**3GPP TSG-CT WG1 Meeting #146C1-24xxxx**

 **was 240105**

**E-meeting , 22– 26 January 2024**

**Source: Qualcomm Incorporated**

**Title: Pseudo-CR on introduction of supplementary RSPP signaling**

**Spec: 3GPP TS 24.514**

**Agenda item: 18.2.23**

**Document for: Decision**

**1. Introduction**

TS 23.586 version 18.2.0 has introduced a new ranging and sidelink protocol message called Supplementary RSPP signaling message. (CR0031 against TS 23.586) SA2 also has decided to let stage-3 design the message as captured in a NOTE in clause 6.8.

<quoted>

*NOTE 4: The supplementary RSPP signalling message mentioned above is conveyed by PC5-U and handled in the Ranging/SL Positioning layer, which detail design is left to stage 3.*

</quoted>

**2. Reason for Change**

According to clause 6.8 of TS 23.586, the supplementary RSPP signaling message is used for the ranging and sidelink positioning control procedure in case of UE-only operation. Here is the excerpt from the stage-2 specification:

(…)

6. If a SL Positioning server UE is selected, UE 1 sends a Ranging/SL positioning request using supplementary RSPP signalling message to the selected SL Positioning Server UE. This request indicates the other UEs 2 to n using the Application layer ID and indicates the Ranging/SL positioning result types needed (e.g. absolute locations, relative locations or distances and directions between pairs of UEs). The required QoS for Ranging/SL positioning is also indicated.

7. The SL Positioning Server UE sends requests to UE1 for capability of UE1 using the SLPP message and for the capabilities of UE2/.../UEn using the supplementary RSPP signalling (e.g. including SLPP containers that may contain Sidelink Positioning capability request for UE2/…/UEn) message with the corresponding Application Layer ID of UE2/.../UEn. UE1 responds to the SL Positioning Server UE with its own capability using SLPP message and the capabilities of UE2 to n using the supplementary RSPP signalling message (e.g. including SLPP containers that may contain Sidelink Positioning capability of UE2/…/UEn) with the corresponding Application Layer ID of UE2/.../UEn. If step 4 did not occur, UE1 retrieves capabilities from UE2/…/UEn using SLPP messages during this step.

 The SL Positioning Server UE may downselect the UEs (e.g. UEx/…/UEy) from UE2/.../UEn for the subsequent SL positioning/ranging operation (e.g., based on UE capability).

8. The SL Positioning Server UE provides the Sidelink Positioning assistance data to UE1.

- For the Sidelink Positioning assistance data used by UE1, it is transmitted by SLPP message.

- For the Sidelink Positioning assistance data used by UEx/…/UEy, it is transmitted using the supplementary RSPP signalling messages (e.g. including SLPP containers that may contain Sidelink Positioning assistance data for UEx/…/UEy) with the corresponding Application Layer ID of UEx/…/UEy and then UE1 sends them to each UEs (UEx/…/UEy) by SLPP messages.

9. The SL Positioning Server UE sends requests to UE1 for SL measurement information of UE 1 and UEx/…/UEy, if the SL Positioning Server UE performs the result calculation. For the SL measurement information of UE1, the request uses the SLPP message. For the SL measurement information of UEx/…/UEy, the request uses the supplementary RSPP signalling message (e.g. including SLPP container that may contain Sidelink Positioning location measurements request for UEx/…/UEy) with the corresponding Application Layer ID of UEx/…/UEy. In addition, the SL Positioning Server UE may also request for the absolute location of UEx/…/UEy from UE1 using the supplementary RSPP signalling message with the corresponding Application Layer ID of UEx/…/UEy.

10. SL-PRS measurement is performed between UE1 and UEx/…/UEy and possibly also amongst UEx/…/UEy. The UE1 requests for the SL measurement information from UEx/…/UEy by the SLPP messages and/or the absolute locations of UEx/…/UEy from UEx/…/UEy by supplementary RSPP signalling messages if requested in step9 by SL Positioning Server UE. The SL-PRS measurement data is transferred to UE1 if it supports SL Positioning Server functionalities and UE1 has not selected a SL Positioning Server UE (different from UE1) in step 5.

11. SL-PRS measurement data of UE1 is transferred by SLPP message to the SL Positioning Server UE and SL-PRS measurement data of UEx/…/UEy is transferred by UE1 using the supplementary RSPP signalling message (e.g. including SLPP container that may contain SL-PRS measurement data of UEx/…/UEy) with the corresponding Application Layer ID of UEx/…/UEy to the SL Positioning Server UE if requested in step 9 in order to perform result calculation. Absolute location of UEx/…/UEy is transferred by UE1 to the SL Positioning Server UE by the supplementary RSPP signalling message with the corresponding Application Layer ID of UEx/…/UEy if requested in step9.

(…)

As shown in the above procedure description, the supplementary RSPP message is used to transport the SLPP container(s) for other UEs (UE x, … UE y) between the UE 1 (i.e., target UE or SL reference UE for ranging and sidelink positioning) and the SL positioning server UE. The UE receives the SLPP containers and the corresponding application layer IDs of UEs (UE x, … UE y), respectively, and the UE sends the SLPP message to the corresponding UE via RSPP communication as specified in clause 7.2 of TS 24.514.

**Observation 1)** the supplementary RSPP signaling message carries the SLPP container(s) and the application layer ID(s) for the UE that is required to receive the SLPP container.

**Proposal 1)** CT1 needs to define supplementary RSPP signaling message as one of Ranging and sidelink positioning control procedure over PC5-U.

However, the yellow highlighted excerpt above has different aspect. Unlike the supplementary RSPP signaling message in other steps, the yellow part does not mean to forward the SLPP container but to request ranging and sidelink positioning service to involve other UEs (UE x, … UE y). The request shall include the application layer IDs of the UEs, the request type of the ranging and sidelink positioning, and the required QoS for ranging and sidelink positioning. This operation is similar to the ranging and sidelink positioning service request as described in step 1 of clause 6.8 of TS 23.586 (see below)

(…)

*1. UE1 (i.e. Target UE or a SL reference UE) may receive a Ranging/SL Positioning Service request from:*

*1a. SL Positioning Client UE over PC5 during procedures for Ranging/SL Positioning service exposure through PC5 as defined in clause 6.7.1.1.*

 *For absolute location, the service request includes the SL Positioning Client UE's user info and Target UE's user info, and required positioning QoS and may also include the user info for a list of candidate Located UE(s).*

 *For relative location or ranging information, the service request includes the SL Positioning Client UE's user info, Target UE's user info, SL Reference UE's user info(UE2/.../UEn), and Ranging/SL Positioning QoS information.*

*1b. RSPP application layer.*

 *The service request includes type of the result (i.e. absolute location, relative location or ranging information) and the required QoS.*

(…)

**Observation 2)** the supplementary RSPP signaling described in the step 6 of clause 6.8 of TS 23.586 has the same design as the ranging and sidelink positioning service request message.

**Proposal 2)** The requirement in step 6 of clause 6.8 of TS 23.586 should be implemented as sidelink positioning service request procedure (defined in clause 7.4.2 of TS 24.514)

**3. Conclusions**

It is proposed to update the specification TS 24.514 to introduce the supplementary RSPP signaling procedure.

**4. Proposal**

It is proposed to agree the following changes to 3GPP TS 24.514 v0.5.0.

In the revision, it is suggested that

- supplementary RSPP signalling is an umbrella for any non-SLPP messages between the UEs.

- Under the supplementary RSPP signaling, we will have 1) the sidelink positioning service request/sidelink positioning service response, 2) the sidelink positioning SLPP transport.

In addition, new message can be discussed for the case of Located UE’s absolute location in step 17 of 6.20.1 in TS 23.273, The existing EN covers it.

Adding an EN to discuss further for the case when the embedded SLPP message is not for forwarding but processing.

\* \* \* First Change \* \* \* \*

## 7.4 Supplementary RSPP signaling over PC5-U

7.4.1 General

This clause describes interactions to exchange ranging and sidelink positioning service related messages among UEs over PC5-U as defined in TS 23.586 [2], including:

a) the sidelink positioning service request/sidelink positioning service response between the sidelink SL positioning client UE and the target UE or SL reference UE; and

b) the sidelink positioning SLPP transport message between the SL positioning server UE and the target UE or SL reference UE for ranging and sidelink positioning.

Editor’s Note: This clause will provide description and the procedures for interactions to exchange service related messages among Ues over PC5-U, and it is FFS whether other interactions will be included.

The supplementary RSPP signalling is transferred over PC5-U as specified in clause 7.2.

\* \* \* Next Change \* \* \* \*

7.4.X Sidelink positioning SLPP transport procedure

7.4.X.1 General

The sidelink positioning SLPP transport procedure is used by the SL positioning server UE and the target UE or SL reference UE for ranging and sidelink positioning to forward embedded SLPP message(s) and its associated UE’s application layer ID(s) as specified in clause 6.8 of 3GPP TS 23.586 [2].7.4.X.2 Sidelink positioning SLPP transport initiation

When an initiating UE needs to request to forward SLPP message(s) for other UE(s) to the target UE or SL reference UE for ranging and sidelink positioning as specified in clause 6.8 of 3GPP TS 23.586 [2], the initiating UE shall generate a sidelink positioning SLPP transport message, and the sidelink positioning SLPP transport message shall include embedded SLPP message(s) and its associated UE’s application layer ID(s), where the SLPP message is either for sidelink positioning capability, sidelink positioning assistance data, sidelink positioning location measurement request, or sidelink positioning reference signaling measurement data as specified in 3GPP TS 38.355 [12].

When an initiating UE needs to forward SLPP message(s) received from other UE(s) to the SL positioning server UE as specified in clause 6.8 of 3GPP TS 23.586 [2], the initiating UE shall generate a sidelink positioning SLPP transport message, and the sidelink positioning SLPP transport message shall include:

1) embedded SLPP message(s) received from the other UE(s) and its associated UE’s application layer ID(s); and

2) the indication that embedded SLPP message(s) for other UE(s) are not to forward.

Editor’s Note: For the case of 2) above, whether different message needs to be defined or different indication is used is for further study.

7.4.X.3 Sidelink positioning SLPP transport reception

Upon receiving the sidelink positioning SLPP transport message, if there is indication that embedded SLPP message(s) for other UE(s) are not to forward, the receiving UE passes the embedded SLPP message(s) and its associated UE’s application layer ID(s) to upper layers. If there is no indication that embedded SLPP message(s) for other UE(s) are not to forward, the receiving UE forwards the embedded SLPP message(s) in the sidelink positioning SLPP transport message to the corresponding UE identified by the associated application layer ID(s) via the ranging and sidelink positioning direct communication over PC5 as specified in clause 7.2.

\* \* \* End of Changes \* \* \* \*