**3GPP TSG-RAN WG4 Meeting #** **98-e R4-2103539**

**Electronic Meeting, Jan. 25-Feb. 5, 2021**

|  |
| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.174** | **CR** | **0007** | **rev** | **2** | **Current version:** | **16.1.0** |  |
|  |
| *For* ***[HE](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)******[LP](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)*** *on using this form: comprehensive instructions can be found at <http://www.3gpp.org/Change-Requests>.* |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **x** | Core Network |  |

|  |
| --- |
|  |
| ***Title:***  | [CR] IAB Core Maintenance |
|  |  |
| ***Source to WG:*** | ZTE Corporation |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_IAB-Core |  | ***Date:*** | 2021-02-04 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-16 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories 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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | IAB-MTs don’t support gap patterns yet there are gap related parameters and descriptions in core requirements. |
|  |  |
| ***Summary of change:*** | Remove the gap related descriptions from core requirements for IAB-MTs. |
|  |  |
| ***Consequences if not approved:*** | The requirements involving gap patterns remain in the core requirement however there is no gap pattern defined for IAB-MTs. |
|  |  |
| ***Clauses affected:*** | 12.3.1.2.2, 12.3.1.3.2, 12.3.2.2.2, 12.3.2.3.2, 12.3.2.5.2, 12.3.2.6.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  | TS/TR ... CR ... |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ... |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |

|  |  |
| --- | --- |
| ***This CR's revision history:*** | Revised from R4-2103539. |

*<start of the change 1>*

##### 12.3.1.2.2 Minimum requirement

IAB-MT shall be able to evaluate whether the downlink radio link quality on the configured RLM-RS resource estimated over the last TEvaluate\_out\_SSB [ms] period becomes worse than the threshold Qout\_SSB within TEvaluate\_out\_SSB [ms] evaluation period.

IAB-MT shall be able to evaluate whether the downlink radio link quality on the configured RLM-RS resource estimated over the last TEvaluate\_in\_SSB [ms] period becomes better than the threshold Qin\_SSB within TEvaluate\_in\_SSB [ms] evaluation period.

TEvaluate\_out\_SSB and TEvaluate\_in\_SSB are defined in Table 12.3.1.2.2-1 for FR1 with scaling factor K1 = 5.

TEvaluate\_out\_SSB and TEvaluate\_in\_SSB are defined in Table 12.3.1.2.2-2 for FR2 with scaling factor N=8 and K2 = 3.

For FR1,

$\frac{}{\frac{\_{}}{}}$- P = 1.

For FR2,

- $P=\frac{1}{1-\frac{T\_{SSB}}{T\_{SMTCperiod}}}$, when the RLM-RS resource is partially overlapped with SMTC occasion (TSSB < TSMTCperiod).

- P is Psharing factor, when the RLM-RS resource is fully overlapped with SMTC period (TSSB = TSMTCperiod).

$\frac{}{\frac{\_{}}{}\frac{\_{}}{\_{}}}$$\frac{\_{}}{\frac{\_{}}{}}$$\frac{}{\frac{\_{}}{\_{}}}$$\frac{\_{}}{\frac{\_{}}{}}$- Psharing factor = 1

- if all of the reference signals configured for RLM are not fully overlapped by intra-frequency SMTC occasions, or

- if all of the reference signal configured for RLM fully-overlapped by intra-frequency SMTC occasions are not overlapped by with the SSB symbols indicated by *SSB-ToMeasure* and 1 symbol before each consecutive SSB symbols indicated by *SSB-ToMeasure* and 1 symbol after each consecutive SSB symbols indicated by *SSB-ToMeasure*, given that *SSB-ToMeasure* is configured;

- Psharing factor = 3, otherwise.

If the IAB-MT is not capable of 4 SMTC configurations per frequency [15], and is provided with higher layer signaling of smtcj, where 1≤*j*≤2 [15], then TSMTCperiod follows smtcjmax where jmax is the maximum value of all j for which smtcj has been configured.

If the IAB-MT is capable of 4 SMTC configurations per frequency [15], and is provided with higher layer signaling of smtcj, where 1≤*j*≤4 [15], then TSMTCperiod follows smtcjmax where jmax is the maximum value of all j for which smtcj has been configured.

Longer evaluation period would be expected if the combination of RLM-RS resource and SMTC occasion configurations does not meet previous conditions.

Table 12.3.1.2.2-1: Evaluation period TEvaluate\_out\_SSB and TEvaluate\_in\_SSB for FR1

|  |  |  |
| --- | --- | --- |
| Configuration | TEvaluate\_out\_SSB (ms)  | TEvaluate\_in\_SSB (ms)  |
| no DRX | Max(200 × K1, Ceil(10 × P × K1) × TSSB) | Max(100 × K1, Ceil(5 × P × K1) × TSSB) |
| NOTE: TSSB is the periodicity of the SSB configured for RLM. |

Table 12.3.1.2.2-2: Evaluation period TEvaluate\_out\_SSB and TEvaluate\_in\_SSB for FR2

|  |  |  |
| --- | --- | --- |
| Configuration | TEvaluate\_out\_SSB (ms)  | TEvaluate\_in\_SSB (ms)  |
| no DRX | Max(200 × K2, Ceil(10 × P × N × K2) × TSSB) | Max(100 × K2, Ceil(5 × P × N × K2) × TSSB) |
| NOTE: TSSB is the periodicity of the SSB configured for RLM. |

##### 12.3.1.2.3 Measurement restrictions for SSB based RLM

The UE requirements in sub-clause 8.1.2.3 [6] apply for IAB-MT.

#### 12.3.1.3 Requirements for CSI-RS based radio link monitoring

##### 12.3.1.3.1 Introduction

The requirements in this clause apply for each CSI-RS based RLM-RS resource configured for PCell or PSCell, provided that the CSI-RS configured for RLM is actually transmitted within IAB-MT active DL BWP during the entire evaluation period specified in clause 12.3.1.3.2. IAB-MT is not expected to perform radio link monitoring measurements on the CSI-RS configured as RLM-RS if the CSI-RS is not in the active TCI state of any CORESET configured in the IAB-MT active BWP.

Table 12.3.1.3.1-1: PDCCH transmission parameters for out-of-sync evaluation

|  |  |
| --- | --- |
| Attribute | Value for BLER Configuration #0 |
| DCI format | 1-0 |
| Number of control OFDM symbols | 2 |
| Aggregation level (CCE) | 8 |
| Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy | 4dB |
| Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy | 4dB |
| Bandwidth (PRBs) | 48 |
| Sub-carrier spacing (kHz) | SCS of the active DL BWP |
| DMRS precoder granularity | REG bundle size |
| REG bundle size | 6 |
| CP length | Normal |
| Mapping from REG to CCE | Distributed |

Table 12.3.1.3.1-2: PDCCH transmission parameters for in-sync evaluation

|  |  |
| --- | --- |
| Attribute | Value for BLER Configuration #0 |
| DCI payload size | 1-0 |
| Number of control OFDM symbols | 2 |
| Aggregation level (CCE) | 4 |
| Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy | 0dB |
| Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy | 0dB |
| Bandwidth (PRBs) | 48 |
| Sub-carrier spacing (kHz) | SCS of the active DL BWP |
| DMRS precoder granularity | REG bundle size |
| REG bundle size | 6 |
| CP length | Normal |
| Mapping from REG to CCE | Distributed |

##### 12.3.1.3.2 Minimum requirement

IAB-MT shall be able to evaluate whether the downlink radio link quality on the configured RLM-RS resource estimated over the last TEvaluate\_out\_CSI-RS [ms] period becomes worse than the threshold Qout\_CSI-RS within TEvaluate\_out\_CSI-RS [ms] evaluation period.

IAB-MT shall be able to evaluate whether the downlink radio link quality on the configured RLM-RS resource estimated over the last TEvaluate\_in\_CSI-RS [ms] period becomes better than the threshold Qin\_CSI-RS within TEvaluate\_in\_CSI-RS [ms] evaluation period.

- TEvaluate\_out\_CSI-RS and TEvaluate\_in\_CSI-RS are defined in Table 12.3.1.3.2-1 for FR1 with scaling factor K1 = 5.

- TEvaluate\_out\_CSI-RS and TEvaluate\_in\_CSI-RS are defined in Table 12.3.1.3.2-2 for FR2 with scaling factor K2 = 3.

The requirements of TEvaluate\_out\_CSI-RS and TEvaluate\_in\_CSI-RS apply provided that the CSI-RS for RLM is not in a resource set configured with repetition ON. The requirements do not apply when the CSI-RS resource in the active TCI state of CORESET is the same CSI-RS resource for RLM and the TCI state information of the CSI-RS resource is not given, wherein the TCI state information means QCL Type-D to SSB for L1-RSRP or CSI-RS with repetition ON.

For FR1,

$\frac{}{\frac{\_{}}{}}$- P=1.

For FR2,

- P=1, when the RLM-RS resource is not overlapped with SMTC occasion.

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

- P = 3, when the RLM-RS resource is fully overlapped with SMTC occasion (TCSI-RS = TSMTCperiod).

$\frac{}{\frac{\_{}}{}\frac{\_{}}{\_{}}}$$\frac{}{\frac{\_{}}{}}$$\frac{}{\frac{\_{}}{\_{}}}$$\frac{}{\frac{\_{}}{}}$If the IAB-MT is not capable of 4 SMTC configurations per frequency [15], and is provided with higher layer signaling of smtcj, where 1≤*j*≤2 [15], then TSMTCperiod follows smtcjmax where jmax is the maximum value of all j for which smtcj has been configured.

If the IAB-MT is capable of 4 SMTC configurations per frequency [15], and is provided with higher layer signaling of smtcj, where 1≤*j*≤4 [15], then TSMTCperiod follows smtcjmax where jmax is the maximum value of all j for which smtcj has been configured.

NOTE: The overlap between CSI-RS for RLM and SMTC means that CSI-RS based RLM is within the SMTC window duration.

Longer evaluation period would be expected if the combination of RLM-RS resource and SMTC occasion configurations does not meet previous conditions.

The values of Mout and Min used in Table 12.3.1.3.2-1 and Table 12.3.1.3.2-2 are defined as:

- Mout = 20 and Min = 10, if the CSI-RS resource configured for RLM is transmitted with higher layer CSI-RS parameter *density* [8, clause 7.4.1] set to 3 and over the bandwidth ≥ 24 PRBs.

Table 12.3.1.3.2-1: Evaluation period TEvaluate\_out\_CSI-RS and TEvaluate\_in\_CSI-RS for FR1

|  |  |  |
| --- | --- | --- |
| Configuration | TEvaluate\_out\_CSI-RS (ms)  | TEvaluate\_in\_CSI-RS (ms)  |
| no DRX | Max(200 × K1, Ceil(Mout×P × K1)×TCSI-RS) | Max(100 × K1, Ceil(Min×P × K1) × TCSI-RS) |
| NOTE: TCSI-RS is the periodicity of the CSI-RS resource configured for RLM. The requirements in this table apply for TCSI-RS equal to 5 ms, 10ms, 20 ms or 40 ms. |

Table 12.3.1.3.2-2: Evaluation period TEvaluate\_out\_CSI-RS and TEvaluate\_in\_CSI-RS for FR2

|  |  |  |
| --- | --- | --- |
| Configuration | TEvaluate\_out\_CSI-RS (ms)  | TEvaluate\_in\_CSI-RS (ms)  |
| no DRX | Max(200 × K2, Ceil(Mout×P × K2)×TCSI-RS) | Max(100 × K2, Ceil(Min×P × K2) × TCSI-RS) |
| NOTE: TCSI-RS is the periodicity of the CSI-RS resource configured for RLM. The requirements in this table apply for TCSI-RS equal to 5 ms, 10 ms, 20 ms or 40 ms. |

##### 12.3.1.3.3 Measurement restrictions for CSI-RS based RLM

The UE requirements in sub-clause 8.1.3.3 [6] apply for IAB-MT.

#### 12.3.1.4 Minimum requirement for IAB-MT turning off the transmitter

The UE requirements in sub-clause 8.1.5 [6] apply for IAB-MT.

#### 12.3.1.5 Minimum requirement for L1 indication

When the downlink radio link quality on all the configured RLM-RS resources is worse than Qout, layer 1 of the IAB-MT shall send an out-of-sync indication for the cell to the higher layers. A layer 3 filter shall be applied to the out-of-sync indications as specified in TS 38.331 [15].

When the downlink radio link quality on at least one of the configured RLM-RS resources is better than Qin, layer 1 of the IAB-MT shall send an in-sync indication for the cell to the higher layers. A layer 3 filter shall be applied to the in-sync indications as specified in TS 38.331 [15].

The out-of-sync and in-sync evaluations for the configured RLM-RS resources shall be performed as specified in clause 5 [10]. Two successive indications from layer 1 shall be separated by at least TIndication\_interval.

TIndication\_interval is max(10ms, TRLM-RS,M), where TRLM,M is the shortest periodicity of all configured RLM-RS resources for the monitored cell, which corresponds to TSSB specified in clause 12.3.1.2 if the RLM-RS resource is SSB, or TCSI-RS specified in clause 12.3.1.3 if the RLM-RS resource is CSI-RS.

#### 12.3.1.6 Scheduling availability of IAB-MT during radio link monitoring

The UE requirements in sub-clause 8.1.7 [6] apply for IAB-MT.

### 12.3.2 Link Recovery Procedure

#### 12.3.2.1 Introduction

The UE requirements in sub-clause 8.5.1 [6] apply for IAB-MT.

#### 12.3.2.2 Requirements for SSB based beam failure detection

##### 12.3.2.2.1 Introduction

The UE requirements in sub-clause 8.5.2.1 [6] apply for IAB-MT.

##### 12.3.2.2.2 Minimum requirement

IAB-MT shall be able to evaluate whether the downlink radio link quality on the configured SSB resource in set  estimated over the last TEvaluate\_BFD\_SSB ms period becomes worse than the threshold Qout\_LR\_SSB within TEvaluate\_BFD\_SSB ms period.

The value of TEvaluate\_BFD\_SSB is defined in Table 12.3.2.2.2-1 for FR1.

The value of TEvaluate\_BFD\_SSB is defined in Table 12.3.2.2.2-2 for FR2 with scaling factor N= 8.

For FR1,

$\frac{}{\frac{\_{}}{}}$- P=1.

For FR2,

- $P=\frac{1}{1-\frac{T\_{SSB}}{T\_{SMTCperiod}}}$, when the BFD-RS resource is partially overlapped with SMTC occasion (TSSB < TSMTCperiod).

- P = Psharing factor, when the BFD-RS resource is fully overlapped with SMTC period (TSSB = TSMTCperiod).

$\frac{}{\frac{\_{}}{}\frac{\_{}}{\_{}}}$$\frac{\_{}}{\frac{\_{}}{}}$$\frac{}{\frac{\_{}}{\_{}}}$$\frac{\_{}}{\frac{\_{}}{}}$- Psharing factor = 1

- if all of the reference signals configured for BFD are not fully overlapped by intra-frequency SMTC occasions, or

- if all of the reference signals configured for BFD fully-overlapped by intra-frequency SMTC occasions are not overlapped with the SSB symbols indicated by SSB-ToMeasure and 1 symbol before each consecutive SSB symbols indicated by SSB-ToMeasure and 1 symbol after each consecutive SSB symbols indicated by SSB-ToMeasure, given that SSB-ToMeasure is configured;

- Psharing factor = 3, otherwise.

If the IAB-MT is not capable of 4 SMTC configurations per frequency [15], and is provided with higher layer signaling of smtcj, where 1≤*j*≤2 [15], then TSMTCperiod follows smtcjmax where jmax is the maximum value of all j for which smtcj has been configured.

If the IAB-MT is capable of 4 SMTC configurations per frequency [15], and is provided with higher layer signaling of smtcj, where 1≤*j*≤4 [15], then TSMTCperiod follows smtcjmax where jmax is the maximum value of all j for which smtcj has been configured.

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

Table 12.3.2.2.2-1: Evaluation period TEvaluate\_BFD\_SSB for FR1

|  |  |
| --- | --- |
| Configuration | TEvaluate\_BFD\_SSB (ms)  |
| no DRX | Max(50, Ceil(5 × P) × TSSB) |
| Note: TSSB is the periodicity of SSB in the set .  |

Table 12.3.2.2.2-2: Evaluation period TEvaluate\_BFD\_SSB for FR2

|  |  |
| --- | --- |
| Configuration | TEvaluate\_BFD\_SSB (ms)  |
| no DRX | Max(50, Ceil(5 × P × N) × TSSB) |
| Note: TSSB is the periodicity of SSB in the set .  |

##### 12.3.2.2.3 Measurement restriction for SSB based beam failure detection

The UE requirements in sub-clause 8.5.2.3 [6] apply for IAB-MT.

#### 12.3.2.3 Requirements for CSI-RS based beam failure detection

##### 12.3.2.3.1 Introduction

The UE requirements in sub-clause 8.5.3.1 [6] apply for IAB-MT.

##### 12.3.2.3.2 Minimum requirement

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

The value of TEvaluate\_BFD\_CSI-RS is defined in Table 12.3.2.3.2-1 for FR1.

The value of TEvaluate\_BFD\_CSI-RS is defined in Table 12.3.2.3.2-2 for FR2 with N=1.

The requirements of TEvaluate\_BFD\_CSI-RS apply provided that the CSI-RS for BFD is not in a resource set configured with repetition ON. The requirements shall not apply when the CSI-RS resource in the active TCI state of CORESET is the same CSI-RS resource for BFD and the TCI state information of the CSI-RS resource is not given, wherein the TCI state information means QCL Type-D to SSB for L1-RSRP or CSI-RS with repetition ON.

For FR1,

$\frac{}{\frac{\_{}}{}}$- P = 1 .

For FR2,

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

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

- P = Psharing factor, when the BFD-RS resource is fully overlapped with SMTC occasion (TCSI-RS = TSMTCperiod).

$\frac{}{\frac{\_{}}{}\frac{\_{}}{\_{}}}$$\frac{\_{}}{\frac{\_{}}{}}$$\frac{}{\frac{\_{}}{\_{}}}$$\frac{\_{}}{\frac{\_{}}{}}$- Psharing factor = 3**.**

If the IAB-MT is not capable of 4 SMTC configurations per frequency [15], and is provided with higher layer signaling of smtcj, where 1≤*j*≤2 [15], then TSMTCperiod follows smtcjmax where jmax is the maximum value of all j for which smtcj has been configured.

If the IAB-MT is capable of 4 SMTC configurations per frequency [15], and is provided with higher layer signaling of smtcj, where 1≤*j*≤4 [15], then TSMTCperiod follows smtcjmax where jmax is the maximum value of all j for which smtcj has been configured.

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

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

The values of MBFD used in Table 12.3.2.3.2-1 and Table 12.3.2.3.2-2 are defined as

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

Table 12.3.2.3.2-1: Evaluation period TEvaluate\_BFD\_CSI-RS for FR1

|  |  |
| --- | --- |
| Configuration | TEvaluate\_BFD\_CSI-RS (ms) |
| no DRX | Max(50, [MBFD × P] × TCSI-RS) |
| Note: TCSI-RS is the periodicity of CSI-RS resource in the set .  |

Table 12.3.2.3.2-2: Evaluation period TEvaluate\_BFD\_CSI-RS for FR2

|  |  |
| --- | --- |
| Configuration | TEvaluate\_BFD\_CSI-RS (ms) |
| no DRX | Max(50, [MBFD × P × N] × TCSI-RS) |
| Note: TCSI-RS is the periodicity of CSI-RS resource in the set .  |

##### 12.3.2.3.3 Measurement restrictions for CSI-RS based beam failure detection

The UE requirements in sub-clause 8.5.3.3 [6] apply for IAB-MT.

#### 12.3.2.4 Minimum requirement for L1 indication

When the radio link quality on all the RS resources in set  is worse than Qout\_LR, layer 1 of the IAB-MT shall send a beam failure instance indication to the higher layers. A layer 3 filter may be applied to the beam failure instance indications as specified in TS 38.331 [15].

The beam failure instance evaluation for the RS resources in set  shall be performed as specified in clause 6 in TS 38.213 [10]. Two successive indications from layer 1 shall be separated by at least TIndication\_interval\_BFD.

TIndication\_interval\_BFD is max(2ms, TSSB-RS,M) ) or max(2ms, TCSI-RS,M), where TSSB-RS,M and TCSI-RS,M is the shortest periodicity of all RS resources in set  for the accessed cell, corresponding to either the shortest periodicity of the SSB in the set  or CSI-RS resource in the set .

#### 12.3.2.5 Requirements for SSB based candidate beam detection

##### 12.3.2.5.1 Introduction

The requirements in this clause apply for each SSB resource in the set  configured for a serving cell, provided that the SSBs configured for candidate beam detection are actually transmitted within IAB-MT active DL BWP during the entire evaluation period specified in clause 12.3.2.5.2.

##### 12.3.2.5.2 Minimum requirement

Upon request the IAB-MT shall be able to evaluate whether the L1-RSRP measured on the configured SSB resource in set  estimated over the last TEvaluate\_CBD\_SSB ms period becomes better than the threshold Qin\_LR provided SSB\_RP and SSB Ês/Iot are according to Annex Table in B.2.4.1 [6] for a corresponding band.

The IAB-MT shall monitor the configured SSB resources using the evaluation period in table 12.3.2.5.2-1 and 12.3.2.5.2-2 which is applicable to the non-DRX mode only.

The value of TEvaluate\_CBD\_SSB is defined in Table 12.3.2.5.2-1 for FR1.

The value of TEvaluate\_CBD\_SSB is defined in Table 12.3.2.5.2-2 for FR2 with scaling factor N=8.

Where,

For FR1,

$\frac{}{\frac{\_{}}{}}$- P = 1.

For FR2,

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

- P is Psharing factor , when candidate beam detection RS is fully overlapped with SMTC period (TSSB = TSMTCperiod).

$\frac{}{\frac{\_{}}{}\frac{\_{}}{\_{}}}$$\frac{\_{}}{\frac{\_{}}{}}$$\frac{}{\frac{\_{}}{\_{}}}$$\frac{\_{}}{\frac{\_{}}{}}$- Psharing factor = 1

- if all of the reference signals configured for CBD are not fully overlapped by intra-frequency SMTC occasions, or

- if all of the reference signal configured for CBD fully-overlapped by intra-frequency SMTC occasions are not overlapped by with the SSB symbols indicated by SSB-ToMeasure and 1 symbol before each consecutive SSB symbols indicated by SSB-ToMeasure and 1 symbol after each consecutive SSB symbols indicated by SSB-ToMeasure, given that SSB-ToMeasure is configured;

- Psharing factor = 3, otherwise.

If the IAB-MT is not capable of 4 SMTC configurations per frequency [15], and is provided with higher layer signaling of smtcj, where 1≤*j*≤2 [15], then TSMTCperiod follows smtcjmax where jmax is the maximum value of all j for which smtcj has been configured.

If the IAB-MT is capable of 4 SMTC configurations per frequency [15], and is provided with higher layer signaling of smtcj, where 1≤*j*≤4 [15], then TSMTCperiod follows smtcjmax where jmax is the maximum value of all j for which smtcj has been configured.

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

Table 12.3.2.5.2-1: Evaluation period TEvaluate\_CBD\_SSB for FR1

|  |  |
| --- | --- |
| Configuration | TEvaluate\_CBD\_SSB (ms) |
| non-DRX | Ceil(3 × P) × TSSB |
| Note: TSSB is the periodicity of SSB in the set .  |

Table 12.3.2.5.2-2: Evaluation period TEvaluate\_CBD\_SSB for FR2

|  |  |
| --- | --- |
| Configuration | TEvaluate\_CBD\_SSB (ms) |
| non-DRX | Ceil(3 × P × N) × TSSB |
| Note: TSSB is the periodicity of SSB in the set . |

##### 12.3.2.5.3 Measurement restriction for SSB based candidate beam detection

The UE requirements in sub-clause 8.5.5.3 [6] apply for IAB-MT.

#### 12.3.2.6 Requirements for CSI-RS based candidate beam detection

##### 12.3.2.6.1 Introduction

The requirements in this clause apply for each CSI-RS resource in the set  configured for a serving cell, provided that the CSI-RS resources configured for candidate beam detection are actually transmitted within IAB MT active DL BWP during the entire evaluation period specified in clause 12.3.2.6.2.

##### 12.3.2.6.2 Minimum requirement

Upon request the IAB-MT shall be able to evaluate whether the L1-RSRP measured on the configured CSI-RS resource in set  estimated over the last TEvaluate\_CBD\_CSI-RS [ms] period becomes better than the threshold Qin\_LR within TEvaluate\_CBD\_CSI-RS [ms] period provided CSI-RS Ês/Iot is according to Annex Table in B.2.4.2 [6] for a corresponding band.

The IAB-MT shall monitor the configured CSI-RS resources using the evaluation period in table 12.3.2.6.2-1 and 12.3.2.6.2-2 which is applicable to the non-DRX mode only.

The value of TEvaluate\_CBD\_CSI-RS is defined in Table 12.3.2.6.2-1 for FR1.

The value of TEvaluate\_CBD\_CSI-RS is defined in Table 12.3.2.6.2-2 for FR2 with scaling factor N=8.

For FR1,

$\frac{}{\frac{\_{}}{}}$- P = 1.

For FR2,

- P = 1, when candidate beam detection RS is not overlapped with SMTC occasion.

$\frac{}{\frac{\_{}}{}}$- $P=\frac{1}{1-\frac{T\_{CSI-RS}}{T\_{SMTCperiod}}}$, when candidate beam detection RS is partially overlapped with SMTC occasion (TCSI-RS < TSMTCperiod).

- P = 3, when candidate beam detection RS is fully overlapped with SMTC occasion (TCSI-RS = TSMTCperiod).

$\frac{}{\frac{\_{}}{}\frac{\_{}}{\_{}}}$$\frac{}{\frac{\_{}}{}}$$\frac{}{\frac{\_{}}{\_{}}}$$\frac{}{\frac{\_{}}{}}$If the IAB-MT is not capable of 4 SMTC configurations per frequency [15], and is provided with higher layer signaling of smtcj, where 1≤*j*≤2 [15], then TSMTCperiod follows smtcjmax where jmax is the maximum value of all j for which smtcj has been configured.

If the IAB-MT is capable of 4 SMTC configurations per frequency [15], and is provided with higher layer signaling of smtcj, where 1≤*j*≤4 [15], then TSMTCperiod follows smtcjmax where jmax is the maximum value of all j for which smtcj has been configured.

Longer evaluation period would be expected if the CSI-RS is on the same OFDM symbols with RLM, BFD, BM-RS, or other CBD-RS, according to the measurement restrictions defined in clause 12.3.2.6.3.

The values of MCBD used in Table 12.3.2.6.2-1 and Table 12.3.2.6.2-2 are defined as

- MCBD = 3, if the CSI-RS resource configured in the set  is transmitted with Density = 3.

Table 12.3.2.6.2-1: Evaluation period TEvaluate\_CBD\_CSI-RS for FR1

|  |  |
| --- | --- |
| Configuration | TEvaluateC\_CBD\_CSI-RS (ms) |
| non-DRX | Max(25, Ceil(MCBD × P) × TCSI-RS) |
| Note: TCSI-RS is the periodicity of CSI-RS resource in the set .  |

Table 12.3.2.6.2-2: Evaluation period TEvaluate\_CBD\_CSI-RS for FR2

|  |  |
| --- | --- |
| Configuration | TEvaluate\_CBD\_CSI-RS (ms) |
| non-DRX | Max(25, Ceil(MCBD × P × N) × TCSI-RS) |
| Note: TCSI-RS is the periodicity of CSI-RS resource in the set . |

*<end of the change 1>*