**3GPP TSG-CT WG1 Meeting #135-eC1-222563**

**E-Meeting, 6th – 12th April 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **24.554** | **CR** | **0003** | **rev** | **1** | **Current version:** | **17.0.0** |  |
|  |
| *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 | **X** |

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|  |
| ***Title:***  | Privacy timer for U2N relay |
|  |  |
| ***Source to WG:*** | OPPO |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5G\_ProSe |  | ***Date:*** | 2022-3-14 |
|  |  |  |  |  |
| ***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 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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | In TS 23.304 (S2-2201310), the privacy timer was added for UE-to-network relay direct communication.Since the direct link identifier update procedure is also applied to relay case, the T5090 is reused as the privacy timer.The corresponding stage 3 implementation is needed. |
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| ***Summary of change:*** | Add privacy timer to configuration parameters for U2N relay direct communication. |
|  |  |
| ***Consequences if not approved:*** | Missing stage 2 requirements. |
|  |  |
| ***Clauses affected:*** | 5.2.5, 7.2.2.3, 7.2.2.4, 7.2.4.2, 7.2.4.4, 7.2.4.5 and 12.3 |
|  |  |
|  | **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 \* \* \* \*

### 5.2.5 Configuration parameters for 5G ProSe UE-to-network relay

The configuration parameters for the role of a ProSe UE-to-network relay UE over PC5 reference point consist of:

a) a validity timer for the validity of the configuration parameter for 5G ProSe UE-to-network relay over PC5 interface;

b) a list of PLMNs in which the UE is authorised to relay traffic for 5G ProSe layer-3 remote UEs when the UE is served by NG-RAN, and in each PLMN;

c) a list of PLMNs in which the UE is authorised to relay traffic for 5G ProSe layer-2 remote UEs when the UE is served by NG-RAN, and in each PLMN;

d) the default destination layer-2 ID(s) for sending the discovery signalling for announcement and additional information, and for receiving the discovery signalling for solicitation;

NOTE 1: Which default destination layer-2 ID is selected is up to UE implementation when there are more than one default destination layer-2 ID.

e) a User info ID for the UE-to-network relay discovery;

f) one or more relay service code(s) for the UE-to-network relay discovery, and for each relay service code:

1) security related content for 5G ProSe relay discovery;

2) an indication of whether the relay service code is offering 5G ProSe layer-2 or layer-3 UE-to-network relay service; and

3) for 5G ProSe layer-3 UE-to-network relay UE, a set of PDU session parameters:

i) PDU Session type;

ii) optionally, DNN;

iii) optionally, SSC Mode;

iv) optionally, S-NSSAI; and

v) optionally, access type preference;

4) for 5G ProSe layer-3 UE-to-network relay UE, security policies for UE-to-network relay direct communication:

i) the signalling integrity protection policy;

ii) the signalling ciphering policy;

iii) the user plane integrity protection policy; and

iv) the user plane ciphering policy;

g) for 5G ProSe layer-3 UE-to-network relay UE, QoS mapping rules including:

1) a mapping between a 5QI value and a 5G ProSe PQI value over PC5 for traffic relayed over the PC5 interface;

2) a PDB adjustment factor of the standardized PDB identified by the PQI; and

3) optionally, the relay service code(s) associated with the QoS mapping rule;

h) the radio parameters of the 5G ProSe UE-to-network relay discovery applicable per geographical area with an indication of whether these radio parameters are "operator managed" or "non-operator managed" when the UE is not served by NG-RAN;

i) for 5G ProSe layer-3 UE-to-network relay UE, for Ethernet and Unstructured traffic using IP type PDU session, a list of ProSe identifier(s) to ProSe application server address mapping rule. Each mapping rule contains one or more ProSe identifier(s) and IP address/FQDN and transport layer port number;

j) the radio parameters of the 5G ProSe direct communication applicable per geographical area with an indication of whether these radio parameters are "operator managed" or "non-operator managed" when the UE is not served by NG-RAN; and

k) optionally, the ProSe key management function (PKMF) address; and

x) the privacy timer value for changing the source layer-2 ID assigned by the 5G ProSe UE-to-network relay UE for direct communication, as specified in 3GPP TS 24.555 [17].

The configuration parameters for the role of a 5G ProSe remote UE consist of:

a) a validity timer for the validity of the configuration parameters for 5G ProSe remote UE;

b) an indication whether the UE is authorized to use a 5G ProSe layer-3 UE-to-network relay UE;

c) a list of PLMNs in which the UE is authorized to use a 5G ProSe layer-2 UE-to-network relay UE;

d) default destination layer-2 ID(s) for sending the discovery signalling for solicitation, and for receiving the discovery signalling for announcement and additional information;

NOTE 2: Which default destination layer-2 ID is selected is up to UE implementation when there are more than one default destination layer-2 ID.

e) a User info ID for the UE-to-network relay discovery;

f) one or more relay service code(s) for the UE-to-network relay discovery, and for each relay service code:

1) security related content for 5G ProSe relay discovery;

2) an indication of whether the relay service code is offering 5G ProSe layer-2 or layer-3 UE-to-network relay service; and

3) for 5G ProSe remote UE using 5G ProSe layer-3 UE-to-network relays, one of the following:

i) a set of PDU session parameters for the relayed traffic without using N3IWF access:

A) PDU Session type;

B) optionally, DNN;

C) optionally, SSC Mode;

D) optionally, S-NSSAI; and

E) optionally, access type preference; or

ii) an indication of using N3IWF access for the relayed traffic;

4) for 5G ProSe remote UE using 5G ProSe layer-3 UE-to-network relays, security policies for UE-to-network relay direct communication:

i) the signalling integrity protection policy;

ii) the signalling ciphering policy;

iii) the user plane integrity protection policy; and

iv) the user plane ciphering policy;

g) the radio parameters of the 5G ProSe Relay Discovery applicable per geographical area with an indication of whether these radio parameters are "operator managed" or "non-operator managed" when the UE is not served by NG-RAN;

h) the radio parameters of the 5G ProSe direct communication applicable per geographical area with an indication of whether these radio parameters are "operator managed" or "non-operator managed" when the UE is not served by NG-RAN;

NOTE 3: Whether a frequency band is "operator managed" or "non-operator managed" in a given Geographical Area is defined by local regulations.

i) the N3IWF selection information for 5G ProSe layer-3 remote UE:

1) N3IWF identifier configuration (either FQDN or IP address); and

2) 5G ProSe layer-3 UE-to-network relays, access node selection information consists of a prioritized list of PLMNs for N3IWF selection and an indication that the selection of an N3IWF in a PLMN should be based on Tracking Area Identity FQDN or on Operator Identifier FQDN;

j) optionally, the PKMF address; and

y) the privacy timer value for changing the source layer-2 ID assigned by the 5G ProSe remote UE for direct communication, as specified in 3GPP TS 24.555 [17].

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

#### 7.2.2.3 5G ProSe direct link establishment procedure accepted by the target UE

Upon receipt of a PROSE DIRECT LINK ESTABLISHMENT REQUEST message, if the target UE accepts this request, the target UE shall uniquely assign a PC5 link identifier, create a 5G ProSe direct link context.

If the PROSE DIRECT LINK ESTABLISHMENT REQUEST message is not used for 5G ProSe direct communication between the remote UE and the UE-to-network relay UE, the target UE assigns a layer-2 ID for this 5G ProSe direct link. The newly assigned layer-2 ID replaces the target layer-2 ID as received on the PROSE DIRECT LINK ESTABLISHMENT REQUEST message. Then the target UE shall store this assigned layer-2 ID and the source layer-2 ID used in the transport of this message provided by the lower layers in the 5G ProSe direct link context.

The target UE may initiate 5G ProSe direct link authentication procedure as specified in clause 7.2.12 and shall initiate 5G ProSe direct link security mode control procedure as specified in clause 7.2.10.

NOTE 1: It is possible for the target UE to reuse the target UE's layer-2 ID used in the transport of the PROSE DIRECT LINK ESTABLISHMENT REQUEST message provided by the lower layers in case that the target UE's layer-2 ID has been used in previous 5G ProSe direct link with the same peer.

If:

a) the target user info IE is included in the PROSE DIRECT LINK ESTABLISHMENT REQUEST message and this IE includes the target UE's application layer ID; or

b) the target user info IE is not included in the PROSE DIRECT LINK ESTABLISHMENT REQUEST message and the target UE is interested in the ProSe application(s) identified by the ProSe identifier IE in the PROSE DIRECT LINK ESTABLISHMENT REQUEST message;

then the target UE shall either:

a) identify an existing KNRP based on the KNRP ID included in the PROSE DIRECT LINK ESTABLISHMENT REQUEST message; or

b) if KNRP ID is not included in the PROSE DIRECT LINK ESTABLISHMENT REQUEST message, the target UE does not have an existing KNRP for the KNRP ID included in PROSE DIRECT LINK ESTABLISHMENT REQUEST message or the target UE wishes to derive a new KNRP, derive a new KNRP. This may require performing one or more 5G ProSe direct link authentication procedures as specified in clause 7.2.12.

NOTE 2: How many times the 5G ProSe direct link authentication procedure needs to be performed to derive a new KNRP depends on the authentication method used.

After an existing KNRP was identified or a new KNRP was derived, the target UE shall initiate a 5G ProSe direct link security mode control procedure as specified in clause 7.2.10.

Upon successful completion of the 5G ProSe direct link security mode control procedure, in order to determine whether the PROSE DIRECT LINK ESTABLISHMENT REQUEST message can be accepted or not, in case of IP communication, the target UE checks whether there is at least one common IP address configuration option supported by both the initiating UE and the target UE.

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.

If the target UE accepts the 5G ProSe direct link establishment procedure, the target UE shall create a PROSE DIRECT LINK ESTABLISHMENT ACCEPT message. The target UE:

a) shall include the source user info set to the target UE's application layer ID received from upper layers;

b) shall include PQFI(s), the corresponding PC5 QoS parameters and optionally the ProSe identifier(s) that the target UE accepts, if the target UE is not acting as a 5G ProSe layer-2 UE-to-network relay UE;

c) may include the PC5 QoS rule(s) if the target UE is not acting as a 5G ProSe layer-2 UE-to-network relay UE;

d) shall include an IP address configuration IE set to one of the following values if IP communication is used and the target UE is not acting as a 5G ProSe layer-2 UE-to-network relay UE:

1) "DHCPv4 server" if only IPv4 address allocation mechanism is supported by the target UE, i.e., acting as a DHCPv4 server; or

2) "IPv6 router" if only IPv6 address allocation mechanism is supported by the target UE, i.e., acting as an IPv6 router; or

3) "DHCPv4 server & IPv6 Router" if both IPv4 and IPv6 address allocation mechanism are supported by the target UE; or

4) "address allocation not supported" if neither IPv4 nor IPv6 address allocation mechanism is supported by the target UE and the target UE is not acting as a 5G ProSe layer-3 UE-to-network relay UE;

NOTE: The UE doesn't include an IP address configuration IE nor a link local IPv6 address IE, if Ethernet or Unstructured data unit type is used for communication.

e) shall include a link local IPv6 address IE formed locally based on IETF RFC 4862 [16] if IP address configuration IE is set to "address allocation not supported", the received PROSE DIRECT LINK SECURITY MODE COMPLETE message included a link local IPv6 address IE and the target UE is neither acting as a 5G ProSe layer-2 UE-to-network relay UE nor acting as a 5G ProSe layer-3 relay UE; and

f) shall include the configuration of UE PC5 unicast user plane security protection based on the agreed user plane security policy, as specified in 3GPP TS 33.503 [34].

After the PROSE DIRECT LINK ESTABLISHMENT ACCEPT message is generated, the target UE shall pass this message to the lower layers for transmission along with the initiating UE's layer-2 ID for unicast communication and the target UE's layer-2 ID for unicast communication, and shall start timer T5090 if at least one of ProSe identifiers for the 5G ProSe direct links satisfies the privacy requirements as specified in clause 5.2.4 and clause 5.2.5.

After sending the PROSE DIRECT LINK ESTABLISHMENT ACCEPT message, the target UE shall provide the following information along with the layer-2 IDs to the lower layer, which enables the lower layer to handle the coming PC5 signalling or traffic data:

a) the PC5 link identifier self-assigned for this 5G ProSe direct link;

b) PQFI(s) and its corresponding PC5 QoS parameters, if available; and

c) an indication of activation of the PC5 unicast user plane security protection for the 5G ProSe direct link, if applicable.

If the target UE accepts the 5G ProSe direct link establishment request and the 5G ProSe direct link is established not for 5G ProSe direct communication between the 5G ProSe remote UE and the 5G ProSe UE-to-network relay UE, then the target UE may perform the PC5 QoS flow establishment over 5G ProSe direct link as specified in clause 7.2.7. If the 5G ProSe direct link is established for 5G ProSe direct communication between the 5G ProSe layer-3 remote UE and the 5G ProSe layer-3 UE-to-network relay UE, then the target UE may perform the PC5 QoS flow establishment over 5G ProSe direct link as specified in clause 8.2.6.

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

#### 7.2.2.4 5G ProSe direct link establishment procedure completion by the initiating UE

If the Target user info IE is included in the PROSE DIRECT LINK ESTABLISHMENT REQUEST message, upon receipt of the PROSE DIRECT LINK ESTABLISHMENT ACCEPT message, the initiating UE shall stop timer T5080. If the Target user info IE is not included in the PROSE DIRECT LINK ESTABLISHMENT REQUEST message the initiating UE may keep the timer T5080 running and continue to handle multiple response messages (i.e., the PROSE DIRECT LINK ESTABLISHMENT ACCEPT message) from multiple target UEs.

For each of the PROSE DIRECT LINK ESTABLISHMENT ACCEPT message received, the initiating UE shall uniquely assign a PC5 link identifier and create a 5G ProSe direct link context for each of the 5G ProSe direct link(s). Then the initiating UE shall store the source layer-2 ID and the destination layer-2 ID used in the transport of this message provided by the lower layers in the 5G ProSe direct link context(s) to complete the establishment of the 5G ProSe direct link with the target UE(s). From this time onward the initiating UE shall use the established link(s) for ProSe direct communication over PC5 and additional PC5 signalling messages to the target UE(s).

After receiving the PROSE DIRECT LINK ESTABLISHMENT ACCEPT message, the initiating UE shall delete the old security context it has for the target UE and shall provide the following information along with the layer-2 IDs to the lower layer, which enables the lower layer to handle the coming PC5 signalling or traffic data:

a) the PC5 link identifier self-assigned for this 5G ProSe direct link;

b) PQFI(s) and its corresponding PC5 QoS parameters, if available; and

c) an indication of activation of the PC5 unicast user plane security protection for the 5G ProSe direct link, if applicable.

The initiating UE shall start timer T5090 if at least one of ProSe identifiers for the 5G ProSe direct links satisfies the privacy requirements as specified in clause 5.2.4 and clause 5.2.5.

In addition, the initiating UE may perform the PC5 QoS flow establishment over 5G ProSe direct link as specified in clause 7.2.7.

Upon expiry of the timer T5080, if the PROSE DIRECT LINK ESTABLISHMENT REQUEST message did not include the Target user info IE, and the initiating UE received at least one PROSE DIRECT LINK ESTABLISHMENT ACCEPT message, it is up to the UE implementation to consider the 5G ProSe direct link establishment procedure as complete or to restart the timer T5080.

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

#### 7.2.4.2 5G ProSe direct link identifier update procedure initiation by 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; and

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.

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; and

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.

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

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

#### 7.2.4.4 5G ProSe direct link identifier update procedure acknowledged by the initiating UE

Upon receipt of the PROSE DIRECT LINK IDENTIFIER UPDATE ACCEPT message, the initiating UE shall stop timer T5082 and respond with a PROSE DIRECT LINK IDENTIFIER UPDATE ACK message. In this message, the initiating UE:

a) shall include the target UE's new layer-2 ID;

b) shall include the target UE's new LSB of KNRP-sess ID;

c) shall include the target UE's new application layer ID, if received; and

d) shall include the target UE's new IP address/prefix, if received.

After the PROSE DIRECT LINK IDENTIFIER UPDATE ACK 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 old layer-2 ID for 5G ProSe direct communication and shall stop timer T5090 if running and start a timer T5090 as configured if at least one of ProSe identifiers for the 5G ProSe direct link satisfying the privacy requirements as specified in clause 5.2.4 or if satifying the privacy requirements as specified in clause 5.2.5.

Upon sending the PROSE DIRECT LINK IDENTIFIER UPDATE ACK message, the initiating UE shall update the associated 5G ProSe direct link context with the new identifiers and pass the new layer-2 IDs (i.e., initiating UE's new layer-2 ID for 5G ProSe direct communication and target UE's new layer-2 ID for 5G ProSe direct communication) along with the PC5 link identifier down to the lower layer. Then the initiating UE shall use the new layer-2 IDs (i.e., initiating UE's new layer-2 ID for 5G ProSe direct communication and target UE's new layer-2 ID for 5G ProSe direct communication) to transmit the PC5 signalling message and PC5 user plane data.

The initiating UE shall continue to receive traffic with the old layer-2 IDs (i.e., initiating UE's old layer-2 ID for 5G ProSe direct communication and target UE's old layer-2 ID for 5G ProSe direct communication) from the target UE until it receives traffic with the new layer-2 IDs (i.e., initiating UE's new layer-2 ID and target UE's new layer-2 ID) from the target UE.

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

#### 7.2.4.5 5G ProSe direct link identifier update procedure completion by the target UE

Upon receipt of the PROSE DIRECT LINK IDENTIFIER UPDATE ACK message, the target UE shall update the associated 5G ProSe direct link context with the new identifiers, pass the new layer-2 IDs (i.e., initiating UE's new layer-2 ID and target UE's new layer-2 ID) down to the lower layer, stop timer T5083 and timer T5090 if running and start a timer T5090 as configured if at least one of ProSe identifiers for the 5G ProSe direct link satisfying the privacy requirements as specified in clause 5.2.4 or if satifying the privacy requirements as specified in clause 5.2.5. Then the target UE shall use the new layer-2 IDs (i.e., initiating UE's new layer-2 ID for 5G ProSe direct communication and target UE's new layer-2 ID for 5G ProSe direct communication) to transmit the PC5 signalling message and PC5 user plane data.

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

## 12.3 Timers of 5G ProSe direct link management procedures

NOTE: Timer T3346 is defined in 3GPP TS 24.008 [31].

Table 12.3.1: 5G ProSe direct link management timers

| TIMER NUM. | TIMER VALUE | CAUSE OF START | NORMAL STOP | ON EXPIRY |
| --- | --- | --- | --- | --- |
| T5080 | 8s NOTE 1 | Upon sending a PROSE DIRECT LINK ESTABLISHMENT REQUEST message | Upon receiving a PROSE DIRECT LINK ESTABLISHMENT ACCEPT or PROSE DIRECT LINK ESTABLISHMENT REJECT message from the target UE if the Target user info is included in the PROSE DIRECT LINK ESTABLISHMENT REQUEST message | Retransmission of PROSE DIRECT LINK ESTABLISHMENT REQUEST message if the Target user info is included in the PROSE DIRECT LINK ESTABLISHMENT REQUEST message; ormay abort the ongoing procedure if the Target user info is not included in the PROSE DIRECT LINK ESTABLISHMENT REQUEST message |
| T5081 | 5s | Upon sending a PROSE DIRECT LINK MODIFICATION REQUEST message | Upon receiving a PROSE DIRECT LINK MODIFICATION ACCEPT or PROSE DIRECT LINK MODIFICATION REJECT or PROSE DIRECT LINK RELEASE REQUEST message from the target UE | Retransmission of PROSE DIRECT LINK MODIFICATION REQUEST message |
| T5082 | 2s | Upon sending a PROSE DIRECT LINK IDENTIFIER UPDATE REQUEST message | Upon receiving a PROSE DIRECT LINK IDENTIFIER UPDATE ACCEPT or PROSE DIRECT LINK IDENTIFIER UPDATE REJECT or PROSE DIRECT LINK RELEASE REQUEST message from the target UE | Retransmission of the PROSE DIRECT LINK IDENTIFIER UPDATE REQUEST message |
| T5083 | 2s | Upon sending a PROSE DIRECT LINK IDENTIFIER UPDATE ACCEPT message | Upon receiving a PROSE DIRECT LINK IDENTIFIER UPDATE ACK message or PROSE DIRECT LINK RELEASE REQUEST message from the initiating UE | Retransmission of the PROSE DIRECT LINK IDENTIFIER UPDATE ACCEPT message  |
| T5084 | 5s | Upon receiving a PC5 signalling message or PC5 user plane data | Upon 5G ProSe direct link release or upon initiating the 5G ProSe direct link keep-alive procedure | Initiate the 5G ProSe direct link keep-alive procedure |
| T5085 | 5s | Upon sending a PROSE DIRECT LINK KEEPALIVE REQUEST message | Upon receiving a PC5 signalling message or PC5 user plane data | Retransmission of the PROSE DIRECT LINK KEEPALIVE REQUEST message |
| T5086 | Default 10mNOTE 2 | Upon receiving a Maximum inactivity period in a PROSE DIRECT LINK KEEPALIVE REQUEST message, receiving a PC5 signalling message or receiving PC5 user plane data | Upon receiving a PC5 signalling message or PC5 user plane data | Either initiate the 5G ProSe direct link keep-alive procedure or the 5G ProSe direct link release procedure |
| T5087 | 5s | Upon sending a PROSE DIRECT LINK RELEASE REQUEST message | Upon receiving a PROSE DIRECT LINK RELEASE ACCEPT message from the target UE | Retransmission of PROSE DIRECT LINK RELEASE REQUEST message |
| T5088 | As described in clause 7.2.2.5 and clause 7.2.6.3 | Upon receiving a PROSE DIRECT LINK ESTABLISHMENT REJECT message with PC5 signalling protocol cause value set to #13 "congestion situation" and a back-off timer value is provided in the messageUpon receiving a PROSE DIRECT LINK RELEASE REQUEST message with PC5 signalling protocol cause value set to #13 "congestion situation" and a back-off timer value is provided in the message | Upon receiving PROSE PC5 DISCOVERY message from the same UE-to-network relay UE due to starting announcing UE procedure or discoveree UE procedure as described in clause 8.2.1.2.1.2 and clause 8.2.1.3.2.2 respectively | Take the peer UE onboard for UE-to-network relay UE discovery and selection |
| T5089 | 2s | Upon sending a PROSE DIRECT LINK SECURITY MODE COMMAND message | Upon receiving a PROSE DIRECT LINK SECURITY MODE COMPLETE or PROSE DIRECT LINK SECURITY MODE REJECT message from the target UE | Retransmission of PROSE DIRECT LINK SECURITY MODE COMMAND message |
| T5090 | NOTE 2 | Upon establishing a 5G ProSe direct link and at least one of ProSe identifiers for the 5G ProSe direct link satisfying the privacy requirements or upon completing a 5G ProSe direct link modification and at least one of ProSe identifiers for the 5G ProSe direct link satisfying the privacy requirements or upon completing the 5G ProSe direct link identifier update procedure | Upon completing a 5G ProSe direct link identifier update orupon accepting a PROSE DIRECT LINK IDENTIFIER UPDATE REQUEST message or upon a 5G ProSe direct link release  | Transmission of PROSE DIRECT LINK IDENTIFIER UPDATE REQUEST message |
| T5091 | 8s | Upon sending a PROSE DIRECT LINK REKEYING REQUEST message | Upon receiving a PROSE DIRECT LINK REKEYING RESPONSE message or PROSE DIRECT LINK RELEASE REQUEST message from the target UE | Retransmission of PROSE DIRECT LINK REKEYING REQUEST message |
| T5092 | 2s | Upon sending a PROSE DIRECT LINK AUTHENTICATION REQUEST message | Upon receiving a PROSE DIRECT LINK AUTHENTICATION RESPONSE or DIRECT LINK AUTHENTICATION REJECT message from the target UE | Retransmission of PROSE DIRECT LINK AUTHENTICATION REQUEST message |
| NOTE 1: If the Target user info is not included in the PROSE DIRECT LINK ESTABLISHMENT REQUEST message, then the initiating UE may keep the timer T5080 running upon receiving PROSE DIRECT LINK ESTABLISHMENT ACCEPT message.NOTE 2: The value of this timer is the privacy timer value which is one of the configuration parameters for 5G ProSe direct communication (see clause 5.2.4 and clause 5.2.5) and it is specified in 3GPP TS 24.555 [17] clause 5.4, clause 5.5 and clause 5.6. |

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