SA WG2 Meeting #143E (e-meeting) S2-21xxxxx

Elbonia, Feb 24 – Mar 9, 2021

**Source: Qualcomm Incorporated**

**Title: Adding clause 6.3.1 on ProSe Direct Discovery procedures over PC3 reference point to TS 23.304**

**Document for: Discussion/Approval**

**Agenda Item: 8.8.2**

**Work Item / Release: 5G\_ProSe/Rel-17**

*Abstract of the contribution: This contribution adds the description of ProSe Direct Discovery procedures over PC3 reference point to TS 23.304 as clause 6.3.1.*

# Discussion

According to the work plan, this contribution adds the description of ProSe Direct Discovery procedures over PC3 reference point to TS 23.304 as clause 6.3.1.

# Text Proposal

It is proposed to add the following to TS 23.304.

**>>>>Start Changes<<<<**

6.3.1 ProSe Direct Discovery procedures over PC3 reference point

6.3.1.1 Overview

ProSe Direct Discovery is defined as the process that detects and identifies another UE in proximity using NR, E-UTRA or WLAN direct radio signals. There are two types of ProSe Direct Discovery supported over PC3 reference point: open and restricted, as defined in TS 23.303 [x]. ProSe Direct Discovery can be a standalone service or can be used for subsequent actions e.g. to initiate ProSe Direct Communication.

ProSe-enabled UEs which have obtained authorization to participate in ProSe Direct Discovery using procedures over PC3 reference point shall not continue in participating in ProSe Direct Discovery procedures when they detect loss of NG-RAN coverage in the serving PLMN.

With ProSe Direct Discovery, the UE can use inter-PLMN discovery transmission based on the indication from the serving NG-RAN or the provisioned radio resource on the UE. How the serving cell authorizes the UE to use inter-PLMN radio resource is specified in TS 38.331 [x].

6.3.1.2 Overall procedure for ProSe Direct Discovery (Model A)



**Figure 6.3.1.2-1: Overall procedure for Model A ProSe Direct Discovery**

This procedure is only applied for open and restricted ProSe Direct Discovery when the ProSe enabled UE is served by NG-RAN.

1. Service authorisation for ProSe Direct Discovery services is performed for as defined in clauses 6.2.

If the UE is authorised to announce:

2a. When the UE is triggered to announce, then it sends a discovery request for announcing to the 5G DDNMF in HPLMN as defined in clauses 6.3.1.4. In addition, for restricted ProSe Direct Discovery, the 5G DDNMF further interacts with the ProSe Application server for the authorization of the discovery request.

3a. If the request is successful and is provided with ProSe Application Code/ProSe Restricted Code, it starts announcing on PC5 interface.

For ProSe restricted discovery and UE requests "on demand" announcing, ProSe Restricted Code may be provided to UE after this procedure. In this case, UE waits for the ProSe Restricted Code allocation and starts to announce the ProSe Restricted Code on PC5 after receiving it in Announcing Alert procedure specified in clause 6.3.1.6.

NOTE 1: More details on the Access Stratum protocol of this step are provided in RAN specifications.

If the UE is authorised to monitor:

2b. When the UE is triggered to monitor, it sends a discovery request for monitoring to the 5G DDNMF as defined in clauses 6.3.1.4. In addition, for restricted ProSe Direct Discovery, the 5G DDNMF further interacts with the ProSe Application server for the authorization of the discovery request.

3b. If the request is successful and the UE is provided with a Discovery Filter consisting of ProSe Application Code(s)/ProSe Restricted Code(s) and/or ProSe Application Mask(s), it starts monitoring for these ProSe Application Codes/ProSe Restricted Codes on the PC5 interface.

NOTE 2: More details on the Access Stratum protocol of this step are provided in RAN specifications.

4b. When the UE detects that one or more ProSe Application Code(s)/ProSe Restricted Code(s) that match the filter (see clause 5.9.1), it reports the ProSe Application Code(s)/ProSe Restricted Code(s) to the 5G DDNMF as defined in clause 6.3.1.5.

Non roaming direct discovery procedures cover the case where both the "announcing UE" and "monitoring UE" are served by their respective HPLMN. Roaming direct discovery procedures cover the other cases.

6.3.1.3 Overall procedure for ProSe Direct Discovery (Model B)



**Figure 6.3.1.3-1: Overall procedure for Model B ProSe Direct Discovery**

This procedure is applied for restricted ProSe Direct Discovery when the ProSe enabled UE is served by NG-RAN.

1. Service authorisation for ProSe Direct Discovery services is performed as defined in clauses 6.2.

If the UE is authorised to perform restricted ProSe Direct Discovery, Model B, as a Discoveree UE, the following steps take place:

2a. When the UE is triggered to perform restricted ProSe Direct Discovery, Model B, it sends a discovery request to the 5G DDNMF in the HPLMN to obtain a ProSe Response Code as defined in clauses 6.3.1.4. The 5G DDNMF further interacts with ProSe Application Server for the authorization of the discovery request.

3a. If the request is successful and the UE is provided with a ProSe Response Code and an associated Discovery Query Filter(s), then the UE starts monitoring for the ProSe Query Code on PC5 interface.

4a. If a received ProSe Query Code matches any of the Discovery Query Filter(s), the UE announces the associated ProSe Response Code on the PC5 interface.

NOTE 1: More details on the Access Stratum protocol of this step are provided in RAN specifications.

If the UE is authorised to perform restricted ProSe Direct Discovery, Model B, as a Discoverer UE, the following steps take place:

2b. When the UE is triggered to perform restricted ProSe Direct Discovery, Model B, it sends a discovery request to the 5G DDNMF in the HPLMN for a ProSe Query Code as defined in clauses 6.3.1.4. The ProSe Function further interacts with ProSe Application Server for the authorization of the discovery request.

3b. If the request is successful and the UE is provided with a ProSe Query Code and the Discovery Response Filter(s) consisting of ProSe Response Code(s) and ProSe Application Mask(s), the UE announces the ProSe Query Code on the PC5 interface.

4b. The UE starts to monitor on PC5 interface for any ProSe Response Code(s) that might match the Discovery Response Filter(s).

NOTE 2: More details on the Access Stratum protocol of this step are provided in RAN specifications.

5b. When the UE detects a match for one or more ProSe Response Code(s), it reports the ProSe Response Code to the 5G DDNMF as defined in clauses 6.3.1.5.

Non roaming direct discovery procedures cover the case where both the Discoveree UE and Discoverer UE are served by their respective HPLMN. Roaming direct discovery procedures cover the other cases.

6.3.1.4 Discovery Request procedures

The Discovery Request procedure can be used by the "announcing UE" or "monitoring UE" in order to be authorised to access the discovery resources and perform ProSe Direct Discovery. The exact signalling procedures involving the UE, the 5G DDNMFs, and the ProSe Application Server are specified in TS 23.303 [x] clause 5.3.3, with the following modifications:

- the 5G DDNMF takes the role of "ProSe Function" in the procedure;

- the HSS is replaced by UDM;

- corresponding 5GS identifiers replace the EPS identifiers, e.g. use SUPI instead of IMSI, and use GPSI instead of MSISDN;

- PC5\_tech definition is extended to support NR.

The Discovery Request procedure can also be used by the Discoveree UE or the Discoverer UE in order to be authorised to access the discovery resources and perform ProSe Direct Discovery, Model B. The exact signalling procedures are defined in TS 23.303 [x] clause 5.3.3A, with the same modifications as in the above list apply.

6.3.1.5 Discovery Reporting procedures

The Discovery Reporting procedure can be used by the "monitoring UE" (in Model A) and Discoverer UE (in Model B) to request the 5G DDNMF to resolve a matched ProSe Discovery Code(s) (ProSe Application Code for open discovery, and ProSe Restricted Code for restricted discovery) and obtain the corresponding ProSe Application ID(s) or RPAUID, and additional information, e.g. metadata.

The signalling procedures for the "monitoring UE" (in Model A) is specified in TS 23.303 [x] clause 5.3.4, and the signalling procedures for the Discoverer UE (in Model B) is specified in TS 23.303 [x] clause 5.3.4A, with the following modifications:

- the 5G DDNMF takes the role of "ProSe Function" in the procedure;

- the HSS is replaced by UDM;

- corresponding 5GS identifiers replace the EPS identifiers, e.g. use SUPI instead of IMSI, and use GPSI instead of MSISDN;

- PC5\_tech definition is extended to support NR.

6.3.1.6 Announcing Alert Procedures for restricted discovery

When supported by the 5G DDNMF and the UE, the Announcing Alert procedure allows the 5G DDNMF to postpone the ProSe Restricted Code allocation, so that the announcing UE would be only triggered by this procedure to announce when the 5G DDNMF receives a Monitor Request from a UE in the vicinity of the announcing UE. This procedure is an optional step of the Discovery Request procedure defined in clause 6.3.1.4.

The signalling procedure of Announcing Alert Procedure is specified in TS 23.303 [x] clause 5.3.5, with the same modifications listed in clause 6.3.1.4.

6.3.1.7 Direct Discovery Update Procedures

The 5G DDNMF can at any time update/revoke a previously allocated ProSe Application Code, or Discovery Filters. The UE can decide at any time to stop announcing a ProSe Application Code or monitoring set of Discovery Filter(s). The Direct Discovery Update procedure as specified in TS 23.303 [x] clause 5.3.6A allows both the network and the UE to update or revoke the previously authorized discovery. In the defined signalling procedures, the 5G DDNMF(s) takes the role of the "ProSe Function".

**>>>>End Changes<<<<**