

Source: Lenovo, Motorola Mobility
 Title: Draft SID for SL Positioning/Ranging
 Document for: Discussion
 Agenda Item: 9.0.2

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
 See also the [3GPP Working Procedures](#), article 39 and the TSG Working Methods in [3GPP TR 21.900](#)

Title: Study on Sidelink Positioning/Ranging

Acronym: TBD

Unique identifier: TBD

NOTE: For new WIs/SIs leave the Unique identifier empty and make a proposal for an Acronym.
 For a revised WI/SI: Take Unique identifier and acronym as shown in 3GPP workplan.
 If this is a RAN WID including Core and Perf. part, then Title, Acronym and Unique identifier refer to the feature WI.
 Please tick (X) the applicable box(es) in the table below:
 Either:

This WID includes a Core part	<input type="checkbox"/>
This WID includes a Performance part	<input type="checkbox"/>

or:

This WID includes a Testing part	<input type="checkbox"/>	
and it addresses the following 3GPP work area:	Radio Access	<input type="checkbox"/>
	Core Network	<input type="checkbox"/>
	Services	<input type="checkbox"/>

Potential target Release: Rel-18

Note that this field above indicates the proposed Release at the time of submission of the WID to TSG approval. It can later be changed without a need to revise the WID. The updated target Release is indicated in the Work Plan. NOTE: In case of contradiction with the target dates of clause 5, clause 5 determines the target release.

1 Impacts

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

2 Classification of the Work Item and linked work items

2.1 Primary classification

This work item is a ...

	Feature
	Building Block
	<i>Work Task</i>
X	Study Item

NOTE: Normally, Core/Perf./Testing parts in RAN WIDs are Building Blocks. Only if they are under an SA or CT umbrella, they are defined as work tasks. If you are in doubt, please contact MCC.

2.2 Parent Work Item

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

NOTE: RAN agreed some time ago, that it describes the feature WI + Core/Perf. part WI or Testing part WI in one WID. Therefore the table above should just include the feature WI data (In case the feature covers Core and Perf. part, please list under Working Group the leading WG of the Core part).

2.3 Other related Work Items and dependencies

Other related Work Items (if any)		
Unique ID	Title	Nature of relationship
880075	Study on scenarios and requirements of in-coverage, partial coverage, and out-of-coverage NR positioning use cases	<i>Baseline input on use cases and requirements for NR Positioning in-coverage, partial coverage, and out-of-coverage scenarios</i>

NOTE: Also related or dependent WIs/SIs in other TSGs should be indicated.

3 Justification

3GPP has thus far specified NR positioning solutions in Rel-16 and Rel-17, which has targeted regulatory, commercial and IIoT verticals with respect to the support of absolute location estimation in scenarios with network coverage. There is a demand by V2X and Public safety use cases to support positioning in all types of radio coverage scenarios including in-coverage, partial coverage, and out-of-coverage scenarios, of which the use cases and requirements have been captured in TR38.845. In addition, to in-coverage scenarios, addressing NR positioning for partial coverage and out-of-coverage scenarios, is especially important for safety critical services, where network coverage and/or GNSS coverage is limited or non-existent. Furthermore, SA1 has specified commercial requirements in TS 22.261 relating to ranging-based services, which have been designed to operate in all three coverage scenarios.

Absolute and relative positioning is a key requirement to be supported for V2X and Public Safety, while determining the distance and direction/orientation between a pair of UEs (ranging) is a key positioning enabler for commercial ranging-based services. In addition, IIoT scenarios have identified key use cases such tool tracking, where relative positioning is an important requirement.

To address the above use cases, the sidelink (PC5) interface has been identified as an enabler to support the absolute and relative positioning requirements of the described use cases. The sidelink positioning/ranging study should aim to evaluate and specify enhancements to the address the following exemplary positioning requirements from each of the use cases:

1. V2X (TS 22.186)
 - 3GPP system shall support relative lateral position accuracy of 0.1 m between UEs for V2X application, and relative longitudinal position accuracy of less than 0.5 m for UEs for V2X platooning in proximity
2. Public Safety (TS 22.261)
 - The positioning accuracy for 1st responders should be “Accuracy: < 1m horizontal, < 2m vertical (indoor for floor detection) and < 0,3 m vertical (relative) to detect changes in height of the UE holder.
3. Commercial: Ranging-based services (TS 22.261)
 - Picture and video sharing based on ranging results with distance accuracy of 0.1m, direction accuracy of 2 degrees and latency of 50ms.
4. IIoT (TS 22.104)
 - Flexible, modular assembly area in smart factories (for tracking of tools at the work-place location) requires < 1m (relative horizontal positioning accuracy).

4 Objective

4.1 Objective of SI or Core part WI or Testing part WI

This study item includes the following objectives, considering NR positioning in in-coverage, partial coverage and out-of-coverage scenarios:

1. Study and identify the SL positioning/ranging techniques, (e.g., using timing-based, angular-based positioning techniques, etc.):
 - a. Evaluate the design of a new sidelink positioning reference signal(s) to support sidelink positioning/ranging techniques [RAN1]
 - b. Study potential signalling and procedures to support the identified sidelink positioning techniques [RAN2]
2. Study enhancements for physical layer procedures to support SL positioning/ranging measurements [RAN1]
3. Identify and evaluate potential physical layer procedures and associated signalling to support the transmission and reception of sidelink positioning reference signals [RAN1, RAN2]
 - a. Study the support for SL positioning/ranging for sidelink unicast/groupcast/broadcast.
 - b. Study resource allocation enhancements for SL positioning/ranging.
4. Identify and evaluate enhancements (e.g., configuration, measurements and reporting) for supporting cooperative positioning using a combination of the Uu and PC5 link interfaces for improved positioning [RAN2, RAN1]
5. Identify potential architectural impacts to enable SL positioning/ranging [RAN3]

NOTE: The use cases and requirements identified in TR 38.845, TS 22.261 and TS22.104 are used as a baseline for the SL positioning/ranging study.

NOTE: The above enhancements are applicable to both network-based positioning (positioning calculation entity is in the network) and UE-based positioning (positioning calculation entity is in the UE).

4.2 Objective of Performance part WI

NOTE: Leave empty if the WI proposal does not contain a RAN performance part.

4.3 RAN time budget request (not applicable to RAN5 WIs/SIs)

NOTE: For all new RAN related WIs/SIs which are not led by RAN WG5 the WI/SI rapporteur has to fill out the attached Excel table to request time budgets for corresponding RAN WG meetings. The Excel table has to be filled out for all affected RAN WGs and up to the target date of the WI/SI. One time unit (TU) corresponds to ~ 2 hours in the meeting. If no TU is needed, then leave the field empty otherwise enter a number >0 in the field.

For revisions of already approved WI/SI descriptions: Please remove the Excel table from the WID/SID's zip file. The time budgets are already recorded. If you want to modify them, then this has to be done via the status report and not via a revised WID/SID.

If this WID is covering Core and Performance part, then please fill out one line for each part in the attached Excel table.

additional comments to the time budget request in the attached Excel table:

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#	Remarks
Internal TR	38.XXX	Study on Sidelink Positioning/Ranging			

{Note 1: Only TSs may contain normative provisions. Study Items shall create or impact only TRs. "Internal TR" is intended for 3GPP internal use only whereas "External TR" may be transposed by OPs.}

NOTE: If this is a RAN WI including Core and Perf. part, then all new Core part specs have to be listed first and then all new Perf. part specs. Indicate "Core part" or "Perf. part" under Remarks for each spec. By default a new specs can only be new for one of both parts.

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

NOTE: If this is a RAN WI including Core and Perf. part, then all new Core part specs have to be listed first and then all new Perf. part specs. Indicate "Core part" or "Perf. part" under Remarks for each spec. If an existing spec is affected by both (Core part and Perf. part), then it has to be listed twice with appropriate approval dates.

6 Work item Rapporteur(s)

...
Company: ...
Email: ...

7 Work item leadership

Primary: RAN1

Secondary: RAN2, RAN3

8 Aspects that involve other WGs

NOTE: For RAN WIs: Section 8 applies only to WGs outside of TSG RAN because RAN WG aspects have to be covered in section 4.

Coordination with SA2 may be required

9 Supporting Individual Members

Supporting IM name
Lenovo
Motorola Mobility