3GPP TSG-RAN WG4 Meeting #116 R4-2512319

**Bengaluru, India, August 25th – 29th, 2025**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  |  | **CR** | **draftCR** | **rev** | **1** | **Current version:** | **19.1.0** |  |
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| *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:***  | draftCR 38.133 Inter-frequency measurement requirements with XR |
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| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_XR\_Ph3-Core |  | ***Date:*** | 2025-08-15 |
|  |  |  |  |  |
| ***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 canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
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| ***Reason for change:*** |  Inter-frequency measurements with XR are not supported. |
|  |  |
| ***Summary of change:*** | Measurement requirements are introduced for inter-frequency measurements with measurement gaps which are cancelled due to the UE XR operation. |
|  |  |
| ***Consequences if not approved:*** | Inter-frequency measurements with XR are not supported. |
|  |  |
| ***Clauses affected:*** | 9.3.4, 9.3.5, 9.3.9.3 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **X** |  |  Test specifications | TS 38.533 |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | R4-2511151 |

### **--- start of Change 1 ---**

### 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) ms

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

Where:

 TPSS/SSS\_sync\_inter: it is the time period used in PSS/SSS detection given in table 9.3.4-1, table 9.3.4-2, table 9.3.4-5 when *highSpeedMeasInterFreq-r17* is configured and UE supports measurementEnhancementInterFreq-r17 and table 9.3.4-9 when *highSpeedMeasFlagFR2-r17* is configured and UE supports *measEnhCAInterFreqFR2-r18*. When the SCG is deactivated, table 9.3.4-7 applies for an inter-frequency carrier configured by SCG and not configured by MCG and table 9.3.4-2 applies for an inter-frequency carrier configured by both SCG and MCG. Regardless of whether the SCG is activated or deactivated, table 9.3.4-2 applies for an inter-frequency carrier configured only by MCG.

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

- For UE supporting feature group 64-1 [2], the TPSS/SSS\_sync\_inter is given in tables 9.3.4-12 and 9.3.4-13, for FR1 and FR2-1, respectively, provided the configurations and conditions in clause 9.1.y.4 are met.

 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.

- For UE supporting feature group 64-1 [2], the TSSB\_time\_index\_inter is given in tables 9.3.4-14 and 9.3.4-15, for FR1 and FR2-1, respectively, provided the configurations and conditions in clause 9.1.y.4 are met.

 TSSB\_measurement\_period\_inter: equal to a measurement period of SSB based measurement given in table 9.3.5-1, table 9.3.5-2, table 9.3.5-3 when *highSpeedMeasInterFreq* is configured and UE supports *measurementEnhancementInterFreq-r17*, and in table 9.3.5-5 when *highSpeedMeasFlagFR2-r17* is configured and UE supports *measEnhCAInterFreqFR2-r18*. When the SCG is deactivated, table 9.3.5-4 applies for an inter-frequency carrier configured by SCG and not configured by MCG and table 9.3.5-2 applies for an inter-frequency carrier configured by both SCG and MCG. Regardless of whether the SCG is activated or deactivated, table 9.3.5-2 applies for an inter-frequency carrier configured only by MCG.

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

- For UE supporting feature group 64-1 [2], the TSSB\_measurement\_period\_inter is given in section 9.3.5, tables 9.3.5-6 and 9.3.5-7, for FR1 and FR2-1, respectively, provided the configurations and conditions in clause 9.1.y.4 are met.

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

 MSSB\_index\_inter: For a UE supporting FR2-1 power class 1 or 5, MSSB\_index\_inter = 40 samples. For a UE supporting FR2 power class 2, MSSB\_index\_inter = 24 samples. For a UE supporting FR2-1 power class 3, MSSB\_index\_inter = 24 samples. For a UE supporting FR2-1 power class 4, MSSB\_index\_inter = 24 samples. For a UE supporting FR2-2 power class 2 or 3, MSSB\_index\_inter = 48 samples. For a UE supporting FR2 power class 1, MSSB\_index\_inter = 72 samples.

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

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

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

- For a window W of duration max(SMTC period, xRP\_max), where xRP\_max is the maximum xRP across all configured per-UE measurement GAPs, periodic MUSIM gaps, and/or per-FR measurement GAPs within the same FR, and starting from the beginning of any SMTC occasion:

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

- Navailable is the number of SMTC occasions that are covered by instances of the non-dropped associated measurement gap within the window W, after accounting for measurement GAP and MUSIM gap collisions by applying the collision rules for the GAP and MUSIM gap in 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 3.6.1NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: For a UE supporting concurrent GAPs, the 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 3.6.1NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: For a UE supporting concurrent GAPs, the 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 3.6.1NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: For a UE supporting concurrent GAPs, the 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 3.6.1NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: For a UE supporting concurrent GAPs, the 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)) × CSSFinterN1 = 7 |
| DRX cycle ≤ 160 ms | max(600 ms, ceil(N2) x max(MGRP, SMTC period, DRX cycle)) x CSSFinterN2 = 7 x M2 |
| 160 ms < DRX cycle ≤ 320 ms | ceil(N3) x DRX cycle x CSSFinterN3 = 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 identifiedNOTE 2: M2 = 1.5 if SMTC periodicity > 40 ms, otherwise M2=1NOTE 3: N4=6 if SMTC periodicity > 40 ms, otherwise N4=5 |

Table 9.3.4-6: Time period for time index detection when *highSpeedMeasInterFreq-r17* is configured (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 3.6.1NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.NOTE 3: M2 = 1.5 if SMTC periodicity > 40 ms, otherwise M2=1. |

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 3.6.1NOTE 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 3.6.1NOTE 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 3.6.1NOTE 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 9.3.4-12: Time period for PSS/SSS detection (FR1) for UE configured with MG cancellation

|  |  |
| --- | --- |
| Condition NOTE1 | TPSS/SSS\_sync\_inter NOTE3 |
| No DRX | Max(600 ms, ceil((8+Lcancel,PSS/SSS) × Kgap) × Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(600 ms, ceil((8+ Lcancel,PSS/SSS) × Kgap ×1.5) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | ceil((8+ Lcancel,PSS/SSS) × Kgap) × 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: Lcancel,PSS/SSS is the the number of measurement gap occasions with SSB not available at the UE due to measurement gap occasions cancelled during TPSS/SSS\_sync\_inter. When DRX is configured, Lcancel,PSS/SSS is the number of DRX cycles in which at least one measurement gap occasion with SSB is not available at the UE due to measurement gap occasions cancelled during TPSS/SSS\_sync\_inter. |

Table 9.3.4-13: Time period for PSS/SSS detection (FR2-1) for UE configured with MG cancellation

|  |  |
| --- | --- |
| Condition NOTE1 | TPSS/SSS\_sync\_inter NOTE3 |
| No DRX | Max(600 ms, ceil((Mpss/sss\_sync\_inter + Lcancel,PSS/SSS) × Kgap) × Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(600 ms, ceil((Mpss/sss\_sync\_inter + Lcancel,PSS/SSS) × 1.5 × Kgap) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | ceil((Mpss/sss\_sync\_inter+ Lcancel,PSS/SSS) × Kgap) × 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: Lcancel,PSS/SSS is the the number of measurement gap occasions with SSB not available at the UE due to measurement gap occasions cancelled during TPSS/SSS\_sync\_inter. When DRX is configured, Lcancel,PSS/SSS is the number of DRX cycles in which at least one measurement gap occasion with SSB is not available at the UE due to measurement gap occasions cancelled during TPSS/SSS\_sync\_inter. |

Table 9.3.4-14: Time period for time index detection (FR1) for UE configured with MG cancellation

|  |  |
| --- | --- |
| **Condition NOTE1** | **TSSB\_time\_index\_inter NOTE3** |
| No DRX | Max(120 ms, ceil((3+ Lcancel,index) × Kgap) × Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(120 ms, ceil((3+ Lcancel,index) × 1.5 × Kgap) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | ceil((3+ Lcancel,index) × Kgap) × 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: Lcancel,index is the the number of measurement gap occasions with SSB not available at the UE due to measurement gap occasions cancelled during TSSB\_time\_index\_inter. When DRX is configured, Lcancel,index is the number of DRX cycles in which at least one measurement gap occasion with SSB is not available at the UE due to measurement gap occasions cancelled during TSSB\_time\_index\_inter. |

Table 9.3.4-15: Time period for time index detection (FR2-1) for UE configured with MG cancellation

|  |  |
| --- | --- |
| **Condition NOTE1** | **TSSB\_time\_index\_inter NOTE3** |
| No DRX | Max(200 ms, ceil((MSSB\_index\_inter + Lcancel,index) × Kgap)× Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(200 ms, ceil((MSSB\_index\_inter + Lcancel,index) × 1.5 × Kgap) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | ceil((MSSB\_index\_inter + Lcancel,index) × Kgap) × 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: Lcancel,index is the the number of measurement gap occasions with SSB not available at the UE due to measurement gap occasions cancelled during TSSB\_time\_index\_inter. When DRX is configured, Lcancel,index is the number of DRX cycles in which at least one measurement gap occasion with SSB is not available at the UE due to measurement gap occasions cancelled during TSSB\_time\_index\_inter. |

#### 9.3.4.1 Void

#### 9.3.4.2 Void

### **--- end of Change 1 ---**

### **--- start of Change 2 ---**

### 9.3.5 Inter-frequency measurements

When measurement gaps are provided for inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting SS-RSRP, SS-RSRQ and SS-SINR measurements to higher layers with measurement accuracy as specified in clauses 10.1.4, 10.1.5, 10.1.9, 10.1.10, 10.1.14 and 10.1.15, respectively, as shown in table 9.3.5-1 and 9.3.5-2. When *highSpeedMeasInterFreq-r17* is configured, and UE supports *measurementEnhancementInterFreq-r17*, TSSB\_measurement\_period\_inter is specified in table 9.3.5-3. When SCG is deactivated, TSSB\_measurement\_period\_inter is specified in table 9.3.5-4 applies for inter-frequency carrier configured by SCG and not configured by MCG and table 9.3.5-2 applies for 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.

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

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

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

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

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

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

Table 9.3.5-4: Measurement period for inter-frequency measurements with gaps when the inter-frequency carrier is configured only by SCG and the SCG is deactivated (FR2)

|  |  |
| --- | --- |
| Condition NOTE1,2 | TSSB\_measurement\_period\_inter |
| No DRX | Max(400 ms, Ceil(Kgap × Mmeas\_period\_inter)× Max(MGRP, measCyclePSCell)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(400 ms, Ceil(1.5 \* Kgap × Mmeas\_period\_inter) × Max(MGRP, measCyclePSCell, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | Ceil(Kgap × Mmeas\_period\_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 measurement GAPs, the MGRP above is the MGRP of the activated Pre-MG or the measurement gap associated with the target frequency layer to be measured if concurrent GAPs are configured. |

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

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

Table 9.3.5-6: Measurement period for inter-frequency measurements with gaps (FR1) for UE configured with MG cancellation

|  |  |
| --- | --- |
| **Condition NOTE1** | **TSSB\_measurement\_period\_inter NOTE3** |
| No DRX | Max(200 ms, ceil((8 + Lcancel,meas) × Kgap) × Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(200 ms, ceil((8 + Lcancel,meas) × 1.5 × Kgap) × Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | ceil((8 + Lcancel,meas) × Kgap) × 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 measurement gaps, the MGRP above is the MGRP of the activated Pre-MG or the measurement gap associated with the target frequency layer to be measured if concurrent gaps are configured.NOTE 3: Lcancel,meas is the the number of measurement gap occasions with SSB not available at the UE due to measurement gap occasions cancelled during TSSB\_measurement\_period\_inter. When DRX is configured, Lcancel,meas is the number of DRX cycles in which at least one measurement gap occasion with SSB is not available at the UE due to measurement gap occasions cancelled during TSSB\_measurement\_period\_inter. |

Table 9.3.5-7: Measurement period for inter-frequency measurements with gaps (FR2-1) for UE configured with MG cancellation

|  |  |
| --- | --- |
| **Condition NOTE1** | **TSSB\_measurement\_period\_inter NOTE3** |
| No DRX | Max(400 ms, ceil((Mmeas\_period\_inter + Lcancel,meas) × Kgap)× Max(MGRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320 ms | Max(400 ms, ceil((Mmeas\_period\_inter + Lcancel,meas) × 1.5 × Kgap)× Max(MGRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320 ms | ceil((Mmeas\_period\_inter + Lcancel,meas) × Kgap) × 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 measurement gaps, the MGRP above is the MGRP of the activated Pre-MG or the measurement gap associated with the target frequency layer to be measured if concurrent gaps are configured.NOTE 3: Lcancel,meas is the the number of measurement gap occasions with SSB not available at the UE due to measurement gap occasions cancelled during TSSB\_measurement\_period\_inter. When DRX is configured, Lcancel,meas is the number of DRX cycles in which at least one measurement gap occasion with SSB is not available at the UE due to measurement gap occasions cancelled during TSSB\_measurement\_period\_inter. |

#### 9.3.5.1 Void

#### 9.3.5.2 Void

#### 9.3.5.3 Void

### **--- end of Change 2 ---**

### **--- start of Change 3 ---**

### 9.3.9 Inter-frequency measurements without measurement gaps

**--- clauses without changes ---**

9.3.9.3 Scheduling availability of UE during inter-frequency measurements when the SSB is completely contained in the active BWP of the UE

If UE supports *interFrequencyMeas-NoGap-r16* and the flag *interFrequencyConfig-NoGap-r16* is configured by the Network, UE is required to be capable of measuring without measurement gaps when the SSB is completely contained in the active bandwidth part of the UE. When any of the conditions in the following clauses is met, there are restrictions on the scheduling availability; otherwise, there is no scheduling restriction. Note that the SSB symbols to be measured in the following clauses are the SSB symbols indicated by *SSB-ToMeasure* [2], if it is configured; otherwise, all L SSB symbols within the SMTC window duration defined in clause 4.1 of TS 38.213 [3] are included.

For UE supporting feature group 64-1 [2], for which the conditions in clause 9.1.y.4 are met, the UE is not required to perform measurement during the cancelled measurement gap occasions, but no restrictions on the scheduling availability during the cancelled gap occasions apply.

The scheduling availability requirements when UE performs inter-frequency measurements without measurement gaps in a TDD bands on FR1 and FR2 in clause 9.3.9.3.1~9.3.9.3.3 are valid under the following conditions:

- SFN and frame boundary across serving cell and inter-frequency neighbor cells is aligned

[For UE supporting MUSIM gaps, when MUSIM gaps are configured, the requirements in clause 9.3.9.3 are also applied to the slots that are not interrupted according to requirements in clause 9.1.10.x3.y2 and 9.1.10.x3.y3.]

### **--- end of Change 3 ---**