**3GPP TSG-RAN WG4 Meeting # 104-e R4-22**

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

**Agenda item:** 9.18.6

**Source:** vivo

**Title:** WF on eDRX and RRM measurement relaxations requirements for Redcap UE

**Document for:** Approval

# Topic #1: Extended DRX enhancements

### Sub-topic 1-1 Remaining issues for idle state eDRX requirements

**Issue 1-1-1: FR2 serving cell requirements and cell reselection requirements for Redcap UE with eDRX length = 20.48s**

* + Option 1: Define requirements for all eDRX configurations with PTW for FR2 (Ericsson Apple)
  + Option 2: When eDRX=20.48s, and DRX=0.32s, UE is allowed to only perform intra-frequency, inter-frequency, inter-RAT measurement within PTW in every 2 eDRX cycles. (Ericsson Apple MTK)
  + Option 3: RAN4 shall capture the following note in the WF and specification: Note: The number of wake-up occasions for the scenario of eDRX IDLE cycle = 20.48s and DRX cycle = 0.32s are twice that of using eDRX cycle = 2.56s, yet this shall not prevent the NW from configuring this scenario. ()

*Agreements: Option 2 is agreed*

**Issue 1-1-2: Update on requirements T when the Redcap UE has not found new suitable cell during T at inactive state**

* + Option 1: If the UE in RRC\_Inactive has not found any new suitable cell based on searches and measurements during the time T’, the UE shall initiate cell selection procedures. (Huawei)
  + - T’= MAX (10 s, one DRX\_inactive cycle or one eDRX\_inactive cycle if configured) in FR1, or
  + - T’= MAX (10 s, N1\* DRX\_inactive cycle or N1\* eDRX\_inactive cycle if configured) in FR2.

*Agreements:*

* 10s if the UE is **not** configured with eDRX\_inactive cycle, or
* MAX (10 s, one eDRX\_inactive cycle) if the UE is configured with eDRX\_inactive cycle for FR1, or
* MAX (10 s, N1\* eDRX\_inactive cycle) if the UE is configured with eDRX\_inactive cycle for FR2.

# Topic #2: RRM measurement relaxations

### Sub-topic 2-1 General aspects for RRM measurment relaxation for Redcap

**Issue 2-1-1: Whether Scenario 8 should be allowed or not**

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Rel-16 relaxation criterion** | **Rel-17 relaxation criterion** | **Applicability** |
| 8 | Rel-16 not-at-cell-edge | Rel-17 stationary |  |

* Proposals
  + Option 1: Case 8 is supported (Apple Xiaomi Huawei vivo MTK)
  + Option 2: Case 8 is not supported (CMCC Ericsson)

GTW Agreement:

* Scenario 8 is supported

**Issue 2-1-1-1: Requirements for scenario 8 if scenario 8 is allowed**

* Proposals
  + Option 1: If UE can meet both Rel-16 not-at-cell-edge and Rel-17 stationary conditions, the UE is allowed to meet the requirements that are the most relaxed out of Rel-16 not-at-cell-edge and Rel-17 stationary RRM relaxation requirements. (Apple Huawei)
  + Option 2: UE could follow the requirements when both Rel-17 not-at-cell-edge criteria and Rel-17 stationary criteria are satisfied. (vivo)

GTW Agreement:

For scenario 8, if UE can meet both Rel-16 not-at-cell-edge and Rel-17 stationary conditions, the UE is allowed to meet the requirements that are the most relaxed out of Rel-16 not-at-cell-edge and Rel-17 stationary RRM relaxation requirements.

The most relaxed requirement is the Rel-17 stationary RRM relaxation requirements.

**Issue 2-1-2 Update the “Srxlev” for stationary criterion to “SS-RSRP” in RRC\_CONNECTED (question from RAN2 LS R2-2206418)**

* Proposals
  + Option 1: the SS-RSRP in stationary condition TP from RAN2 LS shall be revised as: SS-RSRP = current L3 RSRP measurement of the PCell based on an identical SSB (dB) (Apple)
  + Option 2: It is proposed to check with RAN2 whether CSI-RSRP can be used to evaluate the relaxed measurement criterion for stationary UE in addition to SS-RSRP (CMCC)
  + Option 3: From RAN4 perspective, it is reasonable to change the “Srxlev” for stationary criterion to “SS-RSRP” in RRC\_CONNECTED (Huawei Ericsson vivo)

GTW Agreement: Option 3 is used as the baseline for replying LS

**Issue 2-1-3 Clarification on RRM relaxation applying conditions**

* Proposals
  + Option 1: The RedCap UE shall not relax measurements on any of the neighbour cells when it has failed to meet the S criterion; In detail add the phrase: “In this case the UE shall not relax measurements on any of the neighbour cells even if the UE is configured with any relaxed measurement criterion and has fulfilled that criterion.”, for the cases configured eDRX and non-configured eDRX in clause 4.2B.2.2 in TS 38.133 (Nokia Ericsson CMCC Intel)
  + Option 2: RAN4 not to capture the additional highlighted text from the WF in the RAN4 specifications (Apple Qualcomm vivo xiaomi MTK)
  + Option 3: “If the UE is configured with and has fulfilled the stationary and not-at-cell-edge criteria in sections 4.2B.2.10.3 and 4.2B.2.11.3 and if UE has failed to meet the S-criterion, then the UE shall not relax measurements on any of the neighbour cells. (Ericsson)

*Agreements: No*

### Sub-topic 2-2 RRM measurment relaxation for Redcap at Idle/Inactive state

**Issue 2-2-1: On scaling factor based RRM relaxation under eDRX with PTW**

* Proposals
  + Option 1: The scaling factor applies only when the relaxed evaluation/measurement time with such scaling factor on one carrier is not greater than single PTW window length (Ericsson Apple Huawei MTK)
    - Option 1a: UE applies the scaling factor (6) on each PTW window providing the relaxed RRM measurement/evaluation period for PHY filtering shall not cross different PTW windows.(Apple xiaomi Huawei MTK)
  + Option 2: The condition “provided eDRX cycle is ≤ [163.84]” could be removed. ()
  + Option 3: ()
    - The new eDRX requirements are up to 10485.76 s (i.e. already very relaxed) hence there is no need for further relax the high values of eDRX with RRM relaxation.
    - Support the design of new relaxed eDRX for Rel-16/17 RRM relaxation for low eDRX cycles with PTW.
    - Different scaling factor can be applied for different eDRX with PTW, where the larger the eDRX with PTW the smaller the scaling factor.

*Agreements: Option 1*

**Issue 2-2-2: Clarification on the “4 hours” applying conditions of RRM relaxation under eDRX**

* Proposals
  + Option 1: When UE fulfils both stationary and not at cell edge criterion, UE is allowed to relaxed measurement per 4 hours regardless of the eDRX cycle length. (Huawei)

*Agreements: Option 1*

**Issue 2-2-3: Higher priority inter-frequency measurement Relaxation**

* Proposals:
  + - Option 1: When only Rel-17 stationarity criterion is satisfied and Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ or both Rel-17 criteria are satisfied, RRM relaxation for higher priority frequency could be based on the same methodology used by Rel-16 UE power saving, i.e., based on K4\*Thigher\_priority\_search where K4 = 4\*K2 = 240 (Apple Xiaomi vivo oppo)
    - Option 2: (Apple Nokia Xiaomi Ericsson vivo Huawei oppo)
    - When only Rel-17 stationarity criterion is satisfied and Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ, UE performs measurement on high priority layer per 4 hour \*Nlayer.
    - When both R17 criteria are satisfied,
      * When Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ, UE performs the measurement relaxation for lower, equal and higher priority frequency layers are the same, i.e., 4 hours.
      * When Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ, UE performs measurement on high priority layer per 4 hour \*Nlayer.
    - Option 3: When Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ, the UE shall search for inter-frequency layers of higher priority at least every K4\*Thigher\_priority\_search where Thigher\_priority\_search is described in clause 4.2B.2.7 and K4=240
    - Option 4: the value is 4hr\*Nlayer and discuss wording directly at CR

*Agreements: Option 2*

**Issue 2-2-4: RRM measurement relaxation in SDT at inactive state**

* Proposals:
  + - Option 1: RAN4 can define TA validation requirement as a single value = 640ms for SDT in RedCap with RRM relaxation. (Nokia)
    - Option 2: For FR2 640ms is not be sufficient and existing requirements shall be applied (Apple Huawei)
    - Option 3: FFS (Ericsson)
    - Option 4: Reuse the requirements specified for the configuration without eDRX (Huawei)
    - Option 5: Issue needs more clarification. Cannot catch the issues with SDT procedure in conjunction with neighbor cell measurement relaxation in RRC INACTIVE (Intel)
    - Option 6: Option 1 is used for FR1 and existing TA validation period is used for FR2 (MTK)

*Agreements: Follow conclusion of issue 1-1-2 of email thread [223]*

# Topic #3 Others

### Sub-topic 3-1 On offset to transmit CD-SSB and NCD-SSB at different times (Reply LS for R2-2204115)

**Issue 3-1-1: NCD-SSB time offset**

* Proposals
  + Option 1: Besides GTW agreed 20ms and 40ms, suggest to agree 80 ms (Ericsson, Apple, Qualcomm, Huawei MTK)

GTW agreement:

* For NCD-SSB time offset, add the additional MGRP values of 20ms and 40ms, and further discuss whether and what other values are needed.

*Agreement (2nd round): one extra value 80ms is agreed*

**Issue 3-1-2: NCD-SSB time offset impact**

* Proposals
  + Option 1: When the SSB for intra-frequency measurement is fully-partially overlapping with the MG due to SSB offset, UE is required to perform intra-frequency measurement and drop the configured MG. (Ericsson)
  + Option 2: Up to NW configuration to address this issue (Apple vivo Huawei MTK)
  + Option 3: FFS (Huawei xiaomi)

*Agreements: No*

### Sub-topic 3-2 Reply LS for R2- 2201760

**Issue 3-2-1: On draft reply LS to R2- 2201760**

* Proposals
  + Option 1: RAN4 concludes that RAN2’s understanding on “it is up to UE implementation to perform new RSRP measurement in a DL BWP associated with CD-SSB before Msg1/A retransmission” is right and it is up to RAN2 to determine how to progress this work (vivo)

GTW Agreement:

There is no impact on RAN4 RRM specification from LS R1-2112802

# Reference