**3GPP TSG-RAN4 Meeting #104-eR4-2214513**

**Electronic Meeting, Aug 15 – Aug 26, 2022**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.133** | **CR** | **2449** | **rev** | **1** | **Current version:** | **17.6.0** |  |
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| *For* [***HELP***](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:***  | Maintenance CR on TS38.133 for concurrent gaps core part |
|  |  |
| ***Source to WG:*** | MediaTek inc. |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_MG\_enh-Core |  | ***Date:*** | 2022-08-10 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** | Rel-17 |
|  | *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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | 1. In Section 8.5 and 8..5A, there are still terms like [concurent gaps]. As RAN2 already design the exact UE capabiltiy concurrentMeasGap-r17, we should use the UE capability
2. Editorial change for
	* Remove [ ]
	* Change reference 9.1.X2.3 to 9.1.8.3
	* Kgap to Kgap is needed to align the spec terminology
3. In Section 9.1.8.2, Table 9.1.2-2 was cited for gap applicability. However, Table 9.1.2-2 is for EN-DC and NR-DC, which are not applicable to concurrent gpa.
4. In Section 9.3.9, the new calclation of Kp is now unconditionally applicable to all UEs, which is wrong
5. In Section 9.3.9, The note “Kp is applicable for UE suipporting [concurrent gap]’” is actually redundant. All UE needs to consider Kp, The only difference is how Kp is calculated.
6. Wong citation “9.1.2B” is still used in sections 9.2.5.1, 9.2.6.2, 9.3.4, 9.4.2, 9.4.3
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| ***Summary of change:*** | 1. Replace [concurent gaps] by concurrentMeasGap-r17
2. Editorial changes to imporve the spec readability
3. Remove Table 9.1.2-2 from the applicability citation for concurrent gap in Section 9.1.8.2.
4. Calrify that the new Kp calcilation is only applicable to UE supporting concurrent gaps
5. Remove Note2: Kp is applicable for UE suipporting [concurrent gap] in Table 9.3.9.1-1, 9.3.9.1-2 and 9.3.9.1-3.
6. Correct the citation “9.1.2B” to 9.1.8 in sections 9.2.5.1, 9.2.6.2, 9.3.4, 9.4.2, 9.4.3
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| ***Consequences if not approved:*** | * The spec still has editorial error
* The spec does not reflect to actual applicability of concurrent gap
* The spec may confuse people who does not care about concurrent gap
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|  |  |
| ***Clauses affected:*** | 8.5.3.2, 8.5A.5.2, 9.1.5, 9.1.8.2, 9.2.5.1, 9.2.6.2, 9.3.4, 9.3.5, 9.3.9.1, 9.4.2, 9.4.3 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **X** |  |  Test specifications | TS38.533 |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | This CR is the revised version of R4-2212079 |

<Start of the 1st change>

#### 8.5.3.2 Minimum requirement

UE shall be able to evaluate whether the downlink radio link quality on the CSI-RS resource in set  estimated over the last TEvaluate\_BFD\_CSI-RS ms period becomes worse than the threshold Qout\_LR\_CSI-RS within TEvaluate\_BFD\_CSI-RS ms period.

The value of TEvaluate\_BFD\_CSI-RS is defined in Table 8.5.3.2-1 or Table 8.5.3.2-3 (deactivated PSCell) for FR1.

The value of TEvaluate\_BFD\_CSI-RS is defined in Table 8.5.3.2-2 or Table 8.5.3.2-4 (deactivated PSCell) for FR2 with N=1. The requirements of TEvaluate\_BFD\_CSI-RS apply provided that the CSI-RS for BFD is not in a resource set configured with repetition ON. The requirements shall not apply when the CSI-RS resource in the active TCI state of CORESET is the same CSI-RS resource for BFD and the TCI state information of the CSI-RS resource is not given, wherein the TCI state information means QCL Type-D to SSB for L1-RSRP or CSI-RS with repetition ON.

When concurrent gaps are configured,

- P value for a BFD-RS resource to be measured is defined as

- Ntotal / Noutside\_MG in FR1

- Psharing factor \* Ntotal / Noutside\_MG in FR2 with Navailable = 0

- Ntotal / Navailable in FR2 with Navailable > 0

- For a window W of duration max(TL1, MGRP\_max), where MGRP max is the maximum MGRP across all configured per-UE measurement gaps and per-FR measurement gaps within the same FR as serving cell, and starting at the beginning of any BFD-RS resource occasion:

- Ntotal is the total number of BFD-RS resource occasions within the window, including those overlapped with measurement gap occasions or SMTC occasions within the window, and

- Noutside\_MG is the number of BFD-RS resource occasions that are not overlapped with any measurement gap occasion within the window W

- Navailable is the number of BFD-RS resource occasions that are not overlapped with any measurement gap occasion nor any SMTC occasion within the window W

 TL1 is periodicity of the target BFD-RS.

Otherwise, for a UE not supporting *concurrentMeasGap-r17* or when concurrent gaps are not configured,

For FR1,

- $P=\frac{1}{1-\frac{T\_{CSI-RS}}{MGRP}}$, when in the monitored cell there are GAPs configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the CSI-RS.

- P = 1 when in the monitored cell there are no GAPs overlapping with any occasion of the CSI-RS.

For FR2,

- P = 1, when the BFD-RS resource is not overlapped with GAP and also not overlapped with SMTC occasion.

- $P=\frac{1}{1-\frac{T\_{CSI-RS}}{xRP}}$, when the BFD-RS resource is partially overlapped with GAP and the BFD-RS resource is not overlapped with SMTC occasion (TCSI-RS < xRP)

- $P=\frac{1}{1-\frac{T\_{CSI-RS}}{T\_{SMTCperiod}}}$, when the BFD-RS resource is not overlapped with GAP and the BFD-RS resource is partially overlapped with SMTC occasion (TCSI-RS < TSMTCperiod).

- P = Psharing factor, when the BFD-RS resource is not overlapped with GAP and the BFD-RS resource is fully overlapped with SMTC occasion (TCSI-RS = TSMTCperiod).

- $P=\frac{1}{1-\frac{T\_{CSI-RS}}{xRP} - \frac{T\_{CSI-RS}}{T\_{SMTCperiod}}}$, when the BFD-RS resource is partially overlapped with GAP and the BFD-RS resource is partially overlapped with SMTC occasion (TCSI-RS < TSMTCperiod) and SMTC occasion is not overlapped with GAP and

- TSMTCperiod ≠ xRP or

- TSMTCperiod = xGRP and TCSI-RS < 0.5 × TSMTCperiod

- $P=\frac{P\_{sharing factor}}{1-\frac{T\_{CSI-RS}}{xRP}}$, when the BFD-RS resource is partially overlapped with GAP and the BFD-RS resource is partially overlapped with SMTC occasion (TCSI-RS < TSMTCperiod) and SMTC occasion is not overlapped with GAP and TSMTCperiod = xRP and TCSI-RS = 0.5 × TSMTCperiod

- $P=\frac{1}{1-\frac{T\_{CSI-RS}}{T\_{SMTCperiod}}}$, when the BFD-RS resource is partially overlapped with GAP (TCSI-RS < xRP) and the BFD-RS resource is partially overlapped with SMTC occasion (TCSI-RS < TSMTCperiod) and SMTC occasion is partially or fully overlapped with GAP.

- $P=\frac{P\_{sharing factor}}{1-\frac{T\_{CSI-RS}}{xRP}}$, when the BFD-RS resource is partially overlapped with [measurement gap] and the BFD-RS resource is fully overlapped with SMTC occasion (TCSI-RS = TSMTCperiod) and SMTC occasion is partially overlapped with GAP (TSMTCperiod < xRP)

where,

- Psharing factor = 1, if the BFD-RS resource outside gap is

- not overlapped with the SSB symbols indicated by *SSB-ToMeasure* and 1 data symbol before each consecutive SSB symbols indicated by *SSB-ToMeasure* and 1 data symbol after each consecutive SSB symbols indicated by *SSB-ToMeasure*, given that *SSB-ToMeasure* is configured, where the *SSB-ToMeasure* is the union set of *SSB-ToMeasure* from all the configured measurement objects merged on the same serving carrier, and,

- not overlapped by the RSSI symbols indicated by *ss-RSSI-Measurement* and 1 data symbol before each RSSI symbol indicated by *ss-RSSI-Measurement* and 1 data symbol after each RSSI symbol indicated by *ss-RSSI-Measurement*, given that *ss-RSSI-Measurement* is configured.

- Psharing factor = 3, otherwise.

- If the high layer in TS 38.331 [2] signaling of *smtc2* is configured, TSMTCperiod corresponds to the value of higher layer parameter *smtc2*; Otherwise TSMTCperiod corresponds to the value of higher layer parameter *smtc1*. TSMTCperiod is the shortest SMTC period among all CCs in the same FR2 band, provided the SMTC offset of all CCs in FR2 have the same offset.

- When a measurement gap is configured,

- a BFD-RS resource or an SMTC occasion is considered to be overlapped with the GAP if it overlaps a measurement gap occasion, and

- xRP = MGRP

- When NCSG is configured,

- a BFD-RS resource or an SMTC occasion is considered to be overlapped with the GAP if

- it overlaps the VIL1 or VIL2 of NCSG, or

- it overlaps the ML of NCSG in FR2, and there exists a target carrier to be measured within NCSG that is intra-frequency carrier or inter-frequency carrier in the same band as the serving cell, or inter-frequency carrier in different band as the serving cell and UE does not support IBM between the target carrier and the serving cell,

- and

- xRP = VIRP

- If the UE is configured with Pre-MG, a BFD-RS resource or an SMTC occasion is only considered to be overlapped by the Pre-MG if the Pre-MG is activated.

- When concurrent gaps are configured, a BFD-RS or an SMTC occasion is not considered to be overlapped by a gap occasion if the gap occasion is dropped according to 9.1.8.

Note: The overlap between CSI-RS for BFD and SMTC means that CSI-RS for BFD is within the SMTC window duration.

Longer evaluation period would be expected if the combination of the BFD-RS resource, SMTC occasion and GAP configurations does not meet pervious conditions.

For either an FR1 or FR2 serving cell, longer evaluation period would be expected during the period Tidentify\_CGI when the UE is requested to decode an NR CGI.

For either an FR1 or FR2 serving cell, longer BFD evaluation period would be expected during the period Tidentify\_CGI,E-UTRAN when the UE is requested to decode an LTE CGI.

The values of MBFD used in Table 8.5.3.2-1 and Table 8.5.3.2-2 are defined as

- MBFD = 10, if the CSI-RS resource(s) in set  used for BFD is transmitted with Density = 3 and over the bandwidth ≥ 24 PRBs.

The values of PBFD used in Table 8.5.3.2-1 and Table 8.5.3.2-2 are defined as

 For each CSI-RS resource in the set  configured for PCell or PSCell in EN-DC or NE-DC or SA; or PCell in NR-DC

- PBFD = 1.

 For each CSI-RS resource in the set  configured for PSCell in NR-DC

- PBFD = 2 if UE is configured for beam failure detection on SCell, 1 otherwise.

 For each CSI-RS resource in the set  configured for a SCell

- PBFD = Z in EN-DC or NE-DC or SA.

- PBFD = 2\* Z in NR-DC.

- Where Z is the number of band(s) on which UE is performing beam failure detection only for SCell.

<End of the 1st change>

< Start of the 2nd change>

#### 8.5A.5.2 Minimum requirement

Upon request the UE shall be able to evaluate whether the L1-RSRP measured on the configured CBD-RS SSB resource in set  estimated over the last TEvaluate\_CBD\_SSB\_CCA ms period becomes better than the threshold Qin\_LR,CCA provided SSB\_RP and SSB Ês/Iot are according to Annex Table B.2.4.1 for a corresponding band.

The UE shall monitor the configured SSB resources using the evaluation period in table 8.5A.5.2-1 corresponding to the non-DRX mode, if the configured DRX cycle ≤ 320ms.

The value of TEvaluate\_CBD\_SSB\_CCA is defined in Table 8.5A.5.2-1 for FR1.

The value of TEvaluate\_CBD\_SSB\_CCA is defined in Table 8.5A.5.2-2 for FR2-2 with scaling factor N=TBD.

For FR1,

- For a UE supporting *concurrentMeasGap-r17* and when concurrent gaps are configured,

- P value for a CBD-RS resource to be measured is defined as Ntotal / Noutside\_MG

- For a window W of duration max(TL1, MGRP\_max), where MGRP max is the maximum MGRP across all configured per-UE measurement gaps and per-FR measurement gaps within the same FR as serving cell, and starting at the beginning of any CBD-RS resource occasion:

- Ntotal is the total number of CBD-RS resource occasions within the window, including those overlapped with measurement gap occasions within the window, and

- Noutside\_MG is the number of CBD-RS resource occasions that are not overlapped with any measurement gap occasion within the window W

- Otherwise, for a UE not supporting *concurrentMeasGap-r17* or when concurrent gaps are not configured,

- $P=\frac{1}{1-\frac{T\_{SSB}}{MRGP}}$, when in the monitored cell there are GAPs configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the CBD-RS SSB,

- P = 1 when in the monitored cell there are no GAPs overlapping with any occasion of the CBD-RS SSB.

For FR2-2,

- $P=\frac{1}{1-\frac{T\_{SSB}}{T\_{SMTCperiod}}}$, when candidate beam detection RS is not overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion (TSSB < TSMTCperiod).

- P is Psharing factor, when candidate beam detection RS is not overlapped with measurement gap and candidate beam detection RS is fully overlapped with SMTC period (TSSB = TSMTCperiod).

- $P=\frac{1}{1-\frac{T\_{SSB}}{MGRP} - \frac{T\_{SSB}}{T\_{SMTCperiod}}}$, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion (TSSB < TSMTCperiod) and SMTC occasion is not overlapped with measurement gap and

- TSMTCperiod ≠ MGRP or

- TSMTCperiod = MGRP and TSSB < 0.5 × TSMTCperiod

- $P=\frac{P\_{sharing factor}}{1-\frac{T\_{SSB}}{MGRP}}$, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion (TSSB < TSMTCperiod) and SMTC occasion is not overlapped with measurement gap and TSMTCperiod = MGRP and TSSB = 0.5 × TSMTCperiod

- $P=\frac{1}{1-\frac{T\_{SSB}}{T\_{SMTCperiod}}}$, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion (TSSB < TSMTCperiod) and SMTC occasion is partially or fully overlapped with measurement gap

- $P=\frac{P\_{sharing factor}}{1-\frac{T\_{SSB}}{MGRP}}$, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is fully overlapped with SMTC occasion (TSSB = TSMTCperiod) and SMTC occasion is partially overlapped with measurement gap (TSMTCperiod < MGRP)

- Psharing factor = 1, if the candidate beam detection RS outside measurement gap is

- not overlapped with the SSB symbols indicated by *SSB-ToMeasure* and TBD data symbol before each consecutive SSB symbols indicated by *SSB-ToMeasure* and TBD data symbol after each consecutive SSB symbols indicated by *SSB-ToMeasure*, given that *SSB-ToMeasure* is configured, where the *SSB-ToMeasure* is the union set of *SSB-ToMeasure* from all the configured measurement objects merged on the same serving carrier, and;

- not overlapped with the RSSI symbols indicated by *ss-RSSI-Measurement* and TBD data symbol before each RSSI symbol indicated by *ss-RSSI-Measurement* and TBD data symbol after each RSSI symbol indicated by *ss-RSSI-Measurement*, given that *ss-RSSI-Measurement* is configured

- Psharing factor = 3, otherwise.

where,

- If the high layer in TS 38.331 [2] signaling of *smtc2*is present, TSMTCperiod follows *smtc2*; Otherwise TSMTCperiod follows *smtc1.* TSMTCperiod is the shortest SMTC period among all CCs in the same FR2-2 band, provided the SMTC offset of all CCs in FR2-2 have the same offset.

- If the UE is configured with Pre-MG, a CBD-RS resource is only considered to be overlapped by the Pre-MG if the Pre-MG is activated.

- When a measurement gap is configured,

- a CBD-RS resource is considered to be overlapped with the GAP if it overlaps a measurement gap occasion, and

- xRP = MGRP

- When NCSG is configured,

- a CBD-RS resource is considered to be overlapped with the GAP if it overlaps the VIL1 or VIL2 of NCSG, and

- xRP = VIRP

* When concurrent gaps are configured, a CBD-RS is not considered to be overlapped by a gap occasion if the gap occasion is dropped according to9.1.8.

< End of the 2nd change>

< Start of the 3rd change>

### 9.1.5 Carrier-specific scaling factor

This clause specifies the derivation of carrier-specific scaling factor (CSSF) values, which scales the measurement delay requirements given in clause 9.2, 9.2A, 9.3, 9.3A, 9.4, and NR PRS-based positioning measurements in clause 9.9 and CSI-RS based L3 measurement in clause 9.10 when UE is configured to monitor multiple measurement objects. The CSSF values are categorized into CSSFoutside\_gap,i andCSSFwithin\_gap,i, for the measurements conducted outside measurement gaps and within measurement gaps, respectively.

If concurrent measurement gaps are configured by the network, subject to UE capability, the term concurrent measurement gap(s) in the following clauses refer to non-dropped measurement gap occasions after accounting for measurment gap collisions as specified in clause 9.1.8.3 from all the configured measurement gap patterns.

<End of the 3rd change>

<Start of the 4th change>

#### 9.1.8.2 Requirements

If the UE requires measurement gaps to identify and measure intra-frequency cells and/or inter-frequency cells and/or inter-RAT E-UTRAN cells, and the UE supports concurrent measurement gap patterns but does not support independent measurement gap patterns for different frequency ranges as specified in Table 5.1-1 in [18, 19, 20], in order for the requirements in the following clauses to apply the network can provide at most two per-UE measurement gap patterns for monitoring of all frequency layers.

If the UE requires measurement gaps to identify and measure intra-frequency cells and/or inter-frequency cells and/or inter-RAT E-UTRAN cells, and the UE supports both concurrent measurement gap patterns and independent measurement gap patterns for different frequency ranges as specified in Table 5.1-1 in [18, 19, 20], in order for the requirements defined for concurrent measurement gaps to apply the network can provide the following measurement gap patterns’combinations for monitoring of all frequency layers. The supported measurement gap combination configurations for UE supporting both concurrent measurement gap patterns and independent measurement gap patterns for different frequency ranges are specified in Table 9.1.8-1.

Table 9.1.8-1: The number of Gap Combination Configurations by UE supporting both concurrent measurement gap patterns and independent measurement gap patterns

|  |  |
| --- | --- |
| Gap CombinationConfiguration Id  | The number of simultaneous configured measurement gap patterns |
| Per-FR1 measurement gap | Per-FR2 measurement gap | Per-UE measurement gap |
| 0 | 2 | 1 | 0 |
| 1 | 1 | 2 | 0 |
| 2 | 0 | 0 | 2 |
| 3Note 1 | 1 | 0 | 1 |
| 4Note 1 | 0 | 1 | 1 |
| 5Note 1 | 1 | 1 | 1 |
| 6 | 2 | 0 | 0 |
| 7 | 0 | 2 | 0 |
| Note 1: Gap Combination Configuration Id #3, #4, #5 will be only applied when the per-UE measurement gap is associated to measure PRS for any RSTD, PRS-RSRP, and UE Rx-Tx time difference measurement defined in TS 38.215 [4]. |

For UE configured in the SA operation mode, when monitoring of multiple inter-RAT E-UTRAN carrier frequency layers and inter-frequency NR carrier frequency layers as configured by PCell using gaps, each monitored carrier frequency layer, including following measurement types:

- a measurement object with SSB based measurement,

- a measurement object with CSI-RS based measurement,

- E-UTRA inter-RAT measurement object,

- E-UTRAN inter-RAT RSTD measurement,

- NR PRS-based measurements,

can be only associated to one measurement gap pattern. Requirements for concurrent measurement gaps apply provided that each frequency layer is only associated with one concurrent measurement gap. There can be one or more frequency layers associated with each concurrent measurement gap.

When UE supports concurrent measurement gap patterns, each measurement gap pattern supported by the UE is listed in Table 9.1.2-1 based on the applicability specified in table 9.1.2-3.

The requirements in clause 9.1.2 are also applicable for the UE capable of and configured with multiple concurrent measurement gap patterns within each measurement gap pattern.

<End of the 4th change>

<Start of the 5th change>

#### 9.2.5.1 Intrafrequency cell identification

The UE shall be able to identify a new detectable intra-frequency cell within Tidentify\_intra\_without\_index if the UE is not indicated to report SSB based RRM measurement result with the associated SSB index(*reportQuantityRsIndexes* or *maxNrofRSIndexesToReport* is not configured), or the UE is indicated that the neighbour cell is synchronous with the serving cell (*deriveSSB-IndexFromCell* is enabled). Otherwise UE shall be able to identify a new detectable intra frequency cell within Tidentify\_intra\_with\_index. The UE shall be able to identify a new detectable intra frequency SS block of an already detected cell within Tidentify\_intra\_without\_index. It is assumed that *deriveSSB-IndexFromCell* is always enabled for FR1 TDD and FR2.

Tidentify\_intra\_without\_index = (TPSS/SSS\_sync\_intra + T SSB\_measurement\_period\_intra) ms

Tidentify\_intra\_with\_index = (TPSS/SSS\_sync\_intra + T SSB\_measurement\_period\_intra + TSSB\_time\_index\_intra) ms

Where:

 TPSS/SSS\_sync\_intra: it is the time period used in PSS/SSS detection given in table 9.2.5.1-1, 9.2.5.1-2, 9.2.5.1-4 (deactivated SCell) or 9.2.5.1-5 (deactivated SCell) or 9.2.5.1-9 (deactivated SCell) or 9.2.5.1-11 or 9.2.5.1-12 (deactivated PSCell) or 9.2.5.1-13 (deactivated PSCell).

- For UE supporting power class 6 with *highSpeedMeasFlagFR2-r17* configured, if SMTC <= 40ms, TPSS/SSS\_sync\_intra is given in Table 9.2.5.1-11; [otherwise, TPSS/SSS\_sync\_intra is given in Table 9.2.5.1-2.]

 TSSB\_time\_index\_intra: it is the time period used to acquire the index of the SSB being measured given in table 9.2.5.1-3, 9.2.5.1-6 (deactivated SCell), 9.2.5.1-10(deactivated SCell) or 9.2.5.1-14 (deactivated PSCell).

 T SSB\_measurement\_period\_intra: equal to a measurement period of SSB based measurement given in table 9.2.5.2-1, table 9.2.5.2-2 table 9.2.5.2-3 (deactivated SCell), 9.2.5.2-4(deactivated SCell), 9.2.5.2-5 or 9.2.5.2-6(deactivated SCell), 9.2.5.2-8(deactivated PSCell) or 9.2.5.2-9(deactivated PSCell).

- For UE supporting power class 6 with *highSpeedMeasFlagFR2-r17* configured, if SMTC <= 40ms, TSSB\_measurement\_period\_intra is given in Table 9.2.5.2-7; [otherwise, T SSB\_measurement\_period\_intra is given in Table 9.2.5.2-2.]

 CSSFintra: it is a carrier specific scaling factor and is determined

 according to CSSFoutside\_gap,i in clause 9.1.5.1 for measurement conducted outside measurement gaps, i.e. when intra-frequency SMTC is fully non overlapping or partially overlapping with measurement gaps or NCSG, or according to CSSFwithin\_gap,i in clause 9.1.5.2 for measurement conducted within measurement gaps, i.e. when intra-frequency SMTC is fully overlapping with measurement gaps, or according to CSSFwithin\_ncsg,i in clause 9.1.5.3 for measurement conducted within NCSG, i.e. when intra-frequency SMTC is fully overlapping with NCSG.

 For a UE that supports Pre-MG, an SMTC occasion is only considered to be overlapped by Pre-MG if the Pre-MG is activated.

 if the high layer in TS 38.331 [2] signalling of *smtc2* is configured, the assumed periodicity of intra-frequency SMTC occasions corresponds to the value of higher layer parameter *smtc2*; Otherwise the assumed periodicity of intra-frequency SMTC occasions corresponds to the value of higher layer parameter *smtc1*.

 Mpss/sss\_sync\_w/o\_gaps : For a UE supporting FR2 power class 1 or 5, Mpss/sss\_sync\_w/o\_gaps =40. For a UE supporting power class 2, Mpss/sss\_sync\_w/o\_gaps =24. For a UE supporting FR2 power class 3, Mpss/sss\_sync\_w/o\_gaps =24. For a UE supporting FR2 power class 4, Mpss/sss\_sync\_w/o\_gaps =24

 Mmeas\_period\_w/o\_gaps : For a UE supporting power class 1 or 5, Mmeas\_period\_w/o\_gaps =40. For a UE supporting FR2 power class 2, Mmeas\_period\_w/o\_gaps =24. For a UE supporting power class 3, Mmeas\_period\_w/o\_gaps =24. For a UE supporting power class 4, Mmeas\_period\_w/o\_gaps =24.

When UE supports *concurrentMeasGap-r17* and is configured with concurrent measurement gaps,

 Kp is the scaling factor for an SSB frequency layer to be measured without measurement gaps. Kp = Ntotal / Navailable, where Navailable and Ntotal are calculated as follows:

- For a window W of duration max(SMTC period, MGRP\_max), where MGRP max is the maximum MGRP across all configured per-UE measurement gap and/or per-FR measurement gap within the same FR as the SSB frequency layer, and starting from the beginning of any SMTC occasion:

- Ntotal is the total number of SMTC occasions within the window, including those overlapped with measurement gap occasions within the window, and

- Navailable is the number of SMTC occasions that are not overlapped with any non-dropped MG occasion within the window W, after accounting for measurement gap collisions by applying the measurement gap collision rule in section 9.1.8.3.

 Kp = 1 when Navailable = 0.

- Otherwise, when UE is not configured with or UE does not support concurrent measurement gaps:

 When intra-frequency SMTC is fully non overlapping with measurement gaps or intra-frequency SMTC is fully overlapping with MGs, Kp=1

 When intra-frequency SMTC is partially overlapping with measurement gaps, Kp = 1/(1- (SMTC period /MGRP)), where SMTC period < MGRP. When intra-frequency SMTC is partially overlapping with the ML of NCSG, Kp = 1/(1- (SMTC period /VIRP)), where SMTC period < VIRP. For calculation of Kp, if the high layer signalling (TS 38.331 [2]) of *smtc2* is configured, for cells indicated in the *pci-List* parameter in *smtc2*, the SMTC periodicity corresponds to the value of higher layer parameter *smtc2*; for the other cells, the SMTC periodicity corresponds to the value of higher layer parameter *smtc1.*

 If the higher layer signaling in TS38.331 [2] signalling of *smtc2* is present and smtc1 is fully overlapping with measurement gaps and smtc2 is partially overlapping with measurement gaps, requirements are not specified for Tidentify\_intra\_without\_index or Tidentify\_intra\_with\_index

 For FR2,

 Klayer1\_measurement=1,

- if all of the reference signals configured for RLM, BFD, CBD or L1-RSRP for beam reporting on any FR2 serving frequency in the same band outside measurement gap are not fully overlapped by intra-frequency SMTC occasions, or

- if all of the reference signal configured for RLM, BFD, CBD or L1-RSRP for beam reporting on any FR2 serving frequency in the same band outside measurement gap and fully-overlapped by intra-frequency SMTC occasions are not overlapped with any of the SSB symbols and the RSSI symbols, and 1 symbol before each consecutive SSB symbols and the RSSI symbols, and 1 symbol after each consecutive SSB symbols and the RSSI symbols, given that *SSB-ToMeasure* and *SS-RSSI-Measurement* are configured, where SSB symbols are indicated by the union set of SSB-ToMeasure from all the configured measurement objects on the same serving carrier which can be merged.and RSSI symbols are indicated by *SS-RSSI-Measurement*;

 Klayer1\_measurement=1.5, otherwise.

 If the above-mentioned reference signal configured for L1-RSRP measurement is aperiodic CSI-RS resource, longer cell identification delay would be expected.

 If MCG DRX is in use, cell identification requirements for intra-frequency measurement in MCG specified in Table 9.2.5.1-1, Table 9.2.5.1-2, Table 9.2.5.1-3, Table 9.2.5.1-4, Table 9.2.5.1-5 and Table 9.2.5.1-6 shall depend on the MCG DRX cycle. If SCG DRX is in use, cell identification requirements for intra-frequency measurement in SCG specified in Table 9.2.5.1-1, Table 9.2.5.1-2, Table 9.2.5.1-3, Table 9.2.5.1-4, Table 9.2.5.1-5, Table 9.2.5.1-6, Table 9.2.5.1-12, Table 9.2.5.1-13 and Table 9.2.5.1-14 shall depend on the SCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply.

<End of the 5th change>

<Start of the 6th change>

#### 9.2.6.2 Intra-frequency cell identification

When a measurement gap is provided or an activated Pre-MG is provided without any pre-MG status changed during the measurement period, the UE shall be able to identify a new detectable intra frequency cell within Tidentify\_intra\_without\_index if UE is not indicated to report SSB based RRM measurement result with the associated SSB index (*reportQuantityRsIndexes* or *maxNrofRSIndexesToReport* is not configured), or the UE has been indicated that the neighbour cell is synchronous with the serving cell (*deriveSSB-IndexFromCell* is enabled). Otherwise UE shall be able to identify a new detectable intra frequency cell within Tidentify\_intra\_with\_index. The UE shall be able to identify a new detectable intra frequency SS block of an already detected cell within Tidentify\_intra\_without\_index. It is assumed that *deriveSSB-IndexFromCell* is always enabled for FR1 TDD and FR2.

 Tidentify\_intra\_without\_index = TPSS/SSS\_sync\_intra + T SSB\_measurement\_period\_intra ms

 Tidentify\_intra\_with\_index = TPSS/SSS\_sync\_ntra + T SSB\_measurement\_period\_intra + TSSB\_time\_index\_intra ms

Where:

 TPSS/SSS\_sync\_intra: it is the time period used in PSS/SSS detection given in table 9.2.6.2-1, 9.2.6.2-2 or 9.2.6.2-9.

 TSSB\_time\_index\_intra: it is the time period used to acquire the index of the SSB being measured given in table 9.2.6.2-3.

 T SSB\_measurement\_period\_intra: equal to a measurement period of SSB based measurement given in table 9.2.6.3-1 or 9.2.6.3-2.

 CSSFintra: it is a carrier specific scaling factor and is determined according to CSSFwithin\_gap,i in clause 9.1.5.2 for measurement conducted within measurement gaps.

 Kgap is the scaling factor for a SSB frequency layer to be measured within an associated measurement gap pattern. Kgap = 1 when the UE is not configured with concurrent measurement gaps or not supporting [concurrent measurement gaps]. Otherwise, Kgap = Ntotal / Navailable, where Navailable and Ntotal are calculated as follows:

 For a window W of duration max(SMTC period, MGRP\_max), where MGRP max is the maximum MGRP across all configured per-UE measurement gap and per-FR measurement gap within the same FR as the SSB frequency layer, and starting from the beginning of any SMTC occasion:

-- Ntotal is the total number of SMTC occasions that are covered by instances of the associated measurement gap within the window W, including those overlapped with other measurement gap occasions within the window, and

 Navailable is the number of SMTC occasions that are covered by instances of the non-dropped associated measurement gap within the window W after accounting for measurement gap collisions by applying the measurement gap collision rule in section 9.1.8.3.

 When concurrent measurement gaps are configured, requirements in this clause do not apply if Navailable =0.

 Mpss/sss\_sync\_with\_gaps : For a UE supporting FR2 power class 1 or 5, Mpss/sss\_sync with\_gaps=40. For a UE supporting FR2 power class 2, Mpss/sss\_sync with\_gaps =24. For a UE supporting FR2 power class 3, Mpss/sss\_sync with\_gaps =24. For a UE supporting power class 4, Mpss/sss\_sync with\_gaps =24

 Mmeas\_period\_ with\_gaps: For a UE supporting power class 1 or 5, Mmeas\_period\_ with\_gaps =40. For a UE supporting power class 2, Mmeas\_period\_ with\_gaps =24. For a UE supporting power class 3, Mmeas\_period\_ with\_gaps =24. For a UE supporting power class 4, Mmeas\_period with\_gaps =24.

If the higher layer signaling in TS 38.331 [2] of *smtc2* is present and smtc1 is fully overlapping with measurement gaps and smtc2 is partially overlapping with measurement gaps, requirements are not specified for Tidentify\_intra\_without\_index or Tidentify\_intra\_with\_index.

If MCG DRX is in use, cell identification requirements for intra-frequency measurement in MCG specified in Table 9.2.6.2-1, Table 9.2.6.2-2, and Table 9.2.6.2-3 shall depend on the MCG DRX cycle. If SCG DRX is in use, cell identification requirements for intra-frequency measurement in SCG specified in Table 9.2.6.2-1, Table 9.2.6.2-2, and Table 9.2.6.2-3 shall depend on the SCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply.

<End of the 6th change>

<Start of the 7th change>

### 9.3.4 Inter-frequency measurement with measurement gaps

When measurement gaps are provided, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable inter frequency cell within Tidentify\_inter\_without\_index if UE is not indicated to report SSB based RRM measurement result with the associated SSB index (*reportQuantityRsIndexes* or *maxNrofRSIndexesToReport* is not configured). Otherwise UE shall be able to identify a new detectable inter frequency cell within Tidentify\_inter\_with\_index. The UE shall be able to identify a new detectable inter frequency SS block of an already detected cell within Tidentify\_inter\_without\_index.

Tidentify\_inter\_without\_index = (TPSS/SSS\_sync\_inter + T SSB\_measurement\_period\_inter) ms

Tidentify\_inter\_with\_index = (TPSS/SSS\_sync\_inter + T SSB\_measurement\_period\_inter + TSSB\_time\_index\_inter) ms

Where:

 TPSS/SSS\_sync\_inter: it is the time period used in PSS/SSS detection given in table 9.3.4-1, table 9.3.4-2, and table 9.3.4-5 when *highSpeedMeasInterFreq-r17* is configured and UE supports measurementEnhancementInterFreq-r17.

 TSSB\_time\_index\_inter: it is the time period used to acquire the index of the SSB being measured given in table 9.3.4-3, and table 9.3.4-6 when *highSpeedMeasInterFreq* is configured and UE supports measurementEnhancementInterFreq-r17.

 TSSB\_measurement\_period\_inter: equal to a measurement period of SSB based measurement given in table 9.3.5-1, table 9.3.5-2 and table 9.3.5-3 when *highSpeedMeasInterFreq* is configured and UE supports [measurementEnhancementInterFreq-r17.

 Mpss/sss\_sync\_inter: For a UE supporting FR2 power class 1 or 5, Mpss/sss\_sync\_inter = 64 samples. For a UE supporting FR2 power class 2, Mpss/sss\_sync\_inter = 40 samples. For a UE supporting FR2 power class 3, Mpss/sss\_sync\_inter = 40 samples. For a UE supporting FR2 power class 4, Mpss/sss\_sync\_inter = 40 samples.

 MSSB\_index\_inter: For a UE supporting FR2 power class 1 or 5, MSSB\_index\_inter = 40 samples. For a UE supporting FR2 power class 2, MSSB\_index\_inter = 24 samples. For a UE supporting FR2 power class 3, MSSB\_index\_inter = 24 samples. For a UE supporting FR2 power class 4, MSSB\_index\_inter = 24 samples.

 Mmeas\_period\_inter: For a UE supporting FR2 power class 1 or 5, Mmeas\_period\_inter =64 samples. For a UE supporting FR2 power class 2, Mmeas\_period\_inter=40 samples. For a UE supporting FR2 power class 3, Mmeas\_period\_inter =40 samples. For a UE supporting FR2 power class 4, Mmeas\_period\_inter = 40 samples.

 CSSFinter: it is a carrier specific scaling factor and is determined according to CSSFwithin\_gap,i in clause 9.1.5.2 for measurement conducted within measurement gaps.

 Kgap is a scaling factor for a SSB frequency layer to be measured within an associated measurement gap pattern. Kgap = 1 when the UE is not configured with concurrent measurement gaps. Otherwise, Kgap = Ntotal / Navailable, where Navailable and Ntotal are calculated as follows:

- For a window W of duration max(SMTC period, MGRP\_max), where MGRP\_max is the maximum MGRP across all configured per-UE measurement gap(s) and per-FR measurement gap(s) within the same FR, and starting from the beginning of any SMTC occasion:

- Ntotal is the total number of SMTC occasions that are covered by instances of the associated measurement gap within the window W, including those overlapped with other measurement gap occasions within the window, and

- Navailable is the number of SMTC occasions that are covered by instances of the non-dropped associated measurement gap within the window W, after accounting for collisions between the measurement gaps by applying the measurement gap collision rule in section 9.1.8.3.

 Kgap is only applicable for UE supporting *concurrentMeasGap-r17*. When concurrent measurement gaps are configured, requirements in this clause do not apply if Navailable =0.

Table 9.3.4-1: Time period for PSS/SSS detection (Frequency range FR1)

|  |  |
| --- | --- |
| Condition NOTE1,2 | TPSS/SSS\_sync\_inter |
| No DRX |  Max(600ms, Ceil(8 \* Kgap) × Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320ms | Max(600ms, Ceil(8\*1.5 \* Kgap) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320ms | Ceil(8 \* Kgap) × DRX cycle × CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: For a UE supporting concurrent gaps, the MRGP above is the MRGP of the measurement gap associated with the target frequency layer to be measured if concurrent measurement gaps are configured. |

Table 9.3.4-2: Time period for PSS/SSS detection, (Frequency range FR2)

|  |  |
| --- | --- |
| Condition NOTE1,2 | TPSS/SSS\_sync\_inter |
| No DRX | Max(600ms, Ceil(Kgap × Mpss/sss\_sync\_inter) × Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320ms | Max(600ms, Ceil(1.5 \* Kgap × Mpss/sss\_sync\_inter) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320ms | Ceil(Kgap × Mpss/sss\_sync\_inter) × DRX cycle × CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: For a UE supporting concurrent gaps, the MRGP above is the MRGP of the measurement gap associated with the target frequency layer to be measured if concurrent measurement gaps are configured. |

Table 9.3.4-3: Time period for time index detection (Frequency range FR1)

|  |  |
| --- | --- |
| **Condition NOTE1,2** | **TSSB\_time\_index\_inter** |
| No DRX | Max(120ms, Ceil(3 \* Kgap)× Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320ms | Max(120ms, Ceil(3 × 1.5 \* Kgap) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320ms | Ceil(3 \* Kgap)× DRX cycle × CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: For a UE supporting concurrent gaps, the MRGP above is the MRGP of the measurement gap associated with the target frequency layer to be measured if concurrent measurement gaps are configured. |

Table 9.3.4-4: Time period for time index detection (Frequency range FR2)

|  |  |
| --- | --- |
| **Condition NOTE1,2** | **TSSB\_time\_index\_inter** |
| No DRX | Max(200ms, Ceil(Kgap × MSSB\_index\_inter)× Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320ms | Max(200ms, Ceil(1.5 \* Kgap × MSSB\_index\_inter) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320ms | Ceil(Kgap ×MSSB\_index\_inter) × DRX cycle × CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: For a UE supporting concurrent gaps, the MRGP above is the MRGP of the measurement gap associated with the target frequency layer to be measured if concurrent measurement gaps are configured. |

Table 9.3.4-5: Time period for PSS/SSS detection when highSpeedMeasInterFreq-r17 is configured (Frequency range FR1)

|  |  |
| --- | --- |
| Condition NOTE1,2 | TPSS/SSS\_sync\_inter |
| No DRX | max(200ms, N1 × Max(MGRP, SMTC period)) × CSSFinterN1 = 7 |
| DRX cycle ≤ 160ms | max(200ms, ceil(N2) x max(MGRP, SMTC period, DRX cycle)) x CSSFinterN2 = 7 x M2 |
| 160ms < DRX cycle ≤ 320ms | ceil(N3) x DRX cycle x CSSFinterN3 = 7 x M2 |
| DRX cycle>320ms | N4 x DRX cycle x CSSFinter |
| NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is the one used by the cell being identifiedNOTE 2: M2 = 1.5 if SMTC periodicity > 40 ms, otherwise M2=1NOTE 3: N4=6 if SMTC periodicity > 40 ms, otherwise N4=5 |

Table 9.3.4-6: Time period for time index detection when highSpeedMeasInterFreq-r17 is configured (Frequency range FR1)

|  |  |
| --- | --- |
| Condition NOTE1,2 | TSSB\_time\_index\_inter |
| No DRX | Max(120ms, 3 × Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320ms | Max(120ms, Ceil(3 × M2 NOTE3) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320ms | 3 × DRX cycle × CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: M2 = 1.5 if SMTC periodicity > 40 ms, otherwise M2=1. |

#### 9.3.4.1 Void

#### 9.3.4.2 Void

<End of the 7th change>

<Start of the 8th change>

### 9.3.5 Inter-frequency measurements

When measurement gaps are provided for inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting SS-RSRP, SS-RSRQ and SS-SINR measurements to higher layers with measurement accuracy as specified in clauses 10.1.4, 10.1.5, 10.1.9, 10.1.10, 10.1.14 and 10.1.15, respectively, as shown in table 9.3.5-1 and 9.3.5-2. When *highSpeedMeasInterFreq-r17* is configured, and UE supports *measurementEnhancementInterFreq-r17*, T SSB\_measurement\_period\_inter is specified in Table 9.3.5-3.

Table 9.3.5-1: Measurement period for inter-frequency measurements with gaps (Frequency FR1)

|  |  |
| --- | --- |
| **Condition NOTE1,2** | **T SSB\_measurement\_period\_inter** |
| No DRX | Max(200ms, Ceil(8 \* Kgap) × Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320ms | Max(200ms, Ceil(8 × 1.5 \* Kgap) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320ms | Ceil(8 \* Kgap) × DRX cycle × CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: For a UE supporting concurrent gaps, the MRGP above is the MRGP of the measurement gap associated with the target frequency layer to be measured if concurrent measurement gaps are configured. |

Table 9.3.5-2: Measurement period for inter-frequency measurements with gaps (Frequency FR2)

|  |  |
| --- | --- |
| **Condition NOTE1,2** | **T SSB\_measurement\_period\_inter** |
| No DRX | Max(400ms, Ceil(Kgap × Mmeas\_period\_inter)× Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320ms | Max(400ms, Ceil(1.5 \* Kgap × Mmeas\_period\_inter) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320ms | Ceil(Kgap × Mmeas\_period\_inter) × DRX cycle × CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: For a UE supporting concurrent gaps, the MRGP above is the MRGP of the measurement gap associated with the target frequency layer to be measured if concurrent measurement gaps are configured. |

Table 9.3.5-3: Measurement period for inter-frequency measurements with gaps when highSpeedMeasInterFreq-r17 is configured (Frequency range FR1)

|  |  |
| --- | --- |
| Condition NOTE1,2 | T SSB\_measurement\_period\_inter |
| No DRX | max(200ms, 7 × Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 160ms | max(200ms, ceil(7 x M2 NOTE3) x max(MGRP, SMTC period, DRX cycle)) x CSSFinter |
| 160ms < DRX cycle ≤ 320ms | ceil(7 x M2 NOTE3) x DRX cycle x CSSFinter |
| DRX cycle>320ms | 4 x M2 NOTE3 x DRX cycle x CSSFinter |
| NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is the one used by the cell being identifiedNOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: M2 = 1.5 if SMTC periodicity > 40 ms, otherwise M2=1 |

<End of the 8th change>

<Start of the 9th change>

#### 9.3.9.1 Inter frequency Cell identification

If UE supports *interFrequencyMeas-NoGap-r16* and the flag *interFrequencyConfig-NoGap-r16* is configured by the Network, UE shall be able to identify a new detectable inter frequency cell within Tidentify\_inter\_without\_index if UE is not indicated to report SSB based RRM measurement result with the associated SSB index (*reportQuantityRsIndexes* or *maxNrofRSIndexesToReport* is not configured). Otherwise UE shall be able to identify a new detectable inter frequency cell within Tidentify\_inter\_with\_index. The UE shall be able to identify a new detectable inter frequency SS block of an already detected cell within Tidentify\_inter\_without\_index. It is assumed that when UE performs inter-frequency measurements without measurement gaps in a TDD bands on FR1 and FR2, the following conditions are met:

- SFN and frame boundary across serving cell and inter-frequency neighbor cells is aligned, and the timing of SSBs across serving cell and inter-frequency neighbor cells are aligned

 Tidentify\_inter\_without\_index = (TPSS/SSS\_sync\_inter + T SSB\_measurement\_period\_inter) ms

 Tidentify\_inter\_with\_index = (TPSS/SSS\_sync\_inter + T SSB\_measurement\_period\_inter + TSSB\_time\_index\_inter) ms

Where:

 TPSS/SSS\_sync\_inter: it is the time period used in PSS/SSS detection given in table 9.3.9.1-1 and table 9.3.9.1-2.

 TSSB\_time\_index\_inter: it is the time period used to acquire the index of the SSB being measured given in table 9.3.9.1-3.

 T SSB\_measurement\_period\_inter: equal to a measurement period of SSB based measurement given in table 9.3.9.2-1, table 9.3.9.2-2 and table 9.3.9.2-3 when highSpeedMeasInterFreq-r17 is configured and UE supports measurementEnhancementInterFreq-r17.

 CSSFinter: it is a carrier specific scaling factor and is determined according to CSSFoutside\_gap,i in clause 9.1.5.1 for measurement conducted outside measurement gaps or NCSG, i.e. when interfrequency SMTC is fully non overlapping or partially overlapping with measurement gaps or according to CSSFwithin\_gap,i in clause 9.1.5.2 for measurement conducted within measurement gaps, i.e. when interfrequency SMTC is fully overlapping with measurement gaps, or according to CSSFwithin\_ncsg,i in clause 9.1.5.x for measurement conducted within NCSG, i.e. when inter-frequency SMTC is fully overlapping with NCSG.

 Mpss/sss\_sync\_inter: For a UE supporting FR2 power class 1 or 5, Mpss/sss\_sync\_inter = 40 samples. For a UE supporting FR2 power class 2, Mpss/sss\_sync\_inter = 24 samples. For a UE supporting FR2 power class 3, Mpss/sss\_sync\_inter = 24 samples. For a UE supporting FR2 power class 4, Mpss/sss\_sync = 24 samples.

 MSSB\_index\_inter: For a UE supporting power class 1 or 5, MSSB\_index\_inter = 40 samples. For a vehicle mounted UE supporting power class 2, Mpss/sss\_sync\_inter = 24 samples. For a UE supporting power class 3, MSSB\_index\_inter = 24 samples. For a UE supporting power class 4, Mmeas\_period\_inter = 24 samples.

 Mmeas\_period\_inter: For a UE supporting FR2 power class 1 or 5, Mmeas\_period\_inter =40 samples. For a vehicle mounted UE supporting FR2 power class 2, Mpss/sss\_sync\_inter=24 samples. For a UE supporting FR2 power class 3, Mmeas\_period\_inter =24 samples. For a UE supporting FR2 power class 4, Mmeas\_period\_inter = 24 samples.

When UE supports *concurrentMeasGap-r17* and is configured with concurrent measurement gaps,

 Kp is a scaling factor for an SSB frequency layer to be measured without measurement gaps. Kp = Ntotal / Navailable, where Navailable and Ntotal are calculated as follows:

 For a window W of duration max(SMTC period, MGRP\_max), where MGRP max is the maximum MGRP across all configured per-UE MG and per-FR MG within the same FR as the SSB frequency layer, and starting at the beginning of any SMTC occasion:

 Ntotal is the total number of SMTC occasions within the window, including those overlapped with MG occasions within the window, and

 Navailable is the number of SMTC occasions that are not overlapped with any MG occasion within the window W, after accounting for MG collisions by applying the selected gap collision rule provided that concurrent measurement gaps are configured.

 Kp = 1 when Navailable = 0.

Otherwise, when UE is not configured with or UE does not support concurrent measurement gaps:

 When interfrequency SMTC is fully non overlapping with measurement gaps or interfrequency SMTC is fully overlapping with MGs, Kp =1.

 When interfrequency SMTC is partially overlapping with measurement gaps, Kp = 1/(1- (SMTC period /MGRP)), where SMTC period < MGRP. When inter-frequency SMTC is partially overlapping with the VIL of NCSG, Kp = 1/(1- (SMTC period /VIRP)), where SMTC period < VIRP.

For FR2,

 Klayer1\_measurement=1,

- if all of the reference signals configured for RLM, BFD, CBD or L1-RSRP for beam reporting on any FR2 serving frequency in the same band outside measurement gap are not fully overlapped by intra-frequency SMTC occasions, or

- if all of the reference signal configured for RLM, BFD, CBD or L1-RSRP for beam reporting on any FR2 serving frequency in the same band outside measurement gap and fully-overlapped by intra-frequency SMTC occasions are not overlapped with any of the SSB symbols and the RSSI symbols, and 1 symbol before each consecutive SSB symbols and the RSSI symbols, and 1 symbol after each consecutive SSB symbols and the RSSI symbols, given that *SSB-ToMeasure* and *SS-RSSI-Measurement* are configured, where SSB symbols are indicated by *SSB-ToMeasure* and RSSI symbols are indicated by *SS-RSSI-Measurement*;

 Klayer1\_measurement=1.5, otherwise.

 If the above-mentioned reference signal configured for L1-RSRP measurement is aperiodic CSI-RS resource, longer cell identification delay would be expected.

For calculation of Kp, if the high layer signalling (TS 38.331 [2]) of *smtc2* is configured, for cells indicated in the *pci-List* parameter in *smtc2*, the SMTC periodicity corresponds to the value of higher layer parameter *smtc2*; for the other cells, the SMTC periodicity corresponds to the value of higher layer parameter *smtc1.*

Table 9.3.9.1-1: Time period for PSS/SSS detection, (FR1)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_inter |
| No DRX | max( 600ms, ceil( 5 x Kp) x SMTC period )Note 1 x CSSFinter |
| DRX cycle≤ 320ms | max( 600ms, ceil(1.5x 5 x Kp) x max(SMTC period,DRX cycle)) x CSSFinter |
| DRX cycle>320ms | ceil(5 x Kp) x DRX cycle x CSSFinter |
| NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is the one used by the cell being identifiedNOTE 2: VoidNOTE 3: When highSpeedMeasInterFreq-r17 is not configured, M2 = 1.5; When highSpeedMeasInterFreq-r17 is configured, M2 = 1.5 if SMTC periodicity > 40 ms; otherwise M2 = 1 |

Table 9.3.9.1-2: Time period for PSS/SSS detection, (FR2)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_inter |
| No DRX | max(600ms, ceil(Mpss/sss\_sync\_inter x Kp x Klayer1\_measurement)x SMTC period)Note 1 x CSSFinter |
| DRX cycle≤ 320ms | max(600ms, ceil(1.5 x Mpss/sss\_sync\_inter x Kp x Klayer1\_measurement)x max(SMTC period,DRX cycle)) x CSSFinter |
| DRX cycle>320ms | ceil(Mpss/sss\_sync\_inter x Kp x Klayer1\_measurement) x DRX cycle x CSSFinter |
| NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is the one used by the cell being identifiedNOTE 2: Void |

Table 9.3.9.1-3: Time period for time index detection (FR1)

|  |  |
| --- | --- |
| DRX cycle | TSSB\_time\_index\_inter |
| No DRX | max(120ms, ceil( 3 x Kp )x SMTC period)Note 1 x CSSFinter |
| DRX cycle≤ 320ms | max(120ms, ceil (1.5 x 3 x Kp) x max(SMTC period,DRX cycle)) x CSSFinter |
| DRX cycle>320ms | Ceil(3 x Kp) x DRX cycle x CSSFinter |
| NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is the one used by the cell being identifiedNOTE 2: VoidNOTE 3: When highSpeedMeasInterFreq-r17 is not configured, M2 = 1.5; When highSpeedMeasInterFreq-r17 is configured, M2 = 1.5 if SMTC periodicity > 40 ms; otherwise M2 = 1 |

<End of the 9th change>

<Start of the 10th change>

### 9.4.2 NR − E-UTRAN FDD measurements

#### 9.4.2.1 Introduction

The requirements are applicable for NR−E-UTRAN FDD RSRP, RSRQ, and RS-SINR measurements.

In the requirements, an E-UTRAN FDD cell is considered to be detectable when:

- RSRP related conditions in the accuracy requirements in clause 10.2.2 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.3 of TS 36.133 [15],

- RSRQ related conditions in the accuracy requirements in clause 10.2.3 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.3 of TS 36.133 [15],

- RS-SINR related conditions in the accuracy requirements in clause 10.2.5 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.19 of TS 36.133 [15].

#### 9.4.2.2 Requirements when no DRX is used

When the UE requires measurement gaps or NCSG to identify and measure inter-RAT cells and an appropriate measurement gap pattern or NCSG is scheduled, or when the UE is capable of concurrent measurement gap patterns and concurrent measurement gap patterns are scheduled, or an appropriate pre-MG is scheduled and activated, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable FDD cell within TIdentify, E-UTRAN FDD according to the following expression:

 $T\_{Identify, E-UTRAN FDD}=T\_{BasicIdentify}∙\frac{480}{T\_{Inter1}}∙CSSF\_{interRAT} ms$,

where:

 TBasicIdentify = 480 ms,

 TInter1 is defined in clause 9.4.1,

 CSSFinterRAT = CSSFwithin\_gap,i when measurement gaps are configured, or CSSFwithin\_ncsg,i when NCSGs are configured, is the scaling factor for the measured inter-RAT E-UTRA carrier *i* which is calculated as specified in clause 9.1.5.2.

 For a UE supporting and configured with concurrent measurement gaps, Kgap\_EUTRA: it is the scaling factor for an E-UTRAN frequency layer to be measured within the associated measurement gap pattern. Kgap = 1 when the UE is not configured with concurrent measurement gaps. Otherwise, Kgap\_EUTRA = Ntotal / Navailable for UE configured with concurrent measurement gaps.

 For a window W of duration MGRP\_max, where MGRP\_max is the maximum MGRP across all configured per-UE measurement gap(s) and per-FR measurement gap(s) for FR1, and starting from the beginning of any associated gap occasion:

 Ntotal is the total number of associated gap occasions within the window, including those overlapped with other MG occasions within the window, and

 Navailable is the number of non-dropped associated measurement gap occasions after accounting for collisions between the measurement gaps by applying the measurement gap collision rule in section 9.1.8.3.

 Requirements do not apply for UE configured with concurrent measurement gaps, if Navailable =0

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of TMeasure, E-UTRAN FDD defined in Table 9.4.2.2-1.

**Table 9.4.2.2-1:** M**easurement period and measurement bandwidth**

|  |  |  |
| --- | --- | --- |
| **Configuration** | **Physical Layer Measurement period: TMeasure, E-UTRAN FDD [ms]**  | **Measurement bandwidth [RB]** |
| 0 | 480 x [CSSFinterRAT x Ceil(Kgap\_EUTRA)] | 6 |
| 1 (Note 1) | 240 x [CSSFinterRAT x Ceil(Kgap\_EUTRA)] | 50 |
| NOTE 1: This configuration is optional.NOTE 2: Kgap\_EUTRA is only applicable for a UE supporting concurrent measurement gaps. Otherwise Kgap\_EUTRA =1 |

When measurement gaps are scheduled for E-UTRAN FDD inter-RAT measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting RSRP, RSRQ, and RS-SINR measurements to higher layers with measurement period TMeasure, E-UTRAN FDDgiven by table 9.4.2.2-1.

If higher layer filtering is used, an additional cell identification delay can be expected.

The NR – E-UTRAN FDD RSRP measurement accuracy for all measured cells shall be as specified in clause 10.2.2. The NR – E-UTRAN FDD RSRQ measurement accuracy for all measured cells shall be as specified in clause 10.2.3. The NR – E-UTRAN FDD RS-SINR measurement accuracy for all measured cells shall be as specified in clause 10.2.5.

#### 9.4.2.3 Requirements when DRX is used

When DRX is in use and an appropriate measurement gap pattern or NCSG is configured, or when the UE is capable of concurrent measurement gap patterns and concurrent measurement gap patterns are configured, or an appropriate pre-MG is scheduled and activated, the UE shall be able to identify a new detectable E-UTRAN FDD cell within TIdentify, E-UTRAN FDD specified in Table 9.4.2.3-1. When *highSpeedMeasFlag-r16* is configured and UE supports the enhanced inter-RAT E-UTRAN measurement requirements, the UE shall be able to identify a new detectable E-UTRAN FDD cell within TIdentify, E-UTRAN FDD specified in Table 9.4.2.3-2.

 For a UE supporting and configured with concurrent measurement gaps, Kgap\_EUTRA: it is the scaling factor for an E-UTRAN frequency layer to be measured within the associated measurement gap pattern. Kgap = 1 when the UE is not configured with concurrent measurement gaps. Otherwise, Kgap\_EUTRA = Ntotal / Navailable for UE configured with concurrent measurement gaps.

 For a window W of duration MGRP\_max, where MGRP\_max is the maximum MGRP across all configured per-UE measurement gap(s) and per-FR measurement gap(s) for FR1, and starting from the beginning of any associated gap occasion:

 Ntotal is the total number of associated gap occasions within the window, including those overlapped with other MG occasions within the window, and

 Navailable is the number of non-dropped associated measurement gap occasions after accounting for collisions between the measurement gaps by applying the measurement gap collision rule in section 9.1.8.3.

 Requirements do not apply for UE configured with concurrent measurement gaps, if Navailable =0

Table 9.4.2.3-1: Requirement to identify a newly detectable E-UTRAN FDD cell

|  |  |
| --- | --- |
| **DRX cycle length (s)** | **TIdentify, E-UTRAN FDD (s) (DRX cycles)** |
|  | Gap/NCSG period = 40 ms, 20 ms | Gap/NCSG period = 80 ms |
| ≤0.16 | Non-DRX requirements in clause 9.4.2.2 apply | Non-DRX requirements in clause 9.4.2.2 apply |
| 0.256 | 5.12\* CSSFinterRAT x Ceil(Kgap\_EUTRA) (20\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) | 7.68\* CSSFinterRAT x Ceil(Kgap\_EUTRA) (30\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) |
| 0.32 | 6.4\* CSSFinterRAT x Ceil(Kgap\_EUTRA) (20\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) | 7.68\* CSSFinterRAT x Ceil(Kgap\_EUTRA) (24\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) |
| 0.32< DRX-cycle ≤10.24 | Note1 (20\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) | Note1 (20\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) |
| NOTE 1: The time depends on the DRX cycle length.NOTE 2: CSSFinterRAT is as defined in clause 9.4.2.2.NOTE 3: Kgap\_EUTRA is only applicable for a UE supporting concurrent measurement gaps. Otherwise Kgap\_EUTRA =1NOTE 4: If multiple concurrent gaps are configured, the gap period is the periodicity of the MG pattern associated to the E-UTRA inter-RAT frequency layer. |

Table 9.4.2.3-2: Requirement to identify a newly detectable E-UTRAN FDD cell when *highSpeedMeasFlag-r16* is configured

|  |  |
| --- | --- |
| DRX cycle length (s) | TIdentify, E-UTRAN FDD (s) (DRX cycles) |
|  | Gap/NCSG period = 40 ms, 20 ms | Gap/NCSG period = 80 ms |
| ≤0.16 | Non-DRX requirements in clause 9.4.2.2 apply | Non-DRX requirements in clause 9.4.2.2 apply |
| 0.16<DRx cycle<=0.32 |  Note 1(15\*CSSFinterRAT x Ceil((Kgap\_EUTRA)) |  |
| 0.32<DRx cycle <= 0.64 | Note 1(10\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) |  |
| DRx cycle = 1.024 | Note 1(10\*CSSFinterRAT x Ceil( Kgap\_EUTRA)) | Note 1(10\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) |
| DRx cycle = 1.28 | Note 1(8\*CSSFinterRAT x Ceil( Kgap\_EUTRA)) | Note 1(8\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) |
| 1.28< DRX-cycle ≤10.24 | Note1 (20\*CSSFinterRAT x Ceil( Kgap\_EUTRA)) | Note1 (20\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) |
| NOTE 1: The time depends on the DRX cycle length.NOTE 2: CSSFinterRAT is as defined in clause 9.4.2.2.NOTE 3: When *highSpeedMeasFlag-r16* is configured, the requirements apply only to UE supporting either *measurementEnhancement-r16* or *[interRAT-MeasurementEnhancement-r16].*NOTE 4: Kgap\_EUTRA is only applicable for a UE supporting concurrent measurement gaps. Otherwise Kgap\_EUTRA =1NOTE 5: If multiple concurrent gaps are configured, the gap period is the periodicity of the MG pattern associated to the E-UTRA inter-RAT frequency layer. |

When DRX is in use, the UE shall be capable of performing NR – E-UTRAN FDD RSRP, RSRQ, and RS-SINR measurements of at least 4 identified E-UTRAN FDD cells per E-UTRA FDD frequency layer during each layer 1 measurement period, for up to 7 E-UTRA FDD carrier frequency layers, and the UE physical layer shall be capable of reporting NR – E-UTRAN FDD RSRP, RSRQ, and RS-SINR measurements to higher layers with the measurement period Tmeasure, E-UTRAN FDD specified in Table 9.4.2.3-2.

**Table 9.4.2.3-2: Requirement to measure E-UTRAN FDD cells**

|  |  |
| --- | --- |
| **DRX cycle length (s)** | **Tmeasure, E-UTRAN FDD (s) (DRX cycles)**  |
| ≤0.08 | Non-DRX requirements in clause 9.4.2.2 apply |
| 0.08< DRX-cycle ≤10.24 | Note1 (5\* CSSFinterRAT x Ceil(Kgap\_EUTRA)) |
| NOTE 1: The time depends on the DRX cycle length.NOTE 2: CSSFinterRAT is as defined in clause 9.4.2.2.NOTE 3: Kgap\_EUTRA is only applicable for a UE supporting concurrent measurement gaps. Otherwise Kgap\_EUTRA =1 |

If higher layer filtering is used, an additional cell identification delay can be expected.

The NR – E-UTRAN FDD RSRP measurement accuracy for all measured cells shall be as specified in clause 10.2.2. The NR – E-UTRAN FDD RSRQ measurement accuracy for all measured cells shall be as specified in clause 10.2.3. The NR – E-UTRAN FDD RS-SINR measurement accuracy for all measured cells shall be as specified in clause 10.2.5.

<End of the 10th change>

<Start of the 11th change>

### 9.4.3 NR − E-UTRAN TDD measurements

#### 9.4.3.1 Introduction

The requirements are applicable for NR−E-UTRAN TDD RSRP, RSRQ, and RS-SINR measurements.

In the requirements, an E-UTRAN TDD cell is considered to be detectable when:

- RSRP related conditions in the accuracy requirements in clause 10.2.2 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.3 of TS 36.133 [15],

- RSRQ related conditions in the accuracy requirements in clause 10.2.3 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.3 of TS 36.133 [15],

 RS-SINR related conditions in the accuracy requirements in clause 10.2.5 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.19 of TS 36.133 [15].

#### 9.4.3.2 Requirements when no DRX is used

When the UE requires measurement gaps or NCSG to identify and measure inter-RAT cells and an appropriate measurement gap pattern or NCSG is scheduled, or when the UE is capable of concurrent measurement gap patterns and concurrent measurement gap patterns are scheduled, or an appropriate pre-MG is scheduled and activated or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable TDD cell within TIdentify, E-UTRAN TDD according to the following expression:

- When configuration 0 or configuration 1 in Table 9.4.3.2-1 is applied,

 $T\_{Identify, E-UTRAN TDD}=T\_{BasicIdentify}∙\frac{480}{T\_{Inter1}}∙CSSF\_{interRAT} ms$,

- When configuration 2 or configuration 3 in Table 9.4.3.2-1 is applied,

 $T\_{Identify, E-UTRAN TDD}=T\_{BasicIdentify}∙\frac{480}{T\_{Inter1}}∙CSSF\_{interRAT}+240∙CSSF\_{interRAT} ms$,

where:

 TBasicIdentify = 480 ms,

 TInter1 is defined in clause 9.4.1,

 CSSFinterRAT = CSSFwithin\_gap,i when measurement gaps are configured, or CSSFwithin\_ncsg,i when NCSGs are configured, is the scaling factor for the measured inter-RAT E-UTRA carrier *i* which is calculated as specified in clause 9.1.5.2.

For a UE supporting and configured with concurrent measurement gaps, Kgap\_EUTRA: it is the scaling factor for an E-UTRAN frequency layer to be measured within the associated measurement gap pattern. Kgap = 1 when the UE is not configured with concurrent measurement gaps. Otherwise, Kgap\_EUTRA = Ntotal / Navailable for UE configured with concurrent measurement gaps.

- For a window W of duration MGRP\_max, where MGRP\_max is the maximum MGRP across all configured per-UE measurement gap(s) and per-FR measurement gap(s) for FR1, and starting from the beginning of any associated gap occasion:

- Ntotal is the total number of associated gap occasions within the window, including those overlapped with other MG occasions within the window, and

- Navailable is the number of non-dropped associated measurement gap occasions after accounting for collisions between the measurement gaps by applying the measurement gap collision rule in section 9.1.8.3.

- Requirements do not apply for UE configured with concurrent measurement gaps, if Navailable =0

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of TMeasure, E-UTRAN TDD defined in Table 9.4.3.2-1.

Table 9.4.3.2-1: TMeasure, E-UTRAN TDD for different configurations

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Configuration | Measurement bandwidth (RB) | Number of UL/DL sub-frames per half frame (5 ms) | DwPTS | TMeasure, E-UTRAN TDD (ms) |
|  |  | DL | UL | Normal CP | Extended CP |  |
| 0 | 6 | 2 | 2 |  |  | 480 x CSSFinterRAT x Ceil(Kgap\_EUTRA) |
| 1 (Note 1) | 50 | 2 | 2 |  |  | 240 x CSSFinterRAT x Ceil(Kgap\_EUTRA) |
| 2 | 6 | 1 | 3 |  |  | 720 x CSSFinterRAT x Ceil(Kgap\_EUTRA) |
| 3 (Note 1) | 50 | 1 | 3 |  |  | 480 x CSSFinterRAT x Ceil(Kgap\_EUTRA) |
| NOTE 1: This configuration is optional.NOTE 2: VoidNOTE 3: Kgap\_EUTRA is only applicable for a UE supporting concurrent measurement gaps. Otherwise Kgap\_EUTRA =1 |

When measurement gaps are scheduled for E-UTRAN TDD inter-RAT measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting RSRP, RSRQ, and RS-SINR measurements to higher layers with measurement period Tmeasure, E-UTRAN TDD given by table 9.4.3.2-1.

If higher layer filtering is used, an additional cell identification delay can be expected.

The NR – E-UTRAN TDD RSRP measurement accuracy for all measured cells shall be as specified in clause 10.2.2. The NR – E-UTRAN TDD RSRQ measurement accuracy for all measured cells shall be as specified in clause 10.2.3. The NR – E-UTRAN TDD RS-SINR measurement accuracy for all measured cells shall be as specified in clause 10.2.5.

#### 9.4.3.3 Requirements when DRX is used

When DRX is in use and an appropriate measurement gap pattern or NCSG is configured, or when the UE is capable of concurrent measurement gap patterns and concurrent measurement gap patterns are configured, or an appropriate pre-MG is scheduled and activated, the UE shall be able to identify a new detectable E-UTRAN TDD cell within TIdentify, E-UTRAN TDD specified in Table 9.4.3.3-1. When *highSpeedMeasFlag-r16* is configured and UE supports the enhanced inter-RAT E-UTRAN measurement requirements, the UE shall be able to identify a new detectable E-UTRAN TDD cell within TIdentify, E-UTRAN TDD specified in Table 9.4.3.3-2.

 For a UE supporting and configured with concurrent measurement gaps, Kgap\_EUTRA: it is the scaling factor for an E-UTRAN frequency layer to be measured within the associated measurement gap pattern. Kgap = 1 when the UE is not configured with concurrent measurement gaps. Otherwise, Kgap\_EUTRA = Ntotal / Navailable for UE configured with concurrent measurement gaps.

 For a window W of duration MGRP\_max, where MGRP\_max is the maximum MGRP across all configured per-UE measurement gap(s) and per-FR measurement gap(s) for FR1, and starting from the beginning of any associated gap occasion:

 Ntotal is the total number of associated gap occasions within the window, including those overlapped with other MG occasions within the window, and

 Navailable is the number of non-dropped associated measurement gap occasions after accounting for collisions between the measurement gaps by applying the measurement gap collision rule in section 9.1.8.3.

 Requirements do not apply for UE configured with concurrent measurement gaps, if Navailable =0

Table 9.4.3.3-1: Requirement to identify a newly detectable E-UTRAN TDD cell

|  |  |
| --- | --- |
| DRX cycle length (s) | TIdentify, E-UTRAN TDD (s) (DRX cycles) |
|  | Gap/NCSG period = 40 ms, 20 ms | Gap/NCSG period = 80 ms |
| ≤0.16 | Non-DRX requirements in clause 9.4.3.2 apply | Non-DRX requirements in clause 9.4.3.2 apply |
| 0.256 | 5.12\* CSSFinterRAT x Ceil(Kgap\_EUTRA) (20\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) | 7.68\* CSSFinterRAT x Ceil(Kgap\_EUTRA) (30\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) |
| 0.32 | 6.4\* CSSFinterRAT x Ceil(Kgap\_EUTRA) (20\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) | 7.68\* CSSFinterRAT x Ceil(Kgap\_EUTRA) (24\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) |
| 0.32< DRX-cycle ≤10.24 | Note1 (20\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) | Note1 (20\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) |
| NOTE 1: The time depends on the DRX cycle length.NOTE 2: CSSFinterRAT is as defined in clause 9.4.3.2.NOTE 3: Kgap\_EUTRA is only applicable for a UE supporting concurrent measurement gaps. Otherwise Kgap\_EUTRA =1NOTE 4: If multiple concurrent gaps are configured, the gap period is the periodicity of the MG pattern associated to the E-UTRA inter-RAT frequency layer. |

Table 9.4.3.3-2: Requirement to identify a newly detectable E-UTRAN TDD cell when *highSpeedMeasFlag-r16* is configured

|  |  |
| --- | --- |
| DRX cycle length (s) | TIdentify, E-UTRAN TDD (s) (DRX cycles) |
|  | Gap/NCSG period = 40 ms, 20 ms | Gap/NCSG period = 80 ms |
| ≤0.16 | Non-DRX requirements in clause 9.4.3.2 apply | Non-DRX requirements in clause 9.4.3.2 apply |
| 0.16<DRx cycle<=0.32 |  Note 1(15\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) |  |
| 0.32<DRx cycle <= 0.64 | Note 1(10\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) |  |
| DRx cycle = 1.024 | Note 1(10\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) | Note 1(10\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) |
| DRx cycle = 1.28 | Note 1(8\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) | Note 1(8\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) |
| 1.28< DRX-cycle ≤10.24 | Note1 (20\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) | Note1 (20\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) |
| NOTE 1: The time depends on the DRX cycle length.NOTE 2: CSSFinterRAT is as defined in clause 9.4.3.2.NOTE 3: When *highSpeedMeasFlag-r16* is configured, the requirements apply only to UE supporting either *measurementEnhancement-r16* or *[interRAT-MeasurementEnhancement-r16].*NOTE 4: Kgap\_EUTRA is only applicable for a UE supporting concurrent measurement gaps. Otherwise Kgap\_EUTRA =1NOTE 5: If multiple concurrent gaps are configured, the gap period is the periodicity of the MG pattern associated to the E-UTRA inter-RAT frequency layer. |

When DRX is in use, the UE shall be capable of performing NR – E-UTRAN TDD RSRP, RSRQ, and RS-SINR measurements of at least 4 identified E-UTRAN TDD cells per E-UTRA TDD frequency layer during each layer 1 measurement period, for up to 7 E-UTRA TDD carrier frequency layers, and the UE physical layer shall be capable of reporting NR – E-UTRAN TDD RSRP, RSRQ, and RS-SINR measurements to higher layers with the measurement period Tmeasure, E-UTRAN TDD specified in Table 9.4.3.3-3.

Table 9.4.3.3-3: Requirement to measure E-UTRAN TDD cells

|  |  |
| --- | --- |
| DRX cycle length (s) | Tmeasure, E-UTRAN TDD (s) (DRX cycles) |
| ≤0.08 | Non-DRX Requirements in clause 9.4.3.2 apply |
| 0.128 | For configuration 2 Note3, non-DRX requirements in clause 9.4.3.2 apply,Otherwise: Note1 (5\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) |
| 0.128<DRX-cycle≤10.24 | Note1 (5\*CSSFinterRAT x Ceil(Kgap\_EUTRA)) |
| NOTE 1: The time depends on the DRX cycle length.NOTE 2: CSSFinterRAT is as defined in clause 9.4.3.2.NOTE 3: See Table 9.4.3.2-1.NOTE 4: Kgap\_EUTRA is only applicable for a UE supporting concurrent measurement gaps. Otherwise Kgap\_EUTRA =1 |

If higher layer filtering is used, an additional cell identification delay can be expected.

The NR – E-UTRAN TDD RSRP measurement accuracy for all measured cells shall be as specified in clause 10.2.2. The NR – E-UTRAN TDD RSRQ measurement accuracy for all measured cells shall be as specified in clause 10.2.3. The NR – E-UTRAN TDD RS-SINR measurement accuracy for all measured cells shall be as specified in clause 10.2.5.

<End of the 11th change>