3GPP TSG-RAN WG2 Meeting #113bis-e DRAFT

Electronic meeting, 2021-04-12 – 2021-04-20

Agenda Item: 8.12.3.1

Source: Ericsson

Title: Discussion for [Post113bis-e][108][RedCap] LS on eDRX cycles (Ericsson)

Document for: Discussion

# Introduction

This document is to capture companies’ comments on the following discussion

* [Post113bis-e][108][RedCap] LS on eDRX cycles (Ericsson)

Scope: Discuss the content of an LS to SA2/CT1 based on meeting agreements. Check if additional questions/RAN2 preferences can be included in the LS (based on the discussion in the meeting).

Intended outcome: Approved LS

Deadline (for companies' feedback): Monday 2021-04-26 16.00 UTC

Deadline (for final LS in R2-2104374): Tuesday 2021-04-27 16.00 UTC

The discussion is based on the provided draft LS based on the Appendix in R2-2102965 [3]. Discussion on the potential contents of the LS was carried out in Offline 101 [1][2].

Companies are asked to provide their comments on the draft LS in this document with the following suggested schedule:

* Comments related to questions and content to be included in the LS, in this document, by Friday 2021-04-23 by 10.00 UTC
* Fine-tuning the wording and the content of the LS until Monday 2021-04-26 16.00 UTC

The draft LS will be updated based on the discussion and final version to be agreed on Tuesday 2021-04-27.

# Discussion

The draft LS includes the following agreements from RAN2#113bis-e on eDRX for RedCap

|  |
| --- |
| 1. RAN decides and configures eDRX via RRC for RRC\_INACTIVE (FFS on the need and details of coordination with the CN)
2. At least for eDRX cycle, the configurations of the eDRX for RRC\_IDLE and RRC\_INACTIVE can be different (FFS for PTW, e.g. length and starting point, when eDRX cycles are longer than 10.24s)
3. RAN2 assumes that CN provides necessary assistance information on eDRX config. for RRC\_IDLE to RAN (e.g. reusing eDRX config. defined in “CN Assistance Information for RRC INACTIVE IE” for E-UTRA/5GC).
4. eDRX feature, including the related parameters (i.e. PH, PTW. H-SFN) and corresponding paging operation defined for E-UTRA/5GC is used as baseline to enable eDRX >10.24sec for both RRC\_IDLE and RRC\_INACTIVE in NR/5GC
 |

**Discussion point 1:** Please provide feedback, if any, on the listed agreements, e.g. if you think an agreement is missing or if some of the agreement are not relevant for this LS in the table below:

|  |  |
| --- | --- |
| **Company** | **DP1. Comments on the included agreements** |
| Nokia | We agree that these are the relevant agreements for SA2/CT1. |
| OPPO | We agree to provide these relevant agreements to SA2/CT1. |
| Qualcomm | We think some of the eDRX related agreements from earlier meetings should be included too. For example: “From RAN2 perspective it is recommended that paging monitoring does not use PTW and PH for UE in RRC IDLE/INACTIVE and eDRX cycle is equal to or shorter than 10.24s.” |
| ZTE | Agree to Qualcomm’s suggestion.  |
| Futurewei | Agree with Qualcomm. |
| MediaTek | Agree with Qualcomm |
| Ericsson | We also think that additional relevant agreements, or actually recommendations, from study phase can be explicitly mentioned(Note that the intention is in any case to refer to TS 38.875 in the LS text) |
| CATT | We agree that these are the relevant agreements for SA2/CT1 and are also fine with Qualcomm’s suggestion. |
| Xiaomi | Agree with Qualcomm. |
| vivo | Agree with Qualcomm. |
| Apple | Same views as Qualcomm |
| Intel | Share the same views as Qualcomm |
| Sequans | Agree with QC |

**Discussion point 2:** The following text is included in the draft LS to ask about the feasibility of the extension:

*RAN2 would like to ask SA2 and CT1 whether it is feasible from SA2 and CT1 perspective to introduce extended DRX up to 10485.76 s in RRC\_IDLE and RRC\_INACTIVE and if feasible, to specify the necessary support.*

Please provide comments or suggestions, if any, on this in the table below:

|  |  |
| --- | --- |
| **Company** | **DP2. Comments on question about feasibility of the extension** |
| OPPO | We agree to include the text as above. |
| Qualcomm | We agree the above text is important to have in this LS. |
| ZTE | Agree  |
| Futurewei | Agree |
| MediaTek | Agree |
| CATT | Agree |
| Xiaomi | Agree |
| vivo | Agree |
| Apple | Ok |
| Intel | Minor editorial suggestion “*RAN2 would like to ask ~~SA2 and CT1~~ whether it is feasible from SA2 and CT1 perspective to introduce extended DRX up to 10485.76 s in RRC\_IDLE and RRC\_INACTIVE and if feasible, request ~~to~~ specifing the necessary for its support*” |
| Sequans | Agree with the original text and removing the first “*SA2 and CT1”* |

Possible information from RAN to CN related to configuration extended RAN paging cycles was discussed during the offline [2] and in the comeback session. In brief, proponents think that such information would be needed for the CN to understand when UE is reachable and that RAN2 could mention this is preferable from RAN2 point of view. Opponents think this should be discussed in other WGs or have other concerns.

Rapporteur thinks this is not an unreasonable assumption from the network perspective. The original wording has been updated for the draft LS, to highlight that RAN2 understands there would be some mechanism and RAN providing the information is an example – it could be something else as well.

**Discussion point 3:** The following text is included in the draft LS related to information from RAN to CN:

*RAN2 assumes there will be a mechanism for the CN to estimate when the UE is unreachable while it is in RRC\_INACTIVE, e.g. by RAN providing necessary information to CN.*

Please provide comments or suggestions, if any, on this in the table below.

|  |  |
| --- | --- |
| **Company** | **DP3. Comments related to text related to information from RAN to CN** |
| Nokia | In general, we agree. Suggested modification:*RAN2 assumes there will be a mechanism for the CN to estimate when the UE is ~~un~~reachable while it is in RRC\_INACTIVE, e.g. by RAN providing necessary information to CN.*  |
| OPPO | No need to include the above text in the LS.In our understanding, whether this is a valid issue may depend on whether SA2/CTI1 confirms to support eDRX cycle value above 10.24s in RRC INACTIVE. As we have asked SA2/CTI1about the feasibility of the extension in the LS, if they have any concern, they would discuss whether RAN provides necessary information for RRC\_INACTIVE to CN. |
| Qualcomm | We have the same comment as OPPO |
| ZTE | We think it is not necessary to include this in the LS. It is up to SA2/CT1 to decide whether and how the CN to estimate the UE is reachable while it is in RRC\_INACTIVE. If needed, they can inform RAN2 to provide necessary information. |
| Futurewei | We agree with OPPO. This is one of the issues that SA2/CT1 need to study when considering point 2. And with point 2, we have invited them to specify any support required from RAN. |
| MediaTek | Agree with OPPO and ZTE |
| Ericsson | We agree that the actual mechanism, would be outside of RAN2 scope. The need for such also is pending for the feasibility check from other WGs as OPPO mentions. However, what is in RAN2 scope is to expect the eDRX works properly from UE and RAN perspective, that is, CN should be aware of the UE being unreachable and not generate signalling towards RAN while the UE is expected to be sleeping, whether in RRC\_IDLE or RRC\_INACTIVE.Therefore, we think such assumption is very reasonable and can be mentioned in the LS to the other groups. |
| CATT | We share the same view as OPPO. |
| Xiaomi | Agree with ZTE.It is up to SA2/CT1 to decide whether and how the CN to estimate whether the UE is reachable. In our understanding, if RAN configures the UE with an e-DRX cycle in RRC-INACTIVE up to the value used for the UE's idle mode e-DRX cycle as provided by the AMF, or up to the maximum value allowed based on the NAS retransmission timers (whichever is lower), the CN already can estimate this. So we are ok to wait for SA2/CT1’s response. |
| vivo | We share the same view as OPPO and ZTE. |
| Apple | Agree with Oppo/ZTE/Qualcomm |
| Intel | Our preference is not to include this point as it is not part of RAN2 agreements. Our concerns/comments are the following:* In legacy NR/5GC operation, CN is usually not aware when a UE is in RRC\_INACTIVE in order to reduce signaling and latency. We wonder whether this new mechanism would break this operation. E.g. would RAN notify CN every time that gNB transition the UE into RRC\_INACTIVE (or every time that eDRX related configuration for RRC\_INACTIVE is updated in UE)/
* In legacy NR/5GC operation, DL data is buffered in gNB when paging a UE in RRC\_INACTIVE. We wonder whether this new mechanism assumes that this will be changed i.e. CN would buffer the data instead than RAN.

If there is a large majority support to include this discussion point 3, we have the following suggestion “*RAN2 wonders whether CN requires RAN to provide any information related to eDRX configuration for a UE in RRC\_INACTIVE. If so, RAN2 kindly ask SA2 to explain the target use case and required information related to eDRX configuration for a UE in RRC\_INACTIVE.*” |
| Sequans | Agree with Intel. We prefer to not include, but would be fine with a general question, without implying RAN2 understanding. |

Buffering of mobile terminated data when UE is sleeping due to eDRX is discussed in R2-2102965 [3] and was discussed briefly during the offline [1]. The intention trigger this discussion in SA2 as there are implications in RAN2 depending on which solution would be adopted. Based on R2-2102965 CN buffering may result in better mobility support and less impact in RAN2.

**Discussion point 4:** The following text is included in the draft LS related to data buffering:

*RAN2 has discussed data buffering during eDRX in RRC\_INACTIVE and concluded that it would be reasonable if CN buffers the data during the time the UE is unreachable and provides an indication to RAN in case there is DL traffic pending towards the UE. RAN2 would like to ask SA2 whether this is feasible.*

Please provide comments or suggestions, if any, on this in the table below.

|  |  |
| --- | --- |
| **Company** | **DP4. Comments related to text related to buffering** |
| Nokia | In general, we are fine with the intention, but it is not clear why such indication from CN to RAN would be needed. Suggested modifications:*RAN2 has discussed data buffering during eDRX in RRC\_INACTIVE and concluded that it would be desired if CN buffers the data during the time the UE is unreachable ~~and provides an indication to RAN in case there is DL traffic pending towards the UE.~~ RAN2 would like to ask SA2 whether this is feasible.*  |
| OPPO | We think this is a legacy issue, not specific to RedCap.We don’t understand why to include the above text in the LS. |
| Qualcomm | This issue was discussed in email discussion, but no agreement was made (in fact, the summary of the email discussion showed only 5 out of 23 companies supported the proposal). We hence do not think the above text should be included in the LS. Moreover, we think it is more in the scope of SA2 than RAN2 and it is a bit strange for RAN2 to ask SA2 to discuss a SA2 design proposal. |
| ZTE | We also think there is no conclusion in RAN2 on this aspect. If needed, we can ask SA2 a general question, e.g.*RAN2 would like to ask SA2 about the feasibility of buffering data in CN when the UE is unreachable from CN perspective, i.e. during eDRX in RRC\_INACTIVE.* |
| Futurewei | RAN2 indeed discussed this issue but didn’t reach a conclusion on it.  |
| MediaTek | Agree with Qualcomm |
| Ericsson | OPPO commented this is a legacy issue, but there is no long eDRX for RRC\_INACTIVE thus the issue is new and not legacy.As with the previous question, we understand the design is up to other WGs but from RAN2 perspective, to avoid additional implications, if would be preferred if the data would come from CN to RAN when the UE has been paged and not before. Otherwise, it is likely there is need for additional signalling and procedures to be defined in RAN2/3 to ensure reliable data delivery. Therefore, we think it would be good to indicate to SA2/CT1 already now that RAN2 would prefer buffering in CN. Thus we are OK with either Nokia or ZTE suggestions above.  |
| CATT | We share the same view as Qualcomm. |
| Xiaomi | Not clear of the case. 3 questions:1) The data loss is based on the condition that “path switch between the CN and the receiving gNB fails”. Is because there is no Xn? Or it is a corner case?2) We do not this this issue only exists when e-DRX is configured. When UE is configured with DRX, the data loss still exists.3) Is the data loss in this case a big problem since for a UE configured with eDRX, the data sent from CN is not big? |
| Vivo | We agree with Qualcomm, and also think no conclusion has been reached on this aspect in RAN2. Thus, it is a little strange to include this part in the LS, based on current situation. We think the identified issue for data loss due to buffering in RAN could be valid. It is assumed that proponents could bring contributions in SA2 (or RAN3?) to have the corresponding discussion.Regarding the mechanism that CN to estimate when the UE is reachable, we doubt the feasibility. In general, UE could move in RNA. But different cells in RNA may have different configurations (e.g. HSFN). We are not sure whether CN could know which cell the UE locates in and whether the UE is reachable.  |
| Apple | Same views as Qualcomm and ZTE |
| Intel | Similar concerns as explained for discussion point 3 (our preference is not to provide this discussion point 4 from RAN2 side perspective). |
| Sequans | Agree with Intel, ZTE. We prefer to not include, but would be fine with a general question, without implying RAN2 understanding. |

Please provide any other comments related to the contents of the LS in the table below:

|  |  |
| --- | --- |
| **Company** | **Any other comments** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

# Summary / conclusion

TBD

# References

1. R2-2104360, Summary of offline 101 - [REDCAP] eDRX cycles - first round, Intel
2. R2-2104367, Summary of offline 101 - [REDCAP] eDRX cycles - second round, Intel
3. R2-2102965, Discussion of eDRX for RedCap, Ericsson

# Delegate contact information

|  |  |
| --- | --- |
| Company | Delegate contact |
| COMPANY\_NAME | NAME (email@address.com) |
| Ericsson | tuomas.tirronen@ericsson.com |
| OPPO | Haitao Li(lihaitao@oppo.com) |
| Qualcomm | Linhai He (linhaihe@qti.qualcomm.com) |
| ZTE | LiuJing (liu.jing30@zte.com.cn) |
| Futurewei | Yunsong Yang (yyang1@futurewei.com) |
| MediaTek | Pradeep Jose (pradeep[dot]jose[at]mediatek[dot]com) |
| Vivo | Chenli (Chenli5g@vivo.com) |
| Apple | naveen.palle@apple.com |
| Intel Corporation | Marta Martínez Tarradell (marta.m.tarradell@intel.com) |
| Sequans | Noam Cayron (noam.cayr@outlook.com) |