**SA WG2 Meeting #S2-170 S2-2508009**

**25 - 29 August, 2025, Goteborg, Sweden**

Title: Reply LS on the path information in 5G ProSe multi-hop discovery procedures

Response to: (S2-2506119/ C1-253724) LS on the path information in 5G ProSe multi-hop discovery procedures

Release: Release 19

Work Item: 5G\_ProSe\_Ph3

Source: SA2

To: CT1

Cc: -

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Attachments: 23.304 CR <XXXX>

**1. Overall Description:**

SA2 would like to thank CT1 for the LS on path information in 5G ProSe multi-hop discovery procedures. SA2 discussed the issue raised by CT1 and offers the following clarifications.

**For Question 1 CT1 asked**: *For both model A and model B discovery, given that in the path to a 5G ProSe multi-hop layer-3 end UE, the 5G ProSe multi-hop layer-3 end UE's first 5G ProSe layer-3 multi-hop UE-to-UE relay inherently stores the source layer-2 ID of the 5G ProSe multi-hop layer-3 end UE, why does the path information need to include the source layer-2 ID of the 5G ProSe multi-hop layer-3 end UE?*

**SA2 Answer**:

For Model A discovery, it is rightly pointed out that parameter was included incorrectly. SA2 has thus rectified this error in its specifications.

For Model B discovery, similar to the single hop 5G ProSe UE-to-UE Relay operations (as specified in TS 23.304 clause 5.8.4), the User Info of the 5G ProSe End UE is expected to be protected in the Direct Discovery set. Thus, as the User Info ID of the source end UE would not be visible to the U2U relays, source end UE’s first 5G Prose layer-3 multi-hop UE-to-UE relay need the source-layer 2 ID in order to direct the response message to that particular source end UE in a unicast manner. This was discussed and approved in 23.304 CR 0508 S2-2412612.

If this information is omitted, then the first multi-hop relay must use a different source layer-2 ID for sending the next hop Solicitation messages for each of the Solicitation messages received by it (as per Rel-18 approach for single-hop U2U relays as described in clause 5.8.4.2 of TS 23.304). This ensures correct correlation with the corresponding Response messages it will receive. However, since the first multi-hop relay uses separate source layer-2 IDs, even the second relay again needs to choose a separate source layer-2 ID when it sends its own Solicitation messages for each of the Solicitation messages received by the second relay.

This would lead to exponential increase in the number of source layer-2 IDs required as the number of hops increases, which may also increase the chances of conflict.

In case the source end UE’s layer-2 ID is known to the first 5G Prose layer-3 multi-hop UE-to-UE relay (i.e. it is included in the 2nd last Discovery Response message), the first 5G Prose layer-3 multi-hop UE-to-UE can simply use that address in order to send the Discovery Response message to the end UE. Consequently, each multi-hop UE-to-UE relay can just store the mapping of the layer-2 ID to the User Info ID of the UE-to-UE relay and thus the total number of source-layer 2 IDs used are drastically decreased.

**For Question 2 CT1 asked**: *In the 5G ProSe UE-to-UE relay discovery announcement message (for model A discovery), it specifies the path information includes the "source layer-2 ID of the discoverer ProSe end UE (yellow highlighted texts as below)". However, the term "discoverer ProSe end UE" pertains to model B discovery. Why does the announcing relay UE indicate this source layer-2 ID of the* ***discoverer*** *ProSe end UE in the path information, given that model A does not involve a "discoverer" end UE?*

**SA2 Answer**:

SA2 acknowledges and appreciates CT1 for correctly identifying the issue. The source layer-2 ID of the discoverer was mistakenly included in the Model A discovery, but SA2 has rectified this error in its specifications.

**For Question 3 CT1 asked**: *Why are the Layer-2 IDs included in the Multi-hop path info IE, together with the list of the User info IDs?*

**SA2 Answer**:

SA2 discussed this issue and also identified the inconsistency in SA2 specs at few places. SA2 came to the conclusion that in the Multi-hop U2N Model B discovery, the Intermediate Relay(s) does not need to store any state and thus the Layer-2 IDs are included to facilitate the Response message transmission as in step 8-9 of clause 6.3.2.5.3. SA2 has also included the Layer-2 IDs for the link establishment of Prose U2U relays using Model B.

Based on the above reply SA2 has updated their specification in **TS 23.304 CR <XXXX> S2-250xxxx**.

**2. Actions:**

**To SA WG2 group.**

**ACTION:** SA2 kindly asks CT1 to take the above information into account.

**3. Date of Next SA2 Meetings:**

SA2#171 13th October- 17th October 2025 Wuhan, China

SA2#171 17th November- 21st November 2025 Dallas, US