**3GPP TSG-CT WG1 Meeting #141eC1-232206**

**Online 17– 21 April 2023**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **54** | **CR** | **0293** | **rev** | **-** | **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:*** | U2U link modification for PC5 link sharing | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Interdigital | | | | | | | | | |
| ***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 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:*** | | The 5G ProSe UE-to-UE relay link modification is introduced to TS 23.304 v18.0.0 and later is updated in SA2#154AH (S2-2301479).  The corresponding stage 3 implementation is needed as well as the PC5 link sharing support for PC5 links between the end UE and the 5G ProSe UE-to-UE Relay  For link modification,  This CR focuses on both PC5 links between the UE-to-UE Relay and the source/target end UEs.  User info IDs are used instead of application layer IDs when UE-to-UE Relay is used.  Both PC5 links (between source end UE and Relay and between Relay and target end UE) are established at the same time and are associated to the source end UE user info ID, target end UE user info ID and Relay user info ID. When link sharing is used, the new source or target end UE user info ID needs ot be assoicated with the exisitng PC5 link.  Additionally, this CR proposes a new reject cause value related to integrated discovery. With integrated discovery, the target end UE sleects the UE-to-UE Relay. When the target end UE doesn’t select a UE-to-UE Relay which has sent a link modificiation request, the target end UE needs to send a link modification reject message to indicate to the Relay that it’s not selected and then complete the link modification procedure. Without this new reject cause value, i.e. if no reject message is sent to the Relay, the Relay retransmits the link modification request a number of times. This applies to every Relay which is not selected, which is a loss of resources. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add the link modification with PC5 link sharing for UE-to-UE relay. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | U2U link modification with Pc5 link sharing is missing. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 7.2.3.2, 7.2.3.3, 7.2.3.4, 7.2.3.5, 10.3.6.1, 10.3.6.3 (new), 10.3.6.4 (new), 10.3.8, 11.3.19 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 \*\*\*\*\*

### 7.2.3 5G ProSe direct link modification procedure

#### 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); or

e) remove existing PC5 QoS flow(s) from 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 or user info 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.

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 direct link modification procedure is to associate 5G ProSe source and/or target end UE(s) new user info ID(s) to the existing 5G ProSe direct link and possibly associate new ProSe identifier(s) with existing or new PC5 QoS flow(s), and if the 5G ProSe direct link modification procedure is for 5G ProSe direct communication between the 5G ProSe UE-to-UE relay UE and the 5G ProSe Target end UE or 5G ProSe direct communication between the 5G ProSe Source end UE and the 5G ProSe UE-to-UE relay UE, the initiating UE shall create a PROSE DIRECT LINK MODIFICATION REQUEST message. In this message, the initiating UE:

a) shall include the source end UE user info set to the user info ID of the Source 5G ProSe end UE if the initiating UE is the UE-to-UE Relay;

b) shall include the Target end UE user info set to the user info ID of the 5G ProSe Target end UE if the initiating UE is the source end UE and;

c) shall include the link modification operation code set to "Associate new user info IDs with existing 5G ProSe direct link";

d) may include the PQFI(s) and the corresponding PC5 QoS parameters, including the ProSe identifier(s), if new PC5 QoS flow(s) are added;

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

f) shall include the link modification operation code set to "Modify PC5 QoS parameters of the existing PC5 QoS flow(s)", if existing PC5 QoS flow(s) are modified; and

g) may include the PC5 QoS rule(s) to indicate the packet filters of the PC5 QoS flow(s), if new PC5 QoS flow(s) are added.

If the direct link modification procedure is to remove user info ID(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 source end UE user info set to the user info ID of the source 5G ProSe end UE if the communication associated to the source end UE user info ID is terminated, and if the 5G ProSe direct link modification procedure is for 5G ProSe direct communication between the 5G ProSe UE-to-UE relay UE and the 5G ProSe Target end UE;

b) shall include the Target end UE user info set to the user info ID of the target 5G ProSe end UE if the communication associated to the target end UE user info ID is terminated, and if the 5G ProSe direct link modification procedure is for 5G ProSe direct communication between the 5G ProSe Source end UE and the 5G ProSe UE-to-UE relay UE;

c) shall include the link modification operation code set to "Remove ProSe application IDs from 5G ProSe direct link";

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

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

f) shall include the link modification operation code set to "Modify PC5 QoS parameters of the existing PC5 QoS flow(s)", if existing PC5 QoS flow(s) are modified; and

g) may include the PC5 QoS rule(s) to indicate the packet filters of the PC5 QoS flow(s).

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

#### 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 user info ID(s), 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 or user info ID(s) from the 5G ProSe direct link, the target UE shall delete the ProSe identifier or user info ID(s) 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 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.

#### 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 user info ID(s), add new PC5 QoS flow(s) or modify any existing PC5 QoS flow(s) in the 5G ProSe direct link, the initiating UE may provide the new user info ID(s) and 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, to remove existing user info ID(s) or to remove the existing PC5 QoS flow(s) from the 5G ProSe direct link, the initiating UE may provide the removed user info ID(s) and shall provide the removed PQFI(s) along with the PC5 link identifier to the lower layer.

#### 7.2.3.5 5G ProSe direct link modification procedure not accepted by the target UE

If the 5G ProSe direct link modification request cannot be accepted, the target UE shall send a PROSE DIRECT LINK MODIFICATION REJECT message. The PROSE DIRECT LINK MODIFICATION REJECT message contains a PC5 signalling protocol cause IE set to one of the following cause values:

#5 lack of resources for 5G ProSe direct link;

#6 required service not allowed;

#12 security policy not aligned;

#16 lack of local capabilities;

#xx Failure from 5G ProSe end UE; or

#zz 5G ProSe UE-to-UE relay UE is not selected; or

#111 protocol error, unspecified.

If the target UE is not allowed to accept this request, e.g., because the ProSe application to be added is not allowed per the operator policy or configuration parameters for ProSe communication over PC5 as specified in clause 5.2.4, the target UE shall send a PROSE DIRECT LINK MODIFICATION REJECT message with PC5 signalling protocol cause value #6 "required service not allowed".

If the 5G ProSe direct link modification fails due to the congestion problems or other temporary lower layer problems causing resource constraints, the target UE shall send a PROSE DIRECT LINK MODIFICATION REJECT message with PC5 signalling protocol cause value #5 "lack of resources for 5G ProSe direct link".

If the link modification operation code is set to "Associate new ProSe application(s) with existing PC5 QoS flow(s)" and the security policy corresponding to the ProSe identifier(s) is not aligned with the security policy applied to the existing 5G ProSe direct link, then the target UE shall send a PROSE DIRECT LINK MODIFICATION REJECT message with PC5 signalling protocol cause value #12 "security policy not aligned".

If the link modification operation requires the addition of new PC5 QoS flow(s) but the target UE cannot support additional packet filters which would be required on the existing PDU session of the target UE, then the target UE shall send a PROSE DIRECT LINK MODIFICATION REJECT message with PC5 signalling protocol cause value #16"lack of local capabilities".

If the 5G ProSe direct link modification fails due to the 5G ProSe UE-to-UE relay UE not being selected by the 5G ProSe target end UE, the target UE shall send a PROSE DIRECT LINK MODIFICATION REJECT message containing PC5 signalling protocol cause value #zz "5G ProSe UE-to-UE relay UE is not selected".

If the target UE is acting as a target 5G ProSe end UE and the 5G ProSe direct link modification procedure is between the 5G ProSe UE-to-UE relay UE and the target 5G ProSe end UE, the target 5G ProSe end UE may include in the PROSE DIRECT LINK MODIFICATION REJECT message the source end UE info IE set to the user info ID of the source 5G ProSe end UE that has initiated the 5G ProSe direct link establishment procedure.

If the target UE is acting as a 5G ProSe UE-to-UE relay UE, the 5G ProSe direct link modification procedure is between the source 5G ProSe end UE and the 5G ProSe UE-to-UE relay UE, and the target 5G ProSe end UE has rejected the 5G ProSe direct link establishment procedure or the 5G ProSe direct link modification procedure, then the 5G ProSe UE-to-UE relay UE shall send a PROSE DIRECT LINK MODIFICATION REJECT message with PC5 signalling protocol cause value #xx "Failure from 5G ProSe end UE" to the source 5G ProSe end UE. The 5G ProSe UE-to-UE relay UE may include in the PROSE DIRECT LINK MODIFICATION REJECT message the PC5 end UE failure cause IE set to the PC5 signalling protocol cause received from the target 5G ProSe end UE that has rejected the 5G ProSe direct link establishment procedure as specified in clause 7.2.2.5. The 5G ProSe UE-to-UE relay UE may include in the PROSE DIRECT LINK MODIFICATION REJECT message the target end UE info IE set to the user info ID of the target 5G ProSe end UE that has rejected the 5G ProSe direct link establishment procedure.

For other reasons causing the failure of link modification, the target UE shall send a PROSE DIRECT LINK MODIFICATION REJECT message with PC5 signalling protocol cause value #111 "protocol error, unspecified".

Upon receipt of the PROSE DIRECT LINK MODIFICATION REJECT message, the initiating UE shall stop timer T5081 and abort the 5G ProSe direct link modification procedure. If the PC5 signalling protocol cause value in the PROSE DIRECT LINK MODIFICATION REJECT message is #11 "required service not allowed" or #5 "lack of resources for 5G ProSe direct link" or #12 "security policy not aligned", or #zz "5G ProSe UE-to-UE relay UE is not selected", then the initiating UE shall not attempt to start 5G ProSe direct link modification with the same target UE to add the same ProSe application, or to add or modify the same PC5 QoS flow(s) at least for a time period T.

NOTE: The length of time period T is UE implementation specific and can be different for the case when the UE receives PC5 signalling protocol cause value #11 "required service not allowed" or when the UE receives PC5 signalling protocol cause value #5 "lack of resources for 5G ProSe direct link" or when the UE receives PC5 signalling protocol cause value #12 "security policy not aligned". The length of time period T is not less than 30 minutes.

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

### 10.3.6 ProSe direct link modification request

#### 10.3.6.1 Message definition

This message is sent by the UE to another peer UE to initiate the direct link modification procedure. See table 10.3.6.1.1.

Message type: PROSE DIRECT LINK MODIFICATION REQUEST

Significance: dual

Direction: UE to peer UE

Table 10.3.6.1.1: PROSE DIRECT LINK MODIFICATION REQUEST message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | PROSE DIRECT LINK MODIFICATION REQUEST message identity | ProSe PC5 signalling message type  11.3.1 | M | V | 1 |
|  | Sequence number | Sequence number  11.3.2 | M | V | 1 |
|  | Link modification operation code | Link modification operation code  11.3.19 | M | V | 1 |
|  | QoS flow descriptions | PC5 QoS flow descriptions  11.3.5 | M | LV-E | 5-65537 |
| 7C | QoS rules | PC5 QoS rules  11.3.29 | O | TLV-E | 7-65538 |
| XY | Source end UE info | User info ID  11.3.xz | O | TLV | 3-257 |
| XZ | Target end UE info | User info ID  11.3.xz | O | TLV | 3-257 |
| ZZ | Target end UE layer-2 ID | Layer-2 ID  11.3.25 | O | TV | 4 |
| 7B | ProSe identifiers | ProSe identifier  11.3.3 | O | TLV-E | 21-65538 |

#### 10.3.6.2 QoS rules

The UE may include this IE to indicate the PC5 QoS rules for the PC5 QoS flow(s) to be added or modified.

#### 10.3.6.3 Source end UE info

The UE may include this IE if:

a) 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 to indicate the user info ID of the source 5G ProSe end UE.

#### 10.3.6.4 Target end UE info

The UE may include this IE if:

a) 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 to indicate the user info ID of the target 5G ProSe end UE; or

b) 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 to indicate the user info ID of the target 5G ProSe end UE.

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

### 11.3.8 PC5 signalling protocol cause

The purpose of the PC5 signalling protocol cause information element is to indicate the cause used in the PC5 signalling protocol procedures.

The PC5 signalling protocol cause is a type 3 information element with a length of 2 octets.

The PC5 signalling protocol cause information element is coded as shown in figure 11.3.8.1 and table 11.3.8.1.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| PC5 signalling protocol cause IEI | | | | | | | | octet 1 |
| PC5 signalling cause value | | | | | | | | octet 2 |

Figure 11.3.8.1: PC5 signalling protocol cause information element

Table 11.3.8.1: PC5 signalling protocol cause information element

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PC5 signalling cause value (octet 2) | | | | | | | | | |
|  | | | | | | | | | |
| Bits | | | | | | | | | |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |  | Direct communication to the target UE not allowed |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |  | Direct communication to the target UE no longer needed |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |  | Conflict of layer-2 ID for unicast communication is detected |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |  | Direct connection is not available anymore |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |  | Lack of resources for 5G ProSe direct link |
| 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |  | Authentication failure |
| 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |  | Integrity failure |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |  | UE security capabilities mismatch |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |  | LSB of KNRP-sess ID conflict |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |  | UE PC5 unicast signalling security policy mismatch |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |  | Required service not allowed |
| 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |  | Security policy not aligned |
| 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 |  | Congestion situation |
| 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 |  | Authentication synchronisation error |
| 0  0  0 | 0  0  0 | 0  0  0 | 0  1  1 | 1  0  0 | 1  0  1 | 1  1  0 | 1  0  0 |  | Security procedure failure of 5G ProSe UE-to-network relay  path switching is not allowed for the ProSe applications  communication path over Uu is not available for path switching |
| x | x | x | x | x | x | x | x |  | Failure from 5G ProSe end UE |
| z | z | z | z | z | z | z | z |  | 5G ProSe UE-to-UE relay UE is not selected |
| 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |  | Protocol error, unspecified |
| Any other value received by the UE shall be treated as 0110 1111, "protocol error, unspecified". | | | | | | | | | |

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

### 11.3.19 Link modification operation code

The purpose of the Link modification operation code information element is to indicate what the operation of the 5G ProSe direct link modification procedure triggered by initiating UE is.

The Link modification operation code is a type 3 information element, with a length of 2 octets.

The Link modification operation code information element is coded as shown in figure 11.3.19.1 and table 11.3.19.1.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Link modification operation code IEI | | | | | | | | octet 1 |
| Link modification operation code | | | | | | | | octet 2 |

Figure 11.3.19.1: Link modification operation code information element

Table 11.3.19.1: Link modification operation code information element

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Link modification operation code (octet 2) | | | | | |
| Bits | | | | | |
| 4 | 3 | 2 | 1 |  |  |
| 0 | 0 | 0 | 1 |  | void |
| 0 | 0 | 1 | 0 |  | void |
| 0 | 0 | 1 | 1 |  | Add new PC5 QoS flow(s) to the existing 5G ProSe direct link |
| 0 | 1 | 0 | 0 |  | Modify PC5 QoS parameters of the existing PC5 QoS flow(s) |
| 0 | 1 | 0 | 1 |  | Remove existing PC5 QoS flow(s) from the existing 5G ProSe direct link |
| 0 | 1 | 1 | 0 |  | Associate new ProSe application(s) with existing PC5 QoS flow(s) |
| 0 | 1 | 1 | 1 |  | Remove ProSe application(s) from existing PC5 QoS flow(s) |
| x | x | x | x |  | Associate new ProSe application IDs with existing 5G ProSe direct link |
| y | y | y | y |  | Remove ProSe application IDs from 5G ProSe direct link |
| 1 | 0 | 0 | 0 |  |  |
| to | | | |  | Spare |
| 1 | 1 | 1 | 0 |  |  |
| 1 | 1 | 1 | 1 |  | Reserved |
|  | | | | | |
| Bit 5 to 8 of octet 2 are spare and shall be coded as zero. | | | | | |

\*\*\*\*\* End of change \*\*\*\*\*