**3GPP TSG-CT WG1 Meeting #135-eC1-222797**

**E-Meeting, 6th – 12th April 2022**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **25.554** | **CR** | **0044** | **rev** | **1** | **Current version:** | **17.0.0** |  |
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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:*** | Rejection of 5G ProSe direct link due to unsuccessful PDU session establishment by L3 relay UE | | | | | | | | | |
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| ***Source to WG:*** | Samsung | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_ProSe | | | | |  | ***Date:*** | | | 30-03-2022 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
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| ***Reason for change:*** | | TS 24.554 states the following under the 5G ProSe direct link establishment procedure:  “*Before sending the PROSE DIRECT LINK ESTABLISHMENT ACCEPT message to the remote UE, the target UE acting as a 5G ProSe layer-3 UE-to-network relay UE shall inform the lower layer to initiate the UE requested PDU session establishment procedure as specified in 3GPP TS 24.501 [11] if:*  *1) the PDU session for relaying the service associated with the RSC has not been established yet; or*  *2) the PDU session for relaying the service associated with the RSC has been established but the PDU session type is Unstructured*.”  The L3 relay UE may attempt to establish a PDU session but gets a rejection with #8 "maximum number of PDU sessions reached", #27 "Missing or unknown DNN", #28 "Unknown PDU session type", #29 "user authentication or authorization failed", #31 "request rejected, unspecified", #32 "service option not supported", #33 "requested service option not subscribed", or #65 "maximum number of PDU sessions reached", then the relay UE should send a PROSE DIRECT LINK ESTABLISHMENT REJECT message containing PC5 signalling protocol cause value #111 "protocol error, unspecified".  In this case, the L3 relay UE cannot serve the remote UE and therefore should reject the link establishment. | | | | | | | | |
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| ***Summary of change:*** | | The L3 relay UE rejects the PC5 link establishment if it attempted to establish a PDU session which was rejected with the causes that are listed above. | | | | | | | | |
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| ***Consequences if not approved:*** | | The PC5 link between the remote UE and the L3 relay UE is kept although the required PDU session was not successfully established, and this unnecessarily increases congestion on the L3 relay UE to maintain an unused PC5 link. | | | | | | | | |
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| ***Clauses affected:*** | | 7.2.2.5 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

\* \* \* First Change \* \* \* \*

#### 7.2.2.5 5G ProSe direct link establishment procedure not accepted by the target UE

If the PROSE DIRECT LINK ESTABLISHMENT REQUEST message cannot be accepted, the target UE shall send a PROSE DIRECT LINK ESTABLISHMENT REJECT message. The PROSE DIRECT LINK ESTABLISHMENT REJECT message contains a PC5 signalling protocol cause IE set to one of the following cause values:

#1 direct communication to the target UE not allowed;

#3 conflict of layer-2 ID for unicast communication is detected;

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

#13 congestion situation; or

#111 protocol error, unspecified.

If the target UE is not allowed to accept the PROSE DIRECT LINK ESTABLISHMENT REQUEST message, e.g., based on operator policy or configuration parameters for ProSe direct communication over PC5 as specified in clause 5.2, or the target UE is acting as a layer-3 relay UE, is in non-allowed area of its serving PLMN, and the corresponding relay service code is not associated with an emergency services or high priority access as defined in clause 5.3.5 of 3GPP TS 24.501 [11], the target UE shall send a PROSE DIRECT LINK ESTABLISHMENT REJECT message containing PC5 signalling protocol cause value #1 "direct communication to the target UE not allowed".

For a received PROSE DIRECT LINK ESTABLISHMENT REQUEST message from a layer-2 ID (for unicast communication), if the target UE already has an existing link established to a UE using this layer-2 ID or is currently processing a PROSE DIRECT LINK ESTABLISHMENT REQUEST message from the same layer-2 ID, and with one of following parameters different from the existing link or the link for which the link establishment is in progress:

a) the source user info;

b) type of data (e.g., IP or non-IP); or

c) security policy,

the target UE shall send a PROSE DIRECT LINK ESTABLISHMENT REJECT message containing PC5 signalling protocol cause value #3 "conflict of layer-2 ID for unicast communication is detected".

NOTE 1: The type of data (e.g., IP or non-IP) is indicated by the optional IP address configuration IE included in the corresponding DIRECT LINK SECURITY MODE COMPLETE message, i.e., the type of data for the requested link is IP type if this IE is included, and the type of data for the requested link is non-IP if this IE is not included.

If the 5G ProSe direct link establishment fails due to the implementation-specific maximum number of established 5G ProSe direct links has been reached, or other temporary lower layer problems causing resource constraints, the target UE shall send a PROSE DIRECT LINK ESTABLISHMENT REJECT message containing PC5 signalling protocol cause value #5 "lack of resources for 5G ProSe direct link".

If the 5G ProSe direct link establishment request is for relaying and:

a) the NAS level mobility management congestion control as specified in clause 5.3.9 of TS 24.501 [11] is activated at the target UE; or

b) the target UE is under congestion;

the target UE shall send a PROSE DIRECT LINK ESTABLISHMENT REJECT message containing PC5 signalling protocol cause value #13 "congestion situation". The target UE may provide a back-off timer value to the initiating UE in the PROSE DIRECT LINK ESTABLISHMENT REJECT message. The target UE shall not accept any 5G ProSe direct link establishment request for relaying if the back-off timer for NAS level mobility management congestion control is running.

NOTE 2: How the target UE determines that it is under congestion is implementation specific (e.g., any relaying related operational overhead, etc).

NOTE 3: In case the target UE is under the NAS level mobility management congestion control, it is an implementation option that the provided back-off timer value to the initiating UE is set to the remaining time of the mobility management back-off timer T3346 or with an additional offset value.

If the 5G ProSe direct link establishment request is for relaying, the request required the establishment of a PDU session by the 5G ProSe layer-3 UE-to-network relay UE which is a target UE, and the PDU session establishment was unsuccessful due to the reception of 5GSM cause #8 "maximum number of PDU sessions reached", #27 "Missing or unknown DNN", #28 "Unknown PDU session type", #29 "user authentication or authorization failed", #31 "request rejected, unspecified", #32 "service option not supported", #33 "requested service option not subscribed", or #65 "maximum number of PDU sessions reached" as specified in 3GPP TS 24.501 [11], then target UE shall send a PROSE DIRECT LINK ESTABLISHMENT REJECT message containing PC5 signalling protocol cause value #111 "protocol error, unspecified".

If the 5G ProSe direct link establishment fails due to other reasons, the target UE shall send a PROSE DIRECT LINK ESTABLISHMENT REJECT message containing PC5 signalling protocol cause value #111 "protocol error, unspecified".

After sending the PROSE DIRECT LINK ESTABLISHMENT REJECT message, the target UE shall provide the following information along with the initiating UE's layer-2 ID for unicast communication and the target UE's layer-2 ID for unicast communication to the lower layer:

a) an indication of deactivation of the PC5 unicast security protection and deletion of security context for the 5G ProSe direct link, if applicable.

Upon receipt of the PROSE DIRECT LINK ESTABLISHMENT REJECT message, the initiating UE shall stop timer T5080 and abort the 5G ProSe direct link establishment procedure. If the PC5 signalling protocol cause value in the PROSE DIRECT LINK ESTABLISHMENT REJECT message is #1 "direct communication to the target UE not allowed" or #5 "lack of resources for 5G ProSe direct link", then the initiating UE shall not attempt to start the 5G ProSe direct link establishment procedure with the same target UE at least for a time period T. If the PC5 signalling protocol cause value in the PROSE DIRECT LINK ESTABLISHMENT REJECT message is #13 "congestion situation" and a back-off timer value is provided in the PROSE DIRECT LINK ESTABLISHMENT REJECT message, the initiating UE shall start timer T5088 associated with the layer-2 ID of the target UE and set its value to the provided timer value.

NOTE 4: 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 #1 "direct communication to the target UE not allowed" or when the UE receives PC5 signalling protocol cause value #5 "lack of resources for 5G ProSe direct link".

After receiving the PROSE DIRECT LINK ESTABLISHMENT REJECT message, the initiating UE shall provide the following information along with the initiating UE's layer-2 ID for unicast communication and the target UE's layer-2 ID for unicast communication to the lower layer:

a) an indication of deactivation of the PC5 unicast security protection and deletion of security context for the 5G ProSe direct link, if applicable.

\* \* \* Next Change \* \* \* \*

<Proposed change in revision marks>

\* \* \* Next Change \* \* \* \*

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