**3GPP TSG-RAN4 Meeting #111R4-240xxxx**

Fukuoka City, Japan, May 20th – May 24th , 2024

|  |
| --- |
| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  |  | **CR** |  | **rev** | - | **Current version:** |  |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network |  |

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| --- |
|  |
| ***Title:***  | Draft CR to TS 38.133 on Idle Measruement for CA/DC FR1 |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_Moblity\_enh2 |  | ***Date:*** | 2024-05-22 |
|  |  |  |  |  |
| ***Category:*** |  |  | ***Release:*** |  |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
|  |  |
| ***Reason for change:*** | Rel-18 Improvement for Idle/Inactive CA/DC setup test cases |
|  |  |
| ***Summary of change:*** | Add the Rel-18 specified FR1 scenario for both EMR and non-EMR capable UE test case |
|  |  |
| ***Consequences if not approved:*** | Corresponding test case is not complete |
|  |  |
| ***Clauses affected:*** |  A.6.6.9.2 , A. 6.6.9.3, A.6.6.9.4 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  |  |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  |  |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  |  |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

Start of Change 1

**A.6.6.9.2 Test case for Idle mode fast CA/DC measurement for FR1**

**A.6.6.9.2.1 Test Purpose and Environment**

The purpose of this test is to verify that the UE performs the required measurements on the serving cell and the configured inter-frequency carrier for idle mode measurement reporting after the UE has entered Idle mode. This test will partly verify the Idle mode CA/DC measurements requirements in clause 4.7 when *measIdleValidityDuration* is configured for the test case when there are no measurement results to report at RRC connection setup.

In this test, there are two cells: NR cell 1 as PCell in FR1 on NR RF channel 1 and NR cell 2 as neighbour cell in FR1 on NR RF channel 2. The test parameters are given in Tables A.6.6.9.2.1-1, A.6.6.9.2.1-2, A.6.6.9.2.1-3 A.6.6.9.2.1-4.

The test consists of 4 successive time periods, with time duration of T1, T2, T3 and T4 respectively.

During T1, the UE is connected to cell 1 only and shall not have any timing information of cell 2. UE is configured with early measurement reporting for cell 2 in *measIdleCarrierListNR-r16* or *measIdleCarrierListEUTRA-r16*. Beam level reporting for early measurements is not configured. The time point when UE receives RRC\_Release message from the TE defines as the starting point of T2.

During T2, the neibouring cell become detectable however no cell reselection is being performed. Signal level of both neibouring cell is set to level 1. T2 duration shall allow UE at least finishes two measurement period for two neibouring cells. During the time periods T2 UE is in Idle mode and follow the Idle measurement configuration for the T331 timer and Validity timer. The time when T331 timer expires defines as the ending point of T2.

The duration of the T3 should be X second, and the X value is the configured value *measIdleValidityDuration*. During T3, the singal level of the neibouring cells shall be set to turned off.The time when TE receiving the msg 1 from the UE defines as the starting point of T4.

During T4, UE shall not send measurement report within the time defined for T4.

**Table A.6.6.9.2.1-1: supported test configuration**

|  |  |
| --- | --- |
| 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 30kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurationsNote 2: target NR cell has the same SCS, BW and duplex mode as NR serving cell |

**Table A.6.6.9.2.1-2: General test parameters for SA Idle mode CA/DC measurement for FR1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
|  |  |  |  |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | One FR1 NR carrier frequencies is used.One FR1 NR carrier frequencies is used |
| Active cell |  | Config 1,2,3 | NR cell 1 (Pcell) | NR Cell 1 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2,3 | NR cell2 | NR cell 2 is on NR RF channel number 2.  |
| SMTC-SSB parameters |  | Config 1 | SSB.1 FR1 | As specified in clause A.3.10.1 |
|  |  | Config 2 | SSB.1 FR1 | As specified in clause A.3.10.1 |
|  |  | Config 3 | SSB.2 FR1 | As specified in clause A.3.10.1 |
| Hysteresis | dB | Config 1,2,3 | 0 |  |
| PRACH configuration index |  | Config 1,2,3 | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| CP length |  | Config 1,2,3 | Normal |  |
| TimeToTrigger | s | Config 1,2,3 | 0 |  |
| Filter coefficient |  | Config 1,2,3 | 0 | L3 filtering is not used |
| DRX in connected mode |  | Config 1,2,3 | OFF | DRX is not used |
| DRX in idle mode | s | Config 1,2,3 | 0.32 | The value shall be used for all cells in the test. |
| T331 | s |  | 300 |  |
| *measIdleValidityDuration*  | s |  | 100 |  |
| Time offset between serving and neighbour cells |  | Config 1 | 3ms | Asynchronous cells.The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  |  | Config 2,3 | 3μs | Synchronous cells. |
| T1 | s | Config 1,2,3 | 10 |  |
| T2 | s | Config 1,2,3 | 10 |  |
| T3 | s | Config 1,2,3 | 5 |  |
| T4 | s |  | 1 |  |

**Table A.6.6.9.2.1-3: Cell specific test parameters for connected mode for SA Idle mode CA/DC measurement for FR1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | Cell 2 |
|  |  |  | T1 | T2 | T3 | T4 | T1 | T2 | T3 | T4 |
| NR RF Channel Number |  | Config 1,2,3 | 1 | 2 |
| Duplex mode |  | Config 1 | FDD |
|  |  | Config 2,3 | TDD |
| TDD configuration |  | N.A | N.A |
|  |  | TDDConf.1.1 | TDDConf.1.1 |
|  |  | TDDConf.2.1 | TDDConf.2.1 |
| BWchannel | MHz | Config 1,2 | 10: NRB,c = 52 |
|  |  | Config 3 | 40: NRB,c = 106 |
| BWP BW | MHz | Config 1,2 | 10: NRB,c = 52 |
|  |  | Config 3 | 40: NRB,c = 106 |
| BWP configuration | Initial DL BWP |  | Config 1, 2, 3 | DLBWP.0.1 | NA |
|  | Initial UL BWP |  |  | ULBWP.0.1 | NA |
|  | Dedicated DL BWP |  |  | DLBWP.1.1 | NA |
|  | Dedicated UL BWP |  |  | ULBWP.1.1 | NA |
| TRS configuration |  | Config 1 | TRS.1.1 FDD | NA |
|  |  | Config 2 | TRS.1.1 TDD | NA |
|  |  | Config 3 | TRS.1.2 TDD | NA |
| OCNG Patterns defined in A.3.2.1.1 (OP.1)  |  | Config 1,2,3 | OP.1 | OP.1 |
| PDSCH Reference measurement channel |  | Config 1 | SR.1.1 FDD | SR.1.1 FDD |
|  |  | Config 2 | SR.1.1 TDD | SR.1.1 TDD |
|  |  | Config 3 | SR2.1 TDD | SR2.1 TDD |
| CORESET Reference Channel |  | Config 1 | CR.1.1 FDD | CR.1.1 FDD |
|  |  | Config 2 | CR.1.1 TDD | CR.1.1 TDD |
|  |  | Config 3 | CR2.1 TDD | CR2.1 TDD |
| SSB parameters |  | Config 1 | SSB.1 FR1 | SSB.5 FR1 |
|  |  | Config 2 | SSB.1 FR1 | SSB.5 FR1 |
|  |  | Config 3 | SSB.2 FR1 | SSB.6 FR1 |
| SMTC configuration defined in A.3.11 |  | Config 1 | SMTC.2 | SMTC.5 |
|  |  | Config 2, 3 | SMTC.1 | SMTC.4 |
| PDSCH/PDCCH subcarrier spacing | kHz | Config 1,2 | 15 |
|  |  | Config 3 | 30 |
| EPRE ratio of PSS to SSS |  | Config 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  |  |  |  |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) |  |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) |  |  |  |  |
| Note2 | dBm/15kHz |  | -98 | -98 |
| Note2 | dBm/SCS | Config 1,2 | -98 | -98 |
|  |  | Config 3 | -95 | -95 |
| SS-RSRP Note 3 | dBm/SCS | Config 1,2 | -91 | -91 | -91 | -91 | -infinity | -98 | -98 | -98 |
|  |  | Config 3 | -88 | -88 | -88 | -88 | -infinity | -95 | -95 | -56.15 |
|  | dB | Config 1,2,3,4, | 7 | 7 | 7 | 7 | - infinity | 0 | 0 | 0 |
|  | dB | Config 1,2,3 | 7 | 7 | 7 | 7 | infinity | 0 | 0 | 0 |
| IoNote3 | dBm/9.36MHz | Config 1,2 | -62.26 | -62.26 | -62.26 | -62.26 | -70.5 | -67.04 | -67.04 | -67.04 |
|  | dBm/38.16MHz | Config 3 | -56.15 | -56.15 | -56.15 | -56.15 | -63.94 | -60.93 | -60.93 | -60.93 |
| Propagation Condition |  | Config 1,2,3 | AWGN | 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 and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. |

**Table A.6.6.9.2.1-4: Cell specific test parameters for idle mode for SA Idle mode CA/DC measurement for FR1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | Cell 2 |
| T1 | T2 | T3 | T4 | T1 | T2 | T3 | T4 |
| NR RF Channel Number |  | 1,2,3 | 1 | 2 |
| TDD configuration |  | 1 | N/A | N/A |
|  |  | 2 | TDDConf.1.1 | TDDConf.1.1 |
|  |  | 3 | TDDConf.2.1 | TDDConf.2.1 |
| PDSCH RMC  |  | 1 | SR.1.1 FDD | SR.1.1 FDD |
| configuration |  | 2 | SR.1.1 TDD | SR.1.1 TDD |
|  |  | 3 | SR.2.1 TDD | SR.2.1 TDD |
| RMSI CORESET |  | 1 | CR.1.1 FDD | CR.1.1 FDD |
| RMC configuration |  | 2 | CR.1.1 TDD | CR.1.1 TDD |
|  |  | 3 | CR.2.1 TDD | CR.2.1 TDD |
| Dedicated CORESET |  | 1 | CCR.1.1 FDD | CCR.1.1 FDD |
| RMC configuration |  | 2 | CCR.1.1 TDD | CCR.1.1 TDD |
|  |  | 3 | CCR.2.1 TDD | CCR.2.1 TDD |
| OCNG Pattern |  | 1, 2, 3 | OP.1 defined in A.3.2.1 | OP.1 defined in A.3.2.1 |
| Initial DL BWP configuration |  | 1, 2, 3 | DLBWP.0.1 | DLBWP.0.1 |
| Initial UL BWP configuration |  | 1, 2, 3 | ULBWP.0.1 | ULBWP.0.1 |
| RLM-RS |  | 1, 2, 3 | SSB | SSB |
| Qrxlevmin | dBm/SCS | 1, 2 | -140 | -140 |
|  |  | 3 | -137 | -137 |
| Pcompensation | dB | 1, 2, 3 | 0 | 0 |
| Cell\_selection\_and\_reselection\_quality\_measurement |  | 1, 2, 3 | SS-RSRP | SS-RSRP |
|  | dB | 1 | 14 | 14 | 14 | 14 | -infinity | 12 | 12 | 12 |
|  |  | 2 |  |  |  |  |  |  |  |  |
|  |  | 3 |  |  |  |  |  |  |  |  |
|  Note2 | dBm/SCS | 1 | -98 |
|  |  | 2 | -98 |
|  |  | 3 | -95 |
|  Note2 | dBm/15 kHz | 1 | -98 |
|  |  | 2 |
|  |  | 3 |
|  | dB | 1 | 7 | 7 | 7 | 7 | -infinity | 0 | 0 | 0 |
|  |  | 2 |  |  |  |  |  |  |  |  |
|  |  | 3 |  |  |  |  |  |  |  |  |
|  | dB | 1, 2, 3 | 7 | 7 | 7 | 7 | -infinity | 0 | 0 | 0 |
| SS-RSRP Note3 | dBm/SCS | 1 | -91 | -91 | -91 | -91 | -infinity | -98 | -98 | -98 |
|  |  | 2 | -91 | -91 | -91 | -91 | -infinity | -98 | -98 | -98 |
|  |  | 3 | -88 | -88 | -88 | -88 | -infinity | -95 | -95 | -95 |
| Io | dBm/9.36 MHz | 1 | -62.26 | -62.26 | -62.26 | -62.26 | -70.5 | -67.04 | -67.04 | -67.04 |
|  | dBm/9.36 MHz | 2 | -62.26 | -62.26 | -62.26 | -62.26 | -70.5 | -67.04 | -67.04 | -67.04 |
|  | dBm/38.16 MHz | 3 | -56.15 | -56.15 | -56.15 | -56.15 | -63.94 | -60.93 | -60.93 | -60.93 |
| Treselection | s | 1, 2, 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SnonintrasearchP | dB | 1, 2, 3 | Not sent | Not sent |
| 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: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. |

**A.6.6.9.2.2 Test Requirements**

The UE behaviour during time durations T3 shall be as follows:

During the period T3, the UE is in Idle mode and the signal level of cell 2 is changed from on to tured off power. The UE shall not perform reselection. The UE shall perform Idle Mode CA measurement according to Section 4.7.

At the start of T4 the UE is paged for connection setup. During the connection setup the UE is requested to transmit early measurement report for cell 2.

The UE shall NOT send early measurement report to the PCell.

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

End of Change 1

Start of Change 2

**A.6.6.9.3 Test case for Idle mode fast CA/DC cell reselection measurement for FR1**

**A.6.6.9.3.1 Test Purpose and Environment**

The purpose of this test is to verify that the UE performs the required measurements on the serving cell and the configured inter-frequency carrier for idle mode measurement reporting after the UE has entered Idle mode. This test will partly verify the Idle mode CA/DC measurements requirements in clause 4.7 when *measReselectionValidityDuration-r18* is configured for te test case when there are no measurement results to report at RRC connection setup.

In this test, there are two cells: NR cell 1 as PCell in FR1 on NR RF channel 1 and NR cell 2 as neighbour cell in FR1 on NR RF channel 2. The test parameters are given in Tables A.6.6.9.3.1-1, A.6.6.9.3.1-2, A.6.6.9.3.1-3 A.6.6.9.3.1-4.

The test consists of 4 successive time periods, with time duration of T1, T2, T3 and T4 respectively.

During T1, the UE is connected to cell 1 only and shall not have any timing information of cell 2. UE is configured with early measurement reporting for cell 2 in *MeasReselectionCarrierListNR-r18*. Beam level reporting for early measurements is not configured. The time point when UE receives RRC\_Release message from the TE defines as the starting point of T2.

During T2, the neibouring cell become detectable however no cell reselection is being performed. Signal level of both neibouring cell is set to level 1. T2 duration shall allow UE at least finishes two measurement period for two neibouring cells. During the time periods T2 UE is in Idle mode and follow the Idle measurement configuration for the T331 timer and Validity timer. The time when T331 timer expires defines as the ending point of T2.

The duration of the T3 should be X second, and the X value is the configured value *measReselectionValidityDuration-r18 .*During T3, the singal level of the neibouring cells shall be set to turned off.The time when TE receiving the msg 1 from the UE defines as the starting point of T4.

During T4, UE shall not send measurement report within the duration of T4.

**Table A.6.6.9.3.1-1: supported test configuration**

|  |  |
| --- | --- |
| 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 30kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurationsNote 2: target NR cell has the same SCS, BW and duplex mode as NR serving cell |

**Table A.6.6.9.3.1-2: General test parameters for SA Idle mode CA/DC measurement for FR1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
|  |  |  |  |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | One FR1 NR carrier frequencies is used.One FR1 NR carrier frequencies is used |
| Active cell |  | Config 1,2,3 | NR cell 1 (Pcell) | NR Cell 1 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2,3 | NR cell2 | NR cell 2 is on NR RF channel number 2.  |
| SMTC-SSB parameters |  | Config 1 | SSB.1 FR1 | As specified in clause A.3.10.1 |
|  |  | Config 2 | SSB.1 FR1 | As specified in clause A.3.10.1 |
|  |  | Config 3 | SSB.2 FR1 | As specified in clause A.3.10.1 |
| Hysteresis | dB | Config 1,2,3 | 0 |  |
| PRACH configuration index |  | Config 1,2,3 | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| CP length |  | Config 1,2,3 | Normal |  |
| TimeToTrigger | s | Config 1,2,3 | 0 |  |
| Filter coefficient |  | Config 1,2,3 | 0 | L3 filtering is not used |
| DRX in connected mode |  | Config 1,2,3 | OFF | DRX is not used |
| DRX in idle mode | s | Config 1,2,3 | 0.32 | The value shall be used for all cells in the test. |
| T331 | s |  | 10 |  |
| *measReselectionValidityDuration-r18*   | s |  | 5 |  |
| Time offset between serving and neighbour cells |  | Config 1 | 3ms | Asynchronous cells.The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  |  | Config 2,3 | 3μs | Synchronous cells. |
| T1 | s | Config 1,2,3 | 10 |  |
| T2 | s | Config 1,2,3 | 10 |  |
| T3 | s | Config 1,2,3 | 5 |  |
| T4 | s |  | 1 |  |

**Table A.6.6.9.3.1-3: Cell specific test parameters for connected mode for SA Idle mode CA/DC measurement for FR1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | Cell 2 |
|  |  |  | T1 | T2 | T3 | T4 | T1 | T2 | T3 | T4 |
| NR RF Channel Number |  | Config 1,2,3 | 1 | 2 |
| Duplex mode |  | Config 1 | FDD |
|  |  | Config 2,3 | TDD |
| TDD configuration |  | N.A | N.A |
|  |  | TDDConf.1.1 | TDDConf.1.1 |
|  |  | TDDConf.2.1 | TDDConf.2.1 |
| BWchannel | MHz | Config 1,2 | 10: NRB,c = 52 |
|  |  | Config 3 | 40: NRB,c = 106 |
| BWP BW | MHz | Config 1,2 | 10: NRB,c = 52 |
|  |  | Config 3 | 40: NRB,c = 106 |
| BWP configuration | Initial DL BWP |  | Config 1, 2, 3 | DLBWP.0.1 | NA |
|  | Initial UL BWP |  |  | ULBWP.0.1 | NA |
|  | Dedicated DL BWP |  |  | DLBWP.1.1 | NA |
|  | Dedicated UL BWP |  |  | ULBWP.1.1 | NA |
| TRS configuration |  | Config 1 | TRS.1.1 FDD | NA |
|  |  | Config 2 | TRS.1.1 TDD | NA |
|  |  | Config 3 | TRS.1.2 TDD | NA |
| OCNG Patterns defined in A.3.2.1.1 (OP.1)  |  | Config 1,2,3 | OP.1 | OP.1 |
| PDSCH Reference measurement channel |  | Config 1 | SR.1.1 FDD | SR.1.1 FDD |
|  |  | Config 2 | SR.1.1 TDD | SR.1.1 TDD |
|  |  | Config 3 | SR2.1 TDD | SR2.1 TDD |
| CORESET Reference Channel |  | Config 1 | CR.1.1 FDD | CR.1.1 FDD |
|  |  | Config 2 | CR.1.1 TDD | CR.1.1 TDD |
|  |  | Config 3 | CR2.1 TDD | CR2.1 TDD |
| SSB parameters |  | Config 1 | SSB.1 FR1 | SSB.5 FR1 |
|  |  | Config 2 | SSB.1 FR1 | SSB.5 FR1 |
|  |  | Config 3 | SSB.2 FR1 | SSB.6 FR1 |
| SMTC configuration defined in A.3.11 |  | Config 1 | SMTC.2 | SMTC.5 |
|  |  | Config 2, 3 | SMTC.1 | SMTC.4 |
| PDSCH/PDCCH subcarrier spacing | kHz | Config 1,2 | 15 |
|  |  | Config 3 | 30 |
| EPRE ratio of PSS to SSS |  | Config 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  |  |  |  |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) |  |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) |  |  |  |  |
| Note2 | dBm/15kHz |  | -98 | -98 |
| Note2 | dBm/SCS | Config 1,2 | -98 | -98 |
|  |  | Config 3 | -95 | -95 |
| SS-RSRP Note 3 | dBm/SCS | Config 1,2 | -91 | -91 | -91 | -91 | -infinity | -98 | -98 | -98 |
|  |  | Config 3 | -88 | -88 | -88 | -88 | -infinity | -95 | -95 | -56.15 |
|  | dB | Config 1,2,3,4, | 7 | 7 | 7 | 7 | - infinity | 0 | 0 | 0 |
|  | dB | Config 1,2,3 | 7 | 7 | 7 | 7 | infinity | 0 | 0 | 0 |
| IoNote3 | dBm/9.36MHz | Config 1,2 | -62.26 | -62.26 | -62.26 | -62.26 | -70.5 | -67.04 | -67.04 | -67.04 |
|  | dBm/38.16MHz | Config 3 | -56.15 | -56.15 | -56.15 | -56.15 | -63.94 | -60.93 | -60.93 | -60.93 |
| Propagation Condition |  | Config 1,2,3 | AWGN | 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 and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. |

**Table A.6.6.9.3.1-4: Cell specific test parameters for idle mode for SA Idle mode CA/DC measurement for FR1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | Cell 2 |
| T1 | T2 | T3 | T4 | T1 | T2 | T3 | T4 |
| NR RF Channel Number |  | 1,2,3 | 1 | 2 |
| TDD configuration |  | 1 | N/A | N/A |
|  |  | 2 | TDDConf.1.1 | TDDConf.1.1 |
|  |  | 3 | TDDConf.2.1 | TDDConf.2.1 |
| PDSCH RMC  |  | 1 | SR.1.1 FDD | SR.1.1 FDD |
| configuration |  | 2 | SR.1.1 TDD | SR.1.1 TDD |
|  |  | 3 | SR.2.1 TDD | SR.2.1 TDD |
| RMSI CORESET |  | 1 | CR.1.1 FDD | CR.1.1 FDD |
| RMC configuration |  | 2 | CR.1.1 TDD | CR.1.1 TDD |
|  |  | 3 | CR.2.1 TDD | CR.2.1 TDD |
| Dedicated CORESET |  | 1 | CCR.1.1 FDD | CCR.1.1 FDD |
| RMC configuration |  | 2 | CCR.1.1 TDD | CCR.1.1 TDD |
|  |  | 3 | CCR.2.1 TDD | CCR.2.1 TDD |
| OCNG Pattern |  | 1, 2, 3 | OP.1 defined in A.3.2.1 | OP.1 defined in A.3.2.1 |
| Initial DL BWP configuration |  | 1, 2, 3 | DLBWP.0.1 | DLBWP.0.1 |
| Initial UL BWP configuration |  | 1, 2, 3 | ULBWP.0.1 | ULBWP.0.1 |
| RLM-RS |  | 1, 2, 3 | SSB | SSB |
| Qrxlevmin | dBm/SCS | 1, 2 | -140 | -140 |
|  |  | 3 | -137 | -137 |
| Pcompensation | dB | 1, 2, 3 | 0 | 0 |
| Cell\_selection\_and\_reselection\_quality\_measurement |  | 1, 2, 3 | SS-RSRP | SS-RSRP |
|  | dB | 1 | 14 | 14 | 14 | 14 | -infinity | 12 | 12 | 12 |
|  |  | 2 |  |  |  |  |  |  |  |  |
|  |  | 3 |  |  |  |  |  |  |  |  |
|  Note2 | dBm/SCS | 1 | -98 |
|  |  | 2 | -98 |
|  |  | 3 | -95 |
|  Note2 | dBm/15 kHz | 1 | -98 |
|  |  | 2 |
|  |  | 3 |
|  | dB | 1 | 7 | 7 | 7 | 7 | -infinity | 0 | 0 | 0 |
|  |  | 2 |  |  |  |  |  |  |  |  |
|  |  | 3 |  |  |  |  |  |  |  |  |
|  | dB | 1, 2, 3 | 7 | 7 | 7 | 7 | -infinity | 0 | 0 | 0 |
| SS-RSRP Note3 | dBm/SCS | 1 | -91 | -91 | -91 | -91 | -infinity | -98 | -98 | -98 |
|  |  | 2 | -91 | -91 | -91 | -91 | -infinity | -98 | -98 | -98 |
|  |  | 3 | -88 | -88 | -88 | -88 | -infinity | -95 | -95 | -95 |
| Io | dBm/9.36 MHz | 1 | -62.26 | -62.26 | -62.26 | -62.26 | -70.5 | -67.04 | -67.04 | -67.04 |
|  | dBm/9.36 MHz | 2 | -62.26 | -62.26 | -62.26 | -62.26 | -70.5 | -67.04 | -67.04 | -67.04 |
|  | dBm/38.16 MHz | 3 | -56.15 | -56.15 | -56.15 | -56.15 | -63.94 | -60.93 | -60.93 | -60.93 |
| Treselection | s | 1, 2, 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SnonintrasearchP | dB | 1, 2, 3 | Not sent | Not sent |
| 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: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. |

**A.6.6.9.3.2 Test Requirements**

The UE behaviour during time durations T3 shall be as follows:

During the time period T3 the UE is in Idle mode and the signal level of cell 2 is changed from on to tured off power. The UE shall not perform reselection. The UE shall perform Idle Mode CA measurement according to Section 4.7.

At the start of T4 the UE is paged for connection setup. During the connection setup the UE is requested to transmit early measurement report for cell 2.

The UE shall NOT send early measurement report to the PCell.

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

End of Change 2

Start of Change 3

**A.6.6.9.4 Test case for Idle mode fast CA/DC cell reselection measurement for FR1**

**A.6.6.9.4.1 Test Purpose and Environment**

The purpose of this test is to verify that the UE performs the required measurements on the serving cell and the configured inter-frequency carrier for idle mode measurement reporting after the UE has entered Idle mode. This test will partly verify the Idle mode CA/DC measurements requirements in clause 4.7 when *measReselectionValidityDuration-r18* is configured for te test case when there are measurement results to report at RRC connection setup.

In this test, there are two cells: NR cell 1 as PCell in FR1 on NR RF channel 1 and NR cell 2 as neighbour cell in FR1 on NR RF channel 2. The test parameters are given in Tables A.6.6.9.4.1-1, A.6.6.9.4.1-2, A.6.6.9.4.1-3, A.6.6.9.4.1-4.

The test consists of 4 successive time periods, with time duration of T1, T2, T3 and T4 respectively.

During T1, the UE is connected to cell 1 only and shall not have any timing information of cell 2. UE is configured with early measurement reporting for cell 2 in *MeasReselectionCarrierListNR-r18*. Beam level reporting for early measurements is not configured. The time point when UE receives RRC\_Release message from the TE defines as the starting point of T2.

During T2, the neibouring cell become detectable however no cell reselection is being performed. Signal level of both neibouring cell is set to level 1. T2 duration shall allow UE at least finishes two measurement period for two neibouring cells. During the time periods T2 UE is in Idle mode and follow the Idle measurement configuration for the T331 timer and Validity timer. The time when T331 timer expires defines as the ending point of T2.

The duration of the T3 should be X second, and the X value is the configured value *measReselectionValidityDuration-r18 .*During T3, the singal level of the neibouring cells shall be set to another value.The time when TE receiving the msg 1 from the UE defines as the starting point of T4.

During T4, UE shall send measurement report within the duration of T4.

**Table A.6.6.9.4**.1**-1: supported test configuration**

|  |  |
| --- | --- |
| 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 30kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurationsNote 2: target NR cell has the same SCS, BW and duplex mode as NR serving cell |

**Table A.6.6.9.4.**1**-2: General test parameters for SA Idle mode CA/DC measurement for FR1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
|  |  |  |  |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | One FR1 NR carrier frequencies is used.One FR1 NR carrier frequencies is used |
| Active cell |  | Config 1,2,3 | NR cell 1 (Pcell) | NR Cell 1 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2,3 | NR cell2 | NR cell 2 is on NR RF channel number 2.  |
| SMTC-SSB parameters |  | Config 1 | SSB.1 FR1 | As specified in clause A.3.10.1 |
|  |  | Config 2 | SSB.1 FR1 | As specified in clause A.3.10.1 |
|  |  | Config 3 | SSB.2 FR1 | As specified in clause A.3.10.1 |
| Hysteresis | dB | Config 1,2,3 | 0 |  |
| PRACH configuration index |  | Config 1,2,3 | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| CP length |  | Config 1,2,3 | Normal |  |
| TimeToTrigger | s | Config 1,2,3 | 0 |  |
| Filter coefficient |  | Config 1,2,3 | 0 | L3 filtering is not used |
| DRX in connected mode |  | Config 1,2,3 | OFF | DRX is not used |
| DRX in idle mode | s | Config 1,2,3 | 0.32 | The value shall be used for all cells in the test. |
| T331 | s |  | 10 |  |
| *measReselectionValidityDuration-r18*   | s |  | 5 |  |
| Time offset between serving and neighbour cells |  | Config 1 | 3ms | Asynchronous cells.The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  |  | Config 2,3 | 3μs | Synchronous cells. |
| T1 | s | Config 1,2,3 | 10 |  |
| T2 | s | Config 1,2,3 | 10 |  |
| T3 | s | Config 1,2,3 | 5 |  |
| T4 | s |  | 1 |  |

**Table A.6.6.9.4**.1**-3: Cell specific test parameters for connected mode for SA Idle mode CA/DC measurement for FR1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | Cell 2 |
|  |  |  | T1 | T2 | T3 | T4 | T1 | T2 | T3 | T4 |
| NR RF Channel Number |  | Config 1,2,3 | 1 | 2 |
| Duplex mode |  | Config 1 | FDD |
|  |  | Config 2,3 | TDD |
| TDD configuration |  | N/A | N/A |
|  |  | TDDConf.1.1 | TDDConf.1.1 |
|  |  | TDDConf.2.1 | TDDConf.2.1 |
| BWchannel | MHz | Config 1,2 | 10: NRB,c = 52 |
|  |  | Config 3 | 40: NRB,c = 106 |
| BWP BW | MHz | Config 1,2 | 10: NRB,c = 52 |
|  |  | Config 3 | 40: NRB,c = 106 |
| BWP configuration | Initial DL BWP |  | Config 1, 2, 3 | DLBWP.0.1 | NA |
|  | Initial UL BWP |  |  | ULBWP.0.1 | NA |
|  | Dedicated DL BWP |  |  | DLBWP.1.1 | NA |
|  | Dedicated UL BWP |  |  | ULBWP.1.1 | NA |
| TRS configuration |  | Config 1 | TRS.1.1 FDD | NA |
|  |  | Config 2 | TRS.1.1 TDD | NA |
|  |  | Config 3 | TRS.1.2 TDD | NA |
| OCNG Patterns defined in A.3.2.1.1 (OP.1)  |  | Config 1,2,3 | OP.1 | OP.1 |
| PDSCH Reference measurement channel |  | Config 1 | SR.1.1 FDD | SR.1.1 FDD |
|  |  | Config 2 | SR.1.1 TDD | SR.1.1 TDD |
|  |  | Config 3 | SR2.1 TDD | SR2.1 TDD |
| CORESET Reference Channel |  | Config 1 | CR.1.1 FDD | CR.1.1 FDD |
|  |  | Config 2 | CR.1.1 TDD | CR.1.1 TDD |
|  |  | Config 3 | CR2.1 TDD | CR2.1 TDD |
| SSB parameters |  | Config 1 | SSB.1 FR1 | SSB.5 FR1 |
|  |  | Config 2 | SSB.1 FR1 | SSB.5 FR1 |
|  |  | Config 3 | SSB.2 FR1 | SSB.6 FR1 |
| SMTC configuration defined in A.3.11 |  | Config 1 | SMTC.2 | SMTC.5 |
|  |  | Config 2, 3 | SMTC.1 | SMTC.4 |
| PDSCH/PDCCH subcarrier spacing | kHz | Config 1,2 | 15 |
|  |  | Config 3 | 30 |
| EPRE ratio of PSS to SSS |  | Config 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  |  |  |  |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) |  |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) |  |  |  |  |
| Note2 | dBm/15kHz |  | -98 | -98 |
| Note2 | dBm/SCS | Config 1,2 | -98 | -98 |
|  |  | Config 3 | -95 | -95 |
| SS-RSRP Note 3 | dBm/SCS | Config 1,2 | -91 | -91 | -91 | -91 | -infinity | -98 | -98 | -98 |
|  |  | Config 3 | -88 | -88 | -88 | -88 | -infinity | -95 | -95 | -56.15 |
|  | dB | Config 1,2,3,4, | 7 | 7 | 7 | 7 | - infinity | 0 | 0 | 0 |
|  | dB | Config 1,2,3 | 7 | 7 | 7 | 7 | infinity | 0 | 0 | 0 |
| IoNote3 | dBm/9.36MHz | Config 1,2 | -62.26 | -62.26 | -62.26 | -62.26 | -70.5 | -67.04 | -67.04 | -67.04 |
|  | dBm/38.16MHz | Config 3 | -56.15 | -56.15 | -56.15 | -56.15 | -63.94 | -60.93 | -60.93 | -60.93 |
| Propagation Condition |  | Config 1,2,3 | AWGN | 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 and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. |

**Table A.6.6.9.4**.1**-4: Cell specific test parameters for idle mode for SA Idle mode CA/DC measurement for FR1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | Cell 2 |
| T1 | T2 | T3 | T4 | T1 | T2 | T3 | T4 |
| NR RF Channel Number |  | 1,2,3 | 1 | 2 |
| TDD configuration |  | 1 | N/A | N/A |
|  |  | 2 | TDDConf.1.1 | TDDConf.1.1 |
|  |  | 3 | TDDConf.2.1 | TDDConf.2.1 |
| PDSCH RMC  |  | 1 | SR.1.1 FDD | SR.1.1 FDD |
| configuration |  | 2 | SR.1.1 TDD | SR.1.1 TDD |
|  |  | 3 | SR.2.1 TDD | SR.2.1 TDD |
| RMSI CORESET |  | 1 | CR.1.1 FDD | CR.1.1 FDD |
| RMC configuration |  | 2 | CR.1.1 TDD | CR.1.1 TDD |
|  |  | 3 | CR.2.1 TDD | CR.2.1 TDD |
| Dedicated CORESET |  | 1 | CCR.1.1 FDD | CCR.1.1 FDD |
| RMC configuration |  | 2 | CCR.1.1 TDD | CCR.1.1 TDD |
|  |  | 3 | CCR.2.1 TDD | CCR.2.1 TDD |
| OCNG Pattern |  | 1, 2, 3 | OP.1 defined in A.3.2.1 | OP.1 defined in A.3.2.1 |
| Initial DL BWP configuration |  | 1, 2, 3 | DLBWP.0.1 | DLBWP.0.1 |
| Initial UL BWP configuration |  | 1, 2, 3 | ULBWP.0.1 | ULBWP.0.1 |
| RLM-RS |  | 1, 2, 3 | SSB | SSB |
| Qrxlevmin | dBm/SCS | 1, 2 | -140 | -140 |
|  |  | 3 | -137 | -137 |
| Pcompensation | dB | 1, 2, 3 | 0 | 0 |
| Cell\_selection\_and\_reselection\_quality\_measurement |  | 1, 2, 3 | SS-RSRP | SS-RSRP |
|  | dB | 1 | 14 | 14 | 14 | 14 | -infinity | 12 | 12 | 12 |
|  |  | 2 |  |  |  |  |  |  |  |  |
|  |  | 3 |  |  |  |  |  |  |  |  |
|  Note2 | dBm/SCS | 1 | -98 |
|  |  | 2 | -98 |
|  |  | 3 | -95 |
|  Note2 | dBm/15 kHz | 1 | -98 |
|  |  | 2 |
|  |  | 3 |
|  | dB | 1 | 7 | 7 | 7 | 7 | -infinity | 0 | 0 | 0 |
|  |  | 2 |  |  |  |  |  |  |  |  |
|  |  | 3 |  |  |  |  |  |  |  |  |
|  | dB | 1, 2, 3 | 7 | 7 | 7 | 7 | -infinity | 0 | 0 | 0 |
| SS-RSRP Note3 | dBm/SCS | 1 | -91 | -91 | -91 | -91 | -infinity | -98 | -98 | -98 |
|  |  | 2 | -91 | -91 | -91 | -91 | -infinity | -98 | -98 | -98 |
|  |  | 3 | -88 | -88 | -88 | -88 | -infinity | -95 | -95 | -95 |
| Io | dBm/9.36 MHz | 1 | -62.26 | -62.26 | -62.26 | -62.26 | -70.5 | -67.04 | -67.04 | -67.04 |
|  | dBm/9.36 MHz | 2 | -62.26 | -62.26 | -62.26 | -62.26 | -70.5 | -67.04 | -67.04 | -67.04 |
|  | dBm/38.16 MHz | 3 | -56.15 | -56.15 | -56.15 | -56.15 | -63.94 | -60.93 | -60.93 | -60.93 |
| Treselection | s | 1, 2, 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SnonintrasearchP | dB | 1, 2, 3 | Not sent | Not sent |
| 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: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. |

**A.6.6.9.4.2 Test Requirements**

The UE behaviour during time durations T3 and T4 shall be as follows:

During the period T3 the UE is in Idle mode and the signal level of cell 2 is changed to another level. The UE shall not perform reselection. The UE shall perform Idle Mode CA measurement according to Section 4.7.

At the beginning of T3, signal level of cell 2 is changed.

At the start of T4 the UE is paged for connection setup. During the connection setup the UE is requested to transmit early measurement report for cell 2.

The UE shall send early measurement report to the PCell with the changed signal level during T3 . The UE shall send early measurement report to the PCell.After receiving the requested early measurement report, the test equipment verifies the accuracy of measurement reported for Cell 2 meets the requirements in Section 10.1.4B for SS-RSRP and in Section 10.1.8B for SS-RSRQ and test ends.

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

End of Change 3