**3GPP TSG-RAN WG2 Meeting #116 electronic R2-2xxxxxx**

**Online, November 1-12, 2021**

Agenda Item: xx

Source: Session chair (CMCC)

Title: Report from SON/MDT session

Document for: Approval

**Organizational:**

1. LSs – contact companies should flag LSs that need presenting. Otherwise we will directly note them
2. Running CRs will be endorsed to be used as baseline and moved to email discussion. Further agreements will be captured on that baseline CR.
3. Only Email discussions and summary discussions will be treated during e-meetings (indicated clearly in the meeting notes)
4. All organization emails and notes will be shared over the following email discussion throughout the two meeting weeks:

* [AT117][800][SON/MDT] Organizational Hu

Scope:

* + - Share plans for the meetings and list of ongoing email discussions for the sessions related to SON/MDT
    - Share meetings notes and agreements for review and endorsement

## 6.4 SON/MDT support for NR

(NR\_SON\_MDT-Core; leading WG: RAN3; REL-16; started: Jun 19; Completed June 20; WID: RP-191776).

Documents in this agenda item will be handled in a break out session

Tdoc Limitation: See tdoc limitation for Agenda Item 6

### 6.4.1 General and stage-2 corrections

Including incoming LSs, TS 37.320 corrections

R2-2202223 Corrections to SON/MDT capabilities Lenovo, Motorola Mobility CR Rel-16 38.306 16.7.0 0675 - F NR\_SON\_MDT-Core

### 6.4.2 TS 38.314 corrections

R2-2202707 Correction to R16 38.314 on PRB Usage for MIMO CMCC CR Rel-16 38.314 16.4.0 0021 - F NR\_SON\_MDT-Core

### 6.4.3 RRC corrections

R2-2202502 Addition of missing information into RA-InformationCommon-r16 Apple, Ericsson CR Rel-16 38.331 16.7.0 2892 - F NR\_SON\_MDT-Core

R2-2202737 Correction on LTE UE RLF Report China Telecom, CATT, Ericsson discussion

R2-2202783 Corrections on LTE UE RLF Report China Telecom, CATT, Ericsson CR Rel-16 38.331 16.7.0 2906 - F NR\_SON\_MDT-Core

R2-2203330 On DAPS handover failure handling Ericsson CR Rel-16 38.331 16.7.0 2943 - F NR\_SON\_MDT-Core

R2-2203332 On including SSB and CSI-RS measurements in RLF report Ericsson CR Rel-16 38.331 16.7.0 2944 - F NR\_SON\_MDT-Core

R2-2203333 On ObtainCommonLocation related configuration Ericsson CR Rel-16 38.331 16.7.0 2945 - F NR\_SON\_MDT-Core

R2-2203334 On sensor information configuration Ericsson CR Rel-16 38.331 16.7.0 2946 - F NR\_SON\_MDT-Core

## 8.13 SON/MDT

(NR\_ENDC\_SON\_MDT\_enh-Core; leading WG: RAN3; REL-17; WID: RP-201281)

Time budget: 1 TU

Tdoc Limitation: 4 tdocs

### 8.13.1 Organizational

Tdoc Limitation: 0

LS in. For LSes that need action or has impact beyond taking into account by CR rapporteurs: One tdoc by contact company (one company) to address the LS and potential reply is considered Rapporteur Input and may be provided.

R2-2202116 LS on UP measurements for Successful Handover Report (R3-212935; contact: Ericsson) RAN3 LS in Rel-17 To:RAN2

R2-2202117 Reply LS on UE context keeping in the source cell (R3-212944; contact: Ericsson) RAN3 LS in Rel-17 To:RAN2

R2-2202118 LS Reply on the details of logging forms reported by the gNB-CU-CP, gNB-CU-UP and gNB-DU under measurement pollution conditions (R3-214429; contact: Ericsson) RAN3 LS in Rel-17 To:SA5, RAN2

R2-2202120 Reply LS on scenarios need to be supported for MRO in SCG Failure Report (R3-216159; contact: Samsung) RAN3 LS in Rel-17 To:RAN2

R2-2202125 Reply LS on Area scope configuration and Frequency band info in MDT configuration (R3-221178; contact: Huawei) RAN3 LS in Rel-17 To:RAN2

R2-2202133 Reply LS to SA5 on beam measurement reports (R3-221383; contact Ericsson) RAN3 LS in Rel-17 To:SA5 Cc:RAN2

R2-2202177 Reply LS on the details of logging forms reported by the gNB-CU-CP, gNB-CU-UP and gNB-DU under measurement pollution conditions (S5-213499; contact: Ericsson) SA5 LS in Rel-17 To:RAN3 Cc:RAN2

R2-2202178 Reply LS on Report Amount for M4, M5, M6, M7 measurements (S5-214523; contact: Nokia) SA5 LS in Rel-17 To:RAN3 Cc:RAN2

R2-2202179 Reply LS on the details of logging forms reported by the gNB-CU-CP, gNB-CU-UP and gNB-DU under measurement pollution conditions (S5-215493; contact: Ericsson) SA5 LS in Rel-17 To:RAN3 Cc:RAN2

R2-2202180 Reply LS on the Beam measurement reports for the MDT measurements (S5-216628; contact: Ericsson) SA5 LS in Rel-17 To:RAN3 Cc:RAN2

R2-2203029 Draft Reply LS on Area scope configuration and Frequency band info in MDT configuration Huawei, HiSilicon LS out Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core To:RAN3

R2-2203468 Reply LS on user plane measurements in successful handover report Ericsson discussion NR\_ENDC\_SON\_MDT\_enh-Core

### 8.13.2 CRs and Rapporteur Resolutions

Tdoc Limitation: 0.

CR Rapporteurs to provide running CRs, potentially updated, and Provide resolution proposals to Rapporteur Handled Open Issues (directly in the running CR). See also R2-2201991, R2-2202015, and R2-2201986.

R2-2202706 Running 38.314 CR for R17 layer 2 measurements CMCC CR Rel-17 38.314 16.4.0 0020 - B NR\_ENDC\_SON\_MDT\_enh-Core

=> CR is agreed.

R2-2203394 Introduction of Rel-17 MDT enhancements Nokia, Nokia Shanghai Bell CR Rel-17 37.320 16.7.0 0115 - B NR\_ENDC\_SON\_MDT\_enh-Core Late

=> Endorsed as baseline.

R2-2203025 NR RRC CR for introducing R17 MDT Huawei, HiSilicon CR Rel-17 38.331 16.7.0 2922 - B NR\_ENDC\_SON\_MDT\_enh-Core

=> Endorsed as baseline.

R2-2203470 Enhancement of data collection for SON Ericsson CR Rel-17 38.331 16.7.0 2865 1 B NR\_ENDC\_SON\_MDT\_enh-Core R2-2200004

=> Endorsed as baseline.

* **[Post117e][888][SON/MDT] 38.331 CR of introducing R17 SON/MDT (Ericsson, Huawei)**

Step 1: 4 days discussion for endorsing SON CR, which based on R2-2203470 and capturing new agreements from this and previous meetings. (Ericsson)

Step 2: 3 days for merging MDT CR in and reviewing the big SON/MDT CR

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

Intended outcome: Agreed SON/MDT RRC CR(s)

Deadline of Step1: 23:23 UTC, March 9th

Deadline of Step2: 23:23 UTC, March 11th

* **[Post117e][898][SON/MDT] MDT satge-3 CR (Huawei)**

Based on R2-2203025, capturing all the agreements of R17 MDT

Intended outcome: Agreeable draft CR, which will be merged into post meeting #888.

Deadline: 23:23 UTC, March 9th

* **[Post117e][855][SON/MDT]** 37.320 on introduction of Rel-17 MDT enhancements (Nokia)

Based on R2-2203394, capturing all the necessary agreements of R17 MDT

Intended outcome: Agreed 37.320 CR.

Deadline: 23:23 UTC, March 9th

### 8.13.3 SON related Open Issues

Including Pre117-e discussions to gather company input on specific Open Issues

Including company input on Open Issues

See also R2-2201991, and R2-2202015

R2-2202570 SON Enhancements for CHO Lenovo, Motorola Mobility discussion Rel-17

R2-2202571 SON Enhancements for SHR Lenovo, Motorola Mobility discussion Rel-17

R2-2203010 Open issues on SHR NEC discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core

R2-2203210 Discussion on SON HO left issues OPPO discussion Rel-17 NR\_pos\_enh-Core

#### 8.13.3.1 Pre-discussions

Tdoc Limitation: 0

R2-2203526 SON related open issue lists Ericsson revised to R2-2203754

R2-2203754 SON related open issue lists Ericsson

Agreements:

1 The time elapsed between the DAPS HO initialization and the RLF in the source cell after fallback is represented by the timeConnFailure (no changes needed to the current running CR).

2 The modeling of the UE actions in the case of consecutive failures in the current running CR is considered as baseline. Further clarifications (if any) may be addressed during the running CR review.

3 The timeUntilReconnection in the RLF report for the consecutive CHO failure cases represents the time from first failure to the time of reconnection.

4 To include the ‘t312-expiry’ as a new rlf-cause in the RLF-Report.

5 The UE shall generate the 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).

6 To include PLMN checking before sending the availability indicator for the SHR (as in RLF Report).

7 RAN2 to confirm that the UE includes the RA resource related parameters (frequency start, FDM, and SubcarrierSpacing of the msgA RA resource) under following scenarios:

a. RA procedure involves only 2 step RA (i.e. no switching to 4-step RA)

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 are included.

8 TS 36.331 modifications are not introduced to handle the scenario of LTE MN fetching the list of NR RA reports in Rel-17.

9 TS 38.331 modifications are not introduced to handle the scenario of NR MN fetching the LTE RA report in Rel-17.

10 RAN2 confirms (UE behaviour from Rel-15/Rel-16) that the UE sets the failureType to randomAccessProblem in the SCGFailureInformationNR, when the UE experiences random access problem indication from the SCG MAC whileT304 is running for the SCG. Otherwise, if the UE initiates transmission of the SCGFailureInformationNR message to provide reconfiguration with sync failure information for an SCG (T304 expiry), the UE sets the failureType to synchReconfigFailureSCG.

11 The total number of PSCell (across all PCells) related information that should be stored by the UE in the MHI in 16.

12 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.

13 The UE includes the time spent with no PSCell in the MHI, when connected to a certain PCell.

14 Keep the CHO candidate cell list and the CHO configuration only in the RLF-Report (not in the SHR), as in the current running CR. This agreement can be revisit depending on RAN3 progress.

15 UP interruption measurements should be considered: Only at DAPS HO.

16 The SHR configuration is provided in the otherConfig which can be provided by the source cell before the HO, and/or by the target cell as part of the HO command (as in the current running CR).

17 Clarify in the field descriptions of the successHO-Config IE which node (source/target) configures the specific triggering condition:

a. T312/T310 thresholds are configured by the source (confirm agreement from RAN2#115)

b. T304 threshold is configured by the target (confirm agreement from RAN2#116)

c. Source cell(s) configure(s) the DAPS source RLF condition.

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

Including all the proposals not treated in R2-2203895

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

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

Intended outcome: Report to the CB session.

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

R2-2203895

Agreement:

Inclusion of one or more of the following PUSCH resource parameters only when the UE uses random access resources provided in dedicated signalling, or only when configured with CFRA:

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)

R2-2203989 [AT117e][888][SON/MDT] SON related Open Issues (Ericsson) – Phase 2

Agreements:

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

the SCG failure due to random access problem indication in the SCG MAC

2 The UE only includes the perRAInfoList rather than the full RA-Information in the SCGFailureInformation message.

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

4 The SHR shall be generated only if the T312 associated to the measurement identity of the target cell is running.

5 RAN2 does not see the need to include the following:

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

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)

7 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 .

Agreements:

1 For the 2-step RA, the payload reported by the UE in the RA-Report is the overall payload available in the UE buffer at the time of initiating the 2 step RA procedure.

2 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)

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

a. when failureType is set to randomAccessProblem while T304 is running

c. when failureType is set to synchReconfigFailureSCG

4 RAN2 to include the following information in the SCGFailureInformation in case of SCG failure

a. previousPSCellID (i.e. PCI)

b. failedPSCellID (i.e. PCI)

c. timeSCGFailure

5 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

6 The C-RNTI of the target cell is included in the SHR .

=> Regarding Bullet 4, if RAN3 prefers CGI, we will follow RAN3’s preference when reviewing running CR.

#### 8.13.3.2 Invited Input

Company input by tdocs

R2-2202591 MRO-related remaining open issues Apple discussion

R2-2202730 Leftovers for consecutive CHO failures CMCC, CATT discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core

R2-2202731 Leftovers for SHR CMCC discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core

R2-2202732 Leftovers for MRO for SN CMCC discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core

R2-2202778 Discussion on SON related open issues LG Electronics discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core

R2-2202801 Discussion on SON Related Open Issues CATT discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core

R2-2202802 Discussion on Open Issue in Stage-2 Running CR CATT discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core

R2-2202971 Discussion on SHR enhancements vivo discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core

R2-2202973 Consideration on SON open issues ZTE Corporation, Sanechips discussion Rel-17

R2-2203014 Discussion on SHR related open issues Huawei, HiSilicon discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core

R2-2203015 Discussion on SgNB MRO related open issues Huawei, HiSilicon discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core

R2-2203395 Detailed information required for MRO for SN change failure Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core

R2-2203397 SHR and RLF report generation for same handover Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core

R2-2203420 HO related SON changes Qualcomm Incorporated discussion Rel-17

R2-2203464 Handover-related SON aspects Ericsson discussion NR\_ENDC\_SON\_MDT\_enh-Core

R2-2203465 On PSCell MHI and SCG MRO enhancements Ericsson discussion NR\_ENDC\_SON\_MDT\_enh-Core

### 8.13.4 MDT related Open Issues

Including Pre117-e discussions to gather company input on specific Open Issues

Including company input on Open Issues

See also R2-2201986

#### 8.13.4.1 Pre-discussions

Tdoc Limitation: 0

R2-2203026 Pre-meeting discussion report for R17 MDT Huawei discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core Late

Agreements:

**1: When the UE occurs a new CEF, if the failed cell id of the CEF is the same as the failed cell id in the last entry in VarConnEstFailReportList, the UE replaces the last CEF report with the new CEF report and the numberOfConnFail is summed. Otherwise (two cell ids are different), the UE appends the new CEF into VarConnEstFailReportList.**

**2: For excess delay configuration in NR-DC, Node owning the PDCP terminating point configures the UE**

**• Similar to the solution for D1 configuration, for all the bearers, the CU-CP of the node owning the PDCP terminating point configures the UE with excess delay measurement configuration. To enable this solution UE is allowed to be configured with at most one excess delay measurement per PDCP, which follows the D1 measurement for NR DC.**

**3: D1 delay ratio measurement results should include DRB id and excessDelay info, and they can be included in the IE *MeasResults*.**

**4: For D1 delay threshold values, at least the following values can be included:**

**250us, 0.5ms, 1ms, 2ms, 4ms, 10ms, 20ms, 50ms, 100ms, 500ms (10 values)**

**5: Introduce AreaConfiguration-r17 (including areaConfig-r16 and interFreqTargetList-r16 inside it with both fields being optional) in Rel-17.**

* **[AT117e][899][SON/MDT] MDT related Open Issues (Huawei)**

Whether Network should be able to configure different delay threshold for different DRBs.

All the related invited inputs on this proposal should be taken into account.

Other real critical issues from the invited inputs.

Intended outcome: Report for the real final round discussion.

Deadline: 23:55 UTC, Feb, 25th

R2-2203900 Report of [AT117e][899][SON/MDT] MDT related Open Issues (Huawei)

**Agreements:**

**1: For UL PDCP Excess Packet Delay (related to section 4.3.1.e in TS 38.314 CR), network should be able to configure different delay threshold for different DRBs.**

**3: UE reports that whether the on-demand SI acquiring was successful or not.**

**4: RAN2 liaise RAN3 that not introducing SN configuration in DC scenarios is applicable to all the DC scenarios such as EN-DC, NGEN-DC, NE-DC and NR-DC. ([8], Ericsson can handle the LS in #805)**

**=> CB on Wednesday FFS: EMR is not supported in R17 log MDT**

**After offline discussion, Ericsson propose the following:**

Agreements:

1 If the earlyMeasIndication-r17 is not included, the UE is not allowed to log EM in logged MDT report (following legacy logged MDT behaviours).

2 If the earlyMeasIndication-r17 is included, for the following frequencies:

- If interFreqTargetInfo is included, for frequencies included in both interFreqTargetInfo and EMR config

- If interFreqTargetInfo is not included, for frequencies included in EMR config

- For inter-RAT related frequencies included in EMR config

How UE logs the measurements on EMR frequencies is left to the UE implementation.

3 For logging the measurements on EMR frequencies in logged MDT report, the qualityThreshold in measIdleConfig should not be applied.

* **[AT117e][805][SON/MDT] Not introducing SN configuration in DC scenarios (Ericsson)**

Inform RAN3 on our agreement that that not introducing SN configuration in DC scenarios is applicable to all the DC scenarios such as EN-DC, NGEN-DC, NE-DC and NR-DC.

Intended outcome: Approved LS.

Deadline: 11:55 UTC, March, 2nd

#### 8.13.4.2 Invited Input

Company input by tdocs

R2-2202733 Leftovers for on-demand SI CMCC, Ericsson, Samsung, CATT, ZTE, Huawei discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core

R2-2202803 Discussion on MDT Related Open Issues CATT discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core

R2-2202935 Support of MDT and QoE alignment Qualcomm Incorporated discussion NR\_QoE\_enh

R2-2202974 Consideration on MDT open issues ZTE Corporation, Sanechips discussion Rel-17

R2-2203027 Discussion on MDT related open issues Huawei, HiSilicon discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core

R2-2203329 Discussion on logged MDT open issues Ericsson discussion

R2-2203331 On Immediate MDT measurements Ericsson, CMCC discussion

R2-2203396 Early measurements logging in MDT Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core

### 8.13.5 UE Capabilities

Initial discussion on Features / UE caps developed in RAN2, if any. Note that this AI is complementary to AI 8.0.2.

R2-2202804 UE Capabilities about SON and MDT Enhanced Features CATT discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core

R2-2202975 Consideration on UE capability ZTE Corporation, Sanechips discussion Rel-17

R2-2203028 Discussion on UE capabilities for R17 SON and MDT Huawei, HiSilicon discussion Rel-17 NR\_ENDC\_SON\_MDT\_enh-Core

R2-2203427 SON MDT UE Capabilities Qualcomm Incorporated discussion Rel-17

* **[AT117e][877][SON/MDT] SONMDT related UE Capabilities (CATT, Intel)**

Based on R2-2202804, R2-2202975, R2-2203028 and R2-2203427, build capability CR(s)

Intended outcome: Report and draft CR(s)

Deadline: 23:55 UTC, Feb, 25th

R2-2203831 [AT117e][877][SON/MDT] SONMDT related UE Capabilities (CATT, Intel)

Agreements:

1 Introduce an optional UE capability with signalling for Successful Handover Report.

2 Introduce an optional UE capability without signalling for SCG Failure Report for MRO.

3 Introduce an optional UE capability with signalling for Multiple CEF Report.

4 Introduce a conditionally mandatory feature for Logged MDT Measurement Suspension due to IDC Interference.

5 Introduce an optional UE capability with signalling for NR excess packet delay.

6 R17 SON-MDT related capabilities are all defined per UE.

7 Introduce an optional UE capability with signalling for 2-step RACH Information Report.

8 Add “PCell” to the legacy MHI UE capability of “Mobility history information storage” only for R17

9 Introduce an optional UE capability with signalling for On-demand SI Report.

10 Introduce an optional UE capability with signalling for Signaling Based Logged MDT Override Protection.

11 Introduce optional UE capabilities with signalling for RLF-Report for CHO and DAPS HO, respectively.

12 Introduce an optional UE capability with signalling for PSCell MHI Report.

13 Introduce an optional UE capability without signalling for SCell RACH Reporting.

14 No additional capability is required for SgNB RACH Report in NR.

* **[AT117e][876][SON/MDT] SONMDT related UE Capabilities (CATT, Intel)**

Based on the agreements of SONMDT related UE Capabilities, provide CR accordingly

Intended outcome: endorsed CR

Deadline: 23:55 UTC, March, 2nd

### 8.13.6 Others

R2-2202939 Discussion on PSCell MHI recording SHARP Corporation discussion

R2-2202940 Discussion on SHR in CHO recovery case SHARP Corporation discussion R2-2201229

=> WI is closed from RAN2 perspective.