3GPP TSG-RAN WG2 #117-e draftTdoc R2-2203561

Electronic meeting, Feb 21st – Mar 3rd, 2022

Agenda Item: 8.12.2.2.1

Source: Ericsson (Rapporteur)

Title: Email discussion report for [AT117-e][105][RedCap] CP open issues - PH2

Document for: Discussion, Decision

# 1 Introduction

In RAN2#117-e, there was an online discussion based on the outcome of a pre-meeting offline which was captured in [R2-2203538](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2203538.zip). During the online discussion the following agreements were made:

**Agreements**:

1. The following working assumption is confirmed: “System information can provide information on which frequencies accept RedCap UE access (e.g., by considering whether supporting RedCap)”
2. The invalid configuration where INACTIVE eDRX cycle is configured but IDLE eDRX cycle is not configured, is captured in the field description of the parameter ran-ExtendedPagingCycle.
3. The invalid configuration where INACTIVE eDRX cycle is longer than IDLE eDRX cycle, is captured in the field description of the parameter ran-ExtendedPagingCycle.
4. In Rel-17, one spare value is sufficient for the parameter ran-ExtendedPagingCycle-r17.
5. For the handover case, if the target gNB does not configure RRM relaxation for a UE, the UE shall not perform the evaluation of the relaxed measurement criterion for a stationary UE, i.e. the UE shall not perform the procedural text of 5.7.4.X.
6. When network configures both R16/R17 relaxation criteria and the UE fulfills both, RAN2 assumes it is up to UE implementation to perform either Rel-16 or Rel-17 relaxation method based on the “allowed” cases RAN4 specifies, unless we receive different view from RAN4
7. It is up to UE implementation when to start the RRM relaxation in RRC Idle/Inactive if multiple methods are configured
8. RAN2 confirms that it is up to network implementation, but it is expected that the network configures a MO on the NCD-SSB frequency if it wants the UE to use it only for serving cell measurements when some neighbor cells do not send an SSB on UE’s NCD-SSB frequency.
9. For neighbour cell measurements, it is up to network to configure MO on CD-SSB or NCD-SSB or both (same in legacy, no spec impact)
10. servingCellMO is configured to the MO on the CD-SSB when RedCap specific BWP of a UE contains neither CD-SSB nor NCD-SSB.
11. A RedCap UE may be configured with multiple NCD-SSBs, but only one per BWP (FFS on what "only one per BWP" means).
12. The working assumption “The periodicity of NCD-SSB shall be not less than the periodicity of serving cell’s CD-SSB.” is confirmed.
13. NCD-SSB should not be indicated in the handover command, i.e., network sets ServingCellConfigCommon => downlinkConfigCommon => frequencyInfoDL => absoluteFrequencySSB to the frequency of the CD-SSB (not the NCD-SSB)
14. The discussion on whether a non-RedCap UE should be able to use NCD-SSB instead of CD-SSB is deprioritized in Rel-17.
15. The number of most significant bits used for UE\_ID\_H is 13.
16. For RedCap-specific BWP, both common and dedicated configurations are provided using full configuration, i.e., delta configuration is not supported.
17. RAN2 confirms that upon failure of RRC connection setup/resume, UE operates in the initial BWP in which it has been configured to monitor paging (no spec impact)

In this document we continue the discussion for the following proposals:

**Proposals for further discussion**

**Proposal 10** RAN2 confirms that it is up to network implementation, but it is expected that network refers to MO on NCD-SSB explicitly from within the *ServingCell* configuration (similarly to *servingCellMO*) when some neighbor cells do not send an SSB on UE’s NCD-SSB frequency.

**Proposal 11** RAN2 confirms that It is possible for the network to configure a UE with multiple NCD-SSBs.

**Proposal 12** RAN2 confirms that it is sufficient to configure at least one of the MOs configured on CD-SSB or NCD-SSB in the current active BWP, if contained, in servingCellMO.

**Proposal 15** One servingCellMO is configured per UE regardless of whether RedCap specific BWP of a UE contains CD-SSB, NCD-SSB or neither (requires retuning).

**Proposal 16** A RedCap UE may be configured with multiple NCD-SSBs, but only one per BWP (FFS on what "only one per BWP" means)

**Proposal 21** In connected mode if RA occasions are not configured on the active BWP, RedCap UEs should use the RedCap-specific initial UL BWP, if configured.

**Proposal 23** In case RedCap-specific initial DL BWP contains CD-SSB, PDCCH-ConfigCommon includes common search space configurations for paging, RAR, SIB1 and OSI when RedCap-specific initial DL BWP and the legacy initial DL BWP does not overlap sharing the CD-SSB.

**Proposal 24** For a RedCap UE in connected mode, it is up to network implementation to configure a RedCap-specific initial BWP, i.e., no restrictions on existing possible configurations.

**Proposal 25** Discuss whether it should be possible for the network to transmit CD-SSB and NCD-SSB(s) at different times by configuring an offset.

**Proposal 26** In Rel-17, no mechanism is introduced for the network to provide SI or SIB6/SIB7/SIB8 to a UE configured with a DL BWP that does not contain CD-SSB after a notification for system information update or ETWS and/or CMAS is transmitted.

**Proposal 27** Upon submitting the RRCSetupRequest/RRCResumeRequest message to the lower layers, if the RedCap UE is in the separate DL BWP where CD-SSB is not present, it is up to the UE to continue cell re-selection related measurements and cell re-selection evaluation (no spec impact).

**Proposal 29** Discuss whether UE should consider IFRI as “allowed” or follows the IFRI in MIB when i) cell does not indicate support for RedCap UEs or ii) Red Cap UE is unable to acquire SIB1..

**Proposal 30** Discuss whether UE should follow legacy IFRI in MIB or acquire SIB1 and follow the RedCap-specific IFRI provided in SIB1 when cellBarred in MIB is set to barred.

**Proposal 31** Support for Half-Duplex FDD RedCap is indicated in SIB1.

**Proposal 32** UE should consider the RRC\_IDLE eDRX cycle for comparing with the modification period for both RRC\_IDLE and RRC\_INACTIVE to decide if eDRX acquisition period is used.

**Proposal 33** If Proposal 32 is agreed, it is captured with the following change in TS 38.331

1. if the UE is ~~in RRC\_IDLE,~~ configured with an eDRX cycle longer than the modification period and the *systemInfoModification-eDRX* bit of Short Message is set:

Contact information

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| Company | Contact person - email@address.com |
| Ericsson | emre.yavuz@ericsson.com |
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# 2 Discussion

RAN2 discussed the following proposals during the first phase of this offline discussion:

* RAN2 confirms that it is up to network implementation, but it is expected that network refers to MO on NCD-SSB explicitly from within the ServingCell configuration (similarly to servingCellMO) when some neighbor cells do not send an SSB on UE’s NCD-SSB frequency.
* RAN2 confirms that it is sufficient to configure at least one of the MOs configured on CD-SSB or NCD-SSB in the current active BWP, if contained, in servingCellMO.
* One servingCellMO is configured per UE regardless of whether RedCap specific BWP of a UE contains CD-SSB, NCD-SSB or neither (requires retuning).

The rapporteur thinks it would be better to merge the proposals above as suggested during the online discussion and proposes the following:

“One *servingCellMO* is configured per serving cell and the UE performs serving cell measurements according to the MO indicated in *servingCellMO* (as in legacy). It is up to network implementation to refer to the MO on CD-SSB or NCD-SSB in *servingCellMO*."

**Q 2.1** Do you agree with the proposal above? Please elaborate your reply especially if you replied “No”, and suggest an alternative.

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| **Company** | **Yes/No** | **Comments** |
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**Summary – Q 2.1**

TBD

Based on the observations above, the rapporteur proposes the following:

1. ???

RAN2 agreed the following proposal during the first phase of the online discussion: “A RedCap UE may be configured with multiple NCD-SSBs, but only one per BWP (FFS on what "only one per BWP" means)”

Based on the comments provided during the online discussion, the rapporteur proposes the following revision to address the FFS. Note that this discussion covers also Proposal 11 in [R2-2203538](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2203538.zip).

“A RedCap UE may be configured with multiple NCD-SSBs provided that each BWP contains at most one NCD-SSB”

**Q 2.2** Do you agree with the proposal above? Please elaborate your reply especially if you replied “No” and suggest an alternative.

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**Summary – Q 2.2**

TBD

Based on the observations above, the rapporteur proposes the following:

1. ???

During the online session in week 1 there was a discussion on the proposal below:

“In connected mode if RA occasions are not configured on the active BWP, RedCap UEs should use the RedCap-specific initial UL BWP, if configured.”

Based on the comments provided during the online session, the rapporteur suggests revising the proposal as follows:

“In connected mode if RA occasions are not configured on the active BWP, RedCap UEs should use the RedCap-specific initial UL BWP, if configured, or else legacy BWP#0 if it has a bandwidth of <=20 MHz for FR1 or <=100 for FR2.”

**Q 2.3** Do you agree with the proposal above? Please elaborate your reply especially if you replied “No” and suggest an alternative.

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**Summary – Q 2.3**

TBD

Based on the observations above, the rapporteur proposes the following:

1. ???

RAN2 discussed the following proposal during the online session in week 1 following the first phase of this offline discussion:

“In case RedCap-specific initial DL BWP contains CD-SSB, PDCCH-ConfigCommon includes common search space configurations for paging, RAR, SIB1 and OSI when RedCap-specific initial DL BWP and the legacy initial DL BWP does not overlap sharing the CD-SSB.”

Based on the comments provided during the online discussion, the rapporteur proposes the following:

“In case RedCap-specific initial DL BWP contains CD-SSB and CORESET#0, one common search space configuration, i.e., *PDCCH-ConfigCommon*, for paging, RAR, SIB1 and OSI is enough.

**Q 2.4** Do you agree with the proposal above? Please elaborate your reply especially if you replied “No” and suggest an alternative.

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**Summary – Q 2.4**

TBD

Based on the observations above, the rapporteur proposes the following:

1. ???

The following proposal was discussed during the online session in week 1:

“For a RedCap UE in connected mode, it is up to network implementation to configure a RedCap-specific initial BWP, i.e., no restrictions on existing possible configurations.”

During the first phase of the related offline discussion 19 companies responded in total to this question. All companies but one responded with “No” even though the rapporteur assumes that company has a similar view with the rest. Considering that there was a common understanding on the need not to restrict network configuration and during the online session the discussion was rather on the terminology, rapporteur proposes not to discuss the proposal above further:

**Q 2.5** Do you agree that there is no need to discuss the proposal above further? Please elaborate your reply.

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| **Company** | **Yes/No** | **Comments** |
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**Summary – Q 2.5**

TBD

Based on the observations above, the rapporteur proposes the following:

1. ???

During the first phase of this offline discussion RAN2 discussed whether it should be possible for the network to transmit CD-SSB and NCD-SSB(s) at different times by configuring an offset. In total 19 companies responded to this question. 10 companies responded with “Yes”, 7 companies indicated that this should be up to RAN4 to decide, and 2 companies had no strong view. Considering the current status of the discussion, rapporteur proposes to continue this discussion online

1. Discuss whether it should be possible for the network to transmit CD-SSB and NCD-SSB(s) at different times by configuring an offset.

In RAN2117-e, the following proposal was discussed with the intention to improve its formulation:

“In Rel-17, no mechanism is introduced for the network to provide SI or SIB6/SIB7/SIB8 to a UE configured with a DL BWP that does not contain CD-SSB after a notification for system information update or ETWS and/or CMAS is transmitted.”

The rapporteur proposes the following based on the discussion during the online session:

“RAN2 confirms that system information, e.g., SIB6/SIB7/SIB8, can be provided via dedicated signalling to a RedCap UE in an active DL BWP that does not contain CD-SSB after a notification for system information update or ETWS and/or CMAS is transmitted.”

**Q 2.x** Do you agree with the proposal above? Please elaborate your reply especially if you replied “No” and suggest an alternative.

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| **Company** | **Yes/No** | **Comments** |
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**Summary – Q 2.6**

TBD

Based on the observations above, the rapporteur proposes the following:

1. ???

Based on the online discussion in meeting week 1, the rapporteur thinks that there is no need to discuss the proposal below further as it seems to be the common understanding and the intention is not to change the legacy behaviour:

“Upon submitting the *RRCSetupRequest/RRCResumeRequest* message to the lower layers, if the RedCap UE is in the separate DL BWP where CD-SSB is not present, it is up to the UE to continue cell re-selection related measurements and cell re-selection evaluation (no spec impact).”

**Q 2.7** Do you agree that there is no need to discuss the proposal above further? Please elaborate your reply.

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| **Company** | **Yes/No** | **Comments** |
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**Summary – Q 2.7**

TBD

Based on the observations above, the rapporteur proposes the following:

1. ???

The session chair has indicated in the meeting minutes that proposals 29 and 30 are to be discussed only online during the second meeting week.

1. Proposals 29 and 30 are to be discussed online during the second meeting week.

In the pre-meeting offline discussion, i.e., [R2-2203502](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2203502.zip), the rapporteur asked the following question “Do you think that support for Half-Duplex FDD RedCap should be indicated in SIB1?” In total 22 companies responded; 12 companies agree that support for Half-Duplex FDD RedCap should be indicated in SIB1 yet 6 companies prefer not to support. 3 companies do not have any strong opinion and 1 company stated that they do not understand the intention with this indication.

For those companies which responded with “No”, the rapporteur thinks there may be a misunderstanding regarding the need for such support based on the responses provided. For example Oppo and T-Mobile think that HD-FDD operation is a feature for connected mode and therefore can be handled by UE capability signalling. But they might be overlooking at the fact that the network may need to treat all RedCap UEs as HD until UE capability information is received, i.e., during connection establishment. Xiaomi indicated that “in LTE, we have HD-FDD MTC, but we do not see there is such an indication of NW capability” which is correct but both LTE-M and NB-IoT are designed assuming HD from the start, which is why no indication was needed, however this is not the case for RedCap. Samsung indicated “Maybe” and MediaTek stated that there is no need to introduce the indication now before the case is identified. The rapporteur would like to emphasize that this is an indication from the network, there may be an impact on the scheduling during connection establishment, i.e., random access, and it would be too late to introduce the indication in a later release since there may already be a UE implementation that supports only HD-FDD.

So, the rapporteur would like to check once more whether support for Half-Duplex FDD RedCap should be indicated in SIB1 based on the assessment above.

**Q 2.8** Do you think that support for Half-Duplex FDD RedCap should be indicated in SIB1 based on the assessment above? Please reply after reading the text above and elaborate your reply.

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| **Company** | **Yes/No** | **Comments** |
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**Summary – Q 2.8**

TBD

Based on the observations above, the rapporteur proposes the following:

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In the pre-meeting offline discussion, i.e., [R2-2203502](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2203502.zip), the rapporteur asked which option below companies would prefer:

“The following options have been considered regarding which DRX cycle UE should consider for comparing with the modification period to decide if eDRX acquisition period is used.:

1. CN\_eDRX for both RRC\_IDLE and RRC\_INACTIVE (same as LTE)
2. CN\_eDRX for RRC\_IDLE, and RAN eDRX, if configured, for RRC\_INACTIVE, i.e., use CN\_eDRX if RAN eDRX is not configured.”

In total 19 companies responded; 11 companies prefer option a) and 7 companies prefer option b) or slightly updated version of option b) (provided by Oppo). However, 3 of these companies indicated that option a) is also acceptable. One company prefers none of the options and provided yet another option. Considering that only options a and b are under discussion at the moment and 14 companies may accept option a, yet 4 companies prefer option b, rapporteur would like to check whether option a is acceptable.

**Q 2.9** Do you think option a is acceptable? Please elaborate your reply.

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| **Company** | **Yes/No** | **Comments** |
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**Summary – Q 2.9**

TBD

Based on the observations above, the rapporteur proposes the following:

1. ???

The rapporteur would also like to check the proposals below after coordination with the session chair:

In [R2-2203352](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203352.zip), Nokia proposed the following in Proposal 1:

**“**Introduce separate indications broadcasted in system information whether the eDRX is allowed for UEs in RRC\_IDLE or for UEs in RRC\_INACTIVE.”

**Q 2.10** Do you agree with the proposal above? Please elaborate your reply.

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**Summary – Q 2.10**

TBD

Based on the observations above, the rapporteur proposes the following:

1. ???

In [R2-2203056](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203056.zip), Huawei proposed the following in Proposal 3:

**“**The Rx branches capability should be included in the *UERadioPagingInformation* inter-node message.”

**Q 2.11** Do you agree with the proposal above? Please elaborate your reply.

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| **Company** | **Yes/No** | **Comments** |
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**Summary – Q 2.11**

TBD

Based on the observations above, the rapporteur proposes the following:

1. ???

# 3 Conclusion

Based on the discussion above the following observations have been made:

[Observation 1 Proposals 29 and 30 are to be discussed online during the second meeting week.](#_Toc96968196)

Based on the discussion above the following proposals have been made:

[Proposal 1 ???](#_Toc96968209)

[Proposal 2 ???](#_Toc96968210)

[Proposal 3 ???](#_Toc96968211)

[Proposal 4 ???](#_Toc96968212)

[Proposal 5 ???](#_Toc96968213)

[Proposal 6 Discuss whether it should be possible for the network to transmit CD-SSB and NCD-SSB(s) at different times by configuring an offset.](#_Toc96968214)

[Proposal 7 ???](#_Toc96968215)

[Proposal 8 ???](#_Toc96968216)

[Proposal 9 ???](#_Toc96968217)

[Proposal 10 ???](#_Toc96968218)

[Proposal 11 ???](#_Toc96968219)

[Proposal 12 ???](#_Toc96968220)

# References

1. [R2-2201886](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201886.zip) Running 331 CR for RedCap Ericsson
2. [R2-2201887](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201887.zip) Open issue list for 38.331 for RedCap Ericsson
3. [R2-2201888](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201888.zip) Running 304 CR for RedCap Ericsson
4. [R2-2201889](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201889.zip) Open issue list for 38.304 for RedCap Ericsson
5. [R4-2201780](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_101-bis-e/Docs//R4-2201780.zip) Discussion on the use of NCD-SSB MediaTek
6. [R2-2202318](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202318.zip) Discussion on RAN2 impacts on NCD-SSB and separate initial BWP vivo, Guangdong Genius
7. [R2-2202653](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202653.zip) Remaining issues on separate initial BWP and NCD-SSB for RedCap UEs ZTE Corporation, Sanechips
8. [R2-2202998](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202998.zip) Left open issues on NCD-SSB OPPO
9. [R2-2203057](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203057.zip) Discussion on NCD-SSB aspects for RedCap UE Huawei, HiSilicon
10. [R2-2203078](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203078.zip) Discussion on the open issues of NCD-SSB CATT
11. [R2-2203505](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203505.zip) Monitoring POs in connected mode when using NCD-SSB Ericsson
12. [R2-2203508](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203508.zip) C-plane related open issues on NCD-SSB DENSO CORPORATION
13. [R2-2203352](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203352.zip) eDRX and system information Nokia, Nokia Shanghai Bell
14. [R2-2203056](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203056.zip) Access restriction of RedCap UE Huawei, HiSilicon