**3GPP TSG-RAN WG4 Meeting # 115 *R4-2508457***

**Saint Julian’s, Malta, 19 May - 23 May, 2025**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** | **DraftCR** | **rev** | **-** | **Current version:** | **19.0.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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| ***Title:*** | Draft big CR for NR Radio Resource Management (RRM) Phase 5 | | | | | | | | | |
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| ***Source to WG:*** | Apple, CATT | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_RRM\_Ph5-Core | | | | |  | ***Date:*** | | | 2025-05-26 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-19 |
|  | *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)* | |
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| ***Reason for change:*** | | Introduce the core requirements for NR Radio Resource Management (RRM) Phase 5, including CSSF optimization, BSF optimization and EMR-based fast SCell activation. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | This draft bigCR includes the following endorsed draft CRs:  **Draft CRs endorsed in RAN4#114bis:**  Rx BSF optimization:   |  |  |  | | --- | --- | --- | | **T-doc** | **Company** | **Title** | | R4-2503357 | OPPO | DraftCR on Multi-Rx based RRC Connection Release with Redirection requirements | | R4-2504957 | CATT | DraftCR on SSB-based intra-frequency measurement without gap delay reduction by optimizing Rx BSF | | R4-2504958 | CMCC | DraftCR for optimizing Rx beam sweeping factor on SSB based Inter-frequency measurement with MG | | R4-2504959 | Nokia | Draft CR HO requirements and FBS requirement applicability | | R4-2504960 | ZTE Corporation, Sanechips | Draft CR on FBS based RRC Re-establishment for R19 RRM enh | | R4-2504970 | Apple | Draft CR on SSB based Intra-frequency measurement with MG | | R4-2504971 | MediaTek Germany GmbH | draft CR for Rx beam sweeping optimization for SSB based Intra-frequency measurement with NCSG |   **Draft CRs endorsed in RAN4#115:**  CSSF optimization   |  |  |  | | --- | --- | --- | | **T-doc** | **Company** | **Title** | | R4-2508319 | Apple, CATT, Ericsson | draft CR for Rel-19 CSSF enhancement solution 1 (one CC measurement per band) | | R4-2508333 | Huawei, HiSilicon | CR on L3 measurement delay by utilising 3-searcher solution to optimise CSSF outside gap for Rel-19 |   Rx BSF optimization:   |  |  |  | | --- | --- | --- | | **T-doc** | **Company** | **Title** | | R4-2508427 | OPPO | DraftCR on Multi-Rx based RRC Connection Release with Redirection requirements | | R4-2508428 | Nokia | DraftCR for FBS requirement maintenance | | R4-2505995 | CATT, OPPO | DraftCR on Multi-Rx based inter-frequency measurement with NCSG | | R4-2506615 | CMCC | DraftCR for optimizing Rx beam sweeping factor on RRC connection release with redirection to NR | | R4-2508431 | Huawei, HiSilicon | DraftCR on FBS L3 measurement for inter-frequency without gap |   EMR-based fast SCell activation:   |  |  |  | | --- | --- | --- | | **T-doc** | **Company** | **Title** | | R4-2508432 | CATT, Apple, Huawei, HiSilicon, Ericsson | CR for fast SCell activation for UE supporting Rel-18 EMR | | R4-2507222 | Nokia | draftCR to 38.133 on Fast SCell activation with EMR | | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | the core requirements for NR Radio Resource Management (RRM) Phase 5, including CSSF optimization, BSF optimization and EMR-based fast SCell activation, are missing in R19 spec. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 3.6.x (new),  6.1.1.4.2, 6.1.1.5.2, 6.2.1.2.1, 6.2.3.2.1,  8.3.2A (new), 8.3.4, 8.3.12,  9.2.5.1, 9.2.3.2, 9.2.6.2, 9.2.7.1, 9.3.4, 9.3.9.1, 9.3.10.1. | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | NA | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

<Start of Change 1>

3.6.x Applicability of requirements for UE supporting L3 fast beam sweeping operation in FR2-1

The requirements related to the support of [*Rel-19 reduced L3 beam sweeping capability*] are applicable when

- the carrier to be measured is the only carrier in the FR2-1 band, which is configured for L3 SSB measurement, and

- UE is not configured with CA or DC.

<End of Change 1>

<Start of Change 2>

6.1.1.4.2 Interruption time

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay.

When intra-frequency or inter-frequency handover is commanded, the interruption time shall be less than Tinterrupt

Tinterrupt = Tsearch + TIU + Tprocessing + T∆ + Tmargin ms

Where:

Tsearch is the time required to search the target cell when the handover command is received by the UE. Regardless of whether DRX is in use by the UE, Tsearch shall still be based on non-DRX target cell search times.

- If the target cell is a known intra-frequency cell, then Tsearch = 0 ms.

- If the target cell is an unknown intra-frequency cell and the target cell Es/Iot≥-2 dB, then Tsearch = N\* Trs ms.

- If the target cell is a known inter-frequency cell, then

- For a UE supporting *ncd-SSB-BWP-Wor-r18*:

- if the measured SSB is the target SSB for handover of the target cell, Tsearch = 0 ms;

- if the measured SSB of the target cell and the target SSB for handover belong to the same NR target cell, Tsearch = Trs ms provided one of the following conditions is satisfied:

- The measured SSB is the CD-SSB in the target SSB of the HO target SSB is the NCD-SSB in the first active DL BWP, or

- The measured SSB is the NCD-SSB in the target celland the HO target SSB is the CD-SSB in the first active DL BWP, or

- The measured SSB is the NCD-SSB in the target cell and the HO target SSB is the NCD-SSB and both are within different DL BWPs

- If a UE not supporting *ncd-SSB-BWP-Wor-r18,* the target cell is a known inter-frequency cell, then Tsearch = 0 ms.

- If the target cell is an unknown inter-frequency cell and the target cell Es/Iot≥-2 dB, Tsearch = N\*3\* Trs ms.

Where

N = [*reduced beam sweeping factor*] when the UE supports [*Rel-19 reduced L3 beam sweeping capability*] and the conditions in section [3.6.x] are fulfilled, otherwise N = 8 when the target cell is in FR2-1, and N = 12 when the target cell is in FR2-2.

Tprocessing is time for UE processing. Tprocessing can be up to 20 ms.

Tmargin is time for SSB post-processing. Tmargin can be up to 2 ms.

T∆ is time for fine time tracking and acquiring full timing information of the target cell. T∆ = Trs for both known and unknown target cell.

TIU is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. TIU can be up to the summation of SSB to PRACH occasion association period and 10 ms. SSB to PRACH occasion associated period is defined in table 8.1-1 of TS 38.213 [3].

Trs is the SMTC periodicity of the target NR cell if the UE has been provided with an SMTC configuration for the target cell in the handover command, otherwise Trs is the SMTC configured in the measObjectNR having the same SSB frequency and subcarrier spacing. If such measObjectNRs configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation. If the UE is not provided SMTC configuration or measurement object on this frequency, the requirement in this clause is applied with Trs=5 ms assuming the SSB transmission periodicity is 5 ms. There is no requirement if the SSB transmission periodicity is not 5 ms. If the UE has been provided with higher layer in TS 38.331 [2] signalling of *smtc2*prior to the handover command, Trs follows *smtc1* or *smtc2* according to the physical cell ID of the target cell.

In FR2, the target cell is known if it has been meeting the following conditions:

- During the last 5 seconds before the reception of the handover command:

- the UE has sent a valid measurement report for the target cell and

- One of the SSBs measured from the NR target cell being configured remains detectable according to the cell identification conditions specified in clause 9.2 for intra-frequency cell and in clause 9.3 for inter-frequency cell,

- One of the SSBs measured from the target cell also remains detectable during the handover delay according to the cell identification conditions specified in clause 9.2 for intra-frequency cell and in clause 9.3 for inter-frequency cell.

otherwise, it is unknown.

<End of Change 2>

<Start of Change 3>

6.1.1.5.2 Interruption time

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay.

When in inter-frequency handover is commanded, the interruption time shall be less than Tinterrupt

Tinterrupt = Tsearch + TIU + Tprocessing + T∆ + Tmargin ms

Where:

Tsearch is the time required to search the target cell when the handover command is received by the UE. Regardless of whether DRX is in use by the UE, Tsearch shall still be based on non-DRX target cell search times.

- If the target cell is a known intra-frequency cell, then Tsearch = 0 ms.

- If the target cell is an unknown intra-frequency cell and the target cell Es/Iot≥-2 dB, then Tsearch = N\* Trs ms.

- If the target cell is a known inter-frequency cell, then

- For a UE supporting *ncd-SSB-BWP-Wor-r18*:

- if the measured SSB is the target SSB for handover of the target cell, Tsearch = 0 ms;

- if the measured SSB and the target SSB for handover belong to the same NR target cell and are not the same SSB, Tsearch = Trs ms provided one of the following conditions is satisfied:

- The measured SSB is the CD-SSB in the target cell and the HO target SSB is the NCD-SSB in the first active DL BWP, or

- The measured SSB is the NCD-SSB in the target celland the HO target SSB is the CD-SSB in the first active DL BWP, or

- The measured SSB is the NCD-SSB in the target cell and the HO target SSB is the NCD-SSB and both are within different DL BWPs

- For a UE not supporting *ncd-SSB-BWP-Wor-r18,* if the target cell is a known inter-frequency cell, then Tsearch = 0 ms.

- If the target cell is an unknown inter-frequency cell and the target cell Es/Iot≥-2 dB, Tsearch = N\*3\* Trs ms.

Where

N = [*reduced beam sweeping factor*] when the UE supports [*Rel-19 reduced L3 beam sweeping capability*] and the conditions in section [3.6.x] are fulfilled, otherwise N = 8 when the target cell is in FR2-1, and N = 12 when the target cell is in FR2-2.

Tprocessing is time for UE processing. Tprocessing can be up 40 ms.

Tmargin is time for SSB post-processing. Tmargin can be up to 2 ms.

T∆ is time for fine time tracking and acquiring full timing information of the target cell. T∆ = Trs for both known and unknown target cell.

TIU is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. TIU can be up to the summation of SSB to PRACH occasion association period and 10 ms. SSB to PRACH occasion associated period is defined in the table 8.1-1 of TS 38.213 [3].

Trs is the SMTC periodicity of the target NR cell if the UE has been provided with an SMTC configuration for the target cell in the handover command, otherwise Trs is the SMTC configured in the measObjectNR having the same SSB frequency and subcarrier spacing. If such measObjectNRs configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation. If the UE is not provided SMTC configuration or measurement object on this frequency, the requirement in this clause is applied with Trs=5 ms assuming the SSB transmission periodicity is 5 ms. There is no requirement if the SSB transmission periodicity is not 5 ms.

In FR2, the target cell is known if it has been meeting the following conditions:

- During the last 5 seconds before the reception of the handover command:

- the UE has sent a valid measurement report for the target cell and

- One of the SSBs measured from the NR target cell being configured remains detectable according to the cell identification conditions specified in clause 9.3,

- One of the SSBs measured from the target cell also remains detectable during the handover delay according to the cell identification conditions specified in clause 9.3.

otherwise, it is unknown.

<End of Change 3>

<Start of Change 4>

6.2.1.2.1 UE Re-establishment delay requirement

The UE re-establishment delay (TUE\_re-establish\_delay) is the time between the moments when any of the conditions requiring RRC re-establishment as defined in clause 5.3.7 in TS 38.331 [2] is detected by the UE and when the UE sends PRACH to the target PCell. The UE re-establishment delay (TUE\_re-establish\_delay) requirement shall be less than:

The intra-frequency target NR cell shall be considered detectable if each relevant SSB can satisfy that:

- SS-RSRP related side conditions given in clauses 10.1.2 and 10.1.3 are fulfilled for a corresponding NR Band for FR1 and FR2, respectively, and

- the conditions of SSB\_RP and SSB Ês/Iot according to Annex B.2.2 for a corresponding NR Band are fulfilled.

The inter-frequency target NR cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in clauses 10.1.4 and 10.1.5 are fulfilled for a corresponding NR Band for FR1 and FR2, respectively, and

- the conditions of SSB\_RP and SSB Ês/Iot according to Annex B.2.3 for a corresponding NR Band are fulfilled.

Tidentify\_intra\_NR: It is the time to identify the target intra-frequency NR cell and it depends on whether the target NR cell is known cell or unknown cell and on the FR of the target NR cell. If the UE is not configured with intra-frequency NR carrier for RRC re-establishment then Tidentify\_intra\_NR=0; otherwise Tidentify\_intra\_NR shall not exceed the values defined in table 6.2.1.2.1-1 when *highSpeedMeasFlagFR2-r17* is not configured or UE is not capable of FR2 power class 6 and table 6.2.1.2.1-3 when *highSpeedMeasFlagFR2-r17* is configured and UE is capable of FR2 power class 6.

Tidentify\_inter\_NR,i: It is the time to identify the target inter-frequency NR cell on inter-frequency carrier *i* configured for RRC re-establishment and it depends on whether the target NR cell is known cell or unknown cell and on the FR of the target NR cell. Tidentify\_inter\_NR,i shall not exceed the values defined in table 6.2.1.2.1-2.

TSMTC: It is the periodicity of the SMTC occasion configured for the intra-frequency carrier. If the UE has been provided with higher layer in TS 38.331 [2] signalling of *smtc2*, Tsmtc follows *smtc1* or *smtc2* according to the physical cell ID of the target cell.

TSMTC,i: It is the periodicity of the SMTC occasion configured for the inter-frequency carrier *i*. If it is not configured, the UE may assume that the target SSB periodicity is no larger than 20 ms.

TSI-NR: It is the time required for receiving all the relevant system information according to the reception procedure and the RRC procedure delay of system information blocks defined in TS 38.331 [2] for the target NR cell.

TPRACH: It is the delay uncertainty in acquiring the first available PRACH occasion in the target NR cell. TPRACH can be up to the summation of SSB to PRACH occasion association period and 10 ms. SSB to PRACH occasion associated period is defined in table 8.1-1 of TS 38.213 [3].

Nfreq: It is the total number of NR frequencies to be monitored for RRC re-establishment; Nfreq = 1 if the target intra-frequency NR cell is known, else Nfreq = 2 and Tidentify\_intra\_NR = 0 if the target inter-frequency NR cell is known.

There is no requirement if the target cell does not contain the UE context.

In the requirement defined in the below tables, the target FR1 cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown.

**Table 6.2.1.2.1-1: Time to identify target NR cell for RRC connection re-establishment to NR intra-frequency cell**

|  |  |  |  |
| --- | --- | --- | --- |
| **Serving cell** | **FR of target NR** | **Tidentify\_intra\_NR [ms]** | |
| **SSB Ês/Iot (dB)** | **cell** | **Known NR cell** | **Unknown NR cell** |
| ≥ -8 | FR1 | MAX (200 ms, 5 x TSMTC) | MAX (800 ms, 10 x TSMTC) |
| ≥ -8 | FR2-1 | N/A | MAX (1000 ms, (M1Note2 x TSMTC + Tproc)) |
| ≥ -8 | FR2-2 | N/A | MAX (1000 ms, 120 x TSMTC)) |
| < -8 | FR1 | N/A | 800Note1 |
| < -8 | FR2-1 | N/A | M2Note1,Note3 + Tproc |
| < -8 | FR2-2 | N/A | 5280Note1 |
| NOTE 1: The UE is not required to successfullyidentify a cell on any NR frequency layer when TSMTC > 20 ms and serving cell SSB Ês/Iot < -8 dB.  NOTE 2: M1 = 80 and Tproc = 0 ms for the UE not capable of [FBS-R19], otherwise, M1 = N1\*10, N1 = [reduced N] and Tproc = 2 ms.  NOTE 3: M2 = 3520 and Tproc = 0 ms for the UE not capable of [FBS-R19], otherwise, M2 = N1\*440, N1 = [reduced N] and Tproc = 2 ms. | | | |

**Table 6.2.1.2.1-2: Time to identify target NR cell for RRC connection re-establishment to NR inter-frequency cell**

|  |  |  |  |
| --- | --- | --- | --- |
| **Serving cell SSB Ês/Iot (dB)** | **FR of target NR cell** | **Tidentify\_inter\_NR, i [ms]** | |
|  |  | **Known NR cell** | **Unknown NR cell** |
| ≥ -8 | FR1 | MAX (200 ms, 6 x TSMTC, i) | MAX (800 ms, 13 x TSMTC, i) |
| ≥ -8 | FR2-1 | N/A | MAX (1000 ms, (M1Note2 x TSMTC, i + Tproc)) |
| ≥ -8 | FR2-2 | N/A | MAX (1000 ms, 156 x TSMTC, i)) |
| < -8 | FR1 | N/A | 800Note1 |
| < -8 | FR2-1 | N/A | M2Note1,Note3 + Tproc |
| < -8 | FR2-2 | N/A | 6000 Note1 |
| NOTE 1: The UE is not required to successfully identify a cell on any NR frequency layer when TSMTC,i > 20 ms and serving cell SSB Ês/Iot < -8 dB.  NOTE 2: M1 = 104 and Tproc = 0 ms for the UE not capable of [FBS-R19], otherwise, M1 = N1\*13, N1 = [reduced N] and Tproc = 2 ms.  NOTE 3: M2 = 4000 and Tproc = 0 ms for the UE not capable of [FBS-R19], otherwise, M2 = N1\*500, N1 = [reduced N] and Tproc = 2 ms. | | | |

**Table 6.2.1.2.1-3: Time to identify target NR cell for RRC connection re-establishment to NR intra-frequency cell when *highSpeedMeasFlagFR2-r17* is configured (Frequency range FR2)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Serving cell** | **FR of target NR** | **Tidentify\_intra\_NR [ms]** | |
| **SSB Ês/Iot (dB)** | **cell** | **Known NR cell** | **Unknown NR cell** |
| ≥ -8 | FR2 | N/A | MAX (1000 ms, 10 xN2 x TSMTC)) |
|  |  |  |  |
| NOTE 1: The UE is not required to successfullyidentify a cell on any NR frequency layer when TSMTC > 20 ms and serving cell SSB Ês/Iot < -8 dB.  NOTE 2: When SMTC <= 40 ms, N2=2 when *highSpeedMeasFlagFR2-r17* = set1; N2=6 when *highSpeedMeasFlagFR2-r17* = set2. | | | |

<End of Change 4>

<Start of Change 5>

##### 6.2.3.2.1 RRC connection release with redirection to NR

The UE shall be capable of performing the RRC connection release with redirection to the target NR cell within Tconnection\_release\_redirect\_NR.

The time delay (Tconnection\_release\_redirect\_NR) is the time between the end of the last slot containing the RRC command, “*RRCRelease*” (TS 38.331 [2]) on the NR PDSCH and the time the UE starts to send random access to the target NR cell. The time delay (Tconnection\_release\_redirect\_NR) shall be less than:

Tconnection\_release\_redirect\_NR = TRRC\_procedure\_delay + Tidentify-NR + TSI-NR + TRACH

The target NR cell shall be considered detectable when for each relevant SSB, the following side conditions are met:

- the conditions of SSB\_RP and SSB Ês/Iot according to Annex B.2.5 for a corresponding NR Band are fulfilled.

TRRC\_procedure\_delay: It is the RRC procedure delay for processing the received message “*RRCRelease*” as defined in clause 6.2.2 of TS 38.331 [2].

Tidentify-NR: It is the time to identify the target NR cell and depends on the FR of the target NR cell. It is defined in table 6.2.3.2.1-1. Note that Tidentify-NR = TPSS/SSS-sync + Tmeas, in which TPSS/SSS-sync is the cell search time and Tmeas is the measurement time due to cell selection criteria evaluation.

TSI-NR: It is the time required for acquiring all the relevant system information of the target NR cell. This time depends upon whether the UE is provided with the relevant system information of the target NR cell or not by the old NR cell before the RRC connection is released. TRACH: It is the delay uncertainty in acquiring the first available PRACH occasion in the target NR cell. TRACH can be up to the summation of SSB to PRACH occasion association period and 10 ms. SSB to PRACH occasion associated period is defined in the table 8.1-1 of TS 38.213 [3].

Trs is the SMTC periodicity of the target NR cell if the UE has been provided with an SMTC configuration for the target cell in the redirection command, otherwise Trs is the SMTC periodicity configured in the *measObjectNR* having the same SSB frequency and subcarrier spacing configured for the RRC connection release with redirection. If the measObjectNRs having the same SSB frequency and subcarrier spacing configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation. If the UE is not provided with SMTC configuration or measurement object for the frequency which is also configured for the RRC connection release with redirection then:

- the requirement in this clause is applied with Trs = 20 ms if the SSB transmission periodicity is not larger than 20 ms; otherwise,

- there is no requirement if the SSB transmission periodicity is larger than 20 ms.

Table 6.2.3.2.1-1: Time to identify target NR cell for RRC connection release with redirection to NR

|  |  |
| --- | --- |
| FR of target NR cell | Tidentify-NR |
| FR1 | MAX (680 ms, 11 x Trs) |
| FR2-1 | MAX (880 ms, Nx11 x Trs + Tproc) |
| FR2-2 | MAX (880 ms, 12x11 x Trs) |
| NOTE: If the UE has been provided with higher layer signalling of *smtc2*specified in TS 38.331 [2] prior to the redirection command, Trs follows *smtc1* or *smtc2* according to the physical cell ID of the target cell.  NOTE2: If the UE supports [*Rel-19 reduced L3 beam sweeping capability*], N = [*reduced beam sweeping factor*] indicated via UE capability and Tproc = 2 ms, otherwise N = 8 and Tproc = 0. | |

<End of Change 5>

<Start of Change 6>

### 8.3.2A SCell Activation Delay Requirement for Deactivated SCell based on measurement in IDLE/INACTIVE mode

The requirements in this clause shall apply for the UE configured with at least one downlink SCell in EN-DC, or in standalone NR carrier aggregation or in NE-DC or in NR-DC and when one SCell is being activated.

The delay within which the UE shall be able to activate the deactivated SCell depends upon the specified conditions.

Upon receiving SCell activation command in slot *n*, the UE shall be capable to transmit valid CSI report and apply actions related to the activation command for the SCell being activated no later than in slot , where:

THARQ (in ms) is the timing between DL data transmission and acknowledgement as specified in TS 38.213 [3]

TCSI\_reporting is the delay (in ms) including uncertainty in acquiring the first available downlink CSI reference resource, UE processing time for CSI reporting and uncertainty in acquiring the first available CSI reporting resources as specified in TS 38.331 [2].

Tactivation\_time is the SCell activation delay in millisecond, which is defined as:

Requirements in this clause apply if the SCell is unknown, provided:

- UE supports *measValidationReportEMR* and *measIdleValidityDuration-r18* is configured or,

- UE supports *measValidationReportReselectionMeasurements* and *measReselectionValidityDuration-r18* is configured or,

- UE supports *idleInactiveNR-MeasReport-r16*, andneither *measIdleValidityDuration-r18* nor *measReselectionValidityDuration-r18* is configured and *measIdleDuration-r16* has not expired at the moment of initiation of RRC state transition to CONNECTED mode,

The SCell is unknown if the corresponding known conditions specified in clause 8.3.2 are not met.

If the SCell belongs to FR1, Tactivation\_time is TFirstSSB\_MAX + Trs + 5ms provided that the side condition Ês/Iot ≥ -2dB is fulfilled, if the following conditions are met:

- During the period equal to 5s for FR1 before the reception of the SCell activation command:

- the UE has sent a measurement report with SSB index according to the reporting requirements in 4.7.3 or 5.8.3.

- the SSB measured is detectable from the earliest measurement to the end of the defined SCell activation latency (i.e., a valid CQI reporting)

- If *measIdleValidityDuration-r18* or *measReselectionValidityDuration-r18* is configured, the earliest measurement refers to the time instance *measIdleValidityDuration-r18* or *measReselectionValidityDuration-r18* before Msg1 transmission.

- If only *measIdleDuration-r16* is configured, the earliest measurement refers to the time instance when the UE obtained the configuration parameter.

- the SSB measured remains detectable according to the IDLE/INACTIVE mode measurement conditions specified in 4.2 or the CA/DC measurement conditions specified in 4.4 when UE is in IDLE/INACTIVE state and

- the SSB measured remains detectable according to the cell identification conditions specified in clause 9.2 and 9.3 when UE is in CONNECTED mode.

If the SCell belongs to FR2, provided that the side condition Ês/Iot ≥ -2dB is fulfilled, and if the following conditions are met:

- During the period equal to 4s for UE supporting power class 1/5 and 3s for UE supporting power class 2/3/4 before UE receives the last activation command for PDCCH TCI, PDSCH TCI (when applicable) and semi-persistent CSI-RS for CQI reporting (when applicable):

- the UE has sent a measurement report with SSB index according to the reporting requirements in 4.7.3 or 5.8.3.

- the SSB measured is detectable from the earliest measurement to the end of the defined SCell activation latency (i.e. a valid CQI reporting)

- If *measIdleValidityDuration-r18* or *measReselectionValidityDuration-r18* is configured, the earliest measurement refers to the time instance *measIdleValidityDuration-r18* or *measReselectionValidityDuration-r18* before Msg1 transmission.

- If only *measIdleDuration-r16* is configured, the earliest measurement refers to the time instance when the UE obtained the configuration parameter.

- the SSB measured remains detectable according to the IDLE/ INACTIVE mode measurement conditions specified in 4.2 or the CA/DC measurement conditions specified in 4.4 when UE is in IDLE/INACTIVE state and

- the SSB measured remains detectable according to the cell identification conditions specified in clause 9.2 and 9.3 when UE is in CONNECTED mode.

Then Tactivation\_time is:

If the PCell/PSCell and the target SCell are configured as FR1-FR2-1 CA or if the PCell/PSCell and the target SCell are in a FR2-1 band pair with independent beam management, and the target SCell is unknown to UE and semi-persistent CSI-RS is used for CSI reporting, provided that the side condition Ês/Iot ≥ -2dB is fulfilled, then Tactivation\_time is:

- 3ms + TFirstSSB\_MAX + 15\*TSMTC\_MAX + max(Tuncertainty\_MAC + TFineTiming + 2ms, Tuncertainty\_SP) where Tuncertainty\_MAC=0 and Tuncertainty\_SP=0 if UE receives the SCell activation command, semi-persistent CSI-RS activation command and TCI state activation command at the same time.

If the PCell/PSCell and the target SCell are configured as FR1-FR2-1 CA or if the PCell/PSCell and the target SCell are in a FR2-1 band pair with independent beam management, and the target SCell is unknown to UE and periodic CSI-RS is used for CSI reporting, provided that the side condition Ês/Iot ≥ -2dB is fulfilled, then Tactivation\_time is:

- TFirstSSB\_MAX + 15\*TSMTC\_MAX + max(Tuncertainty\_MAC + 5ms + TFineTiming, Tuncertainty\_RRC + TRRC\_delay-THARQ) where Tuncertainty\_MAC=0 if UE receives the SCell activation command and TCI state activation commands at the same time.

Where:

TFirstSSB\_MAX, Trs, TSMTC\_MAX,TFineTiming and TRRC\_delay are same as that defined in clause 8.3.2.

Tuncertainty\_MAC is the time period between reception of the last activation command for PDCCH TCI, PDSCH TCI (when applicable) relative to SCell activation command, and the TCI state is selected based on one of the latest reported SSB indexes

Tuncertainty\_RRC is the time period between reception of the RRC configuration message for TCI of periodic CSI-RS for CQI reporting (when applicable) relative to SCell activation command, and the TCI state is selected based on one of the latest reported SSB indexes;

Tuncertainty\_SP is the time period between reception of the activation command for semi-persistent CSI-RS resource set for CQI reporting relative to SCell activation command, the TCI state for semi-persistent CSI-RS is selected based on one of the latest reported SSB indexes.

<End of Change 6>

<Start of Change 7>

### 8.3.4 Direct SCell Activation at SCell addition

The requirements in this clause apply for UE being configured in the RRC reconfiguration message, TS 38.331 [2], with one SCell for which the parameter *sCellState* is set to *activated*. If the RRC reconfiguration message for direct SCell activation also configures PSCell addition or PSCell change, the direct SCell activation delay may be longer than the requirements defined in this clause.

If the RRC reconfiguration message for direct SCell activation also configures TCI state information, the requirements in clause 8.3.2 based on that TCI state activation command is received at the same time as SCell activation command shall apply.

The UE shall configure the SCell in activated state upon successful completion of the RRC reconfiguration procedure within the specified delay. The UE shall be capable to transmit valid CSI report and apply actions for the directly activated SCell no later than in slot ,

where:

- Slot n is the last slot overlapping with the PDSCH containing the RRC reconfiguration message,

- Ndirect = TRRC\_Process + T1 + Tactivation\_time + TCSI\_Reporting - 3 ms for the cases specified in clause 8.3.2 that TCI state is not indicated within Tactivation\_time; otherwise, Ndirect = TRRC\_Process + T1 + THARQ + Tactivation\_time + TCSI\_Reporting

*-* TRRC\_Process: RRC procedure delay as specified in clause 11.2 of TS 36.331 [16] if the corresponding RRC message is embedded in E-UTRA RRC message, otherwise it is the RRC procedure delay defined in clause 12 of TS 38.331 [2],

*-* T1: Delay from slot until the transmission of *RRCReconfigurationComplete* message,

NOTE: *T1* is UE implementation dependent.

*THARQ* (in ms) is the timing between DL data transmission and acknowledgement as specified in TS 38.213 [3],

If target SCell is unknown, Tactivation\_time is specified in 8.3.2A provided the following conditions are met:

- UE supports *measValidationReportEMR* and *measIdleValidityDuration*-*r18* is configured or,

- UE supports *measValidationReportReselectionMeasurements* and *measReselectionValidityDuration*-*r18* is configured or,

- UE supports idleInactiveNR-*MeasReport*-*r16*, and neither *measIdleValidityDuration*-*r18* nor *measReselectionValidityDuration*-r18 is configured and *measIdleDuration*-r16 has not expired at the moment of initiation of RRC state transition to CONNECTED mode,

Otherwise:

If the SCell is known and belongs to FR1, *TCSI\_Reporting* is specified in clause 8.3.2 and *Tactivation\_time* is defined as:

- TFirstSSB+ 5 ms, if the measurement period of the SCell being activated is equal to or smaller than 2400 ms.

- TFirstSSB\_MAX + Trs + 5 ms, if measurement period of the SCell being activated is larger than 2400 ms.

where,

the measurement period in table 9.2.5.2-1 applies if the target SCell was in an intra-frequency layer corresponding to an activated SCell;

the measurement period in table 9.2.5.2-3 applies if the target SCell was in an intra-frequency layer corresponding to a deactivated SCell;

the measurement period in table 9.3.5-1 applies if the target SCell was in an inter-frequency layer.

*-* Otherwise, Tactivation\_time and TCSI\_Reporting are specified in clause 8.3.2, where the following definitions of TFirstSSB and TFirstSSB\_MAX shall override the existing ones:

- TFirstSSB: the time to the end of the first complete SSB burst indicated by the SMTC after slot n +

- TFirstSSB\_MAX: the time to the end of the first complete SSB burst indicated by the SMTC after slot n +

- In FR1, in case of intra-band SCell activation, the occasion when all active serving cells and SCells being activated or released are transmitting SSB bursts in the same slot; in case of inter-band SCell activation, the first occasion when the SCell being activated is transmitting SSB burst.

- In FR2, the occasion when all active serving cells and SCells being activated or released are transmitting SSB bursts in the same slot.

*-* If a UE supports, *reduceForCellDetection* and/or *reduceForSSB-L1-RSRP-Meas* and/or *shortMeasInterval-r18* capabilities*,* the reduced Tactivation\_time specified in clause 8.3.2 when UE supports these capabilities is applicable for Direct SCell activation at SCell addition also.

In addition to CSI reporting defined above, UE shall also apply other actions related to the activation command specified in TS 38.321 [7] for an SCell at the first opportunities for the corresponding actions once the SCell is activated.

The SCell in FR1 is known provided the following conditions are met for the SCell:

-During the last 5 seconds before the reception of the direct SCell configuration command:

-the UE has sent a valid measurement report for the SCell being directly activated, and

-the SSB measured remains detectable according to the cell identification conditions specified in clauses 9.2 and 9.3,

-the SSB measured during the period equal to [5] seconds also remains detectable during the SCell activation delay according to the cell identification conditions specified in clause 9.2 and 9.3.

Otherwise, the SCell is unknown.

The SCell in FR2 is known provided it meets the corresponding conditions as defined in clause 8.3.2. Otherwise, the SCell is unknown.

The UE may be allowed to cause interruptions to serving cells on other component carriers during an interruption window, as specified in clause 8.2. The starting point of an interruption window on SpCell or any activated SCell shall not occur before slot *n*+1, and shall not occur after slot *n+*1+, where NR slot length is with respect to the numerology of the SCell being activated, and *TX* is:

- *TFirstSSB*, for any scenario where *Tactivation\_time*includes *TFirstSSB*;

- *TFirstSSB\_MAX*, for any scenario where *Tactivation\_time*includes *TFirstSSB\_MAX*;

- *Tuncertainty\_MAC +TFineTiming*, for any scenario where *Tactivation\_time*includes *TFineTiming*.

The length of the interruption window may be different for different victim cells, and depends on the applicable scenario and on the frequency band relation between the aggressor cell and the victim cell.

Starting from the slot until the UE has completed the direct SCell activation, the UE shall report CQI index = 0 (out of range) if the UE has available uplink resources to report CQI for the SCell.

<Start of Change 7>

<End of Change 8>

### 8.3.12 SCell Activation Delay Requirement for Deactivated PUCCH SCell

The requirements in this clause shall apply for the UE configured with one downlink SCell and when PUCCH is configured for the SCell being activated.

If the UE has a valid TA for transmitting on an SCell then the UE shall be capable to transmit valid CSI report and apply actions related to the activation command for the SCell being activated on the PUCCH SCell no later than in slot n+,

Where:

- A TA is considered to be valid provided that the *TimeAlignmentTimer* [2] associated with the TAG containing the PUCCH SCell is running.

- THARQ (in ms) is the timing between DL data transmission and acknowledgement as specified in TS 38.213 [3].

- Tactivation\_time is the SCell activation delay in milliseconds.

If target SCell is unknown, Tactivation\_time is specified in 8.3.2A provided the following conditions are met:

- UE supports *measValidationReportEMR* and *measIdleValidityDuration*-*r18* is configured or,

- UE supports *measValidationReportReselectionMeasurements* and *measReselectionValidityDuration*-*r18* is configured or,

- UE supports idleInactiveNR-*MeasReport*-*r16*, and neither *measIdleValidityDuration*-*r18* nor *measReselectionValidityDuration*-r18 is configured and *measIdleDuration*-r16 has not expired at the moment of initiation of RRC state transition to CONNECTED mode,

For the UE capable of *l3-MeasUnknownSCellActivation-r18*, if the UE is provided with *ReportOnScellActivation* and it reports valid L3 measurement results after receiving the SCell activation command for unknown SCell*,* the Tactivation\_time is the SCell activation delay with L3 reporting in milliseconds as specified in clause 8.3.17 except the definition of Tuncertainty\_MAC is replaced with:

- Tuncertainty\_MAC is the time period between reception of the last activation command for PDCCH TCI, PDSCH TCI (when applicable), UL spatial relation (for FR2) relative to

- SCell activation command for known case;

- First valid L3 report for unknown case, if UE reports valid L3-RSRP before receiving TCI activation command;

- First valid L1-RSRP reporting for unknown case, if UE reports valid L3-RSRP after receiving TCI activation command.

Otherwise, Tactivation\_time is the SCell activation delay in milliseconds as specified in clause 8.3.2 except the definition of Tuncertainty\_MAC is replaced with:

- Tuncertainty\_MAC is the time period between reception of the last activation command for PDCCH TCI, PDSCH TCI (when applicable), UL spatial relation (for FR2) relative to

- SCell activation command for known case;

- First valid L1-RSRP reporting for unknown case.

- Ttarget\_PL-RS is the periodicity of the target pathloss reference signal determined during PUCCH SCell activation.

- TFirst\_available\_CSI is the delay uncertainty (in ms) in acquiring the first available downlink CSI reference resource.

- TCSI\_processing is the UE processing time for CSI reporting.

- TCSI\_reporting\_after is the delay uncertainty (in ms) in acquiring the first available CSI reporting resources after end of max ((TFirst\_available\_CSI + TCSI\_processing), 3\*Ttarget\_PL-RS)

If the UE does not have a valid TA for transmitting on an SCell then the UE shall be capable to perform downlink actions related to the SCell activation command as specified in [7] for the SCell being activated on the PUCCH SCell no later than in slot n+, and shall be capable to perform uplink actions related to the SCell activation command as specified in [7] for the SCell being activated on the PUCCH SCell no later than in slot and shall transmit valid CSI report for the SCell being activated on the PUCCH SCell no later than in slot , where:

Tdelay\_PUCCH\_SCell = Tactivation\_time + max ((TFirst\_available\_CSI + TCSI\_processing), (T1+T2+T3), 3\*Ttarget\_PL-RS) + TCSI\_reporting\_after

Where:

- Tactivation\_time is the SCell activation delay in milliseconds.

If target SCell is unknown, Tactivation\_time is specified in 8.3.2A provided the following conditions are met:

- UE supports *measValidationReportEMR* and *measIdleValidityDuration*-*r18* is configured or,

- UE supports *measValidationReportReselectionMeasurements* and *measReselectionValidityDuration*-*r18* is configured or,

- UE supports idleInactiveNR-*MeasReport*-*r16*, and neither *measIdleValidityDuration*-*r18* nor *measReselectionValidityDuration*-r18 is configured and *measIdleDuration*-r16 has not expired at the moment of initiation of RRC state transition to CONNECTED mode,

For the UE capable of *l3-MeasUnknownSCellActivation-r18*, if the UE is provided with *ReportOnScellActivation* and it reports valid L3 measurement results after receiving the SCell activation command for unknown SCell*,* the Tactivation\_time is the SCell activation delay with L3 reporting in milliseconds as specified in clause 8.3.17 except the definition of Tuncertainty\_MAC is replaced with:

- Tuncertainty\_MAC is the time period between reception of the last activation command for PDCCH TCI, PDSCH TCI (when applicable), UL spatial relation (for FR2) relative to

- SCell activation command for known case;

- First valid L3 report for unknown case, if UE reports valid L3-RSRP before receiving TCI activation command;

- First valid L1-RSRP reporting for unknown case, if UE reports valid L3-RSRP after receiving TCI activation command;

Otherwise, Tactivation\_time is the SCell activation delay in milliseconds as specified in clause 8.3.2 except the definition of Tuncertainty\_MAC is replaced with:

- Tuncertainty\_MAC is the time period between reception of the last activation command for PDCCH TCI, PDSCH TCI (when applicable), UL spatial relation (when applicable in FR2) relative to

- SCell activation command for known case;

- First valid L1-RSRP reporting for unknown case.

- Ttarget\_PL-RS is the periodicity of the target pathloss reference signal determined during PUCCH SCell activation.

- TFirst\_available\_CSI is the delay uncertainty (in ms) in acquiring the first available downlink CSI reference resource.

- TCSI\_processing is the UE processing time for CSI reporting.

- TCSI\_reporting\_after is the delay uncertainty (in ms) in acquiring the first available CSI reporting resources after end of max ((TFirst\_available\_CSI + TCSI\_processing), (T1+T2+T3), 3\*Ttarget\_PL-RS)

- T1 is the delay uncertainty in acquiring the first available PDCCH triggered PRACH occasion in the PUCCH SCell after the slot n+.

- T1 is up to the summation of a delay uncertainty for reception of PDCCH order, SSB to PRACH occasion association period and 10 ms, where SSB to PRACH occasion association period is defined in table 8.1-1 of TS 38.213 [3]

- T2 is the delay from slot n+until UE has obtained a valid TA command for the target PUCCH Scell being activated. Slot n is the slot where the UE receives PUCCH SCell activation command.

- T3 is the delay for applying the received TA for uplink transmission on target PUCCH SCell being activated, as specified in clause 4.2 in TS 38.213 [3].

The pathloss reference signal is known for known PUCCH SCell during activation if the following conditions are met during the period between the last transmission of the RS resource used for L3 measurement reporting and the completion of PUCCH SCell activation, where the RS resource is the target pathloss reference signal or QCLed (with Type D) to the target pathloss reference signal:

- The PUCCH SCell activation command is received within 1280 ms upon the last transmission of the RS resource used for L3 measurement reporting

- The target pathloss reference signal determination is based on the latest L3 measurement reporting

- The target pathloss reference signal remains detectable during the PUCCH SCell activation period

- SNR of the target pathloss reference signal≥-3 dB

- The associated SSBs with the target pathloss reference signal remain detectable during the PUCCH SCell activation period

- SNR of the associated SSB ≥-3 dB

If the target SCell is unknown and following conditions are met:

- UE supports *measValidationReportEMR* and *measIdleValidityDuration*-*r18* is configured or,

- UE supports *measValidationReportReselectionMeasurements* and *measReselectionValidityDuration*-*r18* is configured or,

- UE supports idleInactiveNR-*MeasReport*-*r16*, and neither *measIdleValidityDuration*-*r18* nor *measReselectionValidityDuration*-r18 is configured and *measIdleDuration*-r16 has not expired at the moment of initiation of RRC state transition to CONNECTED mode,

the pathloss reference signal is known for unknown PUCCH SCell during activation if the following conditions are met during the period between the last transmission of the RS resource used for EMR reporting and the completion of PUCCH SCell activation, where the RS resource is the target pathloss reference signal or QCLed (with Type D) to the target pathloss reference signal.

- The target pathloss reference signal determination is based on the EMR reporting in 4.7.3 and 5.8.3.

- The target pathloss reference signal remains detectable during the PUCCH SCell activation period

- SNR of the target pathloss reference signal≥-3dB

- The associated SSBs reported in EMR report with the target pathloss reference signal remain detectable during the PUCCH SCell activation period

- SNR of the associated SSB reported in EMR report≥-3dB

For the UE capable of *l3-MeasUnknownSCellActivation-r18*, if the UE is provided with *ReportOnScellActivation* and it reports valid L3 measurement results after receiving the SCell activation command for unknown SCell*,* the pathloss reference signal is known for unknown PUCCH SCell during activation if the following conditions are met during the period between the last transmission of the RS resource used for L3 reporting after SCell activation command and the completion of PUCCH SCell activation, where the RS resource is the target pathloss reference signal or QCLed (with Type D) to the target pathloss reference signal.

- The PUCCH SCell activation command is received within 1280 ms upon the last transmission of the RS resource used for the L3 reporting after SCell activation command

-- The target pathloss reference signal determination is based on either the latest L1-RSRP measurement reporting or the L3 reporting after SCell activation command, if UE reports both before receiving TCI activation command

- The target pathloss reference signal remains detectable during the PUCCH SCell activation period

- SNR of the target pathloss reference signal≥-3 dB

- The associated SSBs with the target pathloss reference signal remain detectable during the PUCCH SCell activation period

- SNR of the associated SSB ≥-3 dB

Otherwise, the pathloss reference signal is known for unknown PUCCH SCell during activation if the following conditions are met during the period between the last transmission of the RS resource used for L1-RSRP measurement reporting and the completion of PUCCH SCell activation, where the RS resource is the target pathloss reference signal or QCLed (with Type D) to the target pathloss reference signal.

- The PUCCH SCell activation command is received within 1280 ms upon the last transmission of the RS resource used for L1-RSRP measurement reporting

- The target pathloss reference signal determination is based on the latest L1-RSRP measurement reporting

- The target pathloss reference signal remains detectable during the PUCCH SCell activation period

- SNR of the target pathloss reference signal≥-3 dB

- The associated SSBs with the target pathloss reference signal remain detectable during the PUCCH SCell activation period

- SNR of the associated SSB ≥-3 dB

Otherwise, the pathloss reference signal is unknown.

The above delay requirement shall apply provided that:

- The target pathloss reference signal determined during PUCCH SCell activation is known otherwise longer activation time is expected if the pathloss reference signal is unknown; and

- The RA on PUCCH SCell is not interrupted by the RA on PCell otherwise additional delay to activate the SCell is expected; and

- No SRS carrier based switching or SRS antenna port switching occurs during the SCell activation procedure otherwise the PUCCH SCell activation delay can be extended.

The starting point and the end-point of an interruption window on PCell or any activated SCell in MCG for NR standalone mode, or on PSCell or any activated SCell in SCG for EN-DC mode is the same as the interruption in single SCell activation requirement in clause 8.3.2.

In addition to the interruption due to RF retuning during PUCCH SCell activation, if the UE is not capable of *parallelTxPRACH-SRS-PUCCH-PUSCH*, and PRACH on PUCCH SCell and PUCCH/PUSCH/SRS on other active serving cell are fully or partially overlapping in time, the UE shall transmit PRACH on PUCCH SCell and is allowed to drop or cause interruption to SRS or PUCCH or PUSCH transmission on the SpCell or on any activated SCell. Otherwise, UE is not allowed to drop or cause any interruption to SRS or PUCCH or PUSCH transmission on SpCell or on any activated SCell.

For unknown PUCCH SCell activation in FR2, the requirement only applies when UE supports CSI reporting cross PUCCH group capability, and UE is configured with CSI reporting via SpCell. For unknown PUCCH SCell activation in FR1, the requirement only applies when UE supports CSI reporting cross PUCCH group capability, and UE is configured with CSI reporting via SpCell, if ‘ssb-PositionInBurst’ indicates multiple SSBs but TCI state indication is not provided in same MAC PDU with SCell activation.

The requirement for unknown PUCCH SCell applies provided that the PDCCH order (when applicable) and the activation commands for TCI, UL spatial relation and PL-RS (when applicable) are based on the latest valid L1-RSRP reporting or the L3 reporting after SCell activation command via Primary PUCCH group or EMR reporting as defined in 8.3.2A, 4.7.3 and 5.8.3.

<End of Change 8>

<Start of Change 9>

##### 9.1.5.1.1 EN-DC mode: carrier-specific scaling factor for SSB-based, CSI-RS based L3 measurements and RSSI and channel occupancy measurements performed outside gaps

For UE configured with the E-UTRA-NR dual connectivity operation, the carrier-specific scaling factor CSSFoutside\_gap,i for intra-frequency SSB-based measurements, inter-frequency SSB-based measurements performed outside measurements gaps, intra-frequency CSI-RS L3 measurement and RSSI/channel occupancy measurement with no measurement gap on a carrier subject to CCA when SMTC and RMTC are overlapping will be as specified in table 9.1.5.1.1-1.

For UE support [FR1 only EN-DC 3-searcher capability] configured with the E-UTRA-NR dual connectivity operation and none of SMTC occasions of outside gap measurement objects in one FR are overlapped with per-FR measurement GAP in another FR, the carrier-specific scaling factor CSSFoutside\_gap,i for intra-frequency SSB-based measurements, inter-frequency SSB-based measurements performed outside measurements gaps, intra-frequency CSI-RS L3 measurement and RSSI/channel occupancy measurement with no measurement gap on a carrier subject to CCA when SMTC and RMTC are overlapping will be as specified in table 9.1.5.1.1-2.

Table 9.1.5.1.1-1: CSSFoutside\_gap,i scaling factor for EN-DC mode

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scenario | *CSSF*outside\_gap,i for FR1 PSCC | *CSSF*outside\_gap,i for FR1 SCC | *CSSF*outside\_gap,i for FR2 PSCC | *CSSF*outside\_gap,i for FR2 SCC where neighbour cell measurement is required Note 2 | *CSSF*outside\_gap,i for FR2 SCC where neighbour cell measurement is not required | *CSSF*outside\_gap,i for inter-frequency MO with no measurement gp |
| **EN-DC with FR1 only CA** | 1+NPSCC\_CSIRS+NPSCC\_CCA\_RSSI/CO | NSCC\_SSB +Y+2x NSCC\_CSIRS+ NSCC\_CCA\_RSSI/CO | N/A | N/A | N/A | NSCC\_SSB +Y+2x NSCC\_CSIRS+ NSCC\_CCA\_RSSI/CO |
| **EN-DC with**  **FR2 only intra band CA** | N/A | N/A | 1+NPSCC\_CSIRS | N/A | NSCC\_SSB +Y+2x NSCC\_CSIRS | NSCC\_SSB +Y+2x NSCC\_CSIRS |
| **EN-DC with**  **FR2 only inter band CA** | N/A | N/A | 1+NPSCC\_CSIRS | 2x(1+ NSCC\_CSIRS\_FR2\_NCM) Note 3,5 | 2×( NSCC\_SSB +Y+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | 2×( NSCC\_SSB +Y+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) |
| **EN-DC with**  **FR1 +FR2 CA (FR1 PSCell) Note 1** | 1+NPSCC\_CSIRS | 2×( NSCC\_SSB +Y+2xNSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | N/A | 2x(1+NSCC\_CSIRS\_FR2\_NCM) Note 3 | 2×( NSCC\_SSB +Y+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | 2×( NSCC\_SSB +Y+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) |
| **EN-DC with**  **FR1 +FR2 CA (FR2 PSCell) Note 1** | N/A | NSCC\_SSB +Y+2x NSCC\_CSIRS | 1+NPSCC\_CSIRS | N/A | NSCC\_SSB+Y+2x NSCC\_CSIRS | NSCC\_SSB+Y+2x NSCC\_CSIRS |
| NOTE 1: Only one NR FR1 operating band and one NR FR2 operating band are included for FR1+FR2 inter-band EN-DC.  NOTE 2: Selection of FR2 SCC where neighbour cell measurement is required follows clause 9.2.3.2.  NOTE 3: CSSFoutside\_gap,i =1 if only one SCell is configured and no inter-frequency MO without gap and only SSB based L3 measurement is configured on SCC; CSSFoutside\_gap,i =2 if only one SCell is configured and no inter-frequency MO without gap and either both SSB and CSI-RS based L3 configured or only CSI-RS based L3 measurement is configured on SCC.  NOTE 4: Y is the number of configured inter-frequency MOs without MG that are being measured outside of MG; otherwise, it is 0.  NOTE 5: Only two NR FR2 operating band are included for EN-DC with FR2 only inter-band CA  NOTE 6: NPSCC\_CSIRS=1 if PSCC is with either both SSB and CSI-RS based L3 configured or only CSI-RS based L3 measurement configured; otherwise, NPSCC\_CSIRS =0.  NOTE 7: NSCC\_CSIRS=Number of configured SCell(s) with either both SSB and CSI-RS based L3 measurement configured or only CSI-RS based L3 measurement configured  NOTE 8: NSCC\_CSIRS\_FR2\_NCM=1 if FR2 SCC, where neighbour cell measurement is required, is with either both SSB and CSI-RS configured or only CSI-RS measurement configured; otherwise, NSCC\_CSIRS\_FR2\_NCM=0.  NOTE 9: NSCC\_SSB=Number of configured SCell(s) with only SSB based L3 measurement configured, which is measured without MG. For UE supporting [CSSF enhancement for one CC measurement per-band] for intra-frequency measurements without MG, NSCC\_SSB is the number of SCCs to be measured following the principles specified in clause 9.2.3.1 and 9.2.3.2 based on [network indication of enabling one serving carrier measurement for FR2 band or not].  NOTE 10: NPSCC\_CCA\_RSSI/CO= 1 if PSCC is configured with RSSI/CO measurements without MG when RMTC and SMTC are overlapping; NSCC\_CCA\_RSSI/CO = Number of MOs for SCell(s) configured with RSSI/CO measurements without MG when RMTC and SMTC are overlapping.  NOTE 11 If a measurement object configured by PSCell and an NR inter-RAT measurement object configured by E-UTRAN PCell are on the same serving carrier, they shall be counted as one intra-frequency measurement object, provided that they meet the measurement object merging conditions [in clause 9.1.3.2], otherwise they are counted separately as two measurement objects. | | | | | | |

Table 9.1.5.1.1-2: Enhanced CSSFoutside\_gap,i scaling factor for EN-DC mode

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scenario | *CSSF*outside\_gap,i for FR1 PSCC | *CSSF*outside\_gap,i for FR1 SCC | *CSSF*outside\_gap,i for FR2 PSCC | *CSSF*outside\_gap,i for FR2 SCC where neighbour cell measurement is required Note 2 | *CSSF*outside\_gap,i for FR2 SCC where neighbour cell measurement is not required | *CSSF*outside\_gap,i for inter-frequency MO with no measurement gap |
| **EN-DC with FR1 only CA** | 1+NPSCC\_CSIRS+NPSCC\_CCA\_RSSI/CO | ⌈0.5×(NSCC\_SSB +Y+2x NSCC\_CSIRS+ NSCC\_CCA\_RSSI/CO) ⌉ | N/A | N/A | N/A | ⌈0.5×(NSCC\_SSB +Y+2x NSCC\_CSIRS+ NSCC\_CCA\_RSSI/CO) ⌉ |
| **EN-DC with**  **FR2 only intra band CA** | N/A | N/A | 1+NPSCC\_CSIRS | N/A | NSCC\_SSB +Y+2x NSCC\_CSIRS | NSCC\_SSB +Y+2x NSCC\_CSIRS |
| **EN-DC with**  **FR2 only inter band CA** | N/A | N/A | 1+NPSCC\_CSIRS | 2x(1+ NSCC\_CSIRS\_FR2\_NCM) Note 3,5 | 2×( NSCC\_SSB +Y+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | 2×( NSCC\_SSB +Y+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) |
| **EN-DC with**  **FR1 +FR2 CA (FR1 PSCell) Note 1** | 1+NPSCC\_CSIRS | 2×( NSCC\_SSB +Y+2xNSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | N/A | 2x(1+NSCC\_CSIRS\_FR2\_NCM) Note 3 | 2×( NSCC\_SSB +Y+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | 2×( NSCC\_SSB +Y+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) |
| **EN-DC with**  **FR1 +FR2 CA (FR2 PSCell) Note 1** | N/A | NSCC\_SSB +Y+2x NSCC\_CSIRS | 1+NPSCC\_CSIRS | N/A | NSCC\_SSB+Y+2x NSCC\_CSIRS | NSCC\_SSB+Y+2x NSCC\_CSIRS |
| NOTE 1: Only one NR FR1 operating band and one NR FR2 operating band are included for FR1+FR2 inter-band EN-DC.  NOTE 2: Selection of FR2 SCC where neighbour cell measurement is required follows clause 9.2.3.2.  NOTE 3: CSSFoutside\_gap,i =1 if only one SCell is configured and no inter-frequency MO without gap and only SSB based L3 measurement is configured on SCC; CSSFoutside\_gap,i =2 if only one SCell is configured and no inter-frequency MO without gap and either both SSB and CSI-RS based L3 configured or only CSI-RS based L3 measurement is configured on SCC.  NOTE 4: Y is the number of configured inter-frequency MOs without MG that are being measured outside of MG; otherwise, it is 0.  NOTE 5: Only two NR FR2 operating band are included for EN-DC with FR2 only inter-band CA  NOTE 6: NPSCC\_CSIRS=1 if PSCC is with either both SSB and CSI-RS based L3 configured or only CSI-RS based L3 measurement configured; otherwise, NPSCC\_CSIRS =0.  NOTE 7: NSCC\_CSIRS=Number of configured SCell(s) with either both SSB and CSI-RS based L3 measurement configured or only CSI-RS based L3 measurement configured  NOTE 8: NSCC\_CSIRS\_FR2\_NCM=1 if FR2 SCC, where neighbour cell measurement is required, is with either both SSB and CSI-RS configured or only CSI-RS measurement configured; otherwise, NSCC\_CSIRS\_FR2\_NCM=0.  NOTE 9: NSCC\_SSB=Number of configured SCell(s) with only SSB based L3 measurement configured, which is measured without MG.  NOTE 10: NPSCC\_CCA\_RSSI/CO= 1 if PSCC is configured with RSSI/CO measurements without MG when RMTC and SMTC are overlapping; NSCC\_CCA\_RSSI/CO = Number of MOs for SCell(s) configured with RSSI/CO measurements without MG when RMTC and SMTC are overlapping.  NOTE 11 If a measurement object configured by PSCell and an NR inter-RAT measurement object configured by E-UTRAN PCell are on the same serving carrier, they shall be counted as one intra-frequency measurement object, provided that they meet the measurement object merging conditions [in clause 9.1.3.2], otherwise they are counted separately as two measurement objects. | | | | | | |

##### 9.1.5.1.2 SA mode: carrier-specific scaling factor for SSB-based, CSI-RS based L3 measurements and RSSI and channel occupancy measurements performed outside gaps

For UE in SA operation mode, the carrier-specific scaling factor CSSFoutside\_gap,i for intra-frequency SSB-based measurements, inter-frequency SSB-based measurements performed outside measurements gaps, E-UTRA inter-RAT measurement object without measurement gap, intra-frequency CSI-RS L3 measurement and RSSI/channel occupancy measurement with no measurement gap on a carrier subject to CCA when SMTC and RMTC are overlapping will be as specified in table 9.1.5.1.2-1, which shall also be applied for a UE configured with NE-DC operation.

For UE supports [FR1 only CA and FR1 only NR-DC 3-searcher capability] or [FR1+FR2 CA (PCell is FR1 only) 3-searcher capability] in SA operation mode and none of SMTC occasions of outside gap measurement objects in one FR are overlapped with per-FR measurement GAP in another FR, the carrier-specific scaling factor CSSFoutside\_gap,i for intra-frequency SSB-based measurements, inter-frequency SSB-based measurements performed outside measurements gaps, E-UTRA inter-RAT measurement object without measurement gap, intra-frequency CSI-RS L3 measurement and RSSI/channel occupancy measurement with no measurement gap on a carrier subject to CCA when SMTC and RMTC are overlapping will be as specified in table 9.1.5.1.2-2.

Table 9.1.5.1.2-1: CSSFoutside\_gap,i scaling factor for SA mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Scenario | *CSSF*outside\_gap,i for FR1 PCC | *CSSF*outside\_gap,i for FR1 SCC | *CSSF*outside\_gap,i for FR2 PCC | *CSSF*outside\_gap,i for FR2 SCC where neighbour cell measurement is required | *CSSF* outside\_gap,i for FR2 SCC where neighbour cell measurement is not required | *CSSF*outside\_gap,i for inter-frequency MO with no measurement gap | *CSSF*outside\_gap,i for E-UTRA inter-RAT MO with no measurement gap |
| **FR1 only CA** | 1+NPCC\_CSIRS + NPCC\_CCA\_RSSI/CO | NSCC\_SSB +Y+Z+2x NSCC\_CSIRS+ NSCC\_CCA\_RSSI/CO | N/A | N/A | N/A | NSCC\_SSB +Y+Z+2x NSCC\_CSIRS+ NSCC\_CCA\_RSSI/CO | NSCC\_SSB +Y+Z+2x NSCC\_CSIRS |
| **FR2 only intra band CA** | N/A | N/A | 1+NPCC\_CSIRS | N/A | NSCC\_SSB +Y+Z+2x NSCC\_CSIRS | NSCC\_SSB +Y+Z+2x NSCC\_CSIRS | NSCC\_SSB +Y+Z+2x NSCC\_CSIRS |
| **FR2 only inter band CA** | N/A | N/A | 1+NPCC\_CSIRS | 2\*(1+ NSCC\_CSIRS\_FR2\_NCM) Note 3,5 | 2×( NSCC\_SSB +Y+Z+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | 2×( NSCC\_SSB +Y+Z+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | 2×( NSCC\_SSB +Y+Z+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) |
| **FR1 +FR2 CA (FR1 PCell) Note 1** | 1+NPCC\_CSIRS | 2×( NSCC\_SSB +Y+Z+2\* NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | N/A | 2x(1+ NSCC\_CSIRS\_FR2\_NCM) Note 3,5 | 2×( NSCC\_SSB +Y+Z+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | 2×( NSCC\_SSB +Y+Z+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | 2×( NSCC\_SSB +Y+Z+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) |
| **FR1 +FR2 CA (FR2 PCell) Note 1** | N/A | NSCC\_SSB +Y+Z+2x NSCC\_CSIRS | 1+NPCC\_CSIRS | N/A | NSCC\_SSB +Y+Z+2x NSCC\_CSIRS | NSCC\_SSB +Y+Z+2x NSCC\_CSIRS | NSCC\_SSB +Y+Z+2x NSCC\_CSIRS |
| NOTE 1: Only one FR1 operating band and one FR2 operating band are included for FR1+FR2 inter-band CA.  NOTE 2: Selection of FR2 SCC where neighbour cell measurement is required follows clause 9.2.3.2.  NOTE 3: CSSFoutside\_gap,i =1 if only one SCell is configured and no inter-frequency MO without gap and only SSB based L3 measurement is configured on SCC; CSSFoutside\_gap,i =2 if only one SCell is configured and no inter-frequency MO without gap and either both SSB and CSI-RS based L3 configured or only CSI-RS based L3 measurement is configured on SCC.  NOTE 4: Y is the number of configured inter-frequency MOs without MG that are being measured outside of MG; otherwise, it is 0.  NOTE 5: Only two NR FR2 operating bands are included for FR2 inter-band CA.  NOTE 6: NPCC\_CSIRS=1 if PCC is with either both SSB and CSI-RS based L3 configured or only CSI-RS based L3 measurement configured; otherwise, NPCC\_CSIRS =0.  NOTE 7: NSCC\_CSIRS=Number of configured SCell(s) with either both SSB and CSI-RS based L3 measurement configured or only CSI-RS based L3 measurement configured  NOTE 8: NSCC\_CSIRS\_FR2\_NCM=1 if FR2 SCC, where neighbour cell measurement is required, is with either both SSB and CSI-RS configured or only CSI-RS measurement configured; otherwise, NSCC\_CSIRS\_FR2\_NCM=0.  NOTE 9: NSCC\_SSB=Number of configured SCell(s) with only SSB based L3 measurement configured, which is measured without MG. For UE supporting [CSSF enhancement for one CC measurement per-band] for intra-frequency measurements without MG, NSCC\_SSB is the number of SCCs to be measured following the principles specified in clause 9.2.3.1 and 9.2.3.2 based on [network indication of enabling one serving carrier measurement for FR2 band or not].  NOTE 10: NPCC\_CCA\_RSSI/CO= 1 if PSCC is configured with RSSI/CO measurements without MG when RMTC and SMTC are overlapping; NSCC\_CCA\_RSSI/CO = Number of MOs for SCell(s) configured with RSSI/CO measurements without MG when RMTC and SMTC are overlapping.  NOTE 11: Z is the number of configured E-UTRA inter-RAT MOs without MG that are being measured outside of MG; otherwise, it is 0. | | | | | | | |

Table 9.1.5.1.2-2: Enhanced CSSFoutside\_gap,i scaling factor for SA mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Scenario | *CSSF*outside\_gap,i for FR1 PCC | *CSSF*outside\_gap,i for FR1 SCC | *CSSF*outside\_gap,i for FR2 PCC | *CSSF*outside\_gap,i for FR2 SCC where neighbour cell measurement is required | *CSSF* outside\_gap,i for FR2 SCC where neighbour cell measurement is not required | *CSSF*outside\_gap,i for inter-frequency MO with no measurement gap | *CSSF*outside\_gap,i for E-UTRA inter-RAT MO with no measurement gap |
| **FR1 only CA** | 1+NPCC\_CSIRS + NPCC\_CCA\_RSSI/CO | ⌈0.5 ×(NSCC\_SSB +Y+Z+2x NSCC\_CSIRS+ NSCC\_CCA\_RSSI/CO) ⌉ | N/A | N/A | N/A | ⌈0.5 ×(NSCC\_SSB +Y+Z+2x NSCC\_CSIRS+ NSCC\_CCA\_RSSI/CO) ⌉ | ⌈0.5 ×(NSCC\_SSB +Y+Z+2x NSCC\_CSIRS) ⌉ |
| **FR2 only intra band CA** | N/A | N/A | 1+NPCC\_CSIRS | N/A | NSCC\_SSB +Y+Z+2x NSCC\_CSIRS | NSCC\_SSB +Y+Z+2x NSCC\_CSIRS | NSCC\_SSB +Y+Z+2x NSCC\_CSIRS |
| **FR2 only inter band CA** | N/A | N/A | 1+NPCC\_CSIRS | 2\*(1+ NSCC\_CSIRS\_FR2\_NCM) Note 3,5 | 2×( NSCC\_SSB +Y+Z+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | 2×( NSCC\_SSB +Y+Z+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | 2×( NSCC\_SSB +Y+Z+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) |
| **FR1 +FR2 CA (FR1 PCell) Note 1** | 1+NPCC\_CSIRS | (NSCC\_SSB +Y+Z+2\* NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | N/A | (1+ NSCC\_CSIRS\_FR2\_NCM) Note 3,5 | ( NSCC\_SSB +Y+Z+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | ( NSCC\_SSB +Y+Z+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | ( NSCC\_SSB +Y+Z+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) |
| **FR1 +FR2 CA (FR2 PCell) Note 1** | N/A | NSCC\_SSB +Y+Z+2x NSCC\_CSIRS | 1+NPCC\_CSIRS | N/A | NSCC\_SSB +Y+Z+2x NSCC\_CSIRS | NSCC\_SSB +Y+Z+2x NSCC\_CSIRS | NSCC\_SSB +Y+Z+2x NSCC\_CSIRS |
| NOTE 1: Only one FR1 operating band and one FR2 operating band are included for FR1+FR2 inter-band CA.  NOTE 2: Selection of FR2 SCC where neighbour cell measurement is required follows clause 9.2.3.2.  NOTE 3: CSSFoutside\_gap,i =1 if only one SCell is configured and no inter-frequency MO without gap and only SSB based L3 measurement is configured on SCC; CSSFoutside\_gap,i =2 if only one SCell is configured and no inter-frequency MO without gap and either both SSB and CSI-RS based L3 configured or only CSI-RS based L3 measurement is configured on SCC.  NOTE 4: Y is the number of configured inter-frequency MOs without MG that are being measured outside of MG; otherwise, it is 0.  NOTE 5: Only two NR FR2 operating bands are included for FR2 inter-band CA.  NOTE 6: NPCC\_CSIRS=1 if PCC is with either both SSB and CSI-RS based L3 configured or only CSI-RS based L3 measurement configured; otherwise, NPCC\_CSIRS =0.  NOTE 7: NSCC\_CSIRS=Number of configured SCell(s) with either both SSB and CSI-RS based L3 measurement configured or only CSI-RS based L3 measurement configured  NOTE 8: NSCC\_CSIRS\_FR2\_NCM=1 if FR2 SCC, where neighbour cell measurement is required, is with either both SSB and CSI-RS configured or only CSI-RS measurement configured; otherwise, NSCC\_CSIRS\_FR2\_NCM=0.  NOTE 9: NSCC\_SSB=Number of configured SCell(s) with only SSB based L3 measurement configured, which is measured without MG.  NOTE 10: NPCC\_CCA\_RSSI/CO= 1 if PSCC is configured with RSSI/CO measurements without MG when RMTC and SMTC are overlapping; NSCC\_CCA\_RSSI/CO = Number of MOs for SCell(s) configured with RSSI/CO measurements without MG when RMTC and SMTC are overlapping.  NOTE 11: Z is the number of configured E-UTRA inter-RAT MOs without MG that are being measured outside of MG; otherwise, it is 0. | | | | | | | |

*Editor’s note: For UE supports [FR1+FR2 CA (PCell in FR1) 3-searcher capability] the applicability for inter-RAT measurement with no measurement gap can be revisited.*

##### 9.1.5.1.3 NR-DC mode: carrier-specific scaling factor for SSB-based and CSI-RS based L3 measurements performed outside gaps

For UE configured with NR-DC operation, the carrier-specific scaling factor CSSFoutside\_gap,i for intra-frequency SSB-based measurement, inter-frequency SSB-based measurements performed outside measurements gaps and intra-frequency CSI-RS based L3 measurement will be as specified in table 9.1.5.1.3-1.

For UE supports [FR1 only CA and FR1 only NR-DC 3-searcher capability] or [FR1+FR2 NR-DC (PCell is FR1 only) 3-searcher capability] configured with NR-DC operation and none of SMTC occasions of outside gap measurement objects in one FR are overlapped with per-FR measurement GAP in another FR, the carrier-specific scaling factor CSSFoutside\_gap,i for intra-frequency SSB-based measurement, inter-frequency SSB-based measurements performed outside measurements gaps and intra-frequency CSI-RS based L3 measurement will be as specified in table 9.1.5.1.3-2.

Table 9.1.5.1.3-1: CSSFoutside\_gap,i scaling factor for NR-DC mode

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scenario | *CSSF*outside\_gap,i for FR1 PCC | *CSSF*outside\_gap,i for FR1 SCC | CSSFoutside\_gap,i for FR1 PSCC | *CSSF*outside\_gap,i for FR2 PSCC | *CSSF*outside\_gap,i for FR2 SCC where neighbour cell measurement is not required | *CSSF*outside\_gap,i for inter-frequency MO with no measurement gap |
| **FR1 + FR2 NR-DC (FR1 PCell and FR2 PSCell) Note 1** | 1+NPCC\_CSIRS | 2×( NSCC\_SSB +Y+2xNSCC\_CSIRS) | N/A | 2x(1+ NPSCC\_CSIRS) Note 2 | 2x(NSCC\_SSB +Y+2x NSCC\_CSIRS ) | 2x(NSCC\_SSB +Y+2x NSCC\_CSIRS ) |
| FR1 + FR1 NR-DC (FR1 pCell and FR1 PSCell) | 1+NPCC\_CSIRS | 2×( NSCC\_SSB +Y+2xNSCC\_CSIRS) | 2x(1+ NPSCC\_CSIRS) Note 2 | N/A | N/A | 2x(NSCC\_SSB +Y+2x NSCC\_CSIRS ) |
| NOTE 1: NR-DC in Rel-15 only includes the scenarios where all serving cells in MCG in FR1 and all serving cells in SCG in FR2.  NOTE 2: CSSFoutside\_gap,i =1 if no SCell is configured and no inter-frequency MO without gap and only SSB based L3 measurement is configured on PSCC; CSSFoutside\_gap,i =2 if no SCell is configured and no inter-frequency MO without gap and either both SSB and CSI-RS based L3 configured or only CSI-RS based L3 measurement is configured on PSCC.  NOTE 3: Y is the number of configured inter-frequency SSB based frequency layers without MG that are being measured outside of MG; otherwise, it is 0.  NOTE 4: NPCC\_CSIRS=1 if PCC is with either both SSB and CSI-RS based L3 configured or only CSI-RS based L3 measurement configured; otherwise, NPCC\_CSIRS =0.  NOTE 5: NPSCC\_CSIRS=1 if PSCC is with either both SSB and CSI-RS based L3 configured or only CSI-RS based L3 measurement configured; otherwise, NPSCC\_CSIRS =0.  NOTE 6: NSCC\_CSIRS=Number of configured SCell(s) with either both SSB and CSI-RS based L3 measurement configured or only CSI-RS based L3 measurement configured  NOTE 8: NSCC\_SSB=Number of configured SCell(s) with only SSB based L3 measurement configured, which is measured without MG. For UE supporting [CSSF enhancement for one CC measurement per-band] for intra-frequency measurements without MG, NSCC\_SSB is the number of SCCs to be measured following the principles specified in clause 9.2.3.1 and 9.2.3.2 based on [network indication of enabling one serving carrier measurement for FR2 band or not]. | | | | | | |

Table 9.1.5.1.3-2: Enhanced CSSFoutside\_gap,i scaling factor for NR-DC mode

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scenario | *CSSF*outside\_gap,i for FR1 PCC | *CSSF*outside\_gap,i for FR1 SCC | CSSFoutside\_gap,i for FR1 PSCC | *CSSF*outside\_gap,i for FR2 PSCC | *CSSF*outside\_gap,i for FR2 SCC where neighbour cell measurement is not required | *CSSF*outside\_gap,i for inter-frequency MO with no measurement gap |
| **FR1 + FR2 NR-DC (FR1 PCell and FR2 PSCell) Note 1** | 1+NPCC\_CSIRS | ( NSCC\_SSB +Y+2xNSCC\_CSIRS) | N/A | (1+ NPSCC\_CSIRS) Note 2 | (NSCC\_SSB +Y+2x NSCC\_CSIRS ) | (NSCC\_SSB +Y+2x NSCC\_CSIRS ) |
| FR1 + FR1 NR-DC (FR1 pCell and FR1 PSCell) | 1+NPCC\_CSIRS | ( NSCC\_SSB +Y+2xNSCC\_CSIRS) | (1+ NPSCC\_CSIRS) Note 2 | N/A | N/A | (NSCC\_SSB +Y+2x NSCC\_CSIRS ) |
| NOTE 1: NR-DC in Rel-15 only includes the scenarios where all serving cells in MCG in FR1 and all serving cells in SCG in FR2.  NOTE 2: CSSFoutside\_gap,i =1 if no SCell is configured and no inter-frequency MO without gap and only SSB based L3 measurement is configured on PSCC; CSSFoutside\_gap,i =2 if no SCell is configured and no inter-frequency MO without gap and either both SSB and CSI-RS based L3 configured or only CSI-RS based L3 measurement is configured on PSCC.  NOTE 3: Y is the number of configured inter-frequency SSB based frequency layers without MG that are being measured outside of MG; otherwise, it is 0.  NOTE 4: NPCC\_CSIRS=1 if PCC is with either both SSB and CSI-RS based L3 configured or only CSI-RS based L3 measurement configured; otherwise, NPCC\_CSIRS =0.  NOTE 5: NPSCC\_CSIRS=1 if PSCC is with either both SSB and CSI-RS based L3 configured or only CSI-RS based L3 measurement configured; otherwise, NPSCC\_CSIRS =0.  NOTE 6: NSCC\_CSIRS=Number of configured SCell(s) with either both SSB and CSI-RS based L3 measurement configured or only CSI-RS based L3 measurement configured  NOTE 8: NSCC\_SSB=Number of configured SCell(s) with only SSB based L3 measurement configured, which is measured without MG. | | | | | | |

##### 9.1.5.1.4 NE-DC mode: carrier-specific scaling factor for SSB-based and CSI-RS based measurements performed outside gaps

For UE configured with NE-DC operation, the carrier-specific scaling factor CSSFoutside\_gap,i for intra-frequency SSB-based measurement and inter-frequency SSB-based measurements performed outside measurements gaps and intra-frequency CSI-RS based L3 measurement will be as specified in table 9.1.5.1.4-1.

Table 9.1.5.1.4-1: CSSFoutside\_gap,i scaling factor for NE-DC mode

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scenario | *CSSF*outside\_gap,i for FR1 PCC | *CSSF*outside\_gap,i for FR1 SCC | *CSSF*outside\_gap,i for FR2 PCC | *CSSF*outside\_gap,i for FR2 SCC where neighbour cell measurement is required | *CSSF*outside\_gap,i for FR2 SCC where neighbour cell measurement is not required | *CSSF*outside\_gap,i for inter-frequency MO with no measurement gap |
| **NE-DC with FR1 only CA** | 1+NPCC\_CSIRS | NSCC\_SSB +Y+2x NSCC\_CSIRS | N/A | N/A | N/A | NSCC\_SSB +Y+2x NSCC\_CSIRS |
| **NE-DC with FR2 only intra band CA** | N/A | N/A | 1+NPCC\_CSIRS | N/A | NSCC\_SSB +Y+2x NSCC\_CSIRS | NSCC\_SSB +Y+2x NSCC\_CSIRS |
| **NE-DC with**  **FR2 only inter band CA** | N/A | N/A | 1+NPCC\_CSIRS | 2\*(1+ NSCC\_CSIRS\_FR2\_NCM) Note 3,5 | 2×( NSCC\_SSB +Y+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | 2×( NSCC\_SSB +Y+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) |
| **NE-DC with FR1 +FR2 CA (FR1 PCell) Note 1** | 1+NPCC\_CSIRS | 2×( NSCC\_SSB +Y+2\* NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | N/A | 2x(1+ NSCC\_CSIRS\_FR2\_NCM) Note 3,5 | 2×( NSCC\_SSB +Y+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) | 2×( NSCC\_SSB +Y+2x NSCC\_CSIRS -1-NSCC\_CSIRS\_ FR2\_NCM) |
| NOTE 1: Only one FR1 operating band and one FR2 operating band are included for FR1+FR2 inter-band CA.  NOTE 2: Selection of FR2 SCC where neighbour cell measurement is required follows clause 9.2.3.2.  NOTE 3: CSSFoutside\_gap,i =1 if only one SCell is configured and no inter-frequency MO without gap and only SSB based L3 measurement is configured on SCC; CSSFoutside\_gap,i =2 if only one SCell is configured and no inter-frequency MO without gap and either both SSB and CSI-RS based L3 configured or only CSI-RS based L3 measurement is configured on SCC.  NOTE 4: Y is the number of configured inter-frequency MOs without MG that are being measured outside of MG; otherwise, it is 0.  NOTE 5: Only two NR FR2 operating band are included for NE-DC with FR2 only inter-band CA.  NOTE 6: NPCC\_CSIRS=1 if PCC is with either both SSB and CSI-RS based L3 configured or only CSI-RS based L3 measurement configured; otherwise, NPCC\_CSIRS =0.  NOTE 7: NSCC\_CSIRS=Number of configured SCell(s) with either both SSB and CSI-RS based L3 measurement configured or only CSI-RS based L3 measurement configured  NOTE 8: NSCC\_CSIRS\_FR2\_NCM=1 if FR2 SCC, where neighbour cell measurement is required, is with either both SSB and CSI-RS configured or only CSI-RS measurement configured; otherwise, NSCC\_CSIRS\_FR2\_NCM=0.  NOTE 9: NSCC\_SSB=Number of configured SCell(s) with only SSB based L3 measurement configured, which is measured without MG. For UE supporting [CSSF enhancement for one CC measurement per-band] for intra-frequency measurements without MG, NSCC\_SSB is the number of SCCs to be measured following the principles specified in clause 9.2.3.1 and 9.2.3.2 based on [network indication of enabling one serving carrier measurement for FR2 band or not]. | | | | | | |

<End of Change 9>

<Start of Change 10>

#### 9.2.3.2 Requirements for FR2

For UE supporting [CSSF enhancement for one serving CC measurement per-band], if UE receives network indication via [TBD] to enable one serving carrier measurement for each FR2 band,

- For one single intra-frequency layer in a band, during each layer 1 measurement period, the UE shall be capable of performing SS-RSRP, SS-RSRQ, and SS-SINR measurements for at least:

- 6 identified cells, and

- 24 SSBs with different SSB index and/or PCI,

where this single intra-frequency layer shall be:

- PCC, when UE is configured with SA NR or NE-DC operation mode with PCC in this FR2 band; or

- PSCC, when UE is configured with EN-DC with PSCC in this FR2 band; or

- PSCC, when UE is configured with NR-DC with PSCC in this FR2 band; or

- SCC on which UE is configured to report SSB based measurements, when neither PCC nor PSCC is in the same band and this SCC is the only SCC on which UE is configured to report SSB based measurements in this FR2 band; or

- SCC indicated by network via [TBD], when

- neither PCC nor PSCC is in the same band, and,

- there is no SCCs on which UE is configured to report SSB based measurements in this FR2 band, or

- there are multiple SCCs on which UE is configured to report SSB based measurements in this FR2 band;

Editor Note: In this scenario of “SCC indicated by network via [TBD]”, the related requirements above can be revisited if RAN4 and/or RAN2 is achieving any new conclusions.

- otherwise

- SCC determined by UE implementation.

- UE is not required to perform SS-RSRP, SS-RSRQ, and SS-SINR measurements on serving cell for each of the other intra-frequency layer(s) in the same band.

For UE not supporting [CSSF enhancement for one serving CC measurement per-band], or UE supporting [CSSF enhancement for one serving CC measurement per-band] but does not receive network indication via [TBD] to enable one serving carrier measurement for each FR2 band,

- For one single intra-frequency layer in a band, during each layer 1 measurement period, the UE shall be capable of performing SS-RSRP, SS-RSRQ, and SS-SINR measurements for at least:

- 6 identified cells, and

- 24 SSBs with different SSB index and/or PCI,

- where this single intra-frequency layer shall be:

- PCC when UE is configured with SA NR operation mode with PCC in the band; or

- PSCC when UE is configured with EN-DC with PSCC in the band; or

- PSCC when UE is configured with NR-DC with PSCC in the band; or

- One of the SCCs on which UE is configured to report SSB based measurements when neither PCC nor PSCC is in the same band, so that the selected SCC shall be an SCC where the UE is configured with SS-RSRP measurement reporting if such SCC exists, otherwise the selected SCC is determined by UE implementation.

- The UE shall also be capable of performing SS-RSRP, SS-RSRQ, and SS-SINR measurements for at least 2 SSBs on serving cell for each of the other intra-frequency layer(s) in the same band.

<End of Change 10>

<Start of Change 11>

#### 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 the 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 + TSSB\_measurement\_period\_intra + TSSB\_processing) ms

Tidentify\_intra\_with\_index = (TPSS/SSS\_sync\_intra + T SSB\_measurement\_period\_intra + TSSB\_time\_index\_intra + TSSB\_processing) 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* via *NeedForInterruptionInfoNR-r18*, 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* via *NeedForInterruptionInfoNR-r18*, 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 tables 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* via *NeedForInterruptionInfoNR-r18*, 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* via *NeedForInterruptionInfoNR-r18*, TSSB\_time\_index\_intra is given in table 9.2.5.1-19 for FR1.

- Otherwise, TSSB\_time\_index\_intra is given in tables 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).

- TSSB\_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, TSSB\_measurement\_period\_intra is given in table 9.2.5.2-2.

- For UE indicating *no-gap-no-interruption* via *NeedForInterruptionInfoNR-r18*, 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* via *NeedForInterruptionInfoNR-r18*, 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 TSSB\_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.

- Otherwise, TSSB\_measurement\_period\_intra is 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).

TSSB\_processing: it is the time period used to process multiple beams received in one SMTC. TSSB\_processing = 0 ms for UE not supporting [reduced Rx BSF capability], and TSSB\_processing = 2 ms for UE supporting [reduced Rx BSF capability] and it is activated.

- 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 GAP, or

- when intra-frequency SMTC is fully non overlapping with GAP for UE indicating *no-gap-with-interruption*, or

- when intra-frequency SMTC is fully non overlapping or partially overlapping with GAP for UE indicating *no-gap-no-interruption*, or

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 FR2-1 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 FR2-1 power class 3, Mpss/sss\_sync\_w/o\_gaps =24. For a UE supporting FR2-1 power class 4, Mpss/sss\_sync\_w/o\_gaps =24. For a UE supporting FR2-1 power class 6, Mpss/sss\_sync\_w/o\_gaps =24. For a UE supporting FR2-2 power class 1, Mpss/sss\_sync\_w/o\_gaps = 60. For a UE supporting FR2-2 power class 2, Mpss/sss\_sync\_w/o\_gaps = 36. For a UE supporting FR2-2 power class 3, Mpss/sss\_sync\_w/o\_gaps = 36.

Mmeas\_period\_w/o\_gaps: For a UE supporting FR2-1 power class 1 or 5, Mmeas\_period\_w/o\_gaps =40. For a UE supporting FR2-1 power class 2, Mmeas\_period\_w/o\_gaps =24. For a UE supporting FR2-1 power class 3, Mmeas\_period\_w/o\_gaps =24. For a UE supporting power class 4, Mmeas\_period\_w/o\_gaps =24. For a UE supporting power class 6, Mmeas\_period\_w/o\_gaps =24. For a UE supporting FR2-2 power class 1, Mmeas\_period\_w/o\_gaps = 60. For a UE supporting FR2-2 power class 2, Mmeas\_period\_w/o\_gaps = 36. For a UE supporting FR2-2 power class 3, Mmeas\_period\_w/o\_gaps = 36.

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

For a UE that supports [reduced Rx BSF capability], when *highSpeedMeasFlagFR2-r17* is not configured and [reduced Rx BSF capability is activated], the following values shall apply for Mpss/sss\_sync\_w/o\_gaps and Mmeas\_period\_w/o\_gaps:

Mpss/sss\_sync\_w/o\_gaps: For a UE supporting FR2-1 power class 3, Mpss/sss\_sync\_w/o\_gaps =3\* Nreduced\_Rx\_BSF.

Mmeas\_period\_w/o\_gaps: For a UE supporting FR2-1 power class 3, Mmeas\_period\_w/o\_gaps =3\* Nreduced\_Rx\_BSF.

Where,

Nreduced\_Rx\_BSF is the reduced UE Rx beam sweeping factor reported by UE via [UE capability signalling including reduced Rx BSF value].

When UE supports concurrent GAPs, i.e., supports the following capability or capabilities’ combination:

- concurrentMeasGap-r17, or

- concurrentMeasGapsPreMG-r18, or

- concurrentMeasGapsNCSG-r18,

Or when UE supports *musim-GapPreference-r17* or both concurrent measurement GAPs and *musim-GapPreference-r17* and UE concurrent GAPs or periodic MUSIM gaps or both concurrent gaps and periodic MUSIM gaps are configured

Kp is the scaling factor for an SSB frequency layer to be measured without GAP. Kp = 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 GAPs, periodic MUSIM gaps, and/or per-FR GAPs 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 GAP and MUSIM gap occasions within the window, and

- Navailable is the number of SMTC occasions that are not overlapped with any non-dropped GAP or non-dropped MUSIM gap occasions within the window W, after accounting for measurement GAP and MUSIM gap collisions by applying the collision rules for GAP and MUSIM gap in clauses 9.1.8.3, 9.1.10.4, 9.1.10.5, 9.1.12.3, and 9.1.13.3, respectively.

Kp = 1 when Navailable = 0.

- 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.

Requirements in this clause do not apply when Navailable = 0 due to fully overlapping between SMTC occasions and MUSIM gap occasions within the window W.

When UE supports [*MUSIM-GapConfig-17]* and the SMTC occasion of the target frequency layer is overlapping with the configured aperiodic MUSIM gap, longer cell identification period for the target frequency layer is expected.

- Otherwise, when the UE is not configured with or UE does not support concurrent GAPs and the UE is not configured with periodic MUSIM gaps or UE does not support MUSIM gaps:

When intra-frequency SMTC is fully non overlapping with measurement gaps or NCSG, or intra-frequency SMTC is fully overlapping with MGs or NCSG, 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 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 TS 38.331 [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.

- When the target SSB is completely contained in active BWP of UE or the active downlink BWP is initial BWP, the intra-frequency measurement shall be conducted without gap and without interruption regardless of the NeedForGaps’ status reporting.

Table 9.2.5.1-1: Time period for PSS/SSS detection, (Frequency range FR1)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | max( 600 ms, ceil( 5 x Kp) x SMTC period )Note 1 x CSSFintra |
| DRX cycle≤ 320 ms | max( 600 ms, ceil(M2 Note 2x 5 x Kp) x max(SMTC period,DRX cycle)) x CSSFintra |
| DRX cycle>320 ms | ceil(5 x Kp) x DRX cycle x CSSFintra |
| 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: When *highSpeedMeasFlag-r16* is not configured, M2 = 1.5; When *highSpeedMeasFlag-r16* is configured, M2 = 1.5 if SMTC periodicity > 40 ms,otherwise M2=1.  NOTE 3: When *highSpeedMeasFlag-r16* is configured, the requirements apply only to UE supporting either *measurementEnhancement-r16* or *intraNR-MeasurementEnhancement-r16* on measurements of the primary component carrier and do not apply to measurements of a secondary component carrier with active SCell.  NOTE 4: When *highSpeedMeasCA-Scell-r17* is configured and UE supports *measurementEnhancementCA-r17*, M2 = 1.5 if SMTC periodicity > 40 ms; otherwise M2=1. | |

Table 9.2.5.1-2: Time period for PSS/SSS detection, (Frequency range FR2)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | max(600 ms, ceil(Mpss/sss\_sync\_w/o\_gaps x KFR x Kp x Klayer1\_measurement)x SMTC period)Note 1 x CSSFintra |
| DRX cycle≤ 320 ms | max(600 ms, ceil(1.5 x Mpss/sss\_sync\_w/o\_gaps x KFR x Kp x Klayer1\_measurement)x max(SMTC period,DRX cycle)) x CSSFintra |
| DRX cycle>320 ms | ceil(Mpss/sss\_sync\_w/o\_gaps x KFR x Kp x Klayer1\_measurement) x DRX cycle x CSSFintra |
| 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: 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 9.2.5.1-3: Time period for time index detection (FR1)

|  |  |
| --- | --- |
| DRX cycle | TSSB\_time\_index\_intra |
| No DRX | max(120 ms, ceil( 3 x Kp )x SMTC period)Note 1 x CSSFintra |
| DRX cycle≤ 320 ms | max(120 ms, ceil (M2 Note 2 x 3 x Kp) x max(SMTC period,DRX cycle)) x CSSFintra |
| DRX cycle>320 ms | Ceil(3 x Kp) x DRX cycle x CSSFintra |
| 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: When *highSpeedMeasFlag-r16* is not configured, M2 = 1.5; When *highSpeedMeasFlag-r16* is configured, M2 = 1.5 if SMTC periodicity > 40 ms,otherwise M2=1  NOTE 3: When *highSpeedMeasFlag-r16* is configured, the requirements apply only to UE supporting either *measurementEnhancement-r16* or *intraNR-MeasurementEnhancement-r16* on measurements of the primary component carrier and do not apply to measurements of a secondary component carrier with active SCell.  NOTE 4: When *highSpeedMeasCA-Scell-r17* is configured and UE supports *measurementEnhancementCA-r17*, M2 = 1.5 if SMTC periodicity > 40 ms; otherwise M2=1 | |

Table 9.2.5.1-4: Time period for PSS/SSS detection, deactivated SCell (FR1)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | Ceil(5 x Kp) x measCycleSCell x CSSFintra |
| DRX cycle≤ 320 ms | Ceil(5 x Kp) x max(measCycleSCell, 1.5xDRX cycle) x CSSFintra |
| DRX cycle> 320 ms | Ceil(5 x Kp) x max(measCycleSCell, DRX cycle) x CSSFintra |
| NOTE 1: The requirements also apply to deactivated SCG SCell. | |

Table 9.2.5.1-5: Time period for PSS/SSS detection, deactivated SCell (FR2)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | Ceil(Mpss/sss\_sync\_w/o\_gaps x Kp) x measCycleSCell x CSSFintra |
| DRX cycle≤ 320 ms | Ceil(Mpss/sss\_sync\_w/o\_gaps x Kp) x max(measCycleSCell, 1.5xDRX cycle) x CSSFintra |
| DRX cycle> 320 ms | Ceil(Mpss/sss\_sync\_w/o\_gaps x Kp) x max(measCycleSCell, DRX cycle) x CSSFintra |
| NOTE 1: The requirements also apply to deactivated SCG SCell. | |

Table 9.2.5.1-6: Time period for time index detection, deactivated SCell (FR1)

|  |  |
| --- | --- |
| DRX cycle | TSSB\_time\_index\_intra |
| No DRX | Ceil(3 x Kp) x measCycleSCell x CSSFintra |
| DRX cycle≤ 320 ms | Ceil(3 x Kp) x max(measCycleSCell, 1.5xDRX cycle) x CSSFintra |
| DRX cycle> 320 ms | Ceil(3 x Kp) x max(measCycleSCell, DRX cycle) x CSSFintra |
| NOTE 1: The requirements also apply to deactivated SCG SCell. | |

Table 9.2.5.1-7: Void

Table 9.2.5.1-8: Void

Table 9.2.5.1-9: Time period for PSS/SSS detection, deactivated SCell (FR1), when *highSpeedMeasCA-Scell-r17* is configured

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | Ceil(5 x Kp) x measCycleSCell x CSSFintra |
| DRX cycle≤ 320 ms | Ceil(5 x Kp) x max(measCycleSCell, M2 Note 1xDRX cycle) x CSSFintra |
| DRX cycle> 320 ms | Ceil(5 x Kp) x max(measCycleSCell, DRX cycle) x CSSFintra |
| NOTE 1: M2 = 1.5 if SMTC periodicity > 40 ms; otherwise M2=1 | |

Table 9.2.5.1-10: Time period for time index detection, deactivated SCell (FR1)，when *highSpeedMeasCA-Scell-r17* is configured

|  |  |
| --- | --- |
| DRX cycle | TSSB\_time\_index\_intra |
| No DRX | Ceil(3 x Kp) x measCycleSCell x CSSFintra |
| DRX cycle≤ 320 ms | Ceil(3 x Kp) x max(measCycleSCell, M2 Note 1xDRX cycle) x CSSFintra |
| DRX cycle> 320 ms | Ceil(3 x Kp)x max(measCycleSCell, DRX cycle) x CSSFintra |
| NOTE 1: M2 = 1.5 if SMTC periodicity > 40 ms; otherwise M2=1 | |

Table 9.2.5.1-11: Time period for PSS/SSS detection when *highSpeedMeasFlagFR2-r17* is configured, (FR2) when SMTC period ≤ 40ms

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | max(600 ms, ceil(M1Note 2 x Kp x Klayer1\_measurement)x SMTC period)Note 1 x CSSFintra |
| DRX cycle≤ 80 ms | max(600 ms, ceil(M1Note 2 x Kp x Klayer1\_measurement)x max(SMTC period,DRX cycle)) x CSSFintra |
| 80 ms< DRX cycle≤ 320 ms | ceil(1.5x Mpss/sss\_sync\_w/o\_gaps Note 3 x Kp x Klayer1\_measurement)x max(SMTC period,DRX cycle) x CSSFintra |
| DRX cycle>320 ms | ceil(Mpss/sss\_sync\_w/o\_gaps Note 3 x Kp x Klayer1\_measurement) x DRX cycle x CSSFintra |
| 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: For UE supporting power class 6, M1= 6 if *highSpeedMeasFlagFR2-r17* = set1 or M1= 18 if *highSpeedMeasFlagFR2-r17* = set2  NOTE 3: Void | |

Table 9.2.5.1-12: Time period for PSS/SSS detection, deactivated PSCell (FR1)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | Ceil(5 x Kp) x measCyclePSCell x CSSFintra |
| DRX cycle≤ 320 ms | Ceil(5 x Kp) x max(measCyclePSCell, 1.5xDRX cycle) x CSSFintra |
| DRX cycle> 320 ms | Ceil(5 x Kp) x max(measCyclePSCell, DRX cycle) x CSSFintra |

Table 9.2.5.1-13: Time period for PSS/SSS detection, deactivated PSCell (FR2)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | Ceil(Mpss/sss\_sync\_w/o\_gaps x Kp) x measCyclePSCell x CSSFintra |
| DRX cycle≤ 320 ms | Ceil(Mpss/sss\_sync\_w/o\_gaps x Kp) x max(measCyclePSCell, 1.5xDRX cycle) x CSSFintra |
| DRX cycle> 320 ms | Ceil(Mpss/sss\_sync\_w/o\_gaps x Kp) x max(measCyclePSCell, DRX cycle) x CSSFintra |

Table 9.2.5.1-14: Time period for time index detection, deactivated PSCell (FR1)

|  |  |
| --- | --- |
| DRX cycle | TSSB\_time\_index\_intra |
| No DRX | Ceil(3 x Kp) x measCyclePSCell x CSSFintra |
| DRX cycle≤ 320 ms | Ceil(3 x Kp) x max(measCyclePSCell, 1.5xDRX cycle) x CSSFintra |
| DRX cycle> 320 ms | Ceil(3 x Kp) x max(measCyclePSCell, DRX cycle) x CSSFintra |

Table 9.2.5.1-15: Time period for time index detection (Frequency range FR2-2)

|  |  |
| --- | --- |
| DRX cycle | TSSB\_time\_index\_intra |
| No DRX | max(200 ms, ceil(MSSB\_index\_intra x Kp x SMTC period) x CSSFintra |
| DRX cycle≤ 320 ms | max(200 ms, ceil(1.5 x MSSB\_index\_intra x Kp) x max(SMTC period, DRX cycle) x CSSFintra) |
| DRX cycle>320 ms | Ceil(MSSB\_index\_intra x Kp )x DRX cycle x CSSFintra |

Table 9.2.5.1-16: Void

Table 9.2.5.1-17: Time period for PSS/SSS detection for UE indicating *no-gap-with-interruption*, (Frequency range FR1)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | max( 600 ms, 5 x max (80 ms, SMTC period ))Note 1 x CSSFintra |
| [DRX cycle≤ 320 ms] | max( 600 ms, ceil(M2 Note 2x 5) x [max(80 ms, SMTC period,DRX cycle)]) x CSSFintra |
| [DRX cycle>320 ms] | 5 x [DRX cycle x] CSSFintra |
| 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: When *highSpeedMeasFlag-r16* is not configured, M2 = 1.5; When *highSpeedMeasFlag-r16* is configured, M2 = 1.5 if SMTC periodicity > 40 ms;,otherwise M2=1.  NOTE 3: When *highSpeedMeasFlag-r16* is configured, the requirements apply only to UE supporting either *measurementEnhancement-r16* or *intraNR-MeasurementEnhancement-r16* on measurements of the primary component carrier and do not apply to measurements of a secondary component carrier with active SCell.  NOTE 4: When *highSpeedMeasCA-Scell-r17* is configured and UE supports *measurementEnhancementCA-r17*, M2 = 1.5 if SMTC periodicity > 40 ms; otherwise M2=1.  NOTE 5: Requirements only apply when measurement gap is not configured, or measurement gap is fully non-overlapped with SMTC on any carrier on which UE indicates *no-gap-with-interruption*. | |

Table 9.2.5.1-18: Time period for PSS/SSS detection for UE indicating *no-gap-with-interruption*, (Frequency range FR2)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | max(600 ms, ceil(Mpss/sss\_sync\_w/o\_gaps x KFR x Klayer1\_measurement)x max (80 ms, SMTC period ))Note 1 x CSSFintra |
| [DRX cycle≤ 320 ms] | max(600 ms, ceil(1.5 x Mpss/sss\_sync\_w/o\_gaps x KFR x Klayer1\_measurement)x [max(80 ms, SMTC period,DRX cycle)]) x CSSFintra |
| [DRX cycle>320 ms] | [ceil(Mpss/sss\_sync\_w/o\_gaps x KFR x Klayer1\_measurement) x DRX cycle] x CSSFintra |
| 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: KFR is a scaling factor depending on the frequency range and the SSB SCS. For FR2-1, KFR = 1.  NOTE 3: Requirements only apply when measurement gap is not configured, or measurement gap is fully non-overlapped with SMTC on any carrier on which UE indicates *no-gap-with-interruption*. | |

Table 9.2.5.1-19: Time period for time index detection for UE indicating *no-gap-with-interruption* (FR1)

|  |  |
| --- | --- |
| DRX cycle | TSSB\_time\_index\_intra |
| No DRX | max(120 ms, 3x max (80 ms, SMTC period ))Note 1 x CSSFintra |
| [DRX cycle≤ 320 ms] | max(120 ms, ceil (M2 Note 2 x 3) x [max(80 ms, SMTC period,DRX cycle)]) x CSSFintra |
| [DRX cycle>320 ms] | 3 x DRX cycle x CSSFintra |
| 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: When *highSpeedMeasFlag-r16* is not configured, M2 = 1.5; When *highSpeedMeasFlag-r16* is configured, M2 = 1.5 if SMTC periodicity > 40 ms;,otherwise M2=1  NOTE 3: When *highSpeedMeasFlag-r16* is configured, the requirements apply only to UE supporting either *measurementEnhancement-r16* or *intraNR-MeasurementEnhancement-r16* on measurements of the primary component carrier and do not apply to measurements of a secondary component carrier with active SCell.  NOTE 4: When *highSpeedMeasCA-Scell-r17* is configured and UE supports *measurementEnhancementCA-r17*, M2 = 1.5 if SMTC periodicity > 40 ms; otherwise M2=1  NOTE 5: Requirements only apply when measurement gap is not configured, or measurement gap is fully non-overlapped with SMTC on any carrier on which UE indicates *no-gap-with-interruption*. | |

Editor’s note: RAN4 has to decide the UE behaviour when DRX is condifured whether interruptions are allowed.

Table 9.2.5.1-20: Void

Table 9.2.5.1-21: Void

Table 9.2.5.1-22: Void

Table 9.2.5.1-23: Time period for time index detection for a UE operating on a target cell with 12 PRB SSB (Frequency range FR1)

|  |  |
| --- | --- |
| DRX cycle | TSSB\_time\_index\_intra\_less\_than\_5Mhz |
| No DRX | max(120 ms, ceil(7 x Kp) x SMTC period) |
| DRX cycle≤ 320 ms | max(120ms, ceil(M2 x 7 x Kp) x max(SMTC period,DRX cycle)) |
| DRX cycle>320 ms | ceil(7 x Kp) x DRX cycle |
| NOTE 1: When *highSpeedMeasFlag-r16* is not configured, M2 = 1.5; When *highSpeedMeasFlag-r16* is configured, M2 = 1.5 if SMTC periodicity > 40 ms; otherwise M2=1.  NOTE 2: When *highSpeedMeasFlag-r16* is configured, the requirements apply only to UE supporting either *measurementEnhancement-r16* or *intraNR-MeasurementEnhancement-r16*. | |

<End of Change 11>

<Start of Change 12>

#### 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 + TSSB\_measurement\_period\_intra + TSSB\_processing ms

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

Where:

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

- For UEs supporting [Rel-19 L3 fast beam sweeping (FBS) capability] when the FBS operation is activated, TSSB\_processing = 2 ms; otherwise, TSSB\_processing = 0.

- 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).

TSSB\_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-r17* is configured, the TSSB\_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.

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 or the UE does not support 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 GAPs, periodic MUSIM gaps and per-FR GAPs 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 GAP 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 GAP and MUSIM gap collisions by applying the collision rules for GAP and MUSIM gap in clauses 9.1.8.3, 9.1.10.4, 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.

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

When UE supports [*MUSIM-GapConfig-17*] and the configured aperiodic MUSIM gap collides with the measurement gap associated with the target frequency layer, where MUSIM gap collision rule in clause 9.1.10.4 is applied, longer cell identification period for the target intra-frequency is expected.

Mpss/sss\_sync\_with\_gaps : For a UE supporting FR2-1 power class 1 or 5, Mpss/sss\_sync with\_gaps=40. For a UE supporting FR2-1 power class 2, Mpss/sss\_sync with\_gaps =24. For a UE supporting FR2-1 power class 3, Mpss/sss\_sync with\_gaps = 24. For a UE supporting FR2-1 power class 4, Mpss/sss\_sync with\_gaps =24. For a UE supporting FR2-1 power class 6, Mpss/sss\_sync with\_gaps =24. For a UE supporting FR2-2 power class 1, Mpss/sss\_sync with\_gaps = 60. For a UE supporting FR2-2 power class 2, Mpss/sss\_sync with\_gaps = 36. For a UE supporting FR2-2 power class 3, Mpss/sss\_sync with\_gaps = 36.

Mmeas\_period\_ with\_gaps: For a UE supporting FR2-1 power class 1 or 5, Mmeas\_period\_ with\_gaps =40. For a UE supporting FR2-1 power class 2, Mmeas\_period\_ with\_gaps =24. For a UE supporting FR2-1 power class 3, Mmeas\_period\_ with\_gaps = 24. For a UE supporting FR2-1 power class 4, Mmeas\_period with\_gaps =24. For a UE supporting FR2-1 power class 6, Mmeas\_period with\_gaps =24. For a UE supporting FR2-2 power class 1, Mmeas\_period\_ with\_gaps = 60. For a UE supporting FR2-2 power class 2, Mmeas\_period\_ with\_gaps = 36. For a UE supporting FR2-2 power class 3, Mmeas\_period\_ with\_gaps = 36.

- MSSB\_index\_intra: For a UE supporting FR2-2 power class 1, MSSB\_index\_intra = 72. For a UE supporting FR2-2 power class 2, MSSB\_index\_intra = 48. For a UE supporting FR2 power class 3, MSSB\_index\_intra = 48.

For a UE that supports [reduced Rx BSF capability], when *highSpeedMeasFlagFR2-r17* is not configured and [reduced Rx BSF capability is activated], the following values shall apply for Mpss/sss\_sync\_with\_gaps and Mmeas\_period\_with\_gaps:

Mpss/sss\_sync\_with\_gaps: For a UE supporting FR2-1 power class 3, Mpss/sss\_sync\_with\_gaps =3\* Nreduced\_Rx\_BSF.

Mmeas\_period\_with\_gaps: For a UE supporting FR2-1 power class 3, Mmeas\_period\_with\_gaps =3\* Nreduced\_Rx\_BSF.

Where,

Nreduced\_Rx\_BSF is the reduced UE Rx beam sweeping factor reported by UE via [UE capability signalling including reduced Rx BSF value].

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.

Table 9.2.6.2-1: Time period for PSS/SSS detection (FR1)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | max(600 ms, 5 x Kgap x max(MGRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320 ms | max(600 ms, ceil(M2Note 1x 5 x Kgap) x max(MGRP, SMTC period,DRX cycle)) x CSSFintra |
| DRX cycle>320 ms | Ceil( 5 x Kgap ) x max(MGRP, DRX cycle) x CSSFintra |
| NOTE 1: When *highSpeedMeasFlag-r16* is not configured, M2 = 1.5; When *highSpeedMeasFlag-r16* is configured, M2 = 1.5 if SMTC periodicity > 40 ms, otherwise M2=1.  NOTE 2: When *highSpeedMeasFlag-r16* is configured, the requirements apply only to UE supporting either *measurementEnhancement-r16* or *intraNR-MeasurementEnhancement-r16* on measurements of the primary component carrier and do not apply to measurements of a secondary component carrier with active SCell.  NOTE 3: For a UE supporting concurrent GAPs, if multiple concurrent GAPs are configured, the MGRP is the periodicity of the activated Pre-MG or the MG pattern associated to the intra-frequency layer.  NOTE 4: When *highSpeedMeasCA-Scell-r17* is configured, the requirements apply to UE on measurements of secondary component carrier with active SCell. | |

**Table 9.2.6.2-2: Time period for PSS/SSS detection (FR2)**

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | max(600 ms, Mpss/sss\_sync\_with\_gaps x KFR x Kgap x max(MGRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320 ms | max(600 ms, ceil(1.5x Mpss/sss\_sync\_with\_gaps x KFR x Kgap) x max(MGRP, SMTC period, DRX cycle))x CSSFintra |
| DRX cycle>320 ms | Ceil(Mpss/sss\_sync\_with\_gaps x KFR x Kgap ) x max(MGRP, DRX cycle) x CSSFintra |
| NOTE 1: For a UE supporting concurrent GAPs, if multiple concurrent GAPs are configured, the MGRP is the periodicity of the activated Pre-MG or the MG pattern associated to the intra-frequency layer.  NOTE 2: 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 9.2.6.2-3: Time period for time index detection (FR1)

|  |  |
| --- | --- |
| DRX cycle | TSSB\_time\_index\_intra |
| No DRX | max(120 ms, ceil(3 x Kgap ) x max(MGRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320 ms | max(120 ms, ceil(M2Note 1x 3 x Kgap) x max(MGRP, SMTC period,DRX cycle) x CSSFintra) |
| DRX cycle>320 ms | Ceil(3 x Kgap )x max(MGRP, DRX cycle) x CSSFintra |
| NOTE 1: When *highSpeedMeasFlag-r16* is not configured, M2 = 1.5; When *highSpeedMeasFlag-r16* is configured, M2 = 1.5 if SMTC periodicity > 40 ms, otherwise M2=1.  NOTE 2: When *highSpeedMeasFlag-r16* is configured, the requirements apply only to UE supporting either *measurementEnhancement-r16* or *intraNR-MeasurementEnhancement-r16* on measurements of the primary component carrier and do not apply to measurements of a secondary component carrier with active SCell.  NOTE 3: For a UE supporting concurrent GAPs, if multiple concurrent GAPs are configured, the MGRP is the periodicity of the activated Pre-MG or the MG pattern associated to the intra-frequency layer.  NOTE 4: When *highSpeedMeasCA-Scell-r17* is configured, the requirements apply to UE on measurements of secondary component carrier with active SCell. | |

Table 9.2.6.2-7: Void

Table 9.2.6.2-8: Void

Table 9.2.6.2-8: Void

Table 9.2.6.2-9: Time period for PSS/SSS detection when *highSpeedMeasFlagFR2-r17* is configured, (FR2) when SMTC period ≤ 40ms

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | max(600 ms, M1Note 2 x Kgap x max(MGRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 80 ms | max(600 ms, ceil(M1Note2 x Kgap) x max(MGRP, SMTC period, DRX cycle))x CSSFintra |
| 80 ms< DRX cycle≤ 320 ms | max(600 ms, ceil(Mpss/sss\_sync\_with\_gaps x Kgap) x max(MGRP, SMTC period, DRX cycle))x CSSFintra |
| DRX cycle>320 ms | Ceil( Mpss/sss\_sync\_with\_gaps x Kgap ) x max(MGRP, DRX cycle) x CSSFintra |
| NOTE 1: For a UE supporting concurrent GAPs, if multiple concurrent GAPs are configured, the MGRP is the periodicity of the activated Pre-MG or the MG pattern associated to the intra-frequency layer.  NOTE 2: For UE supporting power class 6, M1= 6 if *highSpeedMeasFlagFR2-r17* = set1 or M1= 18 if *highSpeedMeasFlagFR2-r17* = set2  NOTE 3: Void | |

Table 9.2.6.2-10: Time period for time index detection (FR2-2)

|  |  |
| --- | --- |
| DRX cycle | TSSB\_time\_index\_intra |
| No DRX | max(200 ms, ceil(MSSB\_index\_intra x Kgap x max(MGRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320 ms | max(200 ms, ceil(1.5 x MSSB\_index\_intra x Kgap) x max(MGRP, SMTC period, DRX cycle) x CSSFintra) |
| DRX cycle>320 ms | Ceil(MSSB\_index\_intra x Kgap)x DRX cycle x CSSFintra |

Table 9.2.6.2-11: Void

Table 9.2.6.1-12: Time period for time index detection for a UE operating on a target cell with 12 PRB SSB (FR1) (FR1)

|  |  |
| --- | --- |
| DRX cycle | TSSB\_time\_index\_intra\_less\_than\_5Mhz |
| No DRX | max(120 ms, 7 x max(MGRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320 ms | max(120ms, ceil(M2 x 7) x max(MGRP, SMTC period,DRX cycle) x CSSFintra) |
| DRX cycle>320 ms | 7 x max(MGRP, DRX cycle) x CSSFintra |
| NOTE 1: Void  NOTE 2: When *highSpeedMeasFlag-r16* is not configured, M2 = 1.5; When *highSpeedMeasFlag-r16* is configured, M2 = 1.5 if SMTC periodicity > 40 ms, otherwise M2=1.  NOTE 3: When *highSpeedMeasFlag-r16* is configured, the requirements apply only to UE supporting either *measurementEnhancement-r16* or *intraNR-MeasurementEnhancement-r16*. | |

<End of Change 12>

<Start of Change 13>

### 9.2.7 Intra-frequency measurements with NCSG

#### 9.2.7.1 Intra-frequency cell identification

For the UE supporting NCSG, if NCSG is provided, 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 + TSSB\_measurement\_period\_intra + TSSB\_processing) ms

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

Where:

TPSS/SSS\_sync\_intra: it is the time period used in PSS/SSS detection given in table 9.2.7.1-1, 9.2.7.1-2, 9.2.7.1-4 (deactivated Scell) or 9.2.7.1-5 (deactivated SCell).

TSSB\_time\_index\_intra: it is the time period used to acquire the index of the SSB being measured given in table 9.2.7.1-3 or 9.2.7.1-6 (deactivated SCell).

T SSB\_measurement\_period\_intra: equal to a measurement period of SSB based measurement given in table 9.2.7.2-1, 9.2.7.2-2, 9.2.7.2-3, 9.2.7.2-4 (deactivated SCell) or 9.2.7.2-5 (deactivated SCell).

TSSB\_processing: it is the time period used to process multiple beams received in one SMTC. TSSB\_processing = 0 ms for UE not supporting [reduced Rx BSF capability] and TSSB\_processing = 2 ms for UE supporting [reduced Rx BSF capability] and it is activated.

CSSFintra: it is a carrier specific scaling factor and is determined according to CSSFwithin\_ncsg,i in clause 9.1.5.3 for measurement conducted within NCSG.

KNCSG is the scaling factor for a SSB frequency layer to be measured within an associated NCSG pattern. KNCSG = 1 when the UE is not configured with concurrent GAPs. Otherwise, KNCSG = 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 GAP and per-FR 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 NCSG within the window W, including those overlapped with other GAP occasions within the window, and

- Navailable is the number of SMTC occasions that are covered by instances of the non-dropped associated NCSG within the window W after accounting for GAP collisions by applying the GAP collision rule in clauses 9.1.8.3, 9.1.12.3, and 9.1.13.3.

- xRP = MGRP when configured GAP is MG, and xRP = VIRP when configured GAP is NCSG.

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

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

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

For a UE that supports [reduced Rx BSF capability], when *highSpeedMeasFlagFR2-r17* is not configured and [reduced Rx BSF capability is activated], the following values shall apply for Mpss/sss\_sync\_with\_ncsg and Mmeas\_period\_with\_ncsg:

Mpss/sss\_sync\_with\_ncsg: For a UE supporting FR2-1 power class 3, Mpss/sss\_sync\_with\_ncsg =3\* Nreduced\_Rx\_BSF.

Mmeas\_period\_with\_ncsg: For a UE supporting FR2-1 power class 3, Mmeas\_period\_with\_ncsg =3\* Nreduced\_Rx\_BSF.

Where,

Nreduced\_Rx\_BSF is the reduced UE Rx beam sweeping factor reported by UE via [UE capability signalling including reduced Rx BSF value].

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

Table 9.2.7.1-1: Time period for PSS/SSS detection with NCSG (FR1)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | max(600 ms, 5 x KNCSG x max(VIRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320 ms | max(600 ms, ceil(M2Note 1x 5 x KNCSG) x max(VIRP, SMTC period,DRX cycle)) x CSSFintra |
| DRX cycle>320 ms | 5 x KNCSG x max(VIRP, DRX cycle) x CSSFintra |
| NOTE 1: When *highSpeedMeasFlag-r16* is not configured, M2 = 1.5; When *highSpeedMeasFlag-r16* is configured, M2 = 1.5 if SMTC periodicity > 40 ms, otherwise M2=1.  NOTE 2: When *highSpeedMeasFlag-r16* is configured, the requirements apply only to UE supporting either *measurementEnhancement-r16* or *[intraRAT-MeasurementEnhancement-r16]* on measurements of the primary component carrier and do not apply to measurements of a secondary component carrier with active SCell. | |

**Table 9.2.7.1-2: Time period for PSS/SSS detection with NCSG (FR2)**

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | max(600ms, Mpss/sss\_sync\_with\_ncsg x KNCSG x max(VIRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320 ms | max(600ms, ceil(1.5x Mpss/sss\_sync\_with\_ncsg x KNCSG) x max(VIRP, SMTC period, DRX cycle))x CSSFintra |
| DRX cycle>320 ms | Mpss/sss\_sync\_with\_ncsg x KNCSG x max(VIRP, DRX cycle) x CSSFintra |

Table 9.2.7.1-3: Time period for time index detection with NCSG (FR1)

|  |  |
| --- | --- |
| DRX cycle | TSSB\_time\_index\_intra |
| No DRX | max(120 ms, 3 x KNCSG x max(VIRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320 ms | max(120 ms, ceil(M2Note 1x 3 x KNCSG) x max(VIRP, SMTC period,DRX cycle) x CSSFintra) |
| DRX cycle>320 ms | 3 x KNCSG x max(VIRP, DRX cycle) x CSSFintra |
| NOTE 1: *highSpeedMeasFlag-r16* is not configured, M2 = 1.5; When *highSpeedMeasFlag-r16* is configured, M2 = 1.5 if SMTC periodicity > 40 ms, otherwise M2=1.  NOTE 2: When *highSpeedMeasFlag-r16* is configured, the requirements apply only to UE supporting either *measurementEnhancement-r16* or *[intraRAT-MeasurementEnhancement-r16]* on measurements of the primary component carrier and do not apply to measurements of a secondary component carrier with active SCell. | |

Table 9.2.7.1-4: Time period for PSS/SSS detection with NCSG (deactivated SCell) (FR1)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | 5 x KNCSG x max(measCycleSCell, VIRP) x CSSFintra |
| DRX cycle≤ 320 ms | 5 x KNCSG x max(measCycleSCell, VIRP, 1.5xDRX cycle) x CSSFintra |
| DRX cycle> 320 ms | 5 x KNCSG x max(measCycleSCell, VIRP, DRX cycle) x CSSFintra |

**Table 9.2.7.1-5: Time period for PSS/SSS detection with NCSG (deactivated SCell) (FR2)**

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | Mpss/sss\_with\_ncsg x KNCSG x max(measCycleSCell, VIRP) x CSSFintra |
| DRX cycle≤ 320 ms | Mpss/sss\_with\_ncsg x KNCSG x max(measCycleSCell, VIRP, 1.5xDRX cycle) x CSSFintra |
| DRX cycle> 320 ms | Mpss/sss\_with\_ncsg x KNCSG x max(measCycleSCell, VIRP, DRX cycle) x CSSFintra |

Table 9.2.7.1-6: Time period for time index detection with NCSG (deactivated SCell) (FR1)

|  |  |
| --- | --- |
| DRX cycle | TSSB\_time\_index\_intra |
| No DRX | 3 x KNCSG x max(measCycleSCell, VIRP) x CSSFintra |
| DRX cycle≤ 320 ms | 3 x KNCSG x max(measCycleSCell, VIRP, 1.5xDRX cycle) x CSSFintra |
| DRX cycle> 320 ms | 3 x KNCSG x max(measCycleSCell, VIRP,DRX cycle) x CSSFintra |

<End of Change 13>

<Start of Change 14>

### 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 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 + TSSB\_measurement\_period\_inter + TSSB\_processing) ms

Tidentify\_inter\_with\_index = (TPSS/SSS\_sync\_inter + TSSB\_measurement\_period\_inter + TSSB\_time\_index\_inter+ TSSB\_processing) 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 *measEnhCAInterFreqFR2-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.

TSSB\_processing: the time period used to process multiple beams received in one SMTC. TSSB\_processing = 0 ms for UE not supporting [fast beam sweeping factor for L3 measurement] and TSSB\_processing = 2 ms for UE supporting [fast beam sweeping factor for L3 measurement] and it is activated.

- 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.

For a UE that supports [reduced Rx BSF capability], when *highSpeedMeasFlagFR2-r17* is not configured and [reduced Rx BSF capability is activated], the following values shall apply for Mpss/sss\_sync\_inter, MSSB\_index\_inter and Mmeas\_period\_inter:

Mpss/sss\_sync\_inter: For a UE supporting FR2-1 power class 3, Mpss/sss\_sync\_inter =5\* Nreduced\_Rx\_BSF.

MSSB\_index\_inter: For a UE supporting FR2-1 power class 3, MSSB\_index\_inter = 3\* Nreduced\_Rx\_BSF.

Mmeas\_period\_inter: For a UE supporting FR2-1 power class 3, Mmeas\_period\_inter =5\* Nreduced\_Rx\_BSF.

Where,

Nreduced\_Rx\_BSF is the reduced UE Rx beam sweeping factor reported by UE via [UE capability signalling including reduced Rx BSF value].

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 clauses 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 clause 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 (FR1)

|  |  |
| --- | --- |
| Condition NOTE1,2 | TPSS/SSS\_sync\_inter |
| No DRX | Max(600 ms, Ceil(8 \* Kgap) × Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(600 ms, Ceil(8\*1.5 \* Kgap) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | 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, (FR2)

|  |  |
| --- | --- |
| Condition NOTE1,2 | TPSS/SSS\_sync\_inter |
| No DRX | Max(600 ms, Ceil(Kgap × Mpss/sss\_sync\_inter x KFR) × Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(600 ms, Ceil(1.5 \* Kgap × Mpss/sss\_sync\_inter x KFR) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | 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 (FR1)

|  |  |
| --- | --- |
| **Condition NOTE1,2** | **TSSB\_time\_index\_inter** |
| No DRX | Max(120 ms, Ceil(3 \* Kgap)× Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(120 ms, Ceil(3 × 1.5 \* Kgap) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | 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 (FR2)

|  |  |
| --- | --- |
| **Condition NOTE1,2** | **TSSB\_time\_index\_inter** |
| No DRX | Max(200 ms, Ceil(Kgap × MSSB\_index\_inter)× Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(200 ms, Ceil(1.5 \* Kgap × MSSB\_index\_inter) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | 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 (FR1)

|  |  |
| --- | --- |
| Condition NOTE1,2 | TPSS/SSS\_sync\_inter |
| No DRX | max(600 ms, N1 × Max(MGRP, SMTC period)) × CSSFinter  N1 = 7 |
| DRX cycle ≤ 160 ms | max(600 ms, ceil(N2) x max(MGRP, SMTC period, DRX cycle)) x CSSFinter  N2 = 7 x M2 |
| 160 ms < DRX cycle ≤ 320 ms | ceil(N3) x DRX cycle x CSSFinter  N3 = 7 x M2 |
| DRX cycle>320 ms | 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 (FR1)

|  |  |
| --- | --- |
| Condition NOTE1,2 | TSSB\_time\_index\_inter |
| No DRX | Max(120 ms, 3 × Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(120 ms, Ceil(3 × M2 NOTE3) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | 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(600 ms, Ceil(Kgap × Mpss/sss\_sync\_inter) × Max(MGRP, measCyclePSCell)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(600 ms, Ceil(1.5 \* Kgap × Mpss/sss\_sync\_inter) × Max(MGRP, measCyclePSCell, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | 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(200 ms, Ceil(Kgap × MSSB\_index\_inter)× Max(MGRP, measCyclePSCell)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(200 ms, Ceil(1.5 \* Kgap × MSSB\_index\_inter) × Max(MGRP, measCyclePSCell, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | 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(600 ms, M1Note 3 x Kgap x max(MGRP, SMTC period)) x CSSFinter |
| DRX cycle≤ 80 ms | max(600 ms, ceil(M1Note 3 x Kgap) x max(MGRP, SMTC period, DRX cycle))x CSSFinter |
| 80 ms< DRX cycle≤ 320 ms | max(600 ms, ceil(Mpss/sss\_sync\_with\_gaps x Kgap) x max(MGRP, SMTC period, DRX cycle))x CSSFinter |
| DRX cycle>320 ms | 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 <= 40 ms

|  |  |
| --- | --- |
| Condition NOTE1,2 | TSSB\_time\_index\_inter |
| No DRX | Max(200 ms, Ceil(Kgap × , M1Note 3)× Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle≤ 80 ms | Max(200 ms, Ceil(1.5 \* Kgap × M1Note 3) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| 80 ms< DRX cycle≤ 320 ms | Max(200 ms, Ceil(1.5 \* Kgap × MSSB\_index\_inter) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | 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(120 ms, Ceil(6 \* Kgap)× Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(120ms, Ceil(6 × M2 \* Kgap) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | 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: 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. | |

#### 9.3.4.1 Void

#### 9.3.4.2 Void

<End of Change 14>

<Start of Change 15>

9.3.9.1 Inter-frequency Cell identification

UE satisfying the applicability conditions specified in clause 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 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 + TSSB\_measurement\_period\_inter + TSSB\_processing) ms

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

Where:

TPSS/SSS\_sync\_inter: it is the time period used in PSS/SSS detection

For UE supporting [Rel-19 FBS capability] and FBS measurement is activated, TSSB\_processing =2; otherwise, TSSB\_processing =0

- 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 supporting measEnhCAInterFreqFR2-r18:

- If *highSpeedMeasFlagFR2-r17* is configured, and SMTC ≤ 40ms, TPSS/SSS\_sync\_inter is given in table 9.3.9.1-6.

- If *highSpeedMeasFlagFR2-r17* is configured, and SMTC >40ms, TPSS/SSS\_sync\_inter is given in table 9.3.9.1-2.

- If *highSpeedMeasFlagFR2-r17* is not configured, TPSS/SSS\_sync\_inter is given in table 9.3.9.1-2.

- For UE indicating *no-gap-no-interruption*, 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 *no-gap-with-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 supporting measEnhCAInterFreqFR2-r18:

- If *highSpeedMeasFlagFR2-r17* is configured, and SMTC ≤ 40ms, TSSB\_time\_index\_inter is given in table 9.3.9.1-7.

- If *highSpeedMeasFlagFR2-r17* is configured, and SMTC >40ms, TSSB\_time\_index\_inter is given in table 9.3.9.1-4.

- If *highSpeedMeasFlagFR2-r17* is not configured, TSSB\_time\_index\_inter is given in table 9.3.9.1-4.

- For UE *indicating no-gap-no-interruption*, 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 *no-gap-with-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.

- TSSB\_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*, TSSB\_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 *no-gap-no-interruption*, TSSB\_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 *no-gap-with-interruption*, TSSB\_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 inter-frequency SMTC is fully non overlapping or partially overlapping with GAPs.

- when inter-frequency SMTC is fully non overlapping or partially overlapping with measurement gaps for UE *indicating no-gap-no-interruption* or

- when inter-frequency SMTC is fully non overlapping with measurement gaps for UE indicating *no-gap-with-interruption*.

For inter-frequency SSB based measurements without measurement gaps in active BWP

Mpss/sss\_sync\_inter: For a UE supporting FR2-1 power class 1 or 5, Mpss/sss\_sync\_inter = 40. For a UE supporting FR2-1 power class 2, Mpss/sss\_sync\_inter = 24. For a UE supporting FR2-1 power class 3, Mpss/sss\_sync\_inter = 24. For a UE supporting FR2-1 power class 4, Mpss/sss\_sync = 24. For a UE supporting FR2-2 power class 1, Mpss/sss\_sync\_inter = 60. For a UE supporting FR2-2 power class 2, Mpss/sss\_sync\_inter = 36. For a UE supporting FR2-2 power class 3, Mpss/sss\_sync\_inter = 36. For FR1, Mpss/sss\_sync\_inter = 5.

MSSB\_index\_inter: For a UE supporting FR2-2 power class 1, MSSB\_index\_inter = 72. For a UE supporting FR2-2 power class 2, MSSB\_index\_inter = 48. For a UE supporting FR2-2 power class 3, MSSB\_index\_inter = 48. For FR1, MSSB\_index\_inter = 3.

Mmeas\_period\_inter: For a UE supporting FR2-1 power class 1 or 5, Mmeas\_period\_inter = 40. For a vehicle mounted UE supporting FR2-1 power class 2, Mpss/sss\_sync\_inter=24. For a UE supporting FR2-1 power class 3, Mmeas\_period\_inter = 24. For a UE supporting FR2-1 power class 4, Mmeas\_period\_inter = 24. For a UE supporting FR2-2 power class 1, Mmeas\_period\_inter = 60. For a UE supporting FR2-2 power class 2, Mpss/sss\_sync\_inter = 36. For a UE supporting FR2-2 power class 3, Mmeas\_period\_inter = 36. For FR1, Mmeas\_period\_inter = 5.

For a UE supporting FR2-1 power class 3 and supporting [Rel-19 FBS capability] and FBS measurement is activated

Mpss/sss\_sync\_inter: when *highSpeedMeasFlagFR2-r17* is not configured, Mpss/sss\_sync\_inter = 3\*Nreduce­d where Nreduce­d is the value reported in [Rel-19 FBS capability].

Mmeas\_period\_inter: when *highSpeedMeasFlagFR2-r17* is not configured, Mmeas\_period\_inter = 3\*Nreduce­d where Nreduce­d is the value reported in [Rel-19 FBS capability].

If the UE indicates ‘nogap-noncsg’ via *NeedForGapNCSG-InfoNR* for the inter-frequency measurement or the UE indicates either *no-gap-with-interruption* or *no-gap-no-interruption* via *NeedForInterruptionInfoNR-r18*,

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. For FR1, Mpss/sss\_sync\_inter = 8.

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. For FR1, MSSB\_index\_inter = 3.

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. For FR1, Mmeas\_period\_inter = 8.

When UE supports *concurrentMeasGap-r17* or *musim-GapPreference-r17* or both concurrent measurement GAP and *musim-GapPreference-r17* and the UE is configured with concurrent GAPs or periodic MUSIM gaps or both concurrent gaps and periodic MUSIM gaps,

Kp is a scaling factor for an SSB frequency layer to be measured without GAP. Kp = 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 GAPs, periodic MUSIM gaps, and per-FR GAPs 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 GAP and MUSIM gap occasions within the window, and

Navailable is the number of SMTC occasions that are not overlapped with any non-dropped GAP or non-dropped MUSIM gap occasions within the window W, after accounting for GAP and MUSIM gap collisions by applying the collision rules for the measurement GAP and MUSIM gap in clauses 9.1.8.3, 9.1.10.4 and 9.1.10.5, 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.

Kp = 1 when Navailable = 0.

Requirements in this clause do not apply when Navailable = 0 due to fully overlapping between SMTC occasions and MUSIM gap occasions within the window W.

Editor Note: FSS for the case when Navailable = 0 due to fully overlapping between SMTC occasions and the union of MUSIM gap and measurement gap occasions within the window W.

When UE supports [*musim-GapPreference-r17]* and the SMTC occasions of the target frequency layer is fully or partially overlapping with the configured aperiodic MUSIM gap, longer cell identification period for the target frequency layer is expected.

Otherwise, when UE is not configured with or UE does not support concurrent GAPs and the UE is not configured with MUSIM gaps:

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

When inter-frequency 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 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 inter-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 inter-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( 600 ms, ceil(Mpss/sss\_sync\_inter x Kp) x SMTC period )Note 1 x CSSFinter |
| DRX cycle≤ 320 ms | max( 600 ms, ceil(M2x Mpss/sss\_sync\_inter x Kp) x max(SMTC period,DRX cycle)) x CSSFinter |
| DRX cycle>320 ms | ceil(Mpss/sss\_sync\_inter 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 identified  NOTE 2: Void  NOTE 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 9.3.9.1-1a: Time period for PSS/SSS detection, when UE indicate *no-gap-with-interruption* (FR1)**

|  |  |
| --- | --- |
| **DRX cycle** | **TPSS/SSS\_sync\_inter** |
| No DRX | max( 600 ms, Mpss/sss\_sync\_inter x max(80 ms, SMTC period) )Note 1 x CSSFinter |
| [DRX cycle≤ 320 ms] | max( 600 ms, ceil(M2 x Mpss/sss\_sync\_inter) x max(80 ms, SMTC period,DRX cycle)) x CSSFinter |
| [DRX cycle>320 ms] | Mpss/sss\_sync\_inter 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: Void  NOTE 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(600 ms, ceil(Mpss/sss\_sync\_inter x Kp x Klayer1\_measurement)x SMTC period)Note 1 x CSSFinter |
| DRX cycle≤ 320 ms | max(600 ms, ceil(1.5 x Mpss/sss\_sync\_inter x Kp x Klayer1\_measurement)x max(SMTC period,DRX cycle)) x CSSFinter |
| DRX cycle>320 ms | 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 identified  NOTE 2: Void | |

**Table 9.3.9.1-2a: Time period for PSS/SSS detection, when UE indicate no-gap-with-interruption (FR2)**

|  |  |
| --- | --- |
| **DRX cycle** | **TPSS/SSS\_sync\_inter** |
| No DRX | max(600 ms, ceil(Mpss/sss\_sync\_inter x Klayer1\_measurement)x max(80 ms, SMTC period))Note 1 x CSSFinter |
| DRX cycle≤ 320 ms | max(600ms, ceil(1.5 x Mpss/sss\_sync\_inter x Klayer1\_measurement)x max(80ms,SMTC period, DRX cycle)) x CSSFinter |
| DRX cycle>320 ms | ceil(Mpss/sss\_sync\_inter 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 identified  NOTE 2: Void | |

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

|  |  |
| --- | --- |
| **DRX cycle** | **TSSB\_time\_index\_inter** |
| No DRX | max(120 ms, ceil(MSSB\_index\_inter x Kp )x SMTC period)Note 1 x CSSFinter |
| DRX cycle≤ 320 ms | max(120 ms, ceil (M2 x MSSB\_index\_inter x Kp) x max(SMTC period,DRX cycle)) x CSSFinter |
| DRX cycle>320 ms | Ceil(MSSB\_index\_inter 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 identified  NOTE 2: Void  NOTE 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 9.3.9.1-3a: Time period for time index detection, when UE indicate *no-gap-with-interruption* (FR1)**

|  |  |
| --- | --- |
| **DRX cycle** | **TSSB\_time\_index\_inter** |
| No DRX | max(120 ms, MSSB\_index\_inter x max(80 ms, SMTC period))Note 1 x CSSFinter |
| DRX cycle≤ 320 ms | max(120 ms, ceil (M2 x MSSB\_index\_inter) x [max(80 ms, SMTC period, DRX cycle)]) x CSSFinter |
| DRX cycle>320 ms | MSSB\_index\_inter 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: Void  NOTE 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 9.3.9.1-4: Time period for time index detection (FR2)**

|  |  |
| --- | --- |
| **Condition NOTE1,2** | **TSSB\_time\_index\_inter** |
| No DRX | Max(200 ms, Ceil(MSSB\_index\_inter x Kp)× SMTC period) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(200 ms, Ceil(1.5 × MSSB\_index\_inter x Kp) × Max(SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | Ceil(MSSB\_index\_inter x Kp) × DRX cycle × CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1  NOTE 2: Kp is applicable for UE supporting *concurrentMeasGap-r17* | |

**Table 9.3.9.1-4a: ime period for time index detection, when UE indicate *no-gap-with-interruption* (FR2)**

|  |  |
| --- | --- |
| **Condition NOTE1,2** | **TSSB\_time\_index\_inter** |
| No DRX | Max(200 ms, MSSB\_index\_inter × max(80 ms, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(200 ms, Ceil(1.5 × MSSB\_index\_inter) × Max(80 ms, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | 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: Kp is applicable for UE supporting [concurrent gaps] and MUSIM gaps | |

**Table 9.3.9.1-5: Time period for time index detection for a UE operating on a target cell with 12 PRB SSB (FR1)**

|  |  |
| --- | --- |
| **DRX cycle** | **TSSB\_time\_index\_inter\_less\_than\_5 MHz** |
| No DRX | max(120 ms, ceil( 6 x Kp )x SMTC period)Note 1 x CSSFinter |
| DRX cycle≤ 320 ms | max(120 ms, ceil (6 x Kp) x max(SMTC period,DRX cycle)) x CSSFinter |
| DRX cycle>320 ms | Ceil( 6 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 identified  NOTE 2: 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 9.3.9.1-6: 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(600 ms, ceil(M1 Note 2 x Kp x Klayer1\_measurement)x SMTC period)Note 1 x CSSFinter |
| DRX cycle≤ 80 ms | max(600 ms, ceil(M1 Note 2 x Kp x Klayer1\_measurement)x max(SMTC period,DRX cycle)) x CSSFinter |
| 80 ms< DRX cycle≤ 320 ms | max(600 ms, ceil(1.5 x Mpss/sss\_sync\_inter x Kp x Klayer1\_measurement)x max(SMTC period,DRX cycle)) x CSSFinter |
| DRX cycle>320 ms | 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 identified  NOTE 2: For UE supporting power class 6 and *measEnhCAInterFreqFR2-r18*, M1= 6 if *highSpeedMeasFlagFR2-r17* = set1 or M1= 18 if *highSpeedMeasFlagFR2-r17* = set2 | |

**Table 9.3.9.1-7: Time period for time index detection when *highSpeedMeasFlagFR2-r17* is configured (FR2-1) when SMTC period ≤ 40ms**

|  |  |
| --- | --- |
| **Condition NOTE1,2** | **TSSB\_time\_index\_inter** |
| No DRX | Max(200 ms, Ceil(M1 Note 3 x Kp)× SMTC period) × CSSFinter |
| DRX cycle≤ 80 ms | Max(200 ms, Ceil(M1 Note 3 x Kp) × Max(SMTC period, DRX cycle)) × CSSFinter |
| 80 ms< DRX cycle≤ 320 ms | Max(200 ms, Ceil(1.5 × MSSB\_index\_inter x Kp) × Max(SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle>320 ms | Ceil(MSSB\_index\_inter x Kp) × DRX cycle × CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1  NOTE 2: Kp is applicable for UE supporting *concurrentMeasGap-r17*  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 15>

<Start of Change 16>

### 9.3.10 Inter-frequency measurement with NCSG

#### 9.3.10.1 Inter-frequency cell identification

For the UE supporting NCSG, if NCSG is provided, 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. 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 + TSSB\_measurement\_period\_inter + TSSB\_processing) ms

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

Where:

TPSS/SSS\_sync\_inter: it is the time period used in PSS/SSS detection given in table 9.3.10.1-1 and table 9.3.10.1-2.

TSSB\_time\_index\_inter: it is the time period used to acquire the index of the SSB being measured given in table 9.3.10.1-3 and table 9.3.10.1-4.

TSSB\_measurement\_period\_inter: equal to a measurement period of SSB based measurement given in table 9.3.10.2-1 and table 9.3.10.2-2.

TSSB\_processing: it is the time period used to process multiple beams received in one SMTC. TSSB\_processing = 0 ms for UE not supporting [reduced Rx BSF capability] and TSSB\_processing = 2 ms for UE supporting [reduced Rx BSF capability] and the FBS operation is activated.

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.

For a UE that supports [reduced Rx BSF capability], when *highSpeedMeasFlagFR2-r17* is not configured and [FBS operation is activated], the following values shall apply for Mpss/sss\_sync\_inter, MSSB\_index\_inter and Mmeas\_period\_inter:

Mpss/sss\_sync\_inter: For a UE supporting FR2-1 power class 3, Mpss/sss\_sync\_inter =5\* Nreduced\_Rx\_BSF.

MSSB\_index\_inter: For a UE supporting FR2-1 power class 3, MSSB\_index\_inter = 3\* Nreduced\_Rx\_BSF.

Mmeas\_period\_inter: For a UE supporting FR2-1 power class 3, Mmeas\_period\_inter =5\* Nreduced\_Rx\_BSF.

Where,

Nreduced\_Rx\_BSF is the reduced Rx beam sweeping factor reported by UE via [UE capability signalling including reduced Rx BSF value].

CSSFinter: it is a carrier specific scaling factor and is determined according to CSSFwithin\_ncsg,i in clause 9.1.5.3 for measurement conducted within NCSG.

- KNCSG is the scaling factor for a SSB frequency layer to be measured within an associated NCSG pattern. KNCSG = 1 when the UE is not configured with concurrent GAPs. Otherwise, KNCSG = 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 GAPs and per-FR GAPs 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 NCSG within the window W, including those overlapped with other GAP occasions within the window, and

- Navailable is the number of SMTC occasions that are covered by instances of the non-dropped associated NCSG within the window W after accounting for GAP collisions by applying the GAP collision rule in clauses 9.1.8.3, 9.1.12.3, and 9.1.13.3.

- xRP = MGRP when configured GAP is activated Pre-MG or MG, and xRP = VIRP when configured GAP is NCSG.

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

**Table 9.3.10.1-1: Time period for PSS/SSS detection with NCSG (FR1)**

|  |  |
| --- | --- |
| **Condition NOTE1,2** | **TPSS/SSS\_sync\_inter** |
| No DRX | Max(600 ms, 8 × KNCSG × Max(VIRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(600 ms, Ceil(8\*1.5 × KNCSG) × Max(VIRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | 8 × KNCSG × 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. | |

**Table 9.3.10.1-2: Time period for PSS/SSS detection with NCSG (FR2)**

|  |  |
| --- | --- |
| **Condition NOTE1,2** | **TPSS/SSS\_sync\_inter** |
| No DRX | Max(600 ms, Mpss/sss\_sync\_inter × KNCSG × Max(VIRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(600 ms, (1.5 × Mpss/sss\_sync\_inter × KNCSG) × Max(VIRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | Mpss/sss\_sync\_inter × KNCSG × 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. | |

**Table 9.3.10.1-3: Time period for time index detection with NCSG (FR1)**

|  |  |
| --- | --- |
| **Condition NOTE1,2** | **TSSB\_time\_index\_inter** |
| No DRX | Max(120 ms, 3 × KNCSG × Max(VIRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(120 ms, Ceil(3 × 1.5 × KNCSG) × Max(VIRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | 3 × KNCSG × 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. | |

**Table 9.3.10.1-4: Time period for time index detection with NCSG (FR2)**

|  |  |
| --- | --- |
| **Condition NOTE1,2** | **TSSB\_time\_index\_inter** |
| No DRX | Max(200 ms, MSSB\_index\_inter × KNCSG × Max(VIRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(200 ms, (1.5 × MSSB\_index\_inter × KNCSG) × Max(VIRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | MSSB\_index\_inter × KNCSG × 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. | |

<End of Change 16>