**3GPP TSG-RAN WG2 Meeting #117 electronic *R2-2203570***

**Online, February 21st – March 3rd, 2022**

**Agenda Item: 8.10.3.1.1**

**Source: Thales**

**Title: Summary of [AT117-e][115][NTN] UE location in connected mode (Thales)**

**Document for: Discussion and Decision**

# Introduction

This document aims to summarize the following discussion.

** [AT117-e][115][NTN] UE location in connected mode (Thales)**

Scope: Discuss offline whether coarse UE location info can be sent in connected mode without user consent

Initial intended outcome: Summary of the offline discussion

Deadline (for companies' feedback): Thursday 2022-03-03 0300 UTC

Deadline (for rapporteur's summary in R2-2203570): Thursday 2022-03-03 0500 UTC

# 1st round discussion

In its LS response (see [1]),

* *“…. SA2 informs RAN2 and RAN3 that SA2 has no plan to consider any way for providing the LMF/LCS UE location info obtained by AMF back to RAN.*
* *SA2 hypothesis is that the NG-RAN receives a location from the UE after AS security is established, maps that location to a CGI and then sends the CGI as part of the ULI to the AMF.”*

Therefore, in [2] the following has been proposed:

* *Proposal 1: UE to report its coarse GNSS coordinates immediately after AS security/connected mode is established.*

During the GTW session held 1st March 2022 on NTN (see RAN2#117-e chair’s notes), the following was discussed

Proposal 1 UE to report its coarse GNSS coordinates immediately after AS security/connected mode is established.

-       Thales clarifies that the proposal is to send the coarse UE location information.

-       Apple thinks we still need user consent and the UE location info from the UE cannot be trusted. Mediatek agrees

-       QC thinks the user consent in sending the coarse UE location could be implicit

**  RAN2 reconfirms that, in connected mode, UE location information can be sent to the NG-RAN. FFS if full UE location information based on user consent or coarse UE location information.**

**  Discuss offline whether coarse UE location info can be sent without User Consent**

## 2.1 Coarse UE location and User consent ?

**Question 2.1: Whether this coarse UE location information sending in connected mode require user consent and if yes, provide detailed justification ?**

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| --- | --- | --- |
| **Company** | **Yes/no** | **Comments** |
| Thales | No | Given that the information is sent once AS security is activated. It is no longer a privacy issue.  In TN, NG-RAN knows the Cell Id in which the UE is located. Hence, in NTN, the NG-RAN will know the coarse UE location information with the same granularity as typical TN cells in rural areas (e.g. ~2 km)  About the trust question: If the UE purposely report a false UE information, this will impact the service efficiency (e.g. emergency call) and hence it would be detrimental for the user. |
| MediaTek | Yes | Sending location information without user consent should not be supported. UE should not be forced or mandated to send the location information. |
| OPPO | Yes | How RAN2 can determine that whether the coarse UE location information sending in connected mode requires user consent without the input of SA3/SA3-LI?  In our understanding, unless SA3/SA3-LI could confirm that, we should consider that even for coarse UE location sent in connected mode the user consent is still required. |
| vivo | Yes, or up to other WGs | We tend to share MediaTek’s and OPPO’s views. We are also rather confused on how RAN2 can decide the user consent related aspects. For safety, at least RAN2 cannot conclude “Not needed” on our own. |
| Huawei，HiSilicon | Yes | It is not up to RAN2 to decide. Without input from SA3, we should assume user consent is required to send coarse location. We can send an LS to SA3 if necessary. |
| Qualcomm | Yes/No | We think whether the user consent is needed depends on the local jurisdiction and its regulations. The user consent does not have to be the new procedure SA3 is working on. It can be achieved by other means.  For example, the user consent (Y/N) could be provided by the AMF the same as the satellite RATs which are allowed for the UE.  Alternatively, the user consent requirement can be met via provisional means, e.g. per gNB/NTN-GW configuration (consent granted for all UEs subscribing for NTN) based on the service-level agreement between the operator and its NTN subscribers. SA3 has nothing to do here.  As per SA2 reply, gNB would not be able to obtain UE location using existing LCS protocol. In case, SA3 won’t finish working on new procedure for user consent in Rel-17 and we do nothing in RAN2, we risk gNB not having UE location information to make NTN work properly. |
| Samsung | Yes | User consent maybe needed even after AS security is established. Similar to the case of MDT where we still need a user consent. we also agree that an LS to SA3 asking/confirming the need for user consent in this case could be useful |
| CATT | Yes | Agree with that it is not up to RAN2 to decide.  And we think we cannot assume there is no longer privacy issue even the AS layer security has been activated, it is very different thing. |
| Apple | Yes | User consent is the responsibility of SA3. In their LS (S3-214349/R2-2200148), SA3 has clearly indicated that NTN specific user consent is required “before gNB can configure the UE to report the UE location information”. Subsequently we sent an LS to SA3 asking about subscription-based user consent (R2-2201754), to which SA3 has not yet responded. We believe that the user consent issue applies to both fine and coarse UE location. Given that the RAN2 agreement on UE location reporting was conditional on SA3 approval, we do not think it is appropriate to decide on our own without taking into consideration the negative feedback from SA3. We should also wait and see what SA3 has to say about user consent in the near future.  In Rel-18, RAN2 is slated to study network verified UE location and SA3 is likely to study user consent aspects including NTN. We would prefer for those studies to be completed before discussing UE location reporting in AS layer. |
| Xiaomi | Yes | Acquiring UE location without user consent should be avoided, no matter it is coarse location or not. We are ok to send LS to SA3 to confirm this. Besides, if SA3 cannot finish user consent in R17, we should ask that if it is possible user consent is directly configured at gNB instead of acquiring it from UDM. |
| Nokia | Yes | We understand that SA3 had indicated that user consent is needed for any type of UE location reporting (no matter if it is coarse or not). We agree, NW needs this information as quickly as possible, but we also acknowledge that SA3 should make their decisions (we hope they will still respond to our last-meeting’s LS). |

**[Rapporteur summary]:**

Most companies consider that even for coarse UE location sent in connected mode, the user consent is still required unless SA3/SA3-LI states otherwise.

The moderator would like to note that if user consent is needed for UE to send a coarse UE location in NTN, then user consent should also be needed for the reporting of cell Id in TN, since they have similar granularity.

Therefore the moderator suggests

**Proposal 1: Upon network request, after AS security/connected mode is established, a UE can report its coarse UE location information (GNSS coordinates) to the NG-RAN. A possible reported value could refer to "no coarse GNSS location available" (which the UE can set if it cannot/does not want to provide its coarse GNSS coordinates)**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree/Disagree** | **Comments/Suggestions** |
| Thales | Agree |  |
| ESA | Agree |  |
| Omnispace | Agree |  |
| Sateliot | Agree |  |
| GateHouse | Agree |  |
| Intelsat | Agree |  |
| Eutelsat | Agree |  |
| ZTE | Agree with one more sentence added | **Proposal 1: Upon network request, after AS security/connected mode is established, a UE can report its coarse UE location information (GNSS coordinates) to the NG-RAN. A possible reported value could refer to "no coarse GNSS location available" (which the UE can set if it cannot/does not want to provide its coarse GNSS coordinates). RAN2 can reconsider/remove this agreement in the next meeting, if confirmation will be received that NTN specific User Consent for sending fine UE location information (full GNSS coordinates) will be available in Rel-17.** |

**[Rapporteur summary]:**

On the basis of the above feedbacks, the moderator suggests

**Proposal 1: Upon network request, after AS security/connected mode is established, a UE can report its coarse UE location information (GNSS coordinates) to the NG-RAN. A possible reported value could refer to "no coarse GNSS location available" (which the UE can set if it cannot/does not want to provide its coarse GNSS coordinates). RAN2 can reconsider/remove this agreement in the next meeting, if confirmation will be received that NTN specific User Consent for sending fine UE location information (full GNSS coordinates) will be available in Rel-17.**

## When to send the UE location information ?

There could be two options for the sending of the UE location information to the NG-RAN:

Option 1: Immediately after AS security/connected mode is established and then periodically (FFS period). The sending would be enabled/disabled by the operator by RRC dedicated configuration on a per-UE basis

Option 2: Upon specific request from NG-RAN (via RRC command)

**Question 2.2: Which option, do companies prefer?**

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| --- | --- | --- |
| **Company** | **Opt1/Opt2** | **Comments** |
| Thales | Opt1 or Opt2 | What matters is that an accurate CGI determination in ULI for PDU session establishment is mandated for efficient service set-up (e.g. emergency call) |
| MediaTek | Neither | NG-RAN can get it from Core Network. UE can use NAS message to send it to the network. NAS messages are typically security-protected. |
| OPPO | Neither | Both options require user consent and we should wait for SA3’s response. |
| Vivo | Neither | A new feature introduced at this late stage is not preferred. |
| Huawei, HiSilicon | Neither | Postpone the discussion as this relies on the output of Question 2.1. |
| Qualcomm | other | This was already agreed that the UE’s GNSS location report can be piggybacked by measurement report using existing mechanism.  Same mechanism can be used.  As per SA2 reply, gNB would not be able to obtain UE location using existing LCS protocol. So this is not true that NG-RAN can get it from core network. |
| Samsung | Option 2 or event triggered |  |
| CATT | Neither |  |
| Apple | Neither | UE location is user private information that needs to be carefully protected. We do not think SA2 reply mandates sending UE location in RRC Connected. They seem to have been merely repeating a statement in the LS we sent (note the term “hypothesis”). |
| Xiaomi | Option 1, Other | Event trigger or periodic if gNB has user consent |
| Nokia | Option 2 | NW should configure the UE, e.g. with event-triggered reporting. |

**[Rapporteur summary]:**

Qualcomm recalls a previous agreement that the UE’s GNSS location report can be piggybacked by measurement report using existing mechanism

Some companies suggests that the UE be configured with event-triggered reporting, to send the UE location

Other companies would like to postpone the discussion when SA3 will provide its response to RAN2 on User consent.

Assuming, user consent issue is mitigated by the new proposal related to question 2.1, leveraging the previous agreement that the UE’s GNSS location report can be piggybacked by measurement report using existing mechanism, appears the most reasonable way forward

It should also be noted that NG-RAN cannot obtain the UE location info exchanged at NAS level.

## 2.3 What format for the UE location information to be sent ?

**Question 2.3: What format for the coarse UE location information to be sent to NG-RAN, do companies prefer ?**

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| --- | --- |
| **Company** | **Comments/Suggestions** |
| Thales | The UE location information could correspond to the 24 bits of longitude/latitude of GNSS coordinates.  If coarse UE location is adopted, X MSB bits out of the GNSS coordinates could be selected corresponding to ~2km granularity |
| Huawei, HiSilicon | Postpone the discussion as this relies on the output of Question 2.1. |
| Qualcomm | RAN2 has already agreed the definition of coarse location information. Further change to this can be dependent on the previous question. |
| Samsung | Reuse commonLocationInfo as RAN2 has agreed UE location report can be piggybacked by existing measurement report configuration. |
| Xiaomi | Same view as QC and samsung |
| Nokia | We do not think coarse location is essential in connected (more accurate location info can be reported). In any case, we have made some decisions for coarse location also (using MSB of longitude/latitude) |

**[Rapporteur summary]:**

Leveraging the existing agreements defining (MSB of GNSS longitude/latitude) and reporting the coarse UE location information (reusing commonLocationInfo piggybacked by existing measurement report configuration) appears the most reasonable way forward.

# 3. Summary and Proposals

On the basis of the above feedbacks, the moderator suggests

**Observation: NG-RAN cannot obtain the UE location info exchanged at NAS level**

**Proposal 1: Upon network request, after AS security/connected mode is established, a UE can report its coarse UE location information (GNSS coordinates) to the NG-RAN. A possible reported value could refer to "no coarse GNSS location available" (which the UE can set if it cannot/does not want to provide its coarse GNSS coordinates). RAN2 can reconsider/remove this agreement in the next meeting, if confirmation will be received that NTN specific User Consent for sending fine UE location information (full GNSS coordinates) will be available in Rel-17.**

**Proposal 2: If proposal 1 is agreed, leverage existing agreements on UE location information format (Most Significant bits of GNSS longitude/latitude) and reporting mechanism (reusing commonLocationInfo piggybacked by existing measurement report configuration)**

# 4. References

1. R2-2203829 (S2-2201540) LS Response to LS on UE location during initial access in NTN (Qualcomm)
2. R2-2203569 WF for UE location during initial access in NTN (Thales, Leonardo, Avanti, ESA, Sateliot , Omnispace, Novamint, Hispasat, Gatehouse, Hughes network systems, Inmarsat, Viasat, CTTC, Intelsat, Kepler, Ligado, Magister solutions, SES, Airbus)

# Contact information

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