3GPP TSG-RAN WG4 Meeting # 104-e [draft] R4-221xxxx

Electronic Meeting, 15th – 26th August, 2022

**Title: [Draft] Way forward on NB-IoT/eMTC NTN agenda item 12.5.1 & 12.5.4**

**Agenda Item: 12.5.6**

**Source: MediaTek Inc.**

**Document for: Discussion in GTW**

# Introduction

This document highlights aspects that the moderator believes can be approved, and other aspects for further discussion.

Items in highlighted in yellow would benefit from GTW time, as well as general approval of the UE RF requirements that are not marked in red.

1. Discussion

## 2.1 Topic#1: Work Plan and Scope

**Sub-topic #1-1**

**Issue 1-1-1: Work Plan**

Moderator Proposal: Work plan to be endorsed from RF side, but the rapporteur understands there are a few minor comments from the RRM session, so will need a revision.

**Issue 1-1-2: Way of working**

Moderator Proposal:Not to further discuss the separation of work between NB1/2 and cat-M1 at this stage, unless a specific problem is identified with WI progress.

**Sub-topic #1-2**

**Issue 1-2-1: Deployment scenario (standalone vs other operating modes)**

Moderator Proposal: Agree to focus the WI requirements work on the standalone deployment scenario for NB-IoT and cat-M1 operation.

## 2.2 Topic#2: Specification drafting general aspects

**Sub-topic#2-1**

**Issue 2-1-1: 36.102 UE spec drafting approach**

Moderator Proposal: Agree Option 1: For TS36.102, follow NR NTN approach, with same overall requirement framework and referencing 36.101 where requirements from 36.101 apply to 36.102 and are not band-specific. If not, then include requirement in new TS.

**Issue 2-1-3: UE spec structure**

A slight majority view to follow Option 1 (Suffix approach). Some support for a non-suffix approach.

Moderator Proposal: Suggest moving forward with Option 1 for now. As we become more familiar with the spec contents it should be very straightforward to adapt to a non-suffix approach if the opinion of the group changes. Do not include general and additional requirements in clause 4 text for these UE categories.

**Issue 2-1-4: TS36.102 skeleton approval**

Moderator Proposal: Modify the TS skeleton in R4-2211778 to:

* Add Scope
* Remove blue text from template.
* Remove square brackets from clauses.
* Allocate clause 4.3 as “reserved” in accordance with topic 2-1-3 outcome.
* Clause 5.4.2 – keep editor’s note.

**Sub-topic#2-1**

**Issue 2-2-1: SAN spec structure**

Moderator proposal: Agree option 1: Adopt TS38.108 structure as baseline approach for E-UTRA SAN spec independently of whether NB-IoT OTA requirements are included.

**Issue 2-2-2: Create a 37 series SAN spec to replace the already agreed 36 series SAN specification**

Moderator proposal: No consensus was reached, and further discussion needed. If a 37 series spec was adopted, the scope of work should be limited to single RAT E-UTRA requirements to align with current WI scope.

**Issue 2-2-3: 36.108 SAN skeleton approval**

Moderator proposal: Agree on the draft skeleton provided by TS rapporteur in [**R4-2213694**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213694.zip)

2.3 Topic#3: UE RF requirements

Moderator proposal: items in the table with a single option are proposed to be agreed. Items in red require further contribution or discussion. Items highlighted in yellow require specific attention in GTW.

|  |  |
| --- | --- |
| **Requirement clause** | **Moderator Proposal for each item (items highlighted suggested for specific attention in GTW)** |
| Clause 6: Transmitter Characteristics |  |
| 6.1: General | Option 1: Reuse TN (cat-M1 and NB1/2 relevant aspects) |
| 6.2.1: Tx power | Option 2: Power class 3 and 5 as defined for TN for **all** categories |
| 6.2.2: MPR | Option 1: Depends on outcome of SEM/ACLR discussion |
| 6.2.3: A-MPR | Further discussion needed. Options for all categories were:  For b255   * Option 1: Depends on outcome of SEM/ACLR discussion and spurious emission for UE coexistence. * Option 2: Reuse n255 and n256 requirements from NR NTN * Option 3: Already clear that A-MPR is not needed.   For b256   * Option 1: Depends on outcome of SEM/ACLR discussion and spurious emission for UE coexistence. * Option 2: Reuse n255 and n256 requirements from NR NTN * Option 3: Already clear that A-MPR is not needed. |
| 6.2.4: Configured Tx power | Option 1: Reuse TN requirements for **all** categories |
| 6.3: Output Power Dynamics |  |
| 6.3.1 Minimum output power | Option 1: Reuse TN requirements for **all** categories |
| 6.3.2 OFF power | **All categories:** Option 1: Reuse TN requirements |
| 6.3.3 Transmit ON/OFF mask | **Cat-M1:** Options for further discussion:  Option 1: Reuse TN requirements, and sTTI is applicable  Option 2: Reuse TN requirements, but sTTI not applicable |
| **NB1/2:** Option 1: Reuse TN requirements |
| 6.3.4 Power control | Option 1: Reuse TN requirements for **all** categories |
| 6.4: Transmit signal quality |  |
| 6.4.1: Frequency error | Expected to use same requirement values for all categories, but NR NTN approach to frequency error needs to stabilize. Further contribution invited. |
| 6.4.2: Transmit modulation quality | **Cat-M1:** Option 1: Reuse TN, but clarity on modulation orders needed. |
| **NB1/2:** Option 1: Reuse TN (not beyond Rel-16 modulation schemes in line with WID) |
| 6.5: Output RF spectrum emissions |  |
| 6.5.1: Occupied bandwidth | **All categories:** Option 1: Reuse TN |
| 6.5.2: Out of band emission |  |
| 6.5.2.1: SEM | **All categories:** Option 1: Assume TN as baseline, and reconfirm after coexistence verification |
| 6.5.2.2: Additional SEM | Option 1: For **all** categories and bands, this is not applicable. |
| 6.5.2.3: ACLR | Option 1: For **all** categories, wait for coexistence verification outcome |
| 6.5.3: Spurious emission |  |
| 6.5.3.1: Minimum requirements | Option 1: Reuse TN for **all** categories |
| 6.5.3.2: For UE co-existence | Option 1: Further contribution needed but consider NR NTN and existing E-UTRA TN as baselines. |
| 6.5.3.3 Additional spurious emissions |  |
| 6.6: Transmit intermodulation | **Cat-M1:** Further discuss between:   * Option 1: Requirement needs to be defined for 1.4MHz channel bandwidth * Option2: Not applicable for cat-M1 |
| **NB1/2:** Option 1: Reuse TN |
| 7.1: General | Option 1: Reuse TN |
| 7.2: Diversity characteristics | Option 1: Reuse aspects applicable for Cat-M1 and NB1/2 In TN |
| 7.3: Reference sensitivity | **Cat-M1 (1.4MHz):**  Different proposals discussed including reference to equivalent existing TN bands such as b24 and b65, to referring to a bandwidth-scaled version of n255 and n256.  More structured input needed here. |
| **NB1/2:** Option 1:Reuse TN (-108.2dBm for both bands) |
| 7.4: Maximum input level | Option 1: Same relative relaxation (15dB) as for NR NTN for **all** categories  Needs to be confirmed by further analysis. |
| 7.5: ACS | Option 1: Depends on outcome of coexistence verification for **all** categories |
| 7.6: Blocking characteristics |  |
| 7.6.1: In-band blocking | **All categories:** Option 1: Reuse TN |
| 7.6.2: Out-of-band blocking | **Cat-M1**:  For b255: Option 1: reuse TN (some ambiguity in the responses here)  For b256: Option 2: wait for NR NTN outcome in RAN4#104-e. |
| **NB1/2**:  For b255: Option 1: reuse TN (some ambiguity in the responses here)  For b256: Option 2: wait for NR NTN outcome in RAN4#104-e. |
| 7.6.3: Narrow band | **Cat-M1:** Option 1: Reuse TN |
| **NB1/2:** Option 1: Not applicable (as for TN) |
| 7.7: Spurious response | **All categories:** Option 1: Reuse TN |
| 7.8: Intermodulation | **All categories:** Option 1: Reuse TN |
| 7.9: Spurious emissions | Option 1: Reuse TN for **all** categories |

# References

[1] xxxxxxxxxxxxxxx