**3GPP TSG-RAN WG2 Meeting #118-e R2-2206213**

**Online, 9th-20th May 2022**

**Agenda item: 6.12.2.2.2**

**Source: Samsung**

**Title: Report of [AT118-e][115][RedCap] 38.304 CR (Samsung)**

**Document for: Discussion and decision**

1. Introduction

This document is to report the outcome of the following email discussion at RAN2#118e meeting:

* [AT118-e][115][RedCap] 38.304 CR (Samsung)

Initial scope: Discuss 1. eDRX corrections for 38.304 (considering the latest 38.304 version in [R2-2206023](file:///C:/Data/3GPP/Extracts/R2-2206023%20-%20Miscellaneous%20corrections%20for%20RedCap%20WI%20-%20TS%2038.304.docx)), e.g. based on [R2-2205090](file:///C:/Data/3GPP/Extracts/R2-2205090.docx), and 2. cell barring corrections, based on [R2-2205613](file:///C:/Data/3GPP/Extracts/R2-2205613_38.304%20%20Corrections%20on%20Redcap%20UE%27s%20behavior%20on%20cellbar.docx)

Initial intended outcome: Summary of the offline discussion with agreeable proposals/TP for 38.304

Deadline (for companies' feedback): Tuesday 2022-05-17 22:00 UTC

Deadline (for rapporteur's summary in R2-2206213): Tuesday 2022-05-17 23:00 UTC

Proposals/TP marked "for agreement" in R2-2206213 not challenged until Wednesday 2022-05-18 11:00 UTC will be declared as agreed via email by the session chair.

2. Contact Information

|  |  |
| --- | --- |
| Company | Contact: Name (E-mail) |
| Futurewei | Yunsong Yang (yyang1@futurewei.com) |
| Huawei, HiSilicon | Yulong (shiyulong5@huawei.com) |
| Intel | Marta (marta.m.tarradell@intel.com) |
| vivo | Chenli (Chenli5g@vivo.com) |
| OPPO | Haitao Li (lihaitao@oppo.com) |
| LGE | Soo Kim (soo.kim@lge.com) |

3. Discussion

Note that all the corrections to be discussed in this document are based the latest 38.304 version (i.e., R2-2206023) [1]. Based on [1], rapporteur would like to discuss proposed corrections on [2], [3], [4], [5], [6], and [7].

## 3.1 Corrections on eDRX

For corrections in clause 7.1 in TS 38.304, companies proposed corrections in [2], [3], [4], [5], and [6]. Rapporteur understands [2] includes all corrections proposed in [3], [4], [5], and [6]. Therefore, [2] is taken as baseline of the following discussion, and companies are allowed to propose any further update in section 3.3.

As the first proposal in [2], the proponent mentions:

*In clause 7.1, when T (i.e., DRX cycle of the UE) is determined, the indication from NW (i.e., eDRX-allowed in SIB1) is not considered. Therefore, it is proposed in clause 7.1, the condition (i.e., if eDRX-allowed is not signalled in SIB1) is added to determine T.*

Rather than capturing [2] as it is, rapporteur updates the first proposal in [2] on the top of the latest 38.304 [1], as follows:

|  |
| --- |
| Proposed TP1:  *<Other TP is skipped>*  The following parameters are used for the calculation of PF and i\_s above:  T: DRX cycle of the UE.  If *eDRX-Allowed* is not signalled in SIB1 or eDRX is not configured as defined in clause 7.4:  - T is determined by the shortest of the UE specific DRX value(s), if configured by RRC and/or upper layers, and a default DRX value broadcast in system information. In RRC\_IDLE state, if UE specific DRX is not configured by upper layers, the default value is applied.  In RRC\_IDLE state, if *eDRX-Allowed* is signalled in SIB1 and eDRX is configured by upper layers, i.e., TeDRX, CN, according to clause 7.4:  - If TeDRX, CN is no longer than 1024 radio frames:  - T = TeDRX, CN;  - else:  - During CN configured PTW, T is determined by the shortest of UE specific DRX value, if configured by upper layers, and the default DRX value broadcast in system information.  In RRC\_INACTIVE state, if *eDRX-Allowed* is signalled in SIB1 and eDRX is configured by RRC, i.e., TeDRX, RAN , and/or upper layers, i.e., TeDRX, CN, as defined in clause 7.4:  - If both TeDRX, CN and TeDRX, RAN are no longer than 1024 radio frames, T = min{TeDRX, RAN, TeDRX, CN}.  - If TeDRX, CN is no longer than 1024 radio frames and no TeDRX, RAN is configured, T = min{DRX value configured by RRC, TeDRX, CN}.  *<Other TP is skipped>* |

**Q1:** Do you support the proposed TP1 captured above? When you answer, you may refer each update as "Update 1-x"

|  |  |  |
| --- | --- | --- |
| Company | Yes or No | Comments |
| Futurewei | Yes in principle, but | but if RAN2 agree on introducing separate Allowed bits, we need further revision accordingly. |
| Huawei, HiSlicon | See comment | The intention is technically correct, but.  To avoid the complexity (considering the possible two bits in SBI1), we think the current specification already has the statement as below, which should be sufficient, as in LTE.  “The UE may operate in eDRX only if the UE is configured by RRC or upper layers and the cell indicates support for eDRX in System Information”.  Fine to go with majority to come back to this after conclusion of SIB1 indicaitons. |
| Intel | Yes |  |
| vivo | Yes with comments | Agree with the intention, but depending on the conclusion on new indication in SIB1. |
| OPPO | Yes with comment | Since we have agreed to introduce separate eDRX-allowed bits, we need to further revise the wording. |
| LGE | See comment | Agree with Huawei |

**Summary**: <TBD by rapporteur>

Besides, in rapporteur's understanding, if TP1 is agreed, TP1 may be updated further according to the result of [AT118-e][110][RedCap] UE capabilities (Intel). That is because, in the 2nd round of that offline discussion, a proposal (i.e., *Introduce separate bits in SIB1 to indicate whether IDLE eDRX and/or INACTIVE eDRX are enabled. The INACTIVE eDRX may be enabled only if IDLE eDRX is enabled.*) is being discussed.

**Q2:** Do you agree, if the proposed TP1 is agreed, further update may be needed according to the decision on whether to introduce separate bits in SIB1 for inactive eDRX?

|  |  |  |
| --- | --- | --- |
| Company | Yes or No | Comments |
| Futurewei | Yes | As commented in Q1. |
| Huawei, HiSilicon | See comments | General description as our comments in Q1 is sufficient.  That’s also our concern on 2 bits in SIB1, which cause more procedure update. |
| Intel | Yes |  |
| vivo | Yes |  |
| OPPO | Yes |  |
| LGE | Yes | If TP1 is agreed, further updates are required for each RRC state (idle/inactive). |

**Summary**: <TBD by rapporteur>

As the second proposal in [2], the proponent mentions:

*Determination of T used by UEs in RRC\_INACTIVE is wrong. The following RAN2 agreements should be specified accurately.*

*- For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and Inactive eDRX cycle is not configured, during CN PTW, T is determined by the shortest of UE specific DRX cycle, if configured by upper layer, RAN paging cycle and default paging cycle.*

*- For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and Inactive eDRX cycle is no longer than 10.24s, outside CN PTW, T is determined by INACTIVE eDRX cycle.*

*- For RRC\_INACTIVE UE, when IDLE eDRX cycle is no longer than 10.24s and INACTIVE eDRX cycle is no longer than 10.24s, T is determined by the shortest of IDLE eDRX cycle and INACTIVE eDRX cycle.*

*- For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and INACTIVE eDRX cycle is no longer than 10.24s, during CN PTW, T is determined by the shortest of UE specific DRX cycle, if configured by upper layer, INACTIVE eDRX cycle and default paging cycle.*

*- For RRC\_INACTIVE UE, when IDLE eDRX cycle is no longer than 10.24s and INACTIVE eDRX cycle is not configured, T is determined by the shortest of RAN paging cycle and IDLE eDRX cycle.*

*- For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and INACTIVE eDRX cycle is not configured, outside CN PTW, T is determined by RAN paging cycle.*

Rather than capturing [2] as it is, rapporteur updates the second proposal in [2] on the top of the latest 38.304 [1], as follows:

|  |
| --- |
| Proposed TP2:  *<Other TP is skipped>*  In RRC\_INACTIVE state, if eDRX is configured by RRC, i.e., TeDRX, RAN, and/or upper layers, i.e., TeDRX, CN, as defined in clause 7.4:  - If both TeDRX, CN and TeDRX, RAN are no longer than 1024 radio frames, T = min{TeDRX, RAN, TeDRX, CN}.  - If TeDRX, CN is no longer than 1024 radio frames and no TeDRX, RAN is configured, T is determined by the shortest of UE specific DRX value configured by RRC, and TeDRX, CN.  - If TeDRX, CN is longer than 1024 radio frames:  - If TeDRX, RAN is not configured:  - During CN configured PTW, T is determined by the shortest of the UE specific DRX value (s), if configured by RRC and/or upper layers, and a default DRX value broadcast in system information. Outside the CN configured PTW, T is determined by the UE specific DRX value configured by RRC;  - else if TeDRX, RAN is no longer than 1024 radio frames:  - During CN configured PTW, T is determined by the shortest of the UE specific DRX value, if configured by upper layers, and TeDRX, RAN, and a default DRX value broadcast in system information. Outside the CN configured PTW, T is determined by TeDRX, RAN.  *<Other TP is skipped>* |

In rapporteur's understanding, update 2-1 clarifies "UE specific" DRX value configured by RRC, and update 2-4 seems valid since the branch (i.e., else if TeDRX, RAN is no longer than 1024 radio frames: ) already indicates TeDRX, RAN is configured. Other updates can be understood simply.

**Q3**: Do you support the proposed TP2 captured above? When you answer, you may refer each update as "Update 2-x".

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comments |
| Futurewei | Yes |  |
| Huawei, HiSilicoin | Yes |  |
| Intel | Yes |  |
| vivo | Yes |  |
| OPPO | Yes |  |
| LGE | Yes |  |

**Summary**: <TBD by rapporteur>

## 3.2 Corrections on cell barring

In [7], a company proposes update in clause 5.3.1 in TS 38.304:

*This CR Corrects on Redcap UE's behavior on cellbar In 38.304.*

*1) First change:*

*This procedure is for the cellbar in MIB. Redcap UE shall acquire SIB1 and follow IFRI in SIB1 if available. If not, UE will skip this procedure, otherwise Redcap UE will continue to check IFRI in MIB as legacy UE which is not correct.*

*2) Second change is to remove “not supporting RedCap UEs” since in TS38.331, we have captured:*

2> if *intraFreqReselectionRedCap* is not present in *SIB1*:

3> consider the cell as barred in accordance with TS 38.304 [20];

3> perform barring as if *intraFreqReselectionRedCap* is set to allowed;

*Then UE will follow the next else branch to follow IFRI in SIB1.*

*We do not need to specify “not supporting RedCap UEs” in 304 again.*

*3) To add” being unable to acquire the SIB1” to align with RAN2#117 agreement:*

*UE should consider IFRI as “allowed” when Red Cap UE is unable to acquire SIB1.*

Corresponding TP update is captured as follows:

|  |
| --- |
| Proposed TP3:  5.3.1 Cell status and cell reservations  When cell status "barred" is indicated or to be treated as if the cell status is "barred",  - The UE is not permitted to select/reselect this cell, not even for emergency calls.  - The UE shall select another cell according to the following rule:  - If the cell is to be treated as if the cell status is "barred" due to being unable to acquire the *MIB*:  - the UE may exclude the barred cell as a candidate for cell selection/reselection for up to 300 seconds.  - the UE may select another cell on the same frequency if the selection criteria are fulfilled.  - else:  - If the UE is a RedCap UE, the UE shall acquire SIB1 and, in the remainder of this procedure, consider '*intraFreqReselection* in MIB' to be '*intraFreqReselectionRedCap* in SIB1', if available*.* If not available, RedCap UE skips the remainder of this procedure.  - If the field *intraFreqReselection* in *MIB* message is set to "allowed":  - the UE may select another cell on the same frequency if re-selection criteria are fulfilled;  - If the cell is to be treated as if the cell status is "barred" due to being unable to acquire the *SIB1*:  - the UE may exclude the barred cell as a candidate for cell selection/reselection for up to 300 seconds;  *<Other TP is skipped>*  When cell status "barred" is indicated for RedCap UEs with 1Rx/2Rx or to be treated as if the cell status is "barred",  - The UE is not permitted to select/reselect this cell, not even for emergency calls.  - The UE shall select another cell according to the following rule:  - If the cell is to be treated as if the cell status is "barred" due to being unable to acquire the *SIB1*:  - the UE may exclude the barred cell as a candidate for cell selection/reselection for up to 300 seconds.  - the UE may select another cell on the same frequency if the selection criteria are fulfilled.  - else:  - If the field *intraFreqReselectionRedCap* in *SIB1* message is set to "allowed":  - the UE shall exclude the barred cell as a candidate for cell selection/reselection for 300 seconds.  - the UE may select another cell on the same frequency if re-selection criteria are fulfilled.  *<Other TP is skipped>* |

**Q4:** Do you support the proposed TP3 captured above? When you answer, you may refer each update as "Update 3-x".

|  |  |  |
| --- | --- | --- |
| Company | Yes or No | Comments |
| Futurewei | Yes with modifications | If we are to agree on the first change (i.e., removing the scenario where *intraFreqReselectionRedCap* is not available in *SIB1* from the legacy procedure), which we are OK with, we need to deal with the scenario of IFRIRedCap being unavailable in SIB1 in the RedCap-specific procedure.  But with the second change, we will completely lose that scenario. We propose the following to fix it:  When cell status "barred" is indicated for RedCap UEs with 1Rx/2Rx or to be treated as if the cell status is "barred",  - The UE is not permitted to select/reselect this cell, not even for emergency calls.  - The UE shall select another cell according to the following rule:  - If the cell is to be treated as if the cell status is "barred" due to being unable to acquire the *SIB1*:  - the UE may exclude the barred cell as a candidate for cell selection/reselection for up to 300 seconds.  - the UE may select another cell on the same frequency if the selection criteria are fulfilled.  - else:  - If the field *intraFreqReselectionRedCap* in *SIB1* message is set to "allowed"; or  - If the cell is to be treated as if the cell status is "barred" due to the field *intraFreqReselectionRedCap* being absent in *SIB1* message:  - the UE shall exclude the barred cell as a candidate for cell selection/reselection for 300 seconds.  - the UE may select another cell on the same frequency if re-selection criteria are fulfilled. |
| Huawei, HiSilicon | Yes, see comments | For the comments from Futurewei on “update 3-2”, we can just add “being unable to acquire the SIB1” rather than remove something, proposed change like below  - If the cell is to be treated as if the cell status is "barred" due to not supporting RedCap UEs, or due to being unable to acquire the *SIB1*: |
| Intel | Yes with comment | We support the update explained by Huawei |
| vivo | No with comments | For update 3-1: the intention is correct, but:  It is not clear what is exactly meaning of “the remainder of this procedure” in the proposed TP. Since there are two parts in section 5.3.1，   * The first part is for both redcap and non-redcap UEs. * The second part is ONLY for redcap UEs.   In our understanding, the “remainder of this procedure” indicates UE should skip the remainder of the first part and continue with the second part.  Thus, we suggest:  5.3.1 Cell status and cell reservations  When cell status "barred" is indicated or to be treated as if the cell status is "barred",  - The UE is not permitted to select/reselect this cell, not even for emergency calls.  - The UE shall select another cell according to the following rule:  - If the cell is to be treated as if the cell status is "barred" due to being unable to acquire the *MIB*:  - the UE may exclude the barred cell as a candidate for cell selection/reselection for up to 300 seconds.  - the UE may select another cell on the same frequency if the selection criteria are fulfilled.  - else:  - If the UE is a RedCap UE, the UE shall acquire SIB1 and, in the remainder of this procedure, consider '*intraFreqReselection* in MIB' for non-RedCap UEs to be '*intraFreqReselectionRedCap* in SIB1' for RedCap UEs, if available*.*  - If the field *intraFreqReselection* in *MIB* message for non-RedCap UEs is set to "allowed":  - the UE may select another cell on the same frequency if re-selection criteria are fulfilled;  - If the cell is to be treated as if the cell status is "barred" due to being unable to acquire the *SIB1*:  - the UE may exclude the barred cell as a candidate for cell selection/reselection for up to 300 seconds;  For update 3-2: the case that when UE could acquire but there is no RedCap specific IFRI is missed if we agreed this update. |
| OPPO | Yes with comments | For update 3-1, we agree with the intention but it is unclear what “the remainder of this procedure” refers to, maybe need to further clarify.  For update 3-2, we agree with Huawei’s comments. |
| LGE | Yes with comment | Agree with Huawei |

**Summary**: <TBD by rapporteur>

## 3.3 Any further correction to discuss

If you think there is any further update needed in the last CR of TS 38.304 [1], please describe it in the table below.

|  |  |
| --- | --- |
| Company | Issue |
| Intel | We proposed in [3] that RAN2 discuss whether to clarify the different cases for selection of T based on eDRX cycle configured for a UE in RRC\_IDLE and RRC\_INACTIVE by using a table instead. Considering the corrections discussed in previous section, the updated table would look as follow:   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | **TeDRX, CN** | **TeDRX, RAN** | **T to monitor POs within**  **CN configured PTW** | **T to monitor POs outside CN configured PTW** | | UE in  RRC\_IDLE | ≤ 10.24 sec. | none  or any value | TeDRX, CN | NA | | > 10.24 sec. | none or  any value | Shortest of UE specific DRX (if configured by upper layers) and default DRX cycle (broadcasted in system information) | NA | | UE in  RRC\_INACTIVE | ≤ 10.24 sec. | none | Shortest of UE specific DRX value configured by RRC, and TeDRX, CN | NA | | ≤ 10.24 sec. | ≤ 10.24 sec. | Shortest of TeDRX, RAN and TeDRX, CN | NA | | > 10.24 sec. | none | Shortest of UE specific DRX(s), TeDRX, CN and default DRX cycle (broadcasted in system information) | UE specific DRX value configured by RRC | | > 10.24 sec. | ≤ 10.24 sec. | Shortest of UE specific DRX (if configured by upper layers), TeDRX, RAN and default DRX value (broadcasted in system information) | TeDRX, RAN | |
|  |  |
|  |  |
|  |  |

**Summary**: <TBD by rapporteur>

1. Conclusion

Based on the outcome of the discussion, the rapporteur would like to suggest the following set of proposals:

**For agreements**:

<TBD by rapporteur>

**For discussion:**

<TBD by rapporteur>

1. References

[1] [R2-2206023](file:///C:/Data/3GPP/Extracts/R2-2206023%20-%20Miscellaneous%20corrections%20for%20RedCap%20WI%20-%20TS%2038.304.docx), Miscellaneous corrections for RedCap WI, Ericsson

[2] [R2-2205090](file:///C:/Data/3GPP/Extracts/R2-2205090.docx), Corrections on eDRX, Samsung

[3] [R2-2204928](file:///C:/Data/3GPP/Extracts/R2-2204928_38.304_draftCR_eDRX.docx), Draft 38.304 CR for the eDRX handling, Intel Corporation

[4] [R2-2205150](file:///C:/Data/3GPP/Extracts/R2-2205150_Correction%20on%20DRX%20cycle%20of%20the%20UE%20for%20eDRX.docx), Correction on DRX cycle of the UE for eDRX, NEC

[5] [R2-2205769](file:///C:/Data/3GPP/Extracts/R2-2205769%20Corrections%20on%20eDRX.docx), Corrections on eDRX, ZTE Corporation

[6] [R2-2205337](file:///C:/Data/3GPP/Extracts/R2-2205337%20Other%20CP%20aspects%20for%20DRX%20cycle.docx), Other CP aspects for DRX cycle, LG

[7] [R2-2205613](file:///C:/Data/3GPP/Extracts/R2-2205613_38.304%20%20Corrections%20on%20Redcap%20UE%27s%20behavior%20on%20cellbar.docx), 38.304 Corrections on Redcap UE's behavior on cellbar, Xiaomi Communications, Huawei, HiSilicon