**3GPP TSG-RAN WG4 Meeting # 112 R4-2413416**

Maastricht, Netherlands, 19th – 23rd August, 2024

**Agenda item:** 8.26.4

**Source:** Moderator (MediaTek Inc.)

**Title:** Topic summary for [112][316] IoT\_NTN\_Ph3

**Document for:** Information

# Introduction

This discussion summary will cover agenda:

8.26.1 General aspects and work plan

8.26.2 RF core requirements

The topics for corresponding agendas are listed as follows:

* Topic#1: Work plan for Rel-19 IoT\_NTN\_Ph3
* Topic#2: RF core requirements

# Topic #1: Work plan for Rel-19 IoT\_NTN\_Ph3

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Proposals / Observations/Abstracts** | **Company** |
| [R4-2411470](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_112/Docs/R4-2411470.zip) | Title: Work Plan for Rel-19 IoT NTN  **Proposal 1: RAN4 to take above work plan into consideration.** | MediaTek Inc. |

## Open issues summary

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

### Sub-topic 1-1: Workplan

Workplan in [R4-2411470](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_112/Docs/R4-2411470.zip)

**Issue 1-2-1: Work plan for Rel-19 IoT\_NTN\_Ph3**

* Proposals

|  |  |  |  |
| --- | --- | --- | --- |
| **Month** | **Meeting#** | **#TU** | **Work plan** |
| **2024 Q3** | RAN1#118 | 0.5 | Capacity enhancements for uplink   * Continue discussion on the benefits and the options to use OCC on NPUSCH and NPRACH |
|  | RAN2#127 | 1 | Capacity enhancements for uplink   * Continue discussion on the benefit and options for EDT enhancement * Study the RAN2 impacts on usage of OCC (coordinate with RAN1 if needed)   S&F operation for delay-tolerant services   * Study on potential RAN2 impact due to S&F operation (coordinate with CT1/SA2/RAN3 if needed) |
|  | RAN3#125 | 0.5 | * Discuss RAN3 work plan   S&F operation for delay-tolerant services   * Initial discussion on necessary enhancements for S&F |
|  | RAN4#112 | 0.5 (RD)  0.5 (RF) | * Discuss RAN4 RF/RRM core requirement impact and work plan |
| **2024 Q4** | RAN1#118bis | 0.5 | Capacity enhancements for uplink   * Down-select the options for the design of OCC on NPUSCH and NPRACH |
|  | RAN2#127bis | 1 | Capacity enhancements for uplink   * Continue discussion on the benefit and options for EDT enhancement * Study the RAN2 impacts on usage of OCC (coordinate with RAN1 if needed)   S&F operation for delay-tolerant services   * Study on potential RAN2 impact due to S&F operation (coordinate with CT1/SA2/RAN3 if needed) |
|  | RAN3#125bis | 0 |  |
|  | RAN4#112bis | 0.5 (RD)  0.5 (RF) | * Discuss RAN4 RF/RRM core requirement |
|  | RAN1#119 | 0.5 | Capacity enhancements for uplink   * Discuss on further details for usage of OCC on NPUSCH and NPRACH |
|  | RAN2#128 | 1 | Capacity enhancements for uplink   * Conclude on baseline procedure of EDT enhancement * Study the RAN2 impacts on usage of OCC (coordinate with RAN1 if needed)   S&F operation for delay-tolerant services   * Study on potential RAN2 impact due to S&F operation (coordinate with CT1/SA2/RAN3 if needed) |
|  | RAN3#126 | 0.5 | S&F operation for delay-tolerant services   * Continue discussion on necessary enhancements for S&F (coordinate with CT1/SA2/RAN2 if needed) |
|  | RAN4#113 | 0.5 (RD)  0.5 (RF) | * Discuss RAN4 RF/RRM core requirement |
| **2025 Q1** | RAN1#120 | 0.5 | * Further stage-3 works (draft CR, RRC Parameter list) on usage of OCC on NPUSCH and NPRACH |
|  | RAN2#129 | 1 | Capacity enhancements for uplink   * Stage-3 details discussion for EDT enhancement and usage of OCC * Identify the RAN2 impacts on usage of OCC (coordinate with RAN1 if needed)   S&F operation for delay-tolerant services   * Identify the RAN2 impact due to S&F operation (coordinate with CT1/SA2/RAN3 if needed) |
|  | RAN3#127 | 0.5 | S&F operation for delay-tolerant services   * Continue discussion on necessary enhancements for S&F (coordinate with CT1/SA2/RAN2 if needed) * Endorse draft CRs |
|  | RAN4#114 | 0.5 (RD)  0.5 (RF) | * Discuss RAN4 RF/RRM core requirement * Initial discussion on UE feature list, if any |
| **2025 Q2** | RAN1#120bis | 0.5 | * Further stage-3 works (draft CR, RRC Parameter list) on usage of OCC on NPUSCH and NPRACH * Initial discussion on UE feature list |
|  | RAN2#129bis | 1 | * Further stage-3 works (draft CRs) on UL capability enhancement and S&F operation. |
|  | RAN3#127bis | 0 |  |
|  | RAN4#114bis | 0.5 (RD)  0.5 (RF) | * Discuss RAN4 RF/RRM core requirement * LS R2 on the UE feature list, if any * Initial draft of corresponding CRs |
|  | RAN1#121 | 0.5 | * Approve corresponding CRs * Finalize RRC parameter list and UE feature list |
|  | RAN2#130 | 1 | * Remaining stage-3 details discussion for draft CR endorsement * UE Capability discussion |
|  | RAN3#128 | 0.5 | * Conclude the remaining details for S&F operation * Endorse draft CRs |
|  | RAN4#115 | 0.25 (RD)  0.5 (RF) | * Endorse corresponding draft CRs |
| **2025 Q3** | RAN1#122 | 0 | * Note: R1 in maintenance phase. |
|  | RAN2#131 | 1 | * Conclude on UE Capability * Approve corresponding CRs |
|  | RAN3#129 | 0.5 | * Approve corresponding CRs |
|  | RAN4#116 | 0.25 (RD)  0.5 (RF) | * Approve corresponding CRs |

* + Proposal 1: RAN4 to take above work plan into consideration.
* Recommended WF
  + Approve the workplan.

# Topic #2: RF core requirements

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Proposals / Observations** | **Company** |
| [R4-2411471](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_112/Docs/R4-2411471.zip) | Title: Discussion on RF requirement impact for IoT NTN phase 3  **Proposal 1:****No need to update UE RF requirements for the support of capacity enhancements for uplink.** **FFS whether to update SAN RF requirements accordingly. The impact on SAN demodulation performance requirements can be discussed in performance part.** | MediaTek Inc. |
| [R4-2412992](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_112/Docs/R4-2412992.zip) | Title: IoT NTN UE RF impact  Observation 1: RAN1 will down select symbol-level OCC or slot-level OCC  Observation 2: RAN1 still discuss on the OCC performance.  **Proposal 1:** **Wait RAN1 reach conclusions on OCC feature before RAN4 start to evaluate the RF impact.** | Ericsson |
| [R4-2413143](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_112/Docs/R4-2413143.zip) | Title: NTN IoT UL capacity enhancements  Observation 1: UE RF specification 36.102 is not listed as an impacted specification in the WID, neither for core nor performance part  **Proposal 1:** **RAN4 shall not work on NPRACH before further progress in RAN1 is reached.**  **Proposal 2:** **There is no UE RF requirement impact from symbol- or slot-level OCC schemes for NPUSCH**. | Qualcomm |

## Open issues summary

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

### Sub-topic 2-1: Update UE RF requirements accordingly, if needed

*Sub-topic description*

NOTE1: Enhancements to enable multiplexing of multiple UEs in a single 3.75 kHz or 15 kHz subcarrier via orthogonal cover codes (OCC) for NPUSCH format 1 and NPRACH.

#### **Issue 2-1-1:** **UE RF requirement impact for NPUSCH with OCC feature**

* Proposals
  + Proposal 1: No need to update UE RF requirements for the support of capacity enhancements for uplink. (MTK)
  + Proposal 2: Wait RAN1 reach conclusions on OCC feature before RAN4 start to evaluate the RF impact. (Ericsson)
  + Proposal 3: There is no UE RF requirement impact from symbol- or slot-level OCC schemes for NPUSCH. (Qualcomm)
  + Proposal 4: other
* Recommended WF
  + Discussion on the proposals.

#### **Issue 2-1-2: UE RF requirement impact for NPRACH with OCC feature**

* Proposals
  + Proposal 1: No need to update UE RF requirements for the support of capacity enhancements for uplink. (MTK)
  + Proposal 2: Wait RAN1 reach conclusions on OCC feature before RAN4 start to evaluate the RF impact. (Ericsson)
  + Proposal 3: RAN4 shall not work on NPRACH before further progress in RAN1 is reached. (Qualcomm)
  + Proposal 4: other
* Recommended WF
  + Discussion on the proposals.

### Sub-topic 2-2: Update SAN RF requirements accordingly, if needed

*Sub-topic description*

NOTE1: Enhancements to enable multiplexing of multiple UEs in a single 3.75 kHz or 15 kHz subcarrier via orthogonal cover codes (OCC) for NPUSCH format 1 and NPRACH.

#### **Issue 2-2-1: SAN RF requirement impact for NPUSCH/NPRACH with OCC feature**

* Proposals
  + Proposal 1: FFS whether to update SAN RF requirements accordingly. (MTK)
  + Proposal 2: Wait RAN1 reach conclusions on OCC feature before RAN4 start to evaluate the RF impact. (Ericsson)
  + Proposal 3: RAN4 shall not work on NPRACH before further progress in RAN1 is reached. (Qualcomm)
  + Proposal 4: other
* Recommended WF
  + Discussion on the proposals.