**3GPP TSG-RAN WG3 Meeting #127bis R3-252300**

**Wuhan, CN, Apr 7th - Apr 11th, 2025**

**Agenda item: 10.3.1**

**Source: CMCC, Huawei (moderator)**

**Title: Summary of SONMDT for Intra-NTN Mobility**

Document for: Approval

# Introduction

This is the summary of SONMDT for Intra-NTN Mobility.

# For the Chairman’s Notes

# Discussion

## Time based CHO

In last RAN3 meeting, RAN3 make the following agreements and open issue are captured for time-based CHO.

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| --- |
| **Existing timers can be reused to identify when RLF happens with 100ms accuracy.** **No need to identify whether RLF happens before or after T1 for time-based CHO.****FFS whether more accuracy is needed.** |

The viewpoints of both sides are listed below:

**Supporters:**

In [5][8][18], they think the existing T1’s granularity and timer’s granularity (i.e. *timeSinceCHO-Reconfig*) is not aligned, and it may be different for the gNB to derived the accurate reception time of the latest conditional reconfiguration by the UE due to the accuracy issue. It proposes to include the absolute time information which can help the gNB to adjust the configuration of T1.

**Opponents:**

In [3], it thinks the RLFs that occur before 100ms of T1-Threshold can’t be identified via using *timeSinceCHO-Reconfig* as the worst case can be ignored.

In [10], it thinks existing timers can be reused to identify when RLF happens with 100ms accuracy, no more accuracy is needed.

**Q1: Whether more accuracy is needed for time-based CHO?**

**Moderator summary:**

## Location based CHO

In last meeting, companies acknowledged that the accuracy and complexity issue of the network-based solution for earth moving case. Two options are provided below:

* Option 1: to introduce the absolute UTC time of when RLF/HOF happens in the RLF report. [1][5][6][8]

Reason:

1. Option 1 will not introduce extra UE implementation effort, and with the reported absolute UTC time when RLF/HOF happens together with the location information in the RLF report, the network will be able to calculate the distances between the UE and the reference locations precisely to match the 50m location-based CHO distance threshold granularity.
2. Option 1 seems to be more straightforward, the network is able to calculate the accurate measured distance from the UE to moving reference location based on the received absolute time information.
* 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 occurred). [2][7][10][16][18]

Reason:

1. Option 2 is a straightforward solution to get the distance information for location-based CHO. There is no need for Network to perform any additional calculation for distance information as it is optional for the UE to report location in the RLF report.
2. The IE size of measured distance from UE to moving reference location of serving cell and candidate cell would be much less than the IE size of the absolute UTC time.
3. There is no additional complexity for UE to measure the distance between UE and the referenceLocation/moving referenceLocation in serving cell and in candidate cell when RLF occurred.

**Q2: Companies can provide the views on which option to be adopted?**

**Moderator summary:**

## Other Information for time/location-based CHO

In [1], it proposes to include the coarse location information when failure occurs in the RLF report.

In [1], it also proposes to enhance the RLF report with indication that a satellite switch with re-sync procedure was performed and failed.

In [3], it thinks that UE just reports which condition (distance between UE and serving cell moving reference location or distance between UE and moving reference location of neighbor cell or neither) was met in CondEventD2.

In [10], it thinks RLF report can be enhanced to include measurement results of source cell, target cell and candidate cell(s) when location-based CHO execution condition is fulfilled before RLF happens or at the absolute time value of (t1-Threshold + duration) for time-based CHO.

In [18], it thinks UE can record and report the measurement result of the reference signal of the serving cell, handover target cell and other neighbor cells when the location-based CHO happen.

**Q3: Are there any other information needs to be included in RLF report for time-based CHO or location-based CHO?**

**Moderator summary:**

## MRO for RACH-less Handover

In previous meeting, the following open issue was captured.

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| --- |
| **Discuss MRO for RACH-less HO of NTN, only for those different issues identified compared with MRO for LTM.** |

Some companies think the NTN fallback mechanism from RACH-less HO to RACH-based HO needs to be optimized. [1][7][8]

Other companies think there is no need to optimize NTN fallback mechanism from RACH-less HO to RACH-based HO. [6][10]

**Q4: Do companies agree to optimize NTN fallback mechanism from RACH-less HO to RACH-based HO?**

**Moderator summary:**

If the answer of Q4 is yes, companies propose some information should be reported by the UE to optimize the aforementioned case.

In [1], it proposes UE logs the information of the measured RSRP for the SSB beam(s) corresponding to the configured grant for RACH-less HO.

In [7], it proposes the indication “whether UE perform RACH-less fallback” in RACH report to indicate whether RACH-less fallback happens if RACH based success.

In [7], it proposes SON report can be used to optimize e.g., SSB index selection, RSRP threshold configuration for RACH-less HO performance.

In [8], it proposes the RACH-less HO related configuration (e.g., RSRP threshold and SSB subset for CG configuration, SSB index for DG configuration) should be included in the RACH report and RLF report.

**Q5: Which information needs to be included in RACH report or RLF report to optimize the RACH-less HO?**

**Moderator summary:**

## MDT enhancement for NTN

In [2], it wants to introduce a location based event trigger type for logged MDT in NTN cells.

In [3], it proposes to introduce a new “location-based” event trigger to collect logged MDT only when the UE has moved a certain distance w.r.t. a reference location and if the signal strength is above a certain threshold.

**Q6: Do companies agree to introduce Location-based event trigger for logged MDT?**

**Moderator summary:**

## Temporary propagation change

In last meeting, the following open issue was captured.

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| **MRO mechanism for intra-NTN mobility shall be enhanced to enable handling of local and temporary propagation changes (e.g. due to clouds, rain etc.)?** |



In [4], to solve the local and temporary propagation changes, it proposes to enhance the Mobility Setting Change procedure to provide per-UE adaptation of the HO configuration to the next cell serving the area where similar MRO adaptation is needed.

In [9], to solve non-moving objects with a static impact on the coverage of cells, it proposes to including an offset in the Handover Preparation procedure.

**Q7: Do companies agree to enhance MRO mechanism for intra-NTN mobility to enable handling of local and temporary propagation changes?**

**Moderator summary:**

# Conclusion, Recommendations [if needed]

If needed

# References

|  |  |  |
| --- | --- | --- |
| 1 | [R3-252049](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127-bis%5CDocs%5CR3-252049.zip) | SON-MDT enhancements for NTN (Ericsson) |
| 2 | [R3-252121](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127-bis%5CDocs%5CR3-252121.zip) | Discussion on SONMDT for Intra-NTN mobility (Huawei, CMCC, China Unicom) |
| 3 | [R3-251589](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127-bis%5CDocs%5CR3-251589.zip) | SON MDT for NTN (Qualcomm Incorporated) |
| 4 | [R3-251596](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127-bis%5CDocs%5CR3-251596.zip) | [TP to BL CR to 38.423, SON] Solution to avoid restarting MRO in NTN deployments (Nokia) |
| 5 | [R3-251696](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127-bis%5CDocs%5CR3-251696.zip) | Discussion on SON/MDT enhancements for NTN (NEC) |
| 6 | [R3-251726](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127-bis%5CDocs%5CR3-251726.zip) | (TP for MDT BLCRs for TS38.413, TS38.423) SON/MDT enhancements for NTN (Samsung) |
| 7 | [R3-251776](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127-bis%5CDocs%5CR3-251776.zip) | (TP for 38.300 and 38.413) Intra-NTN mobility for SONMDT (CATT) |
| 8 | [R3-251889](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127-bis%5CDocs%5CR3-251889.zip) | (TPs to BL CR for 38.300, 38.413 and 38.423) Further discussion on SONMDT enhancements for NTN (ZTE Corporation) |
| 9 | [R3-251927](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127-bis%5CDocs%5CR3-251927.zip) | (TP for SON BLCR for 38.423) MRO for Intra-NTN mobility (Huawei) |
| 10 | [R3-251934](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127-bis%5CDocs%5CR3-251934.zip) | Discussion on MRO for intra-NTN mobility (Lenovo) |
| 11 | [R3-252050](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127-bis%5CDocs%5CR3-252050.zip) | (BL CR to 38.413 for SON) Addition of SON enhancements (Ericsson) |
| 12 | [R3-252122](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127-bis%5CDocs%5CR3-252122.zip) | (TP for MDT BLCR for TS38.413): Logged MDT enhancement for NTN (Huawei, CMCC, China Unicom) |
| 13 | [R3-252123](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127-bis%5CDocs%5CR3-252123.zip) | (TP for MDT BLCR for TS38.423): Logged MDT enhancement for NTN (Huawei, CMCC, China Unicom) |
| 14 | [R3-252124](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127-bis%5CDocs%5CR3-252124.zip) | (TP for MDT BLCR for TS37.320): Logged MDT enhancement for NTN (Huawei, CMCC, China Unicom) |
| 15 | [R3-252125](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127-bis%5CDocs%5CR3-252125.zip) | [DRAFT] LS on SONMDT for NTN (Huawei, CMCC, China Unicom) |
| 16 | [R3-252167](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127-bis%5CDocs%5CR3-252167.zip) | Discussion on SONMDT enhancement for NTN (CMCC, Huawei) |
| 17 | [R3-252168](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127-bis%5CDocs%5CR3-252168.zip) | LS on SONMDT for NTN (CMCC) |
| 18 | [R3-252249](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_127-bis%5CDocs%5CR3-252249.zip) | Discussion on SONMDT enhancements for NTN mobility (China Unicom) |