**3GPP TSG-RAN WG4 Meeting # 112 R4-2411797**

**Maastricht, Netherlands, August 19 ‒ August 23, 2024**

**Agenda item:** 5.1

**Source:** Moderator (Apple)

**Title:** Topic summary for [112][202] Maintenance\_R18

**Document for:** Information

# Introduction

*Briefly introduce background, the scope of this email discussion (e.g. list of treated agenda items) and provide some guidelines for email discussion if necessary.*

In this section, the following topics are included

* NR\_DualTxRx\_MUSIM-Core
* [NR\_MC\_enh-Core](https://portal.3gpp.org/desktopmodules/WorkItem/WorkItemDetails.aspx?workitemId=940194)
* [LTE\_NBIoT\_eMTC\_NTN\_req-Core](https://portal.3gpp.org/desktopmodules/WorkItem/WorkItemDetails.aspx?workitemId=950174)
* [NR\_FR1\_lessthan\_5MHz\_BW](https://portal.3gpp.org/desktopmodules/WorkItem/WorkItemDetails.aspx?workitemId=941112)
* Other TEI18
* On performance requirements for RTK/PPP positioning for NR

# Topic #1: NR\_DualTxRx\_MUSIM-Core

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** |  **Title** | **Company** | **Proposals / Observations** |
| [**R4-2411967**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411967.zip) | Discussion on remaining aspects of MUSIM | Nokia | 1. Capture in the MUSIM requirements that no requirements related to measurements within gaps apply if collisions occur between a MUSIM gap and any measurement gap without assigned priority if the two gaps collide and have the same MGRP.
2. Capture in section 9.1.10 that the UE is required to be able to conduct reception or transmission from or to the source network during gaps (MUSIM and measurement gaps) which are dropped due to gap collision handling.
3. Remove following line from section 9.1.10: ‘The UE is not required to conduct reception or transmission from or to the [source] network during MUSIM gaps that are not dropped due to collisions, as defined in clauses 9.1.10.4 and 9.1.10.5.’.
4. Remove following line from section 9.1.10: ‘The UE is not required to perform MUSIM related operations such as cell identification and measurement, paging monitoring, SIB acquisition, and/or on-demand SI request of the target cell in the target network that is outside the MUSIM gaps.’
5. Clarify in section 9.1.10 that if UE perform MUSIM related operations outside the allocated MUSIM gaps, these shall be performed with no impact to source network scheduling operations.
6. Capture that the MUSIM requirements in section 9.1.10 applies for a UE supporting MUSIM gaps when the UE is allocated one or more of the requested MUSIM gaps.
7. RAN4 need to discuss potential impact from UE autonomous MUSIM operation using a separate (MUSIM) receiver.
8. RAN4 to provide a clarification within Rel-18 regarding Rel-18 MUSIM operation using separate receiver.
 |
| [**R4-2412286**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412286.zip) | On remaining maintenance issues for MUSIM | vivo | **Observation 1: For issue 1-1-5, current specs will work properly without any further clarification. whether have clarification or not could depend on group’s consensus.****Observation 2: Issue 1-1-7 is out of scope of Rel-18 MUSIM WI.**  |
| [**R4-2412498**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412498.zip) | (NR\_DualTxRx\_MUSIM-Core) Remaining issues on MUSIM | Ericsson | ***Proposal 1: RAN4 to clarify that MUSIM gap requirements applies based on the configured MUSIM gaps by NW other than the MUSIM gaps requested by UE.***  |
| [**R4-2412660**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412660.zip) | Discussion on remaining issues in RRM requirements for MUSIM | Huawei, HiSilicon | **Proposal 1: RAN4 not to make further clarification for Case 3 in the requirements.** **Observation 1: Applicability of MUSIM gap and Type-1 MG collision handling is already in the spec.****Observation 2: UE schedulability during dropped MUSIM gap occasions is already in the spec.****Proposal 2: RAN4 not to make additional clarification on where UE to perform MUSIM operations in the requirements.****Proposal 3: RAN4 to clarify that the MUSIM gap related requirements for NW A apply when UE is allocated one or more of the requested MUSIM gaps.** |

## Open Issues

*Before Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

* **Issue 1-1-2: Scenarios for the case where the MO to be measured without MG have to be measured in the associated MG**
	+ Huawei: RAN4 not to make further clarification for Case 3 in the requirements.
* ======Discussion====
	+ Agreement: RAN4 does not to make further clarification for Case 3 in the requirements.
* **Issue 1-1-3: Solutions for collision between MUSIM gap and any measurement gap without assigned priority**
	+ Nokia: revision highlighted in yellow. “If the colliding MUSIM gap and measurement gap have the same MGRP, the requirements related to measurements within gaps in clause 9 shall not apply.”
* vivo: anything new?
* Nokia: current spec is not clear. clarification is needed.
* Qualcomm:need more time to think.
* Apple: there may be ambiguity when SMTC collides with MG and it is unclear about which gap to drop depending on the priority.
* Nokia: no priority is considered here.
* MTK: there is a case that MG can be dropped when it collides with MUSIM gap. How to define this case?

Ericsson: offline discussion to clarify if this case should be considered

* vivo: should we consider this as a corner case? if so, no further discussion is needed.
* Moderator: take this offline until the end of this meeting.
* **Issue 1-1-4: Clarification on network schedule on dropped gaps**
	+ - the UE is required to be able to conduct reception or transmission from or to the source network during gaps (MUSIM and measurement gaps) which are dropped due to gap collision handling, providing it is not interrupted or scheduling restricted by other events
			* MTK:this should have been covered in the current gap
			* Huawei: other event which may impact UE activities within dropped gap should be considered.
			* Ericsson: in MUSIM section, such clarification is still needed.

Agreement: subject to the agreement on the exact wording, in principle it is agreed to add clarification in MUSIM section. The detailed wording can be agreed in CR drafting.

* + - ~~Remove following line: ‘The UE is not required to conduct reception or transmission from or to the [source] network during MUSIM gaps that are not dropped due to collisions, as defined in clauses 9.1.10.4 and 9.1.10.5.’.~~
		- Remove following line ‘The UE is not required to perform MUSIM related operations such as cell identification and measurement, paging monitoring, SIB acquisition, and/or on-demand SI request of the target cell in the target network that is outside the MUSIM gaps.’
			* + MTK: this is R17 wording..shall we touch it. some procedure concern
				+ vivo: same as MTK.
				+ Nokia: we normally don’t specify what UE should not do.
				+ apple: current wording should be fine.
		- Agreement: work on the wording offline. In principle, instead of removing the existing wording, some clarifications can be added.
		- Clarify that if UE perform MUSIM related operations outside the allocated MUSIM gaps, these shall be performed with no impact to source network scheduling operations.
			* apple: not very necessary. we can compromise to accept this.
			* Huawei:not necessary and potentially impact on other procedures
			* qualcomm: not sure about the necessity.
			* vivo: don’t think this is in the scope of this work
			* OPPO: this may imply some additional requirement outside of MUSIM gap. agree with vivo and concern if this is in the scope.
			* Nokia: don’t see this should be considered as new requirement.
		- Capture that the MUSIM requirements in section 9.1.10 applies for a UE supporting MUSIM gaps when the UE is allocated one or more of the requested MUSIM gaps.
* **Issue 1-1-5: Clarification on MUSIM related operations within allocated MUSIM gaps**
	+ vivo/Huawei: current specs will work properly without any further clarification on MUSIM related operations within allocated MUSIM gaps
	+ Agreement: current specs will work properly without any further clarification on MUSIM related operations within allocated MUSIM gaps
* **Issue 1-1-7: UE Rel-18 MUSIM operation using separate receiver**
	+ Nokia: RAN4 to provide a clarification and potential impact within Rel-18 regarding Rel-18 MUSIM operation using separate receiver.
	+ vivo: this is out of scope of Rel-18 MUSIM WI
	+ Huawei: RAN4 not to make additional clarification on where UE to perform MUSIM operations in the requirements.
		- Nokia: would like to learn more the design options from others on this issue.
		- vivo: out of scope. the related work can be too big to be handled in TEI.
* **Issue 1-1-8: Clarify UE requirements when only part of the requested MUSIM gaps are allocated by the network.**
	+ Ericsson: RAN4 to clarify that MUSIM gap requirements applies based on the configured MUSIM gaps by NW ~~other than the MUSIM gaps requested by UE.~~
	+ Huawei: Proposal 3: RAN4 to clarify that the MUSIM gap related requirements for NW A apply when UE is allocated one or more of the requested MUSIM gaps.
		- Nokia: support Huawei proposal
	+ Agreement: RAN4 to clarify that the MUSIM gap related requirements for NW A apply when UE is allocated one or more of the requested MUSIM gaps.
		- vivo: these two proposals can be the same.
		- qualcomm: such clarification is unnecessary.

# Topic #2: NR\_MC\_enh-Core

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** |  **Title** | **Company** | **Proposals / Observations** |
| [**R4-2412385**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412385.zip) | Discussion on RRM requirements for multi-carrier enhancements | ZTE Corporation, Sanechips | **Observation 1: Tx switching across 2 bands and 2 TAGs case is introduced in Rel-18 NR\_MC\_enh and whether the requirement in 8.2.2.2.10A is apply for 2TAGs is confused.****Observation 2: For Tx switching across 3/4 bands, values for RTD are different from 2 TAGs and single TAG. Concerently, RTD=3us is assumed for single TAG and RTD=9us is assumed for two TAGs to derive the DL interruption length.****Observation 3: For Tx switching across 3/4 bands, the difference between two TAGs and single TAG is small.****Proposal 1: RAN4 should algin the requirements for 2TAGs between 2 bands and 3/4 bands.** |
| [**R4-2412995**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412995.zip) | DL interruption for Tx switching | Nokia, Nokia Shanghai Bell | 1. No distinction was made in 1-TAG and 2TAGs cases for 2 bands scenario in the legacy case.
2. Existing requirements for DL interruption for Tx switching across 2 bands can be applied to DL interruption for Tx switching across 2 bands and 2 TAGs case.
 |

## Open Issues

**Proposal 1 (ZTE): RAN4 should algin the requirements for 2TAGs between 2 bands and 3/4 bands.**

1. **(Nokia) Existing requirements for DL interruption for Tx switching across 2 bands can be applied to DL interruption for Tx switching across 2 bands and 2 TAGs case.**

Huawei: support proposal 1

Nokia: legacy requirement does not differentiate 1 or 2 TAGs.

MTK: none of them is absolutely necessary, especially this work has been closed long time ago.

E///: support proposal 2.

ZTE; 2 band requirement is introduce long time ago when only 1 TAG is considered.

Huawei: we can compromise to no requirement for 2bands 2 TAG.

# Topic #3: [LTE\_NBIoT\_eMTC\_NTN\_req-Core](https://portal.3gpp.org/desktopmodules/WorkItem/WorkItemDetails.aspx?workitemId=950174)

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** |  **Title** | **Company** | **Proposals / Observations** |
| [**R4-2413124**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413124.zip) | Measurements on disappearing neighbor cells | Nokia | [Proposal 1: When a UE starts inter-frequency neighbor cell measurements based on time-based measurement initiation (e.g. Ttrigger before t-service), and the inter-frequency neighbor cells associated to the same satellite are also configured with t-Service, then the UE is not required to measure these cells.](#_Toc174115684)[Proposal 2: When t-service is reached, and the UE has initiated measurements based on time-based measurement initiation, the UE shall immediately perform cell reselection ignoring any previous measurement on the serving cell.](#_Toc174115685) |
| [**R4-2412190**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412190.zip) | (LTE\_NBIOT\_eMTC\_NTN\_req-Core) Discussion on PUR requirements for IoT NTN | Huawei, HiSilicon | **Observation 1: Without RSRP-based TA validation, NW can guarantee the TA is valid by PUR timer.****Observation 2: TA validation for PUR can be guaranteed by existing PUR timer.** **Observation 3: TA validation could be directly referred to existing RAN2 spec (e.g. 36.331 5.3.3.19).****Proposal 1: Update the requirements for TA validation using PUR as follows:**

|  |
| --- |
| 4.6A.3.3 Requirements on TA validation for transmission using PURThe UE is allowed to transmit using PUR provided that TA is valid provided that *pur-TimeAlignmentTimer* is not configured or *pur-TimeAlignmentTimer* is running as defined in [2]The UE shall determine the uplink timing, $T\_{TA}$, for transmitting on PUR using the valid values of $N\_{TA}, N\_{TA,offset}, N\_{TA,adj}^{common}$ and $ N\_{TA,adj}^{UE}$ where $T\_{TA}$ is defined in [16] which are the latest acquired values before PUR transmission. |

 |

## Open Issues

[**Proposal (Nokia): When a UE starts inter-frequency neighbor cell measurements based on time-based measurement initiation (e.g. Ttrigger before t-service), and the inter-frequency neighbor cells associated to the same satellite are also configured with t-Service, then the UE is not required to measure these cells.**](#_Toc174115684)

[**Proposal (Nokia): When t-service is reached, and the UE has initiated measurements based on time-based measurement initiation, the UE shall immediately perform cell reselection ignoring any previous measurement on the serving cell.**](#_Toc174115685)

 **Proposal (Huawei): Update the requirements for TA validation using PUR as follows:**

|  |
| --- |
| 4.6A.3.3 Requirements on TA validation for transmission using PURThe UE is allowed to transmit using PUR provided that TA is valid provided that *pur-TimeAlignmentTimer* is not configured or *pur-TimeAlignmentTimer* is running as defined in [2]The UE shall determine the uplink timing, $T\_{TA}$, for transmitting on PUR using the valid values of $N\_{TA}, N\_{TA,offset}, N\_{TA,adj}^{common}$ and $ N\_{TA,adj}^{UE}$ where $T\_{TA}$ is defined in [16] which are the latest acquired values before PUR transmission. |

Agreement:

**Update the requirements for TA validation using PUR as follows:**

|  |
| --- |
| 4.6A.3.3 Requirements on TA validation for transmission using PURThe UE is allowed to transmit using PUR provided that TA is valid provided that *pur-TimeAlignmentTimer* is not configured or *pur-TimeAlignmentTimer* is running as defined in [2]The UE shall determine the uplink timing, $T\_{TA}$, for transmitting on PUR using the valid values of $N\_{TA}, N\_{TA,offset}, N\_{TA,adj}^{common}$ and $ N\_{TA,adj}^{UE}$ where $T\_{TA}$ is defined in [16] which are the latest acquired values before PUR transmission. |

# Topic #4: [NR\_FR1\_lessthan\_5MHz\_BW](https://portal.3gpp.org/desktopmodules/WorkItem/WorkItemDetails.aspx?workitemId=941112)

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** |  **Title** | **Company** | **Proposals / Observations** |
| [**R4-2412639**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412639.zip) | Discussion on remaining issues in R18 less than 5MHz | Huawei, HiSilicon | **Proposal 1: Update the test requirements in A.6.1.1.9.3 to include the additional time for PBCH/MIB reading, i.e. the 2 SMTC samples, in TSI-NR.****Proposal 2: RAN4 to take simulation results in Table 1 into account for defining SNR levels for RLM/BFD test cases.****Table 1: Simulation results for Qin and Qout levels with PDCCH for less than 5MHz operation**

|  |  |  |
| --- | --- | --- |
|  | SNR (dB) @ 10% BLER | SNR (dB) @ 2% BLER |
| OOS parameters with 12 RB | -4.00 | N/A |
| IS parameters with 12 RB | N/A | 2.14 |
| OOS parameters with 15 RB | -6.60 | N/A |
| IS parameters with 15 RB | N/A | -1.82 |

 |
| [**R4-2412996**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412996.zip) | Discussion on performance part for NR in less than 5 MHz bandwidth | Ericsson | 1. RAN4 to agree following thresholds for the BFD test

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Test 1 |
|  |  | T1 | T2 | T3 | T4 | T5 |
| SNR\_SSB of set q0 | Config 1 | dB | 5 | -3 | -12 | -12 | -12 |
| SNR\_SSB of set q1 | Config 1 | dB | -10 | -10 | 10 | 10 | 10 |
| SSB\_RP of set q1 | Config 1 | dBm/SCS kHz | -108 | -108 | -88 | -88 | -88 |

1. RAN4 to agree following thresholds for the RLM test

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Unit** | **Test 1** |
|  |  | **T1** | **T2** | **T3** | **T4** | **T5** |
| SNR on RLM-RS | Config 1 | dB | 1 | -9 | -15 | -4.5 | -1 |
|  | Config 2 |  | 1 | -7 | -15 | -4.5 | 3 |

 |

## Open Issues

**Issue 1:**

 **Proposal (Huawei): Update the test requirements in A.6.1.1.9.3 to include the additional time for PBCH/MIB reading, i.e. the 2 SMTC samples, in TSI-NR.**

**Issue 2: Qin/Qout and related SNR level during the test.**

# Topic #5: on performance requirements for RTK/PPP positioning for NR

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** |  **Title** | **Company** | **Proposals / Observations** |
| [**R4-241**1586](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413124.zip) | Discussion on performance requirements for RTK/PPP positioning for NR | R&S | **Proposal 1**: RAN4 to introduce RTK/PPP performance requirements for NR in TS 38.171.**Proposal 2**: Do it as a part of a Rel-19 TEI (2 RAN4 meeting cycles), or introduce a Rel-19 WI for more comprehensive requirements and work.**Proposal 3**: Consider the drafted requirements and test cases attached in R4-2405618, as an initial reference for facilitating the specification and simulation work.  |

## Open Issues

* where/when to handle this topic
	+ Rel-18 TEI = Work can start right now
	+ Rel-19 WI = Need to be raised in the plenary, chances are not high
	+ Rel-19 TEI = Work will probably start next year
* Workscope:
	+ RTK / PPP
	+ posSIB
	+ NR/LTE
	+ Requirements
	+ Simulations