



3GPP TSG RAN Meeting #102

Edinburgh, Scotland, December 11 - 15, 2023

Agenda Item: 10.1.2.1

Source: Apple

RP-233169

Views on IoT NTN Evolution in R19

Rel-19 IoT NTN | Topic 1: Uplink Capacity Enhancement

- **Justification:**

- Uplink coverage is ensured with multiple repeated transmissions
 - Multiple repetitions reduces system capacity
- Higher signaling overhead for UL transmission limits the UL system capacity
 - NR Two-step RACH and smaller data transmission alike schemes are beneficial to signaling overhead reduction

- **Objective:**

- Specify PUSCH enhancement to increase system capacity, including [RAN1, RAN2]
 - Procedure and signaling related to use Orthogonal Cover Code
- Specify PUR/EDT enhancement procedure and signaling
 - Support PUSCH associated with PRACH transmission in the random access procedure [RAN1, RAN2]



- **R18 status**

- RAN2 sent an LS (R2-2311326) to SA2/CT1 on UE location reporting in NAS signaling (with NAS security protected) for NB-IoT UE with Control Plane solution.
- SA2 and CT1 seems to have a willingness to support it in Rel-18.
- **Observation: UE location reporting issue has a good chance to be resolved by SA2/CT1 in Rel-18.**

- **Further work in Rel-19**

- Pending on SA2/CT1 progress, RAN can further discuss UE location reporting for NB-IoT UE as an Rel-19 objective.

Rel-19 IoT NTN | Topic 3: Store & Forward

■ R18 status

- Only supports transparent payload.

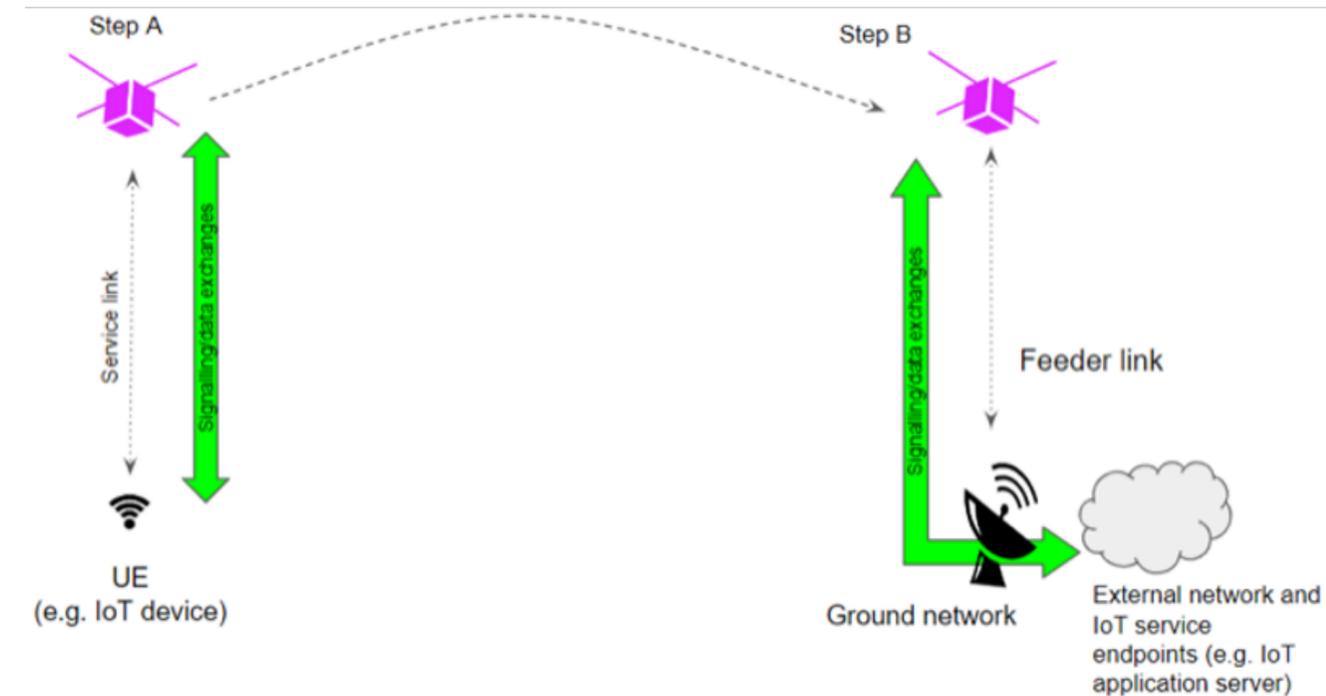
■ R19 Justification

- Delay-tolerant, non-real-time IoT NTN services to be offered in areas visited by the satellites but with no need to have NTN gateway infrastructure (e.g. mid-sea, remote areas)
- Allows service link access to continue to be operational when the feeder link is not connected

■ R19 Objective

- Specify Store & Forward framework
 - S&F mode indication, identification and handling at UE [RAN2]
 - Signaling procedure to support S&F mode [RAN2]
 - Interaction with CN when NW operates in S&F mode [RAN3]

Note: RAN work is tightly correlated to SA2/CT1 progress.



- **Proposed objectives for Rel-19 IoT NTN**
 - **Objective 1: UL capacity enhancement [RAN1, RAN2]**
 - Specify PUSCH enhancement to increase system capacity
 - Procedure and signaling related to use Orthogonal Cover Code
 - Specify PUR/EDT enhancement procedure and signaling
 - Support PUSCH associated with PRACH transmission in the random access procedure
 - **Objective 2: Store and forwarding [RAN2, RAN3]**
 - Specify Store & Forward framework
 - S&F mode indication, identification and handling at UE [RAN2]
 - Signaling procedure to support S&F mode [RAN2]
 - Interaction with CN when NW operates in S&F mode [RAN3]
- **UE location reporting for NB-IoT**
 - Pending on SA2/CT1 progress, RAN can further discuss UE location reporting for NB-IoT UE as an Rel-19 objective.

