**3GPP TSG-RAN WG2 Meeting #111-e *draft* R2-2008216**

**Online, 17–28 August 2020**

**Agenda item:** 8.12.3

**Source:** CATT

**Title: draft** Summary of Offline 111 - DRX Aspects - ‎ Second Round

**Document for:** Discussion and Agreement

# 1 Introduction

This is to report the result of the following offline discussion as per guidance from session Chair [1]

Updated scope: Continue the discussion on remaining proposals in [R2-2008193](file:///C%3A%5CData%5C3GPP%5CRAN2%5CInbox%5CR2-2008193%E2%80%8E.zip) (not agreed during the online session):

Final intended outcome: summary of the offline discussion with e.g.:

* + - List of proposals for agreement
		- List of proposals that require online discussions

Final deadline (for companies' feedback): Thursday 2020-08-27 06:00 UTC

Final deadline (for rapporteur's summary in R2-2008216): Thursday 2020-08-27 08:00 UTC

Proposals marked "for agreement" in R2-2008216 not challenged until Thursday 2020-08-27 18:00 UTC will be declared as agreed by the session chair. For the rest the discussion might continue in the CB online session on Friday 2020-08-28.

The remainder of this document is organized as the following. In Section 2 we provide discussions on possible proposals. In Section 3, a list of proposals were provided for agreement or for further online discussions.

# 2 Discussion

## 2.1 Background

The following proposals were provided based on 1st round of the offline discussion [2].

|  |
| --- |
| List of pontentially agreeable proposalsOn RRC statesProposal 1 RAN2 study eDRX mechanism for both RRC\_IDLE and RRC\_INACTIVE in this SI. ‎On baseline eDRX mechanismProposal 2 If the DRX cycle range is extended beyond 10.24s, the LTE ‎eDRX mechanism is used as baseline for NR eDRX in further studies of this SI. On eDRX cycle range, RRC\_INACTIVEProposal 3 For RRC\_INACTIVE, the DRX cycle is extended to 10.24s as baseline. FFS on the performance and complexity of further extension.On eDRX cycle range, for all RRC statesProposal 5 DRX cycle range beyond 2621.44s is not considered in further studies of this SI.List of proposals for further discussionsOn eDRX cycle range, RRC\_IDLEProposal 4 For RRC\_IDLE, the DRX cycle is at least extended to 10.24s. RAN2 to discuss whether for RRC\_IDLE, the DRX cycle is extended to 2621.44s. On possible LS to SA2 and other CT WG(s)Proposal 6 RAN2 to discuss whether an LS is sent to SA2 and CT WG(s) to inform their progress on NR eDRX (if any) |

After online discussions the following have been agreed

Agreements:

1. RAN2 study eDRX mechanism for both RRC\_IDLE and RRC\_INACTIVE in this SI. ‎
2. For RRC\_INACTIVE, the DRX cycle is extended to 10.24s as baseline.

The above agreement 1 is basically a confirmation of common understanding as per the related SID objective. The agreement 2 is for RRC\_INACTIVE DRX cycle range. It is noted online that agreement 2 does not preclude any potential discussions on value ragne that goes beyond 10.24s.

In the reminder of this document, we aim at more potentially agreeable proposals on the topic. More specifically, taking into account summary in 1st round [2] as well as online discussions [1], we further discuss on

- eDRX cycle range for RRC\_IDLE (in section 2.2), and

- baseline eDRX mechanism for RRC\_INACTIVE and RRC\_IDLE (in section 2.3).

## 2.2 eDRX cycle range for RRC\_IDLE

Let’s first review the discussions so far. The following is copied from ph1 summary [1].

|  |
| --- |
| **Proposal D For RRC\_IDLE, the DRX cycle is extended to 2621.44s as baseline. ‎**Summary of the viewsOn the topic of eDRX cycle range for the case of idle, 21 companies share their views. Among them* 15 companies agree with Proposal D, which says for RRC\_IDLE, the DRX cycle is extended to 2621.44s as baseline‎.
* 6 companies disagree with Proposal D. For these companies, 1 think the use case might not be clear, 1 would like to have common design for both idle and inactive, 1 seems to have concern on the possible complexity and specification effort in RAN and CN if we go that way. The other 3 seem to want more discussions and studies before agreeing on this value range.

But there seems to be no objection of at least extending to 10.24s. Although there is a majority’s view, it seems not easy to agree on Proposal D based on this offline discussion summary. Therefore, Proposal D is listed as Proposal 4 below as well as in section3, as one proposal for further discussions. **Proposal 4 For RRC\_IDLE, the DRX cycle is at least extended to 10.24s. RAN2 to discuss whether for RRC\_IDLE, the DRX cycle is extended to 2621.44s.** On the topic of eDRX cycle range beyond 2621.44s‎, 21 companies share their views. Among them 2 companies think range beyond 2621.44s should be considered in the SI. Based on vast majority’s view, it seems we can list Propsal 5 below as well as in section 3, as a potentially agreeable one. **Proposal 5 DRX cycle range beyond 2621.44s is not considered in further studies of this SI.** |

While the following was from online session minutes

|  |
| --- |
| Proposal 4 For RRC\_IDLE, the DRX cycle is at least extended to 10.24s. RAN2 to discuss whether for RRC\_IDLE, the DRX cycle is extended to 2621.44s. * Mediatek wonders why this number and not a higher one?
* Ericsson thinks this is what LTE-M supports.
* CATT think that majority of companies think there is no use cases for longer values
 |

So the current situation may be summarized in the following observations for eDRX cycle range for RRC\_IDLE.

**Observation 1 There is majority’s support in using ‎2621.44s as baseline eDRX cycle range for RRC\_IDLE, but lack of consensus.**

**Observation 2 It is vast majority’s view (19 out of 21) that eDRX cycle range beyond 2621.44s is not considered for RRC\_IDLE, but 1 company seems to have strong concern with limiting further study only up to 2621.44s.**

Therefore the rapporateur would like to suggest companies to check if the following is agreeable at this stage.

**Proposal A For RRC\_IDLE, the DRX cycle is at least extended to 10.24s. FFS on further extension beyond 10.24s.**

Note that the idea behind Proposal A is that

* it is clear from the previous discussions the group are more positive in going beyond 10.24s for idle compared to the case of inactive, which is then reflected by the wording “at least” and also with an “FFS” part, compared with the agreement 2 for inactive state.
* Also, to reflect the lack of consensus on to what extend (e.g., 2621.44s or even further) the possible range of study would be, we do not mention any specific value beyond 10.24 in the FFS part.

Please insert your views and comments to **Proposal A** in the table below.

Table 1

|  |  |  |
| --- | --- | --- |
| **Company name** | **Agree/Disagree** | **Comments if any** |
| CATT | Agree | Given the previous discussions we think it reasonable to at least extend the drx cycle range to 10.24 for the case of idle. For even further extension we are OK to further discuss.  |
| Nokia | Agree | OK to have this as baseline and continue to look for further extension. |
| Sequans | Agree | We currently don’t see the use case for extension beyond 10.24s for Idle, but are OK to not limit the study of the extension to up to 2621.44s if it allows to move forward |
| Intel | - | As this is the first meeting for the SI, it would be good to continue the discussion on pros/cons of 10.24s and beyond 10.24 s.  |
| Apple | Agree | Agree and we can visit on the maximum limit later. |
| LG | Agree |   |
| Ericsson | Agree | FFS should be rephrased to "RAN2 to study" (similar should have been added to inactive agreement as well). Agree with Intel that we should continue discussing pros/cons of going beyond 10.24s, for both RRC states. |
| MediaTek (pradeep[dot]jose[at]mediatek[dot]com) | Agree | We also agree that it is useful to go beyond 10.24s. 3GPP TS 24.008, Table 10.5.5.32 lists out that E-UTRAN eDRX configurations that can be configured by the CN can go up to 10485.76s. What we would like to understand is:1. Why do companies want to limit RAN configuration to a subset of what the CN already supports?2. What is the cost/drawbacks of supporting eDRX values up to 10485.76s?3. For UL-centric industrial sensors (use-cases mentioned in TR22.804, TR22.832 include sensors that only report on reaching some threshold), what is the need to frequently page the device? |
| Huawei | Agree | OK to have this as baseline and continue to look for further extension. |
| Qualcomm | Agree | We can accept this proposal as a way-forward.  |
| OPPO | Agree | We prefer to extend DRX cycle to 10.24s for RRC IDLE, but we are ok to further discuss the use case for longer DRX cycle. |
| Convida | Disagree | We support the DRX cycle is extended **“beyond”** 10.24s. Based the industrial wireless sensors service performance requirements defined in Table 6.4-6 of TR 22.832, the battery lifetime should be more than 5 years. The 1s transision interval requirement only apply to Mobile Originated traffic, not apply to **Mobile Terminated traffic**. It is crystal clear that the DRX should be extend beyond 10.24 to meet the battery lifetime requirement. Moreover, based on the first round email discussion, majority companies support extend DRX cycle beyond 10.24s, e.g. 15 of 21 companies agree the DRX cycle is extended to 2621.44s as baseline‎ for RRC\_IDLE. |
| vivo | Agree | We can further discuss later based on this starting point.  |
| Fujitsu | Agree |  |
| ZTE | Agree | Ok to have 10.24 as baseline.  |

**Summary & Proposal for 2nd round, DRX cycle for RRC\_IDLE**

Based on the discussions, vast majority seem OK with this proposal as a compromise. The one company that disagrees with this seems mainly willing to study value range beyond 10.24, which is of course not precluded by this proposal. Therefore, we can list the following Proposal 1 as a potentially agreeable one.

**Proposal 1 For RRC\_IDLE, the DRX cycle is at least extended to 10.24s. FFS on further extension ‎beyond 10.24s. ‎**

## Baseline of NR eDRX mechanism

Another important area that we could make progress is what kind of mechanism will be further considered for NR eDRX. The following was copied from ph1 summary [1].

|  |
| --- |
| **Proposal B In further study of NR eDRX, the LTE ‎eDRX mechanism is used as baseline.** Summary of the viewsOn the topic of baseline of NR eDRX mechanism, 22 companies share their views. Among them* 20 companies agree with Proposal B.
* 1 company partially agree. The reason as mentioned by this company is that this depends on whether extend DRX cycle above 10.24. ‎
* 1 company disagree. The reason as mentioned by this company is that before we decide to reuse LTE eDRX as baseline, RAN2 should first ‎discuss whether to extend DRX cycle above 10.24s‎

From the discussions, it seems companies have common view regarding how eDRX works, when the DRX cycle goes beyond the value of 10.24s. Therefore to progress Proposal B is rephrased as Proposal 2 in the following as well as in section 3 of the document, as a potentially agreeable one. **Proposal 2 If the DRX cycle range is extended beyond 10.24s, the LTE ‎eDRX mechanism is used as baseline for NR eDRX in further studies of this SI.**  |

While the following was from session minutes

|  |
| --- |
| Proposal 2 If the DRX cycle range is extended beyond 10.24s, the LTE ‎eDRX mechanism is used as baseline for NR eDRX in further studies of this SI. * Oppo thinks that in LTE the eDRX cycle can also be 5s: should we consider LTE as a baseline also in this case? CATT think that the principle is that LTE should be the baseline. Vivo assumes this means that we use a PTW mechanism and then it’s fine.
* ZTE wonders about the case the value is exactly 10.24s, shall we still use LTE as a reference? Also wonders whether this p2 is only for RRC\_IDLE
* CATT suggests to remove the first part of p2: LTE eDRX should be the baseline in general.
* QC thinks we should decide the max cycle length first.
 |

Companies seem to prefer more specific baseline mechanism instead of only staying in a general level (i.e., LTE as baseline regardless of exact DRX cycle range).

So we will break down to a few value ranges (i.e., <10.24s, =10.24s, or >10.24s) for progress.

Range 1: when NR eDRX cycle is < 10.24s

In this case it seems straightforward, i.e., the LTE eDRX mechainism for 5.12s should be baseline.

**Proposal B For RRC\_IDLE and RRC\_INACTIVE, the LTE ‎eDRX mechanism for 5.12s is used as baseline when NR eDRX cycle is configured below 10.24s.**

Range 2: when NR eDRX cycle = 10.24s

This case, as discussed, may depend on whether in NR the maximum range value is greater than 10.24s, which is still open for now. So we put it FFS at this stage.

**Proposal C FFS on baseline mechanism when the configured NR eDRX cycle is equal to 10.24s.**

Range 3: when NR eDRX cycle > 10.24s

In this case, it seems clear that the LTE eDRX machanims (e.g., concepts such as PTW, PH, etc) for beyond 10.24s case should be baseline. To make it clear we clarify that it is for the case when NR eDRX cycle is configured beyond 10.24s, as Proposal B, if agreed, is adopted if NR eDRX cycle is configured below 10.24s.

**Proposal D For RRC\_IDLE and/or RRC\_INACTIVE, if the NR DRX cycle range is extended beyond 10.24s, the LTE ‎eDRX mechanism beyond 10.24s (e.g., PTW, PH, etc.) is used as baseline when NR eDRX cycle is configured beyond 10.24s.**

Please insert your views and comments to **Proposal B/C/D** in the table below.

Table 2

|  |  |  |
| --- | --- | --- |
| **Company name** | **Agree/Disagree** | **Comments if any** |
| CATT | Agree with proposal B, C and D | First of all we believe reuse lte mechainim is a high level gerneal baseline, which means we mainly consider the existing concept (as long as they work well) and mechainim instead of striving for novelty ideas.Then as we understand some companies think the original proposal in 1st round discussion would be too general and need to break down to specific value ranges. For <10.24s, we think LTE eDRX mechanism for 5.12s shall not be too controversial. For >10.24s (currently FFS on this range), if it is considered then we think LTE eDRX mechainim beyond 10.24 (e.g., concept of PTW, PH etc) can be baseline. For the value exactly equal to 10.24s, it seems FFS, i.e., it depends on whether in R17 we support a DRX cycle beyond 10.24s…  |
| Nokia | Agree with Proposal D | As far as we understand proposal B and C, the intention is to say that in case the DRX cycle is <10.24s, then PTW, etc. are not needed. Should we spell it out rather than hiding it behind “LTE baseline”? |
| Sequans | Agree B,C,D | As Nokia suggest, B (<10.124) could be spelled more explicitely, for example adding “ i.e. PTW etc. are not used” (specifically not suggesting “not introduced” to not cause a contradiction if they are eventually introduced)Case =10.24 can be decided after RAN2 decides on >10.24 |
| Intel  | Agree proposal C; | We don’t think Proposal B is necessary since nobody propose less than 10.24sFor proposal D, considering we did not agree to extend RRC Inactive beyond 10.24s, the proposal should only focus on IDLE mode, i.e. **Proposal D For RRC\_IDLE ~~and/or RRC\_INACTIVE~~, if the NR DRX cycle range is extended beyond 10.24s, the LTE ‎eDRX mechanism beyond 10.24s (e.g., PTW, PH, etc.) is used as baseline when NR eDRX cycle is configured beyond 10.24s.**  |
| Apple | Prop D | We have similar views as Nokia, and also agree that >10.24s for INACTIVE is still FFS.  |
| LG | Agree B,C,D | Also agree with Nokia comment. |
| Ericsson | Agree D | On Intel’s proposal on D, at the time of writing, we haven’t even agreed in extending RRC\_IDLE… In any case the proposal is conditional, so either state should not be removed as both are still in the study scope.“LTE eDRX mechanism” as baseline is not exact so could be clarified further.No need for B, C at the moment – in general RAN2 should study the possible extensions, whether they help with the requirements provided in SI, and exact details of the mechanisms can be discussed in work phase if such extensions are to be specified.  |
| MediaTek | Agree B, C, D |  |
| Huawei | Agree B/CAgree D  | For both RRC\_INACTIVE and RRC\_IDLE, for eDRX cycle up to 10.24, use the same mechanism as eMTC RRC\_INACTIVE (paging cycle = eDRX cycle and no PTW)For RRC\_IDLE, the proposal should focus in RRC\_IDLE for now. For eDRX cycle beyons 10.24s, same mechanism as eMTC RRC\_IDLE (i.e. using a PTW ) |
| Qualcomm | Agree B, C | In all the agreements made so far maximum DRX cycle is up to 10.24 sec. We do not need to make agreement for a hypothetical scenario that has not been discussed yet.  |
| OPPO | Agree with proposal B, C and D | For both cases of eDRX cycle <10.24s and eDRX cycle >10.24s, the LTE ‎eDRX mechanism is used as baseline. And more specifically, for eDRX < 10.24s, for sure, LTE mechanism means no PTW; for eDRX>10.24s, PTW is used.For the case of eDRX cycle =10.24s, whether to use LTE ‎eDRX mechanism as baseline depends on whether to support eDRX cycle above 10.24s. |
| Convida | Agree with B and D | We support to use LTE eDRX mechanism (e.g., PTW, PH, etc.) when NR eDRX cycle is equal to 10.24s as in LTE |
| vivo | Agree B and C | For D, I assume it can be easily agreed if we agreed to introduce eDRX cycle > 10.24.  |
| Fujitsu | Agree B, C and D |  |
| ZTE | Agree C, D | For D, Since the agreement made on RRC\_INACTIVE is to take 10.24 as baseline, it does not preclude other extensions, it seems fine to keep both IDLE and INACTIVE here. |

**Summary & Proposal for 2nd round, baseline mechanism**

On Proposal D

15 companies shared their views, where 12 companies agree with Proposal D. One more company agree with Proposal D with “and/or RRC\_INACTIVE” removed, and one more company think it can be easily agreed if we agreed to introduce eDRX cycle > 10.24. One company does not support Proposal D and thinks it is hypothetical scenario. ‎

Considering the fact that a) the existing agreement on ‎inactive does not preclude cycle >10.24s, and b) the proposal D is conditional (for the sake of progress), it seems the concern from the above companies seems not a show stopper to move forward. Therefore we proposal to list proposal D as another agreeable one (rename as proposal 2 here).

**Proposal 2 For RRC\_IDLE and/or RRC\_INACTIVE, if the NR DRX cycle range is extended beyond 10.24s, the LTE ‎eDRX mechanism beyond 10.24s (e.g., PTW, PH, etc.) is used as baseline when NR eDRX cycle is configured beyond 10.24s.**

On Proposal B/C

Based on views so far, it is fair to say proposal B and C receive majoirty’s support, but there are also views thinking these proposals are not needed. Techncially there is nothing wrong with proposal B and C, but it is just whether it is useful to capture them as agreement.

Besides there are suggestions to reword proposal B so that it is clearer.

Therefore we list proposal B and C below (rename as proposal 3 and 4) for possible further discussions.

**Proposal 3 For RRC\_IDLE and RRC\_INACTIVE, the LTE ‎eDRX mechanism for 5.12s (i.e., paging cycle = eDRX cycle and no PTW ) is used as ‎baseline when NR eDRX cycle is configured below 10.24s. ‎**

**Proposal 4 FFS on baseline mechanism when the configured NR eDRX cycle is equal to 10.24s. ‎**

# 3 Conclusion

This document is for report of the 2nd round offline discussion on NR eDRX in the RedCap SI. Based on the discussions in section 2, the following proposals are listed.

List of proposals for agreement

**Proposal 1 For RRC\_IDLE, the DRX cycle is at least extended to 10.24s. FFS on further extension ‎beyond 10.24s. ‎**

**Proposal 2 For RRC\_IDLE and/or RRC\_INACTIVE, if the NR DRX cycle range is extended beyond 10.24s, the LTE ‎eDRX mechanism beyond 10.24s (e.g., PTW, PH, etc.) is used as baseline when NR eDRX cycle is configured beyond 10.24s.**

List of proposals that require online discussions

**Proposal 3 For RRC\_IDLE and RRC\_INACTIVE, the LTE ‎eDRX mechanism for 5.12s (i.e., paging cycle equal to eDRX cycle and no PTW) is used as ‎baseline when NR eDRX cycle is configured below 10.24s. ‎**

**Proposal 4 FFS on baseline mechanism when the configured NR eDRX cycle is equal to 10.24s. ‎**

# 4 References

[1] Draft report, RAN2-111e - R16 eMIMO-CLI-PRN-RACS - R17 NTN-REDCAP

[2] R2-2008193‎ Summary of offline 111 - DRX aspects CATT