**3GPP TSG-RAN WG4 Meeting # 111 R4-2410267**

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

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| --- |
| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  | **36.133** | **CR** |  | **rev** | **1** | **Current version:** | **18.5.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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| --- |
|  |
| ***Title:***  | Draft CR on TC for eMTC for R18 IoT NTN enh |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | IoT\_NTN\_enh-Perf |  | ***Date:*** | 2024-05-01 |
|  |  |  |  |  |
| ***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 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:*** | According to the work split, following TC are to be introduced:* Time/location based conditional Handover
* UE measurement procedure in RRC-CONNECTED
 |
|  |  |
| ***Summary of change:*** | Introduce following TC:* Time/location based conditional Handover
	+ FD-FDD, Intra-freq, time based, with RSRP condition
	+ HD-FDD, Intra-freq, location basded, with RSRP condition
	+ FD-FDD, Inter-freq, location based, no RSRP condition
	+ HD-FDD, Inter-freq, time basded, no RSRP condition
* UE measurement procedure in RRC-CONNECTED
 |
|  |  |
| ***Consequences if not approved:*** | The requirements can not be verified. |
|  |  |
| ***Clauses affected:*** | A.14.5.2.X1 ~ X6, A.14.2.1.13 ~ 16 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **X** |  |  Test specifications | TS 36.533 |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

### <Start of Change 1>

### A.14.5.2.X1 E-UTRAN FDD-FDD Inter-frequency event triggered reporting under AWGN conditions in asynchronous cells for UE category M1 with discontinuous MPDCCH monitoring in CEModeA

#### A.14.5.2.X1.1 Test Purpose and Environment

The purpose of this test is to verify that the Cat-M1 UE makes correct reporting of an event with discontinuous MPDCCH monitoring. This test will partly verify the FDD-FDD inter-frequency cell search requirements in clause 8.13A.2.2.1. The supported test configurations are provided in Table A.14.5.2.X1.1-1.

Table A.14.5.2.X1.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, FDD-FDD duplex mode |
| 2 | NGSO, FDD-FDD duplex mode |

The test parameters are given in Table A.14.5.2.X1.1-2 and A.14.5.2.X1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 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 cell 2. At the beginning of T2 the transmission power of cell 2 is increased to the same level as for cell 1, and due to usage of an offset this shall result in reporting of Event A3.

Table A.14.5.2.X1.1-2: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| E-UTRA RF Channel Number |  | 1, 2 |  |
| Active cell |  | Cell 1 |  |
| Neighbour cell |  | Cell 2 | Cell to be identified. |
| CP length |  | Normal |  |
| DRX |  | OFF |  |
| A3 | Offset | dB | -6 |  |
| Hysteresis | dB | 0 |  |
| Time To Trigger | S | 0 |  |
| Filter coefficient |  | 0 | L3 filtering is not used |
| Gap pattern ID |  | 0 |  |
| *Rmax*  |  | 8 | As defined in *mPDCCH-NumRepetition* in [3] |
| *G* |  | 10 | As defined in *mPDCCH-startSF-UESS* in [3] |
| *X* |  | scheme10 | As defined in *measGapSharingScheme* in [3] |
| T1 | S | 5 |  |
| T2 | S | 5 |  |

Table A.14.5.2.X1.1-3: Cell specific test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configurations | Cell 1 | Cell 2 |
| T1 | T2 | T1 | T2 |
| Satellite information |  | 1 | SSC.1 | SSC.1 | NSC.1 | NSC.1 |
|  | 2 | SSC.2 | SSC.2 | NSC.2 | NSC.2 |
| E-UTRA RF Channel Number |  |  | 1 | 2 |
| BWchannel | MHz | 1,2 | 1.4 | 1.4 |
| PDSCH parameters:DL Reference Measurement Channel |  | 1,2 | R.48 FDD | - |
| MPDCCH parameters:DL Reference Measurement Channel |  | 1,2 | R.46 FDD | R.46 FDD |
| OCNG Patterns  |  | 1,2 | OP.7 FDD | OP.7 FDD |
| PBCH\_RA | dB | 1,2 | -3 | -3 |
| PBCH\_RB | dB | 1,2 |
| PSS\_RA | dB | 1,2 |
| SSS\_RA | dB | 1,2 |
| PCFICH\_RB | dB | 1,2 |
| PHICH\_RA | dB | 1,2 |
| PHICH\_RB | dB | 1,2 |
| MPDCCH\_RA | dB | 1,2 |
| MPDCCH\_RB | dB | 1,2 |
| PDSCH\_RA | dB | 1,2 |
| PDSCH\_RB | dB | 1,2 |
| OCNG\_RANote 1 | dB | 1,2 |
| OCNG\_RBNote 1  | dB | 1,2 |
|  Note 2 | dBm/15 KHz | 1,2 | -98 |
|  | dB | 1,2 | 4 | 4 | -Infinity | 4 |
|  Note 3 | dB | 1,2 | 4 | 4 | -Infinity | 4 |
| RSRP Note 3 | dBm/15 KHz | 1,2 | -94 | -94 | -Infinity | -94 |
| SCH\_RP Note 3 | dBm/15 KHz | 1,2 | -94 | -94 | -Infinity | -94 |
| Io Note 3 | dBm/9MHz | 1,2 | -64.76 | -64.76 | -Infinity | -64.76 |
| Propagation Condition  |  | 1,2 | AWGN | AWGN |
| Correlation Matrix and Antenna Configuration |  | 1,2 | 1X1 | 1X1 |
| Timing offset to Cell 1 | ms | 1,2 | - | 3 |
| Note 1: OCNG shall be used such that all 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 Noc to be fulfilled.Note 3: Es/Iot, RSRP, SCH\_RP and Io 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.14.5.2.X1.2 Test Requirement

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3.2 s from the beginning of time period T2.

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.14.5.2.X2 E-UTRAN FDD-FDD Inter-frequency event triggered reporting under AWGN conditions in asynchronous cells for UE category M1 in CEModeA when DRX is used

#### A.14.5.2.X2.1 Test Purpose and Environment

The purpose of this test is to verify that the Cat-M1 UE makes correct reporting of an event for inter-frequency. This test will partly verify the FDD-FDD inter-frequency cell search requirements in clause 8.13A.2.2.1. The supported test configurations are provided in Table A.14.5.2.X2.1-1.

Table A.14.5.2.X2.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, FDD-FDD duplex mode |
| 2 | NGSO, FDD-FDD duplex mode |

The test parameters are given in Table A.14.5.2.X2.1-2, A.14.5.2.X2.1-3 and A.14.5.2.X2.1-4 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 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 cell 2. At the beginning of T2 the transmission power of cell 2 is increased to the same level as for cell 1, and due to usage of an offset this shall result in reporting of Event A3.

In Test 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.

In Test 2 the uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.14.5.2.X2.1-2: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| Test1 | Test2 |
| E-UTRA RF Channel Number |  | 1, 2 |  |
| Active cell |  | Cell 1 |  |
| Neighbour cell |  | Cell 2 | Cell to be identified. |
| CP length |  | Normal |  |
| DRX |  | ON |  |
| A3 | Offset | dB | -6 |  |
| Hysteresis | dB | 0 |  |
| Time To Trigger | S | 0 |  |
| Filter coefficient |  | 0 | L3 filtering is not used |
| Gap pattern ID |  | 0 |  |
| *Rmax*  |  | 8 | As defined in *mPDCCH-NumRepetition* in [3] |
| *G* |  | 1 | As defined in *mPDCCH-startSF-UESS* in [3] |
| *X* |  | scheme10 | As defined in *measGapSharingScheme* in [3] |
| T1 | S | 5 |  |
| T2 | S | 10 | 60 |  |

Table A.14.5.2.X2.1-3: Cell specific test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configurations | Cell 1 | Cell 2 |
| T1 | T2 | T1 | T2 |
| Satellite information |  | 1 | SSC.1 | SSC.1 | NSC.1 | NSC.1 |
|  | 2 | SSC.2 | SSC.2 | NSC.2 | NSC.2 |
| E-UTRA RF Channel Number |  | 1,2 | 1 | 2 |
| BWchannel | MHz | 1,2 | 1.4 | 1.4 |
| PDSCH parameters:DL Reference Measurement Channel |  | 1,2 | R.48 FDD | - |
| MPDCCH parameters:DL Reference Measurement Channel |  | 1,2 | R.46 FDD | R.46 FDD |
| OCNG Patterns  |  | 1,2 | OP.7 FDD | OP.7 FDD |
| PBCH\_RA | dB | 1,2 | -3 | -3 |
| PBCH\_RB | dB | 1,2 |
| PSS\_RA | dB | 1,2 |
| SSS\_RA | dB | 1,2 |
| PCFICH\_RB | dB | 1,2 |
| PHICH\_RA | dB | 1,2 |
| PHICH\_RB | dB | 1,2 |
| MPDCCH\_RA | dB | 1,2 |
| MPDCCH\_RB | dB | 1,2 |
| PDSCH\_RA | dB | 1,2 |
| PDSCH\_RB | dB | 1,2 |
| OCNG\_RANote 1 | dB | 1,2 |
| OCNG\_RBNote 1  | dB | 1,2 |
|  Note 2 | dBm/15 KHz | 1,2 | -98 | -98 |
|  | dB | 1,2 | 4 | 4 | -Infinity | 4 |
|  Note 3 | dB | 1,2 | 4 | 4 | -Infinity | 4 |
| RSRP Note 3 | dBm/15 KHz | 1,2 | -94 | -94 | -Infinity | -94 |
| SCH\_RP Note 3 | dBm/15 KHz | 1,2 | -94 | -94 | -Infinity | -94 |
| Io Note 3 | dBm/9MHz | 1,2 | -64.76 | -64.76 | -Infinity | -64.76 |
| Propagation Condition  |  | 1,2 | AWGN | AWGN |
| Correlation Matrix and Antenna Configuration |  | 1,2 | 1X1 | 1X1 |
| Timing offset to Cell 1 | ms | 1,2 | - | 3 |
|  | Note 1: OCNG shall be used such that all 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 Noc to be fulfilled.Note 3: Es/Iot, RSRP, SCH\_RP and Io 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. |

Table A.14.5.2.X2.1-4: DRX-Configuration

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Test1 | Test2 | Comment |
| Value | Value |
| onDurationTimer | psf1 | psf1 | As specified in clause 6.3.2 in TS 36.331 |
| drx-InactivityTimer | psf1 | psf1 |
| drx-RetransmissionTimer | psf1 | psf1 |
| longDRX-CycleStartOffset | sf128 | sf1280 |
| shortDRX | disable | disable |

Table A.14.5.2.X2.1-4: *TimeAlignmentTimer* -Configuration

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Test1 | Test2 | Comment |
| Value | Value |
| TimeAlignmentTimer | sf500 | sf500 | As specified in clause 6.3.2 in TS 36.331 |
| sr-ConfigIndex | 0 | 0 | For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213. |

#### A.14.5.2.X2.2 Test Requirement

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 6.4 s from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

In Test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 51.2 s from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

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 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

### A.14.5.2.X3 E-UTRAN HD-FDD Inter-frequency event triggered reporting under AWGN conditions in asynchronous cells for UE category M1 with discontinuous MPDCCH monitoring in CEModeA

#### A.14.5.2.X3.1 Test Purpose and Environment

The purpose of this test is to verify that the Cat-M1 UE makes correct reporting of an event with discontinuous MPDCCH monitoring. This test will partly verify the HD-FDD inter-frequency cell search requirements in clause 8.13A.2.2.2. The supported test configurations are provided in Table A.14.5.2.X3.1-1.

Table A.14.5.2.X3.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, FDD-FDD duplex mode |
| 2 | NGSO, FDD-FDD duplex mode |

The test parameters are given in Table A.14.5.2.X3.1-2 and A.14.5.2.X3.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 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 cell 2. At the beginning of T2 the transmission power of cell 2 is increased to the same level as for cell 1, and due to usage of an offset this shall result in reporting of Event A3.

Table A.14.5.2.X3.1-2: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| E-UTRA RF Channel Number |  | 1, 2 |  |
| Active cell |  | Cell 1 |  |
| Neighbour cell |  | Cell 2 | Cell to be identified. |
| CP length |  | Normal |  |
| DRX |  | OFF |  |
| A3 | Offset | dB | -6 |  |
| Hysteresis | dB | 0 |  |
| Time To Trigger | S | 0 |  |
| Filter coefficient |  | 0 | L3 filtering is not used |
| Gap pattern ID |  | 0 |  |
| *Rmax*  |  | 8 | As defined in *mPDCCH-NumRepetition* in [3] |
| *G* |  | 10 | As defined in *mPDCCH-startSF-UESS* in [3] |
| *X* |  | scheme10 | As defined in *measGapSharingScheme* in [3] |
| T1 | S | 5 |  |
| T2 | S | 5 |  |

Table A.14.5.2.X3.1-3: Cell specific test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configurations | Cell 1 | Cell 2 |
| T1 | T2 | T1 | T2 |
| Satellite information |  | 1 | SSC.1 | SSC.1 | NSC.1 | NSC.1 |
|  | 2 | SSC.2 | SSC.2 | NSC.2 | NSC.2 |
| E-UTRA RF Channel Number |  | 1,2 | 1 | 2 |
| BWchannel | MHz | 1,2 | 1.4 | 1.4 |
| PDSCH parameters:DL Reference Measurement Channel |  | 1,2 | R.49 HD-FDD | - |
| MPDCCH parameters:DL Reference Measurement Channel |  | 1,2 | R.47 HD-FDD | R.47 HD-FDD |
| OCNG Patterns  |  | 1,2 | OP.7 FDD | OP.7 FDD |
| PBCH\_RA | dB | 1,2 | -3 | -3 |
| PBCH\_RB | dB | 1,2 |
| PSS\_RA | dB | 1,2 |
| SSS\_RA | dB | 1,2 |
| PCFICH\_RB | dB | 1,2 |
| PHICH\_RA | dB | 1,2 |
| PHICH\_RB | dB | 1,2 |
| MPDCCH\_RA | dB | 1,2 |
| MPDCCH\_RB | dB | 1,2 |
| PDSCH\_RA | dB | 1,2 |
| PDSCH\_RB | dB | 1,2 |
| OCNG\_RANote 1 | dB | 1,2 |
| OCNG\_RBNote 1  | dB | 1,2 |
|  Note 2 | dBm/15 KHz | 1,2 | -98 |
|  | dB | 1,2 | 4 | 4 | -Infinity | 4 |
|  Note 3 | dB | 1,2 | 4 | 4 | -Infinity | 4 |
| RSRP Note 3 | dBm/15 KHz | 1,2 | -94 | -94 | -Infinity | -94 |
| SCH\_RP Note 3 | dBm/15 KHz | 1,2 | -94 | -94 | -Infinity | -94 |
| Io Note 3 | dBm/9MHz | 1,2 | -64.76 | -64.76 | -Infinity | -64.76 |
| Propagation Condition  |  | 1,2 | AWGN | AWGN |
| Correlation Matrix and Antenna Configuration |  | 1,2 | 1X1 | 1X1 |
| Timing offset to Cell 1 | ms | 1,2 | - | 3 |
|  | Note 1: OCNG shall be used such that all 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 Noc to be fulfilled.Note 3: Es/Iot, RSRP, SCH\_RP and Io 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.14.5.2.X3.2 Test Requirement

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3.2 s from the beginning of time period T2. During the test, downlink traffic is continuously scheduled.

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.14.5.2.X4 E-UTRAN HD-FDD inter-frequency event triggered reporting under AWGN conditions in asynchronous cells for UE category M1 in CEModeA in DRX

#### A.14.5.2.X4.1 Test Purpose and Environment

The purpose of this test is to verify that the Cat-M1 UE makes correct reporting of an event. This test will partly verify the HD-FDD inter-frequency cell search requirements in clause 8.13A.2.2.2. The supported test configurations are provided in Table A.14.5.2.X4.1-1.

Table A.14.5.2.X4.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, FDD-FDD duplex mode |
| 2 | NGSO, FDD-FDD duplex mode |

The test parameters are given in Table A.14.5.2.X4.1-2, A.14.5.2.X4.1-3, A.14.5.2.X4.1-4 and A.14.5.2.X3.1-5 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 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 cell 2. At the beginning of T2 the transmission power of cell 2 is increased to the same level as for cell 1, and due to usage of an offset this shall result in reporting of Event A3.

In Test 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.

In Test 2 the uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.14.5.2.X4.1-2: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| Test1 | Test2 |
| E-UTRA RF Channel Number |  | 1, 2 |  |
| Active cell |  | Cell 1 |  |
| Neighbour cell |  | Cell 2 | Cell to be identified. |
| CP length |  | Normal |  |
| DRX |  | ON |  |
| A3 | Offset | dB | -6 |  |
| Hysteresis | dB | 0 |  |
| Time To Trigger | S | 0 |  |
| Filter coefficient |  | 0 | L3 filtering is not used |
| Gap pattern ID |  | 0 |  |
| *Rmax*  |  | 8 | As defined in *mPDCCH-NumRepetition* in [3] |
| *G* |  | 1 | As defined in *mPDCCH-startSF-UESS* in [3] |
| *X* |  | scheme10 | As defined in *measGapSharingScheme* in [3] |
| T1 | S | 5 |  |
| T2 | S | 10 | 60 |  |

Table A.14.5.2.X4.1-3: Cell specific test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configurations | Cell 1 | Cell 2 |
| T1 | T2 | T1 | T2 |
| Satellite information |  | 1 | SSC.1 | SSC.1 | NSC.1 | NSC.1 |
|  | 2 | SSC.2 | SSC.2 | NSC.2 | NSC.2 |
| E-UTRA RF Channel Number |  | 1,2 | 1 | 2 |
| BWchannel | MHz | 1,2 | 1.4 | 1.4 |
| PDSCH parameters:DL Reference Measurement Channel |  | 1,2 | R.49 HD-FDD | - |
| MPDCCH parameters:DL Reference Measurement Channel |  | 1,2 | R.47 HD-FDD | R.47 HD-FDD |
| OCNG Patterns  |  | 1,2 | OP.7 FDD | OP.7 FDD |
| PBCH\_RA | dB | 1,2 | -3 | -3 |
| PBCH\_RB | dB | 1,2 |
| PSS\_RA | dB | 1,2 |
| SSS\_RA | dB | 1,2 |
| PCFICH\_RB | dB | 1,2 |
| PHICH\_RA | dB | 1,2 |
| PHICH\_RB | dB | 1,2 |
| MPDCCH\_RA | dB | 1,2 |
| MPDCCH\_RB | dB | 1,2 |
| PDSCH\_RA | dB | 1,2 |
| PDSCH\_RB | dB | 1,2 |
| OCNG\_RANote 1 | dB | 1,2 |
| OCNG\_RBNote 1  | dB | 1,2 |
|  Note 2 | dBm/15 KHz | 1,2 | -98 | -98 |
|  | dB | 1,2 | 4 | 4 | -Infinity | 4 |
|  Note 3 | dB | 1,2 | 4 | 4 | -Infinity | 4 |
| RSRP Note 3 | dBm/15 KHz | 1,2 | -94 | -94 | -Infinity | -94 |
| SCH\_RP Note 3 | dBm/15 KHz | 1,2 | -94 | -94 | -Infinity | -94 |
| Io Note 3 | dBm/9MHz | 1,2 | -64.76 | -64.76 | -Infinity | -64.76 |
| Propagation Condition  |  | 1,2 | AWGN | AWGN |
| Correlation Matrix and Antenna Configuration |  | 1,2 | 1X1 | 1X1 |
| Timing offset to Cell 1 | ms | 1,2 | - | 3 |
|  | Note 1: OCNG shall be used such that all 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 Noc to be fulfilled.Note 3: Es/Iot, RSRP, SCH\_RP and Io 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. |

Table A.14.5.2.X4.1-4: DRX-Configuration

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Test1 | Test2 | Comment |
| Value | Value |
| onDurationTimer | psf1 | psf1 | As specified in clause 6.3.2 in TS 36.331 |
| drx-InactivityTimer | psf1 | psf1 |
| drx-RetransmissionTimer | psf1 | psf1 |
| longDRX-CycleStartOffset | sf128 | sf1280 |
| shortDRX | disable | disable |

Table A.14.5.2.X4.1-5: *TimeAlignmentTimer* -Configuration

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Test1 | Test2 | Comment |
| Value | Value |
| TimeAlignmentTimer | sf500 | sf500 | As specified in clause 6.3.2 in TS 36.331 |
| sr-ConfigIndex | 0 | 0 | For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213. |

#### A.14.5.2.X4.2 Test Requirement

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 6.4 s from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

In Test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 51.2 s from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

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 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the r

### A.14.5.2.X5 E-UTRAN FDD-FDD inter-frequency event triggered reporting under AWGN conditions in asynchronous cells for UE category M1 with discontinuous MPDCCH monitoring in CEModeB

#### A.14.5.2.X5.1 Test Purpose and Environment

The purpose of this test is to verify that the Cat-M1 UE makes correct reporting of an event with discontinuous MPDCCH monitoring. This test will partly verify the FDD-FDD inter-frequency cell search requirements in clause 8.13A.3.2.1. The supported test configurations are provided in Table A.14.5.2.X5.1-1.

Table A.14.5.2.X5.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, FDD-FDD duplex mode |
| 2 | NGSO, FDD-FDD duplex mode |

The test parameters are given in Table A.14.5.2.X5.1-2 and A.14.5.2.X5.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 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 cell 2. At the beginning of T2 the transmission power of cell 2 is increased to the same level as for cell 1, and due to usage of an offset this shall result in reporting of Event A3.

Table A.14.5.2.X5.1-2: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| E-UTRA RF Channel Number |  | 1, 2 |  |
| Active cell |  | Cell 1 |  |
| Neighbour cell |  | Cell 2 | Cell to be identified. |
| CP length |  | Normal |  |
| DRX |  | OFF |  |
| A3 | Offset | dB | -8 |  |
| Hysteresis | dB | 0 |  |
| Time To Trigger | S | 0 |  |
| Filter coefficient |  | 0 | L3 filtering is not used |
| Gap pattern ID |  | 0 |  |
| *Rmax*  |  | 128 | As defined in *mPDCCH-NumRepetition* in [3] |
| *G* |  | 8 | As defined in *mPDCCH-startSF-UESS* in [3] |
| *X* |  | scheme01 | As defined in *measGapSharingScheme* in [3] |
| T1 | S | 5 |  |
| T2 | S | ≤825 |  |

Table A.14.5.2.X5.1-3: Cell specific test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configurations** | **Cell 1** | **Cell 2** |
| **T1** | **T2** | **T1** | **T2** |
| Satellite information |  | 1 | SSC.1 | SSC.1 | NSC.1 | NSC.1 |
|  | 2 | SSC.2 | SSC.2 | NSC.2 | NSC.2 |
| E-UTRA RF Channel Number |  | 1,2 | 1 | 2 |
| BWchannel | MHz | 1,2 | 1.4 | 1.4 |
| PDSCH parameters:DL Reference Measurement Channel |  | 1,2 | R.52 FDD | - |
| MPDCCH parameters:DL Reference Measurement Channel |  | 1,2 | R.50 FDD | R.50 FDD |
| OCNG Patterns  |  | 1,2 | OP.7 FDD | OP.7 FDD |
| PBCH\_RA | dB | 1,2 | -3 | -3 |
| PBCH\_RB | dB | 1,2 |
| PSS\_RA | dB | 1,2 |
| SSS\_RA | dB | 1,2 |
| PCFICH\_RB | dB | 1,2 |
| PHICH\_RA | dB | 1,2 |
| PHICH\_RB | dB | 1,2 |
| MPDCCH\_RA | dB | 1,2 |
| MPDCCH\_RB | dB | 1,2 |
| PDSCH\_RA | dB | 1,2 |
| PDSCH\_RB | dB | 1,2 |
| OCNG\_RANote 1 | dB | 1,2 |
| OCNG\_RBNote 1  | dB | 1,2 |
|  Note 2 | dBm/15 KHz | 1,2 | -98 | -98 |
|  | dB | 1,2 | -12 | -12 | -Infinity | -12 |
|  Note 3 | dB | 1,2 | -12 | -12 | -Infinity | -12 |
| RSRP Note 3 | dBm/15 KHz | 1,2 | -110 | -110 | -Infinity | -110 |
| SCH\_RP Note 3 | dBm/15 KHz | 1,2 | -110 | -110 | -Infinity | -110 |
| Io Note 3 | dBm/9MHz | 1,2 | -69.95 | -69.95 | -Infinity | -69.95 |
| dBm/4.5 MHz | 1,2 | -72.96 | -72.96 | -Infinity | -72.96 |
| Propagation Condition  |  | 1,2 | AWGN | AWGN |
| Correlation Matrix and Antenna Configuration |  | 1,2 | 1X1 | 1X1 |
| Timing offset to Cell 1 | ms | 1,2 | - | 3 |
|  | Note 1: OCNG shall be used such that all 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 Noc to be fulfilled.Note 3: Es/Iot, RSRP, SCH\_RP and Io 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.14.5.2.X5.2 Test Requirement

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than [819.2] s from the beginning of time period T2 which is derived from section 8.13.3.5.

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 *pusch-maxNumRepetitionCEmodeB* x TTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH, where *pusch-maxNumRepetitionCEmodeB* [2] is the maximum number of PUSCH repetitions configured

### A.14.5.2.X6 E-UTRAN HD-FDD inter-frequency event triggered reporting under AWGN conditions in asynchronous cells for UE category M1 with discontinuous MPDCCH monitoring in CEModeB

#### A.14.5.2.X6.1 Test Purpose and Environment

The purpose of this test is to verify that the Cat-M1 UE makes correct reporting of an event with discontinuous MPDCCH monitoring. This test will partly verify the HD-FDD inter-frequency cell search requirements in clause 8.13A.3.2.2. The supported test configurations are provided in Table A.14.5.2.X6.1-1.

Table A.14.5.2.X6.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, FDD-FDD duplex mode |
| 2 | NGSO, FDD-FDD duplex mode |

The test parameters are given in Table A.14.5.2.X6.1-2 and A.14.5.2.X6.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 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 cell 2. At the beginning of T2 the transmission power of cell 2 is increased to the same level as for cell 1, and due to usage of an offset this shall result in reporting of Event A3.

During the test, downlink traffic is continuously scheduled. MPDCCH is not collided with gap.

Table A.14.5.2.X6.1-2: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| E-UTRA RF Channel Number |  | 1, 2 |  |
| Active cell |  | Cell 1 |  |
| Neighbour cell |  | Cell 2 | Cell to be identified. |
| CP length |  | Normal |  |
| DRX |  | OFF |  |
| A3 | Offset | dB | -8 |  |
| Hysteresis | dB | 0 |  |
| Time To Trigger | S | 0 |  |
| Filter coefficient |  | 0 | L3 filtering is not used |
| Gap pattern ID |  | 0 |  |
| *Rmax*  |  | 128 | As defined in *mPDCCH-NumRepetition* in [3] |
| *G* |  | 8 | As defined in *mPDCCH-startSF-UESS* in [3] |
| *X* |  | scheme01 | As defined in *measGapSharingScheme* in [3] |
| T1 | S | 5 |  |
| T2 | S | ≤825 |  |

Table A.14.5.2.X6.1-3: Cell specific test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configurations** | **Cell 1** | **Cell 2** |
| **T1** | **T2** | **T1** | **T2** |
| Satellite information |  | 1 | SSC.1 | SSC.1 | NSC.1 | NSC.1 |
|  | 2 | SSC.2 | SSC.2 | NSC.2 | NSC.2 |
| E-UTRA RF Channel Number |  | 1,2 | 1 | 2 |
| BWchannel | MHz | 1,2 | 1.4 | 1.4 |
| PDSCH parameters:DL Reference Measurement Channel |  | 1,2 | R.53 HD-FDD | - |
| MPDCCH parameters:DL Reference Measurement Channel |  | 1,2 | R.51 HD-FDD | R.51 HD-FDD |
| OCNG Patterns  |  | 1,2 | OP.7 FDD  | OP.7 FDD  |
| PBCH\_RA | dB | 1,2 | -3 | -3 |
| PBCH\_RB | dB | 1,2 |
| PSS\_RA | dB | 1,2 |
| SSS\_RA | dB | 1,2 |
| PCFICH\_RB | dB | 1,2 |
| PHICH\_RA | dB | 1,2 |
| PHICH\_RB | dB | 1,2 |
| MPDCCH\_RA | dB | 1,2 |
| MPDCCH\_RB | dB | 1,2 |
| PDSCH\_RA | dB | 1,2 |
| PDSCH\_RB | dB | 1,2 |
| OCNG\_RANote 1 | dB | 1,2 |
| OCNG\_RBNote 1  | dB | 1,2 |
|  Note 2 | dBm/15 KHz | 1,2 | -98 | -98 |
|  | dB | 1,2 | -12 | -12 | -Infinity | -12 |
|  Note 3 | dB | 1,2 | -12 | -12 | -Infinity | -12 |
| RSRP Note 3 | dBm/15 KHz | 1,2 | -110 | -110 | -Infinity | -110 |
| SCH\_RP Note 3 | dBm/15 KHz | 1,2 | -110 | -110 | -Infinity | -110 |
| Io Note 3 | dBm/9MHz | 1,2 | -69.95 | -69.95 | -Infinity | -69.95 |
| dBm/4.5 MHz | 1,2 | -72.96 | -72.96 | -Infinity | -72.96 |
| Propagation Condition  |  | 1,2 | AWGN | AWGN |
| Correlation Matrix and Antenna Configuration |  | 1,2 | 1X1 | 1X1 |
| Timing offset to Cell 1 | ms | 1,2 | - | 3 |
|  | Note 1: OCNG shall be used such that all 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 Noc to be fulfilled.Note 3: Es/Iot, RSRP, SCH\_RP and Io 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.14.5.2.X6.2 Test Requirement

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 819.2 s from the beginning of time period T2 which is derived from section 8.13.3.5.

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 *pusch-maxNumRepetitionCEmodeB* x TTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH, where *pusch-maxNumRepetitionCEmodeB* [2] is the maximum number of PUSCH repetitions configured

reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

### < End of Change 1>

### <Start of Change 2>

A.14.2.1.13 E-UTRAN FDD Intra frequency time based condition handover for Cat-M1 UEs in CEModeA

A.14.2.1.13.1 Test Purpose and Environment

This test is to verify the requirement for the FDD intra frequency handover requirements.

The test configurations are given in Table A.14.2.1.13.1-1. The test scenario comprises one E-UTRA FDD carrier and two cells as given in tables A.14.2.1.13.1-2 and A.14.2.1.13.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE shall have had the opportunity to acquire satellite assistance information for Cell 2, provided by Cell 1 in *SystemInformationBlockType33.*

During T1, the UE is configured to measure intra-frequency neighbour cell. The RRC message implying time-based handover to cell 2 with Event CondEvent T1 and CondEvent A3 shall be sent to UE, at a time earlier than TRRC (15ms) before the beginning of T2. Starting T2, cell 2 becomes detectable and offset better than cell 1. Time period T3 starts at 1500ms after beginning of T2, and time condition event t1-Threshold-r17 is fulfilled at beginning of T3.

During the test, UE is configured with measurement gap for cell search.

**Table A.14.2.1.13.1-1: Supported test configurations**

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | GSO, FD-FDD duplex mode |
| 2 | NGSO, FD-FDD duplex mode |
| Note: If UE supports both NGSO and GSO, the test case Config 1 can be skipped if the UE passes test case Config 2. |

**Table A.14.2.1.13.1-2: General test parameters for E-UTRAN FDD intra frequency time based conditional handover for Cat-M1 UEs in CEModeA without SFN acquisition test case**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| Initial conditions | Active cell |  | Cell 1 | Cell 1 is on RF channel number 1 |
| Neighbouring cell |  | Cell 2 | Cell 2 is on RF channel number 1 |
| Final condition | Active cell |  | Cell 2 |  |
| A3-Offset | dB | 0 |  |
| Hysteresis | dB | 0 |  |
| Time To Trigger | s | 0 |  |
| Filter coefficient |  | 0 | L3 filtering is not used |
| DRX |  |  | OFF |
| CP length |  | Normal |  |
| Access Barring Information | - | Not Sent | No additional delays in random access procedure. |
| PRACH configuration |  | PRACH\_4CE | As specified in A.3.16 |
| PRACH initial CE level |  | 0 | Specified in the handover message |
| T1 | s | 5 |  |
| T2 | s | 1.5 |  |
| T3 | s | 1 |  |
| Gap pattern ID |  | 0 |  |

**Table A.14.2.1.13.1-3: Cell specific test parameters for E-UTRAN FDD intra frequency time based conditional handover for Cat-M1 UEs in CEModeA without SFN acquisition test case**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Cell 1** | **Cell 2** |
| **T1** | **T2** | **T3** | **T1** | **T2** | **T3** |
| E-UTRA RF Channel Number |  | 1 | 1 |
| Satellite Information (Configuration 1)Note 1 |  | SSC.1 | NSC.1 |
| Satellite Information (Configuration 2)Note 1 |  | SSC.2 | NSC.2 |
| BWchannel | MHz | 1.4 |
| PDSCH Reference Channel in clause A.3.1.4.1 |  | R.48 FDD | R.48 FDD | - | - | - | R.48 FDD |
| MPDCCH Reference Channel in clause A.3.1.3.1 |  | R.46 FDD | R.46 FDD |
| OCNG Patterns in clause A.3.2.1 |  | OP.7 FDD | OP.7 FDD | OP.7 FDD | OP.7 FDD | OP.7 FDD | OP.7 FDD |
| PBCH\_RA | dB | -3 | -3 |
| PBCH\_RB | dB |
| PSS\_RA | dB |
| SSS\_RA | dB |
| PCFICH\_RB | dB |
| PHICH\_RA | dB |
| PHICH\_RB | dB |
| PDCCH\_RA | dB |
| PDCCH\_RB | dB |
| MPDCCH\_RA | dB |
| MPDCCH\_RB | dB |
| PDSCH\_RA | dB |
| PDSCH\_RB | dB |
| OCNG\_RANote 2 | dB |
| OCNG\_RBNote 2  | dB |
|  Note 3 | dBm/15 KHz | -98 |
|  | dB | 8 | 8 | 8 | -Infinity | 12 | 12 |
|  Note 4 | dB | 8 | -4.27 | -4.27 | -Infinity | 3.36 | 3.36 |
| RSRP Note 4 | dBm/15 KHz | -90 | -90 | -90 | -Infinity | -86 | -86 |
| Propagation Condition  |  | AWGN | AWGN |
| Antenna Configuration |  | 1x1 | 1x1 |
| Timing offset to Cell 1Synchronous cells | us | - | Based on Satellite Assistance information |
| Note 1: Satellite information is determined according to the testing principles for NTN determined in clause B.3.8. If satellite movement is applicable, it should be considered for the duration of the test case. Note 2: 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: Es/Iot and RSRP level has been derived from other parameters for information purpose. They are not settable parameters themselves. |

A.14.2.1.13.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 later than beginning of T3 and less than 50 ms from the beginning of time period T3.

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

NOTE: The handover delay is defined in clause 5.5A.2.3, can be expressed as:

 DCHO = TRRC + TEvent\_DU + Tmeasure + Tinterrupt + TCHO\_execution

where:

TRRC = 15, which is the RRC procedure delay as specified in clause 11.2 in TS 36.331 [2] and included in T1.

TEvent\_DU = 0, with CondEvent A3 met at beginning of T2;

Tmeasure = max(1440, 1500) ms, where 1440ms is the cell identification time, and Tmeasure is included in T2;

Tinterrupt = 40ms with Tsearch = 0;

 TCHO\_execution = 10ms.

This gives a total of 50 ms from beginning of T3.

14.2.1.14 E-UTRAN HD-FDD Intra frequency location based condition handover for Cat-M1 UEs in CEModeA

A.14.2.1.14.1 Test Purpose and Environment

This test is to verify the requirement for the HD-FDD intra frequency handover requirements.

The test configurations are given in Table A.14.2.1.14.1-1. The test scenario comprises one E-UTRA FDD carrier and two cells as given in tables A.14.2.1.14.1-2 and A.14.2.1.14.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE shall have had the opportunity to acquire satellite assistance information for Cell 2, provided by Cell 1 in *SystemInformationBlockType33.*

During T1, the UE is configured to measure intra-frequency neighbour cell. The RRC message implying location-based handover to cell 2 with Event CondEvent D1 and CondEvent A3 shall be sent to UE, at a time earlier than TRRC (15ms) before the beginning of T2. Starting T2, cell 2 becomes detectable and offset better than cell 1. Time period T3 starts at 1500ms after beginning of T2, and location condition condEventD1-r17 is fulfilled at beginning of T3.

During the test, UE is configured with measurement gap for cell search.

**Table A.14.2.1.14.1-1: Supported test configurations**

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | GSO, HD-FDD duplex mode |
| 2 | NGSO, HD-FDD duplex mode |
| Note: If UE supports both NGSO and GSO, the test case Config 1 can be skipped if the UE passes test case Config 2. |

**Table A.14.2.1.14.1-2: General test parameters for E-UTRAN HD-FDD intra frequency location based conditional handover for Cat-M1 UEs in CEModeA without SFN acquisition test case**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| Initial conditions | Active cell |  | Cell 1 | Cell 1 is on RF channel number 1 |
| Neighbouring cell |  | Cell 2 | Cell 2 is on RF channel number 2 |
| Final condition | Active cell |  | Cell 2 |  |
| A3-Offset | dB | 0 |  |
| Hysteresis | dB | 0 |  |
| Time To Trigger | s | 0 |  |
| Filter coefficient |  | 0 | L3 filtering is not used |
| DRX |  |  | OFF |
| CP length |  | Normal |  |
| Access Barring Information | - | Not Sent | No additional delays in random access procedure. |
| PRACH configuration |  | PRACH\_4CE | As specified in A.3.16 |
| PRACH initial CE level |  | 0 | Specified in the handover message |
| T1 | s | 5 |  |
| T2 | s | 1.5 |  |
| T3 | s | 1 |  |
| Gap pattern ID |  | 0 |  |
| UE position (N,S, H) at T2 start |  | [(0, 0, 0)] | Set by AT command |
| UE moving speed | km/h | [(108, 0, 0)] | Set by AT command |
| referenceLocation1-r17.condEventD1-r17 | m | [(-700, 0, 0)] | Reference location for serving cell |
| referenceLocation2-r17.condEventD1-r17 | m | [(1300, 0, 0)] | Reference location for target cell |

**Table A.14.2.1.14.1-3: Cell specific test parameters for E-UTRAN HD-FDD intra frequency location based conditional handover for Cat-M1 UEs in CEModeA without SFN acquisition test case**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Cell 1** | **Cell 2** |
| **T1** | **T2** | **T3** | **T1** | **T2** | **T3** |
| E-UTRA RF Channel Number |  | 1 | 1 |
| Satellite Information (Configuration 1)Note 1 |  | SSC.1 | NSC.1 |
| Satellite Information (Configuration 2)Note 1 |  | SSC.2 | NSC.2 |
| BWchannel | MHz | 1.4 |
| PDSCH Reference Channel in clause A.3.1.4.1 |  | R.49 HD-FDD | R.49 HD-FDD | - | - | - | R.49 HD-FDD |
| MPDCCH Reference Channel in clause A.3.1.3.1 |  | R.47 HD-FDD | R.47 HD-FDD |
| OCNG Patterns in clause A.3.2.1 |  | OP.7 FDD | OP.7 FDD | OP.7 FDD | OP.7 FDD | OP.7 FDD | OP.7 FDD |
| PBCH\_RA | dB | -3 | -3 |
| PBCH\_RB | dB |
| PSS\_RA | dB |
| SSS\_RA | dB |
| PCFICH\_RB | dB |
| PHICH\_RA | dB |
| PHICH\_RB | dB |
| PDCCH\_RA | dB |
| PDCCH\_RB | dB |
| MPDCCH\_RA | dB |
| MPDCCH\_RB | dB |
| PDSCH\_RA | dB |
| PDSCH\_RB | dB |
| OCNG\_RANote 2 | dB |
| OCNG\_RBNote 2  | dB |
|  Note 3 | dBm/15 KHz | -98 |
|  | dB | 8 | 8 | 8 | -Infinity | 12 | 12 |
|  Note 4 | dB | 8 | -4.27 | -4.27 | -Infinity | 3.36 | 3.36 |
| RSRP Note 4 | dBm/15 KHz | -90 | -90 | -90 | -Infinity | -86 | -86 |
| Propagation Condition  |  | AWGN | AWGN |
| Antenna Configuration |  | 1x1 | 1x1 |
| Timing offset to Cell 1Synchronous cells | us | - | Based on Satellite Assistance information |
| Note 1: Satellite information is determined according to the testing principles for NTN determined in clause B.3.8. If satellite movement is applicable, it should be considered for the duration of the test case. Note 2: 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: Es/Iot and RSRP level has been derived from other parameters for information purpose. They are not settable parameters themselves. |

A.14.2.1.14.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 later than beginning of T3 and less than 50 ms from the beginning of time period T3.

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

NOTE: The handover delay is defined in clause 5.5A.2.3, can be expressed as:

 DCHO = TRRC + TEvent\_DU + Tmeasure + Tinterrupt + TCHO\_execution

where:

TRRC = 15, which is the RRC procedure delay as specified in clause 11.2 in TS 36.331 [2] and included in T1.

TEvent\_DU = 0, with CondEvent A3 met at beginning of T2;

Tmeasure = max(1440, 1500) ms, where 1440ms is the cell identification time, and Tmeasure is included in T2;

Tinterrupt = 40ms with Tsearch = 0;

 TCHO\_execution = 10ms.

This gives a total of 50 ms from beginning of T3.

#### A.14.2.1.15 E-UTRAN FDD-FDD Inter frequency location based conditional handover for Cat-M1 UEs in CEModeA

##### A.14.2.1.15.1 Test Purpose and Environment

This test is to verify the requirement for the FDD inter frequency conditional handover requirements.

The test configurations are given in Table A.14.2.1.15.1-1. The test scenario comprises of two E-UTRA FDD carrier and one cell in each carrier as given in tables A.14.2.1.15.1-2 and A.14.2.1.15.1-3. The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE shall have had the opportunity to acquire satellite assistance information for Cell 2, provided by Cell 1 in *SystemInformationBlockType33.*

During T1, the UE is configured to measure intra-frequency neighbour cell. The RRC message implying location-based handover to cell 2 with Event CondEvent D1 and without CondEvent A3 shall be sent to UE, at a time earlier than TRRC (15ms) before the beginning of T2. Starting T2, cell 2 becomes detectable and offset better than cell 1 and location condition event condEventD1-r17 is fulfilled.

During the test, UE is configured with measurement gap for cell search.

Table A.14.2.1.15.1-1: Supported test configurations

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | GSO, FD-FDD duplex mode |
| 2 | NGSO, FD-FDD duplex mode |
| Note: If UE supports both NGSO and GSO, the test case Config 1 can be skipped if the UE passes test case Config 2. |

**Table A.14.2.1.15.1-2: General test parameters for E-UTRAN FDD Inter frequency conditional handover for Cat-M1 UEs in CEModeA without SFN acquisition test case**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| Initial conditions | Active cell |  | Cell 1 | Cell 1 is on RF channel number 1 |
| Neighbouring cell |  | Cell 2 | Cell 2 is on RF channel number 2 |
| Final condition | Active cell |  | Cell 2 |  |
| Hysteresis | dB | 0 |  |
| Time To Trigger | s | 0 |  |
| Filter coefficient |  | 0 | L3 filtering is not used |
| DRX |  |  | OFF |
| CP length |  | Normal |  |
| Access Barring Information | - | Not Sent | No additional delays in random access procedure. |
| PRACH configuration |  | PRACH\_4CE | As specified in A.3.16 |
| PRACH initial CE level |  | 0 | Specified in the handover message |
| T1 | s | 5 |  |
| T2 | s | ≤2 |  |
| Gap pattern ID |  | 0 |  |

Table A.14.2.1.15.1-3: Cell specific test parameters for E-UTRAN FDD Inter frequency conditional handover for Cat-M1 UEs in CEModeA without SFN acquisition test case

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Cell 1** | **Cell 2** |
| **T1** | **T2** | **T1** | **T3** |
| E-UTRA RF Channel Number |  | 1 | 1 |
| Satellite Information (Configuration 1)Note 1 |  | SSC.1 | NSC.1 |
| Satellite Information (Configuration 2)Note 1 |  | SSC.2 | NSC.2 |
| BWchannel | MHz | 1.4 |
| PDSCH Reference Channel in clause A.3.1.4.1 |  | R.48 FDD | R.48 FDD | - | R.48 FDD |
| MPDCCH Reference Channel in clause A.3.1.3.1 |  | R.46 FDD | R.46 FDD |
| OCNG Patterns in clause A.3.2.1 |  | OP.7 FDD | OP.7 FDD | OP.7 FDD | OP.7 FDD |
| PBCH\_RA | dB | -3 | -3 |
| PBCH\_RB | dB |
| PSS\_RA | dB |
| SSS\_RA | dB |
| PCFICH\_RB | dB |
| PHICH\_RA | dB |
| PHICH\_RB | dB |
| PDCCH\_RA | dB |
| PDCCH\_RB | dB |
| MPDCCH\_RA | dB |
| MPDCCH\_RB | dB |
| PDSCH\_RA | dB |
| PDSCH\_RB | dB |
| OCNG\_RANote 2 | dB |
| OCNG\_RBNote 2  | dB |
|  Note 3 | dBm/15 KHz | -98 |
|  | dB | 8 | -3.33 | -Infinity | 2.36 |
|  Note 4 | dB | 8 | 8 | -Infinity | 11 |
| RSRP Note 4 | dBm/15 KHz | -90 | -90 | -Infinity | -87 |
| Propagation Condition  |  | AWGN | AWGN |
| Antenna Configuration |  | 1x1 | 1x1 |
| Timing offset to Cell 1Synchronous cells | us | - | Based on Satellite Assistance information |
| Note 1: Satellite information is determined according to the testing principles for NTN determined in clause B.3.8. If satellite movement is applicable, it should be considered for the duration of the test case. Note 2: 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: Es/Iot and RSRP level has been derived from other parameters for information purpose. They are not settable parameters themselves. |

##### A.14.2.1.16.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 no later than 1490 ms from the beginning of time period T2.

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

NOTE: The handover delay is defined in clause 5.5A.2.3, can be expressed as:

 DCHO = TRRC + TEvent\_DU + Tinterrupt + TCHO\_execution

where:

TRRC = 15, which is the RRC procedure delay as specified in clause 11.2 in TS 36.331 [2] and included in T1

TEvent\_DU = 0, with condEventD1-r17 met at beginning of T2;

Tinterrupt = 1480ms with Tsearch = 1440ms;

TCHO\_execution = 10ms.

This gives a total of 1490 ms from beginning of T3.

#### A.14.2.1.16 E-UTRAN HD-FDD Inter frequency time based conditional handover for Cat-M1 UEs in CEModeA

##### A.14.2.1.16.1 Test Purpose and Environment

This test is to verify the requirement for the HD-FDD inter frequency conditional handover requirements. The test configurations are given in Table A.14.2.1.16.1-1.

The test scenario comprises of two E-UTRA FDD carrier and one cell in each carrier as given in tables A.14.2.1.16.1-2 and A.14.2.1.16.1-3. The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE shall have had the opportunity to acquire satellite assistance information for Cell 2, provided by Cell 1 in *SystemInformationBlockType33.*

During T1, the UE is configured to measure intra-frequency neighbour cell. The RRC message implying location-based handover to cell 2 with Event CondEvent T1 and without CondEvent A3 shall be sent to UE, at a time earlier than TRRC (15ms) before the beginning of T2. Starting T2, cell 2 becomes detectable and offset better than cell 1 and location condition event t1-Threshold-r17 is fulfilled.

During the test, UE is configured with measurement gap for cell search.

Table A.14.2.1.16.1-1: Supported test configurations

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | GSO, HD-FDD duplex mode |
| 2 | NGSO, HD-FDD duplex mode |
| Note: If UE supports both NGSO and GSO, the test case Config 1 can be skipped if the UE passes test case Config 2. |

**Table A.14.2.1.16.1-2: General test parameters for E-UTRAN HD-FDD Inter frequency time based conditional handover for Cat-M1 UEs in CEModeA without SFN acquisition test case**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| Initial conditions | Active cell |  | Cell 1 | Cell 1 is on RF channel number 1 |
| Neighbouring cell |  | Cell 2 | Cell 2 is on RF channel number 2 |
| Final condition | Active cell |  | Cell 2 |  |
| Hysteresis | dB | 0 |  |
| Time To Trigger | s | 0 |  |
| Filter coefficient |  | 0 | L3 filtering is not used |
| DRX |  |  | OFF |
| CP length |  | Normal |  |
| Access Barring Information | - | Not Sent | No additional delays in random access procedure. |
| PRACH configuration |  | PRACH\_4CE | As specified in A.3.16 |
| PRACH initial CE level |  | 0 | Specified in the handover message |
| T1 | s | 5 |  |
| T2 | s | ≤2 |  |
| Gap pattern ID |  | 0 |  |

Table A.14.2.1.16.1-3: Cell specific test parameters for E-UTRAN HD-FDD Inter frequency time based conditional handover for Cat-M1 UEs in CEModeA without SFN acquisition test case

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Cell 1** | **Cell 2** |
| **T1** | **T2** | **T3** | **T1** | **T2** | **T3** |
| E-UTRA RF Channel Number |  | 1 | 1 |
| Satellite Information (Configuration 1)Note 1 |  | SSC.1 | NSC.1 |
| Satellite Information (Configuration 2)Note 1 |  | SSC.2 | NSC.2 |
| BWchannel | MHz | 1.4 |
| PDSCH Reference Channel in clause A.3.1.4.1 |  | R.49 HD-FDD | R.49 HD-FDD | - | - | - | R.49 HD-FDD |
| MPDCCH Reference Channel in clause A.3.1.3.1 |  | R.47 HD-FDD | R.47 HD-FDD |
| OCNG Patterns in clause A.3.2.1 |  | OP.7 FDD | OP.7 FDD | OP.7 FDD | OP.7 FDD | OP.7 FDD | OP.7 FDD |
| PBCH\_RA | dB | -3 | -3 |
| PBCH\_RB | dB |
| PSS\_RA | dB |
| SSS\_RA | dB |
| PCFICH\_RB | dB |
| PHICH\_RA | dB |
| PHICH\_RB | dB |
| PDCCH\_RA | dB |
| PDCCH\_RB | dB |
| MPDCCH\_RA | dB |
| MPDCCH\_RB | dB |
| PDSCH\_RA | dB |
| PDSCH\_RB | dB |
| OCNG\_RANote 2 | dB |
| OCNG\_RBNote 2  | dB |
|  Note 3 | dBm/15 KHz | -98 |
|  | dB | 8 | 8 | 8 | -Infinity | 12 | 12 |
|  Note 4 | dB | 8 | -4.27 | -4.27 | -Infinity | 3.36 | 3.36 |
| RSRP Note 4 | dBm/15 KHz | -90 | -90 | -90 | -Infinity | -86 | -86 |
| Propagation Condition  |  | AWGN | AWGN |
| Antenna Configuration |  | 1x1 | 1x1 |
| Timing offset to Cell 1Synchronous cells | us | - | Based on Satellite Assistance information |
| Note 1: Satellite information is determined according to the testing principles for NTN determined in clause B.3.8. If satellite movement is applicable, it should be considered for the duration of the test case. Note 2: 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: Es/Iot and RSRP level has been derived from other parameters for information purpose. They are not settable parameters themselves. |

##### A.14.2.1.16.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 no later than 1490 ms from the beginning of time period T2.

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

NOTE: The handover delay is defined in clause 5.5A.2.3, can be expressed as:

 DCHO = TRRC + TEvent\_DU + Tinterrupt + TCHO\_execution

where:

TRRC = 15, which is the RRC procedure delay as specified in clause 11.2 in TS 36.331 [2] and included in T1

TEvent\_DU = 0, with CondEvent T1 met at beginning of T2;

Tinterrupt = 1480ms with Tsearch = 1440ms;

TCHO\_execution = 10ms.

This gives a total of 1490 ms from beginning of T3.

### < End of Change 2>