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RP-213452

3GPP TSG RAN#94e
Electronic Meeting, Dec. 06-17, 2021
Agenda Item: 8A.2

Views on NTN for IoT project

5G

Background

- In the latest WID draft (RP-212729) the following objectives are proposed for an NTN IOT project in Rel-18:

- Performance enhancements:
  - Disabling of HARQ feedback to mitigate impact of HARQ stalling on UE data rates [RAN1,RAN2]
  - Study and specify, if needed, improved GNSS operations for a new position fix for UE pre-compensation during long connection times and reduced power consumption [RAN1]

- [...]

- Further enhancement to discontinuous coverage
  - Efficient power saving mechanisms (e.g., eDRX/PSM) for sparse satellite constellations [RAN2]
  - Improvements to UE mobility among sparse cells [RAN2]
    - Enhancements in RRC reestablishment or recovery based on the discontinuity of coverage
  - [Further power saving enhancements for IoT NTN to support discontinuous coverage including PUR for NGSO (2nd priority)] [RAN2]

- In this contribution, we present our views on the topics above.

Performance enhancements

- The two performance enhancements listed in the current WID draft were considered to be beneficial during the study phase, but not recommended for normative work due to lack of time in Rel-17.
- Regarding HARQ disabling, the following was concluded in TR 36.763:
  - *Disabling HARQ feedback for downlink transmission was discussed. This can benefit UE power consumption and latency. Disabling HARQ feedback for a DL transmission can improve uplink throughput in NTN as more resource would be available in uplink.*
- Regarding GNSS improvements, TR 36.763 has a study in Subclause 6.3.1, where it is shown that the GNSS fix dramatically reduces the battery life of IOT UEs, especially for sparse reporting.

- **Proposal:** Support HARQ feedback disabling and improved GNSS operations (including impact on power consumption)

Further enhancement to discontinuous coverage

- SA2 has updated the WID to support discontinuous coverage in Rel-17.
- UE may be provided with satellite ephemeris information and other information like satellite start time to help UE predict the discontinuous coverage gap.
  - This is only helpful to detect service link discontinuous coverage.
  - There can be sparse gateway deployment, e.g., there can be area where deployment of gateway won't be feasible for IoT use cases from geographic or economic point of view.
    - This leads to discontinuous backhaul (feeder link) while UE may also experience discontinuous coverage (service link).
    - How UE can predict discontinuous coverage due to unavailability of the feeder link should also be clarified.
- Rel-17 solution to support discontinuous coverage may not be efficient to support MT calls and existing power saving mechanisms like eDRX/PSM.
- There can be other RATs or PLMNs for which the UE may find coverage during discontinuous coverage.
- **Proposal:** Study possible enhancements to Rel-17 solution to support discontinuous coverage.

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