

Title: On the scope of Rel-18 NR NTN enhancement

Agenda item: 9.3.2.7
Source: Samsung
Document for: Decision

Background | 4.1.3 Network verified UE location

- **For network verified UE location, RAN1#112bis-e agreed the following:**

Agreement

For RTT determination in NTN, discuss further the accuracy, and reporting details of combinations of the following UE and gNB receive-transmit time difference measurements:

- Alt-1: UE Rx-Tx time difference based on Option 3 and gNB Rx-Tx time difference as defined in TS 38.215.
 - Note 1: The signaling method of UE Rx-Tx time difference definition option 1 is not precluded if Alt1 is adopted
 - Alt-2: UE Rx-Tx time difference based on Option 2 and gNB Rx-Tx time difference as defined in TS 38.215.
 - Note 2: The LMF will use the time stamp of the PRS and the time stamp of SRS to calculate the time difference between the transmission of PRS and the reception of SRS
 - Alt-3: UE Rx-Tx time difference based on Option 2 and gNB Rx-Tx time difference based on Option 4
- FFS: One or multiple SRS can be used in determining the arrival time
FFS: Additional enhancement including additional information to be reported, if justified

Note 3: The impact of UE autonomous adjustment of TA (when applied) should be taken into account

Note 4: The gNB Rx-Tx time difference option in the above alternatives may need updates accordingly based on the outcome of discussion on reference point for the gNB Rx – Tx time difference

- **RAN1#113 spent lots of time to discuss the details for each option but no consensus was reached.**
- **Since the RAN1 progress of Rel-18 NR NTN is quite behind schedule, RAN intervention is necessary to complete RAN1 work on Rel-18 NR NTN in next RAN1 meeting.**

- Network verified UE location is dropped from the scope of Rel-18 NR NTN

Background | 4.1.2 NR-NTN deployment in above 10 GHz bands

- The objective “4.1.2 NR-NTN deployment in above 10 GHz bands” as one of objectives in Rel-18 NTN enhancement WI aims to introduce above 10GHz example band(s) into RAN4 specifications.
- Based on RAN4 discussion, revision of this objective required for below aspects :
 - New RRM requirements need to be introduced considering the difference on operation conditions for above 10GHz NTN example bands compared to Rel-17 NTN L/S bands

Parameters	Rel-17 L/S bands	Rel-18 above 10GHz example band(s)
Frequency ranges	Band n256 ~2GHz Band n255 ~1.6GHz	Band n512/n511/n510 DL ~17-20 GHz, UL ~27-30GHz
UE assumption	Handle-held UE with omnidirectional antenna	VSAT with directional/beamforming antenna(s)
System parameters	FR1 like operation SCS: 15kHz, 30kHz, 60kHz for data; 15kHz, 30kHz for SSB	FR2 like operation SCS: 60kHz, 120kHz for data; 120kHz, 240kHz for SSB

- RAN4 also has a query for the potential impact on RAN1/RAN2 to support above 10GHz NTN example band(s) e.g. timing issue, system parameters supporting (RAN4 LS to RAN1/RAN2 R4-2305926)

- **Proposal 1: Including below sub-bullet under objective 4.1.2**
“Specify necessary RRM requirements for NTN operation over above 10GHz example band(s)”
- **Proposal 2: Add a note under objective 4.1.2 considering potential involvement of RAN1/RAN2 for this objective**
“Note: RAN1/RAN2 work on NTN operation over above 10GHz example band(s) can be triggered by RAN4 LS”

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Thank you