**3GPP TSG RAN Meeting #104 DRAFT RP-241662**

**Shanghai, China, 17th – 20th June 2024**

**Source: DISH Network, EchoStar, TerreStar, OmniSpace, Telus**

**Title: New WID on Introduction of IoT-NTN S-band (MSS band 2000-2020 MHz UL and 2180-2200 MHz DL)**

**Document for: Approval**

**Agenda Item: 9.1.5**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

Title: Introduction of IoT-NTN S-band (MSS band 2000-2020 MHz UL and 2180-2200 MHz DL)

Acronym: IoT-NTN\_SBand

*{Propose an acronym. Final acronym to be confirmed at the plenary. The sign "-" is a level separator between (Feature)-(Building Block)-(Work Task). The sign "\_" can be freely used. Studies have to start by "FS\_". Each acronym level has to be simple and short, 7 characters max recommended}*

Unique identifier: xxxxx

*{A number to be provided by MCC at the plenary}*

Potential target Release: Rel-19

# 1 Impacts

*{For Normative work, identify the anticipated impacts. For a Study, identify the scope of the study}*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Affects:** | **UICC apps** | **ME** | **AN** | **CN** | **Others (specify)** |
| **Yes** |  | X | X |  |  |
| **No** | X |  |  | X | X |
| **Don't know** |  |  |  |  |  |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

*{Tick one or more box(es). The full structure of all existing Work Items is shown in the 3GPP Work Plan in* [*https://ftp.3gpp.org/Information/WORK\_PLAN*](https://ftp.3gpp.org/Information/WORK_PLAN)*}*

|  |  |
| --- | --- |
|  | Study  |
|  | Normative – Stage 1 |
|  | Normative – Stage 2 |
|  | Normative – Stage 3 |
|  | Normative – Other\* |

**\* Other = e.g. testing**

## 2.2 Parent Work Item

*{"Parent" Work Item refers to the related, earlier-Stage, Work Item, e.g. the related Stage 1 Work Item shall be indicated here when a Stage 2 normative Work Item or Study Item is presented. "Parent" Work Item can also refer to the related preceding Study Item e.g. the related Study Item and the earlier-stage Work Item shall be indicated here when a normative-work Work Items is started. List here all parent Work Items of which requirements are either fully or partially covered by the proposed Item. }*

*{This section is mandatory to be filled out by the rapporteur. This section is to be filled with care: it indicates to the companies monitoring the parent Work Item that it will be addressed in this study/work item.}*

For a brand-new topic, use “N/A” in the table below. Otherwise indicate the parent Work Item.

|  |
| --- |
| **Parent Work / Study Items**  |
| **Acronym** | **Working Group** | **Unique ID** | **Title (as in 3GPP Work Plan)** |
|  |  |  |  |

### 2.3 Other related Work Items and dependencies

*{List here other Work Items which relate to the proposed one, such as a Work Item in an earlier Release if further enhancing the feature from the previous Release)}*

|  |
| --- |
| **Other related Work /Study Items (if any)** |
| **Unique ID** | **Title** | **Nature of relationship** |
| 950074 | NB-IoT/eMTC Core and Perf requirements for NTN | Rel-18 work on B256, B255 band definition |
| xxxxxx | Introduction of a new FDD band (L+S band) for IoT NTN operation | Rel-18 work on B254 band definition |

**Dependency on non-3GPP (draft) specification:**

*{This section is to be typically used to identify the IETF dependencies. Delete the header "Dependency on non-3GPP (draft) specification:" if no such dependency}*

# 3 Justification

One of the objectives of Rel-17 NR\_NTN\_solutions WI was to study and identify relevant NTN bands. The outcome of this work is a definition of two NTN bands – part of ITU-R L band and S band - defined as band n256 and n255 in the 3GPP specifications [1, 2]. Specifically for IoT-NTN, the specification work for B256 in [3] leveraged the study and requirements of n256. However, there is some deviation in how MSS S-band is allocated in region 2 versus in all other regions, see Figure 1. Per ITU, the Region 2 MSS S-Band had been allocated to UL 1980-2025 MHZ and DL 2160-2200 MHz. In the case of North America region (US, Canada, Mexico) the MSS band is allocated to UL 2000 MHz -2020 MHz and DL 2180 MHz -2200 MHz which is not exactly aligned to n256/B256 definition, i.e., UL 1980 MHz – 2010 MHz, DL 2170 MHz – 2200 MHz. For consistency across North America and Region 2 as a whole, it is beneficial to have a common range of UL 2000 MHz -2020 MHz and DL 2180 MHz -2200 MHz as a 3GPP NTN band.

There has been very strong interest from global satellite operators to ensure satellite service using 3GPP NTN to be more aligned with spectrum conditions, regulatory and TN-NTN ecosystem. Therefore, due to the above reason, it is necessary to define the range of UL 2000 MHz -2020 MHz and DL 2180 MHz -2200 MHz as a separate band for E-UTRA IoT-NTN band.

It should be noted that this range is the same LTE Band 23, although LTE Band 23 has a note that says, “NOTE 1: Band 6, 23 is not applicable” in the current version of 36.101 due to the use of 2000-2020 MHz for the Band 70 downlink and 2180-2200 MHz for the extended Band 66 downlink by terrestrial networks in the US. It may be beneficial to leverage the coexistence study and work done on Band 23 when defining this range for E-UTRA IoT-NTN band.

The aim of this spectrum WID is to add support for a new FDD E-UTRA IoT-NTN band with the 2000-2020 MHz UL and 2180-2200 MHz DL.



Figure 1: Table of Frequency Allocations of ITU, United States and Canada

***Reference:***

[1] TR 38.863, “Solutions for NR to support non-terrestrial networks (NTN): Non-terrestrial networks (NTN) related RF and co-existence aspects” (Rel-17)

[2] TS 36.102, “User Equipment (UE) radio transmission and reception for satellite access” (Rel-18)

[3] RP-221556, “Revised WID on NB-IoT/eMTC core & performance requirements for NTN”, MediaTek

[4] FCC ONLINE TABLE OF FREQUENCY ALLOCATIONS, 47 C.F.R. § 2.106, Revised on July 1, 2022 (https://transition.fcc.gov/oet/spectrum/table/fcctable.pdf)

[5] Canadian Table of Frequency Allocations (2022), 2022 Edition
(https://ised-isde.canada.ca/site/spectrum-management-telecommunications/en/learn-more/key-documents/consultations/canadian-table-frequency-allocations-sf10759)

# 4 Objective

### 4.1 Objective of SI or Core part WI or Testing part WI

The objective of the core part is to:

- Specify a new E-UTRA NTN FDD band for NB-IoT/eMTC NTN operation, with a UE transmitting at 2000 – 2020 MHz and SAN transmitting at 2180-2200 MHz;

- Perform necessary co-existence analysis, for example UE-UE coexistence, for adjacent band per RAN4 scope;

- Consider whether assumptions for coexistence should be re-evaluated for the NTN scenario;

- Support UE Categories NB1, NB2, M1;

- Support UE Power Class 3 (+23dBm) and Power Class 5 (+20dBm);

- Introduce the corresponding SAN and UE RF core requirements;

- Introduce the corresponding RRM requirements.

The specification work of this WI shall leverage the studies and requirements for NR/LTE NTN n256/B256, n255/B255, n254/B254, where applicable.

All UE requirements specified as part of this WI shall be Release-independent from Rel-17.

### 4.2 Objective of Performance part WI

NOTE: Leave empty if the WI proposal does not contain a RAN performance part.

The objective of the performance part is to:

- Define conformance requirements for SAN.

### 4.3 RAN time budget request (not applicable to RAN5 WIs/SIs)

NOTE: For all new RAN related WIs/SIs which are not led by RAN WG5 the WI/SI rapporteur has to fill out the attached Excel table to request time budgets for corresponding RAN WG meetings.
The Excel table has to be filled out for all affected RAN WGs and up to the target date of the WI/SI.
One time unit (TU) corresponds to ~ 2 hours in the meeting.
If no TU is needed, then leave the field empty otherwise enter a number >0 in the field.

 For revisions of already approved WI/SI descriptions: Please remove the Excel table from the WID/SID's zip file. The time budgets are already recorded. If you want to modify them, then this has to be done via the status report and not via a revised WID/SID.

 If this WID is covering Core and Performance part, then please fill out one line for each part in the attached Excel table.

**additional comments to the time budget request in the attached Excel table:**

# 5 Expected Output and Time scale

***{If this WID covers both stage 2 and stage 3, clearly indicate the different completion dates.}***

|  |
| --- |
| **New specifications {One line per specification. Create/delete lines as needed}** |
| **Type**  | **TS/TR number** | **Title** | **For info at TSG#**  | **For approval at TSG#** | **Rapporteur** |
| *{Possible values:**"TS" or* *"Internal TR" or* *"External TR". See Note 1}* | *{e.g.* *"22.XXX" or actual number if known}* | *{Title of the specification (as per TR 21.801 §6.1.1), to be aligned as much as possible with the WI/SI title}* | *{e.g.* *"TSG#87"}* | *{e.g.* *"TSG#89"}* | *{<FamilyName>, <GivenName>, <Company>, <email address>. See Note 2}* |
|  |  |  |  |  |  |

*{Note 1: Only TSs may contain normative provisions. Study Items shall create or impact only TRs.
"Internal TR" is intended for 3GPP internal use only whereas "External TR" may be transposed by OPs.}*

*{Note 2: The first listed Rapporteur is the specification primary Rapporteur. Secondary Rapporteur(s) are possible for particular aspect(s) of the TS/TR. In this case, their responsibility has to be provided as "Remarks".}*

|  |
| --- |
| **Impacted existing TS/TR {One line per specification. Create/delete lines as needed}** |
| **TS/TR No.** | **Description of change**  | **Target completion plenary#** | **Remarks** |
| TR 36.764 | Support for IoT-NTN S-band(MSS band 2000-2020 MHz UL and 2180-2200 MHz DL) | RAN#107 (March 2025) | Core |
| TS 36.102 | Support for IoT-NTN S-band(MSS band 2000-2020 MHz UL and 2180-2200 MHz DL) | RAN#107 (March 2025) | Core |
| TS 36.108 | Support for IoT-NTN S-band(MSS band 2000-2020 MHz UL and 2180-2200 MHz DL) | RAN#107 (March 2025) | Core |
| TS 36.133 | Support for IoT-NTN S-band(MSS band 2000-2020 MHz UL and 2180-2200 MHz DL) | RAN#107 (March 2025) | Core |
| TS 36.307 | Support for IoT-NTN S-band(MSS band 2000-2020 MHz UL and 2180-2200 MHz DL) | RAN#107 (March 2025) | Core |
| TS 36.102 | Support for IoT-NTN S-band(MSS band 2000-2020 MHz UL and 2180-2200 MHz DL) | RAN#108 (June 2025) | Perf |
| TS 36.108 | Support for IoT-NTN S-band(MSS band 2000-2020 MHz UL and 2180-2200 MHz DL) | RAN#108 (June 2025) | Perf |
|  |  |  |  |
| TS 36.181 | Support for IoT-NTN S-band(MSS band 2000-2020 MHz UL and 2180-2200 MHz DL) | RAN#108 (June 2025) | Perf |

# 6 Work item Rapporteur(s)

[To be assigned]

*{Mandatory: <FamilyName>, <GivenName>, <Company>, <email address>}*

*{Optional: <FamilyName>, <GivenName>, <Company>, <email address>: Secondary task(s)}*

*{The first listed Rapporteur is the work item primary Rapporteur. The role of a Rapporteur is further described in* [*www.3gpp.org/specifications-groups/delegates-corner/writing-a-new-spec*](http://www.3gpp.org/specifications-groups/delegates-corner/writing-a-new-spec)*. By default, the primary Rapporteur shall ensure the production of the post-completion summary.
Secondary Rapporteur(s) are possible for specific secondary task(s), such as: "Write the post-completion summary"; "In charge of a specific aspect of the work item (specify which)"; "Rapporteur for a secondary responsible WG (specify which)"}*

# 7 Work item leadership

RAN4

# 8 Aspects that *involve* other WGs

*{This information is provided as best effort assumption, at the time of submission of the WID to TSG approval. It can be later changed without a need to revise the WID.*

*The “aspects” can be provided by topic (e.g. “security”, “multimedia”) and/or by specifying the WG(s) e.g.: "SA2, SA3, SA5, SA6. CT6 for storage, and potentially SA4". If not applicable, indicate "None" or "None identified yet"}*

For a Stage 2 WID requiring Stage 3 to be done by another group: on a best-effort basis, indicate which potential WG is expected to specify the Stage 3: *{possible values: "Not applicable", " unknown", "CT WGs", etc}*

# 9 Supporting Individual Members

*{At least 4 supporting Individual Members are needed. There is an expectation that these companies will provide resources to progress the work. Note that having 4 supporting companies is a necessary but not sufficient condition: the usual TSG approval process by consensus is needed for the WID approval}*

|  |
| --- |
| **Supporting IM name** |
| DISH Network |
| EchoStar |
| TerreStar |
| Omnispace |
| Telus |
| Apple |
| Qualcomm |
| Samsung |
| Fujitsu |
| ESA |
| Sateliot |
| Skylo |
| Gatehouse |
| Fraunhofer IIS |
| Fraunhofer HHI |
| Thales |
| TTP Plc |
| Inmarsat |
| Viasat |
| Airbus |
| Novamint |
| … |