three cells transmit PRS resources within initial DL BWP of the UE and with the same numerology as the initial DL BWP.

***Note****: The information on when PRS is muted is conveyed to the UE using PRS muting information.*

The *NR-DL-TDOA-ProvideAssistanceData* and *nr-DL-TDOA-RequestLocationInformation* as defined in TS 37.355 [34, clause 6.5.10], shall be provided to the UE during T1. The UE is configured to report positioning measurements every 20s by setting the value of *reportingInterval* to "*ri20*" in *nr-DL-TDOA-RequestLocationInformation.* The UE is not configured by the LMF to perform RSTD measurement with RX FH in *NR-DL-TDOA-RequestLocationInformation*. The last TTI containing the two messages shall be provided to the UE ΔT ms before the start of T2, where ΔT = 50 ms is the maximum processing time of the DL-TDOA assistance data and location information request.

The beginning of the time interval T2 is not limited to PTW.

The UE is configured with eDRX cycle of 40.96 s.

The general test parameters are listed in Table A.16.10.1.2.1-2, and cell specific test parameters are listed in Table A.16.10.1.2.1-3 and Table A.16.10.1.2.1-4.

Table A.16.10.1.2.1-2: General test parameters for RSTD measurement reporting delay

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| Reference cell | |  | Cell 1 | Reference cell is the cell in the DL-TDOA assistance data with respect to which the RSTD measurement is defined, as specified in TS 38.215 [4] and TS 37.355 [34]. The reference cell is the PCell in this test case. |
| Neighbor cells | |  | Cell 2 and Cell 3 | Cell 2 and Cell 3 appear at the first and second places in the neighbour cell list in the DL-TDOA assistance data. |
| SSB configuration | Config 1,4 |  | SSB.4 RedCap FR1 |  |
| Config 2 |  | SSB.4 RedCap FR1 |
| Config 3 |  | SSB.5 RedCap FR1 |
| SMTC configuration | Config 1,4 |  | SMTC.1 RedCap |  |
| Config 2 |  | SMTC.1 RedCap |
| Config 3 |  | SMTC.1 RedCap |
| PDSCH RMC configuration | Config 1,4 |  | SR.1.1 FDD |  |
| Config 2 |  | SR.1.1 TDD |  |
| Config 3 |  | SR.2.1 TDD |  |
| RMSI CORESET RMC configuration | Config 1,4 |  | CR.1.1 FDD | As specified in clause A.3.1.2.1 |
| Config 2 |  | CR.1.1 TDD |  |
| Config 3 |  | CR.2.1 TDD |  |
| Dedicated CORESET RMC configuration | Config 1,4 |  | CR.1.1 FDD |  |
| Config 2 |  | CR.1.1 TDD |  |
| Config 3 |  | CR.2.1 TDD |  |
| Initial BWP configuration | Config 1,2,3,4 |  | DLBWP.0.1  ULBWP.0.1 |  |
| Active UL BWP configuration | Config 1,2,3,4 |  | ULBWP.1.1 |  |
| PRS Configuration | Config 1,4 |  | PRS.1.1 FR1 | As specified in clause A.3.31 |
| Config 2 |  | PRS.1.1 FR1 |
| Config 3 |  | PRS.2.1 FR1 |
| Physical cell ID PCI | |  | (PCI of Cell 1 – PCI of Cell 2) mod 6 = 0  and  (PCI of Cell 1 – PCI of Cell 3) mod 6 = 0 | The cell PCIs are selected such that the relative shifts of PRS patterns among cells are as given by the test parameters |
| CP length | |  | Normal |  |
| eDRX | | s | 40.96 |  |
| CN and RAN eDRX configuration | | s | eDRX length = 40.96  PTW length = 10.24 |  |
| Radio frame receive time offset between the cells at the UE antenna connector | | μs | Cell 2 to Cell 1: 0  Cell 3 to Cell 1: 3 | PRS are transmitted from synchronous cells |
| Expected RSTD | | μs | Cell 2: 3  Cell 3: 3  Other neighbour cells: randomly between -3 and 3 | The expected RSTD is what is expected at the receiver. The corresponding parameter in the DL-TDOA assistance data specified in TS 37.355 [34] is the expectedRSTD indicator |
| Expected RSTD uncertainty for all neighbour cells | | μs | 5 | The corresponding parameter in the DL-TDOA assistance ta specified in TS 37.355 [34] is the expectedRSTD-Uncertainty index |
| Number of cells provided in DL-TDOA assistance data | |  | 4 | Including the reference cell |
| PRS muting info | |  | Cell 1: ‘10’  Cell 2: ‘01’  Cell 3: ‘10’ | Correponds to *NR-MutingPattern* defined in TS 37.355 [34] |
| PRS resource RE offset | |  | Cell 1: 0  Cell 2: 0  Cell 3: 1 | Cell 1 and Cell 3 are configured with different resource offsets |
| T1 | | s | 3 | The length of the time interval from the beginning of each test |
| T2 | | s | 5 | The length of the time interval that follows immediately after time interval T1. |

Table A.16.10.1.2.1-3: Cell-specific test parameters for RSTD measurement reporting delay during T1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 | Cell 2 | Cell 3 |
| NR RF Channel Number | |  | 1 | 1 | 1 |
| Positiong frequency layer | |  | 1 | 1 | 1 |
| Correlation Matrix and Antenna Configuration | |  | 12 Low | 12 Low | 12 Low |
| OCNG patterns defined in A.3.2.1 | |  | OP.1 | N/A | N/A |
| Note 3 | Config 1 | dBm/SCS | -98 | | |
| Config 2 | dBm/SCS | -98 | | |
| Config 3 | dBm/SCS | -95 | | |
| PRS | | dB | -Infinity | -Infinity | -Infinity |
| SSB | | dB | 10 | -Infinity | -Infinity |
| Io Note 4 | Config 1 | dBm/  9.36 MHz | -56.54 | -56.54 | -56.54 |
| Config 2 | dBm/  9.36 MHz | -56.54 | -56.54 | -56.54 |
| Config 3 | dBm/  18.72 MHz | -56.54 | -56.54 | -56.54 |
| SSB RP Note4 | Config 1 | dBm/SCS | -82 | -Infinity | -Infinity |
| Config 2 | dBm/SCS | -88 | -Infinity | -Infinity |
| Config 3 | dBm/SCS | -85 | -Infinity | -Infinity |
| Propagation Condition | |  | AWGN | | |
| NOTE 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  NOTE 2: The resources for uplink transmission are assigned after the end of time period T2 to UEs that do not support SDT for measurement reporting.  NOTE 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over sub-carriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled.  NOTE 4: SSB RP and Io levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. | | | | | | |

Table A.16.10.1.2.1-4: Cell-specific test parameters for RSTD measurement reporting delay during T2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 | Cell 2 | Cell 3 |
| T2 | T2 | T2 |
| NR RF Channel Number | |  | 1 | 1 | 1 |
| Correlation Matrix and Antenna Configuration | |  | 12 Low | 12 Low | 12 Low |
| OCNG patterns defined in A.3.2.1 | |  | OP.1 | OP.1 | OP.1 |
| PRACH configuration | |  | FR1 PRACH configuration 1 | FR1 PRACH configuration 1 | FR1 PRACH configuration 1 |
| Note 3 | Config 1 | dBm/SCS | -98 | -98 | -98 |
| Config 2 | dBm/SCS | -98 | -98 | -98 |
| Config 3 | dBm/SCS | -95 | -95 | -95 |
| PRS | Config 1 | dB | -5 | -11 | -11 |
| Config 2 | dB | -5 | -11 | -11 |
| Config 3 | dB | -5 | -11 | -11 |
| Io Note 4 | Config 1 | dBm/  9.36MHz | -69.26 | -69.26 | -69.26 |
| Config 2 | dBm/  9.36MHz | -69.26 | -69.26 | -69.26 |
| Config 3 | dBm/  18.72MHz | -66.63 | -66.63 | -66.63 |
| PRS | | dB | -5.33 | -12.19 | -12.19 |
| Propagation Condition | |  | AWGN | | |
| NOTE 1: OCNG shall be used such that active cells (all, except Cell 3 in T2) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the sub-frames with transmitted PRS.  NOTE 2: The resources for uplink transmission are assigned after the end of time period T2.  NOTE 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over sub-carriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled. | | | | | |

##### A.16.10.1.2.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 4.6.2.5. The test is considered complete after the UE reports the first set of positioning measurements based on the configured *reportingInterval.*

The UE shall perform and report the RSTD measurements for Cell 2 and Cell 3 with respect to the reference cell in the DL-TDOA assistance data, Cell 1, within the time duration specified in section 4.6.2.5 starting from the beginning of time interval T2.

***NOTE****: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.*

The rate of the correct events for each neighbour cell observed during the repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in the Clause 10.1A.16.3, i.e., between RSTD\_000000000 and RSTD\_126083073.

## **--- End of Change # 19 ---**

## **--- Start of Change # 20 ---**

#### A.16.10.2.2 PRS-RSRP measurement without Rx FH reporting delay test case for single positioning frequency layer in FR1 SA in RRC\_IDLE state with eDRX cycle > 10.24s

##### A.16.10.2.2.1 Test purpose and Environment

The purpose of the test is to verify that the PRS-RSRP measurement without Rx FH for RedCap UE in RRC\_IDLE state with eDRX cycle > 10.24s meets the delay requirements specified in clause 4.6.3.5 in an environment with AWGN propagation conditions in FR1 in standalone scenario when single positioning frequency layer is configured.

The supported test configurations are specified in Table A.16.10.2.2.1-1.

Table A.16.10.2.2.1-1: Supported test configurations

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | 30 kHz SSB SCS, 20 MHz bandwidth, TDD duplex mode |
| 4 | 15 kHz SSB SCS, 10 MHz bandwidth, HD-FDD duplex mode |
| NOTE: The RedCap 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 test consists of two consecutive time intervals, with duration of T1 and T2. Both cells transmit PRS during T2.

The *NR-DL-AoD-RequestLocationInformation* message and *NR-DL-AoD-ProvideAssistanceData* message as defined in TS 37.355 shall be provided to the UE during T1. The last slot containing the two messages for the assistance data and location information request is denoted as #n. In the next DL slot after slot #n, UE is released into RRC\_IDLE. PRS RX hopping is not requested *in NR-DL-AoD-RequestLocationInformation*.

The beginning of the time interval T2 shall be aligned with the first DRX cycle containing a DL PRS resource occasion occuring ΔT after slot #n, where ΔT = 50 ms is the maximum processing time of the assistance data and location information request.

The general test parameters are listed in Table A.16.10.2.2.1-2, and cell specific test parameters are listed in Table A.16.10.2.2.1-3.

Table A.16.10.2.2.1-2: General test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Reference cell |  | 1, 2, 3, 4 | Cell 1 | Cell 1 is the PCell and the DL-AoD reference cell in the positioning assistance data. |
| Neighbour cell |  | 1, 2, 3, 4 | Cell 2 | Cell 2 is a neighbour cell in the positioning assistance data. |
| RF Channel Number |  | 1, 2, 3, 4 | 1: Cell 1 and Cell 2 |  |
| BWchannel | MHz | 1, 4 | 10: NRB,c = 52 |  |
| 2 | 10: NRB,c = 52 |  |
| 3 | 20: NRB,c = 51 |  |
| SSB configuration |  | 1, 4 | SSB.1 FR1 |  |
|  |  | 2 | SSB.1 FR1 |  |
|  |  | 3 | SSB.1 RedCap FR1 |  |
| SMTC configuration |  | 1, 4 | SMTC.1 |  |
|  |  | 2 | SMTC.1 |  |
|  |  | 3 | SMTC.1 |  |
| CP length |  | 1, 2, 3, 4 | Normal |  |
| DRX | s | 1, 2, 3, 4 | 1.28 |  |
| eDRX cycle length | s | 1, 2, 3, 4 | 40.96 |  |
| PTW length | s | 1, 2, 3, 4 | 1.28 |  |
| Reporting periodicity | s | 1,2,3,4 | 20 | *reportingInterval* for periodic reporting defined in TS 37.355 [4]. |
| Time offset between serving and neighbour cells | μs | 1, 2, 3, 4 | 3 | Synchronous cells |
| Expected RSTD | μs | 1, 2, 3, 4 | 3 |  |
| Expected RSTD uncertainty | μs | 1, 2, 3, 4 | 5 |  |
| T1 | s | 1, 2, 3, 4 | 5 |  |
| T2 | s | 1, 2, 3, 4 | 10 |  |

Table A.16.10.2.2.1-3: Cell specific test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
| T1 | T2 | T1 | T2 |
| TDD configuration |  | 1, 4 | N/A | | N/A | |
|  |  | 2 | TDDConf.1.1 | | TDDConf.1.1 | |
|  |  | 3 | TDDConf.2.1 | | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1, 4 | SR.1.1 FDD | | N/A | |
|  | 2 | SR.1.1 TDD | |  | |
|  | 3 | SR.2.1 TDD | |  | |
| RMSI CORESET RMC configuration |  | 1, 4 | CR.1.1 FDD | | N/A | |
|  | 2 | CR.1.1 TDD | |
|  | 3 | CR.2.1 TDD | |
| Dedicated CORESET RMC configuration |  | 1, 4 | CCR.1.1 FDD | | N/A | |
|  | 2 | CCR.1.1 TDD | |
|  | 3 | CCR.2.1 TDD | |
| OCNG Patterns |  | 1, 2, 3, 4 | OP.1 | | OP.1 | |
| TRS Configuration |  | 1, 4 | TRS.1.1 FDD | | N/A | |
|  | 2 | TRS.1.1 TDD | |
|  | 3 | TRS.1.2 TDD | |
| Initial BWP configuration |  | 1, 2, 3, 4 | DLBWP.0.1 ULBWP.0.1 | | N/A | |
| PRS configuration |  | 1, 4 | PRS.1.3 FR1 | | PRS.1.3 FR1 | |
|  | 2 | PRS.1.3 FR1 | | PRS.1.3 FR1 | |
|  | 3 | PRS.2.3 FR1 | | PRS.2.3 FR1 | |
| PRS muting info |  | 1, 2, 3, 3 | ‘10’ | | ‘01’ | |
| Note 2 | dBm/SCS | 1, 4 | -98 | | | |
|  | 2 | -98 | | | |
|  | 3 | -95 | | | |
| Note 2 | dBm/15 kHz | 1, 4 | -98 | | | |
|  | 2 |  | | | |
|  | 3 |  | | | |
| PRS | dB | 1, 4 | -Infinity | -2.41 | -Infinity | -12.12 |
|  | 2 |  |  |  |  |
|  | 3 |  |  |  |  |
| PRS | dB | 1, 4 | -Infinity | -2 | -Infinity | -10 |
|  | 2 |  |  |  |  |
|  | 3 |  |  |  |  |
| PRS-RSRP Note 3 | dBm/SCS kHz | 1, 4 | -Infinity | -100 | -Infinity | -108 |
|  |  | 2 | -Infinity | -100 | -Infinity | -108 |
|  |  | 3 | -Infinity | -97 | -Infinity | -105 |
| SS-RSRP Note 3 | dBm/SCS kHz | 1, 4 | -88 | -88 | -Infinity | -88 |
| 2 | -88 | -88 | -Infinity | -88 |
| 3 | -85 | -85 | -Infinity | -85 |
| Io | dBm/9.36 MHz | 1, 4 | N/A | -67.92 | N/A | -69.63 |
|  | dBm/9.36 MHz | 2 |  | -67.92 |  | -69.63 |
|  | dBm/18.36 MHz | 3 |  | -65.01 |  | -66.72 |
| Propagation Condition |  | 1, 2, 3, 4 | AWGN | | | |
| NOTE 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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: SS-RSRP/PRS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | |

##### A.16.10.2.2.2 Test Requirements

The UE shall perform and report the PRS-RSRP measurements for Cell 1 and Cell 2, within the time limit specified in clause 4.6.3.5, starting from the beginning of time interval T2.

NOTE: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.

A test is considered complete after the UE has reported first set of results based on the configured reporting periodicity. The rate of the correct events for each cell observed during repeated tests shall be at least 90%, where the reported PRS-RSRP measurement for each correct event shall be within the reporting range specified in clause 10.1A.17.3.

## **--- End of Change # 20 ---**

## **--- Start of Change # 21 ---**

#### A.16.11.2.2 PRS-RSRP measurement without Rx FH accuracy test case for single positioning frequency layer in FR1 SA in RRC\_IDLE state with eDRX cycle > 10.24s

##### A.16.11.2.2.1 Test purpose and Environment

The purpose of the test is to verify that the PRS-RSRP measurement without Rx FH for RedCap UE in RRC\_IDLE state with eDRX cycle > 10.24s meets the accuracy requirements specified in clause 10.1A.17.2 in an environment with AWGN propagation conditions in FR1 in standalone scenario when single positioning frequency layer is configured. And both absolute and relative accuracy of PRS-RSRP measurements are tested.

The supported test configurations are specified in Table A.16.11.2.2.1-1.

Table A.16.11.2.2.1-1: Supported test configurations

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | 30 kHz SSB SCS, 20 MHz bandwidth, TDD duplex mode |
| 4 | 15 kHz SSB SCS, 10 MHz bandwidth, HD-FDD duplex mode |
| NOTE: The RedCap 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 test consists of two consecutive time intervals, with duration of T1 and T2. Both cells transmit PRS during T2.

The *NR-DL-AoD-RequestLocationInformation* message and *NR-DL-AoD-ProvideAssistanceData* message as defined in TS 37.355 shall be provided to the UE during T1. The last slot containing the two messages for the assistance data and location information request is denoted as #n. In the next DL slot after slot #n, UE is released into RRC\_IDLE. PRS RX hopping is not requested *in NR-DL-AoD-RequestLocationInformation*.

The beginning of the time interval T2 shall be aligned with the first DRX cycle containing a DL PRS resource occasion occuring ΔT after slot #n, where ΔT = 50 ms is the maximum processing time of the assistance data and location information request.

The general test parameters are listed in Table A.16.11.2.2.1-2, and cell specific test parameters are listed in Table A.16.11.2.2.1-3.

Table A.16.11.2.2.1-2: General test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Reference cell |  | 1, 2, 3, 4 | Cell 1 | Cell 1 is the PCell and the DL-AoD reference cell in the positioning assistance data. |
| Neighbour cell |  | 1, 2, 3, 4 | Cell 2 | Cell 2 is a neighbour cell in the positioning assistance data. |
| RF Channel Number |  | 1, 2, 3, 4 | 1: Cell 1 and Cell 2 |  |
| BWchannel | MHz | 1, 4 | 10: NRB,c = 52 |  |
| 2 | 10: NRB,c = 52 |  |
| 3 | 20: NRB,c = 51 |  |
| SSB configuration |  | 1, 4 | SSB.1 FR1 |  |
|  |  | 2 | SSB.1 FR1 |  |
|  |  | 3 | SSB.1 RedCap FR1 |  |
| SMTC configuration |  | 1, 4 | SMTC.1 |  |
|  |  | 2 | SMTC.1 |  |
|  |  | 3 | SMTC.1 |  |
| CP length |  | 1, 2, 3, 4 | Normal |  |
| DRX | s | 1, 2, 3, 4 | 1.28 |  |
| eDRX cycle length | s | 1, 2, 3, 4 | 40.96 |  |
| PTW length | s | 1, 2, 3, 4 | 1.28 |  |
| Time offset between serving and neighbour cells | μs | 1, 2, 3, 4 | 3 | Synchronous cells |
| Expected RSTD | μs | 1, 2, 3, 4 | 3 |  |
| Expected RSTD uncertainty | μs | 1, 2, 3, 4 | 5 |  |
| T1 | s | 1, 2, 3, 4 | 5 |  |
| T2 | s | 1, 2, 3, 4 | 10 |  |

Table A.16.11.2.2.1-3: Cell specific test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
| T1 | T2 | T1 | T2 |
| TDD configuration |  | 1, 4 | N/A | | N/A | |
|  |  | 2 | TDDConf.1.1 | | TDDConf.1.1 | |
|  |  | 3 | TDDConf.2.1 | | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1, 4 | SR.1.1 FDD | | N/A | |
|  | 2 | SR.1.1 TDD | |  | |
|  | 3 | SR.2.1 TDD | |  | |
| RMSI CORESET RMC configuration |  | 1, 4 | CR.1.1 FDD | | N/A | |
|  | 2 | CR.1.1 TDD | |
|  | 3 | CR.2.1 TDD | |
| Dedicated CORESET RMC configuration |  | 1, 4 | CCR.1.1 FDD | | N/A | |
|  | 2 | CCR.1.1 TDD | |
|  | 3 | CCR.2.1 TDD | |
| OCNG Patterns |  | 1, 2, 3, 4 | OP.1 | | OP.1 | |
| TRS Configuration |  | 1, 4 | TRS.1.1 FDD | | N/A | |
|  | 2 | TRS.1.1 TDD | |
|  | 3 | TRS.1.2 TDD | |
| Initial BWP configuration |  | 1, 2, 3, 4 | DLBWP.0.1 ULBWP.0.1 | | N/A | |
| PRS configuration |  | 1, 4 | PRS.1.3 FR1 | | PRS.1.3 FR1 | |
|  | 2 | PRS.1.3 FR1 | | PRS.1.3 FR1 | |
|  | 3 | PRS.2.3 FR1 | | PRS.2.3 FR1 | |
| PRS muting info |  | 1, 2, 3, 3 | ‘10’ | | ‘01’ | |
| Note 2 | dBm/SCS | 1, 4 | -98 | | | |
|  | 2 | -98 | | | |
|  | 3 | -95 | | | |
| Note 2 | dBm/15 kHz | 1, 4 | -98 | | | |
|  | 2 |  | | | |
|  | 3 |  | | | |
| PRS | dB | 1, 4 | -Infinity | -2.41 | -Infinity | -12.12 |
|  | 2 |  |  |  |  |
|  | 3 |  |  |  |  |
| PRS | dB | 1, 4 | -Infinity | -2 | -Infinity | -10 |
|  | 2 |  |  |  |  |
|  | 3 |  |  |  |  |
| PRS-RSRP Note 3 | dBm/SCS kHz | 1, 4 | -Infinity | -100 | -Infinity | -108 |
|  |  | 2 | -Infinity | -100 | -Infinity | -108 |
|  |  | 3 | -Infinity | -97 | -Infinity | -105 |
| SS-RSRP Note 3 | dBm/SCS kHz | 1, 4 | -88 | -88 | -Infinity | -88 |
| 2 | -88 | -88 | -Infinity | -88 |
| 3 | -85 | -85 | -Infinity | -85 |
| Io | dBm/9.36 MHz | 1, 4 | N/A | -67.92 | N/A | -69.63 |
|  | dBm/9.36 MHz | 2 |  | -67.92 |  | -69.63 |
|  | dBm/18.36 MHz | 3 |  | -65.01 |  | -66.72 |
| Propagation Condition |  | 1, 2, 3, 4 | AWGN | | | |
| NOTE 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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: SS-RSRP/PRS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | |

##### A.16.11.2.2.2 Test Requirements

In each test, the absolute PRS-RSRP measurement for each cell shall fulfil the absolute accuracy requirement in clause 10.1A.17.2.1. The relative PRS-RSRP measurement between the two PRS resources within the same cell shall fulfil the relative accuracy requirement in clause 10.1A.17.2.2.

## **--- End of Change # 21 ---**

## **--- Start of Change # 22 ---**

#### A.17.8.1.3 NR RSTD measurement reporting delay test case for single positioning frequency layer in FR2 SA in RRC\_INACTIVE state with eDRX > 10.24s

##### A.17.8.1.3.1 Test purpose and environment

The purpose of the test is to verify the measurement requirements specified in clause 5.6A.4.5 for RSTD measurements in RRC\_INACTIVE with eDRX. Refer to clause A.7.8.1.4.1 for test configuration and procedure.

##### A.17.8.1.3.2 Test requirements

The RSTD measurement time shall fulfill the requirements specified in clause 5.6A.4.5.

The UE shall perform and report the RSTD measurements for Cell 1, Cell 2 and Cell 3 within the specified measurement period duration starting from the beginning of time interval T2. The requirement shall be evaluated based on the first measurement report received from the UE.

NOTE 1: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.

NOTE 2: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the time duration above because of TTI insertion uncertainty of the measurement report in DCCH.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in clause 10.1A.16.3.

## **--- End of Change # 22 ---**

## **--- Start of Change # 23 ---**

#### A.17.8.2.3 UE Rx-Tx time difference measurements for single positioning frequency layer with eDRX > 10.24s in FR2 SA

##### A.17.8.2.3.1 Test purpose and environment

The purpose of the test is to verify the measurement requirements specified in clause 5.6A.6.5 for UE Rx-Tx measurements in RRC\_INACTIVE with eDRX. Refer to clause A.7.8.3.3.1 for test configuration and procedure.

##### A.17.8.2.3.2 Test requirements

The UE Rx-Tx time difference measurement time fulfils the requirements specified in clause 5.6A.6.5.

The UE shall perform and report the UE Rx-Tx time difference measurements for Cell 1 and Cell 2 within the specified UE Rx-Tx time difference measurement time starting from the beginning of time interval T2.

NOTE 1: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.

NOTE 2: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the time duration above because of TTI insertion uncertainty of the measurement report in DCCH.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported UE Rx-Tx measurement for each correct event shall be within the UE Rx-Tx reporting range specified in clause 10.1A.18.3.

## **--- End of Change # 23 ---**

## **--- Start of Change # 24 ---**

#### A.17.8.3.3 PRS-RSRP reporting delay in RRC\_INACTIVE with eDRX

##### A.17.8.3.3.1 Test Purpose and Environment

The purpose of the test is to verify a RedCap UE can meet the PRS RSRP measurement requirements specified in Clause 5.6A.5.5 for single positioning frequency layer under AWGN propagation conditions in RRC\_INACTIVE, when configured with eDRX and without FH. Supported test configurations are shown in table A.17.8.3.3.1-1.

There are two cells in the test, PCell (Cell 1) and a FR2 neighbour cell (Cell 2) on the same frequency as the PCell.

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2. Both cells transmit PRS during T2.

During T1 UE is in RRC\_CONNECTED, the *NR-DL-AoD-RequestLocationInformation* message and *NR-DL-AoD-ProvideAssistanceData* message as defined in TS 37.355 shall be provided to the UE during T1. The last slot containing the two messages for the assistance data and location information request is denoted as #n. In the next DL slot after slot #n, UE is released into RRC\_INACTIVE.

The beginning of the time interval T2 is the first PRS resource occasion occurring ΔT after the slot #n, where ΔT = 50 ms is the maximum processing time of the assistance data and location information request.

The test parameters are as given in table A.17.8.3.3.1-2, and table A.17.8.3.3.1-3.

Table A.17.8.3.3.1-1: supported test configurations for PRS RSRP measurement for FR2

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

Table A.17.8.3.3.1-2: General test parameters for PRS RSRP measurement reporting delay

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| NR RF Channel Number |  | Config 1 | 1: Cell 1 and Cell 2 | One TDD carrier frequency is used for the NR cells. |
| Active cell |  | Config 1 | NR cell 1 (Pcell) | Cell 1 is the PCell and the DL-AoD reference cell in the positioning assistance data. |
| Neighbour cell |  | Config 1 | NR cell 2 | Cell 2 is a neighbour cell in the positioning assistance data. |
| SMTC parameters |  | Config 1 | SMTC.1 | As specified in clause A.3.11 |
| SSB parameters |  | Config 1 | SSB.3 FR2 | As specified in clause A.3.10.2 |
| CP length |  | Config 1 | Normal |  |
| DRX |  | Config 1 | 0.64 s |  |
| CN and RAN eDRX configuration |  | Config 1 | eDRX cycle = 40.96 s  PTW length = 1.28 s |  |
| Reporting periodicity | s | Config 1 | 20 | *reportingInterval* for periodic reporting defined in TS 37.355 [4]. |
| Time offset between serving and neighbour cells |  | Config 1 | 3 μs | Synchronous cells. |
| Expected RSTD | μs | Config 1 | 3 |  |
| Expected RSTD uncertainty | μs | Config 1 | 5 |  |
| T1 | s | Config 1 | 5 |  |
| T2 | s | Config 1 | 41 |  |

Table A.17.8.3.3.1-3: Cell-specific test parameters for PRS RSRP measurement reporting delay

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  | |  | T1 | T2 | T1 | T2 |
| AoA setup | |  | Config 1 | Setup 1 as specified in clause A.3.15 | | | |
| Beam AssumptionNote 7 | |  | Config 1 | Rough | | Rough | |
| TDD configuration | |  | Config 1 | TDDConf.3.1 | | TDDConf.3.1 | |
| Duplex mode | |  | Config 1 | TDD | | TDD | |
| BWchannel | | MHz | Config 1 | 100: NRB,c = 66 | | 100: NRB,c = 66 | |
| BWP configuration | Initial DL BWP |  | Config 1 | DLBWP.0.1 | | N/A | |
|  | Initial UL BWP |  |  | ULBWP.0.1 | | N/A | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1 | OP.1 | | OP.1 | |
| PDSCH Reference measurement channel | |  | Config 1 | SR.3.1 TDD | | - | |
| CORESET Reference Channel | |  | Config 1 | CR.3.1 TDD | | - | |
| Dedicated CORESET RMC configuration | |  | Config 1 | CCR.3.1 TDD | | - | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1 | 120 | | 120 | |
| PRS configuration | |  | Config 1 | PRS.1.1 FR2 | | PRS.1.1 FR2 | |
| PRS muting configuration | |  | Config 1 | ‘10’ | | ‘01’ | |
| EPRE ratio of PSS to SSS | |  |  |  | |  | |
| 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 | |  | Config 1 | 0 | | 0 | |
| 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) | |  |  |  | |  | |
| Note2 | | dBm/15kHz Note5 |  | -98 | | -98 | |
| Note2 | | dBm/SCS Note4 | Config 1 | -89 | | -89 | |
| SS-RSRP Note 3 | | dBm/SCS Note5 | Config 1 | -91 | -91 | -Infinity | -99 |
| PRS-RSRP Note 3 | | dBm/SCS Note5 | Config 1 | -Infinity | -91 | -Infinity | -99 |
| PRS | | dB | Config 1 | -Infinity | -2.41 | -Infinity | -12.12 |
| PRS | | dB | Config 1 | -Infinity | -2 | -Infinity | -10 |
| IoNote3 | | dBm/95.04Note5 | Config 1 | -57.89 | | -57.89 | |
| Propagation Condition | |  | Config 1 | AWGN | | | |
| 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: SS-RSRP/PRS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 4: PRS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  NOTE 5: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone.  NOTE 6: As observed with 0 dBi gain antenna at the centre of the quiet zone.  NOTE 7: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation. | | | | | | | |

##### A.17.8.3.3.2 Test Requirements

The PRS RSRP measurement time fulfils the requirements specified in Clause 5.6A.5.5. The UE shall perform and report the PRS RSRP measurements for Cell 2 with respect to the reference cell in the DL-AoD assistance data, Cell 1, within the time duration specified in section 5.6A.5.5 with Tavailable\_PRS = 0.64 s starting from the beginning of time interval T2.

NOTE: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.

A test is considered complete after the UE has reported first set of results based on the configured reporting periodicity. The rate of the correct events for the neighbour cell observed during repeated tests shall be at least 90%, where the reported PRS RSRP measurement for each correct event shall be within the PRS RSRP reporting range specified in Clause 10.1A.17.3.

## **--- End of Change # 24 ---**

## **--- Start of Change # 25 ---**

#### A.17.8.4.3 PRS-RSPP reporting delay in RRC\_INACTIVE state with eDRX > 10.24s

##### A.17.8.4.3.1 Test purpose and environment

The purpose of the test is to verify the measurement requirements specified in clause 5.6A.7.5 for PRS-RSRPP measurements in RRC\_INACTIVE with eDRX. Refer to clause A.7.8.4.3.1 for test configuration and procedure.

##### A.17.8.4.3.2 Test requirements

The PRS-RSRPP measurement time fulfils the requirements specified in clause 5.6A.7.5.

The UE shall perform and report the PRS-RSRPP measurements for Cell 1 and Cell 2 within the specified measurement period duration starting from the beginning of time interval T2. The requirement shall be evaluated based on the first measurement report received from the UE.

NOTE 1: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.

NOTE 2: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the time duration above because of TTI insertion uncertainty of the measurement report in DCCH.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported PRS-RSRPP measurement for each correct event shall be within the PRS-RSRPP reporting range specified in clause 10.1A.19.3.

## **--- End of Change # 25 ---**

## **--- Start of Change # 26 ---**

#### A.17.10.1.2 NR RSTD without FH measurement reporting delay test case for single positioning frequency layer in FR2 SA in RRC\_IDLE state with eDRX > 10.24s

##### A.17.10.1.2.1 Test purpose and environment

The purpose of the test is to verify the measurement requirements specified in clause 4.6.2.5 for RSTD measurements in RRC\_IDLE with eDRX and periodic reporting. Refer to clause A.7.10.1.2.1 for test configuration and procedure.

##### A.17.10.1.2.2 Test requirements

The RSTD measurement time shall fulfill the requirements specified in clause 4.6.2.5.

The UE shall perform and report the RSTD measurements for Cell 1, Cell 2 and Cell 3 within the specified measurement period duration starting from the beginning of time interval T2. The requirement shall be evaluated based on the first measurement report received from the UE.

NOTE 1: The actual overall delays measured in the test may be higher than the time duration above because of the uncertainty in acquiring the first available PRACH occasion to transition to RRC\_CONNECTED state to report the measurements.

NOTE 2: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the time duration above because of TTI insertion uncertainty of the measurement report in DCCH.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in clause 10.1A.16.3.

## **--- End of Change # 26 ---**

## **--- Start of Change # 27 ---**

#### A.17.11.1.2 RSTD without FH measurement accuracy test case for single positioning frequency layer in FR2 SA in RRC\_IDLE state with eDRX > 10.24s

##### A.17.11.1.2.1 Test purpose and environment

The purpose of this test is to verify that RSTD measurements performed in RRC\_IDLE with eDRX and periodic reporting satisfy the measurement accuracy requirements specified in clause 10.1A.16.2. The tests are conducted under AWGN propagation condition with the UE operating in FR2 stand-alone mode and configured to perform RSTD measurements on a single positioning frequency layer (PFL) in FR2.

The supported test configurations are listed in Table A.17.11.1.2.1-1.

Table A.17.11.1.2.1-1: Supported test configurations

|  |  |
| --- | --- |
| PCell configuration | Description |
| 1 | 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |

There are two synchronous cells in the test: 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 *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 4.5.2.5.

The general test parameters and cell specific test parameters are as given in Table A.17.11.1.2.1-2 and Table A.17.11.1.2.1-3, respectively.

Table A.17.11.1.2.1-2: General test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Reference cell |  | 1 | Cell 1 |  |
| Neighbour cell |  | 1 | Cell 2 |  |
| RF Channel Number |  | 1 | 1 | For Cell 1 and Cell 2 |
| BWchannel | MHz | 1 | 100: NRB,c = 66 |  |
| SSB configuration |  | 1 | SSB.3 FR2 |  |
| SMTC configuration |  | 1 | SMTC.1 |  |
| CP length |  | 1 | Normal |  |
| DRX | s | 1 | 0.64 |  |
| eDRX cycle length | s | 1 | 40.96 |  |
| PTW length | s | 1 | 1.28 |  |
| Reporting periodicity | s | 1 | 20 | *reportingInterval* for periodic reporting defined in TS 37.355 [4]. |
| Time offset between serving and neighbour cell | μs | 1 | 3 | Synchronous cells |
| Expected RSTD | μs | 1 | 3 |  |
| Expected RSTD uncertainty | μs | 1 | 5 |  |

Table A.17.11.1.2.1-3: Cell specific test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test 1 | | Test 2 | |
|  |  | Cell 1 | Cell 2 | Cell 1 | Cell 2 |
| AoA setup |  | Setup 1 as specified in clause A.3.15 | | | |
| Beam AssumptionNote 4 |  | Rough | | Rough | |
| TDD configuration |  | TDDConf.3.1 | | TDDConf.3.1 | |
| PDSCH RMC configuration |  | SR.3.1 TDD | - | SR.3.1 TDD | - |
| RMSI CORESET RMC configuration |  | CR.3.1 TDD | - | CR.3.1 TDD | - |
| Dedicated CORESET RMC configuration |  | CR.3.1 TDD | - | CR.3.1 TDD | - |
| Control channel RMC |  | CCR.3.1 TDD | - | CCR.3.1 TDD | - |
| OCNG Patterns |  | OP.1 | OP.1 | OP.1 | OP.1 |
| 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 |
| TRS configuration |  | TRS.2.1 TDD | - | TRS.2.1 TDD | - |
| Initial BWP configuration |  | DLBWP.0.1  ULBWP.0.1 | - | DLBWP.0.1  ULBWP.0.1 | - |
| Dedicated BWP configuration |  | DLBWP.1.1  ULBWP.1.1 | - | DLBWP.1.1  ULBWP.1.1 | - |
| PRS configuration |  | PRS.1.1 FR2 | PRS.1.1  FR2 | PRS.1.2 FR2 | PRS.1.2 FR2 |
| PRS num RB |  | 32 | 32 | 64 | 64 |
| PRS Resource slot offset | slot | 0 | 4 | 0 | 4 |
| Note 2 | dBm/SCS | -89 | | | |
| PRS | dB | -6 | -13 | -6 | -13 |
| PRS | dB | -6 | -13 | -6 | -13 |
| PRP Note 3 | dBm/SCS kHz | -95 | -102 | -95 | -102 |
| Io Note 3 (on symbols where PRS is not allocated) | dBm/95.04 MHz | -58.7 | -58.7 | -58.7 | -58.7 |
| Propagation conditions |  | AWGN | | | |
| Antenna configuration |  | 1x2 | 1x2 | 1x2 | 1x2 |
| NOTE 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved on all OFDM symbols except those in which PRS is allocated.  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: PRP and Io levels have been derived from other parameters and they are provided for information only. They are not settable parameters themselves.  NOTE 4: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation.  NOTE 5: Calculation of Es/Iot 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.  NOTE 6: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone.  NOTE 7: As observed with 0 dBi gain antenna at the centre of the quiet zone. | | | | | |

##### A.17.11.1.2.2 Test requirements

The reported RSTD measurements shall fulfill the absolute accuracy requirements specified in clause 10.1A.16.2.

## **--- End of Change # 27 ---**