**3GPP TSG-RAN4 Meeting #111 *R4-2408649***

**Fukuoka City, Fukuoka, Japan, 20th May 2024 - 24th May 2024**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** | **4522** | **rev** | **-** | **Current version:** | **18.5.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **x** | Core Network |  |

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|  | | | | | | | | | | |
| ***Title:*** | CR to 38.133 on HST FR2 Enhanced RRM Core Maintenance | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_HST\_FR2 | | | | |  | ***Date:*** | | | 2024-05-13 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories 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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | * RAN2 agreed new capability/signalling names for Rel-18 FR2 HST * Value of N in Table 9.5.4.1-3 “Measurement period for Rel-18 FR2 HST should be independent of recent Multi-Rx introduced features | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | * Update the Rel-18 FR2 enhanced HST parameters. * Correct value of N is introduced for Table 9.5.4.1-3 for FR2 HST. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | * HST FR2 RRM requirements will not be defined based on the agreed RAN2 parameters. * There is wrong dependency between FR2 HST operation and Multi-Rx operation | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **x** |  | Test specifications | | | | TS 38.533 | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

<Start of Change # 1>

7.1.2.3 One shot large UL timing adjustment for FR2 Power Class 6 UE

When *highSpeedMeasFlagFR2-r17* is configured and *highSpeedLargeOneStepUL-TimingFR2-r17* is enabled for UE supporting FR2 power class 6 and *ue-OneShotUL-TimingAdj-r17* capability, the following requirements apply to the UE:

If the UE also indicates to support *tci-StateSwitchInd-r18* and *cross-RRH TCI state indicator for UE-specific PDCCH MAC-CE as specified in Clause 6.1.3.77 of TS 38.321 [7]* is indicated as ‘1’ for the TCI state switch

- the UE transmit timing immediately after TCI state switch shall be and clause 7.1.2.1 requirements don’t apply.

- The UE UL transmission timing error after the TCI state switching procedure shall be less than or equal to ±Te as specified in clause 7.1.2 if the new target TCI state is within active TCI state list, otherwise ±7\*64\*Tc, and the reference point is .

If the UE also indicates to support *tci-StateSwitchInd-r18* and *cross-RRH TCI state indicator for UE-specific PDCCH MAC-CE as specified in Clause 6.1.3.77 of TS 38.321 [7]* is indicated as ‘0’ for the TCI state switch

- the requirement in clause 7.1.2.1 apply to the first UL transmission after a TCI state switch.

If the UE does not indicate to support *tci-StateSwitchInd-r18* or *cross-RRH TCI state indicator for UE-specific PDCCH MAC-CE as specified in Clause 6.1.3.77 of TS 38.321 [7]* is not indicated for the TCI state switch

- If the absolute value , the requirement in clause 7.1.2.1 apply to the first UL transmission after a TCI state switch.

- Otherwise, the UE transmit timing immediately after TCI state switch shall be and clause 7.1.2.1 requirements don’t apply.

- The UE UL transmission timing error after the TCI state switching procedure shall be less than or equal to ±Te as specified in clause 7.1.2 if the new target TCI state is within active TCI state list, otherwise ±7\*64\*Tc, and the reference point is .

Above,

- (in units) is the DL timing defined as the time when UE receives downlink frame with new target TCI state.

- (in units) is the DL timing defined as the time when UE receives downlink frame with old source TCI state.

<End of Change #1>

<Start of Change# 2>

7.6 Maximum Receive Timing Difference

7.6.1 Introduction

A UE shall be capable of handling a relative receive timing difference between subframe timing boundary of an E-UTRA cell belonging to the MCG and the closest slot timing boundary of a cell belonging to SCG to be aggregated for EN-DC operation.

A UE shall be capable of handling a relative receive timing difference between subframe timing boundary of an E-UTRA cell belonging to the SCG to be aggregated for NE-DC operation and the closest slot timing boundary of a cell belonging to MCG.

A UE shall be capable of handling a relative receive timing difference between slot timing boundary of a cell belonging to MCG in FR1 or FR2-1 and the closest slot timing boundary of a cell belonging to the SCG FR1 or FR2-1 to be aggregated for NR DC operation.

A UE shall be capable of handling a relative receive timing difference between subframe timing boundary of a cell belonging to MCG in FR1 and the closest subframe timing boundary of a cell belonging to the SCG in FR2-2 to be aggregated for NR DC operation.

A UE shall be capable of handling a relative receive timing difference among the closest slot timing boundaries of different carriers in FR1 and/or FR2-1 to be aggregated in NR carrier aggregation.

A UE shall be capable of handling a relative receive timing difference among the closest subframe timing boundaries of different carriers to be aggregated in FR1 and FR2-2 NR inter-band carrier aggregation.

An FR2-1 PC6 UE supporting *simultaneousReceptionTwoQCL-r18* shall be capable of handling a relative receive timing difference between the subframe boundaries of signals on the same CC received using two different Rx chains simultaneously in HST FR2 bidirectional deployment.

A UE supporting [*FG 40-2-1 or FG 40-2-2*] shall be capable of handling a relative receive timing difference between the slot boundaries of signals on the same CC received from two TRPs.

A UE supporting [*FG 30-1 or 30-2*] shall be capable of handling a relative receive timing difference among the subframe timing boundary of different TCI states indicated for simultaneous reception on a single carrier.

The requirements defined in clause 7.6 are also applicable when UE is configured to receive multiple PDSCH transmission occasions from one or more QCL sources on any one of the aggregated NR carriers.

<End of Change #2>

<Start of Change# 3>

7.6.7 Minimum Requirements for PC6 UE in FR2

In HST FR2 scenario, when *highSpeedMeasFlagFR2-r17* is configured and *highSpeedDeploymentTypeFR2-r17* is configured as bidirectional for a PC6 UE supporting *simultaneousReceptionTwoQCL-r18,* the UE shall be capable of handling a maximum receive timing difference specified as in the below table 7.6.7-1. The specified timing difference is between the subframe boundaries of the signals on the same CC which UE receives using two different Rx chains simultaneously.

**Table 7.6.7-1: Maximum receive timing difference requirement for PC6 UE supporting *simultaneousReceptionTwoQCL-r18***

|  |  |  |
| --- | --- | --- |
| **Frequency Range** | **Subcarrier spacing (kHz)** | **Maximum receive timing difference (µs)** |
| FR2-1 | 120 | 8 |

<End of Change #3>

<Start of Change# 4>

8.1.2.2 Minimum requirement

Editor’s note: The text of the clause is fully omitted due to no changes in it.

**Table 8.1.2.2-3: Evaluation period TEvaluate\_out\_SSB and TEvaluate\_in\_SSB for FR2 power class 6 UE configured with *highSpeedMeasFlagFR2-r17***

|  |  |  |
| --- | --- | --- |
| **Configuration** | **TEvaluate\_out\_SSB (ms)** | **TEvaluate\_in\_SSB (ms)** |
| no DRX | Max(200, Ceil(10 × P × N Note2) × TSSB) | Max(100, Ceil(5 × P × N Note2) × TSSB) |
| DRX cycle≤80ms | Max(200, Ceil(15 × P × N Note2) × Max(TDRX,TSSB)) | Max(100, Ceil(7.5 × P × N Note2) × Max(TDRX,TSSB)) |
| NOTE 1: TSSB is the periodicity of the SSB configured for RLM. TDRX is the DRX cycle length.  NOTE 2: For a UE not supporting *simultaneousReceptionTwoQCL-r18* or when *highSpeedDeploymentTypeFR2-r17* is not configured as *bi-directional*, scaling factor N=2 when *highSpeedMeasFlagFR2-r17* is configured to set1 and scaling factor N=6 when *highSpeedMeasFlagFR2-r17* is configured to set2. For a UE supporting *simultaneousReceptionTwoQCL-r18* and when *highSpeedDeploymentTypeFR2-r17* is configured as *bidirectional*, scaling factor N=1.5 when *highSpeedMeasFlagFR2-r17* is configured to set1 and scaling factor N=4 when *highSpeedMeasFlagFR2-r17* is configured to set2 | | |

<End of Change #4>

<Start of Change# 5>

8.5.2.2 Minimum requirement

Editor’s note: The text of the clause is fully omitted due to no changes in it.

**Table 8.5.2.2-3: Evaluation period TEvaluate\_BFD\_SSB for FR2 power class 6 UE configured with *highSpeedMeasFlagFR2-r17***

|  |  |
| --- | --- |
| **Configuration** | **TEvaluate\_BFD\_SSB (ms)** |
| no DRX | Max(50, Ceil(5 × P × N Note2) × TSSB) |
| DRX cycle ≤ 80ms | Max(50, Ceil(7.5 × P × N Note2) × Max(TDRX,TSSB)) |
| Note 1: TSSB is the periodicity of SSB in the set . TDRX is the DRX cycle length.  Note 2: scaling factor N=2 when *highSpeedMeasFlagFR2-r17* is configured to set1 or scaling factor N=6 when *highSpeedMeasFlagFR2-r17* is configured to set2, if UE is not supporting *simultaneousReceptionTwoQCL-r18* or when *highSpeedDeploymentTypeFR2-r17* is not configured as bidirectional; Scaling factor N=1.5 when *highSpeedMeasFlagFR2-r17* is configured to set1 or scaling factor N=4 when *highSpeedMeasFlagFR2-r17* is configured to set2, if UE is supporting *simultaneousReceptionTwoQCL-r18* and when *highSpeedDeploymentTypeFR2-r17* is configured as bidirectional. | |

<End of Change #5>

<Start of Change# 6>

8.10.3A MAC-CE based TCI state switch delay in HST FR2 scenarios

For FR2 power class 6 UE*,* if the target TCI state is known, upon receiving PDSCH carrying MAC-CE activation command in slot n, UE shall be able to receive PDCCH with target TCI state of the serving cell on which TCI state switch occurs at the symbol m of the first slot that is after slot n+ THARQ + + TOk\*(Tfirst-SSB + TSSB-proc + Trs + Trs-proc) / *NR slot length*. The UE shall be able to receive PDCCH with the old TCI state until slot n+ THARQ + .Where THARQ is the timing between DL data transmission and acknowledgement as specified in TS 38.213 [3];

- Tfirst-SSB is time to first SSB transmission after MAC CE command is decoded by the UE;

- TSSB-proc = 2 ms;

- Trs is time to the first TRS or SSB transmission after the SSB transmission in the definition of Tfirst-SSB is processed by the UE;

- Trs-proc = 2 ms;

- TOk = 1, m = 0 if target TCI state is not in the active TCI state list for PDSCH; otherwise TOk = 0, m = 1.

For FR2 power class 6 UE, if the target TCI state is unknown, the same requirement for unknown target TCI state case specified in clause 8.10.3 applies.

For FR2 power class 6 UE if the UE indicates to support *tci-StateSwitchInd-r18* and *cross-RRH TCI state indicator for UE-specific PDCCH MAC-CE as specified in Clause 6.1.3.77 of TS 38.321 [7]* is indicated as ‘0’ for the TCI state switch, the same requirement specified in clause 8.10.3 applies.

<End of Change #6>

<Start of Change# 7>

9.2.5 Intrafrequency measurements without measurement gaps

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 with SCS smaller or equal to 480 kHz.

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

- 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.

- For UE indicating *no-gap-no-interruption*, TPSS/SSS\_sync\_intra is given in Table 9.2.5.1-1 for FR1 and Table 9.2.5.1-2 for FR2. For UE indicating *no-gap-with-interruption*, TPSS/SSS\_sync\_intra is given in Table 9.2.5.1-17 for FR1 and Table 9.2.5.1-18 for FR2.

- Otherwise, TPSS/SSS\_sync\_intra is 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).

TSSB\_time\_index\_intra: it is the time period used to acquire the index of the SSB being measured

- For UE indicatting *no-gap-no-interruption*, TSSB\_time\_index\_intra is given in Table 9.2.5.1-3 for FR1 and Table 9.2.5.1-15 for FR2-2. For UE indicating *no-gap-with-interruption*, TSSB\_time\_index\_intra is given in Table 9.2.5.1-19 for FR1 and Table 9.2.5.1-20 for FR2-2.

- Otherwise, TSSB\_time\_index\_intra is given in table 9.2.5.1-3, 9.2.5.1-15 (FR2-2), 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

- 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.

- For UE indicating *no-gap-no-interruption*, TSSB\_measurement\_period\_intra is given in Table 9.2.5.2-1 for FR1 and Table 9.2.5.2-2 for FR2. For UE indicating *no-gap-with-interruption*, TSSB\_measurement\_period\_intra is given in Table 9.2.5.2-10 for FR1 and Table Table 9.2.5.2-11 for FR2.

- For power class 6 UE supporting *measEnhCAInterFreqFR2-r18* when [*highSpeedMeasFlagFR2]* is configured, the T SSB\_measurement\_period\_intra given in Table 9.2.5.2-7 (if SMTC <= 40ms) and Table 9.2.5.2-2 (if SMTC > 40ms) shall apply for SCC.

<End of Change #7>

<Start of Change# 8>

9.2.5.2 Measurement period

The measurement period for intra-frequency measurements without gaps is as shown in table 9.2.5.2-1, 9.2.5.2-2, 9.2.5.2-3 (deactivated SCell), 9.2.5.2-4 (deactivated SCell), 9.2.5.2-8 (deactivated SCG applicable for PSCell) or 9.2.5.2-9 (deactivated SCG applicable for PSCell). When *highSpeedMeasFlag-r16* is configured, T SSB\_measurement\_period\_intra is specified in Table 9.2.5.2-5. When UE *highSpeedMeasFlagFR2-r17* is 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. For power class 6 UE supporting *measEnhCAInterFreqFR2-r18* when [*highSpeedMeasFlagFR2]* is configured, the T SSB\_measurement\_period\_intra given in Table 9.2.5.2-7 (if SMTC <= 40ms) and Table 9.2.5.2-2 (if SMTC > 40ms) shall apply for SCC.

<End of Change #8>

<Start of Change# 9>

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 with SCS smaller or equal to 480 kHz.

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.

- For UE supporting power class 6 with *highSpeedMeasFlagFR2-r17* configured, if SMTC <= 40ms, TPSS/SSS\_sync\_intra is given in Table 9.2.6.2-9; otherwise, TPSS/SSS\_sync\_intra is given in Table 9.2.6.2-2.

TSSB\_time\_index\_intra: it is the time period used to acquire the index of the SSB being measured given in table 9.2.6.2-3 or 9.2.6.2-10 (for FR2-2).

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.

- For UE supporting power class 6 with *highSpeedMeasFlagFR2-r17* configured, if SMTC <= 40ms, TSSB\_measurement\_period\_intra is given in Table 9.2.6.3-4; otherwise, T SSB\_measurement\_period\_intra is given in Table 9.2.6.3-2.

- For power class 6 UE supporting *measEnhCAInterFreqFR2-r18* when [*highSpeedMeasFlagFR2]* is configured, the T SSB\_measurement\_period\_intra given in Table 9.2.6.3-4 (if SMTC <= 40ms) and Table 9.2.6.3-2 (if SMTC > 40ms) shall apply for SCC.

<End of Change #9>

<Start of Change# 10>

9.2.6.3 Intrafrequency Measurement Period

The requirements in this clause apply when a measurement gap is provided or when an activated Pre-MG is provided without any pre-MG status changed during the measurement period.

The measurement period for FR1 intrafrequency measurements with gaps is as shown in table 9.2.6.3-1.

The measurement period for FR2 intrafrequency measurements with gaps is as shown in table 9.2.6.3-2.

When *highSpeedMeasFlag-r16* is configured, T SSB\_measurement\_period\_intra is specified in Table 9.2.6.3-3.

For UE supporting power class 6 with *highSpeedMeasFlagFR2-r17* configured, if SMTC <= 40ms, TSSB\_measurement\_period\_intra is given in Table 9.2.6.3-4; otherwise, T SSB\_measurement\_period\_intra is given in Table 9.2.6.3-2.

For power class 6 UE supporting *measEnhCAInterFreqFR2-r18* when [*highSpeedMeasFlagFR2]* is configured, the T SSB\_measurement\_period\_intra given in Table 9.2.6.3-4 (if SMTC <= 40ms) and Table 9.2.6.3-2 (if SMTC > 40ms) shall apply for SCC.

If MCG DRX is in use, measurement period requirements for intra-frequency measurement in MCG specified in Table 9.2.6.3-1 and Table 9.2.6.3-2, shall depend on the MCG DRX cycle. If SCG DRX is in use, measurement period requirements for intra-frequency measurement in SCG specified in Table 9.2.6.3-1and Table 9.2.6.3-2, shall depend on the SCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply.

<End of Change #10>

<Start of Change# 11>

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) or *deriveSSB-IndexFromCellInter-r17* is configured for the FR1 and FR2-1 target frequency layers and and UE supporting *deriveSSB-IndexFromCellInterNon-NCSG-r17*. 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, table 9.3.4-5 when *highSpeedMeasInterFreq-r17* is configured and UE supports measurementEnhancementInterFreq-r17 and table 9.3.4-9 when *highSpeedMeasFlagFR2-r17* is configured and UE supports *measEnhCAInterFreqFR2-r18*. When the SCG is deactivated, table 9.3.4-7 applies for an inter-frequency carrier configured by SCG and not configured by MCG and table 9.3.4-2 applies for an inter-frequency carrier configured by both SCG and MCG. Regardless of whether the SCG is activated or deactivated, table 9.3.4-2 applies for an inter-frequency carrier configured only by MCG.

- For UE supporting power class 6 and *measEnhCAInterFreqFR2-r18* with *highSpeedMeasFlagFR2-r17* configured, if SMTC <= 40ms, TPSS/SSS\_sync\_inter is given in Table 9.3.4-9; otherwise, TPSS/SSS\_sync\_inter is given in Table 9.3.4-2.

TSSB\_time\_index\_inter: it is the time period used to acquire the index of the SSB being measured given in table 9.3.4-3,table 9.3.4-6 when *highSpeedMeasInterFreq* is configured and UE supports measurementEnhancementInterFreq-r17, and table 9.3.4-10 when *highSpeedMeasFlagFR2-r17* is configured and UE supports [*measurementEnhancementCAInterFreqFR2-r18*]. When the SCG is deactivated, table 9.3.4-8 applies for an inter-frequency carrier configured by SCG and not configured by MCG and table 9.3.4-4 applies for an inter-frequency carrier configured by both SCG and MCG. Regardless of whether the SCG is activated or deactivated, table 9.3.4-4 applies for an inter-frequency carrier configured only by MCG.

- For UE supporting power class 6 and *measEnhCAInterFreqFR2-r18* with *highSpeedMeasFlagFR2-r17* configured, if SMTC <= 40ms, TSSB\_measurement\_period\_inter is given in Table 9.3.5-5; otherwise, TSSB\_measurement\_period\_inter is given in Table 9.3.5-2.

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, table 9.3.5-3 when *highSpeedMeasInterFreq* is configured and UE supports measurementEnhancementInterFreq-r17, and in table 9.3.5-5 when *highSpeedMeasFlagFR2-r17* is configured and UE supports *measEnhCAInterFreqFR2-r18*. When the SCG is deactivated, table 9.3.5-4 applies for an inter-frequency carrier configured by SCG and not configured by MCG and table 9.3.5-2 applies for an inter-frequency carrier configured by both SCG and MCG. Regardless of whether the SCG is activated or deactivated, table 9.3.5-2 applies for an inter-frequency carrier configured only by MCG.

- For UE supporting power class 6 and *measEnhCAInterFreqFR2-r18* with *highSpeedMeasFlagFR2-r17* configured, TSSB\_measurement\_period\_inter is given in Table 9.3.5-5; otherwise, TSSB\_measurement\_period\_inter is given in Table 9.3.5-2.

Mpss/sss\_sync\_inter: For a UE supporting FR2-1 power class 1 or 5, Mpss/sss\_sync\_inter = 64 samples. For a UE supporting FR2-1 power class 2, Mpss/sss\_sync\_inter = 40 samples. For a UE supporting FR2-1 power class 3, Mpss/sss\_sync\_inter = 40 samples. For a UE supporting FR2-1 power class 4, Mpss/sss\_sync\_inter = 40 samples. For a UE supporting FR2-2 power class 1, Mpss/sss\_sync\_inter = 96. For a UE supporting FR2-2 power class 2, Mpss/sss\_sync\_inter = 60. For a UE supporting FR2-2 power class 3, Mpss/sss\_sync\_inter = 60.

MSSB\_index\_inter: For a UE supporting FR2-1 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 FR2-1 power class 3, MSSB\_index\_inter = 24 samples. For a UE supporting FR2-1 power class 4, MSSB\_index\_inter = 24 samples. For a UE supporting FR2-2 power class 2 or 3, MSSB\_index\_inter = 48 samples. For a UE supporting FR2 power class 1, MSSB\_index\_inter = 72 samples.

Mmeas\_period\_inter: For a UE supporting FR2-1 power class 1 or 5, Mmeas\_period\_inter =64. For a UE supporting FR2-1 power class 2, Mmeas\_period\_inter=40. For a UE supporting FR2-1 power class 3, Mmeas\_period\_inter =40. For a UE supporting FR2-1 power class 4, Mmeas\_period\_inter = 40. For a UE supporting FR2-2 power class 1, Mmeas\_period\_inter = 96. For a UE supporting FR2-2 power class 2, Mmeas\_period\_inter = 60. For a UE supporting FR2-2 power class 3, Mmeas\_period\_inter = 60.

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 GAPs or MUSIM gaps. Otherwise, Kgap = Ntotal / Navailable, where Navailable and Ntotal are calculated as follows:

- For a window W of duration max(SMTC period, xRP\_max), where xRP\_max is the maximum xRP across all configured per-UE measurement GAPs, periodic MUSIM gaps, and/or per-FR measurement GAPs 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 GAP occasions and MUSIM 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 and MUSIM gap collisions by applying the collision rules for the GAP and MUSIM gap in section 9.1.8.3, 9.1.10.5, 9.1.12.3, and 9.1.13.3, respectively.

- xRP = MGRP when configured GAP is activated Pre-MG or MG, and xRP = VIRP when configured GAP is NCSG, also xRP = MGRP for periodic MUSIM gap.

Kgap is only applicable for UE supporting concurrent GAPs or MUSIM gaps. When concurrent GAPs or MUSIM gaps are configured, requirements in this clause do not apply if Navailable =0.

When UE supports [*musim-GapPreference-r17*] and if the configured aperiodic MUSIM gap collides with the measurement gap associated with the target frequency layer, where MUSIM gap collision rule in section 9.1.10.4 is applied, longer cell identification period for the target inter-frequency is expected.

**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 3.6.1  NOTE 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 MGRP above is the MGRP of the activated Pre-MG or the measurement gap associated with the target frequency layer to be measured if concurrent 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 x KFR) × Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320ms | Max(600ms, Ceil(1.5 \* Kgap × Mpss/sss\_sync\_inter x KFR) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320ms | Ceil(Kgap × Mpss/sss\_sync\_inter x KFR) × DRX cycle × CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1  NOTE 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 MGRP above is the MGRP of the activated Pre-MG or the measurement gap associated with the target frequency layer to be measured if concurrent GAPs are configured.  NOTE 4: KFR is a scaling factor depending on the frequency range and the SSB SCS. For FR2-1, KFR = 1. For FR2-2: KFR = 1 if the SCS of the SSB of the cell being detected is 120 kHz, KFR = 2 if the SCS of the SSB of the cell being detected is 480 kHz, and KFR = 3 if the SCS of the SSB of the cell being detected is 960 kHz. | |

**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 3.6.1  NOTE 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 MGRP above is the MGRP of the activated Pre-MG or the measurement gap associated with the target frequency layer to be measured if concurrent 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 3.6.1  NOTE 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 MGRP above is the MGRP of the activated Pre-MG or the measurement gap associated with the target frequency layer to be measured if concurrent 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(600ms, N1 × Max(MGRP, SMTC period)) × CSSFinter  N1 = 7 |
| DRX cycle ≤ 160ms | max(600ms, ceil(N2) x max(MGRP, SMTC period, DRX cycle)) x CSSFinter  N2 = 7 x M2 |
| 160ms < DRX cycle ≤ 320ms | ceil(N3) x DRX cycle x CSSFinter  N3 = 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 identified  NOTE 2: M2 = 1.5 if SMTC periodicity > 40 ms, otherwise M2=1  NOTE 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 3.6.1  NOTE 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. | |

**Table 9.3.4-7: Time period for PSS/SSS detection when the inter-frequency carrier is configured only by SCG and the SCG is deactivated (FR2)**

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

**Table 9.3.4-8: Time period for time index detection when inter-frequency carrier is configured only by SCG and the SCG is deactivated (FR2)**

|  |  |
| --- | --- |
| **Condition NOTE1,2** | **TSSB\_time\_index\_inter** |
| No DRX | Max(200ms, Ceil(Kgap × MSSB\_index\_inter)× Max(MGRP, measCyclePSCell)) × CSSFinter |
| DRX cycle ≤ 320ms | Max(200ms, Ceil(1.5 \* Kgap × MSSB\_index\_inter) × Max(MGRP, measCyclePSCell, DRX cycle)) × CSSFinter |
| DRX cycle > 320ms | Ceil(Kgap ×MSSB\_index\_inter) × Max(measCyclePSCell, DRX cycle) × CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1.  NOTE 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 MGRP above is the MGRP of the activated Pre-MG or the measurement gap associated with the target frequency layer to be measured if concurrent GAPs are configured. | |

**Table 9.3.4-9: Time period for PSS/SSS detection when *highSpeedMeasFlagFR2-r17* is configured, (FR2-1) when SMTC period <=40ms**

|  |  |
| --- | --- |
| **DRX cycle** | **TPSS/SSS\_sync\_inter** |
| No DRX | max(600ms, M1Note 3 x Kgap x max(MGRP, SMTC period)) x CSSFinter |
| DRX cycle≤ 80ms | max(600ms, ceil(M1Note 3 x Kgap) x max(MGRP, SMTC period, DRX cycle))x CSSFinter |
| 80ms< DRX cycle≤ 320ms | max(600ms, ceil(Mpss/sss\_sync\_with\_gaps x Kgap) x max(MGRP, SMTC period, DRX cycle))x CSSFinter |
| DRX cycle>320ms | Ceil( Mpss/sss\_sync\_with\_gaps x Kgap ) x max(MGRP, DRX cycle) x CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1  NOTE 2: For a UE supporting concurrent GAPs, the MGRP above is the MGRP of the activated Pre-MG or the measurement gap associated with the target frequency layer to be measured if concurrent GAPs are configured.  NOTE 3: For UE supporting power class 6 and *measEnhCAInterFreqFR2-r18*, M1= 6 if *highSpeedMeasFlagFR2-r17* = set1 or M1= 18 if *highSpeedMeasFlagFR2-r17* = set2 | |

**Table 9.3.4-10: Time period for time index detection when when *highSpeedMeasFlagFR2-r17* is configured (Frequency range FR2-1) when SMTC period <= 40ms**

|  |  |
| --- | --- |
| **Condition NOTE1,2** | **TSSB\_time\_index\_inter** |
| No DRX | Max(200ms, Ceil(Kgap × , M1Note 3)× Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle≤ 80ms | Max(200ms, Ceil(1.5 \* Kgap × M1Note 3) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| 80ms< 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 3.6.1  NOTE 2: For a UE supporting concurrent GAPs, the MGRP above is the MGRP of the activated Pre-MG or the measurement gap associated with the target frequency layer to be measured if concurrent GAPs are configured.  NOTE 3: For UE supporting power class 6 and *measEnhCAInterFreqFR2-r18*, M1= 6 if *highSpeedMeasFlagFR2-r17* = set1 or M1= 18 if *highSpeedMeasFlagFR2-r17* = set2 | |

**Table 9.3.4-11: Time period for time index detection for a UE operating on a target cell with 12 PRB SSB (Frequency range FR1)**

|  |  |
| --- | --- |
| **Condition NOTE1** | **TSSB\_time\_index\_inter\_less\_than\_5Mhz** |
| No DRX | Max(120ms, Ceil([6] \* Kgap)× Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320ms | Max(120ms, Ceil([6] × 1.5 \* Kgap) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320ms | Ceil([6]\* Kgap)× DRX cycle × CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1  NOTE 2: FFS When *highSpeedMeasInterFreq-r17* | |

<End of Change #11>

<Start of Change# 12>

9.3.5 Inter-frequency measurements

Editor’s note: The text of the clause is fully omitted due to no changes in it.

**Table 9.3.5-5: Measurement period for inter-frequency measurements with gaps when *highSpeedMeasFlagFR2-r17* is configured (FR2-1) when SMTC period<=40ms**

|  |  |
| --- | --- |
| **DRX cycle** | **T SSB\_measurement\_period\_inter** |
| No DRX | max(400ms, ceil(M1Note 3 x Kgap ) x max(MGRP, SMTC period)) x CSSFinter |
| DRX cycle≤ 80ms | max(400ms, ceil(M1Note 3 x Kgap) x max(MGRP, SMTC period, DRX cycle)) Note 1 x CSSFinter |
| 80ms< DRX cycle≤ 320ms | max(400ms, ceil(Mmeas\_period with\_gaps x Kgap) x max(MGRP, SMTC period, DRX cycle)) Note 1 x CSSFinter |
| DRX cycle>320ms | Ceil( Mmeas\_period with\_gaps x Kgap ) x max(MGRP, DRX cycle) x CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1  NOTE 2: For a UE supporting concurrent measurement GAPs, the MGRP above is the MGRP of the activated Pre-MG or the measurement gap associated with the target frequency layer to be measured if concurrent GAPs are configured.  NOTE 3: For UE supporting power class 6 and *measEnhCAInterFreqFR2-r18*, M1= 6 if *highSpeedMeasFlagFR2-r17* = set1 or M1= 18 if *highSpeedMeasFlagFR2-r17* = set2 | |

<End of Change #12>

<Start of Change# 13>

9.3.9 Inter frequency measurements without measurement gaps

9.3.9.1 Inter frequency Cell identification

UE satisfying the applicability conditions specified in 9.3.1 on the requirement in this clause 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) or *deriveSSB-IndexFromCellInter-r17* is configured for the FR1 and FR2-1 target frequency layers and and UE supporting *deriveSSB-IndexFromCellInterNon-NCSG-r17*. 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.

- For inter-frequency SSB based measurements without measurement gaps in active BWP, it is assumed that when UE performs inter-frequency measurements without measurement gaps in a TDD bands on FR1 and FR2, SFN and frame boundary across serving cell and inter-frequency neighbor cells is 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

- For inter-frequency SSB based measurements without measurement gaps in active BWP, and UE supports interFrequencyMeas-Nogap-r16, TPSS/SSS\_sync\_inter is given in table 9.3.9.1-1 and table 9.3.9.1-2.

- For UE indicating [nogap-nointerurption], TPSS/SSS\_sync\_inter is given in Table 9.3.9.1-1 for FR1 and Table 9.3.9.1-2 for FR2

- For UE indicating [nogap-interruption], TPSS/SSS\_sync\_inter is given in Table 9.3.9.1-1a for FR1 and Table 9.3.9.1-2a for FR2.

- TSSB\_time\_index\_inter: it is the time period used to acquire the index of the SSB being measured

- For inter-frequency SSB based measurements without measurement gaps in active BWP, and UE supports interFrequencyMeas-Nogap-r16, TSSB\_time\_index\_inter is given in table 9.3.9.1-3 and table 9.3.9.1-4.

- For UE indicating [nogap-nointerurption], TSSB\_time\_index\_inter is given in Table 9.3.9.1-3 for FR1 and Table 9.3.9.1-4 for FR2

- For UE indicating [nogap-interruption], TSSB\_time\_index\_inter is given in Table 9.3.9.1-3a for FR1 and Table 9.3.9.1-4a for FR2.

- T SSB\_measurement\_period\_inter: equal to a measurement period of SSB based measurement

- For inter-frequency SSB based measurements without measurement gaps in active BWP, and UE supports interFrequencyMeas-Nogap-r16, T SSB\_measurement\_period\_inter is given in table 9.3.9.2-1, table 9.3.9.2-2, table 9.3.9.2-3 and table 9.3.9.2-3a when *highSpeedMeasInterFreq-r17* is configured and UE supports measurementEnhancementInterFreq-r17, and table 9.3.9.2-4 when *highSpeedMeasFlagFR2-r17* is configured and UE supports *measEnhCAInterFreqFR2-r18*.

- For UE indicating [nogap-nointerurption], T SSB\_measurement\_period\_inter is given in Table 9.3.9.2-1 for FR1, table 9.3.9.2-2 for FR2, and table 9.3.9.2-3 when *highSpeedMeasInterFreq-r17* is configured and UE supports measurementEnhancementInterFreq-r17.

- For UE indicating [nogap-interruption], T SSB\_measurement\_period\_inter is given in Table 9.3.9.2-1a for FR1 and table 9.3.9.2-2a for FR2, and table 9.3.9.2-3b when *highSpeedMeasInterFreq-r17* is configured and UE supports measurementEnhancementInterFreq-r17.

- For UE supporting power class 6 and *measEnhCAInterFreqFR2-r18* with *highSpeedMeasFlagFR2-r17* configured, if SMTC <= 40ms, TSSB\_measurement\_period\_inter is given in Table 9.3.9.2-x; otherwise, TSSB\_measurement\_period\_inter is given in Table 9.3.9.2-2.

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 GAP, i.e. when interfrequency SMTC is fully non overlapping or partially overlapping with GAPs.

<End of Change #13>

<Start of Change# 14>

9.5.4 L1-RSRP measurement requirements

9.5.4.1 SSB based L1-RSRP Reporting

When *groupBasedBeamReporting-r17* is not configured, the UE shall be capable of performing L1-RSRP measurements based on the configured SSB resource for L1-RSRP computation, and the UE physical layer shall be capable of reporting L1-RSRP measured over the measurement period of TL1-RSRP\_Measurement\_Period\_SSB.

When *groupBasedBeamReporting-r17* is configured, the UE shall be capable of performing L1-RSRP measurements based on the two configured SSB resource sets for L1-RSRP, and the UE physical layer shall be capable of reporting group-based L1-RSRP measured over the measurement period of TL1-RSRP\_Measurement\_Period\_SSB.

When there is no intra-frequency L1-RSRP measurement on LTM neighbor cell(s) to measure, the value of TL1-RSRP\_Measurement\_Period\_SSB is defined in Table 9.5.4.1-1 for FR1, the value of TL1-RSRP\_Measurement\_Period\_SSB is defined in Table 9.5.4.1-2 for FR2 when *highSpeedMeasFlagFR2-r17* is not configured and if *groupBasedBeamReporting-r17* is not configured, and defined in Table 9.5.4.1-2A for FR2-1 when *highSpeedMeasFlagFR2-r17* is not configured and if *groupBasedBeamReporting-r17* is configured, and defined in Table 9.5.4.1-3 for FR2 power class 6 UE when *highSpeedMeasFlagFR2-r17* is configured, where

- M=1 if higher layer parameter *timeRestrictionForChannelMeasurement* is configured, and M=3 otherwise

- The value of N in Table 9.5.4.1-2 is [*reducedRxBeamNum*] for UE supporting [faster beam switching capability] and activated with multi-Rx operation, otherwise the value of N in Table 9.5.4.1-2 is 8.

*Editor note: FFS how to capture UE is activated with multi-Rx operation.*

- The value of N in Table 9.5.4.1-2A is 8.

- The value of N in Table 9.5.4.1-3 is 8.

For a UE supporting [*support for Case 1 requirements*] and when concurrent measurement gap(s) with Pre-MG(s) are configured, or a UE supporting [*support for Case 2 requirements*] and when concurrent measurement gap(s) with NCSG measurement gap(s) are configured, or a UE supporting *concurrentMeasGap-r17* or *musim-GapPreference-r17* or both concurrent GAP and *musim-GapPreference-r17* and when concurrent gaps or periodic MUSIM gaps or both concurrent gaps and periodic MUSIM gaps are configured,

<End of Change #14>

<Start of Change# 15>

### 9.5.4 L1-RSRP measurement requirements

#### 9.5.4.1 SSB based L1-RSRP Reporting

Editor’s note: The text is omitted due to no changes in it.

**Table 9.5.4.1-3: Measurement period TL1-RSRP\_Measurement\_Period\_SSB configured with *highSpeedMeasFlagFR2-r17* for FR2**

|  |  |
| --- | --- |
| **Configuration** | **TL1-RSRP\_Measurement\_Period\_SSB (ms)** |
| non-DRX | max(TReport, ceil(M\*P\*N1Note2)\*TSSB) |
| DRX cycle ≤ 80ms | max(TReport, ceil(M\*P\*N1Note2\*M2)\*max(TDRX,TSSB)) |
| 80ms< DRX ≤ 320ms | max(TReport, ceil(1.5\*M\*P\*N)\*max(TDRX,TSSB)) |
| DRX cycle > 320ms | ceil(1.5\*M\*P\*N)\*TDRX |
| Note1: TSSB = ssb-periodicityServingCell is the periodicity of the SSB-Index configured for L1-RSRP measurement. TDRX is the DRX cycle length. TReport is configured periodicity for reporting.  Note 2: Scaling factor N1 = 2 when *highSpeedMeasFlagFR2-r17* = set1 or scaling factor N1 = 6 when *highSpeedMeasFlagFR2-r17* = [set2], if UE does not support *simultaneousReceptionTwoQCL-r18* or when *highSpeedDeploymentTypeFR2-r17* is not configured as bidirectional. Scaling factor N1 = 1.5 when *highSpeedMeasFlagFR2-r17* is configured to set1 or scaling factor N1 = 4 when *highSpeedMeasFlagFR2-r17* is configured to set2, if UE supports *simultaneousReceptionTwoQCL-r18* and when *highSpeedDeploymentTypeFR2-r17* is configured as bidirectional.  Note 3: M2 = 1.5 if SMTC periodicity > 40 ms; otherwise M2 = 1 | |

<End of Change #15>