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

**Bangalore, India, 25-29 August 2025**

**Agenda Item: 8.17**

**Source: Toyota ITC**

**Title: IoT- NTN TDD open issues in MAC CR (Toyota ITC)**

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

**Document for: Discussion and Decision**

# 1 Introduction

This document includes a list of open issues related to MAC for IoT-NTN TDD Rel-19 WI [1], according to the following email discussion:

* [Post130][312][IoT NTN TDD] MAC CR (Toyota)

 Scope: discuss the running MAC CR

 Intended outcome: Endorsed CR and list of remaining open issues

**Deadline:** Long

Please provide your input no later than August 7th, 08:00 UTC.

# 2 Contact information

Please provide your contact information in the table below.

|  |  |  |
| --- | --- | --- |
| **Company** | **Name** | **Email** |
| Toyota ITC | Claude ArzelierKai-Erik Sunell | claude.arzelier@toyota.comerik.sunell@toyota.com |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

# 3 Issues

## 3.1 Issue 1

In the random access reception subclause in subclause 5.1.4, the subframes between preamble transmission and RA Response Window in NB-IoT are defined in Table 5.1.4-1 as below:

Table 5.1.4-1: Subframes between preamble transmission and RA Response Window in NB-IoT

|  |  |  |  |
| --- | --- | --- | --- |
| TDD/FDD mode | Preamble format | Number of NPRACH repetitions | X  |
| FDD | 0 or 1 | >= 64 | 41 |
| FDD | 0 or 1 | < 64 | 4 |
| FDD | 2 | >= 16 | 41 |
| FDD | 2 | < 16 | 4 |
| TDD | Any | Any | 4 |

It needs to be confirmed if the number of NPRACH repetitions ‘Any’ applies to IoT-NTN TDD mode.

Proposal: The number of NPRACH repetitions ‘Any’ applies to IoT-NTN TDD mode. Companies to provide their views on this. In case of disagreement, please provide suggestion.

|  |  |
| --- | --- |
| **Company** | **Comments on the proposal for issue 1** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

## 3.2 Issue 2

In the random access reception subclause in subclause 5.1.4, for NB-IoT UEs operating in TDD mode, the RA-RNTI associated with the PRACH in which the Random Access Preamble is transmitted, is computed as:

RA-RNTI = 1 + floor(SFN\_id/4) + 256\*(H-SFN mod 2)

where SFN\_id is the index of the first radio frame of the specified PRACH and H-SFN is the index of the first hyper frame of the specified PRACH. The PDCCH transmission and the PRACH resource are on the same carrier.

It needs to be confirmed if this formula applies to IoT-NTN TDD mode.

Option 1: The formula above for the RA-RNTI associated with the PRACH in which the Random Access Preamble is transmitted is correct.

Option 2: The formula above for the RA-RNTI associated with the PRACH in which the Random Access Preamble is transmitted needs to be updated..

Proposal: Companies to provide their views between option 1 and option 2. In case of option 2, please provide suggestion.

|  |  |
| --- | --- |
| **Company** | **Opinion between Option 1 or Option 2** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

## 3.3 Issue 3

The PRACH Mask Index values are defined in Table 7.3-1 in subclause 7.3 as follows:

Table 7.3-1: PRACH Mask Index values

|  |  |  |
| --- | --- | --- |
| PRACH Mask Index | Allowed PRACH (FDD) | Allowed PRACH (TDD) |
| 0 | All | All |
| 1 | PRACH Resource Index 0 | PRACH Resource Index 0 |
| 2 | PRACH Resource Index 1 | PRACH Resource Index 1 |
| 3 | PRACH Resource Index 2 | PRACH Resource Index 2 |
| 4 | PRACH Resource Index 3 | PRACH Resource Index 3 |
| 5 | PRACH Resource Index 4 | PRACH Resource Index 4 |
| 6 | PRACH Resource Index 5 | PRACH Resource Index 5 |
| 7 | PRACH Resource Index 6  | Reserved |
| 8 | PRACH Resource Index 7 | Reserved |
| 9 | PRACH Resource Index 8 | Reserved |
| 10 | PRACH Resource Index 9 | Reserved |
| 11 | Every, in the time domain, even PRACH opportunity1st PRACH Resource Index in subframe | Every, in the time domain, even PRACH opportunity1st PRACH Resource Index in subframe  |
| 12 | Every, in the time domain, odd PRACH opportunity1st PRACH Resource Index in subframe | Every, in the time domain, odd PRACH opportunity1st PRACH Resource Index in subframe |
| 13 | Reserved | 1st PRACH Resource Index in subframe |
| 14 | Reserved | 2nd PRACH Resource Index in subframe |
| 15 | Reserved | 3rd PRACH Resource Index in subframe |

It needs to be confirmed if the Allowed PRACH values defined for TDD apply to IoT-NTN TDD mode.

Option 1: The Allowed PRACH values defined for TDD apply to IoT-NTN TDD mode.

Option 2: The Allowed PRACH values defined for TDD apply need to be updated for IoT-NTN TDD mode.

Proposal: Companies to provide their views between option 1 and option 2. In case of option 2, please provide suggestion.

|  |  |
| --- | --- |
| **Company** | **Opinion between Option 1 or Option 2** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

# 4 Summary

Based on the discussion above, the following is a list of MAC-related open issues recommended for discussion at the August RAN2#131 meeting.

***<placeholder to fill after discussion>***

# 5 References

[1] RP-243293, “Revised WID for the introduction of IoT NTN TDD mode”, Iridium Satellite LLC, RAN#106, Madrid, Spain, December 2024.