**3GPP TSG- RAN4 Meeting #** **112 *R4-2413914***

**Maastricht, Netherlands, 19th – 23rd August, 2024**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
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|  | **38.133** | **CR** | **4800** | **rev** | **1** | **Current version:** | **17.14.0** |  |
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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:***  | (NR\_newRAT-Core) Corrections on measurement restriction for RLM, BFD and CBD R17 |
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| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | R4 |
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| ***Work item code:*** | NR\_newRAT-Core |  | ***Date:*** | 2024-8-22 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
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| ***Reason for change:*** | Regarding existing measurement restriction for RLM, BFD and CBD in FR1, 1. In FR1, the current discription only covers the scenario that SSB for RLM (BFD/CBD) is colliding with CSI-RS for RLM, BFD, CBD or L1-RSRP measurement in the same serving cell. However according to scheduling restriction defined in section 9.2.5.3, For UE which do not support *simultaneousRxDataSSB-DiffNumerology*, the same scheduling restriction also apply to all other serving cells in the same band. Therefore the same principle shall be applied to measurement restrictions for RLM, BFD and CBD.

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| 9.2.5.3.2 Scheduling availability of UE performing measurements with a different subcarrier spacing than PDSCH/PDCCH on FR1 *<some content skipped>*When intra-band carrier aggregation is performed, the scheduling restrictions due to a given serving cell also apply to all other serving cells in the same band on the symbols that fully or partially overlap with the aforementioned restricted symbols. |

1. Furthermore in FR1, the MRTD between different CC which is non-contiguous CA is 3us. The time difference is larger than CP when SCS is 60kHz. So the impact OFDM symbol shall be the ones which fully or partially overlapped OFDM symbols.
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| ***Summary of change:*** | Correction on the existing measurement restriction for RLM, BFD and CBD in FR1: 1. In FR1, add the scenario that RLM (BFD/CBD) is colliding with CSI-RS for L1-RSRP measurement in the different serving cells on different CCs in the same band.
2. In FR1, the MRTD between different CC which is non-contiguous CA is 3us. The time difference is larger than CP when SCS is 60kHz. So the impact OFDM symbol shall be the ones which fully or partially overlapped OFDM symbols.
3. The discritpion of impact OFDM symbols “the OFDM symbol that fully or partially overlaps with xxx” is applied to FR2 as well.
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| ***Consequences if not approved:*** | The spec is incorrect. |
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| ***Clauses affected:*** | 8.1.2.3, 8.5.2.3, 8.5.5.3 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **x** |  |  Test specifications | TS38.533 |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

<Start of Change 1>

#### 8.1.2.3 Measurement restrictions for SSB based RLM

The UE is required to be capable of measuring SSB for RLM without measurement gaps. The UE is required to perform the SSB measurements with measurement restrictions as described in the following scenarios.

For FR1, when the SSB OFDM symbols used for RLM fully or partially overlap with CSI-RS for RLM, BFD, CBD or L1-RSRP measurement on the same CC or different CCs in the same band,

- If SSB and CSI-RS have same SCS, UE shall be able to measure the SSB for RLM without any restriction;

- If SSB and CSI-RS have different SCS,

- If UE supports *simultaneousRxDataSSB-DiffNumerology*, UE shall be able to measure the SSB for RLM without any restriction;

- If UE does not support *simultaneousRxDataSSB-DiffNumerology*, UE is required to measure one of but not both SSB for RLM and CSI-RS. Longer measurement period for SSB based RLM is expected, and no requirements are defined

For FR2, when the SSB for RLM measurement on one CC is in the same OFDM symbol as CSI-RS for RLM, BFD, CBD or L1-RSRP measurement on the same CC or different CCs in the same band, UE is required to measure one of but not both SSB for RLM and CSI-RS. Longer measurement period for SSB based RLM is expected, and no requirements are defined.

For FR2, when the SSB for RLM measurement on one CC is in the same or adjacent OFDM symbol as SSB from cell with additional PCI for BFD, CBD or L1-RSRP measurement on the same CC or different CCs in the same band, UE is required to measure one of but not both SSBs. Longer measurement period for SSB based RLM is expected, and no requirements are defined.

For FR2, there is no measurement restriction allowed when the network configures mixed numerology between SSB for RLM measurement on one FR2 band and CSI-RS for RLM, BFD, CBD, L1-RSRP or L1-SINR measurement on the other FR2 band, provided that UE is capable of independent beam management on this FR2 band pair.

<End of Change 1>

<Start of Change 2>

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

The UE is required to be capable of measuring SSB for BFD without measurement gaps. The UE is required to perform the SSB measurements with measurement restrictions as described in the following scenarios.

For FR1, when the SSB OFDM symbols used for BFD measurement fully or partially overlap with CSI-RS for RLM, BFD, CBD or L1-RSRP measurement on the same CC or different CCs in the same band,

- If SSB and CSI-RS have same SCS, UE shall be able to measure the SSB for BFD measurement without any restriction;

- If SSB and CSI-RS have different SCS,

- If UE supports *simultaneousRxDataSSB-DiffNumerology*, UE shall be able to measure the SSB for BFD measurement without any restriction;

- If UE does not support *simultaneousRxDataSSB-DiffNumerology*, UE is required to measure one of but not both SSB for BFD measurement and CSI-RS. Longer measurement period for SSB based BFD measurement is expected, and no requirements are defined.

For FR2, when the SSB for BFD measurement on one CC is in the same OFDM symbol as CSI-RS for RLM, BFD, CBD or L1-RSRP measurement on the same CC or different CCs in the same band, UE is required to measure one of but not both SSB for BFD measurement and CSI-RS. Longer measurement period for SSB based BFD measurement is expected, and no requirements are defined.

For FR2, when the SSB for BFD measurement on one CC is in the same or adjacent OFDM symbol as SSB from cell with additional PCI for L1-RSRP measurement on the same CC or different CCs in the same band, UE is required to measure one of but not both SSBs. Longer measurement period for SSB based BFD is expected, and no requirements are defined.

For FR2, if the network configures same or mixed numerology between SSB for BFD measurement on one FR2 band and CSI-RS for RLM, BFD, CBD, L1-RSRP or L1-SINR measurement on the other FR2 band, UE shall be able to perform the related SSB based measurements in one band without any measurement restrictions on the other band, provided that UE is capable of independent beam management on this FR2 band pair.

<End of Change 2>

<Start of Change 3>

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

For FR1, when the SSB OFDM symbols used for CBD measurement fully or partially overlap with CSI-RS for RLM, BFD, CBD or L1-RSRP measurement on the same CC or different CCs in the same band,

- If SSB and CSI-RS have same SCS, UE shall be able to measure the SSB for CBD measurement without any restrictions;

- If SSB and CSI-RS have different SCS-es,

- If UE supports *simultaneousRxDataSSB-DiffNumerology*, UE shall be able to measure the SSB for CBD measurement without any restriction;

- If UE does not support *simultaneousRxDataSSB-DiffNumerology*, UE is required to measure one of but not both SSB for CBD measurement and CSI-RS. Longer measurement period for SSB based CBD measurement is expected, and no requirements are defined.

For FR2, when the SSB for CBD measurement on one CC is in the same OFDM symbol as CSI-RS for RLM, BFD, CBD or L1-RSRP measurement on the same CC or different CCs in the same band, UE is required to measure one of but not both SSB for CBD measurement and CSI-RS. Longer measurement period for SSB based CBD measurement is expected, and no requirements are defined.

For FR2, when the SSB for CBD measurement on one CC is in the same OFDM symbol as SSB from cell with additional PCI for BFD or L1-RSRP measurement on the same CC or different CCs in the same band, UE is required to measure one of but not both SSBs. Longer measurement period for SSB based CBD measurement is expected, and no requirements are defined.

For FR2, if network configures same or mixed numerology between SSB for CBD measurement on one FR2 band and CSI-RS for RLM, BFD, CBD, L1-RSRP or L1-SINR measurement on the other FR2 band, UE shall be able to perform the related SSB based measurements in one band without any measurement restrictions in the other band, provided that UE is capable of independent beam management on this FR2 band pair.

<End of Change 3>