3GPP TSG-RAN WG2 Meeting #115e draftTdoc R2-2108892

Online, August 16th – 27th 2021

Agenda: 8.12.2.2

Source: Ericsson (rapporteur)

Title: Summary of [AT115-e][104][RedCap] Identification, access and camping restrictions (Ericsson)

Document for: Discussion, Decision

# 1 Introduction

This document captures the following discussion and summary:

* [AT115-e][104][RedCap] Identification, access and camping (Ericsson)

Initial scope: Continue the discussion on p3, p6, p9-p12

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals that require online discussions
    - List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Monday 2021-08-23 10:00 UTC

Initial deadline (for rapporteur's summary in [R2-2108892](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108892.zip)): Monday 2021-08-23 16:00 UTC

Proposals marked "for agreement" in [R2-2108892](file:///C:\Data\3GPP\RAN2\Inbox\R2-2108892.zip) not challenged until Tuesday 2021-08-24 0800 UTC will be declared as agreed via email by the session chair (for the rest the discussion will further continue online).

Final scope: Continue the discussion on p2 from [R2-2108892](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Inbox/R2-2108892.zip)

Intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals that require online discussions

Final deadline (for companies' feedback): Thursday 2021-08-26 1000 UTC

Final deadline (for rapporteur's summary in R2-2109131): Thursday 2021-08-26 1500 UTC

Proposals marked "for agreement" in R2-2109131 not challenged until Friday 2021-08-27 0300 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online during the CB session).

This template has been revised and only the discussion and summary directly related previous Summary proposal 2 have been kept.

The question companies are expected to provide their views on has been highlighted below.

# 2 Access/camping restrictions

The following papers discuss access restrictions, cell barring or network support for RedCap UEs and relevant indications in MIB/SIB1: [2], [7], [8], [9], [10], [12], [13], [14], [16], [18], [19], [21], [23], [24], [25], [26] and [27] (17 papers).

On cellBarred in MIB

It is stipulated by the WID and agreed in RAN2 already that SIB1 indicates barring for 1 Rx and 2 Rx branches separately for RedCap UEs. However, and open issue is what to do with the relevant *cellBarred* and IFRI indications broadcasted in MIB.

The following have been proposed by companies in the submitted papers:

* **UE ignores the existing *cellBarred* in MIB:** OPPO [2], vivo [7], Apple [10], CATT [27]

The main arguments for this option include no need for UE to check barring indication twice (in MIB and SIB1), thus simpler for implementation, more future proof considering possible RedCap-only cells or SSBs, similar solution as IAB-MT adopted.

* **UE follows the existing *cellBarred* in MIB:** Xiaomi [8], Intel [13], DENSO [18], Ericsson [23], CMCC [25]

The main arguments for this option include that there’s no need to support RedCap-specific cells and for such case other solutions exist already (e.g NPN), cellBarred should apply to all UEs e.g. when the cell is in maintenance, there can be negative impact on power consumption when UE needs to check SIB1 instead of just MIB for barring.

* **Depends on the agreement for IFRI**: NEC [20]

Arguments for this option is that barring should be done based on information in the same message i.e. MIB or SIB1.

*Rapporteur comment:* The views are split, and there seem to be valid technical points on both sides, thus it is difficult to formulate proposal on either direction.

1. [To discuss] Continue discussion on whether UE ignores or applies the existing *cellBarred* in MIB.

[Rapporteur]: P6 has not been discussed online in this meeting.

**Question 2:** Should UE apply or ignore the existing *cellBarred* in MIB?

|  |  |  |
| --- | --- | --- |
| **Company** | **Q2:Apply / Ignore** | **Comments** |
| Qualcomm | Neutral | We are neutral on this issue but have a slight preference for ignoring cellBarred in MIB, because it is desirable for UE to get all barring related information from a single message (SIB1). |
| Ericsson | Apply | We lean towards using the existing indication, e.g. if cell is in maintenance, it would benefit the UE to apply barring from MIB already. Nevertheless, both options can made to work, thus we do not have strong position and can agree majority view. |
| Apple | Ignore | While we do agree there won’t be many RedCap specific cells, doing so would make it easier for NWs with wider (>20MHz) SIB1 initial BWP BW to handle RedCap UEs (which require no more than 20MHz initial BWP BW). We had issues in LTE (CRS muting etc..) where such logic was needed, and so it’s better to have all barring related info in SIB as this ensures back-ward compatiability and co-existence. |
| Huawei, HiSilicon | Apply | No strong motivation to support the RedCap only cell, which is the intention of “ignoring”. |
| Vivo | Ignore | It has been agreed that Specify a RedCap specific IFRI in SIB1 during online discussion. Hence, RedCap UE anyway needs to check SIB1 for IFRI even if the cellbar in MIB is applied to RedCap and set to barred. Applying Cellbar in MIB when the cell is in maintenance will not save any UE power consumption for RedCap UE. |
| Nokia | Neutral | Since RedCap specific barring indications will be provided over SIB1, it would be good to always read the SIB1. However, we don’t intend to introduce RedCap only cell. |
| Sharp | Neutral |  |
| Fujitsu | Neutral | Same view as Qualcomm. |
| BT | Apply | When MIB cell barring is active, we don’t want any device to access into the cell and that includes RedCap.  With this reasoning, if MIB is ignored, RedCap device will be forced to read SIB and it will find it is barred resulting in a waste of power consumption. |
| Thales | Neutral | No strong view, both options can work. Slight preference for UE to apply barring from MIB already. |
| Futurewei | Neutral | Same view as Qualcomm. |
| Xiaomi | Neutral | We don’t want to introduce Redcap only cell. So slightly prefer not to ignore. |
| Intel | Apply | We do not see the need to introduce a new mechanism to support RedCap specific cell. And therefore legacy cell bar indicator in MIB shall also be applied for RedCap UEs. |
| Sequans | Ignore | We anyway have more sympathy with the “ignore” considerations. Given that RedCap IFRI was agreed for SIB1, we think there is no drawback in having this indication only there as well.  However, we are OK to agree based on majority. |
| ZTE | Ignore | Since RedCap UE anyway needs to read SIB1 to check RedCap specific IFRI, to ignore cellbar in MIB will not cause additional UE power. In addition, cell barring is rare case, reading SIB1 for RedCap specific cellbar should be acceptable. |
| NEC | Ignore | we thought both cellBarred and IFRI in MIB should be treated similarly, i.e. if cellBarred is applied, IFRI is also applied or vice versa. Now that RedCap specific IFRI in SIB1 has been agreed, cellBarred in MIB can be ignored. |
| NTTDOCOMO | Apply | If the cell is in maintenance, it is more straightforward for UE to directly apply barring in MIB as legacy. |
| MediaTek | Apply | While both options can work, we do not see a strong justification for RedCap specific cells. Therefore, we would prefer to apply cell barring in MIB to RedCap UEs. |
| Spreadtrum | Neutral | This may depend on if there is Redcap only cell. A slight preference for ignoring cellBarred in MIB, to keep the possibility for Network operator to deploy Redcap only cell. |
| OPPO | Ignore | This is the most straightforward and flexible way. |
| CMCC | Apply | We don’t intend to support RedCap only cell. |
| ChinaTelecom | Ignore | Same view as ZTE. |
| LGE | Ignore, see comment | It depends whether RedCap only cells exist or not. |
| Lenovo | Apply | Also, we can agree majority view. |
| CATT | Ignore | Agree with ZTE. Also similar discussions in R16 IAB where it was agreed to ignore barring in MIB. |
| DENSO | Apply | E.g. for maintenance and an NSA-only cell, in particular both MIB and SIB1 is broadcast (for ANR). |

Summary for Question 2

26 replies have been provided, where 9 companies have replied ‘apply’, 9 companies have replied ‘ignore’ and 8 companies replied ‘neutral’.

Companies who replied ‘apply’ think there would be no RedCap specific cells, and that ignoring MIB may lead to increased UE power consumption in case the cell is barred for all UEs.

Companies who replied ‘ignore’ prefer SIB as the IFRI has been agreed to be put there, and also explain there may not be increased power consumption (as response to concern).

The responses are split 9/9/8. However, most (5) of the ‘neutral’ companies indicate slight preference towards ignoring, therefore proposal is made favoring the ‘ignore’ option:

**Summary proposal 2: [For agreement] [9/9/8] RedCap UE ignores the existing cellBarred in MIB.**

**Question: Do you support the above proposal: “RedCap UE ignores the existing *cellBarred* field in MIB”?**

Please provide further arguments supporting your view, if needed.

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| **Company** | **Support y/n?** | **Comments** |
| Apple | Yes | It would be better (and logical) to keep barring along with (agreed) IFRI, and so this is one more reason for the UE to ignore MIB cellBarred. Also as mentioned earlier, without this, the NW deployment options for RedCap would be restricted in cells where the initial DL BWP is >20MHz. And we also agree with ZTE’s view above as an additional reason.  More reasons to support than not support ☺. |
| BT | No | Still lack to see any argument about how a RedCap that ignores CellBarred in MIB will reduce their costs. On contrary, it will be required extra investment on operational side for operators with new logic and new tests.  With latest agreement, IFRI is used to identify if the cell support RedCap devices that is completely different to say that RedCap are barred from that cell. We are mixing things here.  Can anyone explain how a RedCap that ignores CellBarred in MIB can granted the access into a cell which initial BWP > 20MHz if the maximum BW supported by RedCap is 20MHz? What is the difference between apply and ignore for this specific case?  In reference to ZTE comments about power consumption, is it possible to prove that is it beneficial for RedCap to ignore MIB cellBarred?  From an operational point of view, any operator that wants to manage UE and RedCap in the same way, is forced to manage them separately due to there are two different rules to bar a UE and a RedCap.  About simplicity, how is it possible that a new mechanism is simpler than legacy?  Operators have the logic MIB CellBarred – IFRI, can anyone provide a technical reason that justifies the new required logic on the operation side?  Finally, dedicated RedCap cells is not part of the WI description, but it is the result of a RedCap ignoring MIB cellBarred. |
| Qualcomm | Yes | It is easier for UEs if all cell barring indications are in the same SIB.  It is more flexible if UE ignores *cellBarred,* although currently there is no clear use case of RedCap only cells. |
| Futurewei | Leaning towards Yes | Given RAN2 has agreed on a common RedCap-specific IFRI in SIB1, if the cellBarred in MIB is set to *barred*, a RedCap UE still needs to read SIB1 to know if it can reselect a neighboring cell on the barred frequency channel or not. So, it may be untrue to say that “ignoring MIB may lead to increased UE power consumption in case the cell is barred for all UEs”, as the RedCap UE anyway needs to read SIB1 (for the RedCap-specific IFRI).  If the RedCap UE doesn’t read SIB1 and instead tries to apply the IFRI in MIB, then in following scenario the UE may end up using more power as well: The operator’s policy is to bar RedCap UEs throughout an area on a frequency channel. One cell on the frequency channel is taken out for maintenance but the neighboring cells are operational (for non-RedCap UEs). So, the cellBarred in MIB is set to *barred* and the IFRI in MIB is set to *allowed*. If following the IFRI in MIB, the RedCap UE may attempt to reselect a neighboring cell on the barred frequency channel, only to find out that it is barred there as well.  So, Qualcomm’s argument would make a sense if the RedCap UEs anyway have to read SIB1. |
| LGE | Yes | RedCap UEs read SIB1 and we don’t know yet whether RedCap only cells can be supported or not. |
| Fujitsu | Yes | RedCap UEs can read SIB1 to determine whether the cell is allowed for camping. |
| Intel | No | Agree with BT. Fail to understand how “ignore checking bit in MIB” can reduce the cost. |
| OPPO | Yes | This is more flexible and more future-proof. |
| Huawei, HiSilicon | No | There is no so-called low-complexity benefit, since RedCap anyway has to read the MIB.  For the flexibility, the only motivation to ignore cellBarred in MIB, i.e. the motivation gNB set barring differently in SIB1 for RedCap and in MIB for legacy, is for RedCap only deploy cell purpose, which is not the consensus yet. |
| Ericsson | No | Agree with BT and HW comments – there is no way around UE not reading MIB and in the end only motivation to ignore *cellBarred* would be to enable RedCap-only behaviour. |
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# 4 Summary

**TBD**

# 5 Conclusion

**TBD**

# 6 References

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