3GPP TSG-RAN WG2 Meeting #131 R2-250xxxx

Bangalore, India, 25th – 29th August, 2025

**Agenda item: 8.17.1**

**Source: Samsung**

**Title: Report of [Post130][314][IoT NTN TDD] capability CR (Samsung)**

**WID/SID: IoT\_NTN\_TDD**

**Document for: Discussion and Decision**

# Introduction

The following document includes a list of open issues in IoT NTN TDD mode [1] according to the following email discussion:

* [Post130][314][IoT NTN TDD] capability CR (Samsung)

 Scope: discuss the running capability CR

 Intended outcome: Endorsed CR and list of remaining open issues

 Deadline: long

In this e-mail discussion we try to resolve and identify some open issues related to capabilities in IoT NTN TDD.

# Open issues

RAN1 has agreed a first version of the capabilities in R1-2504676 [2]. This can be seen in the Annex A.

**Open issue CAP-1:** IoT NTN TDD mode capability type

RAN2 has yet to discuss the general IoT NTN TDD mode capability type. For the general IoT NTN capability, it was agreed in Release 17 that it is a capability with signalling.

In the LS R1-2504676, RAN1 has indicated that the IoT NTN TDD mode capability shall be optional without capability signalling. However RAN1 has also indicated that the UE supporting band 249 must support this FG, where the supported bands will be indicated as part of the UE capabilities in *supportedBandList-r13*. Since this feature must be supported based on a signalled feature, it can also be viewed as a conditionally mandatory feature dependent on support of band n249.

RAN2 should thus decide whether the capability is a 1) signalled capability, 2) optional capability without signalling or 3) conditionally mandatory feature dependent on support of band n249.

**Rapporteur proposed resolution:**

To follow the intention of RAN1, rapporteur believes that the correct implementation is that it should be a conditionally mandatory feature. This is because IoT NTN TDD is only supported in band n249 and that the UE needs support IoT NTN TDD mode operation to support n249. This is typically not the case for features that are optional without capability signalling. As this is rapporteur proposed resolution, this has already been implemented as part of the draft 36.306.

**How should the general IoT NTN TDD mode capability be implemented in 36.306?**

|  |  |  |
| --- | --- | --- |
| **Company** | **1) conditionally mandatory (as in draft CR) 2) optional cap without signalling 3) Signalled capability, 4) other** | **Comments** |
| vivo | 1. or 2)
 | No strong view either way. |
| Qualcomm | 2) | Current text in CR may be confusing whether it is optional (not mandatory) for other bands.Accessing cell is implicit indication of support of NB-IoT tDD mode and it can happen from IDLE mode before UE can report its capability.We could just clarify what RAN1 has added in the note. |
| Iridium | 1) | conditionally mandatory seems approporate here. |
| Apple | Slightly prefer 2) | Though the effect of two options is the same, we prefer using RAN1 agreement and add some statement to reflect that UE is mandatory to support this feature if it supports band n249. |

Summary:

There is a roughly equal split on whether to introduce a conditionally mandatory or optional capability without signalling. The views on optional capability signalling has to do with following RAN1 agreement and also that it may be confusing whether it is optional for other bands.

Rapporteur also notes that there are not a lot of companies commenting, thus we believe that it can be discussed and resolved quickly in F2F meeting. Rapporteur will add an editors note in the current CR for now.

**Proposal 1: On the general IoT NTN TDD mode capability, RAN2 to decide on type of capability:
 - Conditionally mandatory (as in draft CR)
 - Optional capability without signalling**

# Other identified open issues

Companies are invited to describe any other identified open issues that have not been identified yet. For smaller issues such as editorials or dependencies etc, please comment directly on the 36.306 draft CR.

|  |  |
| --- | --- |
| **Company** | **Issues** |
| vivo | The capability components do not yet capture the RAN2-related functions, e.g., postponement of PUR transmissions in non-U NB-IoT subframes and SI transmissions in non-D NB-IoT subframes.[Rapp] This is a good point. We added this directly to the CR, so we will not add it as an open issue. |
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Summary:

No identified open issues. Issues were resolved directly in the draft CR.

# Conclusion

In this contribution, we have the following proposals/open issue list:

[May need some discussion – but not controversial]

**Proposal 1: On the general IoT NTN TDD mode capability, RAN2 to decide on type of capability:
 - Conditionally mandatory (as in draft CR)
 - Optional capability without signalling**

# Reference

1. RP-243293, Revised WID for introduction of IoT NTN TDD mode, Iridium Satellite LLC, RAN#106, Madrid, Spain, December 2024.
2. R1-2504676, Updated RAN1 UE features list for Rel-19 LTE after RAN1 #121, RAN1, St. Julians, Malta, May, 2025.

# Annex A – RAN1 feature list

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Features** | **Index** | **Feature group** | **Components** | **Prerequisite feature groups** | **Need for the eNB to know if the feature is supported** | **Need for the UE to know if the feature is supported (only for V2X WI, where the PC5-RRC capability signalling is delivered between the UEs)** | **Consequence if the feature is not supported by the UE** | **Type****(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | **Need of FDD/TDD differentiation** | **Capability interpretation for mixture of FDD/TDD** | **Note** | **Mandatory/Optional** |
| 2. IoT\_NTN\_TDD | 2-1 | Support of IoT-NTN TDD mode | 1. Support a TDD pattern with periodicity of N=9 radio frames, which consists of D=8 contiguous DL subframes and U=8 contiguous UL subframes. The guard period between the end of the DL subframes and the beginning of the UL subframes is fixed to be 50 ms at the ULSRP2. The DL subframes of pattern are fixed to subframes [3 4 5 6 7 8 9 0] across two consecutive radio frames.3. The non-U NB-IoT subframes are not considered by the UE as “NB-IoT UL subframes”4. The non-D NB-IoT subframes are not considered by the UE as “NB-IoT DL subframes”5. Support NPSS/NSSS/NPBCH/SIB1-NB transmissions dropped in non-D NB-IoT subframes6. Postponement of NPRACH transmissions in non-U NB-IoT subframes until the next U NB-IoT subframe(s), where the unit of postponement is one PRU.7. Support of NPRACH periodicities of 90ms and 180ms, instead of 40ms and 80ms | Rel-17 2-1b | Yes | N/A | IoT-NTN TDD mode is not supported | n/a | [TDD only] | [N/A] | Applicable only for 1616-1626.5 MHz MSS allocated bandNote: UE supporting band 249 must support this FGNote: Rel-17 2-1b as prerequisite FG doesn’t imply the UE supporting this FG must support IoT NTN FDD band | Optional without capability signalling |