3GPP TSG-RAN WG2 Meeting #131 R2-250xxxx

Bengaluru, India, Aug. 25th – 29th 2025

Source: CATT

Title: Summary of [Post130][603][SONMDT] Running capability CR (CATT)

Agenda Item: 8.10.1

Document for: Discussion and Decision

# Introduction

For R19 SONMDT [1], the following features have been discussed:

1. MRO enhancements for LTM, CHO with candidate SCGs, and subsequent CPAC
2. SON/MDT enhancements for Intra-NTN mobility
3. SON/MDT enhancements for Network Slicing
4. R18 leftovers for RACH optimization for SDT, MHI Enhancement for SCG Deactivation/Activation, MRO for MR-DC SCG failure

And regarding UE capabilities, the following progress has been made:

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| Running CRs  R2-2503582 Introduction of SONMDT UE Capabilities CATT draftCR Rel-19 38.331 18.5.1 B NR\_ENDC\_SON\_MDT\_Ph4-Core  R2-2503583 Introduction of SONMDT UE Capabilities CATT draftCR Rel-19 38.306 18.5.0 B NR\_ENDC\_SON\_MDT\_Ph4-Core  R2-2503584 Introduction of SONMDT UE Capabilities CATT draftCR Rel-19 36.306 18.4.0 B NR\_ENDC\_SON\_MDT\_Ph4-Core   * To be used as baseline in a post meeting email disc * [Post130][603][SONMDT] Running capability CR (CATT)   Scope:   * + - Update the running CR         Intended outcome:   * + - Updated running CR to be submitted to next meeting        Deadline:   * + - Long |

In this post-meeting offline, companies are invited to provide views on UE capabilities and the running CRs will be updated accordingly.

# Discussion

## MRO enhancements for Rel-18 mobility features

### LTM

According to the agreements made in RAN2#125bis meeting, RAN2 considers SHR, RA report and RLF for MCG LTM SON, and RAN2 would start work on MCG LTM.

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| * RAN2 considers SHR, RA report and RLF for MCG LTM SON. * RAN2 will start work on MCG LTM. |

In later meetings, some agreements on RLF report and SHR for LTM have been achieved.

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| RLF report  RAN2#126   * If available, log the L1 measurements for serving cell, target cell and other LTM candidate cells in RLF report, upon RLF or mobility failure. * Log the LTM cell ID upon performing recovery an LTM candidate cell, details TBD e.g. which field. * Extend lastHO-Type in RLF-Report to indicate the LTM cell switch as last executed mobility procedure.   RAN2#127bis   * Unless RAN3 defines a NW-based solution: The UE logs and reports whether and how the UE got the TA value used for a failed LTM switch (gNB indicated or UE determined).   **RAN2#128**   * If RAN3 does not address this meaning that we need a RAN2 solution, add a list indicating which LTM candidates the UE had at RLF.   **SHR**  **RAN2#127**   * We aim to log some info to deduce the ltmCandidate (similar like choCandidate) in SHR to indicate whether a neighbour cell is an LTM candidate cell or not, TBD if explicit/implicit.   RAN2#127bis   * Include an explicit indicator in SHR whether the successful LTM execution was RACH-less or RACH-based. Can sort out the details during stage-3 implementation. * UE logs available L1 measurement results for the serving cell, the target cell and other LTM candidate cells when a successful LTM cell switch triggers SHR. |

In RAN2#130, a new agreement was also made for LTM RA-report as below:

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| RAN2#130   1. Introduce new values of raPurpose for RACH-based LTM-related RA reports. |

**Observation 1: some enhancements on RLF report, RA report and SHR for MCG LTM have been agreed.**

From UE capability perspective, it should be optional for UE to log LTM related information in RLF report, RA report and SHR. Regarding whether a UE capability signalling is needed, we have noticed that *rlfReportDAPS-r17* is introduced considering it may help network to retrieve necessary failure information for DAPS. Similarly, a UE capability signalling can be defined for RLF report for MCG LTM. And for SHR and RA report for LTM, no separate UE capability signalling is needed.

**Proposal 1: an optional UE capability with signalling is defined for RLF report for MCG LTM.**

**Proposal 2: an optional UE capability without signalling is defined for SHR/RA report for MCG LTM.**

Companies are invited to provide views on P1/P2:

**Question 1: Whether P1 is agreeable?**

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| **Company** | **Y or N** | **Comments** |
| Samsung | Y |  |
| Huawei, HiSilicon | Y |  |
| Xiaomi | Y |  |
| Sharp | Y |  |
| Nokia | Y |  |
| Qualcomm | See comment | If indication like *rlfReportDAPS-r17* is introduced, then UE signalling is needed. Otherwise, not needed. |
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**Question 2: Whether P2 is agreeable?**

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| **Company** | **Y or N** | **Comments** |
| Samsung | N for SHR, Y for RA report | For SHR, it will be helpful for the network to know whether the UE supports SHR for LTM, so that it can include the SHR thresholds in the candidate configuration. Similarly, it would be helpful for the network to understand whether the absence of LTM related information is due to the UE not supporting this capability. We don’t have anything like lastHo-type in SHR. |
| Huawei, HiSilicon | N for SHR, Y for RA report | Agree with Samsung. For SHR for a handover from NR to E-UTRA, we introduced optiona with signaling UE capbility, so so that the NR network will know whether to configure the enhancements for the UE. For SHR for MCG LTM, it's good to let UE signal this capability bit to NW for similar reason. |
| Xiaomi | Y | It’s noted that only an optional UE capability signalling is defined for SHR, includes the support of SHR for CHO/legacy HO. So, an optional UE capability without signalling is enough. |
| Sharp | Y |  |
| Nokia | Y |  |
| Qualcomm | Y | So far, there is no additional relevant configuration introduced, so the capability signalling has no use for gNB configuration. |
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Rapp’s summary:

According to companies’ feedback, P1 is agreeable. For P2, the majority view also supports this proposal, as currently there is no additional relevant configuration introduced for LTM SHR. Therefore the original proposals can be kept for online confirmation.

### CHO with candidate SCGs

According to the agreement made in RAN2#125bis meeting, RAN2 aims to study failure and near failure scenarios for CHO with candidate SCGs.

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| * RAN2 to study failure and near failure scenarios for CHO with candidate SCGs. |

In later meetings, some agreements on RLF report, SHR, SCGFailureInformation and SPR for CHO with candidate SCGs have been achieved.

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| **RLF report**  **RAN2#127**   * UE includes following information in RLF report:   b. Time information regarding condition fulfilment for CHO with candidate SCGs. Details are FFS. We consider both the case when both CHO condition and associated CPC condition are fulfilled, and the case when CHO (or CPC) is fulfilled but CPC (or CHO) conditions are not fulfilled.  c. Measurement results of PCells and PSCells.  **RAN2#127bis**   * UE reports the time gap between the first met condition (CHO or CPAC) and the second met condition (CPAC or CHO), and the first met execution condition (as agreed by RAN3), for a failed CHO with candidate SCGs. Details FFS. * Include the elapsed time between the point in time of the first fulfilled condition and RLF in RLF report. Details FFS.   **RAN2#129bis**   * For CHO with candidate SCGs, RAN2 explicitly define a new lastHO-Type for CHO with candidate SCGs.   **SHR/SCGFailureInformation**  **RAN2#128**   * RAN2 understands that current agreements is that the UE shall logs (in RLF report, SHR report and SCGFailureInformation) time from the last triggered event for the PCell (or PSCell) to the time to the last triggered event for the PSCell (or PCell). We don’t intend to do further or more granular enhancements. * Measurement results of PCells and PSCells and the time information (as agreed for RLF) are included in SHR and SCGFailureInformation also. We will check what the spec impact of this is, e.g. something in the spec today may already make the UE log this.   SPR   * In general, and where applicable, agreements valid for SHR, RLF reports and SCG failure info applies also to SPR. |

**Observation 2: some enhancements on RLF report, SHR, SPR** **and SCGFailureInformation for CHO with candidate SCG have been agreed.**

Regarding UE capability, similar to LTM, also considering *rlfReportCHO-r17* has been defined, we have the following proposals:

**Proposal 3: an optional UE capability with signalling is defined for RLF report for CHO with candidate SCG.**

**Proposal 4: an optional UE capability without signalling is defined for SHR/SPR/SCGFailureInformation for CHO with candidate SCG.**

Companies are invited to provide views on P3/P4:

**Question 3: Whether P3 is agreeable?**

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| **Company** | **Y or N** | **Comments** |
| Samsung | Y |  |
| Huawei, HiSilicon | Y |  |
| Xiaomi | Y |  |
| Sharp | Y |  |
| Nokia | Y |  |
| Qualcomm | See comment | If indication like *rlfReportDAPS-r17* is introduced, then UE signalling is needed. Otherwise, not needed. |
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**Question 4: Whether P4 is agreeable?**

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| **Company** | **Y or N** | **Comments** |
| Samsung | Y | Due to the reorganisation of the structures for measurements, it is possible for the network to identify the support of the capability from the report itself, so separate capability is not needed. |
| Huawei, HiSilicon | Y |  |
| Xiaomi | Y |  |
| Sharp | Y |  |
| Nokia | Y |  |
| Qualcomm | Y |  |
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Rapp’s summary:

According to companies’ feedback, P3 and P4 are both agreeable. Therefore the original proposals can be kept for online confirmation.

### Subsequent CPAC

Since no concrete RAN2 progress has been achieved until RAN2#130, no UE capability issue needs to be discussed.

## SON/MDT for Slicing

In RAN2#130, a potential enhancement was agreed for SON/MDT for slice as below:

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| Agreements   1. We aim to specify that: If the UE supports slice-based cell reselection does not find any suitable cell in the frequencies corresponding to the highest ranked NSAG, the UE logs the highest ranked NSAG. FFS the need of cell or frequency info. |

But since no concrete RAN2 progress has been achieved until RAN2#130, no UE capability issue needs to be discussed.

## SON/MDT for NTN

At RAN2#129 meeting, it was agreed:

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| * Existing IEs for CHO are used to report the fulfilled CHO trigger conditions before RLF occurs in case of “time and measurement based trigger condition” or “location and measurement based trigger condition”. |

And in RAN2#130, further signaling enhancement was agreed:

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| R2-2503317 LS on SONMDT for NTN (R3-252382; contact: CMCC) RAN3 LS in Rel-19 NR\_ENDC\_SON\_MDT\_Ph4-Core To:RAN2  *Moved from 8.10.1*  - Option 1: to introduce the absolute UTC time when RLF/HOF happens, based on which the network computes the distance.  - Option 2: to introduce measured distance from UE to moving reference location of serving cell, and measured distance from UE to moving reference location of candidate cell when RLF/HOF happens.   * Noted   Agreements   1. We go with option 2 (distance), unless we find critical issues with granularity. |

In R17 RLF report, CHO Event A3 and A5 related information was introduced. And according to RAN2 analysis, the existing IEs can be reused for time/location based CHO. From UE capability perspective, when *rlfReportCHO-r17* is indicated, UE can support the delivery of R16 CHO related information in RLF report. For R17 time/location based CHO, an optional UE capability without signalling can be introduced for the additional CHO information of time/location based execution conditions.

**Proposal 5: an optional UE capability without signalling is defined for RLF report for time/location based CHO.**

Regarding logged MDT enhancement for NTN, the following agreements were made in RAN2#129bis:

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| 1. **Use dedicated signalling to provide area scope configuration to the UE** 2. **Introduce a UE capability to support geographic area scope checking. FFS if with or without signalling.** |

Since UE needs to report its capability to network first, then network can configure the area scope for logged MDT, it’s necessary to define capability signalling for it.

**Proposal 6: an optional UE capability with signalling is defined for geographic area scope checking for logged MDT.**

Companies are invited to provide views on P5/P6:

**Question 5: Whether P5 is agreeable?**

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| **Company** | **Y or N** | **Comments** |
| Samsung | Y |  |
| Huawei, HiSilicon | Y |  |
| Xiaomi | Y |  |
| Sharp | Y |  |
| Nokia | Y |  |
| Qualcomm | Y |  |
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**Question 6: Whether P6 is agreeable?**

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| **Company** | **Y or N** | **Comments** |
| Samsung | Y |  |
| Huawei, HiSilicon | Y |  |
| Xiaomi | Y |  |
| Sharp | Y |  |
| Nokia | Y |  |
| Qualcomm | Y |  |
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Rapp’s summary:

According to companies’ feedback, P5 and P6 are both agreeable. Therefore the original proposals can be kept for online confirmation.

## Leftovers from Rel-18

### RACH optimization for SDT

The following agreements have been made for SDT:

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| **RAN2#127bis**   * For failed SDT case, UE includes the DL RSRP and UL data volume at the time of SDT evaluation in SON report. For successful SDT procedure, the UE does not log. * RAN2 understands for SON/MDT R19 the SDT enhancements only relate to the RA-SDT procedure. This does not rule out the case when the UE falls back from RA-SDT.   **RAN2#129**   * Include cell re-selection as a failure cause for failed RA-SDT in RA-Report * Introduce a new field in RA-Report to indicate the elapsed time since the execution of RA-SDT. Value in seconds. The maximum value is 172800 seconds. |

Based on the agreements above, the RACH optimization for SDT is included in RA-report. Since a UE capability *rach-Report-r16* has been defined for RA-report, a separate UE capability signaling for SDT related information is not necessary.

**Proposal 7: an optional UE capability without signalling is defined for RA-report for SDT.**

**Question 7: Whether P7 is agreeable?**

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| **Company** | **Y or N** | **Comments** |
| Samsung | Y |  |
| Huawei, HiSilicon | Y |  |
| Xiaomi | Y |  |
| Sharp | Y |  |
| Nokia | Y |  |
| Qualcomm | Y |  |
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Rapp’s summary:

According to companies’ feedback, P7 is agreeable. Therefore the original proposals can be kept for online confirmation.

### MHI Enhancement for SCG Deactivation/Activation

In RAN2#129meeting, it was agreed that:

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| * We will introduce a UE based solution for SCG act/deact MHI, as an optional UE feature. * UE reports the time the UE has spent in PSCell with SCG activated, TBD details, e.g. percentage of time or absolute time, etc. |

Since *pscell-MHI-Report-r17* has been defined to indicate whether the UE supports the storage of PSCell mobility history information and the reporting in *UEInformationResponse* message, there is no need to define another UE capability signaling for MHI for SCG deactivation.

**Proposal 8: an optional UE capability without signalling is defined for** **MHI Enhancement for SCG Deactivation/Activation.**

**Question 8: Whether P8 is agreeable?**

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| **Company** | **Y or N** | **Comments** |
| Samsung | Y |  |
| Huawei, HiSilicon | Y |  |
| Xiaomi | Y |  |
| Sharp | Y |  |
| Nokia | Y |  |
| Qualcomm | Y |  |
|  |  |  |

Rapp’s summary:

According to companies’ feedback, P8 is agreeable. Therefore the original proposals can be kept for online confirmation.

### MRO for MR-DC SCG failure

The following agreements have been made for MRO for MR-DC SCG failure:

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| RAN2#127   * To support MRO for SCG failure in EN-DC, enhance SCGFailureInformationNR message to include previousPSCellId, failedPSCellId, timeSCGFailure.   RAN2#127bis   * Add reporting of the following parameters for SCG failure report in EN-DC scenario:   + - * + **For failedPSCellId and previousPSCellId: frequency and the PCI of the PSCell;**         + **For timeSCGFailure: value range 0-1023;**       * **For failureType: Reuse the legacy field.**       * **perRA-InfoList** |

The corresponding new UE capability is needed to add additional PSCell information in *SCGFailureInformationNR* message, but considering there is no RAN specific configuration or retrieval procedure in LTE specification, it’s unnecessary to define UE capability signalling.

**Proposal 9: an optional UE capability without signalling is defined for MRO for EN-DC SCG failure in LTE specification.**

**Question 9: Whether P9 is agreeable?**

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| **Company** | **Y or N** | **Comments** |
| Samsung | Y |  |
| Huawei, HiSilicon | Y |  |
| Xiaomi | Y |  |
| Sharp | Y |  |
| Nokia | Y |  |
| Qualcomm | Y |  |
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Rapp’s summary:

According to companies’ feedback, P9 is agreeable. Therefore the original proposals can be kept for online confirmation.

**Question 10: Any missing issues or UE capabilities companies would like to discuss?**

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| **Company** | **Comments** |
| Samsung | As we commented in the RRC running CR, we may need to include the capability dependency for the following:  AUE which supports RLF-Report for conditional handover with time-based and location-based trigger condition also support RLF report for conditional handover.  A UE which supports RLF-Report for conditional handover with candidate SCG also support RLF report for conditional handover. |
| Huawei, HiSilicon | For Samsung's comments, we understand that the two new features will re-use reporting IEs from legacy RLF report for conditional handover, and if that is true, we are fine with the two proposals. |
| Nokia | We are OK with Samsung’s proposals on dependencies. |
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Rapp’s summary:

According to companies’ feedback, the following proposals are made for capability dependency:

**Proposal 10: A UE which supports RLF-Report for conditional handover with time-based and location-based trigger conditions also supports RLF report for conditional handover.**

**Proposal 11: A UE which supports RLF-Report for conditional handover with candidate SCG also supports RLF report for conditional handover.**

# Conclusion

Based on the companies’ views, the following proposals are made for R19 SON/MDT UE capabilities:

**Proposal 1: an optional UE capability with signalling is defined for RLF report for MCG LTM.**

**Proposal 2: an optional UE capability without signalling is defined for SHR/RA report for MCG LTM.**

**Proposal 3: an optional UE capability with signalling is defined for RLF report for CHO with candidate SCG.**

**Proposal 4: an optional UE capability without signalling is defined for SHR/SPR/SCGFailureInformation for CHO with candidate SCG.**

**Proposal 5: an optional UE capability without signalling is defined for RLF report for time/location based CHO.**

**Proposal 6: an optional UE capability with signalling is defined for geographic area scope checking for logged MDT.**

**Proposal 7: an optional UE capability without signalling is defined for RA-report for SDT.**

**Proposal 8: an optional UE capability without signalling is defined for** **MHI Enhancement for SCG Deactivation/Activation.**

**Proposal 9: an optional UE capability without signalling is defined for MRO for EN-DC SCG failure in LTE specification.**

**Proposal 10: A UE which supports RLF-Report for conditional handover with time-based and location-based trigger conditions also supports RLF report for conditional handover.**

**Proposal 11: A UE which supports RLF-Report for conditional handover with candidate SCG also supports RLF report for conditional handover.**

# Reference

1. RP-234038 New WID: Data collection for SON (Self-Organising Networks)/MDT (Minimization of Drive Tests) in NR standalone and MR-DC (Multi-Radio Dual Connectivity) Phase 4, CMCC