3GPP TSG RAN Rel-18 workshop
Electronic Meeting, June 28- July 2, 2021

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ZTE
Tomorrow never waits

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Agenda: 4.2

Enhancements on NTN for 5G Advanced

Progress on NTN in 3GPP

- Phase-1 Rel-15 SI with output as 3GPP TR 38.811 for scenarios, channel model and potential impacts on spec
- Phase-2 Rel-16 SI with output as 3GPP TR 38.821 for potential solutions in NR.
- Phase-3:
  - Rel-17 NR-NTN WI:
    - Transparent payload
    - Initial architecture for synchronization based on pre-compensation
    - Timing adjustment/HARQ enhancement
    - Initial study/potential enhancement on beam management (on-going)
  - Rel-17 IoT-NTN SI (3GPP TR 36.763) + WI (to be discussed):
    - Only essential features, all “nice to have” enhancements are precluded from recommendation
    - NR-NTN solution as baseline + some enhancements for IoT-specific issues.

Identified aspects for further enhancement on NTN

- Architecture
  - Considering the re-generative payload (e.g., gNB on-board/CU-DU) at satellite/HAPS side to reduce scheduling latency and enable more applications.

  Note: This part is mainly for NR-NTN, and less beneficial for IoT-NTN with more complicated design at satellite/HAPS side

- Assumptions-Use case
  - Supports on the GNSS incapable UE or poor GNSS case
    - This is common for both NR-NTN and IoT-NTN to enable more use case and ensure the service performance for diverse cases.
  - Optimized cooperation between TN and NTN side as stepping stone for integrated network
    - This part is mainly for NR-NTN, and the needs for IoT-NTN is limited for IoT with sporadic

- Performance improvement
  - Enhancement to improve the supported UE density (only 400 UE/km^2 is assumed for IoT-NTN in Rel-17), e.g., PRACH capacity improvement
  - Enhancement on mobility/RLF/paging/transmission, e.g., in case of discontinuous service
  - Enhancement on power efficiency with usage of GNSS for synchronization

  Note: The above is mainly for IoT-NTN and is also beneficial to NR-NTN

  - Enhancement on UL performance to enable the direct linkage between satellite and smart phone
  - Enhancement on DL performance to improve the system capability including
    - Optimized DM-RS configuration to harvest LoS-based channel condition
    - Optimized CSI feedback to deal with CSI aging (e.g., by enabling the prediction at UE side).
    - Optimized Beam management to reduce overhead and ensure service quality (pending for Rel-17)
  - Enabling DC or PHY-based solution based on multiple-satellites to improve service continuity

  Note: The above is only for NR-NTN and is beneficial to NR-NTN

- New functionality
  - Enabling NR-NTN network based positioning as potential area

Thanks

Tomorrow never waits