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

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

**Agenda item:** 9.18.6

**Source:** Moderator (vivo)

**Title:** Email discussion summary for [224] NR\_redcap\_RRM\_2

**Document for:** Information

# Introduction

This email discussion is for R17 NR RedCap WI and the scope covers the following agenda items:

* AI 9.18.3.2 Extended DRX enhancements
* AI 9.18.3.3 RRM measurement relaxations
* AI 9.18.3.4 Others

Based on the latest approved WI in [RP-211574], the objectives of the WI for the above AIs are duplicated as below:



During email discussion companies are encourages to:

* Provide comments on all interested topics/sub-topics at one time
* Ensure that comments are based on the latest version of the document by checking the folder before uploading
* Use “Track changes” to help identify added comments/changes
* Based on meeting guidance from RAN4 chair when changing the file name, adding your company name

The following tdoc in 9.19.3.4 are treated in email thread [103-e][214] NR\_redcap\_RRM\_1

[R4-2213378](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213378.zip); R4-2213649

Some proposal of the following documents are handled in this email thread: [R4-2211847](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2211847.zip); [R4-2212037](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212037.zip); [R4-2213064](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213064.zip); R4-2213643

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# Topic #1: Extended DRX enhancements

## Companies’ contributions summary

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| T-doc number | Company | Proposals / Observations |
| R4-2212754 | Ericsson | ***Proposal 1: All the eDRX configurations are valid for eDRX\_IDLE cycles with PTW.***  ***Proposal 2: When eDRX=2.56s, and DRX=0.32s, UE is allowed to only perform intra-frequency, inter-frequency, inter-RAT measurement within PTW in every 2 eDRX cycles.*** |
| R4-2212995 | Huawei, HiSilicon | **Proposal 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.**  **- 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.** |
| R4-2212996 | Huawei, HiSilicon | CR |
| R4-2213647 | MediaTek Inc | **Observation 1: The case eDRX cycles with PTW 20.48s and DRX cycle 0.32s has more wake-up occasions compared to the eDRX cycle 2.56s.**  **Observation 2: The deep sleep concept applies for all DRX in IDLE/INACTIVE mode including the ones within PTW, hence the UE can go to deep sleep within the PTW.**  **Observation 3: The case of eDRX cycles with PTW 20.48s and DRX cycle 0.32s has lower power saving compared to eDRX 2.56s, hence it should not be included.**  **Proposal 1: 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.** |
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## Open issues summary

### Sub-topic 1-1 Remaining issues for eDRX requirements for Redcap

**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)
  + Option 2: When eDRX=2.56s, 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)
  + 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. (MTK)
* Recommended WF

Could company compromise to option 3?

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| **Company** | **Comments** |
| Apple | Can compromise to option 3. |
| Nokia | **Issue 1-1-1: FR2 serving cell requirements and cell reselection requirements for Redcap UE with eDRX length = 20.48s**  We agree with Option 1. Can Ericsson clarify Option 2? The option seems misplaced since the issue is for eDRX length = 20.48s. |
| Ericsson | Support option 1 and 2.  The reason behind the issue is that RAN4 defined a strict requirement other than the configuration is unsuitable. RAN4’s responsibility is to define a reasonable requirement to consider UE’s behaviour.  Thus, RAN4 should add some scaling factors to solve the issue other than saying the configuration makes UE more power consumption. |
| vivo | Ok with option 3 or option 1. |
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**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.
* Recommended WF

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| **Company** | **Comments** |
| Apple | We think the clarification inside Huawei’s paper is clearer, duplicated below,  The time duration can be   * 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. |
| Nokia | **Issue 1-1-2: Update on requirements T when the Redcap UE has not found new suitable cell during T at inactive state**  We do not agree with the change. Currently the RRC\_IDLE requirements are:  - T= MAX (10 s, N1\* eDRX\_IDLE cycle) if the UE is configured with eDRX\_IDLE cycle less than 20.48s in FR2,  - Otherwise, T= MAX (10 s, one eDRX\_IDLE cycle) if the UE is configured with eDRX\_IDLE cycle no less than 20.48 s in FR2  Given that the maximum DRX cycle length is 2.56 s, the lower bound of 10 s will always be larger than N1\*DRX\_inactive\_cycle. Therefore, there is no change to introduce DRX\_inactive\_cycle in T’. We are OK to accept Option 1 if DRX\_inactive cycle is removed. |
| Ericsson | Option 1. |
| vivo | The “DRX\_inactive cycle” at the left side of “or” seems redundant |
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## Companies views’ collection for 1st round

### Open issues

*One of the two formats, i.e. either example 1 or 2 can be used by moderators.*

### CRs/TPs comments collection

*For close-to-finalize WIs and maintenance work, comments collections can be arranged for TPs and CRs. For ongoing WIs, suggest to focus on open issues discussion on 1st round.*

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| --- | --- |
| CR/TP number | Comments collection |
| R4-2212996 | Nokia: Depends on outcome of issue 1-1-2. |
| Ericsson: Depends on the discussion |
| vivo : Depends on discussion |
|  | Company A |
| Company B |
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|  | Company A |
| Company B |
|  |
| YYY | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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|  | Status summary |
| Sub-topic #1 | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

*Note: The tdoc decisions shall be provided in Section 3 and this table is optional in case moderators would like to provide additional information.*

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| CR/TP number | CRs/TPs Status update recommendation |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

# Topic #2: RRM measurement relaxations

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

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| T-doc number | Company | Proposals / Observations |
| [R4-2211848](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2211848.zip) | Apple | Proposal 1: For inter-frequency measurement relaxation requirement of R17 RedCap, if only Rel-17 stationarity criterion is met and Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ, the same relaxation shall be applied as the case when both Rel-17 criteria are satisfied.  Proposal 2: It’s allowed to configure both Rel-16 not-at-cell-edge and Rel-17 stationary criteria to UE, i.e., case 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.  Proposal 3: 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) |
| [R4-2211972](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2211972.zip) | Xiaomi | Proposal 1: RAN4 to allow the scenario 8, i.e. Rel-16 not-at-cell-edge & Rel-17 stationary, for RRM relaxation scenarios.  Proposal 2: RAN4 to apply the scaling factor only when the relaxed evaluation/measurement time with such scaling factor on one carrier is not greater than single PTW window length.  Proposal 3: When only Rel-17 stationarity criterion is met and Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ, the relaxation of higher priority inter-frequency measurement could follow Option 2b. |
| [R4-2212281](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212281.zip) | CMCC | **Observation 1: Case#8 is allowed as independent criteria from signalling perspective, not combined criteria for UE to fulfil in order to relax RRM measurements.**  **Proposal 1: No new RRM requirements are needed to support case#8.**  **Observation 2: Both SSB based L3 measurement and CSI-RS based L3 measurement can be supported by RedCap UE in connected mode.**  **Proposal 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** |
| [R4-2212997](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212997.zip) | Huawei, HiSilicon | **Proposal 1: RAN4 to specify requirements for case#8 and case#9:**  **UE is allowed to meet the requirements that are the most relaxed out of Rel-16 and Rel-17 requirements when multiple criteria of Rel-16 and Rel-17 are satisfied.**  **Proposal 2: From RAN4 perspective, it is reasonable to change the “Srxlev” for stationary criterion to “SS-RSRP” in RRC\_CONNECTED.**  **Proposal 3: 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.**  **Proposal 4: 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.** |
| [R4-2212998](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212998.zip) | Huawei, HiSilicon | CR |
| [R4-2213405](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213405.zip) | Ericsson | * **Proposal 1: The RedCap UE shall not relax measurements on any of the neighbour cells when it has failed to meet the S criterion.** * **Observation 1: No RAN4 impact due to RAN2 agreement related to coexistence of Rel-16 and Rel-17 relaxation criteria.** * **Observation 2: No RAN4 impact due to RAN2 decision to change from ‘Srxlev’ to ‘SS-RSRP’ in the stationary relaxation criterion.** |
| [R4-2213445](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213445.zip) | vivo | **Proposal 1: For RRM relaxation scenarios, case 8 is allowed. For the requirement of scenario 8, UE could follow the requirements when both Rel-17 not-at-cell-edge criteria and Rel-17 stationary criteria are satisfied.**  **Proposal 2: 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. The condition “provided eDRX cycle is ≤ [163.84]” could be removed.**  **Proposal 3: Regarding higher priority inter-frequency measurement relaxation when only Rel-17 stationarity criterion is satisfied and Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ or both Rel-17 criteria are satisfied, use option 2b.** |
| [R4-2213459](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213459.zip) | vivo | CR |
| [R4-2213648](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213648.zip) | MediaTek inc. | **Proposal 1: Rel-16 low not-at-cell-edge and Rel-17 stationary (i.e. case 8) are allowed to be configured together.**  **Observation 1: The existing relaxed DRX cycle = 2.56 s for low mobility and not-at-cell edge criteria can be more relaxed compared to the new eDRX requirements, hence there should be new relaxed eDRX to resolve that issue.**  **Proposal 2: 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.**  **Proposal 3: Support the design of new relaxed eDRX for Rel-16/17 RRM relaxation for low eDRX cycles with PTW.**  **Proposal 4: 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.**  **Proposal 5: Different scaling factor can be applied for different eDRX with PTW, where the larger the eDRX with PTW the smaller the scaling factor.**  **Proposal 6: For inter-frequency measurement relaxation RAN4 shall define the following for both stationary criterion and stationary and not-at-cell edge criterion:**   |  | | --- | | **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.** |   **Observation 2: The TA validation requirements for SDT for RedCap with RRM relaxation is always equal to 640ms.**  **Proposal 7: RAN4 can define TA validation requirement as a single value = 640ms for SDT in RedCap with RRM relaxation.** |
| R4-2213000 | Huawei, HiSilicon | CR |
| [R4-2212037](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212037.zip) | OPPO | Proposal 1: No need to add restrictions of relaxed measurements for the case if the UE is not configured with eDRX\_IDLE cycle. |
| [R4-2213064](https://protect2.fireeye.com/v1/url?k=31323334-501d5122-313273af-454445555731-d44b0ca0f64a738c&q=1&e=a17f09da-9118-410f-8712-8bf8f68d0c62&u=https%3A%2F%2Fwww.3gpp.org%2Fftp%2FTSG_RAN%2FWG4_Radio%2FTSGR4_104-e%2FDocs%2FR4-2213064.zip) | Nokia, Nokia Shanghai Bel | 1. 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 with and without configured eDRX in clause 4.2B.2.2 in TS 38.133. |
| R4-2213643 | MTK | 1. RAN4 not to capture the additional highlighted text from the WF in the RAN4 specifications. |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

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

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

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| **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)
* Recommended WF

Could company compromise to option 1.

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| **Company** | **Comments** |
| Apple | Option 1. |
| Nokia | We support option 2. We refer to the previously agreed working assumption in WF in R4-2207105 from RAN4 #102-e:   |  |  |  |  | | --- | --- | --- | --- | | 8 | Rel-16 not-at-cell-edge | Rel-17 stationary | NO |   Thus, RAN4 previously agreed to not support case 8, which is in full alignment to RAN2#115-e agreements (see annex of R4-2209702):  “If configured with a not-at-cell-edge criterion, the R17 stationary criterion can only be configured together with the R17 not-at-cell-edge criterion, not with the R16 one.”  Why RAN4 is re-discussing this issue? |
| Xiaomi | Option 1 |
| Ericsson | Option 1 can be agreed. |
| vivo | We think the decision of WF in R4-2207105 simply followed instructions from early RAN2’s LS which indicated that case 8 is not allowed. Now in the latest LS R2-2206418 indicates case 8 is allowed and we think it is straightforward to update RAN4’s conclusion on it. |
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**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)
* Recommended WF
  + To moderator understanding when multiple criteria are configured and met, it is more logic for the requirements to be based on similar requirements when multiple criteria are satisfied in Rel-16/Rel-17 instead of basing on the most relaxed requirements when a single criteria is satisfied.

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| **Company** | **Comments** |
| Apple | Option 1. |
| Nokia | First discuss issue 2-1-1 and get consensus here. In case scenario 8 is agreed, our preference is option 1. |
| Xiaomi | Option 1 |
| Ericsson | If scenario 8 is supported, we support option 1. It shall be clarified that in this case the UE meets this the stationary RRM relaxation requirements since they are more relaxed than Rel-16 not-at-cell edge criterion. |
| vivo | To our understanding when 2 criteria are satisfied, it is same as other scenarios when multiple criteria are satisfied and the corresponding requirements of that scenario could be used. |
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**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)
* Recommended WF
  + Could option 3 is used as the baseline for replying LS, whether other options (option 2) included in the reply LS or not is up to further discussion.

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| **Company** | **Comments** |
| Apple | Option 1 and option 3. The rationale of option 1 is: Since the purpose of such SS-RSRP measurement is to verify if UE is in a stationary condition and each cell may have multiple SSBs, it would be more accurate to say SS-RSRP is the current L3 RSRP measurement of the PCell based on an identical SSB. That means, on a same SSB (Tx beam) of serving cell, if UE cannot see big RSRP fluctuation during a period, UE can be assumed as stationary. Otherwise, if RSRP from different SSBs are used to determine the stationary (e.g., use strongest SSB RSRP to represent cell quality and to determine the mobility status), it would cause big problem as shown in the following figure. |
| Nokia | We support option 3. For option 1, RRM mobility control procedures are based on SS-RSRP, we don’t need a further restriction on TX beam. For option 2 on CSI-RSRP, we don’t see justification, as RAN2 has not addressed this issue in the LS. |
| Xiaomi | Support option 3.  For option 1, we understand the motivation of option 1, however, the stationary criterion is introduced by RAN2 and RAN2 has agreed not to introduce beam change based criterion in Rel-17 after sufficient discussion. So we prefer not to do such revision.  For option 2, RAN2 has achieved agreement in 116bis-e that “*RedCap UE cannot use CSI-RS-based measurement for stationary criterion in RRC\_CONNECTED.*” |
| Ericsson | We support the recommended WF from moderator. |
| vivo | Ok with option 3. Suggest to reply the LS firstly to confirm the term change is ok. Other technical issues could be discussed further. |
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**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 (Ericsson)
  + Option 2: No need to add restrictions of relaxed measurements for the case if the UE is not configured with eDRX\_IDLE cycle (oppo).
  + Option 3: 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)
  + Option 4: RAN4 not to capture the additional highlighted text from the WF in the RAN4 specifications (MTK)
* Moderator note: options are for the paragraph below:

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| Following highlighted text to capture in the IDLE mode CR was discussed but not agreed. Interested companies may provide their view at next meeting:  *“If the UE is not configured with eDRX\_IDLE cycle and the UE has evaluated according to Table 4.2B.2.2-1 for 1 Rx RedCap or Table 4.2.2.2-1 for 2 Rx RedCap in Nserv\_RedCap consecutive DRX cycles that the serving cell does not fulfil the cell selection criterion S, the UE shall initiate the measurements of all neighbour cells indicated by the serving cell, regardless of the measurement rules currently limiting UE measurement activities. In this case the UE shall not relax measurements on any of the neighbor cells even if the UE is configured with any relaxed measurement criterion and has fulfilled that criterion.”* |

* Recommended WF
  + TBA

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| **Company** | **Comments** |
| Apple | Option 4. |
| Nokia | We support option 3 and option 1. In our understanding, both describe the same UE behaviour. |
| Ericsson | We support option 1 or 3. As explained in our paper, this is a critical stage since the UE has failed to meet the S-criterion, therefore at this point it is more important to exit the relaxation mode and measure more frequently following the legacy mode. We agree that this problem is also relevant for Rel-16 power saving, but the problem was overlooked in Rel-16. |
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### 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 (Xiaomi 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.(vivo)
  + Option 2: The condition “provided eDRX cycle is ≤ [163.84]” could be removed. (vivo)
  + Option 3: (MTK)
    - 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.
* Moderator Note: Option 1 and other options are not exclusive.
* Recommended WF
  + Suggest to agree option 1. Encourage providing views on option 2 and option 3

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| **Company** | **Comments** |
| Apple | Support option 1 and 1a. |
| Nokia | In our view, option 1 aligns to current text in 38.133, clause 4.2B.2.9.2, and thus can be agreed. Regarding option 2, it restricts the number of measurements in PTW’s for very high eDRX cycles. This will not have a real benefit on energy consumption. Hence, we propose to keep the condition eDRX cycle ≤ 163.84 s, as proposed in R4-2209702 to RAN4#103-e. For Option 3, the aspect of RRM relaxation for very high eDRX cycles is relevant. We propose to have a case distinction for eDRX cycle lengths lower/equal a higher than 163.84 sec as contributed in R4-2209702 to RAN4#103-e. Other proposals are new and should be discussed in separate issues. |
| Xiaomi | Support option 1 and 1a. |
| Ericsson | Following text was already captured in the agreed CR from last meeting:  In addition the the conditions listed above, if the UE is configured with eDRX\_IDLE cycle ≤ [163.84] sec then the UE is not required to meet Tdetect,NR\_Intra\_RedCap, Tmeasure,NR\_Intra\_RedCap and Tevaluate,NR\_Intra\_RedCap as defined in clause 4.2B.2.3X and evaluation/measurement time with relaxation on one carrier is not greater than single PTW window length  Therefore we don’t see think any further discussion is needed. |
| vivo | Ok with option 1 and 1a, also ok with Ericsson’s comment. For option 2, considering the ratio between maximum PTW and eDRX cycle length, we think there is still room to extend [163.84]. |
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**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)
* Moderator Note: To moderator’s understanding option 1 is a clarification of previous agreement.
* Recommended WF
  + Suggest to agree option 1.

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| **Company** | **Comments** |
| Apple | Agree with recommended WF. |
| Nokia | We support option 1 and the recommended WF. With regard to the criteria, it is Rel-17 stationary criterion and Rel-17 not-at-cell edge criterion. Rel-16 not-at-cell-edge criterion is excluded, as long as there is no consensus on applicability of scenario 8. |
| Xiaomi | Agree with recommended WF. |
| vivo | Agree with recommended WF |
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**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 (xiaomi vivo Apple)
    - Option 2: (Huawei)
    - 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.(MTK)
* Recommended WF
  + Could the followings are agreeable?
    - 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 and Squal > SnonIntraSearchQ, UE performs measurement on high priority layer per 4 hour \*Nlayer.
  + Then further discuss the scenario when both R17 criteria are satisfied and when Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ, whether UE performs the measurement relaxation for lower, equal and higher priority frequency layers are the same, i.e., 4 hours.

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| **Company** | **Comments** |
| Apple | Support option 1. We also can compromise to option 2 which uses quite similar wording as R16 power saving requirement. |
| Nokia | We support option 2. |
| Xiaomi | Support option 1 and 2 |
| Ericsson | According to RAN2 response LS, the relaxation on higher priority carriers are performed similar to equal/lower priority carriers. Our view is to not define specific requirements to higher priority carriers, instead it can be clarified in the specification that carriers of relaxation include lower, equal and higher priority carriers. Fine with option 2. |
| vivo | OK with option 2 and option 1. |
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**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. (MTK)
* Recommended WF

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| **Company** | **Comments** |
| Apple | In FR2, we think the SDT requirement for TA validation shall consider the Rx beam sweeping, and 640ms may be not sufficient to contain the measurement period with Rx beam sweeping. The existing SDT requirement shall be applied in this case. |
| Nokia | We support option 1. TA validation requirements for T1’ and T2’ should be based on 640 ms for SDT in RedCap with RRM relaxation. |
| Ericsson | Option 1 needs more clarification and discussions. |
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## Companies views’ collection for 1st round

### Open issues

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| CR/TP number | Comments collection |
| R4-2212998 | Nokia: We support the changes. On the cover sheet, ME box needs to be ticked. |
| Ericsson: depends on outcome of related issue above. |
| vivo：need more discussion |
| [R4-2213459](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213459.zip) | Nokia: We do not support the changes. Scenario 8 is introduced by the changes, which depends on conclusion of issue 2-1-1. Relaxation parameter for higher priority inter-frequency cells should be K2 (as used for legacy UEs) rather than K4. |
| Ericsson: depends on outcome of related issue above |
|  |
| R4-2213000 | Nokia: More discussion is needed. Can Huawei provide more detail on the calculation of the new upper limits of the PTW lengths in first and third change? |
| Ericsson: We prefer to keep the current agreement related to relaxation with eDRX and this is also being discussed above. |
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## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | Status summary |
| Sub-topic#1 | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

|  |  |
| --- | --- |
| CR/TP number | CRs/TPs Status update recommendation |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

# Topic #3: Others

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| T-doc number | Company | Proposals / Observations |
| [R4-2212999](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212999.zip) | Huawei, HiSilicon | Proposal 1: Add additional offset values, i.e., 20ms, 40ms, 60ms, to transmit CD-SSB and NCD-SSB. |
| [R4-2213447](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213447.zip) | vivo | 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. |
| [R4-2211847](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2211847.zip) | Apple | *Proposal 3: RAN4 to support the RAN2 proposal on the time offset between CD-SSB of the serving cell and this Non-Cell Defining SSB, with the value range {sf5, sf10, sf15, spare5, spare4, spare3, spare2, spare1}.* |
| R4-2212755 | Ericsson | *Proposal 2: The time offset between two SSBs should be configured as the MGRP of MG to guarantee the possibility of the SSBs to be measured are fully overlapping within MG.*  *Proposal 3: At least the time offset eqauling MGRP (40ms) should be introduced.* |
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## Open issues summary

### Sub-topic 3-1 On offset to transmit CD-SSB and NCD-SSB at different times

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

* Proposals
  + Option 1 (Huawei, Ericsson): The MGRP of MG can be a candidate values for NCD-SSB time offset.
    - Option 1a(Ericsson): At least MGRP=40ms should be introduced.
    - Option 1b(Huawei): Additional offset values, i.e., 20ms, 40ms, 60ms
  + Option 2 (Apple): Support the RAN2 proposal with the value {sf5, sf10, sf15, spare5, spare4, spare3, spare2, spare1}.
* Recommended WF
  + Discuss the options.

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| **Company** | **Comments** |
| Apple | Option 2 but can compromise to option 1 to consider MGRP pattern. |
| Nokia | We support option 1. At least offset values corresponding to MGRP = 20ms and 40ms should be added. |
| Ericsson | Option 1a and we’re also fine with 20ms.  If NW wants UE to perform measurement on both type of SSBs for different frequency layers, the offset between two SSBs should equal with the MGRP of MG to guarantee both type of SSBs is fully within MG. Thus, the configured time offset between CD-SSB and NCD-SSB should include the possible time offset equaling MGRP.  We’re not sure 60ms is needed for option 1b.Could the proponent further explain the reason to introduce the value. |
| vivo | We are ok to have some typical value such as 40ms. OK with [20], [40] ms. Open for other value if there is a strong necessity. |
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**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)
* Recommended WF
  + Discuss the options.

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| **Company** | **Comments** |
| Apple | We think this issue can be addressed by network configuration. Option 1 may cause some problems, e.g., if MG and intra-freq SSB are fully overlapped with MG and UE drops MG as in option 1, how can inter-freq measurement be performed? |
| Nokia | We support option 1. |
| Ericsson | In Rel-17 MG enh, the fully-partially scenario is agreed and gap dropping rule is introduced.  From our understanding, in RedCap, when the type of SSB for intra-frequency layer is fully-partially overlapping with the MG due to SSB offset, UE should perform intra-frequency measurement and drop the configured MG. |
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### 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)
* Recommended WF
  + To moderator’s understanding it is good to have this LS replied from procedure point of view even there is no RAN4 impact.

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| **Company** | **Comments** |
| Apple | Fine with recommended WF. |
| Nokia | No need to provide feedback on this matter to RAN2, as RAN4 has discussed the issue at RAN4 #103-e and no impact to RAN4 specs was identified. |
| Ericsson | We are fine with the RAN2 LS and in our view this LS does not require any response. |
| vivo | To our understanding RAN2 is still waiting for the LS reply and from procedure point of view if the consensus is that there is no impact on RAN4 specs, this information needs to be provided to RAN2. |
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Moderator Note: draft reply LS are provided at R4-2213447

## Companies views’ collection for 1st round

### Open issues

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| CR/TP number | Comments collection |
|  | Company A |
| Company B |
|  |
|  | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | Status summary |
| Sub-topic#1 | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

|  |  |
| --- | --- |
| CR/TP number | CRs/TPs Status update recommendation |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |
| --- | --- | --- |
| Title | Source | Comments |
| WF on … | YYY |  |
| LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
|  |  |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tdoc number | Title | Source | Recommendation | Comments |
| [**R4-2212754**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212754.zip) | Discussions on RedCap eDRX | Ericsson |  |  |
| [**R4-2212995**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212995.zip) | Discussion on Extended DRX enhancements for RedCap UE | Huawei, HiSilicon |  |  |
| [**R4-2212996**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212996.zip) | Correction on measurement with eDRX for RedCap UE | Huawei, HiSilicon |  |  |
| [**R4-2213647**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213647.zip) | Extended DRX in IDLE mode and INACTIVE mode | MediaTek inc. |  |  |

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| Tdoc number | Title | Source | Recommendation | Comments |
| [**R4-2211848**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2211848.zip) | On RRM measurement relaxations for RedCap UE | Apple |  |  |
| [**R4-2211972**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2211972.zip) | Discussion on remaining issues for RedCap RRM measurement relaxations | Xiaomi |  |  |
| [**R4-2212281**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212281.zip) | Reply LS to RAN2 on RRM measurement relaxation | CMCC |  |  |
| [**R4-2212997**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212997.zip) | Discussion on RRM measurement relaxations for RedCap UE | Huawei, HiSilicon |  |  |
| [**R4-2212998**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212998.zip) | CR on higher priority inter-frequency measurement relaxation for RedCap | Huawei, HiSilicon |  |  |
| [**R4-2213405**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213405.zip) | Discussions on RRM measurement relaxations | Ericsson |  |  |
| [**R4-2213445**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213445.zip) | Further considerations on remaining issues for Redcap RRM relaxation | vivo |  |  |
| [**R4-2213648**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213648.zip) | RRM measurements relaxation for stationary criterion | MediaTek inc. |  |  |
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| Tdoc number | Title | Source | Recommendation | Comments |
| [**R4-2212999**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212999.zip) | Discussion on time offset between NCD-SSB and CD-SSB | Huawei, HiSilicon |  |  |
| [**R4-2213000**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213000.zip) | Corrections on measurement relaxations mixed with eDRX for Redcap UE | Huawei, HiSilicon |  |  |
| [**R4-2213447**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213447.zip) | Reply LS on RSRP measurement before Msg1 or MsgA retransmission | vivo |  |  |
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Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

## 2nd round

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tdoc number | Title | Source | Recommendation | Comments |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-210xxxx | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-210xxxx | LS on … | ZZZ | Agreeable, Revised, Noted |  |
|  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents

# Annex

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|  |  |  |
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Note:

1. Please add your contact information in above table once you make comments on this email thread.
2. If multiple delegates from the same company make comments on single email thread, please add you name as suffix after company name when make comments i.e. Company A (XX, XX)