



3GPP TSG RAN Rel-18 workshop
Electronic Meeting, June 28 - July 2, 2021
Agenda Item: 4.2
Source: Apple

RWS-210501

NR NTN Enhancement in Rel-18

NTN | Background

- Rel-15 NTN SI (summarized in TR 38.811)
 - Channel model and deployment scenarios
- Rel-16 NTN SI (summarized in TR 38.821)
 - Physical layer control procedures
 - Uplink timing advance/RACH procedure
 - Retransmission mechanisms
 - Layer 2 aspects due to large propagation delay
 - Handover and dual connectivity
- Rel-17 NTN WI
 - Timing relationship enhancements
 - Uplink time and frequency synchronization
 - HARQ enhancements
 - MAC/RLC/PDCP timers
 - Handover and cell re-selection
 - Assumptions
 - UE with GNSS capabilities; Transparent payload
 - Focus on FDD; Both earth fixed cells and earth moving cells



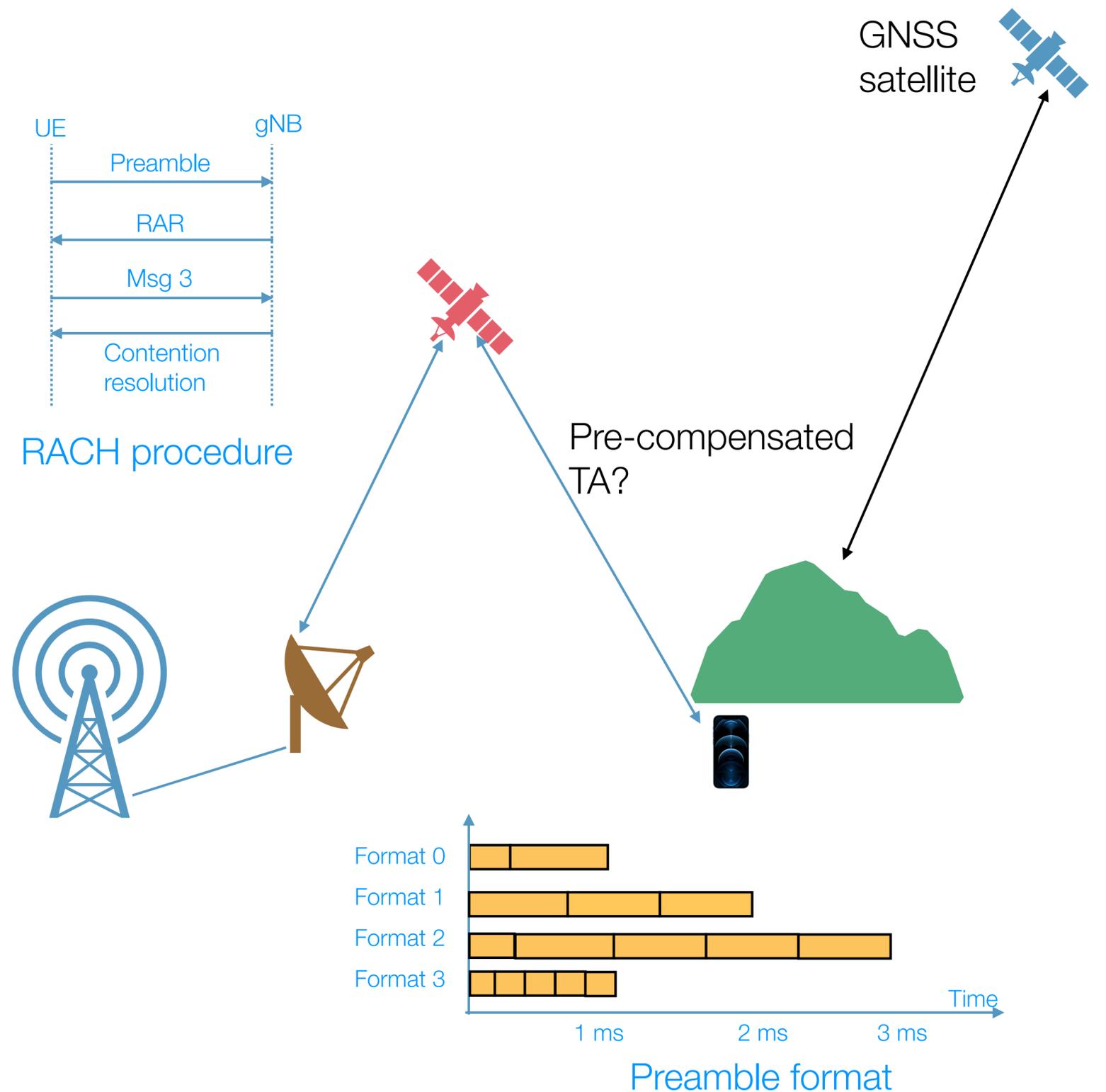
NTN | Non-GNSS Operations

■ Justification

- R17 NTN assumes UE has GNSS capability
- Uplink time and frequency synchronization is based on UE's GNSS location and satellite ephemeris
- UE may not always receive GNSS signals due to
 - Power saving
 - GNSS measurement gap
 - Infeasible GNSS signal

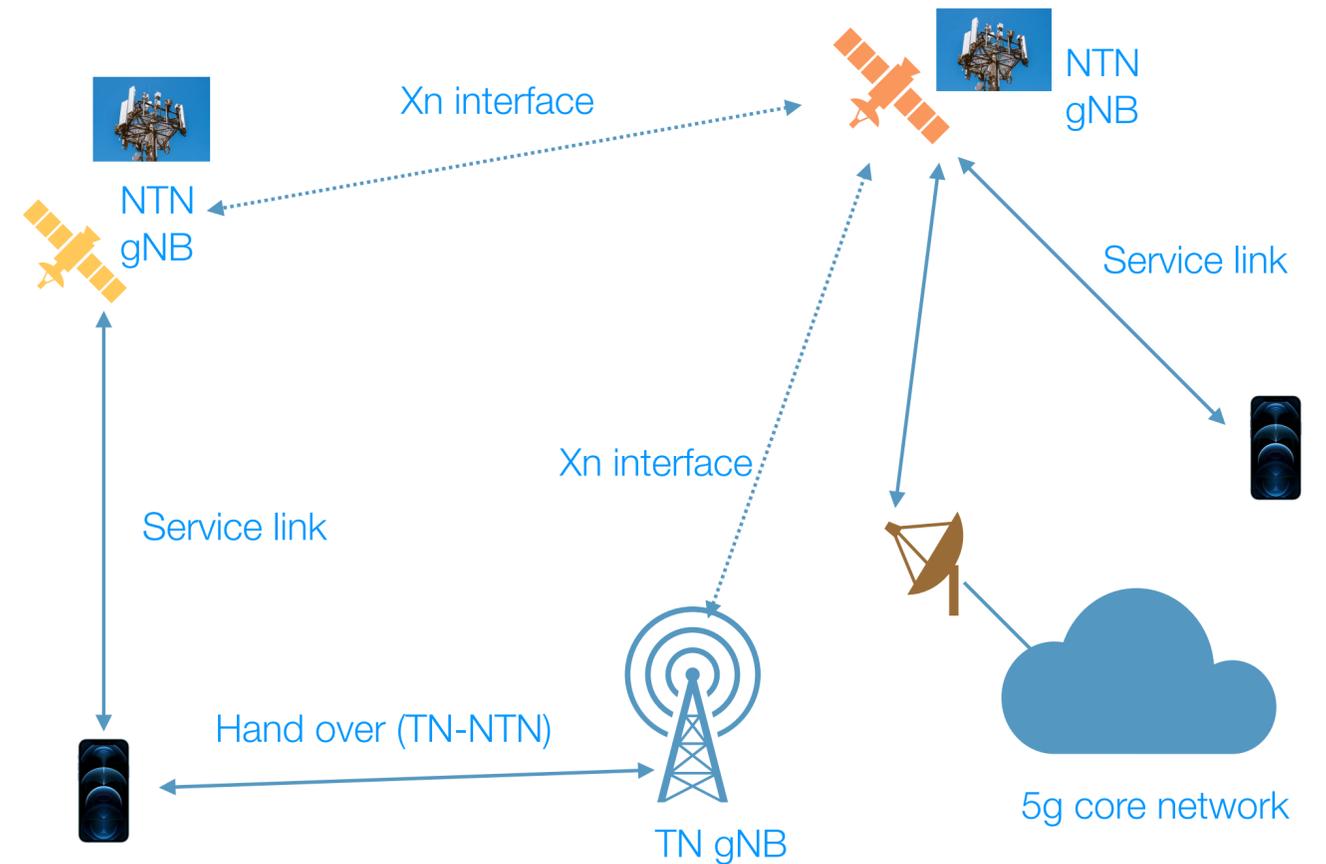
■ Objectives

- Uplink synchronization in RRC idle mode
 - RACH enhancement
- Uplink synchronization in RRC connected mode
 - Time and frequency maintenance enhancement



NTN | Regenerate Satellite

- Justification
 - R17 NTN focuses only on transparent satellite
 - Future NTN deployment may lean on regenerate satellite
 - Reduced latency can be achieved if the gNB is located at satellite
- Objectives
 - TN-NTN handover
 - Satellite mobility will cause additional handover synchronization with TN gNB
 - Uplink time and frequency synchronization
 - Timing relationship



NTN | Beam Management

- Justification
 - R17 NTN supports single beam per cell and multiple beams per cell
 - If frequency reuse is used to avoid inter-beam interference, neighbor satellite beams use different BWPs
- Objectives
 - Beam-specific BWP framework
 - Association between beam and BWP
 - Joint uplink/downlink beam switching or control/data beam switching
 - Beam measurement enhancement
 - Advanced beam switching schemes
 - Predictable beam switching (e.g., timer based)
 - Group-based beam switching

