**3GPP TSG-RAN WG4 Meeting #112 R4-2411558**

**Maastricht, Netherland, Aug 19-23, 2024**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** | 4687 | **rev** | - | **Current version:** |  |  |
|  | | | | | | | | |
| *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\_UE\_pow\_sav\_enh-Core] Clarification to RLM/BFD relaxation with short DRX | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_UE\_pow\_sav\_enh-Core | | | | |  | ***Date:*** | | | 2024-8-9 |
|  |  | | | |  | |  | | |  |
| ***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 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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | According to TS 38.133, UE is not allowed to relax RLM/BFD measurement when configured DRX cycle is longer than 80ms .    **RLM relaxation**  The UE is no longer allowed to relax RLM measurements and apply the relaxed radio link monitoring provided that at least one of the following conditions is met:  - The UE sends out-of sync indications to the higher layers,  - The timer T310 is running.  - No DRX is configured or configured DRX cycle is longer than 80ms  **BFD relaxation:**  The UE is no longer allowed to relax RLM measurements and apply the relaxed radio link monitoring provided that at least one of the following conditions is met:  - The UE sends out-of sync indications to the higher layers,  - The timer T310 is running.  - No DRX is configured or configured DRX cycle is longer than 80ms  It is not clear which “configured DRX cycle” is considered when the UE is configured with a short DRX cycle shorter or equal to 80 ms, and a long DRX cycle longer than 80 ms. | | | | | | | | |
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| ***Summary of change:*** | | Clarify that the UE is not allowed to relax RLM/BFD measurements if short DRX cycle is longer than 80ms when it is configured with a long DRX cycle. | | | | | | | | |
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| ***Consequences if not approved:*** | | The application of relaxed RLM/BFD measurements is not clear. | | | | | | | | |
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| ***Clauses affected:*** | | 8.1.1.1, 8.5.1.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

## << Start of changes 1>>

#### 8.1.1.1 Introduction of Requirement on Radio Link Monitoring for UE Configured with Relaxed Measurement Criteria

For the UE supports *rlm-Relaxation-r17*and configured with explicit signaling *goodServingCellEvaluationRLM*, which is always configured to the UE when the network enables RLM relaxation for the UE as specified in TS 38.331 [2], the relaxed requirements defined in clause 8.1.2.4 for SSB based radio link monitoring and the relaxed requirements defined in clause 8.1.3.4 for CSI-RS based radio link monitoring are allowed to apply to the relaxed RLM measurements on SpCell after fulfilling the following conditions:

- for the serving cells in intra-band carrier aggregation configured with SSB-based or CSI-RS based RLM on SpCell together with CSI-RS based BFD on SCell, when

- the good serving cell quality criterion defined in clause 5.7.13.2 of TS 38.331 [2] is fulfilled for the serving cell based on the measurements that are configured for SSB-based or CSI-RS based RLM on SpCell together with CSI-RS based BFD on SCell in the intra-band carrier aggregation if the *lowMobilityEvaluationConnected* is not configured, or

- the UE is also configured with *lowMobilityEvaluationConnected* and both low mobility criterion defined in clause 5.7.13.1 of TS 38.331 [2] is fulfilled for a period of *TSearchDeltaP-Connected* and good serving cell quality criterion defined in clause 5.7.13.2 of TS 38.331 [2] is fulfilled for the serving cell based on the measurements that are configured for SSB-based or CSI-RS based RLM on SpCell together with CSI-RS based BFD on SCell in the intra-band carrier aggregation.

- for other serving cells, when

- the good serving cell quality criterion defined in clause 5.7.13.2 of TS 38.331 [2] is fulfilled for the SpCell if the *lowMobilityEvaluationConnected* is not configured, or

- the UE is also configured with *lowMobilityEvaluationConnected*  and both low mobility criterion defined in clause 5.7.13.1 of TS 38.331 [2] is fulfilled for a period of TSearchDeltaP-Connected and good serving cell quality criterion defined in clause 5.7.13.2 of TS 38.331 [2] is fulfilled for the SpCell.

otherwise, UE shall apply the requirements defined in clause 8.1.2.2 for SSB based radio link monitoring and the requirements defined in clause 8.1.3.2 for CSI-RS based radio link monitoring. Note that when multiple resources are configured on a serving cell for RLM or BFD evaluation, the good serving cell quality critierion is considered as fulfilled for the serving cell when any resource configured for the cell fulfills the good serving defined in clause 5.7.13.2 of TS 38.331 [2].

The UE is no longer allowed to relax RLM measurements and apply the relaxed radio link monitoring provided that at least one of the following conditions is met:

- The UE sends out-of sync indications to the higher layers,

- The timer T310 is running.

- No DRX is configured or configured DRX cycle is longer than 80ms

- Note: which configured DRX cycle applies refers to TS38.331 clause 5.7.13.0.

## << End of changes 1>>

## << Start of changes 2>>

#### 8.5.1.1 Introduction of Requirement on Link Recovery Procedures for UE configured with relaxed measurement criteria

For the UE supports *bfd-Relaxation-r17* and configured with dedicated signaling *goodServingCellEvaluationBFD*, which is always configured to the UE when the network enables BFD relaxation for the UE as specified in TS 38.331[2], the relaxed requirements defined in clause 8.5.2.4 for SSB based beam failure detection and the relaxed requirements defined in clause 8.5.3.4 for CSI-RS based beam failure detection are allowed to apply to the relaxed BFD measurements on the serving cell after fulfilling the following conditions:

- for the serving cells in intra-band carrier aggregation configured with SSB-based or CSI-RS based RLM on SpCell together with CSI-RS based BFD on SCell, when

- the good serving cell quality criterion defined in clause 5.7.13.2 of TS 38.331 [2] is fulfilled for the serving cell based on the measurements that are configured for SSB-based or CSI-RS based RLM on SpCell together with CSI-RS based BFD on SCell in the intra-band carrier aggregation if the *lowMobilityEvaluationConnected* is not configured, or

- the UE is also configured with *lowMobilityEvaluationConnected* and both low mobility criterion defined in clause 5.7.13.1 of TS 38.331 [2] is fulfilled for a period of TSearchDeltaP-Connected and good serving cell quality criterion defined in clause 5.7.13.2 of TS 38.331 [2] is fulfilled for the serving cell based on the measurements that are configured for SSB-based or CSI-RS based RLM on SpCell together with CSI-RS based BFD on SCell in the intra-band carrier aggregation.

- for other serving cells, when

- the good serving cell quality criterion defined in clause 5.7.13.2 of TS 38.331 [2] is fulfilled for the serving cell configured with BFD-RS if the *lowMobilityEvaluationConnected* is not configured, or

- the UE is also configured with *lowMobilityEvaluationConnected*, and both low mobility criterion defined in clause 5.7.13.1 of TS 38.331 [2] is fulfilled for a period of TSearchDeltaP-Connected and good serving cell quality criterion defined in clause 5.7.13.2 of TS 38.331 [2] is fulfilled for the serving cell configured with BFD-RS.

otherwise, UE shall apply the requirements defined in clause 8.5.2.2 for SSB based beam failure detection and the requirements defined in clause 8.5.3.2 for CSI-RS based beam failure detection. Note that when multiple resources are configured on a serving cell for RLM or BFD evaluation, the good serving cell quality critierion is considered as fulfilled for the serving cell when any resource configured for the cell fulfills the good serving defined in clause 5.7.13.2 of TS 38.331 [2].

The scenario and RS resource configurations in the set  defined in section 8.5.1 apply for this section.

The UE is no longer allowed to relax BFD measurements and apply the relaxed link recovery procedures provided that at least one of the following conditions is met:

- The timer *beamFailureDetectionTimer* is running.

- No DRX is configured or configured DRX cycle(s) are longer than 80ms

-   *drx-ShortCycleTimer* expires when *drx-ShortCycle* is smaller or equal to 80 ms and *drx-LongCycle* is larger than 80 ms.

## << End of changes 2>>