**3GPP TSG-CT WG1 Meeting #134-eC1-22xxxx**

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

**Source: vivo**

**Title: Clarification on target user info**

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

**Agenda item: 17.2.18**

**Document for: Decision**

**1. Introduction**

The target user info is clarified in CT1#133-bis-e that the target user info IE shall be included in PROSE PC5 DISCOVERY message for group member discovery solicitation if the target information is provided by the upper layers to identify a specific group member as per TS 24.554 v1.1.0:

### *10.2.4 Target user info*

*The target user info IE shall be included in PROSE PC5 DISCOVERY message for group member discovery solicitation in as in table 10.2.1.6 if the target information is provided by the upper layers to identify a specific group member of the application layer group identified by the configured application layer group ID.*

**2. Reason for Change**

For group discovery case, the application layer may ask the UE to discover:

a) a specific group member; or

b) multiple targeted group members.

Here, the term “multiple targeted group members” stands for the group members that are identified by the configured application layer group ID.

If the target information is provided by the upper layers, it is clear to identifier a specific group member in case a). However, the meaning when the target information is absent is not clear. There are two potential understandings:

* understanding#1: this means that the discoverer UE trying to discover multiple targeted group members in the group, and not a specific group member in that group. This can be interpreted as “anyone in the group” can respond to the solicitation message; or
* understanding#2: this means that the target info does not exist in the discovery message. It can be considered that there is no limitation on the group member discovery message. This can be also interpreted as “anyone in the group” can respond to the solicitation message.

According to the analysis above, if the PROSE PC5 DISCOVERY message for group member discovery solicitation does not indicate any specific target UE (i.e., target user info is not included in the PROSE PC5 DISCOVERY message), the PROSE PC5 DISCOVERY message for group member discovery solicitation is only used to discover the targeted group members that are identified by the configured application layer group ID. It is proposed to clarify the meaning when the target information is absent in the group discovery procedure.

**3. Proposal**

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

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

#### 6.2.15.1 General

This clause describes the procedures for group member discovery over PC5 interface for both public safety use and commercial services. The purpose of the group member discovery procedure over PC5 interface is to enable a ProSe-enabled UE to detect and identify another ProSe-enabled UE that belongs to the same application layer group (e.g., sharing the same application layer group ID) over PC5 interface.

To perform group member discovery over PC5 interface, the UE is configured with the related information as described in clause 5.2.3. The following models for group member 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).

The following procedures are defined for group member discovery procedure over PC5 interface:

a) Group member discovery over PC5 interface with Model A:

1) Announcing UE procedure for group member discovery initiation;

2) Announcing UE procedure for group member discovery completion;

3) Monitoring UE procedure for group member discovery initiation; and

4) Monitoring UE procedure for group member discovery completion; and

b) Group member discovery over PC5 interface with Model B:

1) Discoverer UE procedure for group member discovery initiation;

2) Discoverer UE procedure for group member discovery completion;

3) Discoveree UE procedure for group member discovery initiation; and

4) Discoveree UE procedure for group member discovery completion.

The group member discovery over PC5 interface with Model A can only discover the targeted group members that are identified by the configured application layer group ID. The group member discovery over PC5 interface with Model B can either discover a specific group member of the application layer group identified by the configured application layer group ID or the targeted group members that are identified by the configured application layer group ID.

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

###### 6.2.15.2.2.2 Discoverer UE procedure for group member discovery initiation

The UE is authorised to perform the discoverer UE procedure for group member discovery if:

a) the following is true:

1) the UE is not served by NG-RAN, is authorised to perform 5G ProSe direct discovery discoverer operation when the UE is not served by NG-RAN, and is configured with the radio parameters to be used for 5G ProSe direct discovery when not served by NG-RAN;

2) the UE is served by NG-RAN, and is authorised to perform 5G ProSe direct discovery discoverer operation in the PLMN indicated by the serving cell; or

3) the UE is:

i) in 5GMM-IDLE mode, in limited service state as specified in 3GPP TS 23.122 [14], and 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]; and

ii) authorised to perform 5G ProSe direct discovery discoverer operation when the UE is not served by NG-RAN, and:

A) configured with the radio parameters to be used for 5G ProSe direct discovery use when not served by NG-RAN; or

B) the lower layers indicate that the UE does not need to request resources for 5G ProSe direct discovery procedure; and

NOTE 1: When the lower layers indicate that the UE does not need to request resources for 5G ProSe direct discovery procedure, the serving cell broadcasts a common radio resources pool for 5G ProSe discovery transmission and the UE can use this common radio resources pool while in limited service state.

b) the UE is configured with the application layer group ID parameter identifying the discovery group to be solicited and with the User info ID for the group member discovery parameter;

otherwise, the UE is not authorised to perform the discoverer UE procedure for group member discovery.

Figure 6.2.15.2.2.2.1 illustrates the interaction of the UEs in the discoverer UE procedure for group member discovery.



Figure 6.2.15.2.2.2.1: Discoverer UE procedure for group member discovery

When the UE is triggered by an upper layer application to solicit proximity of other UEs in a discovery group, and if the UE is authorised to perform the discoverer UE procedure for group member discovery, then the UE:

a) if the UE is served by NG-RAN, and the UE in 5GMM-IDLE mode needs to request resources for sending PROSE PC5 DISCOVERY messages as specified in 3GPP TS 38.331 [13], shall perform a service request procedure as specified in 3GPP TS 24.501 [11];

b) shall obtain a valid UTC time for the discovery transmission from the lower layers and generate the UTC-based counter corresponding to this UTC time;

c) shall generate a PROSE PC5 DISCOVERY message for group member discovery solicitation. In the PROSE PC5 DISCOVERY message for group member discovery solicitation, the UE:

1) shall set the discoverer info parameter to the user info ID for the group member discovery parameter;

2) shall set the application layer group ID parameter to the application layer group ID parameter identifying the discovery group to be solicited;

3) shall set the target user info parameter to the target info, if the target information is provided by the upper layers to identify a specific group member of the application layer group identified by the configured application layer group ID;

NOTE 2: If the PROSE PC5 DISCOVERY message for group member discovery solicitation does not indicate any specific target UE (i.e., target user info is not included in the PROSE PC5 DISCOVERY message), the PROSE PC5 DISCOVERY message for group member discovery solicitation is only used to discover the targeted group members that are identified by the configured application layer group ID.

4) shall set the UTC-based counter LSB parameter to include the 8 least significant bits of the UTC-based counter; and

5) shall set the ProSe direct discovery PC5 message type parameter as specified in table 10.2.1.6;

d) shall apply the DUIK, DUSK, or DUCK with the associated Encrypted Bitmask, along with the UTC-based counter to the PROSE PC5 DISCOVERY message for whichever security mechanism(s) configured to be applied, e.g., integrity protection, message scrambling or confidentiality protection of one or more above parameters, as specified in 3GPP TS 33.303 [36];

Editor’s note: Details of security related content in d) are FFS and will be determinated by SA WG3.

e) shall apply one of the following to determine the destination layer-2 ID:

1) if the application layer group ID has a configured layer-2 group ID as specified in clause 5.2.3, set the destination layer-2 ID to the layer-2 group ID; or

2) otherwise, convert the application layer group ID into a destination layer-2 ID as following:

i) to use the group identifier as the input to the SHA-256 hashing algorithm as specified in ISO/IEC 10118-3:2018 [28]; and

ii) to use the 24 least significant bits of the 256 bits of the output as destination layer-2 ID;

NOTE 3: SHA-256 hashing algorithm is implemented in the ME.

f) shall self-assign a source layer-2 ID for sending the group member discovery solicitation message; and

g) shall pass the resulting PROSE PC5 DISCOVERY message for group member discovery solicitation along with the source layer-2 ID and destination layer-2 ID to the lower layers for transmission over the PC5 interface.

The UE shall ensure that it keeps on passing the same PROSE PC5 DISCOVERY message to the lower layers for transmission with an indication that the message until the UE is triggered by an upper layer application to stop soliciting proximity of other UEs in a discovery group, or until the UE stops being authorised to perform the discoverer UE procedure for group member discovery.

Upon reception of a PROSE PC5 DISCOVERY message for group member discovery response, for the target application layer group ID of the discovery group to be discovered, the UE shall use the associated DUSK, if configured, and the UTC-based counter obtained during the monitoring operation to unscramble the PROSE PC5 DISCOVERY message as described in 3GPP TS 33.303 [36]. Then, if a DUCK is configured, the UE shall use the DUCK and the UTC-based counter to decrypt the configured message-specific confidentiality-protected portion, as described in 3GPP TS 33.303 [36]. Finally, if a DUIK is configured, the UE shall use the DUIK and UTC-based counter to verify the MIC field in the unscrambled PROSE PC5 DISCOVERY message for group member discovery response.

Then if the application layer group ID parameter of the PROSE PC5 DISCOVERY message for group member discovery response is the same as the application layer group ID parameter of the PROSE PC5 DISCOVERY message for group member discovery solicitation, the UE shall consider that other UE in the discovery group the UE seeks to discover has been discovered.

Editor’s note: Details of Discoverer UE procedure upon reception of a PROSE PC5 DISCOVERY message for direct discovery response are FFS and will be determinated by cooperation with SA WG3.

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