3GPP TSG RAN#102
Edinburgh, UK – December 11th-15th, 2023

RP-233275
Agenda Item 9.1.2.3

Rel-19 NR NTN: Scope
[Discussion]

MediaTek Inc.

Proposal

[RAN1-led] NTN Enhancements (NR)

NR NTN DL coverage enhancements[RAN1, RAN2, RAN4]

- Further DL coverage enhancements were proposed in Rel-18, to overcome deep shadowing, but not agreed
- A study phase is needed to identify the appropriate DL SNR target for downlink physical data and control channels and potential solutions for power sharing between beams or different beam pattern/size (i.e., wide or narrow) across the satellite foot print considering in priority existing 3GPP techniques
- The study should be followed by a normative phase for potential solutions as needed

Robust Notification/Alert [RAN1, RAN2, RAN3]

- NR NTN paging may not succeed in adverse link conditions (e.g. UE in pocket or bag)
- Identify the notification message requirement based on liaison with SA WG - size and content [RAN1/2]
  - The notification message should be UE-specific or group-specific in a cell
- Identify and specify possible solutions for the support of a robust notification/alert message and its delivery (including paging procedure impact) over a dedicated downlink only physical channel(s) [RAN1, RAN2, RAN3]

NOTE: There has been no SA work planned or discussed on this

Note:

- SSB channel enhancements is not considered in this scope
- This work should consider both FR1 and >10GHz and consider also 1Rx UE for FR1.

Proposal

[RAN1/2-led] NTN Enhancements (NR)

[2/3]

Uplink Capacity Enhancement for NR NTN [RAN1, RAN2, RAN4]

- Support increased system capacity without sacrificing per-UE throughput and coverage performance due to repetitions
- Study then specify, if beneficial, DFT-s-OFDM PUSCH enhancements via Orthogonal Cover Codes (OCC) across including initial access targeting at least 2 times capacity improvement [RAN1, RAN2]
- Impact on emissions should be minimized [RAN1, RAN4]
- Study then specify if beneficial, sporadic access (i.e. contention based PUSCH) to a pool of shared resources [RAN1/2]

Enhanced GNSS Operation[RAN2, RAN1, RAN4]

- Support increased robustness with GNSS « relaxed » position accuracy of [300] meters for FR1-NTN UE and [90] metres for FR2-NTN due to GNSS jamming or temporarily GNSS un-availability of up to [14.4 minutes] for GNSS-capable UEs at speed up to ~1000 km/h
- Study potential enhancements for the UE pre-compensation for UL time and frequency synchronisation and specify if needed:
  - For PRACH transmission (Initial access, connected mode)
  - For enhanced close loop) (connected mode)

NOTE:

- PRACH channel enhancements is not considered in this scope
- This work should consider both FR1 and >10GHz and consider also 1Rx UE for FR1.

Proposal

[RAN3-led] NTN Enhancements (NR)

Support for Regenerative payload with full gNB incl. ISL [RAN3]:

- Rel-17~18 NR NTN only support transparent payload: this is a major limiting factor for NGSO NTN whereby coverage, service and QoS are reliant on the availability of a feeder link and its characteristics
- A regenerative payload w/ ISL addresses the above by
  - Lifting the reliance on the feeder link
  - Reducing latency
  - Increasing throughput
  - Increasing capacity
- Regenerative payload will enable NR NTN broadband at a global scale, competitive with proprietary systems