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650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
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In the present document, modal verbs have the following meanings:

- shall** indicates a mandatory requirement to do something
- shall not** indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

- should** indicates a recommendation to do something
- should not** indicates a recommendation not to do something
- may** indicates permission to do something
- need not** indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

- can** indicates that something is possible
- cannot** indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

- will** indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document
- will not** indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document
- might** indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

Introduction

1 Scope

The present document specifies the application layer architecture and procedures to support the MMTel service, and also specifies the service enabler layer capability exposure procedures and related APIs for enablement aspects of MMTel service

This work takes into consideration the existing stage 1 and stage 2 work within 3GPP related to MMTel service specified in 3GPP TS 22.261 [2], 3GPP TS 23.228 [3] and 3GPP TS 26.114 [4].

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 22.261: "Service requirements for the 5G system".
- [3] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS)".
- [4] 3GPP TS 26.114: "IP Multimedia Subsystem (IMS); Multimedia Telephony; Media handling and interaction"
- [5] GSMA NG.134: "IMS Data Channel, Version 1.0".
- [6] 3GPP TS 23.434: "Service Enabler Architecture Layer for Verticals (SEAL)".
- [7] OMA-TS-REST_NetAPI_ThirdPartyCall-V1_0-20130212-C: "RESTful Network API for Third Party Call".
- [8] OMA-AD-IMS-V1_0-20050809-A: "Utilization of IMS capabilities Architecture".
- [9] 3GPP TS 23.222: "Functional architecture and information flows to support Common API Framework for 3GPP Northbound APIs; Stage 2".
- [10] IETF RFC 7989 (October 2016): "End-to-End Session Identification in IP-Based Multimedia Communication Networks".
- [11] OMA-TS-REST_NetAPI_Common-V1_0-20180116-A: "Common definitions for RESTful Network APIs".
- [12] 3GPP TS 23.502: " Procedures for the 5G System (5GS); Stage 2".
- ...
- [x] <doctype> <#>[([up to and including]{yyyy[-mm]|V<a[.b[.c]]>}[onwards])]: "<Title>".

3 Definitions of terms, symbols and abbreviations

3.1 Terms

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

MMTel service: An MTSI service as specified in 3GPP TS 26.114 [4] with or without Data channel support.

Root application: A root page of the Data Channel Application that the subscriber could select and use, as specified in GSMA NG.134 [5].

For the purposes of the present document, the following terms and definitions given in 3GPP TS 26.114 [4] apply:

DCMTSI client

DCMTSI client in terminal

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.228 [3] apply:

Application data channel

Bootstrap data channel

Data channel application

3.2 Symbols

Void

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

DC	Data Channel
DCAR	Data Channel Application Repository
DCMTSI	Data Channel Multimedia Telephony Service for IMS
DCSF	Data Channel Signalling Function
IMS	IP Multimedia Core Network Subsystem
OMA	Open Mobile Alliance
SIP	Session Initiation Protocol

4 Overview

The MMTel Enabler provides the Application enablement for MMTel service, mainly including the following aspects:

- 1 DC Application management: providing the management capabilities of Data Channel Applications and data channel application profile to PLMN operators which provide MMTel service with IMS Data Channel
- 2 DC Application downloading control: providing the capabilities to control the downloading of Data Channel applications on UE to PLMN operators which provide MMTel service with IMS Data Channel. The downloading is controlled by the data channel application profile downloaded to the UE.
- 3 usage of MMTel service: providing capabilities to application providers/Vertical service provider to use MMTel service including:
 - a. call between application and DCMTSI client:
 - b. Third-Party Call;

- c. Person-to-Application (P2A) Application Data Channel; and
- d. Application-to-Person (A2P) Application Data Channel.

The DC Application management is specified in clause 8.2, DC Application downloading control is specified in clause 8.3, and usage of MMTel service is specified in clause 8.4.

5 Architectural requirements

5.1 General

This clause specifies architectural requirements for MMTel Enabler.

5.2 Data Channel Application management requirements

5.2.1 Description

This clause specifies the Data Channel Application management requirements for MMTel Enabler.

5.2.2 Requirements

[AR-5.2.2-a] The MMTel Enabler shall provide capability for MMTel service provider to upload, update and delete the Data Channel applications on DCAR via MMTel Enabler .

[AR-5.2.2-b] The MMTel Enabler shall provide capability for MMTel service provider to configure, update, get and delete the Data Channel application profile on DCAR via MMTel Enabler server.

[AR-5.2.2-c] The MMTel Enabler shall provide capability for Data Channel application provider to get the Data Channel application profile information.

[AR-5.2.2-d] The MMTel Enabler shall provide capability to control the downloading of data channel applications on UE by providing data channel application profile to UE.

5.3 MMTel service enablement requirements

5.3.1 Description

This clause specifies the MMTel service enablement requirements for MMTel Enabler.

5.3.2 Requirements

[AR-5.3.2-a] The MMTel Enabler shall provide capability for application without IMS capabilities to establish, modify or terminate a call with an Application supporting MMTel service.

[AR-5.3.2-b] The MMTel Enabler shall provide capability for application providers/Vertical service provider to use MMTel service including establish, modify or terminate a:

- a. call between application and DCMTSI client:
- b. Third-Party Call;
- c. Person-to-Application (P2A) Application Data Channel; and
- d. Application-to-Person (A2P) Application Data Channel

6 Architecture

6.1 General

This clause specifies the architecture of MMTel Enabler.

6.2 MMTel Enabler architecture

6.2.1 General

Figure 6.2-1 shows the MMTel Enabler architecture.

In this release, the MMTel Enabler Server is hosted within the PLMN operator network which supports the MMTel services capabilities exposure.

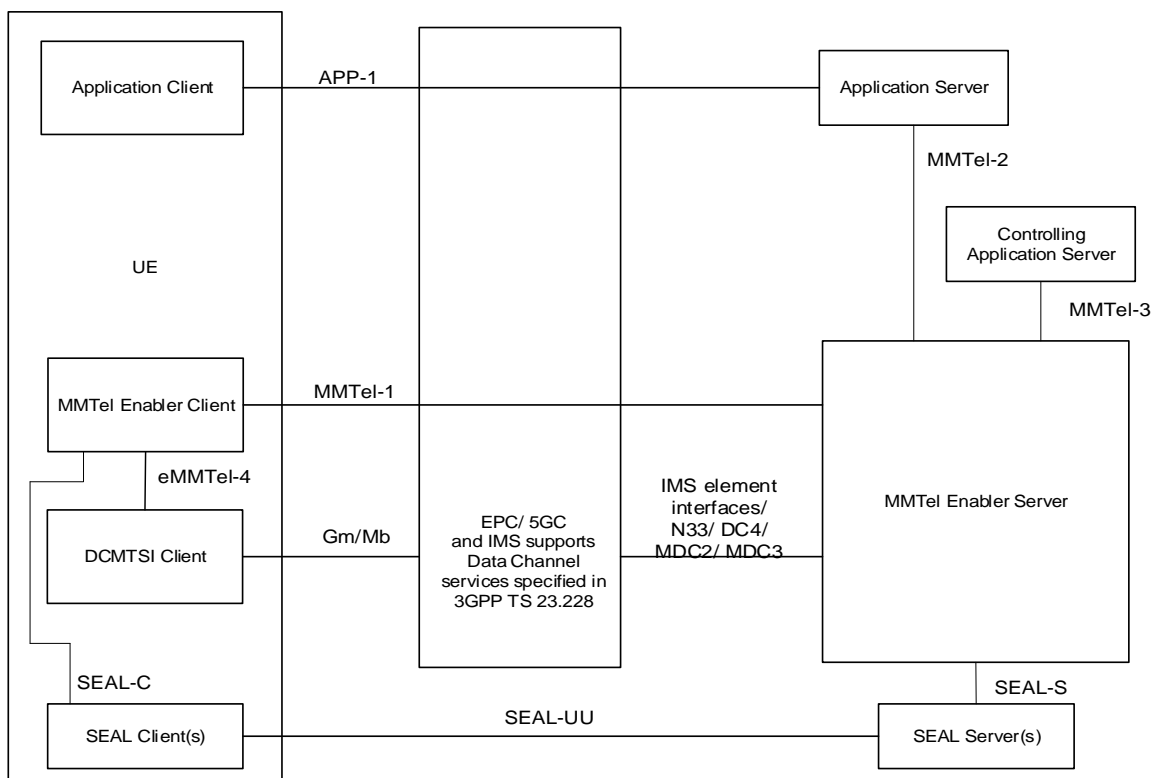


Figure 6.2.1-1: MMTel Enabler architecture

The MMTel functional entities on the UE and the server sides are MMTel Enabler Client and MMTel Enabler Server respectively.

The MMTel Enabler Client communicates with the MMTel Enabler Server over the MMTel-1 reference point to support the application layer interactions needed in MMTel service.

NOTE The interaction between MMTel Enabler Client and DCMTSI Client is internal interaction in the dialler application on the UE and implementation specific.

The MMTel Enabler Client also communicates with the DCMTSI client over the MMTel-4 reference point to downloading behavior on DCMTSI Client based on the application policy provided by the MMTel Enabler Server. The DCMTSI client is specified in 3GPP TS 26.114 [4].

The Application Server communicates with the MMTel Enabler Server over the MMTel-2 reference point to invoke the MMTel service related capabilities provided by MMTel Enabler Server,

The Controlling Application Server communicates with the MMTel Enabler Server over the MMTel-3 reference point to manage the information needed in MMTel service.

The MMTel Enablement Server communicates with the EPC/5GC via N33 to consume the IMS session management services as defined in 3GPP TS 23.502 [12].

The Application Server communicates with the Application Client on the UE over the App-1 reference point to provide the Data Channel Application specific logic.

The MMTel Enabler Client(s) interacts with SEAL Clients over the SEAL-C reference point specified for each SEAL service. The MMTel Enabler Server(s) interacts with SEAL Servers over the SEAL-S reference point specified for each SEAL service. The interaction between a SEAL Client and the corresponding SEAL Server is supported by SEAL-UU reference point specified for each SEAL service as specified in 3GPP TS 23.434 [6].

6.2.2 MMTel Enabler Server architecture model supporting IMS Session Management

The MMTel Enabler Server provides MMTel services capabilities including IMS Session Management capabilities and Data Channel related capabilities to Application Server.

NOTE 1: The MMTel Enabler Server architecture model supporting IMS Session Management will be updated after the IMS Session management capabilities provided by NEF is specified by SA2.

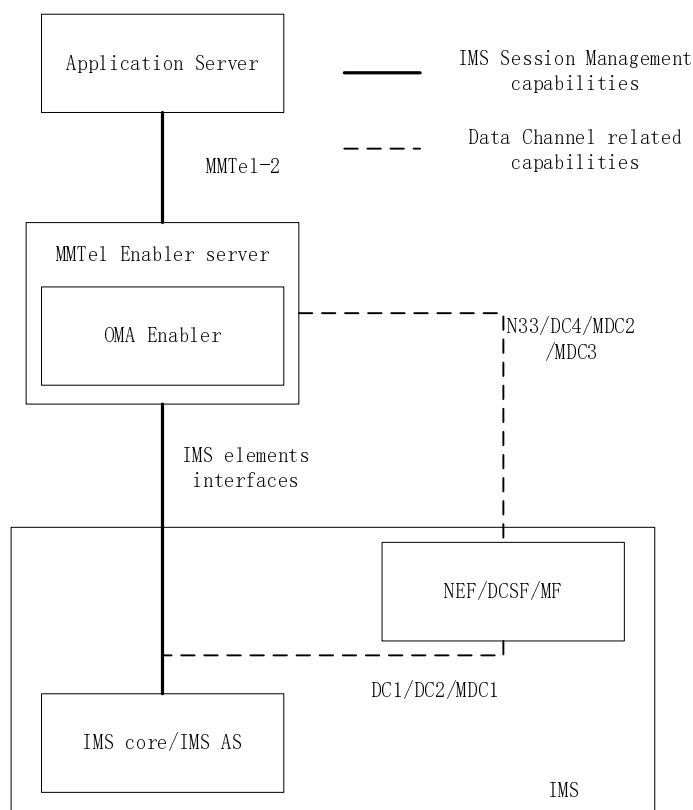


Figure 6.2.2-2: Option2: MMTel Enabler Server supports OMA OSE

Figure 6.2.2-1 shows the relationship between MMTel Enabler Server and IMS. The MMTel Enabler Server supports OMA Enabler, and interacts with IMS by using either:

- a. IMS elements interfaces specified in 3GPP TS 23.228 [3] and OMAIMS [8]; or
- b. implementation specified interfaces.

NOTE 2: The detailed interaction between MMTel Enabler Server and IMS is out of scope of the present document.

NOTE 3: The architecture to support the IMS Session Management will be updated if new capabilities are provided by IMS.

The MMTel Enabler Server interacts with IMS via N33/DC4/MDC2/MDC3 reference points to utilize the Data Channel related capabilities provided by IMS as specified in 3GPP TS 23.228 [3].

6.3 Functional entities

6.3.1 General

The functional entities for MMTel Enabler are described in the following subclauses.

6.3.2 MMTel Enabler Server

The MMTel Enabler Server provides the server side functionalities corresponding to the MMTel service.

The MMTel Enabler Server supports:

- the Application Server and Controlling Application Server to discover, to authenticate and to get authorization the MMTel/MMTel service APIs provided by the MMTel Enabler Server;
- the interaction with Controlling Application Server to configure the DC application profile;
- the integration of the multiple network layer capabilities provided by the underlying network, including the 3GPP core network and IMS into one service enabler layer API. The MMTel Enabler Server exposes these service enabler layer APIs to the Application Server and Controlling Application Server instead of exposing the network layer capabilities directly. The capabilities provided by the underlying network include:
 - a) the APIs provided by the NEF via N33 reference point, as defined in 3GPP TS 23.502 [12];
 - b) the APIs provided by DCSF via DC4 and MDC3 reference points, as defined in 3GPP TS 23.228 [3]; and
 - c) the APIs provided by MF via MDC2 reference point, as defined in 3GPP TS 23.228 [3].

NOTE: In this release, the MMTel Enabler Server interacts with IMS via IMS elements interfaces specified in 3GPP TS 23.228 [3] or implementation specified interfaces;

- the communication with the corresponding functions in the underlying network on behalf of the Application Server and Controlling Application Server when the capabilities provided by the underlying network are needed to be invoked;
- the interaction with MMTel Enabler Client for exchanging service configuration related information, e.g. the DC application profile, needed in MMTel service,
- providing MMTel/MMTel specific value added services which can be used by the Application Server in the MMTel communication between UE and Application Server;
- the interaction with SEAL functionalities to use the corresponding SEAL services in MMTel service, e.g. to use SEAL notification management service to update of DC application profiles to UE;
- the storage of the application layer information associated with the MMTel services;
- the media function to support the media handling/translation, e.g. acts as a media gateway of WebRTC or if supported media type of application is different with the UE;
- the HTTP Proxy to support the establishment of a Bootstrap data channel and application data channel, e.g. if the address type of application is different with the UE, e.g. IPv4 and IPv6, etc;
- providing call control handling consolidation when receiving call control requests from multiple Application Servers, e.g. to merge same control commands, to reject call control requests from certain Application Server with low priority when conflict happens or to decide the call control request execution sequence, etc; and

- acting as CAPIF API provider domain functions as specified in 3GPP TS 23.222 [9] and interacts with CAPIF core function via CAPIF-3/3e/4/4e/5/5e reference points.

6.3.3 MMTel Enabler Client

The MMTel Enabler Client provide the client side functionality needed in MMTel service. The MMTel enabler client is not IMS enabled and therefore it interacts with DCMTSI Client in the same UE to control the downloading behavior on DCMTSI Client based on the DC application profiles provided by the MMTel Enabler Server.

NOTE 1: The DCMTSI client is responsible for creating bootstrap channel and actually downloading the data channel applications.

NOTE 2 The interaction between MMTel Enabler Client and DCMTSI Client is internal interaction in the dialler application on the UE and implementation specific.

6.3.4 Application Server

The Application Server communicates with the MMTel Enabler Server over the MMTel-2 reference point to invoke the MMTel service related capabilities to communicate with the UE, e.g. establishes a MMTel session with or without IMS data channel to the UE, or establishes an application data channel to the UE. It may also communicate with Application Client to provide Application specific logic.

NOTE: The Application Server needs to support MMTel-2 reference point, but the detailed functionalities of the Application Server is out of scope of the present document.

6.3.5 Controlling Application Server

The Controlling Application Server is a specific Application Server that is only used by the MMTel service provider, i.e. MNO, to manage the service configuration related information, e.g. DC application profiles, needed in MMTel service. It communicates with the MMTel Enabler Server over the MMTel-3 reference point to invoke the MMTel service related capabilities and does not interact with Application Client on the UE directly.

NOTE: The functionalities of the Controlling Application Server is out of scope of the present document.

6.3.6 Application Client

The Application Client is an entity in the application layer to implement and perform the application service logic for its own service.

NOTE: The Application Client can be the data channel application client. The functionalities of the Application Client is out of scope of the present document.

6.3.7 SEAL Client

The following SEAL Clients for MMTel enablement service are supported:

- Notification management client as specified in clause 17 of TS 23.434 [6];

6.3.8 SEAL server

The following SEAL servers for MMTel enablement service are supported:

- Notification management server as specified in clause 17 of TS 23.434 [6];

6.4 Reference points

6.4.1 General

The reference points for MMTel Enabler are described in the following subclauses.

6.4.2 MMTel-1 (between the MMTel Enabler Client and the MMTel Enabler Server)

The MMTel-1 reference point supports the interactions between a MMTel Enabler Client and the corresponding MMTel Enabler Server. This reference point supports:

- the MMTel Enabler Client to download the DC application profile from MMTel Enabler Server;
- the MMTel Enabler Server to notify the MMTel Enabler Client in the UE to send application request messages to the MMTel Enabler Server to request the profiles of data channel applications; and
- the MMTel Enabler Server to send the profiles to the UE directly after the UE subscribes to the profile notification.

6.4.3 MMTel-2 (between the MMTel Enabler Server and the Application Server)

The interactions between the Application Server and the underlying network are provided by the MMTel Enabler Server via MMTel-2 reference point to ensure the security access of the underlying network. This reference point supports:

- the Application Server to discover MMTel service APIs, to authenticate, to get authorization and to communicate with the MMTel service; and
- to provide the MMTel calling API with Data Channel capability to the Applications to use the MMTel service.

6.4.4 MMTel-3 (between the MMTel Enabler Server and the Controlling Application Server)

The interactions between the MMTel Enabler Server and the Controlling Application Server are referred to MMTel-3 reference point. This reference point supports:

- the Controlling Application Server to manage the service configuration related information needed in MMTel service; and
- the Controlling Application Server to get the DC application profile information from the MMTel Enabler Server.

6.4.5 MMTel-4 (between the MMTel Enabler Client and the DCMTSI Client)

The interaction between MMTel Enabler Client and DCMTSI Client is referred to MMTel-4 reference point. This reference point is internal interaction in the dialler application on the UE and implementation specific.

NOTE: The functionalities of the MMTel-4 reference point is out of scope of the present document.

6.4.6 App-1 (between the Application Client and the Application Server)

The App-1 reference point supports the communication between Application Client and Application Server to provide the Data Channel Application specific logic.

NOTE: The functionalities of the App-1 reference point is out of scope of the present document.

6.4.7 SEAL-C

The following SEAL-C reference points for MMTel enablement service are supported:

- NM-C reference point for notification management as specified in 3GPP TS 23.434 [6];

6.4.8 SEAL-S

The following SEAL-S reference points for MMTel enablement service are supported:

- NM-S reference point for notification management as specified in 3GPP TS 23.434 [6];

6.4.9 SEAL-UU

The following SEAL-UU reference points for MMTel enablement service are supported:

- NM-UU reference point for notification management as specified in 3GPP TS 23.434 [6];

7 Identities

7.1 General

The following clauses list identities that are used in this technical specification.

7.2 Application ID (APPID)

The APPID is a globally unique value that identifies a Data Channel Application. It is assigned by the MMTel Enabler Server. The value of this IE is also used to set the "req-app-id" parameter in "a=3gpp-req-app" media-level SDP attribute as specified in 3GPP TS 26.114 [4] when the application requests application data channel(s).

7.3 MMTel Enabler Client ID (MMTECID)

The MMTECID is used to identify an MMTel Enabler Client within the MMTel Service. Its value is the same as the identity of the DCMTSI Client that interacts with the MMTel Enabler Client.

8 Procedures and information flows

8.1 General

This clause provides procedures and information flows necessary for application enablement aspects for MMTel including information elements used in the procedures.

8.2 DC application and profile management

8.2.1 General

The following clauses specify procedures and information flows for DC application and profile management.

8.2.2 DC application and profile configuration

8.2.2.1 General

DC application and profile configuration enables a Controlling Application Server to configure the DC application and profile with the MMTel Enabler Server.

8.2.2.2 Procedure

Figure 8.2.2.2-1 illustrates the DC application and profile configuration procedure.

Pre-conditions:

1. The Controlling Application Server has connected to the serving network successfully.
2. Both the Controlling Application Server and MMTel Enabler Server have established a secured connection and mutual authentication is successful.
3. Both DC application and profile have been uploaded to Controlling Application Server.

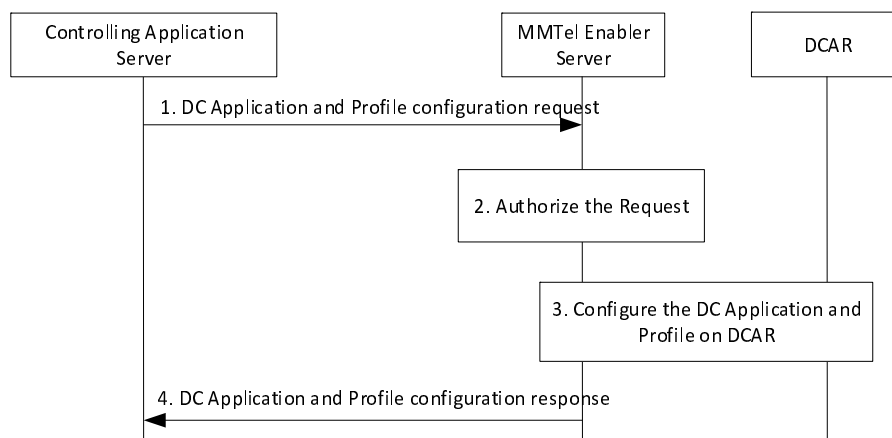


Figure 8.2.2.2-1: DC application and profile configuration

1. The Controlling Application Server sends a DC application and profile configuration request to the MMTel Enabler Server. The request message includes information elements as specified in clause 8.2.2.3.1.
2. Upon receiving the request, the MMTel Enabler Server validates if the requester is authorized for the request based on the Requester Identity. If the authorization is successful, the MMTel Enabler Server allocates an APPID and creates the DC application profile for each DC Application included in the DC application and profile configuration request, and maintain the mapping of APPID and DC Application Profile.
3. The MMTel Enabler Server configures the DC application and profile on DCAR.
4. The MMTel Enabler Server sends a DC application and profile configuration response to the Controlling Application Server. The response message includes information elements as specified in clause 8.2.2.3.2.

NOTE: The detailed interactions between the MMTel Enabler Server and DCAR is implementation specific in this release.

8.2.2.3 Information flows

8.2.2.3.1 DC application and profile configuration request

Table 8.2.2.3.1-1 describes information elements for the DC application and profile configuration request from the Controlling Application Server to the MMTel Enabler Server.

Table 8.2.2.3.1-1: Information elements in DC application and profile configuration request

Information element	Status	Description
Requester Identity	M	The identity of the DC Application provider (VAL service provider) performing the request.
Security credentials	O	Security information required by the MMTel Enabler Server.
DC Application list	M	A list of DC application and configuration parameters included in this request. Each element in this list contains a Data Channel Application package and corresponding configuration parameters. The detailed information elements of DC application list are listed in the Table 8.2.2.3.1-2.

Table 8.2.2.3.1-2: Information elements in DC application list

Information element	Status	Description
Application Identifier	M	Identifier of the Data Channel Application assigned by the Application Provider
Application Name (see NOTE 1)	O	Name of the Data Channel Application
Service Type	O	Service type of the Data Channel Application, used to help the user understand the type of services provided by the application
Application Icon Url	O	Icon url of the Data Channel Application
Application Version (see NOTE 1)	O	The latest version of the application.
Application Validity	O	The latest validity of the application.
Application Loading Phase	O	Indicates when this Data Channel Application is allowed to be used. The values of this IE include: Precall only: The Data Channel Application is allowed to be used before the MMTel call session is established, i.e. after the 18x response is sent/received and before the 200 OK of the initial SIP INVITE request is sent/received. Incall: The Data Channel Application is allowed to be used after the MMTel call session is established, i.e. after the 200 OK of the initial SIP INVITE request is sent/received. Both precall and Incall: The Data Channel Application is allowed to be used during the entire Precall and incall.
Requested UE Version	O	Indicates minimum UE software version (e.g. OS version, SDK version, etc.) required for this Data Channel Application.
Autoload (see NOTE 3)	O	Indicates whether this Data Channel Application is needed to be loaded to the UE automatically.
Autolaunch (see NOTE 3)	O	Indicates whether this Data Channel Application is needed to be downloaded to the UE and launched automatically.
Usage Indication (see NOTE 2)	O	Indicates whether this Data Channel Application can be used if Data Channel is not supported by the other party of the call.
Requested Media Type (see NOTE 2)	O	Indicates media type required for this Data Channel Application. The values of this IE include: Voice call only: This Data Channel Application can be used if and only if the corresponding call is a voice call. Video call only: This Data Channel Application can be used if and only if the corresponding call is a video call. Both Voice and video call: This Data Channel Application can be used in both voice call and video call.
Application Usage Condition (see NOTE 2)	O	Indicates whether this Data Channel Application can be used based on certain condition. The values of this IE include, but not limited: Service area: the application is allowed to be used in a certain area. Time period: the application is allowed to be used for a certain period of time.
3gpp QoS Hint (see NOTE 2)	O	Indicates the QoS requirement of this Data Channel Application which is used to set the value of "a=3gpp-qos-hint" attribute in SDP for the data channel(s) used by the application.
Personal Data Collection Indication (see NOTE 4)	O	Indicates whether this Data Channel Application will collect the user personal data (along with related consent opt-in/opt-out procedures).
Personal Data Collection Info URL (see NOTE 4)	O	URL to retrieve the description of the purpose of mandatory and optional personal data to be collected, their processing their protection etc.
Application Package (see NOTE 1)	O	The Code package of the Data Channel Application.

NOTE 1: This IE shall be present when when configuring the DC application.

NOTE 2: This IE shall be present when when configuring the DC application profile.

NOTE 3: These IEs can be applied only if the specific service using this data channel application is agreed to be used by the user based on the subscription of this specific service or explicitly agreed to be applied by the user on the UE. The relationship with Personal Data Collection should be considered, which is out of 3GPP scope.

NOTE 4: These IEs are mandatory when regulatory requirements request that the user has to be informed if the personal data are collected by the application and how they are treated.

8.2.2.3.2 DC application and profile configuration response

Table 8.2.2.3.2-1 describes information elements for the DC Application and profile configuration response from the MMTel Enabler Server.

Table 8.2.2.3.2-1: Information elements for DC application and profile configuration response

Information element	Status	Description
DC application and profile configuration response list	M	A list of DC application and profile configuration response. This list contains a response for each DC Application. The detailed information is listed in Table 8.2.2.3.2-2.

Table 8.2.2.3.2-2: Information elements in DC application and profile configuration response list

Information element	Status	Description
Application Identifier	M	Identifier of the Data Channel Application assigned by the Application Provider.
Successful response	O	Indicates the success of the configuration of this DC application and profile
> APPID	M	Identifier of the Data Channel Application assigned by the MMTel Enabler Server
Failure response	O	Indicates the failure of the configuration of this DC application and profile
> Reason	O	Indicates the reason for failure.

8.2.3 DC application and profile update

8.2.3.1 General

DC application and profile update enables a Controlling Application Server to update the DC application and profile with the MMTel Enabler Server.

8.2.3.2 Procedure

Figure 8.2.3.2-1 illustrates the DC application and profile update procedure.

Pre-conditions:

1. The Controlling Application Server has connected to the serving network successfully.
2. Both the Controlling Application Server and MMTel Enabler Server have established a secured connection and mutual authentication is successful.

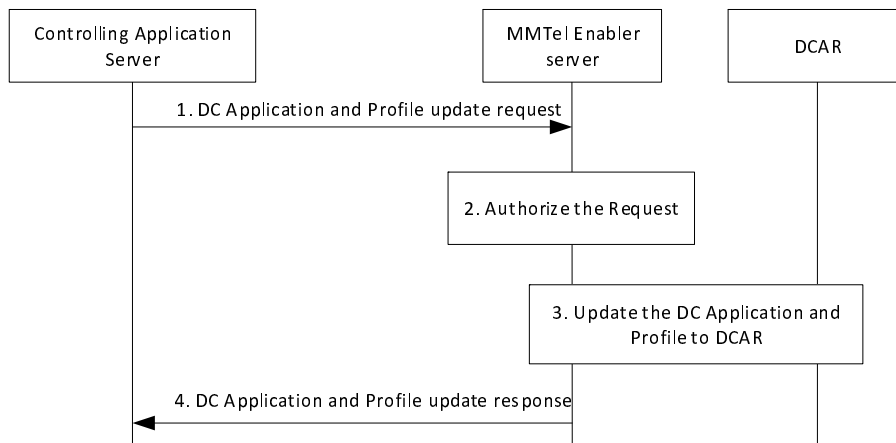


Figure 8.2.3.2-1: DC application and profile update

1. The Controlling Application Server sends a DC application and profile update request to the MMTel Enabler Server. The request message includes information elements as specified in clause 8.2.3.3.1.
2. Upon receiving the request, the MMTel Enabler Server validates if the requester is authorized for the request based on the Requester Identity. If the authorization is successful, the MMTel Enabler Server updates the DC Application or DC application profile for each DC Application based on information provided in the request.
3. The MMTel Enabler Server updates the DC application and profile to DCAR.
4. The MMTel Enabler Server sends a DC application and profile update response to the Controlling Application Server. The response message includes information elements as specified in clause 8.2.3.3.2.

NOTE: The detailed interactions between the MMTel Enabler Server and DCAR is implementation specific in this release.

8.2.3.3 Information flows

8.2.3.3.1 DC application and profile update request

Table 8.2.3.3.1-1 describes information elements for the DC application and profile update request from the Controlling Application Server to the MMTel Enabler Server.

Table 8.2.3.3.1-1: Information elements in DC application and profile update request

Information element	Status	Description
Requester Identity	M	The identity of the DC Application provider (VAL service provider) performing the request.
Security credentials	O	Security information required by the MMTel Enabler Server.
DC Application list	M	A list of DC application and configuration parameters included in this request. Each element in this list contains a Data Channel Application package and corresponding configuration parameters. The detailed information elements of DC application list are listed in Table 8.2.2.3.1-2.

8.2.3.3.2 DC application and profile update response

Table 8.2.3.3.2-1 describes information elements for the DC application and profile update response from the MMTel Enabler Server.

Table 8.2.3.3.2-1: Information elements for DC application and profile update response

Information element	Status	Description
DC application and profile update response list	M	A list of application and profile update response. This list contains a response for each DC application and profile. The detailed information is listed in Table 8.2.3.3.2-2.

Table 8.2.3.3.2-2: Information elements in DC application and profile update response list

Information element	Status	Description
Result	M	Indicates the DC application and profile update request was successful or failure.
> Cause	O	Indicates the cause of DC application and profile update request failure.

8.2.4 DC application deletion

8.2.4.1 General

DC application deletion enables a Controlling Application Server to delete DC application with the MMTel Enabler Server.

8.2.4.2 Procedure

Figure 8.2.4.2-1 illustrates the DC application deletion procedure.

Pre-conditions:

1. The Controlling Application Server has connected to the serving network successfully.
2. Both the Controlling Application Server and MMTel Enabler Server have established a secured connection and configured with the necessary credentials to enable authenticating one another.

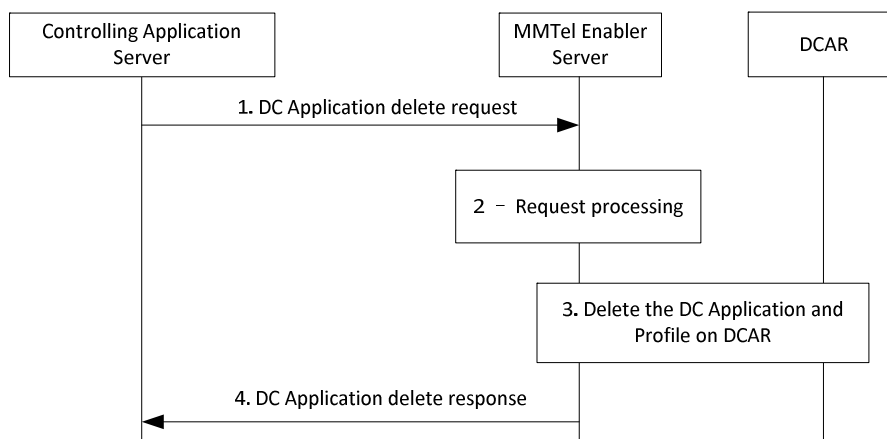


Figure 8.2.4.2-1: DC application deletion

1. The Controlling Application Server sends a DC Application delete request to the MMTel Enabler Server. The request message includes information elements as specified in clause 8.2.4.3.1.
2. Upon receiving the request, the MMTel Enabler Server validates if the requester is authorized for the request, If the requester is authorized then the MMTel Enabler Server initiates authentication procedures with the Requester Identity. If the registration is successful, the MMTel Enabler Server requests the DCAR to delete the DC

application and profile (DC applications and profile need to be deleted at the same time) and delete the mapping of APPID and DC application profile.

3. The MMTel Enabler Server deletes the DC application and profile on DCAR.
4. The MMTel Enabler Server sends a DC Application delete response to the Controlling Application Server. The response message includes information elements as specified in clause 8.2.4.3.2.

NOTE: The detailed interactions between the MMTel Enabler Server and DCAR is implementation specific in this release.

8.2.4.3 Information flows

8.2.4.3.1 DC Application delete request

Table 8.2.4.3.1-1 describes information elements for the DC Application delete request from the Controlling Application Server to the MMTel Enabler Server.

Table 8.2.4.3.1-1: Information elements in DC Application delete request

Information element	Status	Description
Requester Identity	M	The identity of the DC Application provider (VAL service provider) performing the request.
Security credentials	O	Security information required by the MMTel Enabler Server.
List of APPID	M	List of identifiers of the DC application to be deleted.

8.2.4.3.2 DC Application delete response

Table 8.2.4.3.2-1 describes information elements for the DC Application delete response from the MMTel Enabler Server.

Table 8.2.4.3.2-1: Information elements for DC Application delete response

Information element	Status	Description
DC Application delete response list	M	A list of Application deletion response. The detailed information is listed in Table 8.2.4.3.2-2.

Table 8.2.4.3.2-2: Information elements in DC Application delete response list

Information element	Status	Description
Result	M	Indicates the deletion of the DC Application was successful or failure.
> Cause	O	Indicates the cause of failure.

8.2.5 Getting DC application profile information

8.2.5.1 General

Getting DC application profile information enables a Controlling Application Server to get the DC application profile information from the MMTel Enabler Server.

8.2.5.2 Procedure

Figure 8.2.5.2-1 illustrates the procedure of getting DC application profile information.

Pre-conditions:

1. The Controlling Application Server has connected to the serving network successfully.
2. Both the Controlling Application Server and MMTel Enabler Server have established a secured connection and mutual authentication is successful.

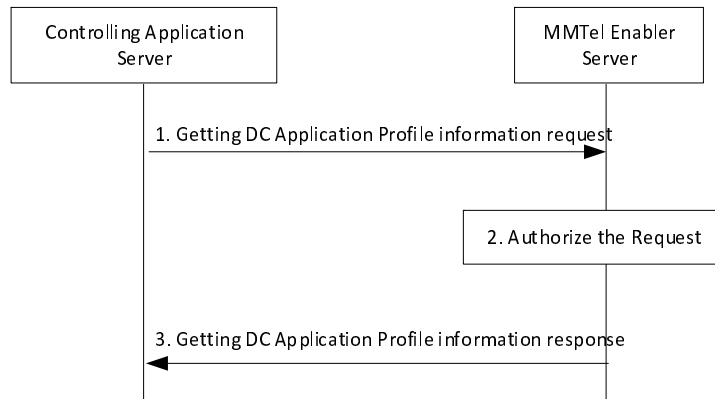


Figure 8.2.5.2-1: Getting DC application profile information

1. The Controlling Application Server sends a DC application and profile information retrieval request to the MMTel Enabler Server. The request message includes information elements as specified in clause 8.2.5.3.1.
2. Upon receiving the request, the MMTel Enabler Server validates if the requester is authorized for the request based on the Requester Identity. If the authorization is successful, the MMTel Enabler Server gets the DC application Profile information based on the APPID included in the Getting DC application profile information request.
3. The MMTel Enabler Server sends a Getting DC application profile information response to the Controlling Application Server. The response message includes information elements as specified in clause 8.2.5.3.2.

8.2.5.3 Information flows

8.2.5.3.1 Getting DC application profile information request

Table 8.2.5.3.1-1 describes information elements for the Getting DC application profile information request from the Controlling Application Server to the MMTel Enabler Server.

Table 8.2.5.3.1-1: Information elements in Getting DC application profile information request

Information element	Status	Description
Requester Identity	M	The identity of the DC Application provider (VAL service provider) performing the request.
Security credentials	O	Security information required by the MMTel Enabler Server.
APPID list	M	A list of APPID for the request.

8.2.5.3.2 Getting DC application profile information response

Table 8.2.5.3.2-1 describes information elements for the Getting DC application profile information response from the MMTel Enabler Server.

Table 8.2.5.3.2-1: Information elements in Getting DC application profile information response

Information element	Status	Description
Successful response	O	Indicates that the Getting DC application profile information request was successful.
> List of DC application profile information	O	List of DC application profile information as defined in Table 8.3.2.3.4-2.
Failure response	O	Indicates that the Getting DC application profile information request failed.
> Cause	O	Indicates the cause of Getting DC application profile information request failure.

8.3 Control the downloading of data channel applications

8.3.1 General

The following clauses specify procedures and information flows for Controlling of the data channel applications downloading.

8.3.2 DC application profiles downloading on UE

8.3.2.1 General

Application profiles downloading enables a MMTel Enabler Client to download the DC application profile from MMTel Enabler Server and use it to control the downloading behavior of the DCMTSI Client in the same UE. This procedure is a detailed HTTP interaction procedure in the bootstrap data channel which established as per Annex AC.7.1 of 3GPP TS 23.228 [3].

8.3.2.2 Procedure

Figure 8.3.2.2-1 illustrates the DC application profiles downloading procedure.

Pre-conditions:

1. The bootstrap data channels between UE and MF have been established as specified in Annex AC.7.1 of 3GPP TS 23.228 [3].

NOTE 1: In an implementation, the DCSF can support the DC application profile functionality of MMTel Enabler Server function, the DCSF can also interact with the MMTel Enabler Server to support this procedure

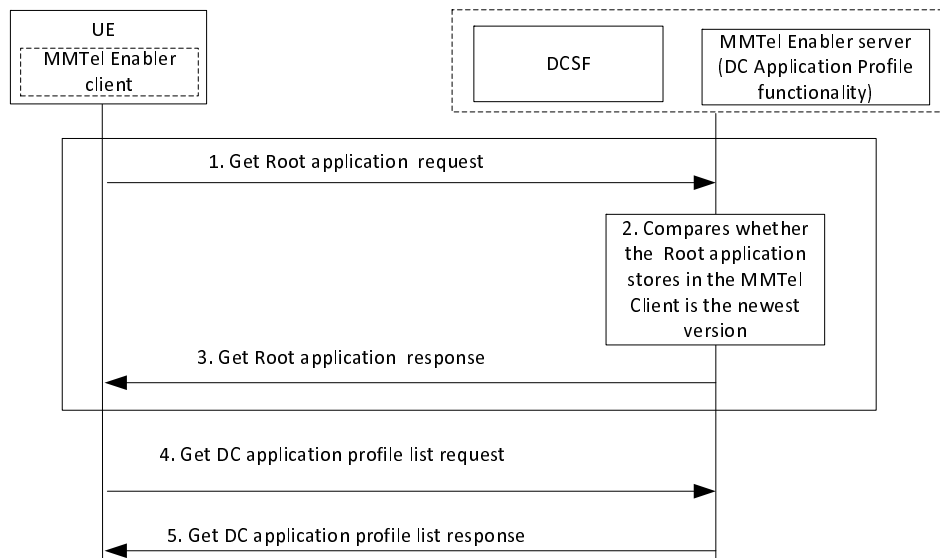


Figure 8.3.2.2-1: MMTel Enabler Client in the UE requests the DC application profile list

1. The MMTel Enabler Client in the UE sends a Get Root application request to MMTel Enabler Server to get the Root application. The request message includes information elements as specified in Table 8.3.2.3.1-1.

NOTE 2: If the DCSF interacts with the MMTel Enabler Server to support this procedure, the MMTel Enabler Client sends the request in step 1 to the DCSF via MF as specified in Annex AC.7.1 of 3GPP TS 23.228 [3], which then sends the request to the MMTel Enabler Server. The response in the opposite direction is also sent to the MMTel Enabler Client through the DCSF. The interaction between DCSF and MMTel Enabler Server is implementation specific in this release.

2. The MMTel Enabler Server checks whether the Root application version included in the Get Root application request is the newest version of the Root application. If the Root application version IE is not included, the Root application version is not considered as newest.
3. If the Root application version included in the Get Root application request is not the newest version of the Root application, the MMTel Enabler Server sends a Get Root application response to the MMTel Enabler Client in the UE. The response message includes information elements as specified in Table 8.3.2.3.2-1.

If Root application is locally stored in the MMTel Enabler Client, validity of the application will be updated to the value received in Root application validity IE.

NOTE 3: When service provider wants the UE to delete the stored Root application, the response message includes NULL value in the Root application validity IE.

4. The MMTel Enabler Client in the UE send a Get DC application profile List request to MMTel Enabler Server to get the DC application profile list available for this user. The request message includes information elements as specified in Table 8.3.2.3.3-1. The application type is used by MMTel Enabler Server to provide DC applications for download.
5. The MMTel Enabler Server sends a Get DC application profile List response to the MMTel Enabler Client in the UE. The response message includes list of Data Channel Application profile and the information elements as specified in Table 8.3.2.3.4-1.

The MMTel Enabler Client locally stores the downloaded DC application profiles and displays the related application information from the DC application profile on the Root application. Users can select and download corresponding DC applications based on the profile information displayed on the Root application. The MMTel Enabler Client may stores the downloaded DC Application which may be obsoleted in the condition of, e.g. the validity is expired, update available for application, etc.

The root application can also be implementation specific. In this case, step 1 to step 3 are skipped.

8.3.2.3 Information flows

8.3.2.3.1 Get Root application request

Table 8.3.2.3.1-1 describes information elements for the Get Root application request from the MMTel Enabler Client to the MMTel Enabler Server.

Table 8.3.2.3.1-1: Information elements in Get Root application request

Information element	Status	Description
UE Information (see NOTE)	M	The UE related information required to identify the Root application (e.g. device type, device vendor, etc)
Root application version	O	The latest version of the Root application stored in the MMTel Enabler Client in the UE. This IE is present if Root application is locally stored in the MMTel Enabler Client.
NOTE: The MMTel service provider can provide the MMTel Enabler Client with different Root application based on this IE.		

8.3.2.3.2 Get Root application response

Table 8.3.2.3.2-1 describes information elements for the Get Root application response from the MMTel Enabler Server to the MMTel Enabler Client.

Table 8.3.2.3.2-1: Information elements for Get Root application response

Information element	Status	Description
Result	M	Indicates the success or failure of Get Root application request.
Update needed	M	Indicates whether the Root application is needed to be updated by the MMTel Enabler Client in the UE
Root application version	O	The latest version of the Root application. This IE presents only if the Root application is needed to be downloaded or updated by the MMTel Enabler Client in the UE.
Root application validity	O	The validity of the Root application. This IE presents only if the Root application is needed to be downloaded or updated by the MMTel Enabler Client in the UE.
Root application (see NOTE)	O	The Root application provided by the MMTel service provider, e.g. layout, and/or home page etc of the Data Channel Application list. This IE is present if the update of the Root application in the UE is needed, i.e. the Root application version included in the Get Root application request is not equal to the latest version on the MMTel Enabler Server.
NOTE: The detailed information of this IE is implementation specific and out of scope of the present document.		

8.3.2.3.3 Get DC application profile List request

Table 8.3.2.3.3-1 describes information elements for the Get DC application profile List request from the MMTel Enabler Client to the MMTel Enabler Server.

Table 8.3.2.1-3: Information elements in Get DC application profile List request

Information element	Status	Description
MMTel Enabler Client version (see NOTE)	M	The version of MMTel Enabler Client.
application type	O	Type of application (e.g. emergency, conference, XR, etc.).
Begin index	O	The starting index of the first Data Channel Application required in the Data Channel Application list. This IE is present if the requested Data Channel Application is not the first one in the Data Channel Application list, e.g. when the Data Channel Application list is needed to be shown in multiple pages, this IE is included when requesting the pages other than the first page. The default value of this IE is 0, if this IE is absent.
NOTE: The MMTel service provider can provide the MMTel Enabler Client with different DC application profile list based on this IE.		

8.3.2.3.4 Get DC application profile List response

Table 8.3.2.3.4-1 describes information elements for the Get DC application profile List response from the MMTel Enabler Server to the MMTel Enabler Client.

Table 8.3.2.3.4-1: Information elements in Get DC application profile List response

Information element	Status	Description
DC Application profile list	M	A list of DC application profiles available for this user. Each element in this list contains a DC application profile of this Data Channel Application. The detailed information elements of DC application profile are listed in Table 8.3.2.3.4-2.

Table 8.3.2.3.4-2: Information elements in DC application profile

Information element	Status	Description
APPID	M	Identifier of the Data Channel Application.
Application Name	O	Name of the Data Channel Application.
Service Type	O	Service type of the Data Channel Application, used to help the user understand the type of services provided by the application.
Application Icon	O	Icon of the Data Channel Application
Application Version	O	The latest version of the application.
Application Validity	O	The latest validity of the application.
Application Loading Phase	O	Indicates when this Data Channel Application is allowed to be used. The values of this IE include: Precall only: The Data Channel Application is allowed to be used before the MMTel call session is established, i.e. after the 18x response is sent/received and before the 200 OK of the initial SIP INVITE request is sent/received. Incall only: The Data Channel Application is allowed to be used after the MMTel call session is established, i.e. after the 200 OK of the initial SIP INVITE request is sent/received.
Requested UE Version	O	Indicates minimum UE software version (e.g. OS version, SDK version, etc.) required for this Data Channel Application.
Autoload (see NOTE 1)	O	Indicates whether this Data Channel Application is needed to be load to the UE automatically.
Autolaunch (see NOTE 1)	O	Indicates whether this Data Channel Application is needed to be downloaded to the UE and launched automatically.
Usage Indication	O	Indicates whether this Data Channel Application can be used if Data Channel is not supported by the other party of the call.
Requested Media Type	O	Indicates media type required for this Data Channel Application. The values of this IE include: Voice call only: This Data Channel Application can be used if and only if the corresponding call is a voice call. Video call only: This Data Channel Application can be used if and only if the corresponding call is a video call. Both voice and video call: This Data Channel Application can be used in both voice call and video call.
Application Usage Condition	O	Indicates whether this Data Channel Application can be used if under this condition. The values of this IE include but not limited: Service area: The application is allowed to be used in a certain area. Time period: The application is allowed to be used for a certain period of time.
3gpp QoS Hint	O	Indicates the QoS requirement of this Data Channel Application which is used to set the value of "a=3gpp-qos-hint" attribute in SDP for the data channel(s) used by the application.
Personal Data Collection (see NOTE 2)	O	Indicates whether this Data Channel Application will collect the user personal data.
Personal Data Collection Info URL (see NOTE 2)	O	URL to retrieve the description of the purpose of mandatory and optional personal data to be collected (along with related consent opt-in/opt-out procedures), their processing their protection etc.
NOTE 1: These IEs can be applied only if the specific service using this data channel application is agreed to be used by the user based on the subscription of this specific service or explicitly agreed to be applied by the user on the UE.		
NOTE 2: These IEs are mandatory when regulatory requirements request that the user has to be informed if the personal data are collected by the application and how they are treated.		

8.3.3 DC application profiles updating on UE

8.3.3.1 General

There are two modes in this procedure:

the MMTel Enabler Server notifies the MMTel Enabler Client in the UE to send application request messages to the MMTel Enabler Server to request the profiles of data channel applications;

the MMTel Enabler Server sends the profiles to the UE directly after the UE subscribes to the profile notification.

The two detailed procedures of DC application profiles updating on UE and the related information flow are specified in clause 8.3.3.2 and 8.3.3.3.

NOTE : The updating procedures go over the top of DCSF. The detailed procedures to update data channel applications to the UE are out of scope of 3GPP TS 23.228 [3].

8.3.3.2 Procedure

8.3.3.2.1 The MMTel Enabler Client request DC application profiles based on notification

The MMTel Enabler Server can notify the MMTel Enabler Client in the UE to send application request messages to the MMTel Enabler Server to request the DC application profiles, the detailed procedure is illustrated in Figure 8.3.3.2.1-1.

NOTE: The MMTel Enabler Server can instruct the MMTel Enabler Client to request root application and DC application profiles as required. e.g. root application version update, offline of a data channel application, etc.

Pre-condition:

1. The bootstrap data channels have been established as specified in 3GPP TS 23.228 [3].

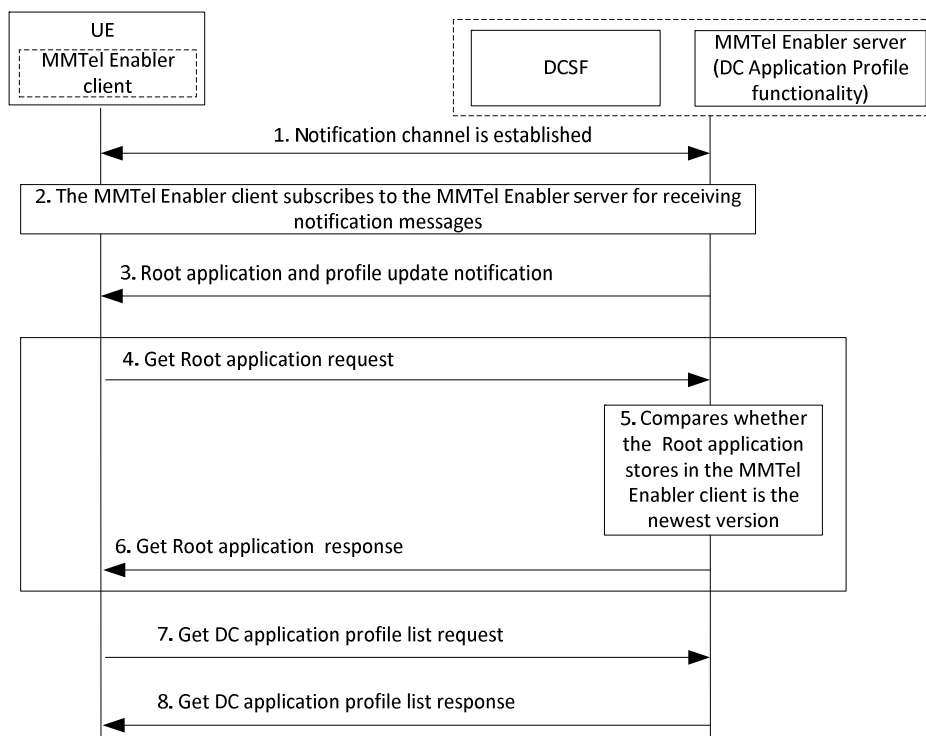


Figure 8.3.3.2.1-1: MMTel Enabler Client request DC application profiles based on notification

1. The notification channel has been established between notification management client and notification management Server as per step 1 to step 6 specified clause 17.3.3 of TS 23.434 [6].
2. The MMTel Enabler Client subscribes to the MMTel Enabler Server for receiving notifications per step 7 specified clause 17.3.3 of 3GPP TS 23.434 [6]. This request includes the information elements as specified in Table 8.3.3.3.3-1 and the callback URL returned from the notification management server as specified in step 4 of clause 17.3.3 of TS 23.434 [6].

If the MMTel Enabler Server provides the notification service, step 1 and step 2 are skipped.

3. The MMTel Enabler Server sends a Root application and profile update notification to notify the MMTel Enabler Client in the UE to get the Root application or DC application profile. The Root application and profile update notification includes information elements as specified in Table 8.3.3.3.1-1.

The step 4 to step 8 are same as steps 1 through 5 in clause 8.3.2.2.

8.3.3.2.2 The MMTel Enabler Server notifies the DC application profile to the MMTel Enabler Client

The MMTel Enabler Server notifies the DC application profiles to the MMTel Enabler Client is illustrated in Figure 8.3.3.2.2-1.

Pre-condition:

1. The bootstrap data channels have been established as specified in 3GPP TS 23.228 [3].

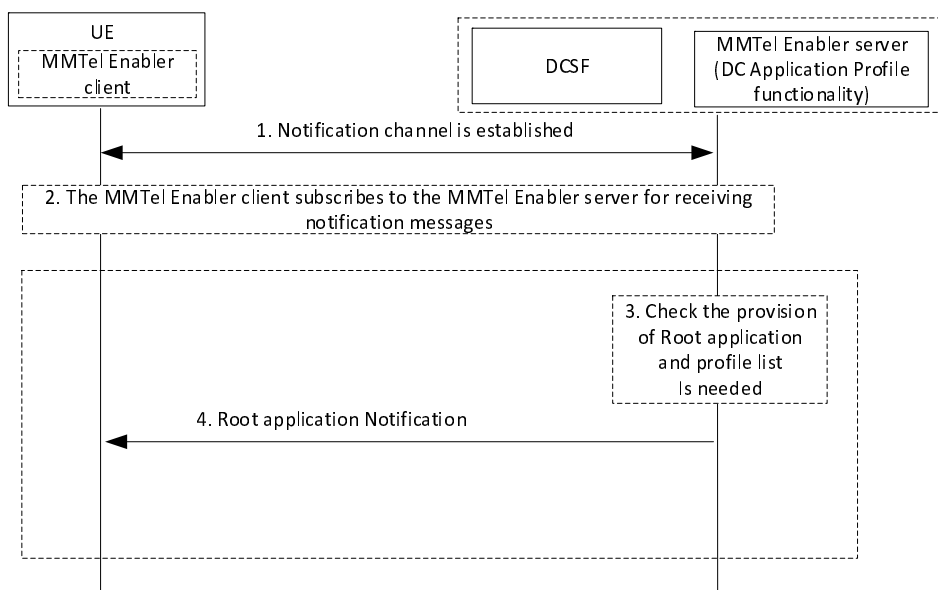


Figure 8.3.3.2.2-1: MMTel Enabler Server notifies the DC application profile list to UE

1. The notification channel has been established between notification management client and notification management server as per step 1 to step 6 specified in clause 17.3.3 of TS 23.434 [6].
2. The MMTel Enabler Client subscribes to the MMTel Enabler Server for receiving notifications. This request includes the information elements as specified in Table 8.3.3.3.3-1 and the callback URL returned from the notification management server as specified in step 4 of clause 17.3.3 of TS 23.434 [6].
3. The MMTel Enabler Server checks the provision of Root application and DC application profile list is needed, e.g. the UE has IMS DC capability, an application version or application profile update is available, etc.

NOTE: The detail additional checklists in this step are out of scope of the present document.

4. The MMTel Enabler Server sends a Root application notification message to the MMTel Enabler Client in the UE. The notification message includes information elements as specified in Table 8.3.3.3.2-1.

8.3.3.3 Information flows

8.3.3.3.1 Root application and profile update notification

If the MMTel Enabler Server interacts with the SEAL notification server to use the notification service, the Notification message specified in clause 17.3.2.4 applies to the Root application and profile update notification. The usage of the information elements in MMTel service is clarified as below:

- The identifier of the MMTel Enabler Client request DC application profiles works as VAL Application ID;
- The service identifier of MMTel Service in SEAL services works as VAL Service ID;

Besides the IEs specified in clause 17.3.2.4 of 3GPP TS 23.434 [6], the information elements included in Table 8.3.3.3.1-1 is also needed to be included in the Root application and profile update notification from the MMTel Enabler Server to the MMTel Enabler Client.

Table 8.3.3.3.1-1: Information elements in Root application and profile update notification

Information element	Status	Description
Immediate Indication	O	Indicates whether the operation is critical to UE, i.e. whether the Root application and profile need to be updated immediately. E.g. the update of Root application and profile is critical, if the available DC Application for the user is changed.

If the MMTel Enabler Server provides the notification service, only the information elements included in Table 8.3.3.3.1-1 are included in the Root application and profile update notification.

8.3.3.3.2 Root application notification

Table 8.3.3.3.2-1 describes information elements for the Root application notification from the MMTel Enabler Server to the MMTel Enabler Client.

Table 8.3.3.3.2-1: Information elements for Root application notification

Information element	Status	Description
Update Indication	M	Indicates whether the Root application is needed to be updated by the MMTel Enabler Client in the UE.
Root application version	O	The latest version of the Root application. This IE presents only if the Root application is needed to be updated by the MMTel Enabler Client in the UE.
Root application (see NOTE)	O	The Root application provided by the MMTel service provider, e.g. layout, and/or home page etc. of the Data Channel Application list. This IE is present if the update of the Root application in the UE is needed, i.e. the Root application version included in the Get Root application request is not equal to the latest version on the MMTel Enabler Server.
DC Application profile list	O	A list of DC application profiles available for this user. Each element in this list contains a DC application profile of this Data Channel Application. The detailed information elements of DC application profile are listed in Table 8.3.2.3.4-2.
NOTE:	The detailed information of this IE is implementation specific and out of scope of the present document.	

8.3.3.3.3 MMTel Enabler Client subscribes to the MMTel Enabler Server request

Table 8.3.3.3.3-1 describes information elements for the MMTel Enabler Client subscribes to the MMTel Enabler Server request.

Table 8.3.3.3.3-1: Information elements for MMTel Enabler Client subscribes to the MMTel Enabler Server request

Information element	Status	Description
MMTel Enabler Client ID	M	Identity of the requesting MMTel Enabler Client
MMTel Enabler Client version (see NOTE)	M	The version of MMTel Enabler Client.
Validity Duration	M	Indicates how long the subscription will last (i.e. subscription lifetime) as requested by the MMTel Enabler client.
NOTE: The MMTel service provider can provide the MMTel Enabler Client with different DC application profile list based on this IE.		

8.4 Application calling enablement

8.4.1 General

The following clauses specify procedures and information flows for Application calling enablement.

8.4.2 Application calling service API with Data Channel capability

8.4.2.1 General

The MMTel Enabler Server exposes the Application calling service API with Data Channel capability to the Applications in order to support establishing a call between Application and DCMTSI client.

8.4.2.2 Procedure

8.4.2.2.1 Establishing an Application Call with Data Channel capability between non-IMS application and DCMTSI client

Figure 8.4.2.2.1-1 illustrates the operation to establish an Application Call with Data Channel capability between non-IMS application and DCMTSI client.

Pre-conditions:

1. The Application is authorized to use Application calling service API provided by the MMTel Enabler Server.
2. The MMTel Enabler Server is authorized to use IMS DC capability APIs as defined in 3GPP TS 23.228 [3].
3. The MMTel Enabler Server is authorized to use OMA ThirdPartyCall API as specified in OMA-TS-REST_NetAPI_ThirdPartyCall [7].

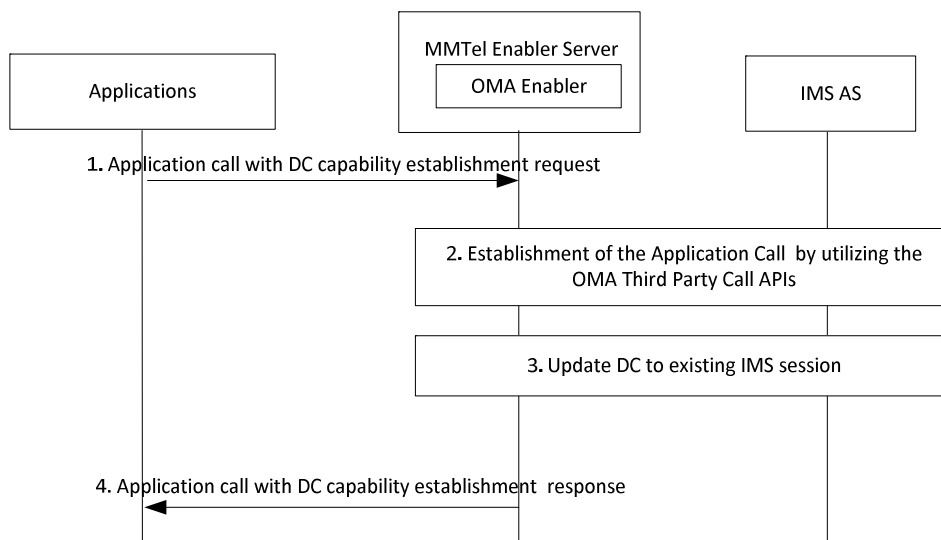


Figure 8.4.2.2.1-1: Establishing a Application Call with Data Channel capability between non-IMS applications and DCMTSI client

1. The Application sends an Application Call with DC capability establishment request to the MMTel Enabler Server. The request message includes information elements as specified in clause 8.4.2.3.1.
2. Upon receiving the request, the MMTel Enabler Server validates if the requester is authorized for the request, if the requester is authorized then the MMTel Enabler Server can utilize the OMA Third Party Call API [7] to establish a Call session with audio and/or video media as specified in OMA-TS-REST_NetAPI_ThirdPartyCall and obtain the result of the Third-Party Call establishment. The MMTel Enabler Server may also obtains the IMS Session ID associated with the Third Party Call as specified in RFC 7989 [10], and handles the mapping between the OMA call session ID and the IMS session ID.

NOTE 1: The OMA call session ID attribute in the OMA Third Party Call API is generated by the entity implementing the OMA APIs, which is different from the IMS session ID.

3. The MMTel Enabler Server utilizes the DC update capability of the IMS core network to add DC media to the existing Application Call Session as specified in Annex AC of 3GPP TS 23.228 [3]. The IMS core network returns the update result.

3. The MMTel Enabler Server sends an Application Call establishment response to the Application. The response message includes information elements as specified in clause 8.4.2.3.2.

NOTE 2: In this release, the MMTel Enabler Server is deployed in the PLMN operator domain.

8.4.2.3 Information flows

8.4.2.3.1 Application Call establishment request

The information elements of Application Call establishment request are as same as the elements in Table 8.4.3.3.1-1.

8.4.2.3.2 Application Call establishment response

The information elements of Application Call establishment response are as same as the elements in Table 8.4.3.3.2-1.

8.4.3 Third-Party Call service API with Data Channel capability

8.4.3.1 General

The MMTel Enabler Server exposes the Third-Party Call service API with Data Channel capability to the Vertical service provider in order to support establishing a call between two UEs.

8.4.3.2 Procedure

8.4.3.2.1 Establishing a Third-Party Call with Data Channel capability

Figure 8.4.3.2.1-1 illustrates the operation to establish a Third-Party Call with Data Channel capability.

Pre-conditions:

1. The Vertical service provider is authorized to use Third-Party Call service API provided by the MMTel Enabler Server.
2. The MMTel Enabler Server is authorized to use the IMS DC capability APIs as defined in 3GPP TS 23.228 [3].
3. The MMTel Enabler Server is authorized to use OMA THIRD PARTY CALL API as specified in OMA-TS-REST_NetAPI_ThirdPartyCall [7].

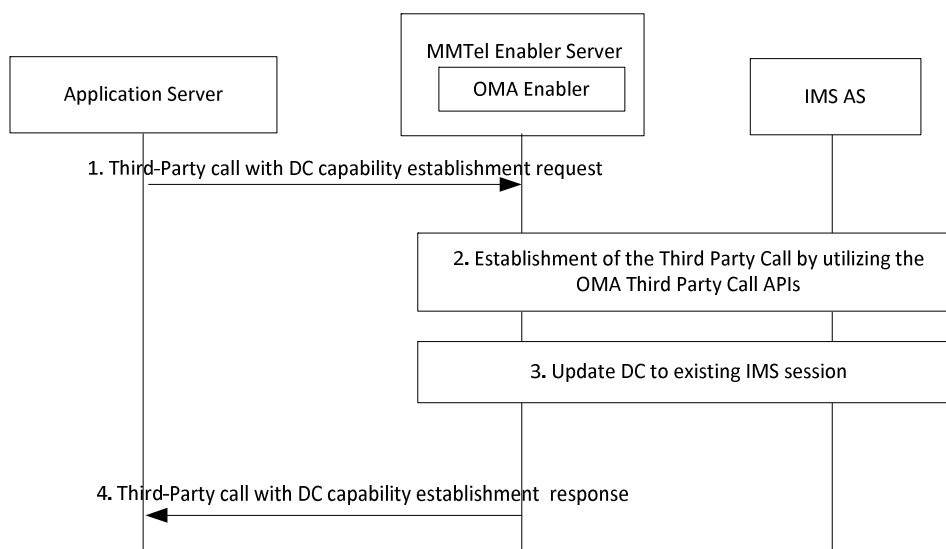


Figure 8.4.3.2.1-1: Establishing a Third-Party Call with Data Channel capability

1. The Vertical service provider sends a Third-Party Call with DC capability establishment request to the MMTel Enabler Server. The request message includes information elements as specified in clause 8.4.3.3.1.
2. Upon receiving the request, the MMTel Enabler Server validates if the requester is authorized for the request, If the requester is authorized then the MMTel Enabler Server utilizes the OMA Third Party Call API [7] to establish a Third-Party Call session with audio and/or video media as specified in OMA-TS-REST_NetAPI_ThirdPartyCall and obtain the result of the Third Party Call establishment. The MMTel Enabler Server obtains IMS Session ID associated with the Third Party Call as specified in RFC 7989 [10], the OMA API call Session ID and handles the mapping between OMA call session ID and the IMS session ID

NOTE 1: The OMA call session ID attribute in the OMA Third Party Call API is generated by the entity implementing the OMA APIs, which is different from the IMS session Id.

3. the MMTel Enabler Server utilizes the DC update capability of the IMS core network to add DC media to the existing Third-Party Call Session as specified in 3GPP TS 23.228 [3], and the IMS core network returns the update result.
4. The MMTel Enabler Server sends a Third-Party Call with DC capability establishment response to the Vertical service provider. The response message includes information elements as specified in clause 8.4.3.3.2.

NOTE 2: In this release, the MMTel Enabler Server is deployed in the PLMN operator domain.

8.4.3.3 Information flows

8.4.3.3.1 Third-Party Call with DC capability establishment request

Table 8.4.3.3.1-1 describes information elements for the Third-Party Call with DC capability establishment request from the Application Server to the MMTel Enabler Server.

Table 8.4.3.3.1-1: Third-Party Call with DC capability establishment request

Information element	Status	Description	Related OMA API Element
Originating ID (see NOTE)	M	The identifier of the caller.	The first element in the participant list, which considered to denote the "A-Party" specified in OMA Third Party Call API [7].
Terminating ID (see NOTE)	M	The identifier of the callee.	The second element in the participant list, which considered to denote the "B-Party" specified in OMA Third Party Call API [7].
Media information	O	Identifier of one or more media type(s) which is expected to be used in the call, i.e. the media type(s) to be applied to the participants in the call session. In this IE, the media type(s) includes a) audio; b) video; c) audio and video. The detailed media information, e.g. the information included in the SDP of MMTel call session is negotiated by the underlying network. If the parameter is absent, the media type(s) and detailed media information are all negotiated by the underlying network.	The medialInfo of the CallSessionInformation specified in OMA Third Party Call API [7].
DC media information	O	Identifier of whether DC media is expected to be used in this call	N/A
Application Profile requested	O	The DC application profile expected to be used in this call	N/A
Notification information	M	The address where the call related notification, e.g. whether the call between UE A and UE B is established successfully or not, is sent to.	The callbackReference of the CallSessionInformation specified in OMA Third Party Call API [7].
NOTE:	The Originating ID and Terminating ID may or may not be MSISDN based identifier, i.e. a private identifier in the Application domain. If Originating ID or Terminating ID is not MSISDN based identifier, the MMTel Enabler Server will translate it into a routable ID in the IMS domain and record the mapping relationship between the Originating ID/Terminating ID and the routable ID.		

8.4.3.3.2 Third-Party Call with DC capability establishment response

Table 8.4.3.3.2-1 describes information elements for the Third-Party Call with DC capability establishment response from the Application Server to the MMTel Enabler Server.

Table 8.4.3.3.2-1: Third-Party Call with DC capability establishment response

Information element	Status	Description	Related OMA API Element
Call establishment result	M	Indication if the Call establishment is success or failure.	The HTTP response codes of the created call session as specified in OMA REST_NetAPI_Common [1 1].
Session ID (see NOTE 1)	O	The identifier of the call session.	The callSessionId as specified in OMA Third Party Call API [7].
Failure Cause (see NOTE 2)	O	The reason for failure	The Policy Exception and Service Exception fault as specified in OMA Third Party Call API [7].
Originating ID (see NOTE 3)	M	The identifier of the caller.	The first element in the participant list, which considered to denote the "A-Party" specified in OMA Third Party Call API [7].
Terminating ID (see NOTE 3)	M	The identifier of the callee.	The second element in the participant list, which considered to denote the "B-Party" specified in OMA Third Party Call API [7].
Media information	O	Identifier of one or more media type(s) which is expected to be used in the call, i.e. the media type(s) to be applied to the participants in the call session. In this IE, the media type(s) includes a) audio; b) video; c) audio and video. The detailed media information, e.g. the information included in the SDP of MMTel call session is negotiated by the underlying network. If the parameter is absent, the media type(s) and detailed media information are all negotiated by the underlying network.	The mediaInfo of the CallSessionInformation specified in OMA Third Party Call API [7].
DC media information	O	Identifier of whether DC media is expected to be used in this call.	N/A
Application Profile requested	O	The DC application profile expected to be used in this call.	N/A
<p>NOTE 1: This IE shall only be present when the Call establishment result is Success.</p> <p>NOTE 2: This IE shall only be present when the Call establishment result is Failure.</p> <p>NOTE 3: The Originating ID and Terminating ID may or may not be MSISDN based identifier, i.e. a private identifier in the Application domain. If Originating ID or Terminating ID is not MSISDN based identifier, the MMTel Enabler Server will translate it into a routable ID in the IMS domain and record the mapping relationship between the Originating ID/Terminating ID and the routable ID.</p>			

8.4.4 Establishing an Application Call with Data Channel capability (A2P)

8.4.4.1 Procedure

Figure 8.4.4-1 illustrates the operation to establish an Application Call with Data Channel capability between the Application and the MMTel Enabler Server in order to add an A2P Data Channel to an existing IMS session of the user on UE1 in alignment with the A2P flow specified in 3GPP TS 23.228 [3].

Pre-conditions:

1. The Application can use DC (supports the media set information for DC) and is authorized to use the service API provided by the MMTel Enabler Server.
2. The MMTel Enabler Server is authorized to use IMS DC capability APIs as defined in 3GPP TS 23.228 [3].
3. The MMTel Enabler Server is authorized to use the NEF exposed IMS session management capabilities as specified in 3GPP TS 23.502 [12].
4. The MMTel Enabler Server is subscribed to the AEF (NEF) for IMS session events information e.g., media changes such as requested for the specific DC Application, for a list of users.

NOTE: How the IMS session ID is provided by the NEF exposure of IMS events in 3GPP TS 23.502 [12] is out of scope of this specification.

5. The DC Application Server is subscribed to the MMTel Enabler Server for events related to the DC application.
6. An IMS MMTel session is ongoing for User (UE1) with another user who requests the DC Application to provide some DC media to the user on UE1.

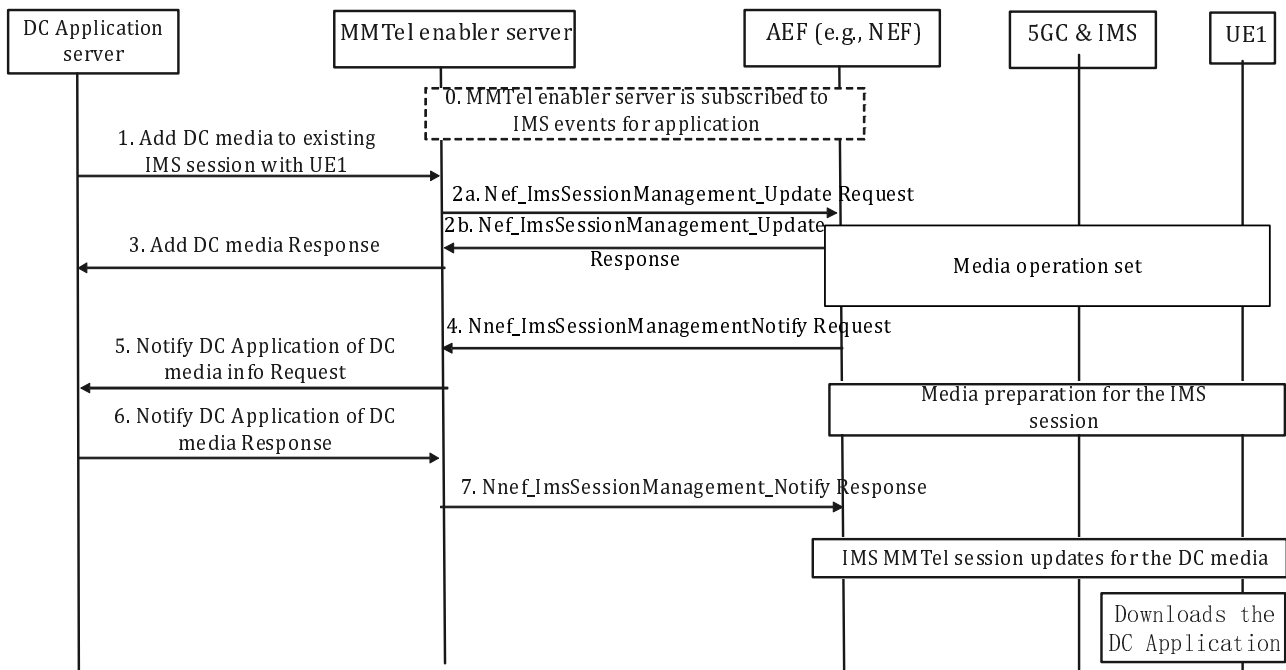


Figure 8.4.4-1: Establishing an Application Call with Data Channel capability

1. The DC Application server determines to add A2P application data channel(s) to an existing IMS session and sends request to MMTel Enabler Server. The request includes parameters such as the session ID, MDC2 endpoint, A2P type.
2. The MMTel Enabler Server requests an IMS session update to the NEF, providing the Session ID and MDC2 endpoint address. The NEF propagates the request to the IMS core which sets the media operation. The NEF sends the response to the MMTel Enabler to the IMS session Update request.
3. The MMTel Enabler Server sends the response to the DC Application Server including the Session ID for the Add media request.
4. Once the IMS system completed the media preparation for the IMS session, based on the notification from the IMS, the NEF sends an IMS session management notification request to the MMTel Enabler Server with MDC2 resource information for the Session ID.
5. The MMTel Enabler Server notifies the DC Application Server of the MDC2 resource information for the Session ID.

6. The DC Application Server responds (acknowledges) the MMTel Enabler Server notification.
7. The MMTel Enabler Server acknowledges the NEF notification.

Post-condition: The UE1 upon getting the updated IMS session information for the DC media proceeds to download the DC Application.

8.4.4.2 Information flows

8.4.4.2.1 Application Add Data Channel media to UE1 session (A2P) request

Table 8.4.4.2.1-1: Application Add Data Channel media to UE1 session (A2P) request

Information element	Status	Description
Data Channel APPID	M	The identifier of the DC application.
Session ID	M	The session identifier of the session on which MMTel Enabler Server must add the new media.
Media resource information	O	The media information to be passed via the Data Channel. It includes information described in 3GPP TS 23.502 [12] clause 5.2.6.40.
Application Profile requested	O	The DC application profile expected to be used in this call.
Notification address	M	The address where the call related notification, e.g. whether the call between UE A and UE B is established successfully or not, is sent to.

8.4.4.2.2 Application Add Data Channel media to UE1 session (A2P) response

Table 8.4.4.2.2-1: Application Add Data Channel media (A2P) response

Information element	Status	Description
Session ID	M	The session identifier of the session on which MMTel Enabler Server must add the new media.
Result	M	Indicates the Notification of Application of DC media info (A2P) request was successful or failure.
> Cause	O	Indicates the cause of request failure.

8.4.4.2.3 Notify Application of DC media info (A2P) request

Table 8.4.4.2.3-1: Notify Application of DCH media info (A2P) request

Information element	Status	Description
Session ID	M	The session identifier of the session on which MMTel Enabler Server must add the new media.
Notification address	M	The address where the call related notification, e.g. whether the call between UE A and UE B is established successfully or not, is sent to.
Media resource information	O	The media information to be passed via the Data Channel. It includes information described in 3GPP TS 23.502 [12] clause 5.2.6.40.
Application Profile requested	O	The DC application profile expected to be used in this call.

8.4.4.2.4 Notify Application of DC media info (A2P) response

Table 8.4.4.2.4-1: Notify Application of DC media info (A2P) response

Information element	Status	Description
Session ID	M	The session identifier of the session on which MMTel Enabler Server must add the new media.
Result	M	Indicates the Notification of Application of DC media info (A2P) request was successful or failure.
> Cause	O	Indicates the cause of request failure.

8.4.5 Application calling service API with Data Channel capability

8.4.5.1 Procedure

8.4.5.1.1 Establishing an Application Call with Data Channel capability (P2A)

Figure 8.4.5.1.1-1 illustrates the operation to establish an Application Call with Data Channel capability between a user (on UE1) and a Data Chanel (DC) Application via the MMTel Enabler Server.

Pre-conditions:

1. The Application can use DC (supports the media set information for DC) and is authorized to use the service API provided by the MMTel Enabler Server.
2. The MMTel Enabler Server is authorized to use IMS DC capability APIs as defined in 3GPP TS 23.228 [3].
3. The MMTel Enabler Server is authorized to use the NEF exposed IMS session management capabilities as specified in [8].
4. The MMTel Enabler Server is subscribed to the AEF (NEF) for IMS session events information for the specific DC Application (using the DCApplication Called party ID).

NOTE: How the IMS session ID is provided by the NEF exposure of IMS events in 3GPP TS 23.502 [12] is out of scope of this specification.

5. The DC Application Server is subscribed to the MMTel Enabler Server for events related to the DC application.
6. An IMS MMTel session is ongoing for User (UE).

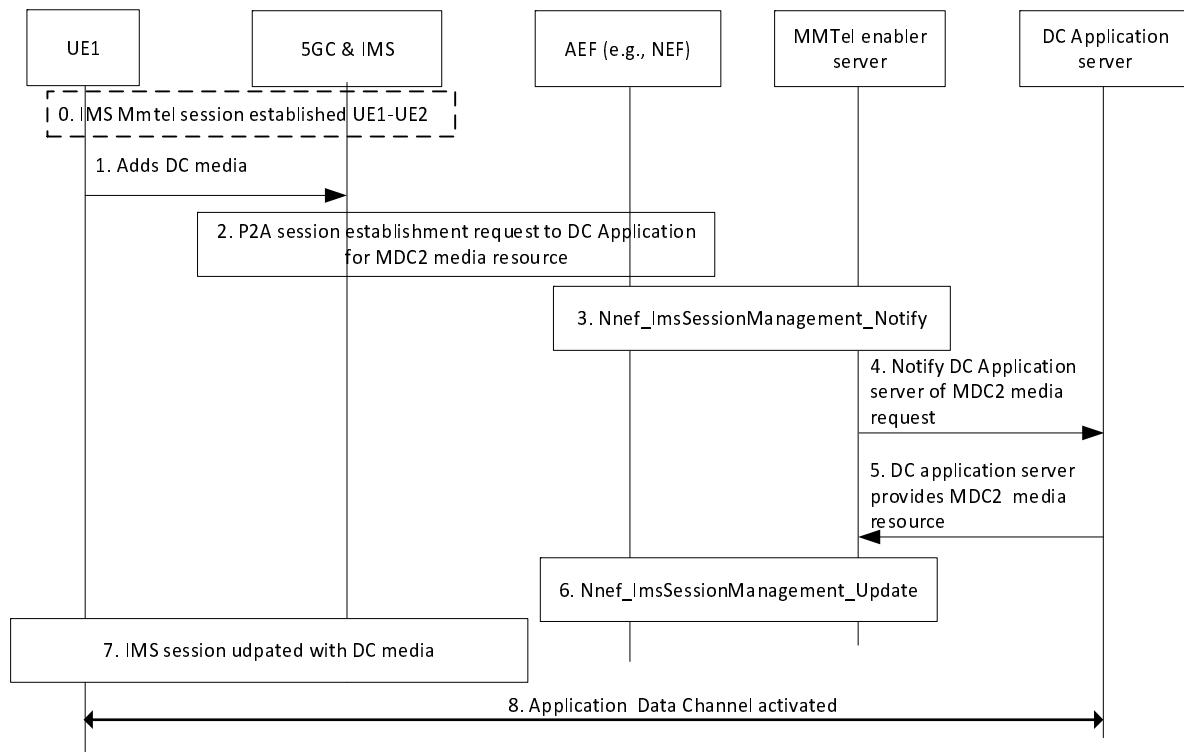


Figure 8.4.5.1.1-1: Establishing a Application Call with Data Channel capability (P2A)

1. The user (on UE1) sends a request, via the 5GC and IMS, to add DC media for a specific DC Application.
2. The P2A session establishment is handled via 5GC and IMS system.
3. NEF notifies the MMTel Enabler Server of the new IMS session event for the DC Application.
4. The MMTel Enabler Server notifies the DC Application Server of the new request for DC media.
5. The DC Application Server accepts the request and provides the MDC2 media resource requested.
6. The MMTel Enabler Server utilizes the IMS session update capability exposed by the NEF [8] to request addition of the DC media to the existing IMS MMTel Call Session.
7. The NEF further interacts with the IMS system to request the DC media addition to the ongoing MMTel session and IMS further handles this as specified in Annex AC of 3GPP TS 23.228 [3].

Post-condition: The Application data channel is activated.

8.4.5.2 Information flows

8.4.5.2.1 Notify DC Application of MDC2 media (P2A) request

Table 8.4.5.2.1-1: Notify DC Application of MDC2 media (P2A) request

Information element	Status	Description
Session ID	M	The session identifier of the session on which MMTel Enabler Server must add the new media.
Media resource information	O	The MDC2 media information requested by the UE1 to be sent over the Data Channel. It includes information described in 3GPP TS 23.502 [12] clause 5.2.6.40.

8.4.5.2.2 Notify DC Application of MDC2 media (P2A) response

Table 8.4.5.2.2-1: Notify DC Application of MDC2 media (P2A) response

Information element	Status	Description
Session ID	M	The session identifier of the session on which MMTel Enabler Server must add the new media.
Result	M	Indicates the Notification of Application of DC media info (A2P) request was successful or failure.
> Cause	O	Indicates the cause of request failure.

8.5 Multiple call control handling coordination among different Application Servers

8.5.1 General

When receiving call control requests from multiple Application Servers, the MMTel Enabler Server provides call control handling consolidation and coordination.

8.5.2 Procedure

Figure 8.5.2-1 illustrates the procedure of multiple call control handling coordination among different Application Servers.

Pre-conditions:

1. The Application Servers and MMTel Enabler Server have mutually authenticated each other.
2. The call control handling policy (e.g. the priority of each Application Server) is pre-configured in MMTel Enabler Server.
3. Application Servers have completed call event subscription to MMTel Enabler Server and the MMTel Enabler Server subscribes the call event from NEF.
4. The MMTel Enabler Server is authorized to use NEF capability APIs as defined in 3GPP TS 23.502 [12].

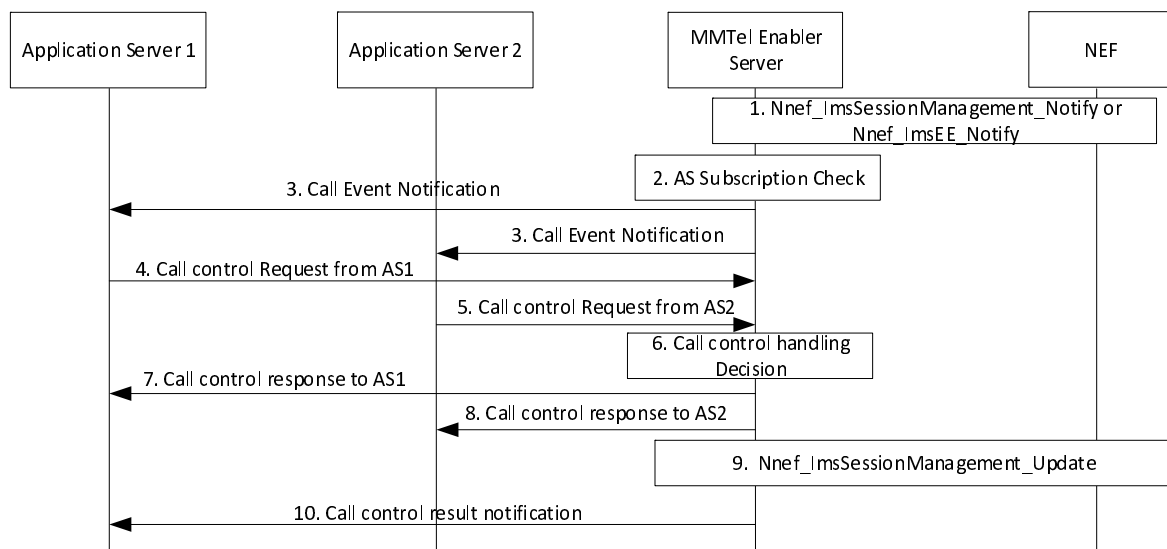


Figure 8.5.2-1: Multiple call control handling coordination among different Application Servers

1. The NEF notifies the MMTel Enabler Server about an event in the IMS session for a user via Nnef_ImSessionManagement_Notify call or via a Nnef_ImEE_Notify, depending on the IMS session event that occurred, as described in 3GPP TS 23.502 [12] and based on the events defined in 3GPP TS 23.228 [3] in Table AA.2.4.4.5.
2. The MMTel Enabler Server checks which Application Server has subscribed this call event notification.
3. The MMTel Enabler Server sends Call event notification to Application Server(s) which has subscribed for this call event notification. The Call event notification request includes information elements as specified in Annex AA.2.4.2 of 3GPP TS 23.228 [3].
- 4-5. Application Servers receive call event notification and sends Call control request (e.g. create new call session, terminate call session or call control, etc.) based on its own service logic. The Call control request includes information elements as specified in Annex AA.2.4.3 or Annex AA.2.4.4 of 3GPP TS 23.228 [3].
6. The MMTel Enabler Server receives call control requests from different Application Servers. It checks whether these call control requests are contradictory or not and makes call control handling decision based on service policy and service priority (e.g. if no conflict happens, to decide call control request execution sequence; if conflict happens, to deny call control request from certain AS with lower priority, etc.).
- 7-8. The MMTel Enabler Server sends call control responses to each Application Server based on the call control handling decision including, whether the call control request is accepted or the failure reason if the call control request is not accepted. The call control response includes information elements as specified in Annex AA.2.4.3 or Annex AA.2.4.4 of 3GPP TS 23.228 [3].
9. The MMTel Enabler Server sends call control requests decided in step 6 from Application Servers (or permitted Application Servers in conflict scenario) to the NEF by returning Nnef_ImSessionManagement_notify response and if applicable, to request the addition of DCH media to the ongoing IMS session via a Nnef_ImSessionManagement_Update request to the NEF as defined in 3GPP TS 23.502 [12].
10. The MMTel Enabler Server sends the call control result notification request to the subscribed Application Servers in conflict scenario decided in step 6. The call control result notification includes information elements as specified in clause 8.5.3.1. The Application Server sends the corresponding control result notification response to the MMTel Enabler Server.

8.5.3 Information flows

8.5.3.1 Call control result notification

Table 8.5.3.1-1 describes information elements for call control result notification request from the MMTel Enabler Server to the Application server.

Table 8.5.3.1-1: Call control result notification request

Information element	Status	Description
Final result of the call control request	M	Indicates the final result of the call control request provided by the IMS
Media resource information set	O	If media resource information set is provided by IMS, include the media resource information set in this notification

9 Deployment Guideline

9.1 General

This clause describes deployments of the functional model specified in clause 6.

9.2 MMTel Enabler server deployed in PLMN operator domain

The MMTel Enabler server is recommended to be deployed in the PLMN operator domain. Figure 9.2-1 illustrates the MMTel Enabler server deployed in PLMN operator domain.

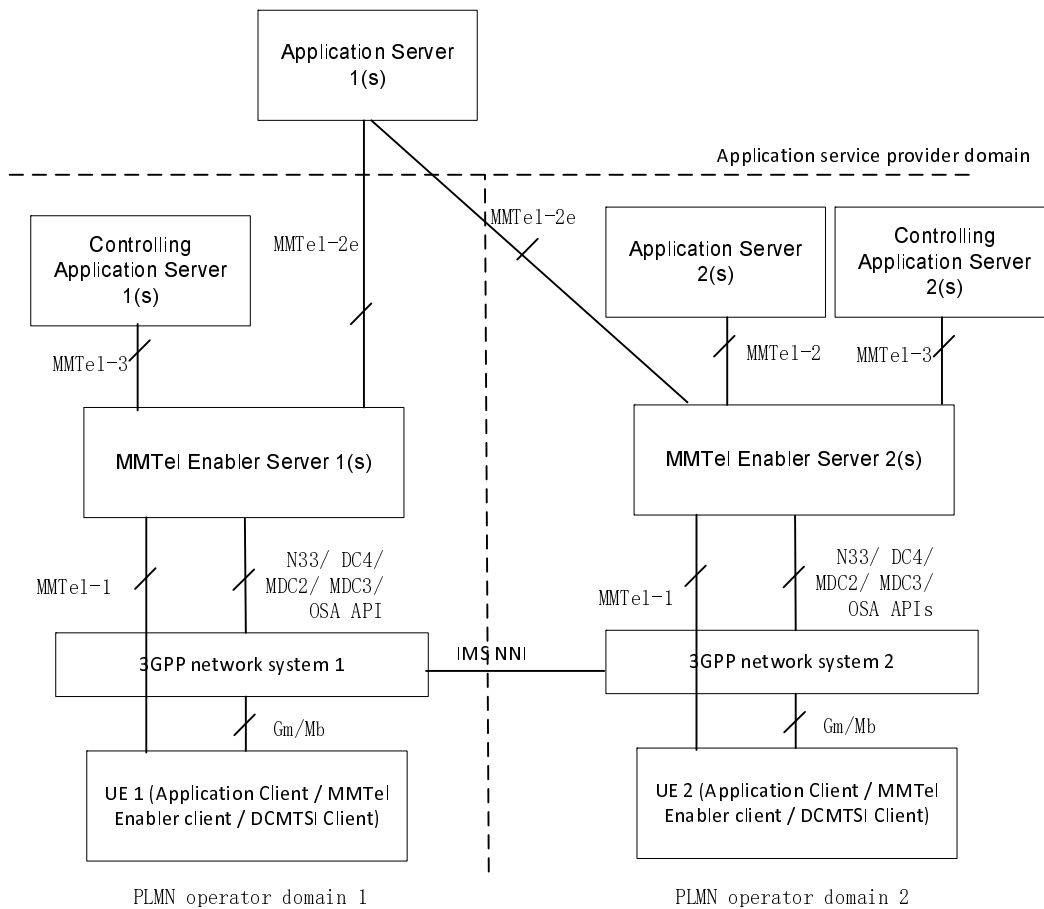


Figure 9.2-1: MMTel Enabler server deployed in PLMN operator domain

The Application server can be deployed in PLMN operator domain or Application service provider domain and interacts with MMTel Enabler server via MMTel-2 reference point and MMTel-2e reference point respectively. The Application server deployed in PLMN operator domain, e.g. Application server 2 can only interact with the MMTel Enabler server deployed in the same PLMN operator domain, i.e. MMTel Enabler server 2. The Application server deployed in Application service provider domain, e.g. Application server 1, can interact with MMTel Enabler servers deployed in different PLMN operator domains, i.e. MMTel Enabler server 1 and MMTel Enabler server 2, based on business agreement between PLMN operator and Application service provider. In this case, the MMTel-2 reference point becomes MMTel-2e reference point.

The Controlling Application server can only be deployed in PLMN operator domain and interacts with MMTel Enabler server via MMTel-3 reference point. The Controlling Application server can only interact with the MMTel Enabler server deployed in the same PLMN operator domain.

NOTE: In this release, the MMTel Enabler Server is deployed in the PLMN operator domain.

Annex A: Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2023-07	SA#62-Ad Hoc-e		-	-	-	Proposed skeleton approved at S6#62-Ad Hoc-e	0.0.0
2023-07	SA#62-Ad Hoc-e					Implemented pCRs approved in S6#62-Ad Hoc-e: S6a240100, S6a240101, S6a240102, S6a240103, S6a240282 Editorial changes by the rapporteur	0.1.0
2023-10	SA#63					Implemented pCRs approved in S6#63: S6-244639, S6-244640, S6-244641, S6-244642, S6-244643, S6-244644 Editorial changes by the rapporteur	0.2.0
2023-11	SA#64					Implemented pCRs approved in S6#64: S6-245625, S6-245626, S6-245627 Editorial changes by the rapporteur	0.3.0
2024-12	SA#106	SP-241697				Submitted to SA#106 for information	1.0.0
2025-02	SA#65					Implemented pCRs approved in S6#65: S6-250072, S6-250074, S6-250077, S6-250078, S6-250079, S6-250150, S6-250372, S6-250373, S6-250374, S6-250375, S6-250376, S6-250379, S6-250380, S6-250381, S6-250382, S6-250383, S6-250384, S6-250549, S6-250550 Editorial changes by the rapporteur	1.1.0
2025-03	SA#107	SP-250194				Submitted to SA#107 for approval	2.0.0
2025-03	SA#107	SP-250194				MCC Editorial update for publication after TSG SA approval	19.0.0
2025-06	SA#108	SP-250612	0001	1	F	MMTel Enabler architecture fixes in section 6.2.1	19.1.0
2025-06	SA#108	SP-250612	0002	2	F	MMTel Enabler Server and Client descriptions update	19.1.0
2025-06	SA#108	SP-250612	0003	3	F	Multiple call control handling coordination multiple AS alignment with SA2	19.1.0
2025-06	SA#108	SP-250612	0006	2	F	Correction on DC application profiles downloading on UE	19.1.0
2025-06	SA#108	SP-250612	0007		F	Correction on MMTel Enabler Client request DC application profiles based on notification	19.1.0
2025-06	SA#108	SP-250612	0008	1	F	Corrections related to authentication aspect indicated in various procedures preconditions.	19.1.0
2025-06	SA#108	SP-250612	0009	1	F	Corrections related to Information elements across various procedures	19.1.0
2025-06	SA#108	SP-250612	0010	1	F	Update in abbreviations clause based on its usage in the procedures and other editorial corrections	19.1.0
2025-06	SA#108	SP-250612	0011		F	Update NOTE in the DC application profiles downloading procedure.	19.1.0
2025-06	SA#108	SP-250612	0012		F	Correction to the notification procedure	19.1.0
2025-06	SA#108	SP-250612	0013	1	F	Correction in Application Call with Data Channel capability procedure	19.1.0
2025-06	SA#108	SP-250612	0014		F	Remove DCAR related ENs in TS23.392	19.1.0
2025-06	SA#108	SP-250612	0016	1	F	Correction the figure in cl. 8.4.5	19.1.0
2025-06	SA#108	SP-250612	0017	1	F	Correction to cl. 8.4.4 and cl. 8.4.5	19.1.0
2025-09	SA#109	SP-251063	0020	1	F	Subscription request sent to the MMTel Enabler server	19.2.0
2025-09	SA#109	SP-251063	0021		F	Remove ENs regarding NEF exposure of IMS session management	19.2.0
2026-01	SA#110	SP-251487	0022		F	DC application and profile configuration request update	19.3.0
2026-01	SA#110	SP-251487	0023	1	F	Correction the figure in clause 8.2.3.2	19.3.0

History

Version	Date	Status
V19.2.0	January 2026	Publication
V19.3.0	February 2026	Publication