**3GPP TSG-RAN WG4 Meeting # 107 R4-2310036**

**Incheon, KR, May 22nd – May 26th , 2023**

**Agenda item:** 9.7.4, 9.8

**Source:** Moderator (MediaTek)

**Title:** Topic summary for [107][153] LTE\_NBeMTC\_NTN\_UERF

**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.*

* *Topic area*

|  |
| --- |
| *9.7.4 UE RF requirement maintenance (8)9.8 IoT NTN9.8.1 General and work plan (0)9.8.2 UE RF requirements (0)* |

# Topic #1: UE RF requirement maintenance for IoT NTN

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

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **TDoc** | **Title** | **Source** | **Observations/Proposals/****Moderator’s remarks** |
| [**R4-2307063**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_107/Docs/R4-2307063.zip) | CR to add B54/n54 as protected band and correct reference clause in 6.5B.4.3 | Ligado Networks | CR to TS 36.102 (Rel-18): * Adding B54/n54 as protected band for Band 256;
* Correcting the referenced clause in 6.5B.4.3
 |
| [**R4-2307618**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_107/Docs/R4-2307618.zip) | Correction on Pcmax and OOBB requirement for category NB1/NB2 UE | China Telecom Corporation Ltd. | CR to TS 36.102 (Rel-18): * Typo “M1” 🡪 “NB1 and NB2” in 6.2B.4
* Void Note1 in Table 7.6B.3-1
* Subclause number 7.6B.2 🡪 7.6B.3 in subclause 7.7
 |
| [**R4-2307849**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_107/Docs/R4-2307849.zip) | CR to 36.102 for NTN IoT UE RF requirements corrections | MediaTek Inc. | Implementing Proposal 1 in R4-2307859 |
| [**R4-2307859**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_107/Docs/R4-2307859.zip) | Discussion on UE RF requirements for IoT NTN | MediaTek Inc. | Proposal 1: Based on RAN2 and RAN5 rules about IE additionalSpectrumEmission, to consider the integer-value 2 for network signalling remark NS\_02N for usage.Proposal 2: Based on proposal 1, to consider agreeing the modification indicated in R4-2307849. |
| [**R4-2307921**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_107/Docs/R4-2307921.zip) | CR to 36.102 for NTN IoT UE A-MPR requirements corrections | Huawei, HiSilicon | CR proposing to add missing A-MPR values for PC3 and PC5 for eMTC and NB1/2.Discussion required on the proposed A-MPR values before approving this CR. |

## 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

*Sub-topic description: This sub-topic addresses the integer-value for network signaling remark NS\_02N.*

*Open issues and candidate options before meeting:*

**Issue 1-1-1: Which integer-value is set to *additionalSpectrumEmission* for network signalling remark NS\_02N?**

* Proposals
	+ Option 1: 2
	+ Option 2: Others, please elaborate
* Recommended WF
	+ Option 1?

**Issue 1-1-2: If Option 1 in Issue 1-1-1 is agreed, is the contents in R4-2307849 agreeable?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No, please suggest your preferred revision.
* Recommended WF
	+ TBD

### Sub-topic 1-2

*Sub-topic description: This sub-topic addresses A-MPR values for PC5 for IoT NTN*

*Open issues and candidate options before meeting:*

**Issue 1-2-1: Should RAN4 specify A-MPR for PC5 different from that for PC3 for IoT NTN?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ Option 1?

**Issue 1-2-2: If the answer to Issue 1-2-1 is Option 1 (Yes), is PC5 A-MPR of 0.5dB lower than that for PC3 agreeable for IoT NTN?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ Option 1?

**Issue 1-2-3: If the answer to Issue 1-2-2 is Option 1 (Yes), is content in R4-2307921 agreeable?**

* Proposals
	+ Option 1: Yes.
	+ Option 2: No, please suggest your revison.
* Recommended WF

Option 1?

### Sub-topic 1-3

*Sub-topic description: This sub-topic addresses “easy” revisions such as obvious editorial correction etc, which does not require further discussion.*

*Open issues and candidate options before meeting:*

**Issue 1-3-1: Is correction in R4-237063 agreeable?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No, please elaborate.
* Recommended WF
	+ Option 1?

**Issue 1-3-2: Is correction in R4-237618 agreeable?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No, please elaborate.
* Recommended WF
	+ Option 1?

# Topic #2: Handling of discrepancy between 3GPP and ETSI for band b255

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

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **TDoc** | **Title** | **Source** | **Observations/Proposals/****Moderator’s remarks** |
| [**R4-2309037**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_107/Docs/R4-2309037.zip) | Maintenance on IoT NTN UE RF -- ETSI issue | Sony | Observation 1: There is a discrepancy between 3GPP and ETSI SEM requirements, and ETSI SEMs are tighter than 3GPP SEMs at some frequency offsets.Observation2: The discrepancies in CatM1 masks are caused by different SEM specification methods used by 3GPP and ETSI (stepwise SEM in 3GPP vs. linearly dBW-interpolated SEM in ETSI) – these discrepancies may not be critical since the real SEM performance is closer to ETSI method. Observation 3: The discrepancies in NB-IoT masks are mostly concerning if NB-IoT is located at the edge of the operating frequency band b255.Observation 4: Similarly to the approach for FCC SEM, a guard band can be introduced help 3GPP NB-IoT devices meet ETSI OOB emission limits for b255. Observation 5: ETSI OOB emission limit is also more stringent in the frequency region that are far from the center freqeucny (e.g., spurious emission region), and also deviate from NS\_02N emission limit. Observation 6: Approved by measurements of the typical CatM1 and NB-IoT devices at Tx frequency close to the b255 UL band - all discrepancies between the ETSI and 3GPP masks may be tolerated at the expense of the actual SEM margins except for ETSI OOB requirement for NB-IoT at 100kHz to ~200kHz offset from channel center.Observation 7: NB-IoT 1-Tone with max Pout (MPR0) is a worst case, which needs a guard band that must be larger than 100kHz to meet the ETIS OOB emission requirement.Observation 8: the 95% TP metric in the 3GPP IBB might be translated to 9dB SNR degradation. Observation 9: Different blocking requirements are adopted in the latest draft version of EN 301 681 compared to the latest published version. Proposal 1: 3GPP shall specify a sufficient guard band or A-MPR to help NB-IoT devices to meet the ETSI OOB emission limit when the carrier is on the edge of the operating frequency band. Proposal 2: 3GPP shall specify a 200 kHz guardband at the edges of band 255 to ensure the 3GPP NB-IoT devices can always meet the ETSI OOB emission mask when the devices are operating in corresponding EU regions. Proposal 3: RAN4 should discuss how to resolve the more stricked emission limit from ETSI in the large frequency offset region. Proposal 4: 3GPP can send LS to ETSI to check if they would consider further aligning the emission limit with 3GPP SEM to improve the spectrum efficiency and utilization.Proposal 5: 3GPP shall decide whether and which blocking requirement from ETSI specification shall be captured and further analyze the performance gap in between. |
| [**R4-2309210**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_107/Docs/R4-2309210.zip) | On ETSI requirements impact on Rel-17 IoT NTN UE | Ericsson | Observation 1 Additional SEM requirement needs to be introduced for OOB emission in Table 4b in ETSI.Observation 2 Additional spurious requirement needs to be introduced for spurious emission in Table 3 in ETSIObservation 3 Receiver spurious emission requirement in 3GPP could be compared with unwanted emission requirement in carrier-off state in ETSI Observation 4 ETIS unwanted emission in carrier-off state is more stringent than 3GPP equivalent requirements.Observation 5 A 3GPP compliance IoT NTN device in Rel-17 can pass ETSI ACS but fail the ETSI IBB requirementProposal-1: ETSI will not be considered in 3GPP IoT NTN release 17Proposal-2: It is up to Rel-17 IoT NTN to comply the ETSIProposal-3: Add the ETSI requirement consideration in Rel-18 IoT NTN with WID updates.Note: ETSI refers to ETSI EN 301 681, V2.1.2 (2016-11), |
| [**R4-2309274**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_107/Docs/R4-2309274.zip) | Handling of ETSI requirements and LS to ETSI | Qualcomm Inc. | Observation 1: ETSI EN 301 681 emission requirements cover both out-of-band as well as in-band requirements.Observation 2: ETSI EN 301 681 includes peak hold emission measurements as well as requirements for measurement averaging time for specific frequency ranges.Observation 3: Both in-band and out-of-band emissions of ETSI EN 301 681 are more stringent than 3GPP general requirements. This applies for both NB-IoT and Cat M1 UEs.Observation 4: Both candidate solutions of guard band and A-MPR are harmful for the system efficiency. It is unclear if 3GPP specified guard band is accepted to be used by local regulator.Proposal 1: Given the large discrepancies between ETSI EN 301 681 and 3GPP requirements, send an LS to ETSI TC SES as provided in Appendix to request to consider possibilities to reduce the misalignment between 3GPP and ETSI standards. Proposal 2: Consider defining a new operating band for which ETSI requirements are captured.Moderator’s remark: Among Fig. 1 ~ 4, Fig. 2 has a different color legend where black curve represents ETSI, while in the rest three figures red curves represent ETSI. Could Proponent clarify and confirm? |

## 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

*Sub-topic description: This sub-topic addresses discrepancy on Tx requirements (both in-band and out-of-band emission, e.g., Tx spurious, SEM, carrier-off /OFF) and Rx requirements (Rx spurious, ACS, IBB) between ETSI and 3GPP for band b255. Part of the reason for the discrepancy could be different methods used in 3GPP and ETSI: in 3GPP, a step-wise method applies, while linearly dBW-interpolated SEM in ETSI. We may focus on the handling of the discrepancy*

*Open issues and candidate options before meeting:*

**Issue 2-1-1: Which way to go for RAN4 to resolve the requirements discrepancy between ETSI and 3GPP?**

* Proposals
	+ Option 1: Guard-band approach similar to that for FCC.
		- Option 1a: 200 kHz guard-band at the edges of band 255
	+ Option 2: A-MPR approach.
	+ Option 3: Defining a new operating band for ETSI.
	+ Option 4: Modify Rel-18 IoT NTN WID to consider ETSI requirement
	+ Option 5: Check with ETSI if there is any possibility that ETSI can consider further aligning the emission limit with 3GPP SEM to improve the spectrum efficiency and utilization.
* Recommended WF
	+ TBA

**Issue 2-1-2: Do you agree that a 3GPP compliance IoT NTN device in Rel-17 can pass ETSI ACS but fail the ETSI IBB requirement?**

* Proposals
	+ Option 1: Yes.
	+ Option 2: No, need to further check
* Recommended WF
	+ Option 1?

**Issue 2-1-3: Do you agree that ETSI is not considered in 3GPP IoT NTN Release 17?**

* Proposals
	+ Option 1: Yes.
	+ Option 2: No, need to further check
* Recommended WF
	+ Option 1?

**Issue 2-1-3: Do you agree that it is up to 3GPP IoT NTN Release 17 to comply ETSI requirements?**

* Proposals
	+ Option 1: Yes.
	+ Option 2: No, need to further check
* Recommended WF
	+ Option 1?

### Sub-topic 2-2

*Sub-topic description: this sub-topic discusses whether or not an LS should be sent to ETSI*

*Open issues and candidate options before meeting:*

**Issue 2-2-1: Should RAN4 send an LS to ETSI on describing the discrepancy between ETSI and 3GPP for band 255 and how to handle the discrepancy?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ Option 1?

**Issue 2-2-2: If the answer to Issue 2-3-1 is Yes, is content of Annex in R4-2309274 agreeable?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No, please suggest your revision.
* Recommended WF
	+ TBA