

Title: NTN enhancements in Rel-19

Agenda: 8.5.2.7
Source: Samsung
Document for : Discussion

DL coverage enhancements [RAN1/RAN2]

▪ **Motivation**

- Rel-18 NTN started to consider practical parameters used for commercial smartphones with -5.5 dBi antenna gain and 3 dB polarization loss.
- However, there was no chance to look into the impact on DL coverage from the above parameters in Rel-18.
- Also, some companies have argued that satellite parameters used for link budget analysis in TR38.821 are too optimistic, e.g., EIRP density, TX antenna gain, TX power and so on
- Impact on DL coverage needs to be studied taking into account the above.

▪ **Potential objectives**

- **Identify target scenarios and evaluation assumptions**
 - Reuse baseline assumptions from TR38.821
 - Consider practical parameters used for satellites
 - Consider practical parameters used for commercial smartphones
- **Identify which channels, if any, need coverage enhancement, e.g., PDCCH, PDSCH**
- **Study and, if needed, specify necessary solutions for DL coverage enhancements**

Support of high power UE (HPUE) in FR1 FDD [RAN4]

▪ **Motivation**

- NTN-specific UL coverage enhancement schemes are under discussion in Rel-18, but they may impact NTN system capacity.
- Another efficient way to improve UL coverage is to increase the TX power on UE side.
- Enabling higher TX power should be considered for both NR-NTN and IoT-NTN UEs.
- The necessity of introducing other power class UEs (e.g., PC1 and PC1.5) is unclear due to
 - No generic requirements for FDD PC1.5 have been studied in RAN4
 - There are potential challenges for FDD PC1.5 related to RF components, and this impacts UE implementation

▪ **Potential objectives**

- **Consider n255 and n256 to support PC2**
 - Study and verify the adjacent channel co-existence with terrestrial network
 - Specify UE RF TX requirements, e.g., UE max. output power, power tolerance, MPR, ACLR and so on.
 - Specify Reference Sensitivity Degradation from PC3 to PC2 if needed

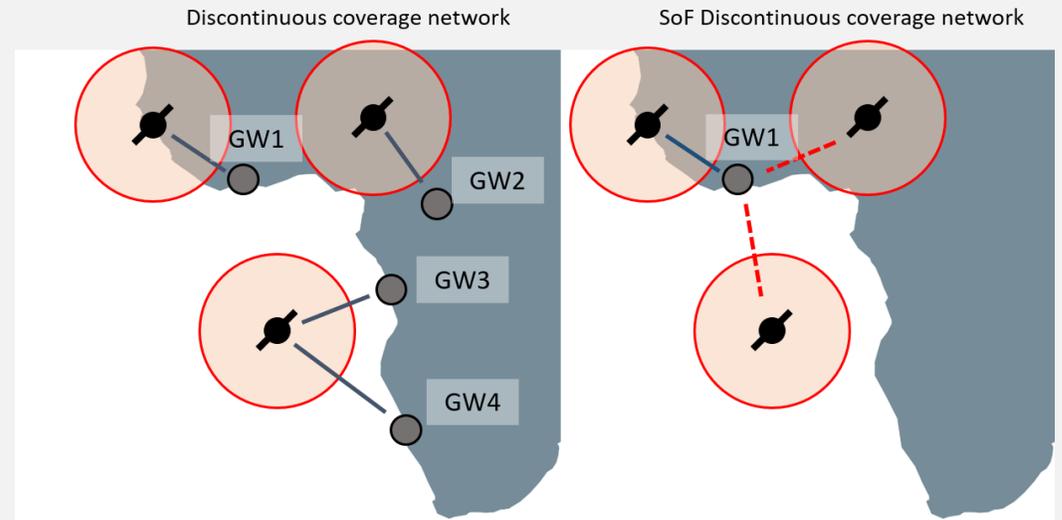
Others [RAN2/RAN3]

▪ Motivation

- Support regenerative payload [NR-NTN and IoT-NTN]
 - NTN so far assumes transparent payload
 - Regenerative satellite allows for better flexibility and is a better solution for large LEO networks
- Support Store and Forward [IoT-NTN]
 - For discontinuous coverage scenario, store and forward capability is key for a satellite network without immediate ground gateway access. The focus should be on a solution that relies on changes to RAN to allow Store and Forward in IoT NTN.
- DU on satellite [NR-NTN]
 - MAC and RLC can be placed on satellite to reduce round-trip delay

▪ Potential objectives

- Specify mechanism to support regenerative payload for NTN [RAN2]
- Study and specify mechanism to support RAN-based Store and Forward solution for IoT-NTN [RAN2]
- Specify mechanism and procedure to support DU on satellite while CU in the ground station [RAN3]



Potential WI scope

- **DL coverage enhancements [RAN1/RAN2]**
 - Identify target scenarios and evaluation assumptions
 - Reuse baseline assumptions from TR38.821
 - Consider practical parameters used for satellites
 - Consider practical parameters used for commercial smartphones
 - Identify which channels, if any, need coverage enhancement, e.g., PDCCH, PDSCH
 - Study and, if needed, specify necessary solutions for DL coverage enhancements
- **Support of high power UE (HPUE) in FR1 FDD [RAN4]**
 - Consider n255 and n256 to support PC2
 - Study and verify the adjacent channel co-existence with terrestrial network
 - Specify UE RF TX requirements, e.g., UE max. output power, power tolerance, MPR, ACLR and so on.
 - Specify Reference Sensitivity Degradation from PC3 to PC2 if needed
- **Others**
 - Specify mechanism to support regenerative payload for NTN [RAN2]
 - Study and specify mechanism to support RAN-based Store and Forward solution for IoT-NTN [RAN2]
 - Specify mechanism and procedure to support DU on satellite while CU in the ground station [RAN3]

Thank you very much!