**3GPP TSG-RAN WG3 #109-e R3-20xxxx**

**17 – 28 August 2020**

Title: [DRAFT] Reply LS on SA WG2 assumptions from conclusion of study on architecture aspects for using satellite access in 5G

Response to: LS on SA WG2 assumptions from conclusion of study on architecture aspects for using satellite access in 5G (SP-2004688/R3-204616)

Release: Release 17

Source: Qualcomm Incorporated [to be RAN3]

To: SA2, RAN2, CT1

Cc:

**Contact Person:**

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

Attachments: None

**1. Overall Description:**

RAN3 would like to thank SA2 for the LS on assumptions after conclusion of the study on architecture aspects for using satellite access in 5G.

Regarding the question posed by SA2, RAN3 has initiated its work on the related release 17 work item, which targets both GEO and LEO systems (the latter comprising both earth-fixed and moving cell scenarios). RAN3 expects to further study this topic in conjunction with RAN2 during release 17 but can offer the following initial considerations.

The cell ID provided to the core network may be sent from the UE (e.g. in signalling related to emergency call) or from the RAN. The latter case (in scope of RAN3) includes particularly signalling within the User Location Information (ULI), which is present in many uplink NGAP messages. In GEO and fixed-earth cell LEO scenarios, the interaction between RAN and CN should be very similar to terrestrial systems, and the information in the ULI should be handled in the same way.

On the other hand, in LEO scenarios with moving cells, the cell identities as broadcast may not map to fixed geographical areas. Several solutions have so far been identified for this issue and below provides a non-exhaustive list of these:

* Solution 1: CN ignores moving cell ID (uses only TA, which is earth-fixed)
* Solution 2: CN receives moving cell ID and maps it to a geographical area using a time stamp (this may be done within the CN, or a new procedure defined to enable CN to request mapping from RAN)
* Solution 3: CN receives virtual fixed cell ID which is configured (conversion of moving cell ID or UE location to a virtual cell ID is performed by the RAN)
* Solution 4: CN receives “cell ID”, however this legacy information element contains (or encodes) the coordinates of a geographical area (e.g. based on UE x,y coordinates when available and an uncertainty) – alternatively such coordinates could be added as a new information element, depending on the interface.

Note that the discussion is so far preliminary, and there is as yet no consensus in RAN3 that a solution is needed.

Solutions 3 and 4 can provide additional granularity compared to solutions 1 and 2, while solution 3 has the least impact in the CN. RAN3 however is not sure that UE reporting would be able to support these solutions, even if the UE is able to determine its position (for example, for Solution 3, the UE would need to be aware of the virtual cell mappings). RAN3 is also unsure whether Solutions 1 and 2, which have lower granularity, can necessarily always support regulatory services and other services (e.g. UE charging) which may require accurate location related information. Therefore, RAN3 will wait for RAN2 progress and feedback from SA2 before making any further progress on this topic.

RAN3 would thus like to ask SA2 the following questions in order to further clarify requirements from a CN perspective:

Q1: Are solutions with higher granularity (than e.g. the cell coverage of a non-terrestrial cell) considered preferable, or essential?

Q2: From perspective of 5GCN impact, would SA2 find acceptable solution(s) (e.g. Solution 2) that require further processing or mapping of the CN-received cell ID to location information of the UE based on known/ predictable ephemeris of a satellite trajectory?

Q3: From perspective of 5GCN impact, is it acceptable to enhance the existing signalling with new IEs (whether in the ULI or in other signalling received by the CN)?

Q4: Would SA2 expect (or prefer) that the related UE-generated information elements be the same as those sent from the NG-RAN (e.g. in ULI)?

**2. Actions:**

**To** **SA WG2, RAN WG2, and CT WG1 groups.**

**ACTION:** RAN3 kindly asks SA WG2, RAN WG2, and CT WG1 to take the above information into account, and inform RAN3 of further progress on this topic.

**ACTION:** RAN3 kindly asks SA WG2 to address the questions in this LS.

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

RAN3#110-e November 2020 Electronic meeting