**3GPP TSG-RAN WG4 Meeting # 106bis-e R4-2306556**

**Online, April 17 – April 26, 2023**

**Agenda item:** 6.5

**Source:** Inmarsat

**Title:** WF on IoT NTN Extended L-band

**Document for:** Approval

# System Parameters

**Issue 1-1: Operating Bands and Band numbering**

 *Candidate options:*

* Option 1: The Extended L-band should be numbered as Table 2.1-1.

Table 2.1-1: E-UTRA operating bands for satellite access

|  |  |  |  |
| --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating bandBS receiveUE transmit | Downlink (DL) operating bandBS transmit UE receive | Duplex Mode |
| FUL\_low – FUL\_high | FDL\_low – FDL\_high |
| [253] | 1668 MHz | – | 1675 MHz | 1518 MHz | – | 1525 MHz | FDD |
| NOTE: Satellite bands are numbered in descending order from 256 |

* Option 2: Further discuss frequency range after further checking of the ECC report.

MODERATOR NOTE: The Extended L-band frequency range for UL and DL has been agreed as part of WID approval in RAN#99

*Tentative agreements:*

Agree on Band 253 as the band numbering.

***Recommended WF:***

* Considering WID agreement in RAN#99 and views from companies, agree on the frequency range in Option 1, but encourage companies to further check ECC Report 263.

**Issue 1-2: Channel numbering, Channel Raster and EARFCN**

***Tentative Agreement:***

* Postpone discussion of Channel Numbering, Channel Raster and EARFCN after other system parameters are more stable.

**Issue 1-3: Default UE TX-RX separation**

*Candidate options:*

Proposal:

* Option 1: Agree on Default TX-RX separation of -150 MHz
* Option 2: Further discuss Default TX-RX separation

***Recommended WF****:*

* Consider if Option 1 can be agreed as a starting point, pending further checking of the frequency range.

**Issue 1-4: Compliance with ECC recommendations**

*Candidate options:*

* Option 1: Evaluate the LTE NB1, NB2, and M1 blocking specification to determine if it complies with the ECC assumption for enhanced performance

*Recommended WF:*

* Companies to further check ECC Report 263 and evaluate, based on current blocking requirements for NB1, NB2 and M1, whether additional blocking requirements need to be considered.

#  UE RF Requirements

**Issue 2-1: UE Maximum Output Power**

*Candidate options:*

* Option 1: Reuse existing UE Maximum Output Power requirements from 36.102 at least as a starting point for further discussion, for category M1 and NB1/NB2, 23dBm with +/-2dB tolerance (Mediatek)
* Option 2: For the Extended L-band, the UE maximum output power for category M1 and category NB1 and NB2 can be specified in Table 2.5-1 and 2.5-2, respectively (ZTE)

**Table 2.5-1: UE Power Class for category M1**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **EUTRA band** | **Class 2****(dBm)** | **Tolerance****(dB)** | **Class 3 (dBm)** | **Tolerance (dB)** | **Class 5 (dBm)** | **Tolerance (dB)** |
| [253] |  |  | 23 | +/-2 | 20 | +/-2 |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance. |

**Table 2.5-2: UE Power Class for category NB1 and NB2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **EUTRA band** | **Class 3 (dBm)** | **Tolerance (dB)** | **Class 5 (dBm)** | **Tolerance (dB)** |
| [253] | 23 | +/-2 | 20 | +/-2 |

MODERATOR NOTE: One company expressed skepticism on inclusion of PC5. However other companies have expressed interest in keeping PC5, which is also currently supported by other NTN bands.

***Recommended WF****:*

* Agree Option 2

**Issue 2-2: MPR**

***Tentative agreement:***

* Reuse existing MPR requirements from 36.102 at least as a starting point for M1 and NB1/NB2. Different MPR tables for category M1 and NB1/NB2 separately

**Issue 2-5: Transmission bandwidth for eMTC**

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| --- | --- |
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***Tentative Agreement:***

* For the Extended L-band, use UE channel bandwidth and transmission bandwidth configuration for eMTC NTN UL operation defined in Table 2.2-1 below.

Table 2.2-1: Transmission bandwidth configuration NRB in E-UTRA channel bandwidths

|  |  |
| --- | --- |
| Channel bandwidth BWChannel [MHz] | 1.4 |
| Transmission bandwidth configuration NRB | 6 |

**Issue 2-3: A-MPR**

***Tentative Agreement:***

* Further discuss whether A-MPR requirements are needed.

**Issue 2-4: Spurious emissions & additional spurious emissions**

***Tentative Agreement:***

* Further discuss spurious emissions requirements.

**Issue 2-6: Transmission bandwidth for NB-IoT**

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| --- | --- |
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***Recommended WF:***

* For the Extended L-band, use UE channel bandwidth and transmission bandwidth configuration for NB-IoT NTN UL operation defined in Table 2.2-2 below as a starting point.

Table 2.2-2: Transmission bandwidth configuration *N*RB, *N*tone 15kHz and *N*tone 3.75kHz in NB1 and NB2 channel bandwidth

|  |  |
| --- | --- |
| Channel bandwidth BWChannel [kHz] | 200 |
| Transmission bandwidth configuration *N*RB | 1 |
| Transmission bandwidth configuration *N*tone 15kHz | 12 |
| Transmission bandwidth configuration *N*tone 3.75kHz  | 48 |

**Issue 2-7: In-band blocking**

*Candidate options:*

* Option 1: Reuse existing In-band blocking requirements from 36.102 at least as a starting point for further discussion, if there is no specific concern. Different band group may have different In-band blocking tables for category M1 and NB1/NB2 separately. (Mediatek)
* Option 2: Further discuss in-band blocking requirements

***Recommended WF****:*

* Consider in-band blocking requirements from 36.102 as a starting point for further discussion, pending clarifications on system parameters.

**Issue 2-8: Out-of-band blocking**

*Candidate options:*

* Option 1: Consider reusing basic Out-of-band blocking requirements for the UE as a starting point, and further discuss any additional blocking requirements based on ECC Recommendations and ETSI requirements for the 1518 MHz DL band edge
* Option 2: Further discuss out-of-band blocking requirements

*Recommended WF:*

* Agree Option 1.

**Issue 2-11: Draft running CR for TS 36.102**

*Tentative Agreement:*

* Postpone discussion of CRs to later meetings when agreement is reached on system parameters and general requirements.

# SAN RF Requirements

**Issue 4-1: Channel Bandwidth for eMTC NTN**

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| --- | --- |
|  |  |
|  |  |

*Tentative Agreement:*

* For the Extended L-band, use SAN channel bandwidth and transmission bandwidth configuration for eMTC NTN operation defined in Table 2.2-1 below as a starting point, and further discuss to align with UE.

Table 2.2-1: Transmission bandwidth configuration NRB in E-UTRA channel bandwidths

|  |  |
| --- | --- |
| Channel bandwidth BWChannel [MHz] | 1.4 |
| Transmission bandwidth configuration NRB | 6 |

**Issue 4-2: Channel Bandwidth for NB-IoT NTN**

|  |  |
| --- | --- |
|  |  |
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*Tentative Agreement*:

* For the Extended L-band, use SAN channel bandwidth and transmission bandwidth configuration for NB-IoT NTN operation should defined in Table 2.2-2 as a starting point and further discuss to make sure it is aligned with agreements on the UE side.

Table 2.2-2: Transmission bandwidth configuration *N*RB, *N*tone 15kHz and *N*tone 3.75kHz in NB1 and NB2 channel bandwidth

|  |  |
| --- | --- |
| Channel bandwidth BWChannel [kHz] | 200 |
| Transmission bandwidth configuration *N*RB | 1 |
| Transmission bandwidth configuration *N*tone 15kHz | 12 |
| Transmission bandwidth configuration *N*tone 3.75kHz  | 48 |

**Issue 4-3: Draft running CR for TS 36.108**

*Tentative Agreement:*

* Postpone discussion of CRs to later meetings when agreement is reached on system parameters and general requirements.