3GPP TSG-RAN Meeting #92-eRP-21xxxx

Electronic Meeting, 14-18 June 2021

Agenda Item: 9.7.1.7

Source: Email discussion moderator (Intel)

Title: Report from Email Discussion [92-e-14-RedCap-WI]

Document for: Discussion and decision

# 1 Introduction

This document reports on the following email discussion during RAN#92-e:

**[92-e-14-RedCap-WI]**

Input contributions covered: RP-211038, RP-211070, RP-211153, RP-211219, RP-211360--> RP-211492

## 2 Proposed WID revisions

RP-211038 is a WID revision from the rapporteur. RP-211153, RP-211219 are discussion documents from Vivo and Nokia respectively that also propose updates to the wording of the objectives. In summary, the following WID updates are proposed:

1. RRM measurement relaxation updated to reflect recent RAN2 agreements (proposed by all 3 documents)
2. Update to the objective on early indication to reflect that indication in both Msg1 and Msg3 will be specified (proposed by RP-211219)
3. Update to the objective on camping restrictions to add "frequencies/PLMN" (proposed by RP-211219)
4. Update to the objective on eDRX to state that CN configures eDRX for Idle and RAN configures eDRX for RRC\_Inactive (proposed by RP-211219)

### 2.1 Initial Round

In the initial round of discussion companies are invited to provide feedback on each of the 4 proposed updates to the objectives. The initial focus should be on the necessity of the updates and the detailed wording can be refined in later stages of discussion.

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| **1/ Companies are invited to provide any comments related to the updates to RRM measurement relaxation objective:** | |
| **Company** | **Comments** |
| Ericsson | We appreciate other companies for looking in to how to update this objective. We believe that our proposal RP-211038 accurately captures the RAN2 status to a sufficient level of detail.  Some comments on the other proposals:  RP-211153: This proposal, while not going beyond any RAN2 agreements, misses some relevant agreements in RAN2 which we think deserved being captured correctly such as that Rel-16 is baseline. And what happens when the criteria are fulfilled in IDLE vs. CONNECTED.  RP-211219: Some RAN2 progress is not captured clearly in the proposal (e.g. that RAN2 has agreed to use Rel-16 as baseline). Also this proposal goes beyond RAN2 agreements w.r.t. beam measurements. That has not been agreed yet. There was a working-assumption in RAN2 for how it would be added, if added. But no agreement has been made so far w.r.t. whether it will be added or not:   1. Working Assumption: If beam-level criterion is adopted for Rel-17 stationary criterion in RRC\_IDLE/INACTIVE, it is configured separately with Rel-16 low mobility criterion reused |
| LG | In general, we agree that updates to RRM measurement relaxation objective is necessary. RP-211038 is a good baseline because it captures RAN2 progress properly and sufficiently. Detailed wording can be discussed at the next round. |
| NordicSemi | We support an update. |
| Apple | We think RP-211038 is a better wording, but with the below modifications.  We think the details of stationary criterion are not needed to be captured in the WID, as RAN2 agreements/discussion already reflect this, but we still have FFS in RAN2 and adding the sub-bullets negates this. We can leave this to the WG discussion.  We also do not prefer to add ‘measurement’ before relaxation. The details of this can be discussed in RAN2/4.   * + Specify RSRP/RSRQ based stationary criterion, which is based on Rel-16 low mobility criterion, for RRM measurement relaxation [RAN2]     - ~~For RRC\_Idle/Inactive, the stationary criterion allows the UE to perform RRM measurement relaxation when fulfilled.~~     - ~~For RRC\_Connected, the stationary criterion triggers the UE to send a report to the gNB when fulfilled.~~     - Enabling/disabling of RRM ~~measurement~~ relaxation should be under the network’s control. Specify both broadcast and dedicated signalling for enabling/disabling of RRM ~~measurement~~ relaxation.   + ~~Specify provision of thresholds for the Rel-16 not-at-cell-edge criterion, alternatively rely on the existing thresholds [RAN2]~~   + Specify RRM ~~measurement~~ relaxation [RAN4] |
| T-Mobile USA | Power savings for RRM relaxation are any technical discussion on relaxation criteria should be done in RAN2. |
| Huawei, HiSilicon | In general fine, however we do not see RAN4 impact as RAN2’s agreement currently had not yet made clear whether new RAN4 requirements are needed. So if update, we prefer to have RAN2 impact only as what exactly proposed in RP-211038. Therefore we see RP-211038 can be a good starting point with following two comments:  1) Beam-level criterion was agreed as FFS in RAN2. We can say “e.g. RSRP/RSRQ based xxx”.  2) We need to specify Rel-17 not-at-cell-edge criterion, rather than Rel-16. Some clarification here is needed maybe.   * Specify support for the following RRM measurement relaxations for neighbouring cells for RedCap devices: for RRC\_Idle/Inactive/Connected [RAN2, RAN4]:   + Specify stationary criterion, e.g. RSRP/RSRQ based on Rel-16 low mobility criterion, for RRM measurement relaxation [RAN2]     - For RRC\_Idle/Inactive, the stationary criterion allows the UE to perform RRM measurement relaxation when fulfilled.     - For RRC\_Connected, the stationary criterion triggers the UE to send a report to the gNB when fulfilled.     - Enabling/disabling of RRM measurement relaxation should be under the network’s control. Specify both broadcast and dedicated signalling for enabling/disabling of RRM measurement relaxation.   + Specify provision of thresholds for the Rel-17 not-at-cell-edge criterion, alternatively rely on the existing thresholds [RAN2]   + ASpecify RRM measurement relaxation [RAN4]   + No RRM measurement relaxations are specified for the serving cell. |
| DOCOMO | We are generally fine with the update from the rapporteur (RP-211038), which is based on RAN2 agreements, while not OK to preclude beam-level criterion from RAN2 discussion at this stage. We are fine either to have conclusion on beam-level criterion at this RAN plenary or to continue RAN2 discussion. |
| Spreadtrum | We are fine to take any proposal in RP-211038, or RP-211153, or RP-211219 as the starting point. Regarding the proposal in RP-211153, we think it is better to add the description to reuse R16 low mobility criterion for stationary criterion. |

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| **2/ Companies are invited to provide any comments related to the updates to the objective on early indication:** | |
| **Company** | **Comments** |
| Ericsson | We agree to the change. |
| LG | We do not agree to the change. The removal of “or” from ‘Msg1 and/or Msg3’ is against RAN2#114 agreement that “either” Msg1 and/or Msg3 early identification will be supported. |
| NordicSemi | We see benefit from supporting early identification in both MSG1 and MSG3, but early indication shall not be in both MSG1 and MSG3 at the same time. This should be clarified in objectives. In addition, gNB may have option not to configure early identification in any of those. |
| FUTUREWEI | We do not agree to the change. There is no need to support Msg 3, as evidenced by the working assumption in RAN1: “for 4-step RACH, support the early indication of RedCap UEs at least in Msg1”. Either we remove Msg 3, or let the WGs continue their work without update of the WID. |
| Apple | Same view as LG. we do not agree to removal of ‘or’. |
| T-Mobile USA | T-Mobile USA doesn’t see the need for early indication, if we have to have the feature then it’s impact should be minimal. We agree with LG’s comment |
| Huawei, HiSilicon | If the change means we need to support both Msg1 and Msg3 for early identification from specification point of view, we are fine. On the other hand we think when and whether to use Msg1 and Msg3 is up to the network configuration, i.e. the network can configure either Msg1, or Msg3, or both for early identification. So it is better to have a common understanding on whether “or” here allows flexibility of network configuration before removing it. |
| DOCOMO | We don’t agree with the update. Either Msg1 (which was agreed as working assumption in RAN1) or existing UE capability reporting based on NW configuration is enough for RedCap UE indication. |
| Spreadtrum | We do not see the need of the change.  The removal of “or” from ‘Msg1 and/or Msg3’ would imply that early indication in both Msg1 and Msg3 should be supported, which is not aligned with the whole picture of current discussion in RAN1 and RAN2. We prefer no update on early indication objective, which would still provide the room for further discussions in WGs. |

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| **3/ Companies are invited to provide any comments related to the update to the objective on camping restrictions to add "frequencies/PLMN":** | |
| **Company** | **Comments** |
| Ericsson | We do not understand why "frequencies" is added and what it implies.  About adding "PLMN", would be reverting the following RAN2 agreement:  The cell barring for RedCap UE is per cell (not per PLMN).    Hence we do not agree with these changes. |
| LG | Agree with Ericsson. |
| NordicSemi | Same opinion as Ericsson |
| Apple | Agree with Ericsson |
| T-Mobile USA | We don’t agree with adding the new language. Support Ericsson’s comment. |
| Huawei, HiSilicon | Agree with Ericsson. |
| DOCOMO | We share the view with Ericsson on “PLMN” that it is precluded by the RAN2 agreement.  Regarding “frequencies”, we would like to ask proponent to clarify the intention |
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| **4/ Companies are invited to provide any comments related to the update to the objective on eDRX:** | |
| **Company** | **Comments** |
| Ericsson | This is in-line with RAN2 agreements and is fine. |
| LG | The change properly captures RAN2 agreement. However, it seems true that current objective has no problem, i.e. no strong need to update WID on this aspect. |
| NordicSemi | We do not see that RAN2 agreements are against current objectives. No need for any update. |
| Apple | The current objective seems to be fine. |
| Huawei, HiSilicon | OK, aligned with RAN2 agreement. |
| DOCOMO | We are fine with the update, which is aligned with RAN2 agreement |
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## 3 RP-211070

RP-211070 discusses some of the WG discussions on RedCap and makes the following proposals:

* **Proposal 1**: WGs shall follow the approved WID and the related compromised discussion together with the approved WID. If necessary, it is recommended that all companies or Rapporteurs or Feature leaders should track the RAN discussion procedure and the implied meanings of WID to avoid unnecessary discussion in WGs.
* **Proposal 2**: If deemed necessary, a joint GTW or joint email discussion can be considered among different WGs in future to assist the standardization of R17 RedCap.

### 3.1 Initial Round

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| **Companies are invited to provide any comments related to the proposals in RP-211070** | |
| **Company** | **Comments** |
| Ericsson | P1: We already think it is established that WGs should follow the WIDs.  P2: We do not think a joint session between WGs will be fruitful. |
| LG | We agree with P1. On P2, We do not think a joint session between WGs is really necessary. |
| NordicSemi | We do not think joint sessions between WGs are of any benefit, it is typically difficult to find common language between WGs. However, RAN should discuss how to handle overlaps between WIDs, for example for Early identification of RedCap UE and Early identification of UE requiring coverage enhancements. |
| FUTUREWEI | P1. The WID directs the work, and RAN conclusions (if there are any) are followed along with the WID. Unclear what we need to agree to here, we are uncomfortable formalizing a new tracking procedure or including feature leads in the working procedures.  P2. We do not think a joint GTW / email discussion is necessary |
| Apple | Similar views as Ericsson.  P1: Our view is that the approved WID has been tightly followed by working grouping.  P2: We did not identify specific Redcap topic that motivates the joint session. We had separate agenda in RAN1 to handle RAN2-Led topics/issues and many of them were concluded to leave to RAN2 decision unless RAN1-relevant context was clearly identified. |
| T-Mobile USA | No new process is needed, RAN requires each project to provide a status report and if the WG’s aren’t following the WID then that is the time to flag the SR and have a discussion at plenary. |
| Huawei, HiSilicon | Proposal 1 should already be the existing way that delegates work, Proposal 2 can be done in an alternative way, that WGs do their leading topics and if coordination is required, measures like LSs can be triggered. We think the current way works well. So in summary we see no need to agree these proposals. |
| DOCOMO | P1: No agreement is necessary as it is common understanding among companies  P2: We don’t think joint GTW or email discussion is necessary |
| Spreadtrum | **For P1,** we simply want to clarify that one area and its background (UE complexity reduction for higher layers) have been discussed and included in the WID, which could potentially avoiding unnecessary duplicated discussion in WGs in future.  **For P2,** we are quite open with our proposal whose motivation is to give a potential suggestion to improve the coordination among WGs. |

## 4 RP-211492 (revision of RP-211360) - Early indication of number of Rx branches

RP-211492 (revision of RP-211360) discusses the need for early indication of number of Rx branches and makes the following proposals:

* **Proposal 1**: include the information on the number of Rx branches supported by a RedCap UE within the early indication during the initial access
* **Proposal 1b**: if Proposal 1 is agreed, RAN to send a LS to RAN1 and RAN2 to take the agreement into account for their normative work
* **Proposal 2**: if Proposal 1 is not agreed, RAN to task RAN1 to identify pros and cons of having the information on the number of Rx branches supported by a RedCap UE within the early indication during the initial access for the purpose of RACH procedure efficiency; RAN1 will then liaise with RAN2 so that RAN2 agreement from RAN2#104-e meeting can be revisited accordingly (if needed)

### 4.1 Initial Round

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| **Companies are invited to provide any comments related to the proposals in RP-211492** | |
| **Company** | **Comments** |
| Ericsson | For Msg1-indication: The issue with this proposal is that it will cause even more partitioning of the preambles. Already now RAN2 are discussing partitioning of preambles for: Coverage enhancements, RedCap vs. non-RedCap, Slicing, and SDT. To partition even further would cause twice as many partitions. It is perhaps not a feasible way forward to partition too much.  For Msg3-indication: perhaps it would be possible to indicate the nrof Rx branches. |
| LG | In RAN2#114, RAN2 concluded that there is no need to support Rx branch-specific early identification from RAN2 perceptive (final decision up to RAN1). In RAN1#105e (May), there was a RAN1 conclusion declaring no consensus to support early identification of the number of Rx branches in Msg1/Msg3/MsgA for Redcap UE in Rel-17.  So, from procedural point of view, we think RX branch-specific early indication is not well justified. |
| NordicSemi | We agree with Ericsson that there cannot be early identification for everything. Moreover, MSG2 repetitions could be bundled with MSG3 repetitions and could be discussed under CovEnh WID? |
| FUTUREWEI | Early identification is useful to address the resulting performance degradation due to a reduced number of Rx branches.  There is no critical problem with allowing the *possibility* of RX branches by configuration. The motivation should be clear from RAN discussion, where early identification was included as part of the discussion to allow 1RX. If an operator does not see the benefit, then they won’t configure it.  Note: regardless of 1RX early identification, the WGs can design RSRP thresholds for ROs which could differently handle “poor” RedCap UEs. |
| Apple | Like what LG mentioned, RAN2 does not see the need to differentiate.  In RAN1, this issue (i.e., early indication of Rx branches number) was also extensively discussed in RAN1 105 e-meeting under Agenda 8.6.1.2. The detailed pros/cons analysis for each option was conducted and documented in Table 1 of FL summary R1-2106125. Based on two rounds debating, the following was concluded in GTW session based on majority companies’ views:    Conclusion   * No consensus to support early identification of the number of Rx branches in Msg1/Msg3/MsgA for Redcap UE in Rel-17   Given the fact that this issue has been extensively discussed and explicitly concluded in RAN1/RAN2, as commented by LG, we did not see the need of any of these proposals. |
| T-Mobile USA | T-Mobile USA doesn’t support early indication; thus we agree with Ericsson, LG and Apple’s comments. |
| Huawei, HiSilicon | This has already been discussed in RAN1/RAN2 and not agreed, thus we do not see need to reopen this discussion. According to the study in TR 38.875, the DL coverage of 1Rx could be similar as the case of 2Rx and thus early identification seems not essential. On the other hand more early identification would make the situation worse for RACH partitioning as REDCAP and non-REDCAP UEs has already required early identification via Msg1.if the intention is to bar UEs differently for 2Rx and 1Rx, it is already agreed to support such differentiation in SIB1 as “SIB1 (not MIB) indicates cell barring for 1 Rx branch and 2 Rx branches separately for RedCap UEs.”. |
| DOCOMO | We don’t support the proposals. Corresponding WGs already have made following conclusions and thus no further discussion is necessary:  [RAN1]  **Conclusion:**   * No consensus to support early identification of the number of Rx branches in Msg1/Msg3/MsgA for Redcap UE in Rel-17   [RAN2]  Agreement  There is no need to support Rx branches specific early identification from RAN2 perceptive (final decision up to RAN1). |
| Spreadtrum | For P1, we share with Ericsson’s view. In addition, according to RAN1’s agreements, the early identification of RedCap UEs (e.g., in Msg1) is configurable, so introducing additional early indication of number of Rx branches is not clear so far.  .  For P2, in the last RAN1 meeting, we had already discussed the pros and cons of the early indication of number of Rx branches in summary R1-2106333. |

## Annex: Contacts

Please provide a company contact that the email discussion moderator can contact if required.

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| **Company** | **Contact name and email** |
| Ericsson | Mattias Bergström (mattias.a.bergstrom@ericsson.com) |
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