**3GPP TSG- Meeting #**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  |  | **CR** |  | **rev** | **1** | **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 | **X** | Radio Access Network |  | Core Network |  |

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|  |
| ***Title:***  |  |
|  |  |
| ***Source to WG:*** |  |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** |  |  | ***Date:*** |  |
|  |  |  |  |  |
| ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | a) For some test cases in A.5.6 the Cell 2 UE beam assumption is stated to be “Rough”, but Cell 2 is FR1 and the UE beam assumption is not applicable.b) Some test cases in A.5.6 state that two FR1 NR carrier frequencies are used, but one of the NR carriers is FR2. |
|  |  |
| ***Summary of change:*** | a) Correct the Cell 2 UE beam assumption to be N/A (not applicable).b) Remove the reference to FR1, and align the statement with equivalent A.7.6 test cases. |
|  |  |
| ***Consequences if not approved:*** | Contradicting information would remain, leading to confusion in how to implement test cases in RAN5.  |
|  |  |
| ***Clauses affected:*** | Tables A.5.6.2.5.1-2, A.5.6.2.5.1-3, A.5.6.2.6.1-2, A.5.6.2.6.1-3, A.5.6.2.7.1-2, A.5.6.2.7.1-3, A.5.6.2.8.1-2, A.5.6.2.8.1-3. |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **X** |  |  Test specifications | TS 38.533  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | R4-2014023 > R4-2017045Coversheet error corrected to include “Proposed change affects”.This CR includes all the changes in R4-2015148. |

<< Start of changes >>

A.5.6.2.5 EN-DC event triggered reporting tests for FR2 cell without SSB time index detection when DRX is not used

A.5.6.2.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the EN-DC inter-frequency NR cell search requirements in clause 9.3.4.

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 on NR RF channel 1 and NR cell 3 as neighbour cell in FR2 on NR RF channel 2. The test parameters and configurations are given in Tables A.5.6.2.5.1-1, A.5.6.2.5.1-2, and A.5.6.2.5.1-3.

In test 1 measurement gap pattern configuration # 0 as defined in Table A.5.6.2.5.1-2 is provided for a UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #13 as defined in Table A.5.6.2.5.1-2 is provided for UE that support per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A4 is used. 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 NR cell 3.

The configuration of LTE cell 1 is defined in table A.3.7.2.1-1. Supported test configurations are shown in table A.5.6.2.5.1-1.

**Table A.5.6.2.5.1-1: EN-DC event triggered reporting tests without SSB index reading for FR1-FR2**

|  |  |  |
| --- | --- | --- |
| **Config** | **Description of serving cell** | **Description of target cell** |
| 1 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode | 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 5 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations |

**Table A.5.6.2.5.1-2: General test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Value** | **Comment** |
| **Test 1** | **Test 2** |
| E-UTRA RF Channel Number |  | Config 1,2,3,4,5,6 | 1 | One E-UTRAN TDD carrier frequencies is used. |
| NR RF Channel Number |  | Config 1,2,3,4,5,6 | 1, 2 | Two NR carrier frequencies are used. |
| Active cell |  | Config 1,2,3,4,5,6 | LTE Cell 1 (PCell) and NR cell 2 (PScell) | LTE Cell 1 is on E-UTRA RF channel number 1.NR Cell 2 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2,3,4,5,6 | NR cell 3 | NR cell 3 is on NR RF channel number 2. |
| Gap Pattern Id |  | Config 1,2,3,4,5,6 | 0 | 13 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3,4,5,6 | 39 | 39 |  |
| SMTC-SSB parameters on NR RF Channel 1 |  | Config 1,4 | SSB.1 FR1 | As specified in clause A.3.10.1 |
|  | Config 2,5 | SSB.1 FR1 | As specified in clause A.3.10.1 |
|  | Config 3,6 | SSB.2 FR1 | As specified in clause A.3.10.1 |
| SMTC-SSB parameters on NR RF Channel 2 |  | Config 1,2,3,4,5,6 | SSB.3 FR2 | As specified in clause A.3.10.2 |
| *offsetMO* | dB | Config 1,2,3,4,5,6 | 6 |  |
| Hysteresis | dB | Config 1,2,3,4,5,6 | 0 |  |
| *a4-Threshold* | dBm | Config 1,2,3,4,5,6 | [-120] |  |
| CP length |  | Config 1,2,3,4,5,6 | Normal |  |
| TimeToTrigger | s | Config 1,2,3,4,5,6 | 0 |  |
| Filter coefficient |  | Config 1,2,3,4,5,6 | 0 | L3 filtering is not used |
| DRX |  | Config 1,2,3,4,5,6 | OFF | DRX is not used |
| Time offset between PCell and PSCell |  | Config 1,2,3,4,5,6 | 3 μs | Synchronous EN-DC |
| Time offset between serving and neighbour cells |  | Config 1,4 | 3ms | Asynchronous cells.The timing of Cell 3 is 3ms later than the timing of Cell 2. |
|  | Config 2,3,5,6 | 3μs | Synchronous cells. |
| T1 | s | Config 1,2,3,4,5,6 | 5 |  |
| T2 | s | Config 1,2,3,4,5,6 | 5.2 for PC1; 3.5 for other PC | 5.2 for PC1; 3.5 for other PC |  |

**Table A.5.6.2.5.1-3: Cell specific test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Cell 2** | **Cell 3** |
| **T1** | **T2** | **T1** | **T2** |
| AoA setup |  | Config 1,2,3,4,5,6 | N/A | Setup 1 as specified in clause A.3.15 |
| Assumption for UE beamsNote 7 |  | Config 1,2,3,4,5,6 | N/A | Rough |
| NR RF Channel Number |  | Config 1,2,3,4,5,6 | 1 | 2 |
| Duplex mode |  | Config 1,4 | FDD | TDD |
|  | Config 2,3,5,6 | TDD | TDD |
| BWchannel | MHz | Config 1,4 | 10: NRB,c = 52 | 100: NRB,c = 66 |
| Config 2,5 | 10: NRB,c = 52 | 100: NRB,c = 66 |
| Config 3,6 | 40: NRB,c = 106  | 100: NRB,c = 66 |
| BWP BW | MHz | Config 1,4 | 10: NRB,c = 52 | 100: NRB,c = 66 |
| Config 2,5 | 10: NRB,c = 52 | 100: NRB,c = 66 |
| Config 3,6 | 40: NRB,c = 106  | 100: NRB,c = 66 |
| TDD configuration |  | Config 2,5 | TDDConf.1.1 | TDDConf.3.1 |
|  | Config 3,6 | TDDConf.2.1 | TDDConf.3.1 |
| Initial DL BWP |  | Config 1,2,3,4,5,6 | DLBWP.0.1 | NA |
| Initial UL BWP |  | Config 1,2,3,4,5,6 | ULBWP.0.1 | NA |
| Dedicated DL BWP |  | Config 1,2,3,4,5,6 | DLBWP.1.1 | NA |
| Dedicated UL BWP |  | Config 1,2,3,4,5,6 | ULBWP.1.1 | NA |
| OCNG Patterns defined in A.3.2.1.1 (OP.1)  |  | Config 1,2,3,4,5,6 | OP.1  | OP.1 |
| PDSCH Reference measurement channel |  | Config 1,4 | SR.1.1 FDD  | - |
|  | Config 2,5 | SR.1.1 TDD |
|  | Config 3,6 | SR2.1 TDD |
| CORESET Reference Channel |  | Config 1,4 | CR.1.1 FDD  | - |
|  | Config 2,5 | CR.1.1 TDD |
|  | Config 3,6 | CR2.1 TDD |
| SMTC configuration defined in A.3.11 |  | Config 1,4 | SMTC.2 | SMTC.2 |
|  | Config 2,3,5,6 | SMTC.1 | SMTC.1 |
| PDSCH/PDCCH subcarrier spacing | kHz | Config 1,2,4,5 | 15 | 120 |
| Config 3,6 | 30 | 120 |
| EPRE ratio of PSS to SSS |  | Config 1,2,3,4,5,6 | 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 Note5 |  | N/ALink only, see clause A.3.7A | NA |
| Note2 | dBm/SCS Note4 | Config 1,2,4,5 | NA |
| Config 3,6 | NA |
| SS-RSRP Note 3 | dBm/SCS Note5 | Config 1,2,4,5 | -Infinity | -87 |
| Config 3,6 | -Infinity | -87 |
|  | dB | Config 1,2,3,4,5,6 | -Infinity | NA |
|  | dB | Config 1,2,3,4,5,6 | -Infinity | NA |
| IoNote3 | dBm/9.36MHz | Config 1,2,4,5 | - | - |
| dBm/38.16MHz | Config 3,6 | - | - |
| dBm/95.04 MHz Note5 | Config 1,2,3,4,5,6 | -Infinity | -87 |
| Propagation Condition  |  | Config 1,2,3,4,5,6 | 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.Note 5: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zoneNote 6: As observed with 0dBi gain antenna at the centre of the quiet zoneNote 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.5.6.2.5.2 Test Requirements

In test 1 with per-UE gap and in test 2 with per-FR gap, the UE shall send one Event A4 triggered measurement report, with a measurement reporting delay less than X ms from the beginning of time period T2, where X is

5120 for UE supporting power class 1, or

3200 for UE supporting other power class.

In test 1 and 2 UE is not required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

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

A.5.6.2.6 EN-DC event triggered reporting tests for FR2 cell without SSB time index detection when DRX is used

A.5.6.2.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the EN-DC inter-frequency NR cell search requirements in clause 9.3.4.

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 on NR RF channel 1 and NR cell 3 as neighbour cell in FR2 on NR RF channel 2. The test parameters and configurations are given in Tables A.5.6.2.6.1-1, A.5.6.2.6.1-2, and A.5.6.2.6.1-3.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table A.5.6.2.6.1-2 is provided for a UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #13 as defined in Table A.5.6.2.6.1-2 is provided for UE that support per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A4 is used. 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 NR cell 3.

The configuration of LTE cell 1 is defined in table A.3.7.2.1-1. Supported test configurations are shown in table A.5.6.2.6.1-1.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

**Table A.5.6.2.6.1-1: EN-DC event triggered reporting tests without SSB index reading for FR1-FR2**

|  |  |  |
| --- | --- | --- |
| **Config** | **Description of serving cell** | **Description of target cell** |
| 1 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode | 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 5 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations |

**Table A.5.6.2.6.1-2: General test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Value** | **Comment** |
| **Test 1** | **Test 2** | **Test 3** | **Test 4** |
| E-UTRA RF Channel Number |  | Config 1,2,3,4,5,6 | 1 | One E-UTRAN TDD carrier frequencies is used. |
| NR RF Channel Number |  | Config 1,2,3,4,5,6 | 1, 2 | Two NR carrier frequencies are used. |
| Active cell |  | Config 1,2,3,4,5,6 | LTE Cell 1 (PCell) and NR cell 2 (PScell) | LTE Cell 1 is on E-UTRA RF channel number 1.NR Cell 2 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2,3,4,5,6 | NR cell 3 | NR cell 3 is on NR RF channel number 2. |
| Gap Pattern Id |  | Config 1,2,3,4,5,6 | 0 | 13 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3,4,5,6 | 39 | 39 |  |
| SMTC-SSB parameters on NR RF Channel 1 |  | Config 1,4 | SSB.1 FR1 | As specified in clause A.3.10.1 |
|  | Config 2,5 | SSB.1 FR1 | As specified in clause A.3.10.1 |
|  | Config 3,6 | SSB.2 FR1 | As specified in clause A.3.10.1 |
| SMTC-SSB parameters on NR RF Channel 2 |  | Config 1,2,3,4,5,6 | SSB.3 FR2 | As specified in clause A.3.10.2 |
| *offsetMO* | dB | Config 1,2,3,4,5,6 | 6 |  |
| Hysteresis | dB | Config 1,2,3,4,5,6 | 0 |  |
| *a4-Threshold* | dBm | Config 1,2,3,4,5,6 | [-120] |  |
| CP length |  | Config 1,2,3,4,5,6 | Normal |  |
| TimeToTrigger | s | Config 1,2,3,4,5,6 | 0 |  |
| Filter coefficient |  | Config 1,2,3,4,5,6 | 0 | L3 filtering is not used |
| DRX |  | Config 1,2,3,4,5,6 | DRX.1 | DRX.2 | DRX.1 | DRX.2 | As specified in clause A.3.3 |
| Time offset between PCell and PSCell |  | Config 1,2,3,4,5,6 | 3 μs | Synchronous EN-DC |
| Time offset between serving and neighbour cells |  | Config 1,4 | 3ms | Asynchronous cells.The timing of Cell 3 is 3ms later than the timing of Cell 2. |
|  | Config 2,3,5,6 | 3μs | Synchronous cells. |
| T1 | s | Config 1,2,3,4,5,6 | 5 |  |
| T2 | s | Config 1,2,3,4,5,6 | 8 for PC1;5 for other PC | 82 for PC1; 52 for other PC | 8 for PC1;5 for other PC | 82 for PC1; 52 for other PC |  |

**Table A.5.6.2.6.1-3: Cell specific test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Cell 2** | **Cell 3** |
| **T1** | **T2** | **T1** | **T2** |
| AoA setup |  | Config 1,2,3,4,5,6 | N/A | Setup 1 as specified in clause A.3.15 |
| Assumption for UE beamsNote 7 |  | Config 1,2,3,4,5,6 | N/A | Rough |
| NR RF Channel Number |  | Config 1,2,3,4,5,6 | 1 | 2 |
| Duplex mode |  | Config 1,4 | FDD | TDD |
|  | Config 2,3,5,6 | TDD | TDD |
| BWchannel | MHz | Config 1,4 | 10: NRB,c = 52 | 100: NRB,c = 66 |
| Config 2,5 | 10: NRB,c = 52 | 100: NRB,c = 66 |
| Config 3,6 | 40: NRB,c = 106  | 100: NRB,c = 66 |
| BWP BW | MHz | Config 1,4 | 10: NRB,c = 52 | 100: NRB,c = 66 |
| Config 2,5 | 10: NRB,c = 52 | 100: NRB,c = 66 |
| Config 3,6 | 40: NRB,c = 106  | 100: NRB,c = 66 |
| TDD configuration |  | Config 2,5 | TDDConf.1.1 | TDDConf.3.1 |
|  | Config 3,6 | TDDConf.2.1 | TDDConf.3.1 |
| Initial DL BWP |  | Config 1,2,3,4,5,6 | DLBWP.0.1 | NA |
| Initial UL BWP |  | Config 1,2,3,4,5,6 | ULBWP.0.1 | NA |
| Dedicated DL BWP |  | Config 1,2,3,4,5,6 | DLBWP.1.1 | NA |
| Dedicated UL BWP |  | Config 1,2,3,4,5,6 | ULBWP.1.1 | NA |
| OCNG Patterns defined in A.3.2.1.1 (OP.1)  |  | Config 1,2,3,4,5,6 | OP.1  | OP.1 |
| PDSCH Reference measurement channel |  | Config 1,4 | SR.1.1 FDD  | - |
|  | Config 2,5 | SR.1.1 TDD |
|  | Config 3,6 | SR2.1 TDD |
| CORESET Reference Channel |  | Config 1,4 | CR.1.1 FDD  | - |
|  | Config 2,5 | CR.1.1 TDD |
|  | Config 3,6 | CR2.1 TDD |
| SMTC configuration defined in A.3.11 |  | Config 1,4 | SMTC.2 | SMTC.2 |
|  | Config 2,3,5,6 | SMTC.1 | SMTC.1 |
| PDSCH/PDCCH subcarrier spacing | kHz | Config 1,2,4,5 | 15 | 120 |
| Config 3,6 | 30 | 120 |
| EPRE ratio of PSS to SSS |  | Config 1,2,3,4,5,6 | 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 Note5 |  | N/ALink only, see clause A.3.7A | -104.7 |
| Note2 | dBm/SCS Note4 | Config 1,2,4,5 | -95.7 |
| Config 3,6 | -95.7 |
| SS-RSRP Note 3 | dBm/SCS Note5 | Config 1,2,4,5 | -Infinity | -86.7 |
| Config 3,6 | -Infinity | -86.7 |
|  | dB | Config 1,2,3,4,5,6 | -Infinity | 9 |
|  | dB | Config 1,2,3,4,5,6 | -Infinity | 9 |
| IoNote3 | dBm/9.36MHz | Config 1,2,4,5 | - | - |
| dBm/38.16MHz | Config 3,6 | - | - |
| dBm/95.04 MHz Note5 | Config 1,2,3,4,5,6 | -66.7 | -57.2 |
| Propagation Condition  |  | Config 1,2,3,4,5,6 | 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.Note 5: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zoneNote 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.5.6.2.6.2 Test Requirements

In test 1 with per-UE gap and in test 3 with per-FR gap, the UE shall send one Event A4 triggered measurement report, with a measurement reporting delay less than X1 ms from the beginning of time period T2, where X1 is

7680 for UE supporting power class 1, or

4800 for UE supporting other power class.

In test 2 with per-UE gap and in test 4 with per-FR gap, the UE shall send one Event A4 triggered measurement report, with a measurement reporting delay less than X2 ms from the beginning of time period T2, where X2 is

81920 for UE supporting power class 1, or

51200 for UE supporting other power class.

In test 1, 2, 3 and 4 UE is not required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

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

A.5.6.2.7 EN-DC event triggered reporting tests for FR2 cell with SSB time index detection when DRX is not used

A.5.6.2.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the EN-DC inter-frequency NR cell search requirements in clause 9.3.4.

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 on NR RF channel 1 and NR cell 3 as neighbour cell in FR2 on NR RF channel 2. The test parameters and configurations are given in Tables A.5.6.2.7.1-1, A.5.6.2.7.1-2, and A.5.6.2.7.1-3.

In test 1 measurement gap pattern configuration # 0 as defined in Table A.5.6.2.7.1-2 is provided for a UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #13 as defined in Table A.5.6.2.7.1-2 is provided for UE that support per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A4 is used. 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 NR cell 3.

The configuration of LTE cell 1 is defined in table A.3.7.2.1-1. Supported test configurations are shown in table A.5.6.2.7.1-1.

**Table A.5.6.2.7.1-1: EN-DC event triggered reporting tests with SSB index reading for FR1-FR2**

|  |  |  |
| --- | --- | --- |
| **Config** | **Description of serving cell** | **Description of target cell** |
| 1 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode | 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 5 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations |

**Table A.5.6.2.7.1-2: General test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Value** | **Comment** |
| **Test 1** | **Test 2** |
| E-UTRA RF Channel Number |  | Config 1,2,3,4,5,6 | 1 | One E-UTRAN TDD carrier frequencies is used. |
| NR RF Channel Number |  | Config 1,2,3,4,5,6 | 1, 2 | Two NR carrier frequencies are used. |
| Active cell |  | Config 1,2,3,4,5,6 | LTE Cell 1 (PCell) and NR cell 2 (PScell) | LTE Cell 1 is on E-UTRA RF channel number 1.NR Cell 2 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2,3,4,5,6 | NR cell 3 | NR cell 3 is on NR RF channel number 2. |
| Gap Pattern Id |  | Config 1,2,3,4,5,6 | 0 | 13 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3,4,5,6 | 39 | 39 |  |
| SMTC-SSB parameters on NR RF Channel 1 |  | Config 1,4 | SSB.1 FR1 | As specified in clause A.3.10.1 |
|  | Config 2,5 | SSB.1 FR1 | As specified in clause A.3.10.1 |
|  | Config 3,6 | SSB.2 FR1 | As specified in clause A.3.10.1 |
| SMTC-SSB parameters on NR RF Channel 2 |  | Config 1,2,3,4,5,6 | SSB.3 FR2 | As specified in clause A.3.10.2 |
| *offsetMO* | dB | Config 1,2,3,4,5,6 | 6 |  |
| Hysteresis | dB | Config 1,2,3,4,5,6 | 0 |  |
| *a4-Threshold* | dBm | Config 1,2,3,4,5,6 | [-120] |  |
| CP length |  | Config 1,2,3,4,5,6 | Normal |  |
| TimeToTrigger | s | Config 1,2,3,4,5,6 | 0 |  |
| Filter coefficient |  | Config 1,2,3,4,5,6 | 0 | L3 filtering is not used |
| DRX |  | Config 1,2,3,4,5,6 | OFF | DRX is not used |
| Time offset between PCell and PSCell |  | Config 1,2,3,4,5,6 | 3 μs | Synchronous EN-DC |
| Time offset between serving and neighbour cells |  | Config 1,4 | 3ms | Asynchronous cells.The timing of Cell 3 is 3ms later than the timing of Cell 2. |
|  | Config 2,3,5,6 | 3μs | Synchronous cells. |
| T1 | s | Config 1,2,3,4,5,6 | 5 |  |
| T2 | s | Config 1,2,3,4,5,6 | 7 for PC1; 4.5 for other PC | 7 for PC1; 4.5 for other PC |  |

**Table A.5.6.2.7.1-3: Cell specific test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Cell 2** | **Cell 3** |
| **T1** | **T2** | **T1** | **T2** |
| AoA setup |  | Config 1,2,3,4,5,6 | N/A | Setup 1 as specified in clause A.3.15 |
| Assumption for UE beamsNote 7 |  | Config 1,2,3,4,5,6 | N/A | Rough |
| NR RF Channel Number |  | Config 1,2,3,4,5,6 | 1 | 2 |
| Duplex mode |  | Config 1,4 | FDD | TDD |
|  | Config 2,3,5,6 | TDD | TDD |
| BWchannel | MHz | Config 1,4 | 10: NRB,c = 52 | 100: NRB,c = 66 |
| Config 2,5 | 10: NRB,c = 52 | 100: NRB,c = 66 |
| Config 3,6 | 40: NRB,c = 106  | 100: NRB,c = 66 |
| BWP BW | MHz | Config 1,4 | 10: NRB,c = 52 | 100: NRB,c = 66 |
| Config 2,5 | 10: NRB,c = 52 | 100: NRB,c = 66 |
| Config 3,6 | 40: NRB,c = 106  | 100: NRB,c = 66 |
| OCNG Patterns defined in A.3.2.1.1 (OP.1)  |  | Config 1,2,3,4,5,6 | OP.1  | OP.1 |
| PDSCH Reference measurement channel |  | Config 1,4 | SR.1.1 FDD  | - |
|  | Config 2,5 | SR.1.1 TDD |
|  | Config 3,6 | SR2.1 TDD |
| CORESET Reference Channel |  | Config 1,4 | CR.1.1 FDD  | - |
|  | Config 2,5 | CR.1.1 TDD |
|  | Config 3,6 | CR2.1 TDD |
| TDD configuration |  | Config 2,5 | TDDConf.1.1 | TDDConf.3.1 |
|  | Config 3,6 | TDDConf.2.1 | TDDConf.3.1 |
| Initial DL BWP |  | Config 1,2,3,4,5,6 | DLBWP.0.1 | NA |
| Initial UL BWP |  | Config 1,2,3,4,5,6 | ULBWP.0.1 | NA |
| Dedicated DL BWP |  | Config 1,2,3,4,5,6 | DLBWP.1.1 | NA |
| Dedicated UL BWP |  | Config 1,2,3,4,5,6 | ULBWP.1.1 | NA |
| SMTC configuration defined in A.3.11 |  | Config 1,4 | SMTC.2 | SMTC.2 |
|  | Config 2,3,5,6 | SMTC.1 | SMTC.1 |
| PDSCH/PDCCH subcarrier spacing | kHz | Config 1,2,4,5 | 15 | 120 |
| Config 3,6 | 30 | 120 |
| EPRE ratio of PSS to SSS |  | Config 1,2,3,4,5,6 | 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 Note5 |  | N/ALink only, see clause A.3.7A | NA |
| Note2 | dBm/SCS Note4 | Config 1,2,4,5 | NA |
| Config 3,6 | NA |
| SS-RSRP Note 3 | dBm/SCS Note5 | Config 1,2,4,5 | -Infinity | -87 |
| Config 3,6 | -Infinity | NA |
|  | dB | Config 1,2,3,4,5,6 | -Infinity | NA |
|  | dB | Config 1,2,3,4,5,6 | -Infinity | -87 |
| IoNote3 | dBm/9.36MHz | Config 1,2,4,5 | - | - |
| dBm/38.16MHz | Config 3,6 | - | - |
| dBm/95.04 MHz Note5 | Config 1,2,3,4,5,6 | -Infinity | -87 |
| Propagation Condition  |  | Config 1,2,3,4,5,6 | 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.Note 5: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zoneNote 6: As observed with 0dBi gain antenna at the centre of the quiet zoneNote 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.5.6.2.7.2 Test Requirements

In test 1 with per-UE gap and in test 2 with per-FR gap, the UE shall send one Event A4 triggered measurement report, with a measurement reporting delay less than X ms from the beginning of time period T2, where X is

6720 for UE supporting power class 1, or

4160 for UE supporting other power class.

In test 1 and 2 UE is required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

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

A.5.6.2.8 EN-DC event triggered reporting tests for FR2 cell with SSB time index detection when DRX is used

A.5.6.2.8.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the EN-DC inter-frequency NR cell search requirements in clause 9.3.4.

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 on NR RF channel 1 and NR cell 3 as neighbour cell in FR2 on NR RF channel 2. The test parameters and configurations are given in Tables A.5.6.2.8.1-1, A.5.6.2.8.1-2, and A.5.6.2.8.1-3.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table A.5.6.2.8.1-2 is provided for a UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #13 as defined in Table A.5.6.2.8.1-2 is provided for UE that support per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A4 is used. 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 NR cell 3.

The configuration of LTE cell 1 is defined in table A.3.7.2.1-1. Supported test configurations are shown in table A.5.6.2.8.1-1.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

**Table A.5.6.2.8.1-1: EN-DC event triggered reporting tests without SSB index reading for FR1-FR2**

|  |  |  |
| --- | --- | --- |
| **Config** | **Description of serving cell** | **Description of target cell** |
| 1 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode | 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 5 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations |

**Table A.5.6.2.8.1-2: General test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Value** | **Comment** |
| **Test 1** | **Test 2** | **Test 3** | **Test 4** |
| E-UTRA RF Channel Number |  | Config 1,2,3,4,5,6 | 1 | One E-UTRAN TDD carrier frequencies is used. |
| NR RF Channel Number |  | Config 1,2,3,4,5,6 | 1, 2 | Two NR carrier frequencies are used. |
| Active cell |  | Config 1,2,3,4,5,6 | LTE Cell 1 (PCell) and NR cell 2 (PScell) | LTE Cell 1 is on E-UTRA RF channel number 1.NR Cell 2 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2,3,4,5,6 | NR cell 3 | NR cell 3 is on NR RF channel number 2. |
| Gap Pattern Id |  | Config 1,2,3,4,5,6 | 0 | 13 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3,4,5,6 | 39 | 39 |  |
| SMTC-SSB parameters on NR RF Channel 1 |  | Config 1,4 | SSB.1 FR1 | As specified in clause A.3.10.1 |
|  | Config 2,5 | SSB.1 FR1 | As specified in clause A.3.10.1 |
|  | Config 3,6 | SSB.2 FR1 | As specified in clause A.3.10.1 |
| SMTC-SSB parameters on NR RF Channel 2 |  | Config 1,2,3,4,5,6 | SSB.3 FR2 | As specified in clause A.3.10.2 |
| *offsetMO* | dB | Config 1,2,3,4,5,6 | 6 |  |
| Hysteresis | dB | Config 1,2,3,4,5,6 | 0 |  |
| *a4-Threshold* | dBm | Config 1,2,3,4,5,6 | [-120] |  |
| CP length |  | Config 1,2,3,4,5,6 | Normal |  |
| TimeToTrigger | s | Config 1,2,3,4,5,6 | 0 |  |
| Filter coefficient |  | Config 1,2,3,4,5,6 | 0 | L3 filtering is not used |
| DRX |  | Config 1,2,3,4,5,6 | DRX.1 | DRX.2 | DRX.1 | DRX.2 | As specified in clause A.3.3 |
| Time offset between PCell and PSCell |  | Config 1,2,3,4,5,6 | 3 μs | Synchronous EN-DC |
| Time offset between serving and neighbour cells |  | Config 1,4 | 3ms | Asynchronous cells.The timing of Cell 3 is 3ms later than the timing of Cell 2. |
|  | Config 2,3,5,6 | 3μs | Synchronous cells. |
| T1 | s | Config 1,2,3,4,5,6 | 5 |  |
| T2 | s | Config 1,2,3,4,5,6 | 11 for PC1; 6.5 for other PC | 108 for PC1; 67 for other PC | 11 for PC1; 6.5 for other PC | 108 for PC1; 67 for other PC |  |

**Table A.5.6.2.8.1-3: Cell specific test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Cell 2** | **Cell 3** |
| **T1** | **T2** | **T1** | **T2** |
| AoA setup |  | Config 1,2,3,4,5,6 | N/A | Setup 1 as specified in clause A.3.15 |
| Assumption for UE beamsNote 7 |  | Config 1,2,3,4,5,6 | N/A | Rough |
| NR RF Channel Number |  | Config 1,2,3,4,5,6 | 1 | 2 |
| Duplex mode |  | Config 1,4 | FDD | TDD |
|  | Config 2,3,5,6 | TDD | TDD |
| BWchannel | MHz | Config 1,4 | 10: NRB,c = 52 | 100: NRB,c = 66 |
| Config 2,5 | 10: NRB,c = 52 | 100: NRB,c = 66 |
| Config 3,6 | 40: NRB,c = 106  | 100: NRB,c = 66 |
| BWP BW | MHz | Config 1,4 | 10: NRB,c = 52 | 100: NRB,c = 66 |
| Config 2,5 | 10: NRB,c = 52 | 100: NRB,c = 66 |
| Config 3,6 | 40: NRB,c = 106  | 100: NRB,c = 66 |
| OCNG Patterns defined in A.3.2.1.1 (OP.1)  |  | Config 1,2,3,4,5,6 | OP.1 | OP.1 |
| PDSCH Reference measurement channel |  | Config 1,4 | SR.1.1 FDD  | - |
|  | Config 2,5 | SR.1.1 TDD |
|  | Config 3,6 | SR2.1 TDD |
| CORESET Reference Channel |  | Config 1,4 | CR.1.1 FDD  | - |
|  | Config 2,5 | CR.1.1 TDD |
|  | Config 3,6 | CR2.1 TDD |
| TDD configuration |  | Config 2,5 | TDDConf.1.1 | TDDConf.3.1 |
|  | Config 3,6 | TDDConf.2.1 | TDDConf.3.1 |
| Initial DL BWP |  | Config 1,2,3,4,5,6 | DLBWP.0.1 | NA |
| Initial UL BWP |  | Config 1,2,3,4,5,6 | ULBWP.0.1 | NA |
| Dedicated DL BWP |  | Config 1,2,3,4,5,6 | DLBWP.1.1 | NA |
| Dedicated UL BWP |  | Config 1,2,3,4,5,6 | ULBWP.1.1 | NA |
| SMTC configuration defined in A.3.11 |  | Config 1,4 | SMTC.2 | SMTC.2 |
|  | Config 2,3,5,6 | SMTC.1 | SMTC.1 |
| PDSCH/PDCCH subcarrier spacing | kHz | Config 1,2,4,5 | 15 | 120 |
| Config 3,6 | 30 | 120 |
| EPRE ratio of PSS to SSS |  | Config 1,2,3,4,5,6 | 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 Note5 |  | N/ALink only, see clause A.3.7A | -104.7 |
| Note2 | dBm/SCS Note4 | Config 1,2,4,5 | -95.7 |
| Config 3,6 | -95.7 |
| SS-RSRP Note 3 | dBm/SCS Note5 | Config 1,2,4,5 | -Infinity | -86.7 |
| Config 3,6 | -Infinity | -86.7 |
|  | dB | Config 1,2,3,4,5,6 | -Infinity | 9 |
|  | dB | Config 1,2,3,4,5,6 | -Infinity | 9 |
| IoNote3 | dBm/9.36MHz | Config 1,2,4,5 | - | - |
| dBm/38.16MHz | Config 3,6 | - | - |
| dBm/95.04 MHz Note5 | Config 1,2,3,4,5,6 | -66.7 | -57.2 |
| Propagation Condition  |  | Config 1,2,3,4,5,6 | 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.Note 5: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zoneNote 6: As observed with 0dBi gain antenna at the centre of the quiet zoneNote 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.5.6.2.8.2 Test Requirements

In test 1 with per-UE gap and in test 3 with per-FR gap, the UE shall send one Event A4 triggered measurement report, with a measurement reporting delay less than X1 ms from the beginning of time period T2, where X1 is

10080 for UE supporting power class 1, or

6240 for UE supporting other power class.

In test 2 with per-UE gap and in test 4 with per-FR gap, the UE shall send one Event A4 triggered measurement report, with a measurement reporting delay less than X2 ms from the beginning of time period T2, where X2 is

107520 for UE supporting power class 1, or

66560 for UE supporting other power class.

In test 1, 2, 3 and 4 UE is required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

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

<< End of changes >>