**3GPP TSG-RAN WG4 Meeting # 104-e R4-221xxxx**

**Electronic Meeting, 15– 26 August 2022**

**Agenda item:** 9.12.4

**Source:** Moderator (MediaTek inc.)

**Title:** WF on RLM/BFD relaxation for UE Power Saving enhancements

**Document for:** Information

# Introduction

This document is to capture the all agreements in RAN4#104-e in email thread #216 on RLM/BFD relaxation for UE Power Saving enhancements.

*Tentative Agreement in the 1st round*

*Agreements in the GTW*

*Agreement in the 2nd round*

# WF on the Core Part

#### **Issue 1-1: Clarifications for Low mobility criteria evaluation**

* Option 2a: Low mobility criterion can be per-SpCell configured. The RLM/BFD relaxation on CG where the corresponding SpCell is configured with low mobility criterion subject to whether low mobility criterion on this SpCell is fulfilled or not, and the RLM/BFD relaxation on CG where the corresponding SpCell is not configured with low mobility criterion does not need to consider the low mobility criterion configured on other SpCell.”

#### **Issue 1-2: Introduce minimum requirement at transitions**

*Moderator: no major consensus and may not need to further discuss. Plan to remove it in the Formal WF.*

#### **Issue 1-3: Ambiguity in CA Handling**

*Moderator: no major consensus and may not need to further discuss. Plan to remove it in the Formal WF.*

**Issue 1-4: Multiple RS Requirement Correction**

* Option 1a:

For exiting condition,

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 used

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 used

#### **Issue 1-5: Evaluation time of downlink radio link quality becomes better than the threshold Qin\_SSB**

*Moderator: no major consensus and may not need to further discuss. Plan to remove it in the Formal WF.*

#### **Issue 1-6: RLM/BFD UAI reporting triggered by DRX state changes**

*Moderator: no major consensus and may not need to further discuss. Plan to remove it in the Formal WF.*

#### **Issue 1-7: Reply LS on how to capture TSearchDeltaP-Connected**

* RAN4 has already captured in the spec TS38.133 that UE shall consider the low mobility criterion is fulfilled only when the defined criterion formula is fulfilled for a period of TSearchDeltaP-Connected. There is no need to further modify the RAN2 spec.

# WF on the Performance Part

#### **Issue 2-1-1: Test set up on relaxation criterion**

**Agreement:**

* Configure low mobility criterion and good cell quality criterion for limited number of test cases
  + Futher discussion on candidate test cases considering the following options:
    - Option 1: one FR1 SSB-based RLM test case (test case #1) and one FR2 BFD test case (test case #16).
    - Option 2: Test case(s) where low mobility criterion is evaluated based on SSB, and RLM or BFD are evaluated based on CSI-RS
* Configure only good cell quality criterion for the rest of test cases
* Configure low mobility criterion and good cell quality criterion for
  + one FR1 SSB-based RLM test case (test case #1) and one FR2 BFD test case (test case #16).

#### **Issue 2-1-2: Test set up on the number of RSs**

**Agreement:**

* Choose one test case with multiple RS configured
  + Revisit the above agreement if needed when the maintenance part for multiple RS is concluded.
* For the rest test cases, configure the single RS.
* Configure multiple RS for
  + TC for BFD SSB in FR2 EN-DC (TC13)

#### **Issue 2-1-3: DRX period setting**

* + Set DRX cycle length of 80 ms for TC4 and DRX cycle length of 40 ms for other TCs.
  + Introduce a new DRX configuration of DRX cycle length of 80 ms in TS38.133 Section A.3.3.

#### **Issue 2-2-1: RLM OOS test – exit relaxation mode during T2 or T3**

**Agreement:**

* Option 2: UE is expected to exit relaxation mode during T3
  + SNR2 is set as same as SNR1 which is higher than the entering threshold~~.~~
  + UE is allowed to send OOS indication based relaxed RLM evaluation during T3.
  + The length of D1 is calculated based on relaxed RLM evaluation period.
* Option 2 does not preclude multiple RS configurations. Option 2 is only applied the first configured RS.

#### **Issue 2-2-2: RLM OOS test – N310**

* + N310 = 1

#### **Issue 2-2-3: RLM OOS test requirement – D1**

* D1= TEvaluate\_out\_Relax  + 40 ms (the legacy margin)
  + where TEvaluate\_out\_Relax is TEvaluate\_out\_SSB\_Relax or TEvaluate\_out\_CSI-RS\_Relax

**Issue 2-3-1: BFD test set up on good serving cell criterion**

* For BFD, use offset = 4dB for good serving cell criterion.

#### **Issue 2-3-2: BFD test setting – whether to include link recovery**

* include link recovery in BFD test.

#### **Issue 2-3-3: BFD test – exit relaxation mode during T2 or T3**

* Follow the same approached in RLM test

#### **Issue 2-3-4: BFD test requirement –T3**

* *beamFailureInstanceMaxCount = n1*