**3GPP TSG RAN WG2#109-e R2-2002004**

Electronic meeting, 24th February - 6th March, 2020

**Title:** Reply LS on Information Needed for MRO in UE RLF Report

**Response to:** R3-197668

**Release:** Rel-16

**Work Item:** NR\_SON\_MDT-Core

**Source:** RAN2

**To:** RAN3

**Cc:** SA5

**Contact Person:**

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1. **Overall Description:**

RAN2 thanks RAN3 for their reply LS on MRO, RACH and RLF report.

After further discussion, RAN2 reached more agreements on other information which is necessary for MRO in UE RLF Report as below:

Issue 1: RAN3 suggests to include TAI of the failed cell and source cell in the RLF report.

RAN2 response: After discussion, RAN2 is fine to include TAI of the failed cell and source cell in the RLF report and the related CRs which captured the agreements are also provided in the attachment.

Issue2: RAN3 suggests to include Re-connection attempt cell CGI information in the RLF report.

RAN2 response: After discussion, RAN2 thinks it’s too late to specify this feature in R16, so Re-connection attempt cell CGI information is not included in RLF report.

Issue3: RAN3 would like to ask RAN2 to clarify the following agreement: “LTE RLF can be reported in NR. How to support this is FFS.”Can this be interpreted to say that an RLF Report encoded in E-UTRA RRC can only be reported to an NR node? Can an RLF Report encoded in NR be reported to an E-UTRA node or to an NR node or both?

RAN2 response: After discussion, RAN2 confirms that an RLF Report encoded in E-UTRA RRC can be reported to an NR node or an E-UTAN node. Due to lack of time for R16, RAN2 suggest to postpone the issue of NR RLF reporting to LTE to R17. More addition, RAN2 also agree to introduce a new capability in 38.306 for cross-RAT RLF report delivery. The related CRs which captured the agreements are also provided in the attachment. In addition, after discussion, RAN2 understands that RAN3 will handle the specs work to 38.300 on RLF report relevant to MRO.

To inform RAN3 and SA5 of our latest progress for SON&MDT work item, RAN2 would like to list the agreements in the below:

Regarding to SON feature, RAN2 made the following agreements:

Agreements:

1 RAN2 confirms the inclusion of cellID in the RAReport.

2 RAN2 confirms the naming requestForOtherSI as an option for raPurpose.

3 RAN2 to confirm the inclusion of VarRAReport as a UE variable.

4 Add “No suitable cell found” flag in the NR RLF report when T311 expires.

5 The UE shall include the LTE RLF report in the UEInformationResponse message to NR node.

6 The UE shall include the TAC of the failed cell (failedPCellId-r16) in the RLF report.

7 The UE shall include the information of RA attempts over different SSBs/CSI-RSs in the chronological order of RA attempts in the RLF report when the cause for RLF is beam failure recovery.

8 The UE shall include TAC of the cell in which the UE performs the RA procedure as part of the RA report.

9 For RLF Report, add the TrackingAreaCode IE into CGI info for the failed cell and source cell.

10 The UE shall reset the entire RA Report when the UE performs a successful random access procedure to a cell belonging to a new PLMN which is not part of the current RPLMN list.

11 RAN2 confirms the inclusion of the following frequency location related information of the RA resources used by the UE in the RAReport:

 a. absoluteFrequencyPointA (e.g., in FrequencyInfoUL)

 b. locationAndBandwidth (e.g., in UL BWP)

 c. subcarrierSpacing (e.g., in UL BWP)

12 CGI info of a NR cell includes: plmn-identity and cellIdentity:

Plmn-identity is defined:

identifies the PLMN of the cell for the reported cellIdentity: the first PLMN-Identity in plmn- IdentityList;

CellIdentity belongs the first PLMN-IdentityInfo IE of PLMN-IdentityInfoList;

13 The ssbRLMConfigBitmap and csi-rsRLMConfigBitmap are encoded with using the format used in the current NR RRC specification

14 Include location info in SCGFailureInformationEUTRA in NR spec and in SCGFailureInformationNR in LTE spec, and the related configuration parts.

15 Postpone the issue of NR RLF reporting to LTE to R17.

16 The UE shall include the failedPCellId using the NR RRC format and include the RLF report as an LTE RRC encoded OCTET STRING to the NR node. Details can be addressed in running CR;

17 Introduce a capability in 38.306 for cross-RAT RLF report delivery.

18 The UE shall include the TAC of the source cell (previousPCellId-r16) in the RLF report.

19 Re-connection attempt cell is not included in the RLF report.

20 UE shall include absoluteFrequencyPointA-r16, locationAndBandwidth, subcarrierSpacing, msg1-FrequencyStart, msg1-FDMInfo and msg1-SubcarrierSpacing in the RLF report when the rlf-Cause is set to beamFailureRecoveryFailure or randomAccessProblem.

21 Include the following frequency location related information of the RA resources used by the UE in the RAReport:

 a. msg1-FDM (e.g., in RACH-ConfigGeneric)

 b. msg1-FrequencyStart (e.g., in RACH-ConfigGeneric)

 c. msg1-SubcarrierSpacing (e.g., in RACH-ConfigCommon)

22 Agree the following option is to be adopted for RAReport retaining at the UE:

 UE will stop logging RA info if all 8 entries is filled in RA report, and starts to count the duration. If not fetched within 48 hours, then the whole RA report will be deleted.

For MDT feature, RAN2 made the following agreements:

Agreements:

1 RAN2 to discuss renaming the logged MDT events using L1, L2 nomenclature.

2 RAN2 confirms that SINR cannot be used as a trigger quantity for A2 event configuration of logged MDT.

3 A Threshold defining measurement trigger quantity for event triggered Logged MDT is MDT specific.

4 UE configured for the event-triggerd logged MDT logs the cell ID, location information if available and time stamp information on

 - first serving cell after leaving the OOC It is the leaving condition.

5 The maximum number of cellIndentity to be configured as part of AreaConfigForNeighbour is 32.

6 Include ‘infinity’,’640ms’ and ‘320ms’ as options for loggingInterval value range.

7 For logged MDT, UE does not log the SSB index of the neighbour cells.

8 The actual process of logging within the UE, takes place in RRC IDLE state could continue in RRC INACTIVE state;

9 For the out of coverage event (i.e. related to EventType-r16 with the value outOfCoverage), it is proposed:

 (1) the entering condition is that UE enters Any Cell Selection.

 (2) the leaving condition is that UE enters Camped Normally state.

10 Remove “last serving cell UE camped on before OOC happens” from the RAN2 minutes, as it is agreed online that it is only the leaving condition.

11 Postpone the following issue to R17

Whether to have an indicator of controlling the beam level measurements in the logged MDT report.

logged MDT in DC scenario

12 Postpone the following issue to R17:

Whether to introduce RAT-Type as part of areaConfigForNeighbour along with frequency and cell list;

For Connection Establishment failure Report, RAN2 made the following agreements:

Agreements:

1 After successful deliver of the UEInformationResponse carrying the CEF report, UE will discard the CEF report stored in VarConnEstFailReport.

2 For multiple CEF reports, it is proposed:

 (1) UE only records one entry of the detail parameters about the last CEF, while for the other previously experienced CEFs, only the per cell “Number of connection failures” field could be recorded.

 (2) If a new CEF occurs, the old CEF records except the per cell *numberOfConnFail* in UE variable should be replaced by the new CEF records and the counter of the newest cell where the UE experiences CEF should be added with 1.

 (3) UE reports the latest number of consecutive connection failures per cell the UE has experienced within the last 48 hours.

For L2 measurements, RAN2 made the following agreements:

Agreements:

1 The potential values (ms120, ms240, ms480, ms640, ms1024, ms2048, ms5120, ms10240, ms20480, ms40960, min1,min6, min12, min30)of the existing ReportInterval can be reused for the field reportInterval in ul-DelayValueConfig. reportInterval should not be used for UE measurement performing.

2 Granularity for per UE measurement performed by UE (i.e. D1 queueing delay) is per DRB per UE for non-split case.

3 Granularity for per UE measurement performed by network (i.e D2 delay, loss rate) is per DRB per UE.

4 Capture in TS 38.314 that for PRB usage measurements that have been defined in TS 28.552, i.e. DL/UL Total PRB Usage, Distribution of DL/UL Total PRB Usage, M(T), M1(T), P(T) are measured per cell level. P(T) is the total available PRBs for this cell. M1(T) is the PRBs used for traffic transmission in this cell.

5 For EN-DC UL D1 delay measurement configuration for non-split bearer,

- D1 measurement of MN terminated bearer(including non-split bearer) can be configured by MN,

- D1 measurement of SN terminated bearer(including non-split bearer) can be configured by SN via RRC message (SRB3 or SRB1).

- For the SN terminated bearers, it is the SN to configure and calculate the UL/DL delay.

6 Capture a general definition of DL measurement in TS 38.314:

Packet delay includes RAN part of delay and CN part of delay. For RAN part, the DL delay comprises:

- D1 (the DL delay in gNB-DU), referring to 5.1.1.1.1 Average delay DL air-interface in TS 28.552

- D2 (the DL delay on F1-U), referring to 5.1.3.3.2 Average delay on F1-U in TS 28.552

- D3 (the DL delay in CU-UP), referring to 5.1.3.3.1 Average delay DL in CU-UP in TS 28.552

7 The flooring operation associated to the definition of mean number of active UEs is removed.

8 ul-DelayValueConfig is configured per CG, i.e.,

 - to configure at most one measurement identity per CG using a reporting configuration with the ul-DelayValueConfig;

9 Number of active UE is measured per DRB per cell by network.

10 Capture a clarification in 38.314 that all the per DRB per cell measurements and per DRB per UE measurements can be aggregated into per QoS level per cell by network implementation.

11 ‘*drbid’* is used in the equation for each per DRB per UE measurement in 38.314, e.g. for average D1 delay: $M\left(T,drbid\right)=\left⌊\frac{\sum\_{∀i}^{}tDeliv\left(i, drbid\right)-tArrival\left(i, drbid\right)}{I\left(T\right)}\right⌋$

12 The equation for mean number of active UE is $M(T,drbid,p)=\frac{\left⌊\frac{\sum\_{∀i}^{}N(i,drbid)}{I(T,p)}\*10\right⌋}{10}$, FFS the definition for *drbid* in the description table of mean number of active UE.

13 Capture in TS 38.314 that the counting unit for PRB usage measurement is 1 Resource Block x 1 symbol. (1 Resource Block = 12 sub-carrier)

14 For the CA duplication bearer, the UE and gNB measure the UL/DL delay assuming the packets of multi-paths are different. No spec impact.

15 For per DRB per UE measurement (e.g. UL delay meas), add the following description inside the table, *drbid*: The identity of the measured DRB.

16 For number of active UE, add the following description inside the table, *drbid* : the DRBs mapped with the same 5QI for NR SA or mapped with the same QCI for EN-DC.

17 UL F1-U delay is measured using the same matrix as DL F1-U delay defined in TS 28.552.

18 0.1ms is applied for UL delay measurement D1 and D2.

19 The following proposals are recommended to be postponed:

- 1: min/max value for delay measurement.

- 2: excess delay measurement;

20 UL delay measurement is not supported for split bearer(s) for EN-DC case in R16. It should be discussed in R17;

For the sake of Work Item progress and RAN3 dependency RAN2 specifications, RAN2 attaches the agreed CRs. RAN2 would like to note the CRs should be taken as a baseline to work with. Further clean-up and potentially corrections to some detailed reports contents or functions may apply in case issues are found.

## 2. Actions:

**To RAN3:**

**ACTION:** RAN2 respectfully asks RAN3 to take the above into account and give the feedback if any.

**To SA5:**

**ACTION:** RAN2 respectfully asks SA5 to take the above into account.

**3. Date of Next TSG-RAN2 Meetings:**

TSG-RAN2 Meeting #109bis 20th-24th Apr 2020 e-meeting

TSG-RAN2 Meeting #110 25th-29th  May 2020 Athen, Greece