**3GPP TSG-CT WG1 Meeting #134-eC1-221311**

**E-Meeting, 17th – 25th February 2022**

**Source: OPPO**

**Title: Miscellaneous changes**

**Spec: 3GPP TS 24.554 v1.1.0**

**Agenda item: 17.2.18**

**Document for: Agreement**

**1. Introduction**

<Introduction part (optional)>

**2. Reason for Change**

There are the following places to be changed:

- ITS-AID is a kind of V2X service identifier so it should be removed in 24.554;

- ProSe direct discovery PC5 message type is type 3 IE which is missing;

- timer of privacy for direct communication, i.e., Taaaa, should be added to the timer table in clause 12.

**3. Conclusions**

<Conclusion part (optional)>

**4. Proposal**

It is proposed to agree the following changes to 3GPP TS 24.554 v1.1.0.

\* \* \* First 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 PC5 unicast 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 XYZZ and shall initiate 5G ProSe direct link security mode control procedure as specified in clause 7.2.10.

Editor's note: The 5G ProSe direct link security mode control procedure and 5G ProSe direct link authentication procedure are FFS as they are waiting for the definitions in SA3 specification by SA3 working group.

NOTE: 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;

Editor's note: The following steps a) and b), and the 5G ProSe direct link security mode control procedure are FFS as they are waiting for the definitions in SA3 specification by SA3 working group.

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 XYZZ.

NOTE: 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.

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 PC5 unicast 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 PC5 unicast 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 remote UE and the 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 remote UE and the 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 PC5 unicast 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).

Editor's note: The requirements for security context and its preservation are FFS as they are waiting for the definitions in SA3 specification by SA3 working group.

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 PC5 unicast 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 PC5 unicast 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.

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 \* \* \* \*

#### 7.2.3.5 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; 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 #c "security policy not aligned".

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", 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 \* \* \* \*

### 11.2.1 ProSe direct discovery PC5 message type

This parameter is used to indicate the type of ProSe direct discovery message over PC5 interface. This parameter is coded as shown in figure 11.2.1.1 and table 11.2.1.1.

The ProSe PC5 signalling message type is a type 3 information element, with the length of 1 octet.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Discovery type | Content type | Discovery model | octet 1 |
|  |

Figure 11.2.1.1: ProSe direct discovery PC5 message type parameter

Table 11.2.1.1: ProSe direct discovery PC5 message type parameter

|  |
| --- |
| Discovery type value (octet 1): |
| Bit |
| 8 | 7 |  |  |  |
| 0 | 0 |  |  | Reserved |
| 0 | 1 |  |  | Open discovery |
| 1 | 0 |  |  | Restricted discovery |
| 1 | 1 |  |  | Reserved |
|  |
| Content type value (octet 1): |
| Bit |
| **6** | **5** | **4** | **3** |  |
| 0 | 0 | 0 | 0 | Announcement/response |
| 0 | 0 | 0 | 1 | Solicitation |
| 0 | 1 | 0 | 0 | UE-to-network relay discovery announcement/UE-to-network relay discovery response |
| 0 | 1 | 0 | 1 | UE-to-network relay discovery solicitation |
| 0 | 1 | 1 | 0 | Group member discovery announcement/group member discovery response |
| 0 | 1 | 1 | 1 | Group member discovery solicitation |
| 1 | 0 | 0 | 0 | Relay discovery additional information |
| The other values are reserved. |
|  |
| Discovery model value (octet 1): |
| Bit |
| **2** | **1** |  |  |  |
| 0 | 0 |  |  | Reserved |
| 0 | 1 |  |  | Model A |
| 1 | 0 |  |  | Model B |
| 1 | 1 |  |  | Reserved |

NOTE 1: Content type '0000' (announce/response) is used for model A announcing and for model B discoveree operation.

NOTE 2: Content type '0100' (UE-to-network relay discovery announcement or UE-to-network relay discovery response) is used for model A announcing and for model B discoveree operation.

NOTE 3: Content type '0110' (group member discovery announcement or group member discovery response) is used for model A announcing and for model B discoveree operation.

\* \* \* 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 PC5 unicast 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 PC5 unicast link keep-alive procedure or the PC5 unicast 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 |
|  |  |  |  |  |
| 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 it is specified in 3GPP TS 24.555 [17] clause 5.4. |

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