**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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|  |  | **CR** |  | **rev** | **1** | **Current version:** |  |  |
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| *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:***  | Update 5G ProSe link modification procedure for the L3 UE-to-UE relay reselection procedure |
|  |  |
| ***Source to WG:*** | InterDigital Inc., Huawei, HiSilicon |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5G\_ProSe\_Ph2 |  | ***Date:*** | 2023-04-10 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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 canbe 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)* |
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| ***Reason for change:*** | In S2-2303389 updates were agreed for the UE-to-UE reselection procedure and implemented in 23.304, clause 6.7.4.3. The proposed changes have impact on the 5G ProSe direct link modification procedure, which needs to be implemented in stage-3. Following updates are proposed in this CR:* Details for link setup with selected relay as part of the link modification procedure
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| ***Summary of change:*** | 5G ProSe direct link modification procedure is updated to implement L3 UE-to-UE reselection procedure.  |
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| ***Consequences if not approved:*** | Stage 2 update of 5G ProSe UE-to-UE relay reselection procedure is not implemented |
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| ***Clauses affected:*** | 7.2.3.1, 7.2.3.2, 7.2.3.3, 7.2.3.4, 7.2.3.y (new) |
|  |  |
|  | **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 ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\*\*\*\*\* First change \*\*\*\*\*

#### 7.2.3.1 General

The purpose of the 5G ProSe direct link modification procedure is to modify the existing ProSe direct link to:

a) add new PC5 QoS flow(s) to the existing 5G ProSe direct link;

b) modify existing PC5 QoS flow(s) for updating PC5 QoS parameters of the existing PC5 QoS flow(s);

c) modify existing PC5 QoS flow(s) for associating new ProSe application(s) with the existing PC5 QoS flow(s);

d) modify existing PC5 QoS flow(s) for removing the associated ProSe application(s) from the existing PC5 QoS flow(s);

e) remove existing PC5 QoS flow(s) from the existing 5G ProSe direct link; or

f) negotiate a new 5G ProSe UE-to-UE relay UE over the existing 5G ProSe direct link.

In this procedure, the UE sending the PROSE DIRECT LINK MODIFICATION REQUEST message is called the "initiating UE" and the other UE is called the "target UE".

NOTE: The 5G ProSe direct link modification procedure is not applicable for 5G ProSe layer-2 UE-to-network relay case.

#### 7.2.3.2 5G ProSe direct link modification procedure initiated by initiating UE

The initiating UE shall meet the following pre-conditions before initiating this procedure for adding a new ProSe application to the existing 5G ProSe direct link:

a) there is a 5G ProSe direct link between the initiating UE and the target UE;

b) the pair of application layer IDs and the network layer protocol of this 5G ProSe direct link are identical to those required by the application layer in the initiating UE for this ProSe application; and

c) the security policy corresponding to the ProSe identifier is aligned with the security policy of the existing 5G ProSe direct link.

The initiating UE shall meet the following pre-conditions before initiating this procedure for negotiating a new 5G ProSe UE-to-UE relay UE over the existing 5G ProSe direct link:

a) the initiating UE is a source 5G ProSe end UE communicating with the target 5G ProSe end UE via a 5G ProSe UE-to-UE relay UE;

b) the initiating UE determines, e.g., based on PC5 signal strength, to perform UE-to-UE relay reselection; and

c) the initiating UE obtains a list of candidate UE-to-UE relays via UE-to-UE discovery procedure.

After receiving the service data or request from the upper layers, the initiating UE shall perform the PC5 QoS flow match as specified in clause 7.2.8. If there is no matched PC5 QoS flow, the initiating UE shall derive the PC5 QoS parameters and assign the PQFI(s) for the PC5 QoS flows(s) to be established as specified in clause 7.2.7.

If the 5G ProSe direct link modification procedure is to add new PC5 QoS flow(s) to the existing 5G ProSe direct link, the initiating UE shall create a PROSE DIRECT LINK MODIFICATION REQUEST message. In this message, initiating UE:

a) shall include the PQFI(s), the corresponding PC5 QoS parameters and optionally the ProSe identifier(s);

b) shall include the link modification operation code set to "Add new PC5 QoS flow(s) to the existing 5G ProSe direct link ";

c) may include the PC5 QoS rule(s) to indicate the packet filters of the PC5 QoS flow(s);

d) may include the source end UE info set to the user info ID of the source 5G ProSe end UE, if the UE acts as a 5G ProSe UE-to-UE relay UE and the 5G ProSe direct link is between the 5G ProSe UE-to-UE relay UE and the target 5G ProSe end UE;

e) may include the target end UE info set to the user info ID of the target 5G ProSe end UE, if:

1) the UE acts as a source 5G ProSe end UE and the 5G ProSe direct link is between the source 5G ProSe end UE and the 5G ProSe UE-to-UE relay UE; or

2) the UE acts as a 5G ProSe UE-to-UE relay UE and the 5G ProSe direct link is between the 5G ProSe UE-to-UE relay UE and the target 5G ProSe end UE; and

f) may include the target end UE layer-2 ID set to the destination layer-2 ID of the target 5G ProSe End UE, if the UE acts as a source 5G ProSe end UE and the 5G ProSe direct link is between the source 5G ProSe end UE and the 5G ProSe UE-to-UE relay UE.

If the 5G ProSe direct link modification procedure is to modify the PC5 QoS parameters for existing PC5 QoS flow(s) in the existing 5G ProSe direct link, the initiating UE shall create a PROSE DIRECT LINK MODIFICATION REQUEST message. In this message, the initiating UE:

a) shall include the PQFI(s) and the corresponding PC5 QoS parameters, including the ProSe identifier(s);

b) shall include the link modification operation code set to "Modify PC5 QoS parameters of the existing PC5 QoS flow(s)";

c) may include the PC5 QoS rule(s) to indicate the packet filters of the PC5 QoS flow(s);

d) may include the source end UE info set to the user info ID of the source 5G ProSe end UE, if the UE acts as a 5G ProSe UE-to-UE relay UE and the 5G ProSe direct link is between the 5G ProSe UE-to-UE relay UE and the target 5G ProSe end UE;

e) may include the target end UE info set to the user info ID of the target 5G ProSe end UE, if:

1) the UE acts as a source 5G ProSe end UE and the 5G ProSe direct link is between the source 5G ProSe end UE and the 5G ProSe UE-to-UE relay UE; or

2) the UE acts as a 5G ProSe UE-to-UE relay UE and the 5G ProSe direct link is between the 5G ProSe UE-to-UE relay UE and the target 5G ProSe end UE; and

f) may include the target end UE layer-2 ID set to the destination layer-2 ID of the target 5G ProSe End UE, if the UE acts as a source 5G ProSe end UE and the 5G ProSe direct link is between the source 5G ProSe end UE and the 5G ProSe UE-to-UE relay UE.

If the 5G ProSe direct link modification procedure is to associate new ProSe application(s) with existing PC5 QoS flow(s), the initiating UE shall create a PROSE DIRECT LINK MODIFICATION REQUEST message. In this message, the initiating UE:

a) shall include the PQFI(s) and the corresponding PC5 QoS parameters, including the ProSe identifier(s);

b) shall include the link modification operation code set to "Associate new ProSe application(s) with existing PC5 QoS flow(s)";

c) may include the PC5 QoS rule(s) to indicate the packet filters of the PC5 QoS flow(s);

d) may include the source end UE info set to the user info ID of the source 5G ProSe end UE, if the UE acts as a 5G ProSe UE-to-UE relay UE and the 5G ProSe direct link is between the 5G ProSe UE-to-UE relay UE and the target 5G ProSe end UE;

e) may include the target end UE info set to the user info ID of the target 5G ProSe end UE, if:

1) the UE acts as a source 5G ProSe end UE and the 5G ProSe direct link is between the source 5G ProSe end UE and the 5G ProSe UE-to-UE relay UE; or

2) the UE acts as a 5G ProSe UE-to-UE relay UE and the 5G ProSe direct link is between the 5G ProSe UE-to-UE relay UE and the target 5G ProSe end UE; and

f) may include the target end UE layer-2 ID set to the destination layer-2 ID of the target 5G ProSe End UE, if the UE acts as a source 5G ProSe end UE and the 5G ProSe direct link is between the source 5G ProSe end UE and the 5G ProSe UE-to-UE relay UE.

If the PC5 5G ProSe direct link modification procedure is to remove the associated ProSe application(s) from existing PC5 QoS flow(s), the initiating UE shall create a PROSE DIRECT LINK MODIFICATION REQUEST message. In this message, the initiating UE:

a) shall include the PQFI(s) and the corresponding PC5 QoS parameters including the ProSe identifier(s); and

b) shall include the link modification operation code set to "Remove ProSe application(s) from existing PC5 QoS flow(s)".

If the direct link modification procedure is to remove any PC5 QoS flow(s) from the existing 5G ProSe direct link, the initiating UE shall create a PROSE DIRECT LINK MODIFICATION REQUEST message. In this message, the initiating UE:

a) shall include the PQFI(s); and

b) shall include the link modification operation code set to "Remove existing PC5 QoS flow(s) from the existing 5G ProSe direct link".

If the 5G ProSe direct link modification procedure is to trigger UE-to-UE relay reselection, the initiating UE shall create a PROSE DIRECT LINK MODIFICATION REQUEST message. In this message:

1) If the intitiating UE acts as a source 5G ProSe end UE and the 5G ProSe direct link is between the source 5G ProSe end UE and the 5G ProSe UE-to-UE relay UE, the initiating UE:

a) shall include the relay reselection indication;

b) shall include the list of candidates 5G ProSe UE-to-UE relay UE user info ID;

c) shall include the list of target 5G ProSe end UEs IP address/prefix, if IP communication is used; and

d) may include the list of candidates 5G ProSe UE-to-UE relay UE layer-2 ID.

2) If the initiating UE acts as a 5G ProSe UE-to-UE relay UE and the 5G ProSe direct link is between the 5G ProSe UE-to-UE relay UE and the target 5G ProSe end UE, the initiating UE:.

a) shall include the relay reselection indication;

b) shall include the list of candidates 5G ProSe UE-to-UE relay UE user info ID;

c) shall include the initiating source 5G ProSe UE IP address/prefix, if IP communication is used; and

d) may include list of candidates 5G ProSe UE-to-UE relay UE layer-2 ID.

Editor's note: The PROSE DIRECT LINK MODIFICATION REQUEST message needs to be updated.

If the 5G ProSe direct link modification procedure is to trigger relay reselection and the initiating UE acts as a 5G ProSe UE-to-UE relay UE, the initiating UE shall create a PROSE DIRECT LINK MODIFICATION REQUEST message for every IP address/prefix of the target 5G ProSe UEs received on the associated PROSE DIRECT LINK MODIFICATION REQUEST message from the 5G ProSe source end UE.

After the PROSE DIRECT LINK MODIFICATION REQUEST message is generated, the initiating UE shall pass this message to the lower layers for transmission along with the initiating UE's layer-2 ID for 5G ProSe direct communication and the target UE's layer-2 ID for 5G ProSe direct communication and start timer T5081. The UE shall not send a new PROSE DIRECT LINK MODIFICATION REQUEST message to the same target UE while timer T5081 is running.



Figure 7.2.3.2.1: 5G ProSe direct link modification procedure



Figure 7.2.3.2.2: 5G ProSe direct link modification procedure for Layer-3 UE-to-UE Relay reselection

\*\*\*\*\* Next change \*\*\*\*\*

#### 7.2.3.3 5G ProSe direct link modification procedure accepted by the target UE

If the PROSE DIRECT LINK MODIFICATION REQUEST message is accepted, the target UE shall respond with the PROSE DIRECT LINK MODIFICATION ACCEPT message.

If the PROSE DIRECT LINK MODIFICATION REQUEST message is to add a new ProSe application, add new PC5 QoS flow(s) or modify any existing PC5 QoS flow(s) in the 5G ProSe direct link, the target UE:

a) shall include the PQFI(s), the corresponding PC5 QoS parameters and optionally the ProSe identifier(s) that the target UE accepts;

b) may include the PC5 QoS rule(s) to indicate the packet filters of the PC5 QoS flow(s);

d) may include the source end UE info set to the user info ID of the source 5G ProSe end UE, if the UE acts as a target 5G ProSe end UE and the 5G ProSe direct link is between the 5G ProSe UE-to-UE relay UE and the target 5G ProSe end UE; and

e) may include the target end UE info set to the user info ID of the target 5G ProSe end UE, if the UE acts as a 5G ProSe UE-to-UE relay UE and the 5G ProSe direct link is between the source 5G ProSe end UE and the 5G ProSe UE-to-UE relay UE;

in the PROSE DIRECT LINK MODIFICATION ACCEPT message.

If the PROSE DIRECT LINK MODIFICATION REQUEST message is to remove an existing ProSe application from the 5G ProSe direct link, the target UE shall delete the ProSe identifier received in the PROSE DIRECT LINK MODIFICATION REQUEST message and the corresponding PQFI(s) and PC5 QoS parameters from the profile associated with the 5G ProSe direct link.

If the PROSE DIRECT LINK MODIFICATION REQUEST message is to remove existing PC5 QoS flow(s) from the PC5 5G ProSe direct link, the target UE shall delete the PQFI(s) and the corresponding PC5 QoS parameters from the profile associated with the 5G ProSe direct link.

If the PROSE DIRECT LINK MODIFICATION REQUEST message is to add a new ProSe application, add new PC5 QoS flow(s) or modify any existing PC5 QoS flow(s) in the 5G ProSe direct link, after sending the PROSE DIRECT LINK MODIFICATION ACCEPT message, the target UE shall provide the added or modified PQFI(s) and corresponding PC5 QoS parameters along with PC5 link identifier to the lower layer.

If the PROSE DIRECT LINK MODIFICATION REQUEST message is to remove an existing ProSe application or to remove the existing PC5 QoS flow(s) from the 5G ProSe direct link, after sending the PROSE DIRECT LINK MODIFICATION ACCEPT message, the target UE shall provide the removed PQFI(s) along with the PC5 link identifier to the lower layer.

If the 5G ProSe direct link is for 5G ProSe direct communication between the 5G ProSe remote UE and the 5G ProSe layer-3 UE-to-network relay UE, and if the initiating UE is the 5G ProSe remote UE, then the target UE (as the 5G ProSe layer-3 UE-to-network relay UE) performs the QoS flows handling procedure as specified in clause 8.2.6.3.3 and clause 8.2.6.4.2.

If the PROSE DIRECT LINK MODIFICATION REQUEST message is for UE-to-UE relay UE reselection, the target UE may perform the 5G ProSe UE-to-UE relay discovery procedure with the User Info ID of a candidate 5G ProSe UE-to-UE Relay in discovery message, and may set the Layer-2 ID of the candidate 5G ProSe UE-to-UE relay, if received in the PROSE DIRECT LINK MODIFICATION REQUEST message, as the Destination Layer-2 ID to carry the discovery message.

If the PROSE DIRECT LINK MODIFICATION REQUEST message is accepted to trigger UE-to-UE relay reselection, the target UE shall set up a PC5 unicast link with the selected 5G ProSe UE-to-UE relay UE, if no such PC5 unicast link already exists, and the 5G ProSe direct link is between the target 5G ProSe end UE and the 5G ProSe UE-to-UE relay UE.

If the PROSE DIRECT LINK MODIFICATION REQUEST message is accepted to trigger relay reselection, the target UE shall respond with PROSE DIRECT LINK MODIFICATION ACCEPT message. In this message,:

1) If the target UE acts as a target 5G ProSe end UE and the 5G ProSe direct link is between the target 5G ProSe end UE and the 5G ProSe UE-to-UE relay UE, the target UE:

a) shall include the relay reselection indication;

b) shall include the new 5G ProSe UE-to-UE relay UE user info ID;

c) shall include the initiating 5G ProSe end UE IP address; and

d) shall include the target 5G ProSe end UE IP address to be used with the newly selected 5G ProSe UE-to-UE relay UE, if IP communication is used.

2) If the target UE acts as a 5G ProSe UE-to-UE relay UE and the 5G ProSe direct link is between the 5G ProSe UE-to-UE relay UE and the source 5G ProSe end UE, the target UE.

a) shall include the relay reselection indication;

b) shall include the new 5G ProSe UE-to-UE relay UE user info ID;

c) shall include the target 5G ProSe end UE IP address; and

d) shall include the target 5G ProSe end UE IP address to be used with the newly selected 5G ProSe UE-to-UE relay UE, if IP communication is used.

Editor's note: The PROSE DIRECT LINK MODIFICATION ACCEPT message needs to be updated.

If the target UE accepts the 5G ProSe direct link modification request, then the target UE may perform the PC5 QoS flow establishment over 5G ProSe direct link as specified in clause 7.2.7 and perform the PC5 QoS flow match over 5G ProSe direct link as specified in clause 7.2.8.

\*\*\*\*\* Next change \*\*\*\*\*

#### 7.2.3.4 5G ProSe direct link modification procedure completion by the initiating UE

Upon receipt of the PROSE DIRECT LINK MODIFICATION ACCEPT message, the initiating UE shall stop timer T5081.

Upon receipt of the PROSE DIRECT LINK MODIFICATION ACCEPT message, if the PROSE DIRECT LINK MODIFICATION REQUEST message is to add a new ProSe application, add new PC5 QoS flow(s) or modify any existing PC5 QoS flow(s) in the 5G ProSe direct link, the initiating UE shall provide the added or modified PQFI(s) and corresponding PC5 QoS parameters along with PC5 link identifier to the lower layer.

Upon receipt of the PROSE DIRECT LINK MODIFICATION ACCEPT message, if the PROSE DIRECT LINK MODIFICATION REQUEST message is to remove an existing ProSe application or to remove the existing PC5 QoS flow(s) from the 5G ProSe direct link, the initiating UE shall provide the removed PQFI(s) along with the PC5 link identifier to the lower layer.

Upon receiving PROSE DIRECT LINK MODIFICATION ACCEPT message, that includes relay reselection indication, if the PROSE DIRECT LINK MODIFICATION REQUEST message is for Layer-3 UE-to-UE relay reselection, the initiating UE shall set up a PC5 unicast link with the selected 5G ProSe UE-to-UE relay UE, if no such PC5 unicast link already exists, and shall create a PROSE DIRECT LINK MODIFICATION ACK message. In this message, the initiating UE:

a) shall include the relay reselection indication, IP address of the initiating 5G ProSe UE to be used with the newly selected 5G ProSe UE-to-UE relay UE and IP address of the target 5G ProSe end UE, if IP communication is used, and if:

1) the UE acts as a source 5G ProSe end UE and the 5G ProSe direct link is between the source 5G ProSe end UE and the 5G ProSe UE-to-UE relay UE; or

b) shall include the relay reselection indication, IP address of the initiating 5G ProSe UE to be used with the newly selected 5G ProSe UE-to-UE relay UE and IP address of the source 5G ProSe end UE, if IP communication is used, and if:

1) the UE acts as a 5G ProSe UE-to-UE relay UE and the 5G ProSe direct link is between the 5G ProSe UE-to-UE relay UE and the target 5G ProSe end UE.

After the PROSE DIRECT LINK MODIFICATION ACK message is generated, the initiating UE shall pass this message to the lower layers for transmission along with the initiating UE's layer-2 ID for 5G ProSe direct communication and the target UE's layer-2 ID for 5G ProSe direct communication.

If the source UE acknowledges the 5G ProSe direct link modification accept, then the source UE starts to receive and/or transmit traffic via the newly selected 5G ProSe UE-to-UE relay UE.

\*\*\*\*\* Next change \*\*\*\*\*

#### 7.2.3.y 5G ProSe direct link modification procedure completion by target UE

Upon receipt of the PROSE DIRECT LINK MODIFICATION ACK, the target 5G ProSe end UE starts to receive traffic, transmit traffic, or both, via the newly selected 5G ProSe UE-to-UE relay UE.

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