**3GPP TSG-RAN WG3 #112-e R3-21xxxx**

**17 – 28 May 2021**

Title: [DRAFT] Reply LS on UE location aspects in NTN

Response to: LS on UE location aspects in NTN (R3-211418/R2-2102055)

Work Item: NR\_NTN\_solutions-Core, 5GSAT\_ARCH

Source: Qualcomm Incorporated [to be RAN3]

To: RAN2, SA2, SA3-LI, SA3, CT1

Cc:

**Contact Person:**

Name: Luis Lopes

Tel. Number:

E-mail Address: llopes@qti.qualcomm.com

**Send any reply LS to: 3GPP Liaisons Coordinator,** **mailto:3GPPLiaison@etsi.org**

Attachments: None

**1. Overall Description:**

RAN3 would like to thank RAN2 for the received LS on UE location aspects in NTN, and also SA2 and SA3-LI for their replies already received.

Regarding the questions posed in the LS:

* **Question 1: RAN2 would like to ask RAN3, SA3-LI and SA2 to confirm whether the current functionality identified above is sufficient for use in Non-Terrestrial Networks including initial registration procedure.**

**Answer from RAN3**:

RAN3 understands from the RAN2 response that only serving cell ID and TAC(s) would be available at access.

Regarding ULI in the INITIAL UE MESSAGE (and other uplink messages before AS security), RAN3 assumes that the gNB might not always be able to provide a CGI with location granularity similar to TN, and that this is acceptable at system level. Regarding NNSF (and e.g. country selection), RAN3 understands that there may be cases where the NG-RAN is not able to select the correct CN at access without more precise location information, and this would need to be corrected later by the NG-RAN or the CN. Minimizing the number of actions (e.g. by providing some level of additional location information at access) seems useful if at all possible, and RAN3 would like to RAN2 to check such feasibility.

After AS security is setup, RAN3 understands from the RAN2 LS that the NG-RAN will be able to obtain the UE’s location information (e.g. GNSS information) on demand, and thereby construct the CGI in ULI.

**Question 1: RAN3 would like to ask SA2 to confirm its assumption that a “rough” CGI in the ULI is acceptable before AS security is set up.**

**Question 2: RAN3 would like RAN2 to confirm whether the gNB will be able to acquire UE location information (e.g. based on GNSS) after AS security, and also to confirm whether it is possible to provide any level of UE location information (below NTN cell) before AS security.**

In addition to the above, RAN3 would like to draw RAN2’s attention to the scenario in which a RRC\_CONNECTED UE moves across a country border but remains in the same NTN cell. To enable triggering of the N2-based Handover to change the AMF, RAN3 agreed that the gNB is expected to know when the UE moves across the country border (to some reasonable level of precision), in case the serving NTN cell serves more than one country. This is linked to a requirement in TS 23.502. RAN3 assumes that this scenario may be covered by functionality needed for CGI mapping.

**Question 3: RAN3 welcomes any feedback from RAN2 on whether the functionality for acquisition of UE location information may be used in the described case (triggering inter-AMF handover at country border).**

RAN3 has also considered the related question of TAC reporting in the ULI, taking into account RAN2’s agreement to support soft TAC update. RAN3 sees two possible ways to set the TAC sent to the CN in ULI, i.e.:

1. The broadcast TAC in the serving cell
2. A location-based TAC (e.g. based on actual geographic location of the UE and CGI/TAC configuration)

The first option may not be possible with soft TAC update, but the second option may result in intermittent inconsistency between the TAC in ULI and the UE’s Registration Area. However RAN3 assumes that either option is valid and could be configured without need for signalling (i.e. to make the AMF aware of how the TAC was constructed).

**Question 4: RAN3 requests SA2 and CT1 to provide any feedback on the above i.e. support of both options for TAC reporting. To avoid a new ULI indication, would SA2 and CT1 agree that one option only (option 1 or option 2) can always be configured in NG-RAN for a PLMN?**

**2. Actions:**

**To RAN WG2, SA WG2 SA WG3-LI, SA WG3 and CT WG1**

**ACTION:** RAN3 kindly asks the above groups to take the above information into account, and RAN WG2, SA WG2 and CT WG1 to provide feedback on the questions raised in this LS.

**3. Date of Next RAN3 Meetings:**

RAN3#113-e 16-27 August 2021 Electronic meeting