**3GPP TSG-RAN WG3 Meeting #117-eR3-225004**

**Online, Aug 15th – 24th 2022**

Agenda Item: 9.2.8

Source: Xiaomi (moderator)

Title: Summary of Offline discussion on CB: # 17\_R17Redcap

Document for: Approval

# Introduction

**CB: # 17\_R17Redcap**

**- Add the RedCap Indication IE in F1 paging to ensure DU page the RedCap UE on RedCap-specific initial BWP If such specific BWP is configured?**

**- Add clarification to RedCap Broadcast Information in Served Cell Information to clarify that RedCap UE applies the cellBarred field in MIB?**

**- Clarify that NCD-SSBs in the measTiming list are RedCap-specific NCD-SSBs if the RedCap Broadcast Information IE is includerd in the served cell Information NR IE?**

**- Provide CRs if agreeable**

(Xiaomi - moderator)

Summary of offline disc [R3-225004](file:///D:\RAN3%20117e\discussion\redcap\Inbox\R3-225004.zip)

**Phase 1, please provide your comments before Friday August 19th 16:00 UTC time**

**Phase 2, update and review the CR according to the phase 1 discussion if any before next week’s Tuesday.**

# For the Chairman notes

**Agree the following:**

# Discussion

## Redcap indication in Paging over F1AP

In [1], it is proposed to introduce *Redcap Indication* IE in Paging message over F1AP, the argument is that the DU is not aware of the Paging is for Redcap UE in current specification, it cannot allocate the Redcap dedicated physical resources for the Paging.

The following the main part of the CR [1] for quick reference.

The *RedCap Indication* IE may be included in the *UE Paging Capability* IE in the PAGING message, and if present the gNB-DU shall, if supported, use it for paging the RedCap UE in the default or RedCap specific initial BWP.

9.3.1.270 UE Paging Capability

This IE provides the UE Paging Capability information needed for paging.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| UEID Subgrouping Support Indication | O |  | ENUMERATED(true,…) |  |
| RedCap Indication | O |  | ENUMERATED(true,…) |  |

**Q1. Do companies agree the CR in R3-224734 [1]?**

|  |  |
| --- | --- |
| Company | Comment |
| Xiaomi | Agree with comments.  Since dedicated search space can also be used for Redcap Paging, we suggest to use a more general description as follows:  The *RedCap Indication* IE may be included in the *UE Paging Capability* IE in the PAGING message, and if present the gNB-DU shall, if supported, use it for paging ~~the RedCap UE in the default or RedCap specific initial BWP~~. |
| Qualcomm | We support this CR. Based on this indication, DU determines which BWP to be used for RedCap UEs. We don’t have to get into details of which resources are used within selected BWP. It looks current CR wording is clear and sufficient. |
| CMCC | Agree |
| Ericsson | We agree with the reformulation of the procedure text from Xiaomi.  we think that the number of Rx should also be mentioned in the IE encoding, e.g. ENUMERATED(~~true,~~ 1Rx, 2Rx…). So that the DU can avoid paging in the case gNB-DU supports only 2Rx RedCap UEs and save on paging resources. |
| ZTE | We prefer the original wording, but no strong view.  to Ericsson: Since CU has already filtered cells according to 1RX/2RX information, it seems there is no need to inform 1RX/2RX information to DU. |
| Deutsche Telekom | We are fine with the CR.  We are also generally fine with Xiaomi’s proposal to reduce details in the procedural text, but we propose to have at the end of the sentence *“… for paging of RedCAP UEs.”* |
| Nokia | Agree with rewording:  The *RedCap Indication* IE may be included in the *UE Paging Capability* IE in the PAGING message, and if present the gNB-DU shall, if supported, consider that the paged UE has indicated Reduced Capability. |
| NEC | Agree to introduce RedCap Indication in the UE Paging Capability IE. For the wording, no strong preference, either is OK. |
| Huawei | The CR looks fine. |
| Ericsson2 | Based on feedback from ZTE, we agree there is no need to inform of #Rx to DU. We agree with the proposed rewording from DT. |

## Redcap Broadcast Information

In [2], a misalignment with RAN2 about Redcap broadcast is raised, the argument is that RAN2 agreed and specified that both the barring info in MIB and the barring info in SIB1 should be applied to Redcap UE, while only the barring info in SIB1 is considered in RAN3 specification, the possible issue is there may be undesired handover for Redcap UEs, which may lead to handover failure and bad UE experience. Therefore, it is proposed to update the semantics description of RedCap Broadcast Information in TS 38.423 and TS 38.473 in [3] and [4].

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| --- | --- | --- | --- | --- | --- | --- |
| RedCap Broadcast Information | O |  | BIT STRING (SIZE(8)) | The presence of this IE indicates that the *intraFreqReselectionRedCap* IE is broadcast in SIB1 of the corresponding cell, see TS 38.331 [10].  Each position in the bitmap indicates which RedCap UEs are allowed access, according to the setting of cell barring indicator in MIB and/or RedCap barring indicators in SIB1, see TS 38.331 [10].  First bit = 1Rx,  second bit = 2Rx,  third bit = halfDuplex,  other bits reserved for future use. Value '1' indicates 'access allowed'. Value '0' indicates 'access not allowed”. | YES | ignore |

**Q2. Do companies agree the CR in R3-224763 [3] and R3-224764 [4]?**

|  |  |
| --- | --- |
| Company | Comment |
| Xiaomi | Agree. |
| Qualcomm | Agree |
| CMCC | Agree |
| Ericsson | Agree |
| ZTE | Disagree.  The cellBarred information in MIB is not exchanged between gNBs. In our understanding, if a cell is barred, the cell is not included in the serving cell list, so the exchanged redcap Broadcast information does not need to consider cellBarred value. On the other hand, if we need to consider cellBarred in MIB in mobility handling , ZTE suggests to introduce cellBarred filed into Served Cell Information NR IE. |
| Xiaomi2 | **Reply to ZTE.**  After further checking the specifications, we think if the cell is barred, the cell still will be included in the serving cell list, as the cell bar is not applied to IAB-MT and NTN-UE. And we understand ZTE’s concern, but currently only RedCap barring information is specified, the intension of the CR is just to make the already introduced IE aligned with RAN2 specification. |
| Deutsche Telekom | Agree with the CRs |
| Nokia | NOK.  I think this change is not correct.  The cellBarredinformation in MIB in not specific to Redcap but applicable to other UEs.  It has not been agreed that when target cell is barred this should be sent over Xn to influence handovers.  Our understanding is that previous agreements for Xn was to indicate which specific Redcap UEs are not supported b target cell. |
| NEC | understand the intention, but since the RAN node does not know the barring indicator in MIB of the cell in neighbouring RAN nodes, the way the CR is proposing does not work well, something more may be needed. but for the moment no change may be better. |
| Huawei | Ack the motivation, no strong view.  However, the behavior of legacy UE and RedCap UE should be the same. MIB bar is not designed for only RedCap UEs. Currently, the cell barring in the MIB seems not work, i.e. a connected UE can still be Handover to a target cell which is indicated as barring in the MIB. So How about normal UEs？It seems a problem. We may need to consider exchanging barring information via Xn. |
| Ericsson2 | After further discussion, we acknowledge the comments from Huawei and ZTE. RedCap UEs should not be treated differently from legacy UEs when it comes to MIB indication. Only the SIB1 aspect is specific to RedCap over Xn. |

## Indication of RedCap-specific NCD-SSB over Xn IF

In [5], it is proposed to introduce a text description about RedCap-specific NCD-SSB over XnAP, the argument is that it would be helpful to exchange RedCap-specific NCD-SSB information over Xn IF, which was agreed in RAN3 before, and NCD-SSB information can be indicated by existing IEs. Regarding how the Redcap-specified NCD-SSB is indicated, the following is the clarification from the proponent, if multiple instances of MeasTiming in the measTimingList are included in MeasurementTimingConfiguration and campOnFirstSSB and psCellOnlyFirstSSR are “true”, it means the first instance is CD-SSB, while all other instances are NCD-SSBs. And if the Redcap-specific NCD-SSBs are indicated, the receiving gNB should consider it for measurement configuration for Redcap UEs.

Below is the main part in CR for quick reference.

If the *RedCap Broadcast Information* IE is included in the *Served Cell Information NR* IE in the XN SETUP REQUEST message or the XN SETUP RESPONSE message, and multiple instances of *MeasTiming* in the *measTimingList* are included in *MeasurementTimingConfiguration*, the receiving NG-RAN node shall consider NCD-SSBs in the *measTiminglist* are RedCap specific NCD-SSBs

**Q3. Do companies agree the CR in R3-224295 [6]?**

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| --- | --- |
| Company | Comment |
| Xiaomi | Generally OK, we prefer a more general description as below.  If the *RedCap Broadcast Information* IE is included in the *Served Cell Information NR* IE in the XN SETUP REQUEST message or the XN SETUP RESPONSE message, and RedCap specific NCD-SSBs are indicated in *MeasurementTimingConfiguration*, the receiving NG-RAN node shall consider it for measurement configuration. |
| Qualcomm | Agree with intention of CR. It seems text proposed in R3-224295 is OK. |
| CMCC | Agree with the CR, but the modification text from Xiaomi is more appropriate. The receiving NG-RAN node may not consider NCD-SSBs since NCD-SSBs may not be indicated in MeasurementTimingConfiguration under some circumstances. |
| Ericsson | We are not sure if we understood the motivation. Why would the source gNB need to know about the potential BWP associated with NCD-SSB before deciding on whether it should trigger a handover towards that neighbour cell? What difference would that make considering that configuration of BWPs it is not part of that criteria such as the serving/neighbour cell related measurements? We do not think such configuration, i.e., SSB association of BWPs, should have an impact on the current mechanism for triggering handover between nodes. Once source gNB gets in touch with the target gNB, the handover command is provided by the target gNB anyway so it is up to the target gNB from that point on. Based on this understanding, we do not think this proposal is needed  [NEC-proponent answer] As discussed in our paper R3-224294, a RAN2 LS ([R2-2206662](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2206662.zip)) (RAN3 did not receive this LS) showed that RAN2 support the handover scenario a) but not handover scenario b)   |  | | --- | | RAN2 LS ([R2-2206662](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2206662.zip)):  **Q3** Are the following Handover scenarios valid from RAN2’s perspective?   * 1. Handover to a target cell’s specific Redcap BWP associated with NCD-SSB directly other than to the initial BWP associated with CD-SSB   2. Handover to a target cell’s initial BWP and further switch to the specific Redcap BWP to send the RACH      + the specific Redcap BWP associated with NCD-SSB      + the specific Redcap BWP without presence of NCD-SSB   **Answer**: From RAN2 standpoint, handover scenario a) is supported whereas scenario b) is not supported. |   Therefore in order to support handover scenario a), the source node need to know the RedCap-specific NCD-SSB of the neighboring cell over Xn.  We propose a way to know by combination of existing IE information, and only by adding procedure text is enough.  Ericsson reply: we still don’t think it is necessary, current specification text can cover scenario a)  NEC2 reply: where is the current specification text that showing the source NG-RAN node know the target Cell has RedCap specific BWP associated with NCD-SSB therefore can handover the RedCap UE to the target cell’s specific Redcap BWP associated with NCD-SSB directly?  (“handover directly” here in our understanding, mean the RedCap UE is in the source cell in RedCap-specific BWP associated with NCD-SSB, and directly handover to the target cell Repcap specific BWP associated with NCD-SSB, without switching or retuning the UE to the normal CD-SSB BWP.) |
| ZTE | Agree with CMCC. |
| Nokia | NOK.  This looks like an optimization not an essential correction.  [NEC-proponent answer] please see our explanation to Ericsson comment above. |
| NEC | This is our proposal. We think it is more important to describe in a way for the node to identify it is “RedCap specific NCD-SSBs”, then proposed wording in R3-224295 would be more appropriate. |
| Huawei | Maybe No. There is no such definition of Redcap-specific NCD-SSB in RAN2 (only Redcap specific BWP)  It proposes that "the receiving NG-RAN node shall consider NCD-SSBs in the measTiminglist are RedCap specific NCD-SSBs". But if not all NDC-SSBs are redcap specific? The restriction seems too strong. NCD-SSBs can be used for other cases. |

# Reference

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| [1] | [R3-224734](file:///D:\\会议硬盘\\TSGR3_117-e\\Docs\\R3-224734.zip) | Correction on RedCap paging capability to TS38.473 (ZTE, Ericsson, Qualcomm) |
| [2] | [R3-224762](file:///D:\会议硬盘\TSGR3_117-e\Docs\R3-224762.zip) | Misalignment with RAN2 in Redcap broadcast information (Xiaomi, Ericsson, CMCC) |
| [3] | [R3-224763](file:///D:\会议硬盘\TSGR3_117-e\Docs\R3-224763.zip) | Correction on RedCap Broadcast Information for TS38.423 (Xiaomi, Ericsson, CMCC) |
| [4] | [R3-224764](file:///D:\会议硬盘\TSGR3_117-e\Docs\R3-224764.zip) | Correction on RedCap Broadcast Information for TS38.473 (Xiaomi, Ericsson, CMCC) |
| [5] | [R3-224294](file:///D:\会议硬盘\TSGR3_117-e\Docs\R3-224294.zip) | Indication of RedCap-specific NCD-SSB over Xn IF (NEC) |
| [6] | [R3-224295](file:///D:\会议硬盘\TSGR3_117-e\Docs\R3-224295.zip) | Correction for RedCap-specific NCD-SSB information exchange over Xn IF (NEC) |