**3GPP TSG-CT WG1 Meeting #135-eC1-222561**

**E-Meeting, 6th – 12th April 2022**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **24.554** | **CR** | **0001** | **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 | **X** |

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| ***Title:*** | DRX configuration parameters and Tx profiles | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | OPPO | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_ProSe | | | | |  | ***Date:*** | | | 2022-4-6 |
|  |  | | | |  | |  | | |  |
| ***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 can be 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 TS 23.304 (S2-2201295), the DRX configuration parameters for direct discovery, direct communication and UE-to-network relay were introduced.  Also, to distinguish with the ealier release PC5 communication, Tx profile was also introduced.  The corresponding stage 3 implementation is needed. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add DRX configuration parameters and Tx profiles. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Missing stage 2 requirements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 3.1, 5.2.3, 5.2.4, 5.2.5, 6.2.14.1, 7.1, 7.3.2.1.1 and 8.2.1.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 \* \* \* \*

## 3.1 Terms

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

**5G ProSe Direct Communication:** A function that supports the communications between two or more UEs in proximity that are 5G ProSe-enabled, by means of user plane transmission using NR technology via a path not traversing any network node.

**5G ProSe Direct Discovery:** A function employed by a 5G ProSe-enabled UE to discover other 5G ProSe-enabled UEs in its vicinity based on direct radio transmissions between the two UEs with NR technology.

**5G ProSe UE-to-network relay:** A function employed by a 5G ProSe-enabled UE to support the communications between a 5G ProSe UE-to-network remote UE and DN.

**5G ProSe layer-2 UE-to-network relay:** A function employed by a 5G ProSe-enabled UE to support the communications between a 5G ProSe layer-2 UE-to-network remote UE and DN.

**5G ProSe layer-3 UE-to-network relay:** A function that supports the communications between a 5G ProSe layer-3 UE-to-network remote UE and DN.

**5G ProSe UE-to-network relay UE:** A 5G ProSe-enabled UE that provides functionality to support connectivity to the network for 5G ProSe remote UE(s).

**5G ProSe layer-2 UE-to-network relay UE:** A 5G ProSe-enabled UE that provides functionality to support connectivity to the network for 5G ProSe layer-2 remote UE(s) via layer-2 protocol.

**5G ProSe layer-3 UE-to-network relay UE:** A 5G ProSe-enabled UE that provides functionality to support connectivity to the network for 5G ProSe layer-3 remote UE(s) via layer-3 protocol.

**5G ProSe layer-2 remote UE:** A 5G ProSe-enabled UE that communicates with a DN via a 5G ProSe layer-2 UE-to-network relay UE.

**5G ProSe layer-3 remote UE:** A 5G ProSe-enabled UE that communicates with a DN via a 5G ProSe layer-3 UE-to-network relay UE.

**Open 5G ProSe direct discovery:** A 5G ProSe direct discovery that takes place without explicit permission from the 5G ProSe-enabled UE being discovered**.**

**Restricted 5G ProSe direct discovery:** A 5G ProSe direct discovery that only takes place with explicit permission from the 5G ProSe-enabled UE being discovered.

For the purposes of the present document, the following term and definition given in TS 23.304 [2] apply:

**5G ProSe-enabled UE**

**5G ProSe remote UE**

**Application layer ID**

**Application layer group ID**

**Destination layer-2 ID**

**Discovery entry ID**

**Discovery filter**

**Discovery query filter**

**Discovery response filter**

**Geographical area**

**Local PLMN**

**Member ID**

**Metadata index**

**Metadata index mask**

**Model A**

**Model B**

**Mode of communication**

**ProSe application code**

**ProSe application mask**

**ProSe application ID**

**ProSe application user ID**

**ProSe discovery UE ID**

**ProSe identifier**

**ProSe layer-2 group ID**

**ProSe query code**

**ProSe response code**

**ProSe restricted code**

**ProSe restricted code prefix**

**ProSe restricted code suffix**

**Relay service code**

**Restricted ProSe application user ID**

**Source layer-2 ID**

**NR Tx profile**

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

### 5.2.3 Configuration parameters for 5G ProSe direct discovery

The configuration parameters for 5G ProSe direct discovery over PC5 reference point consist of:

a) a validity timer for the validity of the configuration parameter for 5G ProSe direct discovery over PC5 interface;

b) a list of PLMNs in which the UE is authorised to perform open 5G ProSe direct discovery Model A monitoring when the UE is served by NG-RAN;

c) a list of PLMNs in which the UE is authorized to perform open 5G ProSe direct discovery Model A announcing when the UE is served by NG-RAN and an authorised discovery range for announcing per PLMN;

d) a list of PLMNs in which the UE is authorised to perform restricted 5G ProSe direct discovery Model A monitoring when the UE is served by NG-RAN;

e) a list of PLMNs in which the UE is authorized to perform restricted 5G ProSe direct discovery Model A announcing when the UE is served by NG-RAN and an authorised discovery range for announcing per PLMN;

f) a list of PLMNs in which the UE is authorized to perform restricted Model B discoverer operation when the UE is served by NG-RAN and an authorised discovery range for announcing per PLMN;

g) a list of PLMNs in which the UE is authorized to perform restricted Model B discoveree operation when the UE is served by NG-RAN and an authorised discovery range for announcing per PLMN;

h) an indication of whether the UE is authorized to perform 5G ProSe direct discovery for Model A or Model B when "not served by NG-RAN";

i) radio parameters for ProSe direct discover per NR PC5 applicable per geographical area(s) with an indication of whether these radio parameters are "operator managed" or "non-operator managed" when "not served by NG-RAN";

NOTE 1: Whether a frequency band is "operator managed" or "non-operator managed" in a given geographical area is defined by local regulations.

j) a 5G ProSe direct discovery UE ID for restricted direct discovery;

k) a list of group member discovery parameters that enable the group member discovery. For each group the list consists of, one application layer group ID, layer-2 group ID, and User info ID;

NOTE 2: User info ID is expected to be assigned uniquely to a user within the discovery group.

l) a list of ProSe identifiers to be used for direct discovery over PC5 interface;

m) a list of security parameters used for direct discovery over PC5;

n) a list of ProSe identifiers to default destination layer-2 ID for initial discovery signalling mapping rule. Each mapping rule contains one or more ProSe identifiers and the default destination layer-2 ID for the initial signalling of direct discovery;

o) default PC5 DRX configuration as specified in 3GPP TS 38.331 [13] when the UE is not served by NG-RAN.

Editor's note: Whether the security parameters can be provided by the PCF and details of security parameters will be determined by SA3 WG.

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

### 5.2.4 Configuration parameters for 5G ProSe direct communication over PC5 interface

The configuration parameters for 5G ProSe direct communication over PC5 interface consist of:

a) a validity timer for the validity of the configuration parameters for 5G ProSe direct communication over PC5 interface;

b) a list of PLMNs in which the UE is authorized to use 5G ProSe direct communication over PC5 interface when the UE is served by NG-RAN. Each entry of the list contains a PLMN ID in which the UE is authorized to use 5G ProSe direct communication over PC5 interface;

c) an indication of whether the UE is authorized to use 5G ProSe direct communication over PC5 interface when the UE is not served by NG-RAN;

d) the radio parameters of the 5G ProSe direct communication over PC5 interface applicable per geographical area with an indication of whether these radio parameters are "operator managed" or "non-operator managed" when the UE is not served by NG-RAN;

e) configuration parameters for groupcast mode 5G ProSe direct communication for each application layer group, consisting of:

1) application layer group ID;

2) ProSe layer-2 group identifier;

3) ProSe group IP multicast address;

4) an indication of whether the UE is authorized to use IPv4 or IPv6; and

5) optionally, an IPv4 address to be used by the UE as a source address for a specific group if the UE is authorized to use IPv4;

f) configuration parameters for privacy support, consisting of:

1) a list of ProSe applications requiring privacy. Each entry of the list contains one or more ProSe identifiers and one or more geographical areas where the privacy is required; and

2) a privacy timer value as specified in 3GPP TS 24.555 [17];

g) optionally, a list of ProSe identifier to ProSe NR frequency mapping rules. Each mapping rule contains one or more ProSe identifiers and the ProSe NR frequencies with associated geographical areas;

h) a list of ProSe identifier to destination layer-2 ID for broadcast mapping rules. Each mapping rule contains one or more ProSe identifiers and the destination layer-2 ID for broadcast;

i) optionally, a default destination layer-2 ID for broadcast;

j) a list of ProSe identifier to default destination layer-2 ID for unicast initial signalling mapping rules. Each mapping rule contains one or more ProSe identifiers and the default destination layer-2 ID for initial signalling to establish unicast connection;

k) a list of ProSe identifier to PC5 QoS parameters mapping rules. The PC5 QoS parameters are specified in clause 5.7 of 3GPP TS 23.304 [2];

l) an AS configuration, including a list of SLRB mapping rules applicable when the UE is not served by NG-RAN. Each SLRB mapping rule contains a PC5 QoS profile and an SLRB. The PC5 QoS profile contains the following parameters:

1) the PC5 QoS profile containing a PQI;

2) if the PQI of the PC5 QoS profile identifies a GBR QoS, the PC5 QoS profile containing a PC5 flow bit rates consisting of a guaranteed flow bit rate (GFBR) and a maximum flow bit rate (MFBR);

3) if the PQI of the PC5 QoS profile identifies a non-GBR QoS, the PC5 QoS profile containing the PC5 link aggregated bit rate consisting of a per link aggregate maximum bit rate (PC5 LINK-AMBR);

NOTE 1: PC5 link aggregated bit rate is only used for unicast mode communications over PC5 interface.

4) the PC5 QoS profile containing a range, which is only used for groupcast mode communications over PC5 interface; and

5) the PC5 QoS profile optionally containing the priority level, the averaging window, and the maximum data burst volume. If one or more of the priority levels, the averaging window or the maximum data burst volume are not contained in the PC5 QoS profile, their default values apply;

m) a list of 5G ProSe direct security policies. Each entry in the list contains a 5G ProSe direct security policy composed of:

1) one or more ProSe identifiers;

2) the signalling integrity protection policy for the ProSe identifier(s);

3) the signalling ciphering policy for the ProSe identifier(s);

4) the user plane integrity protection policy for the ProSe identifier(s);

5) the user plane ciphering policy for the ProSe identifier(s); and

6) one or more geographical areas where the 5G ProSe direct security policy applies;

n) a list of ProSe identifiers to default mode of communication mapping rules. Each mapping rule contains one or more ProSe identifiers and the default mode of communication (one of unicast, groupcast or broadcast);

o) a list of ProSe application to path preference mapping rules (i.e., PC5 preferred, Uu preferred, or no preference) as defined in clause 5.4 in 3GPP TS 24.555 [17]. The list of ProSe application to path preference mapping rules are in prioritized order according to the local configuration of the network;

p) a list of ProSe identifiers to NR Tx profiles for broadcast and groupcast mapping rules. Each mapping rule contains one or more ProSe identifiers and the NR Tx profile for broadcast and groupcast as specified in 3GPP TS 38.300 [21] and 3GPP TS 38.331 [13]; and

q) the PC5 DRX configuration for broadcast and groupcast, as specified in 3GPP TS 38.331 [13], including the mapping of PC5 QoS profile(s) to PC5 DRX cycle(s) and the default PC5 DRX configuration when the UE is not served by NG-RAN.

NOTE 2: In this release of specification, the application ID defined in 3GPP TS 23.303 [35] can be used as the ProSe identifier in 5G ProSe direct discovery and in a consequent 5G ProSe direct communication.

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

### 5.2.5 Configuration parameters for 5G ProSe UE-to-network relay

The configuration parameters for the role of a ProSe UE-to-network relay UE over PC5 reference point consist of:

a) a validity timer for the validity of the configuration parameter for 5G ProSe UE-to-network relay over PC5 interface;

b) a list of PLMNs in which the UE is authorised to relay traffic for 5G ProSe layer-3 remote UEs when the UE is served by NG-RAN, and in each PLMN;

c) a list of PLMNs in which the UE is authorised to relay traffic for 5G ProSe layer-2 remote UEs when the UE is served by NG-RAN, and in each PLMN;

d) the default destination layer-2 ID(s) for sending the discovery signalling for announcement and additional information, and for receiving the discovery signalling for solicitation;

NOTE 1: Which default destination layer-2 ID is selected is up to UE implementation when there are more than one default destination layer-2 ID.

e) a User info ID for the UE-to-network relay discovery;

f) one or more relay service code(s) for the UE-to-network relay discovery, and for each relay service code:

1) security related content for 5G ProSe relay discovery;

2) an indication of whether the relay service code is offering 5G ProSe layer-2 or layer-3 UE-to-network relay service; and

3) for 5G ProSe layer-3 UE-to-network relay UE, a set of PDU session parameters:

i) PDU Session type;

ii) optionally, DNN;

iii) optionally, SSC Mode;

iv) optionally, S-NSSAI; and

v) optionally, access type preference;

4) for 5G ProSe layer-3 UE-to-network relay UE, security policies for UE-to-network relay direct communication:

i) the signalling integrity protection policy;

ii) the signalling ciphering policy;

iii) the user plane integrity protection policy; and

iv) the user plane ciphering policy;

g) for 5G ProSe layer-3 UE-to-network relay UE, QoS mapping rules including:

1) a mapping between a 5QI value and a 5G ProSe PQI value over PC5 for traffic relayed over the PC5 interface;

2) a PDB adjustment factor of the standardized PDB identified by the PQI; and

3) optionally, the relay service code(s) associated with the QoS mapping rule;

h) the radio parameters of the 5G ProSe UE-to-network relay discovery applicable per geographical area with an indication of whether these radio parameters are "operator managed" or "non-operator managed" when the UE is not served by NG-RAN;

i) for 5G ProSe layer-3 UE-to-network relay UE, for Ethernet and Unstructured traffic using IP type PDU session, a list of ProSe identifier(s) to ProSe application server address mapping rule. Each mapping rule contains one or more ProSe identifier(s) and IP address/FQDN and transport layer port number; and

j) the radio parameters of the 5G ProSe direct communication applicable per geographical area with an indication of whether these radio parameters are "operator managed" or "non-operator managed" when the UE is not served by NG-RAN; and

k) optionally, the ProSe key management function (PKMF) address; and

l) for 5G ProSe layer-3 UE-to-network relay UE, the default PC5 DRX configuration for discovery as specified in 3GPP TS 38.331 [13] when the UE is not served by NG-RAN.

The configuration parameters for the role of a 5G ProSe remote UE consist of:

a) a validity timer for the validity of the configuration parameters for 5G ProSe remote UE;

b) an indication whether the UE is authorized to use a 5G ProSe layer-3 UE-to-network relay UE;

c) a list of PLMNs in which the UE is authorized to use a 5G ProSe layer-2 UE-to-network relay UE;

d) default destination layer-2 ID(s) for sending the discovery signalling for solicitation, and for receiving the discovery signalling for announcement and additional information;

NOTE 2: Which default destination layer-2 ID is selected is up to UE implementation when there are more than one default destination layer-2 ID.

e) a User info ID for the UE-to-network relay discovery;

f) one or more relay service code(s) for the UE-to-network relay discovery, and for each relay service code:

1) security related content for 5G ProSe relay discovery;

2) an indication of whether the relay service code is offering 5G ProSe layer-2 or layer-3 UE-to-network relay service; and

3) for 5G ProSe remote UE using 5G ProSe layer-3 UE-to-network relays, one of the following:

i) a set of PDU session parameters for the relayed traffic without using N3IWF access:

A) PDU Session type;

B) optionally, DNN;

C) optionally, SSC Mode;

D) optionally, S-NSSAI; and

E) optionally, access type preference; or

ii) an indication of using N3IWF access for the relayed traffic;

4) for 5G ProSe remote UE using 5G ProSe layer-3 UE-to-network relays, security policies for UE-to-network relay direct communication:

i) the signalling integrity protection policy;

ii) the signalling ciphering policy;

iii) the user plane integrity protection policy; and

iv) the user plane ciphering policy;

g) the radio parameters of the 5G ProSe Relay Discovery applicable per geographical area with an indication of whether these radio parameters are "operator managed" or "non-operator managed" when the UE is not served by NG-RAN;

h) the radio parameters of the 5G ProSe direct communication applicable per geographical area with an indication of whether these radio parameters are "operator managed" or "non-operator managed" when the UE is not served by NG-RAN;

NOTE 3: Whether a frequency band is "operator managed" or "non-operator managed" in a given Geographical Area is defined by local regulations.

i) the N3IWF selection information for 5G ProSe layer-3 remote UE:

1) N3IWF identifier configuration (either FQDN or IP address); and

2) 5G ProSe layer-3 UE-to-network relays, access node selection information consists of a prioritized list of PLMNs for N3IWF selection and an indication that the selection of an N3IWF in a PLMN should be based on Tracking Area Identity FQDN or on Operator Identifier FQDN;

j) optionally, the PKMF address; and

k) for 5G ProSe layer-3 remote UE, the default PC5 DRX configuration for discovery as specified in 3GPP TS 38.331 [13] when the UE is not served by NG-RAN.

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

#### 6.2.14.1 General

This clause describes the procedures for 5G ProSe direct discovery procedure over PC5 interface. The purpose of the 5G ProSe direct discovery procedure over PC5 interface is to enable a ProSe-enabled UE to detect and identify another ProSe-enabled UE over PC5 interface.

To perform 5G ProSe direct discovery procedure over PC5 interface, the UE is configured with the related information as described in clause 5.2.3. The following models for 5G ProSe direct discovery procedure over PC5 interface as specified in 3GPP TS 23.304 [2] are supported:

a) Model A uses a single discovery protocol message (Announcement); and

b) Model B uses two discovery protocol messages (Solicitation and Response).

NOTE: If the UE is authorized to perform both 5G ProSe direct discovery Model A and 5G ProSe direct discovery Model B, it is up to UE implementation to select which model to perform or perform both models simultaneously.

The UE may use the PC5 DRX mechanism to perform 5G ProSe direct discovery over PC5 interface when the UE is not served by NG-RAN as specified in clause 5.2.3.The following procedures are defined for 5G ProSe direct discovery procedure over PC5 interface:

a) 5G ProSe direct discovery procedure over PC5 interface with Model A:

1) Announcing UE procedure for 5G ProSe direct discovery initiation;

2) Announcing UE procedure for 5G ProSe direct discovery completion;

3) Monitoring UE procedure for 5G ProSe direct discovery initiation; and

4) Monitoring UE procedure for 5G ProSe direct discovery completion; and

b) 5G ProSe direct discovery procedure over PC5 interface with Model B:

1) Discoverer UE procedure for 5G ProSe direct discovery initiation;

2) Discoverer UE procedure for 5G ProSe direct discovery completion;

3) Discoveree UE procedure for 5G ProSe direct discovery initiation; and

4) Discoveree UE procedure for 5G ProSe direct discovery completion.

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

## 7.1 Overview

This clause describes the procedures at the UE, and between UEs, for 5G ProSe direct communication over PC5.

The UE shall support requirements for securing 5G ProSe direct communication over PC5.

The PC5 interface is selected based on the ProSe application to path preference mapping rules as specified in clause 5.2.4 before 5G ProSe direct communication.

For unicast mode 5G ProSe direct communication, the following data unit types are supported: IPv4, IPv6, Ethernet, and Unstructured.

For broadcast and groupcast mode 5G ProSe communication, the following data unit types are supported: IPv4, IPv6, Ethernet, Unstructured, and Address Resolution Protocol (see RFC 826 [32]).

5G ProSe direct communication over NR-PC5 supports broadcast mode, groupcast mode, and unicast mode. If the upper layer of the UE indicates the mode of communication, the UE shall set the mode of communication based on the request of the upper layer. Otherwise, the UE shall set the mode of communication based on the mapping rules between the 5G ProSe identifiers and the default mode of communication defined in clause 5.2.4.

NOTE: Further details about whether broadcast, unicast or groupcast can be used over PC5 are described in 3GPP TS 23.304 [3] clause 5.3.

The UE may use the PC5 DRX mechanism to perform 5G ProSe direct communication over PC5 interface for broadcast mode and groupcast mode when the UE is not served by NG-RAN as specified in clause 5.2.4.\* \* \* Next Change \* \* \* \*

##### 7.3.2.1.1 Broadcast mode 5G ProSe communication over PC5 triggered by upper layers

When the UE is requested by upper layers to send data unit(s) of a ProSe application identified by a ProSe identifier using 5G ProSe communication over PC5, the request from the upper layers includes:

a) the data unit(s) of the ProSe application;

b) the ProSe identifier of the ProSe application for the data unit(s);

c) the type of data in the data unit(s) (i.e., IP, Ethernet, Address Resolution Protocol, or Unstructured);

d) optionally the communication mode which is set to broadcast mode; and

e) optionally the 5G ProSe application requirements (e.g., priority requirement, reliability requirement, delay requirement).

Upon a request from upper layers to send data unit(s) of a ProSe application identified by a ProSe identifier using 5G ProSe communication over PC5, if:

a) the UE is configured with ProSe identifier to ProSe NR frequency mapping rules for 5G ProSe communication over PC5 as specified in clause 5.2.4; and

b) there are one or more ProSe NR frequencies associated with the ProSe identifier of the ProSe application for the data unit(s) in the current geographical area,

then the UE passes the one or more ProSe NR frequencies associated with the ProSe identifier of the ProSe application and the communication mode which is set to broadcast mode for the data unit(s) to the lower layers.

Upon a request from upper layers to send data unit(s) of a ProSe application identified by a ProSe identifier using 5G ProSe communication over PC5, the UE determines the Tx profiles based on the list of ProSe identifiers to NR Tx profiles for broadcast and groupcast mapping rules as specified in clause 5.2.4 and passes the NR Tx profiles to the lower layers. Additionally, when the UE is not served by NG-RAN, the UE also passes the configured PC5 DRX configuration as specified in clause 5.2.4 to the lower layers.

Then, if:

a) the following conditions are met:

1) the UE is served by NG-RAN for 5G ProSe communication;

2) the UE intends to use the radio resources (i.e., carrier frequency) provided by a serving cell;

3) the registered PLMN is in the list of PLMNs in which the UE is authorized to use 5G ProSe communication over PC5 when the UE is served by NG-RAN for 5G ProSe communication over PC5 as specified in clause 5.2.4; and

4) 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 the UE is configured with a default destination layer-2 ID for broadcast mode 5G ProSe communication over PC5 as specified in clause 5.2.4; or

b) the following conditions are met:

1) the UE is:

i) not served by NG-RAN for 5G ProSe communication over PC5;

ii) in limited service state as specified in 3GPP TS 23.122 [14], if 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]; or

iii) in limited service state as specified in 3GPP TS 23.122 [14] for reasons other than A), B) or C) above, and located in a geographical area for which the UE is provisioned with "non-operator managed" radio parameters as specified in clause 5.2.4;

2) the UE is authorized to use 5G ProSe communication over PC5 when the UE is not served by NG-RAN for 5G ProSe communication as specified in clause 5.2.4; and

3) 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 the UE is configured with a default destination layer-2 ID for broadcast mode 5G ProSe communication over PC5 as specified in clause 5.2.4;

then the UE shall proceed as specified in clause 7.3.2.1.2, else the UE shall not perform transmission of 5G ProSe communication over PC5.

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

#### 8.2.1.1 General

This clause describes the procedures for both layer-3 and layer-2 UE-to-network relay discovery for public safety use and commercial services at a ProSe-enabled UE over the PC5 interface. The purpose of the UE-to-network relay discovery procedure over PC5 interface is to enable a ProSe-enabled UE to detect and identify another ProSe-enabled UE over PC5 interface for UE-to-network relay communication between a UE and 5GC.

NOTE 1: Relaying Multicast/Broadcast Service traffic to a 5G ProSe remote UE by a 5G ProSe UE-to-network relay is not supported in this release of the specification.

A UE-to-network relay supporting multiple relay service codes can advertise the relay service codes using multiple discovery messages, with one relay service code per discovery message.

The following principles for 5G ProSe UE-to-network relay apply when the relay UE or the remote UE is in service area restriction as defined in clause 5.3.5 of 3GPP TS 24.501 [11]:

a) in non-allowed area of its serving PLMN, the 5G ProSe layer-3 UE-to-network relay UE is not allowed to perform relay operations (e.g., UE-to-network relay discovery as specified in clause 8.2.1, or accept the 5G ProSe direct link establishment procedure as specified in clause 7.2.2) except for e.g., emergency services and high priority access as defined in clause 5.3.5 of 3GPP TS 24.501 [11] based on relay service codes as specified in clause 5.2.5;

b) service area restriction is not applicable to the 5G ProSe layer-3 remote UE;

c) in non-allowed area of its serving PLMN, the 5G ProSe layer-2 UE-to-network relay UE may perform relay operations (e.g., UE-to-network relay discovery as specified in clause 8.2.1, or accept the 5G ProSe direct link establishment procedure as specified in clause 7.2.2); and

d) in non-allowed area of its serving PLMN, the 5G ProSe layer-2 remote UE follows the same principles of service area restrictions as specified in clause 5.3.5 of 3GPP TS 24.501 [11].

To perform UE-to-network relay discovery over PC5 interface, the UE is configured with the related information as described in clause 5.2.5. The following models for UE-to-network relay discovery procedure over PC5 interface as specified in 3GPP TS 23.304 [2] are supported:

a) Model A uses a single discovery protocol message (Announcement); and

b) Model B uses two discovery protocol messages (Solicitation and Response).

NOTE 2: If the UE is authorized to perform both 5G ProSe UE-to-network relay discovery Model A and 5G ProSe UE-to-network relay discovery Model B, it is up to UE implementation to select which model to perform or perform both models simultaneously.

The 5G ProSe layer-3 UE-to-network relay UE and 5G ProSe layer-3 remote UE may use the PC5 DRX mechanism to perform 5G ProSe UE-to-network relay discovery over PC5 interface when the UE is not served by NG-RAN as specified in clause 5.2.5.

The following procedures are defined for UE-to-network relay discovery procedure over PC5 interface:

a) UE-to-network relay discovery over PC5 interface with Model A:

1) Announcing UE procedure for UE-to-network relay discovery initiation;

2) Announcing UE procedure for UE-to-network relay discovery completion;

3) Monitoring UE procedure for UE-to-network relay discovery initiation;

4) Monitoring UE procedure for UE-to-network relay discovery completion;

5) Announcing UE procedure for UE-to-network relay discovery additional information; and

6) Monitoring UE procedure for UE-to-network relay discovery additional information; and

b) UE-to-network relay discovery over PC5 interface with Model B:

1) Discoverer UE procedure for UE-to-network relay discovery initiation;

2) Discoverer UE procedure for UE-to-network relay discovery completion;

3) Discoveree UE procedure for UE-to-network relay discovery initiation; and

4) Discoveree UE procedure for UE-to-network relay discovery completion.

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