|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **3GPP TSG-SA5 Meeting #141-e *S5-221398rev3***  **e-meeting, 17 - 26 January 2022**   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | *CR-Form-v12.1* | | | | | | | | | | **CHANGE REQUEST** | | | | | | | | | |  | | | | | | | | | |  | **32.277** | **CR** |  | **rev** | **1** | **Current version:** |  |  | |  | | | | | | | | | | *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)*.* | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | | | UICC apps | | | |  | ME |  | Radio Access Network | | | | |  | Core Network | **x** |
|  | | | | | | | | | | | | | | | | | |
| ***Title:*** | message flows for 5G ProSe Direct Discovery converged charging | | | | | | | | | | | | | | | | |
|  |  | | | | | | | | | | | | | | | | |
| ***Source to WG:*** | CATT | | | | | | | | | | | | | | | | |
| ***Source to TSG:*** | SA5 | | | | | | | | | | | | | | | | |
|  |  | | | | | | | | | | | | | | | | |
| ***Work item code:*** | 5G\_ProSe | | | | | | | | |  | ***Date:*** | | | 2022-1-7 | | | |
|  |  | | | | |  | | | | |  | | |  | | | |
| ***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:*** | | Message flow for 5G ProSe Direct Discovery converged charging is missing | | | | | | | | | | | | | | | |
|  | |  | | | | | | | | | | | | | | | |
| ***Summary of change:*** | | Adding of the message flows for the converged charging both IEC and ECUR | | | | | | | | | | | | | | | |
|  | |  | | | | | | | | | | | | | | | |
| ***Consequences if not approved:*** | | No message flows for the converged charging of 5G ProSe Direct Discovery. | | | | | | | | | | | | | | | |
|  | |  | | | | | | | | | | | | | | | |
| ***Clauses affected:*** | | 5.x.2 (new) | | | | | | | | | | | | | | | |
|  | |  | | | | | | | | | | | | | | | |
|  | | **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 depends on S5-221397 | | | | | | | | | | | | | | | |
|  | |  | | | | | | | | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | | | | | | | | |

|  |
| --- |
| **1st modified section** |

### 5.x.2 Message flows

#### 5.x.2.1 Introduction

The different scenarios below focus on the different messages from/to the 5G DDNMF and corresponding interaction with the CHF, based on scenarios specified in TS 23.304 [241].

#### 5.x.2.2 5G ProSe Direct Discovery

##### 5.x.2.2.1 Triggers for converged charging for 5G ProSe Direct Discovery

For converged charging, the following tables summarize the set of trigger conditions for 5G ProSe Direct Discovery with 5G DDNMF and Direct Discovery over PC5 reference point.

Table 5.x.2.2.1-1: Triggers for charging events for 5G ProSe Direct Discovery with 5G DDNMF

| Trigger Conditions | | Trigger level | Default category | CHF allowed to change category | | CHF allowed to enable and disable | Message when "immediate reporting" category |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Discovery Response to Direct Discovery Request with command (Announce, Monitor restricted Announcing, restricted Monitoring, restricted Discovery Request) | | - | Immediate | Not Applicable | | Not Applicable | PEC: Charging Data Request [Event] |
| Announce Auth Ack to Announce Authorization messageMonitor response to Monitor Request message | | - | Immediate | Not Applicable | | Not Applicable | PEC: Charging Data Request [Event] |
| Announce Auth Ack to restricted Discovery Request message Model B | | - | Immediate | Not Applicable | | Not Applicable | PEC: Charging Data Request [Event] |
| Match Report Ack to Match Report message | | - | Immediate | Not Applicable | | Not Applicable | PEC: Charging Data Request [Event] |
| Match Report information for Match report of Open discovery | | - | Immediate | Not Applicable | | Not Applicable | PEC: Charging Data Request [Event] |
| Match Report Ack to Model B Discovery reporting | | - | Immediate | Not Applicable | | Not Applicable | PEC: Charging Data Request [Event] |
| After discovery authorization of receiving Direct Discovery Request  with command (Announce, Monitor) | | - | Immediate | Not Applicable | | Not Applicable | IEC: Charging Data Request [Event]  ECUR: Charging Data Request [Initial] |
| After discovery authorization Ack of receiving Direct Discovery Request  with command (Announce, Monitor) | | - | Immediate | Not Applicable | | Not Applicable | ECUR: Charging Data Request [Termination] |
| After discovery authorization of receiving Match Report message | | - | Immediate | Not Applicable | | Not Applicable | IEC: Charging Data Request [Event]  ECUR: Charging Data Request [Initial] |
| After Match Report Ack to Match Report message | | - | Immediate | Not Applicable | | Not Applicable | ECUR: Charging Data Request [Termination] |
| After discovery authorization of Model B Restricted Discovery Request | | - | Immediate | Not Applicable | | Not Applicable | IEC: Charging Data Request [Event]  ECUR: Charging Data Request [Initial] |
| After discovery authorization of Model B Restricted Discovery Reporting | | - | Immediate | Not Applicable | | Not Applicable | IEC: Charging Data Request [Event]  ECUR: Charging Data Request [Initial] |

Table 5.x.2.2.1-2: Triggers for charging events for 5G ProSe Direct Discovery over PC5 reference point

|  |  |
| --- | --- |
| message | Triggering conditions |
| Charging Data Request [Event] | Usage information report from the UE for the group member discovery over PC3  Usage information report from the UE for the UE-to-Network Relay discovery over PC3 |

##### 5.x.2.2.2 Message flows for ProSe Direct Discovery Request - PEC



Figure 5.x.2.2.2-1: Message flow for ProSe Direct Discovery Request - PEC (non-roaming)

More details and completed message flow are defined in TS 23.304 [241] clause 6.3.1.4 and TS 23.303 [238] clause 5.3.4.

1-2. These steps are the same as the ProSe Direct Discovery procedures defined in TS 23.304 [241] clause 6.3.1.5. The Direct Discovery Request could be with command (Announce request, Monitor request, Discoverer request, Discoveree Request).

3. The 5G DDNMF responds with a Discovery Response with:

- (ProSe Application Code, validity timer, PC5\_tech) for open discovery.

- (ProSe Application Code, ProSe Restricted Code/ ProSe Restricted Code Prefix[ProSe Restricted Code Suffix pool], validity timer, Discovery Entry ID, PC5\_tech) for restricted discovery.

3ch-a. The 5G DDNMF triggers Charging Data Request [Event] to CHF for the Direct Discovery Request event. The CDR is generated by CHF.

3ch-b. The CHF creates a CDR for this UE.

3ch-c. The CHF returns Charging Data Response corresponding to the received Charging Data Response[Event].

NOTE: Roaming/inter-PLMN procedures are similar to procedures as defined in clause 5.2.2.1.

##### 5.x.2.2.3 Message flows for ProSe Direct Discovery Report – PEC



Figure 5.x.2.2.3-1: Message flow for ProSe Direct Discovery Report - PEC (non-roaming)

More details and completed message flow are defined in TS 23.304 [241] clause 6.3.1.5 and TS 23.303 [238] clause 5.3.4.

1-4. These steps are the same as the ProSe Direct Discovery procedures defined in TS 23. 304 [11]. The Direct Discovery Report could 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) and obtain the corresponding ProSe Application ID(s) or RPAUID, and additional information, e.g. metadata.

4ch-a. After the 5G DDNMF responds to Direct Discovery Report Ack to the UE. The 5G DDNMF triggers Charging Data Request [Event] to CHF for the Direct Discovery Request event. The CDR is generated by CHF.

4ch-b. The CHF creates a CDR for this UE.

4ch-c. The CHF returns Charging Data Response corresponding to the received Charging Data Response[Event].

NOTE: Roaming/inter-PLMN procedures are similar to procedures as defined in clause 5.2.2.1.

##### 5.x.2.2.4 Message flows for ProSe Direct Discovery over PC5 reference point(PEC)



Figure 5.x.2.2.4-1: Message flow for ProSe Direct Discovery over PC5 charging (non-roaming)

1. UE-1 sends announcement message with model A or solicitation message with model B. In the latter case, UE 2 sends a response message.

NOTE 1: In procedure for UE-to-Network Relay Discovery, the Remote UE and UE-to-Network Relay UE will perform UE-to-Network Relay UE discovery and selection (see TS 23.304 [11] clause 6.2.3.2).

2. When the UE-1 decides that reporting criteria are met, according to the pre-configuration, the UE creates the corresponding usage information report.

3. UE-1 triggers the usage reporting procedure by sending the usage information report to the CTF located in ProSe NF (e.g., 5G-DDNFM).

NOTE 2: Both UE-1, UE2 or other UEs can decide that reporting criteria are met and trigger the usage reporting procedure respectively.

4ch-a. The 5G NF (CTF) triggers Charging Data Request[Event] to CHF.

4ch-b. The CHF creates a CDR for this UE.

4ch-c. The CHF returns Charging Data Response.

##### 5.x.2.2.5 Message flows for ProSe Direct Discovery Request - ECUR



Figure 5.x.2.2.5-1: Message flow for ProSe Direct Discovery Request - ECUR (non-roaming)

1-2. These steps are the same as the clause 5.x.2.2.2. The Direct Discovery Request could be with command (Announce request, Monitor request, Discoverer request, Discoveree Request).

2ch-a. The 5G DDNMF sends Charging Data Request [Initial] to CHF.

2ch-b. The CHF opens a CDR for this UE.

2ch-c. The CHF returns Charging Data Response corresponding to the received Charging Data Response [Initial].

3. The HPLMN 5G DDNMF send the request authorisation to other 5G DDNMF.

4. Authorisation reponse received by 5G DDNMF.

4ch-a. The 5G DDNMF sends Charging Data Request [Termination] to the CHF.

4ch-b. The CHF closes a CDR for this UE.

4ch-c. The CHF acknowledges by sending Charging Data Response [Termination] to the 5G DDNMF.

5. The 5G DDNMF in HPLMN shall respond to the UE with Discovery Response.

##### 5.x.2.2.6 Message flows for ProSe Direct Discovery Report – ECUR



Figure 5.x.2.2.6-1: Message flow for ProSe Direct Discovery Report - ECUR (non-roaming)

1-2. These steps are the same as the clause 5.x.2.2.3. The Direct Discovery Report could 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) and obtain the corresponding ProSe Application ID(s) or RPAUID, and additional information, e.g. metadata.

2ch-a. The 5G DDNMF sends Charging Data Request [Initial] to CHF.

2ch-b. The CHF opens a CDR for this UE.

2ch-c. The CHF returns Charging Data Response corresponding to the received Charging Data Response[Initial].

3. The HPLMN 5G DDNMF send the Report Authorisation to other 5G DDNMF.

4. Authorisation reponse received by 5G DDNMF.

4ch-a. The 5G DDNMF sends Charging Data Request [Termination] to the CHF.

4ch-b. The CHF closes a CDR for this UE.

4ch-c. The CHF acknowledges by sending Charging Data Response [Termination] to the 5G DDNMF.

5. The 5G DDNMF in HPLMN shall respond to the UE with Discovery Report Acknowledgment (ProSe Application ID(s), validity timer(s)) to UE.

|  |
| --- |
| **End of changes** |