3GPP TSG-RAN WG2 #116bis-e R2-220xxxx

Electronic meeting, 16th – 25th January 2022

Agenda Item: 8.13.2

Source: Ericsson

Title: Summary of AI 8.13.2 on SON open issues (Ericsson)

Document for: Discussion, Decision

# Introduction

This contribution addresses the open issues from the running CR related to SON taking into account the contributions submitted to RAN2#116-bis.

The summary focuses primarily on the new issues/topics not discussed/brought up in the email discussion [Post116-e][887.5][SONMDT] Leftover issues on SON ([R2-2200005](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2200005.zip)). For the sake of completeness, the proposals captured in that email discussions are included here as well.

# Discussion

In the following sections, we discuss for each topic the pending issues from previous meetings, as well as the editor´s note captured in the current version of the TS 38.331 running CR.

## CHO/DAPS related

### Proposals from #887.5

In yellow below the proposals from the email discussion 887.5.

1. In case the UE experiences an RLF in a cell after being configured with CHO configuration in that cell (i.e., RLF in source while having CHO config), the UE shall log in the RLF-Report, the already agreed timeSinceCHOReconfig which represents in this case the time elapsed between the RLF in that cell and the latest received CHO configuration while connected to that cell (6/12)
   1. If the above is not agreeble, RAN2 to discuss alternatives on how to represent in the RLF-Report the time between CHO configuration in a cell, and RLF in the same cell before CHO execution initiation.
2. The following granularities are adopted for the timers timeConnSourceDAPSFailure, timeSinceCHOReconfig, timeBetweenEvents:
   1. timeConnSourceDAPSFailure: FFS milliseconds or hundreds of ms
   2. timeSinceCHOReconfig: FFS milliseconds or hundreds of ms
   3. timeBetweenEvents: milliseconds
3. RAN2 to discuss whether there is any issue for the following topics related to CHO/DAPS, and whether those should be addressed in the next revision of running CR:
   1. Whether the latest changes in the running CR captures modeling of the UE actions in the case of consecutive failures.
   2. How to set the timeSinceFailure, i.e. whether to keep the specification as-is (time since last failure) or to modify the specification to start the associated timer from the first failure (needs specification update) in the case of RLF report including dual failure information.
   3. How to represent the case of RLF in source and RLF in target in case of DAPS HO
   4. On the definition of timeConnSourceDAPSFailure, i.e. whether last DAPS handover ‘execution‘ or the last DAPS handover ‘initialization‘ should be used
   5. Merging the field description of the rlfInSource-DAPS in the RLF-Report with the one under the SHR
   6. Whether there is any change needed for logging of Time D in case CHO is not triggered

### 2.1.2 New open issues related to running CR

In [2], it is is proposed to use the timer timeConnSourceDAPSFailure is included in RLF report in case of RLF occurs in source cell after fallback in DAPS HO scenario. Rapporteur notes that in the current running CR [7], the time between the DAPS HO execution and the radio ink failure in the source cell after the fallback to the source cell is already captured by the timeConnFailure, see below:

|  |
| --- |
| **From TS 38.331 Running CR [7]:**  1> else if the failure is detected due to radio link failure as described in 5.3.10.3, set the fields in *VarRLF-report* as follows:  2> set the *connectionFailureType* to *rlf*;  2> set the *rlf-Cause* to the trigger for detecting radio link failure in accordance with clause 5.3.10.4;  2> set the *nrFailedPCellId* in *failedPCellId* to the global cell identity and the tracking area code, if available, and otherwise to the physical cell identity and carrier frequency of the PCell where radio link failure is detected;  2> if an *RRCReconfiguration* message including the *reconfigurationWithSync* was received before the connection failure:  3> if the last *RRCReconfiguration* message including the *reconfigurationWithSync* concerned an intra NR handover:  4> include the *nrPreviousCell* in *previousPCellId* and set it to the global cell identity and the tracking area code of the PCell where the last executed *RRCReconfiguration* message including *reconfigurationWithSync* was received;  4> if the last executed *RRCReconfiguration* message including *reconfigurationWithSync* was concerning a DAPS handover:  5> set *lastHOType* to *daps*;  4> else if the last executed *RRCReconfiguration* message including *reconfigurationWithSync* was concerning a conditional handover:  5> set *lastHOType* to *cho*;  4> set the *timeConnFailure* to the elapsed time since the execution of the last *RRCReconfiguration* message including the *reconfigurationWithSync*; |

Given the above, it seems that the usage of timeConnSourceDAPSFailure is unnecessary in this case. Note also that if it is agreed to use the timeConnSourceDAPSFailure in this case, then additional procedural text should be added to deprecate the use of timeConnFailure when there is an RLF after the fallback. However, it is proposed to discuss it:

1. RAN2 to discuss whether the time elapsed between the DAPS HO initialization and the RLF in the source cell after fallback is represented by the timeConnFailure (as in the current running CR) or via the timeConnSourceDAPSFailure.

In [9], Oppo proposes that at most one previousPCellIds, two failedPCellIds, and one reconnectCellId should be included in the RLF report. Rapporteur notes that this is already the way it is captured in the running CR, i.e. in case of failure both in the first CHO handover, and in the second CHO recovery attempt, the UE includes the previousPCellID (i.e. the source cell), the failedPCellID (i.e. the target PCell), the choCellID (i.e. the second cell where CHO is attempted), and then reestablishmentCellID (in case the second CHO attempt fails). Hence, no further discussion seems needed.

In [9], Oppo proposes that the timeConnFailure for the first CHO failure is not needed to be recorded and that the the timeConnFailure IE corresponding to the second CHO failure is proposed to be recorded in the RLF report. Rapporteur notes that the timeConnFailure is used by the network to better understand the reason of an HOF. If the second CHO failure is instead taken into account for the timeConnFailure, then this information will be lost. Rapporteur proposes to further discuss what is the reason to change this legacy functionality.

1. RAN2 to discuss if there is the need to do not record the timeConnFailure for the first CHO failure, and just record it for the second.

Still in [9], Oppo proposes to include the timeUntilReconnection for the latter failure in the RLF report for the consecutive CHO failure cases. Rapporteur notes that the timeUntilReconnection is used to log the time since the failed reestablishment in legacy. The second CHO failure is not considered a reestablishment, so it is not clear what would be the purpose of this time in this case. Note also that it was discussed in the past whether to consider the time between the failures but that was not agreed.

1. RAN2 to discuss the need to include the *timeUntilReconnection* for the latter failure in the RLF report for the consecutive CHO failure cases.

Still in [9], Oppo proposes to agree that the UE should be allowed to delete or modify the already stored IEs (corresponding to the first failure) in the VarRLF-Report due to the occurrence of the latter failure, rather than appending new IEs with the old ones. Rapportuer notes however that how to model the CHO failures in the RLF report has been already agreed. Hence it suggested not further discussing it.

In [10], Samsung proposes that the the fields, condFirstEventFulfilled and condSecondEventFulfilled are discarded from Running CR and that the inclusion of timeBetweenEvents and firstTriggeredEvent implies that all execution condition(s) are fulfilled. The claimed reason is that in CHO boh events should be fulfilled for the target cell. Note however, that in the current running CR the condFirstEventFulfilled and condSecondEventFulfilled are used also for the candidate target cells in which case not both of them will be always fulfilled. Rapporteur proposes further discussing this.

1. RAN2 to discuss if it is necessary to remove the condFirstEventFulfilled and condSecondEventFulfilled from Running CR.

In [10] and in [18], Samsung and Qualcomm propose to remove the list of CHO candidate cells IDs in RLF Report from the running CR.

1. RAN2 to discuss if it is needed to remove the CHO candidate cells IDs from the RLF Report in the running CR.

In [12], Lenovo proposes that for the cell in which the CHO recovered the UE indicates whether the CHO execution conditions are triggered or not. Rapporteur notes that according to the current running CR, the UE already includes for each of the candidate target cells the CHO configuration and whether the conditions were fulfilled. Hence this seems to be already covered by the current running CR.

In [12] and in [15], Lenovo and CMCC propose to add further information to the RLF-Report for the case of CHO. Rapporteur notes however that radio measurements are already included in the RLF-Report for the candidate target cells as well as their CHO configuration and information on event´s fulfilment.

1. RAN2 to discuss the need of the following additional information to be included in the RLF-Report for the case of CHO:
   1. Whether the entry condition of the second condition is met or not when the first condition is considered as ‘fulfilled’
   2. Whether the second condition is also satisfied during TTT but the status of the first event has been changed to ‘not satisfied’
   3. The measurement result of the corresponding serving cell and candidate cell associated with the second event when the first condition is considered as ‘fulfilled’
   4. The measurement result of the corresponding serving cell and candidate cell when the first condition is considered as ‘not fulfilled’
   5. For the case that two CondEvent A3 or two CondEvent A5 are configured, then the reported first satisfied event or condition includes the corresponding measurement quantity, e.g., RSRP or RSRQ

In [14], it is proposed to capture in TS37.320 that for CHO, the latest radio measurement results of the candidate target cells are included in RLF Report. This is to align with the RRC running CR

1. RAN2 to capture in TS37.320 that for CHO, the latest radio measurement results of the candidate target cells are included in RLF Report.

In [15], CMCC is also proposing that for the case that two different events, i.e., CondEvent A3 and CondEvent A5, are configured, then the first satisfied event or condition refers to the satisfied CondEvent A3 or CondEvent A5. Rapporteur notes that this is already the behaviour captured in the running CR.

In [17], Huawei proposes that the UE includes the CHO configuration of the cell where RLF is detected in the RLF Report. Rapporteur notes that in the current running CR, the CHO configuration at RLF is provided for each candidate target cell. In the CHO context, it is not clear what is the CHO configuration of the cell where the RLF is detected, since the CHO configuration is for target cells not for the source cells.

1. RAN2 to discuss the need to include in the RLF-Report the CHO configuration of the cell where RLF is detected

In [17], it is proposed that in case there is a failure in the CHO recovery cell, the UE should not delete the previous HOF information associated to the CHO. Rapporteur notes that in the current running CR if there is a failure in the CHO cell, that will be treated as a normal RLF.

1. RAN2 to discuss if the UE should keep the previous RLF-Report if a failure occurs in the CHO recovery cell.

In [17], related to DAPS, it is proposed to refine the information provided in the RLF-Report in case of DAPS fallback.

1. RAN2 to discuss the need to refine the information in the RLF-report for the scenario of DAPS fallback, e.g.:
   1. Redefine the reestablishmentCellId to support the fallback cell information
   2. Introduce a new IE, e.g., fallbackIndicator to indicate the successful fallback information

In [18], Qualcomm proposes that the timeConnFailure should be set to 0 in case the failure occurs before the CHO execution. Rapporteur notes that, we should keep the principles that we have in legacy as agreed in last RAN2#116-meeting, i.e. if the failure occurs in cell B, the timeConnFailure is set to the time elapsed since the last HO execution from A->B, and the RLF in cell B. If the timeConnFailure is set to 0, the network will think that the failure occurred immediately after the HO from cell A to cell B, while this might not be true. Rapporteur proposes not further discussing this.

In [18], Qualcomm proposes that if there is an RLF in a target cell after the DAPS HO, a possible RLF in the source encountered during the DAPS HO will not be reported. Rapporteur notes that the running CR is already like that, i.e. the RLF in source can only be captured either if the SHR is generated or if an HOF occurs, otherwise for it is not included for RLF (please check the procedures related to *rlfInSource-DAPS* in the running CR). Rapporteur proposes not further discussing this.

In [20], LG proposes that in case of successive CHO failure, the UE shall not clear the RLF-Report associated to the first CHO failure. Rapporteur notes that this is already the way it is captured in the specification, i.e. if the second CHO failure occurs, the UE does not initiate a new RLF-Report, rather it just appends the new info (i.e. the choCellID in the existing RLF-Report). See the part below in yellow:

|  |
| --- |
| From running CR:  3> if the associated T304 was not initiated as per the cell selection procedure performed in subclause 5.3.7.3:  4> store the handover failure information in *VarRLF-Report* as described in the subclause 5.3.10.5; |

Rapporteur proposes not further discussing this.

In [20], LG claims that there is no way to differentiate legacy RLF-Report and R17 enhanced RLF-Report because there is only single indicator in UE-MeasurementsAvailable. Rapporteur proposes to discuss the need of this:

In addition, it has been proposed by Huawei in [29] to introduce new UE capability bits for the following enhancements and they are optional without capability signalling:

* DAPS failure reporting
* CHO failure reporting
* PSCell change failure reporting

Based on the above papers, Rapporteur proposes the following.

1. Related to capabilities, RAN2 to discuss the need of the following:
   1. Release indicator for each report version, representing that there exists a SON related report needed to be exchanged
   2. Capability bits for DAPS/CHO/PSCell change failure reporting

In [22], Sharp would like to clarify the implications of the following agreement. “Successful CHO recovery while initial failure” is part of the RLF-Report. Rapporteur interpretation is that SHR should not be triggered if the CHO fails, no matter if the recovery is successful or not. This was already discussed in the past, and it is the way it is implemented in the CR already.

1. RAN2 to discuss whether there is the need clarify the implications of the following agreement from RAN2#114-e, i.e. “Successful CHO recovery while initial failure is part of the RLF-Report”
   1. SHR may still be triggered for this successful CHO recovery, but the information of the SHR (e.g. SHR-cause) is not logged in *VarSuccessHO-Report* but in the RLF- report together with the RLF information for initial failure
   2. SHR is not triggered for this successful CHO recovery. The information associated to the first failure and second CHO attempt are included in the RLF-Report (this is the running CR implementation)

In [26], Ericsson proposes to include the t312-expiry as rlf-cause in the RLF-Report as in LTE, and to also let the UE include the frequency whose associated T312 expired.

1. RAN2 to discuss the inclusion of the ‘t312-expiry’ as a new rlf-cause in the RLF-Report.
2. RAN2 to discuss the inclusion of the frequency whose associated T312 expired.

## SHR related

### Proposals from #887.5

In yellow below the proposals from the email discussion 887.5.

1. For the inclusion of RA-InformationCommon in the SHR, RAN2 to discuss the following:
   1. Option A: RA-InformationCommon is included in SHR when T304 is above the threshold (6/12)
   2. Option B: RA-InformationCommon is not included in SHR (6/12)
2. It is not possible for the network to identify that the SHR and RLF report are generated for the same HO.
3. RAN2 to consider one or more of the following solutions to address the issue in Proposal 19:
   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. UE-ID and 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
4. The UP interruption time at HO is evaluated at PDCP layer without considering duplicates.
5. The UE is responsible for performing the user plane interruption time measurements at the HO i.e., inline with the agreement from RAN2#115 meeting.
6. RAN2 to discuss in which HO scenarios the UP interruption measurements should be considered:
   1. Only at DAPS HO (6/12)
   2. For all HO types (ordinary HO, DAPS, CHO) (5/12)
7. The UE shall generate a SHR due to RLF in the source cell during a DAPS HO, only if it is configured to do so in the SHR configuration (i.e. in the *successHO-Config*)
   1. If the above is not agreeable, discuss whether it is acceptable that the T310 threshold is used to determine whether the UE shall log the rlfInSource-DAPS-r17. Consider however, there might be other reasons for which the source RLF is declared beside the T310 (e.g., BFR Failure, reaching maximum number of random accesss attempts etc.).
8. RAN2 to discuss whether there is any issue for the following topics related to SHR, and whether those should be addressed in the next revision of running CR:
   1. Discarding of the SHR if HO fails
   2. Which message carries the SHR configuration, e.g. HO command, or other RRC message
   3. Alignment of the SHR content with the RLF-Report in the ASN.1, e.g. inclusion of the CHO configuration in the SHR, inclusion of the CHO candidate cell list in the SHR.

### 2.2.2 New open issues

In [11], Samsung proposes the the UE should check the PLMN before sending the availability indicator in the case of SHR, as in RLF Report.

1. RAN2 to discuss if PLMN checking is required before sending the availability indicator for the SHR, as in RLF Report.

Still in [11], it is proposed the following:

1. RAN2 discusses if inter-RAT SHR is supported in this release. If so, RAN2 studies the encoding format for inter-RAT SHR.

In [11] and [13], Samsung and Lenovo proposes to include the actual values of the T304, T312, T310 in the SHR. Additionally Samsung propose to capture the time between the RLF in source during the DAPS HO and the successful random access in the targe. Rapporteur notes that the need for this information was already discussed in the past, but not agreed. The following proposal is anyhow added in case there is now more support.

1. RAN2 to discuss the need of including the following information in the SHR:
   1. T310 value in source cell when T310 stops
   2. T312 value in source cell when T312 stops
   3. T304 value in target cell when T304 stops
   4. UE reports the time between RLF@source and successful RACH with the target in DAPS handover in SHR

In [13], Lenovo further wonders what happens in case multiple triggering conditions for the SHR generation are fulfilled. According to the running CR, all the triggering conditions will be represented in the generated SHR. So it seems that no further discussion is needed.

In [16], CMCC proposes the enhance the content of the SHR about the BFR when none of beams in *candidateBeamRSList* could meet the measurement requirement.

1. RAN2 to discuss the need to include BFR related information in the Successful Handover Report, when none of beams in candidateBeamRSList could meet the measurement requirement, e.g.
   1. **Indication that none of beams in candidateBeamRSList could meet the measurement requirement**
   2. **ID and measurements of beams whose measurement higher than the threshod rsrp-ThresholdSSB but not within the configured list candidateBeamRSList**
   3. Measurements of reference signals that within the configured list candidateBeamRSList

In [23], Sharp proposes to investigate whether for the case of SHR, the network needs to know whether the UE was configured with split SRB1 when the SHR was generated.

1. RAN2 to discuss whether the UE needs to indicate in the SHR whether the UE was configured with split SRB when the HO occurred.

In [26], Ericsson claims that the T312 is running per measurement object according to legacy specifications, and there might be different T312 values that the UE is handling for different measurement objects. Related to the T304 value used for the SHR generation, it is proposed then to discussed whether the UE should log the SHR whenever there is at least a T312 value associated to any measurement identity above the threshold, or if only the T304 associated to the measurement identity of the target cell should be considered.

1. 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

Similarly, it is proposed to discuss if the T312 threshold should be common to any measurement identity configured to the UE, or if it should be configured per measurement identity.

1. 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.

## RA report related

### Proposals from #887.5

In yellow below the proposals from the email discussion 887.5.

1. For the 2-step RA, the UE reports the payload size without considering the padding.
2. For the 2-step RA, the UE reports the payload size per RA procedure.
3. 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.
4. The UE includes *intendedSIBs*, *ssbsForSI-Acquisition* in the RA report also for a successfully completed on-demand SI procedure.
5. The UE includes the PCell ID in the RA-Report, if the RA procedure is performed in an SCell of the MCG.
6. The UE includes the PSCell ID in the RA-Report, if the RA procedure is performed in an SCell of the SCG.
7. RAN2 to discuss whether there is any issue for the following topics related to the RA report, and whether those should be addressed in the next revision of running CR:
   1. Whether it is mandatory for the UE to log SN RACH report
   2. Whether the TS 36.331 modifications are introduced to handle the scenario of LTE MN fetching the list of NR RA reports.
   3. Consider to capture other reasons for changing the procedure from 2-step to 4-step, e.g. due to LBT, due to fallback RAR reception
   4. Consider to capture fallback from 4-step CFRA to 4-step CBRA
8. The RA Information associated to a SCG failure (when failureType is set to randomAccessProblem or beamFailureRecoveryFailure-r16) are included in the SCGFailureInformation.

### New open issues

#### 2.3.2.1 2-step RA

Concerning the capability bit for the RA report, following have been proposed in [29],[30],[31]:

* Neither additional capability bit nor optional feature is needed for SgNB RACH Report for NR-DC case, while in EN-DC scenarios additional capability bit is needed for NR RA report enhancement in LTE [31].
* New UE capability bits for 2-step RA report enhancement and SN RA report are needed, and they are optional with capability signalling [29].
* Due to the time constrains prioritize NR DC scenarios and avoid changes in LTE spec for the time being [30].

Based on the above, rapporteur would like to propose the following proposal.

1. RAN2 discuss whether a capability bit is needed for the RA report enhancements in Rel 17 (i.e., enhancement on 2-step RA information and SN related RA information).
2. In case of SN related capabilities, RAN2 to discuss EN-DC scenarios: i.e., whether capability bit for NR RA report is needed in LTE specification

Concerning the topic of when the UE shall include the msgA related PRACH resource information in the RA report has been brought up by multiple companies.

* MSGA PRACH resource should be included in RA report in the case of the following conditions ( CATT- [1]):  
  1) random access procedure with only 2-step RA attempt; or  
  2) 2-step RA is switched to 4-step RA and at least one value among frequency start, FDM, and SubcarrierSpacing of the MsgA RACH occasion is different to the corresponding value of MSG1 RACH occasion
* Confirm that when setting RA resource information in RA report, UE only include the parameters of RA resource that is configured in corresponding RACH configuration and used in the RA procedure (e.g., Msg1-FDM/Msg1-FrequencyStart is included for 2stepRA if shared RO is used)( R2-2200900 – CMCC, ZTE [4]).

Based on the above, RAN2 can discuss the conditional inclusion aspects of msgA related PRACH resources.

1. RAN2 to confirm that the UE includes the RA resource related parameters (frequency start, FDM, and SubcarrierSpacing of the msgA RA resource) only under following scenarios:
   1. RA procedure involves only 2 step RA
   2. When 2 step RA to 4 step RA switching occurs, only those parameters that are different in 4 step RA resources compared to the 2 step RA resources.

Concerning the topic of the amount of data sent over PUSCH resources associated to msgA, companies have proposed the following.

* For the payload size transmitted in MSGA for a 2-step RACH, the size ranges can be (Huawei [5])  
  Option 1: It needs 4 bits, i.e. 11 values + noPayload, and 4 spare values are reserved  
  Option 2: It may need less than 4 bits, e.g. 5 values + noPayload, and 2 spare values are reserved
* The UE shall log and report the overall payload without padding in the RA-Report, considering the overall buffer size just before the msgA transmission (Ericsson [7]).
* The UE shall log and report the overall payload in RA-report per RA procedure (Ericsson [7]).
* MsgA PUSH size range is indicated as a 8-bit bit string in RA report, where the value of the 8-bit bitstring refers to the index of the BSR table in TS 38.321 (Ericsson [7]).

Based on the above proposals, it seems like there are two aspects left to be discussed. Firstly, what information is included in the RA report concerning the payload and secondly, how to represent it.

1. RAN2 to discuss which of the following parameters does the UE include in the RA report:
   1. overall payload without padding i.e., the amount of UL data at the UE at the time of initiating the 2 step RA procedure.
   2. payload without padding i.e., the amount of UL data sent over the PUSCH resources associated to the 2 step RA procedure.
2. RAN2 to discuss which of the following method is used to encode the outcome of Proposal 44:
   1. A 8-bit bit string in RA report, where the value of the 8-bit bitstring refers to the index of the BSR table in TS 38.321
   2. Exactly following the definition of ra-MsgA-SizeGroupA
   3. Simplified definition of ra-MsgA-SizeGroupA by removing some size ranges

Further, some companies have indicated that the UE should include the PUSCH configuration related information as the network might not have the UE context available in its memory when the RAReport is received from the UE. Thus, companies propose the following.

* Include following PUSCH resource allocated for msgA in the RA-Report (CMCC, ZTE [4]):
  + F: the MCS index
  + G: the number of PRB per PO of the PUSCH resource
  + H: the combination of start symbol and length and PUSCH mapping type
  + I: offset of lowest PUSCH occasion in frequency domain with respect to PRB 0
  + J: the number of msgA PUSCH occasions FDMed in one time instance
* Introduce PUSCH configuration related information in 2-step RA report in granularity of per RA procedure (Huawei [5])
  + msgA-MCS (4 bits)
  + nrofPRBs-PerMsgA-PO (5 bits)
  + msgA-PUSCH-TimeDomainAllocation (4 bits)
  + frequencyStartMsgA-PUSCH (9 bits)
  + nrofMsgA-PO-FDM (2 bits)

Based on the above, the following proposal is made.

1. RAN2 to discuss 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)

One company has brought up the clarification regarding when the UE shall set the contentionDetected flag to TRUE while using the 2 step RA procedure. Their argument for doing so is that this condition is not clear in the MAC specification.

* The field contentionDetected corresponding to 2-Step RA is set to TRUE (Samsung [3]),
  + if msgB-ResponseWindow expires (and/or UE has received successRAR but does not include its contention resolution identity), or
  + if fallbackRAR is received for this attempt and contention resolution timer expires

Rapporteur proposes to check the necessity of such a clarification.

1. RAN2 to discuss whether it is necessary or not to clarify when the UE sets the contentionDetected flag to TRUE for 2 step RA procedure, e.g.
   1. if msgB-ResponseWindow expires (and/or UE has received successRAR but does not include its contention resolution identity)
   2. if fallbackRAR is received for this attempt and contention resolution timer expires.

#### 2.3.2.2 On-demand SI

In [29], it has been discussed to introduce a new capability bit for the on-demand SI request related enhancement as part of RA reporting. Based on that, rapporteur wonders if companies agree to introduce a new capability bit for the on-demand SI request enhancement in the RA reporting.

1. RAN2 discuss the necessity of a new capability bit for on-demand SI request enhancement of the RA reporting.

#### 2.3.2.3 Other RA-related topics

In [34], Ericsson proposes that the UE includes the SpCell identifier in the RA report in case the RA procedure was performed in an SCell of the MCG or SCG.

1. The UE includes the SpCell identifier in the RA report in case the RA procedure was performed in an SCell of the MCG or SCG.

Also, associated to the RA report handling between different RATs, one company proposes the following (ZTE [6]).

* Confirm that UE reports all available RA-information (LTE RA information as well as SgNB RA-report if available) to LTE node regardless if it is in DC or not.
* When reporting stored SgNB RA-report, the cell identity of stored SgNB RA-report is encoded in LTE format and put outside the SgNB RA-report container.

Based on this, the following proposals are made.

1. RAN2 confirms that UE reports all available RA-information (LTE RA information as well as SgNB RA-report if available) to LTE node regardless if it is in DC or not.
2. When reporting stored SgNB RA-report, the cell identity of stored SgNB RA-report is encoded in LTE format and put outside the SgNB RA-report container.

One company brings up the topic of impact of power sharing on RA procedure (Samsung [3]).

* The UE indicates whether the UE could not transmit a PRACH due to the power limitation arising from the power allocation related to MR-DC (e.g., EN-DC, NE-DC, or NR-DC). The UE indicates whether the UE had to reduce its PRACH transmission power due to the power limitation arising from the power allocation related to MR-DC

This topic has not been discussed before in RAN2. Thus, rapporteur believes it might be too late for this release. However, the following proposal is made in this regard.

1. RAN2 to decide whether to discuss the following new topic associated to RA report:
   1. The UE indicates whether the UE could not transmit a PRACH due to the power limitation arising from the power allocation related to MR-DC (e.g., EN-DC, NE-DC, or NR-DC). The UE indicates whether the UE had to reduce its PRACH transmission power due to the power limitation arising from the power allocation related to MR-DC

## Other WID related

### 2.4.1 Proposals from #887.5

In yellow below the proposals from the email discussion 887.5.

1. The UE sets the failureType to randomAccessProblem if the UE initiates transmission of the SCGFailureInformationNR message to indicate the reason for declaring failure to be the random access problem from the SCG MAC even if T304 is running. Otherwise, if no random access problem has been detected at T304 expiry, the UE sets the failureType to synchReconfigFailureSCG.
2. 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.
3. RAN2 to discuss the need to introduce an explicit capability indicator that indicates that the UE is capable of storing the PSCell related MHI.
4. RAN2 to discuss the total number of PSCell (across all PCells) related information that should be stored by the UE in the MHI:
   1. 16 PSCells
   2. 32 PSCells
   3. 64 PSCells
5. RAN2 to discuss whether there is any issue for the following topics related to MHI, and whether those should be addressed in the next revision of running CR:
   1. How to deal with the PSCell MHI if the SN is released
   2. How to deal with the PSCell MHI if the SN is added

### 2.4.2 New open issues

#### 2.4.2.1 MHI

In [17] [34] [36], Ericsson and Huawei proposes to include the time spent with no PScell, besides the time duration when there are both Pcell and PScell (already captured in the running CR).

1. RAN2 to discuss the inclusion of the following information in the MHI
   1. the time spent with no PSCell.
   2. The time UE stayed in each PSCell and UE stayed without PSCell should all be recorded in the PCell entry in chronological order

In [35], ZTE proposes that the UE creates a new PCell entry if upon PSCell transition while being on same PCell and the maximum PSCell number of the PCell entry has reached. On the other hand, Ericsson [34] proposes that when the UE reaches the maximum number of PSCell, if it gets a new PSCell, the UE removes the oldest stored PSCell entry and stores the newly configured PSCell entry.

1. RAN2 to discuss how to handle addition/release of PSCells, e.g.
   1. The UE should create a new PCell entry if upon PSCell transition while being on same PCell and the maximum PSCell number of the PCell entry has reached.
   2. When the UE reaches the maximum number of PSCell, if it gets a new PSCell, the UE removes the oldest stored PSCell entry and stores the newly configured PSCell entry

Further, in [36], CATT proposes to add the PScell MHI also to the LTE specifications.

1. RAN2 to discuss if the PSCell MHI should extended to LTE as well.

In [34], Ericsson proposes to clarify how to handle the time spent in case of DAPS.

1. RAN2 to discuss whether to clarify the handling of the time spent in the MHI in case of DAPS, e.g. the time spent in previous PCell is captured as the time spent from entering the source cell until receiving the source DAPS release message.

#### 2.4.2.2 NR-U

Related to NR-U, Rapporteur notes that RAN2 received an LS from RAN3 asking different questions related to NR-U procedures (R3-216042). Rapporteur suggests first treating this LS reply. In [34], Ericsson provided some possible replies for the questions RAN3 asked:

1. RAN2 to discuss how to reply to the RAN3 LS on NR-U procedures (R3-216042), e.g.:
   1. The NR-U channel can be represented by channel ID, centre frequency of the carrier and its configured bandwidth
   2. According to TS 38.300 Section 5.6.1, the NG-RAN node may apply LBT in order to transmit packets to UEs over the air interface. It is not specified in 3GPP specifications whether the NG-RAN node can sense the NR-U channel even when no data are available for transmission
   3. The ED threshold configuration is configured as part of the NR-U channel access configuration which in turn is included in the serving cell configuration, according to TS 38.331. The energy detection threshold can be configured as an offset to the default maximum energy detection threshold value, or as an absolute configurable maximum energy detection threshold value
   4. The ED threshold is configured to the UE per serving cell

Besides the LS reply, various proposals have been proposed on the NR-U topic. For the sake of thoroughness we provided the list of the proposals in the following. These proposals are not part of the Rel 17 running CR. Rapporteur wonders if these proposals should be discussed as part of Rel 17.

* Reporting LBT statistics (RSSI, CO) per “CCA/LBT Evaluation Part.” Such as (i) indications of evaluation parts by the UE using a limited number of bits and (ii) specification of full evaluation parts such as the exact (e.g. lowest) frequency of the BWP by using ARFCN-ValueNR and the bandwidth of the evaluation part [27].
* Definging new NR-U report like CEF, RLF, and RA reports with availability indication in typical messages such as RRCSetupComplete just like CEF, RLF, and RA availability in reports in R16. [27]
* Logging UE position along with LBT statistics if available [27].
* Logging the “lbt-FailureRecoveryConfig” IE in the NR-U report [27].
* Indicating whether LBT recovery was successful or not in the NR-U report [27].
* Loggin maxEnergyDetectionThreshold, energyDetectionThresholdOffset, and ul-to-DL-COT-SharingED-Threshold Key thresholds in the NR-U report [27].
* Using LBT Failures statistics for the network optimizations in non-failure and failure scenarios [32]
* Logging: Cell information on which LBTFailure happened, Timestamp (the time when LBT failure is detected by the MAC), Indicator whether the LBTFailure resulted in RACH/RLF/SCGFailure (for differentiating failure and non-failure scenarios), BWP used and no. of LBT failures observed (on each of the RB sets within BWPs and/or aggregated LBT Failures on each BW), RSSI and CO measurement when LBT failure is detected by the MAC, if available. [32]
* Introduce information in the RLF report which allows to distinguish between RLFs caused by wrongly configured handover parameters (useful for MRO) and those spoiled by channel access delays (not useful for MRO) [33].
* Introduce logging of channel access delay information experienced during the handover process [33].
* A new raPurpose to indicate that the RA was initiated by a “consistent LBT failures” in the SpCell [34].
* UE includes in the RA-Report a random access procedure that failed due to “consistent LBT failures” [34].
* UE includes in the RA-InformationCommon the configured “lbt-FailureInstanceMaxCount” [34]
* For each RA attempt, it is indicated whether the corresponding RA attempt was blocked by LBT [34].
* The failed random access procedure is added in the RA-Report as a separate entry [34]
* The failed random access procedure is included within a single entry of the RA-Report at the time of successful RA, together with other random access procedures in other UL BWPs [34].
* introduce new L2 measurements associated to UP impact of LBT [34].

Given the limited amount of time left in the WI, before jumping on the details of the solutions, Rapporteur would like to first discuss whether RAN2-related enhancements for NR-U should be addressed in Rel.17.

1. RAN2 to discuss whether specific RAN2 enhancements related to NR-U should be addressed.

In case RAN2 wishes to pursue changes in this area in Rel.17, it is proposed to discuss what type of enhancements to introduce based on the above proposals:

1. RAN2 to discuss which of the following enhancements should be pursued related to NR-U in Rel.17:
   1. Introduce new specific SON container to collect LBT statistics
   2. Enhancements to the existing RLF/CEF/RA report.
   3. Enhancements to the existing L2 measurements

#### 2.4.2.3 Fast MCG Link recovery

In [27] and [28], it is proposed to focus on MCG link recovery and address various enhancements for it in the SON framework, e.g..

* Fast MCG link recovery failure indication in the RLF report [R2-2200679],
* Not flushing the RLF report upon successful MCG reconcery procedure [R2-2201044], and
* Including the value of T316 timer upon successful MCG recovery [R2-2201044]
* Including location information in MCGFailure Report [R2-2200679]

In the first place, Rapporteur believes that we should discuss whether MCG fast recovery enhancements should be discussed in Rel.17.

1. RAN2 to discuss whether to address enhancements to the data collection for the MCG recovery optimization in Rel 17.
2. In case RAN2 decides to pursue such enhancements, RAN2 to discuss the benefits of the following proposals:
   1. Fast MCG link recovery failure indication in the RLF report
   2. Not flushing the RLF report upon successful MCG reconcery procedure
   3. Including the value of T316 timer upon successful MCG recovery
   4. Including location information in MCGFailure Report

#### 2.4.2.4 Miscellaneous

In [29], Huawei is proposing discussing whether to have FDD/TDD and FR1/FR2 differentiation for UE capabilities.

1. For new UE capabilities, it is proposed RAN2 to discuss whether to have FDD/TDD differentiation and FR1/FR2 differentiation.

# Conclusion

Based on the discussion in the previous sections we propose the following. Note that the highlighted proposals below are captured from the 887.5 email discussion.

[Proposal 1 In case the UE experiences an RLF in a cell after being configured with CHO configuration in that cell (i.e., RLF in source while having CHO config), the UE shall log in the RLF-Report, the already agreed timeSinceCHOReconfig which represents in this case the time elapsed between the RLF in that cell and the latest received CHO configuration while connected to that cell (6/12)](#_Toc92978935)

[a. If the above is not agreeble, RAN2 to discuss alternatives on how to represent in the RLF-Report the time between CHO configuration in a cell, and RLF in the same cell before CHO execution initiation.](#_Toc92978936)

[Proposal 2 The following granularities are adopted for the timers timeConnSourceDAPSFailure, timeSinceCHOReconfig, timeBetweenEvents:](#_Toc92978937)

[a. timeConnSourceDAPSFailure: FFS milliseconds or hundreds of ms](#_Toc92978938)

[b. timeSinceCHOReconfig: FFS milliseconds or hundreds of ms](#_Toc92978939)

[c. timeBetweenEvents: milliseconds](#_Toc92978940)

[Proposal 3 RAN2 to discuss whether there is any issue for the following topics related to CHO/DAPS, and whether those should be addressed in the next revision of running CR:](#_Toc92978941)

[a. Whether the latest changes in the running CR captures modeling of the UE actions in the case of consecutive failures.](#_Toc92978942)

[b. How to set the timeSinceFailure, i.e. whether to keep the specification as-is (time since last failure) or to modify the specification to start the associated timer from the first failure (needs specification update) in the case of RLF report including dual failure information.](#_Toc92978943)

[c. How to represent the case of RLF in source and RLF in target in case of DAPS HO](#_Toc92978944)

[d. On the definition of timeConnSourceDAPSFailure, i.e. whether last DAPS handover ‘execution‘ or the last DAPS handover ‘initialization‘ should be used](#_Toc92978945)

[e. Merging the field description of the rlfInSource-DAPS in the RLF-Report with the one under the SHR](#_Toc92978946)

[f. Whether there is any change needed for logging of Time D in case CHO is not triggered](#_Toc92978947)

[Proposal 4 RAN2 to discuss whether the time elapsed between the DAPS HO initialization and the RLF in the source cell after fallback is represented by the timeConnFailure (as in the current running CR) or via the timeConnSourceDAPSFailure.](#_Toc92978948)

[Proposal 5 RAN2 to discuss if there is the need to do not record the timeConnFailure for the first CHO failure, and just record it for the second.](#_Toc92978949)

[Proposal 6 RAN2 to discuss the need to include the *timeUntilReconnection* for the latter failure in the RLF report for the consecutive CHO failure cases.](#_Toc92978950)

[Proposal 7 RAN2 to discuss if it is necessary to remove the condFirstEventFulfilled and condSecondEventFulfilled from Running CR.](#_Toc92978951)

[Proposal 8 RAN2 to discuss if it is needed to remove the CHO candidate cells IDs from the RLF Report in the running CR.](#_Toc92978952)

[Proposal 9 RAN2 to discuss the need of the following additional information to be included in the RLF-Report for the case of CHO:](#_Toc92978953)

[a. Whether the entry condition of the second condition is met or not when the first condition is considered as ‘fulfilled’](#_Toc92978954)

[b. Whether the second condition is also satisfied during TTT but the status of the first event has been changed to ‘not satisfied’](#_Toc92978955)

[c. The measurement result of the corresponding serving cell and candidate cell associated with the second event when the first condition is considered as ‘fulfilled’](#_Toc92978956)

[d. The measurement result of the corresponding serving cell and candidate cell when the first condition is considered as ‘not fulfilled’](#_Toc92978957)

[e. For the case that two CondEvent A3 or two CondEvent A5 are configured, then the reported first satisfied event or condition includes the corresponding measurement quantity, e.g., RSRP or RSRQ](#_Toc92978958)

[Proposal 10 RAN2 to capture in TS37.320 that for CHO, the latest radio measurement results of the candidate target cells are included in RLF Report.](#_Toc92978959)

[Proposal 11 RAN2 to discuss the need to include in the RLF-Report the CHO configuration of the cell where RLF is detected](#_Toc92978960)

[Proposal 12 RAN2 to discuss if the UE should keep the previous RLF-Report if a failure occurs in the CHO recovery cell.](#_Toc92978961)

[Proposal 13 RAN2 to discuss the need to refine the information in the RLF-report for the scenario of DAPS fallback, e.g.:](#_Toc92978962)

[a. Redefine the reestablishmentCellId to support the fallback cell information](#_Toc92978963)

[b. Introduce a new IE, e.g., fallbackIndicator to indicate the successful fallback information](#_Toc92978964)

[Proposal 14 Related to capabilities, RAN2 to discuss the need of the following:](#_Toc92978965)

[a. Release indicator for each report version, representing that there exists a SON related report needed to be exchanged](#_Toc92978966)

[b. Capability bits for DAPS/CHO/PSCell change failure reporting](#_Toc92978967)

[Proposal 15 RAN2 to discuss whether there is the need clarify the implications of the following agreement from RAN2#114-e, i.e. “Successful CHO recovery while initial failure is part of the RLF-Report”](#_Toc92978968)

[a. SHR may still be triggered for this successful CHO recovery, but the information of the SHR (e.g. SHR-cause) is not logged in *VarSuccessHO-Report* but in the RLF- report together with the RLF information for initial failure](#_Toc92978969)

[b. SHR is not triggered for this successful CHO recovery. The information associated to the first failure and second CHO attempt are included in the RLF-Report (this is the running CR implementation)](#_Toc92978970)

[Proposal 16 RAN2 to discuss the inclusion of the ‘t312-expiry’ as a new rlf-cause in the RLF-Report.](#_Toc92978971)

[Proposal 17 RAN2 to discuss the inclusion of the frequency whose associated T312 expired.](#_Toc92978972)

[Proposal 18 For the inclusion of RA-InformationCommon in the SHR, RAN2 to discuss the following:](#_Toc92978973)

[a. Option A: RA-InformationCommon is included in SHR when T304 is above the threshold (6/12)](#_Toc92978974)

[b. Option B: RA-InformationCommon is not included in SHR (6/12)](#_Toc92978975)

[Proposal 19 It is not possible for the network to identify that the SHR and RLF report are generated for the same HO.](#_Toc92978976)

[Proposal 20 RAN2 to consider one or more of the following solutions to address the issue in Proposal 19:](#_Toc92978977)

[a. Indicator in the RLF-Report (SHR) indicating that the SHR (RLF-Report) has been already sent to the network for this HO](#_Toc92978978)

[b. Indicator in the RLF-Report (SHR) indicating that there is an SHR (RLF-Report) associated to the same HO](#_Toc92978979)

[c. UE-ID and C-RNTI to be included in the SHR, RLF-Report](#_Toc92978980)

[d. Timestamps in the SHR and RLF-Report to link them in time](#_Toc92978981)

[e. 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.](#_Toc92978982)

[f. If RLF occurs within a certain time window after the generation of the SHR, the SHR should be discarded if not yet transmitted](#_Toc92978983)

[Proposal 21 The UP interruption time at HO is evaluated at PDCP layer without considering duplicates.](#_Toc92978984)

[Proposal 22 The UE is responsible for performing the user plane interruption time measurements at the HO i.e., inline with the agreement from RAN2#115 meeting.](#_Toc92978985)

[Proposal 23 RAN2 to discuss in which HO scenarios the UP interruption measurements should be considered:](#_Toc92978986)

[a. Only at DAPS HO (6/12)](#_Toc92978987)

[b. For all HO types (ordinary HO, DAPS, CHO) (5/12)](#_Toc92978988)

[Proposal 24 The UE shall generate a SHR due to RLF in the source cell during a DAPS HO, only if it is configured to do so in the SHR configuration (i.e. in the *successHO-Config*)](#_Toc92978989)

[a. If the above is not agreeable, discuss whether it is acceptable that the T310 threshold is used to determine whether the UE shall log the rlfInSource-DAPS-r17. Consider however, there might be other reasons for which the source RLF is declared beside the T310 (e.g., BFR Failure, reaching maximum number of random accesss attempts etc.).](#_Toc92978990)

[Proposal 25 RAN2 to discuss whether there is any issue for the following topics related to SHR, and whether those should be addressed in the next revision of running CR:](#_Toc92978991)

[a. Discarding of the SHR if HO fails](#_Toc92978992)

[b. Which message carries the SHR configuration, e.g. HO command, or other RRC message](#_Toc92978993)

[c. Alignment of the SHR content with the RLF-Report in the ASN.1, e.g. inclusion of the CHO configuration in the SHR, inclusion of the CHO candidate cell list in the SHR.](#_Toc92978994)

[Proposal 26 RAN2 to discuss if PLMN checking is required before sending the availability indicator for the SHR, as in RLF Report.](#_Toc92978995)

[Proposal 27 RAN2 discusses if inter-RAT SHR is supported in this release. If so, RAN2 studies the encoding format for inter-RAT SHR.](#_Toc92978996)

[Proposal 28 RAN2 to discuss the need of including the following information in the SHR:](#_Toc92978997)

[a. T310 value in source cell when T310 stops](#_Toc92978998)

[b. T312 value in source cell when T312 stops](#_Toc92978999)

[c. T304 value in target cell when T304 stops](#_Toc92979000)

[d. UE reports the time between RLF@source and successful RACH with the target in DAPS handover in SHR](#_Toc92979001)

[Proposal 29 RAN2 to discuss the need to include BFR related information in the Successful Handover Report, when none of beams in candidateBeamRSList could meet the measurement requirement, e.g.](#_Toc92979002)

[c. Measurements of reference signals that within the configured list candidateBeamRSList](#_Toc92979003)

[Proposal 30 RAN2 to discuss whether the UE needs to indicate in the SHR whether the UE was configured with split SRB when the HO occurred.](#_Toc92979004)

[Proposal 31 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:](#_Toc92979005)

[a. 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.](#_Toc92979006)

[b. The SHR shall be generated only if the T312 associated to the measurement identity associated to the target cell is running](#_Toc92979007)

[Proposal 32 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.](#_Toc92979008)

[Proposal 33 For the 2-step RA, the UE reports the payload size without considering the padding.](#_Toc92979009)

[Proposal 34 For the 2-step RA, the UE reports the payload size per RA procedure.](#_Toc92979010)

[Proposal 35 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.](#_Toc92979011)

[Proposal 36 The UE includes *intendedSIBs*, *ssbsForSI-Acquisition* in the RA report also for a successfully completed on-demand SI procedure.](#_Toc92979012)

[Proposal 37 The UE includes the PCell ID in the RA-Report, if the RA procedure is performed in an SCell of the MCG.](#_Toc92979013)

[Proposal 38 The UE includes the PSCell ID in the RA-Report, if the RA procedure is performed in an SCell of the SCG.](#_Toc92979014)

[Proposal 39 RAN2 to discuss whether there is any issue for the following topics related to the RA report, and whether those should be addressed in the next revision of running CR:](#_Toc92979015)

[a. Whether it is mandatory for the UE to log SN RACH report](#_Toc92979016)

[b. Whether the TS 36.331 modifications are introduced to handle the scenario of LTE MN fetching the list of NR RA reports.](#_Toc92979017)

[c. Consider to capture other reasons for changing the procedure from 2-step to 4-step, e.g. due to LBT, due to fallback RAR reception](#_Toc92979018)

[d. Consider to capture fallback from 4-step CFRA to 4-step CBRA](#_Toc92979019)

[Proposal 40 The RA Information associated to a SCG failure (when failureType is set to randomAccessProblem or beamFailureRecoveryFailure-r16) are included in the SCGFailureInformation.](#_Toc92979020)

[Proposal 41 RAN2 discuss whether a capability bit is needed for the RA report enhancements in Rel 17 (i.e., enhancement on 2-step RA information and SN related RA information).](#_Toc92979021)

[Proposal 42 In case of SN related capabilities, RAN2 to discuss EN-DC scenarios: i.e., whether capability bit for NR RA report is needed in LTE specification](#_Toc92979022)

[Proposal 43 RAN2 to confirm that the UE includes the RA resource related parameters (frequency start, FDM, and SubcarrierSpacing of the msgA RA resource) only under following scenarios:](#_Toc92979023)

[a. RA procedure involves only 2 step RA](#_Toc92979024)

[b. When 2 step RA to 4 step RA switching occurs, only those parameters that are different in 4 step RA resources compared to the 2 step RA resources.](#_Toc92979025)

[Proposal 44 RAN2 to discuss which of the following parameters does the UE include in the RA report:](#_Toc92979026)

[a. overall payload without padding i.e., the amount of UL data at the UE at the time of initiating the 2 step RA procedure.](#_Toc92979027)

[b. payload without padding i.e., the amount of UL data sent over the PUSCH resources associated to the 2 step RA procedure.](#_Toc92979028)

[Proposal 45 RAN2 to discuss which of the following method is used to encode the outcome of Proposal 44:](#_Toc92979029)

[a. A 8-bit bit string in RA report, where the value of the 8-bit bitstring refers to the index of the BSR table in TS 38.321](#_Toc92979030)

[b. Exactly following the definition of ra-MsgA-SizeGroupA](#_Toc92979031)

[c. Simplified definition of ra-MsgA-SizeGroupA by removing some size ranges](#_Toc92979032)

[Proposal 46 RAN2 to discuss the inclusion of one or more of the following PUSCH resource parameters:](#_Toc92979033)

[a. msgA-MCS (4 bits)](#_Toc92979034)

[b. nrofPRBs-PerMsgA-PO (5 bits)](#_Toc92979035)

[c. msgA-PUSCH-TimeDomainAllocation (4 bits)](#_Toc92979036)

[d. frequencyStartMsgA-PUSCH (9 bits)](#_Toc92979037)

[e. nrofMsgA-PO-FDM (2 bits)](#_Toc92979038)

[Proposal 47 RAN2 to discuss whether it is necessary or not to clarify when the UE sets the contentionDetected flag to TRUE for 2 step RA procedure, e.g.](#_Toc92979039)

[a. if msgB-ResponseWindow expires (and/or UE has received successRAR but does not include its contention resolution identity)](#_Toc92979040)

[b. if fallbackRAR is received for this attempt and contention resolution timer expires.](#_Toc92979041)

[Proposal 48 RAN2 discuss the necessity of a new capability bit for on-demand SI request enhancement of the RA reporting.](#_Toc92979042)

[Proposal 49 The UE includes the SpCell identifier in the RA report in case the RA procedure was performed in an SCell of the MCG or SCG.](#_Toc92979043)

[Proposal 50 RAN2 confirms that UE reports all available RA-information (LTE RA information as well as SgNB RA-report if available) to LTE node regardless if it is in DC or not.](#_Toc92979044)

[Proposal 51 When reporting stored SgNB RA-report, the cell identity of stored SgNB RA-report is encoded in LTE format and put outside the SgNB RA-report container.](#_Toc92979045)

[Proposal 52 RAN2 to decide whether to discuss the following new topic associated to RA report:](#_Toc92979046)

[a. The UE indicates whether the UE could not transmit a PRACH due to the power limitation arising from the power allocation related to MR-DC (e.g., EN-DC, NE-DC, or NR-DC). The UE indicates whether the UE had to reduce its PRACH transmission power due to the power limitation arising from the power allocation related to MR-DC](#_Toc92979047)

[Proposal 53 The UE sets the failureType to randomAccessProblem if the UE initiates transmission of the SCGFailureInformationNR message to indicate the reason for declaring failure to be the random access problem from the SCG MAC even if T304 is running. Otherwise, if no random access problem has been detected at T304 expiry, the UE sets the failureType to synchReconfigFailureSCG.](#_Toc92979048)

[Proposal 54 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.](#_Toc92979049)

[Proposal 55 RAN2 to discuss the need to introduce an explicit capability indicator that indicates that the UE is capable of storing the PSCell related MHI.](#_Toc92979050)

[Proposal 56 RAN2 to discuss the total number of PSCell (across all PCells) related information that should be stored by the UE in the MHI:](#_Toc92979051)

[a. 16 PSCells](#_Toc92979052)

[b. 32 PSCells](#_Toc92979053)

[c. 64 PSCells](#_Toc92979054)

[Proposal 57 RAN2 to discuss whether there is any issue for the following topics related to MHI, and whether those should be addressed in the next revision of running CR:](#_Toc92979055)

[a. How to deal with the PSCell MHI if the SN is released](#_Toc92979056)

[b. How to deal with the PSCell MHI if the SN is added](#_Toc92979057)

[Proposal 58 RAN2 to discuss the inclusion of the following information in the MHI](#_Toc92979058)

[a. the time spent with no PSCell.](#_Toc92979059)

[b. The time UE stayed in each PSCell and UE stayed without PSCell should all be recorded in the PCell entry in chronological order](#_Toc92979060)

[Proposal 59 RAN2 to discuss how to handle addition/release of PSCells, e.g.](#_Toc92979061)

[a. The UE should create a new PCell entry if upon PSCell transition while being on same PCell and the maximum PSCell number of the PCell entry has reached.](#_Toc92979062)

[b. When the UE reaches the maximum number of PSCell, if it gets a new PSCell, the UE removes the oldest stored PSCell entry and stores the newly configured PSCell entry](#_Toc92979063)

[Proposal 60 RAN2 to discuss if the PSCell MHI should extended to LTE as well.](#_Toc92979064)

[Proposal 61 RAN2 to discuss whether to clarify the handling of the time spent in the MHI in case of DAPS, e.g. the time spent in previous PCell is captured as the time spent from entering the source cell until receiving the source DAPS release message.](#_Toc92979065)

[Proposal 62 RAN2 to discuss how to reply to the RAN3 LS on NR-U procedures (R3-216042), e.g.:](#_Toc92979066)

[a. The NR-U channel can be represented by channel ID, centre frequency of the carrier and its configured bandwidth](#_Toc92979067)

[b. According to TS 38.300 Section 5.6.1, the NG-RAN node may apply LBT in order to transmit packets to UEs over the air interface. It is not specified in 3GPP specifications whether the NG-RAN node can sense the NR-U channel even when no data are available for transmission](#_Toc92979068)

[c. The ED threshold configuration is configured as part of the NR-U channel access configuration which in turn is included in the serving cell configuration, according to TS 38.331. The energy detection threshold can be configured as an offset to the default maximum energy detection threshold value, or as an absolute configurable maximum energy detection threshold value](#_Toc92979069)

[d. The ED threshold is configured to the UE per serving cell](#_Toc92979070)

[Proposal 63 RAN2 to discuss whether specific RAN2 enhancements related to NR-U should be addressed.](#_Toc92979071)

[Proposal 64 RAN2 to discuss which of the following enhancements should be pursued related to NR-U in Rel.17:](#_Toc92979072)

[a. Introduce new specific SON container to collect LBT statistics](#_Toc92979073)

[b. Enhancements to the existing RLF/CEF/RA report.](#_Toc92979074)

[c. Enhancements to the existing L2 measurements](#_Toc92979075)

[Proposal 65 RAN2 to discuss whether to address enhancements to the data collection for the MCG recovery optimization in Rel 17.](#_Toc92979076)

[Proposal 66 In case RAN2 decides to pursue such enhancements, RAN2 to discuss the benefits of the following proposals:](#_Toc92979077)

[a. Fast MCG link recovery failure indication in the RLF report](#_Toc92979078)

[b. Not flushing the RLF report upon successful MCG reconcery procedure](#_Toc92979079)

[c. Including the value of T316 timer upon successful MCG recovery](#_Toc92979080)

[d. Including location information in MCGFailure Report](#_Toc92979081)

[Proposal 67 For new UE capabilities, it is proposed RAN2 to discuss whether to have FDD/TDD differentiation and FR1/FR2 differentiation.](#_Toc92979082)

# 4. References

1. R2-2200393 The left issues on 2-step RA Report, CATT
2. R2-2200392, Further Discussion on Handover Related SON Aspects, CATT
3. R2-2200670, 2-step Random Access Optimization, Samsung
4. R2-2200900, Remaining issues for 2-step RA CMCC,ZTE

1. [R2-2200967](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2200967.zip), [Discussion on 2 step RA related SON aspects](https://ericsson.sharepoint.com/R2-2200967.zip), Huawei, HiSilicon
2. R2-2201327, Remaining issues on RA-report enhancements, ZTE Corporation, Sanechips
3. R2-2201604, 2-Step RA information for SON purposes Ericsson
4. [R2-2200004](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2200004.zip), [Running 38.331 for introducing R17 SON](https://ericsson.sharepoint.com/R2-2200004.zip), Ericsson

1. [R2-2200560](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2200560.zip), [Further consideration of SON of HO related aspects](https://ericsson.sharepoint.com/R2-2200560.zip), OPPO

1. [R2-2200668](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2200668.zip), [SON Enhancements for CHO Optimization](https://ericsson.sharepoint.com/R2-2200668.zip), Samsung

1. [R2-2200669](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2200669.zip), [SON Enhancements for Successful HO Report](https://ericsson.sharepoint.com/R2-2200669.zip), Samsung

1. [R2-2200752](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2200752.zip), [SON Enhancements for CHO](https://ericsson.sharepoint.com/R2-2200752.zip), Lenovo, Motorola Mobility

1. [R2-2200753](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2200753.zip), [SON Enhancements for SHR](https://ericsson.sharepoint.com/R2-2200753.zip), Lenovo, Motorola Mobility

1. [R2-2200901](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2200901.zip), [On measurements of CHO candidate cells](https://ericsson.sharepoint.com/R2-2200901.zip), CMCC, Ericsson, Huawei, Nokia, ZTE

1. [R2-2200902](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2200902.zip), [Remaining issues on SON Enhancement for CHO](https://ericsson.sharepoint.com/R2-2200902.zip), CMCC

1. [R2-2200903](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2200903.zip), [Further Discussion on Successful Handover Report](https://ericsson.sharepoint.com/R2-2200903.zip), CMCC

1. [R2-2200966](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2200966.zip), [Discussion on handover related SON aspects](https://ericsson.sharepoint.com/R2-2200966.zip), Huawei, HiSilicon

1. [R2-2201035](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201035.zip), [HO related SON changes](https://ericsson.sharepoint.com/R2-2201035.zip) Qualcomm Incorporated
2. [R2-2201036](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201036.zip), [Open Issues in Successful Handover Report](https://ericsson.sharepoint.com/R2-2201036.zip), Qualcomm Incorporated

1. [R2-2201211](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201211.zip), [Remaining CHO related issues on SON](https://ericsson.sharepoint.com/R2-2201211.zip), LG Electronics
2. [R2-2201212](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201212.zip), [Remaining SHR related issues on SON](https://ericsson.sharepoint.com/R2-2201212.zip), LG Electronics

1. [R2-2201229](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201229.zip), [Successful HO report in CHO recovery case](https://ericsson.sharepoint.com/R2-2201229.zip), SHARP Corporation

1. [R2-2201230](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201230.zip), [Discussion on successful HO report in DC case](https://ericsson.sharepoint.com/R2-2201230.zip), SHARP Corporation
2. [R2-2201326](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201326.zip), [Further consideration on SHR enhancements](https://ericsson.sharepoint.com/R2-2201326.zip), ZTE Corporation, Sanechips
3. [R2-2201423](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201423.zip), [Discussion on SHR enhancements](https://ericsson.sharepoint.com/R2-2201423.zip), vivo

1. [R2-2201612](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201612.zip), [Handover-related SON aspects](https://ericsson.sharepoint.com/R2-2201612.zip), Ericsson

1. [R2-2200679](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2200679.zip), [SON Enhancements: Others](https://ericsson.sharepoint.com/R2-2200679.zip), Samsung

1. [R2-2201044](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201044.zip), [Discussion on other SON features](https://ericsson.sharepoint.com/R2-2201044.zip), Nokia, Nokia Shanghai Bell

1. [R2-2200968](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2200968.zip), [Discussion on UE capabilities for R17 SON and MDT](https://ericsson.sharepoint.com/R2-2200968.zip), Huawei, HiSilicon

1. [R2-2201605](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201605.zip), [On Other WID related SON features](https://ericsson.sharepoint.com/R2-2201605.zip), Ericsson

1. [R2-2200394](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2200394.zip), [Specification Impact of SgNB RACH Report on TS38.331 and TS36.331](https://ericsson.sharepoint.com/R2-2200394.zip), CATT

1. [R2-2201037](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201037.zip), [Open Issues in Other SON Topics](https://ericsson.sharepoint.com/R2-2201037.zip), Qualcomm Incorporated

1. [R2-2201045](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201045.zip), [Reporting Enhancements for SON in unlicensed](https://ericsson.sharepoint.com/R2-2201045.zip), Nokia, Nokia Shanghai Bell

1. [R2-2201605](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201605.zip), [On Other WID related SON features](https://ericsson.sharepoint.com/R2-2201605.zip), Ericsson

1. [R2-2201328](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2201328.zip), [Consideration on SN MHI enhancements](https://ericsson.sharepoint.com/R2-2201328.zip), ZTE Corporation, Sanechips

1. [R2-2200395](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Docs/R2-2200395.zip), [Open Issues of PSCell MHI Enhancement](https://ericsson.sharepoint.com/R2-2200395.zip), CATT