**3GPP TSG- Meeting #**

**, , - rev of S2-2411431**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** | **1** | **Current version:** |  |  |
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| *For* [***HELP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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| ***Title:*** | Update for multihop L3 U2U relay reselection | | | | | | | | | |
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| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** | SA2 | | | | | | | | | |
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| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | U2U relay reselection procedure is supported for L2 U2U relay and L3 U2U relay. But, it is missing for multihop L3 U2U relay.  Rev: Simplify the description only refer to multihop U2U relay procedure.  Update general subclause of 6.7.4.1 to include multihop U2U relay reselection procedure as additional procedure for multihop U2U relay for non-IP. | | | | | | | | |
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| ***Summary of change:*** | | Multihop L3 U2U Relay reselection procedure is added. | | | | | | | | |
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| ***Consequences if not approved:*** | | Multihop L3 U2U Relay does not work properly. | | | | | | | | |
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| ***Clauses affected:*** | | 6.3.2.4.X(new), 6.7.4.1, 6.7.4.X (new) | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\* \* \*Start of 1st Changes \* \* \*

##### 6.3.2.4.X multi-hop candidate 5G ProSe UE-to-UE Relay Discovery

This procedure for multi-hop candidate 5G ProSe UE-to-UE Relay Discovery to support the negotiated Relay reselection as described in clause 6.7.4.X when the discoverer End UE discovers a multi-hop candidate 5G ProSe UE-to-UE Relay.

The procedure for 5G ProSe UE-to-UE Relay Discovery with Model B (see clause 6.3.2.6.3.2) is used with the following differences:

- Step 2a: In the 5G ProSe UE-to-UE Relay Discovery Solicitation message the RSC and the User Info ID of a candidate 5G ProSe UE-to-UE Relay are included in the UE-to-UE Relay Discovery set and the Direct Discovery set is not included.

NOTE: The User Info ID of the candidate 5G ProSe UE-to-UE Relay and the user info (i.e. Application Layer ID) of the discoveree 5G ProSe End UE can be distinguished by the 5G ProSe UE-to-UE Relay as different IEs in the message.

- Step 3 and Step 4 are performed without checking Direct Discovery Set unless a 5G ProSe UE-to-UE Relay matches the User Info ID of a candidate 5G ProSe UE-to-UE Relay received in the 5G ProSe UE-to-UE Relay Discovery Solicitation.

- Step 3: If a 5G ProSe UE-to-UE Relay matches the User Info ID of a candidate 5G ProSe UE-to-UE Relay received in the 5G ProSe UE-to-UE Relay Discovery Solicitation then it sends the 5G ProSe UE-to-UE Relay Discovery Response (as shown in step 9 and 10) and does not include the Direct Discovery set.

\* \* \*Start of 2nd Changes \* \* \*

6.7.4.1 General

After being connected to the 5G ProSe UE-to-UE Relay, the 5G ProSe End UEs may trigger the 5G ProSe UE-to-UE Relay reselection based on conditions (e.g. the measured signal strength of PC5 unicast link with the 5G ProSe UE-to-UE Relay) as specified in TS 38.300 [12].

For 5G ProSe UE-to-UE Relay reselection, a 5G ProSe UE-to-UE Relay may be discovered by either the discovery procedures defined in clause 6.3.2.4 or by the negotiated 5G ProSe UE-to-UE Relay reselection procedure defined in clause 6.7.4.2 or clause 6.7.4.3. For 5G ProSe multi-hop Layer3 UE-to-UE Relay for non-IP, in addition, a 5G ProSe UE-to-UE Relay may be discovered by the discovery procedure defined in clause 6.3.2.6.3, by the negotiated 5G ProSe multi-hop Layer3-UE-to-UE Relay reselection for non-IP type PDU defined in clause 6.7.4.X.

In the negotiated UE-to-UE Relay reselection defined in clause 6.7.4.2 or clause 6.7.4.3, one 5G ProSe End UE initiates the UE-to-UE Relay reselection procedure, the 5G ProSe End UEs can negotiate a new 5G ProSe UE-to-UE Relay using the existing connection and to establish the communication via the reselected 5G ProSe UE-to-UE Relay prior to releasing the communication via the current 5G ProSe UE-to-UE Relay.

\* \* \*Start of 3rd Changes \* \* \*

#### 6.7.4.X Negotiated 5G ProSe multi-hop Layer-3 UE-to-UE Relay Reselection for Non-IP type PDU

Depicted in Figure 6.7.4.X-1 is the procedure for the negotiated 5G ProSe multi-hop Layer-3 UE-to-UE Relay reselection.



Figure 6.7.4.X.-1. Negotiated multihop Layer-3 UE-to-UE Relay reselection procedure.

1. 5G ProSe End UEs have set up PC5 unicast links with one or multiple 5G ProSe UE-to-UE Relay, based on the procedure defined in clause 6.7.5.
2. 5G ProSe End UEs are transferring data traffic e.g., Ethernet traffic, via 5G ProSe UE-to-UE Relay(s).
3. The initiating 5G ProSe End UE determines, e.g. based on PC5 signal strength, to perform U2U Relay reselection and obtains a list of candidate UE-to-UE Relays per RSC which are accessible directly. The initiating 5G ProSe End UE may receive UE-to-UE Relay Discovery Announcement message from 5G ProSe UE-to-UE Relays or initiate the 5G ProSe UE-to-UE Relay discovery procedures to find the candidate 5G ProSe UE-to-UE Relays.
4. The initiating 5G ProSe End UE sends a Link Modification Request message to the responding 5G ProSe UE-to-UE Relay, which includes a Relay re-selection indication, the User Info ID(s) of candidate UE-to-UE Relay(s), the User Info ID of the responding 5G ProSe End UEs.

User Info ID of multiple 5G ProSe End UEs may be included when the initiating 5G ProSe End UE is communicating with multiple 5G ProSe End UEs via the 5G ProSe UE-to-UE Relay.

1. 5G ProSe UE-to-UE Relay determines the responding 5G ProSe End UE based on the received User Info ID of End UEs in step 4 and sends a Link Modification Request message to the responding End UEs (via other UE-to-UE Relay(s) if the responding End UE is connected via other UE-to-UE Relay(s)).

The Link Modification Request message includes a Relay re-selection indication, User Info ID(s) of the candidate UE-to-UE Relay(s), User Info ID of initiating 5G ProSe End UE, and indication of multi-hop connection supported.

1. After receiving Link Modification Request for Relay reselection with list of U2U Relays, for each U2U relay, the responding 5G ProSe End UE may perform multi-hop candidate Relay discovery procedure to find available multi-hop path to each candidate U2U Relay with number of hop and delay.(refer to clause 6.3.2.4.X)
2. The responding 5G ProSe End UE may select a proper multi-hop path to the initiating 5G ProSe End UE based on discovery results at step 6 (e.g., link quality, number of hops of e2e route, end to end delay of e2e route, etc.)
3. The responding 5G ProSe End UE may initiate PC5 connection setup or modification procedure for communication with the initiating 5G ProSe End UE with path info for the selected multi-hop path in step 7. (refer to clause 6.7.5.2.2). For Ethernet traffic, MAC address of the initiating 5G ProSe End UE and MAC address of the responding 5G ProSe End UE are included.
4. The responding 5G ProSe End UE sends a Link Modification Accept message via the existing multi-hop 5G ProSe UE-to-UE Relay(s) to the initiating 5G ProSe End UE. Link Modification Accept message includes the newly selected multi-hop path info, User Info ID of the iniating End UE, User Info ID of the responding End UE, and Relay re-selection indication.
5. The responding 5G ProSe UE-to-UE Relay sends a Link Modification Accept message to the initiating 5G ProSe End UE. The Link Modification Accept message includes the newly selected multi-hop path, User Info ID of the initiating End UE, User Info ID of the responding End UE, and Relay re-selection indication.

11. The initiating 5G ProSe UE-to-UE Relay sends Link Modification Ack to the responding 5G ProSe UE-to-UE Relay.

12. The 5G ProSe UE-to-UE Relay sends Link Modification Ack to the responding 5G ProSe End UE. Link Modification Ack includes User Info ID of the iniating End UE, User Info ID of the responding End UE, and Relay re-selection indication.

13. 5G ProSe End UEs transfer traffic via the newly selected multi-hop path. For Ethernet traffic, existing MAC address of 5G ProSe End UEs are reused.

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

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