3GPP TSG-RAN2#116bis-e Tdoc R2-22xxxx

Electronic meeting, 2022-01-17 - 2022-01-25

Agenda Item: 8.12 Reduced Capability

Source: Ericsson

Title: Open issue list for 38.331 for RedCap

Document for: Discussion, Decision

# 1 Introduction

This document relates to this offline discussion:

**[Post116bis-e][102][RedCap] RRC running CR and list of open issues (Ericsson)**

Scope: Update the RRC running CR and define the list of RRC open issues

Intended outcome: Endorsed RRC running CR and list of open issue

Deadline (for companies' feedback): Friday 2022-01-28 0800 UTC

Deadline (for updated running CR and list of open issues): Friday 2022-01-28 1600 UTC

Status: To be started at the beginning of week2

This document captures a list of remaining open issues for TS 38.331 for RedCap.

The following delegates participated in the discussion:

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| --- | --- |
| Company | Contact Name, Email |
| Ericsson | Tuomas Tirronen, @ericsson.com |
| Vivo | Chenli5g@vivo.com |
| Huawei, HiSilicon | Yulong, shiyulong5@huawei.com |
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# 2 Open issue list

In the sections below, open issues are captured for each of the agenda items that has been used for RedCap. There is also one section in the end which captures open issues which does not fit well under any other section.

## 2.1 General open issues in RRC

Below is a list of open issues which does not fit under any of the other agenda items.

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| **Slogan** | **Open issue description** | **Criticality** | **Remark** |
| **RRC additions includes changes over changes** |  | Must be addressed | Changes over changes will be removed once version starts tob e more stable. |
| **UE capabilities** | Capture the UE capabilities in ASN.1 | Must be addressed | To be handled in offline for capabilities / Mega CR. Also more detailed discussion w.r.t. capabilities tob e handled in the other discussion. |
| **L1 parameters in R1-2112976** | * RedCap-specific PRACH configuration for 2-step and 4-step RACH | Must be addressed |  |
|  | * Parameters and configuration for RedCap-specific initial DL/UL BWP configuration | Must be addressed | RedCap-specific initial UL and DL BWP are currently not captured in RRC configuration (or in other specification text) |
|  | * Whether and where to capture restrictions related to UE not supporting 256QAM | TBD | L1 parameter list includes information to update field description on invalid configuration. TBD whether to capture this in RRC. |

Please provide input below:

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| Company | Comments / new open issues |
| Huawei, HiSilicon | For RedCap-specific initial DL/UL BWP configuration, we need to evaluate whether it will large impact on the SIB1 size, which may impact on the coverage.  Solution to reduce the SIB1 size due to introduction of RedCap-specific initial DL/UL BWP configuration is needed. |
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## 2.2 Open issues for "Definition of RedCap UE type and reduced capabilities"

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| **Slogan** | **Open issue description** | **Criticality** | **Remark** |
| **Definition of RedCap** | Capture definition of “RedCap” UE in 3.1 | Must be addressed | To be synced with the definition in other specs, i.e. 306. |
| **Handover from E-UTRA from legacy eNB to legacy gNB** | Agreement RAN2#116bis:  For the LTE to NR handover, in case the target NR cell is a legacy cell, the RedCap UE should trigger RRC re-establishment procedure. FFS any specification impact or purely leave to implementation | FFS should be addressed |  |
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Please provide input below:

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| Company | Comments / new open issues |
| Huawei, HiSilicon | The definition of RedCap in 306 is already stable. We can copy that. |
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## 2.3 Open issues for "Identification, access and camping restrictions"

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| **Slogan** | **Open issue description** | **Criticality** | **Remark** |
| **RACH configuration** | Agreement RAN2#116:  For MsgA PRACH early identification, RAN2 confirms both dedicated ROs and dedicated PRACH preamble can be supported from signalling point of view. | Must be addressed | To be captured once discussion in RIP has concluded / progressed |
| **RACH configuration / MsgA** | Agreement RAN2#116:  For RedCap, MsgA PRACH early identification is enabled/disabled implicitly by the presence of dedicated RACH configuration for MsgA PRACH early identification. | Must be addressed | To be captured once discussion in RIP has concluded / progressed |
| **RACH configuration for 2-step and 4-step** |  | Must be addressed | To be captured once discussion in RIP has concluded / progressed |
| **SI information on which frequencies accept RedCap** | Working assumption:  System information can provide information on which frequencies accept RedCap UE access (e.g. by considering whether supporting RedCap). | Potential enhancement | Potential topic for discussion in RAN2#117 |
| **RedCap UE behavior for cell-reselection if cell is barred** | In case the cell is barred due to not supporting RedCap, UE behaviour for intra-frequency cell reselection is FFS | Must be addressed | No conclusion in RAN2#116bis. We have following three barring cases:  1) Cell does not indicate support for RedCap  2) UE is unable to acquire SIB1  3) MIB has set *cellBarred* field.  Discussed options include specifying intra-frequency cell reselection as “allowed” or alternatively following the IFRI in MIB. For the last case option to read IFRI in SIB1 is a possibility as well. |
| **Treatment of legacy IFRI** | We have the following Editor’s note in 5.2.2.3.1:  Editor’s Note: FFS on the details on how a RedCap UE should treat legacy IFRI. | Must be addressed | Relates to the IFRI issue listed above. |
| **Msg1 identification** | Agreement RAN2#115:  Msg1 identification which can be configured to be enabled/disabled can be specified from RAN2 point of view. | Must be addressed | Assuming this is per presence of the related RACH configuration – to be addressed together with RACH configuration later. |
| **2-step RACH solution** | Agreement RAN2#115:  Solution for early identification for 2-step RACH will be specified. | Must be addressed | To be addressed together with RACH configuration later. |
| **NCD-SSB** | Multiple agreements in RAN2#116bis and further pending discussion | Must be addressed | To be addressed according to further discussion and agreements.  Details can be further expanded during this short discussion, if time permits. |
| **Configuration for RedCap-specific initial BWP for UL and DL** | The following Editor’s note has been captured in 6.3.2:  Editor’s Note: Confugration RedCap-specific initial BWP for UL and DL to be captured | Must be addressed |  |
| **Description of BWP configuration options for RedCap** | We have following Editor’s note in B.2:  Editor’s note: FFS update of this section for RedCap-specific initial BWPs | RRC editorial / description update |  |

Please provide input below:

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| Company | Comments / new open issues |
| Vivo | Per agreement made in RAN2#116bis-e meeting:   1. A RedCap UE in idle/inactive mode monitors paging only in an initial BWP (default or RedCap specific) associated with CD-SSB and performs cell (re-)selection and measurements on the CD-SSB   If RedCap specific initial BWP with CD-SSB is deployed, gNB needs to ensure the paging for RedCap UE is transmitted on RedCap specific initial BWP. Otherwise, the paging for RedCap UE may be transmitted on initial BWP with CD-SSB for normal UE, where the BW may exceed 20MHz. In this way, RedCap UE will miss paging.  Thus, one more open issue should be resolved: **how to ensure the gNB transmit paging for RedCap UE in RedCap specific initial BWP when RedCap specific initial BWP with CD-SSB is configured.**  **Rapp: Is this case about bad configuration, or what would be the intention? Something to capture in 331 or 304 instead?** |
| Ericsson | **Add open issue**: Considering it is possible to have a RedCap UE supporting HD-FDD type A only (see e.g draft RAN1 feature list FG 28-3) and that HD is not supported in FDD bands at the moment, we should specify an indication in SI (SIB1) where NW / gNB can indicate whether HD-FDD operation (for RedCap) is supported. This would facilitate the rollout of RedCap in gNBs. |
| Huawei, HiSilicon | For above added issues, it is better to discuss driven by contribution rather than listed in the open issue. |
| Nokia, Nokia Shanghai Bell | “SI information on which frequencies accept RedCap“ hast to be with“ Must be addressed“ criticality, because it is RAN2 working assumption. Naturally working assumption needs to be discussed to be confirmed. |
| XIaomi | Add open issue „**Redcap UE is unable to support the initial UL/DL BWP configurations in SIB1**“ to „**RedCap UE behavior for cell-reselection if cell is barred**“  The impact of the sepertate initial UL/DL BWP configurations in SIB1 on cellbar also need to be discussed.  An example is if the separate initial UL BWP is configured but wider than the maximum RedCap UE bandwidth, then the cell does not support the RedCap.  RAN2 needs to consider whether to follows the existing IFRI in SIB1 for reselection or to follow legacy UE’s behaviour „*notAllowed*“. |

## 2.4 Open issues for "eDRX cycles"

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| **Slogan** | **Open issue description** | **Criticality** | **Remark** |
| **Invalid configuration / no IDLE eDRX cycle** | Agreement RAN2#115  RAN2 considers the configuration as an invalid case, where INACTIVE eDRX cycle is configured but IDLE eDRX cycle is not configured. FFS whether to capture this restriction in RAN2 spec. | Case for invalid config | TBD if anything needs to be captured |
| **Invalid configuration / shorter IDLE eDRX cycle** | Agreement RAN2#115  RAN2 considers the configuration as invalid case, where INACTIVE eDRX cycle is longer than IDLE eDRX cycle. FFS whether to capture this restriction in RAN2 spec. | Case for invalid config | TBD if anything needs to be captured |
| **Further details of SI change indication mechanism for eDRX** | We have the following Editor’s note in 5.2.2.2.2  Editor’s Note: The details for modication period, eDRX acquisition period and which eDRX/DRX cycles are referred to below are subject to further changes once relevant agreements are made. | Must be addressed | Pending potential further discussion and agreements in RAN2#117.  For example: Which cycle is used in the comparison against modification period to decide if the eDRX acquisition period is used, e.g. follow the LTE way or use different cycles depending on the RRC state. Cf. discussion during RAN2#116. |
| **Procedure text for SI modification for eDRX / RRC\_INACTIVE** | We have the following Editor’s note in 5.2.2.2.2 at the end of procedure text:  Editor’s Note: The case for RRC\_INACTIVE is FFS. | Must be addressed | Pending potential further discussion and agreements in RAN2#117 |
| **Number of spare values for extended RAN paging cycle** | We have the following Editor’s note in ASN.1 in *RRCRelease*:  -- Editor's note: TBD how many spare values are needed. | Must be addressed | Currently one spare is listed but according to earlier comments and discussion more could be beneficial for forward compability. |
| **Need for capability signaling for eDRX in RAN** | Agreement RAN2#115  A UE in idle mode requests eDRX configuration via NAS signalling. FFS if capability signalling in RAN, as part of the UE capability message, is also needed. | TBD |  |

Please provide input below:

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| Company | Comments / new open issues |
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## 2.5 Open issues for "RRM relaxations"

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| **Slogan** | **Open issue description** | **Criticality** | **Remark** |
| **RRM relax enable/disable for IDLE/INACTIVE UE with RRC Release message** | Work item defines objective to have support for enabling/disabling of RRM relaxation by both broadcast and dedicated signalling:  Specify support for the following RRM measurement relaxations for neighbouring cells for RedCap devices: for RRC\_Idle/Inactive/Connected [RAN2, RAN4]:   * Specify measurement (RSRP/RSRQ) based stationarity criterion and not-at-cell-edge criterion [RAN2] * 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. | Must be addressed | To be addressed according to further discussion and agreements. |
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Please provide input below:

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| Company | Comments / new open issues |
| Nokia, Nokia Shanghai Bell | Add open issue on RRM relax enable/disable for IDLE/INACTIVE UE with RRC Release message according WI objectives. |
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## 2.6 Other open issues

Below is a list of open issues which does not fit under any of the other agenda items.

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| **Slogan** | **Open issue description** | **Criticality** | **Remark** |
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| Company | Comments / new open issues |
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# 3 Conclusion

Based on the discussion above it is proposed:

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