**3GPP TSG-CT WG1 Meeting #136-eC1-22xxxx**

**E-Meeting, 12th – 20th May 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **24.554** | **CR** | **0094** | **rev** | **1** | **Current version:** | **17.0.0** |  |
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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:***  | The impact of NR Tx profile on the transmission and reception of Broadcast and Groupcast modes of 5G ProSe communication |
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| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | C1 |
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| ***Work item code:*** | 5G\_ProSe |  | ***Date:*** | 2022-05-04 |
|  |  |  |  |  |
| ***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)* |
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| ***Reason for change:*** | As defined in TS 23.304 (and was introduced by S2-2201295), both the transmitting UE and the receiving UE need to provide the NR Tx profile and the PC5 QoS parameters to lower layers when the Broadcast and Groupcast modes are used. Those parameters are needed by lower layers (Access Stratum) in order to be able to derive the DRX parameters.These requirements can be found in TS 23.304 as following:**(1)**5.13.3 PC5 DRX operations for 5G ProSe Direct Communication and 5G ProSe Layer-3 UE-to-Network Relay CommunicationThe ProSe layer determines the respective ProSe services (i.e. ProSe identifiers), and derives the corresponding PC5 QoS parameters based on either the mapping of ProSe services (i.e. ProSe identifiers) to PC5 QoS parameters, or the ProSe Application Requirements for the ProSe services (i.e. ProSe identifiers) provided by the application layer. For broadcast and groupcast, the ProSe layer also determines the NR Tx profile based on the mapping of ProSe services (i.e. ProSe identifiers) to NR Tx profiles as described in clause 5.1.3.1. The ProSe layer passes the PC5 QoS parameters and destination Layer-2 ID to the AS layer as specified in clauses 6.4.1, 6.4.2 and 6.4.3. The ProSe layer also passes the corresponding NR Tx Profile to the AS layer, if the ProSe layer has determined the corresponding NR Tx profile.NOTE: For broadcast and groupcast, the AS layer needs PC5 QoS parameters as well to determine the PC5 DRX parameter values for reception operation over PC5 reference point. Therefore, the ProSe layer determines the interested ProSe services (i.e. ProSe identifiers) and derives the PC5 QoS parameters based on its reception needs besides the transmission needs. How to derive the PC5 QoS parameters based on its reception needs (e.g. without establishing the PC5 QoS Flows) depends on UE implementation.**(2)**6.4.1 Broadcast mode 5G ProSe Direct Communication(…) The destination Layer-2 ID, the NR Tx Profile and the PC5 QoS parameters are passed down to the AS layer of receiving UE(s) for the reception.(…) The source Layer-2 ID, the destination Layer-2 ID, the NR Tx Profile and the PC5 QoS parameters are passed down to the AS layer of transmitting UE for the transmission.The above requirements need to be reflected into stage-3 spec. |
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| ***Summary of change:*** | Specifying the requirements of providing the NR TX profile and the PC5 QoS parameters (wherever not specified) from ProSe layer to lower layers, for ProSe broadcast and groupcast modes.It is worth to note that, the subclauses of the groupcast mode inside clause 7.4 refer already to the broadcast mode subclauses for such aspects, hence no change is needed in the clauses of the groupcast mode. |
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| ***Consequences if not approved:*** | Stage-2 requirements are not implemented, and lower layers become not able to derive the DRX parameters. |
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| ***Clauses affected:*** | 7.3.2.1.2, 7.3.2.2, 7.3.3 |
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|  | **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 ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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

##### 7.3.2.1.2 PC5 QoS flow match and establishment

In order to determine if any existing PC5 QoS flow matches the request from upper layers, UE shall proceed as follows:

a) according to the PC5 QoS mapping rules specified in clause 5.2.4, the UE shall use the PC5 QoS parameters corresponding to the ProSe identifier and optionally 5G ProSe application requirements;

b) according to the ProSe identifier to destination layer-2 ID for broadcast mapping rules specified in clause 5.2.4, the UE shall use the destination layer-2 ID corresponding to the ProSe identifier;

c) if there is no existing context for the destination layer-2 ID, then:

1) build a new context for the destination layer-2 ID;

2) self-assign a new source layer-2 ID; and

3) pass the source layer-2 ID and the destination layer-2 ID to lower layers.

d) if in the context for the destination layer-2 ID, there is no PC5 QoS rule for the existing PC5 QoS flow(s) matching the service data or request, the UE shall derive the PC5 QoS parameters based on the 5G ProSe application requirements provided by the upper layers (if available) and the ProSe identifier according to the PC5 QoS mapping rules defined in clause 5.2.4 and shall perform the following:

1) if there is no existing PC5 QoS flow that fulfils the derived PC5 QoS parameters, then the UE shall create a new PC5 QoS flow by performing the following operations:

i) self-assign a new PQFI;

ii) create a new PC5 QoS flow context which contains:

A) the PQFI;

B) the ProSe identifier(s); and

C) the derived PC5 QoS parameters;

iii) create a new PC5 QoS rule which contains:

A) a PC5 QoS rule identifier;

B) the PQFI;

C) a set of packet filters; and

D) a precedence value; and

iv) pass the following parameters to the lower layers:

A) the PQFI;

B) the PC5 QoS parameters;

C) the source layer-2 ID and the destination layer-2 ID; and

D) the NR Tx profile, if available, as determined for the respective ProSe identifier based on the configuration parameters and conditions described in clause 5.2.4

2) if there is an existing PC5 QoS flow that fulfils the derived PC5 QoS parameters, then the UE shall update the PC5 packet filter set in the PC5 QoS rule of this PC5 QoS flow, e.g. add the new packet filter in the PC5 QoS rule of this existing PC5 QoS flow; and

3) the UE shall use the new PC5 QoS flow created as described in bullet 1) or the existing PC5 QoS flow with the updated PC5 QoS rules as described in bullet 2) to perform the transmission of 5G ProSe communication over PC5 as specified in clause 7.3.2.2; and

e) if in the context for the destination layer-2 ID, there is a PC5 QoS rule for the existing PC5 QoS flow matching the service data or request, the UE shall use this existing PC5 QoS flow to perform transmission of 5G ProSe communication over PC5 as specified in clause 7.3.2.2.

Three types of packet filters are supported for broadcast mode 5G ProSe direct communication over PC5, i.e., the ProSe IP packet filter set, the ProSe packet filter set, and the ProSe Ethernet packet filter set. The three types of packet filters are defined the same as specified in clause 7.2.7.

\*\*\*\*\* 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 packet, if the data unit(s) contains IP data; or

2) non-IP packet, if the data unit(s) contains Ethernet, Address Resolution Protocol, or 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;

c) the destination layer-2 ID set to:

1) 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, if the ProSe identifier of the ProSe application is included in the list of ProSe applications authorized for 5G ProSe communication over PC5 as specified in clause 5.2.4; or

2) the default destination layer-2 ID configured to the UE for broadcast mode 5G ProSe communication over PC5 as specified in clause 5.2.4, if the ProSe identifier of the ProSe application is not included in the list of ProSe applications authorized for 5G ProSe communication over PC5 and the UE is configured with a default destination layer-2 ID for broadcast mode 5G ProSe communication over PC5;

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 packet or non-IP packet, 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 \*\*\*\*\*