**3GPP TSG RAN Meeting #90-e RP-20XXXX**

**e-meeting, 7-11th December 2020**

Source: Thales (Email discussion moderator)

Title: Summary of email discussion [90E][27][R17\_NTN\_bands&scope] Initial round

TDOC Type: report

Agenda Item: 9.8.6 Solutions for NR to support non-terrestrial networks (NTN) [RAN2 WI: NR\_NTN\_solutions]

Document for: discussion

Release: Rel-17

# Introduction

The following TDOC is submitted to the email discussion decided during RAN#90-E and referenced as follow :

* [90E][27][R17\_NTN\_bands&scope] Initial round (Thales)

Goal: Generate an agreeable way forward and handling NTN bands. Generate revised WID if needed.

Input contributions covered: 2296, 2403, 2707, 2732, 2404, 2406

Moderator: Nicolas Chuberre

The referred contributions entail:

1/ proposals related to the handling of NTN bands:

* RP-202296: “HAPS Bands”, Loon, Google, Intelsat, Softbank, Nokia
  + Proposal 1: Use the term HAPS for now. Terminologies and definitions of HAPS/HIBS should be followed by the ITU-R decision after they conclude studies for WRC-23.
  + Proposal 2: There is no need to specify any new HAPS specific bands in NTN WI but select at least one example band of the existing NR bands which is identified for HAPS deployment by operators.
  + Proposal 3: To demonstrate coexistence between HAPS and TN networks, RAN4 to study at least one example band.
* RP-202403: “Handling of satellite bands in 3GPP-follow-up” , Thales, Hughes Network Systems, Intelsat, Eutelsat, Inmarsat, ESA, Fraunhofer HHI, Fraunhofer IIS, Sateliot, Gatehouse
  + It proposes to revise the proposal 4 of RP-202120 Summary of email discussion [89E][28][Satellite\_bands], Thales (Email discussion moderator) as follow
    - Proposal 4: Traditional 3GPP work for developing generic requirements, such as inter-carrier co-existence to decide ACLR etc. should be followed where possible but may have to be adapted for the satellite case. Adaptations if needed shall be defined by RAN4. ~~Satellite bands introduced in 3GPP for NTN shall neither impact the existing specifications of nor cause degradation (in the sense of RAN4 co-existence studies) to present and future networks in 3GPP specified terrestrial bands.~~ The development of 3GPP specifications in satellite band for NTN use shall not impact the existing specifications of 3GPP terrestrial bands.
* RP-202707: “Frequency range considerations”, Thales
  + Proposal: For the development of 3GPP specifications in a satellite band falling fully or partly in 7-24 GHz frequency range, the recommendations of TR 38.820 should be taken into account

2/ proposals related to WI scope:

* RP-202404: “rational for the revision of WID NR-NTN-solutions”, Thales, Hughes Network systems, ZTE, Firstnet, Qualcomm, Intelsat, Samsung, ESA, CATT, Apple, Softbank
  + Proposal 1: Add at the end of the clause 3. Justification the following sentence
  + “As per TR 38.821, it shall be assumed that handheld devices with Power class 3 at least in FR1 and other devices (including fixed and moving platform mounted devices) are supported”.
  + Proposal 2: Add two principles in clause 4.1 Objective of SI or Core part WI or Testing part WI
    - “Handheld devices with Power class 3 at least in FR1 are supported
    - Other devices (including fixed and moving platform mounted devices) are supported.”
* RP-202406: “revised WID NR-NTN-solutions”, XXX
  + Proposed revisions in line with RP-202404
* RP-202732: “About fixed and moving platform mounted device for NTN”, Hughes Network Systems, Thales, Intelsat, ESA
  + Proposal 1: As per TR 38.821, it shall be assumed that both handheld UE (including smartphones) and other (fixed/moving platform mounted) UE are supported in the Rel-17 WI NR-NTN-solutions.

# Initial round discussion

## 2.1 NTN bands aspects

Based on the proposals related to NTN bands (in clause 1 of this TDOC), the following questions are proposed:

**Question NTNB-1 (related to RP-202403): Can the following proposed revision of *RP-202120’s Proposal 4 (endorsed at RAN#89-e)* related to the handling of “satellite” bands be approved?**

***Proposal 4: Traditional 3GPP work for developing generic requirements, such as inter-carrier co-existence to decide ACLR etc. should be followed where possible but may have to be adapted for the satellite case.*** ***Adaptations if needed shall be defined by RAN4. ~~Satellite bands introduced in 3GPP for NTN shall neither impact the existing specifications of nor cause degradation (in the sense of RAN4 co-existence studies) to present and future networks in 3GPP specified terrestrial bands~~*** ***The development of 3GPP specifications in satellite band for NTN use shall not impact the existing specifications of 3GPP terrestrial bands.***

| **Organization** | **Agree/Agree with modifications/Disagree** | **Comments** |
| --- | --- | --- |
| Thales | Agree to revise the proposal 4 but with modifications to the above | We suggest the following alternative wording for the revision:  ***Proposal 4: Traditional 3GPP work for developing generic requirements, such as inter-carrier co-existence to decide ACLR etc. should be followed where possible but may have to be adapted for the satellite case. Adaptations if needed shall be defined by RAN4. ~~Satellite bands introduced in 3GPP for NTN shall neither impact the existing specifications of nor cause degradation (in the sense of RAN4 co-existence studies) to present and future networks in 3GPP specified terrestrial bands~~ The definition of new 3GPP bands (e.g. for NTN) shall not impact the existing specifications of 3GPP bands. Existing RAN4 adjacent channel coexistence study approach will be used to the possible extent and adapted if needed to take into account satellite communication systems specific deployment & operational characteristics.*** |
| Ligado | Disagree | We do not see the necessity to change the language previously endorsed at RAN#89-e. |
| T-Mobile USA | Disagree | We had already agreed to text in RAN#89e and do not need to revisit this again. |
| Hughes | Agree with comments | Agree with the alternative wording |
| Loon, Google | Agree | Agree with the alternative wording |
| SoftBank | ? | We would like to understand the motivation more why this revision is necessary on top of the previous agreement. |
| DISH | Disagree | The version endorsed in previous Plenary should be approved. The proposal here is trying to reverse some parts of the previously endorsed discussion points. |
| Intelsat | Agree | Agree with alternative wording |

**Question NTNB-2 (related to RP-202707): Can the following proposal related to the handling of “Satellite” bands be approved as it is ?**

***Proposal: For the development of 3GPP specifications in a satellite band falling fully or partly in 7-24 GHz frequency range, the recommendations of TR 38.820 should be taken into account***

| **Organization** | **Agree/Agree with modifications/Disagree** | **Comments** |
| --- | --- | --- |
| Thales | Agree with modifications | Actually, there are no recommendations in the TR 38.820, therefore, we suggest an alternative wording for the proposal:  ***For the development of 3GPP specifications for ~~in a~~ satellite band falling fully or partly in 7-24 GHz frequency range, existing 3GPP specifications and studies ~~the recommendations of~~ (e.g. TR 38.820) should be taken into account*** |
| T-Mobile USA | Agree w/mod | as modified by Thales in their comment |
| Hughes | Agree | As modified above |
| SoftBank | ? | We don’t really sure what is the common understanding of the group, but we want to clarify first whether the development of a 3GPP specification for 7-24GHz is the scope of this WI.  If we understand correctly, the current NTN WID doesn’t explicitly says so. Also, Note 1 in the WID says that target is FR1 or FR2 (sited below for your reference)  *Note 1: It is assumed that this work item will be frequency agnostic and therefore we can consider that NTN can operate in FR1 or FR2 ranges.*  Since TR 38.820 mentions that we should specify many things from RAN1, 2 and 4 point of view, we want to clearly capture it in the WID (if we have a consensus to do so). |
| Intelsat | Agree | Agree with the modification as noted in the Thales response above |

**Question NTNB-3 (related to RP-202296): Should RAN4 as part of the Rel-17 NR-NTN-solutions WI select as exemplary band, one of the existing NR bands which is identified for HAPS deployment by operators ?**

* *(see RP-202296’s Proposal 2: There is no need to specify any new HAPS specific bands in NTN WI but select at least one example band of the existing NR bands which is identified for HAPS deployment by operators.)*

| **Organization** | **Agree/Agree with modifications/Disagree** | **Comments** |
| --- | --- | --- |
| Thales |  | This is not a negligible activity and therefore additional TUs for RAN4 would need to be allocated accordingly. |
| T-Mobile USA | Disagree | An operator who is planning a deployment of an NTN should bring forth a band for whence they are planning testing or commercial deployments. If a vendor brings forth a band for testing that too would be acceptable. But to name a band just so there is a band defined is not an acceptable use of the limited resources in RAN4. The word ‘exemplary’ implies a show band and there is no need for the ‘if you build it they will come’ concept of spectrum definition work to occur. |
| Loon, Google | Agree | The intent of this change is to point that all terrestrial bands can be used by HAPS. Loon is using one such band in a country today. To establish the frame work we want to start with one ‘exemplary band’. |
| Qualcomm |  | Before proceeding with the work in RAN4, it would be good to clarify what is the exact scope of the work, and how to make sure it fits within the RAN4 budget.  This proposal, as worded, seems like a minimal amount of work “select one example band”, but the next proposal actually calls for a full study on coexistence (with potential new requirements, which may mean that a new band definition is needed) |
| SoftBank | Agree | As shown in RP-202296, HAPS interested companies are keen to identify an exemplary band. The current WID just says “Considering the potential bands to be used as example for the WID”, and hence it looks to us that the description is not limited to satellite bands. Why are additional TUs required? |
| DISH | Disagree | Before making these kind of agreements, co-existence should be studied (see NTNB-4 below) |
| Intelsat | Agree | In the interest of making progress this is reasonable. The choice of the ‘exemplary’ band may be a separate agreement/discussion. |

**Question NTNB-4 (related to RP-202296): Should RAN4 as part of the Rel-17 NR-NTN-solutions WI define the generic and core requirements for HAPS by considering at least one exemplary band for HAPS and as such undertake adjacent channel coexistence study between HAPS and TN ?**

* *(see RP-202296’s Proposal 3: To demonstrate coexistence between HAPS and TN networks, RAN4 to study at least one example band.)*

| **Organization** | **Agree/Agree with modifications/Disagree** | **Comments** |
| --- | --- | --- |
| Thales |  | This is not a negligible activity and therefore additional TUs for RAN4 would need to be allocated accordingly. |
| T-Mobile USA | Disagree | For the same reason stated in Question NTNB-3 |
| Loon, Google | Agree | For the same reason as in Q NTNB-3 |
| Qualcomm |  | Same answer as the previous one. |
| SoftBank | Agree | The comment in NTNB-3 applies |
| DISH | Disagree/Agree with modifications | The co-existence between HAPS and TN shall be studied for every HAPS band |
| Intelsat | Agree |  |

## 2.2 WI NR-NTN-solutions revisions

Based on the proposals related to WI scope (in clause 1 of this TDOC), the following questions are proposed:

**Question NTNWI-1 (related to RP-202404/2406/2732): Can the following proposal be approved as it is ?**

* ***Proposal 1: Add at the end of the Rel-17 “NR-NTN-solutions” WI’s clause 3. Justification the following sentence***
  + ***“As per TR 38.821, it shall be assumed that handheld devices with Power class 3 at least in FR1 and other devices (including fixed and moving platform mounted devices) are supported”.***
* ***Proposal 2: Add two principles in the Rel-17 “NR-NTN-solutions” WI’s clause 4.1 Objective of SI or Core part WI or Testing part WI***
  + ***“Handheld devices with Power class 3 at least in FR1 are supported***
  + ***Other devices (including fixed and moving platform mounted devices) are supported.”***

| **Organization** | **Agree/Agree with modifications/Disagree** | **Comments** |
| --- | --- | --- |
| Thales | Agree | The intent is to clarify that there are different types of UE as identified in TR 38.821. Note that for the fixed and moving platform mounted devices, Rel-17 should consider the device as being a UE with a specific RF front-end (e.g. with dish, phased array antenna). |
| Hughes | Agree |  |
| Loon, Google | Agree |  |
| Qualcomm | Agree |  |
| SoftBank | Agree | Handheld is one of the important use cases for HAPS. If the proposal in NTNB-4 is agreed, handheld devices should be taken into consideration for the evaluation. |
| Samsung | Agree |  |

**Question NTNWI-2 (related to RP-202296): Can the following proposal be approved as is ?**

* ***Proposal 1: Use the term HAPS for now. Terminologies and definitions of HAPS/HIBS should be followed by the ITU-R decision after they conclude studies for WRC-23.***

| **Organization** | **Agree/Agree with modifications/Disagree** | **Comments** |
| --- | --- | --- |
| Thales | Agree | No impact on the Rel-17 NR-NTN-solutions WID |
| T-Mobile USA | Agree |  |
| Hughes | Agree |  |
| Loon, Google | Agree |  |
| SoftBank | Agree |  |
| Samsung | Agree |  |

**Question NTNWI-3: Any other views on the revisions of the WI that should be considered ?**

| **Organization** | **Views** |
| --- | --- |
| Thales | No specific recommendations |
| T-Mobile USA | None at this time |

# Intermediate round discussion

# Fine tuning round discussion

# Conclusion

***END***