**3GPP TSG-SA3 Meeting #106-e *S3-220281-r2***

e-meeting, 14 - 25 February 2022 (revision of S3-yyxxxx)

**Source: Xiaomi, Apple, China Mobile, CATT, Huawei, Hisilicon, InterDigital, LGE, Philips, vivo, ZTE, Lenovo, Motorola Mobility, Ericsson, Nokia, Nokia Shanghai Bell**

**Title: New SID on Security Aspects of Ranging Based Services and Sidelink Positioning**

**Document for: Approval**

**Agenda Item: 4.18**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

Title: Study on Security Aspects of Ranging Based Services and Sidelink Positioning

Acronym: FS\_Ranging\_SL\_Sec

Unique identifier: TBD

Potential target Release: Rel-18

# 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  | X | X | X |  |
| No |  |  |  |  |  |
| Don't know | X |  |  |  | X |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

|  |  |
| --- | --- |
|  | Feature |
|  | Building Block |
|  | *Work Task* |
| X | Study Item |

## 2.2 Parent Work Item

For a brand-new topic, use “N/A” in the table below. Otherwise indicate the parent Work Item.

|  |
| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
|  |  |  |  |

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work /Study Items (if any) |
| Unique ID | Title | Nature of relationship |
| 880039 | Study on Ranging-based Services | SA1 preceding study item on use cases scenarios and service requirements of Ranging-based Services |
| 910034 | Stage 1 for Ranging | SA1 preceding work item on service requirements of Ranging-based Services |
| 820024 | Improvement of V2X Service Handling | SA1 preceding work item on requirement on relative position between UEs supporting V2X application |
| 880075 | Study on scenarios and requirements of in-coverage, partial coverage, and out-of-coverage NR positioning use cases | RAN2 preceding study item on use cases and service requirements of sidelink positioning between UEs supporting V2X and public safety services |
| 940069 | Study on Ranging based services and sidelink positioning | SA2 study item (Rel-18) on architecture enhancement for supporting Ranging based services and sidelink positioning. |

# 3 Justification

Ranging refers to the determination of the distance between two UEs and/or the direction of one UE, i.e. target UE, from the other one, i.e. observer UE, via direct device connection. Ranging between two UEs can also be done based on network involvement in some scenarios. Ranging based services can be used in a variety of verticals, such as consumer, smart home, smart city, smart transportation, smart retail, and industry 4.0. Some typical use cases of Ranging based services are captured in TR 22.855.

Meanwhile, there are requirements in TS 22.186 on relative positioning in support of V2X services (e.g. for Vehicles Platooning) defining that the 3GPP system shall support relative lateral and longitudinal position between UEs in proximity supporting V2X application. This can also be seen as one use case of the Ranging based services.

The service requirements of Ranging based services are defined in TS 22.261, among which there are a number of requirements related to security aspects as follows:

*The 5G system shall be able to protect privacy of a UE and its user, ensuring that no identifiable information can be tracked by undesired entities during ranging.*

*The 5G system shall be able to ensure that the use of Ranging, if in licensed spectrum, is only permitted in network coverage under the full control of the operator who provides the coverage.*

*The 5G system shall be able to ensure the integrity and confidentiality of ranging information used by ranging-enabled UEs.*

*The 5G system shall be able to ensure that user privacy is not violated during ranging, e.g., subject to regional or national regulatory requirements.*

*The 5G system shall be able to ensure security protection (e.g., interworking security) when the ranging concerns UEs subscribed with different operators.*

*The level of security provided by the existing 5G system shall not be adversely affected when ranging is enabled.*

*The 5G system shall support means to securely identify other ranging capable UEs, with which a certain UE can perform ranging.*

Furthermore, TS 22.261 also requires that Ranging-based positioning can be supported with or without 5G coverage, i.e. in 5G coverage, in partial 5G coverage or out of 5G coverage. Additionally, TR 38.845 also developed use cases and service requirements of sidelink positioning between UEs supporting V2X and public safety services for in-coverage, partial coverage and out of coverage use cases. Subsequently, a new work item on NR Positioning Enhancements was approved in RAN WG for Rel-18 (RP-212706).

In order to enhance 5G architecture which can enable Ranging-based services and sidelink positioning for commercial, V2X and public safety use cases in in-coverage, partial coverage, and out-of-coverage of 5G network, an SA2 Rel-18 study item “Study on Ranging based services and sidelink positioning” (SP-211647) was approved with three objectives, among which there is a note explicitly stating that SA3 needs to be tasked for privacy and security aspects.

*◦ Authorization and policy/parameter provisioning for a UE or a group of UEs;*

*◦ Ranging device discovery and service operation procedures between two UEs, between one UE and multiple UEs or via the assistance of another UE;*

*◦ Ranging and sidelink positioning service exposure to a UE or an Application Server who has requested the service;*

*NOTE 3: Privacy protection and other security aspects will be tasked to SA3, and the related impact to architecture enhancement will be based on SA3 conclusion.*

Based on the Ranging related work in SA1, SA2 and RAN as introduced above, there is a need for SA3 to identify and investigate the security and privacy issues for Ranging based service and sidelink positioning.

# 4 Objective

This study item aims at investigating the security and privacy aspects of Ranging based services and sidelink positioning, based on what have been defined in Rel-17 (e.g. service requirements in TS 22.261) and what are being studied in Rel-18 (e.g. architectural and functional requirements in SA2), with the following objectives:

- Identify the security and privacy issues, threats, and potential requirements for Ranging based services and sidelink positioning;

- Analyse the gaps in security and privacy issues between Ranging based services and ProSe / V2X applications;

- Study the potential solutions addressing the security and privacy issues specific to Ranging based services and sidelink positioning;

- Align with SA2 / RAN for security and privacy implications on architecture enhancement / RAN dependent aspects.

NOTE 1: For security and privacy protection on discovery and direct communication, the existing solutions for ProSe and V2X will be reused as much as possible.

NOTE 2: Coordination is needed between this study and the study in TR 33.870 for privacy protection of identifiers over air interface.

# 5 Expected Output and Time scale

|  |
| --- |
| New specifications {One line per specification. Create/delete lines as needed} |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Rapporteur |
| Internal TR | 33.XXX | Study on Security Aspects of Ranging Based Services and Sidelink Positioning | SA#98 (Dec. 2022) | SA#99 (March 2023) | Wei Lu, Xiaomi, luwei10@xiaomi.com |
|  |  |  |  |  |  |

|  |
| --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
|  |  |  |  |
|  |  |  |  |

# 6 Work item Rapporteur(s)

Wei Lu, Xiaomi, luwei10@xiaomi.com

# 7 Work item leadership

SA3

# 8 Aspects that involve other WGs

SA2 WG for architecture dependent issues, RAN WG for RAN dependent issues.

# 9 Supporting Individual Members

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| --- |
| Supporting IM name |
| Xiaomi |
| Apple |
| China Mobile |
| CATT |
| Huawei |
| Hisilicon |
| InterDigital |
| LGE |
| Philips |
| vivo |
| ZTE |
| Lenovo |
| Motorola Mobility |
| Ericsson |
| Nokia |
| Nokia Shanghai Bell |