3GPP TSG-RAN WG2 #115-e R2-210xxxx

Electronic meeting, Aug 16th – 27th 2021

Agenda Item: 8.13.2.3

Source: CATT

Title: Report of  [AT115e][871][SON/MDT] Modeling aspects related to information required by SN/SCG (CATT)

Document for: Discussion

# 1 Introduction

This document is for report of the discussions as planned in the following as per session chair’s guidence

 [AT115e][871][SON/MDT] **Modeling aspects related to information required by SN/SCG (CATT)**

Scope: Focus on the set of proposals for RAN2 agreements in R2-2107825

**Intended outcome**: Report with Agreements

**Deadline**: 11:00 UTC, Wednesday August 25th

This document is organized as the following. The discussions are in section 2, and the summary and proposals are in section 3.

# 2 Discussions

Please the participating delegates provide their contact information in this table.

|  |  |
| --- | --- |
| Company | Contact Name / Email address |
| Ericsson | Pradeepa Ramachandra (pradeepa.ramachandra@ericsson.com) |
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## 2.1 RA Report to the SN

For easlier tracking, the same proposal numberings are reused from [1] in the reminder of this document.

The following proposals are provided in [1], and great majority’s support is observed.

**Proposal 1 UE reports the SN RACH report to the MN, and then MN sends the SN RACH report to the SN.**

**Proposal 2 RAN2 to discuss and reply to LS R2-2008723.**

There were concern that regarding whether current UE variable could include both MN and SN RACH information, and that the MN might not be aware of the existence of SN RA report. Rapporteur understands that the role of MN or SN of specific UE should not have impact on the NW node RACH optimization, so the current UE variable can be directly used, and it is not necessary for SN and MN to request RACH information seperately.

For the sake of progress, companies are invited to answer the following question.

**[Q1] Are Proposal 1 and 2 agreeable to you?**

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| --- | --- | --- |
| **Company** | **Yes or No** | **Comments if any proposal(s) not agreeable** |
| **Ericsson** | No | We do not agree for the following limitations associated to P1.   1. SN is dependent on MN to implement the feature of RA report fetching. 2. The ASN.1 changes required is much larger i.e., the UE needs to encode up to 8 cell IDs using the RRC format of the MN when MN and SN belong to different RAT. This increases the Uu interface overhead also. |
| **Qualcomm** | Yes |  |
| CATT | Yes | [Response to Ericsson]  For 1): We don’t find this an issue due to the following. The RACH report in NR is a list which may include multiple RA info of different nodes, not only for the current SN of UE (diff from LTE). Therefore the NW node which recevies the RA info should forward the info to each right node in which the RA actually occurred respectively, for RACH optimization, no matter the node is previlously a “SN” or a “MN” of the the UE. So it is perhaps not very relevant to argue about how this current SN gets the report from MN?  For 2): Not sure if spec change can be an argument here. As has been discussed, for NR-DC almost nothing will be changed. And for EN-DC, a container use NR format needs to be added. But no matter using a NR container (option1) or using a direct message (option 2) to the SN, the overhead in Uu interface are on the same level. |
| Nokia, Nokia Shanghai Bell | Yes |  |
| Samsung | Yes |  |
| Lenovo | Yes |  |
| ZTE | No | Based on the use case so far, the SN RA information will only be used in SN(i.e., MN is not required to open the SN RA report.) Therefore it is more reasonable to let SN independently to request RA report. And since no clear agreements have been achieved previously that we shall mix RA information from SN/MN in the same report, probably we shall first clarify if current NR RA report only applies in RA happens in MN.  In our point of view, separate RA report is a more clean solution. |
| Sharp | Yes |  |
| ITRI | Yes |  |
| Huawei, HiSilicon | Yes |  |
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**Rapporteur summary and suggested WF**

Similar as in [1], there is majority’s support for option 1 (8/10), i.e., UE reports the SN RACH report to the MN, and then MN sends the SN RACH report to the SN. Two companies disagree and the main concern focus on whether the SN needs to request the RA report. It is clarified by some company that the RA report may include information of multiple cells, and it is not appropriate for the current SN of the UE to request.

As there seems to be no new arugment after multiple round discussions, Rapporteur suggests to go with majoirty’s view. Then, whether current NR RA report only applies in RA happens in MN and how to extend it could be discussed in stage-3.

**Proposal 1 UE reports the SN RACH report to the MN, and then MN sends the SN RACH report to the SN.**

**Proposal 2 RAN2 to discuss and reply to LS R2-2008723.**

## 2.2 SN Related MHI Information

The following are provided in [1], and majority’s support is observed.

**Proposal 3 RAN2 to confirm that the PSCell transition is part of MHI.**

**Proposal 5 PSCell MHI is reported only to PCell.**

**Proposal 6 UEInformationResponse message is used to convey the PSCell MHI to the MN.**

For the sake of progress, companies are invited to answer the following question.

**[Q2] Are Proposal 3, 5, and 6 agreeable to you?**

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| --- | --- | --- |
| **Company** | **Yes or No** | **Comments if any proposal(s) not agreeable** |
| **Ericsson** | Yes to P3 and No to P5, P6 | P5 and P6 are not agreeable as this solution means that the SN is dependent on MN to implement the feature of RA report fetching. This is especially not ideal in inter-vendor deployments. |
| **Qualcomm** | Agree with Proposals 5 and 6. | Regarding 3, we argue to include only those transitions of which the network already is not aware. For example, as companies argued that during the connected state to IDLE state transition, the serving gNB releases the UE context and gNB might not be aware whether SN was configured when coming back to the connected state. We argue that only upon such transition the UE should report the PSCell identity and the corresponding time can be referred from the PCell MHI. |
| CATT | Yes to all | Regarding Ericssion comments on P5 and P6, please see our response in the previous question. We failed to see why this is an important issue.  Regarding QC comments on P3, RAN3 discussion on UHI is parellel and independent from the UE reported MHI, inherit from LTE. In fact we do not think it is needed to link them together. |
| Nokia, Nokia Shanghai Bell | Yes |  |
| Samsung | Yes |  |
| Lenovo | Yes to all |  |
| ZTE | Yes |  |
| Sharp | Yes |  |
| ITRI | Yes |  |
| Huawei, HiSilicon | Yes to all |  |
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However, the structure of PSCell MHI report (i.e., proposal 4 in [1]) seems to require more discussions. It would be meaningful if progress is made also on this important aspect. The proposal is copied below from [1].

**Proposal 4 RAN2 to discuss on Option 1 (PSCell MHI nested within the PCell MHI) and potential simplification, taking into the following aspects**

* **the UE memory for PSCell MHI issue and whether/how to reduce it;**
* **Whether the network can know the association between the PScell and PCell based on the report without updating RAN3 specification;**
* **Whether there is need for the SN to know the MHI for MN.**

During the discussions, Option 1 ‎(PSCell MHI nested within the PCell MHI) ‎is supported by majority (7 out of 11 companies), but some concerns exist, which have been reflected as the three sub-bullets in Propsoal 4. These potential concerns haven‘t been discussed much after being raised in the pre-meeting email discussion. Therefore Rapporteur understands it is useful to further collect companies‘ views.

For the sake of progress, companies are invited to answer the following question.

**[Q3] What’s your views regarding the potnetial concerns on Option 1 listed in Proposal 4 (i.e., the sub-bullets), and is it acceptable to take Option 1 as a baseline for further discussions?**

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| --- | --- | --- |
| **Company** | **Any views / comments regarding the potentail concerns as listed in sub-bullets of P4, or any other comments if any?** | **Is it acceptable to take Option 1 as basedline?** |
| **Ericsson** | **Regarding the UE memory overhead:**  One of the concern expressed by companies is that the size would be 16\*16 i.e., 16 PCell related MHI information and for each of the PCell there would be 16 PSCell related MHI. This is not necessary in our understanding. One could have restrictions on the total number of PSCells to be included. For example**, the UE stores only up to 16 latest PSCells but encodes them in a nested structure i.e., some of the old PCell MHI might not have any PSCell related MHI info**. | Yes |
| **Qualcomm** | **For 4.1**: see comment to question2 proposal 3.  **For 4.2**: UE memory is a concern here. We argue for adding limited information regarding PSCell to respect UE memory. Furthermore, I believe that UE MHI's purpose is to assist networks with unknown information at the UE. In my understanding, UE MHI's purpose shouldn’t be a standalone report and it should provide the mapping that is unknown at the gNB. For other aspects, when the relationship can be built with RAN3 spec enhancements, it should be discussed by RAN3 that how they create the mapping between Pcell and PSCell association.  **For 4.3**: MHI can be used by SN during intra-SN PSCel change or SN. I am not sure, how knowing MN MHI can enhance the intra-SN PSCell change success rate. Therefore, we do not see a benefit of this. | We are okay with taking option 1 as a baseline |
| CATT | For the association between the PScell and PCell, the nested structure can present the association clearly, and the MN can have the mapping relationship between the node and Cell identity;  For the 3rd concern, it may be beneficial for the SN to have both info of PCell and PSCell MHI, e.g. it is useful for the SN to select a more suitable PSCell. | Yes |
| Nokia, Nokia Shanghai Bell | -We don’t think UE memory is a limitiation  (can be dedicted UE capablity)  -In our understanding RAN3 builds a network based solution that does not put any specific requirements towards RAN2/UE. We do not see the association exercise in the UE is requested by RAN3. Thus, RAN2 enhancements shouldn’t be based on deduced RAN3 needs.  -In our view, there is no reason for the SN to know the MHI for MN. Having separate report helps not mixing the two. If PSCell is nested in PCell MHI, there is more work to do to extract the PSCell information in MN before sending it to SN. | Yes |
| Samsung | **UE memory issue:** One may aruge that it can limit the total number of visited PSCell(s) in order to address the UE memory issue, but UE can store more PSCell MHI info if it is not correlated with PCell MHI. Besides, more extra work needs to be done how to handle the UE momery issue.  **Association between PSCell and PCell**: We have the same understanding as Nokia.  **Need for SN to know the MHI of MN**: We do not see any benefit on this. | Yes |
| Lenovo | Whether the network can know the association between the PScell and PCell based on the report without updating RAN3 specification;   * Our understanding is that RAN3 specification is not expected to update based on option1. Even there is impact on RAN3 specifiation, it is also fine to enhance it. | Yes |
| ZTE | Above aspects can be further considered during detailed MHI structure design phase. | Yes |
| Sharp | We are not sure about the UE memory issue, it may not be a limitation.  It is useful for the SN to know the MHI of MN, as PSCell/SN is not always configured for UE, SN may use PSCell MHI together with MN MHI for PSCell selection or other parameter configuration. | Yes |
| ITRI | We think it is okay to take Option 1 as a baseline.  The potnetial concerns can be discussed in MHI structure design phase. | Yes |
| Huawei, HiSilicon | We are not sure about the UE memory issue and it is good to discuss it based on the ASN.1 design and some calculations. | Yes |
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There are some other proposals from [1], i.e.,

**Proposal 7 If PSCell MHI is reported to the SN, DL/ULInformationTransferMRDC message can be used.**

**Proposal 8 RAN2 to discuss and decide whether ‘the time without PSCell in the PSCell MHI report’ is reported.**

However, if Proposal 5 is agreed, it seems we do not need to further discuss Proposal 7. And, Proposal 8 may be discussed in a later stage. Therefore no questions are raised on these proposals.

[Ericsson]:

We would like to enable MHI reporting to both MN and SN. Therefore, as P5 and P6 are not agreeable to us, we would like to agree on P7.

We also support P8.

**Rapporteur summary and suggested WF**

From the discussions, it seems P3, P5 and P6 are acceptable by a great majority (9 out of 10 for P5 and P6, 8 out of 10 for P3, P5, and P6). Therefore Rapporteur suggests to agree on the the.

**Proposal 3 RAN2 to confirm that the PSCell transition is part of MHI.**

**Proposal 5 PSCell MHI is reported only to PCell.**

**Proposal 6 UEInformationResponse message is used to convey the PSCell MHI to the MN.**

For P4, all companies can accept to take Option 1 as basedline, and many of them point out that the concerns listed above can be further considered during detailed MHI structure design phase.

Given this wide support Rapporteur suggest to take Option 1 as baseline,which is reflected in the following proposal 4a.

**Proposal 4a Take Option 1 ‎(PSCell MHI nested within the PCell MHI) as baseline.**

And, it seems not easy to agree on the other proposals 7-8 at this stage. So they are not listed here.

## 2.3 Report and Content of SCG Failure Information

In [1], companies’ views have been collected regarding whether all the contents listed by the RAN3 LS R3-211332 are considered necessary by RAN2, and which **fields** in the current specification could be directly reused for these required information (i.e., not which existing IE structure could be used). The following were provided in [1] based on the discussions.

**Proposal 9 RAN2 confirms that the 5 information requested by RAN3 LS ‎ R3-211332 ‎ are needed, and how to report them to the network could be further discussed.**

**Proposal 10 Reuse existing SCG failure messages to transfer the SCG failure information for PSCell ‎failure analysis requested by RAN3.‎**

**Proposal 11 If reuse existing SCG failure messages, add new fields for the first 3 information (i.e., ‎CGI of the Source PSCell, CGI of the Failed PSCell, and timeSCGFailure) requested in RAN3 LS R3-211332.**

**Proposal 12 If reuse existing SCG failure messages, reuse existing field of failureType for the 4th information (i.e., ‎connectionFailureType‎) requested in RAN3 LS R3-211332 ‎.**

**Proposal 14 If a separate message other than existing SCG failure messages is used, new fields are needed for all the 5 information suggested by RAN3 LS R3-211332‎.**

**Proposal 15 Check with RAN3 first about whether EN-DC and NG-EN-DC scenarios are in the consideration of RAN3 LS R3-211332 for the SCG failure recording for the purpose of PSCell failure analysis.**

According to [1], the above proposals are supported by majority. For the sake of progress, companies are invited to answer the following question.

**[Q4] Are proposal 9, 10, 11, 12, 14, and 15 agreeable to you?**

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| --- | --- | --- |
| **Company** | **Yes or No** | **Comments if any proposal(s) not agreeable** |
| **Ericsson** | Yes to 9, 14, 15  No to 10, 11, 12 | Increasing the size of the mandatory messages like SCGFailureInformation/FailureInformation increase the risk of causing Uu interface overload at poor radio regions and/or at high network load scenarios.  SON related UE stored measurements are not needed immediately after a failure and thus the mandatory messages’ (SCGFailureInformation, SCGFailureInformationNR, SCGFailureInformationEUTRA) size should not be increased for the SON purposes.  Thus we have strong concern on reusing existing SCG failure information messages to carry MRO related measurements. |
| **Qualcomm** | Agree with proposals 10, 11, 12, and 15.  No for proposal 14  Maybe for proposal 9 | RA-information-Common is still an open issue |
| CATT | Yes to all | We understand Ericssion’s concern. But these proposals are accetpable to us in this relatively late stage as they are supported by majoirty. |
| Nokia, Nokia Shanghai Bell | Yes to 9, 10, 11, 12  No to 14, 15 | 14 is not agreeable, because RAN3 decided to use the existing SCG failure information and enhance it with some new IEs for Rel-17 UEs for MRO. The legacy UEs will still use the existing SCG failure information. Consistency should be kept between Rel-17 and pre-Rel-17 UEs.  In addition, connection failure type and relevant measurements are already there in existing SCG failure information message.    Thus, existing SCG failure information should be the baseline.  15 is not needed. NR-DC is prioritized, but other scenarios should also be covered, as seen from the LS. |
| Samsung | Yes, except for 14 |  |
| Lenovo | Yes for 9,10,11,12 | We need to resue the existing IE and message as much as possible. |
| ZTE | Yes for 9,10,11,12,15  Not for 14 | We don’t think new message is needed, and current agreed information will not increase the size significantly especially compared to the current SCG Failure messages where the measurement results has already been included.  Regarding to failureType, we’d like to highlight that the current failureType might not be sufficient for RAN3’s requirement. Different from failure Type setting in MN failure report, when deciding SN failure type in SCG failure information, UE will not check T304 status thus UE might mis-categorized some reconfigurationWithSync failure as RandomAccessProblem, and it will mislead NW in failure cause determination. Therefore, we suggest to add one more indication in SCG failure information to indicate whether T304 is running or not, thus NW can derive the correct failure cause. |
| Sharp | Yes to all |  |
| ITRI | Yes to 9, 10, 11, 12, 15  No to 14 | Agree with Nokia and ZTE. Minimization of the spec impact is preferred and new message is not needed. We think existing SCG failure information should be the baseline. |
| Huawei, HiSilicon | Yes to 9, 10, 11, 12, 15 | For 9, we only support the 1st, 2nd, 3rd information in the list. |
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Besides, there are also another proposal on this topic [1]:

**Proposal 13 If reuse existing SCG failure messages, RAN2 to discuss whether to introduce a new field for the 5th information (i.e., random-access related information set by the PSCell) requested in RAN3 LS R3-211332. It is noted that this may depend on whether SgNB RACH report could include SCG failure scenario, i.e., if the information is included in SgNB RACH report then it is not needed in SCG failure messages.**

For this proposal, it seems more discussions are needed perhaps in a later stage. So no question is raised regarding this proposal.

**Rapporteur summary and suggested WF**

Almost all companies think P9/P10/P11/P12/P15 acceptable, and one company has strong concern on reusing existing SCG failure information messages to carry MRO related measurements, and suggests to use a separate message other than existing SCG failure messages. One company thinks P5 may not be needed. For P14, since it is for separate message, most companies do not support it.

As these have been discussed multiple times and these proposals got support by great majority, and it is unclear how further discussions would help to find a even better WF. Therefore Rapporteur suggests checking if the following could be agreeable.

**Proposal 9 RAN2 confirms that the 5 information requested by RAN3 LS ‎ R3-211332 ‎ are needed, and how to report them to the network could be further discussed.**

**Proposal 10 Reuse existing SCG failure messages to transfer the SCG failure information for PSCell ‎failure analysis requested by RAN3.‎**

**Proposal 11 If reuse existing SCG failure messages, add new fields for the first 3 information (i.e., ‎CGI of the Source PSCell, CGI of the Failed PSCell, and timeSCGFailure) requested in RAN3 LS R3-211332.**

**Proposal 12 If reuse existing SCG failure messages, reuse existing field of failureType for the 4th information (i.e., ‎connectionFailureType‎) requested in RAN3 LS R3-211332 ‎.**

**Proposal 15 Check with RAN3 first about whether EN-DC and NG-EN-DC scenarios are in the consideration of RAN3 LS R3-211332 for the SCG failure recording for the purpose of PSCell failure analysis.**

The 5th information (i.e., random-access related information set by the PSCell) may depend on whether SgNB RACH report could include SCG failure scenario, and can be discussed in a later stage.

# 3 Conclusion

This document collects companies’ views regarding the suggested proposals from [1]. Based on the views and some further discussions, the following proposals are made.

# 4 References

1. R2-2107825 Report of [Post114-e][852][SON\_MDT] Modeling aspects related to information required by SN/SCG CATT