**3GPP TSG-RAN WG4 Meeting #112 draftR4-241xxxx**

**Maastricht, Netherlands, 19th – 23rd August, 2024**

**Source:** Ad-hoc chair (Samsung)

**Title:** Ad-hoc agenda for [206] Rel-18 NR\_NTN\_enh

**Agenda item:** 5.23.9

**Document for:** Discussion and Approval

# 1 Introduction

This t-doc captures the ad-hoc discussion outcome on [206] Rel-18 NR\_NTN\_enh covering below topics:

* Issue 5-2
* Issue 6-2-2
* Issue 3-5
* Issue 5-2-S

Ad-hoc place and time:

* Thursday @RAN4 ad-hoc room from 8:30 to 9:30

# 2 Discussion

## **Issue 5-2: NTN to NTN Satellite switching without PCI change**

**Views from companies**

* (Huawei) RAN4 to clarify that the ending point of satellite switch with re-sync is the time point when UE is ready to receive DL channels/signals or transmit UL channels/signals from/to the target satellite, and to remove TIU in the delay/interruption time.

**Moderator’s WF:**

* RAN4 to clarify that the ending point of satellite switch with re-sync is the time point when UE is ready to receive DL channels/signals or transmit UL channels/signals from/to the target satellite, and to remove TIU in the delay/interruption time.

Nokia: Not agree with the proposal. Can add some condition for the existing requirement.

CMCC: OK with the core part update. Discuss further for the test case. Two test cases for RACH-based and RACH-less. The test case will also be impacted if consider this proposal. Do we need to differentiate the RACH-based and RACH-less?

QC, Huawei: this is to align with RAN2 spec.

## **Issue 6-2-2: (FR2-NTN) Rx beam gain**

**Views from companies**

* For the minimum SSB\_RP condition for electronic steering antenna,
  + RAN4 to confirm Y (gain difference between fine and rough beams) = 0
    - Apple, Samsung, Huawei
* (Apple) Remove the bracket for the following 1dB relaxation:
  + The existing absolute measurement accuracy requirement and relative measurement accuracy requirement of TN FR2 (including intra-frequency and inter-frequency) can be applied for NTN UE above 10GHz with 1dB relaxation
* Gmin FR2-NTN
  + Samsung:
    - 27.3dBi for NTN VSAT type 3
    - 33.7dBi for other VSAT types
  + Huawei
    - 25dB for VSAT type 3
    - 33dB for other VSAT types
* Gmax FR2-NTN
  + Samsung: depends on typical implementation of antennas
  + Huawei: 50dB for all VSAT types
* (Apple) The lower bound of Rx beam gain
  + 30dB for NTN VSAT type 3
  + 41dB for other VSAT types
  + VSAT vendor to claim the upper bound of the Rx beam gain
* (Huawei) For RLM for FR2-NTN, RAN4 to discuss the following options
  + Option 1: update core requirements (PDCCH parameters, evaluation period) as for R17 RedCap
  + Option 2: update the SNR levels in TCs with new Qout/Qin and measurement accuracy
* For RLM for FR2-NTN, RAN4 to discuss the following options
  + Option 1: update core requirements (PDCCH parameters, evaluation period) as for R17 RedCap, or,
  + Option 2: update the SNR levels in TCs with new Qout/Qin and measurement accuracy
* Gmin
  + Option 1:
    - 27.3dBi for NTN VSAT type 3
    - 33.7dBi for other VSAT types
  + Option 2:
    - 25dB for VSAT type 3
    - 33dB for other VSAT types
  + Option 3:
    - 30dB for NTN VSAT type 3
    - 41dB for other VSAT types
* Gmax
  + Option 1: depends on typical implementation of antennas
  + Option 2: 50dB for all VSAT types
* Note: If anything above inconsistent with RF requirement is identified, RAN4 to make updates to those aspects accordingly.
* Note: NTN FR2 VSAT classes specified in table 9.2.1.0-1 of TS38.101-5
  + NTN VSAT type 1: Fixed VSAT communicating with GSO and LEO with mechanical steering antenna
  + NTN VSAT type 2: Fixed VSAT communicating with GSO and LEO with electronic steering antenna
  + NTN VSAT type 3: Fixed VSAT communicating only with LEO with electronic steering antenna
  + NTN VSAT type 4: Mobile VSAT communicating with GSO with mechanical steering antenna
  + NTN VSAT type 5: Mobile VSAT communicating with GSO with electronic steering antenna

## **Issue 3-5: Other impact on RRM**

**Views from companies**

* RAN4 to clarify that UE is only required to measure PRS from the serving cell for PRS measurement for NW verified location.
  + Huawei

**Moderator’s WF**:

* RAN4 to clarify that UE is only required to measure PRS from the serving cell for PRS measurement for NW verified location.

## **Issue 5-2-S: Soft’ Satellite switch**

**Views from companies**

* (Apple) Not consider PDD reporting between serving and target satellites involved in the satellite switching without PCI change.
* (Apple) To enhance scheduling restriction in soft satellite switching, consider modifying the capability rule such that: if UE indicates to support soft satellite switching without PCI change, it also means UE supports both simultaneousRxDataSSB-DiffNumerology and parallelMeasurementWithoutRestriction-r17

**Moderator’s WF: The below seems to be already confirmed/agreed by RAN2**

* RAN4 to not consider PDD reporting between serving and target satellites involved in the satellite switching without PCI change.

**Moderator’s WF: Further discussion**

* To enhance scheduling restriction in soft satellite switching, consider modifying the capability rule such that: if UE indicates to support soft satellite switching without PCI change, it also means UE supports both simultaneousRxDataSSB-DiffNumerology and parallelMeasurementWithoutRestriction-r17.

# Reference

[1] [R4-2411801](ftp://10.10.10.10/ftp/tsg_ran/WG4_Radio/TSGR4_111/Inbox/R4-2411801.zip) Topic summary for [112][206] NR\_NTN\_enh, Moderator (Qualcomm)