**3GPP TSG-RAN WG4 Meeting # 104-e R4-2214275**

**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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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)

# 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.**  **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=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)
  + 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. |
| Ericsson | To Nokia,  Sorry, there is a mistake in our proposal. It should be eDRX=20.48s  We don’t support option 3. The accurate wake up times is fully up to UE implementation. RAN4 only defines the requirement. |
| MediaTek | We support Options 3 and 1. For Option 2, we think having a scaling factor is a good idea because the UE cannot skip any PTW for serving cell because there is a risk to miss some paging signals, however, the UE can skip PTW in intra-frequency, inter-frequency and inter-RAT. Hence, we can compromise to support Option 2. |
|  |  |

**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 |
| Huawei | Thanks Apple point out. We can use the description in our discussion paper [R4-2212995] which seems more accurate:  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.   With this, I think the concern from Nokia is addressed as well. |
| Qualcomm | We are fine with the corrected description. |
| OPPO | OK with the updated description by Huawei |
| MediaTek | We support Option 1, with the details provided in their comment. |

## 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.*

|  |  |
| --- | --- |
| 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 |
|  |
|  | 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 #1-1 | **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 vivo MTK)   + 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 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. (MTK Apple vivo)   *Tentative agreements: No*  *Recommendations for 2nd round: Could option 2 can be used as a compromise? In addition could company double check their 1st round feedback since all options are ok for some companies.*  **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.   *Tentative agreements: based on updated expression from Huawei*   * 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.   *Recommendations for 2nd round: close* |

### 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.*

|  |  |
| --- | --- |
| CR/TP number | CRs/TPs Status update recommendation |
| R4-2212996 | *“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

|  |  |  |
| --- | --- | --- |
| 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.

GTW Agreement:

* Scenario 8 is supported

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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. |
| Huawei | GTW agreement on Tuesday  **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)
* 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.

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.

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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. |
| Huawei | Option 1 is agreed during GTW on Tuesday. |
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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.

GTW Agreement:

Option 3 is used as the baseline for replying LS.

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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. |
| Huawei | GTW agreement on Tuesday  **Agreement:**   * Option 3 is used as the baseline for replying LS.   ----  For option 1, we wonder if there is big difference UE evaluate based on different SSB. RAN4 needs to first evaluate. RAN2 has discussed this issue and they sent the LS without mentioning the issue. |
| CMCC | For option 1, this is not a new issue. Rel-16 power saving also has low mobility criterion, but RAN2 did not have such restriction on the SSB used for evaluation.  For option 2, since it was copied from idle mode, and idle mode does not have CSI-RS measurement. That is why we would like to get clarification on connected mode, whether CSI-RS can be used or not. |
| MediaTek | We support Option 3. To our understanding, RAN2 send the LS as an informative LS and they don’t expect response for it. |

**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. |
| Huawei | Option 4. |
| Qualcomm | Option 4 |
| OPPO | Support Option 2/4 |
| CMCC | Option 1 or 3. Agree with Ericsson that if S criterion is not meet, cell reselection will happen, so UE should not relax the neighbor cell measurements. |
| Intel | Option 1 or 3. It would be reasonable not to apply neighbour cell measurement relaxation if the serving cell does not meet fulfil the cell selection criteria. |
| MediaTek | Support Option 4, which aligns with existing requirements. |
| Ericsson2 | Thanks for all comments. We agree that that such clarification/statement is missing in Rel-16 relaxation requirements. However, as mentioned in our earlier comments, this issue was not brought up or discussed during the Rel-16 discussions. This issue was brought up as part of RedCap relaxation Rel-17 and has valid technical benefits. Based on the comments so far, we have not seen that any company denying that UE shall exit the relaxed mode when UE has failed to meet the S-criterion.  Moreover, we don’t’ think it is a valid argument that because RAN4 missed it Rel-16 or because RAN4 did not consider in Rel-16, RAN4 shall not consider it in Rel-17. Instead, we kindly companies to reconsider the proposal from technical point of view. |

### 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]. |
| Huawei | Fine with option 1 and option 1a. To align with the principle proposed in option 1 and option 1a, we provide one CR [R4-2213000]. Herein one example is given, with scaling K3 (i.e.,6), the current requirements would violent the rule. To ensure RedCap UE can perform measurement and evaluate R criterion within one PTW, the PTW length needs to be revised.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **eDRX\_IDLE cycle length [s]** | **DRX cycle length [s]** | **PTW length [s] (number of 1.28s periods)** | **Tdetect,NR\_Intra\_RedCap\_Relax [s] (number of DRX cycles or eDRX cycles Note 3)** | **Tmeasure,NR\_Intra\_RedCap\_Relax [s] (number of DRX cycles or eDRX cycles Note 3)** | **Tevaluate,NR\_Intra\_RedCap\_Relax [s] (number of DRX cycles or eDRX cycles Note 3)** | | 20.48 ≤ eDRX\_IDLE cycle length ≤[163.84] | 0.32 | ≥[6.4] ([5]) | (23 x K3) | 0.32 x M2 x K3 (1 x M2 x K3) | 0.64 x M2 x K3 (2 x M2 x K3) | | 0.64 | ≥[12.8] ([10]) | 0.64 x K3 (1 x K3) | 1.28 x K3 (2 x K3) | | 1.28 | ≥[15.36] ([12]) | 1.28 x K3 (1 x K3) | 2.56 x K3 (2 x K3) | | 2.56 | ≥[30.72] ([24]) | 2.56 x K3 (1 x K3) | 5.12 x K3 (2 x K3) | | Note 1: The number of DRX cycles in this table is given for the DRX cycles within PTWs.  Note 2: The eDRX\_IDLE cycle lengths are as specified in Section 10.5.5.32 of TS 24.008 [34].  Note 3: The lower bound of PTW length is derived based on .  Note 4: M2 = 1.5 if SMTC periodicity of measured intra-frequency cell > 20 ms; otherwise M2=1. If different SMTC periodicities are configured for different cells, the SMTC periodicity in this note is the one used by the cell being identified. During PSS/SSS detection, the periodicity of the SMTC configured for the intra-frequency carrier is assumed, and if the actual SSB transmission periodicity is greater than the SMTC configured for the intra-frequency carrier, longer Tdetect, NR\_intra\_RedCap is expected.  Note 5: K3 = 6 is the measurement relaxation factor applicable for UE fulfilling the stationaryMobilityEvaluation [2] criterion. | | | | | | |
| OPPO | Support option 1 and 1a. |
| MediaTek | Clearly, as highlighted by HW comment that the PTW window should be extended to ensure that the relaxation is not violating the length of PTW. To our understanding, there is no need to have such large scaling factor (i.e. 6) for the long eDRX with PTW. Yet, we see it is necessary to include the scaling factor in the eDRX without PTW. Thus, we support option 3. |

**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 |
| Huawei | Support option1. The intention of option 1 is to clarify that even with long eDRX, UE is allowed to relaxed measurement per 4 hours when both stationary and not at cell edge criterion are satisfied. |
| OPPO | Agree with recommended WF. |
| MediaTek | Support recommended WF. |

**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. |
| Huawei | Support option 2. |
| OPPO | Option 1 or 2 is fine. |
| MediaTek | The LS from RAN2 is to indicate that there is no priority flag (i.e. highPriorityMeasRelax) to consider when measuring high priority layers. An example of such requirements writing can be found in clause 4.2.2.10.4 for power saving Rel-16 of low mobility and not-at-cell edge criterion. Now, looking at the above three options we don’t see a real difference between these options in terms of the exact value. Yet, there is an issue on how to write the spec. We believe RAN4 can agree that the value should equal to **4hr\*Nlayer** then the wording can be discussed directly in the CR. |

**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. |
| Huawei | Is the issue related with Issue 1-1-2: SDT for RedCap with eDRX in thread [223]?  In general, we think even a UE which is outside PTW window when eDRX is configured still needs to perform TA validation for transmitting in uplink using CG-SDT. In addition, in SDT WI there is below agreement:  C:\Users\h00388629\AppData\Roaming\eSpace_Desktop\UserData\h00388629\imagefiles\3A88D350-1D24-44C8-A519-8119FDF1A12B.png  To align with the above agreement in SDT, one way is to reuse the requirements specified for the configuration without eDRX.  If companies would not follow the agreement in SDT, we are open to option 1. We think Option 1 may be also reasonable for FR1. However for FR2, when SMTC periodicity is 160ms, max{480ms, 8\*SMTC periodicity}=1.28s, then 640ms can not cover the upper bound. |
| Intel | Can anybody clarify the issue here ? 640 ms for FR1 is an observation based on the SDT WI. Due to the equation below, 640 ms measurement would be the most relaxed serving cell measurement interval.  However, we cannot catch the issues with SDT procedure in conjunction with neighbor cell measurement relaxation in RRC INACTIVE.  Cf) TA validation rule for FR1 under DRX   |  |  | | --- | --- | | Measurement | FR1 | | RSRP1 | (T1 – min(640ms, M1\*TDRX)) ≤ T1’ ≤ (T1 + min(640ms, M1\*TDRX)) | | RSRP2 | (T2 – min(640ms, M1\*TDRX)) ≤ T2’ ≤ T2 | |
| MediaTek | This issue is similar to that discussed in #[223] for the issue of introducing SDT with eDRX. We believe the issue in here is very similar and the outcome of that issue can be used in here.  Now, the reason for the number 640ms is that the RRM relaxation has a scaling factor to multiply the existing DRX. Besides, given that SDT TA validation has a formula to limit the duration of TA to up to 640ms for FR1, then we can suggest to use this value for the combination or RRM relaxation with SDT for FR1. Yet, for FR2 the existing TA validation period is not impacted by the RRM relaxation, this is because the formula is dependent on SMTC rather than eDRX/DRX. |
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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.*

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| 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. |
| Huawei:  to Nokia, with scaling K3 (i.e.,6), in the current requirements PTW can not accommodate a completed measurement and R critirion evaluation. For example (the first line in table 4.2B.2.9.2-5) Tevaluate=0.64 x M2 x K3=5.76s. To ensure RedCap UE can perform evaluate R criterion within one PTW, the lower bound of PTW length shall be 6.4s (=5\*1.28s), as the granularity of PTW is 1.28s.  To Ericsson, we agree with the principle, but we also think the current tables need revised (please see the above example). |
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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.*

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|  | Status summary |
| Sub-topic#2-1 | **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   *Recommendations for 2nd round: This topic is closed*  **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.  *Recommendations for 2nd round: This topic is closed*  **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  *Recommendations for 2nd round: discuss the LS directly*  **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 (Nokia Ericsson CMCC Intel)   + 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 Ericsson CMCC Intel)   + Option 4: RAN4 not to capture the additional highlighted text from the WF in the RAN4 specifications (Apple Huawei Qualcomm Oppo MTK)   *Tentative agreements: No*  *Candidate options:*  *Recommendations for 2nd round: Continue discussion at 2nd with (option 1 and option 3 combined, option 2 is dropped since it is the same as option 4)* |

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|  | Status summary |
| Sub-topic#2-2 | **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 (Apple Nokia xiaomi vivo Huawei oppo)     - 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 vivo Huawei oppo)   + Option 2: The condition “provided eDRX cycle is ≤ [163.84]” could be removed. ()   + 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.   *Tentative agreements: Option 1*  *Recommendations for 2nd round: Close at 2nd round and discuss related CR R4-2213000 etc. directly at 2nd round*  **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.   *Tentative agreements: Option 1*  *Recommendations for 2nd round: close*  **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   *Tentative agreements: Option 2*  *Recommendations for 2nd round: discuss related CR directly*  **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)   *Tentative agreements: No*  *Recommendations for 2nd round: Could companies compromise to option 6?* |

### CRs/TPs

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

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| CR/TP number | CRs/TPs Status update recommendation |
| R4-2212998 | *“to be revised”* |
| [R4-2213459](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213459.zip) | *Noted* |
| R4-2213000 | *“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

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| 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.

Agreement:

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

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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. |
| Huawei | During GTW on Tuesday, 20ms and 40ms offset 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)
* 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. |
| Huawei | Needs further discussion. When intra-frequency measurement is fully-partially overlapping with the MG, if we refers R15 measurement rule, the intra-f measurement is supposed to be measurement within gap.  In addition, we think in Rel-17 MG enh, the fully-partially scenario is regarded as two gaps, and drop the lower priority gap. Maybe the rule in R17 MG enh is not the same thing with this issue. |
| Qualcomm | We agree with Apple that network can address this issue with proper configuration. |
| OPPO | Agree to leave it to network to address this issue |
| Ericsson | To Apple, Qualcomm, OPPO,  From network’s perspective, we cannot handle this issue since MG is configured by RRC but BWP switching is a L1 procedure. NW cannot follow the BWP switching to adjust the MG.  To HW,  Based on offset=5ms, the agreed RF retuning time will collide with NCD-SSB measurement. We need to further think how to handle it. |
| MediaTek | This is a very corner case and we believe this can be handled by the NW, besides, there is no need to bring new Core features in the maintenance stage. In future releases, this can be discussed if other companies highlight the same issue. |

### 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.

GTW Agreement:

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

|  |  |
| --- | --- |
| **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. |
| Intel | Fine with recommended WF if RAN2 still waiting for this. |
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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#3-1 | **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.   GTW agreement:   * For NCD-SSB time offset, add the addtional MGRP values of 20ms and 40ms, and further discuss whether and what other values are needed.   *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round: other values are discussed at 2nd round.*  **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 Nokia)   + Option 2: Up to NW configuration to address this issue (Apple Qualcomm oppo MTK)   + Option 3: FFS (Huawei)   *Tentative agreements:No*  *Recommendations for 2nd round: discuss at 2nd round.* |

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| --- | --- |
|  | Status summary |
| Sub-topic#3-2 | **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.   GTW Agreement:  There is no impact on RAN4 RRM specification from LS R1-2112802  *Recommendations for 2nd round: close* |

### 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 eDRX and RRM measurement relaxations requirements for Redcap UE | vivo |  |
| Reply LS on RRM relaxation for Redcap | vivo | To: RAN2 |
| Reply LS on introduction of an offset to transmit CD-SSB and NCD-SSB at different times | Huawei | To: RAN2  Cc: RAN1 |
| CR for RRM relaxation on R16 not at cell edge and R17 stationary for idle and inactive state mobility for Redcap | vivo |  |

**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 | Noted |  |
| [**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 | Noted |  |
| [**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 | Revised |  |
| [**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. | Noted |  |

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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 | Noted |  |
| [**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 | Noted |  |
| [**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 | Noted |  |
| [**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 | Noted |  |
| [**R4-2213405**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213405.zip) | Discussions on RRM measurement relaxations | Ericsson | Noted |  |
| [**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 | Noted |  |
| [**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. | Noted |  |
| [R4-2213459](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213459.zip) | draft CR for RRM relaxation for idle and inactive state mobility for Redcap | vivo | Noted |  |
| R4-2213000 | Corrections on measurement relaxations mixed with eDRX for Redcap UE | Huawei, HiSilicon | Revised |  |
| [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 | Revised |  |
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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 | Noted |  |
| [**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 | Noted |  |
|  |  |  |  |  |

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