3GPP TSG-RAN WG2 #117-e R2-2203895

Electronic meeting, 21th February– 3rd March 2022

Agenda Item: 8.13.3

Source: Ericsson

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

Document for: Discussion, Decision

# Introduction

This contribution addresses the following offline discussion:

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

Including proposal 11, 12, 13, 17 and 18.

All the related invited inputs on these proposals should be taken into account.

Intended outcome: Report for the real final round discussion.

Deadline: 23:55 UTC, Feb, 25th

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

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|  |  |  |
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# Discussion

## Two-Step RA

As part of the per meeting 117 discussion [1] the following proposal has been captured concerning logging the payload information as part of the two-step RA procedure information in the RA report.

Proposal 11 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.

Thus, Rapporteur would like to ask the following question.

* **Question-1**: Is there any concern with the above proposal about the payload to be reported?
  + - If yes, please comment your concerns

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes (there are concerns)**  **No (no concerns)** | **Comments** |
| Qualcomm | Yes | In my understanding, the purpose of payload reporting is to determine transmitted payload when the network successfully receives preamble but does not receive msgA payload during a msgA RACH procedure. In such a scenario, the network may be interested to know the transmitted payload size.  Therefore, I believe that UE needs to report transmitted payload size instead of payload in UE buffer size. As payload in UE buffer size has nothing to do with the success or failure of the RACH report, it should not be reported in the RA Report. |
| Samsung | Yes | Need to clarify.  We initially assumed that this discussion is for the payload to be transmitted over Uu because the terminology “payload“ is typically used in MAC PDU. Furthermore, a controversial point was whether to consider padding in that calculation.  However, in the proposal, we assume that “the overall payload without padding available in the UE buffer size“ means just UE data volume to be transmitted in the UE buffer. If so, we are not sure why we discussed the padding issue. |
| Apple | Yes | Agree with Qualcomm |
| **Ericsson** | No | If the UE has still many remaining data after the msgA transmission, such an information will not be conveyed in the RA-Report if only the actual msgA payload is considered. As a consequence, the network cannot for example make the UL grant for the msgA larger, so that the UE can accommodate more data more data into it. What Qualcomm is saying is correct, but how many data the UE includes in the msgA can be known by the network already (since the network knows the size of the UL grant) or if we assume that the network may forget this information, it can be enforced by additional information provided by the UE (as discussed in proposal 13, i.e Q3 below). What the network instead cannot know is how many data the UE had in the buffer size at the moment of RA initiation. We believe that the main objective of including the payload size in the RA-Report is to aid the network to properly optimize the msgA grant configuration, so that the network can balance 2-step RA robustness with 2-step RA efficiency. |
| vivo | Yes | Agree with Qualcomm |
| CATT | **-** | The transmitted payload has real impacts on success of MSGA transmission.Therefore, we slightly perfer the transmitted payload. However, the buffer size can help the network allocates suitable resources, we can also accept the majority view. |
| Sharp | No | Agree with Ericsson, we also understand the purpose of including the payload size in the RA-Report is to aid the network to properly optimize the msgA configuration. |
| OPPO | Yes | Agree with QC |
| CMCC | No | Agree with Ericsson. The information of buffer could help the network to properly optimize the msgA grant configuration. |
| ZTE | No | We think both information the buffered size and the actual transmitted size are helpful. To report the buffered size can help NW to decide if a larger grant is needed, while the actual transmitted size can be derived if PUSCH configuration as mentioned in Q3 can be reported, which is also useful for optimization of the detailed configuration. |
| Nokis |  |  |
| Huawei, HiSilicon | No | Agree with Ericsson.  The reporting of the payload in UE buffer can be used to optimize the PUSCH configuration, e.g., adjust the UL grant of the msgA accordingly to accommodate more data. |
| NEC | No | Agree with Ericsson |

**Rapporteur summary:**

Yes: 5/13 companies

No: 6/13 companies

No strong view: 2/13 companies

Given the above outcome, there are some companies that have concerns on this proposal. Hence, Rapporteur proposes the keep discussin the original proposal from the open issue list:

1. 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

Concerning the ASN.1 structure and in particular the format of the IE for logging the payload size two options are discussed and captured as part of the proposal 12 in the pre-meeting 117 offline discussion [1]. The proposal is captured in the following.

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.

For Option A, there is no need to define the ranges of the payload size in RRC, since the values in the bitstring mirrors the BSR indexes used in the MAC specification.   
For Option B instead, it is necessary to define the size ranges in RRC specification (see the FFS in the above option B). Hence, the proponents of Option B are invited to indicate which values they would like to specify in RRC for the various size ranges.

* + **Question-2**: Which option (Option A or Option B) do you prefer as a format of the IE for reporting the payload size?
    - Proponents of Option B are invited to indicate which values to specify in RRC for the various size ranges

|  |  |  |
| --- | --- | --- |
| **Company** | **Option a**  **Option b (please indicate the size ranges)** | **Comments** |
| Qualcomm | Prefer option – B  or option – A (reduced bit requirement) | We prefer to reduce the size of the RA report.  In my understanding, the 8-bit string buffer size in TS 38.321 is used to report up to 81,338,368 Bytes, i.e. around 81.3 MB. I am not sure if the 81.3 MB payload can be transmitted as msgA payload. Therefore, instead of using 8-bit string, we can use 3 bits (to transmit the index) [as presented in Table 6.1.3.1-1: Buffer size levels (in bytes) for 5-bit Buffer Size field] |
| Samsung | Option B | Fine with the example of the proposal: ENUMERATED {noPayload, sizeRange1, sizeRange2, sizeRange3, sizeRange4, sizeRange5, spare1, spare0}. |
| Apple | B | OK with the moderator’s proposal |
| Ericsson | Option A | Option A is simpler, since it avoids discussing and specifying new ranges in the RRC specification. With option A, we can simply copy the messageSize definition in SL-TrafficPatternInfo and refer to the BSR index in the MAC spec.  We are ok to use the 3-bit bitstring instead to reduce overhead. |
| vivo | B | ENUMERATED {noPayload, sizeRange1, sizeRange2, sizeRange3, sizeRange4, sizeRange5, spare1, spare0} is fine |
| CATT | Option B | Fine with option B. |
| Sharp | Option A | Using 3 bits to reduce the overhead as proposed by Qualcomm is preferred. |
| OPPO | Option b | It is important to save the overhead |
| CMCC | No strong view |  |
| Nokia | Option A | We think ist simpler as avoids specyfing new ranges |
| Huawei, HiSilicon | option – A (less bits can be accepted) | First of all, we prefer to reuse the BSR size defined in TS38.321.  Considering the signalling overhead, we agree to consider less bits. |
| NEC | Option B | No strong view though. Can flowing majority’s view. |

**Rapporteur summary:**

A: 5/12 companies (1 company can accept it but with reduced bitstring size)

B: 6/12 companies

No strong view: 2/12

Given the above outcome, there is no clear majority. However, from the replies it seems that a possible compromise that can be acceptable is to select option A, but rather than using an 8-bit bitstring we use a 3-bit bitstring to reduce the overhead. Rapportuer also observes that the proponents of option B did not express their views on the specific values of the various size ranges to be included in the ASN.1. That woud need to be discussed before the freezing of the specification. Hence, considering the limited time left and the above views, Rapporteur proposes the following:

1. RAN2 tries to agree the following for the reporting of the payload size:
   1. 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)

In addition as part of the pre-meeting 117 offline discussion [1] the proposal 13 has been captured concerning logging the information required for the PUSCH resource optimization for the two-step RA procedure. The proposal 13 is shown in the following.

Proposal 13 RAN2 to discuss the inclusion of one or more of the following PUSCH resource parameters (4/10 do not support, 4/10 support, 2/10 support it tentatively):

a. msgA-MCS (4 bits)

b. nrofPRBs-PerMsgA-PO (5 bits)

c. msgA-PUSCH-TimeDomainAllocation (4 bits)

d. frequencyStartMsgA-PUSCH (9 bits)

e. nrofMsgA-PO-FDM (2 bits)

In order to facilitate the discussion, Rapporteur would like to ask companies to indicate for each parameter above whether that is preferred (P), acceptable (A), or not acceptable (NA) to include in the RA-Report.

* + **Question-3**: Which of the above parameters are needed in the RA-Report for 2-step RA?
    - Please indicate in the table below for each parameter whether its inclusion in the RA-Report is preferred (P), acceptable (A), or not acceptable (NA).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Company** | **a (P/A/NA)** | **b (P/A/NA)** | **c (P/A/NA)** | **d (P/A/NA)** | **e (P/A/NA)** | **Comments** |
| Qualcomm | **NA** | **NA** | **NA** | **NA** | **NA** | The network can optimize these parameters based on transmitted payload size in the RA report. RA reports are quite huge and memory-consuming without these parameters, therefore, we want to avoid making RA report unnecessarily more memory-consuming. |
| Samsung | NA | NA | NA | NA | NA | Share with Qualcomm’s view.  These paramters should not be agreed if most companies don‘t support. Note that we do the functional freeze in this meeting. |
| Apple | NA | NA | NA | NA | NA | Agree with Qualcomm and Samsung |
| Ericsson | A | A | A | A | A | We see benefits to include this information.  **For the sake of compromise,** we suggest considering the possibility to include this information only when they cannot be derivable by the network, i.e. if the UE performed the RA using the dedicated random access resources. |
| CATT | A | A | A | A | A | The above parameters is useful for MSGA PUSCH resources optimization. We can accept to include the above parameters in RA report. |
| OPPO | NA | NA | NA | NA | NA | Agree with Qualcomm and Samsung |
| CMCC | **P** | **P** | **P** | **P** | **P** | The information is beneficial for MSGA PUSCH resources optimization. And the signalling overhead is acceptable since the report is per RA procedure rather than per RA attempt. |
| **ZTE** | **P** | **P** | **P** | **P** | **P** | Please note that for CBRA cases there could be up to 2 PUSCH configuration per group and for CFRA case the PUSCH configuration can also be configured dedicated per UE, thus without UE reporting NW cannot know the detailed PUSCH configuration used. As a compromize we can accept to include them at least for CFRA case. However, for CBRA case we propose to include the PUSCH group information (group A/B) so that NW can know which group of configuration is used. |
| Nokia | P | P | P | P | P | All of those parameters seem useful to optimize PUSCH resources. |
| Huawei, HiSilicon | P | P | P | P | P | All the parameters are beneficial for the optimization of PUSCH resource configuration.  In our understanding, these information is common for all 2-step RACH attempts. So the signaling overhead is only 24 bits, which is acceptable. |
| NEC | NA | NA | NA | NA | NA | Agree with Qualcomm. |

**Rapporteur summary:**

NA: 5/11

P: 4/11

A: 2/11

First of all, Rapporteur observes that all the parameters proposed to be included in the RA Information are either acceptable/preferred or not acceptable at all. Hence it is not possible to find a compromise in including only a subset of those parameters. Ericsson and ZTE proposes as a possible compromise to include this information only when the UE uses random access resources provided in dedicated signalling, or only when CFRA is used. Given this, Rapporteur proposes the following:

1. RAN2 to keep discussing the inclusion of one or more of the following PUSCH resource parameters:
   1. msgA-MCS (4 bits)
   2. nrofPRBs-PerMsgA-PO (5 bits)
   3. msgA-PUSCH-TimeDomainAllocation (4 bits)
   4. frequencyStartMsgA-PUSCH (9 bits)
   5. nrofMsgA-PO-FDM (2 bits)
2. As a possible compromise, RAN2 to consider including the above information only when the UE uses random access resources provided in dedicated signalling, or only when configured with CFRA.

### 2.1.1 Others

Since this is the last meeting, Rapporteur would like to ask if there is any other critical outstanding issue associated to 2-step RA.

* + **Question-4:** Is there any other critical outstanding issue for the 2-step RA topic?

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| --- | --- |
| **Company** | **Comments** |
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## SCG Failure Information

Concerning the MRO for SCG mobility procedures, during RAN2#116-887.5 email discussion, although one company raised a concern about the unnecessary increase of the *MCGFailureInformation* message size, almost all the other companies agreed to include RA information associated to a SCG failure in the *SCGFailureInformation*. Hence proposal 17 was derived from the pre-meeting 117 email discussion [1]. The proposal addresses the inclusion of the RA information in the SCGFailureInformation.

Proposal 17 The RA Information associated to a SCG failure are included in the SCGFailureInformation.

Thus, rapporteur would like to ask the following question.

* + **Question-5**: Do you have concerns related to the above proposal?
    - If yes, please comment your concerns

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| --- | --- | --- |
| **Company** | **Yes (there are concerns)**  **No (no concerns)** | **Comments** |
| **Qualcomm** | **No** | However, we should reduce overhead in the SCGFailureInformation. |
| Samsung | No |  |
| LG | No |  |
| **Apple** | **No** |  |
| **Ericsson** | **Yes, but** | We have strong concernsabout the increased size of the SCGFailureInformation message, which is a legacy (non-SON related) message.  So we are ok with this proposal, but RAN2 should aim at reducing as much as possible the size of the newly included information. To this end, we propose in our replies to the next question not including the RA-InformationCommon in the SCGFailureInformation, but only the perRAInfoList. Additionally, also the scenarios in which this message is used should be limited to MRO use cases, i.e. when T304 is running. |
| **vivo** | **No** |  |
| CATT | No |  |
| **Sharp** | **No** |  |
| **OPPO** | **No** |  |
| **CMCC** | **Yes** | Share the view with Ericsson, we should reduce the size of SCGFailureInformation. |
| **ZTE** | **No** |  |
| **Lenovo** | **No** |  |
| **Nokia** | **No** |  |
| **ITRI** | **No** |  |
| Huawei, HiSilicon | No |  |
| NEC | No |  |

**Rapporteur summary:**

Yes: 2/16

No: 14/16

Given the above outcome, 14 companies do not have any concern, 2 companies believe that RAN2 should aim at reducing the size of the SCGFailureInformation message. Whether to reduce the size of the SCGFailureInformation is addressed in the next questions.

1. The RA related Information associated to the SCG failure are included in the SCGFailureInformation.

Related to the scenarios in which the RA Information should be included in the *SCGFailureInformation*, the following proposal was made:

Proposal 18 The RA Information associated to a SCG failure are included in the SCGFailureInformation for the following scenarios:

a. when failureType is set to randomAccessProblem

b. when failureType is set to beamFailureRecoveryFailure

c. when failureType is set to synchReconfigFailureSCG.

In order to facilitate the discussion, Rapporteur would like to ask companies to indicate for each scenario above whether that is preferred (P), acceptable (A), or not acceptable (NA) to consider when including the RA-Information within the SCGFailureInformation.

* + **Question-6**: Which of the above scenarios needs to be considered when including the RA-Information in the SCGFailureInformation?
    - Please indicate for each of the above scenarios whether that is preferred (P), acceptable (A), or not acceptable (NA) to consider.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Company** | **a (P/A/NA)** | **b (P/A/NA)** | **c (P/A/NA)** | **Comments** |
| **Qualcomm** | **A** | **A** | **A** |  |
| Samsung | P | P | P | It seems beneficial to optimize the size while keeping expected usefulness. |
| LG | A | A | A |  |
| **Apple** | **A** | **A** | **A** |  |
| Ericsson | A (but only when T304 is also running | NA | A | In order to reduce the size of the information included in the SCGFailureInformation, we should only focus on MRO use cases. Option b is not due to MRO issues, and also option a (random access problems) may not be due to MRO issues especially if T304 is not running. |
| **vivo** | **A** | **A** | **A** |  |
| CATT | P | P | P |  |
| **Sharp** | **A** | **A** | **A** |  |
| **OPPO** | **A** | **A** | **A** |  |
| CMCC | **A** | **A** | **A** |  |
| ZTE | **P** | **P** | **P** | **We see benefits in all.** |
| Lenovo | **A** | **A** | **A** |  |
| Nokia | **P** | **NA** | **P** | In our view, inclusion o the information in case failureType is set to beamRecoveryFailure (in the SCGFailureInformation only in case of beam related problems) is not relevant for PSCell changes. Thus, we prefer the inclusion o the information in case failureType is set to beamRecoveryFailure is excluded. |
| ITRI | **A** | **A** | **A** |  |
| Huawei, HiSilicon | P | P | P | For opt b, it may be due to bad cell quality, e.g., too late PSCell change. |
| **NEC** | A | A | A |  |

**Rapporteur summary:**

Scenario a:

* P: 5/16
* A: 11/16 (1 company believe that only when T304 is running should be considered)

Scenario b:

* P: 4/16
* A: 10/16
* NA: 2/16

Scenario c:

* P: 4/16
* A: 11/16

Given the above outcome, Rapporteur proposes the following:

1. 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

In addition, in the pre-meeting 117 offline discussion [1] the following proposal has been captured and invited the companies to provide their input as contribution.

[Company-tdoc] RAN2 to discuss the necessity of inclusion of previousPSCellID, failedPSCellID, timeSCGFailure in the SCGFailureInformation message.

Among the companies addressing this issue in the contributions, some companies [2][3][4][5][7] agree to include the *previousPSCellID*, *failedPSCellID*, *timeSCGFailure* in the *SCGFailureInformation*. Another company [6] only proposes to include the previousPSCellID, failedPSCellID. One company [8] disagrees to include the above information in the *SCGFailureInformation* because the UE context still exists at the time of receiving the *SCGFailureInformation*, hence network can figure out such information from the UE context and the UHI.

Given the above, companies are asked to provide their preference regarding the inclusion of the following parameters in the SCGFailureInformation:

1. previousPSCellID
2. failedPSCellID
3. timeSCGFailure

In order to facilitate the discussion, Rapporteur would like to ask companies to indicate whether the inclusion of the above paremters in the SCGFailureInformation is preferred (P), acceptable (A), or not acceptable (NA).

* + **Question-7:** Which of the above parameters are needed in the SCGFailureInformation message?
    - Please indicate for each of the above parameters whether their inclusion in the SCGFailureInformation is preferred (P), acceptable (A), or not acceptable (NA)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Company** | **a (P/A/NA)** | **b (P/A/NA)** | **c (P/A/NA)** | **Comments** |
| **Qualcomm** | **A** | **A** | **A** |  |
| Samsung | P | P | P | As we currently consider RAN3 discussion and agreements already made in RAN3, these parameters have to be explicitly reported. RAN3 has clear arguments in technical aspect, that the parameters should be supported. |
| LG | P | P | A |  |
| **Apple** | **A** | **A** | **A** |  |
| **Ericsson** | **NA** | **NA** | **NA** | 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 PSCell ID. 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 related information. This information comprises for how long a UE has had a RRC connection in that cell, i.e. the timer is started at the time of UE entering the PSCell and stopped at the time of reception of SCGFailureInformation that is forwarded by the MN. |
| **vivo** | **A** | **A** | **A** |  |
| CATT | P | P | P | These parameters are needed and can not be deduce from the legacy parameters in SCGFailureInformation message by the NW, at least in some cases. Therefore we think it is better to follow RAN3’s request. |
| **Sharp** | **A** | **A** | **NA** |  |
| **CMCC** | **A** | **A** | **A** |  |
| ZTE | P | P | P | RAN3 has identified scenarios where NW cannot based on implementation to derive such information, e.g., intra-SN PSCell change, or UE context might be deleted when receiving failure information in SN and etc.  Since RAN3 has work on a solution based on RAN2 will provide such information explicitly therefore it is preferred to do as request since the overhead is not so large. |
| Lenovo | A | A | A |  |
| Nokia | P | P | P | We believe that to follow the RAN3 requirement the information needs to be supported, but its modelling can be as follows:  ***sourcePSCell-CGI***  This field indicates the CGI of the cell that is the source PSCell of the last SN change.  ***targetPSCell-CGI***  This field indicates the CGI of the cell in which SCG failure is detected or the target PSCell of the failed PSCell change.  ***timeSinceLastPSCellChange***  This field is used to indicate the time that elapsed since the last PSCell change initialization until SCG failure. |
| ITRI | P | P | P | The network may not be able to implicitly identify such information in case e.g. the failure occurs after successful CPC without MN involvement. We think it is better to follow RAN3’s request. |
| Huawei, HiSilicon | P | P | P | We think that RAN3 has identified that based on implementation, MN cannot derive such information based on existing SCGFailureInformation. And the MN cannot know whether there is intra-SN PSCell change. So all the three parameters are needed. |
| **NEC** | P | P | **A** |  |

**Rapporteur summary:**

1. previousPSCellID
   * P: 8/15
   * A: 6/15
   * NA: 1/15
2. failedPSCellID
   * P: 8/15
   * A: 6/15
   * NA: 1/15
3. timeSCGFailure
   * P: 6/15
   * A: 7/15
   * NA: 2/15

Given the above outcome, Rapporteur proposes the following:

1. RAN2 to include the following information in the SCGFailureInformation in case of SCG failure
   1. previousPSCellID
   2. failedPSCellID
   3. timeSCGFailure

It was also discussed about the inclusion of a 1-bit flag to indicate the running of T304 at the time of SCG failure declaration due to *randomAccessProblem*. It has been argued that with the presence of the flag, the network node receiving the *SCGFailureInformation* can identify whether the SCG failure was declared due to too late PSCell change (e.g., if the T304 was not running) or too early PSCell change (e.g., if T304 was running) thus helping RAN3 to resolve their issues with MRO. The following proposal was formulated in the pre-RAN2#117 email discussion:

[Company-tdoc] The UE includes 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.

Companies provided their input and three companies disagreed to include the flag - two companies [2][6] argued assuming the Source PSCell and Failed PSCell inclusion in the SCG failure information is supported, additional flag isn’t necessary, and another company [8] argued that the network can implicitly derive that the UE has declared SCG failure due to SCG change related operation i.e., when the UE includes the RA related information (only *perRAInfoList*), then the network can implicitly derive that the UE is generating the *SCGFailureInformation* to indicate a failed SCG change procedure and thus there is no need to add one-bit flag. Two companies [3][7] support inclusion of the flag indicating the T304 was running.

Hence, from submitted contributions, it is not clear whether there is a strong need to include this information in the SCGFailureInformation.

* + **Question-8:** Is it needed to include in the SCGFailureInformation a flag indicating that the T304 was running at the moment of SCG failure?

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| --- | --- | --- |
| **Company** | **Yes (it is needed)**  **No (it is not needed)** | **Comments** |
| Qualcomm | No | Not needed. |
| Samsung | No |  |
| LG | No |  |
| Apple | No |  |
| Ericsson | No | It 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) |
| **vivo** | **No** |  |
| CATT | No |  |
| Sharp | No |  |
| **CMCC** | **No** |  |
| ZTE | Depends | It depends on outcome of previous question 6/7. Our only demand is that NW can be able to differentiate a SCG failure caused due to RandomAccessProblem/BFR is part of reconfigurationWithSync procedure or not either explicitly or implicitly. If outcome of q6/7 can already help derive such information then we are also fine with not including such indication, otherwise such information is needed. |
| Lenovo | No |  |
| Nokia | No |  |
| ITRI | No |  |
| Huawei, HiSilicon | No |  |
| **NEC** | **No** |  |

**Rapporteur summary:**

Not needed: 13/15 companies

It depends: 2/15 companies

No companies see the need for including this bit of information. However, 2 companies are saying that this depends on whether the information included in P6 allows the network to determine whether T304 is running when random access problem occurred. A possible solution would be to only consider the scenario in which random access problems occurred while T304 is running. Rapporteur proposes the following:

1. 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.
2. RAN2 to discuss whether the network can implicitly determine that T304 was running when random access problems occurred in the SCG.

### 2.2.1 Others

Since this is the last meeting, Rapporteur would like to ask if there is any other critical outstanding issue related to the *SCGFailureInformation* enhancements.

* + **Question-9:** Is there any other critical outstanding issue related to SCGFailureInformation enhancements?

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| --- | --- |
| **Company** | **Comments** |
| **Ericsson** | In order to reduce the size of the SCGFailureInformation, we propose including in the SCGFailureInformation only the perRAInfoList, rather than the full RA Information.  The SCGFailureInformation is a real time message transmitted when the NW still has the UE context available for this UE. Hence all the RA information can be implicitly derived by the network in this case. Thus, it is sufficient to include only perRAInfoList instead of the entire ra-InformationCommon. Similar size reduction is already performed for CEF Report. |
| Huawei, HiSilicon | Agree with Ericsson to reduce the signalling of RA information.  The SCGFailureInformation will be reported immediately. The failure PSCell still has the UE context and can know the RA configuration of the UE. The RACH resource related paramters may be not needed. |
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**Rapporteur summary:**

2 companies believe that in order to reduce the size of the SCGFailureInformation, the RACH resource related parameter may not need to be included in the SCGFailureInformation, since the network may still have this information available at the moment of the failure. Hence, they are proposing to only include the perRAInfoList.  
Given the above Rapporteur proposes the following:

1. 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.

## SHR

Concerning the open issues of the SHR, the following proposal was provided in the pre-meeting 117 email discussion [1], and companies were invided to provide their view on whether the T312 threshold for triggering SHR should be configured per measurement identity or a common threshold can be used for triggering SHR no matter T312 was running on which measurement identity.

[Company-tdoc] RAN2 to discuss whether the T312 threshold for the SHR generation should be configured per measurement identity or if that can be common for all measurement identities configured to the UE.

Companis provided their input and among them, and from the configuration standpoint, one company [9] wants the T312 threshold to be configured per measurement identity and other companies [12][13][10][4][11] want to use a common T312 threshold for all measurements identities.

Given that from the submitted contributions there is a majority of companies that prefer adopting the same T312 threshold for all measurement identities, Rapporteur would like to ask the following question:

* + **Question-10**: Do you have concerns on configuring a common T312 threshold for all the measurement identities?
    - If yes, please comment your concerns

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| --- | --- | --- |
| **Company** | **Yes (there are concerns)**  **No (no concerns)** | **Comments** |
| Qualcomm | Yes | T312 value is configured per measurement identity. A common threshold is not good enough for determining any issue associated with the target cell. Therefore, it should be configured per measurement identity. |
| Samsung | No |  |
| **Apple** | **No** |  |
| **Ericsson** | **No** | Since the threshold is expressed in percentage rather than in absoluted value, it should be ok to have the same threshold for any T312. We are however also ok to have separate T312 thresholds if there are strong concerns. |
| **vivo** | **No** |  |
| CATT | No |  |
| Sharp | No |  |
| **OPPO** | **nO** |  |
| **CMCC** | **No** |  |
| **ZTE** | **No** |  |
| **Lenovo** | **No** |  |
| **Nokia** | **No** |  |
| Huawei, HiSilicon | No |  |
| **NEC** | **No** |  |

**Rapporteur summary:**

Yes: 1/14 companies

No: 13/14 companies

Given the above outcome, Rapporteur proposes the following:

1. A single T312 threshold common to all measurement identities is configured in the SHR configuration.

From triggering SHR standpoint, the following proposal was captured in the premeeting 117 email discussion:

[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

And according to the companies contributions, some companies [12][13][11][9] agree that SHR should be triggered only if the T312 associated to a measurement identity associated to the target cell was above the T312 threshold. Some other companies [10][4] proposed that SHR should be logged when T312 for any measurement identity was above the threshold. Given that from the submitted contributions there is a slight majory of companies that prefer the option b above, Rapporteur would like to ask the following

* + **Question-11**: Do you have concerns on generating the SHR only when the T312 associated to a measurement identity associated to the target cell is above the T312 threshold?
    - If yes, please comment your concerns

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| --- | --- | --- |
| **Company** | **Yes (there are concerns)**  **No (no concerns)** | **Comments** |
| Qualcomm | No |  |
| Samsung | No | Preferable with option b |
| **Apple** | **No** |  |
| **Ericsson** | **No** |  |
| **Vivo** | **No** |  |
| CATT | No |  |
| **Sharp** | Yes | Firstly, we consider T312 is kind of a short T310, which is running when the radio link of the source cell is not good. If a T312 running value is above the threshold, it means the handover is not optimal and SHR should be generated , no matter the T312 is associated to a meas ID associated to the taerget or not.  Secondly, though UE can be configured with more than one T312 value, only one T312 is running at a time on UE. If T312 is started with T312 value configured for cell A(non-target cell), UE will not start another T312 for cell B(target cell) as there is already a running T312, but this does not mean condition for starting T312 for cell B is not fullfiled. |
| **OPPO** | **no** |  |
| **CMCC** | **No** |  |
| ZTE |  | We prefer option a as RLF is triggered due to T312 expiry regardless whether it is associated with target or not which still means the HO is initiated in a near RLF situation. |
| Nokia | No |  |
| Huawei, HiSilicon | No |  |
| NEC | Yes | Agree with Sharp. |

**Rapporteur summary:**

No concern: 10/13

Yes, there are concerns: 3/13

Companies that expressed concerns on this proposal state that it would be beneficial anyhow for the network to know that the HO was taken close to a potential RLF, irrespective of whether the T312 is running for a measurement identity associated to the target cell or for any other measurement identity. Rapporteur observes that this may be correct, however in this case the UE would need to also indicate the measurement identity for which the T312 was running, otherwise that would not bring much benefit to the network. On the other hand, if it is agreed that the SHR is generated only for the T312 of the target cell, the network would know implicitly which is the problematic measurement identity.   
Given the above outcome, Rapporteur proposes the following:

1. The SHR shall be generated only if the T312 associated to the measurement identity of the target cell is running
   1. If this is not agreeble, i.e. if it is agreed that the UE shall log the SHR always when a T312 is running for any measurement identity configured to the UE, RAN2 to discuss if the UE shall also indicate which frequency related measurements had triggered the timer T312.

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

In order to facilitate the discussion, Rapporteur would like to ask companies to indicate for each of the above solutions whether that is preferred (P), acceptable (A), or not acceptable (NA). From the submitted contributions, some companies also highlighted preference for certain combinations of the above solutions. You are therefore also invited to express which combinations of the above solutions can work.

* + **Question-12**: Which of the above solutions do you prefer for solving the issue of SHR, and RLF-Report generated for the same HO? Please indicate for each solution whether that is preferred (P), acceptable (A), not acceptable (NA). You can also indicate combinations of solutions that can work together.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Company** | **a**  **(P/A/NA)** | **b**  **(P/A/NA)** | **c**  **(P/A/NA)** | **d**  **(P/A/NA)** | **e**  **(P/A/NA)** | **f**  **(P/A/NA)** | **Comments** |
| Qualcomm | **P** | **A** | **P** | **NA** | **NA** | **NA** | In our contribution, we proposed:   * Solution A, where the RLF report can contain the indicator that SHR is transmitted to the target cell. (No need to include an indicator in both reports) * If the SHR is not transmitted to the target cell, we can have an indicator in RRCxxComplete message to indicate both RLF and SHR belong to the same HO. (no need to include an indicator in any report) |
| Samsung | A | A | A | A | NA | NA | Since we prefer a simple way in retrieval procedure, we do not support e.  Depending on the window size, there would be ambiguity points in the analysis. Thus we do not support f. |
| LG | A | A | A | P | NA | NA |  |
| **Apple** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **In our contribution we should how the issue can be easily solved by reasonbly smart network implementation without any standards impact** |
| Ericsson | P | A | A | NA | A | NA | **D:** We believe time stamp is not enough as there might be multiple UEs performing HO at the same time and experiencing RLF at the same time, e.g., High Speed Train Scenario. Then it is not possible to correlated SHRs of multiple UEs to the corresponding RLFs from the same set of UEs, bevuase they may report roughly the same time stamps. Further, the timestamp would need to always be included in the SHR becuase at the moment of the SHR generation, the UE does not know whether an RLF will happen. Therefore that will create considerable overhead in the SHR.  In additon the format of the time-stamp is needed to be agreed and given te limited time it may not be possible in this Rel.  **F:** It will be ambiguous for how long the UE will wait before generating the SHR. This time should be somehow coordinated between the source and the target since both source and target may be interested in the SHR. Due to the limited time we prefer avoiding discussing this.  **A/B:** B is similar at A, with the difference that B does not work in case the SHR is transmitted to the network before the RLF-Report is generated. On the other hand, A will work also in this case, since in that case the RLF-Report will indicate that an SHR has been already transmitted. Hence, we prefer A over B.  However, if the intention is to use B when the RLF occurs before sending the SHR to the network, then also B can be acceptable, 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). So from this perspective A/B can also work together. |
| **Vivo** | A | A | A | A | NA | NA |  |
| CATT | NA | NA | P | A | NA | NA | For a and b, we think when the source gNB receives the indicator, the source gNB can also not identify the associated report for same HO.  We prefer c as it has great probability to address the issue and we only need to introduce C-RNTI in SHR (C-RNTI has been included in RLF report). In addition, d is also acceptable to us to further identify for network.  For e and f, we do not support as we prefer a simple way, supporting e and f will introduce some complexity such as how the UE and network perform if the SHR has been send to network, or the accurate duration for the certain time window. |
| **Sharp** | NA | NA | A | A | NA | NA | Share the same view with Apple, but option c/d is considerred accesptable. |
| **OPPO** | **A** | **A** | **A** | **P** |  |  | both the RLF report and SHR needs to store the RLF related and SHR related time stamp and the UE ID (C-RNTI-like) for the network to know that the SHR and RLF corresponds to the same HO and could therefore prioritize the RLF report over the SHR for the MRO. |
| **CMCC** | **A** | **A** | **A** | **NA** | **A** | **NA** |  |
| **ZTE** | **A** | **A** | **A** | **A** | **P** | **NA** | When SHR has not been sent yet, the simplest solution is let UE to merge both report so that NW can obtain complete information with one request, also even NW doesn’t request the report due to more urgent service, there is no risk that only partial information will be fetched since the whole report will either be kept or deleted due to generation of new report.  When SHR has sent to NW, an indication to NW can inform NW to know such situation has happened, but UE identity and time information is still required to help NW correlate both reports(i.e., a,c/d cannot work alone.) But the additional overhead will need to be taken into account. |
| **Lenovo** | **NA** | **NA** | **NA** | **NA** | **P** | **P** | We propose a compromised way to consider a combination of option e and option f, e.g., the UE can start a timer after the generation of the SHR, the SHR should be discarded if a RLF occurs within the timer and only RLF Report is sent to the network; otherwise, both SHR and RLF Report are sent to the network (e.g. RLF-Report can be merged with the SHR). |
| **Nokia** | **NA** | **NA** | **A** | **P** | **NA** | **NA** | Timestamping at UE side (possibly combined with C-RNTI) is the easiest solution that least impacts UE behaviour. |
| Huawei, HiSilicon | NA | A | P | P | NA | NA | We prefer the combination of opt c and opt d. We believe the combination of C-RNTI and time info can assis the network to uniquely identify the UE.  We are also fine to consider “opt c only” if there is no ambiguity at network side.  For opt d, we prefer to introduce the time since the reception of the RRCreconfigurationwithsync.  Besides, with b, the network can know whether to perform the correlation or just analyze based on the received report.  Since the UE only knows whether the SHR (RLF-report) is sent to the reception network. This doesn’t mean the first reported report will be delived to the target network earlier. So we select opt b than opt a.  For e, it is worth noting that there will be lots of duplicated information between SHR and RLF report generated for the same HO. This is not needed and introduce massive signalling overhead. |
| **NEC** | NA | NA | P | P | NA | NA | Agree with the analysis on a, b, e, f.  c and d are straightforward information that can be used to correlate the SHR and RLF-reprot. |

**Rapporteur summary:**

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. Rapporteur would also like to have a brief discussion on whether the C-RNTI is the C-RNTI assigned by the source cell or target cell or both.   
Other options that received significant support are option b and d, therefore Rapporteur also proposes further discussing the need of option d and b. In particular, related to option d, RAN2 should also discuss how to represent this timestamp, e.g.relative timestamp, absolute timestamp.

1. 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.
2. 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)

### Others

Since this is the last meeting, Rapporteur would like to ask if there is any other critical outstanding issue related to the SHR.

* + **Question-13:** Is there any other critical outstanding issue related to the SHR?

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| **Company** | **Comments** |
| **Sharp** | It seems to us the restriction that SHR is not triggered in case of the successful CHO recovery has not been implemented in the running CR, so we propose to add this restriction (as in our contribution R2-2202940). |
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**Rapporteur summary:**

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:

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

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

1. 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.

# Conclusion

Based on the discussion in the previous sections we propose the following:

[Proposal 1 RAN2 to keep discussing how to report the payload reported by the UE in the RA-Report for the 2-step RA:](#_Toc96935303)

[a. The overall payload without padding available in the UE buffer size at the time of initiating the 2 step RA procedure](#_Toc96935304)

[b. The payload without padding sent by the UE over the PUSCH resources in the msgA](#_Toc96935305)

[Proposal 2 RAN2 tries to agree the following for the reporting of the payload size:](#_Toc96935306)

[a. 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)](#_Toc96935307)

[Proposal 3 RAN2 to keep discussing the inclusion of one or more of the following PUSCH resource parameters:](#_Toc96935308)

[a. msgA-MCS (4 bits)](#_Toc96935309)

[b. nrofPRBs-PerMsgA-PO (5 bits)](#_Toc96935310)

[c. msgA-PUSCH-TimeDomainAllocation (4 bits)](#_Toc96935311)

[d. frequencyStartMsgA-PUSCH (9 bits)](#_Toc96935312)

[e. nrofMsgA-PO-FDM (2 bits)](#_Toc96935313)

[Proposal 4 As a possible compromise, RAN2 to consider including the above information only when the UE uses random access resources provided in dedicated signalling, or only when configured with CFRA.](#_Toc96935314)

[Proposal 5 The RA related Information associated to the SCG failure are included in the SCGFailureInformation.](#_Toc96935315)

[Proposal 6 The RA Information associated to a SCG failure are included in the SCGFailureInformation for the following scenarios:](#_Toc96935316)

[a. when failureType is set to randomAccessProblem](#_Toc96935317)

[b. when failureType is set to beamFailureRecoveryFailure](#_Toc96935318)

[c. when failureType is set to synchReconfigFailureSCG](#_Toc96935319)

[Proposal 7 RAN2 to include the following information in the SCGFailureInformation in case of SCG failure](#_Toc96935320)

[a. previousPSCellID](#_Toc96935321)

[b. failedPSCellID](#_Toc96935322)

[c. timeSCGFailure](#_Toc96935323)

[Proposal 8 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.](#_Toc96935324)

[Proposal 9 RAN2 to discuss whether the network can implicitly determine that T304 was running when random access problems occurred in the SCG.](#_Toc96935325)

[Proposal 10 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.](#_Toc96935326)

[Proposal 11 A single T312 threshold common to all measurement identities is configured in the SHR configuration.](#_Toc96935327)

[Proposal 12 The SHR shall be generated only if the T312 associated to the measurement identity of the target cell is running](#_Toc96935328)

[a. If this is not agreeble, i.e. if it is agreed that the UE shall log the SHR always when a T312 is running for any measurement identity configured to the UE, RAN2 to discuss if the UE shall also indicate which frequency related measurements had triggered the timer T312.](#_Toc96935329)

[Proposal 13 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.](#_Toc96935330)

[Proposal 14 RAN2 to further discuss the need of the following options:](#_Toc96935331)

[a. Indicator in the RLF-Report (SHR) indicating that there is an SHR (RLF-Report) associated to the same HO](#_Toc96935332)

[b. Timestamps in the SHR and RLF-Report to link them in time. FFS how to represent this timestamp (e.g. absolute or relative timestamp)](#_Toc96935333)

[Proposal 15 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.](#_Toc96935334)

# References

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