**3GPP TSG-RAN WG4 Meeting # 100-e R4-210XXXX**

**Electronic Meeting, August 16-27, 2021**

**Agenda item:** 9.20.3.3 & 9.20.3.4

**Source:** Moderator (vivo)

**Title:** Email discussion summary for [100-e][235] 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 9.20.3.3 Extended DRX enhancements
* AI 9.20.3.4 RRM measurement relaxations

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
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# Topic #1: Extended DRX enhancements

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2112131](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112131.zip) | Apple | ***Proposal 1: For RedCap UE, RAN4 to define the RRM requirement with eDRX in IDLE/INACTIVE mode only.******Proposal 2: For RedCap UE in IDLE/INACTIVE mode, RAN4 to define the RRM requirement with eDRX=2.56s/5.12s/10.24s without PTW and PH.*** ***Observation: in LTE IDLE mode, max eDRX cycle length for cat-NB is up to 10485.76s while max eDRX cycle length for cat-M and other categories is up to 2621.44s.******Proposal 3:*** * ***For 10.24s<eDRX\_cycle\_length≤2621.44s, RAN4 to use LTE RRM requirement of UE categories other than Cat-M/Cat-NB in IDLE mode as baseline to define the RRM requirement for RedCap UE in IDLE and INACTIVE mode.***
* ***For 2621.44s<eDRX\_cycle\_length≤10485.76s, FFS on RRM requirement for RedCap UE in IDLE and INACTIVE mode.***
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| [R4-2112416](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112416.zip) | Xiaomi | Proposal 1: RAN4 to use LTE eDRX requirements approach as baseline when developing NR eDRX requirements, at least for the legacy eDRX cycles.Proposal 2: The legacy DRX requirements could be reused for the new 2.56s eDRX cycle.**Proposal 3: RAN4 to take the eDRX requirements for idle mode as baseline for inactive mode.****Proposal 4: RAN4 to discuss the certain eDRX cycle length and PTW length used for measurement as inactive mode UE would receive different eDRX configurations.** |
| [R4-2112645](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112645.zip) | vivo | **Proposal 1: When eDRX is configured, the requirements for a NR cell measurement/evaluation/identification should be relaxed compared with requirements when eDRX is not configured. The concrete relaxed value could be determined through related simulation campaign, if necessary.** **Proposal 2: For the inactive performance requirements, , whether reuse idle state requirements or not should be determined.** **Proposal 3: When eDRX is configured for Redcap, in principle, the assumption that all measurements are performed within PTW of an eDRX cycle in LTE, can still be reused for NR. Further investigations are required on the assumption for how measurement is performed when the eDRX length is 2.56s and 5.12s.**  |
| [R4-2113286](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113286.zip) | OPPO | **Proposal 1: eDRX enhancements have impact on the cell (re)selection procedures for a RedCap UE in RRC-Idle and inactive, including measurements on serving cell, intra-frequency and inter-frequency cells.****Proposal 2: For measurement and evaluation of NR serving cell, the requirements of LTE eDRX can be referred as baseline for Redcap UE.****Proposal 3: For measurement on intra-frequency/inter-frequency cell, the requirements for different range of DRX cycle length could be different for Redcap UE.**Proposal 4: For measurements of intra-frequency and inter-frequency NR cells, both eDRX cycles and PTW(s) should be considered at least when eDRX cycle length is longer than 10.24s.Proposal 5: RAN4 to consider the maximum length of the eDRX cycles when UE was configured with multiple eDRX cycles.Proposal 6: Define the requirements for transition between different states. |
| [R4-2113848](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113848.zip) | Huawei, HiSilicon | **Proposal 1: Cell reselection requirements for RedCap UE with eDRX cycle in idle mode can be specified as below,****Proposal 2: For RedCap UE in inactive mode with both RRC\_IDLE eDRX configuration and RRC\_INACTIVE eDRX configuration,** * **If the extended DRX for RRC-Inactive is up to 10.24s which depends on CT1/SA2 conclusion, the cell reselection requirements can be only based on monitoring of RAN initiated POs;**
* **If the extended DRX for RRC\_INACTIVE is larger than 10.24s, two PTW can be present at the same time. How to define the measurement needs further discussion.**
 |
| [R4-2113867](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113867.zip) | ZTE Corporation | **Proposal 1: The relaxation method in LTE can be re-used for NR RedCap under IDLE and INACTIVE mode with the exact value FFS.****Proposal 2: Further study the relaxation methodfor NR RedCap under CONNECTED mode using LTE as baseline.** |
| [R4-2113956](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113956.zip) | MediaTek Inc. | **Observation 1:** **Observation 2:** **Observation 3: The DRX requirements from LTE is used in 5G NR requirements as a baseline, where the requirements of the 5G NR are using scaling factors with the existing numbers from LTE.****Observation 4:** **Observation 5:** **Observation 6:** **Observation 7:** **Proposal 1:** **Proposal 2:** **Proposal 3:** **Proposal 4:** **Proposal 5:** **Proposal 6:** **Proposal 7: The eDRX cycles requirements for Nserv in 5G NR RedCap devices for FR1 are the following:**Table 4.2.2.x-x: Nserv for UE operating with eDRX\_IDLE cycle without PTW for FR1

|  |  |
| --- | --- |
| **eDRX cycle length [s]** | **Nserv [number of DRX cycles]** |
| 2.56 | 2 |
| 5.12 | 2 |
| 10.24 | 2 |

Table 4.2.2.x-x: Nserv for UE operating with eDRX\_IDLE cycle with PTW and PH for FR1

|  |  |  |  |
| --- | --- | --- | --- |
| **eDRX cycle length [s]** | **DRX cycle length [s]** | **PTW length [s]** **(number of DRX cycles)** | **Nserv [number of DRX cycles]** |
| 20.48 ≤ eDRX\_IDLE cycle length ≤ 10485.76 | 0.32 | ≥ 1.28 (4)  |  M1\***2** |
| 0.64 | ≥ M1 \* 1.28 (M1 \* 2) |  M1\***2** |
| 1.28 | ≥ 2.56 (2) | 2 |
| 2.56 | ≥ 5.12 (2) | 2 |
| Note 1: The number of DRX cycles in this table is given for the DRX cycles within PTWs. |

**Proposal 8:** **Proposal 9:** **Proposal 10: Support a new relaxation factor to be used in the DRX cycles requirements for the stationary criterion. In addition, if a new Rel-17 not-at-cell edge criterion is introduced then the same relaxation factor of the stationary criterion shall be used for the RRM measurement relaxations of Rel-17 not-at-cell edge criterion.** |
| [R4-2114085](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114085.zip) | Ericsson | * **Proposal #1:** LTE eDRX requirements are used as baseline for defining the NR eDRX requirements.
* **Proposal #2:** PTW length in measurement requirements when configured with eDRX is determined based on corresponding release 15 requirements, where requirements are based on scaling factors N1 and M2.
* **Proposal #3:** PTW length for serving cell evaluation requirements are determined based on:
	+ Number of DRX cycles needed for a measurement assuming the longest DRX cycle from current table
	+ Scaling factor N1
	+ DRX cycle length
	+ Reference signal periodicity
	+ Minimum DRX cycle length
* **Proposal #4:** PTW length for serving cell evaluation requirements are determined based on:
	+ Number of DRX cycles needed for a measurement assuming the longest DRX cycle from current table
	+ Scaling factor N1
	+ DRX cycle length
	+ Reference signal periodicity
	+ Minimum DRX cycle length
 |
| [R4-2114574](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114574.zip) | Qualcomm Incorporated | **Observation 1: RAN2 specifies that the lower bound for eDRX configuration in RRC\_IDLE and RRC\_INACTIVE is 2.56s****Observation 2: Extended DRX cycles with 2.56s, 5.12s and 10.24s do not require PTW/PH and hence could be considered as typical DRX cycles in the context of RAN4 RRM requirements for cell-reselection such as Nserv, intra-frequency/inter-frequency cell detection, measurement and evaluation periods etc.****Observation 3: RAN4 requirements for filtering SS-RSRP and SS-RSRQ measurements require at least 2 measurements.****Proposal 1: Propose to use the following values for Nserv for eDRX cycle lengths up-to 10.24s**

|  |  |  |
| --- | --- | --- |
| eDRX cycle length [s] | Scaling Factor (N1) | Nserv [number of DRX cycles] |
|  | FR1 | FR2Note1 |  |
| 2.56 | 1 | 3 | N1\*2 |
| 5.12 |  | 3 | N1\*2 |
| 10.24 |  | 3 | N1\*2 |
| Note 1: Applies for UE supporting power class 2&3&4. For UE supporting power class 1, N1 = 8 for all eDRX cycle length. |

**Observation 6: For eDRX cycle lengths greater than 10.24s, PTW and PH will be defined and Nserv can be defined based on the configured DRX cycle length during the PTW.****Proposal 2: Propose to use the same PTW lengths as in LTE to specify Nserv for eDRX cycle lengths greater than 10.24s****Proposal 3: Propose to use the following values for Nserv for eDRX cycle lengths greater than 10.24s**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| eDRX\_IDLE cycle length [s] | DRX cycle length [s] | PTW length [s] (number of 1.28s periods) | Scaling Factor (N1) | Nserv [number of DRX cycles] |
|  | FR1 | FR2Note1 | Note2 |
| 20.48 ≤ eDRX\_IDLE cycle length ≤ 10485.76 | 0.32 | ≥1.28 (1) | 1 | 8 | N1\*2 |
| 0.64 | ≥1.28 (1) |  | 5 | N1\*2  |
| 1.28 | ≥2.56 (1) |  | 4 | N1\*2  |
| 2.56 | ≥5.12 (1) |  | 3 | N1\*2  |
| Note 1: Applies for UE supporting power class 2&3&4. For UE supporting power class 1, N1 = 8 for all DRX cycle length.Note 2: The number of DRX cycles in this table is given for the DRX cycles within PTWs. |

**Proposal 4: Propose to use the following values for Tdetect,NR\_Intra, Tmeasure,NR\_Intra and Tevaluate,NR\_Intra for eDRX cycle lengths up-to 10.24s**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| eDRX cycle length [s] | Scaling Factor (N1) | Tdetect,NR\_Intra [s] (number of eDRX cycles) | Tmeasure,NR\_Intra [s] (number of eDRX cycles) | Tevaluate,NR\_Intra[s] (number of eDRX cycles) |
|  | FR1 | FR2Note1 |  |  |  |
| 2.56 | 1 | 3 | 58.88 x N1 (23 x N1) | 2.56 x N1 (1 x N1) | 7.68 x N1 (3 x N1) |
| 5.12 |  | 3 | 117.76 x N1 (23 x N1) | 5.12 x N1 (1 x N1) | 10.24 x N1 (2x N1) |
| 10.24 |  | 3 | 235.52 x N1 (23 x N1) | 10.24 x N1 (1 x N1) | 20.24 x N1 (2x N1) |
| Note 1: Applies for UE supporting power class 2&3&4. For UE supporting power class 1, N1 = 8 for all eDRX cycle length. |

 **Proposal 5: Propose to use the following values for Tdetect,NR\_Intra, Tmeasure,NR\_Intra and Tevaluate,NR\_Intra for eDRX cycle lengths greater than 10.24s**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| eDRX\_IDLE cycle length [s] | DRX cycle length [s] | PTW length [s] (number of 1.28s periods) | Scaling Factor (N1) | Tdetect,NR\_Intra [s] (number of DRX cycles) | Tmeasure,NR\_Intra [s] (number of DRX cycles) | Tevaluate,NR\_Intra[s] (number of DRX cycles) |
| FR1 | FR2Note1 |
| 20.48 ≤ eDRX\_IDLE cycle length ≤ 10485.76 | 0.32 | ≥1.28 (1) | 1 | 8 | Note4 (23 x N1) | 0.32 x N1(1 x N1) | 0.64 x N1(2 x N1) |
| 0.64 | ≥1.28 (1) |  5 | 0.64 x N1(1 x N1) | 1.28 x N1(2 x N1) |
| 1.28 | ≥2.56 (2) |  4 | 1.28 x N1(1 x N1) | 2.56 x N1(2 x N1) |
| 2.56 | ≥5.12 (4) |  3 | 2.56 x N1(1 x N1) | 5.12 x N1(2 x N1) |
| Note 1: Applies for UE supporting power class 2&3&4. For UE supporting power class 1, N1 = 8 for all DRX cycle length.Note 2: The number of DRX cycles in this table is given for the DRX cycles within PTWs.Note 3: The eDRX\_IDLE cycle lengths are as specified in TBD.Note 4: The time is calculated depending on the number N of DRX cycles as follows:   |

**Proposal 6: Propose to use the following values for Tdetect,NR\_Inter, Tmeasure,NR\_Inter and Tevaluate,NR\_Inter for eDRX cycle lengths up-to 10.24s**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| eDRX cycle length [s] | Scaling Factor (N1) | Tdetect,NR\_Inter [s] (number of eDRX cycles) | Tmeasure,NR\_Inter [s] (number of eDRX cycles) | Tevaluate,NR\_Inter[s] (number of eDRX cycles) |
|  | FR1 | FR2Note1 |  |  |  |
| 2.56 | 1 | 3 | 58.88 x N1 (23 x N1) | 2.56 x N1 (1 x N1) | 7.68 x N1 (3 x N1) |
| 5.12 |  | 3 | 117.76 x N1 (23 x N1) | 5.12 x N1 (1 x N1) | 10.24 x N1 (2x N1) |
| 10.24 |  | 3 | 235.52 x N1 (23 x N1) | 10.24 x N1 (1 x N1) | 20.24 x N1 (2x N1) |
| Note 1: Applies for UE supporting power class 2&3&4. For UE supporting power class 1, N1 = 8 for all eDRX cycle length. |

 **Proposal 7: Propose to use the following values for Tdetect,NR\_Inter, Tmeasure,NR\_Inter and Tevaluate,NR\_Inter for eDRX cycle lengths greater than 10.24s**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| eDRX\_IDLE cycle length [s] | DRX cycle length [s] | PTW length [s] (number of 1.28s periods) | Scaling Factor (N1) | Tdetect,NR\_Inter [s] (number of DRX cycles) | Tmeasure,NR\_Inter [s] (number of DRX cycles) | Tevaluate,NR\_Inter[s] (number of DRX cycles) |
| FR1 | FR2Note1 |
| 20.48 ≤ eDRX\_IDLE cycle length ≤ 10485.76 | 0.32 | ≥1.28 (1) | 1 | 8 | Note4 (23 x N1) | 0.32 x N1(1 x N1) | 0.64 x N1(2 x N1) |
| 0.64 | ≥1.28 (1) |  5 | 0.64 x N1(1 x N1) | 1.28 x N1(2 x N1) |
| 1.28 | ≥2.56 (2) |  4 | 1.28 x N1(1 x N1) | 2.56 x N1(2 x N1) |
| 2.56 | ≥5.12 (4) |  3 | 2.56 x N1(1 x N1) | 5.12 x N1(2 x N1) |
| Note 1: Applies for UE supporting power class 2&3&4. For UE supporting power class 1, N1 = 8 for all DRX cycle length.Note 2: The number of DRX cycles in this table is given for the DRX cycles within PTWs.Note 3: The eDRX\_IDLE cycle lengths are as specified in TBDNote 4: The time is calculated depending on the number N of DRX cycles as follows:   |

 |
| R4-2112191\*Proposal 1 is treated here | CMCC | **Proposal 1: It is proposed to discuss eDRX enhancements in RAN4 after the final conclusions on eDRX configurations are made in RAN2.** |

## Open issues summary

### Sub-topic 1-1 Genearl aspects on eDRX enhancments

**Issue 1-1-1: Scopes where RRM requirement with eDRX in IDLE/INACTIVE mode are defined**

* Proposals
	+ Option 1: Only consider defining the RRM requirement with eDRX in IDLE/INACTIVE mode only. (Apple)
	+ Option 2: Considering the relaxation method for NR RedCap under CONNECTED mode using LTE as baseline. (ZTE)
	+ Option 3: FFS
* Recommended WF
	+ TBA

**Issue 1-1-2:**

* Proposals
	+ Option 1: Yes (MTK)
	+ Option 2: No
	+ Option 3: FFS
* Recommended WF
	+ TBA

**Issue 1-1-3:**

* Proposals
	+ Option 1: Yes (MTK)
	+ Option 2: No
	+ Option 3: FFS
* Recommended WF
	+ TBA

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Apple | **Issue 1-1-1: Scopes where RRM requirement with eDRX in IDLE/INACTIVE mode are defined**Option 1 based WID.**Issue 1-1-2: Whether prioritizing the eDRX requirements for FR1 and de-prioritizing the eDRX requirements for FR2.**Support option 1.**Issue 1-1-3: Whether have the eDRX requirements for FR1 and FR2 on separate tables.**Option 3. Need to discuss the requirement first and then can decide separate table or single table.  |
| ZTE | **Issue 1-1-2: Whether prioritizing the eDRX requirements for FR1 and de-prioritizing the eDRX requirements for FR2.**Can support option 1. |
| CMCC | **Issue 1-1-1: Scopes where RRM requirement with eDRX in IDLE/INACTIVE mode are defined****Option 1****Issue 1-1-2: Whether prioritizing the eDRX requirements for FR1 and de-prioritizing the eDRX requirements for FR2.****OK with option1****Issue 1-1-3: Whether have the eDRX requirements for FR1 and FR2 on separate tables.****Further study is needed.** |
| OPPO | **Issue 1-1-1: Scopes where RRM requirement with eDRX in IDLE/INACTIVE mode are defined**Option 1 based WID.**Issue 1-1-2: Whether prioritizing the eDRX requirements for FR1 and de-prioritizing the eDRX requirements for FR2.**FFS.**Issue 1-1-3: Whether have the eDRX requirements for FR1 and FR2 on separate tables.**FFS. |
| Huawei | **Issue 1-1-1: Scopes where RRM requirement with eDRX in IDLE/INACTIVE mode are defined**Support option 1. eDRX is only introduced in idle/inactive mode rather than connected mode.**Issue 1-1-2: Whether prioritizing the eDRX requirements for FR1 and de-prioritizing the eDRX requirements for FR2.**Option 3. We understand the issue identified by MTK for FR2. There could be two potential solutions: (i) divide the time needed for Nserv to multiple PTWs, and (ii) extend the PTW duration to allow Nserv to be completed in a single PTW. For (i), as eDRX is configured by network, the channel change is expected not frequent, so maybe (i) can also be considered. In general we are open to discuss this issue.**Issue 1-1-3: Whether have the eDRX requirements for FR1 and FR2 on separate tables.**Option 3. It is early to decide whether a uniform or separate table is proper. More discussion on FR1 and FR2 requirements are needed. |
| MediaTek | **Issue 1-1-1: Scopes where RRM requirement with eDRX in IDLE/INACTIVE mode are defined**eDRX for CONNECTED mode is out of the WID scope, hence we support Option 1. **Issue 1-1-2: Whether prioritizing the eDRX requirements for FR1 and de-prioritizing the eDRX requirements for FR2.**Support Option 1. As mentioned in our contribution paper, the eDRX requirement for Nserv for FR2 requires either PTW duration extension or having Nserv over multiple PTWs.**Issue 1-1-3: Whether have the eDRX requirements for FR1 and FR2 on separate tables.**Support option 1. |
| Ericsson | **Issue 1-1-1: Scopes where RRM requirement with eDRX in IDLE/INACTIVE mode are defined**We support option 1. In our understanding, CONNECTED mode DRX is not in the scope of the WI.**Issue 1-1-2: Whether prioritizing the eDRX requirements for FR1 and de-prioritizing the eDRX requirements for FR2.**We support option 2. We would like to develop the eDRX requirements for both FR1 and FR2 with equal priority. UE power saving is also important in FR2, but we agree that actual requirements (e.g. eDRX configuration including PTW length) is likely to be different for FR2. **Issue 1-1-3: Whether have the eDRX requirements for FR1 and FR2 on separate tables.**We can agree to option 1 to have separate tables since the eDRX requirements are going to be different between FR1 and FR2. |
| Xiaomi | **Issue 1-1-1: Scopes where RRM requirement with eDRX in IDLE/INACTIVE mode are defined**Option 1.**Issue 1-1-2: Whether prioritizing the eDRX requirements for FR1 and de-prioritizing the eDRX requirements for FR2.**Option 3.**Issue 1-1-3: Whether have the eDRX requirements for FR1 and FR2 on separate tables.**Option 3. |
| vivo | **Issue 1-1-1: Scopes where RRM requirement with eDRX in IDLE/INACTIVE mode are defined**Option 1**Issue 1-1-2: Whether prioritizing the eDRX requirements for FR1 and de-prioritizing the eDRX requirements for FR2.**FFS.**Issue 1-1-3: Whether have the eDRX requirements for FR1 and FR2 on separate tables.**FFS. |
| Qualcomm | **Issue 1-1-1: Scopes where RRM requirement with eDRX in IDLE/INACTIVE mode are defined**Option 1 based on agreed scope. BTW, is Option 2 referring to RRM relaxations? If yes, it should be discussed separately.**Issue 1-1-2: Whether prioritizing the eDRX requirements for FR1 and de-prioritizing the eDRX requirements for FR2.**We are fine with option 1.**Issue 1-1-3: Whether have the eDRX requirements for FR1 and FR2 on separate tables.**Let’s focus on defining the requirements first, also depends on Issue 1-1-2 |

### Sub-topic 1-2 whether to have different methodologies based on eDRX length when defining performance requirements

**Issue 1-2-1: Whether classify eDRX into different groups based on eDRX length when defining requirements**

* Proposals
	+ Option 1: Yes (Apple, MTK, Huawei, Qualcomm, vivo)
	+ Option 2: No
	+ Option 3: FFS
* Recommended WF
	+ TBA

**Issue 1-2-2: If the answer of issue 1-2-1 is Yes, then the concrete groups**

* Proposals
	+ Option 1: Three groups
		- 1: eDRX value 2.56s/5.12s/10.24s; 2: 10.24s<eDRX\_cycle\_length≤2621.44s; 3: 2621.44s<eDRX\_cycle\_length≤10485.76s (Apple)
	+ Option 2: Two groups
		- 1: eDRX cycle lengths up-to 10.24s 2: eDRX > 10.24s (MTK;Huawei; Qualcomm)
* Recommended WF
	+ TBA

**Issue 1-2-3: If the answer of issue 1-2-1 is Yes, which category considers PTW and which category does not PTW**

* Proposals
	+ Option 1: 1: Without PTW (eDRX length is up-to 10.24s) 2: With PTW (eDRX > 10.24s); (MTK;Huawei; Qualcomm;oppo)
	+ Option 2: 1: Without PTW (eDRX length is up-to 10.24s) 2: With PTW (10.24s<eDRX\_cycle\_length≤2621.44s); 3: FFS 2621.44s<eDRX\_cycle\_length≤10485.76s (Apple)
* Recommended WF
	+ TBA

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Apple | **Issue 1-2-1: Whether classify eDRX into different groups based on eDRX length when defining requirements**Option 1 based on RAN2 conclusions.**Issue 1-2-2: If the answer of issue 1-2-1 is Yes, then the concrete groups**Option 1 because the 2621.44s<eDRX\_cycle\_length≤10485.76s is still pending in RAN2.Our grouping principle is:1. ***eDRX=2.56s/5.12s/10.24s without PTW and PH.***
2. ***10.24s<eDRX\_cycle\_length≤2621.44s with PTW and PH***
3. ***2621.44s<eDRX\_cycle\_length≤10485.76s with PTW and PH is pending in RAN2, RAN4 may discuss it when RAN2 concluded***

But if we categorize those DRXs based on whether PTW/PH is used or not, then only two groups is needed: DRX≤10.24s and DRX>10.24s.**Issue 1-2-3: If the answer of issue 1-2-1 is Yes, which category considers PTW and which category does not PTW** Propose option 2a. Option 2 does not mean 2621.44s<eDRX\_cycle\_length≤10485.76s is without PTW and PH, it just means RAN4 needs wait RAN2 conclusion to design requirement of 2621.44s<eDRX\_cycle\_length≤10485.76s.Option 2a: 1: Without PTW (eDRX length is up-to 10.24s) 2: With PTW (10.24s<eDRX\_cycle\_length≤2621.44s); 3: RAN4 discuss 2621.44s<eDRX\_cycle\_length≤10485.76s with PTW when RAN2 concluds on it. |
| CMCC | **Issue 1-2-1: Whether classify eDRX into different groups based on eDRX length when defining requirements****Option 1****Issue 1-2-2: If the answer of issue 1-2-1 is Yes, then the concrete groups****OK with option2.****Issue 1-2-3: If the answer of issue 1-2-1 is Yes, which category considers PTW and which category does not PTW** **Option 1.** |
| OPPO | **Issue 1-2-1: Whether classify eDRX into different groups based on eDRX length when defining requirements****Option 1****Issue 1-2-2: If the answer of issue 1-2-1 is Yes, then the concrete groups****Option2.****Issue 1-2-3: If the answer of issue 1-2-1 is Yes, which category considers PTW and which category does not PTW** **Option 1. Also need to understand more about the consideration for** 621.44s<eDRX\_cycle\_length≤10485.76s. |
| Huawei | **Issue 1-2-1: Whether classify eDRX into different groups based on eDRX length when defining requirements**Support option 1.**Issue 1-2-2: If the answer of issue 1-2-1 is Yes, then the concrete groups**Prefer option 2. RAN2 sent an LS to SA2 and CT1 to ask whether it is feasible to specify extended DRX up to 10485.76 s. CT1 replied that extended DRX cycles of up to 10485.76 seconds in RRC\_IDLE are already supported since Release 16 for NB-IoT connected to the 5GC. **Issue 1-2-3: If the answer of issue 1-2-1 is Yes, which category considers PTW and which category does not PTW** Support option 1. |
| MediaTek | **Issue 1-2-1: Whether classify eDRX into different groups based on eDRX length when defining requirements**Support Option 1.**Issue 1-2-2: If the answer of issue 1-2-1 is Yes, then the concrete groups**Our preference is Option 2 but also this can be FFS.**Issue 1-2-3: If the answer of issue 1-2-1 is Yes, which category considers PTW and which category does not PTW** The answer for this issue is already give in the WID, which is Option 1 in here.  |
| Ericsson | **Issue 1-2-1: Whether classify eDRX into different groups based on eDRX length when defining requirements**Two groups are reasonable since PTW is not used in the first group where eDRX length is up to a certain level (10.24 sec) and PTW is used in the second group when eDRX length is greater than that level (10.24 sec). Thus we support option 1.**Issue 1-2-2: If the answer of issue 1-2-1 is Yes, then the concrete groups**Two groups are reasonable since PTW is not used in the first group where eDRX length is up to a certain level (10.24 sec) and PTW is used in the second group when eDRX length is greater than that level (10.24 sec).**Issue 1-2-3: If the answer of issue 1-2-1 is Yes, which category considers PTW and which category does not PTW** We are fine with Option 1. However, since the longest eDRX cycle is not yet agreed in RAN2, whether 3 eDRX ranges as proposed in option 2 should be FFS. * + Option 3:
		- 1: Without PTW (eDRX length is up-to 10.24s)
		- 2: With PTW (10.24s<eDRX\_cycle\_length≤T1);
		- 3: FFS T1<eDRX\_cycle\_length≤T2
		- Values of T1 and T2 are FFS
 |
| Xiaomi | **Issue 1-2-1: Whether classify eDRX into different groups based on eDRX length when defining requirements**We can support to categorize eDRXs based on whether PTW is used or not. But we have some questions for clarification on this issue: In our understanding, in LTE, for the case of eDRX\_cycle\_length =5.12s, the PTW would not be considered neither. However, the corresponding eDRX requirements in TS 36.133 are not classified into different groups but defined using a uniform requirement. We are wondering whether the same principle could be reused for NR eDRX requirements. We would appreciate for some clarifications. |
| vivo | **Issue 1-2-1: Whether classify eDRX into different groups based on eDRX length when defining requirements****Option 1****Issue 1-2-2: If the answer of issue 1-2-1 is Yes, then the concrete groups****Wait for ran2 conclusion****Issue 1-2-3: If the answer of issue 1-2-1 is Yes, which category considers PTW and which category does not PTW**  |
| Qualcomm | **Issue 1-2-1: Whether classify eDRX into different groups based on eDRX length when defining requirements**Option 1, classify based on whether PTW is needed or not **Issue 1-2-2: If the answer of issue 1-2-1 is Yes, then the concrete groups**Option 2 Two groups should be sufficient, based on whether PTW is needed or not, furthermore extended DRX cycles of up to 10485.76 seconds in RRC\_IDLE are already agreed. It’s FFS for INACTIVE mode.**Issue 1-2-3: If the answer of issue 1-2-1 is Yes, which category considers PTW and which category does not PTW**Support Option 1 |

### Sub-topic 1-3 eDRX requirements for idle state

**Issue 1-3-1: Design principles of LTE eDRX requirements**

* Proposals
	+ Option 1: RAN4 to use LTE eDRX requirements approach as baseline when developing NR eDRX requirements. (Xiaomi, Oppo, MTK, ZTE, Ericsson)
		- Could companies provide detailed information on what the approach is during the discussion
	+ Option 2: For 10.24s<eDRX\_cycle\_length≤2621.44s, RAN4 to use LTE RRM requirement of UE categories other than Cat-M/Cat-NB in IDLE mode as baseline to define the RRM requirement for RedCap UE in IDLE and INACTIVE mode. For 2621.44s<eDRX\_cycle\_length≤10485.76s, FFS on RRM requirement for RedCap UE in IDLE and INACTIVE mode (Apple)
	+ Option 3: discuss eDRX enhancements in RAN4 after the final conclusions on eDRX configurations are made in RAN2 (CMCC)
	+ Option 4: FFS
* Recommended WF
	+ TBA

**Issue 1-3-2: How to determine PTW length**

* Proposals
	+ Option 1: PTW length for serving cell evaluation requirements are determined based on: (Ericsson)
		- Number of DRX cycles needed for a measurement assuming the longest DRX cycle from current table
			* Scaling factor N1
			* DRX cycle length
			* Reference signal periodicity
			* Minimum DRX cycle length
	+ Option 2: Propose to use the same PTW lengths as in LTE for eDRX cycle lengths greater than 10.24s (Qualcomm)
	+ Option 3: FFS
* Recommended WF
	+ TBA

**Issue 1-3-3: Whether to define for transition between different states**

* Proposals
	+ Option 1: Define the requirements for transition between different states (states need to be identified) (Oppo)
	+ Option 2: No
	+ Option 3: FFS
* Recommended WF
	+ TBA

**Issue 1-3-4: Assumptions on measurements on eDRX with PTW**

* Proposals
	+ Option 1: When eDRX is configured for Redcap, the assumption that all measurements are performed within PTW of an eDRX cycle in LTE, can still be reused for NR (vivo)
	+ Option 2: (MTK)
	+ Option 3: FFS
* Recommended WF
	+ TBA

**Issue 1-3-5: Nserv value**

* Proposals
	+ Option 1: MTK
* Table 4.2.2.x-x: Nserv for UE operating with eDRX\_IDLE cycle without PTW for FR1

|  |  |
| --- | --- |
| **eDRX cycle length [s]** | **Nserv [number of DRX cycles]** |
| 2.56 | 2 |
| 5.12 | 2 |
| 10.24 | 2 |

* Table 4.2.2.x-x: Nserv for UE operating with eDRX\_IDLE cycle with PTW and PH for FR1

|  |  |  |  |
| --- | --- | --- | --- |
| **eDRX cycle length [s]** | **DRX cycle length [s]** | **PTW length [s]** **(number of DRX cycles)** | **Nserv [number of DRX cycles]** |
| 20.48 ≤ eDRX\_IDLE cycle length ≤ 10485.76 | 0.32 | ≥ 1.28 (4)  |  M1\***2** |
| 0.64 | ≥ M1 \* 1.28 (M1 \* 2) |  M1\***2** |
| 1.28 | ≥ 2.56 (2) | 2 |
| 2.56 | ≥ 5.12 (2) | 2 |

* + Option 2: Qualcomm

|  |  |  |
| --- | --- | --- |
| eDRX cycle length [s] | Scaling Factor (N1) | Nserv [number of DRX cycles] |
|  | FR1 | FR2Note1 |  |
| 2.56 | 1 | 3 | N1\*2 |
| 5.12 |  | 3 | N1\*2 |
| 10.24 |  | 3 | N1\*2 |
| Note 1: Applies for UE supporting power class 2&3&4. For UE supporting power class 1, N1 = 8 for all eDRX cycle length. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| eDRX\_IDLE cycle length [s] | DRX cycle length [s] | PTW length [s] (number of 1.28s periods) | Scaling Factor (N1) | Nserv [number of DRX cycles] |
|  | FR1 | FR2Note1 | Note2 |
| 20.48 ≤ eDRX\_IDLE cycle length ≤ 10485.76 | 0.32 | ≥1.28 (1) | 1 | 8 | N1\*2 |
| 0.64 | ≥1.28 (1) |  | 5 | N1\*2  |
| 1.28 | ≥2.56 (1) |  | 4 | N1\*2  |
| 2.56 | ≥5.12 (1) |  | 3 | N1\*2  |
| Note 1: Applies for UE supporting power class 2&3&4. For UE supporting power class 1, N1 = 8 for all DRX cycle length.Note 2: The number of DRX cycles in this table is given for the DRX cycles within PTWs. |

* + Option 3: The legacy DRX requirements could be reused for the new 2.56s eDRX cycle.(xiaomi)
	+ Option 4: FFS
* Recommended WF
	+ TBA

**Issue 1-3-6: Cell reselection requirements for RedCap UE with eDRX cycle (intra frequency)**

* Proposals
	+ Option 1: (Qualcomm)
* **Use the following values for Tdetect,NR\_Intra, Tmeasure,NR\_Intra and Tevaluate,NR\_Intra for eDRX cycle lengths up-to 10.24s**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| eDRX cycle length [s] | Scaling Factor (N1) | Tdetect,NR\_Intra [s] (number of eDRX cycles) | Tmeasure,NR\_Intra [s] (number of eDRX cycles) | Tevaluate,NR\_Intra[s] (number of eDRX cycles) |
|  | FR1 | FR2Note1 |  |  |  |
| 2.56 | 1 | 3 | 58.88 x N1 (23 x N1) | 2.56 x N1 (1 x N1) | 7.68 x N1 (3 x N1) |
| 5.12 |  | 3 | 117.76 x N1 (23 x N1) | 5.12 x N1 (1 x N1) | 10.24 x N1 (2x N1) |
| 10.24 |  | 3 | 235.52 x N1 (23 x N1) | 10.24 x N1 (1 x N1) | 20.24 x N1 (2x N1) |
| Note 1: Applies for UE supporting power class 2&3&4. For UE supporting power class 1, N1 = 8 for all eDRX cycle length. |

* **Use the following values for Tdetect,NR\_Intra, Tmeasure,NR\_Intra and Tevaluate,NR\_Intra for eDRX cycle lengths greater than 10.24s**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| eDRX\_IDLE cycle length [s] | DRX cycle length [s] | PTW length [s] (number of 1.28s periods) | Scaling Factor (N1) | Tdetect,NR\_Intra [s] (number of DRX cycles) | Tmeasure,NR\_Intra [s] (number of DRX cycles) | Tevaluate,NR\_Intra[s] (number of DRX cycles) |
| FR1 | FR2Note1 |
| 20.48 ≤ eDRX\_IDLE cycle length ≤ 10485.76 | 0.32 | ≥1.28 (1) | 1 | 8 | Note4 (23 x N1) | 0.32 x N1(1 x N1) | 0.64 x N1(2 x N1) |
| 0.64 | ≥1.28 (1) |  5 | 0.64 x N1(1 x N1) | 1.28 x N1(2 x N1) |
| 1.28 | ≥2.56 (2) |  4 | 1.28 x N1(1 x N1) | 2.56 x N1(2 x N1) |
| 2.56 | ≥5.12 (4) |  3 | 2.56 x N1(1 x N1) | 5.12 x N1(2 x N1) |
| Note 1: Applies for UE supporting power class 2&3&4. For UE supporting power class 1, N1 = 8 for all DRX cycle length.Note 2: The number of DRX cycles in this table is given for the DRX cycles within PTWs.Note 3: The eDRX\_IDLE cycle lengths are as specified in TBD.Note 4: The time is calculated depending on the number N of DRX cycles as follows:   |

* + Option 2: value could be determined through related simulation campaign (vivo)
	+ Option 3: FFS
* Recommended WF
	+ TBA

**Issue 1-3-7: Cell reselection requirements for RedCap UE with eDRX cycle (inter frequency)**

* Proposals
	+ Option 1: Cell reselection requirements for RedCap UE with eDRX cycle in idle mode defined as below(Huawei)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| eDRX\_IDLE cycle length [s] | DRX cycle length [s] | PTW length [s] (number of 1.28s periods) | Scaling Factor (N1) | Tdetect,NR\_ [s] (number of DRX cycles) | Tmeasure,NR [s] (number of DRX cycles) | Tevaluate,NR [s] (number of DRX cycles) |
| FR1 | FR2Note1 |
| 5.12 | 5.12 | - | 1 | 8 | 117.76 x N1 (23 x N1) | 5.12 x N1 (1 x N1) | 10.24 x N1 (2 x N1) |
| 10.24 | 10.24 | - | 235.52 x N1 (23 x N1) | 10.24 x N1 (1 x N1) | 20.48 x N1 (1 x N1) |
| 10.24< eDRX\_IDLE cycle length ≤10485.76 | 0.32 | ≥1.28 (1) | $$eDRX\\_cycly\\_length\left⌈\frac{[TBD]×N1}{PTW/DRX\\_cycle\\_length}\right⌉$$ | TBD | TBD |
| 0.64 | ≥1.28 (1) |  | 5 | TBD | TBD |
| 1.28 | ≥2.56 (2) |  | 4 | TBD | TBD |
| 2.56 | ≥5.12 (4) |  | 3 | TBD | TBD |

* + Option 2: (Qualcomm)
* **Use the following values for Tdetect,NR\_Inter, Tmeasure,NR\_Inter and Tevaluate,NR\_Inter for eDRX cycle lengths up-to 10.24s**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| eDRX cycle length [s] | Scaling Factor (N1) | Tdetect,NR\_Inter [s] (number of eDRX cycles) | Tmeasure,NR\_Inter [s] (number of eDRX cycles) | Tevaluate,NR\_Inter[s] (number of eDRX cycles) |
|  | FR1 | FR2Note1 |  |  |  |
| 2.56 | 1 | 3 | 58.88 x N1 (23 x N1) | 2.56 x N1 (1 x N1) | 7.68 x N1 (3 x N1) |
| 5.12 |  | 3 | 117.76 x N1 (23 x N1) | 5.12 x N1 (1 x N1) | 10.24 x N1 (2x N1) |
| 10.24 |  | 3 | 235.52 x N1 (23 x N1) | 10.24 x N1 (1 x N1) | 20.24 x N1 (2x N1) |
| Note 1: Applies for UE supporting power class 2&3&4. For UE supporting power class 1, N1 = 8 for all eDRX cycle length. |

* **Use the following values for Tdetect,NR\_Inter, Tmeasure,NR\_Inter and Tevaluate,NR\_Inter for eDRX cycle lengths greater than 10.24s**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| eDRX\_IDLE cycle length [s] | DRX cycle length [s] | PTW length [s] (number of 1.28s periods) | Scaling Factor (N1) | Tdetect,NR\_Inter [s] (number of DRX cycles) | Tmeasure,NR\_Inter [s] (number of DRX cycles) | Tevaluate,NR\_Inter[s] (number of DRX cycles) |
| FR1 | FR2Note1 |
| 20.48 ≤ eDRX\_IDLE cycle length ≤ 10485.76 | 0.32 | ≥1.28 (1) | 1 | 8 | Note4 (23 x N1) | 0.32 x N1(1 x N1) | 0.64 x N1(2 x N1) |
| 0.64 | ≥1.28 (1) |  5 | 0.64 x N1(1 x N1) | 1.28 x N1(2 x N1) |
| 1.28 | ≥2.56 (2) |  4 | 1.28 x N1(1 x N1) | 2.56 x N1(2 x N1) |
| 2.56 | ≥5.12 (4) |  3 | 2.56 x N1(1 x N1) | 5.12 x N1(2 x N1) |
| Note 1: Applies for UE supporting power class 2&3&4. For UE supporting power class 1, N1 = 8 for all DRX cycle length.Note 2: The number of DRX cycles in this table is given for the DRX cycles within PTWs.Note 3: The eDRX\_IDLE cycle lengths are as specified in TBDNote 4: The time is calculated depending on the number N of DRX cycles as follows:   |

* + Option 3: value could be determined through related simulation campaign (vivo)
	+ Option 4: FFS
* Recommended WF
	+ TBA

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Apple | **Issue 1-3-1: Design principles of LTE eDRX requirements** Support option 2. For 2621.44s<eDRX\_cycle\_length≤10485.76s, FFS on RRM requirement for RedCap UE in IDLE and INACTIVE mode since it’s still pending in RAN2 (need to be confirmed by SA2 and CT1).**Issue 1-3-2: How to determine PTW length**Need FFS and need more conclusions from RAN2. In last RAN2 meeting there was open issue that:* It is up to RAN to configure the length for PTW for RAN paging, the RAN PTW length can be different from the CN PTW length.
* When RAN and CN paging coincide in the same PH, the PTW starting locations are the same. FFS how to calculate the PTW starting location so that it is the same for RAN and CN PTW.
* Continue in the next meeting the discussion on how UE is expected to monitor RAN and CN PTW, e.g. whether UE in RRC\_INACTIVE monitors for only RAN PTW or both CN and RAN PTW when they overlap

**Issue 1-3-3: Whether to define for transition between different states**Generally fine with option 1 if following LTE spec.**Issue 1-3-4: Assumptions on measurements on eDRX with PTW**Need more discussion.**Issue 1-3-5: Nserv value**Need more discussion.**Issue 1-3-6: Cell reselection requirements for RedCap UE with eDRX cycle (intra frequency)**Need more discussion.**Issue 1-3-7: Cell reselection requirements for RedCap UE with eDRX cycle (inter frequency)**Need more discussion. |
| CMCC | **Issue 1-3-1: Design principles of LTE eDRX requirements** **Option1 can be considered as the starting point.****Issue 1-3-2: How to determine PTW length****Option1 list the factors that need to be considered, while PTW lengths of LTE can be considered as the baseline.****Issue 1-3-3: Whether to define for transition between different states****More discussion is needed.****Issue 1-3-4: Assumptions on measurements on eDRX with PTW****Option1 is OK. Option 2 needs further study.****Issue 1-3-5: Nserv value****More discussion is needed. Option2 can be considered as starting point. Not sure whether all the power classes for FR2 will be applicable for RedCap UE.** **Issue 1-3-6: Cell reselection requirements for RedCap UE with eDRX cycle (intra frequency)****More discussion is needed. Option1 can be considered as starting point.****Issue 1-3-7: Cell reselection requirements for RedCap UE with eDRX cycle (inter frequency)****More discussion is needed.** |
| CMCC | **Issue 1-3-1: Design principles of LTE eDRX requirements** **Option 1 can be considered as the starting point.****Issue 1-3-2: How to determine PTW length****PTW lengths of LTE can be considered as the baseline.****Issue 1-3-3: Whether to define for transition between different states****Option 1 can be considered as the starting point.****Issue 1-3-4: Assumptions on measurements on eDRX with PTW****FFS.****Issue 1-3-5: Nserv value****FFS.** **Issue 1-3-6: Cell reselection requirements for RedCap UE with eDRX cycle (intra frequency)****FFS****Issue 1-3-7: Cell reselection requirements for RedCap UE with eDRX cycle (inter frequency)****FFS** |
| Huawei | Issue 1-3-1: we don’t think we need to discuss using which requirements as a baseline. The reason is that LTE edrx and eMTC only reach to 2621.44s and granularity of PTW window is 1.28s, normal DRX is below 2.56s. For NB, eDRX can reach to 10485.76s, the granularity of PTW window is 2.56s and the normal DRX includes 5.12s and 10.24s. For the eDRX configuration for NR RedCap can reach to is10485.76s, granularity of PTW window is FFS, and the normal DRX is the same as LTE eDRX. Therefore redcap UE is a mixed configuration of LTE edrx and NB. Issue 1-3-2: wait for the conclusion from RAN2. At least whether the granularity of PTW window is 1.28s or 2.56s has no definitive conclusion.Issue 1-3-3: seems reasonable. We are open to discuss.Issue 1-3-4: For FR2, if scaling factor is 8, Nserv may not be covered by one PTW window. For this issue, we need further consideration.Issue 1-3-5: prefer option 4. Issue 1-3-6: Option 3.Issue 1-3-7: option 1 or option 4.  |
| MediaTek | **Issue 1-3-1: Design principles of LTE eDRX requirements**Our preference is Option 1 but we are also open to FFS Option 2.Justification: the existing requirements of DRX in 5G NR is based on the DRX requirements of LTE, yet the DRX requirements in 5G NR have scaling factors to adapt the values inherited from the LTE DRX cycles. In a similar manner, the eDRX for 5G NR should be based on the eDRX from LTE, yet, the new eDRX in 5G NR should re-use the scaling factors from the existing DRX in 5G NR.**Issue 1-3-2: How to determine PTW length**We are partially agreeing with Option 1* ~~Scaling factor N1~~
* DRX cycle length
* Reference signal periodicity
* Minimum DRX cycle length

The reason is discussed already in our contribution paper [R4-2113956] and we mention it here briefly: If the scaling factor N1 is considered in the PTW, hence the PTW duration is going to be much longer than the existing PTW in LTE (up to N1 = 8 times). Thus, the main benefits of using PTW can be highly degraded. For example, consider using eDRX = 20.48 s, DRX 0.32, PTW = N1\*M1\*1.28 s, N1 = 8 (for FR2), M1 = 2 and assuming the duration of PTW = N1\*M1\*1.28 s = 8\*2\*1.28 = 20.48 s, which means the PTW duration is the same size as the eDRX. This is equivalent to have no eDRX with PTW being used at all. In summary, we suggest to leave the eDRX in FR2 as FFS. Regarding Option 2, which suggest to re-use the PTW as in LTE. This option is also not entirely feasible and the reason for it is that the Nserv process will require multiple PTWs and hence this may not align with that was used in LTE, where Nserv needs to be done in a single PTW.Furthermore, in the tables provided in our paper and shown in Issue 1-3-5, we give an example of how to adapt the PTW duration based only on scaling factors related to M1 and only when it is needed to achieve a single PTW for Nserv.**Issue 1-3-3: Whether to define for transition between different states**Option 3: FFS**Issue 1-3-4: Assumptions on measurements on eDRX with PTW**Option 2.**Issue 1-3-5: Nserv value**Option 1. The reason is given in our comment above in Issue 1-3-2.**Issue 1-3-6: Cell reselection requirements for RedCap UE with eDRX cycle (intra frequency)**Options 3: FFS.Once we reach consensus on the Issues 1-3-1 to 1-3-5 then it should be easy to define the new cell reselection (intra) eDRX tables because all the above issues apply directly in here.**Issue 1-3-7: Cell reselection requirements for RedCap UE with eDRX cycle (inter frequency)**Options 4: FFS.Once we reach consensus on the Issues 1-3-1 to 1-3-5 then it should be easy to define the new cell reselection (intra) eDRX tables because all the above issues apply directly in here. |
| Ericsson | **Issue 1-3-1: Design principles of LTE eDRX requirements** We support option 1 in principle but include also NR specific aspects:The LTE PTW used in the UE requirements in the serving cell evaluation and neighbour cell measurements varies with the eDRX and configured DRX length. However, in NR there are scaling factors like FR2 beam sweeping factor (N1) and other scaling based on DRX cyle length and SMTC period (M1 or M2). These NR specific aspects (such as scaling factors) need to be taken into account when deriving the PTW length for NR eDRX requirements and other requirements e.g. Nserv. **Issue 1-3-2: How to determine PTW length**We support option 1. Please note that there is a typo in option 1 where the last bullet should be “minimum eDRX cycle length” instead of “minimum DRX cycle length”. We don’t think we can use exactly the same PTW lengths as in LTE since NR has different scaling factors that need to be taken into account.**Issue 1-3-3: Whether to define for transition between different states**We cannot agree on defining requirements for transition between different states without first agreeing what are “states”. We therefore support option 3, i.e. whether to define transition requirements needs some more study. **Issue 1-3-4: Assumptions on measurements on eDRX with PTW**Option 1 and 2 are very similar in our view. We prefer to follow the LTE eDRX approach where all measurement samples are taken within the same PTW. Thus we support option 1.**Issue 1-3-5: Nserv value**We support option 4. Option 1 for FR1 seems reasonable. But we also need to define Nserv and PTW in FR2.In Option 2:* the Nserv and PTW for DRX ≤ 0.64 s should scale with M1 for both FR1 and FR2.
* For FR2, the PTW should also scale with N1 to have enough DRX cycles within PTW to allow the beam sweeping.

**Issue 1-3-6: Cell reselection requirements for RedCap UE with eDRX cycle (intra frequency)**We support option 3. PTW should be large enough to allow beam sweeping and other scaling,In Option 2:* PTW for DRX cycle = 0.32 s should scale with M2 (1 or 1.5) for both FR1 and FR2.
* For FR2, the PTW should also scale with N1 to have enough DRX cycles within PTW to allow the beam sweeping.

**Issue 1-3-7: Cell reselection requirements for RedCap UE with eDRX cycle (inter frequency)**We support option 4. PTW should be large enough to allow beam sweeping in FR2. In Option 2: * For FR2, the PTW should also scale with N1 to have enough DRX cycles within PTW to allow the beam sweeping.
 |
| Xiaomi | **Issue 1-3-1: Design principles of LTE eDRX requirements** Support Option 1.**Issue 1-3-2: How to determine PTW length**Option 1 and Option2 are both fine.**Issue 1-3-3: Whether to define for transition between different states**Further study is need.**Issue 1-3-4: Assumptions on measurements on eDRX with PTW**Further study is need.**Issue 1-3-5: Nserv value**Further study is need.**Issue 1-3-6: Cell reselection requirements for RedCap UE with eDRX cycle (intra frequency)**Further study is need.**Issue 1-3-7: Cell reselection requirements for RedCap UE with eDRX cycle (inter frequency)**Further study is need. |
| vivo | **Issue 1-3-1: Design principles of LTE eDRX requirements** FFS**Issue 1-3-2: How to determine PTW length**Need ran2 input **Issue 1-3-3: Whether to define for transition between different states**option 1 can be used as a starting point.**Issue 1-3-4: Assumptions on measurements on eDRX with PTW**Ok with option 1. **Issue 1-3-5: Nserv value**FFS**Issue 1-3-6: Cell reselection requirements for RedCap UE with eDRX cycle (intra frequency)**FFS**Issue 1-3-7: Cell reselection requirements for RedCap UE with eDRX cycle (inter frequency)**FFS |
| Qualcomm | **Issue 1-3-1: Design principles of LTE eDRX requirements** Can agree with Option 1. LTE requirements could be used as baseline with NR specific updates such as Scaling factor N1, etc.**Issue 1-3-2: How to determine PTW length**Support option 2 for FR1. The impact of N1 for FR2 can be further discussed.**Issue 1-3-3: Whether to define for transition between different states**FFS**Issue 1-3-4: Assumptions on measurements on eDRX with PTW**We are fine with both the options. For FR2, we can use current N1 values for DRX cycles within the PTW.**Issue 1-3-5: Nserv value**We can agree on option 1 for FR1, and Ericsson’s suggestions could be further considered in Option 2 for defining FR2 requirements**Issue 1-3-6: Cell reselection requirements for RedCap UE with eDRX cycle (intra frequency)**We can further discussion this based on outcome from previous issues. **Issue 1-3-7: Cell reselection requirements for RedCap UE with eDRX cycle (inter frequency)**We can further discussion this based on outcome from previous issues. |

### Sub-topic 1-4 eDRX requirements for inactive state

**Issue 1-4-1: whether inactive eDRX requirements can based on the corresponding idle state eDRX requirements**

* Proposals
	+ Option 1: RAN4 to take the eDRX requirements for idle mode as baseline for inactive mode.(xiaomi)
	+ Option 2: For the inactive performance requirements, whether reuse idle state requirements or not should be determined. (vivo)
	+ Option 3: FFS
* Recommended WF
	+ TBA

**Issue 1-4-2: Behavior when Redcap UE has both RRC\_IDLE eDRX and RRC\_INACTIVE eDRX configuration**

* Proposals
	+ Option 1: If the extended DRX for RRC-Inactive is up to 10.24s which depends on CT1/SA2 conclusion, the cell reselection requirements can be only based on monitoring of RAN initiated POs; If the extended DRX for RRC\_INACTIVE is larger than 10.24s, two PTW can be present at the same time. How to define the measurement needs further discussion. (Huawei)
	+ Option 2: FFS
* Recommended WF
	+ TBA

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| **Company** | **Comments** |
| Apple | **Issue 1-4-1: whether inactive eDRX requirements can based on the corresponding idle state eDRX requirements**Fine with option 1.**Issue 1-4-2: Behavior when Redcap UE has both RRC\_IDLE eDRX and RRC\_INACTIVE eDRX configuration**Need more conclusions from RAN2. Following issue is still open in RAN2:* Continue in the next meeting the discussion on how UE is expected to monitor RAN and CN PTW, e.g. whether UE in RRC\_INACTIVE monitors for only RAN PTW or both CN and RAN PTW when they overlap
 |
| CMCC | **Issue 1-4-1: whether inactive eDRX requirements can based on the corresponding idle state eDRX requirements****Option1****Issue 1-4-2: Behavior when Redcap UE has both RRC\_IDLE eDRX and RRC\_INACTIVE eDRX configuration****Need more input from RAN2** |
| OPPO | **Issue 1-4-1: whether inactive eDRX requirements can based on the corresponding idle state eDRX requirements**Fine with option 1.**Issue 1-4-2: Behavior when Redcap UE has both RRC\_IDLE eDRX and RRC\_INACTIVE eDRX configuration**Need more conclusions from RAN2. |
| Huawei | Issue 1-4-1: different view. eDRX can configuration in idle mode (CN paging) and in inactive mode (RAN paging) can be different. RedCap UE in inactive mode shall monitor both CN paging and RAN Paging. * If the extended DRX for RRC\_INACTIVE is up to 10.24s, then no PTW for RRC\_INACTIVE. In this case, the requirements can be defined only based on inactive state eDRX.

 If the extended DRX for RRC\_INACTIVE can be larger than 10.24s, two PTW (one for RRC-IDLE and the other for RRC\_INACTIVE) can be present at the same time. This scenario is complex and how to define the measurement needs further discussion.Issue 1-4-2: support option 1.As per the agreements in RAN2, the parameters of PH, PTW and H-SFN are not applied for the eDRX≤ 10.24s. Therefore if the extended DRX for RRC\_INACTIVE is up to 10.24s, there is no PTW for RRC\_INACTIVE. This case is similar as LTE RRC\_INACTIVE state requirements for eMTC. Therefore the reselection requirements for RedCap UE with both RRC\_IDLE eDRX configuration and RRC\_INACTIVE eDRX configuration can be defined only based on monitoring of RAN initiated POs. |
| MediaTek | **Issue 1-4-1: whether inactive eDRX requirements can based on the corresponding idle state eDRX requirements**Reuse the new requirements of IDLE mode to INACTIVE mode.**Issue 1-4-2: Behavior when Redcap UE has both RRC\_IDLE eDRX and RRC\_INACTIVE eDRX configuration**The IDLE mode and INACTIVE mode should have the same requirements.  |
| Ericsson | **Issue 1-4-1: whether inactive eDRX requirements can based on the corresponding idle state eDRX requirements**In general, we agree that the aim can be reuse the IDLE mode eDRX requirements also for INACTIVE state. However, there are some important differences in the eDRX configuration between IDLE and INACTIVE states. For example, it is being discussed whether the eDRX length can be different in INACTIVE state compared to IDLE state. Also, RAN2 is also discussing how to deal with both CN originated and RAN originated paging when the UE is configured with both. Therefore it may not be possible to apply exact same requirements in both IDLE and INACITVE states. Therefore we support option 3 that more discussions are needed.**Issue 1-4-2: Behavior when Redcap UE has both RRC\_IDLE eDRX and RRC\_INACTIVE eDRX configuration**We agree with Huawei that this scenario needs more discussions and such discussions can take place after relevant WGs (e.g. CT1/SA2/RAN2) have confirmed the eDRX parameters for INACTIVE state. |
| Xiaomi | **Issue 1-4-1: whether inactive eDRX requirements can based on the corresponding idle state eDRX requirements**Option1**Issue 1-4-2: Behavior when Redcap UE has both RRC\_IDLE eDRX and RRC\_INACTIVE eDRX configuration**We can wait for more RAN2 outcome. |
| vivo | **Issue 1-4-1: whether inactive eDRX requirements can based on the corresponding idle state eDRX requirements**Similar view as Huawei, need to notice the impact due to the difference on configurations between IDLE and INACTIVE**Issue 1-4-2: Behavior when Redcap UE has both RRC\_IDLE eDRX and RRC\_INACTIVE eDRX configuration**Need more conclusions from RAN2. |
| Qualcomm | **Issue 1-4-1: whether inactive eDRX requirements can based on the corresponding idle state eDRX requirements**Fine with option 1. But we can wait for RAN2 agreement on length of eDRX cycles in Inactive mode.**Issue 1-4-2: Behavior when Redcap UE has both RRC\_IDLE eDRX and RRC\_INACTIVE eDRX configuration**Wait for RAN2 decision. |

### Sub-topic 1-5 eDRX requirements relaxation

**Issue 1-5-1: Whether to consider relaxed eDRX for low mobility and not-at-cell edge criteria**

* Proposals
	+ Option 1: Support the design of new relaxed eDRX for low mobility and not-at-cell edge criteria for low eDRX cycles (MTK)
	+ Option 2: FFS
* Recommended WF
	+ TBA

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| **Company** | **Comments** |
| Apple | **Issue 1-5-1: Whether to consider relaxed eDRX for low mobility and not-at-cell edge criteria**Propose RAN4 to study the RRM relaxation without eDRX first.  |
| CMCC | **Issue 1-5-1: Whether to consider relaxed eDRX for low mobility and not-at-cell edge criteria****Agree with Apple, RRM relaxation without eDRX should be studied first.** |
| OPPO | **Issue 1-5-1: Whether to consider relaxed eDRX for low mobility and not-at-cell edge criteria**FFS |
| Huawei | Suggest to decouple RRM relaxation and eDRX. |
| MediaTek | **Issue 1-5-1: Whether to consider relaxed eDRX for low mobility and not-at-cell edge criteria**Option 1. From our contribution paper: The new eDRX requirements are up to 10485.76 s, which is very relaxed compared to both general 5G NR DRX requirements and relaxed DRX requirements for low mobility and not-at-cell-edge criteria. Hence, designing new eDRX requirements for these criteria may not be necessary. However, the new requirements for eDRX starts from 2.56 s and the requirements for the 2.56 s are expected to be the same as the general requirements for DRX = 2.56 s. Furthermore, the relaxed DRX requirements for low mobility and not-at-cell-edge criteria for DRX = 2.56 s are relaxed by a factor K1 = 3, hence the requirements of DRX cycle = 2.56 s for power are more relaxed compared to the low eDRX cycles = 2.56 s and 5.12 s. Therefore, in order to be consistent with all the DRX and eDRX requirements there should be a new eDRX requirements for the low mobility and not-at-cell edge criteria for low eDRX cycles. Yet, the new relaxed eDRX should not be higher than the next eDRX cycle, for example, the relaxed eDRX cycle =10.48 s should not be more relaxed than the eDRX cycle = 20.48 s. |
| Ericsson | **Issue 1-5-1: Whether to consider relaxed eDRX for low mobility and not-at-cell edge criteria**Since relaxed measurement requirements in IDLE/INACTIVE mode will be supported for RedCap UE, it is reasonable to discuss the relaxed requirements when the UE is configured with eDRX. However, since low mobility criterion and not-at-cell edge criterion is currently under discussion in RAN2 (whether criteria is same as in release 16 or additional improvements are made in release 17) under the measurement relaxation objective, it is preferred to discuss the combination of eDRX+relaxed measurements when the new relaxed criteria are agreed in RAN2. In any case RAN4 should first study and develop requirements for eDRX without relaxation and relaxed requirements without eDRX first. In summary there are following scenarios:1. Idle/inactive measurement requirements for eDRX without relaxation
2. Idle/inactive measurement requirements with relaxation without eDRX
3. Idle/inactive measurement requirements with relaxation and with eDRX

In our view scenario # 1 and #2 should be prioritized since scenario #3 depends on agreements in scenarios #1 and #2. |
| Xiaomi | **Issue 1-5-1: Whether to consider relaxed eDRX for low mobility and not-at-cell edge criteria**We support to study the RRM relaxation without eDRX first. |
| vivo | FFS |
| Qualcomm | **Issue 1-5-1: Whether to consider relaxed eDRX for low mobility and not-at-cell edge criteria**We support option 1 in general. RRM relaxations need to be defined atleast for low eDRX cycles. However, the discussion can wait until we have some agreements on eDRX and RRM relaxations separately.  |

## 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** |
| XXX | 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:* |

**Issue 1-1-1: Scopes where RRM requirement with eDRX in IDLE/INACTIVE mode are defined**

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| --- | --- |
|  | **Status summary**  |
| **Sub-topic 1-1-1** | *All companies which provides feedbacks support option 1*Option 1: Only consider defining the RRM requirement with eDRX in IDLE/INACTIVE mode only. *Tentative agreements: option 1**Recommendations for 2nd round: Agree on option 1 and No further discussion* |

**Issue 1-1-2:**

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|  | **Status summary**  |
| **Sub-topic 1-1-2** | *5 companies support option 1. 1 company support option 2 and 4 companies are for FFS (option 3)*Option 1: Yes (Apple MTK CMCC ZTE QC )Option 2: No (Ericsson)Option 3: FFS (OPPO Huawei Xiaomi vivo)*Tentative agreements: No**Recommendations for 2nd round: Continue discussion at the 2nd round.*  |

**Issue 1-1-3:**

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|  | **Status summary**  |
| **Sub-topic 1-1-3** | *2 companies support option 1. 6 companies are for FFS (option 3)*Option 1: Yes (MTK Ericsson)Option 2: NoOption 3: FFS (Apple CMCC OPPO Huawei Xiaomi vivo)*QC depending on issue 1-1-2**Tentative agreements: No**Recommendations for 2nd round: Continue discussion at the 2nd round.*  |

**Issue 1-2-1: Whether classify eDRX into different groups based on eDRX length when defining requirements**

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|  | **Status summary**  |
| **Sub-topic 1-2-1** | *All companies support option 1.**Tentative agreements: option 1 (classify eDRX into different groups based on eDRX length when defining requirements)**Recommendations for 2nd round: Confirm tentative agreements; no need for further discussion* |

**Issue 1-2-2: If the answer of issue 1-2-1 is Yes, then the concrete groups**

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| --- | --- |
|  | **Status summary**  |
| **Sub-topic 1-2-2** | *1 company support option 1; 7 company support option 2; 2 companies for FFS** + Option 1: Three groups
		- 1: eDRX value 2.56s/5.12s/10.24s; 2: 10.24s<eDRX\_cycle\_length≤2621.44s; 3: 2621.44s<eDRX\_cycle\_length≤10485.76s (Apple)
	+ Option 2: Two groups
		- 1: eDRX cycle lengths up-to 10.24s 2: eDRX > 10.24s (MTK;Huawei; Qualcomm, CMCC Oppo, Huawei, Eric)

*FFS (vivo MTK)**Tentative agreements: NO**Recommendations for 2nd round: Continue discussion at the 2nd round.*  |

**Issue 1-2-3: If the answer of issue 1-2-1 is Yes, which category considers PTW and which category does not PTW**

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|  | **Status summary**  |
| **Sub-topic 1-2-3** | *6 company support option 1; 1 company support option 2a; 1 company support option 3** + Option 1: 1: Without PTW (eDRX length is up-to 10.24s) 2: With PTW (eDRX > 10.24s); (MTK;Huawei; Qualcomm;oppo, CMCC, Oppo, Ericsson)
	+ Option 2: 1: Without PTW (eDRX length is up-to 10.24s) 2: With PTW (10.24s<eDRX\_cycle\_length≤2621.44s); 3: FFS 2621.44s<eDRX\_cycle\_length≤10485.76s (Apple)

Option 2a (Apple): 1: Without PTW (eDRX length is up-to 10.24s) 2: With PTW (10.24s<eDRX\_cycle\_length≤2621.44s); 3: RAN4 discuss 2621.44s<eDRX\_cycle\_length≤10485.76s with PTW when RAN2 concluds on it.Option 3 (Ericsson): 1: Without PTW (eDRX length is up-to 10.24s) 2: With PTW (10.24s<eDRX\_cycle\_length≤T1); 3: FFS T1<eDRX\_cycle\_length≤T2Values of T1 and T2 are FFS*Tentative agreements: NO**Recommendations for 2nd round: Continue discussion at the 2nd round.*  |
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**Issue 1-3-1: Design principles of LTE eDRX requirements**

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|  | **Status summary**  |
| **Sub-topic 1-3-1** | *7 companies support option 1; 2 companies support option 2. 1 company for option 3;1 company support FFS; 1 company provide alternative options:** + Option 1: RAN4 to use LTE eDRX requirements approach as baseline when developing NR eDRX requirements. (Xiaomi, Oppo, MTK, ZTE, Ericsson CMCC QC)
	+ Option 2: For 10.24s<eDRX\_cycle\_length≤2621.44s, RAN4 to use LTE RRM requirement of UE categories other than Cat-M/Cat-NB in IDLE mode as baseline to define the RRM requirement for RedCap UE in IDLE and INACTIVE mode. For 2621.44s<eDRX\_cycle\_length≤10485.76s, FFS on RRM requirement for RedCap UE in IDLE and INACTIVE mode (Apple MTK)
	+ Option 3: discuss eDRX enhancements in RAN4 after the final conclusions on eDRX configurations are made in RAN2 (CMCC)
	+ Option 4: FFS (vivo)
	+ Option 5 (Huawei): LTE eDRX requirements cannot be used as a baseline when developing NR eDRX requirements

*Tentative agreements:No**Recommendations for 2nd round: Continue discussion at the 2nd round.*  |

**Issue 1-3-2: How to determine PTW length**

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|  | **Status summary**  |
| **Sub-topic 1-3-2** | *4 company support option 1; 3 company support option 2 and 1 company opposes ; 3 companies for FFS**Option 1:* PTW length for serving cell evaluation requirements are determined based on: Scaling factor N1; DRX cycle length;Reference signal periodicity; Minimum DRX cycle length (Ericsson CMCC xiaomi) MTK(agree without using N1)*Option 2* Propose to use the same PTW lengths as in LTE for eDRX cycle lengths greater than 10.24s (Qualcomm CMCC Oppo xiaomi) MTK(oppose not entirely feasible)*Option 3 (FFS): Apple Huawei vivo**Tentative agreements:NO**Recommendations for 2nd round: Continue discussion at the 2nd round.*  |
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**Issue 1-3-3: Whether to define for transition between different states**

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|  | **Status summary**  |
| **Sub-topic 1-3-3** | *3 company support option 1; 6 company support option 3 (FFS);* Option 1: Define the requirements for transition between different states (states need to be identified) (Oppo Apple vivo)Option 2: No Option 3: FFS (CMCC Huawei MTK Ericsson xiaomi QC)*Tentative agreements:NO**Recommendations for 2nd round: Continue discussion at the 2nd round.*  |

**Issue 1-3-4: Assumptions on measurements on eDRX with PTW**

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|  | **Status summary**  |
| **Sub-topic 1-3-4** | *4 company support option 1; 2 company support option 2; 4 companies for FFS** + Option 1: When eDRX is configured for Redcap, the assumption that all measurements are performed within PTW of an eDRX cycle in LTE, can still be reused for NR (vivo CMCC Ericsson QC)
	+ Option 2: (MTK QC)
	+ Option 3: FFS (Apple Oppo Huawei xiaomi)

*Tentative agreements:NO**Recommendations for 2nd round: Continue discussion at the 2nd round.*  |

**Issue 1-3-5: Nserv value**

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|  | **Status summary**  |
| **Sub-topic 1-3-5** | *2 company support option 1; 7 company for FFS**Option 1:MTK QC**Option 2:**Option 3: The legacy DRX requirements could be reused for the new 2.56s eDRX cycle.**Option 4: FFS (Apple CMCC Oppo Huawei Ericsson xiaomi vivo)**Tentative agreements:NO**Recommendations for 2nd round: Continue discussion at the 2nd round.*  |

**Issue 1-3-6: Cell reselection requirements for RedCap UE with eDRX cycle (intra frequency)**

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|  | **Status summary**  |
| **Sub-topic 1-3-6** | *All companies for FFS**Tentative agreements: NO**Recommendations for 2nd round: Continue discussion at the 2nd round.*  |

**Issue 1-3-7: Cell reselection requirements for RedCap UE with eDRX cycle (inter frequency)**

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|  | **Status summary**  |
| **Sub-topic 1-3-7** | *1 company support option 1 (Huawei); All companies (including the company support option 1) for FFS**Tentative agreements:NO**Recommendations for 2nd round: Continue discussion at the 2nd round.*  |

**Issue 1-4-1: whether inactive eDRX requirements can based on the corresponding idle state eDRX requirements**

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|  | **Status summary**  |
| **Sub-topic 1-4-1** | *6 company support option 1; 4 companies for FFS** + Option 1: RAN4 to take the eDRX requirements for idle mode as baseline for inactive mode.(xiaomi apple CMCC Oppo MTK QC)
	+ Option 2: For the inactive performance requirements, whether reuse idle state requirements or not should be determined.
	+ Option 3: FFS (Huawei Ericsson vivo QC)

*Tentative agreements:NO**Recommendations for 2nd round: Continue discussion at the 2nd round.*  |

**Issue 1-4-2: Behavior when Redcap UE has both RRC\_IDLE eDRX and RRC\_INACTIVE eDRX configuration**

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|  | **Status summary**  |
| **Sub-topic 1-4-2** | *2 company support option 1 (Huawei); 6 companies for option 3** + Option 1: If the extended DRX for RRC-Inactive is up to 10.24s which depends on CT1/SA2 conclusion, the cell reselection requirements can be only based on monitoring of RAN initiated POs; If the extended DRX for RRC\_INACTIVE is larger than 10.24s, two PTW can be present at the same time. How to define the measurement needs further discussion. (Huawei Ericsson)
	+ Option 2: FFS

Option 3: more input from RAN2 (Apple, CMCC, Oppo, Xiaomi, vivo, QC)*Tentative agreements:NO**Recommendations for 2nd round: Continue discussion at the 2nd round.*  |

**Issue 1-5-1: Whether to consider relaxed eDRX for low mobility and not-at-cell edge criteria**

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|  | **Status summary**  |
| **Sub-topic 1-5-1** | *2 company support option 1; 4 companies for option 3 and 4 companies are for FFS** + Option 1: Support the design of new relaxed eDRX for low mobility and not-at-cell edge criteria for low eDRX cycles (MTK QC))
	+ Option 2: FFS (Oppo Huawei vivo QC)
	+ Option 3: study the RRM relaxation without eDRX first. (Apple CMCC Ericsson xiaomi)

*Tentative agreements:NO**Recommendations for 2nd round: Continue discussion at the 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.*

|  |  |
| --- | --- |
| **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)

### Sub-topic 1-1 Genearl aspects on eDRX enhancments

**Issue 1-1-2:**

* Proposals
* Option 1: Yes (Apple MTK CMCC ZTE QC )
* Option 2: No (Ericsson)
* Option 3: FFS (OPPO Huawei Xiaomi vivo)
* Recommended WF
	+ TBA

**Issue 1-1-3:**

* Proposals
* Option 1: Yes (MTK Ericsson)
* Option 2: No
* Option 3: FFS (Apple CMCC OPPO Huawei Xiaomi vivo)
* Recommended WF
	+ TBA

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| --- | --- |
| **Company** | **Comments** |
| Ericsson | **Issue 1-1-2: Whether prioritizing the eDRX requirements for FR1 and de-prioritizing the eDRX requirements for FR2.**Follow the agreement from GTW. **Issue 1-1-3: Whether have the eDRX requirements for FR1 and FR2 on separate tables.**We support option 1 since the exact requirements might be different, e.g. beam sweeping factor may need to be assumed for FR2.  |

### Sub-topic 1-2 whether to have different methodologies based on eDRX length when defining performance requirements

**Issue 1-2-2: If the answer of issue 1-2-1 is Yes, then the concrete groups**

* Proposals
	+ Option 1: Three groups
		- 1: eDRX value 2.56s/5.12s/10.24s; 2: 10.24s<eDRX\_cycle\_length≤2621.44s; 3: 2621.44s<eDRX\_cycle\_length≤10485.76s (Apple)
	+ Option 2: Two groups
		- 1: eDRX cycle lengths up-to 10.24s 2: eDRX > 10.24s (MTK;Huawei; Qualcomm, CMCC Oppo, Huawei, Eric)
	+ Option 3: FFS (vivo MTK)
* Recommended WF
	+ TBA

**Issue 1-2-3: If the answer of issue 1-2-1 is Yes, which category considers PTW and which category does not PTW**

* Proposals
* Option 1: 1: Without PTW (eDRX length is up-to 10.24s) 2: With PTW (eDRX > 10.24s); (MTK;Huawei; Qualcomm; oppo, CMCC, Oppo, Ericsson)
* Option 2: 1: Without PTW (eDRX length is up-to 10.24s) 2: With PTW (10.24s<eDRX\_cycle\_length≤2621.44s); 3: FFS 2621.44s<eDRX\_cycle\_length≤10485.76s (Apple)
* Option 2a (Apple): 1: Without PTW (eDRX length is up-to 10.24s) 2: With PTW (10.24s<eDRX\_cycle\_length≤2621.44s); 3: RAN4 discuss 2621.44s<eDRX\_cycle\_length≤10485.76s with PTW when RAN2 concluds on it.
* Option 3 (Ericsson):

1: Without PTW (eDRX length is up-to 10.24s)

2: With PTW (10.24s<eDRX\_cycle\_length≤T1);

3: FFS T1<eDRX\_cycle\_length≤T2 Values of T1 and T2 are FFS

* Recommended WF
	+ TBA

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | **Issue 1-2-2: If the answer of issue 1-2-1 is Yes, then the concrete groups**We support option 3 (which is the alternative proposal from 1st round). Since the longest eDRX cycle length is not known yet, it is better to keep the range open as shown in option 3.**Issue 1-2-3: If the answer of issue 1-2-1 is Yes, which category considers PTW and which category does not PTW** We support option 3 (the alternative proposal from 1st round). Since the longest eDRX cycle length is not known yet, it is better to keep the range open as shown in option 3.  |

### Sub-topic 1-3 eDRX requirements for idle state

**Issue 1-3-1: Design principles of LTE eDRX requirements**

* Proposals
	+ Option 1: RAN4 to use LTE eDRX requirements approach as baseline when developing NR eDRX requirements. (Xiaomi, Oppo, MTK, ZTE, Ericsson CMCC QC)
	+ Option 2: For 10.24s<eDRX\_cycle\_length≤2621.44s, RAN4 to use LTE RRM requirement of UE categories other than Cat-M/Cat-NB in IDLE mode as baseline to define the RRM requirement for RedCap UE in IDLE and INACTIVE mode. For 2621.44s<eDRX\_cycle\_length≤10485.76s, FFS on RRM requirement for RedCap UE in IDLE and INACTIVE mode (Apple MTK)
	+ Option 3: discuss eDRX enhancements in RAN4 after the final conclusions on eDRX configurations are made in RAN2 (CMCC)
	+ Option 4: FFS (vivo)
	+ Option 5 (Huawei): LTE eDRX requirements cannot be used as a baseline when developing NR eDRX requirements
* Recommended WF
	+ TBA

**Issue 1-3-2: How to determine PTW length**

* Proposals
* *Option 1:* PTW length for serving cell evaluation requirements are determined based on: Scaling factor N1; DRX cycle length;Reference signal periodicity; Minimum DRX cycle length
* (Ericsson CMCC xiaomi) MTK(agree without using N1)
* *Option 2* Propose to use the same PTW lengths as in LTE for eDRX cycle lengths greater than 10.24s (Qualcomm CMCC Oppo xiaomi) MTK(oppose not entirely feasible)
* *Option 3 (FFS): Apple Huawei vivo*
* Recommended WF
	+ TBA

**Issue 1-3-3: Whether to define for transition between different states**

* Proposals
* Option 1: Define the requirements for transition between different states (states need to be identified) (Oppo Apple vivo)
* Option 2: No
* Option 3: FFS (CMCC Huawei MTK Ericsson xiaomi QC)
* Recommended WF
	+ TBA

**Issue 1-3-4: Assumptions on measurements on eDRX with PTW**

* Proposals
* Option 1: When eDRX is configured for Redcap, the assumption that all measurements are performed within PTW of an eDRX cycle in LTE, can still be reused for NR (vivo CMCC Ericsson QC)
* Option 2: (MTK QC)
* Option 3: FFS (Apple Oppo Huawei xiaomi)
* Recommended WF
	+ TBA

**Issue 1-3-5: Nserv value**

* *Option 1:MTK QC*
* *Option 3: The legacy DRX requirements could be reused for the new 2.56s eDRX cycle.*
* *Option 4: FFS (Apple CMCC Oppo Huawei Ericsson xiaomi vivo)*

**Issue 1-3-6: Cell reselection requirements for RedCap UE with eDRX cycle (intra frequency)**

* *Option 1: FFS*

**Issue 1-3-7: Cell reselection requirements for RedCap UE with eDRX cycle (inter frequency)**

* *Option 1: FFS*

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| **Company** | **Comments** |
| Ericsson | **Issue 1-3-1: Design principles of LTE eDRX requirements** We support option 1 to use LTE eDRX requirements as baseline while taking into account the NR specific scaling factors into account. **Issue 1-3-2: How to determine PTW length**We support option 1. N1 is used already used in existing requirements and its value might be different for FR1 and FR2, same principle should be adopted for eDRX. However, if companies are fine with option 1 while keeping N1=FFS until next meeting, then it is fine. **Issue 1-3-3: Whether to define for transition between different states**We are fine with option 3 and study it until next meeting. **Issue 1-3-4: Assumptions on measurements on eDRX with PTW**We support option 1 to follow the same principle as in LTE eDRX. Option 2 looks similar to option 1 because if all samples are achieved within a single PTW, then isn’t it same as that all measurements are performed with the PTW?**Issue 1-3-5: Nserv value**More discussions needed to agree on exact value.s**Issue 1-3-6: Cell reselection requirements for RedCap UE with eDRX cycle (intra frequency)**We are fine with option 1, FFS.**Issue 1-3-7: Cell reselection requirements for RedCap UE with eDRX cycle (inter frequency)**We are fine with option 1, FFS. |

### Sub-topic 1-4 eDRX requirements for inactive state

**Issue 1-4-1: whether inactive eDRX requirements can based on the corresponding idle state eDRX requirements**

* Proposals
	+ Option 1: RAN4 to take the eDRX requirements for idle mode as baseline for inactive mode.(xiaomi apple CMCC Oppo MTK QC)
	+ Option 2: For the inactive performance requirements, whether reuse idle state requirements or not should be determined.
	+ Option 3: FFS (Huawei Ericsson vivo QC)
* Recommended WF
	+ TBA

**Issue 1-4-2: Behavior when Redcap UE has both RRC\_IDLE eDRX and RRC\_INACTIVE eDRX configuration**

* Proposals
* Option 1: If the extended DRX for RRC-Inactive is up to 10.24s which depends on CT1/SA2 conclusion, the cell reselection requirements can be only based on monitoring of RAN initiated POs; If the extended DRX for RRC\_INACTIVE is larger than 10.24s, two PTW can be present at the same time. How to define the measurement needs further discussion. (Huawei Ericsson)
* Option 2: FFS
* Option 3: more input from RAN2 (Apple, CMCC, Oppo, Xiaomi, vivo, QC)
* Recommended WF
	+ TBA

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| **Company** | **Comments** |
| Ericsson | **Issue 1-4-1: whether inactive eDRX requirements can based on the corresponding idle state eDRX requirements**We support option 3. Since there are differences in the eDRX configuration such as eDRX length, whether they are CN originated or RAN originated paging etc, we think more study is needed. **Issue 1-4-2: Behavior when Redcap UE has both RRC\_IDLE eDRX and RRC\_INACTIVE eDRX configuration**Option 1 and 2 are very much similar, both requires further study. We support option 2.  |

### Sub-topic 1-5 eDRX requirements relaxation

**Issue 1-5-1: Whether to consider relaxed eDRX for low mobility and not-at-cell edge criteria**

* Proposals
* Option 1: Support the design of new relaxed eDRX for low mobility and not-at-cell edge criteria for low eDRX cycles (MTK QC))
* Option 2: FFS (Oppo vivo QC)
* Option 3: study the RRM relaxation without eDRX first. (Apple CMCC Ericsson xiaomi Huawei)
* Recommended WF
	+ TBA

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| **Company** | **Comments** |
| Ericsson | **Issue 1-5-1: Whether to consider relaxed eDRX for low mobility and not-at-cell edge criteria**We support option 3, i.e. RRM relaxation should be discussed without eDRX first. |

# 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** |
| [R4-2112132](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112132.zip) | Apple | ***Proposal 1: EMR shall not be considered in RRM measurement relaxation for RedCap UE in IDLE/Inactive mode.******Proposal 2: except EMR, RAN4 to reuse the same mechanism of R16 RRM relaxation in power saving WI for R17 RedCap UE in IDLE/Inactive mode, i.e.,:**** ***if single criteria (stationarity or not-at-cell-edge) is fulfilled, use K1\_RedCap*** /***K2\_RedCap to relax the RRM requirement. K1\_RedCap /K2\_RedCap has the similar applicability condition as K1/K2 in R16 power saving WI, and FFS on the values for K1\_RedCap /K2\_RedCap.***
* ***if both criterion (stationarity and not-at-cell-edge) are configured and fulfilled, use a fixed long measurement period for requirement relaxation, e.g., like 1 hour in R16 power saving WI.***

***Proposal 3: For RedCap RRM relaxation in RRC connected mode, RAN4 to defer requirement design until sufficient conclusions are made in RAN2.*** ***Proposal 4: For RedCap RRM relaxation in RRC connected mode, based on measurement, when UE turns from ‘fulfil criteria’ to ‘not fulfil criteria’, this is also needed to report to network.*** |
| [R4-2112417](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112417.zip) | Xiaomi | Proposal 1: RAN4 to prioritize the discussion of the relaxation measurement for RRC\_IDLE/INACTIVE mode UE.Proposal 2: RAN4 to reuse the Rel-16 measurement relaxation methodology when considering Rel-17 RRM relaxation measurement for RRC\_IDLE/INACTIVE mode RedCap UE.Proposal 3: RAN4 to focus on the discussion of relaxation method for the Rel-17 relaxation criterion at current stage.  |
| [R4-2112646](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112646.zip) | vivo | **Observation 1: When the stationarity criterion is met the terminal can locate either at the cell centre or at the cell edge and concrete location cannot be learned through the stationarity criterion. Under this scenario the scaling factor based RRM relaxation principle in Rel-16 is more suitable to be used. In addition RRM relaxation with a scaling factor on the top of normal Redcap RRM requirements is still sufficient to get most of power saving gain.** **Proposal 1: Rel-16 RRM relaxation principles should be used as a baseline for idle/inactive R17 RRM relaxation for Redcap.****Proposal 2: When the stationarity criterion is configured, the scaling factor based RRM relaxation principle in Rel-16 should be considered firstly.****Proposal 3: It is suggested that RAN4 starts the investigation on the relaxed RRM requirements under RRC\_Connected state.**  |
| [R4-2113287](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113287.zip) | OPPO | **Observation 1: RAN4 to specify the RRM measurement relaxation for RRC\_Idle/Inactive/Connected states based on relaxation criteria defined in RAN2.****Proposal 1: Regarding RAN2’s progress, RAN4 starts discussion from stationary and not-cell-edge relaxation criterion for RRC\_IDLE/INACTIVE as high priority.****Proposal 2: The requirements for R16 low mobility criterion can be used as baseline for Rel-17 stationary criterion, with a larger scaling factor (e.g., K2＞3) due to different Rel-17 thresholds.****Proposal 3: For R17 not-at-cell-edge criterion, RAN4 can wait for RAN2 to decide whether to reuse the requirements of R16 not-at-cell-edge.****Proposal 4: RAN4 to consider minimum requirements at transitions for different criterions switching;****Proposal 5: RAN4 to consider whether any new relaxation method will be introduced when both Rel-17 stationarity criterion and Rel-17 not-at-cell-edge criterion are configured and fulfilled;****Proposal 6: RAN4 to consider up to UE implementation to select either Rel-16 or Rel-17 relaxation operation when UE is configured with R16/R17 relaxation criteria****Proposal 7: RAN4 to consider the principle of trying to reuse the conclusion of RRC idle/inactive for RRC connected if the same criterion rules are defined.** |
| [R4-2113849](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113849.zip) | Huawei, HiSilicon | **Proposal 1: For stationary scenario, RRM measurement relaxation with larger scaling factor of measurement interval than R16 low mobility is applied.****- The scaling factor is fixed.****Proposal 2: When NW configures both R16 low mobility and R17 stationary relaxation criteria and the UE fulfils both, UE performs Rel-17 RRM relaxation method (more relaxed method).****Proposal 3: It is assumed in RAN4 that “stationary” has lower mobility than “low mobility”.****Proposal 4: It is suggested that Rel-17 not-at-cell-edge criterion in RRC\_IDLE/INACTIVE reuse Rel-16 not-at-cell-edge criterion with the same thresholds.****Proposal 5: When both R17 stationary and not at cell edge criteria are fulfilled, more relaxed RRM measurement is expected.****Proposal 6: No new UE behaviour of RRM measurement relaxation is needed for RedCap UE in connected mode.** |
| [R4-2113868](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113868.zip)\* proposals will be treated at NR\_redcap\_RRM\_1  | ZTE Corporation | **Proposal 1: RRM requirements related to PDSCH processing time, PUSCH preparation time, HARQ-ACK transmission delay and CSI reporting shall be modified.****Proposal 2: When the delay is proportional to the number of Rx chains, relax the delay by multiplying a constant parameter.****Proposal 3: Accuracy requirements shall be studied after core requirements are specified.****Proposal 4: For some RRM requirements for instance the random access, there may need to be at least two sets of requirements for RedCap UEs depending on whether early indication of the UR type is supported / successful.** |
| [R4-2113972](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113972.zip) | MediaTek Inc. | **Proposal 1: Support a new relaxation factor to be used in the DRX cycles requirements for the stationary criterion in IDLE/INACTIVE mode. In addition, if a new Rel-17 not-at-cell edge criterion is introduced then the same relaxation factor of the stationary criterion shall be used for the RRM measurement relaxations of Rel-17 not-at-cell edge criterion.****Proposal 2:** **Support extending the time period in which the UE can stop its measurements for cell reselection in IDLE/INACTIVE mode, when both stationary criterion and not-at-cell edge criterion are satisfied.****Proposal 3:** **RAN4 to wait for RAN2 until they reach to agreement on RRM relaxation in CONNECTED mode.** |
| [R4-2114069](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114069.zip) | Nokia, Nokia Shanghai Bell | 1. RAN2 is still in the process of defining trigger criteria for the different RRC states when to enable RRM measurement relaxation for neighbour cells.

 The support of neighbour cell measurement relaxation for stationary and low mobility RedCap devices in RRC Idle / RRC Inactive and for stationary RedCap devices in RRC Connected, respectively, will impact RAN4 measurement requirements, where the impact will depend on the RRC state.Proposal 1: RAN4 to discuss assumptions how to evaluate RRM measurement relaxation. A distinction into RRC states and neighbour cell types may serve well in this context.  |
| [R4-2114086](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114086.zip) | Ericsson | * **Proposal #1:** Discussions on relaxation methods for IDLE/INACTIVE states neighbour cell measurements are postponed until more progress in reached in RAN2.
* **Proposal #2:** Discussions on relaxation methods for CONNECTED state neighbour cell measurements are postponed until more progress in reached in RAN2.
 |
| [R4-2114576](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114576.zip) | Qualcomm Incorporated | **Observation 1: RAN2 has agreed to specify an RSRP/RSRQ based Rel-17 stationarity criterion in addition to the Rel-16 low mobility and not-at-cell-edge criteria.****Observation 2: Network may choose to configure one or more of Rel-16 and Rel-17 criteria****Observation 3: RAN4 defines a measurement relaxation factor, K = 3 when one of the Rel-16 criteria is met and a relaxation of up-to one hour when both Rel-16 criteria are met.****Proposal 1: During Idle/Inactive mode, when a UE is configured with and fulfils the stationarity criterion, then irrespective of other criteria being configured and/or fulfilled, it may relax the neighbour cell measurements by at-least one hour. Exact value is FFS.****Proposal 2: During Idle/Inactive mode, when a UE is configured with and fulfils the stationarity criterion and additionally fulfils Rel 16 and/or Rel-17 (if defined by RAN2) not-at-cell-edge criteria, the measurement relaxation could be greater than the one defined for a UE fulfilling only stationarity criterion.** |
| R4-2112191\*Proposal 2, 3 is treated here | CMCC | **Proposal 2: Rel-16 RRM relaxation requirements in idle/inactive mode can be considered as the baseline for Rel-17 RedCap RRM relaxation in idle/inactive mode.** **Proposal 3: New RRM relaxation requirements in connected mode need to be defined for Rel-17 RedCap RRM relaxation.** |

## 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 RRM measurment relaxation for Redcap at idle/inactive state

**Issue 2-1-1: whether relaxation methods for IDLE/INACTIVE states should be postponed until more progress in reached in RAN2 or not**

* Proposals
	+ Option 1: Yes (Ericsson)
	+ Option 2: No (Apple, Xiaomi, vivo, oppo, Huawei, MTK, Qualcomm, CMCC) (any company with a detailed proposal is counted)
	+ Option 3: FFS
* Recommended WF
	+ TBA

**Issue 2-1-2: priority issue**

* Proposals
	+ Option 1: Regarding RAN2’s progress, RAN4 starts discussion from stationary and not-cell-edge relaxation criterion for RRC\_IDLE/INACTIVE. (oppo)
		- Relaxation requirements for other criterion, if agreed, by RAN2 are not precluded
	+ Option 2: FFS
* Recommended WF
	+ TBA

**Issue 2-1-3: Mechanism for R17 RedCap UE in IDLE/Inactive mode**

* Proposals
	+ Option 1: reuse the same mechanism of R16 RRM relaxation in power saving WI for R17 RedCap UE in IDLE/Inactive mode (Apple vivo CMCC)
	+ Option 1a: reuse the same mechanism of R16 RRM relaxation without EMR in power saving WI for R17 RedCap UE in IDLE/Inactive mode (Apple)
	+ Option 2: FFS
* Recommended WF
	+ TBA

**Issue 2-1-4: Relaxation when stationary criteria is satisfied**

* Proposals
	+ Option 1: use scaling factor ( one or multiple and fixed/non-fixed for FFS)
		- Option 1a: if single criteria (stationarity or not-at-cell-edge) is fulfilled, use K1\_RedCap /K2\_RedCap to relax the RRM requirement. K1\_RedCap /K2\_RedCap has the similar applicability condition as K1/K2 in R16 power saving WI, and FFS on the values for K1\_RedCap /K2\_RedCap (Apple)
		- Option 1b: When the stationarity criterion is configured, the scaling factor based RRM relaxation principle in Rel-16 should be considered firstly (vivo)
		- Option 1c: The requirements for R16 low mobility criterion can be used as baseline for Rel-17 stationary criterion, with a larger scaling factor (e.g., K2＞3) due to different Rel-17 thresholds. (oppo)
		- Option 1d: For stationary scenario, RRM measurement relaxation with larger scaling factor of measurement interval than R16 low mobility is applied - The scaling factor is fixed (Huawei)
		- Option 1e: Support a new relaxation factor to be used in the DRX cycles requirements for the stationary criterion in IDLE/INACTIVE mode. In addition, if a new Rel-17 not-at-cell edge criterion is introduced then the same relaxation factor of the stationary criterion shall be used for the RRM measurement relaxations of Rel-17 not-at-cell edge criterion. (MTK)
	+ Option 2: Relax by at least one hour - During Idle/Inactive mode, when a UE is configured with and fulfils the stationarity criterion, then irrespective of other criteria being configured and/or fulfilled, it may relax the neighbour cell measurements by at-least one hour. Exact value is FFS (Qualcomm)
	+ Option 3: FFS
* Recommended WF
	+ TBA

**Issue 2-1-5: Relaxation when either Rel-17 or Rel-16 not-at-cell-edge criteria is satisfied**

* Proposals
	+ Option 1: same relaxation factor for the Rel-17 stationary criterion is used if a new Rel-17 not-at-cell edge criterion (MTK)
	+ Option 2: For R17 not-at-cell-edge criterion, RAN4 can wait for RAN2 to decide whether to reuse the requirements of R16 not-at-cell-edge.(oppo)
	+ Option 3: Rel-17 not-at-cell-edge criterion in RRC\_IDLE/INACTIVE reuse Rel-16 not-at-cell-edge criterion with the same thresholds. (Huawei)
	+ Option 4: FFS
* Recommended WF
	+ TBA

**Issue 2-1-6: Relaxation when multiple criteria are satisfied**

* Proposals
	+ Option 1: More relaxed RRM requirements
		- Option 1a: extending the time period in which the UE can stop its measurements for cell reselection in IDLE/INACTIVE mode, when both stationary criterion and not-at-cell edge criterion are satisfied. (MTK)
		- Option 1b: when a UE is configured with and fulfils the stationarity criterion and additionally fulfils Rel 16 and/or Rel-17 (if defined by RAN2) not-at-cell-edge criteria, the measurement relaxation could be greater than the one defined for a UE fulfilling only stationarity criterion. (Qualcomm)
		- Option 1c: When both R17 stationary and not at cell edge criteria are fulfilled, more relaxed RRM measurement is expected. (Huawei)
	+ Option 2: if both criterion (stationarity and not-at-cell-edge) are configured and fulfilled, use a fixed long measurement period for requirement relaxation, e.g., like 1 hour in R16 power saving WI. (Apple)
	+ Option 3: consider new relaxation method when both Rel-17 stationarity criterion and Rel-17 not-at-cell-edge criterion are configured and fulfilled (oppo)
	+ Option 4: RAN4 to consider up to UE implementation to select either Rel-16 or Rel-17 relaxation operation when UE is configured with R16/R17 relaxation criteria (oppo)
* Recommended WF
	+ TBA

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| **Company** | **Comments** |
| Apple | **Issue 2-1-1: whether relaxation methods for IDLE/INACTIVE states should be postponed until more progress in reached in RAN2 or not**Fine with both option 1 and option 2. RAN4 really needs more conclusion from RAN2(e.g., clear criteria definition), but we can still have some rough discussion at this stage.**Issue 2-1-2: priority issue**Option 1 is fine.**Issue 2-1-3: Mechanism for R17 RedCap UE in IDLE/Inactive mode**Option 1a is more accurate description.**Issue 2-1-4: Relaxation when stationary criteria is satisfied**Support option 1a.**Issue 2-1-5: Relaxation when either Rel-17 or Rel-16 not-at-cell-edge criteria is satisfied**Option 2.**Issue 2-1-6: Relaxation when multiple criteria are satisfied**Support option 2 and 1b; and we agree this relaxation shall be more relaxed than the case when only one criteria is met.  |
| CMCC | **Issue 2-1-1: whether relaxation methods for IDLE/INACTIVE states should be postponed until more progress in reached in RAN2 or not****RAN2 input is necessary. The details on how to relax the RRM requirements can be discussed in RAN4 in parallel, and R16 power saving requirements can be considered as the starting point.****Issue 2-1-2: priority issue****Need more input from RAN2.****Issue 2-1-3: Mechanism for R17 RedCap UE in IDLE/Inactive mode****Option1 and option 1a****Issue 2-1-4: Relaxation when stationary criteria is satisfied****Stationarity is a new criterion for RedCap compared to Rel-16 power saving, and how to define the stationarity is up to RAN2 discussion. Furthe study is needed.****Issue 2-1-5: Relaxation when either Rel-17 or Rel-16 not-at-cell-edge criteria is satisfied****We can wait for RAN2 (option2), but Rel-16 can be considered as the starting point (option3).****Issue 2-1-6: Relaxation when multiple criteria are satisfied****Need more discussion, but option4 to select either Rel16/17 up to UE implementation is not preferred from our perspective.** |
| OPPO | **Issue 2-1-1: whether relaxation methods for IDLE/INACTIVE states should be postponed until more progress in reached in RAN2 or not**Fine with option 2. **Issue 2-1-2: priority issue**Option 1 is fine.**Issue 2-1-3: Mechanism for R17 RedCap UE in IDLE/Inactive mode**Option 1a is fine.**Issue 2-1-4: Relaxation when stationary criteria is satisfied**Support option 1c. A larger scaling factor is expected.**Issue 2-1-5: Relaxation when either Rel-17 or Rel-16 not-at-cell-edge criteria is satisfied**Option 2.**Issue 2-1-6: Relaxation when multiple criteria are satisfied**Option 1b is preferred as baseline. FFS the relaxed time period.. |
| Huawei | **Issue 2-1-1: whether relaxation methods for IDLE/INACTIVE states should be postponed until more progress in reached in RAN2 or not**Support option 2. To speed up the progress, parallel discussion in both RAN2 and RAN4 is suggested.**Issue 2-1-2: priority issue**Option 1 is fine.**Issue 2-1-3: Mechanism for R17 RedCap UE in IDLE/Inactive mode**Option 1 needs more clarification. Does it mean using the fixed scaling factor? Which scaling factor is used for R17 stationary state? **Issue 2-1-4: Relaxation when stationary criteria is satisfied**Option 1a, option 1c and option 1d seems similar.**Issue 2-1-5: Relaxation when either Rel-17 or Rel-16 not-at-cell-edge criteria is satisfied**If Option 3 is agreed, option 1 is reasonable. RAN2 had complicated on this issue, RAN4 can provide our analysis from defining requirements perspective.**Issue 2-1-6: Relaxation when multiple criteria are satisfied**Support option 1c. |
| MediaTek | **Issue 2-1-1: whether relaxation methods for IDLE/INACTIVE states should be postponed until more progress in reached in RAN2 or not**Option 2: No. We can start working on the design on the relaxation requirement for the stationary criterion for IDLE/INACTIVE mode.**Issue 2-1-2: priority issue**We are not clear what the motivation for this priority issue is. However, so far we can work on the stationary criterion only because RAN2 has not reached to an agreement regarding the not-at-cell-edge criterion. If RAN2 reaches to an agreement during this meeting (during August) then RAN4 to work on stationary criterion, not-at-cell-edge criterion and both stationary and not-at-cell edge criteria with same priority.**Issue 2-1-3: Mechanism for R17 RedCap UE in IDLE/Inactive mode**This issue is not clear to us so we prefer Option 2: FFS.**Issue 2-1-4: Relaxation when stationary criteria is satisfied**Our preference is Option 1 but also we are open to consider/study other options.**Issue 2-1-5: Relaxation when either Rel-17 or Rel-16 not-at-cell-edge criteria is satisfied**If new threshold is defined for not-at-cell edge for Rel-17 then we support Option 1.**Issue 2-1-6: Relaxation when multiple criteria are satisfied**We support Option 1 and Option 2. We agree that the IDLE/INACTIVE period should be longer than that in Rel-16 and we agree that the new period should be longer than that in Rel-16 and a fixed value too. |
| Ericsson | **Issue 2-1-1: whether relaxation methods for IDLE/INACTIVE states should be postponed until more progress in reached in RAN2 or not**We can agree to option 2, i.e. we are fine to discuss the relaxation methods in IDLE/INACTIVE states. **Issue 2-1-2: priority issue**We are fine to start the discussions for low mobility (stationary) and not-at-cell edge criterion. However, it is premature to conclude that other criterion (if agreed) should have low priority in RAN4 without even knowing what type criteria they are.**Issue 2-1-3: Mechanism for R17 RedCap UE in IDLE/Inactive mode**We support option 1a. We agree that the condition related to EMR in release 16 requirements is not needed since there will be only single carrier operation for RedCap in release 17.**Issue 2-1-4: Relaxation when stationary criteria is satisfied**We agree to use a scaling factor for deriving the relaxed requirements following the release 16 approach. The exact values for the scaling factor shall depend on the type of criteria that is fulfilled and exact values needs more discussions after relaxation method is agreed. **Issue 2-1-5: Relaxation when either Rel-17 or Rel-16 not-at-cell-edge criteria is satisfied**We propose to agree on the relaxation method using a scaling factor for this case also. But RAN4 shall wait for RAN2 to decide on whether the criteria will be same as in Rel-16. Without knowing the exact criteria, it is difficult to agree on the values. Thus we support option 2.**Issue 2-1-6: Relaxation when multiple criteria are satisfied**We have similar view as Apple, i.e. the UE can be allowed to skip the measurements for fixed period (e.g. 1 hours as in Rel-16). Thus we support option 2. |
| Xiaomi | **Issue 2-1-1: whether relaxation methods for IDLE/INACTIVE states should be postponed until more progress in reached in RAN2 or not**Option 2. **Issue 2-1-2: priority issue**Option 1.**Issue 2-1-3: Mechanism for R17 RedCap UE in IDLE/Inactive mode**Both Option 1 and Option 1a are fine.**Issue 2-1-4: Relaxation when stationary criteria is satisfied**Support to take Option1 as baseline for RRM relaxation. For Option2, more RAN2 outcome needed.**Issue 2-1-5: Relaxation when either Rel-17 or Rel-16 not-at-cell-edge criteria is satisfied**Option 2.**Issue 2-1-6: Relaxation when multiple criteria are satisfied**Prefer to reuse the Rel-16 measurement relaxation methodology. Support Option1b. |
| vivo | **Issue 2-1-1: whether relaxation methods for IDLE/INACTIVE states should be postponed until more progress in reached in RAN2 or not**Support option 2. There are sufficient issues to be discussed within RAN4 right now. **Issue 2-1-2: priority issue****Issue 2-1-3: Mechanism for R17 RedCap UE in IDLE/Inactive mode**Option 1 and option 1a is ok.**Issue 2-1-4: Relaxation when stationary criteria is satisfied**Support option 1 and option 1b.**Issue 2-1-5: Relaxation when either Rel-17 or Rel-16 not-at-cell-edge criteria is satisfied**FFS**Issue 2-1-6: Relaxation when multiple criteria are satisfied**Support option 1  |
| Qualcomm | **Issue 2-1-1: whether relaxation methods for IDLE/INACTIVE states should be postponed until more progress in reached in RAN2 or not**Option 2. We can start initial discussion on RRM relaxation methods while RAN2 focuses on relaxation criteria.**Issue 2-1-2: priority issue**We can prioritize relaxations for stationary conditions. Rel17 not-at-cell edge is still being discussed in RAN2, so we can probably wait to see whether RAN2 agrees to specify a separate R17 not-at-cell-edge criteria. **Issue 2-1-3: Mechanism for R17 RedCap UE in IDLE/Inactive mode**We are fine with option 1a.**Issue 2-1-4: Relaxation when stationary criteria is satisfied**We think a stationary UE is very less likely to perform any cell re-selections. Specifying relaxation in terms of a scaling factor K provides less power savings, esp for low DRX cyles, that’s why we think specifying a long relaxation (>1hr) makes more sense. However, we are open to explore using K as well.**Issue 2-1-5: Relaxation when either Rel-17 or Rel-16 not-at-cell-edge criteria is satisfied**FFS. Whether to specify Rel17 not-at-cell-edge criteria is still being discussed in RAN2.**Issue 2-1-6: Relaxation when multiple criteria are satisfied**Support Option1b. |

### Sub-topic 2-2 RRM measurment relaxation for Redcap at CONNECTED state

**Issue 2-2-1: When consider RRM relaxation for RRC\_CONNECTED mode**

* Proposals
	+ Option 1: Wait for RAN2 until more progress on RRM relaxation in CONNECTED mode. (Ericsson MTK Apple)
	+ Option 2: Start RRM measurement relaxation work for CONNECTED state right now (CMCC vivo)
	+ Option 3: No new UE behaviour of RRM measurement relaxation is needed for RedCap UE in connected mode. (Huawei)
	+ Option 4: RAN4 to consider the principle of trying to reuse the conclusion of RRC idle/inactive for RRC connected if the same criterion rules are defined. (oppo)
* Recommended WF
	+ TBA

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| **Company** | **Comments** |
| Apple | **Issue 2-2-1: When consider RRM relaxation for RRC\_CONNECTED mode**Support option 1 . |
| ZTE | **Issue 2-2-1: When consider RRM relaxation for RRC\_CONNECTED mode**Support option 1 which is to wait for clear conclusions in other WGs. |
| CMCC | **Issue 2-2-1: When consider RRM relaxation for RRC\_CONNECTED mode****We are not proposing to start the work right now without RAN2 conclusion. Option1 is OK** |
| OPPO | **Option 1 is fine.** |
| Huawei | **Issue 2-2-1: When consider RRM relaxation for RRC\_CONNECTED mode**Option 1 or option 3 is fine |
| MediaTek | **Issue 2-2-1: When consider RRM relaxation for RRC\_CONNECTED mode**Option 1. |
| Ericsson | **Issue 2-2-1: When consider RRM relaxation for RRC\_CONNECTED mode**Unlike IDLE/INACTIVE state relaxation, there is less progress in RAN2 on the framework for CONNECTED state relaxation. Therefore, we propose to wait until more progress is reached in RAN2 on CONNECTED mode relaxation and RAN4 discussions can take place after that (e.g. in November meeting depending on RAN2 progress). |
| Xiaomi | **Issue 2-2-1: When consider RRM relaxation for RRC\_CONNECTED mode**Support Option1. |
| vivo | ok to have more ran2 input if necessary |
| Qualcomm | **Issue 2-2-1: When consider RRM relaxation for RRC\_CONNECTED mode**Support Option1. We can wait for some RAN2 agreements on this topic. |

### Sub-topic 2-3 Other aspects regarding RRM measurment relaxation for Redcap

**Issue 2-3-1: Whether EMR shall be considered in RRM measurement relaxation for RedCap UE in IDLE/Inactive mode or not.**

* Proposals
	+ Option 1: No - EMR shall not be considered in RRM measurement relaxation for RedCap UE in IDLE/Inactive mode (Apple)
	+ Option 2: Yes
	+ Option 3: FFS
* Recommended WF
	+ TBA

**Issue 2-3-2: Requirements when UE moves between different states.**

* Proposals
	+ Option 1: For RedCap RRM relaxation in RRC connected mode, based on measurement, when UE turns from ‘fulfil criteria’ to ‘not fulfil criteria’, this is also needed to report to network. (apple)
	+ Option 2: RAN4 to consider minimum requirements at transitions for different criterions switching (oppo);
	+ Option 3: RAN4 to discuss assumptions how to evaluate RRM measurement relaxation. A distinction into RRC states and neighbour cell types may serve well in this context. (Nokia)
	+ Option 4: FFS
* Recommended WF
	+ TBA

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Apple | **Issue 2-3-1: Whether EMR shall be considered in RRM measurement relaxation for RedCap UE in IDLE/Inactive mode or not.**Support option 1. CA and DC would not be in the scope of RedCap UE in R17.**Issue 2-3-2: Requirements when UE moves between different states.**Fine with option 1 and 2. |
| CMCC | **Issue 2-3-1: Whether EMR shall be considered in RRM measurement relaxation for RedCap UE in IDLE/Inactive mode or not.****Option 1****Issue 2-3-2: Requirements when UE moves between different states.****Option 1: Not sure option1 should be discussed in RAN4 or RAN2****Option 2: OK** |
| OPPO | **Issue 2-3-1: Whether EMR shall be considered in RRM measurement relaxation for RedCap UE in IDLE/Inactive mode or not.****Option 1****Issue 2-3-2: Requirements when UE moves between different states.****Option 2** |
| Huawei | **Issue 2-3-1: Whether EMR shall be considered in RRM measurement relaxation for RedCap UE in IDLE/Inactive mode or not.**Agree with Option 1**Issue 2-3-2: Requirements when UE moves between different states.**Option 1 is supposed to be discussed in RAN2. Option 2 and option 3 depends on the conclusion of issue 2-3-1. |
| MediaTek | **Issue 2-3-1: Whether EMR shall be considered in RRM measurement relaxation for RedCap UE in IDLE/Inactive mode or not**Option 3: FFS**Issue 2-3-2: Requirements when UE moves between different states**Option 4: FFS |
| Ericsson | **Issue 2-3-1: Whether EMR shall be considered in RRM measurement relaxation for RedCap UE in IDLE/Inactive mode or not.**This issue also discussed in issue 2-1-3, proposal 1a. We agree that the condition related to EMR in release 16 requirements is not needed since there will be only single carrier operation for RedCap in release 17.**Issue 2-3-2: Requirements when UE moves between different states.**We assume this issue is about the requirements at transition when UE changes between relaxed and normal measurement modes. Option 3 is unclear and it seems to be related to different requirements in different RRC states?In general, we are fine to define minimum requirements at transition when the UE moves from one measurement state (e.g. relaxed requirements) to another (e.g. normal requirements). Transition requirements were also introduced in release 16 UE power saving requirements in IDLE mode, and can reuse same principle for requirements at transitions in idle/inactive states. Whether to introduce transition requirements also in CONNECTED mode should be FFS since the basic scenario for relaxation is not clear yet. Thus, we propose fifth option as shown below:* Option 5: RAN4 to introduce minimum requirements at transition when UE changes between relaxed and normal measurement modes based on same transition principle in release 16 relaxation requirements in IDLE/INACTIE states. Whether to introduce minimum requirements at transition when UE changes between relaxed and normal measurement modes in CONNECTED state is FFS.
 |
| Xiaomi | **Issue 2-3-1: Whether EMR shall be considered in RRM measurement relaxation for RedCap UE in IDLE/Inactive mode or not.**Option 1**Issue 2-3-2: Requirements when UE moves between different states.**FFS |
| vivo | **Issue 2-3-1: Whether EMR shall be considered in RRM measurement relaxation for RedCap UE in IDLE/Inactive mode or not**OK with option 1.**Issue 2-3-2: Requirements when UE moves between different states**In general option 5 from Eric could be used as a baseline. |
| Qualcomm | **Issue 2-3-1: Whether EMR shall be considered in RRM measurement relaxation for RedCap UE in IDLE/Inactive mode or not.**Option 1. EMR is not within the scope of RedCap**Issue 2-3-2: Requirements when UE moves between different states**We support option 5 from Ericsson. |

## 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** |
| XXX | 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.*

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

**Issue 2-1-1: whether relaxation methods for IDLE/INACTIVE states should be postponed until more progress in reached in RAN2 or not**

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic 2-1-1** | *1 companies support option 1. 8 company support option 2; 1 companies are option 4.** + Option 1: Yes (apple)
	+ Option 2: No (Apple, oppo, Huawei MTK Eric xiaomi vivo QC)
	+ Option 3: FFS
	+ Option 4: Need RAN2 input (CMCC)

*Tentative agreements:* Option 2 Since there is no objection for option 2, the only company support option 1 is also ok with option 2. *Recommendations for 2nd round: Option 2 as the agreement and no further discussion at 2nd round.*  |

**Issue 2-1-2: priority issue**

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic 2-1-2** | *6 companies support option 1. 1 company support FFS and 1 company mentions need RAN2’s input .** + Option 1: Regarding RAN2’s progress, RAN4 starts discussion from stationary and not-cell-edge relaxation criterion for RRC\_IDLE/INACTIVE as high priority (oppo apple Huawei Eric xiaomi QC)
		- Other potential criterion being or to be discussed in RAN2 should have low priority.
	+ Option 2: FFS
	+ Option 3: RAN2 input (CMCC)
	+ Option 4: not necessary to have it (MTK)

*Tentative agreements: Option 1 is a natural solution since there is no other ways due to lack of information/decision from other groups.**Recommendations for 2nd round: No more discussion at 2nd round.*  |

**Issue 2-1-3: Mechanism for R17 RedCap UE in IDLE/Inactive mode**

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|  | **Status summary**  |
| **Sub-topic 2-1-3** | *3 companies support option 1. 7 company support option 1a, 1 company for clarification for option 1 and 1 companies is for FFS (option 3).** + Option 1: reuse the same mechanism of R16 RRM relaxation in power saving WI for R17 RedCap UE in IDLE/Inactive mode (vivo CMCC xiaomi)
	+ Option 1a: reuse the same mechanism of R16 RRM relaxation without EMR in power saving WI for R17 RedCap UE in IDLE/Inactive mode (Apple CMCC oppo Ericsson xiaomi vivo QC)
	+ Option 2: FFS (MTK)

Huawei: clarification needs for option 1*Tentative agreements:* *To address Huawei’s comment, companies please check whether the following updated option 1a is ok at the 2nd round** + Option 1a: reuse the same mechanism of R16 RRM relaxation, in particular either using a fixed scaling factor (value for FFS) or using a period of time (value for FFS), without EMR in power saving WI for R17 RedCap UE in IDLE/Inactive mode

*Recommendations for 2nd round: Continue discussion at the 2nd round.*  |

**Issue 2-1-4: Relaxation when stationary criteria is satisfied**

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| --- | --- |
|  | **Status summary**  |
| **Sub-topic 2-1-4** | *4 companies support option 1. Besides these 4 companies, another 4 companies support sub-bullet under option 1. 1 company support option 2 and 1 companies are for FFS (option 3).* * + Option 1: use scaling factor ( one or multiple and fixed/non-fixed for FFS) (MTK Eric xiaomi QC)
		- Option 1a: if single criteria (stationarity or not-at-cell-edge) is fulfilled, use K1\_RedCap /K2\_RedCap to relax the RRM requirement. K1\_RedCap /K2\_RedCap has the similar applicability condition as K1/K2 in R16 power saving WI, and FFS on the values for K1\_RedCap /K2\_RedCap (Apple Huawei)
		- Option 1b: When the stationarity criterion is configured, the scaling factor based RRM relaxation principle in Rel-16 should be considered firstly (vivo)
		- Option 1c: The requirements for R16 low mobility criterion can be used as baseline for Rel-17 stationary criterion, with a larger scaling factor (e.g., K2＞3) due to different Rel-17 thresholds. (oppo Huawei)
		- Option 1d: For stationary scenario, RRM measurement relaxation with larger scaling factor of measurement interval than R16 low mobility is applied - The scaling factor is fixed (Huawei)
		- Option 1e: Support a new relaxation factor to be used in the DRX cycles requirements for the stationary criterion in IDLE/INACTIVE mode. In addition, if a new Rel-17 not-at-cell edge criterion is introduced then the same relaxation factor of the stationary criterion shall be used for the RRM measurement relaxations of Rel-17 not-at-cell edge criterion. ()
	+ Option 2: Relax by at least one hour - During Idle/Inactive mode, when a UE is configured with and fulfils the stationarity criterion, then irrespective of other criteria being configured and/or fulfilled, it may relax the neighbour cell measurements by at-least one hour. Exact value is FFS (QC)
	+ Option 3: FFS (CMCC)

*Tentative agreements: No**Recommendations for 2nd round: New option 4 tries to combine option 1a, 1b and 1c and 1d, Continue discussion at the 2nd round.*  |

**Issue 2-1-5: Relaxation when either Rel-17 or Rel-16 not-at-cell-edge criteria is satisfied**

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| --- | --- |
|  | **Status summary**  |
| **Sub-topic 2-1-5** | *1 company support option 1. 5 company support option 2; 2 companies support option 2, 2 companies are for FFS (option 3). 1 company with a new proposal* * + Option 1: same relaxation factor for the Rel-17 stationary criterion is used if a new Rel-17 not-at-cell edge criterion (MTK)
	+ Option 2: For R17 not-at-cell-edge criterion, RAN4 can wait for RAN2 to decide whether to reuse the requirements of R16 not-at-cell-edge.(apple CMCC oppo Ericsson xiaomi)
	+ Option 3: Rel-17 not-at-cell-edge criterion in RRC\_IDLE/INACTIVE reuse Rel-16 not-at-cell-edge criterion with the same thresholds. (Huawei CMCC)
	+ Option 4: FFS (vivo QC)
	+ Option 5: propose to agree on the relaxation method using a scaling factor for this case also (Ericsson)

*Tentative agreements: No**Recommendations for 2nd round: Continue discussion at the 2nd round.*  |

**Issue 2-1-6: Relaxation when multiple criteria are satisfied**

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| --- | --- |
|  | **Status summary**  |
| **Sub-topic 2-1-6** | *2 companies support option 1. 3 companies support option 1b; 1 company for option 1c; 3 company support option 2 and 1 company is for FFS .** + Option 1: More relaxed RRM requirements (MTK vivo)
		- Option 1a: extending the time period in which the UE can stop its measurements for cell reselection in IDLE/INACTIVE mode, when both stationary criterion and not-at-cell edge criterion are satisfied. ()
		- Option 1b: when a UE is configured with and fulfils the stationarity criterion and additionally fulfils Rel 16 and/or Rel-17 (if defined by RAN2) not-at-cell-edge criteria, the measurement relaxation could be greater than the one defined for a UE fulfilling only stationarity criterion. (apple oppo xiaomi QC)
		- Option 1c: When both R17 stationary and not at cell edge criteria are fulfilled, more relaxed RRM measurement is expected. (Huawei)
	+ Option 2: if both criterion (stationarity and not-at-cell-edge) are configured and fulfilled, use a fixed long measurement period for requirement relaxation, e.g., like 1 hour in R16 power saving WI. (Apple MTK Ericsson)
	+ Option 3: consider new relaxation method when both Rel-17 stationarity criterion and Rel-17 not-at-cell-edge criterion are configured and fulfilled ()
	+ Option 4: RAN4 to consider up to UE implementation to select either Rel-16 or Rel-17 relaxation operation when UE is configured with R16/R17 relaxation criteria ()
	+ Option 5: FFS (CMCC)

*Tentative agreements: No**Recommendations for 2nd round: Continue discussion at the 2nd round.*  |

**Issue 2-2-1: When consider RRM relaxation for RRC\_CONNECTED mode**

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| --- | --- |
|  | **Status summary**  |
| **Sub-topic 2-2-1** | *8 companies support option 1. 1 company support option 3* * + Option 1: Wait for RAN2 until more progress on RRM relaxation in CONNECTED mode. (Apple ZTE CMCC Huawei MTK Eric xiaomi QC)
	+ Option 2: Start RRM measurement relaxation work for CONNECTED state right now ()
	+ Option 3: No new UE behaviour of RRM measurement relaxation is needed for RedCap UE in connected mode. (Huawei)
	+ Option 4: RAN4 to consider the principle of trying to reuse the conclusion of RRC idle/inactive for RRC connected if the same criterion rules are defined. ()

*Tentative agreements: option 1.* *Recommendations for 2nd round: No more discussion*  |

**Issue 2-3-1: Whether EMR shall be considered in RRM measurement relaxation for RedCap UE in IDLE/Inactive mode or not.**

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic 2-3-1** | *8 companies support option 1. 1 company for FFS (option 3).** + Option 1: No - EMR shall not be considered in RRM measurement relaxation for RedCap UE in IDLE/Inactive mode (Apple CMCC Oppo Huawei Eric xiaomi vivo QC)
	+ Option 2: Yes
	+ Option 3: FFS (MTK)

*Tentative agreements: Option 1**Recommendations for 2nd round: Agree option 1 and no further discussion for 2nd round.*  |

**Issue 2-3-2: Requirements when UE moves between different states**

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic 2-3-2** | *1 company support option 1. 3 company support option 2; 1 company for FFS and2 companies are for RAN2 input. 3 companies for new proposal optio** + Option 1: For RedCap RRM relaxation in RRC connected mode, based on measurement, when UE turns from ‘fulfil criteria’ to ‘not fulfil criteria’, this is also needed to report to network. (Apple)
	+ Option 2: RAN4 to consider minimum requirements at transitions for different criterions switching (Apple CMCC Oppo);
	+ Option 3: RAN4 to discuss assumptions how to evaluate RRM measurement relaxation. A distinction into RRC states and neighbour cell types may serve well in this context. ()
	+ Option 4: FFS (MTK xiaomi)
	+ Option 5: Option 1 is RAN2 issue (CMCC Huawei)
	+ Option 6: RAN4 to introduce minimum requirements at transition when UE changes between relaxed and normal measurement modes based on same transition principle in release 16 relaxation requirements in IDLE/INACTIE states. Whether to introduce minimum requirements at transition when UE changes between relaxed and normal measurement modes in CONNECTED state is FFS (Ericsson vivo QC)

*Tentative agreements: No**Recommendations for 2nd round: Continue discussion at the 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”.*

### Sub-topic 2-1 RRM measurement relaxation for Redcap at idle/inactive state

**Issue 2-1-3: Mechanism for R17 RedCap UE in IDLE/Inactive mode**

* Proposals
	+ Option 1a: reuse the same mechanism of R16 RRM relaxation, in particular either using a fixed scaling factor (value for FFS) or using a period of time (value for FFS), without EMR in power saving WI for R17 RedCap UE in IDLE/Inactive mode
	+ Option 2: FFS
* Recommended WF
	+ TBA

**Issue 2-1-4: Relaxation when stationary criteria is satisfied**

* Proposals
	+ Option 1: use scaling factor ( one or multiple and fixed/non-fixed for FFS) (MTK Eric xiaomi QC)
		- Option 1a: if single criteria (stationarity or not-at-cell-edge) is fulfilled, use K1\_RedCap /K2\_RedCap to relax the RRM requirement. K1\_RedCap /K2\_RedCap has the similar applicability condition as K1/K2 in R16 power saving WI, and FFS on the values for K1\_RedCap /K2\_RedCap (Apple Huawei)
		- Option 1b: When the stationarity criterion is configured, the scaling factor based RRM relaxation principle in Rel-16 should be considered firstly (vivo)
		- Option 1c: The requirements for R16 low mobility criterion can be used as baseline for Rel-17 stationary criterion, with a larger scaling factor (e.g., K2＞3) due to different Rel-17 thresholds. (oppo Huawei)
		- Option 1d: For stationary scenario, RRM measurement relaxation with larger scaling factor of measurement interval than R16 low mobility is applied - The scaling factor is fixed (Huawei)
	+ Option 2: Relax by at least one hour - During Idle/Inactive mode, when a UE is configured with and fulfils the stationarity criterion, then irrespective of other criteria being configured and/or fulfilled, it may relax the neighbour cell measurements by at-least one hour. Exact value is FFS (QC)
	+ Option 3: FFS (CMCC)
	+ Option 4: if stationarity criteria is fulfilled, use K1\_RedCap /K2\_RedCap to relax the RRM requirement. K1\_RedCap /K2\_RedCap has the similar applicability condition as K1/K2 in R16 power saving WI,
		- K1\_RedCap is a fixed factor and its value > 3; FFS on the values for K2\_RedCap
* Recommended WF
	+ TBA

**Issue 2-1-5: Relaxation when either Rel-17 or Rel-16 not-at-cell-edge criteria is satisfied**

* Proposals
* Option 1: same relaxation factor for the Rel-17 stationary criterion is used if a new Rel-17 not-at-cell edge criterion (MTK)
* Option 2: For R17 not-at-cell-edge criterion, RAN4 can wait for RAN2 to decide whether to reuse the requirements of R16 not-at-cell-edge.(apple CMCC oppo Ericsson xiaomi)
* Option 3: Rel-17 not-at-cell-edge criterion in RRC\_IDLE/INACTIVE reuse Rel-16 not-at-cell-edge criterion with the same thresholds. (Huawei CMCC)
* Option 4: FFS (vivo QC)
* Option 5: propose to agree on the relaxation method using a scaling factor for this case also (Ericsson)
* Recommended WF
	+ TBA

**Issue 2-1-6: Relaxation when multiple criteria are satisfied**

* Proposals
	+ Option 1: More relaxed RRM requirements (MTK vivo)
		- Option 1b: when a UE is configured with and fulfils the stationarity criterion and additionally fulfils Rel 16 and/or Rel-17 (if defined by RAN2) not-at-cell-edge criteria, the measurement relaxation could be greater than the one defined for a UE fulfilling only stationarity criterion. (apple oppo xiaomi QC)
		- Option 1c: When both R17 stationary and not at cell edge criteria are fulfilled, more relaxed RRM measurement is expected. (Huawei)
	+ Option 2: if both criterion (stationarity and not-at-cell-edge) are configured and fulfilled, use a fixed long measurement period for requirement relaxation, e.g., like 1 hour in R16 power saving WI. (Apple MTK Ericsson)
	+ Option 3: FFS (CMCC)
* Recommended WF
	+ TBA

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | **Issue 2-1-3: Mechanism for R17 RedCap UE in IDLE/Inactive mode**We prefer to follow the GTW agreement shown as option 1a. **Issue 2-1-4: Relaxation when stationary criteria is satisfied**We prefer to follow the release 16 approach of applying a fixed scaling factor when one of the relaxation criteria is fulfilled. Thus we support option 1. **Issue 2-1-5: Relaxation when either Rel-17 or Rel-16 not-at-cell-edge criteria is satisfied**We support option 2, i.e. RAN4 needs to discuss the relaxation based on what type of criteria, e.g. if the criteria are identical to release 16 criteria etc. Based on that information, RAN4 can discuss the relaxation requirements.**Issue 2-1-6: Relaxation when multiple criteria are satisfied**We support option 2 of using a fixed long measurement period when UE fulfils both stationary and not-at-cell edge criteria, this is also in line with release 16 relaxation and it will simply and reduce the work.  |

### Sub-topic 2-2 RRM measurment relaxation for Redcap at CONNECTED state

### Sub-topic 2-3 Other aspects regarding RRM measurment relaxation for Redcap

**Issue 2-3-2: Requirements when UE moves between different states.**

* Proposals
	+ Option 1: For RedCap RRM relaxation in RRC connected mode, based on measurement, when UE turns from ‘fulfil criteria’ to ‘not fulfil criteria’, this is also needed to report to network. (Apple)
	+ Option 2: RAN4 to consider minimum requirements at transitions for different criterions switching (Apple CMCC Oppo);
	+ Option 3: RAN4 to discuss assumptions how to evaluate RRM measurement relaxation. A distinction into RRC states and neighbour cell types may serve well in this context. ()
	+ Option 4: FFS (MTK xiaomi)
	+ sOption 5: Option 1 is RAN2 issue (CMCC Huawei)
	+ Option 6: RAN4 to introduce minimum requirements at transition when UE changes between relaxed and normal measurement modes based on same transition principle in release 16 relaxation requirements in IDLE/INACTIE states. Whether to introduce minimum requirements at transition when UE changes between relaxed and normal measurement modes in CONNECTED state is FFS (Ericsson vivo QC)
* Recommended WF
	+ TBA

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | **Issue 2-3-2: Requirements when UE moves between different states.**We support option 6. |

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |
| --- | --- | --- |
| **Title** | **Source** | **Comments** |
| WF on R17 Redcap eDRX enhancements and RRM measurement relaxations  | vivo |  |
|  |  |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation**  | **Comments** |
| [R4-2112131](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112131.zip) | Discussion on RRM requirement with eDRX for RedCap | Apple | noted |  |
| [R4-2112132](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112132.zip) | Discussion on RRM measurement relaxations for RedCap | Apple | noted |  |
| [R4-2112416](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112416.zip) | Discussion on RRM requirements for extended DRX enhancements for RedCap | Xiaomi | noted |  |
| [R4-2112417](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112417.zip) | Discussion on RRM measurement relaxations for RedCap UE | Xiaomi | noted |  |
| [R4-2112645](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112645.zip) | Considerations for eDRX enhancement for Redcap | vivo | noted |  |
| [R4-2112646](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112646.zip) | Considerations for RRM relaxation for Redcap | vivo | noted |  |
| [R4-2113286](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113286.zip) | Extended DRX enhancements for Redcap UE | OPPO | noted |  |
| [R4-2113287](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113287.zip) | RRM measurement relaxations for Reduced Capability UE | OPPO | noted |  |
| [R4-2113848](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113848.zip) | Discussion on Extended DRX enhancements for RedCap UE | Huawei, HiSilicon | noted |  |
| [R4-2113849](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113849.zip) | Discussion on RRM measurement relaxations for RedCap UE | Huawei, HiSilicon | noted |  |
| [R4-2113867](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113867.zip) | On Extended DRX enhancements for RedCap UEs | ZTE Corporation | noted |  |
| [R4-2113868](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113868.zip) | Discussions on RRM measurement relaxations for RedCap UEs | ZTE Corporation | noted |  |
| [R4-2113956](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113956.zip) | Extended DRX enhacnements  | MediaTek Inc. | noted |  |
| [R4-2113972](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113972.zip) | RRM measurements relaxation | MediaTek Inc. | noted |  |
| [R4-2114069](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114069.zip) | On RRM measurement relaxation for neighbouring cells | Nokia, Nokia Shanghai Bell | noted |  |
| [R4-2114085](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114085.zip) | Discussions on eDRX requirements for RedCap | Ericsson | noted |  |
| [R4-2114086](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114086.zip) | Discussions on relaxed mesurment requirements for RedCap | Ericsson | noted |  |
| [R4-2114574](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114574.zip) | eDRX enhancements for RedCap UE | Qualcomm Incorporated | noted |  |
| [R4-2114576](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114576.zip) | RRM relaxations enhancements for RedCap UE | Qualcomm Incorporated | 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

# Annex

Contact information

|  |  |  |
| --- | --- | --- |
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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)