3GPP TSG-RAN WG2 #117-e R2-22xxxxx

Electronic meeting, 21th February– 3rd March 2022

Agenda Item: 8.13.3

Source: Ericsson

Title: [AT117e][888][SON/MDT] SON related Open Issues (Ericsson) – Phase 2

Document for: Discussion, Decision

# Introduction

This contribution addresses the following offline discussion:

 **[AT117e][888][SON/MDT] SON related Open Issues (Ericsson)**

Including all the proposals not treated in R2-2203895

Invite companies to show their view on whether or not to agree these proposals.

There will be no technical discussion on CB session and conclusions will be made following majority and no objection.

      Intended outcome: Report  to the CB session.

       New Deadline: 11:11 UTC, March, 2nd

To aid better communication between the respective delegates handling this topic from different companies, it is requested to fill-in the contact information.

**Contact Information**

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| --- | --- | --- |
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# Discussion

In the following email discussion it will be asked for each question whether a given proposal is acceptable or objected. This is to reflect the chairman guideline that “conclusions will be made following majority and no objection”.

## Two-Step RA

In R2-2203895, the following was proposal was made:

**Proposal from R2-2203895: RAN2 to keep discussing how to report the payload reported by the UE in the RA-Report for the 2-step RA:**

* 1. **The overall payload without padding available in the UE buffer size at the time of initiating the 2 step RA procedure**
  2. **The payload without padding sent by the UE over the PUSCH resources in the msgA**

Rapporteur notes that from the email discussion in R2-2203895, 5 companies expressed concerns on option a, whereas 6 companies were ok with it. 2 companies did not have strong views. Taking into account the chairman guideline that “conclusions will be made following majority and no objection”, Rapporteur considers option “a” having the majority. Hence companies are asked to indicate whether the following proposal is acceptable or it is objected.

* **Question-1**: Is the following proposal acceptable or objected?
* For the 2-step RA, the payload reported by the UE in the RA-Report is equivalent to the overall payload without padding available in the UE buffer size at the time of initiating the 2 step RA procedure

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| **Company** | **Acceptable/Objection** | **Comments** |
| **Qualcomm** | **Agree** | As we have agree to include PUSCH paramters, there is no need to further include msgA transmitted payload size. However, I prefer to modify it as  “For the 2-step RA, the payload reported by the UE in the RA-Report is ~~equivalent to~~ the overall payload ~~without padding~~ available in the UE buffer ~~size~~ at the time of initiating the 2 step RA procedure”  There is no padding if payload is not transmitted. |
| **ZTE** | **Agree** | **Fine with Qualcomm’s clarification** |
| Samsung | - | We can follow the majority view |
| **Ericsson** | Agree | OK, with Qualcomm rewording |
| Huawei, HiSilicon | Agree | Agree with Qualcaomm’s rewording |
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Concerning the ASN.1 structure and in particular the format of the IE for logging the payload size, two options were discussed in R2-2203895:

Proposal 12 RAN2 to agree on one of the following methods of reporting the payload size:

1. A 8-bit bitstring in RA report, where the value of the 8-bit bitstring refers to the index of the BSR table in TS 38.321 (similar to the definition of the messageSize field within SL-TrafficPatternInfo)

b. The payload size is reported as ENUMERATED {noPayload, sizeRange1, sizeRange2, sizeRange3, sizeRange4, sizeRange5, spare1, spare0} wherein each RANGE is known, e.g. hardcoded in the specification. FFS the values for each range.

In R2-2203895, 5/12 companies prefer option “a”, whereas 6/12 companies prefer option “b”. A common wish of various companies is anyhow to reduce as much as possible the overhead of this information. Hence in R2-2203895, Rapporteur proposed the following proposal as a possible compromise. Companies are asked to indicate whether that is acceptable or objected.

**Proposal from R2-2203895: A 3-bit bitstring in RA report is adopted, where the value of the 3-bit bitstring refers to one of the indexes of the 5-bit BSR table in TS 38.321 (similar to the definition of the messageSize field within SL-TrafficPatternInfo)**

* **Question-2**: Is the above proposal acceptable or objected?

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| **Company** | **Acceptable/Objection** | **Comments** |
| **Qualcomm** | Agree |  |
| **ZTE** | **Agree** |  |
| Samsung | Acceptable |  |
| **Ericsson** | **Agree** |  |
| Huawei, HiSilicon | Agree |  |
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## SCG Failure Information

Concerning the MRO for SCG mobility procedures, in the email discussion R2-2203895 the following proposal was made:

**Proposal from R2-2203895: The RA related Information associated to the SCG failure are included in the SCGFailureInformation.**

14 companies did not have any concern with the above proposal, 2 companies believed instead that RAN2 should aim at reducing the size of the SCGFailureInformation message.

* **Question-3**: Is the above proposal acceptable or objected?

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| **Company** | **Acceptable/Objection** | **Comments** |
| **Qualcomm** | Agree |  |
| **ZTE** | **Agree** |  |
| Samsung | Acceptable |  |
| **Ericsson** | **Acceptable** | We are ok with this, given that this is the majority view. However, RAN2 should aim at reducing as much as possible the size of the information that are going to be included in this message, because this is a mandatory message and we need to avoid that it grows too large in future releases. |
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| Huawei, HiSilicon | Agree |  |
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Related to the scenarios in which the RA Information should be included in the *SCGFailureInformation*, the following proposal was made based on companies´ comments in R2-2203895:

**Proposal from R2-2203895: The RA Information associated to a SCG failure are included in the SCGFailureInformation for the following scenarios:**

* 1. **when failureType is set to randomAccessProblem**
  2. **when failureType is set to beamFailureRecoveryFailure**
  3. **when failureType is set to synchReconfigFailureSCG**

For each of the scenarios above, Rapporteur would like to ask whether it is acceptable or objected:

* + **Question-4**: Please indicate for each of the above scenarios whether that is acceptable or objected

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| **Company** | **a (acceptable/ objection)** | **b (acceptable/ objection)** | **c (acceptable/ objection)** | **Comments** |
| **Qualcomm** | **acceptable** | **acceptable** | **acceptable** |  |
| **ZTE** | **acceptable** | **acceptable** | **acceptable** |  |
| **Samsung** | **acceptable** | **acceptable** | **acceptable** |  |
| **Ericsson** | **Acceptable while T304 is running** | **Objection** | **Acceptable** | RAN3 has specifically focus on MRO use cases for the SCG failure.  This is also confirmed in the WID „**Support of data collection for SON features, including …..MRO for SN change failure**“.   Hence since it is critical to reduce the size of the information included in the SCGFailureInformation, we should only focus on MRO use cases. Option b does not imply MRO issues, and also option a (random access problems) is not affecting MRO if T304 is not running. |
| Huawei, HiSilicon | acceptable | acceptable | acceptable | For opt b, it may be caused due to bad cell quality, e.g., too late PSCell change. |
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In addition, in R2-2203895, it was discussed which new parameters should be included in the SCGFailureInformation message. Based on companies´ comments the following was proposed:

**Proposal from R2-2203895: RAN2 to include the following information in the SCGFailureInformation in case of SCG failure:**

1. **previousPSCellID**
2. **failedPSCellID**
3. **timeSCGFailure**

For each of the parameters above, Rapporteur would like to ask whether the inclusion in the SCGFailureInformation is acceptable or objected:

* + **Question-5**: Please indicate for each of the above parameters, whether the inclusion in the SCGFailureInformation is acceptable or objected.

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| **Company** | **a (acceptable/ objection)** | **b (acceptable/ objection)** | **c (acceptable/ objection)** | **Comments** |
| **Qualcomm** | **acceptable** | **acceptable** | **acceptable** |  |
| **ZTE** | **acceptable** | **acceptable** | **acceptable** |  |
| **Samsung** | **acceptable** | **acceptable** | **acceptable** |  |
| **Ericsson** | **Object** | **Object** | **acceptable** | The SCGFailureInformation is a real time message, and at the moment of its transmisson the network still has the UE context available.  So in particular, it is not clear why the network cannot know which were the previousPSCellID and the failed PSCellID. As we analyzed in our paper R2-2203465 both for the case of MN initiated change and SN initiated change, the network has such information still available.  The same applies also for the timeSCGFailure, because the network nodes need to maintain the UE history information including also the time spent by the UE in the cell.  However we can accept it for the sake of progress, if this is the majority view. |
| Huawei, HiSilicon | acceptable | acceptable | acceptable |  |
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It was also discussed in R2-2203895, about the inclusion of a 1-bit flag to indicate the running of T304 at the time of SCG failure declaration due to *randomAccessProblem*.   
Many companies seemed to be fine with not having this 1-bit flag. However, some companies highlighted that this decision depends on whether the proposal discussed in P4 allows the network to figure out that the T304 is running. For example, if the RA-related information are included in the SCGFailureInformation only if random access problems occurred while T304 was running, or if the failureType is set to synchReconfigFailureSCG, then the network can implicitly conclude that the RA-related information are associated to a problem experienced while the T304 was running.

Given the majority view in R2-2203895, Rapporteur asks the following:

* + **Question-6**: Is the following proposal acceptable or objected?
    - There is no need for the UE to include a 1 bit flag in the SCGFailureInformation to indicate that the T304 was running when the UE declared the SCG failure due to random access problem indication in the SCG MAC

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| **Company** | **Acceptable/ Objection** | **Comments** |
| **Qualcomm** | **Agree** |  |
| **ZTE** | **See comments** | **First, connection failure type (RLF or HOF) is part of RAN3-defined solution for SCG MRO. As commented previously, we don’t insist in including explicit indication if there are information available for NW to implicitly deduce this information, otherwise we shall reconsider this. Therefore we suggest following modification to clarify the understanding:**  There is no need for the UE to include a 1 bit flag in the SCGFailureInformation to indicate that the T304 was running when the UE declared the SCG failure due to random access problem indication in the SCG MAC if there are implicit indication available in SCG failure information can help NW to derive whether random access problem is part of reconfiguration with sync procedure or not, otherwise RAN2 shall reconsider explicit indication.  **Or since we are discussing including RA information, if ra-Purpose is included then NW can know the correct connection failure type, but it will take more than 1 bit.** |
| Samsung | Acceptable |  |
| **Ericsson** | **Acceptable, but...** | Somewhat agree with ZTE. This flag is not needed if it is agreed that the RA Information are included in the SCGFailureInformation due to random access problem when T304 is also running (as we propose in Q6). That is another reason for agreeing that the SCGFailureInformation only captures MRO-related problems, i .e. no need to include RA information when the failure type is **beamFailureRecoveryFailure**. |
| Huawei, HiSilicon | agree |  |
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### 2.2.1 Others

In R2-2203895, two companies (Huawei, Ericsson) pointed out that the RACH resource related parameter may not need to be included in the SCGFailureInformation, since the network should still have this information available at the moment of the reception of the SCGFailureInformation. Hence, it was proposed to only include the perRAInfoList.   
Given the above, the following was proposed in R2-2203895:

**Proposal from R2-2203895: RAN2 to consider the possibility to only include the perRAInfoList rather than the full RA-Information in the SCGFailureInformation message, in order to reduce the size of the SCGFailureInformation.**

* **Question-7**: Is the above proposal acceptable or objected?

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| **Company** | **Acceptable/Objection** | **Comments** |
| **Qualcomm** | **Agree** |  |
| **ZTE** | **Agree with comments** | **I am wondering if ra-Purpose can be included, which can help NW knows the connection failure type. If it can be agreed then proposal in Q6 can be agreed as it is. But it will takes more than the original proposed 1 bit.** |
| Samsung | Acceptable |  |
| **Ericsson** | **Acceptable** | Regarding ZTE comment, if it is agreed that the SCGFailureInfo only captures MRO related issues at SN change, then we do not need to include the ra-Purpose. |
| Huawei, HiSilicon | Acceptable |  |
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## SHR

Concerning the open issues of the SHR, the following proposal was made in R2-2203895 which was supported by a large majority of companies:

**Proposal from R2-2203895: A single T312 threshold common to all measurement identities is configured in the SHR configuration.**

* **Question-8**: Is the above proposal acceptable or objected?

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| **Company** | **Acceptable/Objection** | **Comments** |
| **Qualcomm** | **Acceptable** |  |
| **ZTE** | **Acceptable** |  |
| Samsung | Acceptable |  |
| **Ericsson** | **Acceptable** |  |
| Huawei, HiSilicon | Acceptable |  |
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From triggering SHR standpoint, it was further discussed the following:

[Company-tdoc] Given that the T312 is associated to the measurement identity, RAN2 to discuss whether to clarify in the specification in which cases the SHR is generated, e.g. one of the following:

* 1. The UE shall log the SHR always when a T312 is running for any measurement identity configured to the UE. In this case, the UE shall indicate which frequency related measurements had triggered the timer T312.
  2. The SHR shall be generated only if the T312 associated to the measurement identity associated to the target cell is running

Majority of companies do not have concerns with option b, hence in R2-2203895, the following was proposed:

**Proposal from R2-2203895: The SHR shall be generated only if the T312 associated to the measurement identity of the target cell is running**

* **Question-9**: Is the above proposal acceptable or objected?

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| **Company** | **Acceptable/Objection** | **Comments** |
| **Qualcomm** | **Agree** |  |
| **ZTE** | **Acceptable** | **Though we prefer a, but we can go with majority’s view.** |
| Samsung | Acceptable |  |
| **Ericsson** | **Acceptable** |  |
| Huawei, HiSilicon | Acceptable |  |
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Concerning the generation of the SHR and RLF report for the same handover, the following proposal was captured in the premeeting 117 email discussion [1].

[Company-tdoc] RAN2 to consider one or more of the following solutions to address the issue of SHR and RLF report are generated for the same HO:

1. Indicator in the RLF-Report (SHR) indicating that the SHR (RLF-Report) has been already sent to the network for this HO
2. Indicator in the RLF-Report (SHR) indicating that there is an SHR (RLF-Report) associated to the same HO
3. C-RNTI to be included in the SHR, RLF-Report
4. Timestamps in the SHR and RLF-Report to link them in time
5. RLF-Report should be merged with the SHR if the SHR has not been sent yet at the moment of RLF-Report generation, or the SHR should be merged in the RLF-Report.
6. If RLF occurs within a certain time window after the generation of the SHR, the SHR should be discarded if not yet transmitted

The outcome of the discussion in R2-2203895 was the following:

1. Indicator in the RLF-Report (SHR) indicating that the SHR (RLF-Report) has been already sent to the network for this HO
   * P: 2/15
   * A: 6/15
   * NA: 7/15
2. Indicator in the RLF-Report (SHR) indicating that there is an SHR (RLF-Report) associated to the same HO
   * P: 0/15
   * A: 9/15
   * NA: 6/15
3. C-RNTI to be included in the SHR, RLF-Report
   * P: 4/15
   * A: 9/15
   * NA: 2/15
4. Timestamps in the SHR and RLF-Report to link them in time
   * P: 5/15
   * A: 5/15
   * NA: 5/15
5. RLF-Report should be merged with the SHR if the SHR has not been sent yet at the moment of RLF-Report generation, or the SHR should be merged in the RLF-Report.
   * P: 2/15
   * A: 2/15
   * NA: 10/15
6. If RLF occurs within a certain time window after the generation of the SHR, the SHR should be discarded if not yet transmitted
   * P: 1/15
   * A: 0/15
   * NA: 13/15

Given the above outcome, the option that seems more acceptable is option c, i.e. the inclusion of the C-RNTI. Hence, the following was proposed:

**Proposal from R2-2203895: The C-RNTI is included in the SHR. FFS if it is the C-RNTI used in the source cell, or target cell, or both.**

In case this proposal is agreeable, Rapporteur would also like to ask companies whether the C-RNTI to be reported should be the C-RNTI assigned by the source cell or by target cell or both C-RNTIs of source and target cell should be included.

* **Question-10**: Is the above proposal acceptable or objected?
* If it is acceptable, please also indicate if the C-RNTI to be included in the SHR should be the C-RNTI assigned by the source cell or by the target cell or both C-RNTIs of source and target cell should be included

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| **Company** | **Acceptable/Objection** | **Comments  (please indicate if it is the C-RNTI of the source cell/target cell/both)** |
| **Qualcomm** | **Acceptable** | **C-RNTI of target only.**  According to C-RNTI used in RLF“  ***c-RNTI***  This field indicates the C-RNTI used in the PCell upon detecting radio link failure or the C-RNTI used in the source PCell upon handover failure.  In my understanding, SHR and RLF report both can be generated only if RLF happens at the target after successful handover. Therefore, to corelate the SHR and RLF (at target) (contains the C-RNTI at target), SHR should contain C-RNTI provided by target cell. |
| **ZTE** | **Acceptable** | **Both. For source RLF happens during DAPS HO and DAPS HO is successful, source C-RNTI is needed to identify source RLF with SHR . But if in this case UE can merge source RLF into SHR then we don’t need it, otherwise it is needed to link SHR with source RLF.** |
| Samsung | Acceptable | It seems sufficient withC-RNTI assigned by the target cell |
| **Ericsson** | **Acceptable** | Both source and target C-RNTIs.  Target cell CRNTI is needed to correlate the SHR with the RLF-Report (which only contains the target cell C-RNTI in this case), as explained by Qualcomm. However, including also the source cell C-RNTI might be needed, because the SHR may be configured by the source cell, and knowing the C-RNTI is helpful for the source cell to better analyze the UE context (if that for example is still available). |
| Huawei, HiSilicon | Acceptable | **Source C-RNTI is needed, and we are open for target C-RNTI.**  First, we understand that SHR and RLF report should be correlated only in case that RLF occurs shortly at the target after successful handover and the SHR is generated due to the triggering configuration from the source.  The C-RNTI in the SHR may depend on the detailed solutions to correlate.  Opt A: **Target C-RNTI is included** (the SHR is first handled at the target, then at the source)  In this case, the SHR includes target C-RNTI and is sent to the target. With the *shr-cause*, the target realizes the source is the right node.   * One solution A-1 is similar as the RLF-report delivery scheme. The target derives the source C-RNTI if the UE context can be identified by the target C-RNTI and sends it back to the source. The source correlates SHR and RLF-report based on source C-RNTI.   For A-1, it is questionable whether the target will keep UE context if it is unware of the existing of SHR for the HO. **If no, option A-1 cannot work.**   * The other option A-2 is that the target realizes there are both SHR and RLF-report generated for the same HO. The target waits for the other one, performs correlation based on target C-RNTI and then forwards both to the source.   However, it is noting that both SHR and RLF-report are caused due to suboptimal configuration in source in the above case. **It’s more reasonable for the source to perform correlation rather than in target.**  Opt B: **Source C-RNTI is included** (the SHR is handled only at the source)  For the above case, the SHR includes source C-RNTI and is sent to the source from the reception node. The source correlates SHR and RLF-report based on source C-RNTI.  For opt B, **it will always work well and not involve target to correlate SHR and RLF report.**  Consequently, we prefer to include source C-RNTI in the SHR at least. For the target C-RNTI, we don’t have strong view and can follow majority. |
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Other options that received significant support are option b and d, therefore Rapporteur in R2-2203895 also proposed further discussing the need of option b and d:

**Proposal from R2-2203895: RAN2 to further discuss the need of the following options:**

* 1. **Indicator in the RLF-Report (SHR) indicating that there is an SHR (RLF-Report) associated to the same HO**
  2. **Timestamps in the SHR and RLF-Report to link them in time. FFS how to represent this timestamp (e.g. absolute or relative timestamp)**
* **Question-11**: For each of the above option a and b, please indicate it those can be acceptable or objected

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| **Company** | **Option a (acceptable/objection)** | **Option b (acceptable/objection)** | **Comments** |
| **Qualcomm** | **Object** | **Strongly object** | **If target get SHR availability indicator and RLF happens at the target, then target cell know if there is SHR and RLF for same handover. Target should inform source. No need to have indicator in RLF report or SHR.** |
| **ZTE** | **Acceptable** | **Acceptable** | **With (a) NW can know whether to look into to detailed content and perform additional processing. Since C-RNTI might be reused timeStamp can help better correlate the two reports.** |
| Samsung | Objection | Objection | Need not have multiple options |
| **Ericsson** | **Acceptable** | **Object** | **A**: When the RLF occurs before sending the SHR to the network, then A can be beneficial, since it will aid the network to know that at reception of the SHR (or RLF report) there is another report available. In this way the network can for example decide to immediately fetch after the reception of the SHR (RLF-Report) also the RLF-Report (SHR).  Note: the C-RNTI solution alone may not be enough because the C-RNTI can be reused over time, and there is no guarantee that same C-RNTI implies same HO.  So solution A and the C-RNTI solution can be used together in our view.  **B:** It will create considerable overhead in the SHR, because the timestamp would need to always be included but this scenario of SHR-RLF may not happen so frequently. |
| Huawei, HiSilicon | acceptable | acceptable  (no strong opinion) | Since the SHR can be delayed to report. When the target cell gets SHR availability indicator, it cannot know whether the SHR is related to this handover procedure or not.  With opt a, the source node can know whether to perform the analysis just based on the received report or perform correlation with the related report generated during the same HO.  For opt b, we don’t have strong opinion if there is no C-RNTI ambiguity at the node performing correlation. |
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### Others

In the email discussion in R2-2203895, Sharp observes that in the current CR implementation, an SHR will be generated when the UE successfully executes a CHO recovery in a CHO candidate target cell. Rapporteur agrees with this observation, and that the current CR implementation does not correctly capture the agreement from RAN2#114-e:

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| From RAN2#114:  44  The SHR scenario 2c, i.e. “Successful CHO recovery while initial failure” is part of the RLF-Report. |

Rapporteur proposed fixing this issue in the next revision of the running CR:

**Proposal from R2-2203895: Amend the running CR such that the SHR will not be generated when the UE succeeds with the CHO recovery, in line with the agreement from RAN2#114-e.**

* **Question-12**: Is the above proposal acceptable or objected?

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| **Company** | **Acceptable/Objection** | **Comments** |
| **Qualcomm** | **Agree** |  |
| **ZTE** | **See comments** | **We are fine with this if it is majority’s view, but we’d like to further clarify several issues.**   1. **If latest cell measurements will be included for succes this information. However currently the cell measurements information will only be included when T304 expires along with other RLF-content(e.g., time information.)** 2. **For SHR we have agreed on timeSinceCHOReconfig which is the time elapsed between the initiation of the execution of conditional reconfiguration for the target PCell and the reception of the last conditionalReconfiguration including the condRRCReconfig of the target PCell in the source PCell; and for RLF-report this information is only included for failed CHO recovery, do we also need this information when CHO is successful?**   **RAN2 needs to discuss potential update of specs if consider it is part of RLF-report.** |
| Samsung | Acceptable |  |
| **Ericsson** | **Agree** | We already agreed this in RAN2#114, so we just need to capture this agreement properly in the running CR.  @ZTE:  1: yes, we have agreed in the past that cell measurements will be included when the first failure occurs;  2: The timeSinceCHOReconfig at RLF was agreed last meeting, and it is now captured in the latest version of the running CR submitted at this meeting |
| Huawei, HiSilicon | agree |  |
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# Conclusion

To be updated later

# References

1. R2-2203754 - SON related open issue list (Ericsson) - 3GPP TSG-RAN WG2 #117-e, 21th February– 3rd March 2022.

1. [R2-2203395](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203395.zip), [Detailed information required for MRO for SN change failure](https://ericsson.sharepoint.com/R2-2203395.zip) Nokia, Nokia Shanghai Bell

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