**3GPP TSG-RAN WG2 Meeting #119bis electronic R2-220XXXX**

**Online, 10th – 19th October, 2022**

**Agenda Item:**  **8.13.7**

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**Title:** **Pre-meeting summary of 8.13.7 (CATT)**

**WI code(s): NR\_ENDC\_SON\_MDT\_enh2-Core**

**Document for: Discussion and Decision**

# Introduction

This document provides the summary of all the contributions submitted to 8.13.7 agenda item (SON/MDT enhancements for Non-Public Networks) of RAN2#119bis-e meeting.

The summary is based on the following papers wherein the proposals are classified in section 2.

[1] R2-2209568 Discussion on SON enhancement for NPN vivo

[2] R2-2209574 SON and MDT Enhancement for NPN CATT

[3] R2-2209823 SON/MDT enhancements for NPN Samsung R&D Institute India

[4] R2-2209899 Discussion on SON and MDT enhancements for NPN Huawei, HiSilicon

[5] R2-2210032 Discussion on the SON/MDT enhancement for NPN Beijing Xiaomi Software Tech

[6] R2-2210104 Impact of SNPN on MDT and MRO Nokia, Nokia Shanghai Bell

[7] R2-2210149 SONMDT enhancement for NPN CMCC

[8] R2-2210181 SON support for NPN Ericsson

[9] R2-2210292 Consideration on SON-MDT support for NPN ZTE Corporation, Sanechips

[10] R2-2210303 Discussion on SON/MDT enhancements for Non-Public Networks Qualcomm Incorporated

# Summary

## NPN enhancements for general

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| **TDoc** | **Company**  | **Proposals** |
| R2-2209568 | Vivo | **Proposal 4: Common report can be used for the public network and private network.** |
| R2-2209823 | Samsung | **Proposal 2: Include npn-IdentityList in UE variables for storing SON/MDT reports for SNPN.****Proposal 3: RAN2 to discuss whether to include plmn-IdentityList or npn-IdentityList in UE variables for storing SON/MDT reports for PNI-NPN.****Proposal 4: When the npn-IdentityList is included in SON/MDT reports, UE indicates the availability of the report in RRC complete messages if serving NPN identifier is included in npn-IdentityList.** |
| R2-2209899 | Huawei | **Proposal 1: For SON reports recorded in SNPN cells, UE includes NID in the related reports and perform NID checking before sending to the network side.** |
| R2-2210032 | Xiaomi | **Proposal 1: To support the SON/MDT enhancement for NPN, UE can record the NPN information of the cell (e.g. NPN ID) during to accessing and mobility.****Proposal 2: Including the NPN information (e.g. NPN ID) into all existing reports can be considered as baseline.** |
| R2-2210104 | Nokia | **Proposal 2: MDT and SON reports should enable SNPN Cell identification.** |
| R2-2210181 | Ericsson | **Proposal 2 UE logs SON reports for SNPNs in separate variables.****Proposal 3 UE logs MDT report for SNPNs in a separate variable.** |
| R2-2210303 | Qualcomm | **Proposal 1: To represent the global cell identity of a PNI-NPN cell, UE can include the CAG-ID in the existing CGI-Info-Logging.****Proposal 2: To represent the global cell identity of an SNPN cell, UE can include the NID in the existing CGI-Info-Logging.****Proposal 5: UE reports NPN SON and logged MDT reports availability and report only after checking if registered NPN (e.g., SNPN or PNI-NPN) lies within the NPN identity list stored in the UE variable for the corresponding SON and logged MDT report.** |

### **Rapporteur´s summary of ‘NPN enhancements for general’**

The proposals above provided by companies are not focus on specific use cases, which includes the enhancements of NPN ID reporting, the UE variable, and the NPN ID checking. Therefore for general, it is suggest UE performing the NPN ID checking before sending the SON/MDT result to the network side, and the NPN ID (list) should be included in the SON/MDT report.

Proposal 1: NPN ID checking is needed before the corresponding SON and MDT report.

Proposal 2: Include the NPN ID into SON/MDT report, the details are FFS.

To align with the checking and reporting of NPN ID, the related information should also be included in the UE variable. But whether a common or a separate UE variable should be used for NPN and PN needs further discussion.

Proposal 3: NPN ID related information should be included in the UE variables.

Proposal 4: RAN2 to discuss whether a common or a separate UE variable should be used for the private and the non-private network.

## NPN enhancements per use case

***1) For RLF report***

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| **TDoc** | **Company**  | **Proposals** |
| R2-2209568 | Vivo | **Proposal 1: Take the existing RA report, RLF report and SHR as the baseline of SON enhancement for NPN.****Proposal 2: The NPN information of the cell, e.g., NPN ID, should be included in RA report, RLF report and SHR.****Proposal 3: SNPN checking is needed before the following procedure:*** **sending the availability indicator for** **RA report, RLF report and SHR;**
* **transmitting RA report, RLF report and SHR;**
* **appending the contents of RA report.**
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| R2-2209574 | CATT | **Proposal 1: The NPN optimization in SONMDT can be studied from MRO, MDT and L2 measurement perspectives.****Proposal 2: Introduce NID/CAG-ID into the RLF/HOF Report to indicate UE NPN access limit.** |
| R2-2210104 | Nokia | **Proposal 1: Rel-18 Logged MDT and RLF report supports SNPN-identity check.** |
| R2-2210149 | CMCC | **Proposal 2: The NPN indication should be added for the RLF/CEF report to indicate the failure is caused by NPN (e.g. a new NPN related RLF cause).** |
| R2-2210181 | Ericsson | **Proposal 1 Enhance CGI-Info-Logging with NID to support logging the SON reports e.g., RLF report, RA report or MHI and MDT measurements for SNPN.** |

***2) For RA report***

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| **TDoc** | **Company**  | **Proposals** |
| R2-2209568 | Vivo | **Proposal 1: Take the existing RA report, RLF report and SHR as the baseline of SON enhancement for NPN.****Proposal 2: The NPN information of the cell, e.g., NPN ID, should be included in RA report, RLF report and SHR.****Proposal 3: SNPN checking is needed before the following procedure:*** **sending the availability indicator for** **RA report, RLF report and SHR;**
* **transmitting RA report, RLF report and SHR;**
* **appending the contents of RA report.**
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| R2-2210181 | Ericsson | **Proposal 1 Enhance CGI-Info-Logging with NID to support logging the SON reports e.g., RLF report, RA report or MHI and MDT measurements for SNPN.** |

***3) For immediate/logged MDT***

***- For logged MDT***

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| **TDoc** | **Company**  | **Proposals** |
| R2-2209574 | CATT | **Proposal 4: Add NPN related information in the area configuration for logged MDT.** |
| R2-2209823 | Samsung | **Proposal 1: LoggedMeasurementConfiguration can configure npn-IdentityList for SNPN and either plmn-identityList or npn-IdentityList for PNI-NPN.** |
| R2-2209899 | Huawei | **Proposal 2: For logged MDT in NPN, the area scope in MDT configuration should include NID and CAG, for SNPN case and PNI-NPN case, respectively.****Proposal 3: UE should extra perform NID checking before reporting logged MDT measurement results to the network side.** |
| R2-2210104 | Nokia | **Proposal 1: Rel-18 Logged MDT and RLF report supports SNPN-identity check.** |
| R2-2210149 | CMCC | **Proposal 4: For Logged MDT, some enhancements about the logging area are proposed to be considered, such as extending the constituent of the logging area with a list of NPN identities.****Proposal 5: The CAG info need to be added for logged MDT and immediate MDT.** |
| R2-2210181 | Ericsson | **Proposal 1 Enhance CGI-Info-Logging with NID to support logging the SON reports e.g., RLF report, RA report or MHI and MDT measurements for SNPN.****Proposal 4 RAN2 enhance the logged MDT report with cell type indication (e.g., SNPN cell) as part of the measurement results.****Proposal 5** **RAN2 enhance the MDT configuration (interFreqTargetInfo) to enable logging only NPN or PN cells per frequency.** |
| R2-2210292 | ZTE | **Proposal 1: The areaConfiguration in logged MDT configuration needs to be enhanced to allow indicating one or more NPNs., including SNPN identified by PLMN+NID and PNI NPN identified by PLMN + CAG ID.****Proposal 2: The CGI information included logged MDT results needs to be enhanced to allow indicating cellIdentity within a NPN network, including SNPN identified by PLMN+NID and PNI NPN identified by PLMN + CAG ID.** |
| R2-2210303 | Qualcomm | **Proposal 4: Logged MDT for NPN can be supported by including NPN-IdentityList in the existing LoggedMeasurementConfiguration.** |

***- For immediate MDT***

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| **TDoc** | **Company**  | **Proposals** |
| R2-2209574 | CATT | **Proposal 3: No need to perform NPN related enhancement for immediate MDT.** |
| R2-2210149 | CMCC | **Proposal 3: For immediate MDT, signaling based MDT suggests to be considered for the NPN measurement.****Proposal 5: The CAG info need to be added for logged MDT and immediate MDT.** |
| R2-2210303 | Qualcomm | **Proposal 3: No enhancements are required for immediate MDT reporting from the RAN2 point-of-view.** |

***4) For other use cases provided by single company***

***- Potential enhancement involves SHR***

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| **TDoc** | **Company**  | **Proposals** |
| R2-2209568 | Vivo | **Proposal 1: Take the existing RA report, RLF report and SHR as the baseline of SON enhancement for NPN.****Proposal 2: The NPN information of the cell, e.g., NPN ID, should be included in RA report, RLF report and SHR.****Proposal 3: SNPN checking is needed before the following procedure:*** **sending the availability indicator for** **RA report, RLF report and SHR;**
* **transmitting RA report, RLF report and SHR;**
* **appending the contents of RA report.**
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***- Potential enhancement involves CEF***

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| **TDoc** | **Company**  | **Proposals** |
| R2-2210149 | CMCC | **Proposal 2: The NPN indication should be added for the RLF/CEF report to indicate the failure is caused by NPN (e.g. a new NPN related RLF cause).** |

***- Potential enhancement involves L2 measurement***

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| **TDoc** | **Company**  | **Proposals** |
| R2-2209574 | CATT | **Proposal 1: The NPN optimization in SONMDT can be studied from MRO, MDT and L2 measurement perspectives.****Proposal 5: Report the NPN related information to the TCE together with the L2 measurement, e.g. throughput or data volume measurement.** |

***- Potential enhancement involves MHI***

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| **TDoc** | **Company**  | **Proposals** |
| R2-2210181 | Ericsson | **Proposal 1 Enhance CGI-Info-Logging with NID to support logging the SON reports e.g., RLF report, RA report or MHI and MDT measurements for SNPN.** |

### **Rapporteur´s summary of ‘NPN enhancements per use case’**

From the proposals, a lot of companies support the use cases of RLF report and logged MDT, a few companies support RA report, and some other use cases e.g. immediate MDT, SHR, CEF report, L2 measurement and MHI are also proposed by single company.

Rapporteur thinks the use cases of RLF report and logged MDT could have higher priority and others can also be discussed further.

**Proposal 5 RAN2 prioritizes the use cases of RLF report and logged MDT enhancement for NPN**.

**Proposal 6: Other use cases for NPN enhancement, e.g. RA report, immediate MDT, SHR, CEF report, L2 measurement and MHI can be further discussed**.

To the RLF report enhancement for NPN, NPN ID is suggested to be used for registered NPN checking and added to identify the private network as mentioned in the general part, but whether both the NID and the CAG ID should be introduced or only the NID should be introduced needs further discussion.

**Proposal 7: Introduce the NPN ID information in RLF report for SON enhancement for NPN.**

* **FFS: Only NID or both NID and CAG ID will be introduced as NPN ID information.**

**Proposal 8: SNPN checking is needed before sending the available indicator of the RLF report procedure. FFS to PNI-NPN checking.**

To the logged MDT enhancement for NPN, it is suggested by many companies to introduce the NPN ID into the area scope of logged MDT configuration. A few companies suggest including the NPN ID into the logged MDT results, but whether both the NID and the CAG ID should be introduced, or only the NID should be introduced needs further discussion. One company suggests that RAN2 enhance the logged MDT report with cell type indication (e.g., SNPN cell) as part of the measurement results, Rapporteur thinks that the cell type can also be deduce from the NPN ID if the NPN ID is included. Hence, we could discuss the NPN ID information and the cell type information together. One company suggests RAN2 enhance the MDT configuration (interFreqTargetInfo) to enable logging only NPN or PN cells per frequency.

**Proposal 9: Include NID and CAG-ID into the area scope of logged MDT configuration, for SNPN case and PNI-NPN case, respectively.**

**Proposal 10: RAN2 to discuss whether to enhance the MDT configuration (interFreqTargetInfo) to enable logging only NPN or PN cells per frequency.**

**Proposal 11: Include the NPN ID information into the CGI information** **and/or cell type indication (e.g., SNPN cell) as part of logged MDT result.**

* **FFS: Only NID or both NID and CAG ID will be introduced as NPN ID information.**

**Proposal 12: SNPN checking is needed before sending the available indicator of the logged MDT report procedure. FFS to PNI-NPN checking.**

## Others

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| **TDoc** | **Company**  | **Proposals** |
| R2-2209899 | Huawei | **Proposal 4: RAN2 to discuss the potential issue about UE measurement resource wastes in SNPN.** |
| R2-2210032 | Xiaomi | **Proposal 3: UE access mode (e.g. SNPN access mode or with CAG-only indication) can be reported to network for the OOC analysis.** |
| R2-2210149 | CMCC | **Proposal 1: RAN2 is suggested to prioritize PNI-NPN case rather than SNPN.** |
| R2-2210292 | ZTE | **Proposal 3: Support logging of OOC instance in logged MDT for NPN in R18.****Proposal 4: Supports further differentiation OOC cause (e.g., whether due to weak coverage or due to cell being barred) when logging any cell selection state in NPN MDT results.** |

### **Rapporteur´s summary of ‘Other proposals’**

From the other proposals, three issues are raised by companies which can be discussed further:

Proposal 13: RAN2 to further discuss other issues which include:

* + UE measurement resource wastes in SNPN;
	+ Priority of SNPN and PNI-NPN;
	+ OOC analysis based on logging of OOC instance, OOC cause or UE access mode.

# Conclusion

This document has made the following proposals:

**Easy agreement:**

**For general**

Proposal 1: NPN ID checking is needed before the corresponding SON and MDT report.

Proposal 2: Include the NPN ID into SON/MDT report, the details are FFS.

Proposal 3: NPN ID related information should be included in the UE variables.

**For use case**

**Proposal 5: RAN2 prioritizes the use cases of RLF report and logged MDT enhancement for NPN**.

**For RLF report**

**Proposal 7: Introduce the NPN ID information in RLF report for SON enhancement for NPN.**

* **FFS: Only NID or both NID and CAG ID will be introduced as NPN ID information.**

**Proposal 8: SNPN checking is needed before sending the available indicator of the RLF report procedure. FFS to PNI-NPN checking.**

**For logged MDT**

**Proposal 9: Include NID and CAG-ID into the area scope of logged MDT configuration, for SNPN case and PNI-NPN case, respectively.**

**Proposal 11: Include the NPN ID information into the CGI information and/or cell type indication (e.g., SNPN cell) as part of logged MDT result.**

* **FFS: Only NID or both NID and CAG ID will be introduced as NPN ID information.**

**Proposal 12: SNPN checking is needed before sending the available indicator of the logged MDT report procedure. FFS to PNI-NPN checking.**

**Proposal which needs discussion:**

**For general**

Proposal 4: RAN2 to discuss whether a common or a separate UE variable should be used for the private and the non-private network.

**For use case**

**Proposal 6: Other use cases for NPN enhancement, e.g. RA report, immediate MDT, SHR, CEF report, L2 measurement and MHI can be further discussed**.

**For logged MDT**

**Proposal 10: RAN2 to discuss whether to enhance the MDT configuration (interFreqTargetInfo) to enable logging only NPN or PN cells per frequency.**

**For Others**

Proposal 13: RAN2 to further discuss other issues which include:

* + UE measurement resource wastes in SNPN;
	+ Priority of SNPN and PNI-NPN;
	+ OOC analysis based on logging of OOC instance, OOC cause or UE access mode.