**3GPP TSG-RAN WG4 Meeting #95-e *R4-2009117***

**Electronic Meeting, 25 May– 5 June 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **36.133** | **CR** | **6896** | **rev** | **1** | **Current version:** | **16.5.0** |  |
|  | | | | | | | | |
| *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:*** | RSS based RSRP measurement to CONNECTED mode for eMTC | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | LTE\_eMTC5-Core | | | | |  | ***Date:*** | | | 2020-05-25 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Support for RSS based RSRP measurement is introduced in release 16 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Change #1: conditions for intra-frequency RSS based RSRP measurement in CEMode A  Change #1: conditions for intra-frequency RSS based RSRP measurement in CEMode B | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Not clear under what conditions the RSS measurements can be perfromed | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 8.13.2.1, 8.13.3.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **x** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

------------------------------------------------------------- Start of change 1 ------------------------------------------------------------

#### 8.13.2.1 E-UTRAN intra frequency measurements by UE category M1 with CE mode A

The UE shall be able to identify new intra-frequency cells and perform RSRP and RSRQ measurements of identified intra-frequency cells without an explicit intra-frequency neighbour cell list containing physical layer cell identities. During the RRC\_CONNECTED state the UE shall continuously measure identified intra frequency cells and additionally search for and identify new intra frequency cells.

The UE is allowed to perform RSRP measurements based on RSS signals provided UE is configured with *rss-ConfigCarrierInfo* [2] and following conditions are met:

* If measurement gaps are configured, the measured subframes containing RSS are available before or after the measurement gaps and UE shall measure RSS outside the gaps,
* RSS frequency location of the cell being measured occurs in the NB(s) that UE monitors for MPDDCH for 3 successive samples in the window of [n-5, n-1] where n is the first subframe of DRX ON duration
* RSS-based measurement period (Tmeasure\_intra\_UE cat M1) is not longer than CRS-based measurement period.
* RSS power offset (PRSS)with respect to CRS as defined in *RSS-Config* [2], where PRSS ≥ 0 dB
* RSS periodicity (TRSS) as defined in *RSS-Config* [2].

If UE performs RSRP measurement based on RSS for serving or neighbour cell, it is not expected to perform RSRP measurement based on CRS on that cell.

##### 8.13.2.1.1 E-UTRAN FDD intra frequency measurements

8.13.2.1.1.1 E-UTRAN intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify and measure a new detectable FDD intra frequency cell according to requirements in Table 8.13.2.1.1.1-1 when SCH Ês/Iot >= -6 dB, provided

- G=1, or

- rmax\*G < 80ms, or

- UE is receiving PDSCH.

Otherwise, requirements in Table 8.13.2.1.1.1-3 apply, where rmax and G are given by higher layer parameter *mPDCCH-NumRepetition* and *mPDCCH-startSF-UESS* respectively as defined in TS 36.213 [3].

Table 8.13.2.1.1.1-1: Requirement on cell identification delay and measurement delay for FDD intrafrequency cell

|  |  |  |
| --- | --- | --- |
| Gap pattern ID | Cell identification delay (Tidentify\_intra\_UE cat M1) | Measurement delay (Tmeasure\_intra\_UE cat M1) |
| 0 | 1.44 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC seconds | 480 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC ms |
| 1 | 2.88 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC seconds | 960 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC ms |
| N/A | N/A | 3 x TRSS (Note 1) |
| Note 1: It is the measurement period for RSRP measured on RSS signals defined in *RSS-Config* [2]. | | |

Kintra\_M1\_NC = 100 / X where X is signalled by the RRC parameter *measGapSharingScheme* [2] and is defined as in Table 8.13.2.1.1.1-2 when *highSpeedMeasGapCE-ModeA* [2]is not configured, and in Table 8.13.2.1.1.1-2A when *highSpeedMeasGapCE-ModeA* [2] is configured.  is total number of inter-frequency layers to be monitored as defined in 8.1.2.1.1. When inter frequency measurement is not configured, Kintra\_M1\_NC=1 regardless whether or how parameter measGapSharingScheme [2] is configured.

Table 8.13.2.1.1.1-2: Value of parameter X for CEModeA

|  |  |
| --- | --- |
| *measGapSharingScheme* | Value of X (%) |
| ‘00’ |  |
| ‘01’ | 40 |
| ‘10’ | 50 |
| ‘11’ | 60 |

Table 8.13.2.1.1.1-2A: Value of parameter X for CEModeA for UE configured with *highSpeedMeasGapCE-ModeA*

|  |  |
| --- | --- |
| *measGapSharingScheme* | Value of X (%) |
| ‘00’ | [] |
| ‘01’ | [50] |
| ‘10’ | [80] |
| ‘11’ | [90] |

Table 8.13.2.1.1.1-3: Requirement on cell identification delay and measurement delay for FDD intrafrequency cell with MPDCCH scaling

|  |  |  |
| --- | --- | --- |
| Gap pattern ID | Cell identification delay (Tidentify\_intra\_UE cat M1) | Measurement delay (Tmeasure\_intra\_UE cat M1) |
| 0 | Max(20 \* rmax\*G / 1000, 1.44) \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC seconds | Max(5 \* rmax\*G, 480) \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC ms |
| 1 | Max(20 \* rmax\*G / 1000, 2.88) \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC seconds | Max(5 \* rmax\*G, 960) \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC ms |
| N/A | N/A | 3 x TRSS (Note 1) |
| Note 1: It is the measurement period for RSRP measured on RSS signals defined in *RSS-Config* [2]. | | |



KRSTD\_M1\_NC is applicable provided following conditions are met:

-  > 40 ms

-  > 

* PRS bandwidth is less than the bandwidth of the cell used for RSTD measurement in which case gaps are required

where

- is the cell-specific positioning subframe configuration period as defined in TS 36.211 [16],

- **** is the number of consecutive downlink positioning subframes in a positioning occation defined in TS 36.211

Otherwise KRSTD\_M1\_NC = 1.

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.21.1 and 9.1.21.2 are fulfilled for a corresponding Band,

- RSRQ related side conditions given in Clause 9.1.21.6 are fulfilled for a corresponding Band,

- SCH\_RP and SCH Ês/Iot according to Annex Table B.2.14-1 for a corresponding Band.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of Tmeasure\_intra\_UE cat M1. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is according to Table 8.13.2.1.1.1-1. When measurement gaps are activated the UE shall be capable of performing measurements for at least 6cells. If the UE has identified more than 6 cells, the UE shall perform measurements but the reporting rate of RSRP and RSRQ measurement of cells from UE physical layer to higher layers may be decreased.

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.1 and 9.1.21.2.

The RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.6.

8.13.2.1.1.1.1 Measurement Reporting Requirements

8.13.2.1.1.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.1, 9.1.21.2 and 9.1.21.6.

8.13.2.1.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.1, 9.1.21.2 and 9.1.21.6.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.2.1.1.1.1.3.

8.13.2.1.1.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurement contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.1, 9.1.21.2 and 9.1.21.6.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTIDCCH.This measurement reporting delay excludes a delay which caused by no UL resoureces for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T identify intra\_UE cat M1\_NC defined in Clause 8.13.2.1.1.1.When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period Tidentify\_intra\_UE cat M1\_NC defined in clause 8.13.2.1.1.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than TMeasurement\_Period\_UE cat M1, Intra provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.13.2.1.1.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within Tidentify\_intra\_UE cat M1\_NC as shown in table 8.13.2.1.1.2-1.

When eDRX\_CONN is in use the UE shall be able to identify a new detectable FDD intra frequency cell within Tidentify\_intra\_UE cat M1\_NC as shown in table 8.13.2.1.1.2-1A.

Table 8.13.2.1.1.2-1: Requirement to identify a newly detectable FDD intrafrequency cell

|  |  |  |
| --- | --- | --- |
| Gap pattern ID | DRX cycle length (s) | Tidentify\_intra\_UE cat M1\_NC (s) (DRX cycles) |
| 0 | ≤0.04 | 1.44 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC (Note 1) |
| 0.04<DRX-cycle≤0.08 | Note 2 (40 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| 0.128 | 3.2 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC (25 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| 0.128<DRX-cycle≤2.56 | Note 2(20 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| 1 | <0.128 | 2.88 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC (Note 1) |
| 0.128 | 3.2 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC (25 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| 0.128<DRX-cycle≤2.56 | Note 2(20 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| Note 1: Number of DRX cycle depends upon the DRX cycle in use  Note 2: Time depends upon the DRX cycle in use | | |

Table 8.13.2.1.1.2-1A: Requirement to identify a newly detectable FDD intrafrequency cell when eDRX\_CONN cycle is used

|  |  |
| --- | --- |
| eDRX\_CONN cycle length (s) | Tidentify\_intra\_UE cat M1\_NC (s) (eDRX\_CONN cycles) |
| 2.56<eDRX\_CONN cycle≤10.24 | Note (20 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| Note: Time depends upon the eDRX\_CONN cycle in use | |

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.21.1 and 9.1.21.2 are fulfilled for a corresponding Band,

- RSRQ related side conditions given in Clause 9.1.21.6 are fulfilled for a corresponding Band,

- SCH\_RP and SCH Ês/Iot according to Annex B.2.14-1 for a corresponding Band

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is Tmeasure\_intra\_UE cat M1. When DRX is used, Tmeasure\_intra\_UE cat M1\_NC is as specified in table 8.13.2.1.1.2-2. When eDRX\_CONN is used, Tmeasure\_intra\_UE cat M1\_NC is as specified in table 8.13.2.1.1.2-3. The UE shall be capable of performing RSRP and RSRQ measurements for 6 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of Tmeasure\_intra\_UE cat M1.

Table 8.13.2.1.1.2-2: Requirement to measure FDD intrafrequency cells

|  |  |  |
| --- | --- | --- |
| Gap pattern ID | DRX cycle length (s) | Tmeasure\_intra\_UE cat M1\_NC (s) (DRX cycles) |
| 0 | <0.128 | 0.48 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC (Note1) |
| 0.128≤DRX-cycle≤2.56 | Note 2 (5 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| 1 | <0.256 | 0.960 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC (Note 1) |
| 0.256≤DRX-cycle≤2.56 | Note 2 (\*Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| N/A | N/A | Max(DRX cycle length, TRSS ) x 3(Note 3) |
| Note 1: Number of DRX cycle depends upon the DRX cycle in use  Note 2: Time depends upon the DRX cycle in use  Note 3: It is the measurement period for RSRP measured on RSS signals defined in *RSS-Config* [2]. | | |

Table 8.13.2.1.1.2-3: Requirement to measure FDD intrafrequency cells when eDRX\_CONN cycle is used

|  |  |
| --- | --- |
| eDRX\_CONN cycle length (s) | Tmeasure\_intra\_UE cat M1\_NC (s) (eDRX\_CONN cycles) |
| 2.56<eDRX\_CONN cycle≤10.24 | Note (5 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| Note: Time depends upon the eDRX\_CONN cycle in use | |

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.1 and 9.1.21.2.

The RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.6.

The requriements in this subcluse apply regardless of MPDCCH monitoring configuration.

8.13.2.1.1.2.1 Measurement Reporting Requirements

8.13.2.1.1.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.1, 9.1.21.2 and 9.1.21.6.

8.13.2.1.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.1, 9.1.21.2 and 9.1.21.6.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.2.1.1.2.1.3.

8.13.2.1.1.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurement contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.1, 9.1.21.2 and 9.1.21.6.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTIDCCH.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T identify\_intra, UE cat M1 defined in Clause 8.13.2.1.1.2 When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period Tidentify\_intra\_UE cat M1\_NC  defined in clause 8.13.2.1.1.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than Tmeasure\_intra\_UE cat M1\_NC provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

##### 8.13.2.1.2 E-UTRAN intra frequency measurements for HD-FDD

8.13.2.1.2.1 E-UTRAN intra frequency measurements when no DRX is used

The requirements in this section are applicable for the UE which supports half duplex operation on one or more supported frequency bands [2].

The requirements defined in clause 8.13.2.1.1.1 also apply for this section provided the following conditions are met:

- at least downlink subframe # 0 or downlink subframe # 5 per radio frame of an intra-frequency cell to be identified by the UE is available at the UE over Tidentify\_intra\_UE cat M1;

- at least one downlink subframe per radio frame of measured cell is available at the UE for RSRP measurement assuming measured cell is identified cell over Tmeasure\_intra\_UE cat M1.

- RSRP related side conditions given in Sections 9.1.2.1 and 9.1.2.2 are fulfilled for a corresponding Band,

- RSRQ related side conditions given in Clause 9.1.21.6 are fulfilled for a corresponding Band,

- SCH\_RP and SCH Ês/Iot according to Annex Table B.2.14-2 for a corresponding Band

8.13.2.1.2.2 E-UTRAN intra frequency measurements when DRX is used

The requirements in this section are applicable for the UE which supports half duplex operation on one or more supported frequency bands [2].

When DRX is in use the UE shall be able to identify a new detectable HD-FDD intra frequency cell within Tidentify\_intra\_UE cat M1\_NC  as shown in table 8.13.2.1.2.2-1.

When eDRX\_CONN is in use, the UE shall be able to identify a new detectable FDD intra frequency cell within Tidentify\_intra\_UE cat M1\_NC as shown in table 8.13.2.1.2.2-1A.

Table 8.13.2.1.2.2-1: Requirement to identify a newly detectable HD-FDD intrafrequency cell

|  |  |  |
| --- | --- | --- |
| Gap pattern ID | DRX cycle length (s) | Tidentify\_intra\_UE cat M1\_NC (s) (DRX cycles) |
| 0 | ≤0.04 | 1.44 \* Kintra\_M1\_NC  \*  KRSTD\_M1\_NC (Note 1) |
| 0.04<DRX-cycle≤0.08 | Note 2 (40 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| 0.128 | 3.2 \* Kintra\_M1\_NC  \*  KRSTD\_M1\_NC (32 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| 0.128<DRX-cycle≤2.56 | Note 2 (25 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| 1 | ≤0.08 | 2.88 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC (Note 1) |
| 0.128 | 3.2 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC (32 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| 0.128<DRX-cycle≤2.56 | Note 2 (25 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| Note 1: Number of DRX cycle depends upon the DRX cycle in use  Note 2: Time depends upon the DRX cycle in use | | |

Table 8.13.2.1.2.2-1A: Requirement to identify a newly detectable HD-FDD intrafrequency cell when eDRX\_CONN cycle is used

|  |  |
| --- | --- |
| eDRX\_CONN cycle length (s) | Tidentify\_intra\_UE cat M1\_NC (s) (eDRX\_CONN cycles) |
| 2.56<eDRX\_CONN cycle≤10.24 | Note (25 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| Note: Time depends upon the eDRX\_CONN cycle in use | |

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.21.1 and 9.1.21.2 are fulfilled for a corresponding Band,

- RSRQ related side conditions given in Clause 9.1.21.6 are fulfilled for a corresponding Band,

- SCH\_RP and SCH Ês/Iot according to Annex Table B.2.14-2 for a corresponding Band

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is Tmeasure\_intra\_UE cat M1. When DRX is used, Tmeasure\_intra\_UE cat M1\_NC is as specified in table 8.13.2.1.2.2-2. When eDRX\_CONN is used, Tmeasure\_intra\_UE cat M1\_NC is as specified in table 8.13.2.1.2.2-3. The UE shall be capable of performing RSRP and RSRQ measurements for 6 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of Tmeasure\_intra\_UE cat M1.

Table 8.13.2.1.2.2-2: Requirement to measure HD-FDD intrafrequency cells

|  |  |  |
| --- | --- | --- |
| Gap pattern ID | DRX cycle length (s) | Tmeasure\_intra\_UE cat M1\_NC (s) (DRX cycles) |
| 0 | <0.08 | 0.48 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC (Note 1) |
| 0.08≤DRX-cycle≤0.16 | Note 2 (7 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| 0.16<DRX-cycle≤2.56 | Note 2 (5 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| 1 | <0.16 | 0.96 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC (Note 1) |
| DRX-cycle=0.16 | 1.12 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC (7 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| 0.16<DRX-cycle≤2.56 | Note 2 (5 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| N/A | N/A | Max(DRX cycle length, TRSS ) x 3 (Note 3) |
| Note 1: Number of DRX cycle depends upon the DRX cycle in use  Note 2: Time depends upon the DRX cycle in use  Note 3: It is the measurement period for RSRP measured on RSS signals defined in *RSS-Config* [2]. | | |

Table 8.13.2.1.2.2-3: Requirement to measure HD-FDD intrafrequency cells when eDRX\_CONN cycle is used

|  |  |
| --- | --- |
| eDRX\_CONN cycle length (s) | Tmeasure\_intra\_UE cat M1\_NC (s) (eDRX\_CONN cycles) |
| 2.56<eDRX\_CONN cycle≤10.24 | Note (5 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| Note: Time depends upon the eDRX\_CONN cycle in use | |

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.1 and 9.1.21.2.

The RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.6.

The requriements in this subcluse apply regardless of MPDCCH monitoring configuration.

8.13.2.1.2.2.1 Measurement Reporting Requirements

8.13.2.1.2.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.1, 9.1.21.2 and 9.1.21.6.

8.13.2.1.2.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.1, 9.1.21.2, and 9.1.21.6.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.2.1.2.2.1.3.

8.13.2.1.2.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurement contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.1, 9.1.21.2 and 9.1.21.6.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTIDCCH.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T identify\_intra\_UE cat M1\_NC defined in Clause 8.13.2.1.2.2When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period Tidentify\_intra\_UE cat M1\_NC defined in clause 8.13.2.1.2.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than Tmeasure\_intra\_UE cat M1\_NC provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

##### 8.13.2.1.3 E-UTRAN TDD intra frequency measurements

8.13.2.1.3.1 E-UTRAN intra frequency measurements when no DRX is used

When no DRX is in use, the UE shall be able to identify and measure a new detectable TDD intra frequency cell according to requirements in Table 8.13.2.1.3.1-1 when SCH Ês/Iot >= -6 dB, provided

- G=1, or

- rmax\*G < 80ms, or

- UE is receiving PDSCH.

Otherwise, requirements in Table 8.13.2.1.3.1-3 apply, where rmax and G are given by higher layer parameter *mPDCCH-NumRepetition* and *mPDCCH-startSF-UESS* respectively as defined in TS 36.213 [3].

Table 8.13.2.1.3.1-1: Requirement on cell identification delay and measurement delay for TDD intrafrequency cell

|  |  |  |
| --- | --- | --- |
| Gap pattern ID | Cell identification delay (Tidentify\_intra\_UE cat M1) | Measurement delay (Tmeasure\_intra\_UE cat M1) |
| 0 | 1.44 \* Kintra\_M1\_NC  \*  KRSTD\_M1\_NC seconds | 480 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC ms |
| 1 | 2.88 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC seconds | 960 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC ms |
| N/A | N/A | 3 x TRSS (Note 1) |
| Note 1: It is the measurement period for RSRP measured on RSS signals defined in *RSS-Config* [2]. | | |

Kintra\_M1\_NC = 100 / X where X is signalled by the RRC parameter *measGapSharingScheme* [2] and is defined as in Table 8.13.2.1.3.1-2 when *highSpeedMeasGapCE-ModeA* [2] is not configured, and in Table 8.13.2.1.3.1-2A when *highSpeedMeasGapCE-ModeA* [2] is configured.  is total number of inter-frequency layers to be monitored as defined in 8.1.2.1.1. When inter frequency measurement is not configured, Kintra\_M1\_NC=1 regardless whether or how parameter measGapSharingScheme [2] is configured.

Table 8.13.2.1.3.1-2: Value of parameter X for CEModeA

|  |  |
| --- | --- |
| *measGapSharingScheme* | Value of X (%) |
| ‘00’ |  |
| ‘01’ | 40 |
| ‘10’ | 50 |
| ‘11’ | 60 |

Table 8.13.2.1.3.1-2A: Value of parameter X for CEModeA for UE configured with *highSpeedMeasGapCE-ModeA*

|  |  |
| --- | --- |
| *measGapSharingScheme* | Value of X (%) |
| ‘00’ | [] |
| ‘01’ | [50] |
| ‘10’ | [80] |
| ‘11’ | [90] |

Table 8.13.2.1.3.1-3: Requirement on cell identification delay and measurement delay for TDD intrafrequency cell with MPDCCH scaling

|  |  |  |
| --- | --- | --- |
| Gap pattern ID | Cell identification delay (Tidentify\_intra\_UE cat M1) | Measurement delay (Tmeasure\_intra\_UE cat M1) |
| 0 | Max(20 \* rmax\*G / 1000, 1.44) \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC seconds | Max(5 \* rmax\*G, 480) \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC ms |
| 1 | Max(20 \* rmax\*G / 1000, 2.88) \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC seconds | Max(5 \* rmax\*G, 960) \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC ms |
| N/A | N/A | 3 x TRSS (Note 1) |
| Note 1: It is the measurement period for RSRP measured on RSS signals defined in *RSS-Config* [2]. | | |



KRSTD\_M1\_NC is applicable provided following conditions are met:

-  > 40 ms

-  > 

* PRS bandwidth is less than the bandwidth of the cell used for RSTD measurement in which case gaps are required

where

- is the cell-specific positioning subframe configuration period as defined in TS 36.211 [16],

- **** is the number of consecutive downlink positioning subframes in a positioning occation defined in TS 36.211

Otherwise KRSTD\_M1\_NC = 1.

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.21.1 and 9.1.21.2 are fulfilled for a corresponding Band,

- RSRQ related side conditions given in Clause 9.1.21.6 are fulfilled for a corresponding Band,

- SCH\_RP and SCH Ês/Iot according to Annex Table B.2.14-1 for a corresponding Band.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of Tmeasure\_intra\_UE cat M1. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is according to Table 8.13.2.1.3.1-1. When measurement gaps are activated the UE shall be capable of performing measurements for at least 6cells. If the UE has identified more than 6 cells, the UE shall perform measurements but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.1 and 9.1.21.2.

The RSRQmeasurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.6.

8.13.2.1.3.1.1 Measurement Reporting Requirements

8.13.2.1.3.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.1, 9.1.21.2 and 9.1.21.6.

8.13.2.1.3.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.1, 9.1.21.2 and 9.1.21.6.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.2.1.3.1.1.3.

8.13.2.1.3.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurement contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.1, 9.1.21.2 and 9.1.21.6.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTIDCCH.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T identify intra\_UE cat M1\_NC defined in Clause 8.13.2.1.3.1.When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period Tidentify\_intra\_UE cat M1\_NC defined in clause 8.13.2.1.3.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than TMeasurement\_Period Intra\_UE cat M1\_NC provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.13.2.1.3.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within Tidentify\_intra\_ UE catM1 as shown in table 8.13.2.1.3.2-1.

When eDRX\_CONN is in use the UE shall be able to identify a new detectable TDD intra frequency cell within Tidentify\_intra\_UE cat M1\_NC as shown in table 8.13.2.1.3.2-1A.

Table 8.13.2.1.3.2-1: Requirement to identify a newly detectable TDD intrafrequency cell

|  |  |  |
| --- | --- | --- |
| Gap pattern ID | DRX cycle length (s) | Tidentify\_intra\_UE cat M1\_NC (s) (DRX cycles) |
| 0 | ≤0.04 | 1.44 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC (Note 1) |
| 0.04<DRX-cycle≤0.08 | Note 2 (40 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| 0.128 | 3.2 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC (25 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| 0.128<DRX-cycle≤2.56 | Note 2 (20 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| 1 | <0.128 | 2.88 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC (Note 1) |
| 0.128 | 3.2 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC (25 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| 0.128<DRX-cycle≤2.56 | Note 2 (20 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| Note 1: Number of DRX cycle depends upon the DRX cycle in use  Note 2: Time depends upon the DRX cycle in use | | |

Table 8.13.2.1.3.2-1A: Requirement to identify a newly detectable TDD intrafrequency cell when eDRX\_CONN cycle is used

|  |  |
| --- | --- |
| eDRX\_CONN cycle length (s) | Tidentify\_intra\_UE cat M1\_NC (s) (eDRX\_CONN cycles) |
| 2.56<eDRX\_CONN cycle≤10.24 | Note (20 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| Note: Time depends upon the eDRX\_CONN cycle in use | |

A cell shall be considered detectable when

- RSRP related side conditions given in Clause 9.1.21.1 and 9.1.21.2 are fulfilled for a corresponding Band,

- RSRQ related side conditions given in Clause 9.1.21.6 are fulfilled for a corresponding Band,

- SCH\_RP and SCH Ês/Iot according to Annex Table B.2.14-1 for a corresponding Band

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is Tmeasure\_intra\_UE cat M1. When DRX is used, Tmeasure\_intra\_UE cat M1\_NC is as specified in table 8.13.2.1.3.2-2. When eDRX\_CONN is used, Tmeasure\_intra\_UE cat M1\_NC is as specified in table 8.13.2.1.3.2-3. The UE shall be capable of performing RSRP and RSRQ measurements for 6 identified intra-frequency cells and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of Tmeasure\_intra\_UE cat M1.

Table 8.13.2.1.3.2-2: Requirement to measure TDD intra frequency cells

|  |  |  |
| --- | --- | --- |
| Gap pattern ID | DRX cycle length (s) | Tmeasure\_intra\_UE cat M1\_NC (s) (DRX cycles) |
| 0 | <0.128 | 0.48 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC (Note 1) |
| 0.128≤DRX-cycle≤2.56 | Note 2 (5 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| 1 | <0.256 | 0.96 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC (Note 1) |
| 0.256≤DRX-cycle≤2.56 | Note 2 (5 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| N/A | N/A | Max(DRX cycle length, TRSS ) x 3 (Note 3) |
| Note 1: Number of DRX cycle depends upon the DRX cycle in use  Note 2: Time depends upon the DRX cycle in use  Note 3: It is the measurement period for RSRP measured on RSS signals defined in *RSS-Config* [2]. | | |

Table 8.13.2.1.3.2-3: Requirement to measure TDD intra frequency cells when eDRX\_CONN cycle is used

|  |  |
| --- | --- |
| eDRX\_CONN cycle length (s) | Tmeasure\_intra\_UE cat M1\_NC (s) (eDRX\_CONN cycles) |
| 2.56<eDRX\_CONN cycle≤10.24 | Note (5 \* Kintra\_M1\_NC \*  KRSTD\_M1\_NC) |
| Note: Time depends upon the eDRX\_CONN cycle in use. | |

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.1 and 9.1.21.2.

The RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.6.

The requriements in this subcluse apply regardless of MPDCCH monitoring configuration.

8.13.2.1.3.2.1 Measurement Reporting Requirements

8.13.2.1.3.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.1, 9.1.21.2 and 9.1.21.6.

8.13.2.1.3.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.1, 9.1.21.2 and 9.1.21.6.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.2.1.3.2.1.3.

8.13.2.1.3.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurement contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.1, 9.1.21.2 and 9.1.21.6.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTIDCCH.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T identify\_intra\_UE cat M1\_NC defined in Clause 8.13.2.1.3.2.When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period Tidentify\_intra\_UE cat M1\_NC defined in clause 8.13.2.1.3.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than Tmeasure\_intra\_UE cat M1\_NC provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

------------------------------------------------------------- End of change 1 ------------------------------------------------------------

------------------------------------------------------------- Start of change 2 ------------------------------------------------------------

#### 8.13.3.1 E-UTRAN intra frequency measurements by UE category M1 with CE mode B

The UE shall be able to identify new intra-frequency cells and perform RSRP and RSRQ measurements of identified intra-frequency cells without an explicit intra-frequency neighbour cell list containing physical layer cell identities. During the RRC\_CONNECTED state the UE shall continuously measure identified intra frequency cells and additionally search for and identify new intra frequency cells.

The UE is allowed to perform RSRP measurements based on RSS signals provided UE is configured with *rss-ConfigCarrierInfo* [2] and following conditions are met:

* If measurement gaps are configured, the measured subframes containing RSS are available before or after the measurement gaps and UE shall measure RSS outside the gaps.
* RSS frequency location of the cell being measured occurs in the NB(s) that UE monitors for MPDDCH for 5 successive samples in the window of [n-5, n-1] where n is the first subframe of DRX ON duration
* RSS-based measurement period (Tmeasure\_intra\_UE cat M1) is not longer than CRS-based measurement period.
* RSS power offset (PRSS)with respect to CRS as defined in *RSS-Config* [2], where PRSS ≥ 0 dB
* RSS periodicity (TRSS) as defined in *RSS-Config* [2]

If UE performs RSRP measurement based on RSS for serving or neighbour cell, it is not expected to perform RSRP measurement based on CRS on that cell.

##### 8.13.3.1.1 E-UTRAN FDD intra frequency measurements

8.13.3.1.1.1 E-UTRAN intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify and measure a new detectable FDD intra frequency cell according to requirements in Table 8.13.3.1.1.1-1 provided that additional conditions table 8.13.3.1.1.1-1 is met, and

- G=1, or

- rmax\*G < 800ms, or

- UE is receiving PDSCH.

Otherwise, requirements in Table 8.13.3.1.1.1-4 apply, where rmax and G are given by higher layer parameter *mPDCCH-NumRepetition* and *mPDCCH-startSF-UESS* respectively as defined in TS 36.213 [3].

Table 8.13.3.1.1.1-1: Requirement on cell identification delay and measurement delay for FDD intrafrequency cell

|  |  |  |  |
| --- | --- | --- | --- |
| Neighouring cell SCH Ês/Iot: Q2 [dB] | Gap pattern ID | Cell identification delay (Tidentify\_intra\_UE cat M1) | Measurement delay (Tmeasure\_intra\_UE cat M1) |
| -15≤ Q2 < -6 | 0 | 320.8 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC s | 800 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms |
| 1 | 321.6 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC s | 1600 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms |
| Q2≥-6 | 0 | 21.8\* Kintra\_M1\_EC \*  KRSTD\_M1\_EC s | 800 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms |
| 1 | 22.6\* Kintra\_M1\_EC\*  KRSTD\_M1\_EC s | 1600 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms |
| N/A | N/A | N/A | 5 x TRSS (Note 1) |
| Note 1: It is the measurement period for RSRP measured on RSS signals defined in *RSS-Config* [2]. | | | |

Table 8.13.3.1.1.1-2: Void

Kintra\_M1\_EC = 100 / X where X is signalled by the RRC parameter *measGapSharingScheme* [2] and is defined as in Table 8.13.3.1.1.1-3.  is total number of inter-frequency layers to be monitored as defined in 8.1.2.1.1. When inter frequency measurement is not configured, Kintra\_M1\_EC=1 regardless whether or how parameter measGapSharingScheme [2] is configured.

Table 8.13.3.1.1.1-3: Value of parameter X for CEModeB

|  |  |
| --- | --- |
| *measGapSharingScheme* | Value of X (%) |
| ‘00’ |  |
| ‘01’ | 50 |
| ‘10’ | 75 |
| ‘11’ | 87.5 |

Table 8.13.3.1.1.1-4: Requirement on cell identification delay and measurement delay for FDD intrafrequency cell

|  |  |  |  |
| --- | --- | --- | --- |
| Neighouring cell SCH Ês/Iot: Q2 [dB] | Gap pattern ID | Cell identification delay (Tidentify\_intra\_UE cat M1) | Measurement delay (Tmeasure\_intra\_UE cat M1) |
| -15≤ Q2 < -6 | 0 | Max(400 \* rmax\* G / 1000, 320.8) \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC s | Max(5 \* rmax\* G, 800) \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms |
| 1 | Max(400 \* rmax\* G / 1000, 321.6) \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC s | Max(5 \* rmax\* G, 1600) \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms |
| Q2≥-6 | 0 | Max(20 \* rmax\* G / 1000, 21.8)\* Kintra\_M1\_EC \*  KRSTD\_M1\_EC s | Max(5 \* rmax\* G, 800) \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms |
| 1 | Max(20 \* rmax\* G / 1000, 22.6)\* Kintra\_M1\_EC \*  KRSTD\_M1\_EC s | Max(5 \* rmax\* G, 1600) \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms |
| N/A | N/A | N/A | 5 x TRSS (Note 1) |
| Note 1: It is the measurement period for RSRP measured on RSS signals defined in *RSS-Config* [2]. | | | |



KRSTD\_M1\_NC is applicable provided following conditions are met:

-  > 40 ms

-  > 

* PRS bandwidth is less than the bandwidth of the cell used for RSTD measurement in which case gaps are required

where

- is the cell-specific positioning subframe configuration period as defined in TS 36.211 [16],

- **** is the number of consecutive downlink positioning subframes in a positioning occation defined in TS 36.211

Otherwise KRSTD\_M1\_EC = 1.

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.21.3 and 9.1.21.4 are fulfilled for a corresponding Band,

- RSRQ related side conditions given in Clause 9.1.21.7 are fulfilled for a corresponding Band,

- SCH\_RP and SCH Ês/Iot according to Annex Table B.2.14-3 for a corresponding Band.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of Tmeasure\_intra\_UE cat M1\_EC. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is according to Table 8.13.3.1.1.1-1. When measurement gaps are activated the UE shall be capable of performing measurements for at least 6cells. If the UE has identified more than 6 cells, the UE shall perform measurements but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.3, 9.1.21.4 and 9.1.21.7.

The RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.7.

8.13.3.1.1.1.1 Measurement Reporting Requirements

8.13.3.1.1.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.3, 9.1.21.4 and 9.1.21.7.

8.13.3.1.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.3,9.1.21.4 and 9.1.21.7.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.3.1.1.1.1.3.

8.13.3.1.1.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurement contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.3, 9.1.21.4 and 9.1.21.7.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: *pusch-maxNumRepetitionCEmodeB* x TTIDCCH, where *pusch-maxNumRepetitionCEmodeB* [2] is the maximum number of PUSCH repetitions configured for the UE in CE Mode B provided that *pusch-maxNumRepetitionCEmodeB >1*, othwerwise uncertainty is defined as 2 x TTIDCCH. This measurement reporting delay excludes a delay which caused by no UL resoureces for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T identify intra\_UE cat M1\_EC defined in Clause 8.13.3.1.1.1.When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period Tidentify\_intra\_UE cat M1\_EC defined in clause 8.13.3.1.1.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than TMeasurement\_Period\_UE cat M1\_EC, Intra provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.13.3.1.1.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within Tidentify\_intra\_UE cat M1\_EC as shown in table 8.13.3.1.1.2-1 provided that additional conditions Table 8.13.3.1.1.2-1 is met.

When eDRX\_CONN is in use the UE shall be able to identify a new detectable FDD intra frequency cell within Tidentify\_intra\_UE cat M1\_EC as shown in table 8.13.3.1.1.2-1B.

Table 8.13.3.1.1.2-1: Requirement to identify a newly detectable FDD intrafrequency cell

|  |  |  |  |
| --- | --- | --- | --- |
| Neighbouring cell SCH Ês/Iot: Q2 [dB] | Gap pattern ID | DRX cycle length (s) | Tidentify\_intra\_UE cat M1 (s) (DRX cycles) |
| -15≤ Q2 < -6 | 0 | ≤0.64 | 320.8 \* Kintra\_M1\_EC\*  KRSTD\_M1\_EC (Note1) |
| 0.64< DRX-cycle≤2.56 | Note2 (400 \* Kintra\_M1\_EC\*  KRSTD\_M1\_EC) |
| 1 | DRX-cycle ≤ 0.640 | 321.6 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC (Note1) |
| 0.64< DRX-cycle≤2.56 | Note2(400 \* Kintra\_M1\_EC\*  KRSTD\_M1\_EC) |
| Q2≥-6 | 0 | ≤0.64 | 21.8 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC (Note1) |
| 0.64< DRX-cycle≤2.56 | Note2(24 \* Kintra\_M1\_EC\*  KRSTD\_M1\_EC) |
| 1 | DRX-cycle ≤ 0.640 | 22.6 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC (Note1) |
| 0.64< DRX-cycle≤2.56 | Note2(24 \* Kintra\_M1\_EC\*  KRSTD\_M1\_EC) |
| Note1: Number of DRX cycle depends upon the DRX cycle in use  Note2: Time depends upon the DRX cycle in use | | | |

Table 8.13.3.1.1.2-1A: Void

Table 8.13.3.1.1.2-1B: Requirement to identify a newly detectable FDD intrafrequency cell when eDRX\_CONN is used

|  |  |
| --- | --- |
| eDRX\_CONN cycle length (s) | Tidentify\_intra\_UE cat M1\_EC (s) (eDRX\_CONN cycles) |
| 2.56<eDRX\_CONN cycle≤10.24 | Note (400 \* Kintra\_M1\_EC\*  KRSTD\_M1\_EC) |
| NOTE: Time depends upon the eDRX\_CONN cycle in use | |

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.21.3 and 9.1.21.4 are fulfilled for a corresponding Band,

- RSRQ related side conditions given in Clause 9.1.21.7 are fulfilled for a corresponding Band,

- SCH\_RP and SCH Ês/Iot according to Annex Table B.2.14-3 for a corresponding Band

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is Tmeasure\_intra\_UE cat M1\_EC. When DRX is used, Tmeasure\_intra\_UE cat M1\_EC is as specified in table 8.13.3.1.1.2-2 provided that additional conditions table 8.13.3.1.1.2-2 is met. When eDRX\_CONN is used, Tmeasure\_intra\_UE cat M1\_EC is as specified in table 8.13.3.1.1.2-4. The UE shall be capable of performing RSRP and RSRQ measurements for 6 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of Tmeasure\_intra\_UE cat M1\_EC.

Table 8.13.3.1.1.2-2: Requirement to measure FDD intrafrequency cells

|  |  |  |  |
| --- | --- | --- | --- |
| Target cell SCH Ês/Iot: Q2 [dB] | Gap pattern ID | DRX cycle length (s) | Tmeasure\_intra\_UE cat M1 (s) (DRX cycles) |
| Q2≥-15 | 0 | ≤0.16 | 0.8 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC (Note1) |
| 0.16<DRX-cycle≤2.56 | Note2(5 \* Kintra\_M1\_EC\*  KRSTD\_M1\_EC) |
| 1 | ≤0.32 | 1.6 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC (Note1) |
| 0.32<DRX-cycle≤2.56 | Note2(5 \* Kintra\_M1\_EC\*  KRSTD\_M1\_EC) |
| N/A | N/A | N/A | Max(DRX cycle length, TRSS ) x 5 (Note 3) |
| Note1: Number of DRX cycle depends upon the DRX cycle in use  Note2: Time depends upon the DRX cycle in use | | | |

Table 8.13.3.1.1.2-3: Void

Table 8.13.3.1.1.2-4: Requirement to measure FDD intrafrequency cells when eDRX\_CONN cycle is used

|  |  |
| --- | --- |
| eDRX\_CONN cycle length (s) | Tmeasure\_intra\_UE cat M1\_EC (s) (eDRX\_CONN cycles) |
| 2.56<eDRX\_CONN cycle≤10.24 | Note (5 \* Kintra\_M1\_EC\*  KRSTD\_M1\_EC) |
| NOTE: Time depends upon the eDRX\_CONN cycle in use | |

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.3 and 9.1.21.4.

The RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.7.

The requriements in this subcluse apply regardless of MPDCCH monitoring configuration.

8.13.3.1.1.2.1 Measurement Reporting Requirements

8.13.3.1.1.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.3, 9.1.21.4 and 9.1.21.7.

8.13.3.1.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.3, 9.1.21.4 and 9.1.21.7.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.3.1.1.2.1.3.

8.13.3.1.1.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurement contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.3, 9.1.21.4 and 9.1.21.7.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: *pusch-maxNumRepetitionCEmodeB* x TTIDCCH, where *pusch-maxNumRepetitionCEmodeB* [2] is the maximum number of PUSCH repetitions configured for the UE in CE Mode B provided that *pusch-maxNumRepetitionCEmodeB >1*, othwerwise uncertainty is defined as 2 x TTIDCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T identify\_intra, UE cat M1\_EC defined in Clause 8.13.3.1.1.2 When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period Tidentify\_intra\_UE cat M1\_EC defined in clause 8.13.3.1.1.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than Tmeasure\_intra\_UE cat M1\_EC provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

##### 8.13.3.1.2 E-UTRAN intra frequency measurements for HD-FDD

8.13.3.1.2.1 E-UTRAN intra frequency measurements when no DRX is used

The requirements in this section are applicable for the UE which supports half duplex operation on one or more supported frequency bands [2].

The requirements defined in clause 8.13.3.1.1.1 also apply for this section provided the following conditions are met:

- at least downlink subframe # 0 and downlink subframe # 5 per radio frame of an intra-frequency cell to be identified by the UE is available at the UE over Tidentify\_intra\_UE cat M1\_EC;

- at least two consecutive downlink subframe per radio frame of measured cell is available at the UE for RSRP measurements assuming measured cell is identified cell over Tmeasure\_intra\_UE cat M1\_EC.

- RSRP related side conditions given in Sections 9.1.21.3 and 9.1.21.4 are fulfilled for a corresponding Band,

- RSRQ related side conditions given in Clause 9.1.21.7 are fulfilled for a corresponding Band,

- SCH\_RP and SCH Ês/Iot according to Annex Table B.2.14-4

8.13.3.1.2.2 E-UTRAN intra frequency measurements when DRX is used

The requirements in this section are applicable for the UE which supports half duplex operation on one or more supported frequency bands [2].

When DRX is in use the UE shall be able to identify a new detectable HD-FDD intra frequency cell within Tidentify\_intra\_UE cat M1\_EC as shown in table 8.13.3.1.2.2-1 provided that additional conditions table 8.13.3.1.2.2-1 is met.

When eDRX\_CONN is in use, the UE shall be able to identify a new detectable FDD intra frequency cell within Tidentify\_intra\_UE cat M1\_EC as shown in table 8.13.3.1.2.2-1B.

Table 8.13.3.1.2.2-1: Requirement to identify a newly detectable HD-FDD intrafrequency cell

|  |  |  |  |
| --- | --- | --- | --- |
| Neighbouring cell SCH Ês/Iot: Q2 [dB] | Gap pattern ID | DRX cycle length (s) | Tidentify\_intra\_UE cat M1 (s) (DRX cycles) |
| -15≤ Q2 < -6 | 0 | ≤0.64 | 320.8 \* Kintra\_M1 \*  KRSTD\_M1\_EC (Note1) |
| 0.64< DRX-cycle≤2.56 | Note2 (400 \* Kintra\_M1 \*  KRSTD\_M1\_EC) |
| 1 | DRX-cycle ≤ 0.640 | 321.6 \* Kintra\_M1 \*  KRSTD\_M1\_EC (Note1) |
| 0.64< DRX-cycle≤2.56 | Note2(400 \* Kintra\_M1 \*  KRSTD\_M1\_EC) |
| Q2≥-6 | 0 | ≤0.64 | 21.8 \* Kintra\_M1 \*  KRSTD\_M1\_EC (Note1) |
| 0.64< DRX-cycle≤2.56 | Note2 (24 \* Kintra\_M1 \*  KRSTD\_M1\_EC) |
| 1 | DRX-cycle ≤ 0.640 | 22.6 \* Kintra\_M1 \*  KRSTD\_M1\_EC (Note1) |
| 0.64< DRX-cycle≤2.56 | Note2(24 \* Kintra\_M1 \*  KRSTD\_M1\_EC) |
| Note1: Number of DRX cycle depends upon the DRX cycle in use  Note2: Time depends upon the DRX cycle in use | | | |

Table 8.13.3.1.2.2-1A: Void

Table 8.13.3.1.2.2-1B: Requirement to identify a newly detectable HD-FDD intrafrequency cell when eDRX\_CONN cycle is used

|  |  |
| --- | --- |
| eDRX\_CONN cycle length (s) | Tidentify\_intra\_UE cat M1\_EC (s) (eDRX\_CONN cycles) |
| 2.56<eDRX\_CONN cycle≤10.24 | Note (400 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC) |
| NOTE: Time depends upon the eDRX\_CONN cycle in use | |

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.21.3 and 9.1.21.4 are fulfilled for a corresponding Band,

- RSRQ related side conditions given in Clause 9.1.21.7 are fulfilled for a corresponding Band,

- SCH\_RP and SCH Ês/Iot according to Annex Table B.2.14-4 for a corresponding Band

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is Tmeasure\_intra\_UE cat M1\_EC. When DRX is used, Tmeasure\_intra\_UE cat M1\_EC is as specified in table 8.13.3.1.2.2-2 provided that additional conditions Table 8.13.3.1.2.2-2 is met. When eDRX\_CONN cycle is used, Tmeasure\_intra\_UE cat M1\_EC is as specified in table 8.13.3.1.2.2-4. The UE shall be capable of performing RSRP and RSRQ measurements for 6 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of Tmeasure\_intra\_UE cat M1\_EC.

Table 8.13.3.1.2.2-2: Requirement to measure HD-FDD intrafrequency cells

|  |  |  |  |
| --- | --- | --- | --- |
| Neighbouring cell SCH Ês/Iot: Q2 [dB] | Gap pattern ID | DRX cycle length (s) | Tmeasure\_intra\_UE cat M1 (s) (DRX cycles) |
| Q2≥-15 | 0 | <0.128 | 0.8 \* Kintra \_EC \*  KRSTD\_M1\_EC (Note1) |
| 0.128≤DRX-cycle≤0.16 | Note2 (7 \* Kintra\_EC \*  KRSTD\_M1\_EC) |
| 0.16<DRX-cycle≤2.56 | Note2(5 \* Kintra\_EC \*  KRSTD\_M1\_EC) |
| 1 | ≤0.32 | 1.6 \* Kintra\_EC \*  KRSTD\_M1\_EC (Note1) |
| 0.32<DRX-cycle≤2.56 | Note2(5 \* Kintra\_EC \*  KRSTD\_M1\_EC) |
| N/A | N/A | N/A | Max (DRX cycle length, TRSS ) x 5 (Note 3) |
| Note1: Number of DRX cycle depends upon the DRX cycle in use  Note2: Time depends upon the DRX cycle in use  Note 3: It is the measurement period for RSRP measured on RSS signals defined in *RSS-Config* [2]. | | | |

Table 8.13.3.1.2.2-3: Void

Table 8.13.3.1.2.2-4: Requirement to measure HD-FDD intrafrequency cells when eDRX\_CONN cycle is used

|  |  |
| --- | --- |
| eDRX\_CONN cycle length (s) | Tmeasure\_intra\_UE cat M1\_EC (s) (eDRX\_CONN cycles) |
| 2.56<eDRX\_CONN cycle≤10.24 | NOTE (5 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC) |
| NOTE: Time depends upon the eDRX\_CONN cycle in use | |

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.3 and 9.1.21.4.

The RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.7.

The requriements in this subcluse apply regardless of MPDCCH monitoring configuration.

8.13.3.1.2.2.1 Measurement Reporting Requirements

8.13.3.1.2.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.3, 9.1.21.4 and 9.1.21.7.

8.13.3.1.2.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.3, 9.1.21.4 and 9.1.21.7.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.3.1.2.2.1.3.

8.13.3.1.2.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.3, 9.1.21.4 and 9.1.21.7.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: *pusch-maxNumRepetitionCEmodeB* x TTIDCCH, where *pusch-maxNumRepetitionCEmodeB* [2] is the maximum number of PUSCH repetitions configured for the UE in CE Mode B provided that *pusch-maxNumRepetitionCEmodeB >1*, othwerwise uncertainty is defined as 2 x TTIDCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T identify\_intra\_UE cat M1\_EC defined in Clause 8.13.3.1.2.2When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period Tidentify\_intra\_UE cat M1\_EC defined in clause 8.13.3.1.2.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than Tmeasure\_intra\_UE cat M1\_EC provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

##### 8.13.3.1.3 E-UTRAN TDD intra frequency measurements

8.13.3.1.3.1 E-UTRAN intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify and measure a new detectable TDD intra frequency cell according to requirements in Table 8.13.3.1.3.1-1provided that additional conditions Table 8.13.3.1.3.1-2 is met, and

- G=1, or

- rmax\*G < 800ms, or

- UE is receiving PDSCH.

Otherwise, requirements in Table 8.13.3.1.3.1-4 apply, where rmax and G are given by higher layer parameter *mPDCCH-NumRepetition* and *mPDCCH-startSF-UESS* respectively as defined in TS 36.213 [3].

Table 8.13.3.1.3.1-1: Requirement on cell identification delay and measurement delay for TDD intrafrequency cell

|  |  |  |  |
| --- | --- | --- | --- |
| Neighouring cell SCH Ês/Iot: Q2 [dB] | Gap pattern ID | Cell identification delay (Tidentify\_intra\_UE cat M1) for neighbouring cell SCH Ês/Iot (Q): -15≤ Q2 < -6 | Measurement delay (Tmeasure\_intra\_UE cat M1) |
| -15≤ Q2 < -6 | 0 | 320.8 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC s | 800 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC Note1  [1600 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC] Note2 |
| 1 | 321.6 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC s | 1600 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms Note1  [3200 \* Kintra\_M1\_EC ms] Note2 |
| Q2≥-6 | 0 | 21.8 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC S | 800 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms Note1  [1600 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms] Note2 |
| 1 | 22.6 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC S | 1600 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms Note1  [3200 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms] Note2 |
| N/A | N/A | N/A | 5 x TRSS (Note 3) |
| Note1: Under TDD UL/DL configuration other than 0.  Note2: Under TDD UL/DL configuration 0.  Note3: It is the measurement period for RSRP measured on RSS signals defined in *RSS-Config* [2]. | | | |

Kintra\_M1\_EC = 100 / X where X is signalled by the RRC parameter *measGapSharingScheme* [2] and is defined as in Table 8.13.3.1.3.1-3.  is total number of inter-frequency layers to be monitored as defined in 8.1.2.1.1. When inter frequency measurement is not configured, Kintra\_M1\_EC=1 regardless whether or how parameter measGapSharingScheme [2] is configured.

Table 8.13.3.1.3.1-2: Void

Table 8.13.3.1.3.1-3: Value of parameter X for CEModeB

|  |  |
| --- | --- |
| *measGapSharingScheme* | Value of X (%) |
| ‘00’ |  |
| ‘01’ | 50 |
| ‘10’ | 75 |
| ‘11’ | 87.5 |

Table 8.13.3.1.3.1-4: Requirement on cell identification delay and measurement delay for TDD intrafrequency cell

|  |  |  |  |
| --- | --- | --- | --- |
| Neighouring cell SCH Ês/Iot: Q2 [dB] | Gap pattern ID | Cell identification delay (Tidentify\_intra\_UE cat M1) | Measurement delay (Tmeasure\_intra\_UE cat M1) |
| -15≤ Q2 < -6 | 0 | Max(400 \* rmax\* G / 1000, 320.8) \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC s | Max(5 \* rmax\* G, 800) \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms Note1  [Max(5 \* rmax\* G, 1600) \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms] Note2 |
| 1 | Max(400 \* rmax\* G / 1000, 321.6) \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC s | Max(5 \* rmax\* G, 1600) \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms Note1  [Max(5 \* rmax\* G, 3200) \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms] Note2 |
| Q2≥-6 | 0 | Max(20 \* rmax\* G / 1000, 21.8)\* Kintra\_M1\_EC \*  KRSTD\_M1\_EC s | Max(5 \* rmax\* G, 800) \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms Note1  [Max(5 \* rmax\* G, 1600) \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms] Note2 |
| 1 | Max(20 \* rmax\* G / 1000, 22.6)\* Kintra\_M1\_EC \*  KRSTD\_M1\_EC s | Max(5 \* rmax\* G, 1600) \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms Note1  [Max(5 \* rmax\* G, 3200) \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC ms] Note2 |
| N/A | N/A | N/A | 5 x TRSS (Note 3) |
| Note1: Under TDD UL/DL configuration other than 0.  Note2: Under TDD UL/DL configuration 0.  Note3: It is the measurement period for RSRP measured on RSS signals defined in *RSS-Config* [2]. | | | |



KRSTD\_M1\_NC is applicable provided following conditions are met:

-  > 40 ms

-  > 

* PRS bandwidth is less than the bandwidth of the cell used for RSTD measurement in which case gaps are required

where

- is the cell-specific positioning subframe configuration period as defined in TS 36.211 [16],

- **** is the number of consecutive downlink positioning subframes in a positioning occation defined in TS 36.211

Otherwise KRSTD\_M1\_EC = 1.

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.21.3 and 9.1.21.4 are fulfilled for a corresponding Band,

- RSRQ related side conditions given in Clause 9.1.21.7 are fulfilled for a corresponding Band,

- SCH\_RP and SCH Ês/Iot according to Annex Table B.2.14-3 for a corresponding Band.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of **Tmeasure\_intra\_UE cat M1\_EC**. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is according to Table 8.13.3.1.3.1-1. When measurement gaps are activated the UE shall be capable of performing measurements for at least 6cells. If the UE has identified more than 6 cells, the UE shall perform measurements but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.3 and 9.1.21.4.

The RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.7.

8.13.3.1.3.1.1 Measurement Reporting Requirements

8.13.3.1.3.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.3, 9.1.21.4 and 9.1.21.7.

8.13.3.1.3.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.3, 9.1.21.4 and 9.1.21.7.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.3.1.3.1.1.3.

8.13.3.1.3.1.1.3 Event Triggered Reporting

Reported RSRP measurement contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.3, 9.1.21.4 and 9.1.21.7.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: *pusch-maxNumRepetitionCEmodeB* x TTIDCCH, where *pusch-maxNumRepetitionCEmodeB* [2] is the maximum number of PUSCH repetitions configured for the UE in CE Mode B provided that *pusch-maxNumRepetitionCEmodeB >1*, othwerwise uncertainty is defined as 2 x TTIDCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T identify intra\_UE cat M1\_EC defined in Clause 8.13.3.1.3.1.When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period Tidentify\_intra\_UE cat M1\_EC defined in clause 8.13.3.1.3.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than TMeasurement\_Period Intra\_UE cat M1\_EC provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.13.3.1.3.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within Tidentify\_intra\_ UE cat M1\_EC as shown in table 8.13.3.1.3.2-1 provided that additional conditions table 8.13.3.1.3.2-1 is met.

When eDRX\_CONN is in use the UE shall be able to identify a new detectable TDD intra frequency cell within Tidentify\_intra\_UE cat M1\_EC as shown in table 8.13.3.1.3.2-1B.

Table 8.13.3.1.3.2-1: Requirement to identify a newly detectable TDD intrafrequency cell

|  |  |  |  |
| --- | --- | --- | --- |
| Neighbouring cell SCH Ês/Iot: Q2 [dB] | Gap pattern ID | DRX cycle length (s) | Tidentify\_intra\_UE cat M1 (s) (DRX cycles) |
| -15≤ Q2 < -6 | 0 | ≤0.64 | 320.8 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC (Note1) |
| 0.64< DRX-cycle≤2.56 | Note2 (400 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC) |
| 1 | DRX-cycle ≤ 0.640 | 321.6 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC (Note1) |
| 0.64< DRX-cycle≤2.56 | Note2(400 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC) |
| Q2≥-6 | 0 | ≤0.64 | 21.8 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC (Note1) |
| 0.64< DRX-cycle≤2.56 | Note2(24 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC) |
| 1 | DRX-cycle ≤ 0.640 | 22.6 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC (Note1) |
| 0.64< DRX-cycle≤2.56 | Note2(24 \* Kintra\_M1\_EC\*  KRSTD\_M1\_EC) |
| Note1: Number of DRX cycle depends upon the DRX cycle in use  Note2: Time depends upon the DRX cycle in use | | | |

Table 8.13.3.1.3.2-1A: Void

Table 8.13.3.1.3.2-1B: Requirement to identify a newly detectable TDD intrafrequency cell when eDRX\_CONN cycle is used

|  |  |
| --- | --- |
| eDRX\_CONN cycle length (s) | Tidentify\_intra\_UE cat M1\_EC (s) (eDRX\_CONN cycles) |
| 2.56<eDRX\_CONN cycle≤10.24 | Note (400 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC) |
| NOTE: Time depends upon the eDRX\_CONN cycle in use | |

A cell shall be considered detectable when

- RSRP related side conditions given in Clause 9.1.21.3 and 9.1.21.4 are fulfilled for a corresponding Band,

- RSRQ related side conditions given in Clause 9.1.21.7 are fulfilled for a corresponding Band,

- SCH\_RP and SCH Ês/Iot according to Annex Table B.2.14-3 for a corresponding Band

In the RRC\_CONNECTED state the measurement period for intra frequency measurements is Tmeasure\_intra\_UE cat M1\_EC. When DRX is used, Tmeasure\_intra\_UE cat M1\_EC is as shown in table 8.13.3.1.3.2-2 provided that additional conditions Table 8.13.3.1.3.2-2 is met. When eDRX\_CONN is used, Tmeasure\_intra\_UE cat M1\_EC is as shown in table 8.13.3.1.3.2-4. The UE shall be capable of performing RSRP and RSRQ measurement for 6 identified intra-frequency cells and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of Tmeasure\_intra\_UE cat M1\_EC.

Table 8.13.3.1.3.2-2: Requirement to measure TDD intra frequency cells

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Neighbouring cell SCH Ês/Iot: Q2 [dB] | TDD Uplink-downlink  configuration | Gap pattern ID | DRX cycle length (s) | Tmeasure\_intra\_UE cat M1 (s) (DRX cycles) |
| Q2≥-15 | Other than 0 | 0 | ≤0.16 | 0.8 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC (Note1) |
| 0.16<DRX-cycle≤2.56 | Note2 (5 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC) |
| 1 | ≤0.32 | 1.6 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC (Note1) |
| 0.32<DRX-cycle≤2.56 | Note2(5 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC) |
| 0 | 0 | ≤0.32 | [1.6 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC] (Note1) |
| 0.32<DRX-cycle≤2.56 | Note2 (5 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC) |
| 1 | ≤0.64 | [3.2 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC] (Note1) |
| 0.64<DRX-cycle≤2.56 | Note2 (5 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC) |
| N/A | N/A | N/A | N/A | Max(DRX cycle length, TRSS) x 5 (Note 3) |
| Note 1: Number of DRX cycle depends upon the DRX cycle in use.  Note 2: Time depends upon the DRX cycle in use.  Note 3: It is the measurement period for RSRP measured on RSS signals defined in *RSS-Config* [2]. | | | | |

Table 8.13.3.1.3.2-3: Void

Table 8.13.3.1.3.2-4: Requirement to measure TDD intra frequency cells when eDRX\_CONN cycle is used

|  |  |
| --- | --- |
| eDRX\_CONN cycle length (s) | Tmeasure\_intra\_UE cat M1\_EC (s) (eDRX\_CONN cycles) |
| 2.56<eDRX\_CONN cycle≤10.24 | Note (5 \* Kintra\_M1\_EC \*  KRSTD\_M1\_EC) |
| NOTE: Time depends upon the eDRX\_CONN cycle in use. | |

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.3 and 9.1.21.4.

The RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.7.

The requriements in this subcluse apply regardless of MPDCCH monitoring configuration.

8.13.3.1.3.2.1 Measurement Reporting Requirements

8.13.3.1.3.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.3, 9.1.21.4 and 9.1.21.7.

8.13.3.1.3.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.3, 9.1.21.4 and 9.1.21.7.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.3.1.3.2.1.3.

8.13.3.1.3.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurement contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.3, 9.1.21.4 and 9.1.21.7.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: *pusch-maxNumRepetitionCEmodeB* x TTIDCCH, where *pusch-maxNumRepetitionCEmodeB* [2] is the maximum number of PUSCH repetitions configured for the UE in CE Mode B provided that *pusch-maxNumRepetitionCEmodeB >1*, othwerwise uncertainty is defined as 2 x TTIDCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T identify\_intra\_UE cat M1\_EC defined in Clause 8.13.3.1.3.2.When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period Tidentify\_intra\_UE cat M1\_EC defined in clause 8.13.3.1.3.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than Tmeasure\_intra\_UE cat M1\_EC provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

------------------------------------------------------------- End of change 2 ------------------------------------------------------------