**3GPP TSG- RAN WG4 Meeting #102-e *R4-22XXXXX***

**Electronic Meeting, February 21– March 3, 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.133** | **CR** | **draftCR** | **rev** |  | **Current version:** | **17.4.0** |  |
|  |
| *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:***  | CR on minimum requirement for CSI-RS based beam failure detection for UE configured with relaxed measurement criterion |
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| ***Source to WG:*** | Xiaomi |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_UE\_pow\_sav\_enh-Core |  | ***Date:*** | 2022-2-25 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | Support for relaxed BFD requirements for UEs under power saving mode is introduced in release 17. |
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| ***Summary of change:*** | Introduce minimum requirement for CSI-RS based beam failure detection for UE configured with relaxed measurement criterion. |
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| ***Consequences if not approved:*** | The requirements for CSI-RS based beam failure detection for UE configured with relaxed measurement criterion will be missing. |
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| ***Clauses affected:*** | new 8.5.3.X |
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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 ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

========================= Start of Change ===========================

8.5.3.X Minimum requirement for CSI-RS based relaxed beam failure detection

This clause contains the minimum requirements for CSI-RS based relaxed beam failure detection.

UE 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\_Relax ms period becomes worse than the threshold Qout\_LR\_CSI-RS within TEvaluate\_BFD\_CSI-RS\_Relax ms period.

The value of TEvaluate\_BFD\_CSI-RS\_Relax is defined in Table 8.5.3.X-1 for FR1.

The value of TEvaluate\_BFD\_CSI-RS\_Relax is defined in Table 8.5.3.X-2 for FR2 with N=1.

The values of P, MBFD and PBFD is defined in clause 8.5.3.2.

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

For either an FR1 or FR2 serving cell, longer evaluation period would be expected during the period Tidentify\_CGI when the UE is requested to decode an NR CGI.

For either an FR1 or FR2 serving cell, longer evaluation period would be expected during the period Tidentify\_CGI,E-UTRAN when the UE is requested to decode an LTE CGI.

**Table 8.5.3.X-1: Evaluation period TEvaluate\_BFD\_CSI-RS\_Relax for FR1**

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| --- | --- |
| Configuration | TEvaluate\_BFD\_CSI-RS Relax (ms)  |
| Max(TDRX, TCSI-RS) ≤ 80 ms | Max(50 × K3, Ceil(K1 × 1.5 × MBFD × P × PBFD) × Max(TDRX, TCSI-RS)) |
|  |  |
| 80 ms < Max(TDRX, TCSI-RS) ≤ 160 ms | Ceil(1.5 × MBFD × P × PBFD) × Max(TDRX, TCSI-RS) |
| Note 1: TCSI-RS is the periodicity of CSI-RS resource in the set . TDRX is the DRX cycle length and no longer than 80ms.Note 2: K1 is the relaxation factor. K1 = 2 for 40 ms < MAX(TDRX, TRS) ≤ 80 ms, K1 = 4 for MAX(TDRX, TRS) ≤ 40 ms Note 3: K3 is the relaxation factor for the lower bound. K3 = K1, if 1 < K1 ≤ 2; K3 = 1 otherwise. |

**Table 8.5.3.X-2: Evaluation period TEvaluate\_BFD\_CSI-RS\_Relax for FR2**

|  |  |
| --- | --- |
| Configuration | TEvaluate\_BFD\_CSI-RS Relax (ms)  |
| Max(TDRX, TCSI-RS) ≤ 80ms | Max(50 × K4, Ceil(K2 × 1.5 × MBFD × P× N × PBFD) × Max(TDRX, TCSI-RS)) |
| 80 ms < Max(TDRX, TCSI-RS) ≤ 160 ms | Max(50, Ceil(1.5 × MBFD × P× N × PBFD) × Max(TDRX, TCSI-RS)) |
| Note 1: TCSI-RS is the periodicity of CSI-RS resource in the set . TDRX is the DRX cycle length and no longer than 80ms.Note 2: K2 is the relaxation factor. K2 = 2 Note 3: K4 is the relaxation factor for the lower bound. K4 = K2, if 1 < K2 ≤ 2; K4 = 1 otherwise. |

========================= End of Change ===========================