**3GPP TSG-CT WG1 Meeting #136-eC1-223607**

**E-Meeting, 12th – 20th May 2022**

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| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **24.554** | **CR** |  | **rev** | **2** | **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 |  |

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| --- |
|  |
| ***Title:***  | PC5-S for forwarding EAP message |
|  |  |
| ***Source to WG:*** | OPPO, vivo |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5G\_ProSe |  | ***Date:*** | 2022-4-29 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***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 clause 6.3.3.4 of TS 33.503, the PDU session secondary authentication for the L3 remote UE is specified. When L3 relay receives the EAP message for the L3 remote UE, it shall forward the EAP message to L3 remote UE using PC5 signalling.However, there is no exisitng PC5 signalling message to reuse.So a new PC5 procedure is specified.Also the EAP messages are exchanged over PC5 for CP based security procedure.To be future-proof, the new procedure is generalized to be compatible with the possible other AA messages. |
|  |  |
| ***Summary of change:*** | Add a new PC5 procedure to exchange EPA message. |
|  |  |
| ***Consequences if not approved:*** | Missing stage 2 requirements. |
|  |  |
| ***Clauses affected:*** | 2, 3.2, 8.2.x(new), 8.2.x.1(new), 8.2.x.2(new), 8.2.x.3(new), 8.2.x.4(new), 10.3.y(new), 10.3.y.1(new), 10.3.y.2(new), 10.3.z(new), 10.3.z.1(new), 10.3.z.2(new), 11.3.1 and 11.3.a(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:*** | Rev 2: Add the L2 ID determination. Add co-signer. |

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

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document in the same Release as the present document.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.304: "Proximity based Services (ProSe) in the 5G System (5GS); Stage 2".

[3] IETF RFC 7230: "Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing".

[4] IETF RFC 7231: "Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content".

[5] 3GPP TS 24.526: "UE policies for 5G System (5GS); Stage 3".

[6] OMA-WAP-TS-PushOTA-V2\_1-20110405-A: "Push Over the Air".

[7] OMA-AD-Push-V2\_2-20110809-A: "Push Architecture".

[8] WAP-168-ServiceLoad-20010731-a: "Service Loading".

[9] 3GPP TS 29.555: "Inter-5G Direct Discovery Name Management Function (DDNMF) signalling aspects; Stage 3".

[10] 3GPP TS 29.503: "5G System; Unified Data Management Services; Stage 3".

[11] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".

[12] 3GPP TS 23.003: "Numbering, addressing and identification".

[13] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol Specification".

[14] 3GPP TS 23.122: "Non-Access-Stratum (NAS) functions related to Mobile Station (MS) in idle mode".

[15] 3GPP TS 38.304: "User Equipment (UE) procedures in Idle mode and RRC Inactive state".

[16] 3GPP TS 38.323: "NR; Packet Data Convergence Protocol (PDCP) specification".

[17] 3GPP TS 24.555: "Proximity-services (ProSe) in 5G System (5GS); User Equipment (UE) policies; Stage 3".

[18] 3GPP TS 24.587: "Vehicle-to-Everything (V2X) services in 5G System (5GS); Protocol aspects; Stage 3".

[19] 3GPP TS 29.557: "5G System; Application Function ProSe Service; Stage 3".

[20] 3GPP TS 24.007: "Mobile radio interface signalling layer-3; General aspects".

[21] 3GPP TS 38.300: "NR; NR and NG-RAN Overall Description; Stage 2".

[22] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[23] IETF RFC 2131: "Dynamic Host Configuration Protocol".

[24] IETF RFC 4039: "Rapid Commit Option for the Dynamic Host Configuration Protocol version 4 (DHCPv4)".

[25] IETF RFC 4862: "IPv6 Stateless Address Autoconfiguration".

[26] 3GPP TS 24.502: "Access to the 5G System (5GS) via non-3GPP access networks; Stage 3".

[27] ITU-T Recommendation E.212: "The international identification plan for mobile terminals and mobile users".

[28] ISO/IEC 10118-3:2018: "IT Security techniques – Hash-functions – Part 3: Dedicated hash-functions".

[29] W3C REC-xmlschema-2-20041028: "XML Schema Part 2: Datatypes".

[30] IETF RFC 4122: "A Universally Unique IDentifier (UUID) URN Namespace".

[31] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols; Stage 3".

[32] IETF RFC 826: "An Ethernet Address Resolution Protocol".

[33] 3GPP TS 23.503: "Policy and Charging Control Framework for the 5G System; Stage 2".

[34] 3GPP TS 33.503: "Security Aspects of Proximity based Services (ProSe) in the 5G System (5GS)".

[35] 3GPP TS 23.303: "Proximity-based services (ProSe); Stage 2".

[36] 3GPP TS 33.303: "Proximity-based Services (ProSe); Security aspects".

[37] 3GPP TS 33.536: "Security aspects of 3GPP support for advanced Vehicle-to-Everything (V2X) services".

[38] IETF RFC 3927: "Dynamic Configuration of IPv4 Link-Local Addresses".

[r3748] IETF RFC 3748: "Extensible Authentication Protocol (EAP)".

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

## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

5G DDNMF 5G Direct Discovery Name Management Function

5G ProSe 5G Proximity-based Services

AA Authentication and Authorization

DN Data Network

DUCK Discovery User Confidentility Key

DUIK Discovery User Integrity Key

DUSK Discovery User Scrambling Key

GFBR Guaranteed Flow Bit Rate

LSB Least Significant 8 Bits

MSB Most Significant 8 Bits

MFBR Maximum Flow Bit Rate

MIC Message Integrity Check

NCGI NG-RAN Cell Global ID

PC5 LINK-AMBR PC5 Link Aggregated Bit Rate

PDUID ProSe Discovery UE ID

PKMF ProSe Key Management Function

PQI PC5 5QI

ProSeP 5G ProSe Policy

PSDK Public Safety Discovery Key

RQI Reflective QoS Indication

RPAUID Restricted ProSe Application User ID

RSC Relay Service Code

TTL Time-To-Live

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

### 8.2.x 5G ProSe AA message reliable transport procedure

#### 8.2.x.1 General

The purpose of the 5G ProSe AA message reliable transport procedure is to exchange the EAP message between the 5G ProSe layer-3 remote UE and the 5G ProSe layer-3 UE-to-network relay UE.

The 5G ProSe layer-3 remote UE in this procedure shall be a 5G ProSe-enabled UE and is authorised to act as a 5G ProSe layer-3 remote UE towards a 5G ProSe layer-3 UE-to-network relay UE based on the service authorisation procedure as specified in clause 5. The 5G ProSe layer-3 UE-to-network relay UE in this procedure shall be a 5G ProSe-enabled UE and is authorised to act as a 5G layer-3 ProSe UE-to-network relay UE based on the service authorisation procedure as specified in clause 5.

In this clause, the 5G ProSe layer-3 UE-to-network relay UE is the initiating UE and the 5G ProSe layer-3 remote UE is the target UE.

#### 8.2.x.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 T50aa. The UE shall not send a new PROSE AA MESSAGE TRANSPORT REQUEST message to the same target UE while timer T50aa is running.



Figure 8.2.x.2.1: 5G ProSe AA message reliable transport procedure

#### 8.2.x.3 5G ProSe AA message reliable transport procedure accepted by the target UE

Upon receiving a PROSE AA MESSAGE TRANSPORT REQUEST message, the target UE shall pass the EAP message in the EAP message IE to the upper layer for the external DN authentication.

When the upper layers provide an EAP message responding to the received EAP message, the target UE shall generate a PROSE AA MESSAGE TRANSPORT RESPONSE message including the EAP message IE set to the received EAP message from the upper layers.

After the PROSE AA MESSAGE TRANSPORT RESPONSE 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 and the target UE's layer-2 ID.

#### 8.2.x.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 T50aa 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 \* \* \* \*

### 10.3.y ProSe AA message transport request

#### 10.3.y.1 Message definition

This message is sent by the 5G ProSe layer-3 UE-to-network relay UE to the 5G ProSe layer-3 remote UE to forward the EAP message. See table 10.3.y.1.1.

Message type: PROSE AA MESSAGE TRANSPORT REQUEST

Significance: dual

Direction: UE to peer UE

Table 10.3.y.1.1: PROSE AA MESSAGE TRANSPORT REQUEST content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | PROSE AA MESSAGE TRANSPORT REQUEST identity | ProSe PC5 signalling message type11.3.1 | M | V | 1 |
|  | Sequence Number | Sequence number11.3.2 | M | V | 1 |
| 7x | EAP message | EAP message11.3.a | O | TLV-E | 7-1503 |

#### 10.3.y.2 EAP message

The EAP message IE is included if the PROSE AA MESSAGE TRANSPORT REQUEST message is used in an EAP based authentication procedure.

### 10.3.z ProSe AA message transport response

#### 10.3.z.1 Message definition

This message is sent by the 5G ProSe layer-3 remote UE to the 5G ProSe layer-3 UE-to-network relay UE to forward the EAP message. See table 10.3.z.1.1.

Message type: PROSE AA MESSAGE TRANSPORT RESPONSE

Significance: dual

Direction: UE to peer UE

Table 10.3.z.1.1: PROSE AA MESSAGE TRANSPORT RESPONSE content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | PROSE AA MESSAGE TRANSPORT RESPONSE identity | ProSe PC5 signalling message type11.3.1 | M | V | 1 |
|  | Sequence Number | Sequence number11.3.2 | M | V | 1 |
| 7x | EAP message | EAP message11.3.a | O | TLV-E | 7-1503 |

#### 10.3.z.2 EAP message

The EAP message IE is included if the PROSE AA MESSAGE TRANSPORT RESPONSE message is used in an EAP based authentication procedure.

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

### 11.3.1 ProSe PC5 signalling message type

The purpose of the ProSe PC5 signalling message type information element is to indicate the type of messages used in ProSe PC5 signalling protocol.

The value part of the ProSe PC5 signalling message type information element used in the ProSe PC5 signalling messages is coded as shown in table 11.3.1.1.

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

Table 11.3.1.1: ProSe PC5 signalling message type

|  |  |  |
| --- | --- | --- |
| Bits |  |  |
| **8** | **7** | **6** | **5** | **4** | **3** | **2** | **1** |  |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |  | PROSE DIRECT LINK ESTABLISHMENT REQUEST |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |  | PROSE DIRECT LINK ESTABLISHMENT ACCEPT |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |  | PROSE DIRECT LINK ESTABLISHMENT REJECT |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |  | PROSE DIRECT LINK MODIFICATION REQUEST |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |  | PROSE DIRECT LINK MODIFICATION ACCEPT |
| 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |  | PROSE DIRECT LINK MODIFICATION REJECT |
| 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |  | PROSE DIRECT LINK RELEASE REQUEST |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |  | PROSE DIRECT LINK RELEASE ACCEPT |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |  | PROSE DIRECT LINK KEEPALIVE REQUEST |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |  | PROSE DIRECT LINK KEEPALIVE RESPONSE |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |  | PROSE DIRECT LINK AUTHENTICATION REQUEST |
| 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |  | PROSE DIRECT LINK AUTHENTICATION RESPONSE |
| 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 |  | PROSE DIRECT LINK AUTHENTICATION REJECT |
| 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 |  | PROSE DIRECT LINK SECURITY MODE COMMAND |
| 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |  | PROSE DIRECT LINK SECURITY MODE COMPLETE |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |  | PROSE DIRECT LINK SECURITY MODE REJECT |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |  | PROSE DIRECT LINK REKEYING REQUEST |
| 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |  | PROSE DIRECT LINK REKEYING RESPONSE |
| 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |  | PROSE DIRECT LINK IDENTIFIER UPDATE REQUEST |
| 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |  | PROSE DIRECT LINK IDENTIFIER UPDATE ACCEPT |
| 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |  | PROSE DIRECT LINK IDENTIFIER UPDATE ACK |
| 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |  | PROSE DIRECT LINK IDENTIFIER UPDATE REJECT |
| 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 |  | PROSE DIRECT LINK AUTHENTICATION FAILURE |
| 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |  | PROSE ADDITIONAL PARAMETERS ANNOUNCEMENT REQUEST |
| 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |  | PROSE ADDITIONAL PARAMETERS ANNOUNCEMENT RESPONSE |
| 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |  | PROSE AA MESSAGE TRANSPORT REQUEST |
| 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 |  | PROSE AA MESSAGE TRANSPORT RESPONSE |
|  |

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

### 11.3.a EAP message

The purpose of the EAP message information element is to transport an EAP message as specified in IETF RFC 3748 [r3748].

The EAP message information element is coded as specified in clause 9.11.2.2 of 3GPP TS 24.501 [11].

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