**3GPP SA WG2 Meeting #164 *S2-240xxxx***

**Maastricht, NL, 19-23 August 2024 *(was S2-240xxxx)***

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| *CR-Form-v12.3* | | | | | | | | |
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|  |  | **CR** | **xxxx** | **rev** |  | **Current version:** |  |  |
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| ***Proposed change affects:*** | UICC apps |  | ME | **x** | Radio Access Network |  | Core Network | **x** |

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|  | | | | | | | | | | |
| ***Title:*** | 5G ProSe Multi-hop UE-to-UE Relay for IP PDU type | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Qualcomm Incorporated, AT&T?, FirstNet?, Ericsson?, LGE? | | | | | | | | | |
| ***Source to TSG:*** | SA2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_ProSe\_Ph3 | | | | |  | ***Date:*** | | | 2024-08-19 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***Release:*** | | | Rel-19 |
|  | *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:*** | | This contribution added the support of 5G ProSe Multi-hop UE-to-UE Relay for IP PDU type based on conclusions in TR 23.700-03. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add the description of the operations for the support of multi-hop UE-to-UE Relay for IP PDU type, and the corresponding link management. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | No proper support of 5G ProSe Multi-hop UE-to-UE Relay feature in Rel-19. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2; (new) 5.2.x; (new) 5.8.x; (new) 5.14.x; (new) 6.7.x | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*FIRST CHANGE*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.287: "Architecture enhancements for 5G System (5GS) to support Vehicle-to-Everything (V2X) services".

[3] 3GPP TS 23.303: "Proximity-based services (ProSe); Stage 2".

[4] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[5] 3GPP TS 23.502: "Procedures for the 5G System (5GS); Stage 2".

[6] 3GPP TS 22.261: "Service requirements for next generation new services and markets; Stage 1".

[7] 3GPP TS 22.278: "Service requirements for the Evolved Packet System (EPS)".

[8] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".

[9] 3GPP TS 23.503: "Policy and Charging Control Framework for the 5G System".

[10] Void.

[11] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2".

[12] 3GPP TS 38.300: "NR; NR and NG-RAN Overall Description; Stage 2".

[13] 3GPP TS 38.304: "NR; User Equipment (UE) procedures in idle mode".

[14] 3GPP TS 23.122: "Non-Access-Stratum (NAS) functions related to Mobile Station in idle mode".

[15] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification".

[16] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol Specification".

[17] IETF RFC 4862: "IPv6 Stateless Address Autoconfiguration".

[18] IETF RFC 3927: "Dynamic Configuration of IPv4 Link-Local Addresses".

[19] IETF RFC 826: "An Ethernet Address Resolution Protocol".

[20] Void.

[21] 3GPP TR 23.752: "Study on system enhancement for Proximity based Services (ProSe) in the 5G System (5GS)".

[22] 3GPP TS 32.277: "Proximity-based Services (ProSe) charging".

[23] 3GPP TS 24.554: "Proximity-services (ProSe) in 5G System (5GS) protocol aspects; Stage 3".

[24] IETF RFC 2131: "Dynamic Host Configuration Protocol".

[25] IETF RFC 4039: "Rapid Commit Option for the Dynamic Host Configuration Protocol version 4 (DHCPv4)".

[26] Void.

[27] Void.

[28] 3GPP TS 38.351: "NR; Sidelink Adaptation Layer Protocol".

[29] 3GPP TS 33.503: "Security Aspects of Proximity based Services (ProSe) in the 5G System (5GS)".

[30] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[31] 3GPP TS 23.167: "3rd Generation Partnership Project; Technical Specification Group Services and Systems Aspects; IP Multimedia Subsystem (IMS) emergency sessions".

[32] 3GPP TS 23.041: "Technical realization of Cell Broadcast Service (CBS)".

[33] 3GPP TS 22.268: "Public Warning System (PWS) requirements".

[34] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".

[x] IETF RFC 7181: "The Optimized Link State Routing Protocol Version 2".

*NEXT CHANGE*

### 5.2.x 5G ProSe Multi-hop UE-to-UE Relay Discovery

For 5G ProSe Multi-hop UE-to-UE Relay discovery, both Model A and Model B discovery are supported:

- Model A uses a single discovery protocol message (Announcement).

- Model B uses two discovery protocol messages (Solicitation and Response).

Based on the RSC used for the discovery, the 5G ProSe Multi-hop UE-to-UE Relay discovery may use one of the two different types of discovery operations, i.e. discovery for IP PDU type, and discovery for non-IP PDU type. A 5G ProSe Multi-hop UE-to-UE Relay may support only one or both types of discovery operations.

The procedures for 5G ProSe Multi-hop UE-to-UE Relay discovery Model A/B for IP PDU type are defined in clause 6.3.2.x.2. The procedures for 5G ProSe Multi-hop UE-to-UE Relay discovery Model A/B for non-IP PDUs (e.g. Ethernet or Unstructured) are defined in clasue 6.3.2.x.3.

*NEXT CHANGE*

### 5.8.x Identifiers for 5G ProSe Multi-hop UE-to-UE Relay Discovery

#### 5.8.x.1 General

There are two types of discovery mechanisms for the support of 5G ProSe Multi-hop UE-to-UE Relays, i.e. for IP PDU type, and for non-IP PDU type (Ethernet or Unstructured). The 5G ProSe End UE and 5G ProSe Multi-hop UE-to-UE Relay choose the discovery mechanism based on the associated indication of the RSC, as defined in 5.1.5.1.

The idnetifiers used for the two types of discovery mechanisms are specified in clause 5.8.x.2 and 5.x.8.3 respectively.

#### 5.8.x.2 Identifiers for 5G ProSe Multi-hop UE-to-UE Relay discovery of IP PDU type

The Multi-hop UE-to-UE Relay Discovery Announcement message (Model A) is sent by the relay and contains the following information:

- Source Layer-2 ID: the 5G ProSe Layer-3 Multi-hop UE-to-UE Relay self-selects a Source Layer-2 ID. It is used for the transmitting the message at AS layer, and included in the AS layer headers only.

- Destination Layer-2 ID: the Destination Layer-2 ID for Multi-hop UE-to-UE Relay Discovery Announcement message (Model A) is selected based on the configuration (associated with the RSC) as defined in 5.1.5.1.

- User Info ID of 5G ProSe Multi-hop UE-to-UE Relay: provides information about the 5G ProSe Layer-3 Multi-hop UE-to-UE Relay.

- Relay Service Code: information to indicate the connectivity service the 5G ProSe Layer-3 Multi-hop UE-to-UE Relay provides to the 5G ProSe End UEs.

The 5G ProSe Multi-hop UE-to-UE Relay Discovery Solicitation message (Model B) is sent by the source 5G ProSe End UE or a 5G ProSe Layer-3 Multi-hop UE-to-UE Relay, and includes the following information:

- Source Layer-2 ID: the discoverer 5G ProSe End UE or 5G ProSe Layer-3 Multi-hop UE-to-UE Relay self-selects a Source Layer-2 ID.

- Destination Layer-2 ID: the Destination Layer-2 ID for 5G ProSe Multi-hop UE-to-UE Relay Discovery Solicitation message is selected based on the configuration (associated with the RSC) as defined in 5.1.5.1.

- (optional) User Info ID of discoverer: this may be used by the receiver of the message to determine whether to respond to the solicitation.

- Relay Service Code: information about connectivity service offered by the 5G ProSe Layer-3 Multi-hop UE-to-UE Relay(s).

The 5G ProSe UE-to-UE Relay Discovery Response message (Model B) sent by the 5G ProSe Layer-3 Multi-hop UE-to-UE Relay(s) matching the RSC includes the following:

- Source Layer-2 ID: the 5G ProSe Layer-3 Multi-hop UE-to-UE Relay self-selects a Source Layer-2 ID.

- Destination Layer-2 ID: set to the Source Layer-2 ID of the received 5G ProSe Multi-hop UE-to-UE Relay Discovery Solicitation message.

- User Info ID of discoverer: the User Info ID from the received Solicitation message, to ensure the response can be matched at the receiver.

- User Info ID of 5G ProSe UE-to-UE Relay: provides information about the 5G ProSe Multi-hop UE-to-UE Relay.

- Relay Service Code: information about connectivity service offered by the 5G ProSe Layer-3 Multi-hop UE-to-UE Relay.

Editor's Note: Additional information or identifiers for MANET operation assistance may be added.

*NEXT CHANGE*

5.14.x 5G ProSe Layer-3 Multi-hop UE-to-UE Relay communication

#### 5.14.x.1 General

Two types of 5G ProSe Layer-3 Multi-hop UE-to-UE Relay communications are supported, i.e. IP based, and non-IP based (for Ethernet or Unstructured).

Different RSCs are used for the two types of communications. Different discovery and link management procedures are used.

NOTE: Ethernet or Unstructured traffics between 5G ProSe End UEs may be carried over IP based 5G ProSe Layer-3 Multi-hop UE-to-UE Relay communication links by encapsulated them within IP packets. 5G ProSe End UEs can modify the established Layer-2 link to add the corresponding IP flows encapsulating the non-IP traffic as defined in clause 5.7.x.2.1.

#### 5.14.x.2 IP based 5G ProSe Layer-3 Multi-hop UE-to-UE Relay communication

The RSC configuration as defined in defined in 5.1.5.1 indicates if IP based 5G ProSe Layer-3 Multi-hop UE-to-UE Relay communication is used. The 5G ProSe Multi-hop UE-to-UE Relays supporting the same RSC establishe IP based Layer-2 links with each other and form a relay cloud to provide IP connectivity for 5G ProSe End UEs connected to any of the 5G ProSe Multi-hop UE-to-UE Relays.

NOTE 1: If a 5G ProSe Multi-hop UE-to-UE Relay support multiple RSCs, different Layer-2 links will be established, with each associated with a specific RSC. The 5G ProSe UE-to-UE Relay operates as separate logical entities in the separate relay clouds of different RSCs, i.e. no routing table sharing and no traffic forwarding across different relays clouds of different RSCs.

The 5G ProSe End UE may establish multiple Layer-2 links with different 5G ProSe UE-to-UE Relays supporting the same RSC, in order to maximize the reachability (e.g. in some cases, different 5G ProSe UE-to-UE Relays may serve different disjointed IP subnets).

Mobile Ad-hoc Network (MANET) based routing protocols are used over the IP connectivies in the relay cloud to provide multi-hop forwarding functionality between 5G ProSe End UEs. Each of the 5G ProSe Multi-hop UE-to-UE Relay acts as a MANET router. The exact MANET routing protocols to be supported, e.g. OLSRv2 [x], are associated with the RSCs based on configuration.

Based on configuration associated with the RSC, the 5G ProSe End UE obtains the IP address/prefix in two options:

- Each of the 5G ProSe End UE may be configured with a routable IP address/prefix associated with the RSC. This IP address/prefix does not change when the 5G ProSe End UE changes the connections with 5G ProSe Multi-hop UE-to-UE Relays.

- If the 5G ProSe End UE does not have an IP address/prefix configured for the RSC, it obtains an IP address/prefix from the 5G ProSe UE-to-UE Relay it connects to. In this case, the 5G ProSe End UE may need to change the IP address/prefix when it changes its connection to another 5G ProSe UE-to-UE Relay.

The 5G ProSe End UE obtains the IP address/prefix of the target 5G ProSe End UE via DNS queries. 5G ProSe Multi-hop UE-to-UE Relay needs to support DNS operations.

Editor's note: It is FFS if any DNS operation enhancement for 5G ProSe Multi-hop UE-to-UE Relay needs to be specified by 3GPP.

When MANET protocol determines the route for IP forwarding, layer-2 link QoS and hop counts can be refelected, e.g. with the Link Metrics value as defined in OLSRv2 [x]. The 5G ProSe Multi-hop UE-to-UE Relay can also enforce the configured hop limit based on the link metrics when building the routing tables, e.g. ignore the route that exceeds the threshold derived from hop limit.

If 5G 5G ProSe Multi-hop UE-to-UE Relay has traffic for its own, it can use any IP address it owns for the transmission.

#### 5.4.x.3 Non-IP based 5G ProSe Layer-3 Multi-hop UE-to-UE Relay communication

Editor's Note: To be added based on TR 23.700-03 conclusions.

*NEXT CHANGE*

6.3.2.x 5G ProSe Mulit-hop UE-to-UE Relay Discovery

6.3.2.x.1 General

The 5G ProSe Multi-hop UE-to-UE Relay discovery may use one of the two different types of discovery operations, i.e. discovery for IP PDU type, and discovery for non-IP PDU type, depends on the RSC for the discovery.

5G ProSe Multi-hop UE-to-UE Relay discovery of IP PDU type only needs to discover the presence of the 5G ProSe Multi-hop UE-to-UE Relay. The discovery of the target 5G ProSe End UEs are performed via DNS queries after establsihing a link with the 5G ProSe Multi-hop UE-to-UE Relay(s). The details of the procedure are defined in clause 6.3.2.x.2.

5G ProSe Multi-hop UE-to-UE Relay discovery of non-IP (Ethernet or Unstructured) PDU type is for the discovery of a target 5G ProSe End UE and the corresponding routes. The procedures for 5G ProSe Multi-hop UE-to-UE Relay discovery Model A/B for non-IP PDUs (e.g. Ethernet or Unstructured) are defined in clasue 6.3.2.x.3.

6.3.2.x.2 Procedure for 5G ProSe Multi-hop UE-to-UE Relay discovery of IP PDU type

Depicted in figure 6.3.2.x.2-1 is the procedure for 5G ProSe Multi-hop UE-to-UE Relay discovery of IP PDU type, with Model A.



Figure 6.3.2.x.2-1: 5G ProSe Multi-hop UE-to-UE Relay Discovery of IP PDU type with Model A

1. The 5G ProSe Multi-hop UE-to-UE Relay is configured to operate IP PDU type of discovery based on the indication associated with the RSC, as defined in defined in 5.1.5.1.

2. The 5G ProSe Multi-hop UE-to-UE Relay sends a Multi-hp UE-to-UE Relay Discovery Announcement message. This message contains the Type of Discovery Message, User Info ID of the 5G ProSe Multi-hop UE-to-UE Relay, and the RSC, as defined in clause 5.8.x.2.

The 5G ProSe Multi-hop UE-to-UE Relay self generates a Source Layer-2 ID, and decides a Destiantion Layer-2 ID as defined in clause 5.8.x.2.

The 5G ProSe End UE(s) or other 5G ProSe Multi-hop UE-to-UE Relay(s) in proximity monitoring the same RSC may receive the announcement message and process it accordingly, e.g. initiates a Layer-2 Link establishment with the announcing 5G ProSe Multi-hop UE-to-UE Relay.

Depicted in figure 6.3.2.x.2-2 is the procedure for 5G ProSe Multi-hop UE-to-UE Relay discovery of IP PDU type, with Model B.



Figure 6.3.2.x.2-2: 5G ProSe Multi-hop UE-to-UE Relay Discovery of IP PDU type with Model B

1. The 5G ProSe End UE is configured to operate IP PDU type of discovery based on the indication associated with the RSC, as defined in defined in 5.1.5.1.

2. The 5G ProSe End UE sends a Multi-hop UE-to-UE Relay Discovery Solicitation message. This message contains the Type of Discovery Message, RSC, and (optional) User Info ID of the 5G ProSe Multi-hop UE-to-UE Relay, as defined in clause 5.8.x.2.

The User Info ID of the 5G ProSe Multi-hop UE-to-UE Relay is only included if the 5G ProSe End UE wants to find a specific target relay.

The 5G ProSe End UE self generates a Source Layer-2 ID, and decides a Destiantion Layer-2 ID as defined in clause 5.8.x.2.

3. The 5G ProSe Multi-hop UE-to-UE Relay-1 may send a Multi-hop UE-to-UE Relay Discovery Response message, if the RSC contained in the solicitation message matches any of the (pre)configured RSC(s), as specified in clause 5.1.5.1. If User Info ID is included in the solicitation message, 5G ProSe Multi-hop UE-to-UE Relay-1 only sends the response message when it matches its own User Info ID.

The 5G ProSe Multi-hop UE-to-UE Relay-1 may in proximity may decide not to respond if the criteria are not met, or due to UE local configuraitons.

A 5G ProSe Multi-hop UE-to-UE Relay may also use the procedure, i.e. send the Multi-hop UE-to-UE Relay Discovery Solicitation, if it needs to discovery other 5G ProSe Multi-hop UE-to-UE Relays.

##### 6.3.2.x.3 Procedure for 5G ProSe Multi-hop UE-to-UE Relay discovery of non-IP PDU type

Editor's Note: To be added based on TR 23.700-03 conclusions.

*NEXT CHANGE*

#### 6.4.3.x Layer-2 link management for 5G ProSe Layer-3 Multi-hop UE-to-UE Relay

##### 6.4.3.x.1 Layer-2 Link establishment and management for IP PDU type

For the 5G ProSe Communication via 5G ProSe UE-to-UE Relay as described in clause 6.7.x.2:

- The Direct Communication Request message over the PC5 reference point (between a 5G ProSe End UE and 5G ProSe Multi-hop UE-to-UE Relay, or between 5G ProSe Multi-hop UE-to-UE Relays) includes:

- User info (i.e. Application Layer ID) of source 5G ProSe End UE or 5G ProSe Multi-hop UE-to-UE Relay: the identity of the source 5G ProSe End UE or 5G ProSe Multi-hop UE-to-UE Relay requesting the connection establishmet.

- User Info ID of 5G ProSe Multi-hop UE-to-UE Relay: the identity of the 5G ProSe Multi-hop UE-to-UE Relay provided during the 5G ProSe Multi-hop UE-to-UE Relay Discovery procedure.

- (optional)ProSe Service Info: the information about the ProSe identifier(s) requesting Layer-2 link establishment.

- RSC: the connectivity service provided by the 5G ProSe Multi-hop UE-to-UE Relay as requested.

- Security Information: the information for the establishment of security for the PC5 link establishment (see TS 33.503 [29]).

The Direct Communication Accept message over the PC5 reference point (between a 5G ProSe End UE and 5G ProSe Multi-hop UE-to-UE Relay, or between 5G ProSe Multi-hop UE-to-UE Relays) includes:

- User Info ID of 5G ProSe UE-to-UE Relay.

Other link management procedures as defined in clause 6.4.3 (i.e. Link identifier update in 6.4.3.2, Layer-2 link release in 6.4.3.3, Layer-2 link modification in 6.4.3.4, Layer-2 link maintenance in 6.4.3.5) can be used for the layer-2 link without enhancements.

When a new layer-2 link is established, or an existing layer-2 link is released, the 5G ProSe Multi-hop UE-to-UE Relay need to inform the status change internally to the MANET router stack.

Editor's Note: It is FFS if the Layer-2 link management messages need to be enhanced to support efficient MANET operations.

##### 6.4.3.x.2 Layer-2 Link establishment and management for non-IP PDU type

Editor's Note: To be added based on TR 23.700-03 conclusions.

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*NEXT CHANGE*

### 6.7.x 5G ProSe Communication via 5G ProSe Layer-3 Multi-hop UE-to-UE Relay

#### 6.7.x.1 General

5G ProSe Communication via 5G ProSe Layer-3 Multi-hop UE-to-UE Relay supports IP type of traffic or non-IP type of traffic, depending on the RSCs associated with the relays.

For one RSC, only one type of traffic and corresponding procedures should be used for the communicaiton.

#### 6.7.x.2 Communication via 5G ProSe Layer-3 Multi-hop UE-to-UE-Relays (IP type)

#### 6.7.x.2.1 Layer-2 link establishment via 5G ProSe Layer-3 Multi-hop UE-to-UE-Relays (IP type)

Figure 6.7.x.2.1-1 shows the Layer-2 link establshment procedure via 5G ProSe Layer-3 Multi-hop UE-to-UE-Relays. This procedure is used by an 5G ProSe End UE to connect to the relay cloud, or for a 5G ProSe Layer-3 Multi-hop UE-to-UE-Relay to connect to other 5G ProSe Layer-3 Multi-hop UE-to-UE-Relays.

#### 



Figure 6.7.x.2.1-1: 5G ProSe Communication via IP type of 5G ProSe Layer-2 Multi-hop UE-to-UE Relay

0. The 5G ProSe Layer-3 Multi-hop UE-to-UE-Relays and the other 5G ProSe End UEs have already established IP type of connections.

1. The 5G ProSe End UE performs the 5G Multi-hop UE-to-UE Relay discovery procedure as described in 6.3.2.x.2, and finds the 5G Multi-hop UE-to-UE Relay -1.

2. The 5G ProSe End UE establishes an IP based Layer-2 link with the 5G ProSe Multi-hop UE-to-UE Relay-1 as described in clause 6.4.3.x.1.

Depends on the configuration, the 5G ProSe End UE may obtain an IP address/Prefix from the 5G ProSe Multi-hop UE-to-UE Relay-1. Otherwise, the 5G ProSe End UE informs the 5G ProSe Multi-hop UE-to-UE Relay-1 of its pre-configured IP address/prefix.

The 5G ProSe End UE may also configure the corresponding services and PC5 QoS Flows over the Layer-2 like with the 5G ProSe Multi-hop UE-to-UE Relay-1. The 5G ProSe End UE may use the Layer-2 link modification procedure as defined in clause 6.4.3.4 to add/modify/remove PC5 QoS Flows corresponding to the services and link status.

3. The 5G ProSe Multi-hop UE-to-UE Relay-1 updates its records of the 5G ProSe End UEs and may trigger the MANET signalling, e.g. OLSRv2 signalling [x], to update other connected 5G ProSe Multi-hop UE-to-UE Relays. This will result in a routing table on the relays that allows other UEs to reach the newly connected 5G ProSe End UE.

The 5G ProSe Multi-hop UE-to-UE Relay may also trigger signalling to update the DNS entries in other connected 5G ProSe Multi-hop UE-to-UE Relays for the 5G ProSe End UE.

Editor's Note: It is FFS if other enhancements needs to be introduced to support the efficient propagation of the User Info ID and IP address of the 5G ProSe End UE.

4. The 5G ProSe End UE may perform a DNS query for a target 5G ProSe End UE, if it does not know the IP address/prefix of the target. The DNS query may stop at the nearest 5G ProSe Multi-hop UE-to-UE Relays that has the entry for the target 5G ProSe End UE.

5G ProSe End UE starts to communicate with the target 5G ProSe End UE using IP based communications. The 5G ProSe Multi-hop UE-to-UE Relays forwards the packets based on the routing table established with the MANET protocols.

#### 6.7.x.3 Communication via non-IP based 5G ProSe Layer-3 Multi-hop UE-to-UE-Relays

Editor's Note: To be added based on TR 23.700-03 conclusions.

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*End of CHANGEs*