**3GPP TSG-CT WG1 Meeting CT1#137-eC1-22xxxx**

**E-Meeting, 18th - 26th August 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **24.554** | **CR** | **0123** | **rev** | **1** | **Current version:** | **17.1.0** |  |
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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:***  | Add the timer for AA message reliable transport procedure |
|  |  |
| ***Source to WG:*** | OPPO |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5G\_ProSe |  | ***Date:*** | 2022-7-14 |
|  |  |  |  |  |
| ***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)* |
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| ***Reason for change:*** | In current spec, the 5G ProSe AA message reliable transport procedure has been defined while its related timer is missing.Some editorial changes.T5090 is the privacy timer triggering the identifier update procedure, so it cannot be used for U2N relay discovery with model B. |
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| ***Summary of change:*** | Add the timer for 5G ProSe AA message reliable transport procedure.Editorial changes.Change the restransmission timer for U2N relay discovery with model B. |
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| ***Consequences if not approved:*** | The timer for 5G ProSe AA message reliable transport procedure is missing.Editorial errors.Wrong timer number for U2N relay discovery with model B. |
|  |  |
| ***Clauses affected:*** | 8.2.1.3.1.2, 8.2.9.2, 8.2.9.4, 12.3, 12.x(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 ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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

###### 8.2.1.3.1.2 Discoverer UE procedure for UE-to-network relay discovery initiation

The UE is authorised to perform the discoverer UE procedure for UE-to-network relay discovery if:

a) one of the following is true:

1) the UE is not served by NG-RAN, is authorised to act as a remote UE towards a UE-to-network relay UE and is configured with the radio parameters to be used for ProSe UE-to-network relay discovery when not served by NG-RAN;

2) the UE is served by NG-RAN, is authorised to act as a remote UE towards a UE-to-network relay UE; or

3) the UE is:

i) in 5GMM-IDLE mode, in limited service state as specified in 3GPP TS 23.122 [14] and the reason for the UE being in limited service state is one of the following:

A) the UE is unable to find a suitable cell in the selected PLMN as specified in 3GPP TS 38.304 [15];

B) the UE received a REGISTRATION REJECT message or a SERVICE REJECT message with the 5GMM cause #11 "PLMN not allowed" as specified in 3GPP TS 24.501 [11]; or

C) the UE received a REGISTRATION REJECT message or a SERVICE REJECT message with the 5GMM cause #7 "5GS services not allowed" as specified in 3GPP TS 24.501 [11]; and

ii) authorised to act as a remote UE towards a UE-to-network relay UE when the UE is not served by NG-RAN and configured with the radio parameters to be used for ProSe UE-to-network relay discovery use when not served by NG-RAN;

b) the UE is configured with the relay service code parameter identifying the connectivity service to be solicited and with the User info ID for the UE-to-network relay discovery parameter, as specified in clause 5.2.5; and

c) for 5G ProSe layer-2 remote UE, the UE is camped on a cell whose TAI is not in the list of "non-allowed tracking areas" or is camped on a cell whose TAI is in the list of "allowed tracking areas",

otherwise, the UE is not authorised to perform the discoverer UE procedure for UE-to-network relay discovery.

Figure 8.2.1.3.1.2.1 illustrates the interaction of the UEs in the discoverer UE procedure for UE-to-network relay discovery.



Figure 8.2.1.3.1.2.1: Discoverer UE procedure for UE-to-network Relay discovery

For PROSE PC5 DISCOVERY message signal strength measurement, the UE manages a periodic measurement timer T5109, which is used to trigger the periodic PROSE PC5 DISCOVERY message signal strength measurement between the UE and the ProSe UE-to-network relay UE with which the UE has a link established. It is started whenever the UE has established a direct link with a 5G ProSe UE-to-network relay UE and restarted whenever the UE receives the PROSE PC5 DISCOVERY message for UE-to-network relay discovery response from the 5G ProSe UE-to-network relay UE with which the UE has a link established.

When the UE is triggered by an upper layer application to solicit proximity of a connectivity service provided by a UE-to-network relay UE, or when the periodic measurement timer T5109 expires and if the UE is authorised to perform the discoverer UE procedure for UE-to-network relay discovery, then the UE:

a) if the UE is served by NG-RAN and the UE in 5GMM-IDLE mode needs to request resources for sending PROSE PC5 DISCOVERY messages for relay discovery as specified in 3GPP TS 38.331 [13], shall perform a service request procedure as specified in 3GPP TS 24.501 [11];

b) shall obtain a valid UTC time for the discovery transmission from the lower layers and generate the UTC-based counter corresponding to this UTC time;

c) shall generate a PROSE PC5 DISCOVERY message for UE-to-network relay discovery solicitation. In the PROSE PC5 DISCOVERY message for UE-to-network relay discovery solicitation, the UE:

1) shall set the discoverer info parameter to the User info ID for the UE-to-network relay discovery parameter, configured in clause 5.2.5;

2) shall set the relay service code parameter to the relay service code parameter identifying the connectivity service to be solicited, configured in clause 5.2.5. For the 5G ProSe layer-3 remote UE, if the traffic descriptor is configured as specified in clause 5.2.5, the UE shall determine RSC by mapping the traffic from the upper layer application with the traffic descriptor;

Editor's note: Detail operation of the mapping with the traffic descriptor in the ProSeP is FFS.

NOTE 1: Selection of relay service code is up to UE implementation if there is no ProSe application traffic descriptor(s) configured in the UE.

3) shall include the MIC filed computed as described in 3GPP TS 33.503 [34] by using the UTC-based counter and the DUIK contained in the <UNR-discovery-security-parameters-accept> element of the PROSE\_SECURITY\_PARAM\_RESPONSE message;

4) shall set the UTC-based counter LSB parameter to the 4 least significant bits of the UTC-based counter;

5) shall set the ProSe direct discovery PC5 message type parameter as specified in table 10.2.1.9; and

6) may include the target discoveree info parameter set to the user info ID of the targeted discoveree user if the target discoveree info is provided by the application layer;

d) shall apply the DUIK, DUSK, or DUCK with the associated Encrypted Bitmask, along with the UTC-based counter to the PROSE PC5 DISCOVERY message for whichever security mechanism(s) configured to be applied, e.g., integrity protection, message scrambling or confidentiality protection of one or more above parameters, as specified in 3GPP TS 33.503 [34];

e) shall set the default destination layer-2 ID as specified in clause 5.2.5 to the destination layer-2 ID and self-assign a source layer-2 ID for sending the UE-to-network relay discovery solicitation message; and

NOTE 2: The UE implementation ensures that the value of the self-assigned source layer-2 ID is different from any other self-assigned source layer-2 ID(s) in use for 5G ProSe direct communication as specified in clause 7.2, is different from any other provisioned destination layer-2 ID(s) as specified in clause 5.2 and is different from any other self-assigned source layer-2 ID in use for a simultaneous 5G ProSe direct discovery procedure over PC5 with a different discovery model as specified in clause 6.2.14.2.1.2, clause 6.2.15.2.1.2, clause 8.2.1.2.2.2 and clause 8.2.1.2.4.2.

f) shall pass the resulting PROSE PC5 DISCOVERY message for UE-to-network relay discovery solicitation along with the source layer-2 ID, destination layer-2 ID and an indication that the message is for 5G ProSe direct discovery to the lower layers for transmission over the PC5 interface.

If the PROSE PC5 DISCOVERY message for UE-to-network relay discovery solicitation is used to solicit proximity of a connectivity service provided by a UE-to-network relay UE, the UE shall ensure that it keeps on passing the PROSE PC5 DISCOVERY message for UE-to-network relay discovery solicitation for transmission until the UE is triggered by an upper layer application to stop soliciting proximity of a connectivity service provided by a UE-to-network relay UE, or until the UE stops being authorised to perform the discoverer UE procedure for UE-to-network relay discovery. How this is achieved is left up to UE implementation.

NOTE 3: The discoverer UE can stop discoverer UE procedure for UE-to-network relay discovery for power saving by implementation specific means e.g. an implementation-specific maximum number of the UE at a time, or an implementation-specific timer expires.

If the PROSE PC5 DISCOVERY message for UE-to-network relay discovery solicitation is used to trigger the PROSE PC5 DISCOVERY message signal strength measurement between the UE and the 5G ProSe UE-to-network Relay UE with which the UE has a link established, the UE shall start the retransmission timer T5108. If retransmission timer T5108 expires, the UE shall retransmit the PROSE PC5 DISCOVERY message for UE-to-network relay discovery solicitation and restart timer T5108. If no response is received from the ProSe UE-to-network relay UE with which the UE has a link established after reaching the maximum number of allowed retransmissions, the UE shall trigger relay reselection procedure.

NOTE 4: The maximum number of allowed retransmissions is UE implementation specific.

Upon reception of a PROSE PC5 DISCOVERY message for UE-to-network relay discovery response along with the destination layer-2 ID which the UE is configure to respond for, for the target relay service code of the connectivity service which the UE is authorized to discover, the UE shall use the associated DUSK, if received from the 5G DDNMF or 5G PKMF (if security procedure over user plane for 5G ProSe UE-to-network relay is used) and the UTC-based counter obtained during the reception operation to unscramble the PROSE PC5 DISCOVERY message as described in 3GPP TS 33.503 [34]. Then, if a DUCK is received from the 5G DDNMF or 5G PKMF (if security procedure over user plane for 5G ProSe UE-to-network relay is used), the UE shall use the DUCK and the UTC-based counter to decrypt the configured message-specific confidentiality-protected portion, as described in 3GPP TS 33.503 [34]. Finally, if a DUIK is received from the 5G DDNMF or 5G PKMF (if security procedure over user plane for 5G ProSe UE-to-network relay is used), the UE shall use the DUIK and the UTC-based counter to verify the MIC field in the unscrambled PROSE PC5 DISCOVERY message for UE-to-network relay discovery response.

NOTE 5: The UE can determine the received PROSE PC5 DISCOVERY message for UE-to-network relay discovery response is for 5G ProSe direct discovery based on an indication from the lower layer.

Then if:

a) the relay service code parameter of the PROSE PC5 DISCOVERY message for UE-to-network relay discovery response is the same as the relay service code parameter of the PROSE PC5 DISCOVERY message for UE-to-network relay discovery solicitation; and

b) the User info ID of the UE-to-network Relay is not configured as specified in clause 5.2.5 for the connectivity service being solicited, or the Discoverer info parameter of the PROSE PC5 DISCOVERY message for UE-to-network relay discovery response is the same as the User info ID of the UE-to-network Relay configured as specified in clause 5.2.5 for the connectivity service being solicited,

then the UE shall consider that the connectivity service the UE seeks to discover has been discovered. In addition, the UE can measure the signal strength of the PROSE PC5 DISCOVERY message for UE-to-network relay discovery response for relay selection or reselection. If the UE has received the PROSE PC5 DISCOVERY message for UE-to-network relay discovery response from the ProSe UE-to-network Relay UE with which the UE has a link established, the UE shall stop the retransmission timer T5108 and start the periodic measurement timer T5109.

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

#### 8.2.9.2 5G ProSe AA message reliable transport procedure initiation

The UE shall initiate a 5G ProSe AA message reliable transport procedure when the UE receives the EAP message for the target UE from the network.

The UE shall generate a PROSE AA MESSAGE TRANSPORT REQUEST message. In this message, during an EAP based authentication procedure, the initiating UE shall include the EAP message IE set to the received EAP message for the target UE from the network as specified in 3GPP TS 24.501 [11].

NOTE 1: In this release of this specification, the EAP message IE is always included.

The initiating UE shall self-assign a source layer-2 ID and set the destination layer-2 ID to the source layer-2 ID in the PROSE DIRECT LINK ESTABLISHMENT REQUEST message, i.e., the target UE's layer-2 ID.

NOTE 2: The UE implementation ensures that any value of the self-assigned source layer-2 ID is different from any other self-assigned source layer-2 ID(s) in use for 5G ProSe direct discovery as specified in clause 6.2.14, clause 6.2.15 and clause 8.2.1 and is different from any other provisioned destination layer-2 ID(s) as specified in clause 5.2.

After the PROSE AA MESSAGE TRANSPORT 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 and the target UE's layer-2 ID and start timer T5093. The UE shall not send a new PROSE AA MESSAGE TRANSPORT REQUEST message to the same target UE while timer T5093 is running.



Figure 8.2.9.2.1: 5G ProSe AA message reliable transport procedure

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

#### 8.2.9.4 5G ProSe AA message reliable transport procedure completion by the initiating UE

Upon receiving a PROSE AA MESSAGE TRANSPORT RESPONSE message, the UE shall stop timer T5093 and shall pass the EAP message in the PROSE AA MESSAGE TRANSPORT RESPONSE message to the lower layer and inform the lower layer to initiate the PDU EAP message reliable transport procedure as specified in 3GPP TS 24.501 [11].

\*\*\*\*\* 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 | ONEXPIRY |
| --- | --- | --- | --- | --- |
| T5080 | 8sNOTE 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 orupon completing a 5G ProSe direct link modification and at least one of ProSe identifiers for the 5G ProSe direct link satisfying the privacy requirements orupon 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 orupon 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 |
| T5093 | 2s | Upon sending a PROSE AA MESSAGE TRANSPORT REQUEST message | Upon receiving a PROSE AA MESSAGE TRANSPORT RESPONSE message from the target UE | Retransmission of PROSE AA MESSAGE TRANSPORT 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. |

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

## 12.x Timers of 5G ProSe UE-to-network relay with model B

Table 12.x.1: 5G ProSe UE-to-network relay with Model B timers

| TIMER NUM. | TIMER VALUE | CAUSE OF START | NORMAL STOP | ONEXPIRY |
| --- | --- | --- | --- | --- |
| T5108 | 2s | Upon sending the PROSE PC5 DISCOVERY message for 5G ProSe UE-to-network relay discovery solicitation used to trigger the PROSE PC5 DISCOVERY message signal strength measurement between the UE and the 5G ProSe UE-to-network relay UE with which the UE has a link established | Upon receiving the PROSE PC5 DISCOVERY message for 5G ProSe UE-to-network relay discovery response from the 5G ProSe UE-to-network relay UE with which the UE has a link established | Retransmission the PROSE PC5 DISCOVERY message for 5G ProSe UE-to-network relay discovery solicitation |
| T5109 | NOTE | Upon receiving the PROSE PC5 DISCOVERY message for 5G ProSe UE-to-network relay discovery response used for the the PROSE PC5 DISCOVERY message signal strength measurement from the 5G ProSe UE-to-network relay UE with which the UE has a link established | Upon releasing the 5G ProSe direct link with a 5G ProSe UE-to-network relay UE | Sending the PROSE PC5 DISCOVERY message for 5G ProSe UE-to-network relay discovery solicitation used to trigger the PROSE PC5 DISCOVERY message signal strength measurement between the UE and the 5G ProSe UE-to-network relay UE with which the UE has a link established |
| NOTE: The value of this timer is left to implementation. |

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