

3GPP TSG RAN Rel-19 workshop

RWS-230272



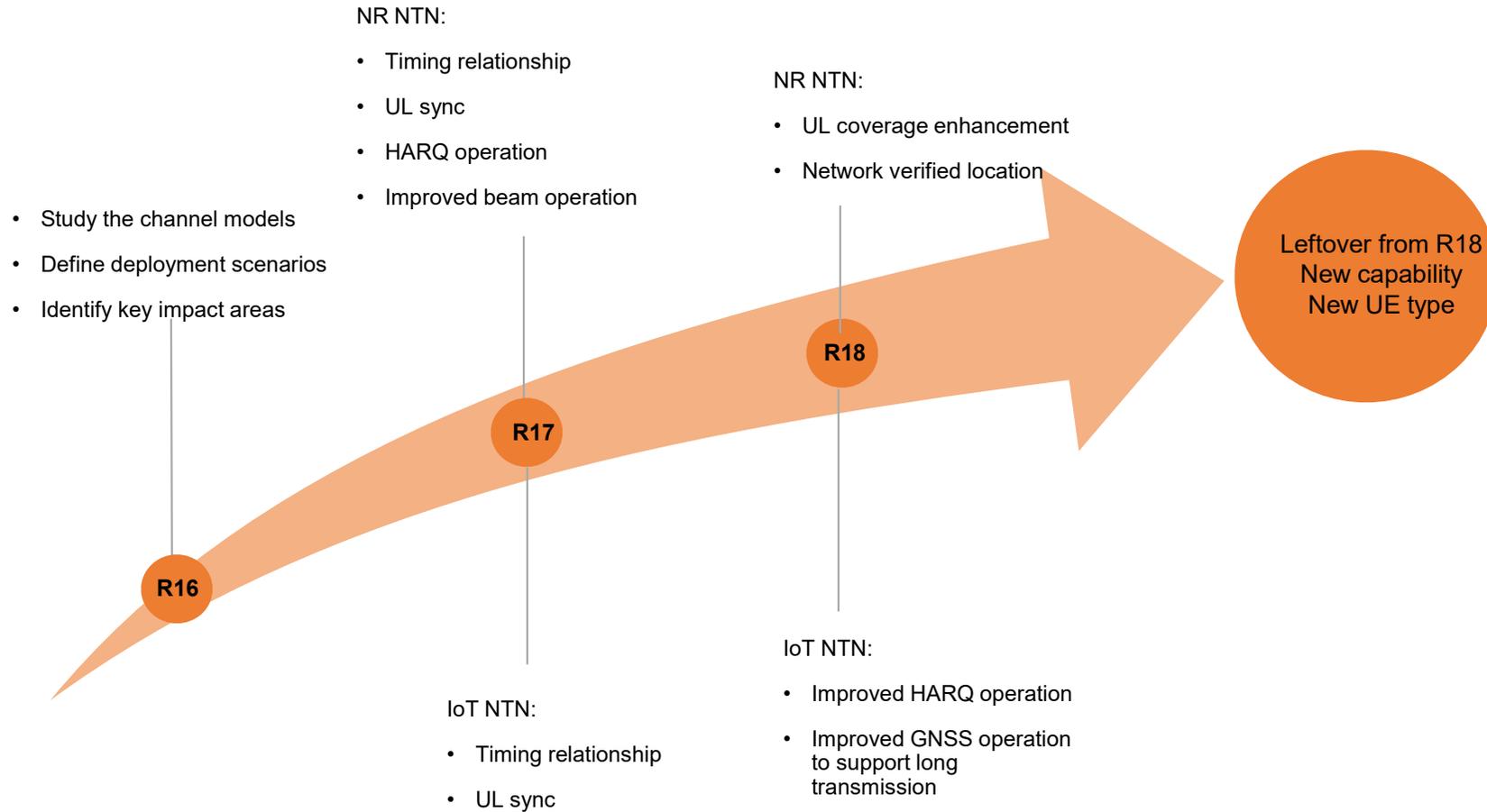
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Agenda Item:	5
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NTN enhancement in Rel-19



Evolution of NTN technologies for RAN





DL coverage enhancement for NR-NTN

Motivation to support DL coverage enhancement

- Multiple beams operation is typically assumed within one satellite depending on the service distribution
- DL power splitting may be needed among the beams

Potential working scope

- Investigate suitable assumptions and identify the DL coverage gap
- Specify potential solutions to improve the DL coverage at least for the PDCCH/PDSCH

Downlink channels	Margin when satellite transmission power reduction is not applied (dB)	Margin when satellite transmission power splitting among 16 beams
PDSCH for VoIP	-8.99 (8 repetition)	3.05(8 repetition)
PDSCH for 3kbps	-8.29 (8 repetition)	3.75(8 repetition)
PDCCH	-7.59 (16 AL)	4.45(16 AL)

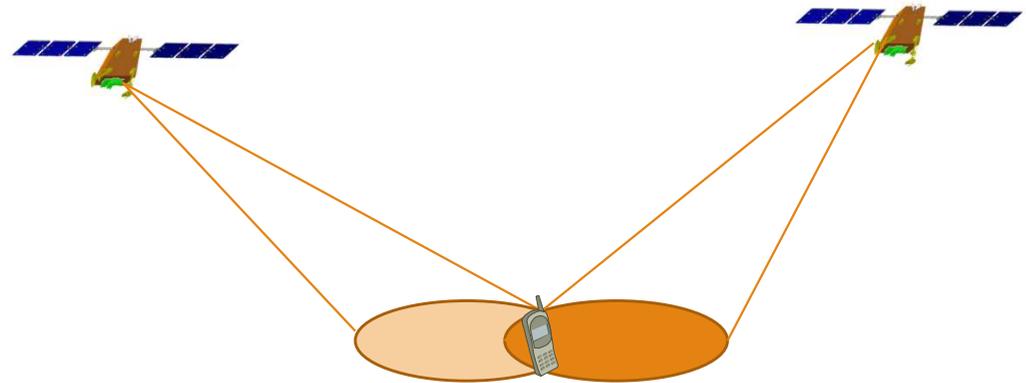
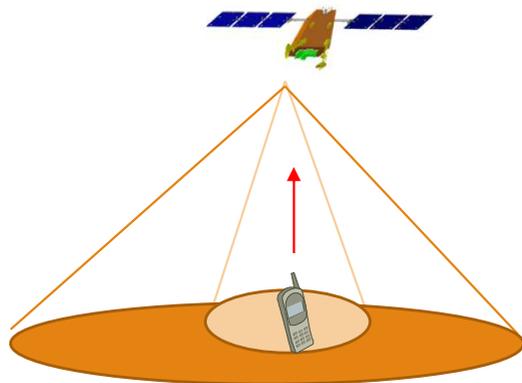
Multi-connectivity

Motivation to multi-connectivity

- Support attractive service that requires higher data rate
- Improve the reliability and mobility performance

Potential working scope

- Evaluate the air interface capability and identify the potential performance gap
- Specify the potential solutions supporting multi-connectivity to meet the service requirement
 - Enhanced beam management schemes to support multi-beam operation within one satellite.
 - Support CA/DC between NTN/NTN and NTN/TN



Others

NTN positioning

- GNSS availability/performance cannot be guaranteed in some scenarios
- Study the feasibility of Rel-16 RAT dependent positioning for NTN and specify the necessary changes to support positioning for NTN
 - NTN positioning with multiple satellites in view

NTN + Redcap

- Support HD-FDD Redcap operation for NTN

HPUE for NTN

- Study the adjacent channel co-existence with TN assuming HPUE (e.g, PC2 for UE supporting satellite access);
- Specify UE RF Tx requirements, e.g. UE maximum output power, power tolerance, MPR, ACLR

Regenerative payload

- Study CU-DU splitting in NTN and F1 over SRI
- Study IAB architecture in NTN and F1 over Uu

Further enhancement to IoT-NTN

Store and forward operation

- In Rel-19, SA1 discussed the use cases on Store and forward satellite operation, under “S&F satellite operation” mode, the end-to-end exchange of signalling/data traffic is now handled as a combination of two steps not concurrent in time (Step A and B).
 - In Step A, signalling/data exchange between the UE and the satellite takes place, without the satellite being simultaneously connected to the ground.
 - In Step B, connectivity between the satellite and the ground network is established so that communication between the satellite and the ground network can take place.
- The S&F satellite operation is especially suited for the delivery of delay-tolerant/non-real-time IoT satellite services with NGSO satellites.

Potential working scope

- Specify the possible indication mechanism of store and forward operation
- Support the mechanism to configure and provision specific required QoS and policies for S&F operation
- Support integrity protection and confidentiality for communications between an authorized UE and the network



Thanks