3GPP TSG RAN #95-e
e-Meeting, March 17th – 23rd, 2022

RP-220200

On Network-verified UE location for NR NTN

Agenda Item:	9.3.2.7
Source:	Intel Corporation
Document for:	Discussion

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Introduction

- The following objective is captured in Rel-18 NR NTN WID [RP-213690]

4.1.3 Network verified UE location

Have a 1-TU 6-month study phase focusing on the following (to derive clear & limited scope):

Study detailed regulatory requirement for network-verified UE location, e.g. accuracy requirement (at RAN plenary, from RAN#95 to RAN#96). [RAN]

- Including further clarification on network verified UE location and its relationship to network-based positioning [RAN]
- Study and evaluate, if needed, solutions for network to verify UE reported location information [RAN2,RAN1,RAN3]

RAN to determine by RAN#98 whether the study has identified any need for Network verified UE location specification support in Rel-18.

Discussion (1/2)

- To comply with laws and regulations at least the following services shall be supported for NR NTN
  - Public Safety, Charging & Billing, Emergency calls, Lawful Interception, Data Retention
    - UE location information at the network is required for the above services
    - FCC mandate E911 [1]; E112 compliance for smartphones sold in the EU from March 2022 [2]
- According to TR 38.811 outdoor conditions and line-of-sight operations are assumed for the UE for communication via satellite
  - Existing positioning methods (e.g. A-GNSS) can achieve high accuracy in such conditions [3]
- Security aspects shall be also considered
  - Subject to regional or national regulatory requirements, the 5G system shall support mechanisms to protect the production of the user location information and user positioning-related data against tampering and spoofing [TS 22.261]
  - The location information reported to the LEMF shall be location information trusted by the 3GPP network (i.e. the location information is either 3GPP network derived or verified), if available [TS 33.126]

[1] Wireless Communications and Public Safety Act (911 Act), 911 and E911 Services, Federal Communications Commission (fcc.gov), released in 1999 with annual updates, www.fcc.gov/general/9-1-1-and-e9-1-1-services;
[2] Guidelines for compliance with delegated regulation (EU) 2019/320, European Commission, April 2021, https://ec.europa.eu/docsroom/documents/45707;
[3] GNSS interference threats and countermeasures (GNSS technology and applications) (English edition), F. Dovis, Artech house publishers, February 2015;

Discussion (2/2)

- According to S3i210282 A-GNSS positioning method is not reliable
  - SA3LI notes that any method which relies solely on UE-generated location information is unlikely to be considered reliable for network selection purposes. Therefore, a method such as GNSS/A-GNSS cannot be considered as reliable or trusted unless the information provided by the UE can be verified by the network. [S3i210282]
- In order to verify location information derived via an unreliable method network-based positioning shall be used
  - UE-assisted LMF-based (e.g. DL-TDOA, DL-AoD, NR E-CID, Multi-RTT)
  - NG-RAN node assisted methods (e.g. UL-TDOA, UL-AoA)
- It can be assumed that accuracy for network verification should be comparable to terrestrial network cell sizes [based on S3i210282]
  - S3i210282 considers positioning for purposes such as CN selection, lawful interception, etc and not accurate user positioning for E911/E112 purposes.
    - UE based A-GNSS remains an acceptable positioning method to meet these purposes

Conclusion

- The following proposal is made based on the discussion in this document

Proposal:

- *Network-based positioning is used in order to verify UE location information*
  - *Consider UE-assisted LMF-based and NG-RAN node assisted positioning methods*
  - *Accuracy should be comparable to terrestrial network cell sizes*
- *Study should evaluate these methods in NTN environment to determine if desired accuracy can be met*

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