3GPP TSG-RAN WG2 #119e R2-220xxxx

eMeeting, 17th – 26th August, 2022

Agenda Item: 8.1.2

Source: ZTE Corporation

**Title: [AT119-e][702][NCR] NCR discussion(ZTE)**

Document for: Discussion and decision

# 1 Introduction

This is report for the following AT119-e mail discussion.

* [AT119-e][702][NCR] TP for TR 38.867 with RAN2 agreements on NCR (ZTE)

Scope: RAN2 impacts of the 4 solutions discussed. The discussion to be conducted in two phases:

* Phase 1 – summary of RAN2 impacts in e.g. a table;
* Phase 2 (after RAN3 TPs are available) – RAN2 TPs, using RAN3 TPs as baseline.

Can also discuss proposal 6 from R2-220888 in phase 1 and include it in the TP in phase 2, if agreeable.

Intended outcome: Agreed TP, LS to RAN1

Deadline: Friday 2022-08-26 1000 UTC

This document is only used to collect company views, in order to produce TP later.

# 2 Contact Information

Respondents to the email discussion are kindly asked to fill in the following table.

|  |  |  |
| --- | --- | --- |
| Company | Name | Email Address |
| ZTE (Rapp) | LiuJing | liu.jing30@zte.com.cn |
| Ericsson | Tony | antonino.orsino@ericsson.com |
| Apple | Zhibin Wu | Zhibin\_wu@apple.com |
| Huawei, HiSilicon | Xubin | xubin10@huawei.com |
| NEC | Satoaki Hayashi | Satoaki-hayashi@nec.com |
| CATT | Hao Xu | xuhao@catt.cn |
| Samsung | Milos | m.tesanovic@samsung.com |
| Nokia | Sari Nielsen | sari.nielsen@nokia.com |
| Intel | Ziyi Li | Ziyi.li@intel.com |
| Fujitsu | Takako Sanda | sanda.takako @ fujitsu.com |
| Sony | Vivek Sharma | Vivek.sharma@sony.com |
| Vodafone | Chandrika Worrall | Chandrika.worrall@vodafone.com |
| Qualcomm | Georg Hampel | ghampel@qti.qualcomm.com |
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# 3 Background

After Tuesday online session, the following RAN2 agreements are made:

* The NCR-MT performs NCR identification and authorization on behalf of the entire NCR.
* Capture RAN2 aspects of solution 1 in TR (leave out the 3rd bullet, feasibility is conditional on SA3 reply)
* Capture RAN2 aspects of solution 2 in TR (leave out “Secure NCR…” bullet, feasibility is conditional on SA3 reply)
* Capture RAN2 aspects of solutions 3 and 4

# 3 Discussion

## 3.1 RAN2 impact table

The section 8.2 in the TR 38.867 describes the specification impact for each solution. In this offline, we will focus on the Uu interface impact, companies are invited to provide your views to the below table.

(Note: the discussion on Uu impact already covers the Uu procedure discussion)

**Question 1: Any views to the Uu impact regarding solution 1~4?**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Company | Proposed text for “Uu impact” column that to be captured in the TP | | | | Comments |
| Solution 1 | Solution 2 | Solution 3 | Solution 4 |
| ZTE | Yes  1. Add NCR indicator in Msg5 and/or UE radio capability;  2. Add NCR assistance information in a UL RRC message (FFS on which RRC message) | Yes  1. Add NCR indicator and OAM container in Msg5;  2.a If RRC signalling is used for OAM traffic, add OAM container in UL/DL RRC message (FFS on which RRC message).  2.b If DRB is used for OAM traffic, define a new DRB type (e.g. not associated with PDU session). | Yes  1. Add NCR indicator in Msg5 and UE radio capability; | No | For Solution 2(OAM-based), the follow-up OAM traffic can be exchanged by RRC message, or DRB, or up to network implementation.  For DRB-based method, the DRB is not associated with PDU session and can use NEA0 security algorithm if needed (same as emergency call).  The security of OAM traffic can be provided by application layer security mechanism, such as SSH/TLS between the NCR and OAM |
| Ericsson | Agree with ZTE. | Agree with ZTE | Agree with ZTE, except that the UE capability indication may be unnecessary.  [Rapp-ZTE] Well, this is supported for IAB. But since several companies comment on this, I changed “and” to “and/or”. | Agree with ZTE, no impact. | Note: We interpret the question to be about what the Uu-impact is on **the authorization/identification-procedure**. RAN2 has not studied other RAN2 impact due to NCRs.  Response to ZTE’s comment about security: Security is going to be evaluated by SA3 since RAN3 has already sent an LS to them. RAN2 just needs to add a NOTE in the concerned solutions for clarifying that the feasibility of the solutions is pending SA3 reply to the RAN3 LS. This will most likely impact solutions 1, 2, and 3.  For all solutions: we may want to have a SIB-flag saying that the gNB supports NCRs otherwise the NCR may perform random access to a gNB that does not perform NCR. |
| Apple | Agree with ZTE on 1st bullet, Regarding the 2nd bullet, we suggest to change “NCR assistance information” to “NCR credential information” or “NCR information necessary for validation”  [Rapp-ZTE] I take “NCR credential information” because it is shorter. Thanks. | Agree with ZTE on 1 . But for bullet 2a, we think Solution 2 can also consider that only UL message is needed to contain OAM container, and there is no need of DL OMA container.  In our view, the step “NCR authorization is performed between OAM and the NCR**”** does not necessarily involve two-way traffic.  Anyway, the authorization results is determined by OAM and only need to be conveyed to gNB.  In this way, the Uu impact on Solution 2 is comparable to other options.  [Rapp-ZTE] I added FFS to DL message. | Agree with ZTE | No impact | Regarding security, we want to emphasize that the legacy AS security mechanism is used for the SRB/DRBs with sizable amounts of upper layer traffic, but for OAM-based approach like solution 2, there is very limited upper layer signalling exchange and the majority traffic in Uu interface is L1/L2 side control which is not protected anyway. So, we agree with ZTE that some simple security mechanism should be fine, or we can leave this out of 3GPP scope and let NW vendors to implement proprietary solution. |
| Huawei,  HiSilicon | Yes/No  1. Identification: There is uu impact if adding NCR indicator in Msg5 and/or UE radio capability;  There is no uu impact if CN identifies the NCR and indicates to RAN after slicing based authorization in step1)  [Rapp-ZTE] Even if slice is used, the gNB needs to know the UE is NCR, so Uu identification is still needed.  2. There is no need for the NCR assistance information in a UL RRC message (for RAN based authorization), if slicing based authorization in step 1 is applied (no double authorization).  [Rapp-ZTE]RAN3 concluded step12/13 are optional, but they did not say there are mutually exclusive. | Yes  1. Identification: Add NCR indicator in Msg5 and/or UE radio capability  2. Define a new mechanism to report UE capability to gNB with security (no AS security)  [Rapp-ZTE] there is a separate column to capture security aspect, and it is not RAN2’s job to define the security mechanism.  3. Define new RRC signaling and/or new DRB type (not associated with PDU session) to carry the OAM container | Yes/No  1. Identification: There is uu impact if adding NCR indicator in Msg5 and/or UE radio capability;  [Rapp-ZTE] use ”and/or” instead.  There is no uu impact if CN identifies the NCR and indicates to RAN after CN based authorization), same as Solution 4  [Rapp-ZTE]No, Msg5 is needed, because gNB needs to recognize the UE and selects an AMF that supports NCR after receiving Msg5. | No, but  UE radio capability anyway needs to be reported  [Rapp-ZTE] for this solution, it is possible to not include any indication in UE capability, and seems this is also the view from most companies. |  |
| NEC | Agree with ZTE on 1st bullet,  On the 2nd bullet, prefer to go with Apple proposal.  [Rapp-ZTE] 2nd is updated based on Apple’s suggestion | Basically, agree with ZTE, with the understanding that the OAM here is local RAN OAM. | Basically, agree with ZTE.  Not sure whether it is good to state UE radio capability. Since in the draft TP, Solution 3 doesn’t mention UE radio capability.  [Rapp-ZTE] I will update TP accordingly. | Not sure  Maybe NCR indication is still needed, see comment | We would like to echo Ericsson’s comment on SIB-flag.  For solution 3, we wonder whether steps 8/9/10 of solution 1 happen too, if not how CN authorizes the NCR based on NCR indication information only.  For solution 4: without any NCR indication or capability information from UE, we wonder how CN knows it is an NCR and triggers NCR authorization.  [Rapp-ZTE] the CN checks UE’s identity based on the subscription information from HSS. |
| CATT | Agree with ZTE | Agree with ZTE | Agree with ZTE | No impact |  |
| Samsung | In principle OK with ZTE’s summary, although it is becoming clear that we are dealing with two solutions (use of Msg5+UE capability, and UE capability only). If the plan is (at this stage) to support both solutions, we should then name them e.g. 1a and 1b – will make things easier when referring to them, especially later on.  [Rapp-ZTE] I think “and/or” can already represent this. Details can be discussed in normative phase.  Also think Apple’s proposal on renaming NCR assistance info is a good idea.  [Rapp-ZTE] done. | In principle OK with ZTE’s summary except… as per text in TP – “procedure for authorization/validation in OAM can be either specified or left to implementation”. Therefore in some instances (when authorization is specified and depending on how the signalling is done) there may be further impact not captured in ZTE’s summary?  [Rapp-ZTE] I may not fully understand the comment, can you please clarify a bit? | Same view as ZTE. | No impact. |  |
| Nokia | Yes,  NCR indicator needed via Msg5 or UE radio capability as ZTE proposed  Regarding ZTE’s bullet 2) we agree with Apple’s comment. RRC needs updates e.g. to provide a unique ID (other than GUTI, or S-TMSI) for gNB/OAM to identify NCR.  [Rapp-ZTE] The term is updated based on apple’s suggestion, regarding the details of this credential information, we can discuss it in normative phase. | Yes,  Agree with ZTE | Yes,  NCR indicator needed via Msg5. We do not see need for UE radio capability.  [Rapp-ZTE] Use “and/or” instead. | No impact | We agree with Ericsson’s comments on security aspects, need to include a NOTE in the concerned solutions for clarifying that the feasibility of the solutions is pending SA3 reply to the RAN3 LS. We also agree Ericsson’s comment on the need for SIB-flag. |
| Intel | Yes  Agree with the 1st bullet from ZTE’s comment.  For 2nd bullet, we share the same view with Apple, it would be more appropriate to use “NCR credential information” or “NCR information necessary for validation”.  [Rapp-ZTE] done. | Yes  As captured in the draft TP, CN is absent in this solution. From AS specification point of view, this solution does not need to have NAS. This will lead to huge impact to all NAS and AS interaction (e.g. how to trigger the connection) from RAN2 point of view. We suggest to capture a bullet:  - support AS procedures (e.g. how to trigger connection between NCR and network) without supporting NAS at NCR-MT.  [Rapp-ZTE] seems this is clear according to the procedure? The triggering for NCR will be simple, e.g. power-up, because there is no data services.  We also agree Apple that DL OAM traffic is not necessary, as there’s no configuration needed from OAM to the UE.  [Rapp-ZTE] done. | Agree with Ericsson.  For IAB-like solution, there’s no need for UE capability.  [Rapp-ZTE] IAB supports indication in UE capability, but I have changed it to “and/or”, we can discuss it further in WI phase.  However, considering there’s also impact in CN. We suggest to capture a note on to check the feasibility with SA2 to update specifications during normative phase.  [Rapp-ZTE]Although I tend to agree with you, this was discussed in RAN3, and companies think LS to SA2 is not needed right now. | No impact. | Regarding to Ericsson’s comment, we also share the same view that certain broadcast information by gNB indicating its support for NCR is necessary. However, we think it is related to initial access of NCR, but not authorization and identification.  Therefore, we suggest to add a NOTE in the TP:  Besides Uu interface impact caused by authorization and identification, and other Uu interface impacts are not precluded and can be discussed during normative phase. |
| Fujitsu | Agree with ZTE. | - Agree with ZTE on the bullet 1 and 2.  - Another impact would be "AS security cannot be activated" because NAS protocol is not supported in this Solution.  [Rapp-ZTE] There is separate column to capture this aspect.  - For the bullet 3, we think DRB could not be established as AS security would not be activated.  [Rapp-ZTE] This is not traditional DRB, it can be considered as the tunnel between NCR and gNB, security issue will be evaluated by SA3. | Agree with ZTE | Agree with ZTE | In Solution 2, RRC messages which require AS security couldn't be used. |
| Sony | Agree with ZTE on bullet 1  Agree with Apple on 2nd bullet  [Rapp-ZTE] done | Agree with ZTE | Agree with Nokia that there is no need for UE capability  [Rapp-ZTE] Use “and/or” instead. | No impact | Agree with Ericsson and others on the need for a SIB-flag and a general statement about security issues for affected solutions. |
| Vodafone | Agree that NCR indicator transmission would require RAN signalling. Either via Msg5 or UE radio capability options should be investigated.  We think that RAN level authorisation may not be needed depending on SA3 reply and how the mapping is done at slicing level.  In anyway “NCR assistance information” is not suitable term as it doesn’t reflect the purpose. Happy to change it to “NCR information necessary for validation” as proposed by Apple, if needed.  [Rapp-ZTE] done. | To carry OAM container, AS message is required. Msg5 is ok as proposed.  Not sure whether DL message is needed for DL OMA container.  [Rapp-ZTE] Add FFS to DL message.  “procedure for authorization/validation in OAM can be either specified or left to implementation”. RAN signalling requirement depends on how the OAM based authorization/validation is designed. If left to implementation entirely, there is no RAN impact.  [Rapp-ZTE] agree. | Only impact to RAN (Uu interface) is to include NCR indicator via Msg5.  [Rapp-ZTE] Use “and/or” instead.  It is better to have a note indicating that the solution may require specification impacts in SA/CT.  [Rapp-ZTE] Emm...this does not belong Uu impact, RAN3 already finalized the column for NG-C,NAS impact. ; ) | No Uu impact | We agree with Ericsson that RAN2 discussion was primarily focus on the Uu-impact on the authorization/identification procedure. RAN2 has not studied the other possible Uu impact from NCR.  Even the Uu impacts are investigated, the feasibility of solutions depends on the SA3 reply on the security aspect. Better to highlight this by a Note. |
| Qualcomm | ZTE’s 1st bullet is fine.  2nd bullet:  Apple’s rewording: “**NCR information necessary for validation” is preferred.**  [Rapp-ZTE] I used “NCR credential information” from Apple because it is shorter, hope this is ok for you. | ZTE’s 1st bullet is fine:  **1. Identification: Add NCR indicator in Msg5 and/or UE radio capability**  Prefer HW’s 2nd bullet on UE capability with some modification.  **2. A new mechanism may be needed to report UE capability to gNB with security (pending SA3)** [Rapp-ZTE] For OAM based solution, UE capability can also be transferred in OAM container, no need to define new mechanism for this.  On OAM container, Huawei’s version is fine. We certainly need DL container as well since there will be extended signaling between NCR and OAM:  [Rapp-ZTE] Several companies comment the need of DL for authorization procedure, so I marked it as FFS.  For side control information configuration, it can be discussed separately.  **3. Define new RRC signaling and/or new DRB type (not associated with PDU session) to carry the OAM container**  [Rapp-ZTE] I understand new DRB type is needed, but why RRC signalling is needed? | ZTE’s bullet is fine with small change:  **1. Add NCR indicator in Msg5 and/or UE radio capability;**  [Rapp-ZTE] done. | Agree with ZTE. | UE capability signaling will certainly be supported and SA3 may most likely require that it is secured. We need to capture. |
| Rapp-ZTE | Yes  1. Add NCR indicator in Msg5 and/or UE radio capability;  2. Add NCR credential information in a UL RRC message (FFS on which RRC message) | Yes  1. Add NCR indicator and OAM container in Msg5;  2.a If RRC signalling is used for OAM traffic, add OAM container in UL RRC message (FFS on which RRC message, FFS on the need of DL RRC message).  2.b If DRB is used for OAM traffic, define a new DRB type (e.g. not associated with PDU session). | Yes  1. Add NCR indicator in Msg5 and/or UE radio capability;; | No | SIB indication can be and will be discussed in normative phase. |
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## 3.2 Necessity of early identification

Since NCR identification is one objective that to be discussed in RAN2. In AI summary [1], the following proposal is provided:

**Proposal 6: RAN2 understands early identification (via Msg1 or Msg3) is not needed for NCR-MT.**

Companies are invited to show your view to this proposal, if this can be agreed, it will be captured in the “Conclusion” section in TR 38.867.

**Question 2: Do companies agree with above Proposal 6?**

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| --- | --- | --- |
| Company | Agree or not | Comments if any |
| ZTE | Agree | Early identification has been specified for RedCap UE in Rel-17, because RedCap UE supports reduced bandwidth and other reduced capability. So the network needs to differentiate RedCap UE in order to perform different actions or different configurations in Msg2 or Msg4.  Different from RedCap UE, NCR does not have reduced capability thus does not need special handling in Msg2 and Msg4. In addition, fast RRC state transition is not needed to NCR-MT (the ON-OFF mechanism is designed for NCR-Fwd).  So we think there is no need to consider early identification (via Msg1, Msg3) for NCR-MT. NCR Identification via Msg5 or via radio capability is enough. |
| Ericsson | Agree |  |
| Apple | Agree |  |
| Huawei, HiSilicon | Agree |  |
| CATT | Agree |  |
| Samsung | Agree |  |
| Nokia | Agree |  |
| Intel | Agree |  |
| Fujitsu | See comment | We think it's a bit early to decide by inputs from only three companies. On the other hand, if many companies agree this proposal in this email discussion, we are fine to decide. |
| Sony | Agree |  |
| Vodafone | Agree |  |
| Qualcomm | Agree |  |

# 4 Conclusions

TBD

# 5 References

[1] R2-2208886 [Pre119-e][701][NCR] Summary of AI 8.1 network-controlled repeaters ZTE (rapporteur)