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3GPP TSG RAN Rel-19 workshop **RWS-230079**

Taipei, June 15 - June 16, 2023

Agenda Item: 5

Source: Spreadtrum Communications

Title: NTN/IoT-NTN enhancements for Rel-19

Document for: Discussion and decision

Evolution of NTN/IOT NTN in Rel-19

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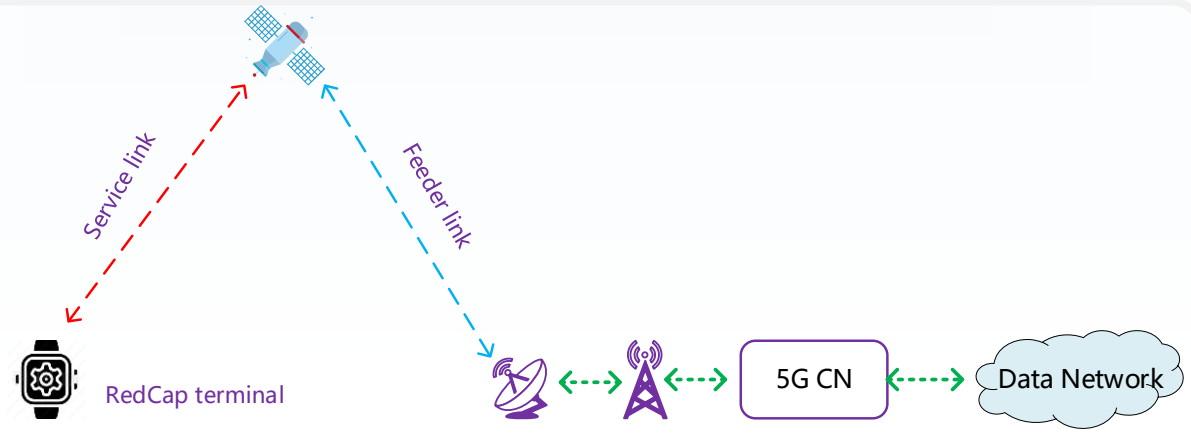
Motivation

- The following reference scenario was considered for smartphone access NTN in R18: parameter set-1 for LEO-1200 satellite operating at Line of Sight (LOS), commercial smartphones with -5.5 dBi antenna gain and 3 dB polarization loss (per antenna port). However, in practice, the transmission power of satellites may be limited, and UE may also be in low SINR environments.
- RedCap had been specified in R17. RedCap should also be capable of access to NTN due to requirements of global coverage. In addition, regarding NTN for RedCap, the following factors should be considered.
  - Antenna gain loss due to wearable form factor
  - Reduced number of Rx/Tx

Proposal 1: For NR NTN, study and if justified, specify coverage enhancement on DL based on the target link margin gap.

Proposal 2: Support of NTN for RedCap.

- **Study and if justified, specify coverage enhancement on DL and UL of NTN for RedCap.**



RedCap terminal connects to satellite

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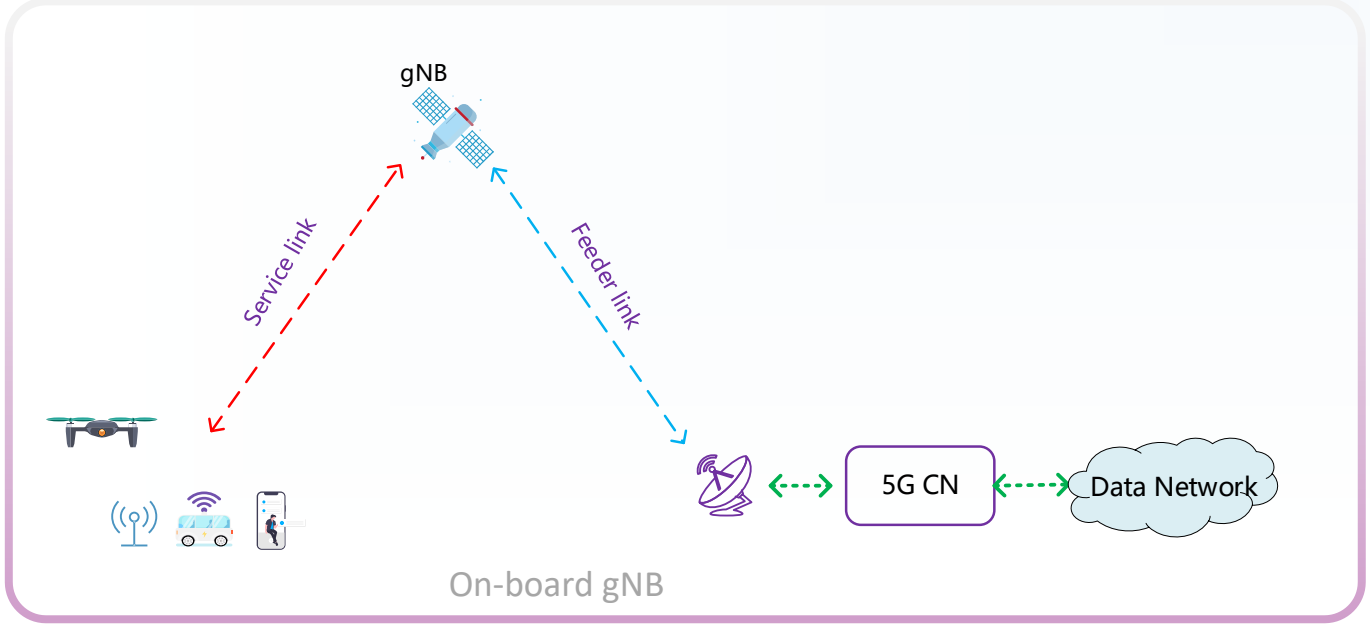
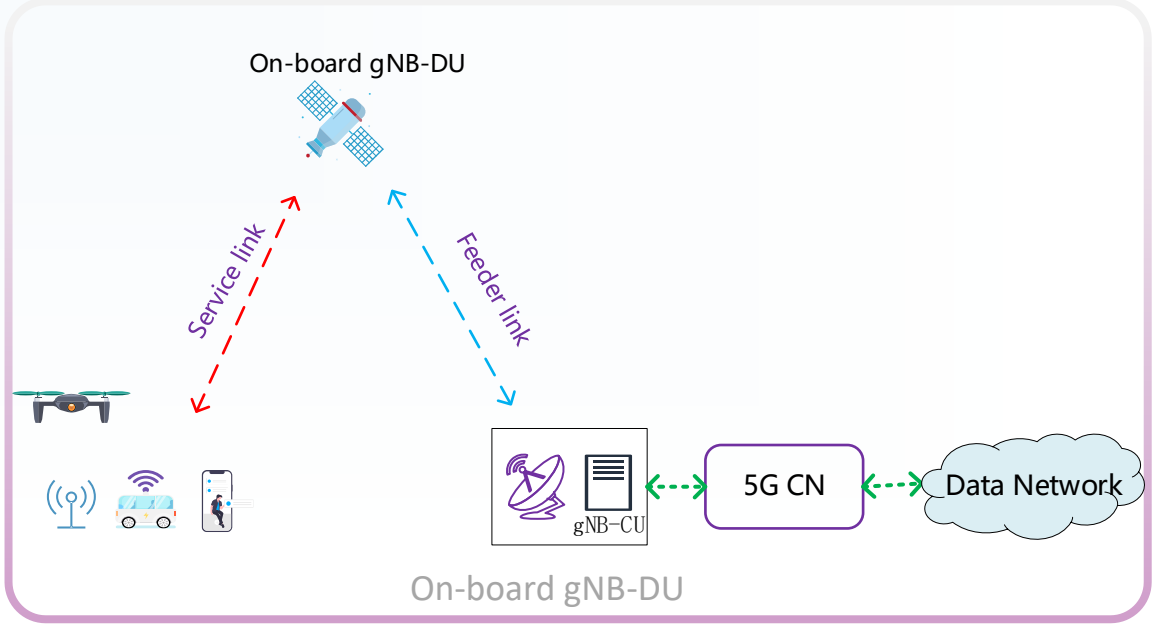
Motivation

- R17/R18 NTN focuses only on transparent payload. Re-generative payload has following advantages:
  - Reduced latency can be achieved if the gNB is located at satellite.
  - Low dependence on ground network and flexible network deployment.
  - ISL could make the resource coordination between the gNBs more efficient, e.g., handover and other cases.

Proposal 3: Support Re-generative payload.

- **Consider the case of full gNB on satellite with/without ISL.**
- **Consider the case of split CU-DU, e.g., on-board gNB-DU.**





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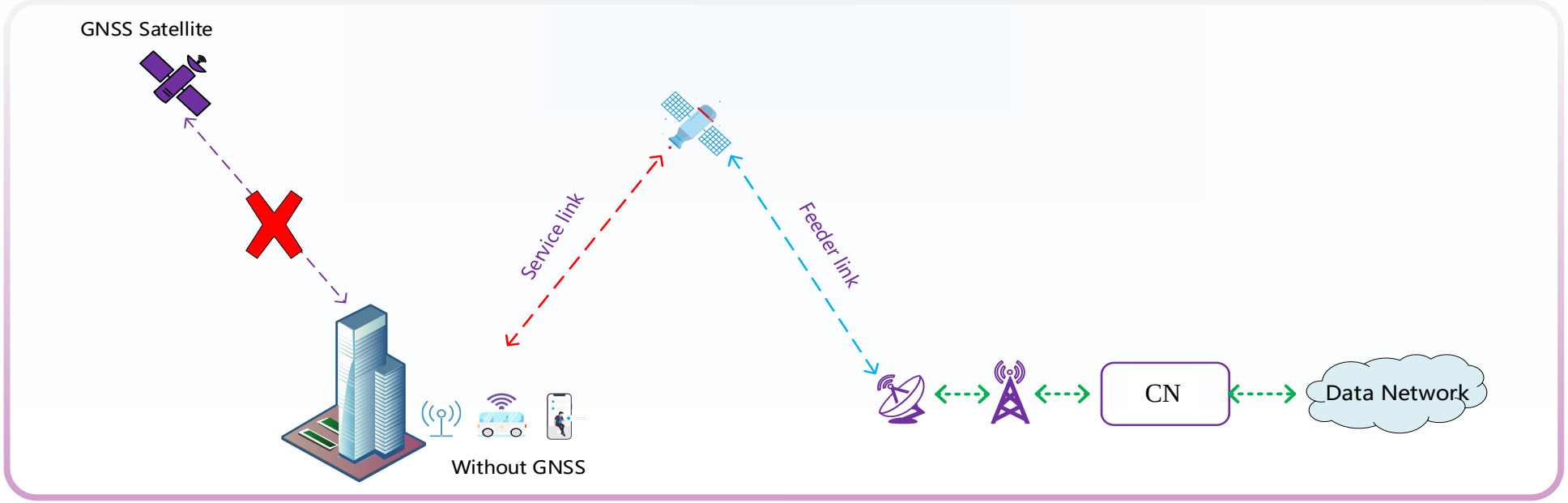
Motivation

- GNSS capability is one of the UE restrictions in Rel-17/Rel-18 NTN.
  - UE needs to use GNSS position information and ephemeris information to perform time-frequency synchronization.
- However, many UEs do not implement GNSS receiver or cannot use it in different contexts.
- GNSS independent operation is one of the use cases in R19 SA1 study.

Proposal 4: Study enhancements on time-/frequency synchronization for UE without GNSS.



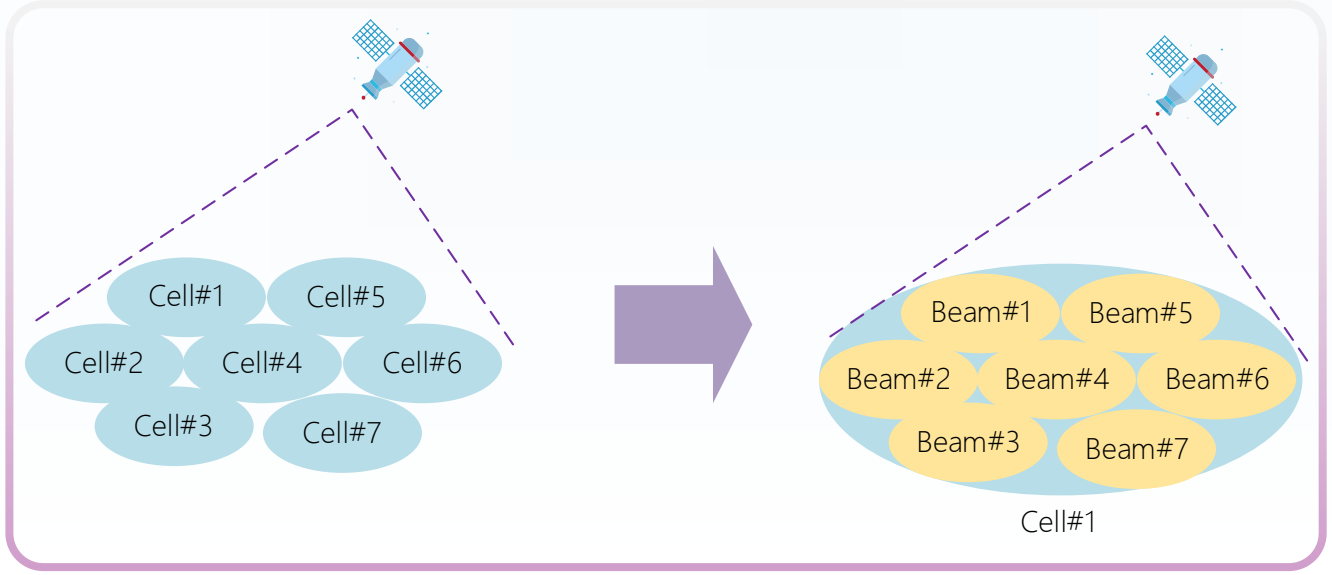
Evolution of NTN/IOT NTN in Rel-19

Motivation

- In Rel-17/Rel-18 IOT NTN, one beam corresponds to one cell.
  - In this case, UE requires frequent cell switching and causes frequent service interruption.
- In order to improve the system capacity of NB IoT, the existing NB IoT specification support multi carrier operation. A UE can be configured with up to 15 carriers.

Proposal 5: Support one cell corresponds to multiple beam in IOT NTN.

- **Support enhancements on multi-carriers operation to achieve beam switching in one cell.**



Thanks

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