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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| --- | --- |
| **Contact person – Company** | **Email** |
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**Discussion**

When cell status "barred" is indicated or to be treated as if the cell status is "barred", as specified in Ch. 5.3.1 of 38.304, the UE is not permitted to select/reselect this cell, not even for emergency calls. Some wireless features are introduced (in Rel. 17, 18) which allow access only for UEs supporting that feature, barring access to all other UEs. This prohibits emergency calls for non-feature UEs, which is unfortunate if both the UE and the network are otherwise capable of supporting an emergency call or public safety service. To enable emergency support, REDCAP CRs were endorsed in the Changsha meeting and the problem is similar for NES feature:

NES feature in Rel. 18 allows cell access only for UEs supporting NES feature. In such a case not only legacy UEs (that obviously do not support this new feature) but also new UEs (specified/ developed according to the same 3GPP release as for the new feature) would not be able to access the cell. These UEs are barred using the *cellBarred* IE included in the Master Information Block (MIB). This prohibits the emergency call establishment from these UEs. This could be detrimental and unfortunate since the cell, even if supporting the new feature, may still be capable for supporting emergency calls. For example, for NES (Network Energy Saving), the network must listen to the PRACH occasions configured in the cell, as in previous releases. Besides this, once the gNB recognizes there is an emergency call or public safety related service (e.g., MPS or MCS), the network should ensure that there is no impact to that service (e.g., it may release or deactivate cell DTX/DRX configuration). So, it would be unfortunate if non-NES UEs (i.e., legacy UEs not supporting NES feature or release 18 UEs not supporting NES feature) can’t make an emergency call while the network is equipped to support it**.**

We can introduce a feature specific barring-exempt bit for each feature in addition to the ones in the endorsed REDCAP CRs, but this email discussion aims for finding a common solution for supporting emergency calls in feature specific scenarios/ cells. This will relieve the SIB1 signalling load, keep our specification lighter e.g., needing less text in 38.331 and 38.304 and simplify UE implementation/ testing efforts. If the common solution is generic enough it may also take care of new features coming in Rel. 19 onwards. However, one may argue that this comes at a price of reduced network control e.g., if network would only want to allow emergency calls for non-NES UEs but not for say REDCAP UEs (or vice-versa). Given the principle that emergency calls should/ must be supported until these can’t be e.g., due to real cell maintenance, the extra operator control for supporting emergency calls appears to be overkill/ un-necessary in rapporteur’s opinion.

**Q1: Would your company support a common solution for supporting emergency calls in feature specific scenarios/ cells?**

Table 1

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| --- | --- | --- |
| Company name | Yes (=common solution); No (=feature specific) | Comments |
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Assuming RAN2 is willing to find a common solution for supporting emergency calls, following options are possible.

**Option A: Reuse one of the existing feature specific barring bits broadcasted in SIB1 and repurpose this to have a common meaning.**

To explain we can take following example:

Ex) One can repurpose ‘*cellBarred-eRedCap1Rx*’ bit and say that not only eREDCAP UEs but any other e.g., even NES UEs (and any other UE barred otherwise) can camp in limited service and therefore consider this cell as “acceptable”, when this bit is set to “not barred”. Of course, RAN2 may decide to use another bit e.g., ‘*cellBarredNES’* or something else.

Some initial Pros-Cons analysis is done here for this option. Kindly keep adding to the table:

Table 2

|  |  |
| --- | --- |
| Pros | Cons |
| Rapp: No ASN.1 impact. | Rapp: Can confuse the feature specific UEs. For example, if RAN2 decides to use ‘*cellBarredNES’,* then in cells where NES isnot intended to be supported, NES UEs will wrongly assume that this is a NES-only cell. This is not a big issue for the said example (as NES UEs can easily survive in “normal” cells) but will be quite problematic if ‘*cellBarred-eRedCap1Rx*’ bit is used for the said purpose and a cell does not indeed support ‘*cellBarred-eRedCap1Rx*’ UEs. Even reuse of ‘*cellBarredNES’* could be seen as problem if NES UEs find every cell as NES, it could have future repercussions. |
| Company X: | Company Y: |

**Q2: Do you think Option A works, and is this your preferred (P), acceptable (A), not-preferred (N-P) solution?**

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| Company name | P/ A/ N-P | Comments |
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**Option B: Agree to a general principle that if cell allows access for any feature (from a subset of features), it supports emergency calls.**

To explain, if the cell allows camping of any (feature-specific) UE, the emergency call for all UEs is supported on the cell. This will mean if one or more of the specific barring bits in SIB1 is set to “not barred”, a UE can camp in limited service and therefore consider this cell as “acceptable”. The said bits are already listed in Ch. 5.3.1 (and of course defined in SIB1) e.g., *cellBarredATG, cellBarred-eRedCap1Rx, cellBarred-eRedCap2Rx, cellBarredNES etc.* Please note that some bits may not be used for this purpose e.g., *cellBarredNTN* as this requires the UE to be NTN capable, and also *cellReservedForOperatorUse/* *cellReservedForOtherUse/ cellReservedForFutureUse* etc. is better left untouched. For the remaining bits (*halfDuplexRedCapAllowed, iab-Support, ncr-Support, mobileIAB-Support*) some further discussion in RAN2 may be needed to decide if these can be included in the said subset of features.

Some initial Pros-Cons analysis is done here for this option. Kindly keep adding to the table:

Table 3

|  |  |
| --- | --- |
| Pros | Cons |
| Rapp: No ASN.1 impact. | Rapp: This option works and sounds very good in principle (“allow one – allow all for emergency”) but maintenance (of the subset of features) could be an issue in future. For example, a R18 UE implementing this common-emergency solution might consider itself barred even for emergency calls if a new feature restriction introduced on R19/ R20 restricting access for that future-specific UEs is used. Some companies may wish to downplay this risk assuming 5G is nearing its term. |
| Company X: | Company Y: |

**Q3: Do you think Option B works, and is this your preferred (P), acceptable (A), not-preferred (N-P) solution?**

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| --- | --- | --- |
| Company name | P/ A/ N-P | Comments |
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**Option C: Use of ‘*ims-EmergencySupport*’ to allow cell camping for UEs to obtain limited services.**

The bit was intended to support emergency calls in rel. 15 for roaming UEs that can’t register itself to obtain normal services. Now RAN2 needs to think if this bit can be repurposed without distorting its original meaning and without causing inter-operability issues e.g., what happens when a new UE implementing repurposed ‘*ims-EmergencySupport*’ initiates emergency call in an older release (say R15) network. Is it a problem to allow emergency call to registered UEs (which consider the cell as barred due to MIB *cellBarred* set to ‘*barred’*) when allowing limited service to roaming UEs (‘*ims-EmergencySupport*’ set to ‘true’)? A new release network will set the ‘*ims-EmergencySupport*’ set consciously to ‘true’ to allow emergency call (or not) i.e., to roaming UEs and non-feature UEs. If the network does not want this since it wants to really bar the cell e.g., for maintenance purpose it may set MIB *cellBarred* to ‘*barred’* and not broadcast‘*ims-EmergencySupport*’. So, still providing full control to the network operator.

The field description of this IE says the following:

***ims-EmergencySupport***

Indicates whether the cell supports IMS emergency bearer services **for UEs in limited service mode**. If absent, IMS emergency call is not supported by the network in the cell for UEs in limited service mode.

Therefore, it is sufficient to allow the non-feature UEs which are otherwise barred in the cell to treat the cell as acceptable cell when *ims-EmergencySupport* is ‘true’. This can be achieved as an example with the following change only:

|  |
| --- |
| 4.5 Cell Categories  The cells are categorised according to which services they offer:  **acceptable cell:**  An "acceptable cell" is a cell on which the UE may camp to obtain limited service (originate emergency calls and receive ETWS and CMAS notifications). Such a cell shall fulfil the following requirements, which is the minimum set of requirements to initiate an emergency call and to receive ETWS and CMAS notification in an NR network:  - The cell is not barred, see clause 5.3.1 or *ims-EmergencySupport* is broadcasted.  - The cell selection criteria are fulfilled, see clause 5.2.3.2. |

The TS 38.304 already ensures that UEs select such a cell only when there’s no other cell available as specified in Ch. 5.2.8 (Camped on Any Cell state).

Some initial Pros-Cons analysis is done here for this option. Kindly keep adding to the table:

Table 4

|  |  |
| --- | --- |
| Pros | Cons |
| Rapp: No ASN.1 impact. | Rapp: Likely only “notional” issues in reusing an old bit? |
| Rapp: No dependency on future/ current list of feature specific cell/ scenario. |  |
| Company X: | Company Y: |
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**Q4: Do you think Option C works, and is this your preferred (P), acceptable (A), not-preferred (N-P) solution?**

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| Company name | P/ A/ N-P | Comments |
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**Option D: We introduce a new bit in SIB1 to explicitly (dis)allow a non-feature UE to consider the cell as acceptable.**

Some initial Pros-Cons analysis is done here for this option. Kindly keep adding to the table:

Table 5

|  |  |
| --- | --- |
| Pros | Cons |
| Rapp: Clean, generic.  Forward compatibility.  No inter-operability issues: Old UEs in new network will not see/ use this and new UEs in old network can’t make emergency when MIB barring is used but no new issues crop-up. | Rapp: ASN.1 change at this late stage of R18. |
| Company X: | Company Y: |
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**Q5: Do you think Option D works, and is this your preferred (P), acceptable (A), not-preferred (N-P) solution?**

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| Company name | P/ A/ N-P | Comments |
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**Option E: Any other option?**

**Conclusion**

**References:**

1. [R2-2402903](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_125bis\Docs\R2-2402903.zip) Introduction of barring exemption for RedCap UEs for emergency calls [RedCap\_EM\_Call] Apple, China Telecom, Vodafone, Verizon, TMobile USA, ZTE, Vivo, Ericsson CR Rel-18 38.304 18.1.0 0380 2 B TEI18 [R2-2400931](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_125bis\Docs\R2-2400931.zip)
2. [R2-2403472](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_125bis\Docs\R2-2403472.zip) Introduction of barring exemption for eRedCap UEs for emergency calls [RedCap\_EM\_Call] Apple, China Telecom, Vodafone, Verizon, TMobile USA, ZTE, Vivo, Ericsson CR Rel-18 38.304 18.1.0 0381 2 B TEI18 [R2-2403141](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_125bis\Docs\R2-2403141.zip)
3. [R2-2402902](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_125bis\Docs\R2-2402902.zip) Introduction of barring exemption for RedCap UEs for emergency calls [RedCap\_EM\_Call] Apple, China Telecom, Vodafone, Verizon, TMobile USA, ZTE, Vivo, Ericsson CR Rel-18 38.331 18.1.0 4570 1 B TEI18 [R2-2400930](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_125bis\Docs\R2-2400930.zip)
4. [R2-2402904](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_125bis\Docs\R2-2402904.zip) Introduction of barring exemption for eRedCap UEs for emergency calls Apple, China Telecom, Vodafone, Verizon, TMobile USA, ZTE, Vivo, Ericsson CR Rel-18 38.331 18.1.0 4571 1 B TEI18 [R2-2400932](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_125bis\Docs\R2-2400932.zip)
5. [R2-2403000](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_125bis\Docs\R2-2403000.zip) Emergency Call in Feature specific cells Lenovo discussion