**3GPP TSG-CT WG1 Meeting #141eC1-23xxxx**

**Online 17– 21 April 2023**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **54** | **CR** |  | **rev** | **1** | **Current version:** |  |  |
|  | | | | | | | | |
| *For* [***HE******LP***](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:*** | Fix Relay update messages for link identifier update via 5G ProSe UE-to-UE relay UE | | | | | | | | | |
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| ***Source to WG:*** | InterDigital Inc. | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_ProSe\_Ph2 | | | | |  | ***Date:*** | | | 2023-04-10 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | LIU procedure with new RELAY\_UPDATE messages has been agreed in CT1 #140 (C1-230891/892).  In C1-230892 the message description (REQUEST/ACCEPT) contains “Tbd” in the Presence field.  The reason to send the RELAY\_UPDATE message required further discussion and was left as TBD, which must be replaced with O being optional IEs.as explained below.  If the End UEs communicate using IP communication. U2U Relay acts as an IP router. In that case the End UEs must know their peer UE’s IP address to be able to communicate. However, if the IP communication is not used then only the application layer UDs are included and the IPv6 address IEs are not included, which makes these IE optional. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | To update “tbd” in PROSE UE to UE RELAY UPDATE REQUEST/ACCEPT message with “O” as - RELAY\_UPDATE SHALL include initiating UE’s old and new IP addr/prefix.  Corresponding changes are also provided in clause 7.2.4.2, and 7.2.13.2 of 24.554. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Missing fields in the relay update messages | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 10.3.28, 10.3.29, 7.2.4.2, 7.2.13.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 change \*\*\*\*\*

### 10.3.28 ProSe UE to UE relay update request

#### 10.3.28.1 Message definition

This message is sent by a 5G ProSe layer-3 UE-to-UE relay UE which is handling communication between a source end UE and a target end UE to initiate the relay update procedure. See table 10.3.28.1.1.

Message type: PROSE UE to UE RELAY UPDATE REQUEST

Significance: dual

Direction: 5G ProSe layer-3 UE-to-UE relay UE to target end UE

**Table 10.3.28.1.1: PROSE UE to UE RELAY UPDATE REQUEST message content**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | PROSE UE TO UE RELAY UPDATE REQUEST message identity | ProSe PC5 signalling message type  11.3.1 | M | V | 1 |
|  | Sequence number | Sequence number  11.3.2 | M | V | 1 |
|  | Old Source end UE IPv6 address | Link local IPv6 address  11.3.7 | O | TV | 17 |
|  | New Source end UE IPv6 address | Link local IPv6 address  11.3.7 | O | TV | 17 |
| xx | Old Source end UE user info | Application layer ID  11.3.4 | O | TLV | 3-257 |
| xx | New Source end UE user info | Application layer ID  11.3.4 | O | TLV | 3-257 |

#### 10.3.28.2 Old Source end UE IPv6 address

This IE is included if IP communication is used and the link local IPv6 address changes at the Source end UE.

10.3.28.3 New Source end UE IPv6 address

This IE is included if IP communication is used and the link local IPv6 address changes at the Source end UE.

10.3.28.4 Old Source end UE user info

This IE is included if the Source end UE application layer ID changes.

10.3.28.5 New Source end UE user info

This IE is included if the Source end UE application layer ID changes.

Editor’s Note: Security related IE will be added based on SA3 normative requirements.

\*\*\*\*\* Second change \*\*\*\*\*

### 10.3.29 ProSe UE to UE relay update accept

#### 10.3.29.1 Message definition

This message is sent by the target end UE to 5G ProSe layer-3 UE-to-UE relay UE to complete the relay update procedure. See table 10.3.29.1.1.

Message type: PROSE UE to UE RELAY UPDATE ACCEPT

Significance: dual

Direction: Target end UE to 5G ProSe layer-3 UE-to-UE relay UE

**Table 10.3.29.1.1: PROSE UE to UE RELAY UPDATE ACCEPT message content**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | PROSE DIRECT RELAY UPDATE ACCEPT message identity | ProSe PC5 signalling message type  11.3.1 | M | V | 1 |
|  | Sequence number | Sequence number  11.3.2 | M | V | 1 |
|  | Old Source end UE IPv6 address | Link local IPv6 address  11.3.7 | O | TV | 17 |
|  | New Source end UE IPv6 address | Link local IPv6 address  11.3.7 | O | TV | 17 |
| xx | Old Source end UE user info | Application layer ID  11.3.4 | O | TLV | 3-257 |
| xx | New Source end UE user info | Application layer ID  11.3.4 | O | TLV | 3-257 |

#### 10.3.29.2 Old Source end UE IPv6 address

This IE is included if the 5G ProSe target end UE receives the Old Source end UE IPv6 address IE in the PROSE UE to UE RELAY UPDATE REQUEST message.

10.3.29.3 New Source end UE IPv6 address

This IE is included if the 5G ProSe target end UE receives the New Source end UE IPv6 address IE in the PROSE UE to UE RELAY UPDATE REQUEST message.

10.3.29.4 Old Source end UE user info

This IE is included when the 5G ProSe Source end UE application layer ID changes.

This IE is included if the 5G ProSe target end UE receives the Old Source end UE user info IE in the PROSE UE to UE RELAY UPDATE REQUEST message.

10.3.29.5 New Source end UE user info

This IE is included if the 5G ProSe target end UE receives the New Source end UE user info IE in the PROSE UE to UE RELAY UPDATE REQUEST message.

Editor’s Note: Security related IE will be added based on SA3 normative requirements.

\*\*\*\*\* Third change \*\*\*\*\*

#### 7.2.4.2 5G ProSe direct link identifier update procedure initiated by the initiating UE

The initiating UE shall initiate the procedure if:

a) the initiating UE receives a request from upper layers to change the application layer ID and there is an existing 5G ProSe direct link associated with this application layer ID; or

b) the privacy timer (see clause 5.2.4) of the initiating UE’s layer-2 ID expires for an existing 5G ProSe direct link.

If the 5G ProSe direct link identifier update procedure is triggered by a change of the initiating UE’s application layer ID, the initiating UE shall create a PROSE DIRECT LINK IDENTIFIER UPDATE REQUEST message. In this message, the initiating UE:

a) shall include the initiating UE’s new application layer ID received from upper layer;

b) shall include the initiating UE’s new layer-2 ID assigned by itself;

c) shall include the new MSB of KNRP-sess ID;

d) shall include the new IP address/prefix if IP communication is used and the 5G ProSe direct link is not for 5G ProSe direct communication between 5G ProSe layer-2 remote UE and 5G ProSe layer-2 UE-to-network relay UE and the target UE is not a 5G ProSe layer-3 UE-to-UE relay UE;

e) shall include the new IP address/prefix, if IP communication is used and IP address/prefix needs to be changed, and the target UE is a 5G ProSe layer-3 UE-to-UE relay UE and IP address/prefix of the initiating UE is allocated by the initiating UE;

f) shall include the “new IP address needed” indication if IP communication is used and the target UE is a 5G ProSe layer-3 UE-to-UE relay UE and IP address/prefix of the initiating UE needs to be changed and is allocated by the 5G ProSe UE-to-UE relay UE;

g) shall include the list of target 5G ProSe end UE(s) info (i.e. application layer ID(s) and IP address(es)/prefix(es)), if IP communication is used and the initiating UE’s IP address/prefix needs to be changed, and if the target UE is a 5G ProSe layer-3 UE-to-UE relay UE; and

h) shall include “peer update” indication if IP communication is used and the initiating UE’s IP address/prefix needs to be changed and/or if the initiating UE’s user info ID has changed, and if the target UE is a 5G ProSe layer-3 UE-to-UE relay UE.

If the 5G ProSe direct link identifier update procedure is triggered by the expiry of the initiating UE's privacy timer T5090 as specified in clause 5.2.4 and clause 5.2.5, the initiating UE shall create a PROSE DIRECT LINK IDENTIFIER UPDATE REQUEST message. In this message, the initiating UE:

a) shall include the initiating UE's new layer-2 ID assigned by itself;

b) shall include the new MSB of KNRP-sess ID;

c) may include the initiating UE's new application layer ID if received from upper layer;

d) shall include the new IP address/prefix if IP communication is used and changed, and the 5G ProSe direct link is not for 5G ProSe direct communication between 5G ProSe layer-2 remote UE and 5G ProSe layer-2 UE-to-network relay UE and the the target UE is not a 5G ProSe layer-3 UE-to-UE relay UE;

e) shall include the new IP address/prefix if IP communication is used and IP address/prefix needs to be changed, and the target UE is a 5G ProSe layer-3 UE-to-UE relay UE and IP address/prefix of the initiating UE is allocated by the initiating UE;

f) shall include the “new IP address/prefix needed” indication if IP communication is used and IP address/prefix shall be changed and the target UE is a 5G ProSe layer-3 UE-to-UE relay UE and IP address/prefix of the initiating UE is allocated by the 5G ProSe layer-3 UE-to-UE relay UE;

g) shall include the list of target 5G ProSe end UE(s) info (i.e. application layer ID and IP address/prefix) if IP communication is used and IP address/prefix shall be changed and the target UE is a 5G ProSe layer-3 UE-to-UE relay UE; and

h) shall include “peer update” indication if IP communication is used and IP address/prefix changed and the target UE is a 5G ProSe layer-3 UE-to-UE relay UE.

After the PROSE DIRECT LINK IDENTIFIER UPDATE REQUEST message is generated, the initiating UE shall pass this message to the lower layers for transmission along with the initiating UE's old layer-2 ID for 5G ProSe direct communication and the target UE's layer-2 ID for 5G ProSe direct communication and start timer T5082. The UE shall not send a new PROSE DIRECT LINK IDENTIFIER UPDATE REQUEST message to the same target UE while timer T5082 is running.



Figure 7.2.4.2.1: 5G ProSe direct link identifier update procedure

\*\*\*\*\* Fourth change \*\*\*\*\*

#### 7.2.13.2 5G ProSe direct relay update procedure initiation by initiating UE

The 5G ProSe layer-3 UE-to-UE relay UE shall initiate the 5G ProSe direct relay update procedure with the target UE, if:

a) the 5G ProSe layer-3 UE-to-UE relay UE receives a PROSE DIRECT LINK IDENTIFIER UPDATE REQUEST message from the initiating end UE as part of 5G ProSe direct link identifier update procedure; and

b) the “peer update” indication is included in the PROSE DIRECT LINK IDENTIFIER UPDATE REQUEST message.

The 5G ProSe layer-3 UE-to UE relay UE retrieves the target UEs’ (e.g., target end UEs’) entry from its local table based on the target end UE(s) info received on the PROSE DIRECT LINK IDENTIFIER UPDATE REQUEST message. The 5G ProSe layer-3 UE-to UE relay UE initiates the 5G ProSe relay update procedure with every target UE.

In order to initiate the 5G ProSe direct relay update procedure, the 5G ProSe layer-3 UE-to-UE relay UE shall create a PROSE UE TO UE RELAY UPDATE REQUEST message. In this message, the 5G ProSe layer-3 UE-to-UE relay UE;

1. shall include the initiating end UE’s old IP address/prefix, if the initiating UE’s IP address/prefix has changed;
2. shall include the initiating end UE’s old user info ID, if the initiating UE’s user info ID has changed;
3. shall include the initiating end UE’s new user info ID, if the initiating UE’s user info ID has changed; and
4. shall include the initiating end UE’s new IP address/prefix, if the initiating UE’s IP address/prefix has changed.

The 5G ProSe layer-3 UE-to-UE relay UE shall pass this message to the lower layers for transmission along with the target UE's layer-2 ID for 5G ProSe direct communication and start timer Txxxx. The 5G ProSe layer-3 UE-to-UE relay UE shall not send a new PROSE UE TO UE RELAY UPDATE REQUEST message to the same target UE while timer Txxxx is running.



Figure 7.2.13.2.1: 5G ProSe direct relay update procedure

\*\*\*\*\* End of changes \*\*\*\*\*