3GPP TSG-RAN WG2 Meeting #116 electronic R2-210xxxx

Online, November 1-12, 2021

Agenda Item: 8.24.3 Other

Source: Ericsson

Title: Summary of [AT116-e][053][NR17] MINT (Ericsson)

Document for: Discussion, Decision

# 1 Introduction

This contribution summarizes the following discussion:

* [AT116-e][053][NR17] MINT (Ericsson)

      Scope: Take into account on-line agreements, take into account also LS in [R2-2109818](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2109818.zip) and tdocs submitted. Determine TS impacts, arrive at agreeable CR and Reply LS out.

      Intended outcome: Report, Endorsed Draft CRs to 38304 38331, and Approved LS out. It is assumed this can be done offline.

      Deadline: EOM

In order to complete by the EOM, the rapporteur suggests two phases. The first phase to conclude on the open issues discussed in this document. Followed by the second phase where LS out and potential draft CRs will be produced.

**First phase:**

* Conclude issues discussed in this document.
* Deadline for input: Wednesday 23:59 UTC.

**Second phase:**

* Prepare LS out
* Prepare draft CRs
* Deadline: EOM.

Contact person(s) for each participating company:

|  |  |
| --- | --- |
| Company | Contact Name, Email |
| Lenovo | Hyung-Nam Choi, hchoi5@lenovo.com |
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| Qualcomm | oozturk@qti.qualcomm.com |

# 2 Discussion

## 2.1 Summary of discussion at RAN2#116

Below is an excerpt from RAN2 chair notes at RAN2#116 for the MINT discussion.

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| --- |
| MINT  Online Friday W1   * [AT116-e][053][NR17] MINT (Ericsson)   Scope: Take into account on-line agreements, take into account LS in [R2-2109818](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2109818.zip) and tdocs submitted, see below. Determine TS impacts, arrive at agreeable CR and Reply LS out.  Intended outcome: Report, Endorsed Draft CRs to 38304 38331, and Approved LS out. It is assumed this can be done offline.  Deadline: EOM  [R2-2109816](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2109816.zip) Reply LS on UAC enhancements for minimization of service interruption when disaster condition applies ([C1-216253](http://www.3gpp.org/ftp/tsg_ct/WG1_mm-cc-sm_ex-CN1//TSGC1_132e/Docs//C1-216253.zip); contact: Ericsson) CT1 LS in Rel-17 FS\_MINT-CT To:RAN2  [R2-2110681](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2110681.zip) RAN2 aspects for MINT Ericsson discussion Rel-17  [R2-2109834](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2109834.zip) Selection of MINT UAC solution Lenovo, Motorola Mobility discussion Rel-17 FS\_MINT-CT   * 3 tdocs noted   COMMENTS by PROPONENTS, on 40 vs 38  - Ericsson think that 38 impact the procedure text, so 38 is a little more complicated.  - Lenovo think both solutions require text update on access identity 3, 40 has the minor drawbacks that there is an additional calculation step, and there is a dependency on configuration for Accedd id 0. So prefer 38.  - Ericsson think the example in Lenovo paper is not the way it should be done.  DISCUSSION on 40 vs 38  - LG agree with Lenovo. Difference is very small. But prefer 38.  - Chair wonder if there is ever a case when configuration for ID 0 is not there.  - Apple think that If they are independent than reconfiguration in easier, but agrees the comment by ericsson on procedure impact thus prefer 40.  - Chair: Both solutions seems acceptable and rather small. SOH (preference) shows a slight majority for 38.  - Huawei think we need to discuss the details.  - Lenovo think this is a WI in CT and SA right now.   * Will use solution 38 * Send reply LS   Chair: We discuss the other parts offline (support for LS in [R2-2109818](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2109818.zip) acc to input tdocs), including LS out. Attempt to arrive at agreeable TP  [R2-2109818](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2109818.zip) LS on system information extensions for minimization of service interruption (MINT) ([C1-216297](http://www.3gpp.org/ftp/tsg_ct/WG1_mm-cc-sm_ex-CN1//TSGC1_132e/Docs//C1-216297.zip); contact: Ericsson) CT1 LS in Rel-17 MINT To:RAN2 Cc:SA2  - LG think a and b in the LS doesn't impact RAN2 solution. Think it only affects NAS.  - Lenovo has different opinion, and think the signalling cen be different for the PLMNS that share a cell in RAN sharing. Apple agrees and think we should discuss new SIB existing SIB etc.   * Noted, will take into account offline   [R2-2111243](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2111243.zip) LS on MINT functionality for Disaster Roaming ([S2-2108172](http://www.3gpp.org/ftp/tsg_sa/WG2_Arch//TSGS2_145E_Electronic_2021-05/Docs//S2-2108172.zip); contact: LGE) SA2      LS in     Rel-17   MINT   To:SA3, SA5, CT1, CT4, CT6, RAN2      Cc:SA, CT, RAN   * Noted (wo pres, no action)   [R2-2109835](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2109835.zip) Discussion on system information extensions for MINT Lenovo, Motorola Mobility discussion Rel-17 FS\_MINT-CT  [R2-2111146](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2111146.zip) RAN2 impact for supporting disaster roaming LG Electronics discussion Rel-17  [R2-2111147](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2111147.zip) Text proposal to 38.331 for solution 38 and 40 LG Electronics discussion Rel-17  [R2-2111224](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2111224.zip) RAN2 impact from MINT Apple discussion Rel-17 FS\_MINT-CT Late |

## 2.2 Remaining open issues

### 2.2.1 Implementation of UAC solution 38

In the online session the UAC solution 38 was agreed. On the details for implementing this solution the following options are proposed:

Option 1: In [R2-2109834](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2109834.zip), Lenovo suggests introducing the new specific barring factor for Access Identity 3 in SIB1 by an R17 NCE of existing *uac-BarringInfoSetList*.

Option 2: In [R2-2111146](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2111146.zip), LG suggests to introduce the new specific barring factor for Access Identity 3 in SIB1 by a new IE *UAC-BarringInfoSetListDisaster-r17* and a new IE *UAC-BarringPerCatDisaster-r17* to indicate mapping between Access Category and *uac-BarringInfoSetDisaster-r17*.

**Q1: Which option do you prefer for implementing UAC solution 38?**

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| --- | --- | --- |
| **Company** | **Option 1 / Option 2** | **Comments** |
| LGE | Option 1/2 | We do not have a strong preference. Fine with majority view. |
| Lenovo | Option 1 | We think that Option 1 limits the impacts to procedure text and ASN.1 since it does not change the existing mapping between Access Category and uac-BarringInfoSet, and works for both implicit and explict configuration of UAC barring information.  Option 2 has the drawbacks that it requires some more changes to procedure text due to the new IEs (see TP R2-2111147). Furthermore, acc. to the ASN.1 example given in R2-2111146, the solution works only for the explict configuration of UAC barring information and not for the implicit configuration option. |
| Huawei, HiSilicon | Option 2 | Option 2 seems slightly clearer, but we don’t have strong view and can go with the majority. |
| Qualcomm | Option 1 | Prefer Option 1 for the same reasons Lenovo mentions. It is better to keep the existing Access Cateorgy mapping since the barring time will come from this one. We can accept Option 2 if the majority prefers. |
| Nokia | Option 1 | Share Lenovo and Qualcomm view. |

### 2.2.2 Applicability of the special Access Identities 1, 2, 11 to 15

Beside Access Identity 3 a disaster roaming UE may be configured by its HPLMN with one or multiple special Access Identities 1, 2, 11 to 15. However, the applicability of the special Access Identities in the PLMN that offers disaster roaming service is not clear. This issue was briefly discussed in RAN2#115-e meeting but there was no consensus. In [R2-2111146](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2111146.zip) LG proposes that the UE attempting for disaster roaming access is configured with Access Identity 1, 2 or 11 to 15 and 3, only Access Identity 3 specific barring is applied.

**Q2: Do you agree that the UE attempting for disaster roaming access is configured with Access Identity 1, 2 or 11 to 15 and 3, only Access Identity 3 specific barring is applied?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| LG | Y/N | Although we proposed that for UE attempting for disaster roaming access is configured with Access Identity 1, 2 or 11 to 15 and 3, only Access Identity 3 specific barring is applied, we are fine with a slightly different conclusion.  The reasoning of our poposla is relying on the assumption that Access Identity 1,2, and 11 to 15 may be retained even in case of disaster roaming access (this is not clear from any SA1/2/CT1 specification though). Depending on whether the assumption is valid, we have two cases:.  Case a) If that is a valid assumption, we should decide what UAC shall apply for access with such AIs. Currently, there is no UAC requirements applicable to disaster roaming access with AI 1,2 and 11 to 15, and SA2/CT2 did not consider other UAC requirements than AI3 for disaster roaming. This is the motivation of the proposal in [R2-2111146](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2111146.zip). If we go this way, there may be imapct to both AS UAC procedure and NAS; UE AS needs to be aware of whether access with AI1,2 and 11 to 15 is for disasgter roaming or not so as to decide either MINT specific UAC or existing UAC for those AIs. To enable the AS‘s awareness, NAS may need to indicate to AS if the access with AI 1,2 and 11 to 15 is for disaster roaming or not. Since this direction involves some interactio between AS and NAS, we may need to send an LS to CT1/SA2 to inform RAN2 understanding.  Case b) If that is not a valid assumption, it means that every disaster roaming access, if attempted, is configured with AI3, and in this case, we can rely on UAC for AI 3.  We are fine with any direction of conclusion in RAN2. But in any case, it would be safe to send an LS to CT1/SA2 to ask for feedback on what we have chosen. If this is considered reasonable, we can volunteer to draft an LS. |
| Lenovo | No | We think that at least the Access Identities 1, 2, 12 to 14 may be applicable as well since as specified in TS 22.261 the Access Identities 11 and 15 are valid in HPLMN only if the EHPLMN is not present or in any EHPLMN.  But to be clear this should be clarified by SA1, SA2, CT1. At least from AS pov, UE performs access attempts in accordance with the information it receives from NAS (i.e. Access Category and Access Identity). That means, if the disaster roaming UE receives from NAS the information that access attempt shall be performed for an Access Identity other than Access Identity 3 e.g. Access Identity 1, then it will do that for the indicated Access Identity. |
| Huawei, HiSilicon | No | We understand this only applies to Identity 3, not clear whether it applies to other Access Identities. Better to check with CT1. |
| Qualcomm | Not sure | Better to clarify this in CT1. The companies can check internally with their CT1 collegaues and bring up the issue there. The question can be captured in RAN2 Chair notes. |
| Nokia | Not sure | It seems SA2/CT2 did not really consider other UAC requirements than AI3 for disaster roaming, thus most simplistic approach is that we do not consider the AIs applicable, but we need clarification (internal checks with CT1 delagates) |

### 2.2.3 SIB to carry the disaster roaming information

CT1 indicated in [R2-2109818](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2109818.zip):

|  |
| --- |
| Thus, for available PLMN(s), NAS will need to obtain from RRC:  a) disaster related indication, for which CT1 still discusses whether it indicates (a) solely that the available PLMN is accessible for disaster inbound roamers or (b) that the available PLMN is accessible for disaster inbound roamers and all other PLMNs have disaster condition; or  b) "list of one or more PLMN(s) with disaster condition for which disaster roaming is offered by the available PLMN" where each PLMN with disaster condition is identified by its PLMN ID. The list will need to be able to hold at least the same amount of PLMN IDs as number of PLMNs which can share an NR cell.  (a) or (b) is used depending on the decision of the available PLMN. |

RAN2 needs to decide which SIB the information used for disaster roaming should be placed.

In [R2-2109835](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2109835.zip), Lenovo suggests to "*defer this issue for the moment*".

In [R2-2111146](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2111146.zip), LG proposes that "*Disaster roaming information is broadcast in a new SIB.*"

In [R2-2111224](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2111224.zip), Apple suggests that "*a new SIB is more justified*",

**Q3: Which SIB should be used to provide the information used for disaster roaming?**

|  |  |  |
| --- | --- | --- |
| **Company** | **New SIB/SIB1/Other** | **Comments** |
| LGE | New SIB | We want to avoid populating SIB1. |
| Lenovo |  | We have no strong opinion yet. The answer to this question depends on the support of RAN sharing and whether other disaster related information need to be broadcast. |
| Huawei, HiSilicon | Other | Better to dicuss this until CT1 has made the decision. It depends on the size of the contents and if it is large, we prefer to go with a new SIB. |
| Qualcomm | Other | We are fine to wait for the CT1 conclusion and then do a size analysis fo the signaling to see if this justifies a new SIB. |
| Nokia |  | No preference yet, beforw knowing size analysis and potential impacts to SIB1 |

### 2.2.4 Support of RAN sharing scenarios

In [R2-2109835](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2109835.zip), Lenovo suggests RAN2 to agree that in case of RAN sharing the ASN.1 signaling of the 1-bit flag (Option a) or PLMN list (Option b) in NR and LTE needs to allow both a common PLMN signaling and a per-PLMN specific signaling.

And in [R2-2110681](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2110681.zip) Ericsson proposes that RAN2 signalling should, in addition to signal disaster PLMN(s) per available PLMN, also allow to signal shared disaster PLMNs.

**Q4: Do you agree that in case of RAN sharing the ASN.1 signalling of the 1-bit flag (Option a) or PLMN list (Option b) in NR and LTE needs to allow both a common PLMN signalling and a per-PLMN specific signalling?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| LGE | No | We think per-PLMN signaling is sufficient. Signaling optimization with common PLMN signalling is not essential. |
| Lenovo | Yes | We think that the following cases need to be supported:   * All PLMNs which share the same cell, offer disaster roaming service to the same set of PLMNs with disaster condition. * One or multiple PLMNs which share the same cell, may offer disaster roaming service to different PLMNs with disaster condition. * One or multiple PLMNs which share the same cell, may not offer disaster roaming service at all.   We think that the validity of the above cases needs to be clarified with CT1. |
| Huawei, HiSilicon | Yes | In principle Yes. Regarding LTE part, it is clearly supported by CT1 in the LS. We understand the AC mechanism is different between LTE and NR, so if LTE needs to be supported, we need more time to consider how to make modifications. |
| Qualcomm | Yes | It would be good to minimize the signaling overhead, even if we use a new SIB. |
| Nokia | Yes | SIB extensions mitigation should be kept in mind to not result in delayed access by new enhancements |

### 2.2.5 NAS interaction

CT1 asked RAN2 in [R2-2109818](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2109818.zip) to specify that the RRC provides NAS with the disaster roaming information which were acquired from SIB.

In [R2-2111146](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2111146.zip) LG proposes that upon reading the Disaster Roaming information, UE AS forwards to NAS accessibility indication and a list of PLMNs, if available, with a corresponding PLMN for each PLMN in SIB1.

**Q5: Do you agree that upon reading the Disaster Roaming information, UE AS forwards to NAS accessibility indication and a list of PLMNs, if available, with a corresponding PLMN for each PLMN in SIB1?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| LGE | Yes |  |
| Lenovo |  | If we understood the CT1 LS correctly, then a cell will broadcast either the 1-bit flag **or** the list of PLMNs with disaster condition, but not both at the same time.  Furthermore, in case of the latter the UE AS will just forward the complete PLMN list to NAS. Therefore, it is not clear to us what is meant with saying „with a corresponding PLMN for each PLMN in SIB1“. |
| Huawei, HiSilicon | Yes |  |
| Qualcomm | Yes |  |
|  |  |  |

### 2.2.6 Impacts on cell (re)selection

Referring to the inputs from CT1 only impacts to UAC and SIB are expected to support the MINT feature in AS. However, on impacts to cell (re)selection the following proposals are made:

In [R2-2111146](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2111146.zip), LG proposes to not introduce any modification of cell suitability criteria for disaster roaming access.

In [R2-2109835](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2109835.zip), Lenovo suggests that a clarification from CT1 or SA2 may be needed whether specific requirements on cell (re)selection exist for disaster roaming UEs.

**Q6: Do you think there may be any impacts on cell selection/reselection due to MINT? Or do we need to seek input from CT1/SA2?**

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| --- | --- | --- |
| **Company** | **Yes/No/Wait** | **Comments** |
| LGE | No | We do not see any requirments to introduce modifications to cell selection/reselection. |
| Lenovo | Yes | We think there may be impacts on cell selection/reselection to consider due to MINT support. We understood that disaster roaming service is offered only in an area that covers the area in which disaster happened. That means if a disaster roaming UE leaves the concerned area then it has to leave the cell/PLMN that offers disaster roaming service. In connected state it can be left to NW whether to keep the UE in connected state or to release the connection with redirection. However, in idle/inactive state we think at least the cell suitability criteria may need to be modified for MINT. Other impacts on cell selection/reselection need to be checked.  We suggest to clarify this with CT1/SA2. |
| Huawei, HiSilicon | No | We so far did not see any impacts on cell selection/reslection. Regarding Lenovo’s comments, is it more relevant to PLMN selection instead of cell selection? If this is the case, CT1/SA2 can decide by themselves and maybe no need to ask from RAN2. |
| Qualcomm | No | We do not see any reason to impact cell (re)-selection. There were similar discussions for NPN onboarding and separate credentials in eNPN WI and the conclusion was the same. |
| Nokia | No | No reason to interfere cell selection by a feature priority, as with many other features RAN2 always decide to stick to radio conditions assessment first. |

### 2.2.7 Support of NPNs

According to the CT1 LS [R2-2109818](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2109818.zip) the MINT feature is supposed to be supported in public PLMNs. However, it is not fully clear whether it is applicable for NPNs as well. In [R2-2111146](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_116-e/Docs//R2-2111146.zip) LG proposes that NPNs do not support disaster roaming.

**Q7: Do you agree that NPNs do not support disaster roaming?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| LGE | Yes | We have not identified any requirements that NPN shall support disaster roaming. |
| Lenovo | Partly | Acc. to our understanding the MINT feature is not applicable for SNPNs. For PNI-NPNs we are not sure. This should be clarified by CT1. |
| Huawei, HiSilicon | Yes | We think we can start from public PLMNs. |
| Qualcomm |  | Note that PNI-NPNs are PLMNs as well. SNPN situation is not clear. But RAN2 can’t make decisions on these. It should be discussed in SA2 and CT1. |
| Nokia |  | It is not fully clear nor elaborated how/if MINT applies thus we believe no specifc agreement has to be taken on that.  Altearnatively, we can state all the considerations apply for public PLMNs |

# 3 Conclusion

TBD