**3GPP TSG-CT WG1 Meeting #136-eC1-223381**

**E-Meeting, 12th – 20th May 2022**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **24.554** | **CR** | **0078** | **rev** | **-** | **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:*** | Charging information collection for 5G ProSe Direct Discovery | | | | | | | | | |
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| ***Source to WG:*** | CATT | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_ProSe | | | | |  | ***Date:*** | | | 2022-05-05 |
|  |  | | | |  | |  | | |  |
| ***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)* | |
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| ***Reason for change:*** | | As specified in clause 5.1.2.1 of TS 32.277, the charging information for 5G ProSe Direct Discovery shall be collected by the 5G DDNMF when a UE performs 5G ProSe Direct Discovery. | | | | | | | | |
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| ***Summary of change:*** | | Add description of information collected by the 5G DDNMF from the UE for charging for 5G ProSe Direct Discovery.  Remove the Editor's note in cluase 6.2.8.3 regarding the information for charging. | | | | | | | | |
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| ***Consequences if not approved:*** | | Charging information collected by the 5G DDNMF from the UE for 5G ProSe Direct Discovery is unclear. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.2.2.3, 6.2.3.3, 6.2.4.3, 6.2.5.3, 6.2.6.3, 6.2.7.3, 6.2.8.3, 6.2.9.3, 6.2.10.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 \* \* \* \*

#### 6.2.2.3 Announce request procedure accepted by the 5G DDNMF

Upon receiving a DISCOVERY\_REQUEST message with the command set to "announce", if the requested timer is included in the DISCOVERY\_REQUEST message and the requested timer is set to 0, the 5G DDNMF shall check whether there is an existing UE context containing the discovery entry identified by the discovery entry ID included in the DISCOVERY\_REQUEST message. If the discovery entry exists in the UE context, the 5G DDNMF shall inform the 5G DDNMF in the announcing PLMN to remove the corresponding discovery entry as specified in 3GPP TS 29.555 [9] when the announcing PLMN is not the same as that of the PLMN to which the 5G DDNMF belongs and remove the discovery entry identified by the discovery entry ID from the UE's context. Then the 5G DDNMF shall send a DISCOVERY\_RESPONSE message containing a <response-announce> element with:

a) the transaction ID set to the value of the transaction ID received in the DISCOVERY\_REQUEST message; and

b) the discovery entry ID set to the identifier associated with the corresponding discovery entry.

Upon receiving a DISCOVERY\_REQUEST message with the command set to "announce", if the requested timer is not included in the DISCOVERY\_REQUEST message or the requested timer included in the DISCOVERY\_REQUEST message is not set to 0, the 5G DDNMF shall perform the following procedure.

The 5G DDNMF shall check that the application corresponding to the application identity contained in the DISCOVERY\_REQUEST message is authorized for open 5G ProSe direct discovery announcing. If the application is authorized for open 5G ProSe direct discovery announcing, the 5G DDNMF may also check whether the ProSe application ID contained in the DISCOVERY\_REQUEST message is known. If the ProSe application ID is known or the 5G DDNMF skips the check of the ProSe application ID, the 5G DDNMF shall check whether there is an existing context for the UE associated with the requested ProSe application ID.

If there is no associated UE context, the 5G DDNMF checks with the UDM whether the UE is authorized for open 5G ProSe direct discovery announcing as described in 3GPP TS 29.503 [10]. If the check indicates that the UE is authorized then:

a) the 5G DDNMF shall check whether the UE is authorized to announce the ProSe application ID contained in the DISCOVERY\_REQUEST message;

b) if the UE is authorized to announce the ProSe application ID, the ACE enabled indicator is included and set to "application-controlled extension enabled", the application level container is included in the DISCOVERY\_REQUEST message and the requested application uses application-controlled extension, the 5G DDNMF shall check whether the UE is authorized to use ACE. If the UE is authorized for ACE, the 5G DDNMF shall invoke the procedure described in 3GPP TS 29.557 [19] to check whether the UE is authorized to announce the requested ProSe application ID with application-defined suffix(es), and obtain suffix-related information from the ProSe application server. The 5G DDNMF shall then allocate one ProSe application code prefix and a value for validity timer T5060 to be used with the ProSe application code suffix(es) obtained from the ProSe application server for the given ProSe application ID as specified in 3GPP TS 29.557 [19]. The 5G DDNMF may take into account the requested timer if contained in the DISCOVERY\_REQUEST message;

c) if the UE is authorized to announce the ProSe application ID, the ACE enabled indicator is included and set to "normal" in the DISCOVERY\_REQUEST message and the requested application does not use application-controlled extension, the 5G DDNMF shall allocate the corresponding ProSe application code(s) and a value for validity timer T5060. The 5G DDNMF may take into account the requested timer if contained in the DISCOVERY\_REQUEST message;

d) if the UE is authorized to announce the ProSe application ID, the ACE enabled indicator is set included and to "normal" in the DISCOVERY\_REQUEST message, the application level container is included in the DISCOVERY\_REQUEST and the requested application only uses application-controlled extension, the 5G DDNMF shall check whether the UE is authorized to use ACE. If the UE is authorized for ACE, 5G DDNMF shall invoke the procedure described in 3GPP TS 29.557 [19] to check whether the UE is authorized to announce the requested ProSe application ID with application-defined suffix(es), and obtain suffix-related information from the ProSe application server. The 5G DDNMF shall then allocate one ProSe application code prefix and a value for validity timer T5060 to be used with the ProSe application code suffix(es) obtained from the ProSe application server for the given ProSe application ID as specified in 3GPP TS 29.557 [19]. The 5G DDNMF may take into account the requested timer if contained in the DISCOVERY\_REQUEST message;

e) if the UE is authorized to announce the ProSe application ID, the ACE enabled indicator is included and set to "application-controlled-extension enabled" and the application level container is included in the DISCOVERY\_REQUEST message but the requested application does not use application-controlled extension, the 5G DDNMF shall allocate the corresponding ProSe application code(s) and a value for validity timer T5060. The 5G DDNMF may consider the requested timer if contained in the DISCOVERY\_REQUEST message; and

f) if the UE is authorized to announce the ProSe application ID and the ACE enabled indicator is not included in the DISCOVERY\_REQUEST message, the 5G DDNMF shall allocate the corresponding ProSe application code(s) and a value for validity timer T5060. The 5G DDNMF may consider the requested timer if contained in the DISCOVERY\_REQUEST message.

NOTE: The 5G DDNMF can allocate multiple ProSe application codes for a given ProSe application ID for instance in the case when one or more labels in the ProSe application ID name are wild carded as described in clause 24.2.2 of 3GPP TS 23.003 [12].

If the requested ProSe application ID is country-specific or global as described in clause 24.2 of 3GPP TS 23.003 [12], the 5G DDNMF shall allocate the corresponding ProSe application code(s) or ProSe application code prefix according to clause 24.3 of 3GPP TS 23.003 [12]. The temporary identity part of each ProSe application code or ProSe application code prefix is taken from the data structure corresponding to the country-specific or global ProSe application ID namespace according to clause 24.3 of 3GPP TS 23.003 [12]. The 5G DDNMF shall use the MCC and MNC of the PLMN ID of this 5G DDNMF for the PLMN ID part of the ProSe application code or ProSe application code prefix.

After the ProSe application code(s) or ProSe application code prefix allocation, the 5G DDNMF then associates the ProSe application code(s) or ProSe application code prefix with a new discovery entry identified by a non-zero value discovery entry ID in the new context for the UE that contains the UE's subscription parameters obtained from the UDM, and starts timer T5061. The UDM also provides to the 5G DDNMF the PLMN ID of the PLMN in which the UE is currently registered. For a given set of ProSe application codes or the allocated ProSe application code prefix, timer T5061 shall be longer than timer T5060. By default, the value of timer T5061 is 4 minutes greater than the value of timer T5060.

If there is an existing context for the UE that contains the UE's subscription parameters obtained from the UDM, but no discovery entry identified by the discovery entry ID contained in the DISCOVERY\_REQUEST message, the 5G DDNMF shall behave as if the discovery entry ID included in the DISCOVERY\_REQUEST message was set to 0, and the 5G DDNMF shall allocate a new non-zero discovery entry ID for this entry.

If the metadata is included in the DISCOVERY\_REQUEST message, the 5G DDNMF shall allocate the ProSe application code or ProSe application code prefix including a metadata index to indicate the current version of the metadata, and store the received metadata in the UE context.

Moreover, if the command is set to "metadata\_update" in the DISCOVERY\_REQUEST message and there is an existing UE context stored in the 5G DDNMF, the 5G DDNMF shall update the metadata in the UE context by using the received metadata in the DISCOVERY\_REQUEST message, and update the ProSe application code or ProSe application code prefix in the UE context by changing the metadata index portion and keeping the rest unchanged.

After the ProSe application code(s) allocation, the 5G DDNMF then associates the ProSe application code(s) with a new discovery entry identified by a non-zero value discovery entry ID in the UE context, and starts timer T5061.

If there is an existing context for the UE and a discovery entry identified by the discovery entry ID contained in the DISCOVERY\_REQUEST message associated with the requested ProSe application ID, the 5G DDNMF shall either update the discovery entry with a new validity timer T5060, or allocate new ProSe application code(s) or ProSe application code prefix for the requested ProSe application ID with a new validity timer T5060, and restart timer T5061. The 5G DDNMF may consider the requested timer if contained in the DISCOVERY\_REQUEST message.

If a new discovery entry was created or an existing discovery entry was updated and the UE is currently roaming or the Announcing PLMN ID is included in the DISCOVERY\_REQUEST message, the 5G DDNMF checks with the 5G DDNMF of the VPLMN or in case of open 5G ProSe direct discovery the local PLMN identified by the Announcing PLMN ID whether the UE is authorized for open 5G ProSe direct discovery announcing as described in 3GPP TS 29.555 [9].

If the check indicates that the UE is authorized, then the 5G DDNMF shall send a DISCOVERY\_RESPONSE message containing a <response-announce> element with:

a) the transaction ID set to the value of the transaction ID received in the DISCOVERY\_REQUEST message from the UE;

b) either the ProSe application code(s) set to the ProSe application code(s) allocated by the 5G DDNMF, or the ProSe application code ACE parameter set to include the ProSe-application code- prefix allocated by the 5G DDNMF, and one or more ProSe application code suffix Ranges which contain the suffix(es) for the ProSe application ID received in the DISCOVERY\_REQUEST message from the UE;

c) validity timer T5060 set to the T5060 timer value assigned by the 5G DDNMF to the ProSe application code(s):

d) if the ACE enabled indicator was included by the UE in the DISCOVERY\_REQUEST message, the ACE enabled indicator set to:

1) "application-controlled extension enabled" if application-controlled extension is used; or

2) "normal" if application-controlled extension is not used;

e) the discovery entry ID set to the identifier associated with the corresponding discovery entry;

f) the discovery key set to a value provided by the 5G DDNMF; and

g) the current time set to the current UTC-based time at the 5G DDNMF and the max offset.

If timer T5061 expires, the 5G DDNMF shall remove the discovery entry identified by the discovery entry ID from the UE's context.

The 5G DDNMF uses the information (e.g. ProSe application ID, application identity) received from the UE in the DISCOVERY\_REQUEST message, UE identity in GBA or AKMA information related to TLS tunnel transporting the DISCOVERY\_REQUEST message, and other information for charging purposes as specified in 3GPP TS 32.277 [r32277].

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

#### 6.2.3.3 Announce request procedure accepted by the 5G DDNMF

Upon receiving a DISCOVERY\_REQUEST message with the command set to "announce" and the discovery type set to "Restricted discovery", if the requested timer is included in the DISCOVERY\_REQUEST message and the requested timer is set to 0, the 5G DDNMF shall check whether there is an existing UE context containing the discovery entry identified by the discovery entry ID included in the DISCOVERY\_REQUEST message. If the discovery entry exists in the UE context, the 5G DDNMF shall inform the 5G DDNMF in the announcing PLMN to remove the corresponding discovery entry as specified in 3GPP TS 29.555 [9] when the announcing PLMN is not the same as that of the PLMN to which the 5G DDNMF belongs and remove the discovery entry identified by the discovery entry ID from the UE's context.

Upon receiving a DISCOVERY\_REQUEST message with the command set to "announce" and the discovery type set to "Restricted discovery", if the requested timer is not included in the DISCOVERY\_REQUEST message or the requested timer included in the DISCOVERY\_REQUEST message is not set to 0, the 5G DDNMF shall perform the following procedure.

The 5G DDNMF shall check that the application corresponding to the application identity contained in the DISCOVERY\_REQUEST message is authorized for restricted 5G ProSe direct discovery model A announcing. If the application is authorized for restricted 5G ProSe direct discovery model A announcing, the 5G DDNMF shall check whether there is an existing context for the UE.

If there is no associated UE context, the 5G DDNMF checks with the UDM whether the UE is authorized for restricted 5G ProSe direct discovery model A announcing as described in 3GPP TS 29.503 [10]. If the check indicates that the UE is authorized, the 5G DDNMF creates a UE context that contains the UE's subscription parameters obtained from the UDM. The UDM also provides to the 5G DDNMF the PLMN ID of the PLMN in which the UE is currently registered. If the UE context exists, the 5G DDNMF shall then check whether the UE is authorized for restricted 5G ProSe direct discovery model A announcing in the currently registered PLMN or in the local PLMN identified by the Announcing PLMN ID included in the DISCOVERY\_REQUEST message.

If the UE is authorized and the discovery entry ID included in the DISCOVERY\_REQUEST message is set to 0 then:

a) the 5G DDNMF shall check whether the UE is authorized to announce the RPAUID contained in the DISCOVERY\_REQUEST message. Optionally this can include checking with the ProSe application server as described in 3GPP TS 29.557 [19] to obtain the binding between the RPAUID and PDUID, and then verifying that the PDUID belongs to the requesting UE;

b) if the UE is authorized to announce the RPAUID, the ACE enabled indicator is set to "application-controlled extension enabled", the application level container is included in the DISCOVERY\_REQUEST message and the requested application uses application-controlled extension, the 5G DDNMF shall check whether the UE is authorized to use ACE. If the UE is authorized for ACE, the 5G DDNMF shall invoke the procedure described in 3GPP TS 29.557 [19] to check whether the UE is authorized to announce the requested RPAUID with application-defined suffix(es), and obtain suffix-related information from the ProSe application server. The 5G DDNMF shall then allocate a ProSe restricted code prefix and a value for validity timer T5062 to be used with the ProSe restricted code suffix(es) obtained from the ProSe application server for the given RPAUID as specified in 3GPP TS 29.557 [19]. The 5G DDNMF may take into account the requested timer if contained in the DISCOVERY\_REQUEST message when allocating validity timer T5062;

c) if the UE is authorized to announce the RPAUID, the ACE enabled indicator is set to "normal" in the DISCOVERY\_REQUEST message and the requested application does not use application-controlled extension, the 5G DDNMF shall allocate the corresponding ProSe restricted code and a value for validity timer T5062. The 5G DDNMF may take into account the requested timer if contained in the DISCOVERY\_REQUEST message when allocating validity timer T5062;

d) if the UE is authorized to announce the RPAUID, the ACE enabled indicator is set to "normal" in the DISCOVERY\_REQUEST message, the application level container is included in the DISCOVERY\_REQUEST and the requested application only uses application-controlled extension, the 5G DDNMF shall check whether the UE is authorized to use ACE. If the UE is authorized for ACE, the 5G DDNMF shall invoke the procedure described in 3GPP TS 29.557 [19] to check whether the UE is authorized to announce the requested RPAUID with application-defined suffix(es), and obtain suffix-related information from the ProSe application server. The 5G DDNMF shall then allocate a ProSe restricted code prefix and a value for validity timer T5062 to be used with the ProSe restricted code suffix(es) obtained from the ProSe application server for the given RPAUID as specified in 3GPP TS 29.557 [19] The 5G DDNMF may consider the requested timer if contained in the DISCOVERY\_REQUEST message when allocating validity timer T5062;

e) if the UE is authorized to announce the RPAUID, the ACE enabled indicator is set to "application-controlled-extension enabled" and the application level container is included in the DISCOVERY\_REQUEST message but the requested application does not use application-controlled extension, the 5G DDNMF shall allocate the corresponding ProSe restricted code and a value for validity timer T5062. The 5G DDNMF may consider the requested timer if contained in the DISCOVERY\_REQUEST message when allocating validity timer T5062; and

f) the 5G DDNMF associates the allocated ProSe restricted code or ProSe restricted code prefix with a new discovery entry in the UE's context, and starts timer T5063. The UDM also provides to the 5G DDNMF the PLMN ID of the PLMN in which the UE is currently registered. For a given ProSe restricted code, timer T5063 shall be longer than timer T5062. By default, the value of timer T5063 is 4 minutes greater than the value of timer T5062.

If the discovery entry ID included in the DISCOVERY\_REQUEST message is not set to 0 and if there is an existing discovery entry for this discovery entry ID value in the UE's context, the 5G DDNMF shall either update the discovery entry with a new validity timer T5062, or allocate a new ProSe restricted code or ProSe restricted code prefix for the requested RPAUID with a new validity timer T5062, restart timer T5063, and clear any existing on demand announcing enabled indicator. The 5G DDNMF may consider the requested timer if contained in the DISCOVERY\_REQUEST message when allocating validity timer T5062.

If the discovery entry ID contained in the DISCOVERY\_REQUEST message is not found in the UE context or there is no UE context in the 5G DDNMF, the 5G DDNMF shall behave as if the discovery entry ID included in the DISCOVERY\_REQUEST message was set to 0, and the 5G DDNMF shall allocate a new non-zero discovery entry ID for this entry.

If the announcing type is set to "on demand" in the DISCOVERY\_REQUEST message, the 5G DDNMF shall check if "on demand" announcing is authorized and enabled based on the application identity and the operator's policy. If "on demand" announcing is authorized and enabled, and there is no ongoing monitoring request for this RPAUID, then the 5G DDNMF shall set the on demand announcing enabled indicator to 1 for the corresponding discovery entry in the UE's context.

If a new UE context was created or an existing UE context was updated, and the UE is currently roaming or the announcing PLMN ID is included in the DISCOVERY\_REQUEST message, and the on demand announcing enabled indicator is not set to 1 for this discovery entry in the UE's context, the 5G DDNMF checks with the 5G DDNMF of the VPLMN or the local PLMN represented by the Announcing PLMN ID whether the UE is authorized for restricted 5G ProSe direct discovery model A announcing as described in 3GPP TS 29.555 [9].

The 5G DDNMF shall then send a DISCOVERY\_RESPONSE message containing a <restricted-announce-response> element with:

a) the transaction ID set to the value of the transaction ID received in the DISCOVERY\_REQUEST message from the UE;

b) if the on demand announcing enabled indicator is not set to 1 in the UE's context for this discovery entry, either the ProSe restricted code set to the ProSe restricted code or the ProSe restricted code prefix allocated by the 5G DDNMF, and optionally one or more ProSe restricted code suffix Ranges which contain the suffix(es) for the RPAUID received in the DISCOVERY\_REQUEST message;

c) a validity timer T5062 set to the T5062 timer value assigned by the 5G DDNMF to the ProSe restricted code;

d) the ACE enabled indicator set to "application-controlled extension enabled" if application-controlled extension is used, or "normal" if application-controlled extension is not used;

e) the code-sending security parameter containing the security-related information for the UE to protect the transmission of the ProSe restricted code;

f) the on demand announcing enabled indicator indicating whether the on demand announcing is enabled or not for this discovery entry if the announcing type is set to "on demand" in the DISCOVERY\_REQUEST message;

g) the discovery entry ID set to the ID of the discovery entry associated with this announce request in the UE's context;

h) the current time set to the current UTC-based time at the 5G DDNMF and the max offset; and

i) optionally, the PC5 security policies used for 5G ProSe direct link establishment procedure.

If timer T5063 expires, the 5G DDNMF shall remove the discovery entry associated with the corresponding RPAUID from the UE's context.

The 5G DDNMF uses the information (e.g. application identity) received from the UE in the DISCOVERY\_REQUEST message, UE identity in GBA or AKMA information related to TLS tunnel transporting the DISCOVERY\_REQUEST message, and other information for charging purposes as specified in 3GPP TS 32.277 [r32277].

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

#### 6.2.4.3 Monitor request procedure accepted by the 5G DDNMF

Upon receiving a DISCOVERY\_REQUEST message with the command set to "monitor", if the requested timer is included in the DISCOVERY\_REQUEST message and the requested timer is set to 0, the 5G DDNMF shall check whether there is an existing UE context containing the discovery entry identified by the discovery entry ID included in the DISCOVERY\_REQUEST message. If the discovery entry exists in the UE context, the 5G DDNMF shall remove the discovery entry identified by the discovery entry ID from the UE's context. When the associated ProSe application ID is PLMN-specific and that PLMN ID indicated by the ProSe application ID is not the same as that of the PLMN to which the 5G DDNMF belongs, the 5G DDNMF shall inform the 5G DDNMF in the PLMN indicated by the ProSe application ID to remove the corresponding discovery entry as specified in 3GPP TS 29.555 [9]. Then the 5G DDNMF shall send a DISCOVERY\_RESPONSE message containing a <response-monitor> element with:

a) the transaction ID set to the value of the transaction ID received in the DISCOVERY\_REQUEST message; and

b) the discovery entry ID set to the value of the discovery entry ID received in the DISCOVERY\_REQUEST message.

Upon receiving a DISCOVERY\_REQUEST message with the command set to "monitor", if the requested timer is not included in the DISCOVERY\_REQUEST message, the 5G DDNMF shall perform the following procedure.

The 5G DDNMF shall check that the application corresponding to the application identity contained in the DISCOVERY\_REQUEST message is authorized for open 5G ProSe direct discovery monitoring. If the application is authorized for open 5G ProSe direct discovery monitoring, the 5G DDNMF checks whether there is an existing context for the UE associated with the requested ProSe application ID.

If there is no associated UE context, the 5G DDNMF checks with the UDM whether the UE is authorized for open 5G ProSe direct discovery monitoring as described in 3GPP TS 29.503 [10]. The UDM provides to the 5G DDNMF the PLMN ID of the PLMN in which the UE is currently registered. If the subscription check indicates that the UE is authorized, the 5G DDNMF creates a new context for the UE and a new discovery entry identified by a non-zero value discovery entry ID which is associated with the requested ProSe application ID.

If the ACE enabled indicator in the DISCOVERY\_REQUEST message is included and set to "application-controlled extension enabled" and the requested application uses application-controlled extension, the 5G DDNMF shall check whether the UE is authorized to use ACE. If the UE is authorized for ACE, the 5G DDNMF shall also use the procedure described in 3GPP TS 29.557 [19] to obtain the mask(s) for monitoring the ProSe application code suffix (es) corresponding to the requested ProSe application ID.

If the PLMN ID indicated in the ProSe application ID is PLMN-Specific and that PLMN ID is not the same as that of the PLMN to which the 5G DDNMF belongs, then the 5G DDNMF executes the procedures defined in 3GPP TS 29.555 [9] to obtain the discovery filter(s) for the ProSe application ID. Otherwise, the 5G DDNMF shall allocate one or more discovery filters for the requested ProSe application ID if it is known to the 5G DDNMF, and at least one corresponding valid ProSe application code or ProSe application code prefix is available in the 5G DDNMF. Each discovery filter consists of a ProSe application code, one or more ProSe application masks, and a TTL timer T5064. If application-controlled extension is used, the allocated Discovery Filter shall be applicable to match both prefix and suffix portions of the ProSe application code.

If the requested ProSe application ID is country-specific or global or PLMN-specific as defined respectively in clause 24.2 of 3GPP TS 23.003 [12], the 5G DDNMF shall allocate the discovery filter which contains ProSe application code and ProSe application mask(s) in the corresponding scope. If the ProSe application ID is country-specific or global, the ProSe application mask(s) enclosed in the discovery filter hides the PLMN ID part correspondingly and the temporary identity part is taken from the data structure corresponding to the global or country-wide ProSe application ID namespace, as specified in clause 24.3 of 3GPP TS 23.003 [12]. If the requested ProSe application ID is PLMN-specific, the 5G DDNMF shall allocate one or more PLMN-specific discovery filters. Each of these discovery filters shall contain a PLMN-specific Prose application code and the ProSe application mask(s) whose PLMN ID portion shall be set such that when the mask is applied to the ProSe application code, the outcome matches the full PLMN ID of that specific PLMN.

After the discovery filter(s) are allocated, the 5G DDNMF then associates the discovery filters with the new discovery entry in the UE context and starts timer T5065 assigned for each discovery filter. For a given discovery filter timer T5065 shall be longer than timer T5064. By default, the value of timer T5065 is 4 minutes greater than the value of timer T5064.

If there is an existing context for the UE that contains the UE's subscription parameters obtained from the UDM, but no discovery entry identified by the discovery entry ID contained in the DISCOVERY\_REQUEST message, the 5G DDNMF shall check whether the UE is authorized for ProSe direct discovery monitoring. If the UE is authorized, the 5G DDNMF shall allocate the discovery filter as specified above.

After the discovery filter is allocated, the 5G DDNMF then associates the discovery filter with a new discovery entry identified by a non-zero value discovery entry ID in the UE context, and starts timer T5065 assigned for each discovery filter.

Similarly, if there is an existing context and a discovery entry identified by the discovery entry ID contained in the DISCOVERY\_REQUEST message for the UE associated with the requested ProSe application ID, the 5G DDNMF updates the content of discovery filter(s), associate the discovery entry with the updated discovery filter(s) and restart timer T5065 for each filter. The update of a discovery filter content includes setting new TTL timer(s) and if necessary, assigning new ProSe application code or ProSe application code prefix and ProSe application mask(s).

Then the 5G DDNMF shall send a DISCOVERY\_RESPONSE message containing a <response-monitor> element with:

a) the transaction ID set to the value of the transaction ID received in the DISCOVERY\_REQUEST message from the UE;

b) the discovery entry ID set to the identifier associated with the discovery entry;

c) if the ACE enabled indicator was included by the UE in the DISCOVERY\_REQUEST message, the ACE enabled indicator set to:

1) "application-controlled extension enabled" if application-controlled extension is used; or

2) "normal" if application-controlled extension is not used;

d) one or more discovery filters allocated by the 5G DDNMF(s) for the ProSe application ID received in the DISCOVERY\_REQUEST message from the UE; and

e) the current time set to the current UTC-based time at the 5G DDNMF and the max offset.

If timer T5065 expires, the 5G DDNMF shall remove the UE's association with the corresponding discovery filter. Furthermore, the 5G DDNMF shall remove the discovery entry from the UE's context if there is no discovery filter corresponding to the ProSe application ID.

The 5G DDNMF uses the information (e.g. application identity) received from the UE in the DISCOVERY\_REQUEST message, UE identity in GBA or AKMA information related to TLS tunnel transporting the DISCOVERY\_REQUEST message, and other information for charging purposes as specified in 3GPP TS 32.277 [r32277].

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

#### 6.2.5.3 Monitor request procedure accepted by the 5G DDNMF

Upon receiving a DISCOVERY\_REQUEST message with the command set to "monitor" and the discovery type set to "Restricted discovery", if the requested timer is included in the DISCOVERY\_REQUEST message and the requested timer is set to 0, the 5G DDNMF shall check whether there is an existing UE context containing the discovery entry identified by the discovery entry ID included in the DISCOVERY\_REQUEST message. If the discovery entry exists in the UE context, the 5G DDNMF shall remove the discovery entry identified by the discovery entry ID from the UE's context. For each of the PDUIDs corresponding to the target RPAUIDs contained the restricted discovery filters in the discovery entry, if the PDUID is PLMN-specific and that PLMN ID indicated by the PDUID is not the same as that of the PLMN to which the 5G DDNMF belongs, the 5G DDNMF shall inform the 5G DDNMF in the PLMN indicated by the PDUID to remove the corresponding discovery entry as specified in 3GPP TS 29.555 [9].

Upon receiving a DISCOVERY\_REQUEST message with the command set to "monitor" and the discovery type set to "Restricted discovery", if the requested timer is not included in the DISCOVERY\_REQUEST message, the 5G DDNMF shall perform the following procedure.

The 5G DDNMF shall check that the application corresponding to the application identity contained in the DISCOVERY\_REQUEST message is authorized for ProSe direct discovery model A monitoring. If the application is authorized for restricted 5G ProSe direct discovery model A monitoring, the 5G DDNMF shall check whether there is an existing UE context.

If there is no associated UE context, the 5G DDNMF checks with the UDM whether the UE is authorized for restricted 5G ProSe direct discovery model A monitoring as described in 3GPP TS 29.503 [10]. The UDM provides to the 5G DDNMF the PLMN ID of the PLMN in which the UE is currently registered. If the subscription check indicates that the UE is authorized, the 5G DDNMF creates a new UE context containing the UE's subscription parameters obtained from the UDM.

If the discovery entry ID included in the DISCOVERY\_REQUEST is set to 0 then:

a) the 5G DDNMF shall use the procedure described in 3GPP TS 29.557 [19] to pass the application level container included in the DISCOVERY\_REQUEST message to the ProSe application server and obtain a list of PDUID(s) , an application level container and optionally Metadata Indicator(s) corresponding to the authorized target RPAUID(s) from the ProSe application server;

b) if the ACE enabled indicator in the DISCOVERY\_REQUEST message is set to "application-controlled extension enabled" and the requested application uses application-controlled extension, the 5G DDNMF shall check whether the UE is authorized to use ACE. If the UE is authorized for ACE, the 5G DDNMF shall also use the procedure described in 3GPP TS 29.557 [19] to obtain the mask(s) for monitoring a ProSe restricted suffix pool corresponding to each of the Target RPAUIDs.

NOTE 1: The ProSe application server can reject the request for some of the target RPAUIDs included in the application level container in the DISCOVERY\_REQUEST message because they are ineligible to be monitored by the requesting UE. Depending on the operator policy and application layer permissions, it is possible that only a subset of valid RPAUIDs is authorized by the ProSe application server.

c) for each of the PDUIDs corresponding to an authorized target RPAUID, if the PLMN ID of the PDUID is not the same as that of the PLMN to which the 5G DDNMF belongs, then the 5G DDNMF executes the procedures defined in 3GPP TS 29.555 [9] to obtain the ProSe restricted code or ProSe restricted code prefix for the target RPAUID and creates restricted discovery filter(s). Otherwise, for each target RPAUID, the 5G DDNMF shall allocate one or more restricted discovery filter(s). If the ACE enabled indicator in the DISCOVERY\_REQUEST message does not match the ACE configuration in the 5G DDNMF or ProSe application server for this application, the ACE configuration in the 5G DDNMF or ProSe application server shall be used to create Restricted discovery filter(s). Each Restricted discovery filter consists of a ProSe restricted code, one or more masks, a TTL timer T5066, optionally the target RPAUID, optionally a metadata indicator and optionally metadata associated with this RPAUID;

d) the 5G DDNMF associates the restricted discovery filters with a new discovery entry in the UE's context; and

e) the 5G DDNMF starts timer T5067 assigned for each Restricted discovery filter. For a given restricted discovery filter, timer T5067 shall be longer than timer T5066. By default, the value of timer T5067 is 4 minutes greater than the value of timer T5066.

NOTE 2: For each target RPAUID, the 5G DDNMF either allocates one restricted discovery filter for full-matching the ProSe restricted code assigned to this RPAUID, or allocates one or more restricted discovery filter(s) for matching the ProSe restricted code prefix and suffix pool assigned to this RPAUID.

If the discovery entry ID included in the DISCOVERY\_REQUEST message is not set to 0 and if there is an existing discovery entry for this discovery entry ID in the UE's context, the 5G DDNMF shall check whether the UE is authorized for restricted 5G ProSe direct discovery model A monitoring. If the UE is authorized, the 5G DDNMF shall process the request as above-mentioned and update this discovery entry with the contents of the restricted discovery filter(s) associated with this discovery entry and restart timer T5067(s) for each filter. The update of a restricted discovery filter content includes setting new TTL timer(s) and if necessary, obtaining new ProSe restricted code and ProSe restricted mask(s) via the procedure defined in 3GPP TS 29.555 [9].

If the discovery entry ID contained in the DISCOVERY\_REQUEST message is not found in the UE context or there is no UE context in the 5G DDNMF, the 5G DDNMF shall behave as if the discovery entry ID included in the DISCOVERY\_REQUEST message was set to 0, and the 5G DDNMF shall allocate a new non-zero discovery entry ID for this entry.

Then the 5G DDNMF shall send a DISCOVERY\_RESPONSE message containing a <restricted-monitor-response> element with:

a) the transaction ID set to the value of the transaction ID received in the DISCOVERY\_REQUEST message from the UE;

b) one or more restricted discovery filter(s) allocated by the 5G DDNMF(s) for the authorized target RPAUID(s);

c) the ACE enabled indicator set to "application-controlled extension enabled" if application-controlled extension is used, or "normal" if application-controlled extension is not used;

d) the discovery entry ID set to the ID of the discovery entry associated with this monitor request;

e) the application level container set to the application-level data received from the ProSe application server;

f) the coding-receiving security parameter containing the security-related information needed by the UE to undo the protection applied by the announcing UE;

g) the current time set to the current UTC-based time at the 5G DDNMF and the max offset; and

h) optionally, the PC5 security policies used for 5G ProSe direct link establishment procedure.

If T5067 expires, the 5G DDNMF shall remove the corresponding restricted discovery filter from the discovery entry in the UE's context. Furthermore, if there are no valid restricted discovery filters associated with the discovery entry (e.g., all restricted discovery filters have expired), the 5G DDNMF shall delete the discovery entry from the UE's context.

The 5G DDNMF uses the information (e.g. application identity) received from the UE in the DISCOVERY\_REQUEST message, UE identity in GBA or AKMA information related to TLS tunnel transporting the DISCOVERY\_REQUEST message, and other information for charging purposes as specified in 3GPP TS 32.277 [r32277].

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

#### 6.2.6.3 Discoveree request procedure accepted by the 5G DDNMF

Upon receiving a DISCOVERY\_REQUEST message, the 5G DDNMF shall check that the application corresponding to the application identity contained in the DISCOVERY\_REQUEST message is authorised for restricted 5G ProSe direct discovery model B discoveree operation. If the application is authorised for restricted 5G ProSe direct discovery model B discoveree operation, the 5G DDNMF shall check whether there is an existing context for the UE.

If there is no associated UE context, the 5G DDNMF checks with the UDM whether the UE is authorised for restricted 5G ProSe direct discovery model B discoveree operation as described in 3GPP TS 29.503 [10]. If the check indicates that the UE is authorised, the 5G DDNMF creates a UE context that contains the UE's subscription parameters obtained from the UDM. The UDM also provides to the 5G DDNMF the PLMN ID of the PLMN in which the UE is currently registered.

If the UE context exists, the 5G DDNMF shall check whether the UE is authorized for restricted 5G ProSe direct discovery model B discoveree operation in the currently registered PLMN or the local PLMN identified by the Announcing PLMN ID included in the DISCOVERY\_REQUEST message.

If the UE is authorized and the discovery entry ID included in the DISCOVERY\_REQUEST message is set to 0 then:

a) the 5G DDNMF shall check whether the UE is authorised to announce the RPAUID contained in the DISCOVERY\_REQUEST message. Optionally this can include checking with the ProSe application server as described in 3GPP TS 29.557 [19] to obtain the binding between the RPAUID and PDUID, and then verifying that the PDUID belongs to the requesting UE;

b) if the UE is authorised to announce the RPAUID, the 5G DDNMF shall allocate the corresponding ProSe response code and ProSe query code for the RPAUID. It shall also allocate discovery query filter(s) based on the allocated ProSe query code. Then it shall assign a value for validity timer T5068, which is associated with the ProSe response code, ProSe query code and discovery query filter(s); and

c) the 5G DDNMF associates the allocated ProSe response code, ProSe query code, and discovery query filter with a new discovery entry ID in the UE context, and starts timer T5069. For a given ProSe response code, timer T5069 shall be longer than timer T5068. By default, the value of timer T5069 is 4 minutes greater than the value of timer T5068.

If the discovery entry ID included in the DISCOVERY\_REQUEST message is not set to 0 and if there is an existing discovery entry for this discovery entry ID value in the UE context, the 5G DDNMF shall either update the discovery entry with a new validity timer T5068, or allocate a new ProSe response code, ProSe query code and the discovery query filter(s) for the requested RPAUID with a new validity timer T5068, restart timer T5069.

If the discovery entry ID contained in the DISCOVERY\_REQUEST message is not found in the UE context or there is no UE context in the 5G DDNMF, the 5G DDNMF shall behave as if the discovery entry ID included in the DISCOVERY\_REQUEST message was set to 0, and the 5G DDNMF shall allocate a new non-zero discovery entry ID for this entry.

If a new UE context was created or an existing UE context was updated, and the UE is currently roaming or the Announcing PLMN ID is included in the DISCOVERY\_REQUEST message, the 5G DDNMF checks with the 5G DDNMF of the VPLMN or the local PLMN identified by the Announcing PLMN ID whether the UE is authorised for restricted 5G ProSe direct discovery model B discoveree operation as described in 3GPP TS 29.555 [9].

The 5G DDNMF shall then send a DISCOVERY\_RESPONSE message containing a <restricted-discoveree-response> element with:

a) the transaction ID set to the value of the transaction ID received in the DISCOVERY\_REQUEST message from the UE;

b) the ProSe response code set to the ProSe response code allocated for the RPAUID received in the DISCOVERY\_REQUEST message;

c) one or more discovery query filters set to the ProSe query filter(s) used to match a query for the RPAUID received in the DISCOVERY\_REQUEST message;

d) a validity timer T5068 set to the T5068 timer value assigned by the 5G DDNMF to the ProSe response code and the discovery query filter(s);

e) the code-sending security parameter containing the security-related information for the discoveree UE to protect the transmission of the ProSe response code;

f) the code-receiving security parameter containing the security-related information needed by the discoveree UE to undo the protection applied by the discoverer UE;

g) the discovery entry ID set to the ID of the discovery entry associated with this discoveree request in the UE context;

h) the current time set to the current UTC-based time at the 5G DDNMF and the max offset; and

i) optionally, the PC5 security policies used for 5G ProSe direct link establishment procedure.

If timer T5069 expires, the 5G DDNMF shall remove the discovery entry associated with the corresponding RPAUID from the UE's context.

The 5G DDNMF uses the information (e.g. application identity) received from the UE in the DISCOVERY\_REQUEST message, UE identity in GBA or AKMA information related to TLS tunnel transporting the DISCOVERY\_REQUEST message, and other information for charging purposes as specified in 3GPP TS 32.277 [r32277].

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

#### 6.2.7.3 Discoverer request procedure accepted by the 5G DDNMF

Upon receiving a DISCOVERY\_REQUEST message, the 5G DDNMF shall check that the application corresponding to the application identity contained in the DISCOVERY\_REQUEST message is authorised for restricted 5G ProSe direct discovery model B discoverer operation. If the application is authorised for restricted 5G ProSe direct discovery model B discoverer operation, the 5G DDNMF shall check whether there is an existing context for the UE.

If there is no associated UE context, the 5G DDNMF checks with the UDM whether the UE is authorised for restricted 5G ProSe direct discovery model B discoverer operation as described in 3GPP TS 29.503 [10]. If the check indicates that the UE is authorised, the 5G DDNMF creates a UE context that contains the UE's subscription parameters obtained from the UDM. The UDM also provides to the 5G DDNMF the PLMN ID of the PLMN in which the UE is currently registered.

If the UE context exists, the 5G DDNMF shall check whether the UE is authorized for restricted 5G ProSe direct discovery model B discoveree operation in the currently registered PLMN or the local PLMN identified by the Announcing PLMN ID included in the DISCOVERY\_REQUEST message.

If the UE is authorized and the discovery entry ID included in the DISCOVERY\_REQUEST message is set to 0 then:

a) the 5G DDNMF uses the procedure described in 3GPP TS 29.557 [19] to pass the application level container included in the DISCOVERY\_REQUEST message to the ProSe application server and obtain a list of PDUID(s) corresponding to the authorised target RPAUID(s) from the ProSe application server;

b) for each of the PDUIDs corresponding to an authorised target RPAUID:

1) if the PLMN ID of the PDUID is not the same as that of the PLMN to which the 5G DDNMF belongs, then the 5G DDNMF executes the procedures defined in 3GPP TS 29.555 [9] to obtain the ProSe query code, the ProSe response code, the associated validity timer T5070, and optionally metadata associated with this target RPAUID. Otherwise, the 5G DDNMF shall locate the discoveree UE context and retrieve the corresponding ProSe query code and ProSe response code and the validity timer T5070, and optionally metadata associated with this RPAUID. Then, the 5G DDNMF in the HPLMN builds one or more discovery response filter(s) based on the respective ProSe response code, and associate the discovery response filter(s) and ProSe query code with a new validity timer T5071 based on the remaining value of T5071.

NOTE 1: If the 5G DDNMF cannot retrieve the corresponding discoveree UE context for a target RPAUID, e.g., the target RPAUID has not yet been requested to be discovered by Model B in a discoveree request procedure, or the discoveree UE context expires, the 5G DDNMF can skip the processing of this target RPAUID.

NOTE 2: The 5G DDNMF can choose the value of T5070 to be longer than the remaining value of T5069, so that the discoverer UE sends a new discoverer request for renewing the query-related information no earlier than the discoveree UE renewing its own ProSe response code with the 5G DDNMF.

2) the 5G DDNMF associates the ProSe query code and corresponding discovery response filter(s), target RPAUID, and optionally metadata associated with the target RPAUID with a new discovery entry in the discoverer UE's context; and

c) the 5G DDNMF starts timer T5071 assigned for each ProSe query code and discovery response filter(s) (of each target RPAUID) under this discovery entry of the discoverer UE context. For a given ProSe query code and the corresponding discovery response filter(s), timer T5071 shall be longer than timer T5070. By default, the value of timer T5071 is 4 minutes greater than the value of timer T5070.

If the discovery entry ID included in the DISCOVERY\_REQUEST message is not set to 0 and if there is an existing discovery entry for this discovery entry ID value in the UE's context, the 5G DDNMF shall still process the above steps, but update the discovery entry instead of creating a new discovery entry.

If the discovery entry ID contained in the DISCOVERY\_REQUEST message is not found in the UE context or there is no UE context in the 5G DDNMF, the 5G DDNMF shall behave as if the discovery entry ID included in the DISCOVERY\_REQUEST message was set to 0, and the 5G DDNMF shall allocate a new non-zero discovery entry ID for this entry.

If a new UE context was created or an existing UE context was updated, the UE is currently roaming or the announcing PLMN ID is included in the DISCOVERY\_REQUEST message, the 5G DDNMF checks with the 5G DDNMF of the VPLMN or the local PLMN indicated by the announcing PLMN ID whether the UE is authorised for restricted 5G ProSe direct discovery model B discoverer operation as described in 3GPP TS 29.555 [9].

The 5G DDNMF shall then send a DISCOVERY\_RESPONSE message containing a <restricted-discoverer-response> element with:

a) the transaction ID set to the value of the transaction ID received in the DISCOVERY\_REQUEST message from the UE;

b) one or more Subquery Result information elements, each of which includes:

1) a target RPAUID;

2) the ProSe query code set to the ProSe query code for the target RPAUID;

3) one or more discovery response filters which are set to the discovery response filter(s) used to match a potential ProSe response code responding to the ProSe query code;

4) a validity timer T5070 set to the T5070 timer value assigned by the 5G DDNMF to the ProSe query code and the discovery response filter(s);

5) optionally, the metadata associated with the target RPAUID;

6) the code-sending security parameter containing the security-related information needed by the discoverer UE to protect the transmission of ProSe query code; and

7) the code-receiving security parameter containing the security-related information needed by the discoverer UE to undo the protection applied by the discoveree UE;

c) the discovery entry ID set to the ID of the discovery entry associated with this announce request in the UE context;

d) the current time set to the current UTC-based time at the 5G DDNMF and the max offset; and

e) optionally, the PC5 security policies used for 5G ProSe direct link establishment procedure.

If T5071 expires, the 5G DDNMF shall remove the corresponding ProSe query code and ProSe response filter(s) from the discovery entry associated with the discoverer UE's context.

The 5G DDNMF uses the information (e.g. application identity) received from the UE in the DISCOVERY\_REQUEST message, UE identity in GBA or AKMA information related to TLS tunnel transporting the DISCOVERY\_REQUEST message, and other information for charging purposes as specified in 3GPP TS 32.277 [r32277].

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

#### 6.2.8.3 Match report procedure accepted by the 5G DDNMF

Upon receiving a MATCH\_REPORT message, the 5G DDNMF shall check whether there is an existing context for the UE identified by its SUPI. If there is no associated UE context, the 5G DDNMF checks with the UDM whether the UE is authorized for open 5G ProSe direct discovery monitoring as described in 3GPP TS 29.503 [10].

The 5G DDNMF shall also check the PLMN ID in the ProSe application code received from the UE. If the PLMN ID in the ProSe application code is not the same of that of the PLMN to which the 5G DDNMF belongs, the 5G DDNMF shall execute the procedures defined in 3GPP TS 29.555 [9]. Otherwise, the 5G DDNMF shall check whether the received ProSe application code is authorized to be transmitted on the monitored PLMN indicated in the Monitored PLMN ID in the received message.

If the ProSe application code is PLMN-specific, the 5G DDNMF shall verify if the PLMN ID in the ProSe application code is the same as the PLMN of the 5G DDNMF. If so, the 5G DDNMF shall map the ProSe application code to the corresponding ProSe application ID from the PLMN-specific database. If the ProSe application code is country-specific, as specified in clause 24.3 of 3GPP TS 23.003 [4], the 5G DDNMF shall check whether the MCC of the PLMN ID part of the ProSe application code corresponds to the country of the 5G DDNMF. If so, the 5G DDNMF shall map the ProSe application code to the corresponding ProSe application ID from the country-specific database. If the ProSe application code is global as specified in clause 24.3 of 3GPP TS 23.003 [4], the 5G DDNMF shall map the ProSe application code to the corresponding ProSe application ID from the global database. If the ProSe application code contains a ProSe application code prefix, the 5G DDNMF maps the ProSe application code prefix to the corresponding ProSe application ID.

The 5G DDNMF shall analyze the ProSe application code received from the UE and determine the validity of the ProSe application code.

NOTE: This might require the 5G DDNMF to execute procedures defined in 3GPP TS 29.555 [9].

The 5G DDNMF shall check if the MIC value and its corresponding UTC-based counter are valid, as defined in 3GPP TS 33.503 [34].

The 5G DDNMF uses the information (e.g. ProSe application code, monitored PLMN ID, VPLMN ID if included) received from the UE in the DISCOVERY\_REQUEST message, UE identity in GBA or AKMA information related to TLS tunnel transporting the DISCOVERY\_REQUEST message, and other information for charging purposes as specified in 3GPP TS 32.277 [r32277].

If the outcome of above processing is successful, the 5G DDNMF shall send a MATCH\_REPORT\_ACK message containing a <match-ack> element with:

a) the transaction ID set to the value of the transaction ID received in the MATCH\_REPORT message from the UE;

b) the ProSe application ID set to the ProSe application ID provided by the 5G DDNMF and corresponding to the ProSe application code contained in the MATCH\_REPORT message;

c) the validity timer T5072 set to indicate for how long this ProSe application ID is valid;

d) the match report refresh timer T5074 set to indicate for how long the UE will wait before sending a new match report for this ProSe application code; and

e) optionally, the metadata set to the metadata information associated with the ProSe application code received in the MATCH\_REPORT message and set the metadata index mask to the metadata index mask allocated by the 5G DDNMF for the ProSe application code received in the MATCH\_REPORT message, if the UE has set the metadata flag to indicate that it wishes to receive metadata information associated with the ProSe application ID.

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

#### 6.2.9.3 Match report procedure accepted by the 5G DDNMF

Upon receiving a MATCH\_REPORT message, the 5G DDNMF shall check whether there is an existing context for the UE identified by its SUPI.

The 5G DDNMF shall analyze the ProSe restricted code received from the UE in the MATCH\_REPORT message. If the MIC value and its corresponding UTC-based counter are included, the 5G DDNMF shall check whether the MIC value and the UTC-based counter are valid and within the acceptable range respectively as defined in 3GPP TS 33.503 [34]. The 5G DDNMF shall then check in the UE context if the ProSe restricted code matches any restricted discovery filter(s) allocated for the particular application identified by the application identity received in the MATCH\_REPORT message. If such a discovery filter exists, the target RPAUID associated with the filter(s) shall be identified as the corresponding RPAUID for this code. Optionally, the 5G DDNMF may further invoke the procedure defined in 3GPP TS 29.503 [10] to verify if the target RPAUID is allowed to be discovered by the RPAUID of the requesting UE that has sent the MATCH\_REPORT message, or to retrieve metadata associated for the target RPAUID if metadata flag is set to "True" in the MATCH\_REPORT message and the 5G DDNMF does not have the latest metadata.

If the outcome of the above processing is successful, the 5G DDNMF shall send a MATCH\_REPORT\_ACK message containing a <restricted-match-ack> element with:

a) the transaction ID set to the value of the transaction ID received in the MATCH\_REPORT message from the UE;

b) the RPAUID set to the target RPAUID retrieved from the UE context at the 5G DDNMF which corresponds to the ProSe restricted code contained in the MATCH\_REPORT message;

c) the validity timer T5076 set to indicate for how long this ProSe restricted code is valid;

d) the match report refresh timer T5077 to indicate for how long the UE will wait before sending a new match report for this ProSe restricted code if the MIC value and the UTC-based counter are included in the MATCH\_REPORT message; and

e) the metadata set to the associated metadata information, if there exists metadata information associated with this target RPAUID and the metadata flag is set to "True" in the MATCH\_REPORT message.

If the corresponding PDUID of the target RPAUID does not belong to the HPLMN of the requesting UE, the 5G DDNMF may optionally invoke the procedure defined in 3GPP TS 29.555 [9] to inform the 5G DDNMF of the announcing UE about the match event.

The 5G DDNMF uses the information (e.g. application identity) received from the UE in the MATCH\_REPORT message, UE identity in GBA or AKMA information related to TLS tunnel transporting the MATCH\_REPORT message, and other information for charging purposes as specified in 3GPP TS 32.277 [r32277].

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#### 6.2.10.3 Match report procedure accepted by the 5G DDNMF

Upon receiving a MATCH\_REPORT message, the 5G DDNMF shall check whether there is an existing discoverer UE context for the UE identified by its SUPI.

The 5G DDNMF shall analyze the ProSe response code received from the UE in the MATCH\_REPORT message. If the MIC value and its corresponding UTC-based counter are included, the 5G DDNMF shall check whether the MIC value and the UTC-based counter are valid and within the acceptable range respectively, as defined in 3GPP TS 33.503 [34]. The 5G DDNMF shall then check in the UE context if the ProSe response code matches any discovery response filter(s) allocated for the particular application identified by the application identity received in the MATCH\_REPORT message. If such a discovery filter exists, the target RPAUID associated with the filter(s) shall be identified as the corresponding RPAUID for this code. Optionally, the 5G DDNMF may further invoke the procedure defined in 3GPP TS 29.503 [10] to verify if the target RPAUID is allowed to be discovered by the RPAUID of the requesting UE that has sent the MATCH\_REPORT message, or to retrieve metadata associated for the target RPAUID if metadata flag is set to "True" in the MATCH\_REPORT message and the 5G DDNMF does not have the latest metadata.

If the outcome of the above processing is successful, the 5G DDNMF shall send a MATCH\_REPORT\_ACK message containing a <restricted-match-ack> element with:

a) the transaction ID set to the value of the transaction ID received in the MATCH\_REPORT message from the UE;

b) the RPAUID set to the target RPAUID retrieved from the UE context at the 5G DDNMF which corresponds to the ProSe response code contained in the MATCH\_REPORT message;

c) the validity timer T5076 set to indicate for how long the RPAUID is matched;

d) the match report refresh timer T5077 set to indicate for how long the UE will wait before sending a new match report for this ProSe response code if the MIC value and the UTC-based counter are included in the MATCH\_REPORT message; and

e) optionally, the metadata set to the associated metadata information, if there exists metadata information associated with this target RPAUID.

If the corresponding PDUID of the target RPAUID does not belong to the HPLMN of the requesting UE, the 5G DDNMF may optionally invoke the procedure defined in 3GPP TS 29.555 [9] to inform the 5G DDNMF of the discoveree UE about the match event.

The 5G DDNMF uses the information (e.g. application identity) received from the UE in the MATCH\_REPORT message, UE identity in GBA or AKMA information related to TLS tunnel transporting the MATCH\_REPORT message, and other information for charging purposes as specified in 3GPP TS 32.277 [r32277].

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