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

**E-Meeting, 18th – 26th August 2022 was C1-224830**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **24.554** | **CR** | **0129** | **rev** | **1** | **Current version:** | **17.1.0** |  |
|  |
| *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:***  | Protocol data unit type used over user plane for NR PC5 |
|  |  |
| ***Source to WG:*** | ZTE |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5G\_ProSe |  | ***Date:*** | 2022-08-18 |
|  |  |  |  |  |
| ***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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | According to C1-224523/R2-2206597 Reply LS on SDU type used over user plane for NR PC5 reference point, RAN2 agrees to introduce three new code points of PDCP SDU type to support "Ethernet", "Unstructured" and "Address Resolution Protocol" data unit type for 5G ProSe.Therefore, when handling the transmission, the UE shall tag each outgoing protocol data unit with "Ethernet", "Unstructured" or "Address Resolution Protocol" data unit type accordingly, instead of "non-IP". |
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| ***Summary of change:*** | Change the layer-3 protocol data unit type from "non-IP" to "Ethernet", "Unstructured" or "Address Resolution Protocol".Correct the reference number of RFC 4862 in 7.2.2.3. |
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| ***Consequences if not approved:*** | Not align with RAN2 decision |
|  |  |
| ***Clauses affected:*** | 7.2.2.3, 7.2.9.1, 7.3.2.2, 7.3.3 |
|  |  |
|  | **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 \* \* \* \*

#### 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 for 5G ProSe direct communication between the 5G ProSe remote UE and the 5G ProSe UE-to-network relay UE, the target UE decrypts the encrypted relay service code and 5G PRUK ID, if received, using the DUIK, DUSK, or DUCK with the associated encrypted bitmask used for 5G ProSe UE-to-network relay discovery and verifies if the relay service code matches with the one that the target UE has sent during 5G ProSe UE-to-network relay discovery procedure.

If the 5G ProSe direct link establishment procedure is not for direct communication between the 5G ProSe remote UE and the 5G ProSe UE-to-network relay UE, 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.

If the 5G ProSe direct link establishment procedure is for direct communication between the 5G ProSe remote UE and the 5G ProSe UE-to-network relay UE, the target UE shall proceed with either the security procedure over control plane or the security procedure over user plane as specified in 3GPP TS 33.503 [34].

The target UE shall set the source layer-2 ID and the destination layer-2 ID as specified in clause 7.2.12 and clause 7.2.10, and store the corresponding source layer-2 ID for unicast communication and the destination layer-2 ID for unicast communication in the 5G ProSe direct link context.

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 1: 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 5G ProSe 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 2: 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 [25] 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.

NOTE 3: Two UEs negotiate the PC5 DRX configuration in the AS layer, and the PC5 DRX parameter values are configured per pair of source and destination Layer-2 IDs in the AS layer, as specified in 3GPP TS 38.300 [21].

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 \* \* \* \*

#### 7.2.9.1 Transmission

When receiving user data from upper layers to be sent over 5G ProSe direct link to a specific UE, the transmitting UE shall determine the 5G ProSe direct link context corresponding to the application layer ID and then shall tag each outgoing protocol data unit with the following information before passing it to the lower layers for transmission:

a) a layer-3 protocol data unit type (see 3GPP TS 38.323 [16]) set to:

1) IP, if the ProSe message contains IP data;

2) Ethernet, if the ProSe message contains Ethernet data; or

3) Unstructured, if the ProSe message contains Unstructured data;

b) the PC5 link identifier associated with the 5G ProSe direct link context;

c) optionally, the source layer-2 ID set to the source layer-2 ID associated with the 5G ProSe direct link context;

d) optionally, the destination layer-2 ID set to the destination layer-2 ID associated with the 5G ProSe direct link context; and

e) the PQFI set to the value corresponding to the ProSe identifier and the optional ProSe application requirements according to the mapping rules specified in clause 5.2.4.

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

#### 7.3.2.2 Transmission

The UE shall include the data unit(s) in a protocol data unit with the following parameters:

a) a layer-3 protocol data unit type (see 3GPP TS 38.323 [16]) set to:

1) IP, if the data unit(s) contains IP data;

2) Ethernet, if the data unit(s) contains Ethernet data;

3) Address Resolution Protocol, if the data unit(s) contains Address Resolution Protocol data; or

4) Unstructured, if the data unit(s) contains Unstructured data;

b) the source layer-2 ID set to the layer-2 ID self-assigned by the UE for 5G ProSe communication over PC5 as specified in clause 7.3.2.1.2;

c) the destination layer-2 ID set to the destination layer-2 ID associated with the ProSe identifier of the ProSe application in this list of ProSe applications authorized for 5G ProSe communication over PC5 as specified in clause 5.2.4;

d) if the data unit(s) contains IP data, the source IP address set to the source IP address allocated to the UE as specified in clause 7.3.4;

NOTE: How to set the destination IP address is left to UE implementation.

e) the PQFI set to the value corresponding to the PC5 QoS rules as specified in clause 7.3.2.1, and

f) if the UE is configured with ProSe identifiers to NR Tx profiles for broadcast and groupcast mapping rules for 5G ProSe direct communication over PC5 as specified in clause 5.2.4, the NR Tx profile associated with the ProSe identifier as specified in clause 5.2.4,

then UE shall request radio resources for 5G ProSe communication over PC5 as specified in 3GPP TS 38.300 [21] and pass the data unit(s) on the PC5 QoS Flow identified by the PQFI to lower layers for transmission. The PC5 QoS Rules corresponding to the PQFIs map the data unit(s) with the same ProSe identifier and with the same PC5 QoS parameters to the same PC5 QoS Flow and apply PQFI to the data unit(s).

If the UE is camped on a serving cell indicating that 5G ProSe communication over PC5 is supported by the network, but not broadcasting any carrier frequencies and radio resources for 5G ProSe communication over PC5 as specified in 3GPP TS 38.331 [13], the UE shall request radio resources for 5G ProSe communication over PC5 as specified in 3GPP TS 24.501 [11].

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

### 7.3.3 Reception of broadcast mode 5G ProSe communication over PC5

The UE may be configured by upper layers with one or more destination layer-2 ID(s) for reception of data unit(s) over PC5. The receiving UE shall determine the PC5 QoS parameters for this broadcast ProSe service in the same way described in clause 7.3.2.1.2 and shall determine the NR Tx profile as described in clause 5.2.4, and shall provide the PC5 QoS parameters, the NR Tx profile if available and the destination layer-2 ID(s) to lower layers. For each received protocol data unit over PC5, the receiving UE shall check if the destination layer-2 ID of the received protocol data unit matches one of the configured destination layer-2 IDs. If yes, the UE shall then check whether the protocol data unit type as defined 3GPP TS 38.323 [16] provided by the lower layers for the received packet is set to IP, Ethernet, Address Resolution Protocol or Unstructured and pass the protocol data unit to the corresponding upper layer entity.

NOTE: When the PC5 DRX operation is needed based on the provided NR Tx profile if any, the lower layers use PC5 QoS parameters and the destination layer-2 ID(s) to determine the PC5 DRX parameter values (see 3GPP TS 38.300 [21]) for reception operation over PC5 reference point.

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