3GPP TSG-RAN WG2 Meeting #126 R2-240xxxx

Fukuoka, Japan, May 20-24th, 2024

**[POST125bis][019][Emergency Calls] Common solution (Lenovo)**

**Intended outcome: Discuss need for a common solution and possible solutions for a common framework**

**Deadline: two weeks**

**Please fill in the below table:**

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| --- | --- |
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**Phase 1 Completed**: Deadline 29th April UTC 22:00

**Phase 2**: Deadline for Phase 2: May 3rd, UTC 12:00

Let’s start with clarifying the aim of the common solution, as:

1. Common solution for EM Calls aims only UEs which are capable of EM Calls “in this cell”. Similar to (e)RedCap endorsed CRs, it will required to be defined how UE determines that UE can make EM calls in the cell under consideration.
2. Common solution aims at enabling EM Calls for EM call capable UEs that are otherwise barred in the cell either due to MIB barring or feature specific SIB1 barring.

Based on the discussion in Phase 1, the most acceptable and working solution seems: **One explicit bit in SIB1 to indicate if cell supports EM calls irrespective of the feature(s) supported in the cell**. This bit will replace (e)RedCap barringExempt-eRedCap bit and therefore does not pose any further signalling load in SIB1. This information is used by a UE capable of EM Calls, barred in the cell and having no suitable cell to camp on.

**Q1: Is an explicit 1-bit indication in SIB1 replacing *barringExempt-eRedCap* bit acceptable to your company? The 1-bit indication in SIB1 is to be used to indicate if cell supports EM calls irrespective of the feature(s) supported in the cell. It is to be used by a UE when it is considered barred in the cell and has no suitable cell to camp on, to obtain limited services.**

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| Company name | Yes/ No | Comments |
| ZTE | Yes,  with some clarifications (please see the comments) | We would like to add that the above should only be the case if the UE can access the cell normally (i.e. there is no issue with supported bandwidth, duplex mode etc) and MIB is not set to barred.  So, to be clear, in this case, we still need all the text below in Red (from the endorsed R2-2402903) which is to check that the UE can access the cell “normally” although it has fewer number of Rx antennas)- the only change is the actual SIB1 bit:  -----------------  When *cellBarredRedCap1Rx* is set to “barred” in SIB1, a RedCap UE that supports only 1Rx branch can consider the cell as acceptable cell, only if cell selection criteria are fulfilled as defined in clause 5.2.3, *cellBarred* in MIB is not set to “barred” and in SIB1, *barringExemptIndication* is set to “true” and, if the RedCap UE supports only half duplex FDD operation, *halfDuplexRedCapAllowed* is set to “true” and, *intraFreqReselectionRedCap* is present in SIB1; or  -----------------  Btw, the turquoise highlighted text above seems to be missing from R2-2402903 (and 3472)?? Shouldn’t this check also be there?? i.e. for the emergency calls for 2RX/1RX to be allowed the cell should support (e)redcap in the first place, right??  Similar text as above can then be reused for eRedcap (with the same “barringExemptIndication” bit and for both 1Rx and 2Rx cases).  Then, for XR we can add similar text too (e.g. as below):  ------------------ proposed text for XR -----  When *cellBarred2RxXR* is included in SIB1, an XR UE that supports only 2Rx branches can consider the cell as acceptable cell, only if cell selection criteria are fulfilled as defined in clause 5.2.3, *cellBarred* in MIB is not set to “barred” and in SIB1, *barringExemptIndication* is set to “true”; or  -----------------  Finally, for NES since the barring is based on MIB, we don’t think we need to do anything. i.e. when the MIB is set to barred and the cellBarredNES is present (note that cellBarredNES being present indicates that cell is actually **not barred**), the NES UE will anyway consider the cell as suitable cell. So, for this case, we don’t think anything is needed for the exemption (since the NES UE can access the cell normally for everything including EM calls).  Btw, an alternative for the above is to allow UEs by default without checking the “*barringExemptIndication*” bit. If the intention is to go this way, it is also fine, but then this should be used for all cases. In this scenario, we still need all the above checks for each feature (to ensure EM calls can be performed in the cell), but without the check for the *barringExemptIndication* bit. |
| Huawei | Partially Yes, but | We still prefer and also seems more supported option B that there is no need of this *barringExemptIndication* bit (also mentioned above by ZTE).  Rapp) It was not clear how the Option B would be implemented, even if many companies liked it…the problem was how to define “subset of features” that will stand good with time i.e., for future features still allow EM calls to past UEs.  If clear majority prefer to introduce on bit control, we can accept to reuse/rename the barringExempt-eRedCap for 1 bit explicit control for R18 features  But, this emergency call should only be used if the cell is not barred due to MIB *cellbarred*. We should not override the MIB cell barring function which has been there since R15 (this is also the principle for the last meeting agreed RedCap CRs.). |
| Apple | No | We have concerns with re-interpreting the Redcap bit. That redcap bit is meant to also allow R17 redcap UEs to utilize the cell for EM calls. It will create confusion and likely corner cases if a single bit will link rel-17 Redcap and all Rel-18 features.  Rapp) The R17 part is the next question and I understand HW point about R17 already on the field.  ZTE2: We need to understand why we need such bit for RedCap (but not for eRedCap and/or XR). The point is that there is nothing special the network needs to do to support EM call for a 2RX/1RX UE (the only implication is that these UEs have slightly inferior performance, but the EM call itself should go through regardless). If this assumption is wrong, then we need separate bits for each feature. Given that there is no issue to support EM call as such even in existing networks as long as the network supports (e)RedCap, then we don’t really understand what is the difference between eRedCap/XR and RedCap as far as EM calls are concerned.  We think it is simple to just allow EMs calls for R18 and future features where they have similar cases as eRedCap and NES. AND do this without any new bit – why would we need to consider NWs which support and which do not support EM calls by the Rel-18 UEs when we already know that EM calls are possible even when the UE bars the cell (with the conditions that ZTE listed). We do not see the need for additional SIB1 bit! This will only complicate where both the NWs and UE need to have procedures with the presence and absence of this bit.  No need for a SIB1 bit for eRedCap, NES and any other R18 and future features.  Rapp) This “default” allowing EM calls will make MIB barring or complete barring (not even EM Calls allowed) impossible, or? |
| Ericsson | No | As we tried to explain during the first phase of this discussion, the problem does not seem to be common for all cases mentioned in this document. For example, barring bits for RedCap UEs that support 1Rx/2Rx are introduced so that operators can control access of such UEs when RedCap feature is enabled in the cell. It was due to a concern that those UEs may have an impact on performance in the cell, not because it was not technically possible for those UEs to operate in the cell. On the other hand, for NES cells  it is not about performance degradation. It is rather that UEs that do not support NES will not be able to operate in the cell unless NES features are disabled. So barring exemption cannot simply be a solution, at least by itself. One can say that for XR the case is similar to the case for RedCap UEs with 1Rx/2Rx, but then the question is if operators would be willing to bundle such access control together, i.e., it will not be possible to bar devices that are RedCap with 1Rx branch yet allow XR devices with reduced receiver branches.  Rapp) Operator input is helpful here – So far, I am not sure if there’s a need to control RedCap with 1Rx branch separately from XR UEs for EM calls. My understanding from talking to operators was that the cell/ operator is willing to allow EM Calls as much as possible. And so, I assume a “temporary” and hopefully not huge performance hit should be acceptable. The question is here about "technical e.g., hardware feasibility" - so, I agree that the UE needs to understand if it can make EM Calls in "this" cell. But this determination will have to be specific for each feature and will need to be described in 38.304 per feature as in endorsed CRs for (e)RedCap. With aiming for the common bit, we are going with the belief that an operator allows (or not) EM Calls for "any" UE capable of EM Calls in "this" cell. In other words, operator is (not) willing to take a performance hit and allow EM Calls as long as it is technically possible. The "willingness" might also be regulatory in many cases.  Alternative is to have one bit to control EM access per feature.  ZTE2: Agree with Rapporteur view. So, the question really is whether operators really want to differentiate between UEs with different features as far as 2RX UEs are concerned for EM calls. i.e. for emergency call, is a 2RX XR UE different to a 2RX RedCap UE? If the answer is yes from operator perspective, then we need separate bit for each feature. If it is no, then we don’t need a separate bit.  Yet another criteria that should be considered is that how it would be possible for a UE to interpret a feature that it does not support so that the UE can judge whether it can camp in the cell to perform an EM call if there is an exception.  Rapp) That’s the benefit of the common bit since it will be then not require to interpret past/ future features. |
| Qualcomm Incorporated | See comment | We are still not 100% clear about the use case.  We believe this solution is only meant for the scenario where the cell is barred for UEs supporting a certain feature and is not barred for regular UEs, and allow emergency call by the former “feature UEs”.  Rapp) It is the other way round i.e., cell allows access only to NES/ 2Rx UEs. So, remaining UEs can’t make EM Calls as these are considered barred.  Such scenario seems to be only applicable to RedCap and XR 2Rx. We do not see any use case of such scenario in ATG, NTN and NES.  Rapp) NES is relevant as explained above. NTN and ATG cells will not be accessed by TN UEs and so that general discussion of UE being capable of EM calls “in this cell” still holds true.  ZTE2: I had the same understanding as Masato. We need to figure out solution for any case where the UE can access the cell normally (i.e. MIB not barred and system information can be obtained normally etc) whilst SIB1 indicates it is barred (e.g. because of fewer antennas etc). Currently the only features as of today are XR 2RX, Redcap (2 and 1 Rx) and eRedCap (2 and 1 RX). We don’t think we are trying to solve the case for NES. But seems there is different understanding on this issue?? May need further discussion perhaps…  We also think even if there is a common exempt bit is defined, RAN2 still need to additionally specify which type of UEs and features the exemption is applicable, because it depends on the amount of the impact to the system when the emergency call is exceptionally allowed.  Rapp) True. The UE needs to understand if it is capable of making EM calls in this cell, given what the cell is supporting.  ZTE2: Indeed, along with the exemption bit, there should be other rules to check that the feature specific UE can actually access the cell normally (we showed example text for each feature (redcap, eRedCap and XR in our comment above)  All in all, we suggest RAN2 discuss the use case and impact for induvial feature before jumping on to a “common solution”. |

**Q2: Can the same 1-bit indication in SIB1 be applicable to Rel. 17 UEs, specifically for RedCap UEs (i.e., *barringExempt-RedCap* is not required anymore) as well to obtain limited services? And for this purpose, a magic sentence in the Rel. 17 CRs is sufficient?**

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| Company name | Yes/ No | Comments |
| ZTE | Yes | One bit can indicate the barring exemption and we should capture that the barring exemption according to this bit is applicable only if the UE can access the cell normally please see the comment above. |
| Huawei | No | We should not bound the R18 feature and R17 feature together, which will delay the network to consider enable this feature for RedCap.  R17 RedCap is already deployed. The *barringExempt-RedCap* is to somehow indicate whether the network has been upgraded to support this TEI feature.  ZTE2: This reasoning is a bit unclear to us. What exactly is incompatible in the Rel-17 network to support EM call in this case for 2RX UEs? If there is something that needs to be done at the network side, then same reasoning should apply also for Rel-18 and future UEs including eRedCap and XR. We think there is nothing that the network needs to do and hence we can have the RedCap UEs also without any explicit bit if we were to go this way. |
| Apple | No | Same reason as HW and also pls see our comments above. |
| Ericsson | No | Please see our reply for the first question. |