**3GPP TSG-RAN WG4 Meeting # 107 R4-23XXXXX**

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

**Agenda item:** 9.5.6

**Source:** Moderator (Inmarsat)

**Title:** Draft Topic summary for [107][122] IoT\_NTN\_extLband

**Document for:** Information

# Introduction

This scope of the email thread [122] discussion is agenda items 6.5.1, 6.5.2, 6.5.3, 6.5.4 for making progress on WI IoT\_NTN\_extLband with topics below.

* Topic#1 General and Work Plan
* Topic#2 Band Definition and System Parameters
* Topic#3 UE RF Requirements
* Topic#4 SAN RF Requirements

The aim for the 1st round is to maximise agreement and common understanding on the above aspects.

It is appreciated that the delegates for this topic put their contact information in the table below.

Contact information

|  |  |  |
| --- | --- | --- |
| **Company** | **Name** | **Email address** |
| Inmarsat | Luca Lodigiani | Luca.lodigiani [at] inmarsat.com |
|  |  |  |

Note:

1. Please add your contact information in above table once you make comments on this email thread.
2. If multiple delegates from the same company make comments on single email thread, please add you name as suffix after company name when make comments i.e. Company A (XX, XX)

# Topic #1: General and Work Plan

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2309660 | Inmarsat | **Proposal: Agree the proposed workplan for the IoT NTN Extended L-band spectrum WI.**   1. RAN4#106bis (April 2023, electronic) (PAST)   - Discussion of General aspects.  - Initial identification of system and RF parameters for discussion and any issues, if any.  - Initial discussion on whether some system and RF parameters could be reused from the existing NTN and/or terrestrial bands.  2) RAN4#107 (May 2023, F2F)  - Agreement of general system and RF parameters.  - Further discussions on any system and RF aspects that need further technical analysis.  - Endorsement of draft running CRs capturing agreements made during the meeting.  3) RAN4#108 (August 2023, F2F)  - Further discussion and final agreement on any leftover system and RF parameters or aspects, in order to reach final conclusions.  - Approval of the CRs for the initial batch of core RF specifications  4) RAN4#108bis (October 2023, F2F)  - Finalisation of core system and RF parameters.  - Approval of the CRs for any remaining core RF specifications.  5) RAN4#109 (November 2023, F2F)  - Finalisation of remaining issues, if any.  - Approval of any leftover CRs, if any. |

## 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

*Work Plan.*

**Issue 1-1: Work plan for WI IoT\_NTN\_FDD\_LS\_band core part**

* Proposals
  + Option 1: Agree the proposed workplan for the IoT NTN Extended L-band spectrum WI:

|  |
| --- |
| 1. RAN4#106bis (April 2023, electronic) (PAST)   - Discussion of General aspects.  - Initial identification of system and RF parameters for discussion and any issues, if any.  - Initial discussion on whether some system and RF parameters could be reused from the existing NTN and/or terrestrial bands.  2) RAN4#107 (May 2023, F2F)  - Agreement of general system and RF parameters.  - Further discussions on any system and RF aspects that need further technical analysis.  - Endorsement of draft running CRs capturing agreements made during the meeting.  3) RAN4#108 (August 2023, F2F)  - Further discussion and final agreement on any leftover system and RF parameters or aspects, in order to reach final conclusions.  - Approval of the CRs for the initial batch of core RF specifications  4) RAN4#108bis (October 2023, F2F)  - Finalisation of core system and RF parameters.  - Approval of the CRs for any remaining core RF specifications.  5) RAN4#109 (November 2023, F2F)  - Finalisation of remaining issues, if any.  - Approval of any leftover CRs, if any. |

* + Option 2: Other
* Recommended WF
  + Agree Option 1.

# Topic #2: Band Definition and System Parameters

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2309506 | Qualcomm Incorporated | **Proposal: Option 5 is selected. Two bands are defined where one has interference protection by including a 3 MHz guard band in the extended L band and enhanced UE blocking (FFS). The second band does not include the interference mitigation mechanisms but enables usage of the full extended L band. A note is included in the 3GPP specification to indicate the risk for harmful interference, but the NTN operator is free to choose which band to deploy depending on needs and its ability to otherwise contain the risk.**   1. Option 5. Define two extended L bands – one with 3 MHz guard band and one without. UE blocking is specified according to ECC report 263 for the band with 3 MHz guard band. In this way, the operator can choose which band to deploy depending on whether coexistence with IMT is required. |
| R4-2309661 | Inmarsat | 1. **The MSS Extended L-band, 1518-1525 MHz (space-to-Earth) and 1668-1675 MHz (Earth-to-space), has long been used for Maritime and Aeronautical mission-critical safety and emergency services. This use of the band is expected to continue and grow, and progressively adopt more and more 3GPP NTN specifications.** 2. **ITU-R Recommendations and WRC Resolutions encourage administrations to consider additional frequency separation below 1518 MHz, with a total separation of different values up to 6 MHz, to protect existing MSS services starting from the 1518 MHz boundary.** 3. **ECC Reports 263, 299 and ECC Decision (17)06 note that the IMT block ends at 1517 MHz and stipulate a baseline guard band with MSS of 1 MHz in the 1517-1518 MHz range.** 4. **ECC Report 263 studies always assume IMT base stations operating at frequency offsets of 1, 3 and 6 MHz below 1518 MHz with the MSS MES operation starting from 1518 MHz, with a first 200 kHz channel at 1518.1 MHz, thereby no recommendation is made to introduce any guard band within the MSS band.** 5. **ECC Report 299 recommends even further PFD limits on base stations operating in the frequency band ending at 1517 MHz to provide additional protections to MSS terminals operating in airports and seaports.** 6. **From previous observations, we can conclude that the introduction of any guard band in the new NTN Extended L-band is not aligned with regulation, and moreover not warranted.** 7. **Agree specification of NTN Extended L-band DL frequency range from 1518-1525 MHz, in line with ITU-R, WRC and country regulations, as per table below.**   Table 2.1-1: E-UTRA operating bands for satellite access   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS 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 | | | | | | | |  1. **For coexistence purposes, and at least for Region 1, consider the assumption of Terrestrial deployments ending not further than 1517 MHz.** 2. **Although not a requirement, assumptions from TR 38.863 can be reused as a baseline working assumption when considering System Parameters and UE RF requirements. This could include assuming at least a 1500m separation distance of an NTN UE from nearest TN base station operating near the adjacent band.** 3. **Location-based frequency assignment mechanisms can be used by the network to assign DL frequencies to NTN UE appropriately in order to minimize interference. Additionally or alternatively, interference measurement and mitigation techniques can be used by the network and UE to detect and mitigate interference. These methods can be left to operator’s deployment and do not require additional specification.** 4. **Specify additional optional NS values to allow NTN operators to specify additional blocking requirements if, when and where needed, on a per-deployment basis. Different NS values can be later on specified on a country by country basis to address regional or country-specific requirements.** 5. **Agree on Default TX-RX separation of -150 MHz** |

## Open issues summary

### Sub-topic 2-1

*Band Definition, including overall frequency range.*

**Issue 2-1-1: Band Defintion**

* Proposals
  + Option 1: Two bands are defined where one has interference protection by including a 3 MHz guard band in the extended L band and enhanced UE blocking (FFS). The second band does not include the interference mitigation mechanisms but enables usage of the full extended L band. A note is included in the 3GPP specification to indicate the risk for harmful interference, but the NTN operator is free to choose which band to deploy depending on needs and its ability to otherwise contain the risk. (Option 5 from R4-2309506, N.D.M.).
  + Option 2: Agree specification of NTN Extended L-band DL frequency range from 1518-1525 MHz, in line with ITU-R, WRC and country regulations, as per table below.

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS 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 | | | | | | | |

* Recommended WF
  + TBA

**Issue 2-1-2: Default TX-RX Separation**

* Proposals
  + Option 1: Agree on Default TX-RX separation of -150 MHz
  + Option 2: Other
* Recommended WF
  + TBA

### Sub-topic 2-2

*General co-existence aspects for consideration. The following issues group a number of proposals on co-existence aspects for consideration in definition of the requirements. There is some overlap with some issues in Sub-topic 3-3*

**Issue 2-2-1: General co-existence aspects**

Proposals

* + Proposal 1 (Inmarsat): For coexistence purposes, and at least for Region 1, consider the assumption of Terrestrial deployments ending not further than 1517 MHz.
  + Proposal 2 (Inmarsat): Although not a requirement, assumptions from TR 38.863 can be reused as a baseline working assumption when considering System Parameters and UE RF requirements. This could include assuming at least a 1500m separation distance of an NTN UE from nearest TN base station operating near the adjacent band.
  + Proposal 3 (Inmarsat): Location-based frequency assignment mechanisms can be used by the network to assign DL frequencies to NTN UE appropriately in order to minimize interference. Additionally or alternatively, interference measurement and mitigation techniques can be used by the network and UE to detect and mitigate interference. These methods can be left to operator’s deployment and do not require additional specification
  + Proposal 4 (Inmarsat): Specify additional optional NS values to allow NTN operators to specify additional blocking requirements if, when and where needed, on a per-deployment basis. Different NS values can be later on specified on a country by country basis to address regional or country-specific requirements.
* Recommended WF:
  + Companies are encouraged to comment on the individual proposals and provide their views
    - Note: There is some overlap with some issues in Sub-topic 3-3, if companies agree we can merge sub-topics.

# Topic #3: UE RF Requirements

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2308590 | ZTE Corporation | **Observation 1:** For the extended L-band, the introduction of Isolation distance and/or frequency separation can be used to suppress the interference between TN band and NTN band and most receiver characteristics can be reused.  **Observation 2:** For the extended L-band, without considering Isolation distance and frequency separation, the receiver performance may be significantly affected and most receiver characteristics can not be reused.  **Proposal 1:** For the extended L-band, the introduction of Isolation distance and/or frequency separation with most receiver characteristics reused are slightly preferred.  **Proposal 2:** The Extended L-band should be defined as Table 2.2-1.  Table 2.2-1: E-UTRA operating bands for satellite access   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode | | FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | | | [253] | 1668 MHz | – | 1675 MHz | 1521 MHz | – | 1525 MHz | FDD | | NOTE: Satellite bands are numbered in descending order from 256 | | | | | | | |   **Proposal 3:** For the Extended L-band, the channel raster, carrier frequency and EARFCN can be defined as Table 2.3-1.  Table 2.3-1: E-UTRA channel numbers   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | E-UTRA Operating  Band | ΔFRaster (kHz) | Downlink | | | Uplink | | | | FDL\_low (MHz) | NOffs-DL | Range of NDL  (First – <Step size> – Last) | FUL\_low (MHz) | NOffs-UL | Range of NUL  (First – <Step size> – Last) | | [253] | 100 | 1521 | 228531 | 228531-<1>-228570 | 1668 | 261269 | 261269-<1>-261338 | | NOTE 1: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7 channel numbers at the lower operating band edge and the last 6 channel numbers at the upper operating band edge shall not be used for channel bandwidth of 1.4 MHz. | | | | | | | |   **Proposal 4:** For the extended L-band, the spurious emissions requirements of TS36.102 can be reused as a starting point.  **Proposal 5:** For the extended L-band, the UE co-existence emission requirements for band 255 can be reused as starting point.  **Proposal 6:** For the extended L-band, the reference sensitivity level for eMTC NTN can be defined as Table 2.5-1 and the reference sensitivity level for NB-IoT can be defined as Table 2.5-2.  Table 2.5-1: Reference sensitivity for FDD UE category M1 QPSK PREFSENS   |  |  |  | | --- | --- | --- | | NTN Band | REFSENS (dBm) | Duplex Mode | | [253] | -102.7 | FDD | | NOTE 1: The transmitter shall be set to PUMAX as defined in subclause 6.2.5- in TS 36.101. | | |   Table 2.5-2: Reference sensitivity for UE category NB1 and NB2   |  |  | | --- | --- | | Operating band | REFSENS [dBm] | | According to subclause 5.2B in TS 36.102 | - 108.2 |   **Proposal 7:** For the extended L-band, the out-of-band blocking for eMTC NTN can be defined as Table 2.6-1 and the out-of-band blocking for NB-IoT can be defined as Table 2.6-2.  Table 2.6-1: Out of-band blocking for category M1 UE   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Operating Band | Parameter | Unit | Range 1 | Range 2 | Range 3 | |  | Pinterferer | dBm | -44 | -30 | -15 | | [253] | Finterferer (C`W) | MHz | -60 < f – FDL\_low < -15  or  15 < f – FDL\_high < 60 | -85 < f – FDL\_low ≤ -60  or  60 ≤ f – FDL\_high < 85 | 1 ≤ f ≤ FDL\_low – 85  or  FDL\_high + 85 ≤ f  ≤ 12750 | | NOTE 1: Band 256 lower frequency ranges are modified to enable specific implementations. | | | | | |   Table 2.6-2: Out-of-band blocking parameters for category NB1 and NB2 UE   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Operating Band | Parameter | Unit | Range 1 | Range 2 | Range 3 | | Pw | dBm | REFSENS + 6 dB | | | | Pinterferer | dBm | -44 | -30 | -153 | | [253] | Finterferer (CW) | MHz | -60 < f – FDL\_low < -15  or  15 < f – FDL\_high < 60 | -85 < f – FDL\_low ≤ -60  or  60 ≤ f – FDL\_high < 85 | 1 ≤ f ≤ FDL\_low – 85  or  FDL\_high + 85 ≤ f  ≤ 12750 | | NOTE 1: The transmitter shall be set to 4dB below PCMAX\_L at the minimum uplink configuration specified in Table 7.3.1-2 in TS 36.101 [7] with PCMAX\_L as defined in subclause 6.2.5.  NOTE 2: Band 256 lower frequency ranges are modified to enable specific implementations.  NOTE 3: For operating bands which downlink band frequency range is between 1475.9 MHz < f < 2690 MHz the power level of the interferer (PInterferer) for Range 3 shall be modified to: -20 dBm for the frequency range which is bounded by FDL\_low- 200 MHz of the lowest band that UE supports in frequency range 1475.9 MHz < f < 2690 MHz and FDL\_high + 200 MHz of the highest band that UE supports in frequency range 1475.9 MHz < f < 2690 MHz.”  NOTE 4: The power level of the interferer (PInterferer) for Range 3 shall be modified to -20 dBm for FInterferer > 2800 MHz and FInterferer < 4400 MHz. | | | | | | |
| R4-2308591 | ZTE Corporation | **Draft CR to TS36.102 Introduction of the Extended L-band** |
| R4-2309507 | Qualcomm Incorporated | **Proposal: The UE blocking specifications for extended L-band (Band [253]) shall take into account the findings of ECC Report 263.**  **Observation: The blocking requirements considered in this paper assume at least 3 MHz frequency separation between IMT and MSS. In the absence of such frequency separation, the blocking requirements considered in this paper will be inadequate to facilitate coexistence between IMT and MSS in accordance with ECC Report 263.**  **Proposal: It is proposed to evaluate the feasibility of the blocker requirement as described above.**   * ***MODERATOR NOTE: “Above” Refers to requirements described in the body of R4-2309507, full text omitted for sake of readability.*** |
| R4-2309721 | Inmarsat | **Observation 1: Although the initial focus proposed in the WID was Region 1 [1], the MSS Extended L-band broadly has worldwide applicability, with limited exceptions in specific countries.**  **Observation 2: ECC Reports 263 and 299 identify the benefit of specifying additional receiver blocking requirements in the MSS UE to further protect from blocking signals from terrestrial base stations in adjacent band.**  **Proposal 1:** **Given the applicability of the band beyond just Region 1, specify first a general set of UE requirements reusing IoT NTN band 255 core RF requirements as a baseline. Any additional region- or country-specific can be specified on top of the general set of requirements. This can include any additional UE receiver blocking requirements specific to ECC countries.**  **Proposal 2: Consider additional UE requirements for ECC countries and any other applicable countries based on ETSI EN 301 681.**  **Proposal 3: Consider specifying additional UE receiver blocking requirements specific in line with ECC recommendation 263.**  **Proposal 4: Specify additional optional NS values to allow NTN operators to specify additional blocking requirements if, when and where needed, on a per-deployment basis. Different NS values can be later on specified on a country by country basis to address regional or country-specific requirements.** |

## 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 3-1

*UE General parameters*

**Issue 3-1-1: E-UTRA Operating Bands**

* Proposals
  + Option 1: The Extended L-band should be defined as Table 2.2-1.

Table 2.2-1: E-UTRA operating bands for satellite access

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| [253] | 1668 MHz | – | 1675 MHz | 1521 MHz | – | 1525 MHz | FDD |
| NOTE: Satellite bands are numbered in descending order from 256 | | | | | | | |

* + Option 2: Other
* Recommended WF
  + TBA

**Issue 3-1-2: E-UTRA Channel Numbers**

* Proposals
  + Option 1: For the Extended L-band, the channel raster, carrier frequency and EARFCN can be defined as Table 2.3-1.

Table 2.3-1: E-UTRA channel numbers

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA Operating  Band | ΔFRaster (kHz) | Downlink | | | Uplink | | |
| FDL\_low (MHz) | NOffs-DL | Range of NDL  (First – <Step size> – Last) | FUL\_low (MHz) | NOffs-UL | Range of NUL  (First – <Step size> – Last) |
| [253] | 100 | 1521 | 228531 | 228531-<1>-228570 | 1668 | 261269 | 261269-<1>-261338 |
| NOTE 1: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7 channel numbers at the lower operating band edge and the last 6 channel numbers at the upper operating band edge shall not be used for channel bandwidth of 1.4 MHz. | | | | | | | |

* + Option 2: Other
* Recommended WF
  + TBA

### Sub-topic 3-2

*UE Tx Requirements:*

**Issue 3-2-1: UE spurious emission requirements**

* Proposals
  + Option 1: For the extended L-band, the spurious emissions requirements of TS36.102 can be reused as a starting point.
  + Option 2: Other
* Recommended WF
  + Agree Option 1

**Issue 3-2-2: Other UE emission requirements**

* Proposals
  + Option 1: For the extended L-band, the UE co-existence emission requirements for band 255 can be reused as starting point.
  + Option 2: Other
* Recommended WF
  + Agree Option 1

### Sub-topic 3-3

*Companies have different views on how to address UE receiver requirements in general, and in particular receiver blocking requirements also in terms of general approach vs handling of additional requirements that are more region-specific.*

**Issue 3-3-1: General Handling of UE Rx Requirements:**

* Proposals
  + Proposal 1: For the extended L-band, the introduction of Isolation distance and/or frequency separation with most receiver characteristics reused are slightly preferred
  + Proposal 2 (Qualcomm): The UE blocking specifications for extended L-band (Band [253]) shall take into account the findings of ECC Report 263.
  + Proposal 3 (Qualcomm): It is proposed to evaluate the feasibility of the blocker requirement as described above
    - *MODERATOR NOTE: “Above” Refers to requirements described in the body of R4-2309507, full text omitted for sake of readability.*
  + Proposal 4 (Inmarsat): Given the applicability of the band beyond just Region 1, specify first a general set of UE requirements reusing IoT NTN band 255 core RF requirements as a baseline. Any additional region- or country-specific can be specified on top of the general set of requirements. This can include any additional UE receiver blocking requirements specific to ECC countries.
  + Proposal 5 (Inmarsat): Consider additional UE requirements for ECC countries and any other applicable countries based on ETSI EN 301 681
  + Proposal 6 (Inmarsat): Consider specifying additional UE receiver blocking requirements specific in line with ECC recommendation 263.
  + Proposal 7 (Inmarsat): Specify additional optional NS values to allow NTN operators to specify additional blocking requirements if, when and where needed, on a per-deployment basis. Different NS values can be later on specified on a country by country basis to address regional or country-specific requirements
* Recommended WF
  + Companies are encouraged to comment on the individual proposals and provide their views.
    - Note: Proposal 2 and Proposal 6 appear to be broadly aligned and could be merged if agreeable.

**Issue 3-3-2: Reference Sensitivity**

* Proposals
  + Option 1: For the extended L-band, the reference sensitivity level for eMTC NTN can be defined as Table 2.5-1 and the reference sensitivity level for NB-IoT can be defined as Table 2.5-2.

Table 2.5-1: Reference sensitivity for FDD UE category M1 QPSK PREFSENS

|  |  |  |
| --- | --- | --- |
| NTN Band | REFSENS (dBm) | Duplex Mode |
| [253] | -102.7 | FDD |
| NOTE 1: The transmitter shall be set to PUMAX as defined in subclause 6.2.5- in TS 36.101. | | |

Table 2.5-2: Reference sensitivity for UE category NB1 and NB2

|  |  |
| --- | --- |
| Operating band | REFSENS [dBm] |
| According to subclause 5.2B in TS 36.102 | - 108.2 |

* + Option 2: Other
* Recommended WF
  + TBA

**Issue 3-3-3: Out-of-band Blocking**

* Proposals
  + Option 1: For the extended L-band, the out-of-band blocking for eMTC NTN can be defined as Table 2.6-1 and the out-of-band blocking for NB-IoT can be defined as Table 2.6-2.

Table 2.6-1: Out of-band blocking for category M1 UE

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Operating Band | Parameter | Unit | Range 1 | Range 2 | Range 3 |
|  | Pinterferer | dBm | -44 | -30 | -15 |
| [253] | Finterferer (C`W) | MHz | -60 < f – FDL\_low < -15  or  15 < f – FDL\_high < 60 | -85 < f – FDL\_low ≤ -60  or  60 ≤ f – FDL\_high < 85 | 1 ≤ f ≤ FDL\_low – 85  or  FDL\_high + 85 ≤ f  ≤ 12750 |
| NOTE 1: Band 256 lower frequency ranges are modified to enable specific implementations. | | | | | |

Table 2.6-2: Out-of-band blocking parameters for category NB1 and NB2 UE

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Operating Band | Parameter | Unit | Range 1 | Range 2 | Range 3 |
| Pw | dBm | REFSENS + 6 dB | | |
| Pinterferer | dBm | -44 | -30 | -153 |
| [253] | Finterferer (CW) | MHz | -60 < f – FDL\_low < -15  or  15 < f – FDL\_high < 60 | -85 < f – FDL\_low ≤ -60  or  60 ≤ f – FDL\_high < 85 | 1 ≤ f ≤ FDL\_low – 85  or  FDL\_high + 85 ≤ f  ≤ 12750 |
| NOTE 1: The transmitter shall be set to 4dB below PCMAX\_L at the minimum uplink configuration specified in Table 7.3.1-2 in TS 36.101 [7] with PCMAX\_L as defined in subclause 6.2.5.  NOTE 2: Band 256 lower frequency ranges are modified to enable specific implementations.  NOTE 3: For operating bands which downlink band frequency range is between 1475.9 MHz < f < 2690 MHz the power level of the interferer (PInterferer) for Range 3 shall be modified to: -20 dBm for the frequency range which is bounded by FDL\_low- 200 MHz of the lowest band that UE supports in frequency range 1475.9 MHz < f < 2690 MHz and FDL\_high + 200 MHz of the highest band that UE supports in frequency range 1475.9 MHz < f < 2690 MHz.”  NOTE 4: The power level of the interferer (PInterferer) for Range 3 shall be modified to -20 dBm for FInterferer > 2800 MHz and FInterferer < 4400 MHz. | | | | | |

* + Option 2: Other
* Recommended WF
  + TBA

# Topic #4: SAN RF Requirements

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2308592 | ZTE Corporation | **Proposal 1:** The Extended L-band should be defined as Table 2.1-1.  Table 2.1-1: E-UTRA operating bands for satellite access   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode | | FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | | | [253] | 1668 MHz | – | 1675 MHz | 1521 MHz | – | 1525 MHz | FDD | | NOTE: Satellite bands are numbered in descending order from 256 | | | | | | | |   **Proposal 2:** For the Extended L-band, the channel raster, carrier frequency and EARFCN can be defined as Table 2.2-1.  Table 2.2-1: E-UTRA channel numbers   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | E-UTRA Operating  Band | ΔFRaster (kHz) | Downlink | | | Uplink | | | | FDL\_low (MHz) | NOffs-DL | Range of NDL  (First – <Step size> – Last) | FUL\_low (MHz) | NOffs-UL | Range of NUL  (First – <Step size> – Last) | | [253] | 100 | 1521 | 228531 | 228531-<1>-228570 | 1668 | 261269 | 261269-<1>-261338 | | NOTE 1: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7 channel numbers at the lower operating band edge and the last 6 channel numbers at the upper operating band edge shall not be used for channel bandwidth of 1.4 MHz. | | | | | | | | |
| R4-2308593 | ZTE Corporation | **Draft CR to TS36.108 Introduction of the Extended L-band** |

## 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 4-1

*Satellite Access Node (SAN) band parameters:*

**Issue 4-1-1: E-UTRA Operating Bands for Satellite access**

* Proposals
  + Option 1: The Extended L-band should be defined as Table 2.1-1.

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E‑UTRA Operating Band | Uplink (UL) operating band BS receive UE transmit | | | Downlink (DL) operating band BS transmit  UE receive | | | Duplex Mode |
| FUL\_low – FUL\_high | | | FDL\_low – FDL\_high | | |
| [253] | 1668 MHz | – | 1675 MHz | 1521 MHz | – | 1525 MHz | FDD |
| NOTE: Satellite bands are numbered in descending order from 256 | | | | | | | |

* + Option 2: Other
* Recommended WF
  + TBA

**Issue 4-1-2: E-UTRA Channel numbers**

* Proposals
  + Option 1: For the Extended L-band, the channel raster, carrier frequency and EARFCN can be defined as Table 2.2-1.

Table 2.2-1: E-UTRA channel numbers

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA Operating  Band | ΔFRaster (kHz) | Downlink | | | Uplink | | |
| FDL\_low (MHz) | NOffs-DL | Range of NDL  (First – <Step size> – Last) | FUL\_low (MHz) | NOffs-UL | Range of NUL  (First – <Step size> – Last) |
| [253] | 100 | 1521 | 228531 | 228531-<1>-228570 | 1668 | 261269 | 261269-<1>-261338 |
| NOTE 1: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7 channel numbers at the lower operating band edge and the last 6 channel numbers at the upper operating band edge shall not be used for channel bandwidth of 1.4 MHz. | | | | | | | |

* + Option 2: Other
* Recommended WF
  + TBA

# <void>