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**TECHNICAL SPECIFICATION**

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Mission Critical Push To Talk (MCPTT) call control;
Protocol specification
(3GPP TS 24.379 version 13.0.1 Release 13)

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# Contents

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# 1 Scope

This document specifies the session control protocols needed to support Mission Critical Push To Talk (MCPTT). This document specifies both on-network and off-network protocols.

Mission critical communication services are services that require preferential handling compared to normal telecommunication services, e.g. in support of police or fire brigade.

The MCPTT service can be used for public safety applications and also for general commercial applications (e.g., utility companies and railways).

This document is applicable to User Equipment (UE) supporting the MCPTT client functionality, and to application servers supporting the MCPTT server functionality.

# 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 22.179: "Mission Critical Push To Talk (MCPTT) over LTE; Stage 1".

[3] 3GPP TS 23.179: "Functional architecture and information flows to support mission critical communication services; Stage 2".

[4] 3GPP TS 24.229: "IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".

[5] 3GPP TS 24.380: "Mission Critical Push To Talk (MCPTT) floor control Protocol specification".

[6] IETF RFC 3841 (August 2004): "Caller Preferences for the Session Initiation Protocol (SIP)".

[7] IETF RFC 4028 (April 2005): "Session Timers in the Session Initiation Protocol (SIP)".

[8] IETF RFC 4574 (August 2006): "The Session Description Protocol (SDP) Label Attribute".

[9] IETF RFC 6050 (November 2010): "A Session Initiation Protocol (SIP) Extension for the Identification of Services".

[10] IETF RFC 3550 (July 2003): "RTP: A Transport Protocol for Real-Time Applications".

[11] Void.

[12] IETF RFC 4566 (July 2006): "Session Description Protocol".

[13] IETF RFC 3605 (October 2003): "Real Time Control Protocol (RTCP) attribute in Session Description Protocol (SDP)".

[14] IETF RFC 3325 (November 2002): "Private Extensions to the Session Initiation Protocol (SIP) for Asserted Identity within Trusted Networks".

[15]        IETF RFC 5626 (October 2009): "Managing Client-Initiated Connections in the Session Initiation Protocol (SIP)".

[16]        IETF RFC 3840 (August 2004): "Indicating User Agent Capabilities in the Session Initiation Protocol (SIP)".

[17]        IETF RFC 5245 (April 2010): "Interactive Connectivity Establishment (ICE): A Protocol for Network Address Translator (NAT) Traversal for Offer Answer Protocols".

[18]        IETF RFC 5373 (November 2008): "Requesting Answering Modes for the Session Initiation Protocol (SIP)".

[19]        IETF RFC 5364 (October 2008): "Extensible Markup Language (XML) Format Extension for Representing Copy Control Attributes in Resource Lists".

[20]        IETF RFC 5366 (October 2008): "Conference Establishment Using Request-Contained Lists in the Session Initiation Protocol (SIP)".

[21]        IETF RFC 2046 (November 1996): "Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types".

[22]        IETF RFC 4488 (May 2006): "Suppression of Session Initiation Protocol (SIP) REFER Method Implicit Subscription".

[23]        IETF RFC 4538 (June 2006): "Request Authorization through Dialog Identification in the Session Initiation Protocol (SIP)".

[24]        IETF RFC 3261 (June 2002): "SIP: Session Initiation Protocol".

[25]        IETF RFC 3515 (April 2003): "The Session Initiation Protocol (SIP) Refer Method".

[26]        IETF RFC 6665 (July 2012): "SIP-Specific Event Notification".

[27]        IETF RFC 7647 (September 2015): "Clarifications for the use of REFER with RFC6665".

[28]        3GPP TS 24.334: "Proximity-services (ProSe) User Equipment (UE) to Proximity-services (ProSe) Function Protocol aspects; Stage 3".

[29]        IETF RFC 4412 (February 2006): "Communications Resource Priority for the Session Initiation Protocol (SIP)".

[30]        IETF RFC 4575 (August 2006): "A Session Initiation Protocol (SIP) Event Package for Conference State".

[31]        3GPP TS 24.381: "Mission Critical Push To Talk (MCPTT) group management Protocol specification".

[32]        IETF RFC 4483 (May 2006): "A Mechanism for Content Indirection in Session Initiation Protocol (SIP) Messages.

[33]        IETF RFC 3428 (December 2002): "Session Initiation Protocol (SIP) Extension for Instant Messaging".

[34]        IETF RFC 4964 (October 2007): "The P-Answer-State Header Extension to the Session Initiation Protocol for the Open Mobile Alliance Push-to-talk over Cellular".

[35]        IETF RFC 7614 (August 2015): "Explicit Subscriptions for the REFER Method".

[36]        IETF RFC 5318 (December 2008): "The Session Initiation Protocol (SIP) P-Refused-URI-List Private-Header (P-Header)".

[37]        IETF RFC 3903 (October 2004): "Session Initiation Protocol (SIP) Extension for Event State Publication".

[38]        IETF RFC 5368 (October 2008): "Referring to Multiple Resources in the Session Initiation Protocol (SIP)".

[39]          IETF RFC 5761 (April 2010): "Multiplexing RTP Data and Control Packets on a Single Port".

[40]          3GPP TS 23.003: "Numbering, addressing and identification".

[41]          3GPP TS 23.203: "Policy and charging control architecture".

[42]          3GPP TS 29.468: "Group Communication System Enablers for LTE (GCSE_LTE); MB2 Reference Point; Stage 3".

[43]          3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols; Stage 3".

[44]          IETF RFC 3264 (June 2002): "An Offer/Answer Model with the Session Description Protocol (SDP)".

[45]          3GPP TS 24.383: "Mission Critical Push To Talk (MCPTT) Management Object (MO)".

[46]          3GPP TS 33.179: "Security of Mission Critical Push-To-Talk (MCPTT)".

[47]          IETF RFC 4567 (July 2006): "Key Management Extensions for Session Description Protocol (SDP) and Real Time Streaming Protocol (RTSP)".

[48]          draft-holmberg-dispatch-mcptt-rp-namespace-00.txt (February 2016) "Resource-Priority Namespace for Mission Critical Push To Talk service".

Editor's note [CT1#96, C1-161109]: The above document cannot be formally referenced until it is published as an RFC.

[49]          3GPP TS 24.382: "Mission Critical Push To Talk (MCPTT) identity management Protocol specification.

[50]          3GPP TS 24.384: "Mission Critical Push To Talk (MCPTT) configuration management Protocol specification".

[51]          IETF RFC 3856 (August 2004): "A Presence Event Package for the Session Initiation Protocol (SIP)".

[52]          IETF RFC 3863 (August 2004): "Presence Information Data Format (PIDF)".

[53]          IETF RFC 7519 (May 2015): "JSON Web Token (JWT)".

[54]          3GPP TS 23.032: "Universal Geographical Area Description (GAD)".

[55]          IETF RFC 4354 (January 2006): "A Session Initiation Protocol (SIP) Event Package and Data Format for Various Settings in Support for the Push-to-Talk over Cellular (PoC) Service".

# 3          Definitions, symbols and abbreviations

## 3.1          Definitions

For the purposes of the present document, the terms and definitions given in 3GPP 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 3GPP TR 21.905 [1].

**An MCPTT user is affiliated to an MCPTT group**: The MCPTT user is listed as a member of the MCPTT group in the MCPTT group document, the MCPTT server owning the MCPTT group has authorised the MCPTT user's interest in the MCPTT group and the MCPTT server serving the MCPTT user has authorised the MCPTT user's interest in the MCPTT group.

**An MCPTT user is affiliated to an MCPTT group at an MCPTT client**: The MCPTT user is affiliated to the MCPTT group, the MCPTT client has a registered IP address for an IMPU related to the MCPTT ID, and the MCPTT server serving the MCPTT user has authorised the MCPTT user's interest in the MCPTT group at the MCPTT client.

**Affiliation status**: Applies for an MCPTT user to an MCPTT group and has one of the following states:

   a) the "not-affiliated" state indicating that the MCPTT user is not interested in the MCPTT group and the MCPTT user is not affiliated to the MCPTT group;

   b) the "affiliating" state indicating that the MCPTT user is interested in the MCPTT group but the MCPTT user is not affiliated to the MCPTT group yet;

   c) the "affiliated" state indicating that the MCPTT user is affiliated to the MCPTT group and there was no indication that MCPTT user is no longer interested in the MCPTT group; and

   d) the "deaffiliating" state indicating that the MCPTT user is no longer interested in the MCPTT group but the MCPTT user is still affiliated to the MCPTT group.

**Group identity**: An MCPTT group identity or a temporary MCPTT group identity.

**MCPTT emergency alert state:** MCPTT client internal perspective of the state of an MCPTT emergency alert.

**MCPTT emergency group state:** MCPTT client internal perspective of the in-progress emergency state of an MCPTT group maintained by the controlling MCPTT function.

**MCPTT emergency group call state:** MCPTT client internal perspective of the state of an MCPTT emergency group call.

**MCPTT speech:** Conversational audio media used in mission critical push to talk systems as defined by 3GPP TS 22.179 [2] and 3GPP TS 23.179 [3].

**Media-floor control entity**: A media control resource shared by participants in an MCPTT session, controlled by a state machine to ensure that only one participant can access the media resource at the same time.

**Temporary MCPTT group identity**: A group identity representing a temporary grouping of MCPTT group identities formed by the group regrouping operation as specified in 3GPP TS 24.381 [31].

**Trusted mutual aid**: A business relationship whereby the Partner MCPTT system is willing to share the details of the members of an MCPTT group that it owns with the Primary MCPTT system.

**Untrusted mutual aid**: A business relationship whereby the Partner MCPTT system is not willing to share the details of the members of an MCPTT group that it owns with the Primary MCPTT system.

For the purposes of the present document, the following terms and definitions given in 3GPP TS 22.179 [2] apply:

   **In-progress emergency**
   **MCPTT emergency alert**
   **MCPTT emergency group call**
   **MCPTT emergency state**
   **Partner MCPTT system**
   **Primary MCPTT system**

For the purpose of the present document, the following terms and definitions given in 3GPP TS 24.380 [5] apply:

   **MBMS subchannel**

# 3.2   Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP 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 3GPP TR 21.905 [1].

| | |
|---|---|
| ECGI | E-UTRAN Cell Global Identification |
| MBMS | Multimedia Broadcast and Multicast Service |
| MBSFN | Multimedia Broadcast multicast service Single Frequency Network |
| MCPTT | Mission Critical Push To Talk |
| MCPTT group ID | MCPTT group IDentity |
| MEA | MCPTT Emergency Alert |
| MEG | MCPTT Emergency Group |

| MEGC | MCPTT Emergency Group Call |
|------|-----------------------------|
| MIME | Multipurpose Internet Mail Extensions |
| MONP | MCPTT Off-Network Protocol |
| NAT | Network Address Translation |
| PLMN | Public Land Mobile Network |
| QCI | QoS Class Identifier |
| RTP | Real-time Transport Protocol |
| SAI | Service Area Identifier |
| SDP | Session Description Protocol |
| SIP | Session Initiation Protocol |
| TGI | Temporary MCPTT Group Identity |
| TMGI | Temporary Mobile Group Identity |
| UE | User Equipment |
| URI | Uniform Resource Identifier |

# 4 General

Editor's Note: This clause contains any material of a descriptive nature needed to introduce the document and its procedures.

Editor's Note: The proposal in this skeleton is that on-network and off-network procedures are covered at the greatest header level depth in the skeleton, in order to ensure that compatible procedures exist for both modes of operation where required by the stage 1. This proposal is likely to be revised.

## 4.1 MCPTT overview

Editor's Note: This subclause will have some general text here to explain MCPTT and list the procedures covered by this document.

## 4.2 URI and address assignments

In order to support MCPTT, the following URI and address assignments are assumed:

1) the participating MCPTT function is configured to be reachable using:

   a) the public service identity identifying the pre-established session on the MCPTT server serving the MCPTT user;

   b) the MBMS public service identity of the participating MCPTT function; and

   c) the public service identity of the participating MCPTT function serving the MCPTT user.

NOTE: The above PSI values are configured with the same URI. However, in the present document the above names on the URIs are used for the purpose of readability.

## 4.3 MCPTT speech

Editor's Note: More detailed aspects of SDP offer and answer for an MCPTT speech session are to be described in the clause on "Common procedures".

A session that contains MCPTT speech is either a full-duplex session or a half-duplex session with an SDP media component containing an audio media type with a codec suitable for conversational speech that exists between an MCPTT client and an MCPTT server.

If the MCPTT speech session is a half-duplex session, it additionally contains a media component that describes the characteristics of the media-floor control entity.

# 4.4 Warning Header Field

## 4.4.1 General

The MCPTT server can include a free text string in a SIP response to a SIP request. When the MCPTT server includes a text string in a response to a SIP INVITE request the text string is included in a Warning header field as specified in IETF RFC 3261 [24]. The MCPTT server includes the Warning code set to 399 (miscellaneous warning) and includes the host name set to the host name of the MCPTT server.

EXAMPLE: Warning: 399 "100 User not authorised to make group calls"

## 4.4.2 Warning texts

The text string included in a Warning header field consists of an explanatory text preceded by a 3-digit text code, according to the following format in Table 4.4.2-1.

**Table 4.4.2-1 ABNF for the Warning text**

```
warn-text      =/  DQUOTE mcptt-warn-code SP warn-mcptt-text DQUOTE
mcptt-warn-code = DIGIT DIGIT DIGIT
mcptt-warn-text = *( qdtext | quoted-pair )
```

Table 4.4.2-2 defines the warning texts that are defined for the Warning header field when a Warning header field is included in a response to a SIP INVITE request as specified in subclause 4.4.1.

**Table 4.4.2-2: Warning texts defined for the Warning header field**

| Code | Explanatory text | Description |
|---|---|---|
| 100 | function not allowed due to <detailed reason> | The function is not allowed to this user. The <detailed reason> will be either "group definition", "access policy", "local policy", or "user authorisation", or can be a free text string. |
| 101 | TBD | TBD |
| 102 | too many simultaneous affiliations | The MCPTT user already has N2 maximum number of simultaneous affiliations. |
| 103 | maximum simultaneous MCPTT group calls reached | The number of maximum simultaneous MCPTT group calls supported for the MCPTT user has been exceeded. |
| 104 | isfocus not assigned | A controlling MCPTT function has not been assigned to the MCPTT session. |
| 105 | maximum simultaneous MCPTT sessions reached | The number of maximum simultaneous MCPTT sessions supported for the MCPTT user has been exceeded. |
| 106 | user not authorised to join chat group | The MCPTT user is not authorised to join this chat group. |
| 107 | user not authorised to make private calls | The MCPTT user is not authorised to make private calls. |
| 108 | user not authorised to make chat group calls | The MCPTT user is not authorised to make chat group calls. |
| 109 | user not authorised to make prearranged group calls | The MCPTT user is not authorised to make group calls to a prearranged group. |
| 110 | user declined the call invitation | The MCPTT user declined to accept the call. |
| 111 | group call proceeded without all required group members | The required members of the group did not responded within the acknowledged call time, but the call still went ahead. |
| 112 | group call abandoned due to required group members not part of the group session | The group call was abandoned, as the required members of the group did not respond within the acknowledged call time. |
| 113 | group document does not exist | The group document requested from the group management server does not exist. |
| 114 | unable to retrieve group document | The group document exists on the group management server but the MCPTT server was unable to retrieve it. |
| 115 | group is disabled | The group has the <disabled> element set to "true" in the group management server. |
| 116 | user is not part of the MCPTT group | The group exists on the group management server but the requesting user is not part of this group. |
| 117 | the group identity indicated in the request is a prearranged group | The group id that is indicated in the request is for a prearranged group, but did not match the request from the MCPTT user, |
| 118 | the group identity indicated in the request is a chat group | The group id that is indicated in the request is for a chat group, but did not match the request from the MCPTT user, |
| 119 | user is not authorised to initiate the group call | The MCPTT user identified by the MCPTT ID is not authorised to initiate the group call. |
| 120 | user is not affiliated to this group | The MCPTT user is not affiliated to the group. |
| 121 | user is not authorised to join the group call | The MCPTT user identified by the MCPTT ID is not authorised to join the group call. |
| 122 | too many participants | The group call has reached its maximum number of participants. |
| 123 | MCPTT session already exists | Inform the MCPTT user that the group call is currently ongoing. |
| 124 | maximum number of private calls reached | The maximum number of private calls allowed at the MCPTT server for the MCPTT user has been reached. |

| 125 | user not authorised to make private call with automatic commencement | The MCPTT user is not authorised to make a private call with automatic commencement. |
|---|---|---|
| 126 | user not authorised to make private call with manual commencement | The MCPTT user is not authorised to make a private call with manual commencement. |
| 127 | user not authorised to be called in private call | The called MCPTT user is not allowed to be part of a private call. |
| 128 | isfocus already assigned | The MCPTT server owning an MCPTT group received a SIP INVITE request destined to the MCPTT group from another MCPTT server already assigned as the controlling MCPTT function and the MCPTT server owning the MCPTT group does not support mutual aid or supports trusted mutual aid but does not authorise trusted mutual aid. |
| 129 | group not authorised for emergency group call, authorised for emergency alert | The MCPTT group is not authorised for emergency group call, but is authorised for emergency alert. |
| 130 | group not authorised for emergency group call, not authorised for emergency alert | The MCPTT group is not authorised for both emergency group call and emergency alert. |
| 131 | group not authorised for emergency group call | The MCPTT group is not authorised for emergency group call. |
| 132 | emergency group call authorised, emergency alert not authorised | The MCPTT group is authorised for emergency group call but is not authorised for emergency alert. |
| 133 | in-progress emergency group state not cancelled | The in-progress emergency group state was not cancelled. |
| 134 | in-progress emergency group state not cancelled, emergency alert cancelled. | The in-progress emergency group state was not cancelled but the emergency alert was cancelled. |
| 135 | in-progress emergency group state not cancelled, but emergency alert sent | The in-progress emergency group state was not cancelled but the emergency alert was sent. |
| 136 | authentication of the MIKEY-SAKKE I_MESSAGE failed | The client received the "mikey" attribute value but the authentication failed. |

# 4.5    MCPTT session identity

The MCPTT session identity is a SIP URI, which identifies the MCPTT session between the MCPTT client and the controlling MCPTT function.

The MCPTT session identity identifies the MCPTT session in such a way that e.g.:

- the MCPTT user is able to subscribe to the participant information of the ongoing MCPTT session;

- the MCPTT user is able to re-join an ongoing MCPTT session; and

- the IM CN subsystem is able to route an initial SIP request to the controlling MCPTT function.

The controlling MCPTT function allocates a unique MCPTT session identity for the MCPTT session at the time of session establishment.

The controlling MCPTT function sends the MCPTT session identity towards the MCPTT client during MCPTT session establishment by including it in the Contact header field of the final SIP response to a session initiation request.

The MCPTT client can cache the MCPTT session identity until a time when it is no longer needed.

The MCPTT session identity is also used in floor control requests and responses as specified in 3GPP TS 24.380 [5].

Editor's Note [CT1#94, C1-153805]: It is FFS if the MCPTT session identity needs to be a GRUU.

# 4.6          MCPTT priority calls and alerts

## 4.6.1          MCPTT emergency group calls

MCPTT emergency group calls as defined by 3GPP TS 23.179 [3] are supported by the procedures in this specification. The following MCPTT emergency group call functionalities are described:

-          MCPTT emergency group call origination;

-          upgrade of an MCPTT group call to an MCPTT emergency group call; and

-          in-progress group emergency cancel.

> NOTE 1:          In-progress group emergency cancel means the cancellation of the in-progress emergency state of the group, which is managed by the controlling MCPTT function.

The above functionalities are supported using both MCPTT prearranged group calls and MCPTT chat group calls.

Key aspects of MCPTT emergency group calls include:

-          adjusted EPS bearer priority for all participants whether or not they themselves are in an emergency condition (i.e. have their MCPTT emergency state set). This is achieved by using the Resource-Priority header field as specified in IETF RFC 4412 [29] with namespaces defined for use by MCPTT specified in draft-holmberg-dispatch-mcptt-rp-namespace [48];

-          pre-emptive floor control priority over MCPTT users in MCPTT emergency group calls who themselves do not have their MCPTT emergency state set;

-          restoration of normal EPS bearer priority to the call participants when the in-progress emergency group state is cancelled;

-          restoration of normal floor control priority participants when the in-progress emergency group state is cancelled;

-          requires the MCPTT user to be authorised to either originate or cancel an MCPTT emergency group call;

-          requests to originate MCPTT emergency group calls may also include an indication of an MCPTT emergency alert; and

-          requests to cancel MCPTT emergency group calls may also include an indication of cancelling a previously issued MCPTT emergency alert.

There are a number of states that are key in managing these aspects of MCPTT emergency group calls, which include:

-          **MCPTT emergency state:** as defined in 3GPP TS 22.179 [2] and 3GPP TS 23.179 [3], indicates that the MCPTT user is in a life-threatening situation. Managed by the MCPTT user of the device or an authorised MCPTT user. While the MCPTT emergency state is set on the client, all calls originated by the client will be MCPTT emergency calls, assuming the MCPTT user is authorised for MCPTT emergency calls on them.

-          **in-progress emergency group state:** as defined in 3GPP TS 22.179 [2] and 3GPP TS 23.179 [3], indicates whether or not there is an MCPTT emergency group call ongoing on the specified group. This state is managed by the controlling MCPTT function. All group calls originated on this MCPTT group when in an in-progress emergency state are MCPTT emergency group calls until this state is cancelled, whether or not the originator is themselves in an MCPTT emergency state.

-          **MCPTT emergency group state (MEG):** this is an internal state managed by the MCPTT client which tracks the in-progress emergency state of the group as defined in 3GPP TS 22.179 [2] and 3GPP TS 23.179 [3] and managed by the controlling MCPTT function. Ideally, the MCPTT client would not need to track the in-progress emergency group state, but doing so enables the MCPTT client to request MCPTT emergency-level priority earlier than otherwise possible. For example, if the MCPTT user wishes to join an MCPTT emergency group call and is not in MCPTT emergency state itself, the MCPTT client should have emergency level priority. If it has knowledge of the in-progress emergency state of the group, it can request priority by including a Resource-Priority header field set to the MCPTT namespace specified in draft-holmberg-dispatch-mcptt-rp-namespace [48], and appropriate priority level in the SIP INVITE request (or SIP re-INVITE request).

- **MCPTT emergency group call state (MEGC)**: this is an internal state managed by the MCPTT client which in conjunction with the MCPTT emergency alert state aids in managing the MCPTT emergency state and related actions.

- **MCPTT emergency alert state (MEA)**: this is also an internal state of the MCPTT client which in conjunction with the MCPTT emergergency group call state aids in managing the MCPTT emergency state and related actions.

   NOTE 2:  The above states and their transitions are described in Annex G.

# 4.7     End-to-end communication security

If a mission critical organisation requires MCPTT users to communicate using end-to-end security, a security context needs to be established between the initiator of the call and the recipient(s) of the call, prior to the establishment of media, or floor control signalling. This provides assurance to MCPTT users that no unauthorised access to communications is taking place within the MCPTT network. An MCPTT key management server (KMS) manages the security domain. For any end-point to use or access end-to-end secure communications, it needs to be provisioned with keying material associated to its identity by the KMS as specified in 3GPP TS 33.179 [46].

For group calls, the security context is set up at the time of creation of the group or temporary group. The group management server creates group call keying material associated with the group and distributes it all members of the group or temporary group, in advance of the initiation of a group call as specified in 3GPP TS 24.381 [31] and 3GPP TS 33.179 [46]. The establishment of a security context for group calls has no impact on this specification.

For private calls, the security context is initiated at call setup. An end-to-end security context is established that is unique to the pair of users involved in the call. The procedure involves transferral of an encapsulated private call key (PCK) and private call key id (PCK-ID) from the initiator to the terminator. The PCK is encrypted using the terminator's MCPTT ID and domain-specific material provided from the KMS. The PCK and PCK-ID are distributed within a MIKEY payload within the SDP offer of the private call request. This payload is called a MIKEY-SAKKE I_MESSAGE, as defined in IETF RFC 6509 [47], which ensures the confidentiality, integrity and authenticity of the payload. The encoding of the MIKEY payload in the SDP offer is described in IETF RFC 4567 [47] using an "a=keymgmt" attribute. The payload is signed using a key associated to the identity of the initiating user. At the terminating side, the signature is validated. If valid, the UE extracts and decrypts the encapsulated PCK. The MCPTT UE also extracts the PCK-ID. This process is described in 3GPP TS 33.179 [46]. With the PCK successfully shared between the two MCPTT UEs, the UEs are able to use SRTP/SRTCP to create an end-to-end secure session.

End-to-end security is independent of the transmission path and hence is applicable to both on and off-network communications. With a security context established, the group call key and private call key can be used to encrypt media and, if required, floor control traffic between the end-points as described in 3GPP TS 24.380 [5] clause 13.

# 4.8     Protection of sensitive application data.

In certain deployments, for example, in the case that the MCPTT operator uses the underlying SIP core infrastructure from the carrier operator, the MCPTT operator can prevent certain sensitive application data from being visible in the clear to the SIP layer. The following data are classed as sensitive application data:

- MCPTT ID;

- MCPTT group ID;

- user location information;

- emergency, alert and imminent-peril indicators; and

- access token (containing the MCPTT ID).

The above data is transported as XML content in SIP messages. 3GPP TS 33.179 [46] describes a method to provide confidentiality protection of sensitive application data by using XML encryption (i.e. xmlenc). Integrity protection can also be provided by using XML signatures (i.e. xmlsig).

Protection of the data relies on a shared XML protection key (XPK) used to encrypt and sign data:

- between the MCPTT client and the MCPTT server, the XPK is a client-server key (CSK); and

- between MCPTT servers and between MCPTT domains, the XPK is a SIP protection key (SPK).

The CSK (XPK) and a key-id CSK-ID (XPK-ID) are generated from keying material provided by the key management server. Identity based public key encryption based on MIKEY-SAKKE is used to transport the CSK between SIP end-points. The encrypted CSK is transported from the MCPTT client to the MCPTT server when the MCPTT client performs service authorisation as described in clause 7 and is also used during service authorisation to protect the access token.

The SPK (XPK) and a key-id SPK-ID (XPK-ID) are directly provisioned in the MCPTT servers.

Configuration in the MCPTT client and MCPTT server is used to determine whether one or both of confidentiality protection and integrity protection are required.

The following four examples give a brief overview of the how confidentiality and integrity protection is applied to application data in this specification.

EXAMPLE 1:    Pseudo code showing how confidentiality protection is represented in the procedures in the document for sensitive data sent by the originating client.

```
IF configuration is set for confidentiality protection of sensitive data
THEN
     Encrypt data element using the CSK (XPK) by following TS 33.179
     Include in an <EncryptedData> element of the XML MIME body according to TS 33.179:
       (1) the encryption method;
       (2) the key-id (XPK-ID);
       (3) the cipher data;
ELSE
     include application data into XML MIME body in clear text;
ENDIF;
```

EXAMPLE 2:    Pseudo code showing how integrity protection is represented in the procedures in this document for data sent by the originating client.

```
IF configuration is set for integrity protection of application data
THEN
     Use a method to hash the content as specified in TS 33.179;
     Generate a signature for the hashed content using the CSK (XPK) as specified in TS 33.179
     Include within a <Signature> XML element of the XML MIME body according to TS 33.179:
       (1) a cannonicalisation method to be applied to the signed information;
       (2) the signature method used for generating the signature;
       (3) a reference to the content to be signed;
       (4) the hashing method used;
       (5) the hashed content;
       (6) the key-id (XPK-ID);
       (7) the signature value;
ENDIF;
```

EXAMPLE 3:    Pseudo code showing how confidentiality protection is represented in the procedures in this document at the server side when receiving encrypted content.

```
IF configuration is set for confidentiality protection of sensitive data
THEN
     Check that the XML content contains the <EncryptedData> element.
     Return an error if the <EncryptedData> element is not found.
     Otherwise:
       (1) obtain the CSK (XPK) using the CSK-ID (XPK-ID) in the received XML body;
       (2) decrypt the data elements using the CSK as specified in TS 33.179;
ENDIF;
```

EXAMPLE 4:    Pseudo code showing how integrity protection is represented in the procedures in this document at the server side when receiving signed content.

```
IF configuration is set for integrity protection of application data
THEN
   Check that the XML content contains the <Signature> element;
   Return an error if the <Signature> element is not found;
   Otherwise
       (1) obtain the CSK (XPK) using the CSK-ID (XPK-ID) in the received XML body;
       (2) verify the signature of the content using the CSK;
   Return an error if the validation of the signature fails;
```

```
      IF validation of the signature passes
      THEN
         decrypt any data found in <EncryptedData> elements;
      ENDIF;
   ENDIF;
```

The content can be re-encrypted and signed again using the SPK between MCPTT servers.

The following examples show the difference between normal and encrypted data content. In this example consider the MCPTT client initiating a prearranged group session.

EXAMPLE 5: <mcptt-info> MIME body represented with data elements in the clear:

```
Content-Type: application/vnd.3gpp.mcptt-info+xml
<?xml version="1.0"?>
<mcptt-info>
  <mcptt-Params>
    <session-type>prearranged</session-type>
    <mcptt-request-uri xsd:type=Normal>sip:group123@mcpttoperator1.com</mcptt-request-uri>
  </mcptt-Params>
</mcptt-info>
```

EXAMPLE 6: <mcptt-info> MIME body represented with the <mcptt-request-uri> encrypted:

```
Content-Type: application/vnd.3gpp.mcptt-info+xml
<?xml version="1.0"?>
<mcptt-info>
  <mcptt-Params>
    <session-type>prearranged</session-type>
    <mcptt-request-uri xsd:type=Encrypted>
      <EncryptedData xmlns='http://www.w3.org/2001/04/xmlenc#'
       Type='http://www.w3.org/2001/04/xmlenc#Content'>
        <EncryptionMethod Algorithm="http://www.w3.org/2009/xmlenc11#aes128-gcm"/>
        <ds:KeyInfo>
          <ds:KeyName>base64XpkId</KeyName>
        </ds:KeyInfo>
        <CipherData>
          <CipherValue>A23B45C5657689090</CipherValue>
        </CipherData>
      </EncryptedData>
    </mcptt-request-uri>
  </mcptt-Params>
</mcptt-info>
```

# 5 Functional entities

Editor's Note: This clause describes the functional entities that are used later in each of the procedures clauses. This is currently the MCPTT client and the MCPTT server. Note that discussions are ongoing in stage 2 as to any split of the MCPTT server functionality, and if that occurs this clause and the subsequent subclauses would change accordingly.

## 5.1 Introduction

This clause associates the functional entities with the MCPTT roles described in the stage 2 architecture document (see 3GPP TS 23.179 [3]).

## 5.2 MCPTT client

To be compliant with the procedures in this document, an MCPTT client shall:

- act as the user agent for all MCPTT application transactions (e.g. initiation of a group call);

To be compliant with the on-network procedures in this document, an MCPTT client shall:

- support the MCPTT client on-network procedures defined in 3GPP TS 23.179 [3];

- act as a SIP UA as defined in 3GPP TS 24.229 [4];

- generate SDP offer and SDP answer in accordance with 3GPP TS 24.229 [4] and subclause 6.2;

- act as a floor participant responsible for floor requests and implement the on-network procedures for floor requests as specified in 3GPP TS 24.380 [5];

- for service authorisation, implement the procedures specified in subclause 7.2;

- for support of pre-established sessions, implement the procedures specified in subclause 8.2.1, subclause 8.3.1, subclause 8.4.1, and the procedures specified in 3GPP TS 24.380 [5];

- for affiliation, implement the procedures specified in subclause 9.2;

- dependent on the desired functionality for group call, implement the MCPTT client procedures specified in subclause 10.1; and

- dependent on the desired functionality for private call, implement the MCPTT client procedures specified in subclause 11.1.

To be compliant with the off-network procedures in this document, an MCPTT client shall:

Editor's Note [CT1#94, C1-153802]: A reference is required to the role of the MCPTT client related to the protocol for off-network. However the protocol for off-network is still to be specified.

- support the MCPTT client off-network procedures defined in 3GPP TS 23.179 [3];

- act as a floor participant for floor requests and implement the off-network procedures for floor requests as specified in 3GPP TS 24.380 [5];

- act as a floor control server providing distributed floor control and implement the off-network procedures for floor control as specified in 3GPP TS 24.380 [5];

- implement the procedures for ProSe direct discovery for public safety use as specified in 3GPP TS 24.334 [28];

- implement the procedures for one-to-one ProSe direct communication for Public Safety use as specified in 3GPP TS 24.334 [28];

- dependent on the desired functionality for group call, implement the MCPTT client procedures specified in subclause 10.2; and

- dependent on the desired functionality for private call, implement the MCPTT client procedures specified in subclause 11.2.

To be compliant with the service continuity procedures in the present document, an MCPTT client shall:

- implement the procedures for UE-to-network relay functionality as specified in 3GPP TS 24.334 [28]; and

- implement the procedures specified in subclause [TBD].

To be compliant with the on-network and off-network procedures in this document requiring private call key distribution, an MCPTT client shall support the procedures specified in 3GPP TS 33.179 [46].

Editor's Note [CT1#94, C1-153802]: A reference is required to an appropriate subclause when available.

Editor's Note: [CT1#94, C1-153802]: The term "dependent on the desired functionality" may be removed dependent on the discussion in SA6 regarding what aspects of functionality are mandatory and what are optional.

# 5.3 MCPTT server

## 5.3.1 General

An MCPTT server can perform the controlling role for group calls and private calls as defined in 3GPP TS 23.179 [3].

An MCPTT server can perform the participating role for group calls and private calls as defined in 3GPP TS 23.179 [3].

An MCPTT server can perform a non-controlling role for group calls involving groups from multiple MCPTT systems as specified in 3GPP TS 23.179 [3].

An MCPTT server performing the participating role can serve an originating MCPTT user.

An MCPTT server performing the participating role can serve a terminating MCPTT user.

The same MCPTT server can perform the participating role and controlling role for the same group session.

When referring to the procedures in this document for the MCPTT server acting in a participating role for the served user, the term, "participating MCPTT function" is used.

When referring to the procedures in this document for the MCPTT server acting in a controlling role for the served user, the term "controlling MCPTT function" is used.

When referring to the procedures in this document for the MCPTT server acting in a non-controlling role for a group call, the term "non-controlling MCPTT function of an MCPTT group" is used.

To be compliant with the procedures in this document, an MCPTT server shall:

- support the MCPTT server procedures defined in 3GPP TS 23.179 [3];

- implement the role of an AS performing 3rd party call control acting as a routing B2BUA as defined in 3GPP TS 24.229 [4];

- generate SDP offer and SDP answer in accordance with 3GPP TS 24.229 [4] and subclause 6.3;

- implement the role of a centralised floor control server and implement the on-network procedures for floor control as specified in 3GPP TS 24.380 [5];

- for service authorisation, implement the procedures specified in subclause 7.3;

- for support of pre-established sessions, implement the procedures specified in subclause 8.2.2, subclause 8.3.2, subclause 8.4.2 and the procedures specified in 3GPP TS 24.380 [5];

- for affiliation, implement the procedures specified in subclause 9.3;

- dependent on the desired functionality for group call, implement the MCPTT server procedures specified in subclause 10.1; and

- dependent on the desired functionality for private call, implement the MCPTT server procedures specified in subclause 11.1.

To be compliant with the procedures in this document requiring the distribution of private call keying material between MCPTT clients as specified in 3GPP TS 33.179 [46], an MCPTT server shall ensure that the keying material is copied from incoming SIP messages into the outgoing SIP messages.

Editor's Note [CT1#94, C1-153803]: The term "dependent on the desired functionality" may be removed dependent on the discussion in SA6 regarding what aspects of functionality are mandatory and what are optional.

## 5.3.2   Functional connectivity models

The following figures give an overview of the connectivity between the different functions of the MCPTT server as described in subclause 5.3.1.

NOTE:   Separate boxes are shown for each of the functions of the MCPTT server. In each MCPTT system, these functions can be physically combined into one MCPTT server or can be implemented on more than one MCPTT server. For example, there could be an instantiation of an MCPTT server that only serves as a controlling MCPTT function, but not as a participating MCPTT function for any MCPTT clients. When an MCPTT server supports more than one function, then sending requests from one function to another does not incur a traversal of the underlying IMS SIP core network.

Figure 5.3.2-1 shows the basic functions of the MCPTT server when operating within the primary MCPTT system.

Primary MCPTT system
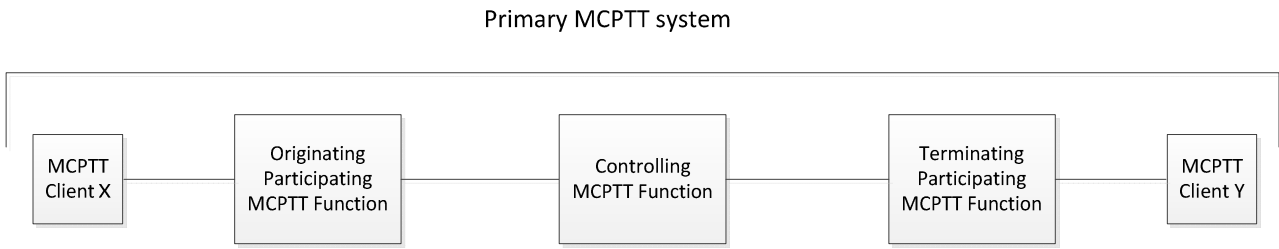


**Figure 5.3.2-1: Functions of the MCPTT server in the primary MCPTT system**

Figure 5.3.2-2 shows the use of the non-controlling MCPTT function of an MCPTT group within the primary MCPTT system. This can occur due to group re-grouping of groups within the same MCPTT system, where the MCPTT server(s) of one or more of the constituent groups are not controlled by the same controlling MCPTT function as that of the temporary group. The non-controlling MCPTT function of an MCPTT group either provide the identities of the users of the group to the controlling MCPTT function, or the non-controlling MCPTT function of an MCPTT group can invite the users of the group on behalf of the controlling MCPTT function.

Primary MCPTT system
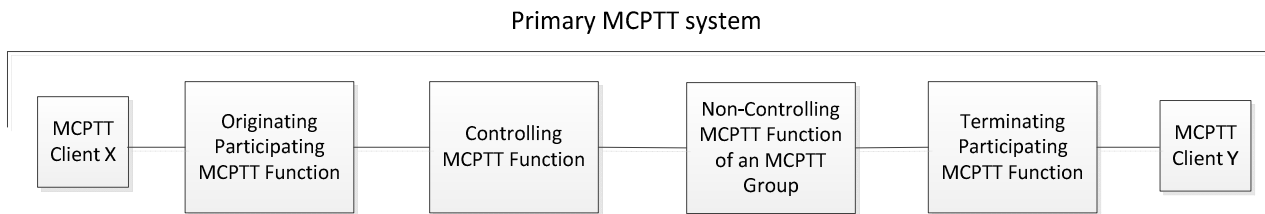


**Figure 5.3.2-2: The non-controlling function operating in the primary MCPTT system**

Figure 5.3.2-3 shows the roles of the MCPTT server in a mutual aid relationship between a primary MCPTT system and a partner MCPTT system. Here, the controlling MCPTT function is in the primary MCPTT system and the called user is homed in a partner MCPTT system.

Primary MCPTT system                    Partner MCPTT system
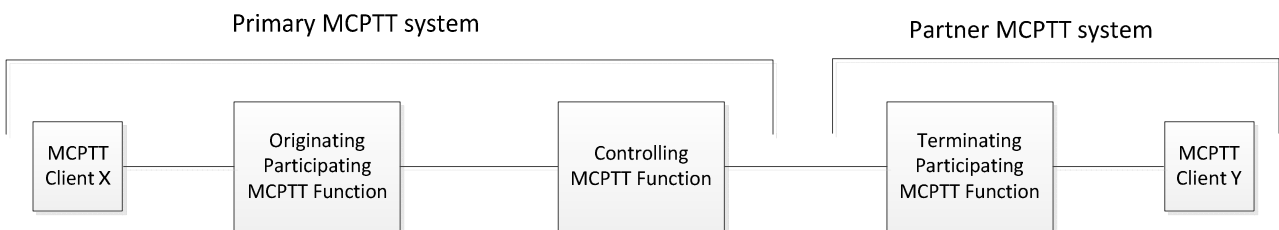


**Figure 5.3.2-3: Mutual aid relationship between the primary MCPTT system and a partner MCPTT system with the controlling MCPTT function in the primary MCPTT system**

Figure 5.3.2-4 shows the roles of the MCPTT server in a mutual aid relationship between a primary MCPTT system and a partner MCPTT system. Here, the controlling MCPTT function is in the partner MCPTT system.

Primary MCPTT system                    Partner MCPTT system
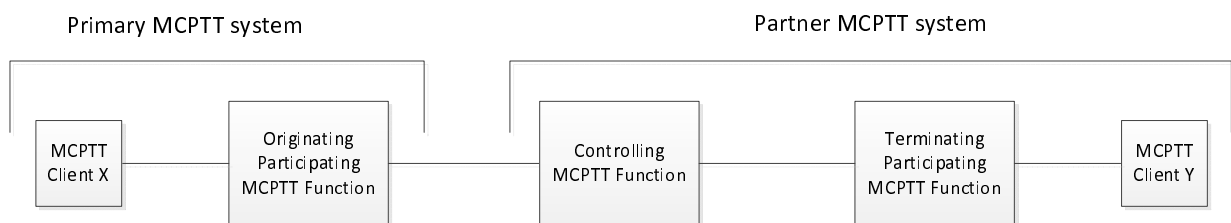


**Figure 5.3.2-4: Mutual aid relationship between the primary MCPTT system and a partner MCPTT system with the controlling MCPTT function in the partner MCPTT system**

Figure 5.3.2-5 shows the roles of the MCPTT server in a mutual aid relationship between a primary MCPTT system and a partner MCPTT with the use of a non-controlling MCPTT function of an MCPTT group within the partner MCPTT system. This can occur due to group re-grouping where the MCPTT server(s) of one or more of the constituent groups

are homed on the partner system. If the primary MCPTT system and partner MCPTT system operate in a trusted mutual aid relationship, then the non-controlling MCPTT function of an MCPTT group can provide the identities of the users of the group to the controlling MCPTT function. If the primary MCPTT system and partner MCPTT system operate in an untrusted mutual aid relationship, then the non-controlling MCPTT function of an MCPTT group invites the users of the group on behalf of the controlling MCPTT function.

Primary MCPTT system                                        Partner MCPTT system

| MCPTT Client X | Originating Participating MCPTT Function | Controlling MCPTT Function | Non–Controlling MCPTT Function of an MCPTT Group | Terminating Participating MCPTT Function | MCPTT Client Y |
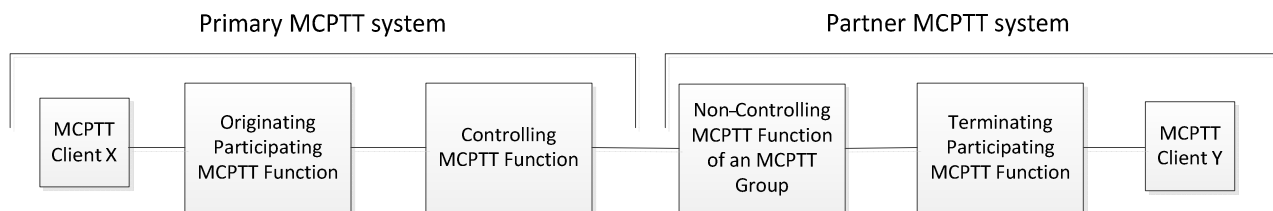
**Figure 5.3.2-5: Mutual aid relationship between the primary MCPTT system and a partner MCPTT system involving the use of a non-controlling MCPTT function of an MCPTT group in the partner MCPTT system**

Figure 5.3.2-6 illustrates a functional connectivity model involving multiple partner systems where the partner system that owns the group does not home any of the group members.

Primary MCPTT System          Partner MCPTT System 1          Partner MCPTT System 2

| MCPTT Client X | Originating Participating MCPTT Function | Controlling MCPTT Function | Terminating Participating MCPTT Function | MCPTT Client Y |
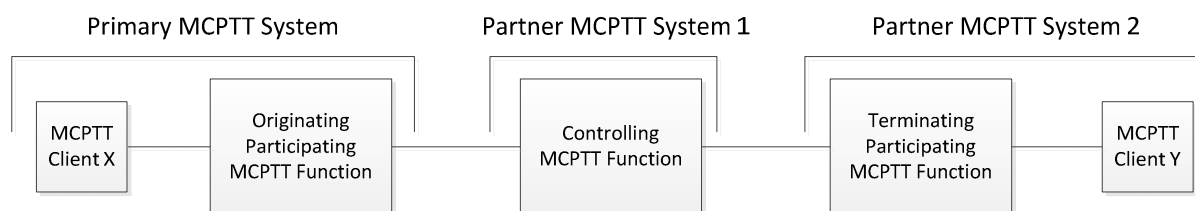
**Figure 5.3.2-6: : Mutual aid relationship between the primary MCPTT system and more than one partner MCPTT system**

Other functional connectivity models can exist.

# 6      Common procedures

Editor's Note: This subclause will provide any procedures common to the more specific subclauses below. However care needs to be taken to distinguish material that should be in 3GPP TS 24.229, versus material that belongs in the scope of this document.

## 6.1      Introduction

This clause describes the common procedures for each functional entity as specified.

## 6.2      MCPTT client procedures

### 6.2.1      SDP offer generation

The SDP offer shall contain only one SDP media-level section for MCPTT speech containing an "m=audio" line with the "a=label" attribute having a unique value as specified in IETF RFC 4574 [8] and an "i=" field associated with the "m=audio" line set to "speech" according to 3GPP TS 24.229 [4].

When composing an SDP offer according to 3GPP TS 24.229 [4] the MCPTT client:

   1)   shall set the IP address of the MCPTT client for the offered media stream and for the offered media-floor control entity, if any;

NOTE: If the MCPTT client is behind a NAT the IP address and port can be a different IP address and port than the one of the MCPTT client depending on NAT traversal method used by SIP/IP Core.

2) shall include the media-level section for the media stream consisting of:

a) the port number for the media stream selected as specified in 3GPP TS 24.380 [5]; and

b) the codec(s) and media parameters; and

3) shall include the media-level section of the offered media-floor control entity, if any, consisting of:

a) an "m=application" line, including the port number for the media-floor control entity selected as specified in 3GPP TS 24.380 [5], the transport protocol and floor control protocol; and

b) if the MCPTT client has its MCPTT emergency state set and is originating an emergency call, shall include an mc_priority attribute set to the level specified for MCPTT emergency group calls; and

4) shall include the MIKEY-SAKKE I_MESSAGE, if generated by the MCPTT client, in an "a=key-mgmt" attribute as a "mikey" attribute value in the SDP offer as specified in IETF RFC 4567 [47].

Editor's Note [CT1#95, C1-154551]: What is the emergency level for mc_priority? Is it "well-known" or configured? An alternative mechanism to provide elevated floor control priority would be to include an emergency indication in the floor control request which the MCPTT server could use to provide the appropriate floor control priority based upon policy.

Editor"s Note: the "floor control protocol" name as mentioned above is TBD.

Editor"s Note: the use of preconditions is FFS.

## 6.2.2 SDP answer generation

When the MCPTT client receives an initial SDP offer for an MCPTT session, the MCPTT client shall process the SDP offer and shall compose an SDP answer according to 3GPP TS 24.229 [4].

When composing an SDP answer, the MCPTT client:

1) shall accept the MCPTT speech media stream if offered in the SDP offer and bind the media-level section that identifies MCPTT speech to the corresponding media-floor control entity, as in the SDP offer;

2) shall set the IP address of the MCPTT client for the accepted media stream and for the accepted media-floor control entity, if any;

Editor"s Note [CT1#94, C1-153762]: If the MCPTT client is behind NAT the IP address and port can be a different IP address and port than the one of the MCPTT client depending on NAT traversal method used by SIP/IP Core.

3) shall include the media-level section for each accepted media as specified in 3GPP TS 24.229 [4]; and

4) shall include the media-level section of the offered media-floor control entity accepted in the SDP answer, if any, consisting of:

a) an "m=application" line, including the port number for the media-floor control entity selected as specified in 3GPP TS 24.380 [5], the transport protocol and floor control protocol.

Editor"s Note [CT1#94, C1-153762]: the "floor control protocol" name as mentioned above is TBD.

Editor"s Note [CT1#94, C1-153762]: the use of preconditions is FFS.

## 6.2.3 Commencement modes

### 6.2.3.1 Automatic commencement mode

#### 6.2.3.1.1 Automatic commencement mode for private calls

When performing the automatic commencement mode procedures, the MCPTT client:

1) shall accept the SIP INVITE request and generate a SIP 2xx response according to rules and procedures of 3GPP TS 24.229 [4];

2) shall include the option tag "timer" in a Require header field of the SIP 2xx response;

3) shall, if anonymity is requested by the invited MCPTT user, include the value "id" in a Privacy header field of the SIP 2xx response according to 3GPP TS 24.229 [4];

4) shall include the g.3gpp.mcptt media feature tag in the Contact header field of the SIP 2xx response;

5) shall include the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt" in the Contact header field of the SIP 2xx response;

6) shall include the Session-Expires header field in the SIP 2xx response and start the SIP session timer according to IETF RFC 4028 [7]. The "refresher" parameter in the Session-Expires header field shall be set to "uas";

7) shall include an SDP answer in the SIP 2xx response to the SDP offer in the incoming SIP INVITE request according to 3GPP TS 24.229 [4] with the clarifications given in subclause 6.2.2;

8) shall include an "application/vnd.3gpp.mcptt-info" MIME body with the <mcptt-called-party-id> element set to the MCPTT ID of the called MCPTT user, in the SIP 2xx response;

9) shall send the SIP 2xx response towards the MCPTT server according to rules and procedures of 3GPP TS 24.229 [4]; and

10) shall interact with the media plane as specified in 3GPP TS 24.380 [5].

When NAT traversal is supported by the MCPTT client and when the MCPTT client is behind a NAT, generation of SIP responses is done as specified in this subclause and as specified in IETF RFC 5626 [15].

#### 6.2.3.1.2 Automatic commencement mode for group calls

When performing the automatic commencement mode procedures, the MCPTT client shall follow the procedures in subclause 6.2.3.1.1 with the following clarification:

- The MCPTT client may include a P-Answer-State header field with the value "Confirmed" as specified in IETF RFC 4964 [34] in the SIP 2xx response.

### 6.2.3.2 Manual commencement mode

#### 6.2.3.2.1 Manual commencement mode for private calls

When performing the manual commencement mode procedures:

1) if the MCPTT user declines the MCPTT session invitation the MCPTT client shall send a SIP 480 (Temporarily Unavailable) response towards the MCPTT server with the warning text set to: "110 user declined the call invitation" in a Warning header field as specified in subclause 4.4, and not continue with the rest of the steps in this subclause.

The MCPTT client:

1) shall accept the SIP INVITE request and generate a SIP 180 (Ringing) response according to rules and procedures of 3GPP TS 24.229 [4];

2) shall include the option tag "timer" in a Require header field of the SIP 180 (Ringing) response;

3) shall, if anonymity is requested by the invited MCPTT user, include the value "id" in a Privacy header field of the SIP 180 (Ringing) response according to 3GPP TS 24.229 [4];

4) shall include the g.3gpp.mcptt media feature tag in the Contact header field of the SIP 180 (Ringing) response;

5) shall include the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt" in the Contact header field of the SIP 180 (Ringing) response;

6) shall include an "application/vnd.3gpp.mcptt-info" MIME body with the <mcptt-called-party-id> element set to the MCPTT ID of the called MCPTT user, in the SIP 180 (Ringing) response; and

7) shall send the SIP 180 (Ringing) response to the MCPTT server.

When sending the SIP 200 (OK) response to the incoming SIP INVITE request, the MCPTT client shall follow the procedures in subclause 6.2.3.1.1.

When NAT traversal is supported by the MCPTT client and when the MCPTT client is behind a NAT, generation of SIP responses is done as specified in this subclause and as specified in IETF RFC 5626 [15].

### 6.2.3.2.2 Manual commencement mode for group calls

When performing the manual commencement mode procedures:

1) the terminating MCPTT client may automatically generate a SIP 183 (Session Progress) in accordance with 3GPP TS 24.229 [4], prior to the MCPTT user's acknowledgement; and

2) if the MCPTT user declines the MCPTT session invitation the MCPTT client shall send a SIP 480 (Temporarily Unavailable) response towards the MCPTT server with the warning text set to: "110 user declined the call invitation" in a Warning header field as specified in subclause 4.4, and not continue with the rest of the steps in this subclause.

When generating a SIP 183 (Session Progress) response, the MCPTT client:

1) if privacy is requested by the invited MCPTT user, shall include value "id" in the Privacy header field according to 3GPP TS 24.229 [4];

2) shall include the following in the Contact header field:

   a) the g.3gpp.mcptt media feature tag; and

   b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt"; and

3) may include a P-Answer-State header field with the value "Unconfirmed" as specified in IETF RFC 4964 [34];

When sending the SIP 200 (OK) response to the incoming SIP INVITE request, the MCPTT client shall follow the procedures in subclause 6.2.3.1.2.

When NAT traversal is supported by the MCPTT client and when the MCPTT client is behind a NAT, generation of SIP responses is done as specified in this subclause and as specified in IETF RFC 5626 [15].

## 6.2.4 Leaving an MCPTT session initiated by MCPTT client

### 6.2.4.1 On-demand session case

Upon receiving a request from an MCPTT user to leave an MCPTT session established using on-demand session signalling, the MCPTT client:

1) shall interact with the media plane as specified in 3GPP TS 24.380 [5];

2) shall generate a SIP BYE request according to 3GPP TS 24.229 [4];

3) shall set the Request-URI to the MCPTT session identity to leave;

4) shall, if privacy is requested, include the value "id" in the Privacy header field according to 3GPP TS 24.229 [4]; and

5) shall send a SIP BYE request towards MCPTT server according to 3GPP TS 24.229 [4].

Upon receiving a SIP 200 (OK) response to the SIP BYE request, the MCPTT client shall interact with the media plane as specified in 3GPP TS 24.380 [5].

### 6.2.4.2 Pre-established session case

Upon receiving a request from an MCPTT user to leave an MCPTT session within a pre-established session, the MCPTT client:

1) shall interact with the media plane as specified in 3GPP TS 24.380 [5];

2) shall generate an initial SIP REFER request outside a dialog in accordance with the procedures specified in 3GPP TS 24.229 [4], IETF RFC 4488 [22] and IETF RFC 3515 [25] as updated by IETF RFC 6665 [26] and IETF RFC 7647 [27];

3) shall set the Request-URI of the SIP REFER request to the public service identity identifying the pre-established session on the MCPTT server serving the MCPTT user;

4) shall include the Refer-Sub header field with value "false" according to rules and procedures of IETF RFC 4488 [22];

5) shall include the Supported header field with value "norefersub" according to rules and procedures of IETF RFC 4488 [22];

Editor's Note [CT1#95, C1-154537]: Need to discuss if the MCPTT client includes the "norefersub" in a Supported header field and the Refer-Sub header field with value "false" as specified in RFC 4488 or whether the MCPTT server should also or instead use the Explicit Subscription mechanism in RFC 7614 with the "explicitsub" and "nosub" option tag in the Require header field, of the REFER request, or both.

6) shall set the Refer-To header field of the SIP REFER request to the MCPTT session identity to leave;

7) shall include the "method" SIP URI parameter with the value "BYE" in the URI in the Refer-To header field;

8) shall, if privacy is requested, include the value "id" in the Privacy header field according to 3GPP TS 24.229 [4];

9) shall include a Target-Dialog header field as specified in IETF RFC 4538 [23] identifying the pre-established session; and

10) shall send the SIP REFER request according to 3GPP TS 24.229 [4].

Upon receiving a SIP 2xx response to the SIP REFER request, the MCPTT client shall interact with media plane as specified in 3GPP TS 24.380 [5].

## 6.2.5 Releasing an MCPTT session initiated by MCPTT client

### 6.2.5.1 On-demand session case

When the MCPTT client wants to release an MCPTT session established using on-demand session signalling, the MCPTT client:

1) shall interact with the media plane as specified in 3GPP TS 24.380 [5];

2) shall generate a SIP BYE request according to 3GPP TS 24.229 [4];

3) shall set the Request-URI to the MCPTT session identity to release;

4) shall, if privacy is requested, include the value "id" in the Privacy header field according to 3GPP TS 24.229 [4]; and

5) shall send a SIP BYE request towards MCPTT server according to 3GPP TS 24.229 [4].

Upon receiving a SIP 200 (OK) response to the SIP BYE request, the MCPTT client shall interact with the media plane as specified in 3GPP TS 24.380 [5].

### 6.2.5.2 Pre-established session case

When the MCPTT client wants to release an MCPTT session using a pre-established session, the MCPTT client:

1) shall interact with the media plane as specified in 3GPP TS 24.380 [5];

2) shall generate an initial SIP REFER request outside a dialog in accordance with the procedures specified in 3GPP TS 24.229 [4], IETF RFC 4488 [22] and IETF RFC 3515 [25] as updated by IETF RFC 6665 [26] and IETF RFC 7647 [27];

3) shall set the Request-URI of the SIP REFER request to the public service identity identifying the pre-established session on the MCPTT server serving the MCPTT user;

4) shall include the Refer-Sub header field with value "false" according to rules and procedures of IETF RFC 4488 [22];

5) shall include the Supported header field with value "norefersub" according to rules and procedures of IETF RFC 4488 [22];

Editor's Note [CT1#95, C1-154537]: Need to discuss if the MCPTT client includes the "norefersub" in a Supported header field and the Refer-Sub header field with value "false" as specified in RFC 4488 or whether the MCPTT server should also or instead use the Explicit Subscription mechanism in RFC 7614 with the "explicitsub" and "nosub" option tag in the Require header field, of the REFER request, or both.

6) shall set the Refer-To header field of the SIP REFER request to the MCPTT session identity to release;

7) shall include the "method" SIP URI parameter with the value "BYE" in the URI in the Refer-To header field;

8) shall, if privacy is requested, include the value "id" in the Privacy header field according to 3GPP TS 24.229 [4];

9) shall include a Target-Dialog header field as specified in IETF RFC 4538 [23] identifying the pre-established session; and

10) shall send the SIP REFER request according to 3GPP TS 24.229 [4].

Upon receiving a SIP 2xx response to the SIP REFER request, the MCPTT client shall interact with media plane as specified in 3GPP TS 24.380 [5].

## 6.2.6 Receiving an MCPTT session release request

Upon receiving a SIP BYE request, the MCPTT client:

1) shall interact with the media plane as specified in 3GPP TS 24.380 [5]; and

2) shall send SIP 200 (OK) response towards MCPTT server according to 3GPP TS 24.229 [4].

## 6.2.7 Receiving a SIP MESSAGE request

Upon receipt of a SIP MESSAGE request the MCPTT client shall handle the request in accordance with 3GPP TS 24.229 [4] and IETF RFC 3428 [33].

Editor's Note [CT1#95, C1-154544]: This subclause requires that the MCPTT ID is placed in the Request-URI. This decision may be revised such that the IMPU is placed in the Request-URI and then the client can be map this directly to the MCPTT ID in the clients address book.

If the SIP MESSAGE request contains:

- a content-type of multipart/mixed;

- a boundary parameter set to "mcptt";

- a content type within a first "mcptt" boundary set to "application/mcptt-info+xml"; and

- a content type within a second "mcptt" boundary set to "text/plain";

then the MCPTT client:

- shall validate the MCPTT ID in the <mcptt-request-uri> element of the mcptt-info MIME body; and

- if the validation of the MCPTT ID succeeds, shall render the message content in the text/plain MIME body to the MCPTT user identified by the MCPTT ID.

## 6.2.8 Priority call conditions

This subclause contains common procedures to be used for MCPTT emergency group calls and MCPTT imminent peril group calls.

### 6.2.8.1 MCPTT emergency group call conditions

#### 6.2.8.1.1 SIP INVITE request for originating MCPTT emergency group calls

NOTE 1: This subclause is referenced from other procedures.

When the MCPTT emergency state is set and this group and the MCPTT user are authorised to originate MCPTT emergency group calls, the MCPTT client:

1) shall include in the SIP INVITE request a MIME mcpttinfo body as defined in Annex F.1 with the <emergency-ind> element set to "true" and if the MCPTT emergency group call state is set to "MEGC 1: emergency-gc-capable" shall set the MCPTT emergency group call state to "MEGC 2: emergency-call-requested";

2) if the MCPTT emergency alert state is set to "MEA 3: emergency-alert-initiated", shall set the <alert-ind> element of the MIME mcpttinfo body to "true";

3) if the MCPTT user has also requested an MCPTT emergency alert to be sent and is authorised to do so, and the MCPTT emergency alert state is set to "MEA 1: no-alert", shall set the <alert-ind> element of the MIME mcpttinfo body to "true" and set the MCPTT emergency alert state to "MEA 2: emergency-alert-confirm-pending";

4) if the MCPTT user has not requested an MCPTT emergency alert to be sent and the MCPTT emergency alert state is set to "MEA 1: no-alert", shall set the <alert-ind> element of the MIME mcpttinfo body to "false"; and

5) if the MCPTT client emergency group state of the group is set to a value other than "MEG 2: in-progress" set the MCPTT client emergency group state of the MCPTT group to "MEG 3: confirm-pending".

NOTE 2: This is the case of an MCPTT user already being in the MCPTT emergency state it initiated previously while originating an MCPTT emergency group call or MCPTT emergency alert. All group calls the MCPTT user originates while in MCPTT emergency state will be MCPTT emergency group calls.

When the MCPTT emergency state is clear and the MCPTT emergency group call state is set to "MEGC 1: emergency-gc-capable" and this group and MCPTT user are authorised to originate MCPTT emergency group calls, the MCPTT client shall set the MCPTT emergency state and perform the following actions:

1) shall include in the SIP INVITE request a MIME mcpttinfo body as defined in Annex F.1 with the <emergency-ind> element set to "true" and set the MCPTT emergency group call state to "MEGC 2: emergency-call-requested" state;

2) if the MCPTT user has also requested an MCPTT emergency alert to be sent and is authorised to do so, shall include in the MIME mcpttinfo body the <alert-ind> element set to "true" and set the MCPTT emergency alert state to "MEA 2: emergency-alert-confirm-pending";

3) if the MCPTT user has not requested an MCPTT emergency alert to be sent, shall set the <alert-ind> element of the MIME mcpttinfo to "false"; and

4) if the MCPTT client emergency group state of the group is set to a value other than "MEG 2: in-progress" shall set the MCPTT client emergency group state of the MCPTT group to "MEG 3: confirm-pending".

NOTE 3: This is the case of an initial MCPTT emergency group call and optionally an MCPTT emergency alert being sent. As the MCPTT emergency state is not sent, there is no MCPTT emergency alert outstanding.

NOTE 4:  An MCPTT group call originated by an affiliated member of an MCPTT group which is in an in-progress emergency state (as tracked on the MCPTT client by the MCPTT client emergency group state) but is not in an MCPTT emergency state of their own will also be an MCPTT emergency group call. The emergency-ind and alert-ind elements of the MIME mcpttinfo body do not need to be included in this case and hence no action needs to be taken in this subclause.

Editor's Note [CT1#95-bis, C1-160416]: statements concerning MCPTT user authorisation and group authorisation to originate MCPTT emergency group calls or MCPTT emergency alerts need to have a document to reference. Currently these authorisations are discussed in 23.179 Annex B but are expected to be in CT1 MCPTT specifications during the course of Rel-13

### 6.2.8.1.2 Resource-Priority header field for MCPTT emergency group calls

This subclause is referenced from other procedures.

When the MCPTT emergency group call state is set to either "MEGC 2: emergency-call-requested" or "MEGC 3: emergency-call-granted" and this group is authorised to originate MCPTT emergency group calls, or the MCPTT client emergency group state of the group is set to "MEG 2: in-progress", the MCPTT client shall include in the SIP INVITE request a Resource-Priority header field with the namespace set to the MCPTT-specific namespace specified in draft-holmberg-dispatch-mcptt-rp-namespace [48], and the priority set to the priority indicated for emergency calls.

NOTE:  The MCPTT client ideally would not need to maintain knowledge of the in-progress emergency state of the group (as tracked on the MCPTT client by the MCPTT client emergency group state) but can use this knowledge to provide a Resource-Priority header field set to emergency level priority, which starts the infrastructure priority adjustment process sooner than otherwise would be the case.

When the MCPTT emergency group call state is set to "MEGC 1: emergency-gc-capable" and the MCPTT user is authorised to cancel MCPTT emergency group calls, or the MCPTT client emergency group state of the group is "no-emergency" or "cancel-pending", the MCPTT client shall include in the SIP INVITE request a Resource-Priority header field with the namespace set to the MCPTT-specific namespace specified in draft-holmberg-dispatch-mcptt-rp-namespace [48], and the priority set to the normal priority level designated for this MCPTT user.

Editor's Note [CT1#95-bis, C1-160326]: It is to be determined if configuration or another mechanism is used for the MCPTT client to determine what "the priority indicated for emergency calls" should be.

### 6.2.8.1.3 SIP re-INVITE request for cancelling MCPTT in-progress emergency group state

This subclause is referenced from other procedures.

When the MCPTT emergency group call state is set to "MEGC 3: emergency-call-granted" and the MCPTT emergency alert state is set to "MEA 1: no-alert", the MCPTT client shall generate a SIP re-INVITE request according to 3GPP TS 24.229 [4] with the clarifications given below.

The MCPTT client:

1)  shall include in the SIP re-INVITE request an mcpttinfo MIME body as defined in Annex F.1 with the <emergency-ind> element set to "false";

2)  shall clear the MCPTT emergency state and set the MCPTT emergency group call state to "MEGC 1: emergency-gc-capable"; and

3)  shall set MCPTT emergency group state of the MCPTT group to "MEG 3: cancel-pending"

NOTE 1:  This is the case of an MCPTT user who has initiated an MCPTT emergency group call and wants to cancel it.

When the MCPTT emergency group call state is set to "MEGC 3: emergency-call-granted" and the MCPTT emergency alert state is set to a value other than "MEA 1: no-alert" and the MCPTT user has indicated only the MCPTT emergency group call should be cancelled, the MCPTT client:

1)  shall include in the SIP re-INVITE request an mcpttinfo MIME body as defined in Annex F.1 with the <emergency-ind> element set to "false";

2)  shall set the MCPTT emergency group state of the MCPTT group to "MEG 3: cancel-pending"; and

3) shall set the MCPTT emergency group call state to "MEGC 1: emergency-gc-capable";

NOTE 2: This is the case of an MCPTT user has initiated both an MCPTT emergency group call and an MCPTT emergency alert and wishes to only cancel the MCPTT emergency group call. This leaves the MCPTT emergency state set.

When the MCPTT emergency group call state is set to "MEGC 3: emergency-call-granted" and the MCPTT emergency alert state is set to a value other than "MEA 1: no-alert" and the MCPTT user has indicated that the MCPTT emergency alert on the MCPTT group should be cancelled in addition to the MCPTT emergency group call, the MCPTT client:

1) shall include in the SIP re-INVITE request an mcpttinfo MIME body as defined in Annex F.1 with the <emergency-ind> element set to "false";

2) shall include in the mcpttinfo MIME body an <alert-ind> element set to "false";

3) shall set the MCPTT emergency group state of the MCPTT group to "MEG 3: cancel-pending"; and

4) shall clear the MCPTT emergency state and enter the "MEGC 1: emergency-gc-capable" state.

NOTE 3: This is the case of an MCPTT user that has initiated both an MCPTT emergency group call and an MCPTT emergency alert and wishes to cancel both.

### 6.2.8.1.4 Receiving a SIP 2xx response to a SIP INVITE request for an emergency group call

On receiving a SIP 2xx response to a SIP INVITE request for an emergency group call, the MCPTT client:

1) shall set the MCPTT client emergency group state of the group to "MEG 2: in-progress" if it was not already set;

2) if no warning text was included in the SIP 2xx response and if the MCPTT emergency alert state is set to "MEA 2: emergency-alert-confirm-pending", shall set the MCPTT emergency alert state to "MEA 3: emergency-alert-initiated";

3) if warning text was included in the SIP 2xx response and contains the MCPTT warning code "132" as specified in subclause 4.4 and if the MCPTT emergency alert state is set to "MEA 2: emergency-alert-confirm-pending", shall set the MCPTT emergency alert state to "MEA 1: no-alert"; and

4) shall set the MCPTT emergency group call state to "MEGC 3: emergency-call-granted".

NOTE: the MCPTT client emergency group state above is the MCPTT client's view of the in-progress emergency state of the group.

### 6.2.8.1.5 Receiving a SIP 4xx response to a SIP INVITE request for an emergency group call

Upon receiving a SIP 4xx response to a SIP INVITE request for an emergency group call the MCPTT client:

1) shall set the MCPTT emergency group call state to "MEGC 1: emergency-gc-capable";

2) if the MCPTT client emergency group state of the group is "MEG 3: confirm-pending" shall set the MCPTT client emergency group state of the group to "MEG 1: no-emergency";

3) if the warning text contains the MCPTT warning code "129" as specified in subclause 4.4 shall set the MCPTT emergency alert state to "MEA 3: emergency-alert-initiated";

NOTE 1: this is the case where the MCPTT user has requested an MCPTT emergency alert in addition to the MCPTT emergency and the MCPTT emergency alert is granted.

4) if the warning text contains the MCPTT warning code "130" as specified in subclause 4.4 shall set the MCPTT emergency alert state to "MEA 1: no-alert"; and

NOTE 2: this is the case where the MCPTT user has requested an MCPTT emergency alert in addition to an MCPTT emergency call and the MCPTT emergency alert is not granted.

5) otherwise if the MCPTT emergency alert state is set to "MEA 2: emergency-alert-confirm-pending" shall set the MCPTT emergency alert state to "MEA 1: no-alert".

NOTE 3: warning text of "131 not authorised for emergency group call" can be returned as well but as no further processing is needed it is not included in the above procedure.

### 6.2.8.2 Request for an originating broadcast group calls

NOTE: This subclause is referenced from other procedures.

When the MCPTT user initiates a broadcast group call, the MCPTT client:

1) in the case of the prearranged group call is initiated on-demand, shall include in the "application/g.3gpp.mcptt-info+xml" MIME body the <broadcast-ind> element set to "true" as defined in clause F.1; and

2) in the case the prearranged group call is initiated using a pre-established session, shall include in the "application/g.3gpp.mcptt-info+xml" MIME body in the "body" URI header field in the Refer-To header field the <broadcast-ind> element set to "true" as defined in clause F.1.

## 6.2.9 Location information

### 6.2.9.1 Location information for location reporting

This procedure is initiated by the MCPTT client when it is including location report information as part of a SIP request for a specified location trigger.

The MCPTT client:

1) if more than one MIME body is to be included and not present already, shall include a Content-Type header field with the value "multipart/mixed" as specified in IETF RFC 2046 [21];

2) shall include a Content-Type header field set to "application/vnd.3gpp.location-info+xml";

3) shall include an "application/vnd.3gpp.location-info+xml" MIME body as specified in Annex F.3 with a <Report> element included in the <location-info> root element; and

4) shall include in the <Report> element the specific location information configured for the specified location trigger.

# 6.3 MCPTT server procedures

## 6.3.1 Distinction of requests sent to the MCPTT server

### 6.3.1.1 SIP INVITE request

The MCPTT server needs to distinguish between the following initial SIP INVITE requests for originations and terminations:

- SIP INVITE requests routed to the participating MCPTT function as a result of processing initial filter criteria at the S-CSCF in accordance with the origination procedures as specified in 3GPP TS 24.229 [4] with the Request-URI set to a public service identity of the participating MCPTT function that identifies the pre-established session set-up. Such requests are known as "SIP INVITE request for establishing a pre-established session" in the procedures in this document;

- SIP INVITE requests routed to the participating MCPTT function as a result of processing initial filter criteria at the S-CSCF in accordance with the origination procedures as specified in 3GPP TS 24.229 [4] and the Request-URI is set to a public service identity of the participating MCPTT function that does not identify the pre-established session set-up. Such requests are known as "SIP INVITE request for originating participating MCPTT function" in the procedures in this document;

- SIP INVITE requests routed to the participating MCPTT function as a result of processing initial filter criteria at the S-CSCF in accordance with the termination procedures as specified in 3GPP TS 24.229 [4] and the Request-URI contains a PSI of the terminating participating MCPTT function. Such requests are known as "SIP INVITE request for terminating participating MCPTT function" in the procedures in this document;

- SIP INVITE requests routed to the controlling MCPTT function as a result of PSI routing on the originating side in accordance with the originating procedures as specified in 3GPP TS 24.229 [4], or as a result of direct PSI routing, in accordance with the termination procedures as specified in 3GPP TS 24.229 [4], the Request-URI is set to a public service identity for MCPTT private call and the Contact header field does not contain the isfocus media feature tag specified in IETF RFC 3840 [16]. Such requests are known as "SIP INVITE request for controlling MCPTT function of a private call" in the procedures in this document;

- SIP INVITE requests routed to the controlling MCPTT function as a result of PSI routing on the originating side in accordance with the originating procedures as specified in 3GPP TS 24.229 [4], or as a result of direct PSI routing, in accordance with the termination procedures as specified in 3GPP TS 24.229 [4], the Request-URI is set to a public service identity serving an MCPTT group and the Contact header field does not contain the isfocus media feature tag specified in IETF RFC 3840 [16]. Such requests are known as "SIP INVITE request for controlling MCPTT function of an MCPTT group" in the procedures in this document; and

- SIP INVITE requests routed to the non-controlling MCPTT function of an MCPTT group as a result of direct PSI routing, in accordance with the termination procedures as specified in 3GPP TS 24.229 [4], the Request-URI is set to a public service identity serving an MCPTT group and the Contact header field contains the isfocus media feature tag specified in IETF RFC 3840 [16]; Such requests are known as "SIP INVITE request for non-controlling MCPTT function of an MCPTT group" in the procedures in this document.

### 6.3.1.2 SIP REFER request

The MCPTT server needs to distinguish between the following initial SIP REFER request for originations and terminations:

- SIP REFER requests routed to the participating MCPTT function as a result of processing initial filter criteria at the S-CSCF in accordance with the origination procedures as specified in 3GPP TS 24.229 [4] with the Request-URI set to a public service identity identifying the pre-established session on the participating MCPTT function. Such requests are known as "SIP REFER request for a pre-established session" in the procedures in this document.

### 6.3.1.3 SIP MESSAGE request

The MCPTT server needs to distinguish between the following SIP MESSAGE request for originations and terminations:

- SIP MESSAGE requests routed to the participating MCPTT function as a result of processing initial filter criteria at the S-CSCF in accordance with the origination procedures as specified in 3GPP TS 24.229 [4] with the Request-URI set to the MBMS public service identity of the participating MCPTT function. Such requests are known as "SIP MESSAGE request for an MBMS listening status update" in the procedures in this document;

- SIP MESSAGE request routed to the participating MCPTT function as a result of initial filter criteria containing a Content-Type header field set to "application/vnd.3gpp.mcptt-location-info+xml" and includes an XML body containing a Location root element containing a Report element. Such requests are known as "SIP MESSAGE request for location reporting";

- SIP MESSAGE request routed to the MCPTT client as a result of initial filter criteria containing a Content-Type header field set to "application/vnd.3gpp.mcptt-location-info+xml" and includes an XML body containing a Location root element containing a Configuration element. Such requests are known as "SIP MESSAGE request for location report configuration"; and

- SIP MESSAGE request routed to the MCPTT client as a result of initial filter criteria containing a Content-Type header field set to "application/vnd.3gpp.mcptt-location-info+xml" and includes an XML body containing a Location root element containing a Request element. Such requests are known as "SIP MESSAGE request for location report request".

Editor's Note [CT1#95-bis, C1-160453]: MESSAGE is assumed as the request carrying the XML body for the location information. This assumption can change if MESSAGE is deemed inappropriate.

## 6.3.2 Participating MCPTT Function

### 6.3.2.1 Requests initiated by the served MCPTT user

#### 6.3.2.1.1 SDP offer generation

##### 6.3.2.1.1.1 On-demand session

This subclause is referenced from other subclauses.

The SDP offer is generated based on the received SDP offer. The SDP offer generated by the participating MCPTT function:

1) shall contain only one SDP media-level section for MCPTT speech as contained in the received SDP offer; and

2) shall contain an SDP media-level section for one media-floor control entity, if present in the received SDP offer.

When composing the SDP offer according to 3GPP TS 24.229 [4], the participating MCPTT function:

1) shall replace the IP address and port number for the offered media stream in the received SDP offer with the IP address and port number of the participating MCPTT function if required for call recording, lawful interception or other reasons;

2) shall replace the IP address and port number for the offered media floor control entity, if any, in the received SDP offer with the IP address and port number of the participating MCPTT function; and

3) shall contain an "a=key-mgmt" attribute field with a "mikey" attribute value, if present in the received SDP offer.

##### 6.3.2.1.1.2 Pre-established session

This subclause is referenced from other subclauses.

When composing an SDP offer according to 3GPP TS 24.229 [4], the participating MCPTT function:

1) shall set the IP address of the participating MCPTT function for MCPTT speech from the SDP negotiated during the pre-established session establishment;

2) shall set the IP address of the participating MCPTT function for the offered media-floor control entity from the SDP negotiated during the pre-established session establishment, if present in the received SDP offer;

3) shall contain only one SDP media-level section for MCPTT speech obtained from the SDP negotiated during the pre-established session establishment consisting of:

   a) the port number for the MCPTT speech; and

   b) the codec(s) and media parameters as in the SDP negotiated during the pre-established session establishment;

4) shall include the media-level section of the offered media-floor control entity from the SDP negotiated during the pre-established session establishment, if any media-floor control entity is offered consisting of:

   a) the media-floor control entity parameters as in the SDP negotiated during the pre-established session establishment; and

   b) the port number for the selected media-floor control entity selected as specified in 3GPP TS 24.229 [4]; and

5) shall contain an "a=key-mgmt" attribute field with a "mikey" attribute value if present in the received SDP offer.

#### 6.3.2.1.2 SDP answer generation

##### 6.3.2.1.2.1 On-demand session

When composing the SDP answer according to 3GPP TS 24.229 [4], the participating MCPTT function:

1) shall replace the IP address and port number in the received SDP answer with the IP address and port number of the participating MCPTT function, for the accepted media stream in the received SDP offer if required for call recording, lawful interception or other reasons; and

2) shall replace the IP address and port number in the received SDP answer with the IP address and port number of the participating MCPTT function, for the accepted media-floor control entity, if present in the received SDP offer.

#### 6.3.2.1.2.2 Pre-established session establishment

When composing the SDP answer according to 3GPP TS 24.229 [4], the participating MCPTT function:

1. shall set the IP address and port number to those of the participating MCPTT function for each accepted media stream from the list contained in the received SDP offer and for each accepted media stream in the received SDP offer; and

2. shall set the IP address and port number to those of the participating MCPTT function, for the accepted media-floor control entity, if present in the received SDP offer.

#### 6.3.2.1.3 Sending an INVITE request on receipt of an INVITE request

This subclause is referenced from other procedures.

When generating an initial SIP INVITE request according to 3GPP TS 24.229 [4], on receipt of an incoming SIP INVITE request, the participating MCPTT function:

Editor's Note [CT1#94, C1-153763]: The incoming SIP INVITE request may contain a Privacy header field. The behaviour of the server receiving the Privacy header field is FFS.

1) shall include in the SIP INVITE request all Accept-Contact header fields and all Reject-Contact header fields, with their feature tags and their corresponding values along with parameters according to rules and procedures of IETF RFC 3841 [6] if included in the incoming SIP INVITE request;

2) should include the Session-Expires header field according to IETF RFC 4028 [7]. It is recommended that the "refresher" header field parameter is omitted. If included, the "refresher" header field parameter shall be set to "uac";

3) shall include the option tag "timer" in the Supported header field;

4) shall copy the contents of the P-Asserted-Identity header field of the incoming SIP INVITE request to the P-Asserted-Identity header field of the outgoing SIP INVITE request;

5) shall include the g.3gpp.mcptt media feature tag into the Contact header field of the outgoing SIP INVITE request;

6) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcptt" (coded as specified in 3GPP TS 24.229 [4]), into the P-Asserted-Service header field of the outgoing SIP INVITE request;

7) if the incoming SIP INVITE request contained a MIME resource-lists body with the MCPTT ID of the invited MCPTT user, shall include a Content-Type header field with multipart/mixed, as specified in IETF RFC 2046 [21], and copy the MIME resource-lists body, according to rules and procedures of IETF RFC 5366 [20]; and

8) if the incoming SIP INVITE request contained an "application/g.3gpp.mcptt-info+xml" MIME body, shall copy the contents of the "application/g.3gpp.mcptt-info+xml" MIME body of the incoming SIP INVITE request to the outgoing SIP INVITE request.

Editor's Note [CT1#94, C1-153763]: Considerations need to also be made for inclusion of the Priority header field or Resource Priority Header field depending on the contents of the incoming SIP INVITE request and the type of request (i.e. whether emergency or non-emergency). This is FFS.

#### 6.3.2.1.4 Sending an INVITE request on receipt of a REFER request

This subclause is referenced from other procedures.

When generating an initial SIP INVITE request according to 3GPP TS 24.229 [4], on receipt of an incoming SIP REFER request, the participating MCPTT function:

1) shall include in the SIP INVITE request all header fields included in the headers portion of the SIP URI in the Refer-To header field in the incoming SIP REFER request;

2) should include the Session-Expires header field according to IETF RFC 4028 [7]. It is recommended that the "refresher" header field parameter is omitted. If included, the "refresher" header field parameter shall be set to "uac";

3) shall include the option tag "timer" in the Supported header field;

4) shall copy the contents of the P-Asserted-Identity header field of the incoming SIP REFER request to the P-Asserted-Identity header field of the outgoing SIP INVITE request;

5) shall include the g.3gpp.mcptt media feature tag into the Contact header field of the outgoing SIP INVITE request;

6) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcptt" (coded as specified in 3GPP TS 24.229 [4]), into the P-Asserted-Service header field of the outgoing SIP INVITE request; and

7) if the incoming SIP REFER request contained an "application/g.3gpp.mcptt-info+xml" MIME body in the "body" URI header field, shall include a Content-Type header field with multipart/mixed, as specified in IETF RFC 2046 [21], and copy the "application/g.3gpp.mcptt-info+xml" MIME body to the SIP INVITE request, according to rules and procedures of IETF RFC 5366 [20].

Editor's Note [CT1#94, C1-153763]: Considerations need to also be made for inclusion of the Priority header field or Resource Priority Header field depending on the contents of the incoming SIP REFER request and the type of request (i.e. whether emergency or non-emergency). This is FFS.

### 6.3.2.1.5 Response to an INVITE request

#### 6.3.2.1.5.1 Provisional responses

NOTE: This subclause is referenced from other procedures

When sending SIP provisional responses other than the SIP 100 (Trying) response, the participating MCPTT function shall generate a SIP provisional response according to 3GPP TS 24.229 [4] and:

1) shall, if privacy is requested, include the value "id" in the Privacy header field according to rules and procedures of 3GPP TS 24.229 [4];

2) shall include the following in the Contact header field:

   a) the g.3gpp.mcptt media feature tag;

   b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt";

   c) the isfocus media feature tag; and

   d) an MCPTT session identity constructed from the MCPTT session identity if provided in the Contact header field of the incoming provisional response;

3) may include a Resource-Share header field in accordance with subclause 5.7.1.20.2 in 3GPP TS 24.229 [4]; and

4) if the incoming SIP provisional response contained an "application/g.3gpp.mcptt-info+xml" MIME body, shall copy the "application/g.3gpp.mcptt-info+xml" MIME body to the outgoing SIP provisional response.

#### 6.3.2.1.5.2 Final response

This subclause is referenced from other procedures.

When sending SIP 200 (OK) responses, the participating MCPTT function shall generate a SIP 200 (OK) response according to 3GPP TS 24.229 [4] and:

1)  shall include the option tag "timer" in a Require header field;

2)  shall include the Session-Expires header field according to rules and procedures of IETF RFC 4028 [7], "UAS Behavior". If the "refresher" parameter is not included in the received request, the "refresher" parameter in the Session-Expires header field shall be set to "uac";

3)  shall, if privacy is requested, include the value "id" in the Privacy header field according to rules and procedures of 3GPP TS 24.229 [4];

4)  shall include the following in the Contact header field:

    a)  the g.3gpp.mcptt media feature tag;

    b)  the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt"; and

    c)  the isfocus media feature tag;

5)  shall include the option tag "tdialog" in a Supported header field according to rules and procedures of IETF RFC 4538 [23];

6)  may include a Resource-Share header field in accordance with subclause 5.7.1.20.2 in 3GPP TS 24.229 [4]; and

7)  if the incoming SIP 200 (OK) response contained an "application/g.3gpp.mcptt-info+xml" MIME body, shall copy the "application/g.3gpp.mcptt-info+xml" MIME body to the outgoing SIP 200 (OK) response.

Editor's Note [CT1#94, C1-153763]: Need to discuss if the participating MCPTT function includes the "norefersub" in a Supported header field and includes the Refer-Sub header field equal to "false" as specified in RFC 4488 or whether the participating MCPTT function should instead use the Explicit Subscription mechanism in RFC 7614 with the "explicitsub" and "nosub" option tags in the Require header

### 6.3.2.1.6    Sending a SIP BYE request on receipt of a SIP BYE request

Upon receiving a SIP BYE request from the MCPTT client, the participating MCPTT function:

1)  shall interact with the media plane as specified in subclause 6.4 in 3GPP TS 24.380 [5];

2)  shall generate a SIP BYE request as specified in 3GPP TS 24.229 [4];

3)  shall set the Request-URI to the MCPTT session identity as included in the received SIP BYE request;

4)  shall copy the contents of the P-Asserted-Identity header field of the incoming SIP BYE request to the P-Asserted-Identity header field of the outgoing SIP BYE request;

5)  shall include a Privacy header field, according to 3GPP TS 24.229 [4], with the value set to same value of the Privacy header field in the received SIP BYE request, if the Privacy header field is included in the received SIP request; and

Editor's Note [CT1#95, C1-154712]: Privacy is FFS.

6)  shall send the SIP BYE request toward the controlling MCPTT function, according to 3GPP TS 24.229 [4].

Upon receiving a SIP 200 (OK) response to the SIP BYE request the terminating MCPTT function shall forward a SIP 200 (OK) response to the MCPTT client and shall interact with the media plane as specified in subclause 6.4 in 3GPP TS 24.380 [5] for releasing media plane resources associated with the SIP session with the controlling MCPTT function.

### 6.3.2.1.7    Sending a SIP BYE request on receipt of a SIP REFER request

Upon receiving a SIP REFER request with the "method" SIP URI parameter set to value "BYE" in the URI in the Refer-To header field from the MCPTT client, the participating MCPTT function:

1)  if the user identified by the MCPTT ID is not authorised, shall reject the "SIP REFER request for pre-established session" with a SIP 403 (Forbidden) response to the SIP BYE request, with warning text set to "100 function not allowed due to <detailed reason>" as specified in subclause 4.4. Otherwise, continue with the rest of the steps;

2)  shall generate a SIP 200 (OK) response;

3) shall include the Supported header field with value "norefersub" according to rules and procedures of IETF RFC 4488 [22];

4) shall check the presence of the Refer-Sub header field of the SIP REFER request and if it is present and set to the value "false" shall include the Refer-Sub header field with value "false" according to rules and procedures of IETF RFC 4488 [22];

Editor's Note [CT1#95, C1-154712]: Need to discuss if the participating MCPTT function includes the "norefersub" in a Supported header field and includes the Refer-Sub header field equal to "false" as specified in RFC 4488 or whether the participating MCPTT function should instead use the Explicit Subscription mechanism in RFC 7614 with the "explicitsub" and "nosub" option tags in the Require header.

5) shall send a SIP 200 (OK) response to the SIP REFER request towards MCPTT client according to 3GPP TS 24.229 [4];

6) shall generate a SIP BYE request and set the Request-URI to the MCPTT session identity which was included at the Refer-To header field of the received REFER request;

7) shall copy the contents of the P-Asserted-Identity header field of the received REFER request to the P-Asserted-Identity header field of the outgoing SIP BYE request;

8) shall include a Privacy header field, according to 3GPP TS 24.229 [4], with the value set to the received SIP request Privacy header field value, if the Privacy header field is included in the received SIP request; and

Editor's Note [CT1#95, C1-154712]: Privacy is FFS.

9) shall send the SIP BYE request toward the controlling MCPTT function according to 3GPP TS 24.229 [4].

Upon receiving a SIP 200 (OK) response to the SIP BYE request the participating MCPTT function shall interact with the media plane as specified in subclause 6.4 in 3GPP TS 24.380 [5] for releasing media plane resources associated with the SIP session with the controlling MCPTT function.

### 6.3.2.1.8 Priority call conditions

This subclause contains common procedures to be used for MCPTT emergency group calls and MCPTT imminent peril group calls.

### 6.3.2.1.9 Generating a SIP re-INVITE request on receipt of a SIP re-INVITE request

This subclause is referenced from other procedures.

When generating a SIP re-INVITE request according to 3GPP TS 24.229 [4] on receipt of an incoming SIP re-INVITE request, the participating MCPTT function:

1) should include the Session-Expires header field according to IETF RFC 4028 [7]. It is recommended that the "refresher" header field parameter is omitted. If included, the "refresher" header field parameter shall be set to "uac";

2) shall include the option tag "timer" in the Supported header field;

3) shall include the g.3gpp.mcptt media feature tag into the Contact header field of the outgoing SIP re-INVITE request;

4) if the incoming SIP re-INVITE request contained a MIME resource-lists body with the MCPTT ID of the invited MCPTT user, shall include a Content-Type header field with multipart/mixed, as specified in IETF RFC 2046 [21], and copy the MIME resource-lists body, according to rules and procedures of IETF RFC 5366 [20];

5) if the incoming SIP re-INVITE request contained an "application/g.3gpp.mcptt-info+xml" MIME body, shall include a Content-Type header field with multipart/mixed (if not already included), as specified in IETF RFC 2046 [21], and copy the "application/g.3gpp.mcptt-info+xml" MIME body, according to rules and procedures of IETF RFC 5366 [20];

6) if the incoming SIP re-INVITE request contained an "application/vnd.3gpp.location-info+xml" MIME body, shall include a Content-Type header field with multipart/mixed (if not already included), as specified in

IETF RFC 2046 [21], and copy the "application/vnd.3gpp.location-info+xml" MIME body, according to rules and procedures of IETF RFC 5366 [20]; and

7) shall include the Call-ID, From tag and To tag which are provided from the MCPTT session.

## 6.3.2.2 Requests terminated to the served MCPTT user

### 6.3.2.2.1 SDP offer generation

The participating MCPTT function shall follow the procedures in subclause 6.3.2.1.1.

### 6.3.2.2.2 SDP answer generation

#### 6.3.2.2.2.1 On-demand session

The participating MCPTT function shall follow the procedures in subclause 6.3.2.1.2.

#### 6.3.2.2.2.2 Pre-established session

When composing an SDP answer according to 3GPP TS 24.229 [4], the MCPTT server:

1) shall set the IP address of the MCPTT server for the accepted MCPTT speech media stream from the received SDP offer, which was also negotiated during the pre-established session establishment;

2) shall set the IP address of the MCPTT server for the accepted media-floor control entity from the received SDP offer, which was also negotiated during the pre-established session establishment, if present in the received SDP offer;

3) shall include the media-level section for the accepted MCPTT speech media stream from the received SDP offer, which was also negotiated in pre-established session establishment, consisting of:

   a) the port number for MCPTT speech; and

   b) the codec(s) and media parameters selected by the MCPTT server from the received SDP offer; and

4) shall include for the media-floor control entity, that is offered in the SDP offer from the MCPTT server and accepted in the SDP answer by MCPTT client, the media-level section of each offered media-floor control entity consisting of:

   a) the media-floor control entity parameters contained in the received SDP offer, restricted to media-floor control entity parameters negotiated during the pre-established session establishment; and

   b) the port number for selected media-floor control entity selected as specified in 3GPP TS 24.229 [4].

### 6.3.2.2.3 SIP INVITE request towards the terminating MCPTT client

The participating MCPTT function shall generate an initial SIP INVITE request according to 3GPP TS 24.229 [4] and:

Editor's Note [CT1#94, C1-153763]: The incoming SIP INVITE request may contain a Privacy header field with "id". The behaviour of the server receiving the Privacy header field with "id" is FFS.

1) shall include in the SIP INVITE request all Accept-Contact header fields and all Reject-Contact header fields, with their feature tags and their corresponding values along with parameters according to rules and procedures of IETF RFC 3841 [6] if included in the incoming SIP INVITE request;

2) should include the Session-Expires header field according to IETF RFC 4028 [7]. It is recommended that the "refresher" header field parameter is omitted. If included, the "refresher" header field parameter shall be set to "uac";

3) shall include the option tag "timer" in the Supported header field;

4) shall include the following in the Contact header field:

    a) the g.3gpp.mcptt media feature tag;

    b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt";

    c) the isfocus media feature tag;

    d) an MCPTT session identity constructed from the MCPTT session identity provided in the Contact header field of the incoming SIP INVITE request; and

    e) any other uri-parameter provided in the Contact header field of the incoming SIP INVITE request;

5) shall include the option tag "tdialog" in a Supported header field according to rules and procedures of IETF RFC 4538 [23];

6) may include a Resource-Share header field in accordance with subclause 5.7.1.20.3 in 3GPP TS 24.229 [4]; and

Editor's Note [CT1#94, C1-153763]: Need to discuss if the participating MCPTT function includes the "norefersub" in a Supported header field and includes the Refer-Sub header field equal to "false" as specified in RFC 4488 or whether the participating MCPTT function should instead use the Explicit Subscription mechanism in RFC 7614 with the "explicitsub" and "nosub" option tags in the Require header.

Editor's Note [CT1#94, C1-153763]: Considerations need to also be made for inclusion of the Priority header field or Resource Priority Header field depending on the contents of the incoming SIP INVITE request and the type of request (i.e. whether emergency or non-emergency). This is FFS.

Editor's Note [CT1#95, C1-154398]: Further specification of the inclusion of the Resource-Share header field for the case where the SIP INVITE request was received without SDP offer needs to be studied.

7) if the incoming SIP INVITE request contained an "application/g.3gpp.mcptt-info+xml" MIME body, shall include a Content-Type header field with multipart/mixed, as specified in IETF RFC 2046 [21], and copy the "application/g.3gpp.mcptt-info+xml" MIME body, according to rules and procedures of IETF RFC 5366 [20].

Editor's note [CT1#95-bis, C1-160396]: If the broadcast call can be initiated over the MBMS bearer without using an SIP session (on-demand or pre-established) is FFS. There may be security issues with such a solution if security keys are not distributed to affiliated group members prior to the establishment of the broadcast call.

### 6.3.2.2.4 Response to a SIP INVITE request

#### 6.3.2.2.4.1 Provisional response

This subclause is referenced from other procedures.

When sending a SIP provisional responses other than the SIP 100 (Trying) response to the SIP INVITE request, the participating MCPTT function shall generate a SIP provisional response according to 3GPP TS 24.229 [4] and:

1) shall, if privacy is requested, include value "id" in the Privacy header field according to 3GPP TS 24.229 [4];

Editor's Note [CT1#94, C1-153766]: The exact use of "id" is FFS.

2) shall include the following in the Contact header field:

    a) the g.3gpp.mcptt media feature tag; and

    b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt"; and

3) if the outgoing SIP provisional response is to be sent in response to the receipt of a SIP provisional response and the response contains an "application/g.3gpp.mcptt-info+xml" MIME body, shall copy the "application/g.3gpp.mcptt-info+xml" MIME body to the outgoing SIP provisional response.

#### 6.3.2.2.4.2 Final response

This subclause is referenced from other procedures.

Editor's Note [CT1#94, C1-153763]: This subclause needs to be updated to cover 200 OK for case of pre-established session.

When sending SIP 200 (OK) responses, the participating MCPTT function shall generate a SIP 200 (OK) response according to 3GPP TS 24.229 [4] and:

1) shall include the option tag "timer" in a Require header field;

2) shall include the Session-Expires header field according to rules and procedures of IETF RFC 4028 [7], "UAS Behavior". If no "refresher" parameter was included in the SIP INVITE request, the "refresher" parameter in the Session-Expires header field shall be set to "uas";

3) shall, if privacy is requested, include value "id" in the Privacy header field according to rules and procedures of 3GPP TS 24.229 [4];

4) shall include the following in the Contact header field:

   a) the g.3gpp.mcptt media feature tag;

   b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt"; and

   c) an MCPTT session identity constructed from the MCPTT session identity provided in the Contact header field of the received SIP INVITE request from the controlling MCPTT function;

5) shall include the option tag "tdialog" in a Supported header field according to rules and procedures of IETF RFC 4538 [23]; and

6) if the incoming SIP response contained an "application/g.3gpp.mcptt-info+xml" MIME body, shall copy the "application/g.3gpp.mcptt-info+xml" MIME body to the outgoing SIP 200 (OK) response.

Editor's Note [CT1#94, C1-153763]: Need to discuss if the participating MCPTT function includes the "norefersub" in a Supported header field and includes the Refer-Sub header field equal to "false" as specified in RFC 4488 or whether the participating MCPTT function should instead use the Explicit Subscription mechanism in RFC 7614 with the "explicitsub" and "nosub" option tags in the Require header.

### 6.3.2.2.5 Automatic Commencement Mode

#### 6.3.2.2.5.1 General

When receiving a "SIP INVITE request for terminating participating MCPTT function" that requires automatic commencement mode:

1) if:

   a) the invited MCPTT client has one or more pre-established sessions without an associated MCPTT session;

   b) the media-level section for the offered MPCTT speech media stream is the same as the media-level section for MCPTT speech media stream in an existing pre-established session; and

   c) the media-level section of the offered media-floor control entity is the same as the media-level section for media-floor control entity in an existing pre-established session;

   then the participating MCPTT function shall perform the actions specified in subclause 6.3.2.2.5.3; or

2) otherwise the participating MCPTT function shall perform the actions specified in subclause 6.3.2.2.5.2.

#### 6.3.2.2.5.2 Automatic commencement for On-Demand session

When receiving a "SIP INVITE request for terminating participating MCPTT function" for an on-demand session that requires automatic commencement mode the participating MCPTT function:

1) shall generate a SIP 183 (Session Progress) response to the "SIP INVITE request for terminating participating MCPTT function" as specified in subclause 6.3.2.2.4.1;

2) shall set the P-Answer-State header field to "Unconfirmed" in the SIP 183 (Session Progress) response;

3) shall generate a SIP INVITE request as specified in subclause 6.3.2.2.3;

4) shall set the Request-URI to the public user identity associated to the MCPTT ID of the MCPTT user to be invited based on the contents of the Request-URI of the received "SIP INVITE request for terminating participating MCPTT function";

5) shall copy the contents of the "application/g.3gpp.mcptt-info+xml" MIME body of the incoming "SIP INVITE request for terminating participating MCPTT function" to the outgoing SIP INVITE request;

6) shall copy the contents of the P-Asserted-Identity header field of the incoming "SIP INVITE request for terminating participating MCPTT function" to the P-Asserted-Identity header field of the outgoing SIP INVITE request;

7) shall copy the contents of the Answer-Mode header field from the received "SIP INVITE request for terminating participating MCPTT function" to the outgoing SIP INVITE request;

8) shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received "SIP INVITE request for terminating participating MCPTT function" as specified in subclause 6.3.2.2.1; and

9) shall send the SIP INVITE request towards the MCPTT client according to 3GPP TS 24.229 [4].

Upon receiving a SIP 200 (OK) response to the above SIP INVITE request sent to the MCPTT client, the participating MCPTT function:

1) if the SIP 183 (Session Progress) was sent unreliably, shall send the SIP 200 (OK) response immediately; and

2) if the SIP 183 (Session Progress) was sent reliably, shall wait until the receipt of a SIP PRACK request before sending the SIP 200 (OK) response.

Upon receiving a SIP PRACK request the participating MCPTT function shall generate a SIP 200 (OK) response to the SIP PRACK request and forward the SIP 200 (OK) response, according to 3GPP TS 24.229 [4].

When the participating MCPTT function sends the SIP 200 (OK) response, the participating MCPTT function:

1) shall generate a SIP 200 (OK) response as described in the subclause 6.3.2.2.4.2;

2) shall include in the SIP 200 (OK) response an SDP answer based on the SDP answer in the received SIP 200 (OK) response as specified in subclause 6.3.2.2.2.1;

3) shall interact with the media plane as specified in 3GPP TS 24.380 [5]; and

4) shall forward the SIP 200 (OK) response according to 3GPP TS 24.229 [4].

The participating MCPTT function shall forward any other SIP response that does not contain SDP along the signalling path to the originating network according to 3GPP TS 24.229 [4].

### 6.3.2.2.5.3 Automatic commencement for pre-established session

When receiving a "SIP INVITE request for terminating participating MCPTT function" for a pre-established session that requires automatic commencement mode the participating MCPTT function:

1) shall validate that the media parameters are acceptable for the participating MCPTT function and if not reject the request with a SIP 488 (Not Acceptable Here) response. Otherwise, continue with the rest of the steps;

2) shall modify the pre-established session as described in subclause 8.3.2 if the current state of the pre-established session prevents successful completion of the call establishment and in case of failure of the modification reject the request with a SIP 500 ( Server Internal Error) response. Otherwise, continue with the rest of the steps.

3) shall generate a SIP 200 (OK) response to the "SIP INVITE request for terminating participating MCPTT function" as described in the subclause 6.3.2.2.4.2;

4) shall include in the SIP 200 (OK) response an SDP answer as specified in the subclause 6.3.2.2.2.2 based on the SDP negotiated during the pre-established session establishment and SDP offer received in the "SIP INVITE request for terminating participating MCPTT function";

5) shall set the P-Answer-State header field to "Unconfirmed" in the SIP 200 (OK) response;

6)  shall, if the invited MCPTT client has requested privacy when the pre-established session was established, include value "id" in the Privacy header field according to 3GPP TS 24.229 [4];

Editor's Note [CT1#94, C1-153766]: Privacy is FFS.

7)  shall send the SIP 200 (OK) response to the SIP INVITE request according to 3GPP TS 24.229 [4]; and

8)  shall interact with the media plane as specified in 3GPP TS 24.380 [5].

### 6.3.2.2.6    Manual Commencement Mode

#### 6.3.2.2.6.1    General

When receiving a "SIP INVITE request for terminating participating MCPTT function" that requires manual commencement mode:

1)  if:

   a)  the invited MCPTT client has one or more pre-established sessions without an associated MCPTT session;

   b)  the media-level section for the offered MPCTT speech media stream is the same as the media-level section for MCPTT speech media stream in the existing pre-established session; and

   c)  the media-level section of the offered media-floor control entity is the same as the media-level section for media-floor control entity in the existing pre-established session;

then the participating MCPTT function shall perform the actions specified in subclause 6.3.2.2.6.3; or

2)  otherwise the participating MCPTT function shall perform the actions specified in subclause 6.3.2.2.6.2.

#### 6.3.2.2.6.2    Manual commencement for On-Demand session

When receiving a "SIP INVITE request for terminating participating MCPTT function" for an on-demand session that requires manual commencement mode the participating MCPTT function:

1)  shall generate a SIP INVITE request as specified in subclause 6.3.2.2.3;

2)  shall set the Request-URI to the public user identity associated to the MCPTT ID of the MCPTT user to be invited based on the contents of the Request-URI of the received "SIP INVITE request for terminating participating MCPTT function";

3)  shall copy the contents of the "application/g.3gpp.mcptt-info+xml" MIME body of the incoming "SIP INVITE request for terminating participating MCPTT function" to the outgoing SIP INVITE request;

4)  shall copy the contents of the Answer-Mode header field from the received "SIP INVITE request for terminating participating MCPTT function" to the SIP INVITE request;

5)  shall copy the contents of the P-Asserted-Identity header field of the incoming "SIP INVITE request for terminating participating MCPTT function" to the P-Asserted-Identity header field of the outgoing SIP INVITE request;

Editor's Note [CT1#94, C1-153766]: Privacy is FFS.

6)  shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received "SIP INVITE request for terminating participating MCPTT function" as specified in subclause 6.3.2.2.1; and

7)  shall send the SIP INVITE request towards the MCPTT client according to 3GPP TS 24.229 [4].

Upon receiving a SIP 180 (Ringing) response to the above SIP INVITE request, the participating MCPTT function:

NOTE 1:  A SIP 180 (Ringing) response is received from a terminating MCPTT client in the case of a private call.

1)  shall generate a SIP 180 (Ringing) response as specified in subclause 6.3.2.2.4.1;

2)  shall include the P-Asserted-Identity header field as received in the incoming SIP 180 (Ringing) response; and

3) shall forward the SIP 180 (Ringing) response according to 3GPP TS 24.229 [4].

Upon receiving a SIP 183 (Session Progress) response to the above SIP INVITE request, the participating MCPTT function:

NOTE 2: A SIP 183 (Session Progress) response can be received from a terminating MCPTT client in the case of a group call.

1) shall generate a SIP 183 (Session Progress) response as specified in subclause 6.3.2.2.4.1;

2) shall include the P-Asserted-Identity header field as received in the incoming SIP 183 (Session Progress) response;

3) shall include the P-Answer-State header field if received in the incoming SIP 183 (Session Progress) request; and

4) shall forward the SIP 183 (Session Progress) response according to 3GPP TS 24.229 [4].

Upon receiving a SIP 200 (OK) response to the SIP INVITE request sent to the MCPTT client, the participating MCPTT function:

When the participating MCPTT function sends the SIP 200 (OK) response the participating MCPTT function:

1) shall generate a SIP 200 (OK) response as described in the subclause 6.3.2.2.4.2;

2) shall include in the SIP 200 (OK) response an SDP answer based on the SDP answer in the received SIP 200 (OK) response as specified in subclause 6.3.2.2.2.1;

3) shall interact with the media plane as specified in 3GPP TS 24.380 [5]; and

4) shall forward the SIP 200 (OK) response according to 3GPP TS 24.229 [4].

The participating MCPTT function shall forward any other SIP response that does not contain SDP along the signalling path to the originating network according to 3GPP TS 24.229 [4].

### 6.3.2.2.6.3 Manual commencement for Pre-established session

When receiving a "SIP INVITE request for terminating participating MCPTT function" for a pre-established session that requires manual commencement mode the participating MCPTT function:

1) shall generate a SIP re-INVITE request as described in subclause 6.3.2.2.3;

Editor"s Note [CT1#94, C1-153766]: the management of the media resource allocation by the pre-established session is FFS.

NOTE 1: A SIP re-INVITE request cannot include an Answer-Mode header field as specified in IETF RFC 5373 [18] so Manual Answer is implied with a SIP re-INVITE request within the existing SIP dialog of the pre-established session.

2) shall set the Request-URI to the URI contained in the Contact header field returned when establishing the pre-established session from the invited MCPTT user;

3) shall include the Call-ID, From tag and To tag which are provided from pre-established session;

4) shall include in a Contact header field the URI which was contained in the Contact header field in SIP 200 (OK) response when establishing the pre-established session with the invited MCPTT user;

5) shall copy the contents of the "application/g.3gpp.mcptt-info+xml" MIME body of the incoming "SIP INVITE request for terminating participating MCPTT function" to the outgoing SIP re-INVITE request;

6) shall include in the SIP re-INVITE request an SDP offer based on the SDP offer in the received SIP INVITE request as specified in the subclause 6.3.2.2.1;

7) shall include value "id" in the Privacy header field according to 3GPP TS 24.229 [4], if the Invited MCPTT client has requested privacy, when the pre-established session was established; and

Editor's Note [CT1#94, C1-153766]: Privacy is FFS.

8) shall send the SIP re-INVITE request towards the MCPTT client according to 3GPP TS 24.229 [4];

Upon receiving a SIP 180 (Ringing) response to the above SIP re-INVITE request, the participating MCPTT function:

   NOTE 2: A SIP 180 (Ringing) response is received from a terminating MCPTT client in the case of a private call.

   1) shall generate a SIP 180 (Ringing) response as specified in subclause 6.3.2.2.4.1;

   2) shall include the P-Asserted-Identity header field as received in the incoming SIP 180 (Ringing) response; and

   Editor's Note [CT1#94, C1-153766]: Privacy is FFS.

   3) shall forward the SIP 180 (Ringing) response according to 3GPP TS 24.229 [4].

Upon receiving a SIP 183 (Session Progress) response to the above SIP re-INVITE request, the participating MCPTT function:

   NOTE 3: A SIP 183 (Session Progress) response can be received from a terminating MCPTT client in the case of a group call.

   1) shall generate a SIP 183 (Session Progress) response as specified in subclause 6.3.2.2.4.1;

   2) shall include the P-Asserted-Identity header field as received in the incoming SIP 183 (Session Progress) response;

   3) shall include the P-Answer-State header field as received in the incoming SIP 183 (Session Progress) request; and

   4) shall forward the SIP 183 (Session Progress) response according to 3GPP TS 24.229 [4].

Upon receiving a SIP 200 (OK) response to the SIP re-INVITE request, the participating MCPTT function:

   1) if the received SDP answer includes changes in codecs or media formats, shall interact with the media plane as specified in 3GPP TS 24.380 [5] for updating the media plane with the newly negotiated codecs and media parameters from the received SDP answer;

   2) shall generate a SIP 200 (OK) response as described in the subclause 6.3.2.2.4.2;

   3) shall include in the SIP 200 (OK) response, an SDP answer based on the SDP answer in the received SIP 200 (OK) response, as specified in subclause 6.3.2.2.2.1;

   4) shall interact with the media plane as specified in 3GPP TS 24.380 [5]; and

   NOTE 4: The participating MCPTT function sends a MCCP Connect message, in order to give MCPTT session identity to the terminating MCPTT client.

   5) shall send the SIP 200 (OK) response to the SIP INVITE request according to rules and procedures of SIP/IP Core.

### 6.3.2.2.7     SIP MESSAGE request towards the terminating MCPTT client

This subclause is referenced from other procedures.

   Editor's Note [CT1#95, C1-154544]: This subclause requires that the MCPTT ID is placed in a body. This decision may be revised such that the IMPU can be mapped directly to the MCPTT-ID in the clients address book.

The participating MCPTT function shall generate a SIP MESSAGE request accordance with 3GPP TS 24.229 [4] and IETF RFC 3428 [33] and:

   1) shall include in the SIP MESSAGE request all Accept-Contact header fields and all Reject-Contact header fields, with their feature tags and their corresponding values along with parameters according to rules and procedures of IETF RFC 3841 [6] that were received (if any) in the incoming SIP MESSAGE request;

   2) shall set the Request-URI of the outgoing SIP MESSAGE request to the public user identity associated to the MCPTT ID of the MCPTT user that was in the Request-URI of the incoming SIP MESSAGE request;

   3) shall include a content-type of multipart/mixed with boundary parameter set to "mcptt";

4) shall include within a first "mcptt" boundary a content-type of "application/vnd.3gpp.mcptt-info+xml";

5) shall include within the first "mcptt" boundary an mcptt-info MIME body with a <mcptt-request-uri> element set to the MCPTT ID of the MCPTT user that was in the <mcptt-request-uri> element of the mcptt-info MIME body of the incoming SIP MESSAGE request, according to rules and procedures of IETF RFC 5366 [20];

6) shall include within a second "mcptt" boundary a content-type of "text/plain";

7) shall include within the second "mcptt" boundary, the text that was included in the MIME body of the incoming SIP MESSAGE request;

8) shall copy the contents of the P-Asserted-Identity header field of the incoming SIP MESSAGE request to the P-Asserted-Identity header field of the outgoing SIP INVITE request; and

9) shall send the SIP MESSAGE request towards the MCPTT client according to rules and procedures of 3GPP TS 24.229 [4];

### 6.3.2.2.8 SIP BYE request towards the terminating MCPTT client

#### 6.3.2.2.8.1 On-demand

Upon receiving a SIP BYE request from the controlling MCPTT function, the participating MCPTT function:

1) shall interact with the media plane as specified in subclause 6.4 in 3GPP TS 24.380 [5] for releasing media plane resource associated with the SIP session with the controlling MCPTT function;

2) shall generate a SIP BYE request according to 3GPP TS 24.229 [4];

3) shall set the Request-URI to the public user identity associated with the MCPTT user belonging to the MCPTT session targeted in the received SIP BYE request;

4) shall copy the contents of the P-Asserted-Identity header field of the incoming SIP BYE request to the P-Asserted-Identity header field of the outgoing SIP BYE request; and

5) shall send the SIP BYE request to the MCPTT client according to 3GPP TS 24.229 [4].

Upon receiving a SIP 200 (OK) response to the SIP BYE request the participating MCPTT function shall forward SIP 200 (OK) response towards the controlling MCPTT function according to 3GPP TS 24.229 [4] and shall interact with the media plane as specified in 3GPP TS 24.380 [5] for releasing media plane resources associated with the SIP session with the MCPTT client.

#### 6.3.2.2.8.2 Using pre-established session

Upon receiving a SIP BYE request from the controlling MCPTT function, the participating MCPTT function:

1) shall interact with the media plane as specified in subclause 9.3 in 3GPP TS 24.380 [5] for disconnecting the media plane resources towards the controlling MCPTT function;

2) shall send a SIP 200 (OK) response to the controlling MCPTT function;

3) shall interact with the media plane as specified in 3GPP TS 24.380 [5] for disconnecting media plane resources towards the MCPTT client from the media plane resources towards the controlling MCPTT function; and

4) shall maintain the pre-established session towards the MCPTT client.

#### 6.3.2.2.9 Populate MIME bodies

This subclause is referenced from other procedures.

If the incoming SIP request contains an "application/vnd.3gpp.mcptt-info" MIME body, the participating MCPTT function:

1) if more than one MIME body will be included in the SIP request and if not already included, shall include the Content-Type header field with the value "multipart/mixed" as specified in IETF RFC 2046 [21];

2) if not already included, shall include a Content-Type header field set to "application/vnd.3gpp.mcptt-info+xml"; and

3) if not already copied, shall copy the contents of the "application/g.3gpp.mcptt-info+xml" MIME body received in the SIP request into an "application/g.3gpp.mcptt-info+xml" MIME body included in the outgoing SIP request.

If the received SIP request contains an "application/vnd.3gpp.location-info+xml" MIME body as specified in Annex F.3:

1) if more than one MIME body will be included in the SIP request and if not already included, shall include the Content-Type header field with the value "multipart/mixed" as specified in IETF RFC 2046 [21];

2) if not already included, shall include a Content-Type header field set to "application/vnd.3gpp.location-info+xml"; and

3) if not already copied, shall copy the contents of the "application/vnd.3gpp.location-info+xml" MIME body received in the SIP request into an "application/vnd.3gpp.location-info+xml" MIME body included in the outgoing SIP request.

If the received SIP request contains an "application/resource-lists+xml" MIME body:

1) if more than one MIME body will be included in the SIP request and if not already included, shall include the Content-Type header field with the value "multipart/mixed" as specified in IETF RFC 2046 [21];

2) if not already included, shall include a Content-Type header field set to "application/resource-lists+xml"; and

3) if not already copied, shall copy the contents of the resource-lists MIME body received in the SIP request into an "application/resource-lists+xml" MIME body included in the outgoing SIP request.

### 6.3.2.2.10 Generating a SIP re-INVITE request towards the terminating MCPTT client

This subclause is referenced from other procedures.

The participating MCPTT function shall generate a SIP re-INVITE request according to 3GPP TS 24.229 [4] and:

1) shall include in the Contact header field the MCPTT session identity contained in the Contact header field of the received SIP re-INVITE request with the g.3gpp.mcptt media feature tag and the isfocus media feature tag according to IETF RFC 3840 [16];

2) should include the Session-Expires header field according to IETF RFC 4028 [7]. It is recommended that the "refresher" header field parameter is omitted. If included, the "refresher" header field parameter shall be set to "uac";

3) shall include the option tag "timer" in the Supported header field;

4) shall include the option tag "tdialog" in a Supported header field according to rules and procedures of IETF RFC 4538 [23];

5) may include a Resource-Share header field in accordance with subclause 5.7.1.20.3 in 3GPP TS 24.229 [4];

6) shall include the Call-ID, From tag and To tag which are provided from the MCPTT group session;

7) shall perform the procedures specified in subclause 6.3.2.2.9 to include any MIME bodies in the received SIP re-INVITE request; and

8) if the received SIP re-INVITE request contains a Resource-Priority header field, shall include a Resource-Priority header field with the contents set as in the received Resource-Priority header field.

## 6.3.3 Controlling MCPTT function

### 6.3.3.1 Request initiated by the controlling MCPTT function

#### 6.3.3.1.1 SDP offer generation

The SDP offer is generated based on the received SDP offer. The SDP offer generated by the controlling MCPTT function:

1) shall contain only one SDP media-level section for MCPTT speech as contained in the received SDP offer; and

2) shall contain an SDP media-level section for one media-floor control entity, if present in the received SDP offer.

When composing the SDP offer according to 3GPP TS 24.229 [4], the controlling MCPTT function:

1) shall replace the IP address and port number for the offered media stream in the received SDP offer with the IP address and port number of the controlling MCPTT function; and

2) shall replace the IP address and port number for the offered media floor control entity, if any, in the received SDP offer with the IP address and port number of the controlling MCPTT function;

When receiving a SIP request to add a new MCPTT user to an existing MCPTT Session, the controlling MCPTT function shall offer the media stream currently used in the MCPTT session.

#### 6.3.3.1.2 Sending an INVITE request

This subclause is referenced from other procedures.

The controlling MCPTT function shall generate an initial SIP INVITE request according to 3GPP TS 24.229 [4].

The controlling MCPTT function:

1) shall include in the Contact header field an MCPTT session identity for the MCPTT session with the g.3gpp.mcptt media feature tag and the isfocus media feature tag according to IETF RFC 3840 [16];

2) shall include an Accept-Contact header field containing the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

3) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcptt" (coded as specified in 3GPP TS 24.229 [4]), in a P-Asserted-Service-Id header field according to IETF RFC 6050 [9] in the SIP INVITE request;

4) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref with the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt" along with parameters "require" and "explicit" according to IETF RFC 3841 [6];

5) shall include a Referred-By header field with the MCPTT address of the inviting MCPTT client;

6) should include the Session-Expires header field according to rules and procedures of IETF RFC 4028 [7]. The refresher parameter shall be omitted;

7) shall include the Supported header field set to "timer";

8) shall, if privacy is requested by the inviting MCPTT client, include the value "id" in a Privacy header field according to rules and procedures of IETF RFC 3325 [14];

9) shall include an unmodified Answer-Mode header field if present in the incoming SIP INVITE request or in the headers portion of the SIP URI in the Refer-To header field in the incoming SIP REFER request that caused the outgoing SIP INVITE request to be generated; and

10) if the incoming SIP INVITE request contained an "application/g.3gpp.mcptt-info+xml" MIME body, shall copy the "application/g.3gpp.mcptt-info+xml" MIME body to the outgoing INVITE request.

### 6.3.3.1.3 Receipt of a SIP response to a SIP INVITE request

#### 6.3.3.1.3.1 Final response

On receipt of the SIP 200 (OK) response to the initial outgoing SIP INVITE request the controlling MCPTT function:

1) shall start the SIP session timer according to rules and procedures of IETF RFC 4028 [7]; and

2) shall cache SIP feature tags, if received in the Contact header field, and if the specific feature tags are supported.

### 6.3.3.1.4 Sending a SIP MESSAGE request

This subclause is referenced from other procedures.

> Editor's Note [CT1#95, C1-154544]: This subclause requires that the MCPTT ID is placed in the Request-URI. This decision may be revised such that the IMPU is placed in the Request-URI and then the client can be map this directly to the MCPTT-ID in the clients address book.

The controlling MCPTT function:

1) shall generate an SIP MESSAGE request in accordance with 3GPP TS 24.229 [4] and IETF RFC 3428 [33];

2) shall include an Accept-Contact header field containing the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

3) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref with the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt" along with parameters "require" and "explicit" according to IETF RFC 3841 [6];

4) shall set the Request-URI to a public service identity identifying the terminating participating MCPTT function associated with the MCPTT ID of the MCPTT user;

5) shall include a content-type of multipart/mixed with boundary parameter set to "mcptt";

6) shall include within a first "mcptt" boundary a content-type of "application/vnd.3gpp.mcptt-info +xml";

7) shall include within the first "mcptt" boundary an mcptt-info MIME body with a <mcptt-request-uri> element set to the MCPTT ID of the MCPTT user;

8) shall include within a second "mcptt" boundary, a content-type of "text/plain" with the required text to render to the MCPTT user;

9) shall include in the P-Asserted-Identity header field, the public service identity of the controlling MCPTT function; and

10) shall send the SIP MESSAGE request towards the MCPTT client according to rules and procedures of 3GPP TS 24.229 [4].

### 6.3.3.1.5 Sending a SIP BYE request

When a participant needs to be removed from the MCPTT session or when an MCPTT session needs to be released, the controlling MCPTT function:

1) shall interact with the media plane as specified in 3GPP TS 24.380 [5] for MCPTT session release;

2) shall generate a SIP BYE request according to 3GPP TS 24.229 [4];

3) shall set the Request-URI to the MCPTT session identity; and

4) shall send the SIP BYE request to the MCPTT clients according to 3GPP TS 24.229 [4].

Upon receiving a SIP 200 (OK) response to the SIP BYE request the controlling MCPTT function shall interact with the media plane as specified in subclause 6.3 in 3GPP TS 24.380 [5] for releasing media plane resources associated with the SIP session with the MCPTT clients.

### 6.3.3.1.6 Sending a SIP re-INVITE request for MCPTT emergency group call

This subclause is referenced from other procedures.

The controlling MCPTT function shall generate a SIP re-INVITE request according to 3GPP TS 24.229 [4].

The controlling MCPTT function:

1) shall include in the Contact header field an MCPTT session identity for the MCPTT session with the g.3gpp.mcptt media feature tag and the isfocus media feature tag according to IETF RFC 3840 [16];

2) shall set the Request-URI to the public service identity of the terminating MCPTT participating function associated with the MCPTT user to be invited;

NOTE: How the controlling MCPTT function finds the address of the terminating MCPTT participating function is out of the scope of the current release.

3) shall include an SDP offer with the media parameters as currently established with the terminating MCPTT client according to 3GPP TS 24.229 [4];

4) shall include an "application/vnd.3gpp.mcptt-info" MIME body with the <mcptt-calling-user-id> element set to the MCPTT ID of the initiating MCPTT user;

5) shall include the Call-ID, From tag and To tag which are provided from the MCPTT group session;

6) should include the Session-Expires header field according to rules and procedures of IETF RFC 4028 [7]. The refresher parameter shall be omitted;

7) shall include the Supported header field set to "timer";

8) if the in-progress emergency state of the group is set to a value of "true" the controlling MCPTT function:

   a) shall include a Resource-Priority header field with the namespace set to the MCPTT-specific namespace specified in draft-holmberg-dispatch-mcptt-rp-namespace [48], and the priority set to the priority level designated for MCPTT emergency group call;

   b) shall include an "application/vnd.3gpp.mcptt-info" MIME body with the <emergency-ind> element set to a value of "true"; and

   c) if the <alert-ind> element is set to "true" in the received SIP (re-)INVITE and MCPTT emergency alerts are authorised for this group and MCPTT user, shall populate the "application/vnd.3gpp.mcptt-info" MIME body and "application/vnd.3gpp.location-info+xml" MIME body as specified in subclause 6.3.3.1.12. Otherwise, shall set the <alert-ind> element to a value of false; and

Editor's Note [C1#95-bis, C1-160422]: if the alert-ind is to be included, the Location info of the client needs to be included. It is currently missing.

9) if the in-progress emergency state of the group is set to a value of "false":

   a) shall include a Resource-Priority header field with the namespace set to the MCPTT-specific namespace specified in draft-holmberg-dispatch-mcptt-rp-namespace [48], and the priority set to the normal priority level designated for this MCPTT user; and

   b) shall include an "application/vnd.3gpp.mcptt-info" MIME body with the <emergency-ind> element set to a value of "false" and the <alert-ind> element set to the value of the <alert-ind> element of the received SIP INVITE request.

### 6.3.3.1.7 Sending a SIP INVITE request for MCPTT emergency group call

This subclause is referenced from other procedures.

This subclause describes the procedures for inviting an MCPTT user to an MCPTT session associated with an MCPTT emergency group call. The procedure is initiated by the controlling MCPTT function as the result of an action in subclause 10.1.2.4.1.1.

The controlling MCPTT function:

1) shall generate a SIP INVITE request as specified in subclause 6.3.3.1.2;

2) shall set the Request-URI to the address of the terminating participating function associated with the MCPTT ID of the targeted MCPTT user;

3) shall include an "application/vnd.3gpp.mcptt-info" MIME body with the <mcpttinfo> element containing the <mcpttt-Params> element populated as follows:

   a) the <mcptt-request-uri> element set to the value of the MCPTT ID of the targeted MCPTT user;

   b) the <mcptt-calling-user-id> element set to the value of the MCPTT ID of the calling MCPTT user; and

   c) the <mcptt-group-id> element set to the value of the MCPTT group ID of the emergency group call.

4) shall include in the P-Asserted-Identity header field the IMPU associated with the inviting MCPTT client;

5) shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received SIP INVITE request from the originating network according to the procedures specified in subclause 6.3.3.1.1; and

6) if the in-progress emergency state of the group is set to a value of "true" the controlling MCPTT function:

   a) shall include a Resource-Priority header field with the namespace set to the MCPTT-specific namespace specified in draft-holmberg-dispatch-mcptt-rp-namespace [xx] and the priority set to the priority level designated for MCPTT emergency group call;

   b) shall include an "application/vnd.3gpp.mcptt-info" MIME body with the <emergency-ind> element set to a value of "true"; and

   c) if the <alert-ind> element is set to "true" in the received SIP INVITE request and the requesting MCPTT user and MCPTT group are authorised for the initiation of MCPTT emergency alerts shall populate the "application/vnd.3gpp.mcptt-info" MIME body and the "application/vnd.3gpp.location-info+xml" MIME body as specified in subclause 6.3.3.1.12. Otherwise, shall set the <alert-ind> element to a value of "false".

### 6.3.3.1.8 Sending a SIP UPDATE request for Resource-Priority header field correction

This subclause is referenced from other procedures.

This subclause describes the procedures for updating an MCPTT session associated with an MCPTT emergency group call when the received SIP INVITE request did not include a correctly populated Resource-Priority header field. The procedure is initiated by the controlling MCPTT function for the purpose of providing the correct Resource-Priority header field.

1) shall generate a SIP 183 (Session Progress) response according to 3GPP TS 24.229 [4] with the clarifications provided specified in subclause 6.3.3.2.3.1;

2) shall include the option tag "100rel" in a Require header field in the SIP 183 (Session Progress) response;

3) shall include in the SIP 183 (Session Progress) response an SDP answer to the SDP offer in the incoming SIP INVITE request as specified in the subclause 6.3.3.2.1; and

4) shall send the SIP 183 (Session Progress) response towards the MCPTT client according to 3GPP TS 24.229 [4].

Upon receiving a SIP PRACK request to the SIP 183 (Session Progress) response the controlling MCPTT function:

1) shall generate a SIP 200 (OK) response to the SIP PRACK request according to 3GPP TS 24.229 [4] and shall:

   a) include the following in the Contact header field:

      i) the g.3gpp.mcptt media feature tag;

      ii) g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt";

      iii) the isfocus media feature tag; and

      iv) the MCPTT session identity; and

   b) send the SIP 200 (OK) response to the SIP PRACK request according to 3GPP TS 24.229 [4].

2)  The controlling MCPTT function shall generate a SIP UPDATE request according to 3GPP TS 24.229 [4] with the following clarifications:

    a)  shall include in the Contact header field an MCPTT session identity for the MCPTT session with the g.3gpp.mcptt media feature tag and the isfocus media feature tag according to IETF RFC 3840 [16]; and

    b)  shall set the Request-URI to the public user identity associated with the sender of the received SIP INVITE request.

<span style="color:red">Editor's Note [CT1-onMCPTT, C1ah160039]: mapping of the public user identity of the MCPTT user to the MCPTT ID is yet to be determined.</span>

3)  shall include in the SIP UPDATE request an SDP offer based on the SDP offer in the received SIP INVITE request from the originating network according to the procedures specified in subclause 6.3.3.1.1;

4)  shall include the Call-ID, From tag and To tag which are provided from the early dialog according to 3GPP TS 24.229 [4];

5)  should include the Session-Expires header field according to rules and procedures of IETF RFC 4028 [7]. The refresher parameter shall be omitted;

6)  shall include the Supported header field set to "timer";

7)  if the in-progress emergency state of the group is set to a value of "true" the controlling MCPTT function shall include a Resource-Priority header field with the namespace set to the MCPTT-specific namespace specified in draft-holmberg-dispatch-mcptt-rp-namespace [48] and the priority set to the priority level designated for MCPTT emergency group call; and

<span style="color:red">Editor's Note [CT1-onMCPTT, C1ah160039]: need a reference on how the proper namespace.priority levels are to be retrieved.</span>

NOTE 1:  This is the case when the sending MCPTT client did not send a Resource-Priority header field populated appropriately to receive emergency-level priority. In this case, the Resource-Priority header field is populated appropriately to provide emergency-level priority.

8)  if the in-progress emergency state of the group is set to a value of "false" the controlling MCPTT function shall include a Resource-Priority header field with the namespace set to the MCPTT-specific namespace specified in draft-holmberg-dispatch-mcptt-rp-namespace [48] and the priority set to the priority level designated for a normal priority MCPTT group call.

NOTE 2:  This is the case when the sending MCPTT client incorrectly populated a Resource-Priority header field for emergency-level priority and the controlling MCPTT function re-populates it to a normal priority level.

### 6.3.3.1.9          Generating a SIP re-INVITE request

This subclause is referenced from other procedures.

This subclause describes the procedures for generating a SIP re-INVITE request to be sent by the controlling MCPTT function.

The controlling MCPTT function:

1)  shall include in the Contact header field an MCPTT session identity for the MCPTT session with the g.3gpp.mcptt media feature tag and the isfocus media feature tag according to IETF RFC 3840 [16];

2)  shall set the Request-URI to the address of the terminating participating function associated with the MCPTT user to be re-invited;

3)  shall include an SDP offer with the media parameters as currently established with the terminating MCPTT client according to 3GPP TS 24.229 [4] with the clarifications specified in subclause 6.3.3.1.1;

4)  shall include the Call-ID, From tag and To tag which are provided from the MCPTT group session;

5)  should include the Session-Expires header field according to rules and procedures of IETF RFC 4028 [7]. The refresher parameter shall be omitted; and

6) shall include the Supported header field set to "timer".

### 6.3.3.1.10 Generating a SIP re-INVITE request to cancel an in-progress emergency

This subclause is referenced from other procedures.

This subclause describes the procedures for sending a SIP re-INVITE request to cancel the in-progress emergency state of an MCPTT group. The procedure is initiated by the controlling MCPTT function when it determines the cancellation of the in-progress emergency state of an MCPTT group is required.

The controlling MCPTT function:

1) shall generate a SIP re-INVITE request as specified in 3GPP TS 24.229 [4] with the clarifications specified in subclause 6.3.3.1.9;

2) shall include a Resource-Priority header field with the namespace set to the MCPTT-specific namespace specified in draft-holmberg-dispatch-mcptt-rp-namespace [xx] and the priority set to the normal priority level designated for the targeted MCPTT user; and

3) shall include an "application/vnd.3gpp.mcptt-info" MIME body with the <emergency-ind> element set to a value of "false".

### 6.3.3.1.11 Generating a SIP MESSAGE request for notification of in-progress emergency status change

This subclause is referenced from other procedures.

This subclause describes the procedures for generating a SIP MESSAGE request to notify affiliated but not participating members of an MCPTT group of the change of status of the in-progress emergency state of an MCPTT group. The procedure is initiated by the controlling MCPTT function when it has set or cancelled the in-progress emergency state of an MCPTT group.

The controlling MCPTT function:

1) shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [4] and IETF RFC 3428 [33];

2) shall include an Accept-Contact header field containing the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

3) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref with the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt" along with parameters "require" and "explicit" according to IETF RFC 3841 [6];

4) shall set the Request-URI to the address of the terminating participating function associated with the MCPTT ID of the targeted MCPTT user;

5) shall include an "application/vnd.3gpp.mcptt-info" MIME body with the <mcpttinfo> element containing the <mcpttt-Params> element with the <mcptt-request-uri> element set to the value of the MCPTT ID of the targeted MCPTT user; and

6) shall include in the "application/vnd.3gpp.mcptt-info" MIME body an <mcptt-group-id> element set to the MCPTT group ID of the MCPTT group on which the in-progress emergency state has changed.

### 6.3.3.1.12 Populate mcptt-info and location-info MIME bodies for emergency alert

This subclause is referenced from other procedures.

This subclause describes the procedures for populating the "application/vnd.3gpp.mcptt-info" and "application/vnd.3gpp.location-info+xml" MIME bodies for an MCPTT emergency alert. The procedure is initiated by the controlling MCPTT function when it has received a SIP request initiating an MCPTT emergency alert and generates a message containing the MCPTT emergency alert information required by 3GPP TS 23.179 [3].

The controlling MCPTT function:

1) if not already included, shall include a Content-Type header field with the value "multipart/mixed" as specified in IETF RFC 2046 [21];

2) shall include a Content-Type header field set to "application/vnd.3gpp.mcptt-info+xml";

3) shall include, if not already present, an "application/vnd.3gpp.mcptt-info+xml" MIME body as specified in Annex F.1, and set the <alert-ind> element to a value of "true";

4) shall determine the value of the MCPTT user's Mission Critical Organization;

Editor's Note [CT1onMCPTT, C1-16034]: need to include a reference here how the MCPTT user's Mission Critical Organization data element is acquired.

5) shall include in the <mcpttinfo> element containing the <mcptt-Params> element containing an <mc-org> element set to the value of the MCPTT user's Mission Critical Organization;

6) shall include a Content-Type header field set to "application/vnd.3gpp.location-info+xml";

7) shall include an "application/vnd.3gpp.location-info+xml" MIME body as specified in Annex F.3 with a <Report> element included in the <location-info> root element; and

8) shall copy the contents of the "application/vnd.3gpp.location-info+xml" MIME body in the received SIP request into an "application/vnd.3gpp.location-info+xml" MIME body included in the outgoing SIP request.

## 6.3.3.2 Requests terminated by the controlling MCPTT function

### 6.3.3.2.1 SDP answer generation

When composing the SDP answer according to 3GPP TS 24.229 [4], the controlling MCPTT function:

1) shall replace the IP address and port number in the received SDP offer with the IP address and port number of the controlling MCPTT function, for the accepted media stream in the received SDP offer; and

2) shall replace the IP address and port number in the received SDP offer with the IP address and port number of the controlling MCPTT function, for the accepted media-floor control entity, if present in the received SDP offer.

### 6.3.3.2.2 Receipt of a SIP INVITE request

On receipt of an initial SIP INVITE request the controlling MCPTT function shall cache SIP feature tags, if received in the Contact header field and if the specific feature tags are supported.

### 6.3.3.2.3 Sending a SIP response to a SIP INVITE request

#### 6.3.3.2.3.1 Provisional response

When sending SIP provisional responses with the exception of the SIP 100 (Trying) response to the SIP INVITE request the controlling MCPTT function:

1) shall generate the SIP provisional response;

2) shall include a P-Asserted-Identity header field received in the incoming SIP INVITE request;

3) shall include an MCPTT session identity in the Contact header field; and

4) shall include the following in the Contact header field:

   a) the g.3gpp.mcptt media feature tag;

   b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt"; and

   c) the isfocus media feature tag.

#### 6.3.3.2.3.2 Final response

When sending a SIP 200 (OK) response to the initial SIP INVITE request, the controlling MCPTT function:

1) shall generate the SIP 200 (OK) response according to rules and procedures of 3GPP TS 24.229 [4];

2) shall include the Session-Expires header field and start supervising the SIP session according to rules and procedures of IETF RFC 4028 [7], "UAS Behavior". The "refresher" parameter in the Session-Expires header field shall be set to "uac";

3) shall include the option tag "timer" in a Require header field;

4) shall include the P-Asserted-Identity header field received in the incoming SIP INVITE request;

5) shall include a SIP URI for the MCPTT session identity in the Contact header field identifying the MCPTT session at the controlling MCPTT function;

6) shall include the following in the Contact header field:

   a) the g.3gpp.mcptt media feature tag;

   b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt"; and

   c) the isfocus media feature tag;

7) shall include Warning header field(s) received in incoming responses to the SIP INVITE request;

8) shall include the option tag "tdialog" in a Supported header field according to rules and procedures of IETF RFC 4538 [23];

9) shall include the "norefersub" option tag in a Supported header field according to IETF RFC 4488 [22];

10) shall include the "explicitsub" and "nosub" option tags in a Supported header field according to IETF RFC 7614 [35]; and

11) shall interact with the media plane as specified in 3GPP TS 24.380 [5].

#### 6.3.3.2.4 Receiving a SIP BYE request

Upon receiving a SIP BYE request the controlling MCPTT function:

1) shall interact with the media plane as specified in subclause 6.3 in 3GPP TS 24.380 [5] for releasing the media plane resource associated with the SIP session towards the participating MCPTT function;

2) shall generate a SIP 200 (OK) response and send it towards the MCPTT client according to 3GPP TS 24.229 [4]; and

3) shall check the MCPTT session release policy as specified in subclause 6.3.8.1 and subclause 6.3.8.2 whether the MCPTT session needs to be released for each participant of the MCPTT session. If it is required, perform the procedures as specified in the subclause 6.3.3.1.5.

Upon receiving a SIP 200 (OK) response to the SIP BYE request the controlling MCPTT function shall interact with the media plane as specified in subclause 6.3 in 3GPP TS 24.380 [5] for releasing media plane resources associated with the SIP session with the MCPTT client.

#### 6.3.3.3 Handling of the acknowledged call setup timer (TNG1)

When the controlling MCPTT function receives a SIP INVITE request to initiate a group session and there are members of the group document retrieved from the group management server that are affiliated and are marked as <required> then the controlling MCPTT function shall start timer TNG1 (acknowledged call setup timer) prior to sending out SIP INVITE requests inviting group members to the group session.

When the controlling MCPTT function receives all SIP 200 (OK) responses to the SIP INVITE requests, from all affiliated and <required> members then it shall stop timer TNG1 (acknowledged call setup timer) and send a SIP 200 (OK) response to the initiating MCPTT client.

NOTE 1: MCPTT clients that are affiliated but are not <required> members that have not yet responded will be considered as joining an ongoing session when the controlling MCPTT function receives SIP 200 (OK) responses from these MCPTT clients.

After expiry of timer TNG1 (acknowledged call setup timer) the controlling MCPTT function shall execute the steps described below:

1) if the action configured in the group document for expiry of the timer indicates that the controlling MCPTT function should proceed with the setup of the group call, then the controlling MCPTT function:

   a) shall perform the following actions:

      i) generate a SIP 200 (OK) response to the SIP INVITE request as specified in the subclause 6.3.3.2.2 before continuing with the rest of the steps;

      ii) include in the SIP 200 (OK) response the warning text set to "111 group call proceeded without all required group members" in a Warning header field as specified in subclause 4.4;

      iii) include in the SIP 200 (OK) response an SDP answer to the SDP offer in the incoming SIP INVITE request as specified in the subclause 6.3.3.2.1;

      iv) interact with the media plane as specified in 3GPP TS 24.380 [5]; and

   NOTE 2: Resulting media plane processing is completed before the next step is performed.

      v) send a SIP 200 (OK) response to the inviting MCPTT client according to 3GPP TS 24.229 [4];

   b) when a SIP 200 (OK) response to a SIP INVITE request is received from an invited MCPTT client the controlling MCPTT function may send an in-dialog SIP MESSAGE request to the MCPTT client that originated the group session with the text "group call proceeded without all required group members";

   c) when the controlling MCPTT function receives a SIP BYE request from an invited MCPTT client, shall take the actions specified in subclause 6.3.3.2.4 and may send an in-dialog SIP MESSAGE request to the MCPTT client that originated the group session with the text "group call proceeded without all required group members"; and

   d) shall generate a notification package as specified in subclause 6.3.3.4 and send a SIP NOTIFY request according to 3GPP TS 24.229 [4] to the MCPTT clients which have subscribed to the conference state event; and

2) if the action configured in the group document for expiry of the timer indicates that the controlling MCPTT function should abandon the setup of the group call, then the controlling MCPTT function shall:

   a) send a SIP 480 (Temporarily Unavailable) response to the MCPTT client that originated the group session with the warning text set to "112 group call abandoned due to required group members not part of the group session" in a Warning header field as specified in subclause 4.4;

   b) for each confirmed dialog at the controlling MCPTT function, send a SIP BYE request towards the MCPTT clients invited to the group session in accordance with 3GPP TS 24.229 [4] and interact with the media plane as specified in 3GPP TS 24.380 [5]; and

   c) for each non-confirmed dialog at the controlling MCPTT function, send a SIP CANCEL request towards the MCPTT clients invited to the group session in accordance with 3GPP TS 24.229 [4].

If the controlling MCPTT function receives a final SIP 4xx, 5xx or 6xx response from an affiliated and <required> group member prior to expiry of timer TNG1 (acknowledged call setup timer) and based on policy, the controlling MCPTT function decides not to continue with the establishment of the group call without the affiliated and <required> group member, then the controlling MCPTT function:

   NOTE 3: It is expected that this action is taken if the policy is to abandon the call on expiry of timer TNG1 (acknowledged call setup timer).

1) shall stop timer TNG1 (acknowledged call setup timer); and

2) shall forward the final SIP 4xx, 5xx or 6xx response towards the inviting MCPTT client with the warning text set to "112 group call abandoned due to required group member not part of the group session" in a Warning header field as specified in subclause 4.4.

If the controlling MCPTT function receives a final SIP 4xx, 5xx or 6xx response from an affiliated and <required> group member prior to expiry of timer TNG1 (acknowledged call setup timer) and based on policy, the controlling MCPTT function decides to continue with the establishment of the group call without the affiliated and <required> group member, then the controlling MCPTT function:

NOTE 4: It is expected that this action is taken if the policy is to proceed with the call on expiry of timer TNG1 (acknowledged call setup timer).

1) if all other invited clients have not yet responded, shall continue running timer TNG1 (acknowledged call setup timer); and

2) if all other invited clients have responded with SIP 200 (OK) responses, shall

a) stop timer TNG1 (acknowledged call setup timer);

b) generate SIP 200 (OK) response to the SIP INVITE request as specified in the subclause 6.3.3.2.2 before continuing with the rest of the steps;

c) include in the SIP 200 (OK) response the warning text set to "111 group call proceeded without all required group members" in a Warning header field as specified in subclause 4.4;

d) include in the SIP 200 (OK) response an SDP answer to the SDP offer in the incoming SIP INVITE request as specified in the subclause 6.3.3.2.1;

e) interact with the media plane as specified in 3GPP TS 24.380 [5]; and

NOTE 5: Resulting media plane processing is completed before the next step is performed.

f) send a SIP 200 (OK) response to the inviting MCPTT client according to 3GPP TS 24.229 [4].

## 6.3.3.4 Generating a SIP NOTIFY request

The controlling MCPTT function shall generate a SIP NOTIFY request according to 3GPP TS 24.229 [4] with the clarification in this subclause.

In the SIP NOTIFY request, the controlling MCPTT function:

1) shall set the Request-URI to the IMPU of the targeted MCPTT client;

2) shall set the P-Asserted-Identity header field to the public service identity of the controlling MCPTT function;

3) shall include an Event header field set to the 'conference' event package;

4) shall include an Expires header field set to 3600 seconds according to IETF RFC 4575 [30], as default value;

5) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcptt" (coded as specified in 3GPP TS 24.229 [4]), in a P-Preferred-Service header field according to IETF RFC 6050 [9]; and

6) shall include an "application/vnd.3gpp.mcptt-info" MIME body with the <mcpttinfo> element containing the <mcptt-Params> element with the <mcptt-request-uri> set to the value of MCPTT ID of the targeted MCPTT user.

In the SIP NOTIFY request, the controlling MCPTT function shall include a MIME conference-info+xml body according to IETF RFC 4575 [30] with the following limitations:

1) the controlling MCPTT function shall include the MCPTT group ID of the MCPTT group in the "entity" attribute of the <conference-info> element;

2) for each participant in the MCPTT session, the controlling MCPTT function shall include a <user> element. The <user> element shall:

a) include the "entity" attribute. The "entity" attribute:

    i)   shall for the MCPTT client, which initiated, joined or re-joined an MCPTT session, include the MCPTT ID of the MCPTT user which originates SIP INVITE request, if privacy is not requested by the MCPTT user or if the receiver of the SIP NOTIFY request is an authorised user;

    ii)  shall for an invited MCPTT client include the MCPTT ID of the invited MCPTT user in case of a prearranged group call or chat group call, if privacy is not requested by the MCPTT use or if the receiver of the SIP NOTIFY request is an authorised user; and

    iii) shall include the anonymous MCPTT ID of the participant, which has request privacy unless the receiver of the SIP NOTIFY request is an authorised user;

  b)  shall include a single <endpoint> element. The <endpoint> element:

    i)   shall include the "entity" attribute; and

    ii)  shall include the <status> element indicating the status of the MCPTT session according to RFC 4575; and

  c)  may include <role> element.

NOTE:    The usage of <role> is only applicable for human consumption.

## 6.3.4 Non-controlling MCPTT function of an MCPTT group

### 6.3.4.1 Request initiated by the non-controlling MCPTT function of an MCPTT group

#### 6.3.4.1.1 SDP offer generation

The SDP offer is generated based on the received SDP offer. The SDP offer generated by the non-controlling MCPTT function of an MCPTT group:

1) shall include only one SDP media-level section for MCPTT speech as contained in the received SDP offer; and

2) shall include an SDP media-level section for one media-floor control entity, if present in the received SDP offer.

When composing the SDP offer according to 3GPP TS 24.229 [4], the non-controlling MCPTT function of an MCPTT group:

1) shall replace the IP address and port number for the offered media stream in the received SDP offer with the IP address and port number of the non-controlling MCPTT function; and

2) shall replace the IP address and port number for the offered media floor control entity, if any, in the received SDP offer with the IP address and port number of the non-controlling MCPTT function;

#### 6.3.4.1.2 Sending an INVITE request

This subclause is referenced from other procedures.

The non-controlling MCPTT function of an MCPTT group shall generate initial SIP INVITE requests according to 3GPP TS 24.229 [4].

For each SIP INVITE request, the non-controlling MCPTT function of an MCPTT group:

1) shall generate a new MCPTT session identity for the MCPTT session with the invited MCPTT client and include it in the Contact header field with the g.3gpp.mcptt media feature tag and the isfocus media feature tag according to IETF RFC 3840 [16];

2) shall include an Accept-Contact header field containing the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

3) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcptt" (coded as specified in 3GPP TS 24.229 [4]), in a P-Asserted-Service-Id header field according to IETF RFC 6050 [9] in the SIP INVITE request;

4) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref with the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt" along with parameters "require" and "explicit" according to IETF RFC 3841 [6];

5) shall set the Request-URI to the public service identity of the terminating participating function associated to the MCPTT ID of the MCPTT user to be invited;

NOTE 1: How the controlling MCPTT function finds the address of the terminating MCPTT participating function is out of the scope of the current release.

NOTE 2: If the terminating MCPTT user is part of a partner MCPTT system, then the public service identity can identify an entry point in the partner network that is able to identify the terminating participating MCPTT function.

6) shall include an mcptt-info MIME body with:

   a) a <mcptt-request-uri> element set to the MCPTT ID of the invited MCPTT user;

   b) a <mcptt-calling-user-id> element set to the MCPTT ID of the calling user; and

   c) a <mcptt-calling-group-id> set to the group identity;

7) shall include the public service identity of the non-controlling MCPTT function in the P-Asserted-Identity header field;

8) shall include the received Referred-By header field with the MCPTT address of the inviting MCPTT client;

9) should include the Session-Expires header field according to rules and procedures of IETF RFC 4028 [7]. The refresher parameter shall be omitted;

10) shall include the Supported header field set to "timer";

11) shall include an unmodified Privacy header field, if present in the incoming SIP INVITE request; and

12) shall include an unmodified Answer-Mode header field, if present in the incoming SIP INVITE request.

## 6.3.4.2 Requests terminated by the non-controlling MCPTT function of an MCPTT group

### 6.3.4.2.1 SDP answer generation

When composing the SDP answer according to 3GPP TS 24.229 [4], the non-controlling MCPTT function of an MCPTT group:

1) shall replace the IP address and port number in the received SDP offer with the IP address and port number of the non-controlling MCPTT function, for the accepted media stream in the received SDP offer; and

2) shall replace the IP address and port number in the received SDP offer with the IP address and port number of the non-controlling MCPTT function, for the accepted media-floor control entity, if present in the received SDP offer.

### 6.3.4.2.2 Sending a SIP response to the SIP INVITE request

#### 6.3.4.2.2.1 Sending a SIP 183 (Session Progress) response

When sending a SIP 183 (Session Progress) the non-controlling MCPTT function of an MCPTT group:

1) shall generate a SIP 183 (Session Progress) response according to 3GPP TS 24.229 [4];

2) shall, if privacy is allowed, according to local policy in the non-controlling MCPTT function, include value "id" in the Privacy header field according to 3GPP TS 24.229 [4];

3) shall include the MCPTT session identity provided by the controlling MCPTT function in the incoming SIP INVITE request, in the Contact header field of the SIP 183 (Session Progress);

4) shall include the following in the Contact header field:

   a) the g.3gpp.mcptt media feature tag;

   b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt"; and

   c) the isfocus media feature tag;

5) shall include the public service identity of the non-controlling MCPTT function in the P-Asserted-Identity header field;

6) shall include a SIP URI for the MCPTT session identity in the Contact header field identifying the MCPTT session at the non-controlling MCPTT function of an MCPTT group;

7) shall include the option tag "tdialog" in a Supported header field according to rules and procedures of IETF RFC 4538 [23];

8) shall include the "norefersub" option tag in a Supported header field according to IETF RFC 4488 [22]; and

9) shall include the "explicitsub" and "nosub" option tags in a Supported header field according to IETF RFC 7614 [35];

### 6.3.4.2.2.2 Sending a SIP 200 (OK) response

When sending a SIP 200 (OK) response, the non-controlling MCPTT function of an MCPTT group:

1) shall generate the SIP 200 (OK) response according to rules and procedures of 3GPP TS 24.229 [4];

2) shall include the Session-Expires header field and start supervising the SIP session according to rules and procedures of IETF RFC 4028 [7], "UAS Behavior". The "refresher" parameter in the Session-Expires header field shall be set to "uac";

3) shall, if privacy is allowed according to local policy in the non-controlling MCPTT function, include value "id" in the Privacy header field according to 3GPP TS 24.229 [4];

4) shall include the option tag "timer" in a Require header field;

5) shall include the public service identity of the non-controlling MCPTT function in the P-Asserted-Identity header field;

6) shall include the MCPTT session identity provided by the controlling MCPTT function in the incoming SIP INVITE request, in the Contact header field of the SIP 200 (OK) response;

7) shall include the following in the Contact header field:

   a) the g.3gpp.mcptt media feature tag;

   b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt"; and

   c) the isfocus media feature tag;

8) shall include Warning header field(s) received in incoming responses to the SIP INVITE request;

9) shall include the option tag "tdialog" in a Supported header field according to rules and procedures of IETF RFC 4538 [23];

10) shall include the "norefersub" option tag in a Supported header field according to IETF RFC 4488 [22];

11) shall include the "explicitsub" and "nosub" option tags in a Supported header field according to IETF RFC 7614 [35]; and

12) shall interact with the media plane as specified in 3GPP TS 24.380 [5].

## 6.3.5 Retrieving and processing a group document

### 6.3.5.1 General

This subclause describes how an MCPTT server accesses a group document from a group management server. The MCPTT server which accesses a group document performs the role of a controlling MCPTT function or performs the role of a non-controlling MCPTT function of an MCPTT group when accessing a group document. In such cases, for a group call:

-   the controlling MCPTT function and group management server are both located in the primary MCPTT system;

-   the controlling MCPTT function and group management server are both located in a partner MCPTT system; or

-   the controlling MCPTT function is located in the primary MCPTT system and accesses a group management server in the primary MCPTT system and a non-controlling MCPTT function of an MCPTT group is located in a partner MCPTT system and accesses a group management server in the partner MCPTT system.

When the MCPTT server receives a SIP INVITE request that requires it to access a group document, it uses an MCPTT group ID or a temporary MCPTT group identity (TGI) which was created by the group regrouping operation as specified in 3GPP TS 24.381 [31].

The MCPTT server can cache the group document associated with an MCPTT group or temporary group, and can subscribe to be notified of changes to the group document associated with an MCPTT group or temporary group as specified in 3GPP TS 24.381 [31].

NOTE 1: During the group regrouping operation as specified in 3GPP TS 24.381 [31], the controlling MCPTT function is notified of the constituent MCPTT group identities associated with the TGI.

If the group data associated with an MCPTT group ID or TGI cached in the MCPTT server is removed, the MCPTT server re-subscribes for changes in the group information associated with the MCPTT group ID or TGI.

NOTE 2: Re-subscription can occur prior to the receipt of an SIP INVITE request containing an MCPTT group ID or TGI of a group document which is no longer cached on the MCPTT server.

### 6.3.5.2 Rules for retrieving Group Document(s)

NOTE 1: In this subclause, "MCPTT server" can refer to either the controlling MCPTT function or the non-controlling MCPTT function of an MCPTT group.

Upon receipt of a SIP INVITE request:

1) if the MCPTT server is not yet subscribed to the group document for the group identity in the <mcptt-request-uri> element of the application/vnd.3gpp.mcptt-info MIME body of the SIP INVITE request, the MCPTT server shall subscribe to the "xcap-diff" event-package for the group document of this group identity as specified in 3GPP TS 24.381 [31];

NOTE 2: The group identity in the <mcptt-request-uri> element is either an MCPTT group ID or a temporary MCPTT group identity (TGI).

NOTE 3: As a group document can potentially have a large content, the controlling MCPTT function can subscribe to the group document indicating support of content-indirection as defined in IETF RFC 4483 [32], by following the procedures in 3GPP TS 24.381 [31].

2) upon receipt of a SIP 404 (Not Found) response as a result of attempting to subscribing to the "xcap-diff" event-package for the group document of the group identity in the <mcptt-request-uri> element of the application/vnd.3gpp.mcptt-info MIME body of the SIP INVITE request as specified in 3GPP TS 24.381 [31], the MCPTT server shall send the SIP 404 (Not Found) response with the warning text set to "113 group document does not exist" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the rest of the steps;

3) upon receipt of any other SIP 4xx, SIP 5xx or SIP 6xx response as a result of attempting to subscribing to the "xcap-diff" event-package for the group document of the group identity in the <mcptt-request-uri> element of the application/vnd.3gpp.mcptt-info MIME body of the SIP INVITE request as specified in 3GPP TS 24.381 [31], the MCPTT server shall send the SIP final response with the warning text set to "114

unable to retrieve group document" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the rest of the steps;

4)  if the SIP INVITE request is a "SIP INVITE request for controlling function of an MCPTT group" and the group identity in the <mcptt-request-uri> element of the application/vnd.3gpp.mcptt-info MIME body of the SIP-INVITE request is an MCPTT group ID, then upon receipt of a notification from the group management server containing the group document or if the group document is already cached, the MCPTT server shall access the following elements from the group document:

   a)  if the <disabled> element is "true", shall send a SIP 403 (Forbidden) response with the warning text set to "115 group is disabled" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the rest of the steps;

   b)  if the <list> element of the <list-service> element does not contain an entry matching the MCPTT ID of the user in the SIP INVITE request, shall send a SIP 403 (Forbidden) response with the warning text set to "116 user is not part of the MCPTT group" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the rest of the steps;

   c)  if the <invite-members> element is set to "true" and if the SIP INVITE request contains an application/vnd.3gpp.mcptt-info MIME body with the <session-type> element containing a value not set to "prearranged", shall return a SIP 404 (Not Found) response with the warning text set to "117 the group identity indicated in the request is a prearranged group" as specified in subclause 4.4 "Warning header field"; Otherwise, continue with the rest of the steps; and

   d)  if the <invite-members> element is set to "false" and if the SIP INVITE request contains an application/vnd.3gpp.mcptt-info MIME body with the <session-type> element containing a value not set to "chat" shall return a SIP 404 (Not Found) response with the warning text set to "118 the group identity indicated in the request is a chat group" as specified in subclause 4.4 "Warning header field";

5)  if the SIP INVITE request is a "SIP INVITE request for non-controlling function of an MCPTT group" and the identity in the <mcptt-request-uri> element of the application/vnd.3gpp.mcptt-info MIME body of the SIP-INVITE request is an MCPTT group ID, then upon receipt of a notification from the group management server containing the group document or if the group document is already cached, the MCPTT server shall access the following elements from the group document:

   a)  if the <disabled> element is "true", the MCPTT server shall send a SIP 403 (Forbidden) response with the warning text set to "115 group is disabled" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the rest of the steps; and

   b)  if the <invite-members> element is set to "true" and if the SIP INVITE request contains an application/vnd.3gpp.mcptt-info MIME body with the <session-type> element containing a value not set to "prearranged", the MCPTT server shall return a SIP 404 (Not Found) response with the warning text set to "117 the group identity indicated in the request is a prearranged group" as specified in subclause 4.4 "Warning header field"; Otherwise, continue with the rest of the steps;

6)  if the identity in the <mcptt-request-uri> element of the application/vnd.3gpp.mcptt-info MIME body of the SIP-INVITE request is a TGI, then upon receipt of a notification from the group management server containing a group document for a TGI, or if the group document is already cached, the MCPTT server shall access the following elements from the group document:

   a)  if the <disabled> element is "true", the MCPTT server shall send a SIP 403 (Forbidden) response with the warning text set to "115 group is disabled" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the rest of the steps; and

   b)  if the <invite-members> element is set to "true" and if the SIP INVITE request contains an application/vnd.3gpp.mcptt-info MIME body with the <session-type> element containing a value not set to "prearranged", the MCPTT server shall return a SIP 404 (Not Found) response with the warning text set to "117 the group identity indicated in the request is a prearranged group" as specified in subclause 4.4 "Warning header field"; Otherwise, continue with the rest of the steps; and

7)  if the identity in the <mcptt-request-uri> element of the application/vnd.3gpp.mcptt-info MIME body of the SIP-INVITE request is a TGI and if at least one of the constituent MCPTT group IDs contained in the temporary group is owned by the primary MCPTT system, and the MCPTT server is not yet subscribed to the constituent MCPTT group document(s), then the MCPTT server:

a) shall subscribe to the "xcap-diff" event-package for the group document(s) for the MCPTT group ID(s) associated to the TGI that are homed on the same MCPTT system as the MCPTT server, as specified in 3GPP TS 24.381 [31];

b) upon receipt of a SIP 404 (Not Found) response as a result of attempting to subscribing to the "xcap-diff" event-package for the group document(s) for the MCPTT group ID(s) associated to the TGI as specified in 3GPP TS 24.381 [31], shall send the SIP 404 (Not Found) response with the warning text set to "113 group document does not exist" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the rest of the steps; and

c) upon receipt of any other SIP 4xx, SIP 5xx or SIP 6xx response as a result of attempting to subscribe to the "xcap-diff" event-package for the group document(s) for the MCPTT group ID(s) associated to the TGI as specified in 3GPP TS 24.381 [31], shall send the SIP final response with the warning text set to "114 unable to retrieve group document" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the rest of the steps;

## 6.3.5.3 Rules for joining a group session

The following conditions shall be met for the controlling MCPTT function to allow an MCPTT user to join an existing group session:

1) an <entry> element exists in the <list> element of the group document for the MCPTT user;

2) a <rule> exists in the group document with:

a) the <is-list-member> element of the <conditions> element present and with the <join-handling> element of the corresponding <actions> element set to "true"; or

b) the <identity> element of the <conditions> element containing an entry matching the MCPTT ID in the SIP INVITE request, with the <join-handling> element of the <actions> element set to "true"; and

3) if the <supported-services> element is present, it contains:

a) a <service> element containing an "enabler" attribute which is set to the MCPTT ICSI; and

b) if a <group-media> element is present, an entry set to "MCPTT speech".

If all of the above conditions are not met, then the MCPTT user shall not be authorised to join the group session.

## 6.3.5.4 Rules for initiating a prearranged group session

The following conditions shall be met for the controlling MCPTT function to initiate a group session for the requesting MCPTT user:

1) an <entry> element exists in the <list> element of the group document for the MCPTT user;

2) a <rule> exists in the group document with:

a) the <is-list-member> element of the <conditions> element present and with the <allow-initiate-conference> element of the corresponding <actions> element set to "true"; or

b) the <identity> element of the <conditions> element containing an entry matching the MCPTT ID in the SIP INVITE request, with the <allow-initiate-conference> element of the <actions> element is set to "true"; and

3) if the <supported-services> element is present, it contains:

a) a <service> element containing an "enabler" attribute which is set to the MCPTT ICSI; and

b) if a <group-media> element is present, an entry set to "MCPTT speech".

If all the above conditions are not met, then the MCPTT user shall not be authorised to initiate the group session.

### 6.3.5.5 Determining the group members to invite

The MCPTT server shall only invite affiliated group members to a group session. The MCPTT server determines the affiliated members from the entries contained in the <list> element of the group document by following the procedures specified in subclause 6.3.5.

NOTE 1: The term "affiliated group members" used above also includes those members that are implicitly affiliated by the controlling MCPTT function.

If the number of members of the MCPTT group exceeds the value contained in the <max-participant-count> element the MCPTT server shall invite only <max-participant-count> members from the list, but shall prioritise inviting those group members to the group session that have an <entry> element in the <list> element with a <required> element present.

NOTE 2: The <max-participant-count> element indicates the maximum number of participants allowed in the group session. The <required> element is used to determine which group members need to acknowledge the group call before audio transmission can proceed.

NOTE 3: Other requirements for how the controlling MCPTT function selects which of the <max participant count> members to invite is outside the scope of this specification.

NOTE 4: It is assumed that validation checks are performed at the group management server to ensure that the <max-participant-count> cannot be less than the number of <required> users.

## 6.3.6 Affiliation check

The MCPTT server checks if an MCPTT user is affiliated to an MCPTT group by following the procedures below.

Editor's Note [CT1#95, C1-154540]: It is still TBD whether the affiliation information is stored. If stored in the GMS with the group information, then the controller will subscribe to the group document. If stored in the GMS in a separate document, then the controller will need to subscribe to that document. If stored in the participating function for the user, then the controller will need to subscribe to that document on the participating function.

## 6.3.7 Error handling

### 6.3.7.1 Public service identity does not exist

Upon receiving a request that includes the Request-URI set to a public service identity that is not allocated in the participating or the controlling MCPTT function, the participating or the controlling MCPTT function shall return a SIP 404 (Not Found) response.

## 6.3.8 Session release policy

### 6.3.8.1 Session release policy for group call

If:

1) the controlling MCPTT function receives an indication from the media plane that the T4 (Inactivity) timer specified in 3GPP TS 24.380 [5] expired;

2) there are only one or no participants in the MCPTT session;

3) the initiator of the group call leaves the MCPTT session; or

4) the minimum number of affiliated MCPTT group members is not present;

the controlling MCPTT function shall release the MCPTT session for the group call.

### 6.3.8.2 Session release policy for private call

If:

1) the controlling MCPTT function receives an indication from the media plane that the T4 (Inactivity) timer specified in 3GPP TS 24.380 [5] expired;

2) the MCPTT session has lasted longer than the maximum of duration of private call; or

3) there are only one or no participants in the MCPTT session.

the controlling MCPTT function shall release the MCPTT session for a private call.

# 6.4 Implicit floor request

An initial SIP INVITE request fulfilling one of the following criteria shall be regarded by the MCPTT server as an implicit floor request when the MCPTT client:

1) initiates an MCPTT speech session or initiates a pre-established session; and

2) includes the "mc_implicit_request" media level attribute in the associated UDP stream for the floor control in the SDP offer/answer.

In all other cases the SIP INVITE request shall be regarded as received without an implicit floor request.

When using a pre-established session the MCPTT server shall regard the SIP REFER request as an implicit floor request:

1) if the pre-established session was established with an implicit floor request and if an SDP offer is not included in a "body" parameter in the headers portion of the SIP URI in the Refer-To header field;

2) if the pre-established session was established with an implicit floor request, an SDP offer is included in a "body" parameter in the headers portion of the SIP URI in the Refer-To header field and this SDP includes the "mc_implicit_request" media level attribute in the associated UDP stream for the floor control in the SDP offer; or

3) if the pre-established session was established without an implicit floor request and the SDP offer in a "body" parameter in the headers portion of the SIP URI in the Refer-To header field includes the "mc_implicit_request" media level attribute in the associated UDP stream for the floor control in the SDP offer.

In all other cases the SIP REFER request shall be regarded as received without an implicit floor request.

Editor's Note [CT1#94, C1-153804]: The management of the media resource allocation by the pre-established session is FFS.

# 7 Registration and service authorisation

# 7.1 General

This clause describes the procedures for SIP registration and MCPTT service authorization for the MCPTT client and the MCPTT service. The MCPTT UE can use SIP REGISTER or SIP PUBLISH for MCPTT server settings to perform service authorization for MCPTT. The decision which method to use is based on implementation and on availability of an access-token received as outcome of the user authentication procedure as described in 3GPP TS 24.382 [49].

Editor's note [CT1#96, C1-161507]: how to find out whether encryption is to be used is FFS.

# 7.2 MCPTT client procedures

## 7.2.1 SIP REGISTER request for service authorisation

When the MCPTT client performs SIP registration the MCPTT client shall perform the registration procedures as specified in 3GPP TS 24.229 [4].

If the MCPTT client, upon performing SIP registration:

1) has successfully finished the user authentication procedure as described in 3GPP TS 24.382 [49];

2) has available an access-token;

3) based on implementation decides to use SIP REGISTER for service authorization; and

4) identity hiding is not required;

then the MCPTT client:

1) shall include the g.3gpp.mcptt media feature tag in the Contact header field;

2) shall include a Content-Type header field set to "application/vnd.3gpp.mcpttinfo+xml"; and

3) shall include an "application/vnd.3gpp.mcptt-info" MIME body as defined in Annex F.1 with the <mcptt-access-token> element set to the value of the access token received during the user authentication procedures;

in the SIP REGISTER request.

    NOTE: the access-token contains the MCPTT ID of the user.

If the MCPTT client, upon performing SIP registration:

1) has successfully finished the user authentication procedure as described in 3GPP TS 24.382 [49];

2) has available an access-token;

3) based on implementation decides to use SIP REGISTER for service authorization; and

4) identity hiding is required;

then the MCPTT client:

1) shall include the g.3gpp.mcptt media feature tag in the Contact header field;

2) shall encrypt the received access-token using the client server key (CSK) as specified in 3GPP TS 33.179 [46];

3) shall include an "application/vnd.3gpp.mcptt-info+xml" MIME body as specified in Annex F.1 with the <mcptt-access-token> element set to the encrypted access-token using EncryptedData as specified for XML encryption in 3GPP TS 33.179 [46] in the body of the SIP REGISTER request; and

4) shall include an "application/mikey" MIME body with the CSK as MIKEY-SAKKE I_MESSAGE as specified in 3GPP TS 33.179 [46] in the body of the SIP REGISTER request.

## 7.2.2 SIP PUBLISH request for service authorisation

If based on implementation the MCPTT client decides to use SIP PUBLISH for MCPTT server settings to perform service authorization and

1) has successfully finished the user authentication procedure as described in 3GPP TS 24.382 [49]; and

2) has available an access-token;

then the MCPTT client shall include service authorization specific information in the SIP PUBLISH request for MCPTT server settings that is sent as specified in subclause 7.2.3.

If hiding is not required then upon sending the SIP PUBLISH request, the MCPTT client:

1) shall include a Content-Type header field set to "application/vnd.3gpp.mcpttinfo+xml"; and

2) shall include an "application/vnd.3gpp.mcptt-info+xml" MIME body as specified in Annex F.1 with the <mcptt-access-token> element set to the value of the access token received during the user authentication procedures in the body of the SIP PUBLISH request.

If hiding is required then upon sending the SIP PUBLISH request the MCPTT client:

1) shall encrypt the access-token using the client server key (CSK) as specified in 3GPP TS 33.179 [46];

2) shall include an "application/vnd.3gpp.mcptt-info+xml" MIME body as specified in Annex F.1 with the <mcptt-access-token> element set to the encrypted access-token using EncryptedData as specified for XML encryption in 3GPP TS 33.179 [46] in the body of the SIP PUBLISH request; and

3) shall include an "application/mikey" MIME body with the CSK as MIKEY-SAKKE I_MESSAGE as specified in 3GPP TS 33.179 [46] in the body of the SIP PUBLISH request.

## 7.2.3 Sending SIP PUBLISH for MCPTT service settings

To set, update, remove or refresh the MCPTT service settings, the MCPTT client shall generate a SIP PUBLISH request according 3GPP TS 24.229 [4], IETF RFC 3903 [37] and IETF RFC 4354 [55]. In the SIP PUBLISH request, the MCPTT client:

1) shall set the Request-URI to the public user identity identifying the MCPTT user;

2) shall include an Accept-Contact header field containing the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

3) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcptt" (coded as specified in 3GPP TS 24.229 [4]), in a P-Preferred-Service header field according to IETF RFC 6050 [9];

4) shall set the Event header field to the "poc-settings" value;

5) shall set the Expires header field according to IETF RFC 3903 [37], to 4294967295, if the MCPTT user is not removing the MCPTT service settings, otherwise to remove the MCPTT Service Settings the MCPTT client shall set the Expires header field to zero;

NOTE 1: 4294967295, which is equal to $2^{32}-1$, is the highest value defined for Expires header field in IETF RFC 3261 [24].

NOTE 2: The expiration timer of the MCPTT client service settings is only applicable for the MCPTT client service settings from this MCPTT client that matches the Instance Identifier URN. The expiration timer of MCPTT user service settings is also updated in the MCPTT server if expiration timer of MCPTT client service settings is updated in the MCPTT server.

6) shall include a Content-Type header field with multipart/mixed; and

7) shall include an application/poc-settings+xml MIME body containing the Answer-Mode Indication setting (auto-answer or manual-answer) in the poc-settings event package if setting or updating the MCPTT service settings:

The MCPTT client shall send the SIP PUBLISH request according to 3GPP TS 24.229 [4].

On receiving the SIP 200 (OK) response to the SIP PUBLISH request the MCPTT client may indicate to the MCPTT User the successful communication of the MCPTT service settings to the MCPTT server.

## 7.3 MCPTT server procedures

### 7.3.1 General

The MCPTT server can obtain information that it needs to implement service authorization specific requirements from:

a) any received third-party SIP REGISTER request (e.g. including information contained in the body of the third-party SIP REGISTER request) as specified in 3GPP TS 24.229 [4]. The body will carry the SIP REGISTER request as sent by the MCPTT client, containing information needed for service authorization; or

b) any received SIP PUBLISH request for MCPTT server settings containing containing the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters. The body of the SIP PUBLISH request will contain information needed for service authorization.

## 7.3.2 SIP REGISTER request for service authorisation

When the MCPTT server obtains service authorization specific information from a third-party SIP REGISTER request, the MCPTT server:

1) shall identify the IMS public user identity from the third-party SIP REGISTER request;

2) shall identify the MCPTT ID from the SIP REGISTER request sent from the MCPTT client and included in the third-party SIP REGISTER request;

   a) if an <EncryptedData> XML tag is not available in the received "application/vnd.3gpp.mcptt-info+xml" MIME body, the MCPTT server shall identify the MCPTT ID from <AccessTokenMCPTT> element received in an "application/vnd.3gpp.mcpttinfo+xml" MIME body; and

   b) if an <EncryptedData> XML tag is available in the received "application/vnd.3gpp.mcptt-info+xml" MIME body, the MCPTT server shall decrypt the received encrypted access-token in <AccessTokenMCPTT> using the CSK received as MIKEY-SAKKE I_MESSAGE as specified in 3GPP TS 33.179 [46]. The MCPTT server shall identify the MCPTT ID from the decrypted value;

3) shall perform service authorization for the identified MCPTT ID as described in 3GPP TS 33.179 [46]; and

4) if service authorization was successful, shall bind the MCPTT ID to the IMS public user identity.

   NOTE: The MCPTT server will store the binding MCPTT ID, IMS public user identity and an identifier addressing the MCPTT server in an external database.

## 7.3.3 SIP PUBLISH request for service authorisation

When the MCPTT server obtains service authorization specific information from a SIP PUBLISH request for MCPTT server settings, the MCPTT server:

1) shall identify the IMS public user identity from the P-Asserted-Identity header field;

2) shall identify the MCPTT ID as follows:

   a) if an <EncryptedData> XML tag is not available in the received "application/vnd.3gpp.mcpttinfo+xml" MIME body, the MCPTT server shall identify the MCPTT ID from <AccessTokenMCPTT> element received in an "application/vnd.3gpp.mcpttinfo+xml" MIME body; and

   b) if an <EncryptedData> XML tag is available in the received "application/vnd.3gpp.mcpttinfo+xml" MIME body, the MCPTT server shall decrypt the received encrypted access-token in <AccessTokenMCPTT> using the CSK received as MIKEY-SAKKE I_MESSAGE as specified in 3GPP TS 33.179 [46]. The MCPTT server shall identify the MCPTT ID from the decrypted value;

3) shall perform service authorization for the identified MCPTT ID as described in 3GPP TS 33.179 [46]; and

4) if service authorization was successful, shall bind the MCPTT ID to the IMS public user identity.

   NOTE: The MCPTT server will store the binding MCPTT ID, IMS public user identity and an identifier addressing the MCPTT server in an external database.

## 7.3.3 Receiving SIP PUBLISH request for MCPTT service settings

Upon receiving a SIP PUBLISH request containing an Event header field set to the "poc-settings" value the MCPTT server:

1) shall identify the MCPTT user based upon the public user identity in the Request-URI;

2) shall process the SIP PUBLISH request according to rules and procedures of IETF RFC 3903 [37] and if processing of the SIP request was not successful, do not continue with the rest of the steps; and

3) shall cache the received MCPTT Service Settings until the MCPTT Service Settings expiration timer expires.

The MCPTT server shall send a SIP 200 (OK) response according 3GPP TS 24.229 [4].

# 8 Pre-established session

## 8.1 General

## 8.2 Session establishment

### 8.2.1 MCPTT client procedures

When the MCPTT client initiates a pre-established session the MCPTT client shall generate an initial SIP INVITE request by following the UE originating session procedures specified in 3GPP TS 24.229 [4], with the clarifications given below.

The MCPTT client:

Editor's Note [CT1#94, C1-153751]: NAT traversal and the potential use of ICE is FFS.

1) shall set the Request-URI of the SIP INVITE request to the Public Service Identity of the participating MCPTT function serving the MCPTT user;

2) shall include an Accept-Contact header field with the media feature tag g.3gpp.mcptt along with parameters "require" and "explicit" according to IETF RFC 3841 [6];

3) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcptt" (coded as specified in 3GPP TS 24.229 [4]), in a P-Preferred-Service header field according to IETF RFC 6050 [9] in the SIP INVITE request;

4) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref set to the value "urn:urn-7:3gpp-service.ims.icsi.mcptt" along with parameters "require" and "explicit" according to IETF RFC 3841 [6];

5) shall include the "timer" option tag in the Supported header field;

6) should include the Session-Expires header field according to IETF RFC 4028 [7] and should not include the "refresher" header field. The "refresher" header field parameter shall be set to "uac" if included;

7) shall include an SDP offer in according to 3GPP TS 24.229 [4] with the clarifications given in subclause 6.2.1;

8) shall, if privacy is requested to be used in the automatically answered terminated MCPTT sessions, include the value "id" in the Privacy header field according to rules and procedures of IETF RFC 3325 [14]; and

Editor's Note: use of "id" is FFS.

9) shall send the SIP INVITE request according to 3GPP TS 24.229 [4].

Upon receiving a SIP 2xx response to the SIP INVITE request the MCPTT client:

1) shall interact with the media plane as specified in 3GPP TS 24.380 [5].

### 8.2.2 Participating MCPTT function procedures

Upon receipt of a "SIP INVITE request for establishing a pre-established session" the participating MCPTT function:

Editor's Note [CT1#95, C1-154731]: The priority mechanisms are still to be specified for MCPTT.

1) shall check whether the public service identity is allocated and perform the actions specified in subclause 6.3.7.1 if it is not allocated. Otherwise, continue with the rest of the steps;

2) shall determine the MCPTT ID of the calling user and perform actions to verify the MCPTT ID of the MCPTT client and authorise the request according to local policy, and if not authorised, the participating MCPTT function shall return a SIP 403 (Forbidden) response with the warning text set to "100 function not allowed due to <detailed reason>" as specified in subclause 4.4. Otherwise, continue with the rest of the steps;

Editor's Note [CT1#94, C1-153551]: It has not been yet determined how the participating MCPTT function obtains the MCPTT ID. The MCPTT ID could either be 1) included in a body (and encrypted if need be) and then decrypted by the participating MCPTT function, with the key management solution being FFS or 2) mapping tables are provided by identity management between the IMS IMPU and the MCPTT ID and then the IMPU is translated to the MCPTT ID at the entities.

3) shall validate the media parameters and if the MCPTT speech codec is not offered in the SIP INVITE request shall reject the request with a SIP 488 (Not Acceptable Here) response. Otherwise, continue with the rest of the steps;

Editor's Note [CT1#94, C1-153751]: NAT traversal and the potential use of ICE is FFS.

4) shall allocate a URI to be used to identify the pre-established session;

Editor"s Note [CT1#94, C1-153751]: the use of the Resource-Priority header field is FFS.

5) shall generate a SIP 200 (OK) response to the SIP INVITE request according to subclause 6.3.2.1.5.2; and

   a) shall include a Contact header field containing the URI that identifies the pre-established session;

   b) shall include the Public Service Identity in the P-Asserted-Identity header field; and

   c) shall include an SDP answer as specified in 3GPP TS 24.229 [4] with the clarifications in subclause 6.3.2.1.2.2;

6) shall interact with the media plane as specified in 3GPP TS 24.380 [5]; and

NOTE:    Resulting media plane processing is completed before the next step is performed.

7) shall send the SIP 200 (OK) response towards the MCPTT client according to the rules and procedures of the 3GPP TS 24.229 [4].

## 8.3 Session modification

### 8.3.1 MCPTT client procedures

### 8.3.2 MCPTT server procedures

## 8.4 Session release

### 8.4.1 MCPTT client procedures

### 8.4.2 MCPTT server procedures

# 9 Affiliation

## 9.1 General

Editor's Note [CT1#95-bis, C1-160419]: MCPTT ID and MCPTT group ID hiding is FFS. It is not possible to indicate MCPTT ID and MCPTT group ID in clear text when hiding is required.

Editor's note: definition of MCPTT client ID is FFS.

The affiliation description consists of procedures and coding.

## 9.2 Procedures

### 9.2.1 MCPTT client procedures

#### 9.2.1.1 General

The MCPTT client procedures consist of:

- an affiliation status change procedure; and

- an affiliation status determination procedure.

#### 9.2.1.2 Affiliation status change procedure

In order;

- to indicate that an MCPTT user is interested in one or more MCPTT group(s) at an MCPTT client;

- to indicate that the MCPTT user is no longer interested in one or more MCPTT group(s) at the MCPTT client;

- to refresh indication of an MCPTT user interest in one or more MCPTT group(s) at an MCPTT client due to near expiration of the expiration time of an MCPTT group with the affiliation status set to the "affiliated" state received in a SIP NOTIFY request in subclause 9.2.1.3; or

- any combination of the above;

the MCPTT client shall generate a SIP PUBLISH request according to 3GPP TS 24.229 [4], and IETF RFC 3903 [37].

In the SIP PUBLISH request, the MCPTT client:

1) shall set the Request-URI to the public service identity identifying the originating participating MCPTT function serving the MCPTT user;

2) shall include an application/vnd.3gpp.mcptt-info MIME body. In the application/vnd.3gpp.mcptt-info MIME body, the MCPTT client shall include the <mcptt-request-uri> element set to the MCPTT ID of the MCPTT user;

3) shall include an Accept-Contact header field containing the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

4) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcptt" (coded as specified in 3GPP TS 24.229 [4]), in a P-Preferred-Service header field according to IETF RFC 6050 [9];

5) if the MCPTT user is interested in at least one MCPTT group at the MCPTT client, shall set the Expires header field according to IETF RFC 3903 [37], to 4294967295;

NOTE:     4294967295, which is equal to $2^{32}-1$, is the highest value defined for Expires header field in IETF RFC 3261 [24].

6) if the MCPTT user is no longer interested in any MCPTT group at the MCPTT client, shall set the Expires header field according to IETF RFC 3903 [37], to zero; and

7) shall include an application/pidf+xml MIME body indicating per-user affiliation information according to subclause 9.3.1. The MCPTT client shall include all MCPTT groups where the MCPTT user indicates its interest. The MCPTT client shall not include the "status" attribute and the "expires" attribute in the <group> element.

The MCPTT client shall send the SIP PUBLISH request according to 3GPP TS 24.229 [4].

## 9.2.1.3      Affiliation status determination procedure

NOTE 1:   The MCPTT UE also uses this procedure to determine which MCPTT groups the MCPTT user successfully affiliated to.

In order to discover MCPTT groups which the MCPTT user at an MCPTT client is affiliated to, the MCPTT client shall generate an initial SIP SUBSCRIBE request according to 3GPP TS 24.229 [4], IETF RFC 3856 [51], and IETF RFC 6665 [26].

Editor's Note [CT1#95-bis, C1-160419]: whether a filter needs to be provided is FFS

In the SIP SUBSCRIBE request, the MCPTT client:

1) shall set the Request-URI to the public service identity identifying the originating participating MCPTT function serving the MCPTT user;

2) shall include an application/vnd.3gpp.mcptt-info MIME body. In the application/vnd.3gpp.mcptt-info MIME body, the MCPTT client shall include the <mcptt-request-uri> element set to the MCPTT ID of the MCPTT user;

3) shall include an Accept-Contact header field containing the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

4) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcptt" (coded as specified in 3GPP TS 24.229 [4]), in a P-Preferred-Service header field according to IETF RFC 6050 [9];

5) if the MCPTT client wants to receive the current status and later notification, shall set the Expires header field according to IETF RFC 6665 [26], to 4294967295;

NOTE 2:   4294967295, which is equal to $2^{32}-1$, is the highest value defined for Expires header field in IETF RFC 3261 [24].

6) if the MCPTT client wants to fetch the current state only, shall set the Expires header field according to IETF RFC 6665 [26], to zero; and

7) shall include an Accept header field containing the "application/pidf+xml" MIME type.

In order to re-subscribe or de-subscribe, the MCPTT client shall generate an in-dialog SIP SUBSCRIBE request according to 3GPP TS 24.229 [4], IETF RFC 3856 [51], and IETF RFC 6665 [26]. In the SIP SUBSCRIBE request, the MCPTT client:

1) if the MCPTT client wants to receive the current status and later notification, shall set the Expires header field according to IETF RFC 6665 [26], to 4294967295;

NOTE 3:  4294967295, which is equal to $2^{32}$-1, is the highest value defined for Expires header field in IETF RFC 3261 [24].

2) if the MCPTT client wants to de-subscribe, shall set the Expires header field according to IETF RFC 6665 [26], to zero; and

3) shall include an Accept header field containing the "application/pidf+xml" MIME type.

Upon receiving a SIP NOTIFY request according to 3GPP TS 24.229 [4], IETF RFC 3856 [51], and IETF RFC 6665 [26], if SIP NOTIFY request contains an application/pidf+xml MIME body indicating per-user affiliation information constructed according to subclause 9.3.1, then the MCPTT client shall determine affiliation status for each MCPTT group in the MIME body.

## 9.2.1.4    Affiliation status change request procedure of target users by an authorised user – negotiated mode

Editor's note [CT1ah, C1ah-160083]: affiliation change request in negotiated mode to a list of target users is FFS.

Upon receiving a request from the MCPTT user to send an affiliation change request in negotiated mode to a target user, the MCPTT client shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [4] and IETF RFC 3428 [33]. In the SIP MESSAGE request, the MCPTT client:

1) shall include an Accept-Contact header field containing the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

2) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcptt" (coded as specified in 3GPP TS 24.229 [4]), in a P-Preferred-Service header field according to IETF RFC 6050 [9] in the SIP MESSAGE request;

3) shall include an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt" along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

4) may include a P-Preferred-Identity header field in the SIP MESSAGE request containing a public user identity as specified in 3GPP TS 24.229 [4];

5) shall include an application/vnd.3gpp.mcptt-affiliation-command+xml MIME body as specified in Annex F.4; and

Editor's note [CT1ah, C1ah-160083]: it is FFS how to set up Request-URI.

6) shall send the SIP MESSAGE request according to rules and procedures of 3GPP TS 24.229 [4];

On receiving a SIP 2xx response to the SIP MESSAGE request, the MCPTT client shall indicate to the user that the request has been delivered to an MCPTT client of the target MCPTT user.

## 9.2.1.5    Affiliation status change request reception by a target user – negotiated mode

Upon receiving a SIP MESSAGE request containing:

1) an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref set to the value "urn:urn-7:3gpp-service.ims.icsi.mcptt";

2) a Content-Type header field set to "application/ vnd.3gpp.mcptt-affiliation-command+xml" ; and

3) an "application/vnd.3gpp.mcptt-affiliation-command+xml" MIME body with a list L1 of MCPTT groups under the <affiliate> element and a list L2 of MCPTT groups under the <de-affiliate> element;

then the MCPTT client:

1) shall send a 2xx response to the SIP MESSAGE request;

2) shall seek confirmation of the list of MCPTT groups for affiliation L1 and for de-affiliation L2, resulting in an accepted list L1 and accepted list L2; and

3) if the user accepted the request:

   a) shall perform affiliation for each entry in the list of MCPTT groups L1 for which the MCPTT client is not affiliated yet, as specified in subclause 9.2.1.2; and

   b) shall perform de-affiliation for each entry in the list of MCPTT groups L2 for which the MCPTT client is affiliated yet, as specified in subclause 9.2.1.2.

## 9.2.2    MCPTT server procedures

### 9.2.2.1    General

The MCPTT server procedures consist of:

- procedures of MCPTT server serving the MCPTT user; and

- procedures of MCPTT server owning the MCPTT group.

### 9.2.2.2    Procedures of MCPTT server serving the MCPTT user

#### 9.2.2.2.1    General

The procedures of MCPTT server serving the MCPTT user consist of:

- a receiving affiliation status change from MCPTT client procedure;

- a receiving subscription to affiliation status procedure;

- a sending notification of change of affiliation status procedure; and

- a sending affiliation status change towards MCPTT server owning MCPTT group procedure.

#### 9.2.2.2.2    Stored information

The MCPTT server shall maintain a list of MCPTT user information entries. The list of the MCPTT user information entries contains one MCPTT user information entry for each served MCPTT ID.

In each MCPTT user information entry, the MCPTT server shall maintain:

1) an MCPTT ID. This field uniquely identifies the MCPTT user information entry in the list of the MCPTT user information entries; and

2) a list of MCPTT client information entries.

In each MCPTT client information entry, the MCPTT server shall maintain:

1) an MCPTT client ID. This field uniquely identifies the MCPTT client information entry in the list of the MCPTT client information entries; and

2) a list of MCPTT group information entries.

In each MCPTT group information, the MCPTT server shall maintain:

1) an MCPTT group ID. This field uniquely identifies the MCPTT group information entry in the list of the MCPTT group information entries;

2) an affiliation status; and

3) an expiration time.

### 9.2.2.2.3 Receiving affiliation status change from MCPTT client procedure

Upon receiving a SIP PUBLISH request such that:

1) Request-URI of the SIP PUBLISH request contains either the public service identity identifying the originating participating MCPTT function serving the MCPTT user, or the public service identity identifying the terminating participating MCPTT function serving the MCPTT user;

2) the SIP PUBLISH request contains an application/vnd.3gpp.mcptt-info MIME body containing the <mcptt-request-uri> element;

3) an Accept-Contact header field of the SIP PUBLISH request contains the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

4) the Event header field of the SIP PUBLISH request contains the "presence" event type; and

5) SIP PUBLISH request contains an application/pidf+xml MIME body indicating per-user affiliation information according to subclause 9.3.1;

Editor's Note [CT1#95-bis, C1-160419]: which MIME type is used depends on event package used and is FFS.

then the MCPTT server:

1) shall identify the served MCPTT ID in the <mcptt-request-uri> element of the application/vnd.3gpp.mcptt-info MIME body of the SIP PUBLISH request;

2) if the Request-URI of the SIP PUBLISH request contains the public service identity identifying the originating participating MCPTT function serving the MCPTT user, shall identify the originating MCPTT ID from public user identity in the P-Asserted-Identity header field of the SIP PUBLISH request;

3) if the Request-URI of the SIP PUBLISH request contains the public service identity identifying the terminating participating MCPTT function serving the MCPTT user, shall identify the originating MCPTT ID in the <mcptt-calling-user-identity> element of the application/vnd.3gpp.mcptt-info MIME body of the SIP PUBLISH request;

4) if the originating MCPTT ID is different than the served MCPTT ID and the originating MCPTT ID is not authorized to modify affiliation status of the served MCPTT ID, shall send a 403 (Forbidden) response and shall not continue with the rest of the steps;

5) if the Expires header field of the SIP PUBLISH request is not included or has nonzero value lower than 4294967295, shall send a SIP 423 (Interval Too Brief) response to the SIP PUBLISH request, where the SIP 423 (Interval Too Brief) response contains a Min-Expires header field set to 4294967295, and shall not continue with the rest of the steps;

6) if the Expires header field of the SIP PUBLISH request has nonzero value, shall determine the candidate expiration interval to according to IETF RFC 3903 [37];

7) if the Expires header field of the SIP PUBLISH request has zero value, shall set the candidate expiration interval to zero;

8) shall respond with SIP 200 (OK) response to the SIP PUBLISH request according to 3GPP TS 24.229 [4], IETF RFC 3903 [37]. In the SIP 200 (OK) response, the MCPTT server:

   a) shall set the Expires header field according to IETF RFC 3903 [37], to the candidate expiration time;

9) if the "entity" attribute of the <presence> element of the application/pidf+xml MIME body of the SIP PUBLISH request is different than the served MCPTT ID, shall not continue with the rest of the steps;

10) shall identify the served MCPTT client ID in the "id" attribute of the <tuple> element of the <presence> element of the application/pidf+xml MIME body of the SIP PUBLISH request;

11) shall consider an MCPTT user information entry such that:

   a) the MCPTT user information entry is in the list of MCPTT user information entries described in subclause 9.2.2.2.2; and

    b)   the MCPTT ID of the MCPTT user information entry is equal to the served MCPTT ID;

    as the served MCPTT user information entry;

12) shall consider an MCPTT client information entry such that:

    a)   the MCPTT client information entry is in the list of MCPTT client information entries of the served MCPTT user information entry; and

    b)   the MCPTT client ID of the MCPTT client information entry is equal to the served MCPTT client ID;

    as the served MCPTT client information entry;

13) shall consider a copy of the list of the MCPTT group information entries of the served MCPTT client information entry as the served list of the MCPTT group information entries;

14) if the candidate expiration interval is nonzero:

    a)   shall construct the candidate list of the MCPTT group information entries as follows:

        i)   for each MCPTT group ID which has an MCPTT group information entry in the served list of the MCPTT group information entries and which is indicated in a "group" attribute of an <affiliation> element of the <tuple> element of the <presence> root element of the application/pidf+xml MIME body of the SIP PUBLISH request:

            A)   shall copy the MCPTT group information entry into a new MCPTT group information entry of the candidate list of the MCPTT group information entries; and

            B)   shall set the expiration time of the new MCPTT group information entry to the current time increased with the candidate expiration interval;

        ii)   for each MCPTT group ID which has an MCPTT group information entry in the served list of the MCPTT group information entries and which is not indicated in any "group" attribute of the <affiliation> element of the <tuple> element of the <presence> root element of the application/pidf+xml MIME body of the SIP PUBLISH request:

            A)   shall copy the MCPTT group information entry into a new MCPTT group information entry of the candidate list of the MCPTT group information entries;

            B)   shall set the affiliation status of the new MCPTT group information entry to the "de-affiliating" state; and

            C)   shall set the expiration time of the new MCPTT group information entry to the current time increased with twice the value of timer F; and

        iii)   for each MCPTT group ID which does not have an MCPTT group information entry in the served list of the MCPTT group information entries and which is indicated in a "group" element of the <affiliation> element of the <tuple> element of the <presence> root element of the application/pidf+xml MIME body of the SIP PUBLISH request:

            A)   shall add a new MCPTT group information entry in the candidate list of the MCPTT group information list for the MCPTT group ID;

            B)   shall set the affiliation status of the new MCPTT group information entry to the "affiliating" state; and

            C)   shall set the expiration time of the new MCPTT group information entry to the current time increased with twice the value of timer F;

    b)   determine the candidate number of MCPTT group IDs as number of different MCPTT group IDs which have an MCPTT group information entry:

        i)   in the candidate list of the MCPTT group information entries; or

        ii)   in the list of the MCPTT group information entries of an MCPTT client information entry such that:

            A)   the MCPTT client information entry is in the list of the MCPTT client information entries of the served MCPTT user information entry; and

        B) the MCPTT client ID of the MCPTT client information entry is not equal to the served MCPTT client ID;

      with the affiliation status set to the "affiliating" state or the "affiliated" state; and

    c) if the candidate number of MCPTT group IDs is bigger than N2 value of the served MCPTT ID, shall based on MCPTT service provider policy reduce the candidate MCPTT group IDs to that equal to N2;

NOTE:    The MCPTT service provider policy can determine to remove an MCPTT group ID based on the order it appeared in the PUBLISH request or based on the importance or priority of the MCPTT group or some other policy to determine which MCPTT groups are preferred.

15) if the candidate expiration interval is zero, constructs the candidate list of the MCPTT group information entries as follows:

    a) for each MCPTT group ID which has an entry in the served list of the MCPTT group information entries:

        i) shall copy the MCPTT group entry of the served list of the MCPTT group information into a new MCPTT group information entry of the candidate list of the MCPTT group information entries;

        ii) shall set the affiliation status of the new MCPTT group information entry to the "de-affiliating" state; and

        iii) shall set the expiration time of the new MCPTT group information entry to the current time increased with twice the value of timer F;

16) shall replace the list of the MCPTT group information entries stored in the served MCPTT client information entry with the candidate list of the MCPTT group information entries; and

17) shall perform the procedures specified in subclause 9.2.2.2.6 for the served MCPTT ID and each MCPTT group ID:

    a) which does not have an MCPTT group information entry in the served list of the MCPTT group information entries and which has an MCPTT group information entry in the candidate list of the MCPTT group information entries; or

    b) which has an MCPTT group information entry in the served list of the MCPTT group information entries with the affiliation status set to the "affiliated" state and which has an MCPTT group information entry in the candidate list of the MCPTT group information entries with the affiliation status set to the "de-affiliating" state.

### 9.2.2.2.4 Receiving subscription to affiliation status procedure

Upon receiving a SIP SUBSCRIBE request such that:

1) Request-URI of the SIP PUBLISH request contains either the public service identity identifying the originating participating MCPTT function serving the MCPTT user, or the public service identity identifying the terminating participating MCPTT function serving the MCPTT user;

2) the SIP PUBLISH request contains an application/vnd.3gpp.mcptt-info MIME body containing the<mcptt-request-uri> element;

3) an Accept-Contact header field of the SIP SUBSCRIBE request contains the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6]; and

4) the Event header field of the SIP SUBSCRIBE request contains the "presence" event type;

the MCPTT server:

1) shall identify the served MCPTT ID in the <mcptt-request-uri> element of the application/vnd.3gpp.mcptt-info MIME body of the SIP PUBLISH request;

2) if the Request-URI of the SIP PUBLISH request contains the public service identity identifying the originating participating MCPTT function serving the MCPTT user, shall identify the originating MCPTT ID from public user identity in the P-Asserted-Identity header field of the SIP PUBLISH request;

3) if the Request-URI of the SIP PUBLISH request contains the public service identity identifying the terminating participating MCPTT function serving the MCPTT user, shall identify the originating MCPTT ID in the <mcptt-calling-user-identity> element of the application/vnd.3gpp.mcptt-info MIME body of the SIP PUBLISH request;

4) if the originating MCPTT ID is different than the served MCPTT ID and the originating MCPTT ID is not authorized to modify affiliation status of the served MCPTT ID, shall send a 403 (Forbidden) response and shall not continue with the rest of the steps; and

5) shall generate a 200 (OK) response to the SIP SUBSCRIBE request according to 3GPP TS 24.229 [4], IETF RFC 6665 [26].

For the duration of the subscription, the MCPTT server shall notify the subscriber about changes of the information of the served MCPTT ID, as described in subclause 9.2.2.2.5.

### 9.2.2.2.5 Sending notification of change of affiliation status procedure

In order to notify the subscriber about changes of the served MCPTT ID, the MCPTT server:

1) shall consider an MCPTT user information entry such that:

   a) the MCPTT user information entry is in the list of MCPTT user information entries described in subclause 9.2.2.2.2; and

   b) the MCPTT ID of the MCPTT user information entry is equal to the served MCPTT ID;

   as the served MCPTT user information entry;

2) shall consider the list of the MCPTT client information entries of the served MCPTT user information entry as the served list of the MCPTT client information entries;

3) shall generate an application/pidf+xml MIME body indicating per-user affiliation information according to subclause 9.3.1 and the served list of the MCPTT client information entries; and

Editor's Note [CT1#95-bis, C1-160419]: which MIME type is used depends on event package used and is FFS.

Editor's Note [CT1#95-bis, C1-160419]: exact construction of the MIME body is FFS

4) send a SIP NOTIFY request according to 3GPP TS 24.229 [4], and IETF RFC 6665 [26] with the MIME body. In the SIP NOTIFY request, the MCPTT server shall include the generated application/pidf+xml MIME body indicating per-user affiliation information.

### 9.2.2.2.6 Sending affiliation status change towards MCPTT server owning MCPTT group procedure

Editor's note: it is FFS how to use one PUBLISH to carry information about change of affiliation state of several MCPTT users served by the same MCPTT server and whether this is needed.

In order:

- to send an affiliation request of a served MCPTT ID to a handled MCPTT group ID;

- to send an de-affiliation request of a served MCPTT ID from a handled MCPTT group ID; or

- to send an affiliation request of a served MCPTT ID to a handled MCPTT group ID due to near expiration of the previously published information;

the MCPTT server shall generate a SIP PUBLISH request according to 3GPP TS 24.229 [4], IETF RFC 3903 [37] and IETF RFC 3856 [51]. In the SIP PUBLISH request, the MCPTT server:

1) shall set the Request-URI to the public service identity of the controlling MCPTT function associated with the handled MCPTT group ID;

2) shall include an application/vnd.3gpp.mcptt-info MIME body. In the application/vnd.3gpp.mcptt-info MIME body, the MCPTT server:

   a) shall include the <mcptt-request-uri> element set to the handled MCPTT group ID; and

   b)  shall include the <mcptt-calling-user-id> element set to the served MCPTT ID;

3)  shall include an Accept-Contact header field containing the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

4)  shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcptt" (coded as specified in 3GPP TS 24.229 [4]), in a P-Asserted-Service header field according to IETF RFC 6050 [9];

5)  if sending an affiliation request, shall set the Expires header field according to IETF RFC 3903 [37], to 4294967295;

NOTE 1:  4294967295, which is equal to $2^{32}$-1, is the highest value defined for Expires header field in IETF RFC 3261 [24].

6)  if sending an de-affiliation request, shall set the Expires header field according to IETF RFC 3903 [37], to zero;

7)  shall include an P-Asserted-Identity header field set to the public service identity of the MCPTT server according to 3GPP TS 24.229 [4];

8)  shall consider an MCPTT user information entry such that:

   a)  the MCPTT user information entry is in the list of MCPTT user information entries described in subclause 9.2.2.2.2; and

   b)  the MCPTT ID of the MCPTT user information entry is equal to the served MCPTT ID;

   as the served MCPTT user information entry; and

9)  shall include an application/pidf+xml MIME body indicating per-group affiliation information constructed according to subclause 9.2.3.2. The MCPTT server shall indicate all served MCPTT client IDs, such that:

   a)  affiliation status is set to "affiliating" or "affiliated" in an MCPTT group information entry with the MCPTT group ID set to the handled MCPTT group;

   b)  the MCPTT group information entry is in the list of the MCPTT group information entries of an MCPTT client information entry;

   c)  the MCPTT client information entry has the MCPTT client ID set to the served MCPTT client ID; and

   d)  the MCPTT client information entry is in the list of the MCPTT client information entries of the served MCPTT user information entry.

The MCPTT server shall send the SIP PUBLISH request according to 3GPP TS 24.229 [4].

If timer F expires for the SIP PUBLISH request sent for a (de)affiliation request of served MCPTT ID to the MCPTT group ID or upon receiving a SIP 3xx, 4xx 5xx or 6xx response to the SIP PUBLISH request, the MCPTT server:

1)  shall remove each MCPTT group ID entry such that:

   a)  the MCPTT group information entry has the MCPTT group ID set to the handled MCPTT group ID;

   b)  the MCPTT group information entry is in the list of the MCPTT group information entries of an MCPTT client information entry; and

   c)  the MCPTT client information entry is in the list of the MCPTT client information entries of the served MCPTT user information entry.

### 9.2.2.2.7 Affiliation status determination from MCPTT server owning MCPTT group procedure

In order to discover whether a served MCPTT user was successfully affiliated to a handled MCPTT group in the MCPTT server owning the handled MCPTT group, the MCPTT server shall generate an initial SIP SUBSCRIBE request according to 3GPP TS 24.229 [4], IETF RFC 3856 [51], and IETF RFC 6665 [26].

Editor's Note [CT1#95-bis, C1-160419]: whether a filter needs to be provided is FFS

In the SIP SUBSCRIBE request, the MCPTT server:

1) shall set the Request-URI to the public service identity of the controlling MCPTT function associated with the handled MCPTT group ID;

2) shall include an application/vnd.3gpp.mcptt-info MIME body. In the application/vnd.3gpp.mcptt-info MIME body, the MCPTT server:

   a) shall include the <mcptt-request-uri> element set to the handled MCPTT group ID; and

   b) shall include the <mcptt-calling-user-id> element set to the served MCPTT ID;

3) shall include an Accept-Contact header field containing the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

4) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcptt" (coded as specified in 3GPP TS 24.229 [4]), in a P-Asserted-Service header field according to IETF RFC 6050 [9];

5) if the MCPTT server wants to receive the current status and later notification, shall set the Expires header field according to IETF RFC 6665 [26], to 4294967295;

NOTE 1: 4294967295, which is equal to $2^{32}$-1, is the highest value defined for Expires header field in IETF RFC 3261 [24].

6) if the MCPTT server wants to fetch the current state only, shall set the Expires header field according to IETF RFC 6665 [26], to zero; and

7) shall include an Accept header field containing the "application/pidf+xml" MIME type; and

8) shall include an Event header field with the "presence" event type.

In order to re-subscribe or de-subscribe, the MCPTT server shall generate an in-dialog SIP SUBSCRIBE request according to 3GPP TS 24.229 [4], IETF RFC 3856 [51], and IETF RFC 6665 [26]. In the SIP SUBSCRIBE request, the MCPTT server:

1) if the MCPTT server wants to receive the current status and later notification, shall set the Expires header field according to IETF RFC 6665 [26], to 4294967295;

NOTE 2: 4294967295, which is equal to $2^{32}$-1, is the highest value defined for Expires header field in IETF RFC 3261 [24].

2) if the MCPTT server wants to de-subscribe, shall set the Expires header field according to IETF RFC 6665 [26], to zero; and

3) shall include an Accept header field containing the "application/pidf+xml" MIME type;

Upon receiving a SIP NOTIFY request according to 3GPP TS 24.229 [4], IETF RFC 3856 [51], and IETF RFC 6665 [26], if SIP NOTIFY request contains an application/pidf+xml MIME body indicating per-group affiliation information constructed according to subclause 9.3.1, then the MCPTT server:

1) if the SIP NOTIFY request identifies the affiliating MCPTT user as affiliated:

   a) shall set the affiliation status to "affiliated" for each MCPTT group information entry such that:

      i) the MCPTT group information entry has the "affiliating" affiliation status and the MCPTT group ID set to the handled MCPTT group ID;

      ii) the MCPTT group information entry is in the list of the MCPTT group information entries of an MCPTT client information entry; and

      iii) the MCPTT client information entry is in the list of the MCPTT client information entries of the served MCPTT user information entry; and

2) if the SIP NOTIFY request identifies the affiliating MCPTT user is no longer unaffiliated:

   a) shall remove each MCPTT group information entry such that:

i)    the MCPTT group information entry has the MCPTT group ID set to the handled MCPTT group ID;

ii)   the MCPTT group information entry is in the list of the MCPTT group information entries of an MCPTT client information entry; and

iii)  the MCPTT client information entry is in the list of the MCPTT client information entries of the served MCPTT user information entry.

Editor's note: changes of the list of MCPTT user information entries based on received notify request need to be double checked.

### 9.2.2.3       Procedures of MCPTT server owning the MCPTT group

#### 9.2.2.3.1       General

The procedures of MCPTT server owning the MCPTT group consist of:

-    receiving group affiliation status change procedure.

Editor's note: usage of CSC-3 procedures is FFS

#### 9.2.2.3.2       Stored information

The MCPTT server shall maintain a list of MCPTT group information entries.

In each MCPTT group information entry, the MCPTT server shall maintain:

1)  an MCPTT group ID. This field uniquely identifies the MCPTT group information entry in the list of the MCPTT group information entries; and

2)  a list of MCPTT user information entries.

In each MCPTT user information entry, the MCPTT server shall maintain:

1)  an MCPTT ID. This field uniquely identifies the MCPTT user information entry in the list of the MCPTT user information entries;

2)  a list of MCPTT client information entries; and

3)  an expiration time.

In each MCPTT client information entry, the MCPTT server shall maintain:

1)  an MCPTT client ID. This field uniquely identifies the MCPTT client information entry in the list of the MCPTT client information entries.

#### 9.2.2.3.3       Receiving group affiliation status change procedure

Upon receiving a SIP PUBLISH request such that:

1)  Request-URI of the SIP PUBLISH request contains the public service identity of the controlling MCPTT function associated with the served MCPTT group;

2)  the SIP PUBLISH request contains an application/vnd.3gpp.mcptt-info MIME body containing the <mcptt-request-uri> element and the <mcptt-calling-user-identity> element;

3)  an Accept-Contact header field of the SIP PUBLISH request contains the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

4)  the Event header field of the SIP PUBLISH request contains the "presence" event type; and

5)  SIP PUBLISH request contains an application/pidf+xml MIME body indicating per-group affiliation information constructed according to subclause 9.2.3.2;

then the MCPTT server:

1) shall identify the served MCPTT group ID in the <mcptt-request-uri> element of the application/vnd.3gpp.mcptt-info MIME body of the SIP PUBLISH request;

2) shall identify the handled MCPTT ID in the <mcptt-calling-user-identity> element of the application/vnd.3gpp.mcptt-info MIME body of the SIP PUBLISH request;

3) if the Expires header field of the SIP PUBLISH request is not included or has nonzero value lower than 4294967295, shall send a SIP 423 (Interval Too Brief) response to the SIP PUBLISH request, where the SIP 423 (Interval Too Brief) response contains a Min-Expires header field set to 4294967295, and shall not continue with the rest of the steps;

4) if an MCPTT group for the served MCPTT group ID does not exist in the group management server according to 3GPP TS 24.381 [31], shall reject the SIP PUBLISH request with SIP 403 (Forbidden) response to the SIP PUBLISH request according to 3GPP TS 24.229 [4], IETF RFC 3903 [37] and IETF RFC 3856 [51] and skip the rest of the steps;

5) if the handled MCPTT ID is not a member of the MCPTT group identified by the served MCPTT group ID, shall reject the SIP PUBLISH request with SIP 403 (Forbidden) response to the SIP PUBLISH request according to 3GPP TS 24.229 [4], IETF RFC 3903 [37] and IETF RFC 3856 [51] and skip the rest of the steps;

6) shall respond with SIP 200 (OK) response to the SIP PUBLISH request according to 3GPP TS 24.229 [4], IETF RFC 3903 [37]. In the SIP 200 (OK) response, the MCPTT server:

   a) shall set the Expires header field according to IETF RFC 3903 [37], to the selected expiration time;

7) if the "entity" attribute of the <presence> element of the application/pidf+xml MIME body of the SIP PUBLISH request is different than the served MCPTT group ID, shall not continue with the rest of the steps;

8) if the handled MCPTT ID is different from the MCPTT ID in the "id" attribute of the <tuple> element of the <presence> root element of the application/pidf+xml MIME body of the SIP PUBLISH request, shall not continue with the rest of the steps;

9) shall consider an MCPTT group information entry such that:

   a) the MCPTT group information entry is in the list of MCPTT group information entries described in subclause 9.2.2.3.2; and

   b) the MCPTT group ID of the MCPTT group information entry is equal to the served MCPTT group ID;

   as the served MCPTT group information entry;

10) if the selected expiration time is zero:

   a) shall remove the MCPTT user information entry such that:

      i) the MCPTT user information entry is in the list of the MCPTT user information entries of the served MCPTT group information entry; and

      ii) the MCPTT user information entry has the MCPTT ID set to the served MCPTT ID;

11) if the selected expiration time is not zero:

   a) shall consider an MCPTT user information entry such:

      i) the MCPTT user information entry is in the list of the MCPTT user information entries of the served MCPTT group information entry; and

      ii) the MCPTT ID of the MCPTT user information entry is equal to the handled MCPTT ID;

      as the served MCPTT user information entry; and

   b) shall set the following information in the served MCPTT user information entry:

      i) set the MCPTT client ID list according to the "client" attributes of the <affiliation> elements of the <tuple> element of the <presence> root element of the application/pidf+xml MIME body of the SIP PUBLISH request; and

ii) set the expiration time according to the selected expiration time.

### 9.2.2.3.4 Receiving subscription to affiliation status procedure

Upon receiving a SIP SUBSCRIBE request such that:

1) Request-URI of the SIP SUBSCRIBE request contains the public service identity of the controlling MCPTT function associated with the served MCPTT group;

2) the SIP SUBSCRIBE request contains an application/vnd.3gpp.mcptt-info MIME body containing the<mcptt-request-uri> element and the <mcptt-calling-user-identity> element;

3) an Accept-Contact header field of the SIP PUBLISH request contains the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6]; and

4) the Event header field of the SIP PUBLISH request contains the "presence" event type;

then the MCPTT server:

1) shall identify the served MCPTT group ID in the <mcptt-request-uri> element of the application/vnd.3gpp.mcptt-info MIME body of the SIP PUBLISH request;

2) shall identify the handled MCPTT ID in the <mcptt-calling-user-identity> element of the application/vnd.3gpp.mcptt-info MIME body of the SIP PUBLISH request;

3) if the Expires header field of the SIP SUBCRIBE request is not included or has nonzero value lower than 4294967295, shall send a SIP 423 (Interval Too Brief) response to the SIP SUBCRIBE request, where the SIP 423 (Interval Too Brief) response contains a Min-Expires header field set to 4294967295, and shall not continue with the rest of the steps;

4) if an MCPTT group for the served MCPTT group ID does not exist in the group management server according to 3GPP TS 24.381 [31], shall reject the SIP SUBCRIBE request with SIP 403 (Forbidden) response to the SIP PUBLISH request according to 3GPP TS 24.229 [4], IETF RFC 3903 [37] and IETF RFC 3856 [51] and skip the rest of the steps;

5) if the handled MCPTT ID is not a member of the MCPTT group identified by the served MCPTT group ID, shall reject the SIP SUBCRIBE request with SIP 403 (Forbidden) response to the SIP PUBLISH request according to 3GPP TS 24.229 [4], IETF RFC 3903 [37] and IETF RFC 3856 [51] and skip the rest of the steps; and

6) shall generate a SIP 200 (OK) response to the SIP SUBSCRIBE request according to 3GPP TS 24.229 [4], IETF RFC 6665 [26].

For the duration of the subscription, the MCPTT server shall notify subscriber about changes of the information of the served MCPTT ID, as described in subclause 9.2.2.2.5.

### 9.2.2.3.5 Sending notification of change of affiliation status procedure

Editor's note: it is FFS how to use one NOTIFY to carry information about change of affiliation state of several MCPTT users served by the same MCPTT server.

In order to notify the subscriber identified by the handled MCPTT ID about changes of the affiliation status of the served MCPTT group ID, the MCPTT server:

1) shall consider an MCPTT group information entry such that:

   a) the MCPTT group information entry is in the list of MCPTT group information entries described in subclause 9.2.2.3.2; and

   b) the MCPTT group ID of the MCPTT group information entry is equal to the served MCPTT group ID;

2) shall consider an MCPTT user information entry such:

   a) the MCPTT user information entry is in the list of the MCPTT user information entries of the served MCPTT group information entry; and

b)  the MCPTT ID of the MCPTT user information entry is equal to the handled MCPTT ID;

as the served MCPTT user information entry;

3)  shall generate an application/pidf+xml MIME body indicating per-group affiliation information according to subclause 9.3.1 and the served list of the served MCPTT user information entry of the MCPTT group information entry: and

4)  send a SIP NOTIFY request according to 3GPP TS 24.229 [4], and IETF RFC 6665 [26] with the MIME body. In the SIP NOTIFY request, the MCPTT server shall include the generated application/pidf+xml MIME body indicating per-group affiliation information.

# 9.3     Coding

## 9.3.1     Extension of application/pidf+xml MIME type

### 9.3.1.1       Introduction

The parent subclause of this subclause describes an extension of the application/pidf+xml MIME body specified in IETF RFC 3863 [52]. The extension is used to indicate:

-   per-user affiliation information; and

-   per-group affiliation information.

Editor's note: it is FFS whether encoding of MCPTT ID and MCPTT group ID in XML elements is more secure than encoding in XML attributes. If so, the encoding would need to be adjusted.

### 9.3.1.2       Syntax

The application/pidf+xml MIME body indicating per-user affiliation information is constructed according to IETF RFC 3863 [52] and:

1)  contains a <presence> root element according to IETF RFC 3863 [52];

2)  contains an "entity" attribute of the <presence> element set to the MCPTT ID of the MCPTT user;

3)  contains one <tuple> child element according to IETF RFC 3863 [52] per each MCPTT client of the <presence> element;

4)  contains an "id" attribute of the <tuple> element set to the MCPTT client ID;

5)  contains one <affiliation> child element defined in the XML schema defined in table 9.3.1.2-1, of the <tuple> element, for each MCPTT group in which the MCPTT user is interested at the MCPTT client;

6)  contains a "group" attribute of each <affiliation> element set to the MCPTT group ID of the MCPTT group in which the MCPTT user is interested at the MCPTT client;

7)  can contain a "status" attribute of each <affiliation> element indicating the affiliation status of the MCPTT user to MCPTT group at the MCPTT client; and

8)  can contain an "expires" attribute of each <affiliation> element indicating expiration of affiliation of the MCPTT user to MCPTT group at the MCPTT client.

The application/pidf+xml MIME body indicating per-group affiliation information is constructed according to IETF RFC 3856 [51] and:

1)  contains the <presence> root element according to IETF RFC 3863 [52];

2)  contains an "entity" attribute of the <presence> element set to the MCPTT group ID of the MCPTT group;

3)  contains one <tuple> child element according to IETF RFC 3863 [52] of the <presence> element;

4)  contains an "id" attribute of the <tuple> element set to the MCPTT ID of the MCPTT user;

5)  contains one <affiliation> child element defined in the XML schema defined in table 9.3.1.2-1, of the <tuple> element, for each MCPTT client at which the MCPTT user is interested in the MCPTT group; and

6)  contains one "client" attribute defined in the XML schema defined in table 9.3.1.2-2, of the <affiliation> element set to the MCPTT client ID.

**Table 9.3.1.2-1: XML schema with elements and attributes extending the application/pidf+xml MIME body**

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema
  targetNamespace="urn:3gpp:ns:mcpttPresInfo:1.0"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:mcpttPI10="urn:3gpp:ns:mcpttPresInfo:1.0"
  elementFormDefault="qualified" attributeFormDefault="unqualified">

  <!-- MCPTT specific child elements of tuple element -->
  <xs:element name="affiliation" type="mcpttPI10:affiliationType"/>
  <xs:complexType name="affiliationType">
    <xs:sequence>
      <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="group" type="xs:anyURI" use="optional"/>
    <xs:attribute name="client" type="xs:anyURI" use="optional"/>
    <xs:attribute name="status" type="mcpttPI10:statusType" use="optional"/>
    <xs:attribute name="expires" type="xs:dateTime" use="optional"/>
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>

  <xs:simpleType name="statusType" >
    <xs:restriction base="xs:string">
      <xs:enumeration value="affiliating"/>
      <xs:enumeration value="affiliated"/>
      <xs:enumeration value="deaffiliating"/>
    </xs:restriction>
  </xs:simpleType>

  </xs:schema>
```

# 10 Group call

## 10.0 General

This subclause describes the group call procedures for on-network and off-network.

For on-network, prearranged group call including emergency group call for each functional entity are specified in subclause 10.1.1 and chat group (restricted) call including emergency group call for each functional entity are specified in subclause 10.1.2.

Off-network group call and off-network broadcast group call are specified in subclause 10.2 and subclause 10.3.

# 10.1 On-network group call

## 10.1.1 Prearranged group call

### 10.1.1.1 General

### 10.1.1.2 MCPTT client procedures

#### 10.1.1.2.1 On-demand prearranged group call

##### 10.1.1.2.1.1 Client originating procedures

Upon receiving a request from an MCPTT user to establish an MCPTT prearranged group session the MCPTT client shall generate an initial SIP INVITE request by following the UE originating session procedures specified in 3GPP TS 24.229 [4], with the clarifications given below.

The MCPTT client:

1) if the MCPTT user has requested the origination of an MCPTT emergency group call or is originating an MCPTT prearranged group call and the MCPTT emergency state is already set, the MCPTT client shall comply with the procedures in subclause 6.2.8.1.1;

2) if the MCPTT user has requested the origination of a broadcast group call, the MCPTT client shall comply with the procedures in subclause 6.2.8.2;

3) shall include the g.3gpp.mcptt media feature tag in the Contact header field of the SIP INVITE request according to IETF RFC 3840 [16];

4) shall include an Accept-Contact header field containing the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

5) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcptt" (coded as specified in 3GPP TS 24.229 [4]), in a P-Preferred-Service header field according to IETF RFC 6050 [9] in the SIP INVITE request;

6) shall include an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt" along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

7) should include the "timer" option tag in the Supported header field;

8) should include the Session-Expires header field according to IETF RFC 4028 [7]. It is recommended that the "refresher" header field parameter is omitted. If included, the "refresher" header field parameter shall be set to "uac";

9) shall set the Request-URI of the SIP INVITE request to the public service identity identifying the participating MCPTT function serving the MCPTT user;

NOTE 1: The MCPTT client is configured with public service identity identifying the participating MCPTT function serving the MCPTT user.

10) may include a P-Preferred-Identity header field in the SIP INVITE request containing a public user identity as specified in 3GPP TS 24.229 [4];

Editor's Note [CT1#95, C1-154553]: The Resource-Priority header field may need to be used to indicate the need for elevated bearer priority for emergency calls. This aspect of its usage is under study.

11) if the MCPTT emergency state is already set or the MCPTT client emergency group state for this group is set to "MEG 2: in-progress", the MCPTT client shall comply with the procedures in subclause 6.2.8.1.2;

12) shall contain an "application/vnd.3gpp.mcptt-info" MIME body with the <mcpttinfo> element containing the <mcptt-Params> element with:

a) the <session-type> element set to a value of "prearranged"; and

b) the <mcptt-request-uri> element set to the group identity;

NOTE 2: The MCPTT client does not include the MCPTT ID of the originating MCPTT user in the body, as this will be inserted into the body of the SIP INVITE request that is sent from the originating participating MCPTT function.

13) shall include an SDP offer according to 3GPP TS 24.229 [4] with the clarifications given in subclause 6.2.1;

14) if an implicit floor request is required, shall indicate this as specified in subclause 6.4; and

15) shall send the SIP INVITE request towards the MCPTT server according to 3GPP TS 24.229 [4].

On receiving a SIP 2xx response to the SIP INVITE request, the MCPTT client:

1) shall interact with the user plane as specified in 3GPP TS 24.380 [5] ; and

2) if the MCPTT emergency group call state is set to "MEGC 2: emergency-call-requested" or "MEGC 3: emergency-call-granted" the MCPTT client shall perform the actions specified in subclause 6.2.8.1.4.

On receiving a SIP 4xx response to a SIP INVITE request when the MCPTT emergency group call state is set to "MEGC 2: emergency-call-requested" or "MEGC 3: emergency-call-granted" the MCPTT client shall perform the actions specified in subclause 6.2.8.1.5.

### 10.1.1.2.1.2 Client terminating procedures

Upon receipt of an initial SIP INVITE request, the MCPTT client shall follow the procedures for termination of multimedia sessions in the IM CN subsystem as specified in 3GPP TS 24.229 [4] with the clarifications below.

The MCPTT client:

1) may reject the SIP INVITE request if either of the following conditions are met:

   a) MCPTT client does not have enough resources to handle the call; or

   b) any other reason outside the scope of this specification;

   otherwise, continue with the rest of the steps.

2) if the SIP INVITE request is rejected in step 1), shall respond toward participating MCPTT function either with appropriate reject code as specified in 3GPP TS 24.229 [4] and warning texts as specified in subclause 4.4.2 or with SIP 480 (Temporarily unavailable) response not including warning texts if the user is authorised to restrict the reason for failure and skip the rest of the steps of this subclause;

3) shall check if a Resource-Priority header field is included in the incoming SIP INVITE request and may perform further actions outside the scope of this specification to act upon an included Resource-Priority header field as specified in 3GPP TS 24.229 [4];

Editor's Note: The values of Resource-Priority header field are FFS.

4) may display to the MCPTT user the MCPTT address of the inviting MCPTT user;

5) shall perform the automatic commencement procedures specified in subclause 6.2.3.1.2 if the following conditions are met:

   a) SIP INVITE request contains an Answer-Mode header field with the value "Auto"; or

   b) SIP INVITE request does not contain an Answer-Mode header field and the policy for answering the call at the invited MCPTT client is to use automatic commencement mode; and

6) shall perform the manual commencement procedures specified in subclause 6.2.3.2.2 if the following conditions are met:

   a) SIP INVITE request contains an Answer-Mode header field with the value "Manual"; or

    b) SIP INVITE request does not contain an Answer-Mode header field and the policy for answering the call at the invited MCPTT client is to use manual commencement mode.

### 10.1.1.2.1.3 MCPTT upgrade to in-progress emergency

Upon receiving a request from an MCPTT user to upgrade the MCPTT group session to an emergency condition on an MCPTT prearranged group, the MCPTT client shall generate a SIP re-INVITE request as specified in 3GPP TS 24.229 [4], with the clarifications given below.

The MCPTT client:

1) shall include an "application/vnd.3gpp.mcptt-info" MIME body populated as specified in subclause 6.2.8.1.1;

2) if an indication of an MCPTT emergency alert is to be included, shall perform the procedures specified in subclause 6.2.9.1 for the MCPTT emergency alert trigger;

3) shall include the g.3gpp.mcptt media feature tag in the Contact header field of the SIP re-INVITE request according to IETF RFC 3840 [16];

4) should include the "timer" option tag in the Supported header field;

5) should include the Session-Expires header field according to IETF RFC 4028 [7]. It is recommended that the refresher parameter is omitted. If included, the refresher parameter shall be set to "uac";

6) shall set the Request-URI of the SIP re-INVITE request to the MCPTT session identity;

7) shall include the Call-ID, From tag and To tag which are provided from the MCPTT group session;

8) shall include in the SIP re-INVITE request an SDP offer according to 3GPP TS 24.229 [4] with the clarifications specified in subclause 6.2.1;

9) if an implicit floor request is required, shall indicate this as specified in subclause 6.4;

10) shall include a Resource-Priority header field and comply with the procedures in subclause 6.2.8.1.2; and

11) shall send the SIP re-INVITE request according to 3GPP TS 24.229 [4].

On receiving a SIP 2xx response to the SIP re-INVITE request the MCPTT client:

1) shall interact with the user plane as specified in 3GPP TS 24.380 [5]; and

2) if the MCPTT emergency group call state is set to "MEGC 2: emergency-call-requested" or "MEGC 3: emergency-call-granted" the MCPTT client shall perform the actions specified in subclause 6.2.8.1.4.

On receiving a SIP 4xx response to a SIP INVITE request when the MCPTT emergency group call state is set to "MEGC 2: emergency-call-requested" or "MEGC 3: emergency-call-granted" the MCPTT client shall perform the actions specified in subclause 6.2.8.1.5.

> Editor's Note [CT1#96, C1-161141]: the use of the Warning header to indicate emergency related authentication failures needs to be replaced globally as this can be considered to be sensitive information. One candidate is the inclusion of an mcpttinfo body in the SIP 2xx response or SIP 4xx response indicating the type of failure.

### 10.1.1.2.2 Prearranged group call using pre-established session

### 10.1.1.2.2.1 Client originating procedures

Upon receiving a request from an MCPTT user to establish an MCPTT group session using an MCPTT group identity identifying a prearranged MCPTT group within the pre-established session, the MCPTT client shall generate a SIP REFER request as specified in IETF RFC 3515 [25] as updated by IETF RFC 6665 [26] and IETF RFC 7647 [27], and in accordance with the UE procedures specified in 3GPP TS 24.229 [4], with the clarifications given below.

The MCPTT client shall follow the procedures specified in subclause 10.1.2.2.2.1 with the clarification in step 2) of subclause 10.1.2.2.2.1 that the Refer-To header field of the SIP REFER request:

   1) shall contain a URI of the prearranged MCPTT group;

   2) shall contain a Content-Type URI header field containing an "application/vnd.3gpp.mcptt-info"MIME type of the "body" URI header field and the body URI header field containing the <mcptt-info> element with the <mcptt-Params> element and with the <session-type> element set to a value of "prearranged"; and

   3) if the MCPTT user has requested the origination of a broadcast group call, the MCPTT client shall comply with the procedures in subclause 6.2.8.2.

### 10.1.1.2.2.2 Client terminating procedures

Upon receiving a SIP re-INVITE request within a pre-established Session without an associated MCPTT session or when generating SIP responses to the SIP re-INVITE request, the MCPTT client shall follow the procedures in subclause 10.1.1.2.1.2.

   NOTE: In subclause 10.1.1.2.1.2, the reader is assumed to replace occurrences of SIP INVITE request with SIP re-INVITE request.

## 10.1.1.2.3 End group call

### 10.1.1.2.3.1 Client originating procedures on-demand

When an MCPTT client wants to leave the MCPTT session that has been established using on-demand session, the MCPTT client shall follow the procedures as specified in subclause 6.2.4.1.

### 10.1.1.2.3.2 Client originating procedures using pre-established session

When an MCPTT client wants to leave the MCPTT session within a pre-established session, the MCPTT client shall follow the procedures as specified in subclause 6.2.4.2.

### 10.1.1.2.3.3 Client terminating procedures

Upon receiving a SIP BYE request for releasing the prearranged MCPTT group call, the MCPTT client shall follow the procedures as specified in subclause 6.2.6.

## 10.1.1.2.4 Re-join procedure

### 10.1.1.2.4.1 On demand session establishment

Upon receiving a request from an MCPTT user to re-join an ongoing MCPTT session or triggered by coming back from out of coverage, the MCPTT client shall generate an initial SIP INVITE request by following the UE originating session procedures specified in 3GPP TS 24.229 [4], with the clarifications given below.

   NOTE: How an MCPTT client is informed whether it comes back from out of coverage is out of scope of present document.

The MCPTT client shall follow the procedures specified in subclause 10.1.1.2.1.1 with the clarification in step 9) of subclause 10.1.1.2.1.1 that the Request-URI of the SIP INVITE request shall contain a URI of the MCPTT session identity to re-join.

### 10.1.1.2.4.2 Pre-established session

Upon receiving a request from an MCPTT user to re-join an ongoing MCPTT session within the pre-established session or triggered by coming back from out of coverage, the MCPTT client shall generate a SIP REFER request as specified in IETF RFC 3515 [25] as updated by IETF RFC 6665 [26] and IETF RFC 7647 [27], and in accordance with the UE procedures specified in 3GPP TS 24.229 [4], with the clarifications given below.

The MCPTT client shall follow the procedures specified in subclause 10.1.1.2.2.1 with the clarification in step 1) of subclause 10.1.1.2.2.1 that the Refer-To header field of the SIP REFER request:

   1) shall contain a URI of the MCPTT session identity to re-join; and

2) shall contain a Content-Type URI header field containing an "application/vnd.3gpp.mcptt-info"MIME type of the "body" URI header field and the body URI header field containing the <mcptt-info> element with the <mcptt-Params> element and with the <session-type> element set to a value of "prearranged".

## 10.1.1.3    Participating MCPTT function procedures

### 10.1.1.3.1    Originating procedures

#### 10.1.1.3.1.1        On demand prearranged group call

In the procedures in this subclause, group identity in an incoming SIP INVITE request refers to the group identity from the <mcptt-request-uri> element of the "application/vnd.3gpp.mcptt-info" MIME body of the incoming SIP INVITE request.

Upon receipt of a "SIP INVITE request for originating participating MCPTT function" containing an "application/vnd.3gpp.mcptt-info" MIME body with the <session-type> element set to a value of "prearranged", the participating MCPTT function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response. The participating MCPTT function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [24]. Otherwise, continue with the rest of the steps;

Editor's Note [CT1#94, C1-153763]: The priority mechanisms are still to be specified for MCPTT. The priority mechanisms may be a factor in determining whether to reject or allow the request.

2) shall determine the MCPTT ID of the calling user from public user identity in the P-Asserted-Identity header field of the SIP INVITE request, and shall authorise the calling user;

NOTE 1: The MCPTT ID of the calling user is bound to the public user identity at the time of service authorisation, as documented in subclause 7.3.

3) if the user identified by the MCPTT ID is not authorised to initiate prearranged group calls, shall reject the "SIP INVITE request for originating participating MCPTT function" with a SIP 403 (Forbidden) response to the SIP INVITE request, with warning text set to "109 user not authorised to make prearranged group calls" in a Warning header field as specified in subclause 4.4;

4) if the user identified by the MCPTT ID already has N2 simultaneous affiliations and the user is not affiliated to the group identified in the "SIP INVITE request for originating participating MCPTT function", shall reject the "SIP INVITE request for originating participating MCPTT function" with a SIP 486 (Busy Here) response with warning text set to "102 too many simultaneous affiliations" in a Warning header field as specified in subclause 4.4;

NOTE 2: N2 is the total number of MCPTT groups that an MCPTT User can be affiliated to simultaneously.

5). shall validate the media parameters and if the MCPTT speech codec is not offered in the SIP INVITE request shall reject the request with a SIP 488 (Not Acceptable Here) response. Otherwise, continue with the rest of the steps;

6) shall check if the number of maximum simultaneous MCPTT group calls supported for the MCPTT user has been exceeded. If exceeded, the participating MCPTT function shall respond with a SIP 486 (Busy Here) response with the warning text set to "103 maximum simultaneous MCPTT group calls reached" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the rest of the steps;

Editor's Note [CT1#94, C1-153763]: The above step requires that the participating function has configuration related to maximum number of simultaneous group calls for the MCPTT user. This is still to be determined.

Editor's Note [CT1#94, C1-153763]: It needs to be determined if there is configuration at the participating function for outgoing MCPTT call barring and hence a check for its existence for the MCPTT user at the participating function.

7)  shall check if a Resource-Priority header field is included in the SIP INVITE request according to rules and procedures of specified in 3GPP TS 24.229 [4];

Editor's Note [CT1#94, C1-153763]: The values of Resource-Priority header field are FFS. How the participating function processes the Resource-Priority header in conjunction with other data (e.g. priority data which is also FFS) is to be determined.

8)  shall determine the public service identity of the controlling MCPTT function associated with the group identity in the SIP INVITE request;

NOTE 3:  The public service identity can identify the controlling function in the primary MCPTT system or a partner MCPTT system.

NOTE 4:  How the participating MCPTT server discovers the public service identity of the controlling MCPTT function associated with the group identity is out of scope of the current release.

9)  shall generate a SIP INVITE request as specified in subclause 6.3.2.1.3;

10) shall set the Request-URI to the public service identity of the controlling MCPTT function associated with the group identity which was present in the incoming SIP INVITE request;

11) shall set the <mcptt-calling-user-identity> element of the "application/vnd.3gpp.mcptt-info" MIME body of the SIP INVITE request to the MCPTT ID of the calling user;

12) shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received SIP INVITE request from the MCPTT client as specified in subclause 6.3.2.1.1.1;

13) shall include a Resource-Priority header field according to rules and procedures of 3GPP TS 24.229 [4] set to the value indicated in the Resource-Priority header field of the SIP INVITE request from the MCPTT client; and

Editor's Note [CT1#94,C1-153763]: What values the Resource-Priority header field is set to is FFS. How the participating function processes the Resource-Priority header in conjunction with other data (e.g. priority data which is also FFS) to determine how to set this header in the outgoing INVITE is FFS.

14) shall forward the SIP INVITE request, according to 3GPP TS 24.229 [4].

Upon receipt of a SIP 2xx response in response to the above SIP INVITE request in step 14):

1)  shall generate a SIP 200 (OK) response as in subclause 6.3.2.1.5.2;

2)  shall include in the SIP 200 (OK) response an SDP answer as specified in the subclause 6.3.2.1.2.1;

3)  shall include Warning header field(s) that were received in the incoming SIP 200 (OK) response;

4)  shall include the public service identity received in the P-Asserted-Identity header field of the incoming SIP 200 (OK) response into the P-Asserted-Identity header field of the outgoing SIP 200 (OK) response;

5)  shall include an MCPTT session identity constructed from the MCPTT session identity provided in the Contact header field of the received SIP 200 (OK) response;

6)  shall send the SIP 200 (OK) response to the MCPTT client according to 3GPP TS 24.229 [4];

7)  shall interact with Media Plane as specified in 3GPP TS 24.380 [5]; and

8)  shall start the SIP Session timer according to rules and procedures of IETF RFC 4028 [7].

### 10.1.1.3.1.2  Prearranged group call using pre-established session

Upon receipt of a "SIP REFER request for a pre-established session", with the Refer-To header containing an "application/vnd.3gpp.mcptt-info"MIME type content in a "body" URI header field and with the <session-type> element set to "prearranged" the participating MCPTT function:

Editor's Note [CT1#95, C1-154715]: The above SIP REFER request assumes no encryption of application-related sensitive data in the request (e.g. to hide the MCPTT identities from the SIP layer). Requirements for encryption are FFS, If encryption is required then the above SIP request will also exist in a form that identifies that the request carries sensitive data, e.g. "SIP REFER request for pre-established session with application data encryption".

1)  if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response. The participating MCPTT function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [24]. Otherwise, continue with the rest of the steps;

Editor's Note [CT1#95, C1-154715]: The priority mechanisms are still to be specified for MCPTT. The priority mechanisms may be a factor in determining whether to reject or allow the request.

Editor's Note: [CT1#95, C1-154715]: It needs to be determined if there is configuration at the participating function for outgoing MCPTT call barring and hence a check for its existence for the MCPTT user at the participating function.

2)  shall check if the number of maximum simultaneous MCPTT sessions supported for the MCPTT user has been exceeded. If exceeded, the participating MCPTT function shall respond with a SIP 486 (Busy Here) response with the warning text set to "105 maximum simultaneous MCPTT sessions reached" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the rest of the steps;

3)  shall determine the MCPTT ID of the calling user;

Editor's Note [CT1#95, C1-154715]: The P-Asserted-Identity field will contain the IMPU and this is not necessarily the MCPTT ID. It has not yet been determined how the participating MCPTT function obtains the MCPTT ID. The MCPTT ID could either be 1) included in a body (and encrypted if need be and then decrypted by the server, with the key management solution being FFS) or 2) mapping tables are provided by identity management between the IMS IMPU and the MCPTT-ID and then the IMPU is translated to the MCPTT-ID at the entities.

4)  if the user identified by the MCPTT ID is not authorised to initiate prearranged group calls, shall reject the "SIP REFER request for pre-established session" with a SIP 403 (Forbidden) response to the SIP INVITE request, with warning text set to "109 user not authorised to make prearranged group calls" in a Warning header field as specified in subclause 4.4;

5)  if the "SIP REFER request for a pre-established session" contained a Refer-Sub header field containing "false" value and a Supported header field containing "norefersub" value, shall handle the SIP REFER request as specified in 3GPP TS 24.229 [4], IETF RFC 3515 [25] as updated by IETF RFC 6665 [26], and IETF RFC 4488 [22] without establishing an implicit subscription;

Editor's Note: [CT1#95, C1-154715]: Whether the client should be using the Explicit Subscription ("nosub") mechanism in RFC 7614 or whether the Refer-sub=False header and "norefersub" option tag as defined in RFC 4488 can be used to avoid creation of an implicit subscription is for further study.

6)  shall generate a final SIP 2xx response to the "SIP REFER request for a pre-established session" according to 3GPP TS 24.229 [4];

NOTE:  In accordance with IETF RFC 4488 [22], the participating MCPTT function inserts the Refer-Sub header field containing the value "false" in the SIP 2xx response to the SIP REFER request to indicate that it has not created an implicit subscription.

7)  shall send the response to the "SIP REFER request for a pre-established session" towards the MCPTT client according to 3GPP TS 24.229 [4];

8)  shall generate a SIP INVITE request as specified in subclause 6.3.2.1.4;

9)  shall copy the contents of the URI including any other uri-parameter present, from the Refer-To header field of the "SIP REFER request for a pre-established session" to the Request-URI of the SIP INVITE request;

10) shall include in the SIP INVITE request the option tag "tdialog" in a Supported header field according to the rules and procedures of IETF RFC 4538 [23];

11) shall include in the SIP INVITE request an SDP offer as specified in subclause 6.3.2.1.1.2 based upon the SDP negotiated during the pre-established session establishment, together with the SDP offer (if any) included in the "SIP REFER request for a pre-established session";

12) shall determine if the SIP REFER request is regarded as being received with an implicit floor request;

    a) if the SIP REFER request is regarded as being received with an implicit floor request, the participating MCPTT function shall include the "mc_implicit_request" media level attribute in the associated UDP stream for the floor control in the SDP offer of the SIP INVITE request; and

    b) if the SIP REFER request is regarded as being not received with an implicit floor request, the participating MCPTT function shall not include the "mc_implicit_request" media level attribute in the associated UDP stream for the floor control in the SDP offer of the SIP INVITE request; and

13) shall forward the SIP INVITE request according to 3GPP TS 24.229 [4].

Upon receiving SIP provisional responses for the SIP INVITE request the participating MCPTT function:

1) shall discard the received SIP responses without forwarding them.

Upon receiving a SIP 200 (OK) response for the SIP INVITE request the participating MCPTT function:

1) shall interact with the media plane as specified in 3GPP TS 24.380 [5].

### 10.1.1.3.2 Terminating Procedures

NOTE: This subclause covers both on-demand session and pre-established sessions.

Upon receipt of a "SIP INVITE request for terminating participating MCPTT function", the participating MCPTT function:

Editor's Note [CT1#94, C1-153763]: The name of the above SIP INVITE request assumes no encryption of application-related sensitive data in the request (e.g. to hide the MCPTT identities from the SIP layer). Requirements for encryption are FFS, If encryption is required then the above SIP request will also exist in a form that identifies that the request carries sensitive data, e.g. "SIP INVITE request for originating participating function with application data encryption"

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response. The participating MCPTT function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [24]. Otherwise, continue with the rest of the steps;

2) shall check the presence of the isfocus media feature tag in the URI of the Contact header field and if it is not present then the participating MCPTT function shall reject the request with a SIP 403 (Forbidden) response with the warning text set to "104 isfocus not assigned" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the rest of the steps; and

Editor's Note [CT1#94, C1-153763]: If privacy is included in the request, policy may exist on the server to reject the request if anonymity is disallowed. This is FFS.

Editor's Note [CT1#94, C1-153763]: It is still to be determined how priority is specified for MCPTT. Priority would be a factor for the participating server when considering Resource-Priority in the case of possible congestion.

3) shall use the MCPTT ID present in the <mcptt-request-uri> element of the "application/vnd.3gpp.mcptt-info" MIME body of the incoming SIP INVITE request to retrieve the binding between the MCPTT ID and public user identity;

4) if the binding between the MCPTT ID and public user identity does not exist, then the participating MCPTT function shall reject the SIP INVITE request with a SIP 404 (Not Found) response. Otherwise, continue with the rest of the steps;

5) shall perform the automatic commencement procedures specified in subclause 6.3.2.2.5.1 and according to IETF RFC 5373 [18] if the following conditions are met:

a) "SIP INVITE request for terminating participating MCPTT function" contains an Answer-Mode header field with the value "Auto"; or

b) "SIP INVITE request for terminating participating MCPTT function" does not contain an Answer-Mode header field and the default policy for answering the call at the invited MCPTT client is to use automatic commencement mode; and

6) shall perform the manual commencement procedures specified in subclause 6.3.2.2.6.1 and according to IETF RFC 5373 [18] if the following conditions are met:

a) "SIP INVITE request for terminating participating MCPTT function" contains an Answer-Mode header field with the value "Manual"; or

b) "SIP INVITE request for terminating participating MCPTT function" does not contain an Answer-Mode header field and the default policy for answering the call at the invited MCPTT client is to use manual commencement mode.

### 10.1.1.3.3 End group call at the originating participating MCPTT function

#### 10.1.1.3.3.1 Receipt of SIP BYE request for ending group call on-demand

Upon receiving from the MCPTT client a SIP BYE request the participating MCPTT function shall follow the procedures as specified in subclause 6.3.2.1.6.

#### 10.1.1.3.3.2 Receipt of SIP REFER "BYE" request for ending group call using pre-established session

Upon receiving from the MCPTT client a SIP REFER request when using a pre-established session with the method SIP-URI parameter set to value "BYE" in the URI in the Refer-To header field the participating MCPTT function shall follow the procedures as specified in subclause 6.3.2.1.7.

### 10.1.1.3.4 End group call at the terminating participating MCPTT function

#### 10.1.1.3.4.1 Receipt of SIP BYE request for private call on-demand

Upon receiving a SIP BYE request from the controlling MCPTT function, the participating MCPTT function shall follow the procedures as specified in subclause 6.3.2.2.8.1.

#### 10.1.1.3.4.2 Receipt of SIP BYE request when ongoing pre-established session

Upon receiving a SIP BYE request from the controlling MCPTT function and if the MCPTT session id refers to an MCPTT user that has a pre-established session with the participating MCPTT function, the participating MCPTT function shall follow the procedures as specified in subclause 6.3.2.2.8.2.

### 10.1.1.3.5 Re-join procedures

#### 10.1.1.3.5.1 Originating procedures - on demand prearranged group call

Upon receipt of a "SIP INVITE request for originating participating MCPTT function" containing an "application/vnd.3gpp.mcptt-info" MIME body with the <session-type> element set to a value of "prearranged", the participating MCPTT function shall follow the procedures specified in subclause 10.1.1.3.1.1 with the clarification in step 9) of subclause 10.1.1.3.1.1 that the Request-URI of the SIP INVITE request shall contain a URI of the MCPTT session identity which constructed from the MCPTT session identity provided in Request-URI header filed of the "SIP INVITE request for originating participating MCPTT function".

#### 10.1.1.3.5.2 Originating procedures - prearranged group call using pre-established session

Upon receipt of a "SIP REFER request for a pre-established session", with the Refer-To header containing an "application/vnd.3gpp.mcptt-info"MIME type content in a "body" URI header field and with the <session-type> element set to "prearranged" the participating MCPTT function shall follow the procedures specified in subclause 10.1.1.3.1.2 with the clarification in step 9) of subclause 10.1.1.3.1.2 that the Request-URI of the SIP

INVITE request shall contain a URI of the MCPTT session identity which constructed from the MCPTT session identity provided in the Refer-to header field of the "SIP REFER request for a pre-established session".

## 10.1.1.4 Controlling MCPTT function procedures

### 10.1.1.4.1 Originating Procedures

#### 10.1.1.4.1.1 INVITE targeted to an MCPTT client

Editor's Note [CT1#95, C1-154731]: In the following subclause, the relevance of the information in the conference state event package in presence of broadcast transmission is FFS.

This subclause describes the procedures for inviting an MCPTT user to an MCPTT session. The procedure is initiated by the controlling MCPTT function as the result of an action in subclause 10.1.1.4.2 or as the result of receiving a SIP 403 (Forbidden) response as described in this subclause.

The controlling MCPTT function:

1) shall generate a SIP INVITE request as specified in subclause 6.3.3.1.2;

2) shall set the Request-URI to the public service identity of the terminating participating MCPTT function associated to the MCPTT user to be invited.;

NOTE 1: How the controlling MCPTT function finds the address of the terminating MCPTT participating function is out of the scope of the current release.

NOTE 2: If the terminating MCPTT user is part of a partner MCPTT system, then the public service identity can identify an entry point in the partner network that is able to identify the terminating participating MCPTT function.

3) shall set the P-Asserted-Identity header field to the public service identity of the controlling MCPTT function;

4) shall include in the "application/vnd.3gpp.mcptt-info" MIME body in the outgoing SIP INVITE request:

   a) the <mcptt-request-uri> element set to the MCPTT ID of the terminating user; and

   b) the <mcptt-group-id> element set to the group identity;

NOTE 3: The <mcptt-calling-user-id> is already included in the MIME body as a result of calling subclause 6.3.3.1.2 in step 1).

5) shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received SIP INVITE request from the originating network according to the procedures specified in subclause 6.3.3.1.1; and

6) shall send the SIP INVITE request towards the terminating network in accordance with 3GPP TS 24.229 [4].

Upon receiving a SIP 183 (Session Progress) response containing a Require header field with the option tag "100rel" and containing a P-Answer-State header field with the value "Unconfirmed" in response to the SIP INVITE request the controlling MCPTT function:

1) shall send a SIP PRACK request towards the MCPTT client according to 3GPP TS 24.229 [4]; and

2) shall create and cache an anonymous MCPTT ID for the invited MCPTT user, if anonymity is requested via a Privacy header field containing the tag "id" in the SIP response and an anonymous MCPTT ID has not been created yet for the invited MCPTT user.

NOTE 4: The anonymous MCPTT ID is an alias for the MCPTT user, and this address appears in participant information and the media plane Floor Taken message as described in 3GPP TS 24.380 [5]. This alias MCPTT ID is used when expelling an MCPTT participant from the MCPTT session.

Upon receiving a SIP 200 (OK) response for the SIP INVITE request the controlling MCPTT function:

Editor's Note [CT1#95, C1-154731]: OMA PCPS allows privacy for an MCPTT group by using the <allow-anonymity> element. It is FFS if this capability is required for MCPTT. If so, then procedures will need to be specified here for the controller to either obey the privacy and release the client from the session or ignore the privacy.

1)  shall create and cache an anonymous MCPTT address for the invited MCPTT user, if anonymity is requested via a Privacy header field containing the tag "id" in the SIP response and an anonymous MCPTT address has not been created yet for the invited MCPTT user;

NOTE 5:  The anonymous MCPTT ID is an alias for the MCPTT user, and this address appears in participant information and the media plane Floor Taken message as described in 3GPP TS 24.380 [5]. This alias MCPTT ID is used when expelling an MCPTT participant from the MCPTT session.

2)  shall interact with the media plane as specified in 3GPP TS 24.380 [5] subclause 6.3;

3)  shall generate a notification to the MCPTT clients, which have subscribed to the conference state event package that an invited MCPTT user has joined in the MCPTT group session, as specified in subclause 6.3.3.4; and

NOTE 6:  As a group document can potentially have a large content, the controlling MCPTT function can notify using content-indirection as defined in IETF RFC 4483 [32].

4)  shall send the SIP NOTIFY request to the MCPTT client according to 3GPP TS 24.229 [4].

NOTE 7:  The notifications above could be sent prior to the SIP 200 (OK) response being sent to the inviting MCPTT client. These notifications received by MCPTT clients that are group members do not mean that the group session will be successfully established.

NOTE 8:  The procedures executed by the controlling MCPTT function prior to sending a response to the inviting MCPTT client are specified in subclause 10.1.1.4.2.

Upon receiving SIP 403 (Forbidden) response for the SIP INVITE request, if according to local policy and if:

1)  the response contains a Warning header field with the MCPTT warning code "128"; and

2)  the response contains a P-Refused-URI-List header field and an "application/resource-lists+xml" MIME body as specified in IETF RFC 5318 [36];

NOTE 9:  The "application/resource-lists+xml" MIME body contains MCPTT IDs identifying MCPTT users in a partner MCPTT system that needs to be invited to the prearranged group call in case of group regrouping using interrogating method as specified in 3GPP TS 23.179 [3] subclause 10.6.2.4.2.

then the controlling MCPTT function:

1)  shall check if the number of members of the MCPTT group exceeds the value contained in the <max-participant-count> element. If exceeded, the controlling MCPTT function shall invite only <max-participant-count> members from the "application/resource-lists+xml" MIME body; and

NOTE 10: The <max-participant-count> element indicates the maximum number of participants allowed in the prearranged group session.

2)  shall invite MCPTT users as specified in this subclause using the list of MCPTT IDs in URI-List.

Editor's note [CT1#95-bis, C1-160489]: How to handle the active call case is FFS.

### 10.1.1.4.1.2    INVITE targeted to the non-controlling MCPTT function of an MCPTT group

The controlling MCPTT function:

1)  shall generate a SIP INVITE request as specified in subclause 6.3.3.1.2;

2)  shall set the Request-URI to the public service identity of the non-controlling MCPTT function serving the group identity of the MCPTT group owned by the partner MCPTT system;

3)  shall set the P-Asserted-Identity to the public service identity of the controlling MCPTT function;

4) shall include in the "application/vnd.3gpp.mcptt-info" MIME body in the outgoing SIP INVITE request, the <mcptt-request-uri> element set to the group identity;

5) shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received SIP INVITE request from the originating network according to the procedures specified in subclause 6.3.3.1.1; and

6) shall send the SIP INVITE request towards the partner MCPTT system in accordance with 3GPP TS 24.229 [4].

Upon receiving a SIP 200 (OK) response for the SIP INVITE request the controlling MCPTT function:

1) shall interact with the media plane as specified in 3GPP TS 24.380 [5] subclause 6.3.

NOTE: The procedures executed by the controlling MCPTT function prior to sending a response to the inviting MCPTT client are specified in subclause 10.1.1.4.2.

### 10.1.1.4.2 Terminating Procedures

In the procedures in this subclause:

1) MCPTT ID in an incoming SIP INVITE request refers to the MCPTT ID of the originating user from the <mcptt-calling-user-id> element of the "application/vnd.3gpp.mcptt-info" MIME body of the incoming SIP INVITE request;

2) group identity in an incoming SIP INVITE request refers to the group identity from the <mcptt-request-uri> element of the "application/vnd.3gpp.mcptt-info" MIME body of the incoming SIP INVITE request;

3) MCPTT ID in an outgoing SIP INVITE request refers to the MCPTT ID of the called user in the <mcptt-request-uri> element of the "application/vnd.3gpp.mcptt-info" MIME body of the outgoing SIP INVITE request;

4) MCPTT ID in an incoming SIP 200 (OK) response refers to the MCPTT ID of the contacted user in the <mcptt-called-party-id> element of the "application/vnd.3gpp.mcptt-info" MIME body of the incoming SIP 200 (OK) response; and

5) required group members in a SIP 183 (Session Progress) response refers to the <required> element of the "application/vnd.3gpp.mcptt-info" MIME body set to "true" in a SIP 183 (Session Progress) sent by the non-controlling MCPTT function of an MCPTT group.

Upon receipt of a "SIP INVITE request for controlling MCPTT function of an MCPTT group", the controlling MCPTT function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response. The controlling MCPTT function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [24]. Otherwise, continue with the rest of the steps;

Editor's Note [CT1#95, C1-154731]: The priority mechanisms are still to be specified for MCPTT. The priority mechanisms may be a factor in determining whether to reject or allow the request.

2) shall determine if the media parameters are acceptable and the MCPTT speech codec is offered in the SDP offer and if not reject the request with a SIP 488 (Not Acceptable Here) response. Otherwise, continue with the rest of the steps;

3) shall reject the SIP request with a SIP 403 (Forbidden) response and not process the remaining steps if:

   a) an Accept-Contact header field does not include the g.3gpp.mcptt media feature tag; or

   b) an Accept-Contact header field does not include the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt";

4) if the user identified by the MCPTT ID is not authorised to initiate group calls, shall reject the "SIP INVITE request for controlling MCPTT function of an MCPTT group" with a SIP 403 (Forbidden) response to the SIP INVITE request, with warning text set to "109 user not authorised to make prearranged group calls" in a Warning header field as specified in subclause 4.4;

5) shall retrieve the necessary group document(s) from the group management server for the group identity contained in the SIP INVITE request and carry out initial processing as specified in subclause 6.3.4.2 and continue with the rest of the steps if the checks in subclause 6.3.4.2 succeed;

Editor's Note [CT1#95, C1-154731]: OMA PCPS procedures check whether privacy is allowed for the user when anonymity is requested i.e. the privacy header field containing the value "id", by checking the <allow-anonymity> field in the Group Document as specified in OMA-TS-XDM_Group-V1. This is not yet specified in TS 24.381 and it is FFS if this is required for MCPTT.

6) shall perform the actions as described in subclause 6.3.3.2.2;

7) shall determine if an MCPTT group call for the group identity is already ongoing by determining if an MCPTT session identity has already been allocated for the group call and the MCPTT session is active;

8) if the MCPTT group call is not ongoing then:

   a) if the user identified by the MCPTT ID is not affiliated to the group identity contained in the SIP INVITE request as specified in subclause 6.3.6, shall return a SIP 403 (Forbidden) response with the warning text set to "120 user is not affiliated to this group" in a Warning header field as specified in subclause 4.4;

   b) if the user identified by the MCPTT ID is not authorised to initiate the prearranged group session as specified in subclause 6.3.5.4, shall send a SIP 403 (Forbidden) response with the warning text set to: "119 user is not authorised to initiate the group call" in a Warning header field as specified in subclause 4.4. Otherwise continue with the rest of the steps below; and

   c) shall check if a Resource-Priority header field is included in the incoming SIP INVITE request and may apply any preferential treatment to the SIP request as specified in 3GPP TS 24.229 [4];

Editor's Note [CT1#95, C1-154731]: The values of Resource-Priority header field are FFS. How the participating function processes the Resource-Priority header in conjunction with other data is to be determined.

   d) shall create a prearranged group session and allocate an MCPTT session identity for the prearranged group call;

   e) if the group identity in the "SIP INVITE request for controlling MCPTT function of an MCPTT group" is a TGI:

      i) shall for each of the constituent MCPTT groups homed on the primary MCPTT system:

         A) if the controlling MCPTT function does not own the MCPTT group identified by the MCPTT group ID, then generate a SIP INVITE request towards the MCPTT server that owns the MCPTT group identity by following the procedures in subclause 10.1.1.4.1.2; and

NOTE 1: The MCPTT server that the SIP INVITE request is sent to acts as a non-controlling MCPTT function;

         B) if the controlling MCPTT function owns the MCPTT group identified by the MCPTT group ID then:

            I) determine the members to invite to the prearranged MCPTT group call as specified in subclause 6.3.5.5;

            II) invite each group member determined in step A) above, to the group session, as specified in subclause 10.1.1.4.1.1; and

            III) interact with the media plane as specified in 3GPP TS 24.380 [5] subclause 6.3; and

      ii) shall for each of the constituent MCPTT groups homed on the partner MCPTT system generate a SIP INVITE request for the MCPTT group identity homed on the partner MCPTT system as specified in subclause 10.1.1.4.1.2; and

   f) if the group identity in the SIP INVITE request for controlling MCPTT function of an MCPTT group is an MCPTT group ID:

      i) shall determine the members to invite to the prearranged MCPTT group call as specified in subclause 6.3.5.5;

    ii) if necessary, shall start timer TNG1 (acknowledged call setup timer) according to the conditions stated in subclause 6.3.3.3;

    iii) shall invite each group member determined in step i) above, to the group session, as specified in subclause 10.1.1.4.1.1; and

    iv) shall interact with the media plane as specified in 3GPP TS 24.380 [5] subclause 6.3; and

9) if the MCPTT group call is ongoing then:

    a) if the user identified by the MCPTT ID in the SIP INVITE request is not affiliated to the group identity contained in the SIP INVITE request as specified in subclause 6.3.6, shall return a SIP 403 (Forbidden) response with the warning text set to "120 user is not affiliated to this group" in a Warning header field as specified in subclause 4.4;

    b) if the user identified by the MCPTT ID in the SIP INVITE request is not authorised to join the prearranged group session as specified in subclause 6.3.5.3, shall send a SIP 403 (Forbidden) response with the warning text set to "121 user is not allowed to join the group call" in a Warning header field as specified in subclause 4.4. Otherwise continue with the rest of the steps below;

    c) shall check if a Resource-Priority header field is included in the incoming SIP INVITE request and may apply any preferential treatment to the SIP request as specified in 3GPP TS 24.229 [4];

Editor's Note [CT1#95, C1-154731]: The values of Resource-Priority header field are FFS. How the participating function processes the Resource-Priority header in conjunction with other data is to be determined.

    d) if <max-participant-count> as specified in 3GPP TS 24.381 [31] is already reached shall return a SIP 486 (Busy Here) response with the warning text set to "122 too many participants" to the originating network as specified in subclause 4.4 Otherwise, continue with the rest of the steps;

Editor's Note [CT1#95, C1-154731]: A priority user may be allowed to join the session even if the <max-participant-count> is reached. This may mean that a participant in the session already, is released from the group call. This functionality is FFS.

    e) shall generate a SIP 200 (OK) response as specified in the subclause 6.3.3.2.4.2;

    f) shall include in the SIP 200 (OK) response an SDP answer to the SDP offer in the incoming SIP INVITE request as specified in the subclause 6.3.3.2.1;

    g) shall include in the SIP 200 (OK) response with the warning text set to "123 MCPTT session already exists" as specified in subclause 4.4;

    h) shall interact with media plane as specified in 3GPP TS 24.380 [5] subclause 6.3;

NOTE 2: Resulting media plane processing is completed before the next step is performed.

    i) shall send the SIP 200 (OK) response towards the inviting MCPTT client according to 3GPP TS 24.229 [4];

    j) shall generate a notification to the MCPTT clients, which have subscribed to the conference state event package that the inviting MCPTT User has joined in the MCPTT group session, as specified in subclause 6.3.3.4;

NOTE 3: As a group document can potentially have a large content, the controlling MCPTT function can notify using content-indirection as defined in IETF RFC 4483 [32].

    k) shall send a SIP NOTIFY request to each MCPTT client according to 3GPP TS 24.229 [4]; and

    l) shall not continue with the rest of the subclause.

Upon receiving a SIP 183 (Session Progress) response for a SIP INVITE request containing a P-Answer-State header field with the value "Unconfirmed" as specified in IETF RFC 4964 [34] as specified in subclause 10.1.1.4.1, the timer TNG1 (acknowledged call setup timer) is not running and the controlling MCPTT function supports media buffering:

1) shall generate a SIP 200 (OK) response to SIP INVITE request as specified in the subclause 6.3.3.2.3.2 and continue with the rest of the steps if unconfirmed mode is supported by the controlling MCPTT function and the

SIP final response is not yet sent to the inviting MCPTT client, otherwise do not proceed with the rest of the steps;

2) shall include the warning text set to "122 too many participants" as specified in subclause 4,4 in the SIP 200 (OK) response, if the prearranged MCPTT group has more than <max-participant-count> members as specified in 3GPP TS 24.381 [31];

3) shall include in the SIP 200 (OK) response an SDP answer to the SDP offer in the incoming SIP INVITE request as specified in the subclause 6.3.3.2.1;

4) shall include a P-Answer-State header field with the value "Unconfirmed";

5) shall interact with the media plane as specified in 3GPP TS 24.380 [5] subclause 6.3;

NOTE 4: Resulting user plane processing is completed before the next step is performed.

6) shall send the SIP 200 (OK) response towards the inviting MCPTT client according to 3GPP TS 24.229 [4];

7) shall generate a notification to the MCPTT clients, which have subscribed to the conference state event package that the inviting MCPTT User has joined in the MCPTT group session, as specified in subclause 6.3.3.4; and

NOTE 5: As a group document can potentially have a large content, the controlling MCPTT function can notify using content-indirection as defined in IETF RFC 4483 [32].

8) shall send a SIP NOTIFY request to each MCPTT client according to 3GPP TS 24.229 [4].

Upon receiving a SIP 183 (Session Progress) response for a SIP INVITE request as specified in subclause 10.1.1.4.1.2 containing required group members, the timer TNG1 (acknowledged call setup timer) is running and all SIP 200 (OK) responses have been received to all SIP INVITE requests sent to MCPTT clients specified in subclause 10.1.1.4.1.1, then the controlling MCPTT function shall wait until the SIP 200 (OK) response has been received to the SIP INVITE request specified in subclause 10.1.1.4.1.2 before generating a SIP 200 (OK) response to the "SIP INVITE request for controlling MCPTT function of an MCPTT group".

Upon receiving a SIP 200 (OK) response for a SIP INVITE request as specified in subclause 10.1.1.4.1 that was sent to an affiliated and <required> group member; and

1) if the MCPTT ID in the SIP 200 (OK) response matches to the MCPTT ID in the corresponding SIP INVITE request;

2) there are no outstanding SIP 200 (OK) responses to SIP INVITE requests which were sent to affiliated and <required> group members; and

3) there is no outstanding SIP 200 (OK) response to a SIP INVITE request sent in subclause 10.1.1.4.1.2 where the SIP 183 (Session Progress) response indicated required group members;

the controlling MCPTT function:

1) shall stop timer TNG1 (acknowledged call setup timer) as described in subclause 6.3.3.3;

2) shall generate SIP 200 (OK) response to the SIP INVITE request as specified in the subclause 6.3.3.2.3.2 before continuing with the rest of the steps;

3) shall include the warning text set to "122 too many participants" as specified in subclause 4.4 in the SIP 200 (OK) response, if all members were not invited because the prearranged MCPTT group has been exceeded the <max-participant-count> members as specified in 3GPP TS 24.381 [31];

4) shall include in the SIP 200 (OK) response an SDP answer to the SDP offer in the incoming SIP INVITE request as specified in the subclause 6.3.3.2.1;

5) shall interact with the media plane as specified in 3GPP TS 24.380 [5] subclause 6.3;

NOTE 6: Resulting media plane processing is completed before the next step is performed.

6) shall send a SIP 200 (OK) response to the inviting MCPTT client according to 3GPP TS 24.229 [4];

7) shall generate a notification to the MCPTT clients, which have subscribed to the conference state event package that the inviting MCPTT user has joined in the MCPTT group session, as specified in subclause 6.3.3.4; and

NOTE 7: As a group document can potentially have a large content, the controlling MCPTT function can notify using content-indirection as defined in IETF RFC 4483 [32].

8) shall send the SIP NOTIFY request to the MCPTT clients according to 3GPP TS 24.229 [4].

Upon receiving a SIP 200 (OK) response for a SIP INVITE request as specified in subclause 10.1.1.4.1, the timer TNG1 (acknowledged call setup timer) is not running, the controlling MCPTT function supports media buffering and the SIP final response has not yet been sent to the inviting MCPTT client the controlling MCPTT function according to local policy:

1) shall generate SIP 200 (OK) response to the SIP INVITE request as specified in the subclause 6.3.3.2.2 before continuing with the rest of the steps;

2) shall include the warning text set to "122 too many participants" as specified in subclause 4.4 in the SIP 200 (OK) response, if all members were not invited because the prearranged MCPTT group has been exceeded the <max-participant-count> members as specified in 3GPP TS 24.381 [31];

3) shall include in the SIP 200 (OK) response an SDP answer to the SDP offer in the incoming SIP INVITE request as specified in the subclause 6.3.3.2.1;

4) shall interact with the media plane as specified in 3GPP TS 24.380 [5] subclause 6.3;

NOTE 8: Resulting media plane processing is completed before the next step is performed.

5) shall send a SIP 200 (OK) response to the inviting MCPTT client according to 3GPP TS 24.229 [4];

6) shall generate a notification to the MCPTT clients, which have subscribed to the conference state event package that the inviting MCPTT user has joined in the MCPTT group session, as specified in subclause 6.3.3.4; and

NOTE 9: As a group document can potentially have a large content, the controlling MCPTT function can notify using content-indirection as defined in IETF RFC 4483 [32].

7) shall send the SIP NOTIFY request to the MCPTT clients according to 3GPP TS 24.229 [4].

Upon expiry of timer TNG1 (acknowledged call setup timer), if there are outstanding SIP 200 (OK) responses to SIP INVITE requests sent to affiliated and <required> group members, the controlling MCPTT function shall follow the procedures specified in subclause 6.3.3.3.

If timer TNG1 (acknowledged call setup timer) is running and a final SIP 4xx, 5xx or 6xx response is received from an affiliated and <required> group member, the controlling MCPTT function shall follow the relevant procedures specified in subclause 6.3.3.3.

If timer TNG1 (acknowledged call setup timer) is not running and a final SIP 4xx, 5xx or 6xx response is received from an invited MCPTT client, the controlling MCPTT function shall perform one of the following based on policy:

1) send the SIP final response towards the inviting MCPTT client, according to 3GPP TS 24.229 [4], if a SIP final response was received from all the other invited MCPTT clients and the SIP 200 (OK) response is not yet sent; or

2) remove the invited MCPTT client from the MCPTT Session as specified in subclause 6.3.3.1.5, if a SIP final response other than 2xx or 3xx was received from all the invited MCPTT clients and the SIP 200 (OK) response is already sent. the controlling MCPTT function may invite an additional member of the prearranged MCPTT group as specified in subclause 10.1.1.4.1 that has not already been invited, if the prearranged MCPTT group has more than <max-participant-count> members and all members have not yet been invited.

### 10.1.1.4.3 End group call at the terminating controlling MCPTT function

Upon receiving a SIP BYE request the controlling MCPTT function shall follow the procedures as specified in subclause 6.3.3.2.4.

### 10.1.1.4.4 End group call initiated by the controlling MCPTT function

#### 10.1.1.4.4.1 General

This subclause describes the procedures of each functional entity for ending the group call initiated by the controlling MCPTT function.

#### 10.1.1.4.4.2 SIP BYE request for releasing MCPTT session for a group call

When the MCPTT session for group call needs to be released as specified in subclause 6.3.8.1, the controlling MCPTT function shall follow the procedures in subclause 6.3.3.1.5.

#### 10.1.1.4.4.3 SIP BYE request toward an de-affiliated MCPTT client

When an MCPTT client needs to be removed from the MCPTT session by de-affiliation, the controlling MCPTT function shall follow the procedures in subclause 6.3.3.1.5.

After successful removing the MCPTT client from the MCPTT session, the controlling MCPTT function may generate a notification to the MCPTT clients, which have subscribed to the conference state event package that an MCPTT user has been removed from the MCPTT session, as specified in subclause 6.3.3.4 and send the SIP NOTIFY request to the MCPTT client according to 3GPP TS 24.229 [4].

### 10.1.1.4.5 Re-join procedures

#### 10.1.1.4.5.1 Terminating procedures

Upon receipt of a SIP INVITE request that includes an MCPTT session identity of an ongoing MCPTT session in the Request-URI the controlling MCPTT function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response. The controlling MCPTT function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [24]. Otherwise, continue with the rest of the steps;

   Editor's Note [CT1#95-bis, C1-160491]: The priority mechanisms are still to be specified for MCPTT. The priority mechanisms may be a factor in determining whether to reject or allow the request.

2) shall reject the SIP request with a SIP 404 (Not Found) response if the MCPTT group call represented by the MCPTT session identity in Request-URI header is not present;

3) shall determine if the media parameters are acceptable and the MCPTT speech codec is offered in the SDP offer and if not, reject the request with a SIP 488 (Not Acceptable Here) response. Otherwise, continue with the rest of the steps;

4) shall reject the SIP request with a SIP 403 (Forbidden) response and not process the remaining steps if:

   a) an Accept-Contact header field does not include the g.3gpp.mcptt media feature tag; or

   b) an Accept-Contact header field does not include the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt";

5) shall determine the MCPTT ID of the calling user;

6) if the user identified by the MCPTT ID is not authorised to join the prearranged group session as specified in subclause 6.3.3.4.2, shall send a SIP 403 (Forbidden) response with the warning text set to "121 user is not allowed to join the group call" in a Warning header field as specified in subclause 4.4. Otherwise continue with the rest of the steps below;

7) shall perform the actions on receipt of an initial SIP INVITE request as described in subclause 6.3.3.2.2;

8) if the user identified by the MCPTT ID is not affiliated to the MCPTT group ID associated with the MCPTT session identity as specified in subclause 6.3.3.5, shall return a SIP 403 (Forbidden) response with the warning text set to "120 user is not affiliated to this group" in a Warning header field as specified in subclause 4.4;

9) shall check if a Resource-Priority header field is included in the incoming SIP INVITE request and may apply any preferential treatment to the SIP request as specified in 3GPP TS 24.229 [4];

Editor's Note [CT1#95-bis, C1-160491]: The values of Resource-Priority header field are FFS. How the participating function processes the Resource-Priority header in conjunction with other data is to be determined.

10) if <max-participant-count> as specified in 3GPP TS 24.381 [31] is already reached shall return a SIP 486 (Busy Here) response with the warning text set to "122 too many participants" to the originating network as specified in subclause 4.4 Otherwise, continue with the rest of the steps;

Editor's Note [CT1#95-bis, C1-160491]: A priority user may be allowed to join the session even if the <max-participant-count> is reached. This may mean that a participant in the session already, is released from the group call. This functionality is FFS.

11) shall generate a SIP 200 (OK) response as specified in the subclause 6.3.3.2.4.2;

12) shall include in the SIP 200 (OK) response an SDP answer to the SDP offer in the incoming SIP INVITE request as specified in the subclause 6.3.3.2.1;

13) shall interact with media plane as specified in 3GPP TS 24.380 [5] subclause 6.3;

NOTE 1: Resulting media plane processing is completed before the next step is performed.

14) shall send the SIP 200 (OK) response towards the inviting MCPTT client according to 3GPP TS 24.229 [4];

15) shall generate a notification to the MCPTT clients, which have subscribed to the conference state event package that the inviting MCPTT User has joined in the MCPTT group session, as specified in subclause 6.3.3.4; and

NOTE 2: As a group document can potentially have a large content, the controlling MCPTT function can notify using content-indirection as defined in IETF RFC 4483 [32].

16) shall send a SIP NOTIFY request to each MCPTT client according to 3GPP TS 24.229 [4].

### 10.1.1.4.6 Late call entry initiated by controlling MCPTT function

When controlling MCPTT function is notified that an MCPTT client is newly affiliated or comes back from out of coverage, the controlling MCPTT function shall invite the MCPTT client to join an ongoing MCPTT group call by following the procedures specified in subclause 10.1.1.4.1.

NOTE: How the MCPTT function is informed when an MCPTT client is coming back from out of coverage is out of scope of present document.

## 10.1.1.5 Non-controlling function of an MCPTT group procedures

### 10.1.1.5.1 Originating procedures

This subclause describes the procedures for inviting an MCPTT user to an MCPTT session. The procedure is initiated by the non-controlling MCPTT function of an MCPTT group as the result of an action in subclause 10.1.1.5.2.

The non-controlling MCPTT function:

1) shall invite the MCPTT clients as specified in subclause 6.3.4.1.2;

2) shall include in each SIP INVITE request an SDP offer based on the SDP offer in the received SIP INVITE request from the controlling MCPTT function according to the procedures specified in subclause 6.3.4.1.1; and

3) shall send each SIP INVITE request towards the terminating network in accordance with 3GPP TS 24.229 [4].

For each SIP 183 (Session Progress) response received to each SIP INVITE request sent to an MCPTT client, the non-controlling MCPTT function of an MCPTT group:

1) For each SIP 183 (Session Progress) response containing the option tag "100rel", shall send a SIP PRACK request towards the MCPTT client according to 3GPP TS 24.229 [4];

2) shall cache the received response; and

3) shall create and cache an anonymous MCPTT ID for the invited MCPTT user, if anonymity is requested via a Privacy header field containing the tag "id" in the SIP response and an anonymous MCPTT ID has not been created yet for the invited MCPTT user.

NOTE 1: The anonymous MCPTT ID is an alias for the MCPTT user, and this address appears in participant information and the media plane Floor Taken message as described in 3GPP TS 24.380 [5]. This alias MCPTT ID is used when expelling an MCPTT participant from the MCPTT session.

For each SIP 200 (OK) response received to each SIP INVITE request sent to an MCPTT client, the non-controlling MCPTT function of an MCPTT group:

1) shall cache the SIP 200 (OK) response;

2) shall start the SIP session timer according to rules and procedures of IETF RFC 4028 [7]; and

3) shall create and cache an anonymous MCPTT address for the invited MCPTT user, if anonymity is requested via a Privacy header field containing the tag "id" in the SIP response and an anonymous MCPTT address has not been created yet for the invited MCPTT user;

NOTE 2: The anonymous MCPTT ID is an alias for the MCPTT user, and this address appears in participant information and the media plane Floor Taken message as described in 3GPP TS 24.380 [5]. This alias MCPTT ID is used when expelling an MCPTT participant from the MCPTT session.

On receipt of a SIP 3xx, 4xx, 5xx or 6xx response from an invited MCPTT client, the non-controlling MCPTT function of an MCPTT group:

1) shall send an SIP ACK request towards the MCPTT client as specified in 3GPP TS 24.229 [4];

2) shall remove the cached provisional responses received from the MCPTT client, if any cached provisional responses exists; and

3) shall cache the SIP 3xx, 4xx, 5xx or 6xx response.

NOTE 3: The procedures executed by the non-controlling MCPTT function of an MCPTT group prior to sending a response to the controlling MCPTT function are specified in subclause 10.1.1.5.2.

### 10.1.1.5.2 Terminating procedures

#### 10.1.1.5.2.1 General

When receiving the "SIP INVITE request for non-controlling MCPTT function of an MCPTT group" the MCPTT server can be acting as a controller MCPTT function in an ongoing prearranged group call or, if an prearranged group call is not ongoing, be initiated as an non-controlling MCPTT function and invite MCPTT users.

If a prearranged group call is not ongoing the MCPTT server shall perform the actions specified in subclause 10.1.1.5.2.2.

If the "SIP INVITE request for non-controlling MCPTT function of an MCPTT group" is received when a prearranged group call is ongoing, the controlling MCPTT function may switch from operating in a controlling MCPTT function mode to operate in a non-controlling MCPTT function mode as specified in subclause 10.1.1.5.2.3.

When operating in the non-controlling mode and a SIP BYE request is received from the controlling MCPTT function, the non-controlling MCPTT function shall change from operating in the non-controlling mode to operating in the controlling mode as specified in subclause 10.1.1.5.2.4.

#### 10.1.1.5.2.2 Initiating a prearranged group call

Upon receipt of a "SIP INVITE request for non-controlling MCPTT function of an MCPTT group" and if a prearranged group call is not ongoing, the non-controlling MCPTT function of an MCPTT group:

NOTE 1: The Contact header field of the SIP INVITE request contains the "isfocus" feature media tag.

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response. The controlling MCPTT function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [24]. Otherwise, continue with the rest of the steps;

2) shall determine if the media parameters are acceptable and the MCPTT speech codec is offered in the SDP offer and if not reject the request with a SIP 488 (Not Acceptable Here) response. Otherwise, continue with the rest of the steps;

3) shall reject the SIP request with a SIP 403 (Forbidden) response and not process the remaining steps if:

   a) an Accept-Contact header field does not include the g.3gpp.mcptt media feature tag; or

   b) an Accept-Contact header field does not include the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt";

4) if the partner MCPTT system does not have a mutual aid relationship with the primary MCPTT system identified by the contents of the P-Asserted-Identity, shall reject the "SIP INVITE request for non-controlling MCPTT function of an MCPTT group" with a SIP 403 (Forbidden) response, with warning text set to "128 isfocus already assigned" in a Warning header field as specified in subclause 4.4, and shall not process the remaining steps;

5) if a trusted mutual aid relationship exists between the partner MCPTT system and the primary MCPTT system and the procedure in 3GPP TS 23.179 [3] subclause 10.6.2.4.2 is supported:

   a) shall generate a SIP 403 (Forbidden) response as specified in 3GPP TS 24.229 [4];

   b) shall retrieve the group members of the prearranged group identified by the <mcptt-request-uri> element of the "application/vnd.3gpp.mcptt-info" MIME body of the SIP INVITE request, as specified in subclause 6.3.4;

   c) if the retrieval of group members was successful shall include a P-Refused-URI-List header field populated with members of the prearranged group in accordance with the IETF RFC 5318 [36]:

   d) if the retrieval of group members was not successful, shall include the warning text set to "128 isfocus already assigned" in a Warning header field as specified in subclause 4.4; and

   e) shall send the SIP 403 (Forbidden) response towards the controlling MCPTT function as specified in 3GPP TS 24.229 [4]; and

   f) shall not process the remaining steps;

6) shall retrieve the group document from the group management server for the MCPTT group ID contained in the <mcptt-request-uri> element of the "application/vnd.3gpp.mcptt-info" MIME body of the SIP INVITE request and carry out initial processing as specified in subclause 6.3.4.2 and continue with the rest of the steps if the checks in subclause 6.3.4.2 succeed;

Editor's Note [CT1#95-bis, C1-160458]: OMA PCPS procedures check whether privacy is allowed for the user when anonymity is requested i.e. the privacy header field containing the value "id", by checking the <allow-anonymity> field in the Group Document as specified in OMA-TS-XDM_Group-V1. This is not yet specified in TS 24.381 and it is FFS if this is required for MCPTT.

7) shall cache the content of the SIP INVITE request, if received in the Contact header field and if the specific feature tags are supported;

8) shall check if a Resource-Priority header field is included in the incoming SIP INVITE request and may apply any preferential treatment to the SIP request as specified in 3GPP TS 24.229 [4];

9) determine the members to invite to the prearranged MCPTT group call as specified in subclause 6.3.5.5;

10) if the group document retrieved from the group management server contains <required> group members, shall send a SIP 183 (Session Progress) response to the SIP INVITE request for non-controlling MCPTT function of an MCPTT group as specified in subclause 6.3.4.2.2.1 and shall populate the response with an "application/vnd.3gpp.mcptt-info" MIME body containing the <required> element set to "true".

11) if the group document retrieved from the group management server does not contain any <required> group members, may, according to local policy, send a SIP 183 (Session Progress) response to the SIP INVITE request for non-controlling MCPTT function of an MCPTT group as specified in subclause 6.3.4.2.2.1;

12) shall invite each group member determined in step 9) above, to the group session, as specified in subclause 10.1.1.5.1; and

13) shall interact with the media plane as specified in 3GPP TS 24.380 [5] subclause 6.3;

Unless a SIP response has been sent to the controlling MCPTT function as specified in step 10 or 11 above, the non-controlling MCPTT function of an MCPTT group shall wait for the first SIP provisional response or first SIP 200 (OK) response from one of the invited MCPTT clients, before sending a response to the SIP INVITE request for non-controlling MCPTT function of an MCPTT group.

Upon receiving the first 18x response to a SIP INVITE request sent to an invited MCPTT client as specified in subclause 10.1.1.5.1, not containing a P-Answer-State header field, and if a SIP 183 (Session Progress) response has not already been sent in response to the SIP INVITE request for non-controlling MCPTT function of an MCPTT group, the non-controlling MCPTT function of an MCPTT group:

1) shall generate a SIP 183 (Session Progress) response as described in subclause 6.3.4.2.2.1; and

2) shall forward the SIP 183 (Session Progress) response to the controlling MCPTT function according to 3GPP TS 24.229 [4].

Upon receiving the first 18x response to a SIP INVITE request sent to an invited MCPTT client as specified in subclause 10.1.1.5.1, containing a P-Answer-State header field with the value "Unconfirmed" as specified in IETF RFC 4964 [34], a SIP 183 (Session Progress) response has not already been sent in response to the SIP INVITE request for non-controlling MCPTT function of an MCPTT group and the non-controlling MCPTT function of an MCPTT group supports media buffering, the non-controlling MCPTT function of an MCPTT group:

1) shall generate SIP 200 (OK) response to the SIP INVITE request as specified in the subclause 6.3.4.2.2.2 before continuing with the rest of the steps;

2) shall include in the SIP 200 (OK) response an SDP answer to the SDP offer in the incoming SIP INVITE request as specified in the subclause 6.3.4.2.1;

3) shall interact with the media plane as specified in 3GPP TS 24.380 [5] subclause 6.3.5; and

NOTE 2: Resulting media plane processing is completed before the next step is performed.

4) shall send a SIP 200 (OK) response to the controlling MCPTT function according to 3GPP TS 24.229 [4].

If the group document does not contain any <required> group members, then upon receiving the first SIP 200 (OK) response to a SIP INVITE request sent to an invited MCPTT client as specified in subclause 10.1.1.5.1, the non-controlling MCPTT function of an MCPTT group:

1) shall generate SIP 200 (OK) response to the SIP INVITE request as specified in the subclause 6.3.4.2.2.2 before continuing with the rest of the steps;

2) shall include in the SIP 200 (OK) response an SDP answer to the SDP offer in the incoming SIP INVITE request as specified in the subclause 6.3.4.2.1;

3) shall interact with the media plane as specified in 3GPP TS 24.380 [5] subclause 6.3.5; and

NOTE 3: Resulting media plane processing is completed before the next step is performed.

4) shall send a SIP 200 (OK) response to the controlling MCPTT function according to 3GPP TS 24.229 [4];

If the group document contains <required> group member(s), then the non-controlling MCPTT function of an MCPTT group shall wait until all SIP 200 (OK) responses to SIP INVITE requests have been received from the <required> MCPTT clients before sending a SIP 200 (OK) response back to the controlling MCPTT function, as specified above.

If all invited MCPTT clients have rejected SIP INVITE requests with a SIP 3xx, 4xx, 5xx or 6xx response, the non-controlling MCPTT function of an MCPTT group:

1) shall generate a SIP reject response as specified in 3GPP TS 24.229 [4];

2) shall, from the list of reject response codes cached by the non-controlling MCPTT function of an MCPTT group, select the highest prioritized cached reject response code as specified in IETF RFC 3261 [24]; and

3) shall send the reject response towards the controlling MCPTT function as specified in 3GPP TS 24.229 [4].

### 10.1.1.5.2.3 Joining an ongoing prearranged group call

Upon receipt of a "SIP INVITE request for non-controlling MCPTT function of an MCPTT group" and if a prearranged group call is already ongoing, the non-controlling MCPTT function of an MCPTT group:

NOTE 1: The Contact header field of the SIP INVITE request contains the "isfocus" feature media tag.

1) shall determine if the media parameters are acceptable and the MCPTT speech codec is offered in the SDP offer and if not, reject the request with a SIP 488 (Not Acceptable Here) response. Otherwise, continue with the rest of the steps;

2) shall reject the SIP request with a SIP 403 (Forbidden) response and not process the remaining steps if:

   a) an Accept-Contact header field does not include the g.3gpp.mcptt media feature tag; or

   b) an Accept-Contact header field does not include the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt";

3) if the partner MCPTT system does not have a mutual aid relationship to merged an ongoing prearranged call with the primary MCPTT system identified by the contents of the P-Asserted-Identity, shall reject the "SIP INVITE request for non-controlling MCPTT function of an MCPTT group" with a SIP 403 (Forbidden) response, with warning text set to "128 isfocus already assigned" in a Warning header field as specified in subclause 4.4, and shall not process the remaining steps;

4) shall cache the content of the SIP INVITE request, if received in the Contact header field and if the specific feature tags are supported;

5) shall check if a Resource-Priority header field is included in the incoming SIP INVITE request and may apply any preferential treatment to the SIP request as specified in 3GPP TS 24.229 [4];

6) shall generate SIP 200 (OK) response to the SIP INVITE request as specified in the subclause 6.3.4.2.2.2 before continuing with the rest of the steps;

7) shall include in the SIP 200 (OK) response an SDP answer to the SDP offer in the incoming SIP INVITE request as specified in the subclause 6.3.4.2.1;

8) shall request media plane to switch to non-controlling mode as specified in 3GPP TS 24.380 [5] subclause 6.3.3; and

NOTE 2: Resulting media plane processing is completed before the next step is performed.

9) shall send a SIP 200 (OK) response to the controlling MCPTT function according to 3GPP TS 24.229 [4].

### 10.1.1.5.2.4 Splitting an ongoing prearranged group call

Upon receipt of a SIP BYE request, the non-controlling MCPTT function of an MCPTT group:

1) if keeping the prearranged group call active is according to local policy, shall request media plane to switch to controlling mode as specified in 3GPP TS 24.380 [5] subclause 6.3.5; and

NOTE: Resulting media plane processing is completed before the next step is performed.

2) shall send a SIP 200 (OK) response to the SIP BYE request.

## 10.1.2 Chat group (restricted) call

### 10.1.2.1 General

### 10.1.2.2 MCPTT client procedures

#### 10.1.2.2.1 On-demand chat group call

##### 10.1.2.2.1.1 MCPTT client joins a chat MCPTT group session

Upon receiving a request from an MCPTT user to establish an MCPTT group session using an MCPTT group identity, identifying a chat MCPTT group, the MCPTT client shall generate an initial SIP INVITE request by following the UE originating session procedures specified in 3GPP TS 24.229 [4], with the clarifications given below.

The MCPTT client:

1) if the MCPTT user has requested the origination of an MCPTT emergency group call or is originating an MCPTT chat group call and the MCPTT emergency state is already set, the MCPTT client shall comply with the procedures in subclause 6.2.8.1.1;

2) shall include the g.3gpp.mcptt media feature tag in the Contact header field of the SIP INVITE request according to IETF RFC 3840 [16];

3) shall include an Accept-Contact header field containing the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

4) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcptt" (coded as specified in 3GPP TS 24.229 [4]), in a P-Preferred-Service header field according to IETF RFC 6050 [9] in the SIP INVITE request;

5) shall include an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt" along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

6) should include the "timer" option tag in the Supported header field;

7) should include the Session-Expires header field according to IETF RFC 4028 [7]. It is recommended that the refresher parameter is omitted. If included, the refresher parameter shall be set to "uac";

8) shall set the Request-URI of the SIP INVITE request to the public service identity identifying the participating MCPTT function serving the MCPTT user;

NOTE 1: The MCPTT client is configured with public service identity identifying the participating MCPTT function serving the MCPTT user.

9) may include a P-Preferred-Identity header field in the SIP INVITE request containing a public user identity as specified in 3GPP TS 24.229 [4];

Editor's Note [CT1#95, C1-154450]: The Resource-Priority header field may need to be used to indicate the need for elevated bearer priority for emergency calls. This aspect of its usage is under study.

10) if the MCPTT emergency state is already set or the MCPTT client emergency group state for this group is set to "MEG 2: in-progress", the MCPTT client shall comply with the procedures in subclause 6.2.8.1.2;

11) shall contain an "application/vnd.3gpp.mcptt-info" MIME body with the <mcpttinfo> element containing the <mcptt-Params> element with:

a) the <session-type> element set to a value of "chat"; and

b) the <mcptt-request-uri> element set to the group identity;

NOTE 2: The MCPTT ID of the originating MCPTT user is not included in the body, as this will be inserted into the body of the SIP INVITE request that is sent from the originating participating MCPTT function.

12) shall include in the SIP INVITE request an SDP offer according to 3GPP TS 24.229 [4] with the clarifications specified in subclause 6.2.1;

13) if an implicit floor request is required, shall indicate this as specified in subclause 6.4; and

14) shall send the SIP INVITE request according to 3GPP TS 24.229 [4].

On receiving a SIP 2xx response to the SIP INVITE request, the MCPTT client:

1) shall interact with the user plane as specified in 3GPP TS 24.380 [5]; and

2) if the MCPTT emergency group call state is set to "MEGC 2: emergency-call-requested" or "MEGC 3: emergency-call-granted" the MCPTT client shall perform the actions specified in subclause 6.2.8.1.4.

On receiving a SIP 4xx response to a SIP INVITE request when the MCPTT emergency group call state is set to "MEGC 2: emergency-call-requested" or "MEGC 3: emergency-call-granted" the MCPTT client shall perform the actions specified in subclause 6.2.8.1.5.

### 10.1.2.2.1.2 MCPTT client receives SIP re-INVITE request for an MCPTT emergency group call

Upon receipt of a SIP re-INVITE request the MCPTT client:

1) if the SIP re-INVITE request contains an "application/vnd.3gpp.mcptt-info" MIME body with the <mcpttinfo> element containing the <mcptt-Params> element with the <emergency-ind> element set to a value of "true":

   a) should display to the MCPTT user the MCPTT ID of the originator of the MCPTT emergency group call and an indication that this is an MCPTT emergency group call;

   b) if the <mcpttinfo> element containing the <mcptt-Params> element contains an <alert-ind> element set to "true", should display to the MCPTT user an indication of the MCPTT emergency alert and associated information; and

   c) shall set the MCPTT emergency group state to "MEG 2: in-progress";

2) may check if a Resource-Priority header field is included in the incoming SIP re-INVITE request and may perform further actions outside the scope of this specification to act upon an included Resource-Priority header field as specified in 3GPP TS 24.229 [4];

3) shall accept the SIP re-INVITE request and generate a SIP 2xx response according to rules and procedures of 3GPP TS 24.229 [4];

4) shall include the g.3gpp.mcptt media feature tag in the Contact header field of the SIP 2xx response;

5) shall include the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt" in the Contact header field of the SIP 2xx response;

6) shall include the Session-Expires header field in the SIP 2xx response and start the SIP session timer according to IETF RFC 4028 [7]. If no "refresher" parameter was included in the received SIP re-INVITE request the "refresher" parameter in the Session-Expires header field shall be set to "uas", otherwise shall include a "refresher" parameter set to the value received in the Session-Expires header field the received SIP re-INVITE request;

7) shall include an SDP answer in the SIP 2xx response to the SDP offer in the incoming SIP re-INVITE request according to 3GPP TS 24.229 [4] with the clarifications given in subclause 6.2.2;

8) shall send the SIP 2xx response towards the MCPTT server according to rules and procedures of 3GPP TS 24.229 [4]; and

9) shall interact with the media plane as specified in 3GPP TS 24.380 [5].

### 10.1.2.2.1.3 MCPTT in-progress emergency cancel

Upon receiving a request from an MCPTT user to cancel the in-progress emergency condition on a chat MCPTT group, the MCPTT client shall generate a SIP re-INVITE request by following the UE originating session procedures specified in 3GPP TS 24.229 [4], with the clarifications given below.

The MCPTT client:

1) shall include an "application/vnd.3gpp.mcptt-info" MIME body populated as specified in subclause 6.2.8.1.3;

2) shall include in the "application/vnd.3gpp.mcptt-info" MIME body with the <mcpttinfo> element containing the <mcptt-Params> element with:

   a) the <session-type> element set to a value of "chat"; and

   b) the <mcptt-request-uri> element set to the group identity;

   NOTE 1: The MCPTT ID of the originating MCPTT user is not included in the body, as this will be inserted into the body of the SIP INVITE request that is sent from the originating participating MCPTT function.

3) shall include the g.3gpp.mcptt media feature tag in the Contact header field of the SIP re-INVITE request according to IETF RFC 3840 [16];

4) should include the "timer" option tag in the Supported header field;

5) should include the Session-Expires header field according to IETF RFC 4028 [7]. It is recommended that the refresher parameter is omitted. If included, the refresher parameter shall be set to "uac";

6) shall set the Request-URI of the SIP re-INVITE request to the MCPTT session identity;

7) shall include the Call-ID, From tag and To tag which are provided from the MCPTT group session;

8) shall include in the SIP re-INVITE request an SDP offer according to 3GPP TS 24.229 [4] with the clarifications specified in subclause 6.2.1;

9) shall include a Resource-Priority header field and comply with the procedures in subclause 6.2.8.1.2; and

10) shall send the SIP re-INVITE request according to 3GPP TS 24.229 [4].

On receiving a SIP 2xx response to the SIP re-INVITE request including no warning text, the MCPTT client:

1) shall interact with the user plane as specified in 3GPP TS 24.380 [5];

2) shall set the MCPTT emergency group state of the group to "MEG 1: no-emergency";

3) shall set the MCPTT emergency group call state of the group to "MEGC 1: emergency-gc-capable"; and

4) if the MCPTT emergency alert state is set to "MEA 4: Emergency-alert-cancel-pending", set the MCPTT emergency alert state to "MEA 1: no-alert".

On receiving a SIP 4xx response to the SIP re-INVITE request:

1) if the warning text contains the MCPTT warning code "133" as specified in subclause 4.4 the MCPTT client shall set the MCPTT emergency group state as "MEG 2: in-progress";

2) if the warning text contains the MCPTT warning code "134" as specified in subclause 4.4 the MCPTT client shall set the MCPTT emergency alert state to "MEA 1: no-alert"; and

   NOTE 2: this is the case where the MCPTT client requested the cancellation of the MCPTT emergency alert in addition to the MCPTT emergency alert and the cancellation of the MCPTT emergency alert was successful.

3) if the warning text contains the MCPTT warning code "135" as specified in subclause 4.4 the MCPTT client shall set the MCPTT emergency alert state to "MEA 3: emergency-alert-initiated".

   NOTE 3: this is the case where the MCPTT client requested the cancellation of the MCPTT emergency alert in addition to the MCPTT emergency alert and the cancellation of the MCPTT emergency alert was not successful.

   NOTE 4: if the in-progress emergency group state cancel request is rejected, the state of the session does not change, i.e. continues with MCPTT emergency group call level priority.

10.1.2.2.1.4        MCPTT upgrade to in-progress emergency

Upon receiving a request from an MCPTT user to upgrade the MCPTT group session to an emergency condition on a chat MCPTT group, the MCPTT client shall generate a SIP re-INVITE request by following the UE originating session procedures specified in 3GPP TS 24.229 [4], with the clarifications given below.

The MCPTT client:

1)  shall include an "application/vnd.3gpp.mcptt-info" MIME body populated as specified in subclause 6.2.8.1.1;

2)  if an indication of an MCPTT emergency alert is to be included, shall perform the procedures specified in subclause 6.2.9.1 for the MCPTT emergency alert trigger;

3)  shall include the g.3gpp.mcptt media feature tag in the Contact header field of the SIP re-INVITE request according to IETF RFC 3840 [16];

4)  should include the "timer" option tag in the Supported header field;

5)  should include the Session-Expires header field according to IETF RFC 4028 [7]. It is recommended that the refresher parameter is omitted. If included, the refresher parameter shall be set to "uac";

6)  shall set the Request-URI of the SIP re-INVITE request to the MCPTT session identity;

7)  shall include the Call-ID, From tag and To tag which are provided from the MCPTT group session;

8)  shall include in the SIP re-INVITE request an SDP offer according to 3GPP TS 24.229 [4] with the clarifications specified in subclause 6.2.1;

9)  if an implicit floor request is required, shall indicate this as specified in subclause 6.4;

10) shall include a Resource-Priority header field and comply with the procedures in subclause 6.2.8.1.2; and

11) shall send the SIP re-INVITE request according to 3GPP TS 24.229 [4].

On receiving a SIP 2xx response to the SIP re-INVITE request the MCPTT client:

1)  shall interact with the user plane as specified in 3GPP TS 24.380 [5]; and

2)  if the MCPTT emergency group call state is set to "MEGC 2: emergency-call-requested" or "MEGC 3: emergency-call-granted" the MCPTT client shall perform the actions specified in subclause 6.2.8.1.4.

On receiving a SIP 4xx response to a SIP INVITE request when the MCPTT emergency group call state is set to "MEGC 2: emergency-call-requested" or "MEGC 3: emergency-call-granted" the MCPTT client shall perform the actions specified in subclause 6.2.8.1.5.

Editor's Note [CT1#96, C1-161141]: the use of the Warning header to indicate emergency related authentication failures needs to be replaced globally as this can be considered to be sensitive information. One candidate is the inclusion of an mcpttinfo body in the SIP 2xx response or SIP 4xx response indicating the type of failure.

10.1.2.2.2        Chat group call within a pre-established session

10.1.2.2.2.1        MCPTT client joins a chat MCPTT group session

Upon receiving a request from an MCPTT user to establish an MCPTT group session using an MCPTT group identity identifying a chat MCPTT group within the pre-established session, the MCPTT client shall generate a SIP REFER request as specified in IETF RFC 3515 [25] as updated by IETF RFC 6665 [26] and IETF RFC 7647 [27], and in accordance with the UE procedures specified in 3GPP TS 24.229 [4], with the clarifications given below.

NOTE:    this procedure assumes the use of a pre-established session as specified in subclause 8.2.1.

Editor's Note [CT1#94, C1-153749]: This subclause assumes no encryption of application-related sensitive data in the request (e.g. to hide the MCPTT identities from the SIP layer) is required. Requirements for encryption are FFS, If encryption is required then this SIP request will also exist in a form that identifies that the request carries sensitive data.

Editor's Note [CT1#94, C1-153749]: This procedure and any associated server procedures may need to be revisited for the purposes of decreasing the overall number of sessions consumed by joined members of the group.

Editor"s Note [CT1#94, C1-153749]: the management of the media resource allocation by the pre-established session is FFS.

The MCPTT client:

1)  shall set the Request URI of the SIP REFER request to the session identity of the pre-established session;

2)  shall set the Refer-To header field of the SIP REFER request to the URI of the chat MCPTT group according to IETF RFC 3515 [25] and extended with the following header fields in the headers portion of the SIP URI:

    a)  the Accept-Contact header field containing the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

    b)  an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt" along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6]; and

    c)  a Content-Type URI header field containing an "application/vnd.3gpp.mcptt-info"MIME type of the "body" URI header field with a body containing the <mcpttinfo> element with the <mcptt-Params> element and with the <session-type> element set to a value of "chat";

3)  may additionally include the Resource-Priority header field with the namespace set to the MCPTT-specific namespace specified in draft-holmberg-dispatch-mcptt-rp-namespace [48] and the priority set to the priority level designated for MCPTT chat group session;

Editor's Note [CT1#94, C1-153749]: What values the Resource-Priority header field is set to is FFS.

4)  shall include a P-Preferred-Service header field set to the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcptt" (coded as specified in 3GPP TS 24.229 [4]), according to IETF RFC 6050 [9];

5)  shall include the following according to IETF RFC 4488 [22]:

    a)  the option tag "norefersub" in the Supported header field; and

    b)  the value "false" in the Refer-Sub header field.

Editor's Note [CT1#94, C1-153749]: Need to discuss if the MCPTT client includes the "norefersub" in a Require header field and the Refer-Sub header field with value "false" as specified in RFC 4488 or whether the MCPTT server should instead use the Explicit Subscription mechanism in RFC 7614 with the "explicitsub" and "nosub" option tag in the Require header field, of the REFER request, or both.

6)  shall include a Target-Dialog header field as specified in IETF RFC 4538 [23] identifying the pre-established session;

7)  shall include the g.3gpp.mcptt media feature tag in the Contact header field of the SIP REFER request according to IETF RFC 3840 [16];

8)  if implicit floor control is required, shall comply with the conditions specified in subclause 6.4; and

9)  shall send the SIP REFER request according to 3GPP TS 24.229 [4].

On receiving a final SIP 2xx response to the SIP REFER request, the MCPTT client:

1)  shall interact with the media plane as specified in 3GPP TS 24.380 [5].

## 10.1.2.3      Participating MCPTT function procedures

### 10.1.2.3.1        On-demand chat group call

#### 10.1.2.3.1.1            MCPTT chat session establishment

In the procedures in this subclause:

1) group identity in an incoming SIP INVITE request refers to the group identity from the <mcptt-request-uri> element of the "application/vnd.3gpp.mcptt-info" MIME body of the incoming SIP INVITE request; and

2) emergency indication in an incoming SIP INVITE request refers to the <emergency-ind> element of the "application/vnd.3gpp.mcptt-info" MIME body.

Upon receipt of a "SIP INVITE request for originating participating MCPTT function" for a group identity identifying a chat MCPTT group containing an "application/vnd.3gpp.mcptt-info" MIME body with the <session-type> element set to a value of "chat", the participating MCPTT function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response. The participating MCPTT function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [24]. Otherwise, continue with the rest of the steps;

NOTE 1: if the SIP INVITE request contains an emergency indication set to a value of "true", the participating MCPTT function can by means beyond the scope of this specification choose to accept the request.

Editor's Note [CT1#95-bis, C1-160421]: the participating server should really know if this user is authorised to originate and/or participate in MCPTT emergency group calls, as exceptions to limits on affiliations, simultaneous sessions etc. should likely not be made unless the user is authorised to make an MCPTT emergency group call and emergency group calls are permitted on this group. This applies to steps 1, 4 and 6 of this procedure. Access to the MCPTT user's user profile data as captured in Table B.3-1 of 3GPP TS 23.179 v13.0.0 would enable this functionality.

Editor's Note [CT1#94, C1-153736]: The priority mechanisms are still to be specified for MCPTT. The priority mechanisms may be a factor in determining whether to reject or allow the request.

2) shall determine the MCPTT ID of the calling user from public user identity in the P-Asserted-Identity header field of the SIP INVITE request, and authorise the calling user;

NOTE 2: The MCPTT ID of the calling user is bound to the public user identity at the time of service authorisation, as documented in subclause 7.3.

3) if the user identified by the MCPTT ID is not authorised to make chat group calls, shall reject the "SIP INVITE request for originating participating MCPTT function" with a SIP 403 (Forbidden) response to the SIP INVITE request, with warning text set to "108 user not authorised to make chat group calls" in a Warning header field as specified in subclause 4.4;

4) if the MCPTT user is not affiliated with the chat MCPTT group identified by the group identity in the SIP INVITE request, and already has N2 simultaneous affiliations, shall reject the "SIP INVITE request for originating participating MCPTT function" with a SIP 486 (Busy Here) response with the warning text set to "102 too many simultaneous affiliations" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the remaining steps;

NOTE 3: N2 is the total number of MCPTT groups that an MCPTT user can be affiliated to simultaneously as specified in 3GPP TS 23.179 [3].

NOTE 4: if the SIP INVITE request contains an emergency indication set to a value of "true", the participating MCPTT function can by means beyond the scope of this specification choose to allow an exception to the N2 limit. Alternatively, a lower priority affiliation of the MCPTT user could be cancelled to allow for the new affiliation.

5) shall determine if the media parameters are acceptable and the MCPTT speech codec is offered in the SDP offer and if not, reject the request with a SIP 488 (Not Acceptable Here) response. Otherwise, continue with the rest of the steps;

6) shall check if the number of maximum simultaneous MCPTT sessions supported for the MCPTT user has been exceeded. If exceeded, the MCPTT function shall respond with a SIP 486 (Busy Here) response with the warning text set to "105 maximum simultaneous MCPTT sessions reached" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the rest of the steps;

NOTE 5: If the SIP INVITE request contains an emergency indication set to a value of "true", the participating MCPTT function can by means beyond the scope of this specification choose to allow for an exception to the limit for the maximum simultaneous MCPTT sessions supported for the MCPTT user. Alternatively, a lower priority session of the MCPTT user could be terminated to allow for the new session.

7) shall determine the public service identity of the controlling MCPTT function associated with the group identity in the SIP INVITE request;

NOTE 6: The public service identity can identify the controlling function in the primary MCPTT system or a partner MCPTT system.

NOTE 7: How the participating MCPTT server discovers the public service identity of the controlling MCPTT function associated with the group identity is out of scope of the current document.

8) shall generate a SIP INVITE request as specified in subclause 6.3.2.1.3;

9) shall set the Request-URI to the public service identity of the controlling function associated with the group identity present in the incoming SIP INVITE request;

10) shall include the MCPTT ID of the calling user in <mcptt-calling-user-id> element of the "application/vnd.3gpp.mcptt-info" MIME body of the SIP INVITE request;

11) shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received SIP INVITE request as specified in subclause 6.3.2.1.1.1;

12) if the received SIP INVITE request contains an "application/vnd.3gpp.location-info+xml" MIME body as specified in Annex F.3; and

   a) if not already included, shall include a Content-Type header field set to "application/vnd.3gpp.location-info+xml"; and

   b) if not already copied, shall copy the contents of the "application/vnd.3gpp.location-info+xml" MIME body received in the SIP INVITE request into an "application/vnd.3gpp.location-info+xml" MIME body included in the outgoing SIP request;

NOTE 8: Note that the mcptt-info MIME body will already have been copied into the outgoing SIP INVITE request by subclause 6.3.2.1.3.

Editor's Note [CT1#95-bis, C1-160421]: how does the participating server know what the in-progress emergency state of the group is? Where is this data element stored?

13) if a Resource-Priority header field was included in the received SIP INVITE request, shall include a Resource-Priority header field according to rules and procedures of IETF RFC 4412 [29] set to the value indicated in the Resource-Priority header field of the SIP INVITE request from the MCPTT client; and

NOTE 9: The participating MCPTT function will leave verification of the Resource-Priority header field to the controlling MCPTT function.

Editor's Note [CT1onMCPTT, C1ah-160037]: the participating MCPTT function will leave verification of the Resource-Priority header field to the controlling MCPTT function.

Editor's Note [CT1#94, C1-153736]: The values of Resource-Priority header field are FFS. How the participating MCPTT function processes the Resource-Priority header field in conjunction with other data (e.g. priority data which is also FFS) to determine how to set this header in the outgoing INVITE is FFS.

14) shall forward the SIP INVITE request according to 3GPP TS 24.229 [4].

Upon receipt of a SIP 2xx response to the above SIP INVITE request in step 14) the participating MCPTT function:

1) shall generate a SIP 200 (OK) response as specified in the subclause 6.3.2.1.5.2;

2) shall include in the SIP 200 (OK) response an SDP answer as specified in the subclause 6.3.2.1.2.1;

3) shall include Warning header field(s) that were received in the incoming SIP 200 (OK) response;

4) shall include the public service identity received in the P-Asserted-Identity header field of the incoming SIP 200 (OK) response into the P-Asserted-Identity header field of the outgoing SIP 200 (OK) response;

5) shall send the SIP 200 (OK) response to the MCPTT client according to 3GPP TS 24.229 [4]; and

6) shall interact with the media plane as specified in 3GPP TS 24.380 [5].

Upon receipt of a SIP 403 (Forbidden) response to the above SIP INVITE request in step 14) the participating MCPTT function:

1) shall generate a SIP 403 (Forbidden) response according to 3GPP TS 24.229 [4];

2) shall include Warning header field(s) that were received in the incoming SIP 403 (Forbidden) response;

3) shall forward the SIP 403 (Forbidden) response to the MCPTT client according to 3GPP TS 24.229 [4]; and

4) shall interact with the media plane as specified in 3GPP TS 24.380 [5].

### 10.1.2.3.1.2 Reception of a SIP re-INVITE request from served MCPTT client

Upon receipt of a SIP re-INVITE request for a served MCPTT client of a chat MCPTT group, the participating MCPTT function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the "SIP INVITE request for terminating participating MCPTT function" with a SIP 500 (Server Internal Error) response. The participating MCPTT function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [24]. Otherwise, continue with the rest of the steps;

NOTE 1: If the SIP INVITE request contains an "application/vnd.3gpp.mcptt-info"MIME body with the <emergency-ind> element set to a value of "true", the participating MCPTT function may by means beyond the scope of this specification choose to accept the request.

2) shall generate an outgoing SIP re-INVITE request as specified in subclause 6.3.2.1.9;

3) shall include as the contents of the Request-URI the received Request-URI including any uri-parameters present;

4) shall determine if the media parameters are acceptable and the MCPTT speech codec is offered in the SDP offer and if not reject the request with a SIP 488 (Not Acceptable Here) response. Otherwise, continue with the rest of the steps;

Editor's Note [CT1onMCPTT, C1ah-160038]: It has not been yet determined how the participating MCPTT function obtains the MCPTT ID. The MCPTT ID could either be 1) included in a body (and encrypted if need be) and then decrypted by the participating MCPTT function, with the key management solution being FFS or 2) mapping tables are provided by identity management between the IMS IMPU and the MCPTT ID and then the IMPU is translated to the MCPTT ID at the entities.

5) shall include in the SIP re-INVITE request an SDP offer based on the SDP offer in the received SIP re-INVITE request as specified in subclause 6.3.2.1.1;

6) if the received SIP re-INVITE request contains a Resource-Priority header field, shall include a Resource-Priority header field with the contents set as in the received Resource-Priority header field; and

NOTE 2: the controlling MCPTT function will determine the validity of the Resource-Priority header field.

7) shall forward the SIP re-INVITE request according to 3GPP TS 24.229 [4].

Upon receipt of a SIP 2xx response to the above SIP INVITE request in step 7) the participating MCPTT function:

1) shall generate a SIP 200 (OK) response as specified in the subclause 6.3.2.1.5.2;

2) shall include in the SIP 200 (OK) response an SDP answer as specified in the subclause 6.3.2.1.2.1;

3) shall include Warning header field(s) that were received in the incoming SIP 200 (OK) response;

4) shall copy the contents received in the P-Asserted-Identity header field of the incoming SIP 200 (OK) response into the P-Asserted-Identity header field of the outgoing SIP 200 (OK) response;

5) shall send the SIP 200 (OK) response to the MCPTT client according to 3GPP TS 24.229 [4]; and

6) shall interact with the media plane as specified in 3GPP TS 24.380 [5].

Upon receipt of a SIP 403 (Forbidden) response to the above SIP INVITE request in step 7) the participating MCPTT function:

1) shall generate a SIP 403 (Forbidden) response according to 3GPP TS 24.229 [4];

2) shall include Warning header field(s) that were received in the incoming SIP 403 (Forbidden) response;

3) shall forward the SIP 403 (Forbidden) response to the MCPTT client according to 3GPP TS 24.229 [4]; and

4) shall interact with the media plane as specified in 3GPP TS 24.380 [5].

### 10.1.2.3.1.3 Reception of a SIP INVITE request for terminating MCPTT client

Upon receipt of a "SIP INVITE request for terminating participating MCPTT function", for a terminating MCPTT client of a chat MCPTT group, the participating MCPTT function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the "SIP INVITE request for terminating participating MCPTT function" with a SIP 500 (Server Internal Error) response. The participating MCPTT function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [24]. Otherwise, continue with the rest of the steps;

NOTE: If the SIP INVITE request contains an "application/vnd.3gpp.mcptt-info"MIME body with the <emergency-ind> element set to a value of "true", the participating MCPTT function can by means beyond the scope of this specification choose to accept the request.

2) shall check the presence of the isfocus media feature tag in the URI of the Contact header field and if it is not present then the participating MCPTT function shall reject the request with a SIP 403 (Forbidden) response with the warning text set to "104 isfocus not assigned" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the rest of the steps;

3) shall generate a SIP INVITE request as specified in subclause 6.3.2.2.3;

4) shall set the Request-URI to the public user identity associated with the MCPTT ID of the MCPTT user to be invited based on the contents of the Request-URI of the received "SIP INVITE request for terminating participating MCPTT function";

5) shall copy the contents of the P-Asserted-Identity header field of the incoming "SIP INVITE request for terminating participating MCPTT function" to the P-Asserted-Identity header field of the outgoing SIP INVITE request;

6) shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received "SIP INVITE request for terminating participating MCPTT function" as specified in subclause 6.3.2.2.1;

7) if the received SIP INVITE request contains a Resource-Priority header field, shall include a Resource-Priority header field with the contents set as in the received Resource-Priority header field;

8) shall perform the procedures specified in subclause 6.3.2.2.9 to include any MIME bodies in the received SIP INVITE request; and

9) shall send the SIP INVITE request towards the MCPTT client according to 3GPP TS 24.229 [4].

Upon receiving a SIP 200 (OK) response to the above SIP INVITE request sent to the MCPTT client, the participating MCPTT function:

1) shall generate a SIP 200 (OK) response as described in the subclause 6.3.2.2.4.2;

2) shall include in the SIP 200 (OK) response an SDP answer based on the SDP answer in the received SIP 200 (OK) response as specified in subclause 6.3.2.2.2.1;

3) shall interact with the media plane as specified in 3GPP TS 24.380 [5]; and

4) shall forward the SIP 200 (OK) response according to 3GPP TS 24.229 [4].

### 10.1.2.3.1.4 Reception of a SIP re-INVITE request for terminating MCPTT client

Upon receipt of a SIP re-INVITE request for a terminating MCPTT client of a chat MCPTT group, the participating MCPTT function:

1) shall check if a Resource-Priority header field is included in the incoming SIP INVITE request and may perform further actions outside the scope of this specification to act upon an included Resource-Priority header field as specified in 3GPP TS 24.229 [4];

2) shall generate an outgoing SIP re-INVITE request as specified in subclause 6.3.2.2.10;

3) shall set the Request-URI to the public user identity associated to the MCPTT ID of the MCPTT user to be invited based on the contents of the Request-URI of the received SIP re-INVITE request;

4) shall include in the SIP re-INVITE request an SDP offer based on the SDP offer in the received SIP re-INVITE request as specified in subclause 6.3.2.2.1; and

5) shall send the SIP re-INVITE request towards the MCPTT client according to 3GPP TS 24.229 [4].

Upon receiving a SIP 200 (OK) response to the above SIP re-INVITE request sent to the MCPTT client, the participating MCPTT function:

1) shall generate a SIP 200 (OK) response as described in the subclause 6.3.2.2.4.2;

2) shall include in the SIP 200 (OK) response an SDP answer based on the SDP answer in the received SIP 200 (OK) response as specified in subclause 6.3.2.2.2.1;

3) shall interact with the media plane as specified in 3GPP TS 24.380 [5]; and

4) shall forward the SIP 200 (OK) response according to 3GPP TS 24.229 [4].

## 10.1.2.3.2 Chat group call within a pre-established session

### 10.1.2.3.2.1 MCPTT chat session establishment

Upon receipt of a SIP REFER request containing in the Request-URI a SIP URI of a pre-established session owned by this participating MCPTT function and if the "method" SIP URI parameter in the URI in the Refer-to header field is set as "INVITE" or is not present and the session establishment requested is for a chat group call, the participating MCPTT function:

Editor's Note [CT1#95, C1-154552]: This subclause assumes no encryption of application-related sensitive data in the request (e.g. to hide the MCPTT identities from the SIP layer) is required. Requirements for encryption are FFS, If encryption is required then the above SIP request will also exist in a form that identifies that the request carries sensitive data.

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP REFER request with a SIP 500 (Server Internal Error) response. The participating MCPTT function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [24]. Otherwise, continue with the rest of the steps ;

Editor's Note [CT1#95, C1-154552]: The priority mechanisms are still to be specified for MCPTT. The priority mechanisms may be a factor in determining whether to reject or allow the request.

2) shall determine the MCPTT ID of the calling user and authorise the calling user;

Editor's Note [CT1#95, C1-154552]: It has not been yet determined how the participating MCPTT function obtains the MCPTT ID. The MCPTT ID could either be 1) included in a body (and encrypted if need be) and then decrypted by the participating MCPTT function, with the key management solution being FFS or 2) mapping tables are provided by identity management between the IMS IMPU and the MCPTT-ID and then the IMPU is translated to the MCPTT-ID at the entities.

3) if the user identified by the MCPTT ID is not authorised to make chat group calls, shall reject the SIP REFER request with a SIP 403 (Forbidden) response to the SIP INVITE request, with warning text set to "108 user not authorised to make group calls" in a Warning header field as specified in subclause 4.4.2;

Editor's Note [CT1#95, C1-154552]: It has not been yet determined how the participating MCPTT function obtains the MCPTT group identity. The MCPTT group identity could be included in a body (and encrypted if need be) and then decrypted by the participating MCPTT function, with the key management solution being FFS or by another mechanism when identity hiding is required.

4) if the MCPTT user is not affiliated with the chat MCPTT group and already has N2 simultaneous affiliations, shall reject the SIP REFER request with a SIP 486 (Busy Here) response with the warning text set to "102 too many simultaneous affiliations" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the remaining steps;

NOTE:    N2 is the total number of MCPTT groups that an MCPTT user can be affiliated to simultaneously as specified in 3GPP TS 23.179 [3].

5) shall check if the number of maximum simultaneous MCPTT sessions supported for the MCPTT user has been exceeded. If exceeded, the participating MCPTT function shall respond with a SIP 486 (Busy Here) response with the warning text set to "105 maximum simultaneous MCPTT sessions reached" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the rest of the steps;

6) shall check if a Resource-Priority header field is included in the SIP REFER request according to rules and procedures of 3GPP TS 24.229 [4];

Editor's Note [CT1#95, C1-154552]: some action may be needed if a Resource-Priority header field is included here if it has a different value than was present when the pre-established session was established.

7) shall generate a final SIP 2xx response to the "SIP REFER request for a pre-established session" according to 3GPP TS 24.229 [4];

8) if the "SIP REFER request for a pre-established session" contained a Refer-Sub header field containing the value "false" and a Supported header field containing "norefersub" value, shall handle the SIP REFER request as specified in 3GPP TS 24.229 [4], IETF RFC 3515 [25] as updated by IETF RFC 6665 [26], and IETF RFC 4488 [22] without establishing an implicit subscription;

9) shall send the SIP 2xx response to the SIP REFER request towards the MCPTT client according to 3GPP TS 24.229 [4];

10) shall generate a SIP INVITE request as specified in subclause 6.3.2.1.4;

11) shall include as the contents of the Request-URI the received Request-URI including any uri-parameters present in the received Request-URI;

12) shall include in the SIP INVITE request an SDP offer based on the SDP negotiated during the pre-established session establishment as specified in subclause 6.3.2.1.1.2;

13) shall include a Resource-Priority header field according to rules and procedures of 3GPP TS 24.229 [4] set to the value indicated in the pre-established session establishment request from the MCPTT client;

Editor's Note [CT1#95, C1-154552]: The values of Resource-Priority header field are FFS. How the participating MCPTT function processes the Resource-Priority header in conjunction with other data (e.g. priority data which is also FFS) to determine how to set this header in the outgoing INVITE, is FFS.

14) shall include in the SIP INVITE request the option tag "tdialog" in a Supported header field according to the rules and procedures of IETF RFC 4538 [23]; and

15) shall forward the SIP INVITE request according to 3GPP TS 24.229 [4].

Upon receipt of a SIP 2xx response to the above SIP INVITE request in step 15 the participating MCPTT function shall follow procedures specified in 3GPP TS 24.229 [4], with the clarifications given below:

1) shall cache the contact received in the Contact header field; and

2) shall interact with the media plane as specified in 3GPP TS 24.380 [5].

## 10.1.2.4 Controlling MCPTT function procedures

### 10.1.2.4.1 On-demand chat group call

#### 10.1.2.4.1.1 MCPTT chat session establishment

In the procedures in this subclause:

1)  MCPTT ID in an incoming SIP INVITE request refers to the MCPTT ID of the originating user from the <mcptt-calling-user-id> element of the "application/vnd.3gpp.mcptt-info" MIME body of the incoming SIP INVITE request;

2)  group identity in an incoming SIP INVITE request refers to the group identity from the <mcptt-request-uri> element of the "application/vnd.3gpp.mcptt-info" MIME body of the incoming SIP INVITE request;

3)  MCPTT ID in an outgoing SIP INVITE request refers to the MCPTT ID of the called user in the <mcptt-request-uri> element of the "application/vnd.3gpp.mcptt-info" MIME body of the outgoing SIP INVITE request;

4)  emergency indication in an incoming SIP INVITE request refers to the <emergency-ind> element of the "application/vnd.3gpp.mcptt-info" MIME body; and

5)  alert indication in an incoming SIP INVITE request refers to the <alert-ind> element of the "application/vnd.3gpp.mcptt-info" MIME body.

Upon receipt of a "SIP INVITE request for controlling MCPTT function of an MCPTT group" containing a group identity identifying a chat MCPTT group, the controlling MCPTT function:

1)  if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response. The controlling MCPTT function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [24]. Otherwise, continue with the rest of the steps;

NOTE 1: If the SIP INVITE request contains an emergency indication set to a value of "true", the controlling MCPTT function can by means beyond the scope of this specification choose to accept the request.

2)  shall reject the SIP request with a SIP 403 (Forbidden) response and not process the remaining steps if:

   a)  an Accept-Contact header field does not include the g.3gpp.mcptt media feature tag;

   b)  an Accept-Contact header field does not include the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt"; or

   c)  the isfocus media feature tag is present in the Contact header field;

3)  if the user identified by the MCPTT ID in the SIP INVITE request is not authorised to join the chat group identified by the group identity in the SIP INVITE request, shall reject the "SIP INVITE request for controlling MCPTT function of an MCPTT group" with a SIP 403 (Forbidden) response to the SIP INVITE request, with warning text set to "106 user not authorised to join chat group" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the remaining steps;

4)  if the SIP INVITE request contains an emergency indication set to a value of "true" and the MCPTT group is not authorised for MCPTT emergency group calls; and

   a)  if the SIP INVITE request contains an alert indication set to "true" and MCPTT emergency alerts are authorised for this MCPTT group, shall reject the "SIP INVITE request for controlling MCPTT function of an MCPTT group" with a SIP 403 (Forbidden) response to the SIP INVITE request, with warning text set to "129 group not authorised for emergency group call, authorised for emergency alert" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the remaining steps;

Editor's Note [C1#95-bis, C1-160422]: for the case in step a) above, an emergency alert needs to be sent to the affiliated members of the group but is not included in this contribution.

   b)  if the SIP INVITE request contains an alert indication set to "true" and MCPTT emergency alerts are not authorised for this MCPTT group, shall reject the "SIP INVITE request for controlling MCPTT function of an MCPTT group" with a SIP 403 (Forbidden) response to the SIP INVITE request, with warning text set to

"130 group not authorised for emergency group call, not authorised for emergency alert" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the remaining steps; or

c) if the SIP INVITE request contains an alert indication set to "false" shall reject the "SIP INVITE request for controlling MCPTT function of an MCPTT group" with a SIP 403 (Forbidden) response to the SIP INVITE request, with warning text set to "131 group not authorised for emergency group call" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the remaining steps;

Editor's Note [C1#96, C1-161138]: step 5 needs to be adapted to not use the Warning header field to indicate authorisation failure conditions for emergency as this is an exposure of sensitive application information. A body needs to be placed in the SIP response to indicate such conditions.

Editor's Note [C1#95-bis, C1-160422]: step 5) may be moved to a general subclause to make it re-usable for prearranged emergency calls.

Editor's Note [C1#95-bis, C1-160422]: authorising the MCPTT user as being able to originate MCPTT emergency calls is needed as well. This could be obtained from the configuration management server although this is not at this time specified as data that would be known by the MCPTT server in Annex B of 23.179 v1.2.0.

5) if the MCPTT user identified by the MCPTT ID in the SIP INVITE request is not affiliated with the chat MCPTT group identified by the group identity in the SIP INVITE request, the controlling MCPTT function shall affiliate the MCPTT user with the MCPTT chat group and store the affiliation information locally;

Editor's Note [CT1#94, C1-153737]: the mechanism for implicit affiliation is to be determined, including how this information is made available to the participating server to enable its check for maximum simultaneous affiliations (N2).

6) if the MCPTT user was newly affiliated in step 5) above, update the MCPTT user's affiliation status with the group management server as specified in 3GPP TS 24.381 [31];

7) shall determine if the media parameters are acceptable and the MCPTT speech codec is offered in the SDP offer and if not reject the request with a SIP 488 (Not Acceptable Here) response. Otherwise, continue with the rest of the steps;

8) shall create a chat group session and allocate an MCPTT session identity for the chat group session if the MCPTT chat group session identity does not already exist;

9) if the SIP INVITE request contains an emergency indication set to a value of "true" or the in-progress emergency state of the group to "true" the controlling MCPTT function shall:

a) validate that the SIP INVITE request includes a Resource-Priority header field with the namespace set to the MCPTT-specific namespace specified in draft-holmberg-dispatch-mcptt-rp-namespace [48] and the priority set to the priority designated for emergency calls and if not:

i) shall perform the actions specified in subclause 6.3.3.1.8;

ii) shall send the SIP UPDATE request generated in subclause 6.3.3.1.8 towards the initiator of the SIP INVITE request according to 3GPP TS 24.229 [4]; and

iii) upon receiving a SIP 200 (OK) response to the SIP UPDATE request sent in subclause 6.3.3.1.8 shall proceed with the rest of the steps.

NOTE 2: Verify that the Resource-Priority header is included and properly populated for both ongoing and newly-entered in-progress emergency states of the specified group.

b) if the in-progress emergency state of the group is set to a value of "true" and this MCPTT user is indicating a new emergency indication:

i) shall send a notification to the other affiliated members of the group of the MCPTT user's emergency indication as specified in subclause 6.t.t.t.t;

ii) shall cache the information that this MCPTT user has initiated an MCPTT emergency call; and

iii) if the <alert-ind> element of the mcpttinfo MIME body is set to "true" and MCPTT emergency alerts are authorised for this MCPTT user and MCPTT group, shall cache the information that this MCPTT user has initiated an MCPTT emergency alert; and

c) if the in-progress emergency state of the group is set to a value of "false":

   i) shall set the value of the in-progress emergency state of the group to "true";

   ii) shall start timer TNG2 (in-progress emergency group call timer) and handle its expiry as specified in subclause 10.1.2.4.1.3;

   iii) shall generate SIP re-INVITE requests for the MCPTT emergency group call to the other affiliated and joined participants of the chat MCPTT group as specified in subclause 6.3.3.1.6;

   iv) shall generate SIP INVITE requests for the MCPTT emergency group call to the affiliated but not joined members of the chat MCPTT group as specified in subclause 6.3.3.1.7;

   A) for each affiliated but not joined member shall send the SIP INVITE request towards the MCPTT client as specified in 3GPP TS 24.229 [4]; and

   B) Upon receiving a SIP 200 (OK) response to the SIP INVITE request the controlling MCPTT function shall interact with the media plane as specified in 3GPP TS 24.380 [5];

   v) shall cache the information that this MCPTT user has initiated an MCPTT emergency call; and

   vi) if the <alert-ind> element of the mcpttinfo MIME body is set to "true" and MCPTT emergency alerts are authorised for this MCPTT user and MCPTT group, shall cache the information that this MCPTT user has initiated an MCPTT emergency alert;

10) shall accept the SIP request and generate a SIP 200 (OK) response to the SIP INVITE request according to 3GPP TS 24.229 [4];

11) shall include in the SIP 200 (OK) response an SDP answer according to 3GPP TS 24.229 [4] with the clarifications specified in subclause 6.3.3.2.1 unless the procedures of subclause 6.3.3.1.8 were performed in step9) above;

12) should include the Session-Expires header field and start supervising the SIP session according to IETF RFC 4028 [7]. It is recommended that the "refresher" header field parameter is omitted. If included, the "refresher" header field parameter shall be set to "uac";

13) shall include the "timer" option tag in a Require header field;

14) shall include the following in a Contact header field:

   a) the g.3gpp.mcptt media feature tag;

   b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt";

   c) the MCPTT session identity; and

   d) the media feature tag isfocus;

15) shall include the "norefersub" option tag in a Supported header field according to IETF RFC 4488 [22];

Editor's Note [CT1#94, C1-153737]: Need to discuss if the MCPTT client includes the "norefersub" in a Require header field and the Refer-Sub header field with value "false" as specified in RFC 4488 or whether the MCPTT server should instead use the Explicit Subscription mechanism in RFC 7614 with the "explicitsub" and "nosub" option tag in the Require header field where applicable, or both.

16) shall include the "tdialog" option tag in a Supported header field according to IETF RFC 4538 [23];

17) if the SIP INVITE request contains an alert indication set to a value of "true" and if MCPTT emergency alerts are not authorised for this MCPTT group, shall include warning text set to "132 emergency group call authorised, emergency alert not authorised" in a Warning header field as specified in subclause 4.4;

18) shall interact with media plane as specified in 3GPP TS 24.380 [5]; and

19) shall send the SIP 200 (OK) response to the MCPTT client according to 3GPP TS 24.229 [4].

### 10.1.2.4.1.2 Receipt of a SIP re-INVITE request

Upon receipt of a SIP re-INVITE request for an MCPTT session identity identifying a chat MCPTT group session, the controlling MCPTT function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP re-INVITE request with a SIP 500 (Server Internal Error) response. The controlling MCPTT function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [24]. Otherwise, continue with the rest of the steps;

NOTE 1: If the SIP re-INVITE request contains an "application/vnd.3gpp.mcptt-info" MIME body with the \<emergency-ind> element set to a value of "true", the controlling MCPTT function may by means beyond the scope of this specification choose to accept the request.

Editor's Note [CT1-onMCPTT, C1ah-160039]: The priority mechanisms are still to be specified for MCPTT. The priority mechanisms may be a factor in determining whether to reject or allow the request.

2) if the SIP re-INVITE request contains an "application/vnd.3gpp.mcptt-info" MIME body with the \<emergency-ind> element set to a value of "true" and the MCPTT group is not authorised for MCPTT emergency group calls:

   a) if the \<alert-ind> element of the mcpttinfo MIME body is set to "true" and MCPTT emergency alerts are authorised for this MCPTT group, shall:

      i) reject the SIP re-INVITE request with a SIP 403 (Forbidden) response to the SIP re-INVITE request, with warning text set to "129 group not authorised for emergency group call, authorised for emergency alert" in a Warning header field as specified in subclause 4.4; and

      ii) send MCPTT emergency alerts to the other affiliated members of the MCPTT group as specified in subclause 6.3.3.1.u;

Editor's Note [CT1-onMCPTT, C1ah-160039]: for the case in step a) above, an emergency alert needs to be sent to the affiliated members of the group but is to be provided.

   b) if the \<alert-ind> element of the mcpttinfo MIME body is set to "true" and MCPTT emergency alerts are not authorised for this MCPTT group, shall reject the SIP re-INVITE request with a SIP 403 (Forbidden) response to the SIP INVITE request, with warning text set to "130 group not authorised for emergency group call, not authorised for emergency alert" in a Warning header field as specified in subclause 4.4; or

   c) if the \<alert-ind> element of the mcpttinfo MIME body is set to "false" shall reject the SIP re-INVITE request with a SIP 403 (Forbidden) response to the SIP re-INVITE request, with warning text set to "131 group not authorised for emergency group call" in a Warning header field as specified in subclause 4.4;

Editor's Note [CT1-onMCPTT, C1ah-160039]: while this is an error case, the use of the Warning header message which reveal the status of emergency messages is not desirable and should be replaced with another FFS mechanism.

3) if the SIP re-INVITE request contains an "application/vnd.3gpp.mcptt-info" MIME body with the \<emergency-ind> element set to a value of "true" the controlling MCPTT function shall:

   a) validate that the SIP re-INVITE request includes a Resource-Priority header field with the namespace set to the MCPTT-specific namespace specified in draft-holmberg-dispatch-mcptt-rp-namespace [48], and the priority set to the priority designated for emergency calls and if not:

      i) shall perform the actions specified in subclause 6.3.3.1.8; and

      ii) upon receiving a SIP 200 (OK) response to the SIP UPDATE request sent in subclause 6.3.3.1.8 shall proceed with the rest of the steps.

NOTE 2: verify that the Resource-Priority header is included and properly populated for both ongoing and newly-entered in-progress emergency states of the specified group.

   b) if the in-progress emergency state of the group is set to a value of "true" and this MCPTT user is indicating a new emergency indication:

      i) shall cache the information that this MCPTT user has initiated an MCPTT emergency call;

    ii) if the SIP re-INVITE request contains an "application/vnd.3gpp.mcptt-info" MIME body with the <alert-ind> element set to a value of "true", and the requesting MCPTT user and MCPTT group are authorised for the initiation of MCPTT emergency alerts, shall cache the information that this MCPTT user has initiated an MCPTT emergency alert; and

    iii) send a notification to the other affiliated members of the group of the MCPTT user's emergency indication and emergency alert, if indicated, as specified in subclause 6.3.3.1.u; and

Editor's Note [CT1-on MCPTT, C1-160039]: stage one or stage 2 do not explicitly cover this case, assuming that it's needed. Subclause 6.t.t.t.t is to be provided.

  c) if the in-progress emergency state of the group is set to a value of "false":

    i) shall set the value of the in-progress emergency state of the group to "true";

    ii) shall cache the information that this MCPTT user has initiated an MCPTT emergency call;

    iii) if the SIP re-INVITE request contains an "application/vnd.3gpp.mcptt-info" MIME body with the <alert-ind> element set to a value of "true", and the requesting MCPTT user and MCPTT group are authorised for the initiation of MCPTT emergency alerts, shall cache the information that this MCPTT user has initiated an MCPTT emergency alert;

    iv) shall start timer TNG2 (in-progress emergency group call timer) and handle its expiry as specified in subclause 10.1.2.4.1.3;

Editor's Note [CT1-onMCPTT, C1ah-160039]: should TNG2 be re-started for case b) above?

    v) shall generate SIP re-INVITE requests for the MCPTT emergency group call to the other affiliated and joined participants of the chat MCPTT group as specified in subclause 6.3.3.1.6. The MCPTT controlling function:

      A) for each affiliated and joined member shall send the SIP re-INVITE request towards the MCPTT client as specified in 3GPP TS 24.229 [4]; and

      B) Upon receiving a SIP 200 (OK) response to the SIP re-INVITE request the controlling MCPTT function shall interact with the media plane as specified in 3GPP TS 24.380 [5]; and

    vi) shall generate SIP INVITE requests for the MCPTT emergency group call to the affiliated but not joined members of the chat MCPTT group as specified in subclause 6.3.3.1.7. The controlling MCPTT function:

      A) for each affiliated but not joined member shall send the SIP INVITE request towards the MCPTT client as specified in 3GPP TS 24.229 [4]; and

      B) Upon receiving a SIP 200 (OK) response to the SIP INVITE request the controlling MCPTT function shall interact with the media plane as specified in 3GPP TS 24.380 [5];

4) if the SIP INVITE request contains an "application/vnd.3gpp.mcptt-info" MIME body with the <emergency-ind> element set to a value of "false" and if the MCPTT user is not authorised to cancel MCPTT emergency group calls:

  a) if an <alert-ind> element of the mcpttinfo MIME body is included and set to "false" and there is an outstanding MCPTT emergency alert for this MCPTT user:

    i) shall reject the SIP re-INVITE request with a SIP 403 (Forbidden) response to the SIP re-INVITE request, with warning text set to "134 in-progress emergency group state not cancelled, emergency alert cancelled" in a Warning header field as specified in subclause 4.4;

    ii) shall send MCPTT emergency alert cancellation messages to the other affiliated members of the group as specified in subclause 6.3.3.1.u; and

    iii) shall cache the information that this MCPTT user no longer has an outstanding MCPTT emergency alert; otherwise;

Editor's Note [CT1-onMCPTT, C1ah-160039]: 6.3.3.1.u is to be provided]

b) shall reject the SIP re-INVITE request with a SIP 403 (Forbidden) response to the SIP re-INVITE request, with warning text set to "133 in-progress emergency group state not cancelled" in a Warning header field as specified in subclause 4.4;

Editor's Note [CT1-onMCPTT, C1ah-160039]: there may be other reasons why the cancel would be rejected, e.g. there are still other participants in the session that are themselves in an emergency condition.

5) if the SIP re-INVITE request contains an "application/vnd.3gpp.mcptt-info" MIME body with the <emergency-ind> element set to a value of "false" and the in-progress emergency state of the group to is set to a value of "true" the controlling MCPTT function shall:

a) validate that the SIP INVITE request includes a Resource-Priority header field with the namespace set to the MCPTT-specific namespace specified in draft-holmberg-dispatch-mcptt-rp-namespace [48], and the priority set to the priority level designated for a normal priority MCPTT group call, and if not:

i) shall perform the actions specified in subclause 6.3.3.1.8; and

ii) upon receiving a SIP 200 (OK) response to the SIP UPDATE request sent in subclause 6.3.3.1.8 shall proceed with the rest of the steps;

NOTE 3: verify that the Resource-Priority header is included and properly populated for an in-progress emergency state cancellation of the specified group.

b) shall set the in-progress emergency state of the group to a value of "false";

c) shall cache the information that this MCPTT user no longer has an outstanding MCPTT emergency group call;

d) if an <alert-ind> element of the mcpttinfo MIME body is included and set to "false" and there is an outstanding MCPTT emergency alert for this MCPTT user shall cache the information that this MCPTT user no longer has an outstanding MCPTT emergency alert;

e) shall generate SIP re-INVITE requests to the other affiliated and joined members of the MCPTT group as specified in subclause 6.3.3.1.6. The MCPTT controlling function:

A) for each affiliated and joined member shall send the SIP re-INVITE request towards the MCPTT client as specified in 3GPP TS 24.229 [4]; and

B) Upon receiving a SIP 200 (OK) response to the SIP re-INVITE request the controlling MCPTT function shall interact with the media plane as specified in 3GPP TS 24.380 [5]; and

NOTE 4: subclause 6.3.3.1.6 will inform the affiliated and joined members of the cancellation of the MCPTT group's in-progress emergency state and the cancellation of the MCPTT emergency alert if applicable.

f) shall send MCPTT emergency group call cancellation and if indicated in step d) above MCPTT emergency alert cancellation messages to affiliated but not joined members of the group as specified in subclause 6.3.3.1.u.

Editor's Note [CT1-on MCPTT, C1-160339]: neither stage one nor stage 2 explicitly cover this case, assuming that it's needed. Subclause 6.3.3.1.u is to be provided.

6) shall include in the SIP 200 (OK) response an SDP answer according to 3GPP TS 24.229 [4] with the clarifications specified in subclause 6.3.3.2.1 unless the procedures of subclause 6.3.3.1.8 were performed in step 5) a) i) above;

7) should include the Session-Expires header field and start supervising the SIP session according to IETF RFC 4028 [7]. It is recommended that the "refresher" header field parameter is omitted. If included, the "refresher" header field parameter shall be set to "uac";

8) shall include the "timer" option tag in a Require header field;

9) shall include the following in a Contact header field:

a) the g.3gpp.mcptt media feature tag;

b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt";

c)  the MCPTT session identity; and

d)  the media feature tag isfocus;

10) shall include the "norefersub" option tag in a Supported header field according to IETF RFC 4488 [22];

<span style="color:red">Editor's Note [CT1-onMCPTT, C1ah-160039]: Need to discuss if the MCPTT client includes the "norefersub" in a Require header field and the Refer-Sub header field with value "false" as specified in RFC 4488 or whether the MCPTT server should instead use the Explicit Subscription mechanism in RFC 7614 with the "explicitsub" and "nosub" option tag in the Require header field where applicable, or both.</span>

11) shall include the "tdialog" option tag in a Supported header field according to IETF RFC 4538 [23];

12) if the received SIP INVITE request contains an "application/vnd.3gpp.mcptt-info" MIME body with the <alert-ind> element set to a value of "true" and if MCPTT emergency alerts are not authorised for this MCPTT group, shall include warning text set to "132 emergency group call authorised, emergency alert not authorised" in a Warning header field as specified in subclause 4.4;

13) shall interact with media plane as specified in 3GPP TS 24.380 [5]; and

14) shall send the SIP 200 (OK) response towards the MCPTT client according to 3GPP TS 24.229 [4].

### 10.1.2.4.1.3  Handling the expiry of timer TNG2 (in-progress emergency group call timer)

Upon expiry of the in-progress emergency group call timer (TNG2) for an MCPTT group, the controlling MCPTT function:

1)  shall set the in-progress emergency state of the group to a value of "false";

2)  shall, if an MCPTT group call or MCPTT group session is in progress on the indicated group, for each of the participating members:

a)  generate a SIP re-INVITE request as specified in subclause 6.3.3.1.10;

b)  shall include in the P-Asserted-Identity header field the public service identity of the controlling MCPTT function; and

c)  send the SIP re-INVITE request towards the MCPTT client according to 3GPP TS 24.229 [4]; and

3)  shall for each affiliated but non-participating members member of the group:

a)  generate a SIP MESSAGE request according to subclause 6.3.3.1.11 and include in the "application/vnd.3gpp.mcptt-info" MIME body an <emergency-ind> element set to a value of "false";

b)  shall include in the P-Asserted-Identity header field the public service identity of the controlling MCPTT function; and

c)  send the SIP MESSAGE request towards the MCPTT client according to rules and procedures of 3GPP TS 24.229 [4].

Upon receiving a SIP 200 (OK) response to a re-SIP INVITE request the controlling MCPTT function shall interact with the media plane as specified in 3GPP TS 24.380 [5].

## 10.1.2.5  Non-controlling function of an MCPTT group procedures

### 10.1.2.5.1  Terminating procedures

#### 10.1.2.5.1.1  General

When receiving the "SIP INVITE request for non-controlling MCPTT function of an MCPTT group" the MCPTT server can be acting as a controller MCPTT function in an ongoing chat group call or, if a chat group call is not ongoing, be initiated as an non-controlling MCPTT function and invite MCPTT users.

If a chat group call is not ongoing the MCPTT server shall perform the actions specified in subclause 10.1.2.5.1.2.

If the "SIP INVITE request for non-controlling MCPTT function of an MCPTT group" is received when a chat group call is ongoing, the controlling MCPTT function may switch from operating in a controlling MCPTT function mode to operate in a non-controlling MCPTT function mode as specified in subclause 10.1.2.5.1.3.

When operating in the non-controlling mode and a SIP BYE request is received from the controlling MCPTT function, the non-controlling MCPTT function shall change from operating in the non-controlling mode to operating in the controlling mode as specified in subclause 10.1.2.5.1.4.

### 10.1.2.5.1.2        Initiating a chat group session

Upon receipt of a "SIP INVITE request for non-controlling MCPTT function of an MCPTT group" and if a chat group call is not ongoing, the non-controlling MCPTT function of an MCPTT group:

NOTE 1: The Contact header field of the SIP INVITE request contains the "isfocus" feature media tag.

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response. The controlling MCPTT function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [24]. Otherwise, continue with the rest of the steps;

2) shall determine if the media parameters are acceptable and the MCPTT speech codec is offered in the SDP offer and if not, reject the request with a SIP 488 (Not Acceptable Here) response. Otherwise, continue with the rest of the steps;

3) shall reject the SIP request with a SIP 403 (Forbidden) response and not process the remaining steps if:

   a) an Accept-Contact header field does not include the g.3gpp.mcptt media feature tag; or

   b) an Accept-Contact header field does not include the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt";

4) if the partner MCPTT system does not have a mutual aid relationship with the primary MCPTT system identified by the contents of the P-Asserted-Identity, shall reject the "SIP INVITE request for non-controlling MCPTT function of an MCPTT group" with a SIP 403 (Forbidden) response, with warning text set to "128 isfocus already assigned" in a Warning header field as specified in subclause 4.4, and shall not process the remaining steps;

5) shall check if a Resource-Priority header field is included in the incoming SIP INVITE request and may apply any preferential treatment to the SIP request as specified in 3GPP TS 24.229 [4];

6) shall generate SIP 200 (OK) response to the SIP INVITE request as specified in the subclause 6.3.4.2.2.2 before continuing with the rest of the steps;

7) shall include in the SIP 200 (OK) response an SDP answer to the SDP offer in the incoming SIP INVITE request as specified in the subclause 6.3.4.2.1;

8) shall interact with the media plane as specified in 3GPP TS 24.380 [5] subclause 6.3.5; and

NOTE 2: Resulting media plane processing is completed before the next step is performed.

9) shall send a SIP 200 (OK) response to the controlling MCPTT function according to 3GPP TS 24.229 [4].

### 10.1.2.5.1.3        Joining an ongoing chat group call

Upon receipt of a "SIP INVITE request for non-controlling MCPTT function of an MCPTT group" and if a chat group call is already ongoing, the non-controlling MCPTT function of an MCPTT group:

NOTE 1: The Contact header field of the SIP INVITE request contains the "isfocus" feature media tag.

1) shall determine if the media parameters are acceptable and the MCPTT speech codec is offered in the SDP offer and if not reject the request with a SIP 488 (Not Acceptable Here) response. Otherwise, continue with the rest of the steps;

2) shall reject the SIP request with a SIP 403 (Forbidden) response and not process the remaining steps if:

a) an Accept-Contact header field does not include the g.3gpp.mcptt media feature tag; or

b) an Accept-Contact header field does not include the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt";

3) if the partner MCPTT system does not have a mutual aid relationship with the primary MCPTT system identified by the contents of the P-Asserted-Identity, shall reject the "SIP INVITE request for non-controlling MCPTT function of an MCPTT group" with a SIP 403 (Forbidden) response, with warning text set to "128 isfocus already assigned" in a Warning header field as specified in subclause 4.4, and shall not process the remaining steps;

4) shall cache the content of the SIP INVITE request, if received in the Contact header field and if the specific feature tags are supported;

5) shall check if a Resource-Priority header field is included in the incoming SIP INVITE request and may apply any preferential treatment to the SIP request as specified in 3GPP TS 24.229 [4];

6) shall generate SIP 200 (OK) response to the SIP INVITE request as specified in the subclause 6.3.4.2.2.2 before continuing with the rest of the steps;

7) shall include in the SIP 200 (OK) response an SDP answer to the SDP offer in the incoming SIP INVITE request as specified in the subclause 6.3.4.2.1;

8) shall request media plane to initialise the switch to the non-controlling mode as specified in 3GPP TS 24.380 [5] subclause 6.3.3; and

NOTE 2:  Resulting media plane processing is completed before the next step is performed.

9) shall send a SIP 200 (OK) response to the controlling MCPTT function according to 3GPP TS 24.229 [4].

Upon receipt of the SIP ACK request, the non-controlling MCPTT function of an MCPTT group:

1) shall instruct the media plane to finalise the switch to the non-controlling mode as specified in 3GPP TS 24.380 [5] subclause 6.3.5.

### 10.1.2.5.1.4 Splitting an ongoing chat group call

Upon receipt of a SIP BYE request, the non-controlling MCPTT function of an MCPTT group:

1) if keeping the chat group call active is according to local policy, shall request media plane to switch to controlling mode as specified in 3GPP TS 24.380 [5] subclause 6.3.5; and

NOTE:    Resulting media plane processing is completed before the next step is performed.

2) shall send a SIP 200 (OK) response to the SIP BYE request.

# 10.2 Off-network group call

## 10.2.1 General

### 10.2.1.1 Common Procedures

#### 10.2.1.1.1 MONP message transport

Editor's note [CT1#95-bis, C1-160770]: it is FFS how security works in off-network situations as SA3 has not concluded on stage-2 requirements

In order to participate in a call of an MCPTT group, the MCPTT client:

1) shall send the MONP message as a UDP message to the multicast IP address of the MCPTT group, on UDP port TBD, with an IP time-to-live set to 255; and

Editor's note [CT1#95-bis, C1-160770]: Port number for the message is FFS.

2) shall treat UDP messages received on the multicast IP address of the MCPTT group and on port TBD as received MONP messages.

The MONP message is the entire payload of the UDP message.

### 10.2.1.1.2 Session description

For an off-network MCPTT session, only MCPTT speech is used.

One off-network MCPTT session includes one media-floor control entity.

The MCPTT client shall generate an SDP body for a group call in accordance with rules and procedures of RFC4566 [12].

The MCPTT client:

1) shall include in the session-level section:

   a) the "o=" field with the <username> portion set to a dash;

   b) the "s=" field with the <session name> portion set to a dash; and

   c) the "c=" field with the <nettype> portion set to "IN", the <addrtype> portion set to the IP version of a multicast IP address of the MCPTT group and the <connection-address> portions set to the multicast IP address of the MCPTT group;

2) shall include the media-level section for MCPTT speech consisting of:

   a) the "m=" field with the <media> portion set to "audio", the <port> portion set to a port number for MCPTT speech of the MCPTT group, the <proto> field set to "RTP/AVP" and <fmt> portion set indicating RTP payload type numbers;

   b) the "i=" field with the <session description> portion set to "speech";

   c) the "a=fmtp:" attribute(s), the "a=rtpmap:" attribute(s) or both, indicating the codec(s) and media parameters of the MCPTT speech; and

   d) the "a=rtcp:" attribute indicating port number to be used for RTCP at the MCPTT client selected according to the rules and procedures of IETF RFC 3605 [13], if the media steam uses other than the default IP address; and

3) shall include the media-level section for media-floor control entity consisting of:

   a) an "m=" line, with the <media> portion set to "application", the <port> portion set to a port number for media-floor control entity of the MCPTT group, the <proto> field set to "udp" and <fmt> portion set to "MCPTT"; and

   b) the "a=fmtp:MCPTT" attribute indicating the parameters of the media-floor control entity as specified 3GPP TS 24.380 [5].

## 10.2.2    Basic call control

### 10.2.2.1    General

In this release of specification, media streams of off-network group call cannot be modified and the SDP is the same for the entire duration of the call.

### 10.2.2.2    Basic call control state machine

The Figure 10.2.2.2-1 gives an overview of the main states and transitions on the UE for call control.

Each call control state machine is per MCPTT group ID.
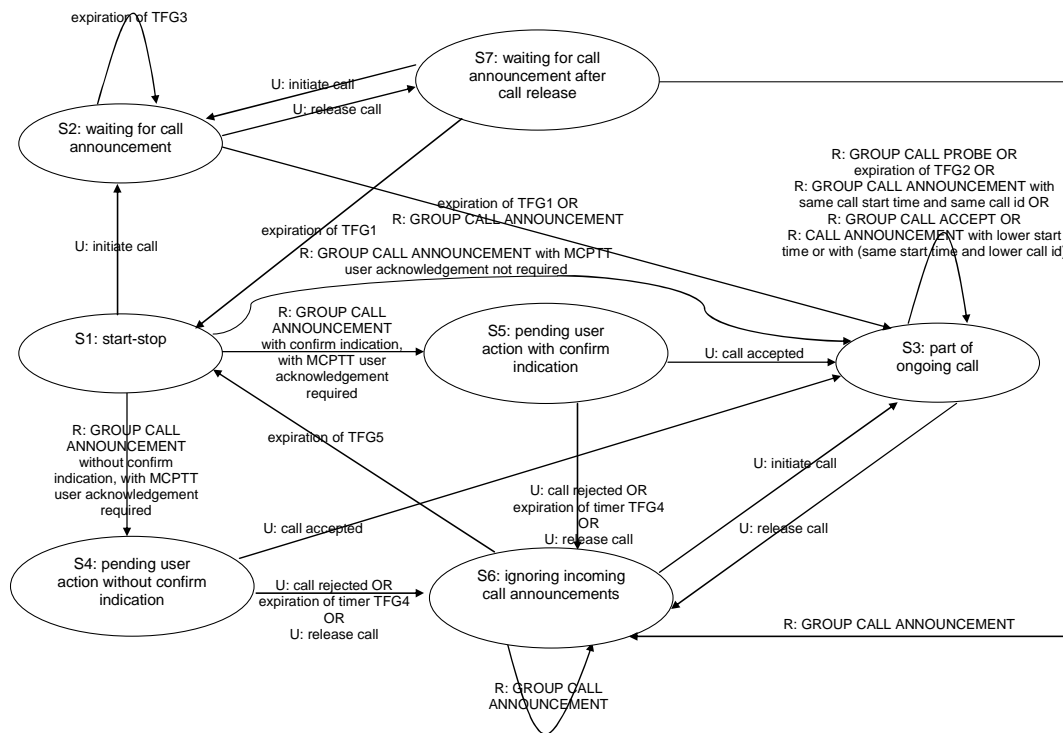
**Figure 10.2.2.2-1: Call Control state machine**

The following pieces of information are associated with the basic call control state machine:

    a) the stored call identifier of the call;

    b) the probe response value of the call;

    c) the stored refresh interval of the call;

    d) the stored SDP body of the call;

    e) the stored originating MCPTT user ID of the call; and

    f) the stored MCPTT group ID of the call.

The basic call control state machine has a related call type control state machine described in subclause 10.2.3.2.

When sending the message, MCPTT client indicates the stored current ProSe per-packet priority associated with the call type control state machine to the lower layers.

## 10.2.2.3 Call Control states

### 10.2.2.3.1 S1: start-stop

This state exists for UE, when the UE is not part of an ongoing call.

This state is the start state of this state machine.

This state is the stop state of this state machine.

#### 10.2.2.3.2 S2: waiting for call announcement

This state exists for UE, when the UE has sent a GROUP CALL PROBE message and is waiting for a GROUP CALL ANNOUNCEMENT message.

#### 10.2.2.3.3 S3: part of ongoing call

This state exists for UE, when the UE is part of an ongoing group call.

#### 10.2.2.3.4 S4: pending user action without confirm indication

This state exists for UE, when the UE has presented a notification to the MCPTT user for the received GROUP CALL ANNOUNCEMENT message, is waiting for a response and is not expected to send confirm indication.

#### 10.2.2.3.5 S5: pending user action with confirm indication

This state exists for UE, when the UE has presented a notification to the MCPTT user for the received GROUP CALL ANNOUNCEMENT message, is waiting for a response and is expected to send confirm indication.

#### 10.2.2.3.6 S6: ignoring incoming call announcements

This state exists for UE, when the group call was rejected or released, GROUP CALL ANNOUNCEMENT message was sent or received and GROUP CALL ANNOUNCEMENT messages continue being received.

#### 10.2.2.3.7 S7: waiting for call announcement after call release

This state exists for UE, when the group call was released, GROUP CALL ANNOUNCEMENT message was neither sent nor received and GROUP CALL PROBE was sent.

### 10.2.2.4 Procedures

#### 10.2.2.4.1 General

##### 10.2.2.4.1.1 Call announcement timer calculation

###### 10.2.2.4.1.1.1 Periodic call announcement timer calculation

The MCPTT client:

    1)  shall generate a random number, X, with uniform distribution between 0 and 1; and

    2)  shall set the TFG2 (periodic announcement) timer as follows:

       -  TFG2 (periodic announcement) = the refresh interval of the call * $(2/3 + 2/3*X)$ seconds.

###### 10.2.2.4.1.1.2 Call announcement timer calculation after CALL PROBE

The MCPTT client:

    1)  shall generate a random number, X, with uniform distribution between 0 and 1; and

    2)  shall set the TFG2 (periodic announcement) timer as follows:

       -  TFG2 (periodic announcement) = $1/12*X$ seconds.

### 10.2.2.4.2 Call Probe

#### 10.2.2.4.2.1 Originating UE call probe initiation

When in the "S1: start-stop" state, upon an indication from an MCPTT user to initiate a group call for an MCPTT group ID, the MCPTT client:

1) shall store the MCPTT group ID as the MCPTT group ID of the call;

2) shall create a call type control state machine as described in subclause 10.2.3.2;

3) shall generate a GROUP CALL PROBE message as specified in subclause 15.1.2. In the GROUP CALL PROBE message, the MCPTT client:

   a) shall set the MCPTT group ID IE to the stored MCPTT group ID of the call;

4) shall send the GROUP CALL PROBE message as specified in subclause 10.2.2.1.1;

5) shall start timer TFG3 (call probe retransmission);

6) shall start timer TFG1 (wait for call announcement); and

7) shall enter the "S2: waiting for call announcement" state.

   Editor"s note [CT1#94, C1-153926]: the call probe mechanism is under scrutiny.

#### 10.2.2.4.2.2 Originating UE call probe retransmission

When in the "S2: waiting for call announcement" state, upon expiration of TFG3 (call probe retransmission), the MCPTT client:

1) shall generate a GROUP CALL PROBE message as specified in subclause 15.1.2. In the GROUP CALL PROBE message, the MCPTT client:

   a) shall set the MCPTT group ID IE to the stored MCPTT group ID of the call;

2) shall send the GROUP CALL PROBE message as specified in subclause 10.2.1.1.1;

3) shall start timer TFG3 (call probe retransmission); and

4) shall remain in the "S2: waiting for call announcement" state.

#### 10.2.2.4.2.3 Terminating UE receiving GROUP CALL PROBE message when participating in the ongoing call

When in the "S3: part of ongoing call" state, upon receiving a GROUP CALL PROBE message with the MCPTT group ID IE matching the stored MCPTT group ID of the call, the MCPTT client:

1) if the stored probe response value of the call is set to "false":

   a) shall stop timer TFG2 (call announcement);

   b) shall start timer TFG2 (call announcement) with value as specified in subclause 10.2.2.4.1.1.2; and

   c) shall set the stored probe response of the call to "true"; and

2) shall remain in the "S3: part of ongoing call" state.

### 10.2.2.4.3 Call setup

#### 10.2.2.4.3.1 UE not receiving any response to GROUP CALL PROBE message

When in the "S2: waiting for call announcement" state, upon expiry of timer TFG1 (wait for call announcement), the MCPTT client:

1) shall stop timer TFG3 (call probe retransmission), if running;

2) shall generate an SDP body as specified in subclause 10.2.1.1.2 and store it as the SDP body of the call;

3) shall generate a random number with uniform distribution between 0 and 65535 and store it as the call identifier of the call;

4) shall select refresh interval value and store it as the refresh interval of the call;

5) shall store own MCPTT user ID as the originating MCPTT user ID of the call;

6) shall store the current UTC time as the call start time of the call;

7) shall generate a GROUP CALL ANNOUNCEMENT message as specified in subclause 15.1.3. In the GROUP CALL ANNOUNCEMENT message, the MCPTT client:

   a) shall set the Call identifier IE to the stored call identifier of the call;

   b) shall set the Call type IE to the stored current call type associated with the call type control state machine;

   c) shall set the Refresh interval IE to the stored refresh interval of the call;

   d) shall set the SDP IE to the stored SDP body of the call;

   e) shall set the originating MCPTT user ID IE to the stored originating MCPTT user ID of the call;

   f) shall set the MCPTT group ID IE to the stored MCPTT group ID of the call;

   g) shall set the Call start time IE to the stored call start time of the call;

   h) shall set the Last call type change time IE to the stored last call type change time of the call associated with call type control state machine;

   i) shall set the Last user to change call type IE to last user to change call type associated with call type control state machine; and

   j) may include the Confirm mode indication IE;

8) shall send the GROUP CALL ANNOUNCEMENT message as specified in subclause 10.2.1.1.1;

9) shall establish a media session based on the stored SDP body of the call;

10) shall start floor control as originating floor participant as specified in subclause 7.2 in 3GPP TS 24.380 [5];

11) shall start timer TFG2 (call announcement) with value as specified in subclause 10.2.2.4.1.1.1; and

12) shall enter the "S3: part of ongoing call" state.

Note: In this release of the specification, the refresh interval of the call is fixed to 10 seconds.

### 10.2.2.4.3.2 Originating UE receiving a GROUP CALL ANNOUNCEMENT message

When in the "S2: waiting for call announcement" state, upon receiving a GROUP CALL ANNOUNCEMENT message with the MCPTT group ID IE matching the stored MCPTT group ID of the call, the MCPTT client:

1) shall stop timer TFG3 (call probe retransmission);

2) shall stop timer TFG1 (wait for call announcement);

3) shall store the value of the SDP IE of the GROUP CALL ANNOUNCEMENT message as the SDP body of the call;

4) shall store the value of the Call identifier IE of the GROUP CALL ANNOUNCEMENT message as the call identifier of the call;

5) shall store the value of the originating MCPTT user ID IE of the GROUP CALL ANNOUNCEMENT message as the originating MCPTT user ID of the call;

6) shall store the value of the Refresh interval IE of the GROUP CALL ANNOUNCEMENT message as the refresh interval of the call;

7) shall store the value of the Call start time IE of the GROUP CALL ANNOUNCEMENT message as the call start time of the call;

8) shall establish a media session based on the stored SDP body of the call;

9) shall start floor control as terminating floor participant as specified in subclause 7.2 in 3GPP TS 24.380 [5];

10) shall start timer TFG2 (call announcement) with value as specified in subclause 10.2.2.1.3.1; and

11) shall enter the "S3: part of ongoing call" state.

### 10.2.2.4.3.3 Terminating UE receiving a GROUP CALL ANNOUNCEMENT message when not participating in the ongoing call

When in the "S1: start-stop" state, upon receiving a GROUP CALL ANNOUNCEMENT message with the MCPTT group ID IE not matching MCPTT group ID of the call stored for other state machines, the MCPTT client:

1) shall store the value of the SDP IE of the GROUP CALL ANNOUNCEMENT message as the SDP body of the call;

2) shall store the value of the Call identifier IE of the GROUP CALL ANNOUNCEMENT message as the call identifier of the call;

3) shall store the value of the Originating MCPTT user ID IE of the GROUP CALL ANNOUNCEMENT message as the originating MCPTT user ID of the call;

4) shall store the value of the Refresh interval IE of the GROUP CALL ANNOUNCEMENT message as the refresh interval of the call;

5) shall store the value of the MCPTT group ID IE of the GROUP CALL ANNOUNCEMENT message as the MCPTT group ID of the call;

6) shall store the value of the Call start time IE of the GROUP CALL ANNOUNCEMENT message as the call start time of the call;

7) shall create a call type control state machine as described in subclause 10.2.3.2;

8) if the terminating UE is configured that the terminating MCPTT user acknowledgement is required upon a terminating call request reception:

   a) shall start timer TFG4 (waiting for the user);

   b) if the GROUP CALL ANNOUNCEMENT message contains the confirm mode indication IE, shall enter the "S5: pending user action with confirm indication" state; and

   c) if the GROUP CALL ANNOUNCEMENT message does not contains the confirm mode indication IE, shall enter the "S4: pending user action without confirm indication" state; and

9) if the terminating UE is configured that the terminating MCPTT user acknowledgement is not required upon a terminating call request reception:

   a) shall establish a media session based on the stored SDP body of the call;

   b) shall start floor control as terminating floor participant as specified in subclause 7.2 in 3GPP TS 24.380 [5];

   c) if the GROUP CALL ANNOUNCEMENT message contains the confirm mode indication IE:

      i) shall generate a GROUP CALL ACCEPT message as specified in subclause 15.1.4. In the GROUP CALL ACCEPT message, the MCPTT client:

         A) shall set the Call identifier IE to the stored call identifier of the call;

         B) shall set the Originating MCPTT user ID IE to own MCPTT user id;

　　　　　　C) shall set the Call type IE to the stored current call type associated with the call type control state machine;

　　　　　　D) shall set the MCPTT group ID IE to the stored MCPTT group ID of the call; and

　　　　　　E) shall set the Call start time IE to the stored call start time of the call; and

　　　　ii) shall send the GROUP CALL ACCEPT message as specified in subclause 10.2.1.1.1;

　　d) shall start timer TFG2 (call announcement) with value as specified in subclause 10.2.2.4.1.1.1; and

　　e) shall enter the "S3: part of ongoing call" state.

### 10.2.2.4.3.4　　　MCPTT user accepts the terminating call with confirm indication

When in the "S5: pending user action with confirm indication" state, upon indication from the MCPTT user to accept the incoming group call, the MCPTT client:

　　1) shall establish a media session based on the stored SDP body of the call;

　　2) shall start floor control as terminating floor participant as specified in subclause 7.2 in 3GPP TS 24.380 [5];

　　3) shall generate a GROUP CALL ACCEPT message as specified in subclause 15.1.4. In the GROUP CALL ACCEPT message, the MCPTT client:

　　　a) shall set the Call identifier IE to the stored call identifier of the call;

　　　b) shall set the Originating MCPTT user ID IE to own MCPTT user id;

　　　c) shall set the Call type IE to the stored current call type associated with the call type control state machine; and

　　　d) shall set the MCPTT group ID IE to the stored MCPTT group ID of the call; and

　　4) shall send the GROUP CALL ACCEPT message as specified in subclause 10.2.1.1.1;

　　5) shall start timer TFG2 (call announcement) with value as specified in subclause 10.2.2.4.1.1.1; and

　　6) shall enter the "S3: part of ongoing call" state.

### 10.2.2.4.3.5　　　MCPTT user accepts the terminating call without confirm indication

When in the "S4: pending user action without confirm indication" state, upon an indication from the MCPTT user to accept the incoming group call, the MCPTT client:

　　1) shall establish a media session based on the stored SDP body of the call;

　　2) shall start floor control as terminating floor participant as specified in subclause 7.2 in 3GPP TS 24.380 [5];

　　3) shall start timer TFG2 (call announcement) with value as specified in subclause 10.2.2.1.3.1; and

　　4) shall enter the "S3: part of ongoing call" state.

### 10.2.2.4.3.6　　　Originating UE receiving GROUP CALL ACCEPT message

When in the "S3: part of ongoing call" state, upon receiving a GROUP CALL ACCEPT message with the MCPTT group ID IE matching the stored MCPTT group ID of the call, the MCPTT client:

　　1) can inform the MCPTT user about the call acceptance; and

　　2) shall remain in the "S3: part of ongoing call" state.

### 10.2.2.4.3.7　　　MCPTT user rejects the terminating call

When in the "S5: pending user action with confirm indication" state or the "S4: pending user action without confirm indication" state, upon an indication from the MCPTT user to reject the incoming group call, the MCPTT client:

   1) shall stop timer TFG4 (waiting for the user);

   2) shall start timer TFG5 (not present incoming call announcements); and

   3) shall enter the "S6: ignoring incoming call announcements" state.

### 10.2.2.4.3.8 MCPTT user does not act on terminating call

When in the "S5: pending user action with confirm indication" state or the "S4: pending user action without confirm indication" state, upon expiration of timer TFG4 (waiting for the user), the MCPTT client:

   1) shall start timer TFG5 (not present incoming call announcements); and

   2) shall enter the "S6: ignoring incoming call announcements" state.

## 10.2.2.4.4 Periodic group call announcement

### 10.2.2.4.4.1 Originating UE sending periodic call announcement

When in the "S3: part of ongoing call" state, upon expiry of timer TFG2 (call announcement), the MCPTT client:

   1) shall generate a GROUP CALL ANNOUNCEMENT message as specified in subclause 15.1.3. In the GROUP CALL ANNOUNCEMENT message, the MCPTT client:

     a) shall set the Call identifier IE to the stored call identifier of the call;

     b) shall set the Call type IE to the stored current call type associated with the call type control state machine;

     c) shall set the Refresh interval IE to the stored refresh interval of the call;

     d) shall set the SDP IE to the stored SDP body of the call;

     e) shall set the Originating MCPTT user ID IE to the stored originating MCPTT user ID of the call;

     f) shall set the MCPTT group ID IE to the stored MCPTT group ID of the call;

     g) shall set the Last call type change time IE to the stored last call type change time of the call associated with call type control state machine;

     h) shall set the Last user to change call type IE to last user to change call type associated with call type control state machine;

     i) shall set the Call start time IE to the stored call start time of the call;

     j) if the stored probe response value of the call is set to "true", shall include Probe response IE;

   2) shall send the GROUP CALL ANNOUNCEMENT message as specified in subclause 10.2.2.1.;

   3) if the stored probe response value of the call is set to "true", shall set the stored probe response value of the call to "false";

   4) shall start timer TFG2 (call announcement) with value as specified in subclause 10.2.2.1.3.1; and

   5) shall remain in the "S3: part of ongoing call" state.

### 10.2.2.4.4.2 Terminating UE receiving periodic call announcement

When in the "S3: part of ongoing call" state, upon receiving a GROUP CALL ANNOUNCEMENT message with the MCPTT group ID IE matching the stored MCPTT group ID of the call, the Call start time IE being the same as the stored call start time of the call, the Last call type change time IE being the same as the stored last call type change time of the call associated with the call type control state machine, the Last user to change call type IE being the same as the stored last user to change call type of the call associated with the call type control state machine and the Call identifier IE being the same as the stored call identifier of the call and Call type IE same as the stored current call type associated with the call type control state machine and:

1) if the stored probe response value of the call is set to "true" and GROUP CALL ANNOUNCEMENT message contains Probe response IE; or

2) the stored probe response value of the call is set to "false":

the MCPTT client,

1) shall stop timer TFG2 (call announcement);

2) shall start timer TFG2 (call announcement) with value as specified in subclause 10.2.2.1.3.1;

3) shall set the stored probe response of the call to "false", if set to "true"; and

4) shall remain in the "S3: part of ongoing call" state.

### 10.2.2.4.5 Call release

#### 10.2.2.4.5.1 MCPTT user leaves the call when GROUP CALL ANNOUNCEMENT was sent or received

When in the "S3: part of ongoing call" state, the "S5: pending user action with confirm indication" state, or the "S4: pending user action without confirm indication" state, upon an indication from the MCPTT user to release the group call, the MCPTT client:

1) shall release the media session;

2) shall stop timer TFG4 (waiting for the user), if running;

3) shall stop timer TFG2 (call announcement), if running;

4) shall start timer TFG5 (not present incoming call announcements); and

5) shall enter the "S6: ignoring incoming call announcements" state.

#### 10.2.2.4.5.2 Receiving GROUP CALL ANNOUNCEMENT message for rejected or released call

When in the "S6: ignoring incoming call announcements" state, upon receiving a GROUP CALL ANNOUNCEMENT message with the MCPTT group ID IE matching the stored MCPTT group ID of the call, the MCPTT client:

1) shall store the value of the SDP IE of the GROUP CALL ANNOUNCEMENT message as the SDP body of the call;

2) shall store the value of the Call identifier IE of the GROUP CALL ANNOUNCEMENT message as the call identifier of the call;

3) shall store the value of the Originating MCPTT user ID IE of the GROUP CALL ANNOUNCEMENT message as the originating MCPTT user ID of the call;

4) shall store the value of the Refresh interval IE of the GROUP CALL ANNOUNCEMENT message as the refresh interval of the call;

5) shall store the value of the Call start time IE of the GROUP CALL ANNOUNCEMENT message as the call start time of the call;

6) shall stop timer TFG5 (not present incoming call announcements);

7) shall start timer TFG5 (not present incoming call announcements); and

8) shall remain in the "S6: ignoring incoming call announcements" state.

#### 10.2.2.4.5.3 MCPTT user initiates originating call for rejected or released call

When in the "S6: ignoring incoming call announcements" state, upon an indication from the MCPTT user to initiate a group call for an MCPTT group ID matching the stored MCPTT group ID of the call, the MCPTT client:

1)  stop timer TFG5 (not present incoming call announcements);

2)  shall establish a media session based on the stored SDP body of the call;

3)  shall start floor control as terminating floor participant as specified in subclause 7.2 in 3GPP TS 24.380 [5];

4)  shall start timer TFG2 (call announcement) with value as specified in subclause 10.2.2.1.3.1; and

5)  shall enter the "S3: part of ongoing call" state.

### 10.2.2.4.5.4  No GROUP CALL ANNOUNCEMENT messages for rejected or released call

When in the "S6: ignoring incoming call announcements" state, upon expiration of timer TFG5 (not present incoming call announcements), the MCPTT client:

1)  shall release the stored SDP body of the call;

2)  shall release the stored call identifier of the call;

3)  shall release the stored originating MCPTT user ID of the call;

4)  shall release the stored refresh interval of the call;

5)  shall release the stored MCPTT group ID of the call;

6)  shall release the call start time of the call;

7)  shall destroy the call type control state machine; and

8)  shall enter the "S1: start-stop" state.

### 10.2.2.4.5.5  MCPTT user leaves the call when GROUP CALL PROBE was sent

When in the "S2: waiting for call announcement" state, upon an indication from the MCPTT user to release the group call, the MCPTT client:

1)  shall stop timer TFG3 (call probe retransmission); and

2)  shall enter the "S7: Waiting for call announcement after call release" state.

### 10.2.2.4.5.6  MCPTT user initiates originating call for released call

When in the "S7: Waiting for call announcement after call release" state, upon an indication from the MCPTT user to initiate a group call for an MCPTT group ID matching the stored MCPTT group ID of the call, the MCPTT client:

1)  shall stop timer TFG1 (wait for call announcement);

2)  shall generate a GROUP CALL PROBE message as specified in subclause 15.1.2. In the GROUP CALL PROBE message, the MCPTT client:

   a)  shall set the MCPTT group ID IE to the stored MCPTT group ID of the call; and

3)  shall send the GROUP CALL PROBE message as specified in subclause 10.2.2.1.1;

4)  shall start timer TFG3 (call probe retransmission);

5)  shall start timer TFG1 (wait for call announcement); and

6)  shall enter the "S2: waiting for call announcement" state.

### 10.2.2.4.5.7  Receiving GROUP CALL ANNOUNCEMENT message for released call

When in the "S7: Waiting for call announcement after call release" state, upon receiving a GROUP CALL ANNOUNCEMENT message with the MCPTT group ID IE matching the stored MCPTT group ID of the call, the MCPTT client:

1) shall store the value of the SDP IE of the GROUP CALL ANNOUNCEMENT message as the SDP body of the call;

2) shall store the value of the Call identifier IE of the GROUP CALL ANNOUNCEMENT message as the call identifier of the call;

3) shall store the value of the Originating MCPTT user ID IE of the GROUP CALL ANNOUNCEMENT message as the originating MCPTT user ID of the call;

4) shall store the value of the Refresh interval IE of the GROUP CALL ANNOUNCEMENT message as the refresh interval of the call;

5) shall store the value of the Call start time IE of the GROUP CALL ANNOUNCEMENT message as the call start time of the call;

6) shall stop timer TFG1 (wait for call announcement);

7) shall start timer TFG5 (not present incoming call announcements); and

8) shall enter the "S6: ignoring incoming call announcements" state.

### 10.2.2.4.5.8　　　No GROUP CALL ANNOUNCEMENT messages for released call

When in the "S7: Waiting for call announcement after call release" state, upon expiration of timer TFG1 (wait for call announcement), the MCPTT client:

1) shall release the stored MCPTT group ID of the call; and

2) shall enter the "S1: start-stop" state.

## 10.2.2.4.6　　　Merge of calls

### 10.2.2.4.6.1　　　Merge of two calls

When in the "S3: part of ongoing call" state, upon receiving a GROUP CALL ANNOUNCEMENT message with the MCPTT group ID IE matching the stored MCPTT group ID of the call and the Originating MCPTT user ID IE is different from the stored originating MCPTT user ID of the call, and:

1) if the stored current call type associated with the call type control state machine is "BASIC GROUP CALL" and the value of the Call type IE of GROUP CALL ANNOUNCEMENT message is either "IMMINENT PERIL GROUP CALL" or "EMERGENCY GROUP CALL";

2) if the stored current call type associated with the call type control state machine is "IMMINENT PERIL GROUP CALL" and the value of the Call type IE of GROUP CALL ANNOUNCEMENT message is "EMERGENCY GROUP CALL";

3) the stored current call type associated with the call type control state machine being equal to the Call type IE and the Call start time IE being lower than the stored call start time of the call; or

4) the stored current call type associated with the call type control state machine being equal to the Call type IE and the Call start time IE being equal to the stored call start time of the call and the Call identifier IE being lower than the stored call identifier of the call;

the MCPTT client:

1) shall store the value of the SDP IE of the GROUP CALL ANNOUNCEMENT message as the SDP body of the call;

2) shall store the value of the Call identifier IE of the GROUP CALL ANNOUNCEMENT message as the call identifier of the call;

3) shall store the value of the Originating MCPTT user ID IE of the GROUP CALL ANNOUNCEMENT message as the originating MCPTT user ID of the call;

4) shall store the value of the Refresh interval IE of the GROUP CALL ANNOUNCEMENT message as the refresh interval of the call;

5) shall store the value of the Call start time IE of the GROUP CALL ANNOUNCEMENT message as the call start time of the call;

6) shall adjust the media session based on the stored SDP body of the call and restart floor control as terminating floor participant as specified in subclause 7.2 in 3GPP TS 24.380 [5];

7) shall stop timer TFG2 (call announcement); and

8) shall start timer TFG2 (call announcement) with value according to rules and procedures as specified in subclause 10.2.2.1.3.3; and

9) shall remain in the "S3: part of ongoing call" state.

### 10.2.2.4.7 Error handling

#### 10.2.2.4.7.1 Unexpected MONP message received

Upon receiving a MONP message in a state where there is no handling specified for the MONP message, the MCPTT client shall discard the MONP message.

#### 10.2.2.4.7.2 Unexpected indication from MCPTT user

Upon receiving an indication from the MCPTT user in a state where there is no handling specified for the indication, the MCPTT client shall ignore the indication.

#### 10.2.2.4.7.3 Unexpected expiration of a timer

Upon expiration of a timer in a state where there is no handling specified for expiration of the timer, the MCPTT client shall ignore the expiration of the timer.

## 10.2.3. Call type control

### 10.2.3.1 General

This state machine exists when the UE is part of an ongoing group call.

### 10.2.3.2 Call type control state machine

The Figure 10.2.3.2-1 gives an overview of the states and transitions of the state machine.

Each call control state machine is per MCPTT group ID.
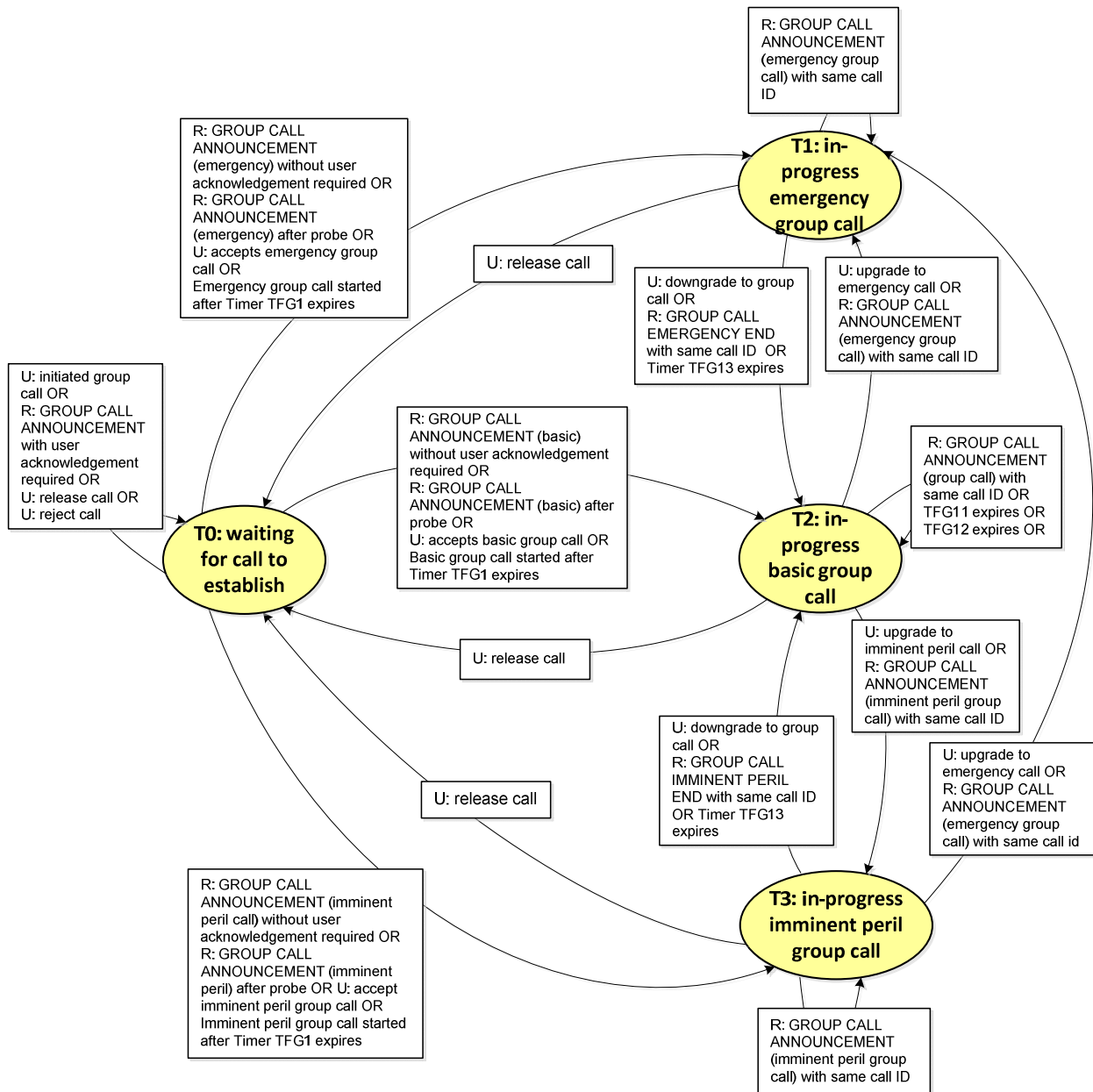
**Figure 10.2.3.2-1: Call type control state machine**

The following pieces of information are associated with the call type control state machine:

a)  the stored current call type;

b)  the stored current ProSe per-packet priority;

c)  the stored last call type change time of the call; and

d)  the stored last user to change call type of the call.

When sending the message, MCPTT client indicates the stored current ProSe per-packet priority (as described in 3GPP TS 24.383 [45]) associated with the call type control state machine to the lower layers.

## 10.2.3.3      Call Control states

### 10.2.3.3.1          T0: waiting for call to establish

This state is the start state of this state machine.

### 10.2.3.3.2          T1: in-progress emergency group call

This state exists for UE, when the UE is part of an in-progress emergency group call.

### 10.2.3.3.3          T2: in-progress basic group call

This state exists for UE, when the UE is part of an in-progress basic group call.

### 10.2.3.3.4          T3: in-progress imminent peril group call

This state exists for UE, when the UE is part of an in-progress imminent peril group call.

## 10.2.3.4      Procedures

### 10.2.3.4.1          General

### 10.2.3.4.2          User initiated the call probe

When in the "T0: waiting for the call to establish " state, upon an indication from an MCPTT user to initiate a group call probe for an MCPTT group, the MCPTT client:

1)  if the stored emergency state associated with emergency alert state machine described in 12.2.2.2 is set to "true":

    a)  shall set the stored current call type to "EMERGENCY GROUP CALL"; and

    b)  shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network emergency group call as described in 3GPP TS 24.383 [45];

2)  if the stored emergency state associated with emergency alert state machine described in 12.2.2.2 is set to "false", and:

    a)  if the user initiates an MCPTT emergency call:

        i)   shall set the stored current call type to "EMERGENCY GROUP CALL"; and

        ii)  shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network emergency group call as described in 3GPP TS 24.383 [45];

    b)  if the user initiates an MCPTT imminent peril group call:

        i)   shall set the stored current call type to "IMMINENT PERIL GROUP CALL"; and

        ii)  shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network imminent peril group call as described in 3GPP TS 24.383 [45]; and

    c)  if the user initiates an MCPTT group call which is not an MCPTT emergency call and which is not an MCPTT imminent peril group call:

        i)   shall set the stored current call type to "BASIC GROUP CALL"; and

        ii)  shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network basic group call as described in 3GPP TS 24.383 [45];

3)  shall set the stored last call type change time to current UTC time;

4)  shall set the last user to change call type to own MCPTT user ID; and

5) shall remain in "T0: waiting for the call to establish" state.

### 10.2.3.4.3 Received GROUP CALL ANNOUNCEMENT message as a response to GROUP CALL PROBE message

When in the "T0: waiting for the call to establish " state, upon receipt of a GROUP CALL ANNOUNCEMENT message as a response to GROUP CALL PROBE message, the MCPTT client:

1) if the Call type IE of the received GROUP CALL ANNOUNCEMENT message is set to "EMERGENCY GROUP CALL":

   a) shall set the stored current call type to "EMERGENCY GROUP CALL";

   b) shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network emergency group call as described in 3GPP TS 24.383 [45]; and

   c) shall enter "T1: in-progress emergency group call" state;

2) if the Call type IE of the received GROUP CALL ANNOUNCEMENT message is set to "IMMINENT PERIL GROUP CALL", and if the stored current call type is other than "EMERGENCY GROUP CALL":

   a) shall set the stored current call type to "IMMINENT PERIL GROUP CALL";

   b) shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network imminent peril group call as described in 3GPP TS 24.383 [45]; and

   c) shall enter "T3: in-progress imminent peril group call" state; and

3) if the Call type IE of the received GROUP CALL ANNOUNCEMENT message is set to "BASIC GROUP CALL", and if the stored current call type is "BASIC GROUP CALL":

   a) shall enter "T2: in-progress basic group call" state.

### 10.2.3.4.4 Received GROUP CALL ANNOUNCEMENT with MCPTT user acknowledgement required

When in the "T0: waiting for the call to establish" state, upon receipt of a GROUP CALL ANNOUNCEMENT message by an idle MCPTT client when MCPTT user acknowledgement is required, the MCPTT client:

1) if the Call type IE of the received GROUP CALL ANNOUNCEMENT message is set to "EMERGENCY GROUP CALL":

   a) shall set the stored current call type to "EMERGENCY GROUP CALL"; and

   b) shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network emergency group call as described in 3GPP TS 24.383 [45];

2) if the Call type IE of the received GROUP CALL ANNOUNCEMENT message is set to "IMMINENT PERIL GROUP CALL":

   a) shall set the stored current call type to "IMMINENT PERIL GROUP CALL"; and

   b) shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network imminent peril group call as described in 3GPP TS 24.383 [45];

3) if the Call type IE of the received GROUP CALL ANNOUNCEMENT message is set to "BASIC GROUP CALL":

   a) shall set the stored current call type to "BASIC GROUP CALL";

   b) shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network basic group call as described in 3GPP TS 24.383 [45];

4) shall set the stored last call type change time to the Last call type change time IE of the GROUP CALL ANNOUNCEMENT message;

5) shall set the last user to change call type to the Last user to change call type IE of the GROUP CALL ANNOUNCEMENT message; and

6) shall remain in "T0: waiting for the call to establish" state.

### 10.2.3.4.5 Received GROUP CALL ANNOUNCEMENT without MCPTT user acknowledgement required

When in the "T0: waiting for the call to establish" state, upon receipt of a GROUP CALL ANNOUNCEMENT message by an idle MCPTT client when MCPTT user acknowledgement is not required, the MCPTT client:

1) shall set the stored last call type change time to the Last call type change time IE of the GROUP CALL ANNOUNCEMENT message;

2) shall set the last user to change call type to the Last user to change call type IE of the GROUP CALL ANNOUNCEMENT message;

3) if the Call type IE of the received GROUP CALL ANNOUNCEMENT message is set to "EMERGENCY GROUP CALL":

   a) shall set the stored current call type to "EMERGENCY GROUP CALL";

   b) shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network emergency group call as described in 3GPP TS 24.383 [45]; and

   c) shall enter "T1: in-progress emergency group call" state;

4) if the Call type IE of the received GROUP CALL ANNOUNCEMENT message is set to "IMMINENT PERIL GROUP CALL":

   a) shall set the stored current call type to "IMMINENT PERIL GROUP CALL";

   b) shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network imminent peril group call as described in3GPP TS 24.383 [45]; and

   c) shall enter "T3: in-progress imminent peril group call" state; and

5) if the Call type IE of the received GROUP CALL ANNOUNCEMENT message is set to "BASIC GROUP CALL":

   a) shall set the stored current call type to "BASIC GROUP CALL";

   b) shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network basic group call as described in 3GPP TS 24.383 [45]; and

   c) shall enter "T2: in-progress basic group call" state.

### 10.2.3.4.6 Call started

When in state "T0: waiting for the call to establish", if:

   a) the MCPTT user accepts the call when MCPTT user acknowledgement is required; or

   b) the MCPTT client sends a GROUP CALL ANNOUNCEMENT message on expiry of timer TFG1 (wait for call announcement) associated with the basic call control state machine;

the MCPTT client:

1) if the stored current call type is set to "EMERGENCY GROUP CALL", shall enter "T1: in-progress emergency group call" state;

2) if the stored current call type is set to "IMMINENT PERIL GROUP CALL", shall enter "T3: in-progress imminent peril group call" state; or

3) if the stored current call type is set to "BASIC GROUP CALL", shall enter "T2: in-progress basic group call" state.

### 10.2.3.4.7 Upgrade call

#### 10.2.3.4.7.1 Originating user upgrading the call

When in the "T2: in-progress basic group call" state or "T3: in-progress imminent peril group call" state, upon receiving an indication from the user to upgrade the call to "IMMINENT PERIL GROUP CALL" or "EMERGENCY GROUP CALL", the MCPTT client:

   1)  if the user request is to upgrade the call to "EMERGENCY GROUP CALL":

     a)  shall set the stored current call type to "EMERGENCY GROUP CALL";

     b)  shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network emergency group call as described in 3GPP TS 24.383 [45]; and

     c)  shall enter "T1: in-progress emergency group call" state;

   2)  if the user request is to upgrade the call to "IMMINENT PERIL GROUP CALL":

     a)  shall set the stored current call type to "IMMINENT PERIL GROUP CALL";

     b)  shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network imminent peril group call as described in 3GPP TS 24.383 [45]; and

     c)  shall enter "T3: in-progress imminent peril group call" state;

   3)  shall store the current UTC time as last call type change time of the call;

   4)  shall store own MCPTT user ID as last user to change call type of the call;

   5)  shall generate a GROUP CALL ANNOUNCEMENT message as specified in subclause 15.1.3. In the GROUP CALL ANNOUNCEMENT message, the MCPTT client:

     a)  shall set the Call identifier IE to the stored call identifier of the call associated with the basic call control state machine;

     b)  shall set the Call type IE to the stored current call type;

     c)  shall set the Refresh interval IE to the stored refresh interval of the call associated with the basic call control state machine;

     d)  shall set the SDP IE to the stored SDP body of the call associated with the basic call control state machine;

     e)  shall set the originating MCPTT user ID IE to the stored originating MCPTT user ID of the call associated with the basic call control state machine;

     f)  shall set the MCPTT group ID IE to the stored MCPTT group ID of the call associated with the basic call control state machine;

     g)  shall set the call start time IE to the stored call start time of the call;

     h)  shall set the Last call type change time IE to the stored last call type change time of the call; and

     i)  shall set the last user to change call type IE to the stored last user to change call type of the call; and

   6)  shall send the GROUP CALL ANNOUNCEMENT message as specified in subclause 10.2.1.1.1;

Editor's note [CT1#95-bis, C1-160770]: Usage of message(s) dedicated to indicate upgrade of the basic call instead of the GROUP CALL ANNOUNCEMENT is FFS.

#### 10.2.3.4.7.2 Terminating UE receiving a GROUP CALL ANNOUNCEMENT message when participating in the ongoing call

When in the "T1: in-progress emergency group call" state or "T2: in-progress basic group call" state or "T3: in-progress imminent peril group call" state, upon receiving a GROUP CALL ANNOUNCEMENT message with the MCPTT

group ID IE matching with MCPTT group ID of the ongoing call and the Call Identifier IE being the same as the stored call identifier of the call, the MCPTT client:

1) if the stored last user to change call type of the call is same as the Last user to change call type IE of the GROUP CALL ANNOUNCEMENT message and the stored last call type change time is smaller than Last call type change time IE of the GROUP CALL ANNOUNCEMENT message:

   a) shall set the stored last call type change time of the call to Last call type change time IE of the GROUP CALL ANNOUNCEMENT message;

   b) if the Call type IE of the received GROUP CALL ANNOUNCEMENT message is set to "EMERGENCY GROUP CALL" and the stored call type is other than "EMERGENCY GROUP CALL":

      i)   shall set the stored current call type to "EMERGENCY GROUP CALL";

      ii)  shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network emergency group call as described in 3GPP TS 24.383 [45]; and

      iii) shall enter "T1: in-progress emergency group call" state;

   c) if the Call type IE of the received GROUP CALL ANNOUNCEMENT message is set to "IMMINENT PERIL GROUP CALL" and the stored call type is other than "IMMINENT PERIL GROUP CALL":

      i)   shall set the stored current call type to "IMMINENT PERIL GROUP CALL";

      ii)  shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network imminent peril group call as described in 3GPP TS 24.383 [45]; and

      iii) shall enter "T3: in-progress imminent peril group call" state; and

   d) if the Call type IE of the received GROUP CALL ANNOUNCEMENT message is set to "BASIC GROUP CALL" and the stored call type is other than "BASIC GROUP CALL":

      i)   shall set the stored current call type to "BASIC GROUP CALL";

      ii)  shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network basic group call as described in 3GPP TS 24.383 [45]; and

      iii) shall enter "T3: in-progress basic group call" state; and

2) if the stored last user to change call type of the call is different from the Last user to change call type IE of the GROUP CALL ANNOUNCEMENT message and:

   a) if the stored call type is same as Call type IE in the received GROUP CALL ANNOUNCEMENT message and the stored last call type change time is smaller than Last call type change time IE of the GROUP CALL ANNOUNCEMENT message:

      i)   shall set the stored last call type change time of the call to Last call type change time IE of the GROUP CALL ANNOUNCEMENT message; and

      ii)  shall set the stored last user to change call type of the call to Last user to change call type IE of the GROUP CALL ANNOUNCEMENT message;

   b) if the Call type IE of the received GROUP CALL ANNOUNCEMENT message is set to "EMERGENCY GROUP CALL" and the stored call type is other than "EMERGENCY GROUP CALL":

      i)   shall set the stored last call type change time of the call to Last call type change time IE of the GROUP CALL ANNOUNCEMENT message;

      ii)  shall set the stored last user to change call type of the call to Last user to change call type IE of the GROUP CALL ANNOUNCEMENT message;

      iii) shall set the stored current call type to "EMERGENCY GROUP CALL";

      iv)  shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network emergency group call as described in 3GPP TS 24.383 [45]; and

      v) shall enter "T1: in-progress emergency group call" state; and

  c) if the Call type IE of the received GROUP CALL ANNOUNCEMENT message is set to "IMMINENT PERIL GROUP CALL" and the stored call type is "BASIC GROUP CALL":

      i) shall set the stored last call type change time of the call to Last call type change time IE of the GROUP CALL ANNOUNCEMENT message;

      ii) shall set the stored last user to change call type of the call to Last user to change call type IE of the GROUP CALL ANNOUNCEMENT message;

      iii) shall set the stored current call type to "IMMINENT PERIL GROUP CALL ";

      iv) shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network imminent peril group call as described in 3GPP TS 24.383 [45]; and

      v) shall enter "T3: in-progress imminent peril group call" state.

### 10.2.3.4.8 Downgrade call

#### 10.2.3.4.8.1 Originating user downgrading emergency group call

When in the "T1: in-progress emergency group call" state, upon receiving an indication from the user to downgrade "EMERGENCY GROUP CALL", the MCPTT client:

1) shall set the stored current call type to "BASIC GROUP CALL";

2) shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network basic group call as described in 3GPP TS 24.383 [45];

3) shall set current UTC time as last call type change time of the call;

4) shall store own MCPTT user ID as last user to change call type of the call;

5) shall generate a GROUP CALL EMERGENCY END message as specified in subclause 15.1.15. In the GROUP CALL EMERGENCY END message, the MCPTT client:

  a) shall set the Call identifier IE to the stored call identifier of the call associated with the basic call control state machine;

  b) shall set the Originating MCPTT user ID IE to the stored originating MCPTT user ID of the call associated with the basic call control state machine;

  c) shall set the MCPTT group ID IE to the stored MCPTT group ID of the call associated with the basic call control state machine;

  d) shall set the Last call type change time IE to the stored last call type change time of the call; and

  e) shall set the Last user to change call type IE to the stored last user to change call type of the call;

6) shall send the GROUP CALL EMERGENCY END message as specified in subclause 10.2.1.1.1;

7) shall start timer TFG11 (emergency end retransmission); and

8) shall enter the "T2: in-progress basic group call" state.

#### 10.2.3.4.8.2 Retransmitting GROUP CALL EMERGENCY END

When in the "T2: in-progress basic group call" state, upon expiry of timer TFG11 (emergency end retransmission), the MCPTT client:

1) shall generate a GROUP CALL EMERGENCY END message as specified in subclause 15.1.15. In the GROUP CALL EMERGENCY END message, the MCPTT client:

  a) shall set the Call identifier IE to the stored call identifier of the call associated with the basic call control state machine;

    b) shall set the Originating MCPTT user ID IE to the stored originating MCPTT user ID of the call associated with the basic call control state machine;

    c) shall set the MCPTT group ID IE to the stored MCPTT group ID of the call associated with the basic call control state machine;

    d) shall set the Last call type change time IE to the stored last call type change time of the call; and

    e) shall set the Last user to change call type IE to the stored last user to change call type of the call;

2)   shall send the GROUP CALL EMERGENCY END message as specified in subclause 10.2.1.1.1;

3)   shall start timer TFG11 (emergency end retransmission) if the associated counter CFG11 is less than the upper limit; and

4)   shall remain in "T2: in-progress basic group call" state.

### 10.2.3.4.8.3 Terminating user downgrading emergency group call

When in the "T1: in-progress emergency group call" state, upon receiving GROUP CALL EMERGENCY END message, the MCPTT client:

1)   shall set the stored last call type change time to the Last call type change time IE of the received GROUP CALL EMERGENCY END message;

2)   shall set the stored last user to change call type to the Last user to change call type IE of the received GROUP CALL EMERGENCY END message;

3)   shall set the stored current call type to "BASIC GROUP CALL";

4)   shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network basic group call as described in 3GPP TS 24.383 [45];

5)   shall stop timer TFG13 (implicit downgrade); and

6)   shall enter the "T2: in-progress basic group call" state.

### 10.2.3.4.8.4 Originating user downgrading imminent peril group call

When in the "T3: in-progress imminent peril group call" state, upon receiving an indication from the user to downgrade "IMMINENT PERIL GROUP CALL", the MCPTT client:

1)   shall set the stored current call type to "BASIC GROUP CALL";

2)   shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network basic group call as described in 3GPP TS 24.383 [45];

3)   shall set current UTC time as last call type change time of the call;

4)   shall store own MCPTT user ID as last user to change call type of the call;

5)   shall generate a GROUP CALL IMMINENT PERIL END message as specified in subclause 15.1.14. In the GROUP CALL IMMINENT PERIL END message, the MCPTT client:

    a) shall set the Call identifier IE to the stored call identifier of the call associated with the basic call control state machine;

    b) shall set the Originating MCPTT user ID IE to the stored originating MCPTT user ID of the call associated with the basic call control state machine;

    c) shall set the MCPTT group ID IE to the stored MCPTT group ID of the call associated with the basic call control state machine;

    d) shall set the Last call type change time IE to the stored last call type change time of the call; and

    e) shall set the Last user to change call type IE to the stored last user to change call type of the call;

6) shall send the GROUP CALL IMMINENT PERIL END message as specified in subclause 10.2.1.1.1;

7) shall start timer TFG12 (imminent peril end retransmission); and

8) shall enter the "T2: in-progress basic group call" state.

### 10.2.3.4.8.5                Retransmitting GROUP CALL IMMINENT PERIL END

When in the "T2: in-progress basic group call" state, upon expiry of timer TFG12 (imminent peril end retransmission), the MCPTT client:

1) shall generate a GROUP CALL IMMINENT PERIL END message as specified in subclause 15.1.14. In the GROUP CALL IMMINENT PERIL END message, the MCPTT client:

   a) shall set the Call identifier IE to the stored call identifier of the call associated with the basic call control state machine;

   b) shall set the Originating MCPTT user ID IE to the stored originating MCPTT user ID of the call associated with the basic call control state machine;

   c) shall set the MCPTT group ID IE to the stored MCPTT group ID of the call associated with the basic call control state machine;

   d) shall set the Last call type change time IE to the stored last call type change time of the call; and

   e) shall set the Last user to change call type IE to the stored last user to change call type of the call;

2) shall send the GROUP CALL IMMINENT PERIL END message as specified in subclause 10.2.1.1.1;

3) shall start the timer TFG12 (imminent peril end retransmission) if the associated counter CFG12 is less than the upper limit; and

4) shall remain in "T2: in-progress basic group call" state.

### 10.2.3.4.8.6                Terminating user downgrading imminent peril group call

When in the "T3: in-progress imminent peril group call" state, upon receiving GROUP CALL IMMINENT PERIL END message, the MCPTT client:

1) shall set the stored last call type change time to the Last call type change time IE of the received GROUP CALL IMMINENT PERIL END message;

2) shall set the stored last user to change call type to the Last user to change call type IE of the received GROUP CALL IMMINENT PERIL END message;

3) shall set the stored current call type to "BASIC GROUP CALL";

4) shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network basic group call as described in 3GPP TS 24.383 [45];

5) shall stop timer TFG13 (implicit downgrade); and

6) shall enter the "T2: in-progress basic group call" state.

### 10.2.3.4.8.7                Reset TFG13 (implicit downgrade) timer

When in the "T1: in-progress emergency group call" state or "T3: in-progress imminent peril group call" state, upon receiving a GROUP CALL ANNOUNCEMENT message with Last user to change call type IE same as stored last user to change call type, the MCPTT client:

1) shall restart timer TFG13 (implicit downgrade); and

2) shall remain in the current state.

#### 10.2.3.4.8.8 Implicit priority end

When in the "T1: in-progress emergency group call" state or "T3: in-progress imminent peril call" state, upon expiry of timer TFG13 (implicit downgrade), the MCPTT client:

1) shall store the current UTC time as the stored last call type change time of the call;

2) shall store the originating MCPTT user ID as the stored last user to change call type of the call;

3) shall set the stored current call type to "BASIC GROUP CALL";

4) shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network basic group call as described in 3GPP TS 24.383 [45]; and

5) shall enter the "T2: in-progress basic group call" state.

### 10.2.3.4.9 Merge of two calls

When in the "T1: in-progress imminent peril call" state or "T2: in-progress basic group call" state or "T3: in-progress imminent peril group call" state, upon receiving a GROUP CALL ANNOUNCEMENT message with the MCPTT group ID IE matching the stored MCPTT group ID of the call and the Originating MCPTT user ID IE is different from the stored originating MCPTT user ID of the call, and:

1) if the stored current call type is "BASIC GROUP CALL" and the value of the Call type IE of GROUP CALL ANNOUNCEMENT message is either "IMMINENT PERIL GROUP CALL" or "EMERGENCY GROUP CALL"; or

2) if the stored current call type is "IMMINENT PERIL GROUP CALL" and the value of the Call type IE of GROUP CALL ANNOUNCEMENT message is "EMERGENCY GROUP CALL"; or

3) the stored current call type being equal to the Call type IE and the call start time IE being lower than the stored call start time of the call; or

4) the stored current call type being equal to the Call type IE and the Call start time IE being equal to the stored call start time of the call and the call identifier IE being lower than the stored call identifier of the call;

the MCPTT client:

1) shall store the value of the Last priority change time IE of the received GROUP CALL ANNOUNCEMENT message as the last call type change time of the call;

2) shall store the value of the Last user to change priority IE of the GROUP CALL ANNOUNCEMENT message as the last user to change call type of the call;

3) if the Call type IE of GROUP CALL ANNOUNCEMENT message is set to "EMERGENCY GROUP CALL":

   a) shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network emergency group call as described in 3GPP TS 24.383 [45]; and

   b) shall enter "T1: in-progress emergency group call" state; and

4) if the Call type IE of GROUP CALL ANNOUNCEMENT message is set to "IMMINENT PERIL GROUP CALL":

   a) shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network imminent peril group call as described in 3GPP TS 24.383 [45]; and

   b) shall enter "T3: in-progress imminent peril group call" state.

### 10.2.3.4.10 Call release after call establishment

When in state T1: in-progress emergency group call" or "T2: in-progress basic group call" or "T3: in-progress imminent peril group call" or upon receiving an indication from MCPTT user to release the call, the MCPTT client:

1) shall release stored current call type;

2) shall release stored ProSe per-packet priority;

3) shall release Last call type change time;

4) shall release Last user to change call type; and

5) shall enter "T0: waiting for the call to establish" state.

### 10.2.3.4.11    Call release or reject before call establishment

When in state "T0: waiting for the call to establish", upon receiving an indication from MCPTT user to release or reject the call, the MCPTT client:

1) shall release stored current call type;

2) shall release stored ProSe per-packet priority;

3) shall release Last call type change time;

4) shall release Last user to change call type;

5) shall remain in "T0: waiting for the call to establish" state.

### 10.2.3.4.12    Error handling

#### 10.2.3.4.12.1    Unexpected MONP message received

Upon receiving a MONP message in a state where there is no handling specified for the MONP message, the MCPTT client shall discard the MONP message.

#### 10.2.3.4.12.2    Unexpected indication from MCPTT user

Upon receiving an indication from the MCPTT user in a state where there is no handling specified for the indication, the MCPTT client shall ignore the indication.

#### 10.2.3.4.12.3    Unexpected expiration of a timer

Upon expiration of a timer in a state where there is no handling specified for expiration of the timer, the MCPTT client shall ignore the expiration of the timer.

# 10.3    Off-network Broadcast group call

## 10.3.1    General

## 10.3.2    Basic call control

### 10.3.2.1    General

### 10.3.2.2    Call control state machine

The figure 10.3.2.2-1 gives an overview of the main states and transitions on the UE for broadcast group call call control.
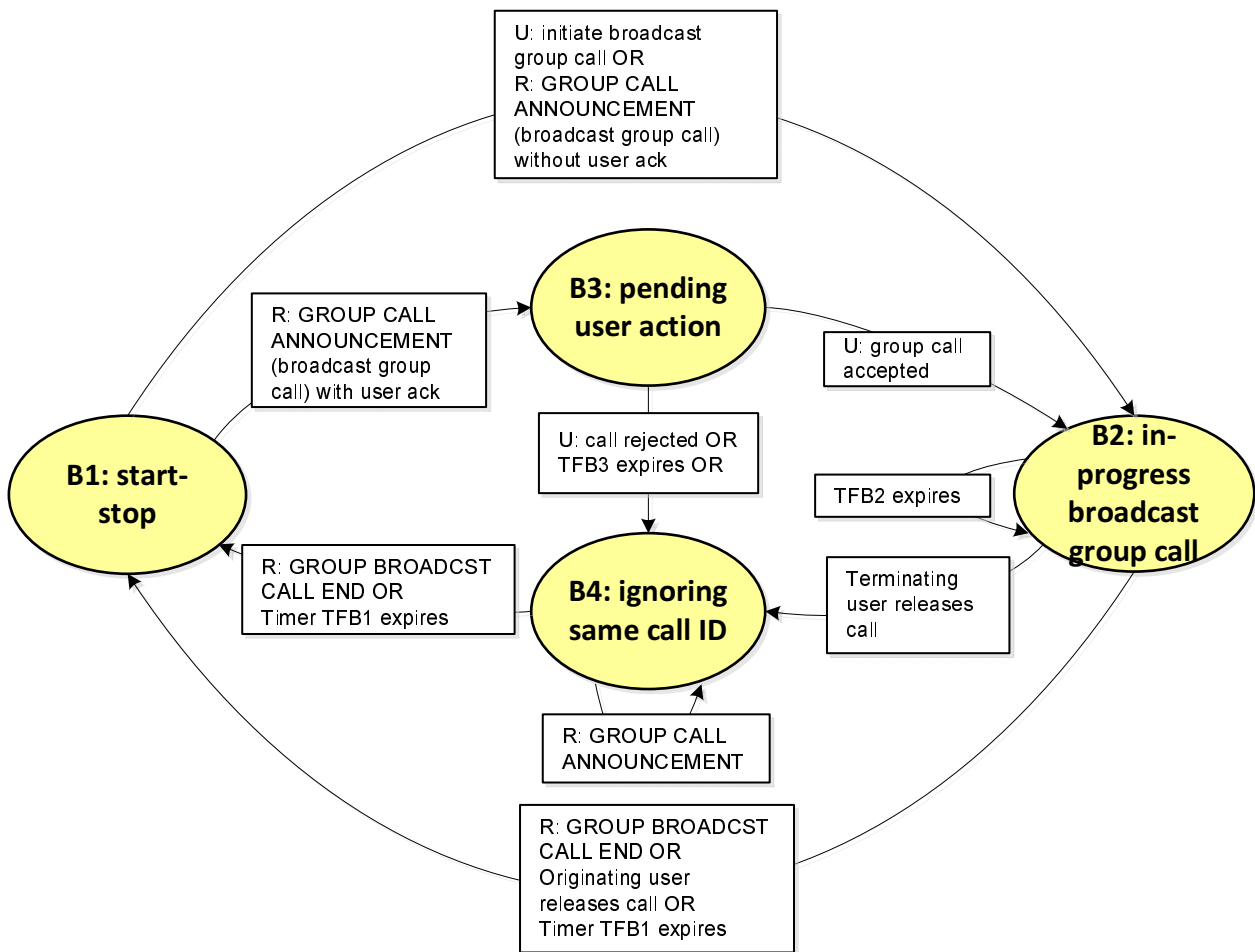
**Figure 10.3.2.2-1: Broadcast group call state machine**

## 10.3.2.3     Broadcast group call Control states

### 10.3.2.3.1       B1: start-stop

This state exists for UE, when the UE is not part of an ongoing broadcast group call.

### 10.3.2.3.2       B2: in-progress broadcast group call

This state exists for UE, when the UE is part of an ongoing broadcast group call.

### 10.3.2.3.3       B3: pending user action

This state exists for the UE, when the UE has presented a notification to the MCPTT user for the received GROUP CALL BROADCAST message, is waiting for a response and is not expected to send confirm indication.

### 10.3.2.3.4       B4: ignoring same call ID

This state exists for UE, when the group call was rejected or released and GROUP CALL BROADCAST message continue being received.

### 10.3.2.4        Procedures

#### 10.3.2.4.1        User initiating a broadcast group call

When in the "B1: start-stop" state, upon the indication from MCPTT user to initiate the broadcast group call, the MCPTT client:

1)  shall generate an SDP body as specified in subclause 10.2.2.1.2 and store it as the SDP body of the call;

2)  shall generate a random number with uniform distribution between 0 and 65535 and store it as the call identifier of the call;

3)  shall store own MCPTT user ID as the originating MCPTT user ID of the call;

4)  shall store "BROADCAST GROUP CALL" as the current call type;

5)  shall generate a GROUP CALL BROADCAST message as specified in subclause 15.1.20. In the GROUP CALL BROADCAST message, the MCPTT client:

   a)  shall set the Call identifier IE to the stored call identifier of the call;

   b)  shall set the Call type IE to the stored current call type;

   c)  shall set the Originating MCPTT user ID IE to the stored originating MCPTT user ID of the call;

   d)  shall set the MCPTT group ID IE to the stored MCPTT group ID of the call; and

   e)  shall set the SDP IE to the stored SDP body of the call;

6)  shall set the ProSe per-packet priority to the value corresponding to MCPTT off-network broadcast callas described in 3GPP TS 24.383 [45];

7)  shall start floor control as originating floor participant as described specified in subclause 7.2 in 3GPP TS 24.380 [5];

8)  shall send the GROUP CALL BROADCAST message as specified in subclause 10.2.2.1.1;

9)  shall establish a media session based on the stored SDP body of the call;

10) shall start timer TFB2 (broadcast retransmission); and

11) shall enter the "B2: in-progress broadcast group call" state.

#### 10.3.2.4.2        Terminating UE receiving a GROUP CALL BROADCAST message when not participating in the in-progress broadcast group call

When in the "B1: start-stop" state, upon receiving a GROUP CALL BROADCAST message with the Call identifier IE not matching any in-progress broadcast group call, the MCPTT client:

1)  shall store the value of the Call identifier IE of the GROUP CALL BROADCAST message as the call identifier of the call;

2)  shall store the value of the Call type IE of the GROUP CALL BROADCAST message as the received current call type;

3)  shall store the value of the SDP IE of the GROUP CALL BROADCAST message as the SDP body of the call;

4)  shall store the value of the Originating MCPTT user ID IE of the GROUP CALL BROADCAST message as the originating MCPTT user ID of the call;

5)  shall store the value of the MCPTT group ID IE of the GROUP CALL BROADCAST message as the MCPTT group ID of the call;

6)  if the terminating UE is configured that the terminating MCPTT user acknowledgement is required upon a terminating call request reception:

    i)   shall start timer TFB3 (waiting for the user); and

    ii)  shall enter the "B3: pending user action" state; and

7)  if the terminating UE is configured that the terminating MCPTT user acknowledgement is not required upon a terminating call request reception:

    i)   shall establish a media session based on the stored SDP body of the call;

    ii) shall start floor control as terminating floor participant as specified in subclause 7.2 in 3GPP TS 24.380 [5]

    iii) shall start timer TFB1 (max duration); and

    iv) shall enter the "B2: in-progress broadcast group call" state.

### 10.3.2.4.3 MCPTT user accepts the terminating call

When in the "B3: pending user action" state, upon indication from the MCPTT user to accept the incoming broadcast group call, the MCPTT client:

1)  shall establish a media session based on the stored SDP body of the call;

2)  shall start floor control as terminating floor participant as described specified in subclause 7.2 in 3GPP TS 24.380 [5];

3)  shall start timer TFB1 (max duration); and

4)  shall enter the "B2: in-progress broadcast group call" state.

### 10.3.2.4.4 MCPTT user rejects the terminating call

When in the "B3: pending user action" state, upon an indication from the MCPTT user to reject the incoming broadcast group call, the MCPTT client:

1)  shall stop timer TFB3 (waiting for the user); and

2)  shall enter the "B4: ignoring same call ID" state.

### 10.3.2.4.5 MCPTT user does not act on terminating call

When in the "B3: pending user action" state, upon expiration of timer TFB3 (waiting for the user), the MCPTT client:

1)  shall enter the "B4: ignoring same call ID" state.

### 10.3.2.4.6 Terminating user releasing the call

When in the "B2: in-progress broadcast group call" state, upon an indication from the terminating MCPTT user to release the in-progress broadcast group call, the MCPTT client:

1)  shall release the media session;

2)  shall stop floor control; and

3)  shall enter the "B4: ignoring same call ID" state.

### 10.3.2.4.7 Originating user releasing the call

When in the "B2: in-progress broadcast group call" state, upon an indication from the originating MCPTT user to release the in-progress broadcast group call, the MCPTT client:

1)  shall release the media session;

2)  shall generate a GROUP CALL BROADCAST END message as specified in subclause 15.1.21. In the GROUP CALL BROADCAST END message, the MCPTT client:

    a) shall set the Call identifier IE to the stored call identifier of the call;

    b) shall set the Originating MCPTT user ID IE to the stored originating MCPTT user ID of the call; and

    c) shall set the MCPTT group ID IE to the stored MCPTT group ID of the call;

   3) shall send the GROUP CALL BROADCAST END message as specified in subclause 10.2.2.1.1;

   4) shall stop timer TFB2 (broadcast retransmission);

   5) shall stop floor control; and

   6) shall enter the "B1: start-stop" state.

### 10.3.2.4.8 Receiving GROUP CALL BROADCAST END message

When in the "B2: in-progress broadcast group call" state or "B4: ignoring same call ID" state, upon receiving GROUP CALL BROADCAST END message with the same Call identifier IE as the stored call identifier, the MCPTT client:

   1) shall release media session;

   2) shall stop floor control, if running; and

   3) shall enter the "B1: start-stop" state.

### 10.3.2.4.9 Originating UE retransmitting GROUP CALL BROADCAST message

When in the "B2: in-progress broadcast group call" state, upon expiry of timer TFB2 (broadcast retransmission), the MCPTT client:

   1) shall generate a GROUP CALL BROADCAST message as specified in subclause 15.1.20. In the GROUP CALL BROADCAST message, the MCPTT client:

    a) shall set the Call identifier IE to the stored call identifier of the call;

    b) shall set the Call type IE to the stored current call type;

    c) shall set the Originating MCPTT user ID IE to the stored originating MCPTT user ID of the call;

    d) shall set the MCPTT group ID IE to the stored MCPTT group ID of the call; and

    e) shall set the SDP IE to the stored SDP body of the call;

   2) shall send the GROUP CALL BROADCAST message as specified in subclause 10.2.2.1.1;

   3) shall restart timer TFB2 (broadcast retransmission); and

   4) shall remain in the "B2: in-progress broadcast group call" state.

### 10.3.2.4.10 Ignoring same call ID

When in the "B2: in-progress broadcast group call" state, upon receiving GROUP CALL BROADCAST message and if the call identifier in GROUP CALL BROADCAST message matches with the stored call identifier the MCPTT client:

   1) shall restart timer TFB1 (max duration); and

   2) shall remain in "B4: ignoring same call ID" state.

### 10.3.2.4.11 Releasing the call

When in the "B2: in-progress broadcast group call" state or "B4: ignoring same call ID" state, upon expiry of timer TFB1 (max duration) the MCPTT client:

   1) shall clear the stored call identifier;

   2) shall stop floor control, if running; and

3) shall enter the "B1: start-stop" state.

# 11 Private call

## 11.0 General

This subclause describes the private call procedures between two MCPTT clients for on-network and off-network.

For on-network, private call procedures with floor control and without floor control for each functional entity are specified in subclause 11.1.1 and subclause 11.1.2. On commencement mode on terminating side, automatic commencement and manual commencement are specified.

For off-network, private call is specified in subclause 11.2.

## 11.1 On-network private call

### 11.1.1 Private call with floor control

#### 11.1.1.1 General

#### 11.1.1.2 MCPTT client procedures

##### 11.1.1.2.1 On-demand private call

###### 11.1.1.2.1.1 Client originating procedures

Upon receiving a request from an MCPTT user to establish an MCPTT private call the MCPTT client shall generate an initial SIP INVITE request by following the UE originating session procedures specified in 3GPP TS 24.229 [4], with the clarifications given below.

The MCPTT client:

1) shall set the Request-URI of the SIP INVITE request to a public service identity identifying the private call service on the MCPTT server;

2) shall, if privacy is requested, include the value "id" in the Privacy header field according to 3GPP TS 24.229 [4];

3) may include a P-Preferred-Identity header field in the SIP INVITE request containing a public user identity as specified in 3GPP TS 24.229 [4];

4) shall include the g.3gpp.mcptt media feature tag in the Contact header field of the SIP INVITE request according to IETF RFC 3840 [16];

5) shall include an Accept-Contact header field containing the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

6) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcptt" (coded as specified in 3GPP TS 24.229 [4]), in a P-Preferred-Service header field according to IETF RFC 6050 [9] in the SIP INVITE request;

7) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref contain with the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt" along with parameters "require" and "explicit" according to IETF RFC 3841 [6];

8) shall insert in the SIP INVITE request a MIME resource-lists body with the MCPTT ID of the invited MCPTT user, according to rules and procedures of IETF RFC 5366 [20];

9)  if the URI is requested to be anonymous and not to be presented to the invited MCPTT user, shall, for the URI in the MIME resource-list body, set the "copyControl" attribute to "to", and set the "anonymize" attribute to "true" according to rules and procedures of IETF RFC 5364 [19];

10) if an end-to-end security context needs to be established then:

   a)  if necessary, shall instruct the key management client to request keying material from the key management server as described in 3GPP TS 33.179 [46];

   b)  shall use the keying material to generate a PCK as described in 3GPP TS 33.179 [46];

   c)  shall use the PCK to generate a PCK-ID with the four most significant bits set to "0001" to indicate that the the purpose of the PCK is to protect private call communications and with the remaining twenty eight bits being randomly generated as described in 3GPP TS 33.179 [46];

   d)  shall encrypt the PCK to a UID associated to the MCPTT client using the MCPTT ID of the invited user and a time related parameter as described in in 3GPP TS 33.179 [46];

   e)  shall generate a MIKEY-SAKKE I_MESSAGE using the encapsulated PCK and PCK-ID as specified in 3GPP TS 33.179 [46]; and

   g)  shall add the MCPTT ID of the originating MCPTT to the initiator field (IDRi) of the I_MESSAGE as described in 3GPP TS 33.179 [46]; and

   f)  shall sign the MIKEY-SAKKE I_MESSAGE using the originating MCPTT user's signing key provided in the keying material together with a time related parameter, and add this to the MIKEY-SAKKE payload, as described in in 3GPP TS 33.179 [46].

11) shall include an SDP offer according to 3GPP TS 24.229 [4] with the clarification given in subclause 6.2.1 and with a media stream of the offered media-floor control entity;

12) if implicit floor control is required, shall comply with the conditions specified in subclause 6.4;

13) if automatic commencement mode at the invited MCPTT client is requested, shall include in the SIP INVITE request an Answer-Mode header field with the value "Auto" according to the rules and procedures of IETF RFC 5373 [18];

14) if manual commencement mode at the invited MCPTT client is requested is requested, shall include in the SIP INVITE request an Answer-Mode header field with the value "Manual" according to the rules and procedures of IETF RFC 5373 [18];

15) shall contain an "application/vnd.3gpp.mcptt-info" MIME body with the <mcpttinfo> element containing the <mcptt-Params> element with the <session-type> element set to a value of "chat"; and

16) shall send SIP INVITE request towards the MCPTT server according to 3GPP TS 24.229 [4].

Upon receiving a SIP 183(Session Progress) response to the SIP INVITE request the MCPTT client:

1)  may indicate the progress of the session establishment to the inviting MCPTT user.

Upon receiving a SIP 200 (OK) response to the SIP INVITE request the MCPTT client:

1)  shall interact with the media plane as specified in 3GPP TS 24.380 [5]; and

2)  shall notify the user that the call has been successfully established.

#### 11.1.1.2.1.2 Client terminating procedures

Upon receipt of an initial SIP INVITE request, the MCPTT client shall follow the procedures for termination of multimedia sessions in the IM CN subsystem as specified in 3GPP TS 24.229 [4] with the clarifications below.

The MCPTT client:

1)  may reject the SIP INVITE request if either of the following conditions are met:

    a) MCPTT client is already occupied in another session and the number of simultaneous sessions exceeds <MaxCall>, the maximum simultaneous MCPTT session for private call, as specified in TS 24.384 [50];

    b) MCPTT client does not have enough resources to handle the call; or

    c) any other reason outside the scope of this specification;

    otherwise, continue with the rest of the steps.

2) if the SIP INVITE request is rejected in step 1), shall respond toward participating MCPTT function either with appropriate reject code as specified in 3GPP TS 24.229 [4] and warning texts as specified in subclause 4.4.2 or with SIP 480 (Temporarily unavailable) response not including warning texts if the user is authorised to restrict the reason for failure according to <allow-failure-restriction> as specified in 3GPP TS 24.384 [50] and skip the rest of the steps of this subclause;

3) if the SDP offer of the SIP INVITE request contains an "a=key-mgmt" attribute field with a "mikey" attribute value containing a MIKEY-SAKKE I_MESSAGE:

    a) shall extract the MCPTT ID of the originating MCPTT from the initiator field (IDRi) of the I_MESSAGE as described in 3GPP TS 33.179 [46];

    b) shall convert the MCPTT ID to a UID as described in 3GPP TS 33.179 [46];

    c) shall use the UID to validate the signature of the MIKEY-SAKKE I_MESSAGE as described in 3GPP TS 33.179 [46];

    d) if authentication verification of the MIKEY-SAKKE I_MESSAGE fails, shall reject the SIP INVITE request with a SIP 488 (Not Acceptable Here) response as specified in IETF RFC 4567 [47], and include warning text set to "136 authentication of the MIKEY-SAKE I_MESSAGE failed" in a Warning header field as specified in subclause 4.4; and

    e) if the signature of the MIKEY-SAKKE I_MESSAGE was successfully validated:

        i) shall extract and decrypt the encapsulated PCK using the terminating user's (KMS provisioned) UID key as described in 3GPP TS 33.179 [46]; and

        ii) shall extract the PCK-ID, from the payload as specified in 3GPP TS 33.179 [46];

NOTE: With the PCK successfully shared between the originating MCPTT client and the terminating MCPTT client, both clients are able to use SRTP/SRTCP to create an end-to-end secure session.

4) may check if a Resource-Priority header field is included in the incoming SIP INVITE request and may perform further actions outside the scope of this specification to act upon an included Resource-Priority header field as specified in 3GPP TS 24.229 [4];

5) may display to the MCPTT user the MCPTT ID of the inviting MCPTT user;

6) shall perform the automatic commencement procedures specified in subclause 6.2.3.1.1 if the following conditions are met:

    a) SIP INVITE request contains an Answer-Mode header field with the value "Auto"; or

    b) SIP INVITE request does not contain an Answer-Mode header field and the policy for answering the call at the invited MCPTT client is to use automatic commencement mode; and

7) shall perform the manual commencement procedures specified in subclause 6.2.3.2.1 if the following conditions are met:

    a) SIP INVITE request contains an Answer-Mode header field with the value "Manual"; or

    b) SIP INVITE request does not contain an Answer-Mode header field and the policy for answering the call at the invited MCPTT client is to use manual commencement mode.

Editor's Note [CT1#94, C1-153762]: In 5) and 6), the terminating client may need to check for existence of the "require" modifier, and Priv-Answer-Mode header field may be included instead of Answer-Mode. This is FFS.

### 11.1.1.2.2 Private call using pre-established session

#### 11.1.1.2.2.1 Client originating procedures

Upon receiving a request from an MCPTT user to establish an MCPTT private call within a pre-established session the MCPTT client shall generate a SIP REFER request outside a dialog in accordance with the procedures specified in 3GPP TS 24.229 [4], IETF RFC 4488 [22] and IETF RFC 3515 [25] as updated by IETF RFC 6665 [26] and IETF RFC 7647 [27], with the clarifications given below.

> Editor's Note [CT1#94, C1-153765]: The procedures of MCPTT client is FFS when the media resource allocation for the pre-established session is not active.

If an end-to-end security context needs to be established the MCPTT client:

1) if necessary, shall instruct the key management client to request keying material from the key management server as described in 3GPP TS 33.179 [46];

2) shall use the keying material to generate a PCK as described in 3GPP TS 33.179 [46];

3) shall use the PCK to generate a PCK-ID with the four most significant bits set to "0001" to indicate that the purpose of the PCK is to protect private call communications and with the remaining twenty eight bits being randomly generated as described in 3GPP TS 33.179 [46];

4) shall encrypt the PCK to a UID associated to the MCPTT client using the MCPTT ID of the invited user and a time related parameter as described in in 3GPP TS 33.179 [46];

5) shall generate a MIKEY-SAKKE I_MESSAGE using the encapsulated PCK and PCK-ID as specified in 3GPP TS 33.179 [46];

6) shall add the MCPTT ID of the originating MCPTT to the initiator field (IDRi) of the I_MESSAGE as described in 3GPP TS 33.179 [46]; and

7) shall sign the MIKEY-SAKKE I_MESSAGE using the originating MCPTT user's signing key provided in the keying material together with a time related parameter, and add this to the MIKEY-SAKKE payload, as described in in 3GPP TS 33.179 [46].

The MCPTT client populates the SIP REFER request as follows:

1) shall include the Request-URI set to the public service identity identifying the pre-established session on the MCPTT server serving the MCPTT user;

2) shall include the Refer-Sub header field with value "false" according to rules and procedures of IETF RFC 4488 [22];

3) shall include the Supported header field with value "norefersub" according to rules and procedures of IETF RFC 4488 [22];

> Editor's Note [CT1#94, C1-153765]: Need to discuss if the MCPTT client includes the "norefersub" in a Supported header field and the Refer-Sub header field with value "false" as specified in RFC 4488 or whether the MCPTT server should also or instead use the Explicit Subscription mechanism in RFC 7614 with the "explicitsub" and "nosub" option tag in the Require header field, of the REFER request, or both.

4) shall include the option tag "multiple-refer" in the Require header field;

5) shall include the Refer-To header field containing a public service identity identifying the private call service on the MCPTT server and the following header fields in the headers portion of the SIP containing information related to the private call as follows;

   a) shall include a "body" parameter in the headers portion in the SIP URI in the Refer-To header field containing the MIME resource-lists body (specified in IETF RFC 5366 [20]) with the invited MCPTT user;

   b) if automatic commencement mode at the invited MCPTT client is requested, shall include an Answer-Mode header field with the value "Automatic" according to rules and procedures of IETF RFC 5373 [18];

   c) if manual commencement mode at the invited MCPTT client is requested, shall include an Answer-Mode header field with the value "Manual" according to rules and procedures of IETF RFC 5373 [18];

   d)   shall include a Content-Type header field containing "application/sdp" MIME type of the "body" parameter in the headers portion in the SIP URI containing SDP parameters according to 3GPP TS 24.229 [4] with the clarification given in subclause 6.2.1;

       i)   with a media-level section of the offered media-floor control entity; and

      ii)   with an "a=key-mgmt" attribute with a "mikey" attribute value as specified in IETF RFC 4567 [47] containing a MIKEY-SAKKE I_MESSAGE if generated by the MCPTT client as specified in 3GPP TS 33.179 [46];

NOTE:   The MIKEY-SAKKE I_MESSAGE is generated from time-limited key information at the start of the private call which can only be attributed to the private call when sending the SIP REFER request. Consequently the client always includes an SDP offer in a "body" in the SIP REFER request. The "body" can also include changes to SDP parameters changed since the establishment of the pre-established session.

   e)   shall, if privacy is requested, include value "id" in the Privacy header field according to 3GPP TS 24.229 [4]; and

   f)   shall include a Content-Type URI header field containing an "application/vnd.3gpp.mcptt-info"MIME type of the "body" URI header field with a body containing the <mcpttinfo> element with the <mcptt-Params> element and with the <session-type> element set;

6)   if implicit floor control is required, shall comply with the conditions specified in subclause 6.4;

7)   shall include a MIME resource-lists body as specified in IETF RFC 5366 [20c] containing the MCPTT ID of the invited MCPTT user;

8)   shall include a Content-Type header field with "application/resource-lists+xml";

9)   may include a Resource-Priority header field according to rules and procedures of IETF RFC 4412 [29] in the SIP REFER request as well as the Refer-to URI parameter; and

<span style="color:red">Editor's Note [CT1#94, C1-153765]: The values of Resource-Priority header field and the detailed conditions for inclusion are FFS.</span>

10) shall include a Target-Dialog header field as specified in IETF RFC 4538 [23] identifying the pre-established session.

The MCPTT client shall send the SIP REFER request towards the MCPTT server according to 3GPP TS 24.229 [4].

Upon receiving a final SIP 2xx response to the SIP REFER request the MCPTT client shall interact with media plane as specified in 3GPP TS 24.380 [5].

### 11.1.1.2.2.2 Client terminating procedures

The MCPTT client shall follow the procedures for termination of multimedia sessions as specified in subclause 11.1.1.2.1.2 with the clarification that the MCPTT client receives a SIP re-INVITE request rather than a SIP INVITE request.

## 11.1.1.3 Participating MCPTT function procedures

### 11.1.1.3.1 Originating procedures

### 11.1.1.3.1.1 On-demand private call

Upon receipt of a "SIP INVITE request for originating participating MCPTT function" containing an "application/vnd.3gpp.mcptt-info" MIME body with the <session-type> element set to a value of "private", the participating MCPTT function:

Editor's Note [CT1#94, C1-153764]: The name of the above SIP INVITE request assumes no encryption of application-related sensitive data in the request (e.g. to hide the MCPTT identities from the SIP layer). Requirements for encryption are FFS, If encryption is required then the above SIP request will also exist in a form that identifies that the request carries sensitive data, e.g. "SIP INVITE request for originating participating MCPTT function with application data encryption".

1) may reject the SIP INVITE request depending on the value of the Resource-Priority header field if the Resource-Priority header field is included in the received SIP INVITE request according to rules and procedures specified in IETF RFC 4412 [29]. Otherwise, continue with the rest of the steps;

Editor's Note [CT1#94, C1-153764]: The values of Resource-Priority header field are FFS.

2) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the "SIP INVITE request for originating participating MCPTT function" with a SIP 500 (Server Internal Error) response. The participating MCPTT function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [24];

Editor's Note [CT1#94, C1-153764]: The priority mechanisms are still to be specified for MCPTT. The priority mechanisms may be a factor in determining whether to reject or allow the request.

3) shall check if the maximum number of private calls supported for the MCPTT user has been exceeded. If exceeded, the participating MCPTT function shall respond with a SIP 486 (Busy Here) response with the warning text set to "124 maximum number of private calls reached" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the rest of the steps;

4) shall determine the MCPTT ID of the calling user from public user identity in the P-Asserted-Identity header field of the SIP INVITE request and shall authorise the user;

NOTE: The MCPTT ID of the calling user is bound to the public user identity at the time of service authorisation, as documented in subclause 7.3.

5) if the user identified by the MCPTT ID is not authorised to initiate private calls, shall reject the "SIP INVITE request for originating participating MCPTT function" with a SIP 403 (Forbidden) response, with warning text set to "107 user not authorised to make private calls" in a Warning header field as specified in subclause 4.4;

6) when the received SIP INVITE request includes an Answer-Mode header field with the value "Auto" and the configuration on the participating MCPTT function indicates that the user identified by the MCPTT ID is not authorised to initiate private call with automatic commencement, shall reject the "SIP INVITE request for originating participating MCPTT function" with a SIP 403 (Forbidden) response including warning text set to "125 user not authorised to make private call with automatic commencement" in a Warning header field as specified in subclause 4.4;

7) when the received SIP INVITE request includes an Answer-Mode header field with the value "Manual" and the configuration on the participating MCPTT function indicates that the user identified by the MCPTT ID is not authorised to initiate private call with manual commencement, shall reject the "SIP INVITE request for originating participating MCPTT function" with a SIP 403 (Forbidden) response including warning text set to "126 user not authorised to make private call with manual commencement" in a Warning header field as specified in subclause 4.4;

8) shall validate the media parameters and if the MCPTT speech codec is not offered in the "SIP INVITE request for originating participating MCPTT function" shall reject the request with a SIP 488 (Not Acceptable Here) response. Otherwise, continue with the rest of the steps;

9) shall generate a SIP INVITE request as specified in subclause 6.3.2.1.3;

10) shall copy the received Request-URI including any other uri-parameter present in the received Request-URI into the Request-URI of the outgoing SIP INVITE request;

11) shall set the <mcptt-calling-user-identity> element in an "application/vnd.3gpp.mcptt-info" MIME body of the SIP INVITE request to the MCPTT ID of the calling user;

12) if the incoming "SIP INVITE request for originating participating MCPTT function" contained an Answer-Mode header field, then populate the Answer-Mode header field of the outgoing SIP INVITE request with the contents of the Answer-Mode header field from the incoming "SIP INVITE request for originating participating MCPTT function";

13) shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received "SIP INVITE request for originating participating MCPTT function", as specified in subclause 6.3.2.1.1.1;

14) shall include a Resource-Priority header field according to rules and procedures of 3GPP TS 24.229 [4] set to the value indicated in the Resource-Priority header field if included in the SIP INVITE request from the MCPTT client; and

Editor's Note [CT1#94, C1-153764]: What values it is set to is FFS. How the participating MCPTT function processes the Resource-Priority header in conjunction with other data (e.g. priority data which is also FFS) to determine how to set this header in the outgoing INVITE is FFS.

15) shall forward the SIP INVITE request, according to 3GPP TS 24.229 [4].

Upon receiving a SIP 180 (Ringing) response, the participating MCPTT function:

1) shall generate a SIP 180 (Ringing) response to the SIP INVITE request as specified in the subclause 6.3.2.1.5.1;

2) shall include the P-Asserted-Identity header field as received in the incoming SIP 180 (Ringing) response;

3) shall include Warning header field(s) received in the incoming SIP 180 (Ringing) response; and

4) shall forward the SIP 180 (Ringing) response to the MCPTT client according to 3GPP TS 24.229 [4].

Upon receiving a SIP 200 (OK) response, the participating MCPTT function:

1) shall generate a SIP 200 (OK) response as specified in the subclause 6.3.2.1.5.2;

2) shall include in the SIP 200 (OK) response an SDP answer as specified in the subclause 6.3.2.1.2.1;

3) shall include Warning header field(s) received in the incoming SIP 200 (OK) response;

4) shall include the P-Asserted-Identity header field received in the incoming SIP 200 (OK) response into the outgoing SIP 200 (OK) response;

5) shall include an MCPTT session identity constructed from the MCPTT session identity provided in the Contact header field of the received SIP 200 (OK) response;

6) shall send the SIP 200 (OK) response to the MCPTT client according to 3GPP TS 24.229 [4];

7) shall interact with the media plane as specified in 3GPP TS 24.380 [5]; and

8) shall start the SIP session timer according to rules and procedures of IETF RFC 4028 [7].

### 11.1.1.3.1.2        Private call initiation using pre-established session

Upon receipt of a "SIP REFER request for a pre-established session" with the Refer-To header field containing an "application/vnd.3gpp.mcptt-info"MIME type in a "body" URI header field and with the <session-type> element set to "private", the participating MCPTT function:

Editor's Note [CT1#94, C1-153764]: The above SIP REFER request assumes no encryption of application-related sensitive data in the request (e.g. to hide the MCPTT identities from the SIP layer). Requirements for encryption are FFS, If encryption is required then the above SIP request will also exist in a form that identifies that the request carries sensitive data, e.g. "SIP REFER request for pre-established session with application data encryption".

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response. The participating MCPTT function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [24]. Otherwise, continue with the rest of the steps;

Editor's Note [CT1#94, C1-153764]: The priority mechanisms are still to be specified for MCPTT. The priority mechanisms may be a factor in determining whether to reject or allow the request.

2) shall check if the maximum number of private calls supported for the MCPTT user has been exceeded. If exceeded, the participating MCPTT function shall respond with a SIP 486 (Busy Here) response with the

warning text set to "124 maximum number of private calls reached" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the rest of the steps;

3)  shall determine the MCPTT ID of the calling user;

Editor's Note [CT1#94, C1-153764]: The P-Asserted-Identity field will contain the IMPU and this is not the MCPTT ID. It has not yet been determined how the participating MCPTT function obtains the MCPTT ID. The MCPTT ID could either be 1) included in a body (and encrypted if need be and then decrypted by the server, with the key management solution being FFS) or 2) mapping tables are provided by identity management between the IMS IMPU and the MCPTT-ID and then the IMPU is translated to the MCPTT-ID at the entities.

4)  if the user identified by the MCPTT ID is not authorised to initiate private calls, shall reject the "SIP REFER request for pre-established session" with a SIP 403 (Forbidden) response to the SIP INVITE request, with warning text set to "107 user not authorised to make private calls" in a Warning header field as specified in subclause 4.4;

5)  when the received SIP REFER request includes a Refer-To URI with an Answer-Mode header field in the header portion of the SIP URI set to "Auto" and configuration on the participating MCPTT function indicates that the user identified by the MCPTT ID is not authorised to initiate private call with automatic commencement, shall reject the "SIP REFER request for pre-established session' with a SIP 403 (Forbidden) response including warning text set to "125 user not authorised to make private call with automatic commencement" in a Warning header field as specified in subclause 4.4;

6)  when the received SIP REFER request includes a Refer-To URI with an Answer-Mode header field in the header portion of the SIP URI set to "Manual" and configuration on the participating MCPTT function indicates that the user identified by the MCPTT ID is not authorised to initiate private call with manual commencement, shall reject the "SIP REFER request for pre-established session' with a SIP 403 (Forbidden) response including warning text set to "126 user not authorised to make private call with manual commencement" in a Warning header field as specified in subclause 4.4;

7)  if the "SIP REFER request for a pre-established session" contained a Refer-Sub header field containing "false" value and a Supported header field containing "norefersub" value, shall handle the SIP REFER request as specified in 3GPP TS 24.229 [4], IETF RFC 3515 [25] as updated by IETF RFC 6665 [26], and IETF RFC 4488 [22] without establishing an implicit subscription;

Editor's Note: [CT1#94, C1-153764]: Whether the client should be using the Explict Subscription ("nosub") mechanism in RFC 7614 or whether the Refer-sub=False header and "norefersub" option tag as defined in RFC 4488 can be used to avoid creation of an implicit subscription is for further study.

8)  shall generate a final SIP 2xx response to the "SIP REFER request for a pre-established session" according to 3GPP TS 24.229 [4];

NOTE:  In accordance with IETF RFC 4488 [22], the participating MCPTT function inserts the Refer-Sub header field containing the value "false" in the SIP 2xx response to the SIP REFER request to indicate that it has not created an implicit subscription.

9)  shall send the response to the "SIP REFER request for a pre-established session" towards the MCPTT client according to 3GPP TS 24.229 [4];

10) shall generate a SIP INVITE request as specified in subclause 6.3.2.1.4;

11) shall copy the contents of the URI including any uri-parameter present in the uri-parameters portion from the URI in the Refer-To header field of the "SIP REFER request for a pre-established session" to the Request-URI of the SIP INVITE request;

12) if the incoming SIP REFER request contained a Refer-To URI with a headers portion including an Answer-Mode header field then populate the Answer-Mode header field of the outgoing SIP INVITE request with the contents of this Answer-Mode header field;

13) shall include in the SIP INVITE request the option tag "tdialog" in a Supported header field according to the rules and procedures of IETF RFC 4538 [23];

14) shall include in the SIP INVITE request an SDP offer as specified in subclause 6.3.2.1.1.2 based upon the SDP negotiated during the pre-established session establishment, together with the SDP offer (if any) included in the

"body" parameter in the headers portion of the SIP URI in the Refer-To header field in the "SIP REFER request for a pre-established session";

15) shall determine if the SIP REFER request is regarded as being received with an implicit floor request;

    a)  if the SIP REFER request is regarded as being received with an implicit floor request, the participating MCPTT function shall include the "mc_implicit_request" media level attribute in the associated UDP stream for the floor control in the SDP offer of the SIP INVITE request; and

    b)  if the SIP REFER request is regarded as being not received with an implicit floor request, the participating MCPTT function shall not include the "mc_implicit_request" media level attribute in the associated UDP stream for the floor control in the SDP offer of the SIP INVITE request; and

16) shall forward the SIP INVITE request according to 3GPP TS 24.229 [4].

Upon receiving SIP provisional responses for the SIP INVITE request the participating MCPTT function:

1) shall discard the received SIP responses without forwarding them.

Upon receiving a SIP 200 (OK) response for the SIP INVITE request the participating MCPTT function:

1) shall interact with the media plane as specified in 3GPP TS 24.380 [5].

### 11.1.1.3.2 Terminating procedures

NOTE: This subclause covers both on demand session and pre-established session.

Upon receipt of a "SIP INVITE request for terminating participating MCPTT function", the participating MCPTT function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the "SIP INVITE request for terminating participating MCPTT function" with a SIP 500 (Server Internal Error) response. The participating MCPTT function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [24]. Otherwise, continue with the rest of the steps;

2) shall check the presence of the isfocus media feature tag in the URI of the Contact header field and if it is not present then the participating MCPTT function shall reject the request with a SIP 403 (Forbidden) response with the warning text set to "104 isfocus not assigned" in a Warning header field as specified in subclause 4.4. Otherwise, continue with the rest of the steps;

Editor's Note [CT1#94, C1-153766]: If the service settings for the served MCPTT client have not yet been received by the participating MCPTT function, then the participating MCPTT function should reject the request. Service settings and required behaviour are FFS.

Editor's Note [CT1#94, C1-153766]: If privacy is included in the request, policy may exist on the participating MCPTT function to reject the request if anonymity is disallowed. This is FFS.

Editor's Note [CT1#94, C1-153766]: It is still to be determined if priority is to be specified for MCPTT. If so, then the priority would be a factor for the participating MCPTT function when considering Resource-Priority in the case of possible congestion.

3) shall use the MCPTT ID present in the <mcptt-request-uri> element of the "application/vnd.3gpp.mcptt-info" MIME body of the incoming SIP INVITE request to retrieve the binding between the MCPTT ID and public user identity;

4) if the binding between the MCPTT ID and public user identity does not exist, then the participating MCPTT function shall reject the SIP INVITE request with a SIP 404 (Not Found) response. Otherwise, continue with the rest of the steps;

5) when the user identified by the MCPTT ID is not authorised to be called in private call, shall reject the "SIP INVITE request for terminating participating MCPTT function" with a SIP 403 (Forbidden) response including warning text set to "127 user not authorised to be called in private call" in a Warning header field as specified in subclause 4.4;

6) shall perform the automatic commencement procedures specified in subclause 6.3.2.2.5.1 and according to IETF RFC 5373 [18] if the following conditions are met:

  a) "SIP INVITE request for terminating participating MCPTT function" contains an Answer-Mode header field with the value "Auto"; or

  b) "SIP INVITE request for terminating participating MCPTT function" does not contain an Answer-Mode header field and the default policy for answering the call at the invited MCPTT client is to use automatic commencement mode; and

7) shall perform the manual commencement procedures specified in subclause 6.3.2.2.6.1 and according to IETF RFC 5373 [18] if the following conditions are met:

  a) "SIP INVITE request for terminating participating MCPTT function" contains an Answer-Mode header field with the value "Manual"; or

  b) "SIP INVITE request for terminating participating MCPTT function" does not contain an Answer-Mode header field and the default policy for answering the call at the invited MCPTT client is to use manual commencement mode.

## 11.1.1.4      Controlling MCPTT function procedures

### 11.1.1.4.1      Originating procedures

This subclause describes the procedures for inviting an MCPTT user to an MCPTT session. The procedure is initiated by the controlling MCPTT function as the result of an action in subclause 11.1.1.4.2

The controlling MCPTT function:

1) shall generate a SIP INVITE request as specified in subclause 6.3.3.1.2;

NOTE 1: As a result of calling subclause 6.3.3.1.2, the <mcptt-request-uri> containing the called user MCPTT ID and the <mcptt-calling-user-id> containing the calling user's MCPTT ID are copied into the outgoing SIP INVITE.

2) shall set the Request-URI to the public service identity of the terminating participating MCPTT function associated to the MCPTT user to be invited;

NOTE 2: How the controlling MCPTT function finds the address of the terminating MCPTT participating function is out of the scope of the current release.

NOTE 3: If the terminating MCPTT user is part of a partner MCPTT system, then the public service identity can identify an entry point in the partner network that is able to identify the terminating participating MCPTT function.

3) shall include the public user identity of the invited MCPTT client in the P-Asserted-Identity header field of the SIP INVITE request;

4) shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received SIP INVITE request from the originating network according to the procedures specified in subclause 6.3.3.1.1;

5) shall send the SIP INVITE request towards the core network according to 3GPP TS 24.229 [4]; and

6) shall start a private call timer with a value set to the configured max private call duration for the user.

Upon receiving SIP 200 (OK) response for the SIP INVITE request the controlling MCPTT function:

1) shall cache the contact received in the Contact header field;

2) shall create and cache an anonymous MCPTT ID for the invited MCPTT user, if anonymity is requested via a Privacy header field containing the tag "id" in the SIP response and anonymous MCPTT ID has not been created yet for the invited MCPTT user; and

3) shall interact with the media plane as specified in 3GPP TS 24.380 [5].

Editor's Note [CT1#94, C1-153739]: the procedure for anonymous MCPTT ID is FFS.

Upon expiry of the private call timer, the controlling MCPTT function shall follow the procedure for releasing private call session as specified in subclause 11.1.4.4.

### 11.1.1.4.2 Terminating procedures

Upon receiving of a "SIP INVITE request for controlling MCPTT function of a private call" the controlling MCPTT function:

1) shall check whether the public service identity contained in the Request-URI is allocated for private call and perform the actions specified in subclause 6.3.7.1 if it is not allocated. Otherwise, continue with the rest of the steps;

2) shall perform actions to verify the MCPTT ID of the inviting MCPTT user in the <mcptt-calling-user-id> element of the application/vnd.3gpp.mcptt-info" MIME body of the SIP INVITE request, and authorise the request according to local policy, and if it is not authorised the controlling MCPTT function shall return a SIP 403 (Forbidden) response with the warning text as specified in "Warning header field". Otherwise, continue with the rest of the steps;

3) shall validate that the received SDP offer includes at least one media stream for which the media parameters and at least one codec or media format is acceptable by the controlling MCPTT function and if not, reject the request with a SIP 488 (Not Acceptable Here) response. Otherwise, continue with the rest of the steps;

4) shall perform actions as described in subclause 6.3.3.2.2;

5) shall allocate an MCPTT session identity for the MCPTT private call session; and

6) shall invite the MCPTT user listed in the MIME resource-lists body of received SIP INVITE request as specified in subclause 11.1.1.4.1.

Upon receiving a SIP 180 (Ringing) response and if the SIP 180 (Ringing) response or the SIP final response has not yet been sent to the inviting MCPTT client, the controlling MCPTT function:

1) shall generate a SIP 180 (Ringing) response to the SIP INVITE request and send the SIP 180 (Ringing) response towards the inviting MCPTT client according to 3GPP TS 24.229 [4].

Upon receiving a SIP 200 (OK) response for the SIP INVITE request and if the SIP final response has not yet been sent to the inviting MCPTT client the, controlling MCPTT function:

1) shall generate a SIP 200 (OK) response to the SIP INVITE request as specified in the subclause 6.3.3.2.3 before continuing with the rest of the steps;

2) shall include in the SIP 200 (OK) response an SDP answer to the SDP offer in the incoming SIP INVITE request as specified in the subclause 6.3.3.2.2;

3) shall interact with the media plane as specified in 3GPP TS 24.380 [5]; and

NOTE: Resulting media plane processing is completed before the next step is performed.

4) shall send a SIP 200 (OK) response towards the inviting MCPTT client according to 3GPP TS 24.229 [4].

## 11.1.2 Private call without floor control

Editor's Note: This covers automatic commencement mode and manual commencement mode.

### 11.1.2.1 General

### 11.1.2.2 MCPTT client procedures

When the MCPTT user wants to make an on-demand private call without floor control, the MCPTT client shall follow the procedures in subclause 11.1.1.2.1.1 with the following exceptions:

1) in step 11) of subclause 11.1.1.2.1.1, the MCPTT client shall not offer a media-level section for a media-floor control entity; and

2) step 12) of subclause 11.1.1.2.1.1 shall be ignored.

When the MCPTT user wants to make a private call without floor control using a pre-established session, the MCPTT client shall follow the procedures in subclause 11.1.1.2.2.1 with the following exceptions:

1) in step 5d) of subclause 11.1.1.2.2.1, if the MCPTT client includes an SDP offer in the request, it shall not include a media-level section for a media-floor control entity; and

2) step 6) of subclause 11.1.1.2.2.1 shall be ignored.

Upon receipt of an initial SIP INVITE request for the private call with an SDP offer not including a media-level section for a media-floor control entity, the MCPTT client shall consider it as the request for private call without floor control and shall follow the procedures as specified in subclause 11.1.1.2.1.2 for on-demand session and subclause 11.1.1.2.2.2 for pre-established session.

## 11.1.2.3    Participating MCPTT function procedures

### 11.1.2.3.1    Originating procedures

Upon receipt of a "SIP INVITE request for originating participating MCPTT function" or "SIP REFER request for a pre-established session" for the private call with SDP offer not including media-level section for media-floor control entity, the participating MCPTT function shall consider it as the request for the private call without floor control and shall follow the procedures as specified in subclause 11.1.1.3.1.1 for an on-demand session and shall follow the procedures as specified in subclause 11.1.1.3.1.2 for initiation using a pre-established session.

### 11.1.2.3.2    Terminating procedures

Upon receipt of a "SIP INVITE request for terminating participating MCPTT function" for the private call with SDP offer not including media-level section for media-floor control entity, the participating MCPTT shall consider it as the request for the private call without floor control and shall follow the procedures as specified in subclause 11.1.1.3.2.

## 11.1.2.4    Controlling MCPTT function procedures

### 11.1.2.4.1    Originating procedures

The controlling MCPTT function shall follow the procedures as specified in subclause 11.1.1.4.1.

### 11.1.2.4.2    Terminating procedures

Upon receiving of a "SIP INVITE request for controlling MCPTT function of a private call" with SDP offer not including media-level section for media-floor control entity, the controlling MCPTT function shall consider it as the request for the private call without floor control and shall follow the procedures as specified in subclause 11.1.1.4.2.

# 11.1.3    Ending the private call initiated by MCPTT client

## 11.1.3.1    MCPTT client procedures

### 11.1.3.1.1    On-demand private call

#### 11.1.3.1.1.1    Client originating procedures

Upon receiving a request from an MCPTT user to release an MCPTT private call session established using on-demand session signalling, the MCPTT client shall follow the procedures as specified in subclause 6.2.5.1.

#### 11.1.3.1.1.2 Client terminating procedures

Upon receiving a SIP BYE request for private call session, the MCPTT client shall follow the procedures as specified in subclause 6.2.6.

### 11.1.3.1.2 Private call using pre-established session

#### 11.1.3.1.2.1 Client originating procedures

Upon receiving a request from an MCPTT user to release an MCPTT private call within a pre-established session, the MCPTT client shall follow the procedures as specified in subclause 6.2.5.2.

#### 11.1.3.1.2.2 Client terminating procedures

The MCPTT client shall follow the procedures for terminating of request for MCPTT private call release as specified in subclause 6.2.6.

## 11.1.3.2 Participating MCPTT function procedures

### 11.1.3.2.1 Originating procedures

#### 11.1.3.2.1.1 Receipt of SIP BYE request for on-demand private call

Upon receiving from the MCPTT client a SIP BYE request the participating MCPTT function shall follow the procedures as specified in subclause 6.3.2.1.6.

#### 11.1.3.2.1.2 Receipt of REFER "BYE" request for private call using pre-established session

Upon receiving from the MCPTT client a SIP REFER request when using a pre-established session with the "method" SIP URI parameter set to value "BYE" in the URI in the Refer-To header field the participating MCPTT function shall follow the procedures as specified in subclause 6.3.2.1.7.

### 11.1.3.2.2 Terminating procedures

#### 11.1.3.2.2.1 Receipt of SIP BYE request for private call on-demand

Upon receiving a SIP BYE request from the controlling MCPTT function, the participating MCPTT function shall follow the procedures as specified in subclause 6.3.2.2.8.1.

#### 11.1.3.2.2.2 Receipt of SIP BYE request when ongoing pre-established session

Upon receiving a SIP BYE request from the controlling MCPTT function and if the MCPTT session id refers to an MCPTT user that has a pre-established session with the participating MCPTT function, the participating MCPTT function:

1) shall interact with the media plane as specified in subclause 9.3 in 3GPP TS 24.380 [5] for disconnecting the media plane resources towards the controlling MCPTT function;

2) shall send a SIP 200 (OK) response to the controlling MCPTT function;

3) shall interact with the media plane as specified in subclause 9.3 in 3GPP TS 24.380 [5] for disconnecting media plane resources towards the MCPTT client from the media plane resources towards the controlling MCPTT function; and

4) shall maintain the pre-established session towards the MCPTT client.

### 11.1.3.3 Controlling MCPTT function procedures

#### 11.1.3.3.1 Terminating procedures

Upon receiving a SIP BYE request the controlling MCPTT function shall follow the procedures as specified in subclause 6.3.3.2.4.

## 11.1.4 Ending the private call initiated by the MCPTT server

### 11.1.4.1 General

This subclause describes the procedures of each functional entity for ending the private call initiated by the MCPTT server.

> NOTE: For private call without floor control, ending the private call is initiated only by the MCPTT client.

### 11.1.4.2 MCPTT client procedures

Upon receiving a SIP BYE request for private call session, the MCPTT client shall follow the procedures as specified in subclause 6.2.6.

### 11.1.4.3 Participating MCPTT function procedures

#### 11.1.4.3.1 Originating procedures

When the MCPTT session for private call needs to be released as specified in subclause 6.3.8.2, the participating MCPTT function shall follow the procedures in subclause 6.3.3.1.5.

#### 11.1.4.3.2 Terminating procedures

##### 11.1.4.3.2.1 Receipt of SIP BYE request for private call on-demand

Upon receiving a SIP BYE request from the controlling MCPTT function, the participating MCPTT function shall follow the procedures as specified in subclause 6.3.2.2.8.1.

##### 11.1.4.3.2.2 Receipt of SIP BYE request when ongoing pre-established session

Upon receiving a SIP BYE request from the controlling MCPTT function and if the MCPTT session id refers to an MCPTT user that has a pre-established session with the participating MCPTT function, the participating MCPTT function shall follow the procedures in subclause 11.1.3.2.2.2.

### 11.1.4.4 Controlling MCPTT function procedures

When the MCPTT session for private call needs to be released as specified in subclause 6.3.8.2, the controlling MCPTT function shall follow the procedures in subclause 6.3.3.1.5.

# 11.2 Off-network private call

## 11.2.1 General

### 11.2.1.1 Common procedures

#### 11.2.1.1.1 Sending/Receiving a message

Editor's note [CT1#95-bis, C1-160392]: it is FFS how security works in off-network situations as SA3 has not concluded on stage-2 requirements

In order to participate in a private call, the MCPTT client:

1) shall send the MONP message as a UDP message to the local IP address of the MCPTT user, on UDP port TBD, with an IP time-to-live set to 255; and

Editor's note [CT1#95, C1-160392]: Port number for the message is FFS.

Editor's note [CT1#95, C1-160392]: The local IP address of each UE can be assigned during the eProSe discovery procedures. In case of not using local IP address, the multicast IP address can be used.

2) shall treat UDP messages received on the port TBD as received MONP message.

NOTE: An MCPTT client that supports IPv6 shall listen to the IPv6 addresses.

#### 11.2.1.1.2 Session description

For an off-network MCPTT session, only MCPTT speech is used.

One off-network MCPTT session may include one media-floor control entity.

The MCPTT client shall generate an SDP body for a group call in accordance with rules and procedures of IETF RFC 4566 [12] and IETF RFC 3264 [44].

The MCPTT client:

1) shall include in the session-level section:

a) the "o=" field with the <username> portion set to a dash;

b) the "s=" field with the <session name> portion set to a dash; and

c) the "c=" field with the <nettype> portion set to "IN", the <addrtype> portion set to the IP version of the unicast IP address of the MCPTT client and the <connection-address> portion set to the unicast IP address of the MCPTT client;

2) shall include the media-level section for MCPTT speech consisting of:

a) the "m=" field with the <media> portion set to "audio", the <port> portion set to a port number for MCPTT speech of the MCPTT group, the <proto> field set to "RTP/AVP" and <fmt> portion set indicating RTP payload type numbers;

b) the "i=" field with the <session description> portion set to "speech";

c) the "a=fmtp:" attribute(s), the "a=rtpmap:" attribute(s) or both, indicating the codec(s) and media parameters of the MCPTT speech; and

d) the "a=rtcp:" attribute indicating port number to be used for RTCP at the MCPTT client selected according to the rules and procedures of IETF RFC 3605 [13], if the media steam uses other than the default IP address;

3) may include the media-level section for media-floor control entity consisting of:

a) an "m=" line, with the <media> portion set to "application", the <port> portion set to a port number for media-floor control entity of the MCPTT group, the <proto> field set to "udp" and <fmt> portion set to "MCPTT"; and

b) the "a=fmtp:MCPTT" attribute indicating the parameters of the media-floor control entity as specified 3GPP TS 24.380 [5]; and

4) shall include the MIKEY-SAKKE I_MESSAGE, if generated by the MCPTT client, in an "a=key-mgmt" attribute as a "mikey" attribute value in the SDP offer as specified in IETF RFC 4567 [47].

## 11.2.2 Basic call control

### 11.2.2.1 General

### 11.2.2.2 Call control state machine

The figure 11.2.2.2-1 gives an overview of the main states and transitions on the UE for private call control.
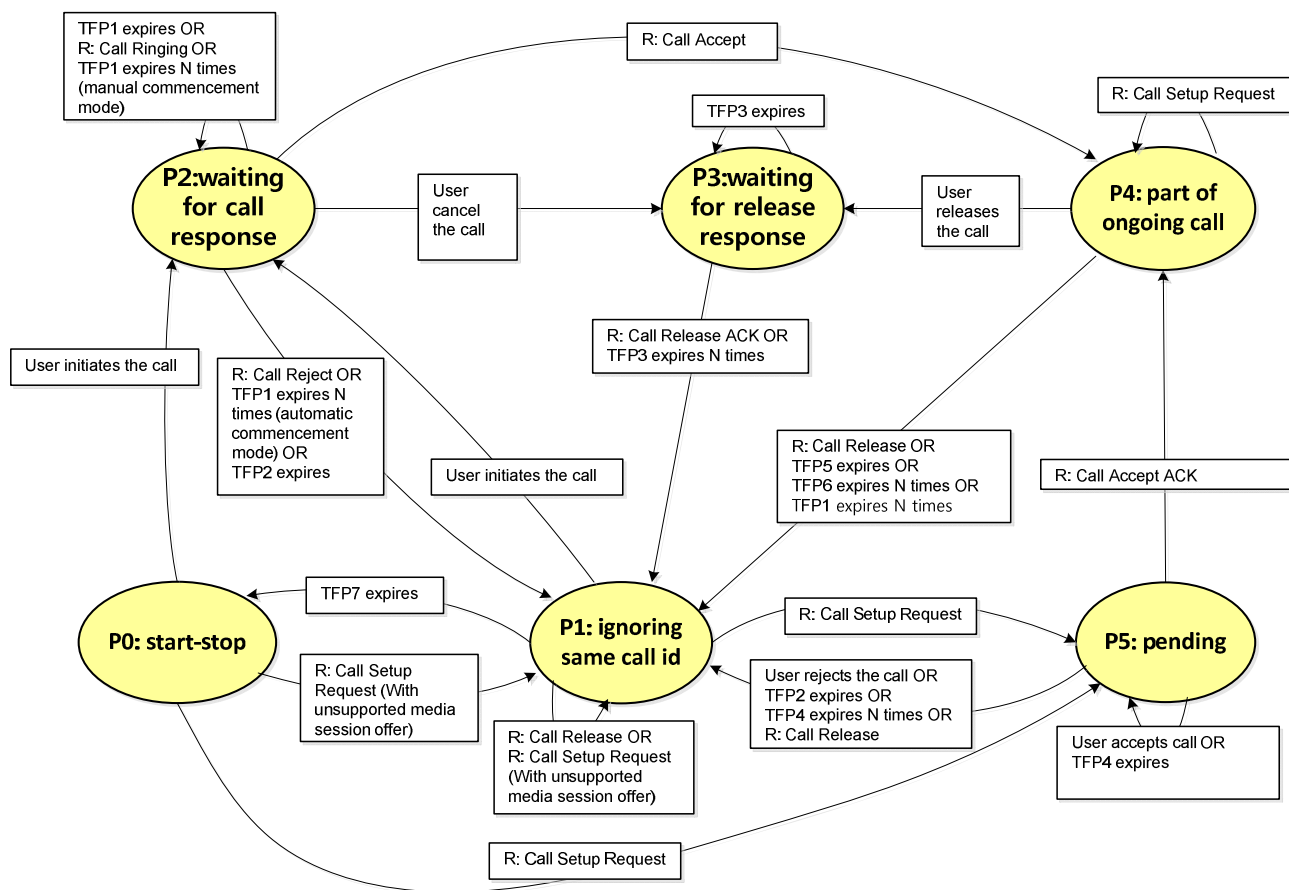


**Figure 11.2.2.2-1: Private Call Control state machine**

### 11.2.2.3 Call Control states

#### 11.2.2.3.1 P0: start stop

In this state, no private call control entity exists.

### 11.2.2.3.2 P1: ignoring same call id

This state exists for UE, when the UE is not part of an ongoing private call.

### 11.2.2.3.3 P2: wait for call response

This state exists for UE, when the UE has sent a PRIVATE CALL SETUP REQUEST message and is waiting for a response, PRIVATE CALL ACCEPT or PRIVATE CALL REJECT message.

### 11.2.2.3.4 P3: wait for release response

This state exists for UE, when the UE has sent a PRIVATE CALL RELEASE message and is waiting for a PRIVATE CALL RELEASE ACK message.

### 11.2.2.3.5 P4: part of ongoing call

This state exists for UE, when the UE is part of an ongoing private call.

### 11.2.2.3.6 P5: pending

This state exists for UE, when the UE has presented a notification to the user for the received PRIVATE CALL SETUP REQUEST message and is waiting for a user indication.

## 11.2.2.4 Procedures

### 11.2.2.4.1 General

### 11.2.2.4.2 Private call setup

#### 11.2.2.4.2.1 Initiating a private call

When in the "P0: start-stop" state or "P1: ignoring same call id", upon an indication from MCPTT User to initiate a private call, the MCPTT client:

1) shall generate and store the call identifier as a random number uniformly distributed between (0, 65536);

2) shall store own MCPTT user ID as caller ID;

3) shall store MCPTT user ID of the callee as callee ID;

4) shall store "AUTOMATIC COMMENCEMENT MODE" as commencement mode, if requested. Otherwise store "MANUAL COMMENCEMENT MODE" as commencement mode;

5) shall create a call type control state machine as described in subclause 11.2.3.2;

6) if an end-to-end security context needs to be established then:

   a) shall use keying material provided by the key management server to generate a PCK as described in 3GPP TS 33.179 [46];

   b) shall use the PCK to generate a PCK-ID with the four most significant bits set to "0001" to indicate that the purpose of the PCK is to protect private call communications and with the remaining twenty eight bits being randomly generated as described in 3GPP TS 33.179 [46];

   c) shall encrypt the PCK to a UID associated to the MCPTT client using the MCPTT ID of the invited user and a time related parameter as described in in 3GPP TS 33.179 [46];

   d) shall generate a MIKEY-SAKKE I_MESSAGE using the encapsulated PCK and PCK-ID as specified in 3GPP TS 33.179 [46];

   e) shall add the MCPTT ID of the originating MCPTT to the initiator field (IDRi) of the I_MESSAGE as described in 3GPP TS 33.179 [46]; and

  f) shall sign the MIKEY-SAKKE I_MESSAGE using the originating MCPTT user's signing key provided in the keying material together with a time related parameter, and add this to the MIKEY-SAKKE payload, as described in in 3GPP TS 33.179 [46] and;

  g) shall store the MIKEY-SAKKE I_MESSAGE for later inclusion in an SDP body;

 7) shall store "TRUE" as sent floor control indication, if requested. Otherwise store "FALSE" as sent floor control indication;

 8) may store current user location as user location;

 9) shall generate and store offer SDP, as defined in subclause 11.2.1.1.2;

 10) shall generate a PRIVATE CALL SETUP REQUEST message as specified in subclause 15.1.5:

  a) shall set the Call identifier IE with the stored call identifier;

  b) shall set the MCPTT user ID of the caller IE with the stored caller ID;

  c) shall set the MCPTT user ID of the callee IE with the stored callee ID;

  d) shall set the Commencement mode IE with the stored commencement mode;

  e) shall set the Call type IE with the stored current call type associated with the call type control state machine;

  f) shall set the Use floor control indication IE with the stored sent floor control indication;

  g) shall set the SDP offer IE with the stored offer SDP; and

  h) may set the User location IE with the stored user location if the stored current call type associated with the call type control state machine is "EMERGENCY PRIVATE CALL".

 11) shall send the PRIVATE CALL SETUP REQUEST message towards other MCPTT client according to rules and procedures as specified in subclause 11.2.2.1.1;

 12) shall start timer TFP1 (private call request retransmission); and

 13) shall enter the "P2: waiting for call response" state.

### 11.2.2.4.2.2    Private call setup request retransmission

When in the "P2: waiting for call response" state, upon expiry of timer TFP1 (private call request retransmission), the MCPTT client:

 1) may update the stored user location with current user location;

 2) shall generate a PRIVATE CALL SETUP REQUEST message as specified in subclause 15.1.5;

  a) shall set the Call identifier IE with the stored call identifier;

  b) shall set the MCPTT user ID of the caller IE with the stored caller ID;

  c) shall set the MCPTT user ID of the callee IE with the stored callee ID;

  d) shall set the Commencement mode IE with the stored commencement mode;

  e) shall set the Call type IE with the stored current call type associated with the call type control state machine;

  f) shall set the Use floor control indication with the stored sent floor control indication;

  g) shall set the SDP offer IE with the stored offer SDP; and

  h) may set the User location IE with stored user location if the stored current call type is "EMERGENCY PRIVATE CALL" associated with the call type control state machine.

 3) shall send the PRIVATE CALL SETUP REQUEST message towards other MCPTT client according to rules and procedures as specified in subclause 11.2.1.1.1;

4)  shall start timer TFP1 (private call request retransmission); and

5)  shall remain in the "P2: waiting for call response" state.

### 11.2.2.4.2.3          Ringing notification to the user

When in the "P2: waiting for call response" state, upon receiving a PRIVATE CALL RINGING message, the MCPTT client:

1)  shall remain in the "P2: waiting for call response" state.

### 11.2.2.4.2.4          No response to private call setup request with automatic commencement mode

In the "P2: waiting for call response" state, when timer TFP1 (private call request retransmission) expires for a configurable number of times and the stored commencement mode is "AUTOMATIC COMMENCEMENT MODE", the MCPTT client:

1)  shall start timer TFP7 (waiting for any message with same call identifier); and

2)  shall enter the "P1: ignoring same call id" state.

### 11.2.2.4.2.5          No response to private call setup request with manual commencement mode

When in the "P2: waiting for call response" state when timer TFP1 (private call request retransmission) expires for a configurable number of times and the stored commencement mode is "MANUAL COMMENCEMENT MODE", the MCPTT client:

1)  shall start timer TFP2 (waiting for call response message); and

2)  shall remain in the "P2: waiting for call response" state.

### 11.2.2.4.2.6          No response to private call setup request after waiting for user acknowledgement

When in the "P2: waiting for call response" state, upon expiry of timer TFP2 (waiting for call response message), the MCPTT client:

1)  shall start timer TFP7 (waiting for any message with same call identifier);

2)  shall release the call control state machine; and

3)  shall enter the "P1: ignoring same call id" state.

### 11.2.2.4.2.7          Private call setup request rejected

When in the "P2: waiting for call response" state, upon receiving a PRIVATE CALL REJECT message in response to PRIVATE CALL SETUP REQUEST message with Call identifier IE same as the stored call identifier and Reason IE set to "REJECT", the MCPTT client:

1)  shall stop timer TFP1 (call setup retransmission), if running;

2)  shall stop timer TFP2 (waiting for call response message), if running;

3)  shall start timer TFP7 (waiting for any message with same call identifier);

4)  shall release the call control state machine; and

5)  shall enter the "P1: ignoring same call id" state.

### 11.2.2.4.2.8          Private call setup request accepted

When in the "P2: waiting for call response" state, upon receiving a PRIVATE CALL ACCEPT message response to PRIVATE CALL SETUP REQUEST message with the same call identifier, the MCPTT client:

1) shall store the Use floor control indication IE received in the PRIVATE CALL ACCEPT message as received floor control indication;

2) shall store the SDP answer IE received in the PRIVATE CALL ACCEPT message as answer SDP;

3) shall generate a PRIVATE CALL ACCEPT ACK message as specified in subclause 15.1.11:

   a) shall set the Call identifier IE to the stored call identifier;

   b) shall set the MCPTT user ID of the caller IE with the stored caller ID; and

   c) shall set the MCPTT user ID of the callee IE with the stored callee ID.

4) shall send the PRIVATE CALL ACCEPT ACK message in response to the request message according to rules and procedures as specified in subclause 11.2.2.1.1;

5) shall stop timer TFP1 (call setup retransmission), if running;

6) shall stop timer TFP2 (waiting for call response message) , if running;

7) shall establish a media session based on the SDP body of the stored answer SDP;

8) shall start floor control as terminating floor participant as specified in subclause 7.2 in 3GPP TS 24.380 [5], if both the stored received floor control indication and sent floor control indication are set to "TRUE";

9) shall start timer TFP5 (call release); and

10) shall enter the "P4: part of ongoing call" state.

### 11.2.2.4.2.9 User cancels the private call setup request

When in the "P2: waiting for call response" state, upon an indication from MCPTT User to cancel the private call request, the MCPTT client:

1) shall generate a PRIVATE CALL RELEASE message as specified in subclause 15.1.9;

   a) shall set the Call identifier IE to the stored call identifier;

   b) shall set the MCPTT user ID of the caller IE with the stored caller ID; and

   c) shall set the MCPTT user ID of the callee IE with the stored callee ID.

2) shall send the PRIVATE CALL RELEASE message in response to the request message according to rules and procedures as specified in subclause 11.2.1.1.1;

3) shall start timer TFP3 (private call release retransmission); and

4) shall enter the "P3: waiting for release response" state.

### 11.2.2.4.3 Private call setup in automatic commencement mode

### 11.2.2.4.3.1 Unable to establish media

When in the "P0: start-stop" or "P1: ignoring same call id" state, upon receiving a PRIVATE CALL SETUP REQUEST message with Call identifier IE different than stored call identifier and media session declared in SDP body of PRIVATE CALL SETUP REQUEST message cannot be established, the MCPTT client:

1) shall store the Call identifier IE in the received message as call identifier;

2) shall store the MCPTT user ID of the caller IE in the received PRIVATE CALL SETUP message as caller ID;

3) shall store own MCPTT user ID as callee ID;

4) shall generate a PRIVATE CALL REJECT message as specified in subclause 15.1.8;

   a) shall set the Call identifier IE to the cached call identifier;

    b) shall set the MCPTT user ID of the caller IE with the stored caller ID;

    c) shall set the MCPTT user ID of the callee IE with stored callee ID; and

    d) shall set the Reason IE as "REJECT".

5) shall send the PRIVATE CALL REJECT message in response to the request message according to rules and procedures as specified in subclause 11.2.1.1.1;

6) shall start timer TFP7 (waiting for any message with same call identifier) if current state is the "P0: start-stop" state;

7) shall restart timer TFP7 (waiting for any message with same call identifier) if current state is the "P1: ignoring same call id" state; and

8) shall enter the "P1: ignoring same call id" state if current state is the "P0: start-stop" state.

### 11.2.2.4.3.2 Responding to private call setup request when not participating in the ongoing call

When in the "P0: start-stop" or "P1: ignoring same call id" state, upon receiving a PRIVATE CALL SETUP REQUEST message with Commencement mode IE set to "AUTOMATIC COMMENCEMENT MODE" and Call identifier IE different than stored call identifier and media session declared in SDP body of PRIVATE CALL SETUP REQUEST message can be established, the MCPTT client:

1) shall store the Call identifier IE in the received message as call identifier;

2) shall create the call type control state machine as described in subclause 11.2.3.2;

3) shall store the MCPTT user ID of the caller IE in the received PRIVATE CALL SETUP REQUEST message as caller ID;

4) shall store own MCPTT user ID as callee ID;

5) shall store the Use floor control indication IE in the received message as received floor control indication. If the received floor control indication is "TRUE", MCPTT client shall set and store the sent floor control indication as requested;

6) if the SDP offer contains an "a=key-mgmt" attribute field with a "mikey" attribute value containing a MIKEY-SAKKE I_MESSAGE:

    a) shall extract the MCPTT ID of the originating MCPTT user from the initiator field (IDRi) of the I_MESSAGE as described in 3GPP TS 33.179 [46];

    b) shall convert the MCPTT ID to a UID as described in 3GPP TS 33.179 [46];

    c) shall use the UID to validate the signature of the MIKEY-SAKKE I_MESSAGE as described in 3GPP TS 33.179 [46];

    d) if the validation of the signature failed, shall generate a PRIVATE CALL REJECT message as specified in subclause 10.2.3.8, and:

        i) shall set the call identifier IE to the stored call identifier;

        ii) shall set the MCPTT user ID of the caller IE with the stored caller ID;

        iii) shall set the MCPTT user ID of the callee IE with the stored callee ID;

        iv) shall set the reason IE as "E2E SECURITY CONTEXT FAILURE"; and

        v) shall send the PRIVATE CALL REJECT message in response to the request message according to rules and procedures as specified in subclause 11.2.1.1.1and skip the remaining steps in this subclause;

    e) if the validation of the signature was successful:

        i) shall extract and decrypt the encapsulated PCK using the terminating user's (KMS provisioned) UID key as described in 3GPP TS 33.179 [46]; and

      ii) shall extract the PCK-ID, from the payload as specified in 3GPP TS 33.179 [46];

NOTE:     With the PCK successfully shared between the originating MCPTT client and the terminating MCPTT client, both clients are able to use SRTP/SRTCP to create an end-to-end secure session.

7) shall generate and store answer SDP based on received SDP offer IE in PRIVATE CALL SETUP REQUEST message, as defined in subclause 11.2.1.1.2;

8) shall generate a PRIVATE CALL ACCEPT message as specified in subclause 15.1.7:

    a) shall set the Call identifier IE to the stored call identifier; and

    b) shall set the MCPTT user ID of the caller IE with stored caller ID.

    c) shall set the MCPTT user ID of the callee IE with stored callee ID;

    d) shall set the Use floor control indication IE with the stored sent floor control indication; and

    e) shall set the SDP answer IE with the stored answer SDP;

9) shall send PRIVATE CALL ACCEPT message in response to the request message according to rules and procedures as specified in subclause 11.2.1.1.1;

10) shall establish a media session based on the SDP body of the stored answer SDP;

11) shall start timer TFP4 (private call accept retransmission); and

12) shall enter the "P5: pending" state.

### 11.2.2.4.3.3 Private call accept retransmission

When in the "P5: pending" state, upon expiry of timer TFP4 (private call accept retransmission), the MCPTT client:

1) shall generate a PRIVATE CALL ACCEPT message as specified in subclause 15.1.7:

    a) shall set the Call identifier IE to the stored call identifier;

    b) shall set the MCPTT user ID of the caller IE with the stored caller ID;

    c) shall set the MCPTT user ID of the callee IE with the stored callee ID;

    d) shall set the Use floor control indication IE with the stored sent floor control indication; and

    e) shall set the SDP answer IE with the stored answer SDP;

2) shall send PRIVATE CALL ACCEPT message in response to the request message according to rules and procedures as specified in subclause 11.2.1.1.1;

3) shall start timer TFP4 (private call accept retransmission); and

4) shall remain in the "P5: pending" state.

### 11.2.2.4.3.4 Establishing the call

When in the "P5: pending" state, upon receiving a PRIVATE CALL ACCEPT ACK message or RTP media from originating user, the MCPTT client:

1) shall stop timer TFP4(private call accept retransmission);

2) shall start floor control as terminating MCPTT client as specified in subclause 7.2 in 3GPP TS 24.380 [5], if both the stored sent floor control indication and received floor control indication are "TRUE";

3) shall start timer TFP5 (call release);and

4) shall enter the "P4: part of ongoing call" state.

### 11.2.2.4.3.5          Call failure

In the "P5: pending" state, when timer TFP4 (private call accept retransmission) expires for a configurable number of times, the MCPTT client:

1) shall start timer TFP7 (waiting for any message with same call identifier);

2) shall release the call type control state machine; and

3) shall enter the "P1: ignoring same call id" state.

### 11.2.2.4.3.6          Responding to private call setup request when participating in the ongoing call

When in the "P4: part of ongoing call", upon receiving a PRIVATE CALL SETUP REQUEST message from other MCPTT client, the MCPTT client:

1) shall generate a PRIVATE CALL REJECT message as specified in subclause 15.1.8:

    a) shall set the Call identifier IE with the Call identifier IE as received in the PRIVATE CALL SETUP REQUEST message;

    b) shall set the MCPTT user ID of the caller IE with the MCPTT user ID of the caller IE as received in the PRIVATE CALL SETUP REQUEST message;

    c) shall set the MCPTT user ID of the callee IE with the stored callee ID; and

    d) shall set the Reason IE as "BUSY".

2) shall send PRIVATE CALL REJECT message in response to the request message according to rules and procedures as specified in subclause 11.2.1.1.1;

3) shall remain in the "P4: part of ongoing call" state.

## 11.2.2.4.4          Private call setup in manual commencement mode

### 11.2.2.4.4.1          Incoming private call

When in the "P0: start-stop" or "P1: ignoring same call id" state, upon receiving a PRIVATE CALL SETUP REQUEST message with Commencement mode IE set to "MANUAL COMMENCEMENT MODE" and Call identifier IE different from stored call identifier, the MCPTT client:

1) shall store the Call identifier IE in the received message as call identifier;

2) shall create the call type control state machine as described in subclause 11.2.3.2;

3) shall store the MCPTT user ID of the caller IE as received in the PRIVATE CALL SETUP REQUEST as caller ID;

4) shall store own MCPTT user ID as callee ID;

5) shall store the Use floor control indication IE in the received PRIVATE CALL SETUP REQUEST message as received floor control indication. If the received floor control indication is "TRUE", MCPTT client shall set and store the sent floor control indication as requested;

6) shall generate a PRIVATE CALL RINGING message as specified in subclause 15.1.6;

    a) shall set the Call identifier IE to the stored call identifier;

    b) shall set the MCPTT user ID of the caller IE with the stored caller ID; and

    c) shall set the MCPTT user ID of the callee IE with the stored callee ID.

7) shall send PRIVATE CALL RINGING message in response to the request message according to rules and procedures as specified in subclause 11.2.1.1.1;

8) shall start timer TFP2 (waiting for call response message); and

   9)  shall enter the "P5: pending" state.

### 11.2.2.4.4.2 No response from the user

When in the "P5: pending" state, upon expiry of timer TFP2 (waiting for call response message), the MCPTT client:

   1)  shall generate a PRIVATE CALL REJECT message as specified in subclause 15.1.8:

     a)  shall set the Call identifier IE to the stored call identifier;

     b)  shall set the MCPTT user ID of the caller IE with the stored caller ID;

     c)  shall set the MCPTT user ID of the callee IE with the stored callee ID; and

     d)  shall set the Reason IE as "NO ANSWER".

   2)  shall send the PRIVATE CALL REJECT message in response to the request message according to rules and procedures as specified in subclause 11.2.2.1.1;

   3)  shall start timer TFP7 (waiting for any message with same call identifier);

   4)  shall release the call type control state machine; and

   5)  shall enter the "P1: ignoring same call id" state.

### 11.2.2.4.4.3 User accepts the private call setup request

When in the "P5: pending" state, upon an indication from MCPTT User to accept the incoming private call, the MCPTT client:

   1)  shall generate and store answer SDP based on received SDP offer IE in PRIVATE CALL SETUP REQUEST message, as defined in subclause 11.2.1.1.2;

   2)  if the SDP offer contains an "a=key-mgmt" attribute field with a "mikey" attribute value containing a MIKEY-SAKKE I_MESSAGE:

     a)  shall extract the MCPTT ID of the originating MCPTT user from the initiator field (IDRi) of the I_MESSAGE as described in 3GPP TS 33.179 [46];

     b)  shall convert the MCPTT ID to a UID as described in 3GPP TS 33.179 [46];

     c)  shall use the UID to validate the signature of the MIKEY-SAKKE I_MESSAGE as described in 3GPP TS 33.179 [46];

     d)  if the validation of the signature failed, shall generate a PRIVATE CALL REJECT message as specified in subclause 10.2.3.8 and:

       i)  shall set the call identifier IE to the stored call identifier;

       ii)  shall set the MCPTT user ID of the caller IE with the stored caller ID;

       iii)  shall set the MCPTT user ID of the callee IE with the stored callee ID;

       iv)  shall set the reason IE as "E2E SECURITY CONTEXT FAILURE"; and

       v)  shall send the PRIVATE CALL REJECT message in response to the request message according to rules and procedures as specified in subclause 11.2.1.1.1 and skip the remaining steps in this subclause;

     e)  if the validation of the signature was successful:

       i)  shall extract and decrypt the encapsulated PCK using the terminating user's (KMS provisioned) UID key as described in 3GPP TS 33.179 [46]; and

       ii)  shall extract the PCK-ID, from the payload as specified in 3GPP TS 33.179 [46];

   NOTE:  With the PCK successfully shared between the originating MCPTT client and the terminating MCPTT client, both clients are able to use SRTP/SRTCP to create an end-to-end secure session.

3) shall generate a PRIVATE CALL ACCEPT message as specified in subclause 15.1.7:

   a) shall set the Call identifier IE to the stored call identifier;

   b) shall set the MCPTT user ID of the caller IE with the stored caller ID;

   c) shall set the MCPTT user ID of the callee IE with the stored callee ID;

   d) shall set the Use floor control indication IE with the stored sent floor control indication; and

   e) shall set the SDP answer IE with the stored answer SDP;

4) shall send the PRIVATE CALL ACCEPT message in response to the request message according to rules and procedures as specified in subclause 11.2.1.1.1;

5) shall establish a media session based on the SDP body of the private call;

6) shall stop timer TFP2 (waiting for call response message);

7) shall start timer TFP4 (private call accept retransmission); and

8) shall remain in the "P5: pending" state.

### 11.2.2.4.4.4 Private call accept retransmission

When in the "P5: pending" state, upon expiry of timer TFP4 (private call accept retransmission), the MCPTT client:

1) shall generate a PRIVATE CALL ACCEPT message as specified in subclause 15.1.7:

   a) shall set the Call identifier IE to the stored call identifier;

   b) shall set the MCPTT user ID of the caller IE the stored caller ID;

   c) shall set the MCPTT user ID of the callee IE with the stored callee ID;

   d) shall set the Use floor control indication IE with the stored sent floor control indication; and

   e) shall set the SDP answer IE with the stored answer SDP;

2) shall send PRIVATE CALL ACCEPT message in response to the request message according to rules and procedures as specified in subclause 11.2.1.1.1;

3) shall start timer TFP4 (private call accept retransmission); and

4) shall remain in the "P5: pending" state.

### 11.2.2.4.4.5 Establishing the call

When in the "P5: pending" state, upon receiving a PRIVATE CALL ACCEPT ACK message or RTP media from originating user, the MCPTT client:

1) shall stop timer TFP4(private call accept retransmission);

2) shall start floor control as terminating MCPTT client as specified in subclause 7.2 in 3GPP TS 24.380 [5], if both the stored sent floor control indication and received floor control indication are "TRUE";

3) shall start timer TFP5 (call release); and

4) shall enter the "P4: part of ongoing call" state.

### 11.2.2.4.4.6 Call failure

In the "P5: pending" state, when timer TFP4 (private call accept retransmission) expires for a configurable number of times, the MCPTT client:

1) shall start timer TFP7 (waiting for any message with same call identifier);

    2)  shall release the call type control state machine; and

    3)  shall enter the "P1: ignoring same call id" state.

### 11.2.2.4.4.7 User rejects the private call setup request

When in the "P5: pending" state, upon an indication from MCPTT User to reject the incoming private call, the MCPTT client:

    1)  shall generate a PRIVATE CALL REJECT message as specified in subclause 15.1.8:

        a)  shall set the Call identifier IE to the stored call identifier;

        b)  shall set the MCPTT user ID of the caller IE with the stored caller ID;

        c)  shall set the MCPTT user ID of the callee IE with stored callee ID; and

        d)  shall set the Reason IE as "REJECT".

    2)  shall send the PRIVATE CALL REJECT message in response to the request message according to rules and procedures as specified in subclause 11.2.1.1.1;

    3)  shall start timer TFP7 (waiting for any message with same call identifier);

    4)  shall release the call type control state machine; and

    5)  shall enter the "P1: ignoring same call id" state.

### 11.2.2.4.4.8 Caller cancels the private call setup request before call establishment

When in the "P5: pending" state or "P1: ignoring same call id" state, upon receiving a PRIVATE CALL RELEASE message, the MCPTT client:

    1)  shall generate a PRIVATE CALL RELEASE ACK message as specified in subclause 15.1.10:

        a)  shall set the Call identifier IE to the stored call identifier;

        b)  shall set the MCPTT user ID of the caller IE with the stored caller ID; and.

        c)  shall set the MCPTT user ID of the callee IE with the stored callee ID.

    2)  shall send the PRIVATE CALL RELEASE ACK message in response to the request message according to rules and procedures as specified in subclause 11.2.1.1.1;

    3)  shall start timer TFP7 (waiting for any message with same call identifier) if current state is "P5: pending" state;

    4)  shall restart timer TFP7 (waiting for any message with same call identifier) if current state is "P1: ignoring same call id" state ;

    5)  shall stop timer TFP4 (private call accept retransmission) if running;

    6)  shall release the call type control state machine if the current state is "P5: pending" state; and

    7)  shall enter the "P1: ignoring same call id" state if the current state is "P5: pending" state.

### 11.2.2.4.4.9 Responding to private call setup request when participating in the ongoing call

When in the "P4: part of ongoing call" state, upon receiving a PRIVATE CALL SETUP REQUEST message from other MCPTT client, the MCPTT client:

    1)  shall store Call identifier IE as received in the PRIVATE CALL SETUP REQUEST message as waiting call identifier;

    2)  shall store MCPTT user ID of the call IE in the PRIVATE CALL SETUP REQUEST message as waiting caller ID;

3) shall generate a PRIVATE CALL REJECT message as specified in subclause 15.1.8:

    a) shall set the Call identifier IE to the stored waiting call identifier;

    b) shall set the MCPTT user ID of the callee IE with stored callee ID;

    c) shall set the MCPTT user ID of the caller IE stored waiting caller ID; and

    d) shall set the Reason IE as "BUSY".

4) shall send PRIVATE CALL REJECT message in response to the request message according to rules and procedures as specified in subclause 11.2.1.1.1.

### 11.2.2.4.5 Private call release

#### 11.2.2.4.5.1 Releasing a private call

When in the "P4: part of ongoing call" state, upon an indication from MCPTT User to release a private call, the MCPTT client:

1) shall generate a PRIVATE CALL RELEASE message as specified in subclause 15.1.9:

    a) shall set the Call identifier IE to the stored call identifier;

    b) shall set the MCPTT user ID of the caller IE with stored caller ID; and

    c) shall set the MCPTT user ID of the callee IE with stored callee ID.

2) shall send the PRIVATE CALL RELEASE message in response to the request message according to rules and procedures as specified in subclause 11.2.2.1.1;

3) shall start timer TFP3 (private call release retransmission); and

4) shall enter the "P3: waiting for release response" state.

#### 11.2.2.4.5.2 Private call release retransmission

When in the "P3: waiting for release response" state, upon expiry of timer TFP3 (private call release retransmission), the MCPTT client:

1) shall generate a PRIVATE CALL RELEASE message as specified in subclause 15.1.9:

    a) shall set the Call identifier IE to the stored call identifier;

    b) shall set the MCPTT user ID of the caller IE with stored caller ID; and

    c) shall set the MCPTT user ID of the callee IE with the stored callee ID.

2) shall send the PRIVATE CALL RELEASE message in response to the request message according to rules and procedures as specified in subclause 11.2.1.1.1;

3) shall start timer TFP3 (private call release retransmission); and

4) shall remain in the "P3: waiting for release response" state.

#### 11.2.2.4.5.3 No response to private call release

In the "P3: waiting for release response" state, when timer TFP3 (private call request retransmission) expires for a configurable number of times, the MCPTT client:

1) shall terminate the media session;

2) shall start timer TFP7 (waiting for any message with same call identifier);

3) shall release the call type control state machine; and

4) shall enter the "P1: ignoring same call id" state.

### 11.2.2.4.5.4 Acknowledging private call release after call establishment

When in the "P4: part of ongoing call" state, upon receiving a PRIVATE CALL RELEASE message, the MCPTT client:

1) shall generate a PRIVATE CALL RELEASE ACK message as specified in subclause 15.1.10;

   a) shall set the Call identifier IE to the stored call identifier;

   b) shall set the MCPTT user ID of the caller IE the stored caller ID; and

   c) shall set the MCPTT user ID of the callee IE with the stored callee ID.

2) shall send the PRIVATE CALL RELEASE ACK message in response to the request message according to rules and procedures as specified in subclause 11.2.2.1.1;

3) shall terminate the media session for private call;

4) shall start timer TFP7 (waiting for any message with same call identifier); and

5) shall release the call type control state machine;

6) shall enter the "P1: ignoring same call id" state.

### 11.2.2.4.5.5 Private call release acknowledged

When in the "P3: waiting for release response" state, upon receiving a PRIVATE CALL RELEASE ACK to PRIVATE CALL RELEASE message, the MCPTT client:

1) shall stop timer TFP3 (private call release retransmission), if running;

2) shall terminate the media session;

3) shall start timer TFP7 (waiting for any message with same call identifier);

4) shall release the call type control state machine; and

5) shall enter the "P1: ignoring same call id" state.

### 11.2.2.4.5.6 Implicit call release

When in the "P4: part of ongoing call" state, upon expiry of timer TFP5 (call release), the MCPTT client:

1) shall terminate the media session;

2) shall start timer TFP7 (waiting for any message with same call identifier);

3) shall release the call type control state machine; and

4) shall enter the "P1: ignoring same call id" state.

### 11.2.2.4.5.7 Stop ignoring same call id

When in the "P1: ignoring same call id" state, upon expiry of timer TFP7 (waiting for any message with same call identifier) the MCPTT client:

1) shall clear the stored call identifier; and

2) shall enter the "P0: start-stop" state.

### 11.2.2.4.5.8 No response to emergency private call setup request

In the "P4: part of ongoing call" state, when timer TFP1 (private call request retransmission) expires for a configurable number of times, the MCPTT client:

1) shall start timer TFP7 (waiting for any message with same call identifier);

2) shall release the call type control state machine; and

3) shall enter the "P1: ignoring same call id" state.

#### 11.2.2.4.5.9 No response to emergency private call cancel

In the "P4: part of ongoing call" state, when timer TFP6 (emergency private call cancel retransmission) expires for a configurable number of times, the MCPTT client:

1) shall start timer TFP7 (waiting for any message with same call identifier);

2) shall release the call type control state machine; and

3) shall enter the "P1: ignoring same call id" state.

### 11.2.2.4.6 Error handling

#### 11.2.2.4.6.1 Unexpected MONP message received

Upon receiving a MONP message in a state where there is no handling specified for the MONP message, the MCPTT client shall discard the MONP message.

#### 11.2.2.4.6.2 Unexpected indication from MCPTT user

Upon receiving an indication from the MCPTT user in a state where there is no handling specified for the indication, the MCPTT client shall ignore the indication.

#### 11.2.2.4.6.3 Unexpected expiration of a timer

Upon expiration of a timer in a state where there is no handling specified for expiration of the timer, the MCPTT client shall ignore the expiration of the timer.

## 11.2.3 Call type control

### 11.2.3.1 General

### 11.2.3.2 Call type control state machine

The Figure 11.2.3.2-1 gives an overview of the states and transitions of the state machine.

Each call control state machine is per MCPTT group ID.
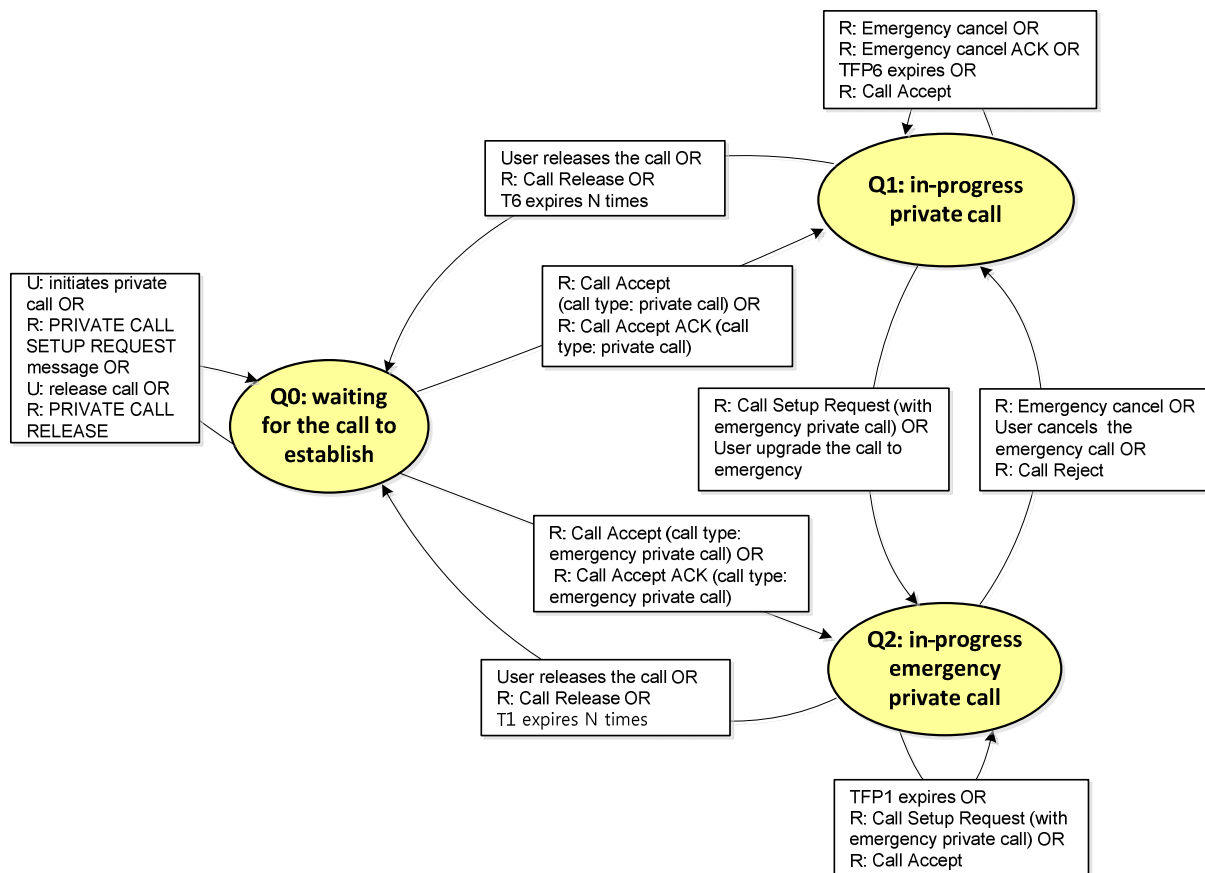
**Figure 11.2.3.2-1: Call type state machine**

When sending the message, MCPTT client indicates the stored current ProSe per-packet priority associated with the call type control state machine to the lower layers.

## 11.2.3.3      Call Control states

### 11.2.3.3.1           Q0: waiting for the call to be established

This state is the start state of this state machine.

### 11.2.3.3.2           Q1: in-progress private call

This state exists for UE, when the UE is part of an in-progress private call.

### 11.2.3.3.3           Q2: in-progress emergency private call

This state exists for UE, when the UE is part of an in-progress emergency private call.

### 11.2.3.4          Procedures

#### 11.2.3.4.1          General

#### 11.2.3.4.2          Outgoing call initiated

When in "Q0: waiting for the call to be established" state, upon an indication from the MCPTT user to initiate a call, the MCPTT client:

    1)  the stored emergency state associated with emergency alert state machine described in 12.2.2.2 is set to "true":

        a)  shall set the stored current call type to "EMERGENCY PRIVATE CALL"; and

        b)  shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network emergency private call as described in 3GPP TS 24.383 [45];

    2)  the stored emergency state associated with emergency alert state machine described in 12.2.2.2 is set to "false":

        a)  if the user initiates an MCPTT emergency private call or:

            i)  shall set the stored current call type to "EMERGENCY PRIVATE CALL"; and

            ii)  shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network emergency private call as described in 3GPP TS 24.383 [45].

        b)  if the user initiates an MCPTT private call:

            i)  shall set the stored current call type to "PRIVATE CALL"; and

            ii)  shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network private call as described in 3GPP TS 24.383 [45].

#### 11.2.3.4.3          Received incoming call

When in "Q0: waiting for the call to be established" state, upon receipt of a PRIVATE CALL SETUP by an idle MCPTT client, the MCPTT client:

    1)  if the Call type IE of the received PRIVATE CALL SETUP REQUEST message is set to "EMERGENCY PRIVATE CALL":

        a)  shall set the stored current call type to "EMERGENCY PRIVATE CALL"; and

        b)  shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network emergency private call as described in 3GPP TS 24.383 [45];

    2)  if the Call type IE of the received PRIVATE CALL SETUP REQUEST message is set to "PRIVATE CALL":

        a)  shall set the stored current call type to "PRIVATE CALL"; and

        b)  shall set the stored current ProSe per-packet priority to value corresponding to MCPTT off-network private call as described in 3GPP TS 24.383 [45].

#### 11.2.3.4.4          Establishing the private call

When in "Q0: waiting for the call to be established" state, upon receiving PRIVATE CALL ACCEPT message or PRIVATE CALL ACCEPT ACK message, the MCPTT client:

    1)  if the stored current call type is set to "EMERGENCY PRIVATE CALL":

        a)  shall enter "Q2: in-progress emergency private call" state.

    2)  if the stored current call type is set to "PRIVATE CALL":

        a)  shall enter "Q1: in-progress private call" state.

### 11.2.3.4.5          Upgrade call

#### 11.2.3.4.5.1          User upgrades private call to emergency private call

When in the "Q1: in-progress private call" state, upon an indication from MCPTT User to upgrade the call to emergency, the MCPTT client:

1)  shall generate and store emergency offer SDP as defined in subclause 11.2.1.1.2;

2)  shall update caller ID as own MCPTT user ID;

3)  shall update callee ID as MCPTT user ID of the other user;

4)  shall store current user location as user location;

5)  shall generate a PRIVATE CALL SETUP REQUEST message as specified in subclause 15.1.5:

   a)  shall set the Call identifier IE with the stored call identifier;

   b)  shall set the MCPTT user ID of the caller IE with stored caller ID;

   c)  shall set the MCPTT user ID of the callee IE with the stored callee ID;

   d)  shall set the Commencement mode IE as "AUTOMATIC COMMENCEMENT MODE";

   e)  shall set the Call type IE as "EMERGENCY PRIVATE CALL";

   f)  shall set the Use floor control indication IE with the stored sent floor control indication;

   g)  shall set the SDP offer IE with emergency offer SDP; and

   h)  may set the User location IE with user location.

6)  shall set the ProSe per-packet priority to the value corresponding to MCPTT off-network emergency private call as described in 3GPP TS 24.383 [45];

7)  shall send the PRIVATE CALL SETUP REQUEST message towards other MCPTT client according to rules and procedures as specified in subclause 11.2.1.1.1;

8)  shall start timer TFP1 (private call request retransmission); and

9)  shall enter the "Q2: in-progress emergency private call" state.

#### 11.2.3.4.5.2          Emergency private call setup request retransmission

When in the "Q2: in-progress emergency private call" state, upon expiry of timer TFP1 (private call request retransmission), the MCPTT client:

1)  may update the stored user location with current user location;

2)  shall generate a PRIVATE CALL SETUP REQUEST message as specified in subclause 15.1.5;

   a)  shall set the Call identifier IE with the stored call identifier;

   b)  shall set the MCPTT user ID of the caller IE with stored caller ID;

   c)  shall set the MCPTT user ID of the callee IE with stored callee ID;

   d)  shall set the Commencement mode IE as "AUTOMATIC COMMENCEMENT MODE";

   e)  shall set the Call type IE as "EMERGENCY PRIVATE CALL";

   f)  shall set the Use floor control indication IE with the stored sent floor control indication;

   g)  shall set the SDP offer IE with the stored emergency offer SDP; and

   h)  may set the User location IE with stored user location.

3) shall send the PRIVATE CALL SETUP REQUEST message towards other MCPTT client according to rules and procedures as specified in subclause 11.2.1.1.1;

4) shall start timer TFP1 (private call request retransmission); and

5) shall remain in the "Q2: in-progress emergency private call" state.

### 11.2.3.4.5.3  Emergency private call setup request accepted

When in the "Q2: in-progress emergency private call" state or in the "Q1: in-progress private call" state, upon receiving a PRIVATE CALL ACCEPT message response to PRIVATE CALL SETUP REQUEST message with the same call identifier, the MCPTT client:

1) shall store the Use floor control indication IE received in the PRIVATE CALL ACCEPT message as received floor control indication;

2) shall store the SDP answer IE received in the PRIVATE CALL ACCEPT message as emergency answer SDP;

3) shall generate a PRIVATE CALL ACCEPT ACK message as specified in subclause 15.1.11:

   a) shall set the Call identifier IE to the stored call identifier;

   b) shall set the MCPTT user ID of the caller IE with stored caller ID; and

   c) shall set the MCPTT user ID of the callee IE with the stored callee ID.

4) shall send the PRIVATE CALL ACCEPT ACK message in response to the request message according to rules and procedures as specified in subclause 11.2.2.1.1;

5) shall stop timer TFP1 (call setup retransmission), if running;

6) shall stop timer TFP2 (waiting for call response message) , if running;

7) shall establish a media session based on the SDP body of the stored emergency answer SDP;

8) shall start floor control , if not already started, as terminating floor participant as specified in subclause 7.2 in 3GPP TS 24.380 [5], if both the stored received floor control indication and sent floor control indication are set to "TRUE"; and

9) shall remain in the current state.

Note: PRIVATE CALL ACCEPT ACK message is retransmitted as described in this subclause, every time a PRIVATE CALL ACCEPT message is received.

### 11.2.3.4.5.4  Emergency private call setup request rejected

When in the "Q2: in-progress emergency private call" state, upon receiving a PRIVATE CALL REJECT message in response to PRIVATE CALL SETUP REQUEST message with Call identifier IE same as stored call identifier and Reason IE set to "REJECT", the MCPTT client:

1) shall stop timer TFP1 (call setup retransmission), if running;

2) shall set the ProSe per-packet priority to the value corresponding to the MCPTT off-network private call as described in 3GPP TS 24.383 [45]; and

3) shall enter the "Q1: in-progress private call" state.

### 11.2.3.4.5.5  No response to emergency private call setup request

In the "Q2: in-progress emergency private call" state, when timer TFP1 (private call request retransmission) expires for a configurable number of times, the MCPTT client:

1) shall release the stored current call type;

2) shall release the stored Prose per-packet priority; and

3) shall enter "Q0: waiting for the call to be established".

11.2.3.4.5.6 Responding to emergency private call setup request when participating in the ongoing call

When in the "Q1: in-progress private call" or "Q2: in-progress emergency private call", upon receiving a PRIVATE CALL SETUP REQUEST message with the Call identifier IE same as the stored call identifier of the call, the Call type IE set as "EMERGENCY PRIVATE CALL", the MCPTT client:

1) if the media session declared in SDP body of PRIVATE CALL SETUP REQUEST message can be established:

a) shall generate and store emergency answer SDP based on received SDP offer IE in PRIVATE CALL SETUP REQUEST message, as defined in subclause 11.2.1.1.2;

b) shall update the caller ID with the MCPTT user ID of the caller IE as received in the PRIVATE CALL SETUP REQUEST message;

c) shall update the callee ID with own MCPTT user ID;

d) shall update the received floor control indication with the Use floor control indication IE as received in the PRIVATE CALL SETUP REQUEST message;

e) shall generate a PRIVATE CALL ACCEPT message as specified in subclause 15.1.7:

i) shall set the Call identifier IE to the stored call identifier;

ii) shall set the MCPTT user ID of the callee IE with stored callee ID;

iii) shall set the MCPTT user ID of the caller IE with stored caller ID;

iv) shall set the Use floor control indication IE with the stored sent floor control indication; and

v) shall set the SDP answer IE with the stored emergency answer SDP.

f) shall set the ProSe per-packet priority to the value corresponding to MCPTT off-network emergency private call as described in 3GPP TS 24.383 [45];

g) shall send PRIVATE CALL ACCEPT message in response to the request message according to rules and procedures as specified in subclause 11.2.1.1.1;

h) shall start floor control as terminating floor participant as specified in subclause 7.2 in 3GPP TS 24.380 [5], if both the stored received floor control indication and sent floor control indication are set to "TRUE" ; and

i) shall enter the "Q2: in-progress emergency private call" state.

2) if the media session declared in SDP body of PRIVATE CALL SETUP REQUEST message cannot be established:

a) shall generate a PRIVATE CALL REJECT message as specified in subclause 10.2.3.8;

b) shall set the call identifier IE with the call identifier in the received message;

c) shall set the MCPTT user ID of the caller IE with the caller ID in the received message;

d) shall set the MCPTT user ID of the callee IE with the callee ID in the received message;

d) shall set the reason IE as "REJECT";

e) shall send a PRIVATE CALL REJECT message in response to the request message according to rules and procedures as specified in subclause 11.2.1.1.1; and

f) shall remain in the current state.

#### 11.2.3.4.6       Downgrade call

##### 11.2.3.4.6.1             User cancels the emergency private call

When in the "Q2: in-progress emergency private call" state, upon an indication from caller of the emergency private call, to cancel the emergency private call, the MCPTT client:

1) shall generate a PRIVATE CALL EMERGENCY CANCEL message as specified in subclause 15.1.12;

    a) shall set the Call identifier IE to the stored call identifier;

    b) shall set the MCPTT user ID of the caller IE with the stored caller; and

    c) shall set the MCPTT user ID of the callee IE with the stored callee.

2) shall send the PRIVATE CALL EMERGENCY CANCEL message according to rules and procedures as specified in subclause 11.2.1.1.1;

3) shall start timer TFP6 (emergency private call cancel retransmission); and

4) shall enter the "Q1: in-progress private call" state.

##### 11.2.3.4.6.2             Emergency private call cancel retransmission

When in the "Q1: in-progress private call" state, upon expiry of timer TFP6 (emergency private call cancel retransmission), the MCPTT client:

1) shall generate a PRIVATE CALL EMERGENCY CANCEL message as specified in subclause 15.1.12;

    a) shall set the Call identifier IE to the stored call identifier;

    b) shall set the MCPTT user ID of the caller IE with the stored caller ID; and

    c) shall set the MCPTT user ID of the callee IE with store callee ID.

2) shall send the PRIVATE CALL EMERGENCY CANCEL message according to rules and procedures as specified in subclause 11.2.1.1.1;

3) shall start timer TFP6 (emergency private call cancel retransmission); and

4) shall remain in the "Q1: in-progress private call" state.

##### 11.2.3.4.6.3             Emergency private call cancel accepted

When in the "Q1: in-progress private call" state, upon receiving a PRIVATE CALL EMERGENCY CANCEL ACK message response to PRIVATE CALL EMERGENCY CANCEL message with the same "call identifier", the MCPTT client:

1) shall stop timer TFP6 (emergency private call cancel retransmission), if running;

2) shall establish a media session based on the SDP body of the stored answer SDP;

3) shall set the ProSe per-packet priority to the value corresponding to MCPTT off-network private call as described in 3GPP TS 24.383 [45]; and

4) shall remain in the "Q1: in-progress private call" state.

##### 11.2.3.4.6.4             No response to emergency private call cancel

In the "Q1: in-progress private call" state, when timer TFP6 (emergency private call cancel retransmission) expires for a configurable number of times, the MCPTT client:

1) shall release the stored current call type;

2) shall release the stored Prose per-packet priority; and

3) shall enter "Q0: waiting for the call to be established".

#### 11.2.3.4.6.5 Responding to emergency private call cancel

When in the "Q1: in-progress private call" or "Q2: in-progress emergency private call", upon receiving a PRIVATE CALL EMERGENCY CANCEL message with the same "call identifier" IE, the MCPTT client:

1) shall generate a PRIVATE CALL EMERGENCY CANCEL ACK as specified in subclause 15.1.13:

   a) shall set the Call identifier IE to the stored call identifier;

   b) shall set the MCPTT user ID of the callee IE with own MCPTT user ID; and

   c) shall set the MCPTT user ID of the caller IE with MCPTT user ID of the caller IE in received message;

2) shall send PRIVATE CALL EMERGENCY CANCEL ACK message according to rules and procedures as specified in subclause 11.2.1.1.1;

3) shall establish a media session based on the SDP body of the stored answer SDP;

4) shall set the ProSe per-packet priority to the value corresponding to MCPTT off-network private call as described in 3GPP TS 24.383 [45]; and

5) shall enter the "Q1: in-progress private call" state if current state is the "Q2: in-progress emergency private call" state.

### 11.2.3.4.7 Call Release

When in state "Q1: in-progress private call" or "Q2: in-progress emergency private call", upon receiving an indication from MCPTT user to release the call or upon receiving PRIVATE CALL RELEASE message, the MCPTT client:

1) shall release the stored current call type;

2) shall release the stored Prose per-packet priority; and

3) shall enter "Q0: waiting for the call to be established".

### 11.2.3.4.8 Error handling

#### 11.2.3.4.8.1 Unexpected MONP message received

Upon receiving a MONP message in a state where there is no handling specified for the MONP message, the MCPTT client shall discard the MONP message.

#### 11.2.3.4.8.2 Unexpected indication from MCPTT user

Upon receiving an indication from the MCPTT user in a state where there is no handling specified for the indication, the MCPTT client shall ignore the indication.

#### 11.2.3.4.8.3 Unexpected expiration of a timer

Upon expiration of a timer in a state where there is no handling specified for expiration of the timer, the MCPTT client shall ignore the expiration of the timer.

# 12 Emergency alert

## 12.0 General

This subclause describes the emergency alert procedures for on-network and off-network.

For on-network emergency alert, the procedures for each originating MCPTT client is specified in subclause 12.1. The procedures for other entities shall be performed as defined in subclause 10.1 for on-network group call and in subclause 11.1 for on-network private call.

For off-network emergency alert, the procedures for each functional entity is specified in subclause 12.2.

# 12.1 On-network emergency alert

<span style="color:red">Editor's Note [CT1#95-bis, C1-160423]: whether or not the use of SIP MESSAGE for conveying application data is appropriate is a global issue for MCPTT. This subclause may need updating pending a definitive decision on this issue.</span>

Upon receiving a request from the MCPTT user to send an MCPTT emergency alert to the indicated MCPTT group and the MCPTT user is authorised to do so, the MCPTT client shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [4] and IETF RFC 3428 [33] with the clarifications given below.

NOTE 1: this SIP MESSAGE request is assumed to be sent out-of-dialog.

The MCPTT client:

1) shall include an Accept-Contact header field containing the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

2) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcptt" (coded as specified in 3GPP TS 24.229 [4]), in a P-Preferred-Service header field according to IETF RFC 6050 [9] in the SIP INVITE request;

3) shall include an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt" along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

4) may include a P-Preferred-Identity header field in the SIP MESSAGE request containing a public user identity as specified in 3GPP TS 24.229 [4];

<span style="color:red">Editor's Note [CT1#95-bis, C1-160423]: The P-Preferred-Identity field will contain the IMPU and this is not necessarily the MCPTT ID. It has not yet been agreed on how the MCPTT ID will be conveyed by the MCPTT client. It may be included in a MIME body (e.g., as an element in mcpttinfo) and encrypted when the confidentiality of sensitive application data is required or by some other mechanism yet to be determined.</span>

5) shall include a Content-Type header field with the value "multipart/mixed" as specified in IETF RFC 2046 [21];

6) shall include a Content-Type header field set to "application/vnd.3gpp.mcptt-info+xml";

7) shall include an "application/vnd.3gpp.mcptt-info+xml" MIME body as specified in Annex F.1 with the <mcpttinfo> element containing the <mcptt-Params> element with:

    a) the <mcptt-request-uri> element set to the group identity; and

    b) the <alert-ind> element set to a value of "true";

8) shall include a Content-Type header field set to "application/vnd.3gpp.location-info+xml";

9) shall include an "application/vnd.3gpp.location-info+xml" MIME body as specified in Annex F.3 with a <Report> element included in the <location-info> root element;

10) shall include in the <Report> element the specific location information configured for the MCPTT emergency alert location trigger;

<span style="color:red">Editor's Note [CT1#95-bis, C1-160423]: the "application/vnd.3gpp.location-info+xml" schema is not complete yet. It is assumed that it will in time include a data element which can contain the actual location information.</span>

11) shall set the MCPTT emergency state if not already set;

12) shall set the MCPTT emergency alert state to "MEA 2: emergency-alert-confirm-pending";

NOTE 2:  the assumption here is that the MCPTT client is to have no more than one outstanding MCPTT emergency alert at a time.

13) shall set the Request-URI to the public service identity identifying the participating MCPTT function serving the group identity; and

14) shall send the SIP MESSAGE request according to rules and procedures of 3GPP TS 24.229 [4];

On receiving a SIP 2xx response to the SIP MESSAGE request, the MCPTT client shall set the MCPTT emergency alert state to "MEA 3: emergency-alert-initiated"; or

On receiving a SIP 4xx response to the SIP MESSAGE request, the MCPTT client shall set the MCPTT emergency alert state to "MEA 1: no-alert".

NOTE 3:  the MCPTT emergency state is left set in this case as the MCPTT user presumably is in the best position to determine whether or not they are in a life-threatening condition. The assumption is that the MCPTT user can clear the MCPTT emergency state manually if need be.

# 12.2     Off-network emergency alert

## 12.2.1    General

## 12.2.2    Basic state machine

### 12.2.2.1     General

### 12.2.2.2     Emergency alert state machine

The figure 12.2.2.2-1 gives an overview of the main states and transitions on the UE for emergency alert.

Each emergency alert state machine is per MCPTT client.
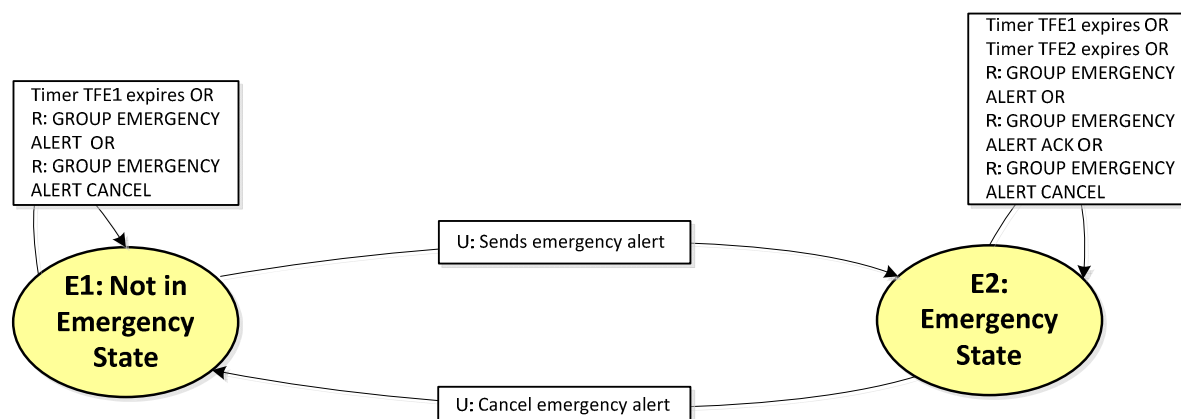


**Figure 12.2.2.2-1: Emergency alert state machine**

The following pieces of information are associated with the emergency alert state machine:

a)  the stored emergency state of the MCPTT client;

NOTE:      The emergency alert state machine is referred by the MCPTT off-network group call and MCPTT off-network private call procedures.

### 12.2.2.3 Emergency alert states

#### 12.2.2.3.1 E1: Not in emergency state

This state is the start state of this state machine.

The UE stays in this state while not in emergency state.

#### 12.2.2.3.2 E2: Emergency state

This state exists for UE, when the UE has sent a GROUP EMERGENCY ALERT message.

## 12.2.3 Procedures

### 12.2.3.1 Originating user sending emergency alert

When in state "E1: Not in emergency state", upon receiving an indication from the MCPTT user to transmit an emergency alert, the MCPTT client:

1) shall set the stored emergency state as "true";

2) shall set the stored MCPTT group ID to the indicated MCPTT group ID;

3) shall generate a GROUP EMERGENCY ALERT message as specified in subclause 15.1.16. In the GROUP EMERGENCY ALERT message, the MCPTT client:

   a) shall set the MCPTT group ID IE to the stored MCPTT group ID;

   b) shall set the Originating MCPTT user ID IE to own MCPTT user ID;

   c) shall set the Organization name IE to own organization name; and

   d) may set the User location IE with client's current location, if requested;

4) shall send the GROUP EMERGENCY ALERT message as specified in subclause 10.2.1.1.1;

5) shall start timer TFE2 (emergency alert retransmission); and

6) shall enter "E2: Emergency state" state.

### 12.2.3.2 Emergency alert retransmission

When in state "E2: Emergency state", upon expiry of timer TFE2 (emergency alert retransmission), the MCPTT client:

1) shall generate a GROUP EMERGENCY ALERT message as specified in subclause 10.2.3.16. In the GROUP EMERGENCY ALERT message, the MCPTT client:

   a) shall set the MCPTT group ID IE to the stored MCPTT group ID;

   b) shall set the originating MCPTT user ID IE to own MCPTT user ID;

   c) shall set the Organization name IE to own organization name; and

   d) may set the Location IE with client's current location, if requested; and

2) shall send the GROUP EMERGENCY ALERT message as specified in subclause 10.2.1.1.1;

3) shall start the timer TFE2 (emergency alert retransmission); and

4) shall remain in the current state.

### 12.2.3.3     Terminating user receiving emergency alert

When in state "E1: Not in emergency state" or in "E2: Emergency state", upon receiving a GROUP EMERGENCY ALERT message with the Originating MCPTT user ID IE not stored in the list of users in emergency, the MCPTT client:

1) shall store the Originating MCPTT user ID IE and location IE in the list of users in emergency;

2) shall generate a GROUP EMERGENCY ALERT ACK message as specified in subclause 15.1.17. In the GROUP EMERGENCY ALERT ACK message, the MCPTT client:

    a) shall set the MCPTT group ID IE to the MCPTT group ID IE of the received GROUP EMERGENCY ALERT message;

    b) shall set the sending MCPTT user ID IE to own MCPTT user ID; and

    c) shall set the originating MCPTT user ID IE to the Originating MCPTT user ID IE of the received GROUP EMERGENCY ALERT message; and

3)  shall send the GROUP EMERGENCY ALERT ACK message as specified in subclause 10.2.1.1.1;

4) shall start timer TFE1 (Emergency Alert); and

5) shall remain in the current state.

    NOTE:     Each instance of timer TFE1 is per MCPTT user ID.

### 12.2.3.4     Terminating user receiving retransmitted emergency alert

When in state "E1: Not in emergency state" or in "E2: Emergency state", upon receiving a GROUP EMERGENCY ALERT message with the Originating MCPTT user ID IE stored in the list of users in emergency and Location IE different than the stored location of the user, the MCPTT client:

1) may update the stored location of the user with the received Location IE;

2) shall restart the associated timer TFE1 (Emergency Alert); and

3) shall remain in the current state.

### 12.2.3.5     Originating user cancels emergency alert

When in "E2: Emergency state", upon receiving an indication from the MCPTT user to cancel an emergency alert, the MCPTT client:

1) shall set the stored emergency state as "false";

2) shall generate a GROUP EMERGENCY ALERT CANCEL message as specified in subclause 15.1.18. In the GROUP EMERGENCY ALERT CANCEL message, the MCPTT client:

    a) shall set the MCPTT group ID IE to the stored MCPTT group ID; and

    b) shall set the Originating MCPTT user ID IE to own MCPTT user ID; and

3)  shall send the GROUP EMERGENCY ALERT CANCEL message as specified in subclause 10.2.1.1.1; and

4) shall enter "E1: Not in emergency state" state.

### 12.2.3.6     Terminating user receives GROUP EMERGENCY ALERT CANCEL message

When in state "E1: Not in emergency state" or in "E2: Emergency state", upon receiving a GROUP EMERGENCY ALERT CANCEL message with the Originating MCPTT user ID IE stored in the list of users in emergency, the MCPTT client:

1) shall remove the MCPTT user ID and associated location information from the stored list of users in emergency;

2) shall generate a GROUP EMERGENCY ALERT CANCEL ACK message as specified in subclause 15.1.19. In the GROUP EMERGENCY ALERT CANCEL ACK message, the MCPTT client:

    a) shall set the MCPTT group ID IE to the MCPTT group ID IE of the received GROUP EMERGENCY ALERT CANCEL message; and

    b) shall set the sending MCPTT user ID IE to own MCPTT user ID; and

    c) shall set the originating MCPTT user ID IE to the originating MCPTT user ID of the received GROUP EMERGENCY ALERT message; and

3)  shall send the GROUP EMERGENCY ALERT CANCEL ACK message as specified in subclause 10.2.1.1.1; and

4) shall remain in the current state.

### 12.2.3.7      Implicit emergency alert cancel

When in state "E1: Not in emergency state" or in "E2: Emergency state", upon expiry of timer TFE1 (Emergency Alert) associated with a stored MCPTT user ID, the MCPTT client:

1) shall remove the MCPTT user ID and associated location information from the stored list of users in emergency; and

2) shall remain in the current state.

# 13      Location procedures

## 13.1      General

If the participating MCPTT function needs to obtain location information the participating MCPTT function configures the MCPTT client when the participating MCPTT function receives a third-party REGISTER request where the MCPTT client SIP URI is in the To header field. The configuration contains information the MCPTT client uses to set up filter criteria for when the MCPTT client shall send location reports to the participating MCPTT function.

The participating MCPTT function can also explicitly request the MCPTT client to send a location report.

The MCPTT client will, based on the received configuration or when explicitly requested, send location reports.

The location information is used by the participating MCPTT function to determine whether to use MBMS bearers or not as described in clause 14.

## 13.2      Participating MCPTT function location procedures

### 13.2.1      General

The participating MCPTT function has procedures to:

-      configure the location reporting at the UE;

-      request the UE to report the location of the UE; and

-      receive a location information report from the UE.

### 13.2.2      Location reporting configuration

Upon receipt of a third-party SIP REGISTER request for an MCPTT client, the participating MCPTT function may configure the location reporting in the MCPTT client by generating a SIP MESSAGE request in accordance with 3GPP TS 24.229 [4] and IETF RFC 3428 [33]. The participating MCPTT function:

1) shall include a Request-URI set to the URI received in the To header field in the third-party SIP REGISTER request;

2) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref set to the value "urn:urn-7:3gpp-service.ims.icsi.mcptt" along with parameters "require" and "explicit" in accordance with IETF RFC 3841 [6];

3) shall include a Content-Type header field with multipart/mixed, as specified in IETF RFC 2046 [21] with a boundary parameter set to "mcptt" and insert:

   a) within a first "mcptt" boundary, a Content-Type header field set to "application/vnd.3gpp.mcptt-info+xml" and an mcptt-info MIME body with an <mcptt-request-uri> element containing the MCPTT ID of the MCPTT user to receive the configuration; and

   b) within a second "mcptt" boundary a Content-Type header field set to "application/vnd.3gpp.mcptt-location-info+xml" and a location-info MIME body with the <Configuration> element contained in the <location-info> root element set to the desired configuration;

4) shall include the TriggerId attribute where defined for the sub-elements defining the trigger criterion ;

Editor's Note [CT1#95-bis, C1-160453]: Exact coding of the <Configuration> element is for further study.

5) shall include the public service identity of the participating MCPTT function in the P-Asserted-Identity header field;

6) shall include a P-Asserted-Service header field with the value "urn:urn-7:3gpp-service.ims.icsi.mcptt"; and

7) shall send the SIP MESSAGE request as specified in 3GPP TS 24.229 [4].

## 13.2.3    Location information request

If the participating MCPTT function needs to request the MCPTT client to report its location, the participating MCPTT functions shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [4] and IETF RFC 3428 [33]. The participating MCPTT function:

1) shall include a Request-URI set to the URI received in the To header field in the third-party SIP REGISTER request;

2) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref set to the value "urn:urn-7:3gpp-service.ims.icsi.mcptt" along with parameters "require" and "explicit" in accordance with IETF RFC 3841 [6];

3) shall include a Content-Type header field with multipart/mixed, as specified in IETF RFC 2046 [21] with a boundary parameter set to "mcptt" and insert:

   a) within a first "mcptt" boundary, a Content-Type header field set to "application/vnd.3gpp.mcptt-info+xml" and an mcptt-info MIME body with an <mcptt-request-uri> element containing the MCPTT ID of the MCPTT user; and

   b) within a second "mcptt" boundary a Content-Type header field set to "application/vnd.3gpp.mcptt-location-info+xml" and a location-info MIME body with a <Request> element contained in the <location-info> root element;

4) shall include a P-Asserted-Service header field with the value "urn:urn-7:3gpp-service.ims.icsi.mcptt"; and

5) shall send the SIP MESSAGE request as specified in 3GPP TS 24.229 [4].

## 13.2.4    Location information report

If the participating MCPTT function receives a SIP request containing:

1) a Content-Type header field set to "application/vnd.3gpp.mcptt-location-info+xml"; and

2) an "application/vnd.3gpp.mcptt-location-info+xml" MIME body with a <Report> element included in the <location-info> root element;

then the participating MCPTT function shall authorise the location report based on the MCPTT ID received. If the MCPTT user is authorised to send a location report the participating MCPTT function:

1) shall use the location information as needed.

NOTE: The <Report> element contains the event triggering identity in the location information report from the UE, and can contain location information.

## 13.2.5 Abnormal cases

Upon receipt of a SIP request:

1) where the P-Asserted-Identity identifies a public user identity not associated with an MCPTT user served by the participating MCPTT function; or

2) with a MIME body with Content-Type header field set to "application/vnd.3gpp.mcptt-info+xml" and with a <mcptt-request-URI> element containing an MCPTT ID that identifies an MCPTT user served by the participating MCPTT function;

then, when the SIP request request contains:

1) an Accept-Contact header field with the g.3gpp.mcptt media feature tag;

2) an Accept-Contact header field with the g.3gpp.icsi-ref media-feature tag with the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt"; and

3) an "application/vnd.3gpp.location-info+xml" MIME body containing a <Request> element or a <Configuration> element;

the participating MCPTT function shall remove the "application/vnd.3gpp.location-info+xml" MIME body from the outgoing SIP request.

## 13.3 MCPTT client location procedures

### 13.3.1 General

The MCPTT client sends a location report when one of the trigger criteria is fulfilled or when it receives a request from the participating MCPTT function to send a location report. To send the location report the MCPTT client can use an appropriate SIP message that it needs to send for other reasons, or it can include the location report in a SIP MESSAGE request.

To send a location report, the MCPTT client includes in the SIP MESSAGE request an "application/vnd.3gpp.mcptt-location-info+xml" MIME body as specified in clause F.3. The MCPTT client populates the elements in accordance with its reporting configuration. Further location information may also be included in the P-Access-Network-Info header field.

### 13.3.2 Location reporting configuration

Upon receiving a SIP MESSAGE request containing:

1) an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref set to the value "urn:urn-7:3gpp-service.ims.icsi.mcptt";

2) a Content-Type header field set to "application/vnd.3gpp.mcptt-location-info+xml"; and

3) an "application/vnd.3gpp.mcptt-location-info+xml" MIME body with a <Configuration> root element included in the <location-info> root element;

then the MCPTT client:

1) shall store the contents of the <Configuration> elements;

2)  shall set the location reporting triggers accordingly; and

3)  shall start the minimumReportInterval timer.

## 13.3.3    Location information request

Upon receiving a SIP MESSAGE request containing

1)  an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref set to the value "urn:urn-7:3gpp-service.ims.icsi.mcptt";

2)  a Content-Type header field set to "application/vnd.3gpp.mcptt-location-info+xml"; and

3)  an "application/vnd.3gpp.mcptt-location-info+xml" MIME body with a <Request> element included in the <location-info> root element;

then the MCPTT client:

1)  shall send a location report as specified in subclause 13.3.4; and

2)  shall reset the minimumReportInterval timer.

## 13.3.4    Location information report

### 13.3.4.1    Report triggering

If a location reporting trigger fires the MCPTT client checks if the minimumReportInterval timer is running. If the timer is running the MCPTT client waits until the timer expires. When the minimumReportInterval timer fires, the MCPTT client:

1)  shall, if any of the reporting triggers are still true send a location report as specified in subclause 13.3.4.2.

If the MCPTT client receives a location information request as specified in subclause 13.3.3, the MCPTT client shall send a location report as specified in subclause 13.3.4.2.

### 13.3.4.2    Sending location information report

If the MCPTT client needs to send a SIP request for other reasons (e.g. a SIP MESSAGE request containing an MBMS listening report as described in clause 12), the MCPTT client:

1)  if more than one MIME body will be included in the SIP request and if not already included, shall include the Content-Type header field with the value "multipart/mixed" as specified in IETF RFC 2046 [21];

2)  shall include a Content-Type header field set to "application/vnd.3gpp.mcptt-location-info+xml";

3)  shall include an "application/vnd.3gpp.mcptt-location-info+xml" MIME body and in the <location-info> root element the MCPTT client shall include:

   a)  a <Report> element and if the Report was triggered by a location request include the <ReportID> attribute set to the value of the of the <RequestID> attribute in the received Request;

   b)  <TriggerId> child elements, where each element is set to the value of the <Trigger-Id> attribute associated with the trigger that have fired; and

   c)  the location reporting elements corresponding to the triggers that have fired;

4)  shall set the minimumReportInterval timer to the minimumReportInterval time and start the timer; and

5)  shall reset all triggers.

If the MCPTT client does not need to send a SIP request for other reasons, the MCPTT client shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [4] and IETF RFC 3428 [33]. The MCPTT client;

1) shall include in the Request-URI, the SIP URI received in the P-Asserted-Identity header field in the received SIP MESSAGE request for location report configuration;

2) shall include a Content-Type header field set to "application/vnd.3gpp.mcptt-location-info+xml";

3) shall include an "application/vnd.3gpp.mcptt-location-info+xml" MIME body and in the <location-info> root element include:

   a) a <Report> element and if the Report was triggered by a location request include the <ReportID> attribute set to the value of the of the <RequestID> attribute in the received Request;

   b) a <TriggerId> child element set to the value of each <Trigger-Id> value of the triggers that have fired; and

   c) the location reporting elements corresponding to the triggers that have fired;

4) shall include an Accept-Contact header field with the media feature tag g.3gpp.mcptt along with parameters "require" and "explicit" in accordance with IETF RFC 3841 [6];

5) shall set the minimumReportInterval timer to the minimumReportInterval time and start the timer;

6) shall reset all triggers; and

7) shall send the SIP MESSAGE request as specified in 3GPP TS 24.229 [4].

# 14 MBMS transmission usage procedure

## 14.1 General

This clause describes the participating MCPTT function and the MCPTT client procedure for:

1) MBMS bearer announcements; and

2) MBMS bearer listening status.

## 14.2 Participating MCPTT function MBMS usage procedures

### 14.2.1 General

This subclause describes the procedures in the participating MCPTT function for:

1) sending an MBMS bearer announcements to the MCPTT client; and

2) receiving an MBMS bearer listening status from the MCPTT client.

### 14.2.2 Sending MBMS bearer announcement procedures

#### 14.2.2.1 General

The availability of pre-activated MBMS bearer is announced to MCPTT clients by means of an MBMS bearer announcement. One or more MBMS bearer announcements are included in an "application/vnd.3gpp.mcptt-mbms-usage-info+xml" MIME body.

An MBMS bearer announcement message can contain new MBMS bearer announcements, updated MBMS bearer announcements or cancelled MBMS bearer announcements or a mix of all of them at the same time in an "application/vnd.3gpp.mcptt-mbms-usage-info+xml" MIME body.

NOTE: A new MBMS bearer announcement does not implicitly remove previously sent MBMS bearer announcements if the previously sent MBMS bearer announcement is not included in an MBMS bearer announcement message.

When and to whom the participating MCPTT function sends the MBMS bearer announcement is based on local policy in the participating MCPTT function.

The following subclauses describe how the participating MCPTT function:

1. sends an initial MBMS bearer announcement;

2. updates a previously sent announcement; and

3. cancels a previously sent announcement.

## 14.2.2.2 Sending an initial MBMS bearer announcement procedure

For each MCPTT client that the participating MCPTT function is sending an MBMS bearer announcement to, the participating MCPTT function:

1) shall generate an SIP MESSAGE request in accordance with 3GPP TS 24.229 [4] and IETF RFC 3428 [33];

2) shall set the Request-URI to the public service identity identifying the participating MCPTT function serving the MCPTT user;

3) shall include an Accept-Contact header field containing the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

4) shall include an Accept-Contact header field with the g.3gpp.icsi-ref media-feature tag with the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt" along with parameters "require" and "explicit" according to IETF RFC 3841 [6];

5) shall include a P-Asserted-Service header field with the value "urn:urn-7:3gpp-service.ims.icsi.mcptt";

6) shall include the Content-Type header field with the value "multipart/mixed" as specified in IETF RFC 2046 [21];

7) shall include one "application/sdp" MIME body conforming to 3GPP TS 24.229 [4] where the "application/sdp" MIME body and:

   a) shall include the Content-Type header field set to "application/sdp";

   b) shall include the Content-Disposition header field with the value "render"; and

   c) should include one or more" m=audio" media lines and media line attributes as defined in 3GPP TS 24.380 [5] to be used as the MBMS subchannel for audio and media control. Additional the participating MCPTT function:

      i) shall set c-line to the unspecified address (0.0.0.0), if IPv4, or to a domain name within the ".invalid" DNS top-level domain, if IPv6;

      ii) shall set port number of the media line to 9;

      ii) shall include the "a=rtp-mux" attribute as specified in IETF RFC 5761 [39]; and

      iii) shall include the "a=rtcp:9" as specified in IETF RFC 5761 [39].

   d) should include one or more" m=audio" media lines and media line attributes as defined in 3GPP TS 24.380 [5] to be used as the MBMS subchannel for audio only. Additional the participating MCPTT function:

      i) shall set the c-line to the unspecified address (0.0.0.0), if IPv4, or to a domain name within the ".invalid" DNS top-level domain, if IPv6; and

      ii) shall set the port number of the media line to 9;

   NOTE 1: If an MBMS subchannel for audio only is included, the "a=rtp-mux" and "a=rtcp:" attributes are not included in the media line.

   e)  shall include one "m=application" media line as defined in 3GPP TS 24.380 [5] to be used as the general purpose MBMS subchannel. The media line shall include a valid IP address and a valid port number; and

NOTE 2:  The media parameters to be used by the MBMS subchannel for media is included in the Map Group To Bearer message defined in 3GPP TS 24.380 [5] and not included in this "application/sdp" MIME body.

   f)  if "m=audio" media lines to be used in an MBMS subchannel for audio only are included above, shall include one or more "m=application" media line as defined in 3GPP TS 24.380 [5] to be used as the MBMS subchannel for floor control messages. The media line:

      i)  shall set c-line to the unspecified address (0.0.0.0), if IPv4, or to a domain name within the ".invalid" DNS top-level domain, if IPv6; and

      ii) shall set the port number of the media line to 9;

NOTE 3:  The use of a separate MBMS subchannel for floor control is optional. When a separate MBMS subchannel for floor control is not used, floor control messages are sent in the MBMS subchannel for media.

8)  shall include one or more <announcement> elements associated with the pre-activated MBMS bearers in the "application/vnd.3gpp.mcptt-mbms-usage-info+xml" MIME body as defined in clause F.2. Each set of an <announcement> element:

   a)  shall include a TMGI value in the <TMGI> element;

NOTE 4:  The same TMGI value can only appear in one <announcement> element. The TMGI value is also used to identify the <announcement> when updating or cancelling the <announcement> element.

   b)  shall include the MBSFN area id in the <MBSFN-area-id> element, if known;

Editor's Note [CT1#96, C1-16520]: This usage of MBSFN needs to be clarified.

   c)  shall include the QCI value in the <QCI> element;

   d)  if multiple carriers are supported, shall include the frequency to be used in the <frequency> element;

NOTE 5:  In the current release if the <frequency> element is included, the frequency in the <frequency> element is the same as the frequency used for unicast.

   e)  shall include one or more MBMS service area in the <mbms-service-area> elements; and

   f)  shall include the number of "m=application" media line to be used as the general purpose MBMS subchannel;

9)  shall include one <GPMS> element giving the number of "m=application" media line in the "application/sdp" MIME body generated in step 7 above to be used as the general purpose MBMS subchannel;

10) shall include the MBMS public service identity of the participating MCPTT function in the P-Asserted-Identity header field;

11) shall include in a MIME body with Content-Type header field set to "application/vnd.3gpp.mcptt-info+xml ", the <mcptt-request-uri> element set to the MCPTT ID of the user; and

12) shall send the SIP MESSAGE request towards the MCPTT client according to 3GPP TS 24.229 [4].

## 14.2.2.3    Updating an announcement

When the participating MCPTT function wants to update a previously sent announcement, the participating MCPTT function sends an MBMS bearer announcement in an SIP MESSAGE request as specified in subclause 14.2.2.2 where the participating MCPTT function in the <announcement> element to be updated:

1)  shall include the same TMGI value as in the MBMS bearer announcement to be updated in the <TMGI> element;

NOTE 1:  TMGI value is used to identify the <announcement> when updating or cancelling the <announcement> element and can't be changed.

2) shall include the MBSFN area id in the <MBSFN-area-id> element, if known,

3) shall include the same or an updated value of the QCI in the <QCI> element;

4) if a frequency was included in the previously sent announcement, shall include the same value in the <frequency> element;

NOTE 2: In the current release if the <frequency> element is included, the frequency in the <frequency> element is the same as the frequency used for unicast.

5) shall include the same list of MBMS service areas or an updated list of MBMS service areas in the <mbms-service-areas>;

6) shall include the <GPMS> element with the same value as in the initial <announcement> element; and

7) shall include the same "application/sdp" MIME body as included in the initial MBMS announcement.

## 14.2.2.4 Cancelling an MBMS bearer announcement

When the participating MCPTT function wants to cancel an MBMS bearer announcement associated with an <announcement> element, the participating MCPTT function sends an MBMS bearer announcement as specified in subclause 14.2.2.2 where the participating MCPTT function in the <announcement> element to be cancelled:

1) shall include the same TMGI value as in the <announcement> element to be cancelled in the <TMGI> element;

2) shall include the same value of the QCI in the <QCI> element;

3) shall include one <mbms-service-area> element set to "0";

4) if the "application/vnd.3gpp.mcptt-mbms-usage-info+xml" MIME body only contains <announcement> elements that are to be cancelled, shall not include an <GPMS> element; and

5) if the "application/vnd.3gpp.mcptt-mbms-usage-info+xml" MIME body only contains <announcement> elements that are to be cancelled, shall not include an "application/sdp" MIME body.

## 14.2.3 Receiving an MBMS bearer listening status from an MCPTT client

Upon receiving a "SIP MESSAGE request for an MBMS listening status update", the participating MCPTT function shall handle the request in accordance with 3GPP TS 24.229 [4] and IETF RFC 3428 [33].

If the SIP MESSAGE request contains the "application/vnd.3gpp.mcptt-mbms-usage-info+xml" MIME body with an <mbms-listening-status> element, the participating MCPTT function:

1) shall verify that the P-Asserted-Identity header field contains the MCPTT ID of an MCPTT user served by the participating MCPTT function and if that is the case:

    a) if the <mbms-listening-status> element is set to "listening":

       i) if <session-identifier> elements are included, shall indicate to the media plane that the MCPTT client in the session identified by the <session-identifier> element is now listening to the MBMS subchannel; and

       ii) if <general-purpose> element is included with the value "true", shall indicate to the media plane that the MCPTT client is now listening to the general purpose MBMS subchannel; and

    b) if the <mbms-listening-status> element is set to "not-listening":

       i) if <session-identifier> elements are included, shall indicate to the media plane that the MCPTT client in the sessions identified by the <session-identifier> elements is not listening to the MBMS subchannel; and

       ii) if <general-purpose> element is included with the value "false", shall indicate to the media plane that the MCPTT client is no longer listening to the general purpose MBMS bearer.

NOTE: If the MCPTT client reports that the MCPTT client is no longer listening to the general purpose MBMS subchannel it is implicitly understood that the MCPTT client no longer listens to any MBMS subchannel in ongoing conversations that the MCPTT client previously reported status "listening".

## 14.2.4    Abnormal cases

Upon receipt of a SIP MESSAGE request:

1.  where the P-Asserted-Identity identifies a public user identity not associated with MCPTT user served by the participating MCPTT function; or

2.  with a MIME body with Content-Type header field set to "application/vnd.3gpp.mcptt-info+xml" and with a <mcptt-request-URI> element containing an MCPTT ID that identifies an MCPTT user served by the participating MCPTT function;

then, when the SIP MESSAGE request contains:

1.  an Accept-Contact header field with the g.3gpp.mcptt media feature tag;

2.  an Accept-Contact header field with the g.3gpp.icsi-ref media-feature tag with the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt"; and

3.  an "application/vnd.3gpp.mcptt-mbms-usage-info+xml" MIME body containing an <mbms-usage-info> element;

the participating MCPTT function shall send a SIP 403 (Forbidden) response as specified in 3GPP TS 24.229 [4].

# 14.3    MCPTT client MBMS usage procedures

## 14.3.1    General

This subclause describes the procedures in the MCPTT client for:

1)  receiving an MBMS bearer announcement from the participating MCPTT function; and

2)  sending an MBMS bearer listening status to the participating MCPTT function.

## 14.3.2    Receiving an MBMS bearer announcement

When the MCPTT client receives an SIP MESSAGE request containing:

1)  an Accept-Contact header field with the g.3gpp.mcptt media feature tag;

2)  an Accept-Contact header field with the g.3gpp.icsi-ref media-feature tag with the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt";

3)  P-Asserted-Service header field containing the "urn:urn-7:3gpp-service.ims.icsi.mcptt"; and

4)  an "application/vnd.3gpp.mcptt-mbms-usage-info+xml" MIME body containing an <mbms-usage-info> element;

then the MCPTT client for each <announcement> element in the "application/vnd.3gpp.mcptt-mbms-usage-info+xml" MIME body:

1) if the <mbms-service-areas> elements contain a value different from "0":

   a)  if an <announcement> element with the same value of the <TMGI> element is already stored:

      i)  shall replace the old <announcement> element with the <announcement> element received in the "application/vnd.3gpp.mcptt-mbms-usage-info+xml" MIME body;

   b)  if there is no <announcement> element with the same value of the <TMGI> element stored:

      i)  shall store the received <announcement> element;

   c)  shall associate the received announcement with the received "application/sdp" MIME body;

   d)  shall associate the received announcement with the received <GPMS> element;

e)  shall store the MBMS public service identity of the participating MCPTT function received in the P-Asserted-Identity header field and associate the MBMS public service identity with the new <announcement> element;

f)  shall listen to the general purpose MBMS subchannel defined in the "m=application" media line in the "application/sdp" MIME body in the received SIP MESSAGE request when entering an MBMS service area where the announced MBMS bearer is available; and

g)  shall check the condition for sending a listening status report as specified in the subclause 14.3.3; and

2)  if the <mbms-service-areas> element contains a value equal to "0":

a)  shall discard a previously stored <announcement> element identified by the value of the <TMGI>;

b)  shall remove the association with the stored "application/sdp" MIME body and stop listening to the general purpose MBMS subchannel;

c)  if no more <announcement> elements associated with the stored "application/sdp" MIME body are stored in the MCPTT client, shall remove the stored "application/sdp" MIME body; and

d)  check the condition for sending a listening status report as specified in the subclause 14.3.3.

## 14.3.3   The MBMS bearer listening status report procedure

### 14.3.3.1     Conditions for sending an MBMS listening status report

If one of the following conditions is fulfilled:

1)  if the MCPTT client:

a)  receives a Map Group To Bearer message over the general purpose MBMS channel;

b)  participates in a group session identified by the Map Group To Bearer message; and

c)  the status "listening" is not already reported; or

2)  if the MCPTT client:

a)  receives an announcement as described in subclause 14.3.2;

b)  enters an MBMS service area where a general purpose MBMS is available; and

c)  experiences good MBMS bearer radio condition;

then the MCPTT client shall report that the MCPTT client is listening to the MBMS bearer as specified in subclause 14.3.3.2.

If one of the following conditions is fulfilled:

1)  if the MCPTT client:

a)  receives an MBMS bearer announcement as described in the subclause 14.3.2;

b)  the MBMS bearer announcement contains a cancellation of an <announcement> element identified by the same TGMI value as received in a Map Group To Bearer message in an ongoing conversation; and

c)  the status "not-listening" is not already reported;

2)  if the MCPTT client:

a)  receives an MBMS bearer announcement as described in the subclause 14.3.2;

b)  the MBMS bearer announcement contains a cancellation of an <announcement> element;

c)  does not participate in an ongoing conversation;

d) the MCPTT client has reported the "listening" status due to the availability of the general purpose MBMS subchannel in the <announcement> element; and

e) the status "not-listening" is not already reported; or

3. if the MCPTT client:

a) suffers from bad MBMS bearer radio condition, then the MCPTT client shall report that the MCPTT client is not listening to the MBMS subchannels as specified in subclause 14.3.3.2.

## 14.3.3.2 Sending the MBMS bearer listening status report

When the MCPTT client wants to report the MBMS bearer listening status, the MCPTT client:

NOTE 1: The "application/vnd.3gpp.mcptt-mbms-usage-info+xml" can contain both the listening status "listening" and "not listening" at the same time.

1. shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [4] and IETF RFC 3428 [33]; and

2. shall send the SIP MESSAGE request, the SIP MESSAGE request:

a) shall include in the Request-URI the MBMS public service identity of the participating MCPTT function received in the P-Asserted-Identity header field of the announcement message;

b) shall include an Accept-Contact header field containing the g.3gpp.mcptt media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [6];

c) shall include an Accept-Contact header field with the g.3gpp.icsi-ref media-feature tag with the value of "urn:urn-7:3gpp-service.ims.icsi.mcptt" along with parameters "require" and "explicit" according to IETF RFC 3841 [6];

d) should include the MCPTT ID in the P-Preferred-Identity header field;

e) shall include a P-Preferred-Service header field with the value "urn:urn-7:3gpp-service.ims.icsi.mcptt";

f) if the MCPTT client is listening to the MBMS bearer, the "application/vnd.3gpp.mcptt-mbms-usage-info+xml" MIME body:

i) shall include an <mbms-listening-status> element set to "listening";

ii) if the intention is to report that the MCPTT client is listening to the MBMS subchannel for an ongoing conversation in a session (e.g. as the response to the Map Group To Bearer message), shall include the MCPTT session identity of the ongoing conversation in <session-identity> element;

iii) shall include one or more <TGMI> elements for which the listening status applies; and

iv) if the intention is to report that the MCPTT client is listening to the general purpose MBMS subchannel, shall include the <general-purpose> element set to "true"; and

g) if the MCPTT client is not listening, the "application/vnd.3gpp.mcptt-mbms-usage-info+xml" MIME body:

i) shall include an <mbms-listening-status> element set to "not-listening";

iii) shall include one or more <TGMI> elements for which the listening status applies;

iii) if the intention is to report that the MCPTT client is no longer listening to the MBMS subchannel in an ongoing session (e.g. as the response to Unmap Group to Bearer message), shall include the MCPTT session identity in <session-identity> elements; and

iv) if the intention is to report that the MCPTT client is no longer listening to general purpose MBMS subchannel, shall include the <general-purpose> element set to "false".

NOTE 2: If the MCPTT client reports that the MCPTT client is no longer listening to the general purpose MBMS subchannel, it is implicitly understood that the MCPTT client no longer listens to any MBMS subchannel in ongoing conversations that the MCPTT client previously reported status "listening".

# 15 Off-network message formats

## 15.1 MONP message functional definitions and contents

### 15.1.1 General

### 15.1.2 GROUP CALL PROBE message

#### 15.1.2.1 Message definition

This message is sent by the UE to other UEs to check for an ongoing group call. For contents of the message see Table 15.1.2.1-1.

Message type: GROUP CALL PROBE

Direction: UE to other UEs

**Table 15.1.2.1-1: GROUP CALL PROBE message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|-----|---------------------|----------------|----------|--------|--------|
| | Group call probe message identity | Message type 15.2.2 | M | V | 1 |
| | MCPTT group ID | MCPTT group ID 15.2.5 | M | LV-E | 3-x |

### 15.1.3 GROUP CALL ANNOUNCEMENT message

#### 15.1.3.1 Message definition

This message is sent by the UE to other UEs to announce an ongoing group call to other UEs. For contents of the message see Table 15.1.3.1-1.

Message type: GROUP CALL ANNOUNCEMENT

Direction: UE to other UEs

**Table 15.1.3.1-1: GROUP CALL ANNOUNCEMENT message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|---|---|---|---|---|---|
| | Group call announcement message identity | Message type 15.2.2 | M | V | 1 |
| | Call identifier | Call identifier 15.2.3 | M | V | 2 |
| | Call type | Call type 15.2.11 | M | V | 1 |
| | Refresh interval | Refresh interval 15.2.4 | M | V | 2 |
| | MCPTT group ID | MCPTT group ID 15.2.5 | M | LV-E | 3-x |
| | SDP | SDP 15.2.6 | M | LV-E | 3-x |
| | Originating MCPTT user ID | MCPTT user ID 15.2.10 | M | LV-E | 3-x |
| | Call start time | Call start time 15.2.15 | M | V | 5 |
| yy | Last call type change time | Last call type change time 15.2.16 | M | V | 5 |
| zz | Last user to change call type | MCPTT User ID 10.2.4.10 | M | LV | 3-x |
| 80 | Confirm mode indication | Confirm mode indication 15.2.9 | O | TV | 1 |
| xx | Probe response | Probe response 15.2.17 | O | TV | 1 |

## 15.1.4 GROUP CALL ACCEPT message

### 15.1.4.1 Message definition

This message is sent by the UE to other UEs to indicate acceptance of a group call. For contents of the message see Table 15.1.4.1-1.

Message type: GROUP CALL ACCEPT

Direction: UE to other UEs

**Table 15.1.4.1-1: GROUP CALL ACCEPT message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|---|---|---|---|---|---|
| | Group call accept message identity | Message type 15.2.2 | M | V | 1 |
| | Call identifier | Call identifier 15.2.3 | M | V | 2 |
| | Call type | Call type 15.2.11 | M | V | 1 |
| | MCPTT group ID | MCPTT group ID 15.2.5 | M | LV-E | 3-x |
| | Sending MCPTT user ID | MCPTT user ID 15.2.10 | M | LV-E | 3-x |

## 15.1.5 PRIVATE CALL SETUP REQUEST message

### 15.1.5.1 Message definition

This message is sent by a UE to another UE to request setup of a private call. For contents of the message see Table 15.1.5.1-1.

Message type: PRIVATE CALL SETUP REQUEST

Direction:        UE to another UE

**Table 15.1.5.1-1: PRIVATE CALL SETUP REQUEST message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|-----|---------------------|----------------|----------|--------|--------|
|  | Private call setup request message identity | Message type 15.2.2 | M | V | 1 |
|  | Call identifier | Call identifier 15.2.3 | M | V | 2 |
|  | MCPTT user ID of the caller | MCPTT user ID 15.2.10 | M | LV-E | 3-x |
|  | MCPTT user ID of the callee | MCPTT user ID 15.2.10 | M | LV-E | 3-x |
|  | Commencement mode | Commencement mode 15.2.7 | M | V | 1 |
|  | Call type | Call type 15.2.11 | M | V | 1 |
|  | Use floor control indication | Floor control mode 15.2.12 | M | V | 1 |
|  | SDP offer | SDP 15.2.6 | M | LV-E | 3-x |
|  | User location | User location 15.2.13 | O | LV-E | 3-x |

## 15.1.6    PRIVATE CALL RINGING message

### 15.1.6.1      Message definition

This message is automatically sent by a UE to another UE in response to a PRIVATE CALL SETUP REQUEST message. This message indicates that the UE has presented the incoming call notification to the user and is awaiting user response. For contents of the message see Table 15.1.6.1-1.

Message type:    PRIVATE CALL RINGING

Direction:        UE to another UE

**Table 15.1.6.1-1: PRIVATE CALL RINGING message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|-----|---------------------|----------------|----------|--------|--------|
|  | Private call ringing message identity | Message type 15.2.2 | M | V | 1 |
|  | Call identifier | Call identifier 15.2.3 | M | V | 2 |
|  | MCPTT user ID of the caller | MCPTT user ID 15.2.10 | M | LV-E | 3-x |
|  | MCPTT user ID of the callee | MCPTT user ID 15.2.10 | M | LV-E | 3-x |

## 15.1.7    PRIVATE CALL ACCEPT message

### 15.1.7.1      Message definition

This message is sent by a UE to another UE in response to a PRIVATE CALL SETUP REQUEST message when user accepts the call. This message indicates that the UE accepts the call setup request. For contents of the message see Table 15.1.7.1-1.

Message type:    PRIVATE CALL ACCEPT

Direction:        UE to another UE

**Table 15.1.7.1-1: PRIVATE CALL ACCEPT message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|-----|---------------------|----------------|----------|--------|--------|
| | Private call accept message identity | Message type 15.2.2 | M | V | 1 |
| | Call identifier | Call identifier 15.2.3 | M | V | 2 |
| | MCPTT user ID of the caller | MCPTT user ID 15.2.10 | M | LV-E | 3-x |
| | MCPTT user ID of the callee | MCPTT user ID 15.2.10 | M | LV-E | 3-x |
| | Use floor control indication | Floor control mode 15.2.12 | M | V | 1 |
| | SDP answer | SDP 15.2.6 | M | LV-E | 3-x |

## 15.1.8    PRIVATE CALL REJECT message

### 15.1.8.1    Message definition

This message is sent by a UE to another UE in response to a PRIVATE CALL SETUP REQUEST message when user rejects the call. This message indicates that the UE rejects the call setup request. For contents of the message see Table 15.1.8.1-1.

Message type:    PRIVATE CALL REJECT

Direction:        UE to another UE

**Table 15.1.8.1-1: PRIVATE CALL REJECT message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|-----|---------------------|----------------|----------|--------|--------|
| | Private call reject message identity | Message type 15.2.2 | M | V | 1 |
| | Call identifier | Call identifier 15.2.3 | M | V | 2 |
| | MCPTT user ID of the caller | MCPTT user ID 15.2.10 | M | LV-E | 3-x |
| | MCPTT user ID of the callee | MCPTT user ID 15.2.10 | M | LV-E | 3-x |
| | Reason | Reason 15.2.8 | M | LV-E | 3-x |

## 15.1.9    PRIVATE CALL RELEASE message

### 15.1.9.1    Message definition

This message is sent by a UE to another UE to terminate an ongoing private call. For contents of the message see Table 15.1.9.1-1.

Message type:    PRIVATE CALL RELEASE

Direction:        UE to another UE

**Table 15.1.9.1-1: PRIVATE CALL RELEASE message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|---|---|---|---|---|---|
| | Private call release message identity | Message type 15.2.2 | M | V | 1 |
| | Call identifier | Call identifier 15.2.3 | M | V | 2 |
| | MCPTT user ID of the caller | MCPTT user id 15.2.10 | M | LV-E | 3-x |
| | MCPTT user ID of the callee | MCPTT user id 15.2.10 | M | LV-E | 3-x |

## 15.1.10 PRIVATE CALL RELEASE ACK message

### 15.1.10.1 Message definition

This message is sent by a UE to another UE in response to a PRIVATE CALL RELEASE message. This message indicates that the UE has terminated the call. For contents of the message see Table 15.1.10.1-1.

Message type: PRIVATE CALL RELEASE ACK

Direction: UE to another UE

**Table 15.1.10.1-1: PRIVATE CALL RELEASE ACK message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|---|---|---|---|---|---|
| | Private call release ack message identity | Message type 15.2.2 | M | V | 1 |
| | Call identifier | Call identifier 15.2.3 | M | V | 2 |
| | MCPTT user ID of the caller | MCPTT user id 15.2.10 | M | LV-E | 3-x |
| | MCPTT user ID of the callee | MCPTT user ID 15.2.10 | M | LV-E | 3-x |

## 15.1.11 PRIVATE CALL ACCEPT ACK message

### 15.1.11.1 Message definition

This message is sent by a UE to another UE in response to a PRIVATE CALL ACCEPT message. This message acknowledges the receipt of PRIVATE CALL ACCEPT message. For contents of the message see Table 15.1.11.1-1.

Message type: PRIVATE CALL ACCEPT ACK

Direction: UE to another UE

**Table 15.1.11.1-1: PRIVATE CALL ACCEPT ACK message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|---|---|---|---|---|---|
| | Private call accept ack message identity | Message type 15.2.2 | M | V | 1 |
| | Call identifier | Call identifier 15.2.3 | M | V | 2 |
| | MCPTT user ID of the caller | MCPTT user ID 15.2.10 | M | LV-E | 3-x |
| | MCPTT user ID of the callee | MCPTT user ID 15.2.10 | M | LV-E | 3-x |

Editor's note [CT1#94, C1-153926]: the security of the messages is FFS.

## 15.1.12 PRIVATE CALL EMERGENCY CANCEL message

### 15.1.12.1 Message definition

This message is sent by a UE to another UE to indicate termination of emergency mode in private call. For contents of the message see Table 15.1.12.1-1.

Message type: PRIVATE CALL EMERGENCY CANCEL

Direction: UE to another UE

**Table 15.1.12.1-1: PRIVATE CALL EMERGENCY CANCEL message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|-----|--------------------|----------------|----------|--------|--------|
| | Private call emergency cancel message identity | Message type 15.2.2 | M | V | 1 |
| | Call identifier | Call identifier 15.2.3 | M | V | 2 |
| | MCPTT user ID of the caller | MCPTT user ID 15.2.10 | M | LV-E | 3-x |
| | MCPTT user ID of the callee | MCPTT user ID 15.2.10 | M | LV-E | 3-x |

## 15.1.13 PRIVATE CALL EMERGENCY CANCEL ACK message

### 15.1.13.1 Message definition

This message is sent by a UE to another UE to indicate receipt of PRIVATE CALL EMERGENCY CANCEL message. For contents of the message see Table 15.1.13.1-1.

Message type: PRIVATE CALL EMERGENCY CANCEL ACK

Direction: UE to another UE

**Table 15.1.13.1-1: PRIVATE CALL EMERGENCY CANCEL ACK message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|-----|--------------------|----------------|----------|--------|--------|
| | Private call emergency cancel ack message identity | Message type 15.2.2 | M | V | 1 |
| | Call identifier | Call identifier 15.2.3 | M | V | 2 |
| | MCPTT user ID of the caller | MCPTT user ID 15.2.10 | M | LV-E | 3-x |
| | MCPTT user ID of the callee | MCPTT user ID 15.2.10 | M | LV-E | 3-x |

## 15.1.14 GROUP CALL IMMINENT PERIL END message

### 15.1.14.1 Message definition

This message is sent by the UE to other UEs to indicate termination of imminent peril mode in the group call. For contents of the message see Table 15.1.14.1-1.

Message type: GROUP CALL IMMINENT PERIL END

Direction: UE to other UEs

**Table 15.1.14.1-1: GROUP CALL IMMINENT PERIL END message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|-----|---------------------|----------------|----------|--------|--------|
| | Group call imminent peril end message identity | Message type 15.2.2 | M | V | 1 |
| | Call identifier | Call identifier 15.2.3 | M | V | 2 |
| | MCPTT group ID | MCPTT group ID 15.2.5 | M | LV-E | 3-x |
| | Sending MCPTT user ID | MCPTT user ID 15.2.10 | M | LV-E | 3-x |
| yy | Last call type change time | Last call type change time 15.2.16 | M | V | 5 |
| zz | Last user to change call type | MCPTT User ID 10.2.4.10 | M | LV | 3-x |

## 15.1.15   GROUP CALL EMERGENCY END message

### 15.1.15.1   Message definition

This message is sent by the UE to other UEs to indicate termination of emergency mode in the group call. For contents of the message see Table 15.1.15.1-1.

   Message type:    GROUP CALL EMERGENCY END

   Direction:        UE to other UEs

**Table 15.1.15.1-1: GROUP CALL EMERGENCY END message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|-----|---------------------|----------------|----------|--------|--------|
| | Group call emergency end message identity | Message type 15.2.2 | M | V | 1 |
| | Call identifier | Call identifier 15.2.3 | M | V | 2 |
| | MCPTT group ID | MCPTT group ID 15.2.5 | M | LV-E | 3-x |
| | Sending MCPTT user ID | MCPTT user ID 15.2.10 | M | LV-E | 3-x |
| yy | Last call type change time | Last call type change time 15.2.16 | M | V | 5 |
| zz | Last user to change call type | MCPTT User ID 10.2.4.10 | M | LV | 3-x |

## 15.1.16   GROUP EMERGENCY ALERT message

### 15.1.16.1   Message definition

This message is sent by the UE to other UEs to indicate an emergency situation. For contents of the message see Table 15.1.16.1-1.

   Message type:    GROUP EMERGENCY ALERT

   Direction:        UE to other UEs

**Table 15.1.16.1-1: GROUP EMERGENCY ALERT message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|-----|--------------------|----------------|----------|--------|--------|
| | Group emergency alert message identity | Message type 15.2.2 | M | V | 1 |
| | MCPTT group ID | MCPTT group ID 15.2.5 | M | LV-E | 3-x |
| | Originating MCPTT user ID | MCPTT user ID 15.2.10 | M | LV-E | 3-x |
| | Organization name | Organization name 15.2.14 | M | LV | 3-x |
| | User location | User location 15.2.13 | O | LV-E | 3-x |

## 15.1.17 GROUP EMERGENCY ALERT ACK message

### 15.1.17.1 Message definition

This message is sent by the UE to other UEs to indicate receipt of emergency alert. For contents of the message see Table 15.1.17.1-1.

Message type: GROUP EMERGENCY ALERT ACK

Direction: UE to other UEs

**Table 15.1.17.1-1: GROUP EMERGENCY ALERT ACK message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|-----|--------------------|----------------|----------|--------|--------|
| | Group emergency alert ack message identity | Message type 15.2.2 | M | V | 1 |
| | MCPTT group ID | MCPTT group ID 15.2.5 | M | LV-E | 3-x |
| | Originating MCPTT user ID | MCPTT user ID 15.2.10 | M | LV-E | 3-x |
| | Sending MCPTT user ID | MCPTT user ID 15.2.10 | M | LV-E | 3-x |

## 15.1.18 GROUP EMERGENCY ALERT CANCEL message

### 15.1.18.1 Message definition

This message is sent by the UE to other UEs to indicate end of emergency situation. For contents of the message see Table 15.1.18.1-1.

Message type: GROUP EMERGENCY ALERT CANCEL

Direction: UE to other UEs

**Table 15.1.18.1-1: GROUP EMERGENCY ALERT CANCEL message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|-----|--------------------|----------------|----------|--------|--------|
| | Group emergency alert cancel 0message identity | Message type 15.2.2 | M | V | 1 |
| | MCPTT group ID | MCPTT group ID 15.2.5 | M | LV-E | 3-x |
| | Originating MCPTT user ID | MCPTT User ID 10.2.10 | M | LV-E | 3-x |
| | Sending MCPTT user ID | MCPTT user ID 15.2.10 | M | LV-E | 3-x |

## 15.1.19 GROUP EMERGENCY ALERT CANCEL ACK message

### 15.1.19.1 Message definition

This message is sent by the UE to other UEs to indicate receipt of emergency alert cancel. For contents of the message see Table 15.1.19.1-1.

Message type: GROUP EMERGENCY ALERT CANCEL ACK

Direction: UE to other UEs

**Table 15.1.19.1-1: GROUP EMERGENCY ALERT CANCEL ACK message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|-----|---------------------|----------------|----------|--------|--------|
| | Group emergency alert cancel ack message identity | Message type 15.2.2 | M | V | 1 |
| | MCPTT group ID | MCPTT group ID 15.2.5 | M | LV-E | 3-x |
| | Originating MCPTT user ID | MCPTT User ID 10.2.10 | M | LV-E | 3-x |
| | Sending MCPTT user ID | MCPTT user ID 15.2.10 | M | LV-E | 3-x |

## 15.1.20 GROUP CALL BROADCAST message

### 15.1.20.1 Message definition

This message is sent by the UE to other UEs to announce a broadcast group call to other UEs. For contents of the message see Table 15.1.20.1-1.

Message type: GROUP CALL BROADCAST

Direction: UE to other UEs

**Table 15.1.20.1-1: GROUP CALL BROADCAST message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|-----|---------------------|----------------|----------|--------|--------|
| | Group call broadcast message identity | Message type 15.2.2 | M | V | 1 |
| | Call identifier | Call identifier 15.2.3 | M | V | 2 |
| | Call type | Call type 15.2.11 | M | V | 1 |
| | Originating MCPTT user ID | MCPTT user ID 15.2.10 | M | LV-E | 3-x |
| | MCPTT group ID | Group ID 15.2.5 | M | LV-E | 3-x |
| | SDP | SDP 15.2.6 | M | LV-E | 3-x |

## 15.1.21 GROUP CALL BROADCAST END message

### 15.1.21.1 Message definition

This message is sent by the UE to other UEs to indicate termination of a broadcast group call. For contents of the message see Table 15.1.21.1-1.

Message type: GROUP CALL BROADCAST END

Direction: UE to other UEs

**Table 15.1.21.1-1: GROUP CALL BROADCAST END message content**

| IEI | Information Element | Type/Reference | Presence | Format | Length |
|---|---|---|---|---|---|
| | Group call broadcast end message identity | Message type 15.2.2 | M | V | 1 |
| | Call identifier | Call identifier 15.2.3 | M | V | 2 |
| | MCPTT group ID | MCPTT group ID 15.2.5 | M | LV-E | 3-x |
| | Originating MCPTT user ID | MCPTT user ID 15.2.10 | M | LV-E | 3-x |

# 15.2 General message format and information elements coding

## 15.2.1 General

The least significant bit of a field is represented by the lowest numbered bit of the highest numbered octet of the field. When the field extends over more than one octet, the order of bit values progressively decreases as the octet number increases.

Figure 15.2.1-1 shows an example of a field where the most significant bit of the field is marked MSB and the least significant bit of the field is marked LSB.
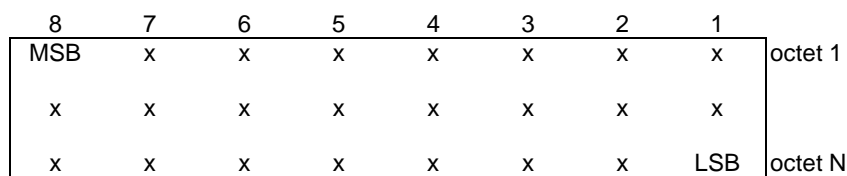


**Figure 15.2.1-1: Example of bit ordering of a field**

Within the protocols defined in the present document, the message consists of the following parts:

a) message type information element; and

b) other information elements, as required.

The organization of a message is illustrated in the example shown in Figure 15.2.1-2.
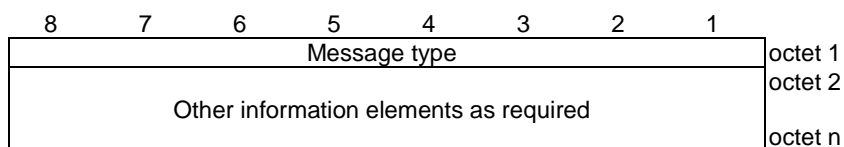


**Figure 15.2.1-2: General message organization example**

Unless specified otherwise in the message descriptions of subclause 10.2.2, a particular information element shall not be present more than once in a given message.

The sending entity shall set value of a spare bit to zero. The receiving entity shall ignore value of a spare bit

The sending entity shall not set a value of an information element to a reserved value. The receiving entity shall discard message containing an information element set to a reserved value.

## 15.2.2 Message type

The purpose of the Message type information element is to identify the type of the message.

The value part of the Message type information element is coded as shown in Table 15.2.2-1.

The Message type information element is a type 3 information element with a length of 1 octet.

**Table 15.2.2-1: Message types**

```
Bits
8  7  6  5  4  3  2  1

0  0  0  0  0  0  0  1    GROUP CALL PROBE
0  0  0  0  0  0  1  0    GROUP CALL ANNOUNCEMENT
0  0  0  0  0  0  1  1    GROUP CALL ACCEPT
0  0  0  0  0  1  0  0    GROUP CALL EMERGENCY END
0  0  0  0  0  1  0  1    GROUP CALL IMMINENT PERIL END
0  0  0  0  0  1  1  0    GROUP CALL BROADCAST
0  0  0  0  0  1  1  1    GROUP CALL BROADCAST END
0  0  0  0  1  0  0  0    PRIVATE CALL SETUP REQUEST
0  0  0  0  1  0  0  1    PRIVATE CALL RINGING
0  0  0  0  1  0  1  0    PRIVATE CALL ACCEPT
0  0  0  0  1  0  1  1    PRIVATE CALL REJECT
0  0  0  0  1  1  0  0    PRIVATE CALL RELEASE
0  0  0  0  1  1  0  1    PRIVATE CALL RELEASE ACK
0  0  0  0  1  1  1  0    PRIVATE CALL ACCEPT ACK
0  0  0  0  1  1  1  1    PRIVATE ENERGENCY CALL CANCEL
0  0  0  1  0  0  0  0    PRIVATE ENERGENCY CALL CANCEL ACK
0  0  0  1  0  0  0  1    GROUP EMERGENCY ALERT
0  0  0  1  0  0  1  0    GROUP EMERGENCY ALERT ACK
0  0  0  1  0  0  1  1    GROUP EMERGENCY ALERT CANCEL
0  0  0  1  0  1  0  0    GROUP EMERGENCY ALERT CANCEL ACK

All other values are reserved.
```

## 15.2.3 Call identifier

The purpose of the Call identifier information element is to uniquely identify the call.

The Call identifier information element is coded as shown in Figure 15.2.3-1 and Table 15.2.3-1.

The Call identifier information element is a type 3 information element with a length of 2 octets.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
|---|---|---|---|---|---|---|---|---|
| | | | Call identifier | | | | | octet 1 |
| | | | | | | | | octet 2 |
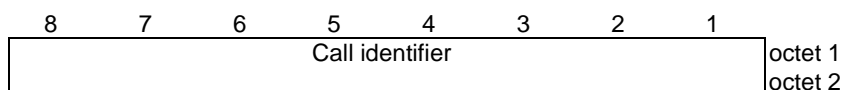
**Figure 15.2.3-1: Call identifier information element**

**Table 15.2.3-1: Call identifier information element**

Call identifier value (octet 1 to 2)

The Call identifier contains a number uniquely identifying the call.

## 15.2.4 Refresh interval

The refresh interval information identifier is used to indicate the minimum time period between successive periodic messages;

The Refresh interval information element is coded as shown in Figure 15.2.4-1 and Table 15.2.4-1.

The Refresh interval information element is a type 3 information element with a length of 2 octets.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
|---|---|---|---|---|---|---|---|---|
| Refresh interval value | | | | | | | | Octet 1 |
| | | | | | | | | Octet 2 |
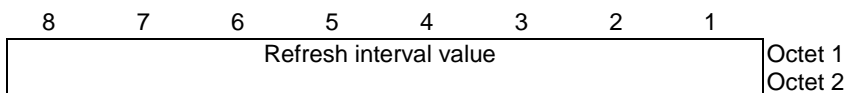
**Figure 15.2.4-1: Refresh interval**

**Table 15.2.4-1: Refresh interval information element**

Refresh interval value (octet 1 to 2)

The Refresh interval contains a number denoting the minimum time interval (milliseconds) between two successive periodic announcements.

## 15.2.5    MCPTT group ID

The MCPTT group ID information element is used to indicate the destination MCPTT group identifier;

The MCPTT group ID information element is coded as shown in Figure 15.2.5-1 and Table 15.2.5-1.

The MCPTT group ID information element is a type 6 information element.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
|---|---|---|---|---|---|---|---|---|
| Length of MCPTT group ID contents | | | | | | | | octet 1 |
| | | | | | | | | octet 2 |
| MCPTT group ID contents | | | | | | | | octet 3 |
| | | | | | | | | octet n |

**Figure 15.2.5-1: MCPTT group ID information element**

**Table 15.2.5-1: MCPTT group ID information element**

MCPTT group ID is contained in octet 3 to octet n; Max value of 65535 octets.

Editor"s note [CT1#94, C1-153926]: the value of Group ID is FFS.

## 15.2.6    SDP

The purpose of the SDP information element is to contain SDP message.

The SDP information element is coded as shown in Figure 15.2.6-1 and Table 15.2.6-1.

The SDP information element is a type 6 information element.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
|---|---|---|---|---|---|---|---|---|
| Length of SDP contents | | | | | | | | octet 1 |
| | | | | | | | | octet 2 |
| SDP contents | | | | | | | | octet 3 |
| | | | | | | | | octet n |

**Figure 15.2.6-1: SDP information element**

**Table 15.2.6-1: SDP information element**

| |
|---|
| SDP message container contents (octet 3 to octet n); Max value of 65535 octets. |
| This information element contains SDP message as defined in Section 10.2.2.1.2. |

## 15.2.7 Commencement mode

The purpose of the Commencement mode information element is to identify the type of the commencement mode of the private call.

The value part of the Commencement mode information element is coded as shown in Table 15.2.7-1.

The Commence mode information element is a type 3 information element with a length of TBD octet.

**Table 15.2.7-1: Commencement mode**

```
Bits
8  7  6  5  4  3  2  1

0  0  0  0  0  0  0  0    AUTOMATIC COMMENCEMENT MODE
0  0  0  0  0  0  0  1    MANUAL COMMENCEMENT MODE

All other values are reserved.
```

## 15.2.8 Reason

The purpose of the Reason information element is to indicate the reason of the reject.

The Reason information element is coded as shown in figure 15.2.8-1.

The Reason information element is a type 3 information element.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
|---|---|---|---|---|---|---|---|---|
| | | | Reason IEI | | | | | octet 1 |
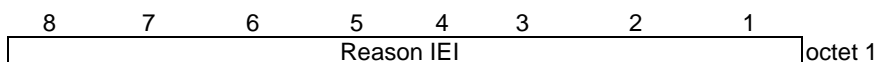
**Figure 15.2.8-1: Reason information element**

**Table 15.2.8-1: Reason type**

```
Bits
8  7  6  5  4  3  2  1

0  0  0  0  0  0  0  0    REJECT
0  0  0  0  0  0  0  1    NO ANSWER
0  0  0  0  0  0  1  0    BUSY
0  0  0  0  0  0  1  1    E2E SECURITY CONTEXT FAILURE

All other values are reserved.
```

## 15.2.9 Confirm mode indication

The purpose of the Confirm mode indication information element is to indicate that the terminating MCPTT client is expected to confirm call acceptance.

The Confirm mode indication information element is coded as shown in figure 15.2.9-1.

The Confirm mode indication information element is a type 2 information element.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
|---|---|---|---|---|---|---|---|---|
| Confirm mode indication IEI | | | | | | | | octet 1 |
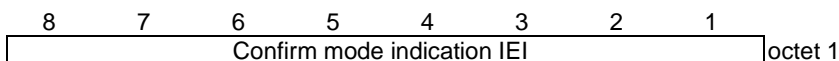
**Figure 15.2.9-1: Confirm mode indication information element**

## 15.2.10  MCPTT user ID

The MCPTT user ID information element is used to indicate an MCPTT user ID.

The MCPTT user ID information element is coded as shown in Figure 15.2.10-1 and Table 15.2.10-1.

The MCPTT user ID information element is a type 6 information element.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
|---|---|---|---|---|---|---|---|---|
| Length of MCPTT user ID contents | | | | | | | | octet 1 |
| | | | | | | | | octet 2 |
| MCPTT user ID contents | | | | | | | | octet 3 |
| | | | | | | | | octet n |
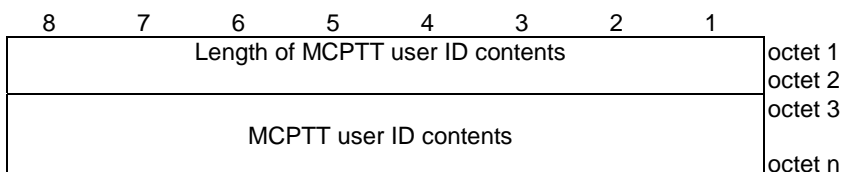
**Figure 15.2.10-1: MCPTT user ID information element**

**Table 15.2.10-1: MCPTT user ID information element**

| |
|---|
| MCPTT user ID is contained in octet 3 to octet n; Max value of 65535 octets. |

## 15.2.11  Call type

The purpose of the Call type information element is to identify the type of the call.

The value part of the Call type information element is coded as shown in Table 15.2.11-1.

The Call type information element is a type 3 information element with a length of 1 octet.

**Table 15.2.11-1: Call type**

```
Bits
8  7  6  5  4  3  2  1

0  0  0  0  0  0  0  1    BASIC GROUP CALL
0  0  0  0  0  0  1  0    BROADCAST GROUP CALL
0  0  0  0  0  0  1  1    EMERGENCY GROUP CALL
0  0  0  0  0  1  0  0    IMMINENT PERIL GROUP CALL
0  0  0  0  0  1  0  1    PRIVATE CALL
0  0  0  0  0  1  1  0    EMERGENCY PRIVATE CALL

All other values are reserved.
```

## 15.2.12  Floor control mode

The purpose of the Floor control mode information element is to indicate whether to use floor control or not.

The Floor control mode information element is coded as shown in figure 15.2.12-1.

The Floor control mode information element is a type 13 information element.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
|---|---|---|---|---|---|---|---|---|
| Floor control mode IEI | | | | | | | | octet 1 |
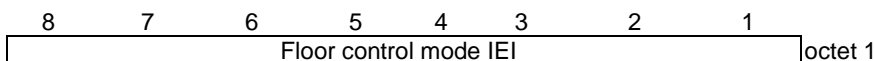
**Figure 15.2.12-1: Floor control mode information element**

**Table 15.2.12-1: Floor control mode type**

```
Bits
8 7 6 5 4 3 2 1

0 0 0 0 0 0 0 0    FALSE
0 0 0 0 0 0 0 1    TRUE

All other values are reserved.
```

## 15.2.13   User location

The User location information element is used to indicate the current location of the MCPTT client;

The User location information element is coded as shown in Figure 15.2.13-1 and Table 15.2.13-1.

The User location information element is a type 6 information element.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
|---|---|---|---|---|---|---|---|---|
| Length of User location contents | | | | | | | | octet 1 |
| | | | | | | | | octet 2 |
| User location contents | | | | | | | | octet 3 |
| | | | | | | | | octet n |
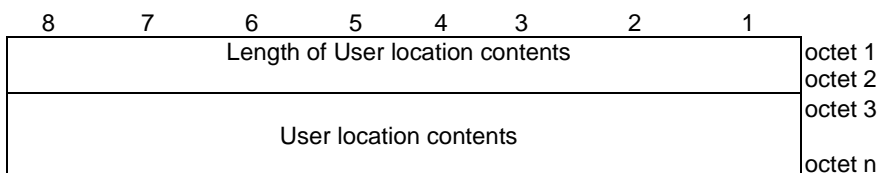
**Figure 15.2.13-1: User location information element**

**Table 15.2.13-1: User location information element**

User location is contained in octet 3 to octet n; Max value of 65535 octets.

Editor"s note [CT1#95-bis, C1-160770]: the value of location is FFS.

## 15.2.14   Organization name

The Organization name information element is used to indicate the name of the organization to which the user belongs.

The Organization name information element is coded as shown in Figure 15.2.12-1 and Table 15.2.12-1.

The Organization name information element is a type 6 information element.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
|---|---|---|---|---|---|---|---|---|
| Length of Organization name contents | | | | | | | | octet 1 |
| | | | | | | | | octet 2 |
| Organization name contents | | | | | | | | octet 3 |
| | | | | | | | | octet n |
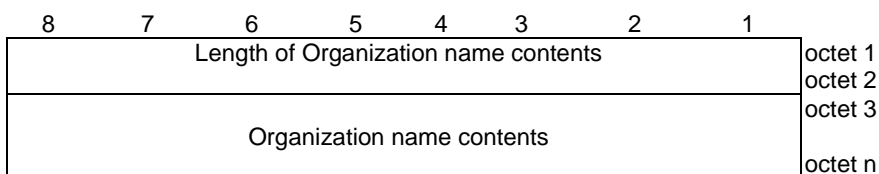
**Figure 15.2.12-1: Organization name information element**

**Table 15.2.12-1: Organization name information element**

Organization name is contained in octet 3 to octet n; Max value of 65535 octets.

Editor"s note [CT1#95-bis, C1-160770]: the value of Organization name is FFS.

## 15.2.15   Call start time

The Call start time information element is used to indicate the UTC time when a call was started.

The Call start time information element is coded as shown in Figure 15.2.15-1 and Table 15.2.15-1.

The Call start time information element is a type 3 information element with a length of 5 octets.
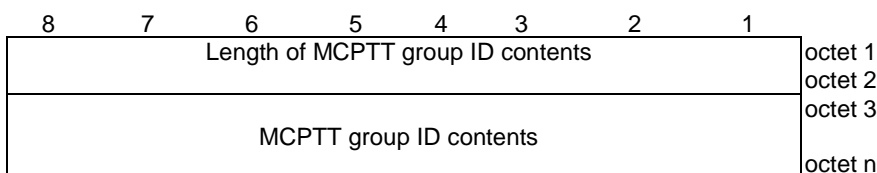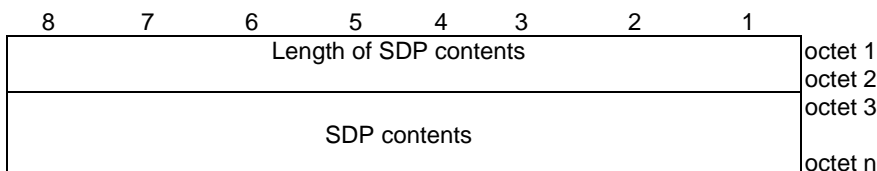
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
|---|---|---|---|---|---|---|---|---|
| Call start time value | | | | | | | | Octet 1<br>Octet 5 |
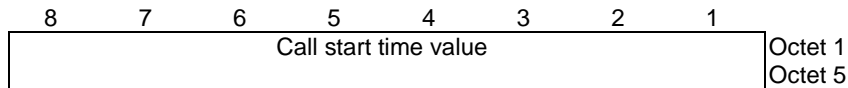
**Figure 15.2.15-1: Call start time value**

**Table 15.2.15-1: Call start time value**

| Call start time value (octet 1 to 5) |
|---|
| The Call start time value is an unsigned integer containing UTC time of the time when a call was started, in seconds since midnight UTC of January 1, 1970 (not counting leap seconds). |

## 15.2.16   Last call type change time

The Last call type change time information identifier is used to indicate the last UTC time when a call priority was changed.

The Last call type change time information element is coded as shown in Figure 15.2.16-1 and Table 15.2.16-1.

The Last call type change time information element is a type 3 information element with a length of 5 octets.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
|---|---|---|---|---|---|---|---|---|
| Call start time value | | | | | | | | Octet 1<br>Octet 5 |
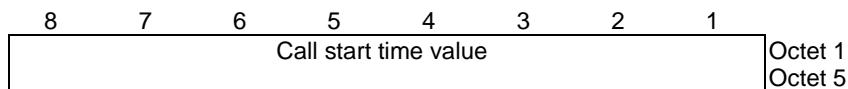
**Figure 15.2.16-1: Call start time value**

**Table 15.2.16-1: Call start time value**

| Last call type change time (octet 1 to 5) |
|---|
| The Last call type change time value is an unsigned integer containing UTC time of the time when a call priority was changed, in seconds since midnight UTC of January 1, 1970 (not counting leap seconds). |

## 15.2.17   Probe response

The purpose of the probe response information element is to indicate that the GROUP CALL ANNOUNCEMENT message was sent in response of a GROUP CALL PROBE message.

The probe response information element is coded as shown in figure 15.2.17-1.

The probe response is a type 2 information element.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
|---|---|---|---|---|---|---|---|---|
| Probe Response IEI | | | | | | | | octet 1 |
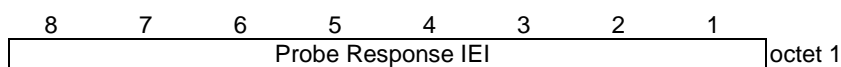
**Figure 15.2.17-1: Probe response information element**

# Annex A (informative):
# Signalling flows

Editor"s Note: The included signalling flows will be limited to illustrate key functionalities and will not cover all possible scenarios.

Editor"s Note: As inclusion of all protocol details in the signalling flows can be time consuming to specify and only illustrate an informative example, it is FFS whether the included signalling flows will show all protocol details or if they only will list the information elements and / or possible key parameters that are needed to illustrate certain aspects of each signalling flow.

# Annex B (normative): Timers

## B.1 General

The following tables give a brief description of the timers used in this document.

For the on-network timers described in this document, the following timer families are used:

- TNGx: Timer oN-network Group call x

For the off-network timers described in this document, the following timer families are used:

- TFGx: Timer oFf-network Group call x

- TFPy: Timer oFf-network Private call y

- TFBz: Timer oFf-network Broadcast group call z

where x, y and z represent numbers.

## B.2 On-network timers

## B.2.1 Timers in the controlling MCPTT function

The table B.2.1-1 provides a description of the timers used by the controlling MCPTT function, specifies the timer values, describes the reason for of starting the timer, normal stop and the action on expiry.

**Table B.2.1-1: controlling MCPTT function timers**

| Timer | Timer value | Cause of start | Normal stop | On expiry |
|---|---|---|---|---|
| TNG1 (acknowledged call setup timer) | TBD (configured by operator) value can be set to infinite | On reception of a SIP INVITE request to start a group session where the group document contains <required> group members. | On receipt of all SIP 200 (OK) responses to all SIP INVITE requests for <required> group members. | Either proceed with the set-up of the call or abandon the call. |
| TNG2 (in-progress emergency group call timer) | TBD (configured by operator) value can be set to infinite | On reception of a SIP INVITE request or SIP re-INVITE request that initiates an MCPTT emergency group call. | On acceptance of a request to cancel the in-progress emergency state of a group. | Cancels the in-progress emergency state of the group and return the session and/or call to normal priority level. |

## B.3 Off-network timers

## B.3.1 Timers in off-network group call

### B.3.1.1 Basic call control

The table B.3.1.1-1 enlists timers in basic call control, their limits and the action on expiry.

**Table B.3.1.1-1: Timers in basic call control**

| Timer | Timer value | Cause of start | Normal stop | On expiry |
|-------|-------------|----------------|-------------|-----------|
| TFG1 | Default value: 150 millisecond | When the client sends a CALL PROBE message | Reception of a CALL ANNOUNCEMENT message. | Send a CALL ANNOUNCEMENT message |
| TFG2 | Calculated. Refer to section 10.2.2.1.3. | Commencement of group call. Restarted every time a CALL PROBE message is received OR CALL ANNOUNCEMENT message is sent or received, | Termination of group call. When the client Receives a CALL PROBE message or CALL ANNOUNCEMENT message, Re-calculate timer value and restart. | Send a CALL ANNOUNCEMENT message. Re-calculate timer value and restart. |
| TFG3 | Default value: 40 millisecond Depends on the characteristic of the D2D (D2D Sidelink period) | When the client sends a CALL PROBE message. | Reception of a CALL ANNOUNCEMENT message. Or TFG1 Expires. Or User releases the call | Send a CALL PROBE message |
| TFG4 | Default value: 30 seconds Configurable as specified in 3GPP TS 24.383 [45]. Maximum value: 60 seconds | Reception of CALL ANNOUNCEMENT message when not participating in the ongoing call. | Reception of User action (Accept or Reject) | Stop incoming call notification. |
| TFG5 | Default value: 30 seconds | Expiration of TFG4 Or User rejects the call Or User releases the call | - | Reset group call state machine. |

## B.3.1.2   Call type control

The table B.3.1.2-1 enlists timers in call type control, their limits and the action on expiry.

**Table B.3.1.2-1: Call type control**

| Timer | Timer value | Cause of start | Normal stop | On expiry |
|-------|-------------|----------------|-------------|-----------|
| TFG11 (emergency end retransmission) | Default value: 1 second | When the client sends a GROUP CALL EMERENCY END message. | | Send a GROUP CALL EMERENCY END message Increment associated counter by 1. If counter has reached limit, stop the timer. |
| TFG12 (imminent peril end retransmission) | Default value: 1 second | When the client sends a GROUP CALL IMMINENT PERIL END message. | | Send a GROUP CALL IMMINENT PERIL END message Increment associated counter by 1. If counter has reached limit, stop the timer. |
| TFG13 | Default value : 600 seconds Configurable as specified in 3GPP TS 24.383 [45]. | Upgrade of the call | Downgrade of the call | Downgrade the call |

## B.3.2 Timers in off-network private call

The table B.3.2-1 enlists timers in off-network private call, their limits and the action on expiry.

**Table B.3.2-1: Timers in off-network private call**

| Timer | Timer value | Cause of start | Normal stop | On expiry |
|---|---|---|---|---|
| TFP1 (private call request retransmission) | Default value: 40 millisecond Depends on the characteristic of the D2D (D2D Sidelink period) | When the client sends a PRIVATE CALL SETUP REQUESTmessage | Reception of a PRIVATE CALL ACCEPT or PRIVATE CALL REJECT message. | Resend PRIVATE CALL SETUP REQUEST message. Increment associated counter by 1. If counter has reached limit, assume the called client is not available. Terminate call setup. |
| TFP2 (waiting for call response message) | Default value: 30 seconds Configurable as specified in 3GPP TS 24.383 [45]. Maximum value: 60 seconds | Reception of a PRIVATE CALL SETUP REQUEST message. | User responds to the incoming call notification. | Start TFP7 timer. Send a PRIVATE CALL REJECT message |
| TFP3 (private call release retransmission) | Default value: 40 millisecond Depends on the characteristic of the D2D (D2D Sidelink period) | When the client sends a PRIVATE CALL RELEASE message. | Reception of PRIVATE CALL RELEASE ACK message. | Resend PRIVATE CALL RELEASE message. Increment associated counter by 1. If counter has reached limit, assume the receiving client is not available anymore. Release the call. |
| TFP4 (private call accept retransmission) | Default value: 40 millisecond Depends on the characteristic of the D2D (D2D Sidelink period) | When the client sends a PRIVATE CALL ACCEPT message. | Reception of a PRIVATE CALL ACCEPT ACK message or RTP media. | Resend PRIVATE CALL ACCEPT message. Increment associated counter by 1. If counter has reached limit, assume the receiving client is not available anymore Notify call setup failure. |
| TFP5 (call release) | Default value: 300 seconds Configurable as specified in 3GPP TS 24.383 [45]. Maximum value: 600 seconds | Call establishment. | Call termination. | Terminate the call |
| TFP6 (private emergency call cancel retransmission) | Default value: 40 millisecond Depends on the characteristic of the D2D. (D2D Sidelink period) | When the client sends a PRIVATE EMERGENCY CALL CANCEL message. | Reception of a PRIVATE EMERGENCY CALL CANCEL ACK message | Resend PRIVATE EMERGENCY CALL CANCEL message. Increment associated counter by 1. If counter has reached limit, assume the receiving client is not available anymore Notify call setup failure. |

| Timer | Timer value | Cause of start | Normal stop | On expiry |
|---|---|---|---|---|
| TFP7 (waiting for any message with same call identifier) | Default value: 1 second | Rejection of a call OR Termination of a call OR Call Failure | - | Reset the call control state machine. |

## B.3.3 Timers in off-network broadcast call

The table B.3.3-1 enlists timers in off-network broadcast call, their limits and the action on expiry.

**Table B.3.3-1: Timers in off-network broadcast call**

| Timer | Timer value | Cause of start | Normal stop | On expiry |
|---|---|---|---|---|
| TFB1 | Default value: 300 seconds Configurable as specified in 3GPP TS 24.383 [45]. Maximum value: 600 seconds | Start of the broadcast call | - | Terminate the broadcast call |
| TFB2 | Default value: 3 seconds Configurable as specified in 3GPP TS 24.383 [45]. Maximum value: 10 seconds | Start of the broadcast call | Broadcast call termination. | Send GROUP CALL BROADCAST message |
| TFB3 | Default value: 30 seconds Configurable as specified in 3GPP TS 24.383 [45]. Maximum value: 60 seconds | Receipt of GROUP CALL BROADCAST message when user response is required. | Response from user. | Terminate incoming call notification. |

## B.3.4 Timers in off-network emergency alert

The table B.3.4-1 enlists timers in off-network emergency alert, their limits and the action on expiry.

**Table B.3.4-1: Timers in off-network emergency alert**

| Timer | Timer value | Cause of start | Normal stop | On expiry |
|---|---|---|---|---|
| TFE1 (Emergency Alert) | Default value: 30 seconds Configurable as specified in 3GPP TS 24.383 [45]. Max 60 seconds<br><br>TFE1 shall be more than total time it takes for a certain number of retransmissions of GROUP EMERGENCY ALERT message. | Receipt of GROUP EMERGENCY ALERT | Receipt of GROUP EMERGENCY ALERT CANCEL | Assume end of emergency state, remove associated user from the list |
| TFE2 (emergency alert retransmission) | Default value: 5 seconds Configurable as specified in 3GPP TS 24.383 [45]. Max 10 seconds | Transmission of GROUP EMERGENCY ALERT | Transmission of GROUP EMERGENCY ALERT CANCEL | Transmit GROUP EMERGENCY ALERT |

# Annex C (normative):
# Counters

## C.1 General

The following tables give a brief description of the timers used in this document.

## C.2 Off-network counters

### C.2.1 Counters in off-network group call

The table C.2.1-1 enlists counters in off-network group call, their limits and the action on expiry.

**Table C.2.1-1: Counters in off-network group call**

| Counter | Limit | Associated timer | On expiry |
|---|---|---|---|
| CFG11 (emergency end retransmission) | Default value: 5 | TFG11 | Stop timer TFG11. |
| CFG12 (imminent peril end retransmission) | Default value: 5 | TFG12 | Stop timer TFG12. |

### C.2.2 Counters in off-network private call

The table C.2.2-1 enlists counters in off-network private call, their limits and the action on expiry.

**Table C.2.2-1: Counters in off-network private call**

| Counter | Limit | Associated timer | On expiry |
|---|---|---|---|
| CFP1 (private call request retransmission) | Default value: 3 | TFP1 | Assume the called client is not available. Terminate call setup. |
| CFP3 (private call release retransmission) | Default value: 3 | TFP3 | Assume the receiving client is not available anymore. Release the call. |
| CFP4 (private call accept retransmission) | Default value: 3 | TFP4 | Notify call setup failure. |
| CFP6 (private call accept retransmission) | Default value: 3 | TFP6 | Notify call setup failure. |

# Annex D (normative):
# Media feature tags within the current document

## D.1    General

This subclause describes the media feature tag definitions that are applicable for the 3GPP IM CN Subsystem for the realisation of the Mission Critical Push To Talk (MCPTT) service.

## D.2    Definition of media feature tag g.3gpp.mcptt

Media feature tag name: g.3gpp.mcptt

Editor's Note: this media feature tag needs to be registered with IANA when the release 13 is completed.

ASN.1 Identifier: 1.3.6.1.8.2.x

Summary of the media feature indicated by this media feature tag: This media feature tag when used in a SIP request or a SIP response indicates that the function sending the SIP message supports Mission Critical Push To Talk (MCPTT) communication.

Values appropriate for use with this media feature tag: Boolean

The media feature tag is intended primarily for use in the following applications, protocols, services, or negotiation mechanisms: This media feature tag is most useful in a communications application, for describing the capabilities of a device, such as a phone or PDA.

Examples of typical use: Indicating that a mobile phone supports the Mission Critical Push To Talk (MCPTT) communication.

Related standards or documents: 3GPP TS 24.379: "Mission Critical Push To Talk (MCPTT) call control Protocol specification"

Security Considerations: Security considerations for this media feature tag are discussed in subclause 11.1 of IETF RFC 3840 [16].

# Annex E (normative):
# ICSI values defined within the current document

# E.1 General

This subclause describes the IMS communications service identifier definitions that are applicable for the 3GPP IM CN Subsystem for the realisation of the Mission Critical Push To Talk (MCPTT) service.

> NOTE: The template has been created using the headers of the table in http://www.3gpp.org/specifications-groups/34-uniform-resource-name-urn-list

# E.2 Definition of ICSI value for MCPTT service

## E.2.1 URN

urn:urn-7:3gpp-service.ims.icsi.mcptt

## E.2.2 Description

This URN indicates that the device has the capabilities to support the mission critical push to talk (MCPTT) service.

## E.2.3 Reference

3GPP TS 24 379: "Mission Critical Push To Talk (MCPTT) call control Protocol specification"

## E.2.3 Contact

Name: <MCC name>

Email: <MCC email address>

## E.2.4 Registration of subtype

Yes

## E.2.5 Remarks

None

# Annex F (normative): XML schemas

## F.1 XML schema for MCPTT Information

### F.1.1 General

This subclause defines XML schema and MIME type for MCPTT information.

> Editor's Note [CT1#95, C1-154416]: The presence of sensitive information in this schema may need to be handled (e.g. a way may be required that allows the UE to signal "emergency call" but keep that secret from the lower layers).

### F.1.2 XML schema

```
<?xml version="1.0"?>
<xs:schema
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified"
  attributeFormDefault="unqualified">

  <xs:element name="mpcttinfo" type="mcpttinfo-Type"/>

  <xs:complexType name="mcpttinfo-Type">
    <xs:sequence>
      <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>

  <xs:element name="mcptt-Params" type=" mcptt-ParamsType"/>

  <xs:complexType name="mcptt-ParamsType">
    <xs:sequence>
      <xs:element name="mcptt-access-token" type="xs:string" minOccurs="0" maxOccurs="1"/>
      <xs:element name="session-type" type="xs:string" minOccurs="0" maxOccurs="1"/>
      <xs:element name="mcptt-request-uri" type="xs:anyURI" minOccurs="0" maxOccurs="1"/>
      <xs:element name="mcptt-calling-user-id" type="xs:anyURI" minOccurs="0" maxOccurs="1"/>
      <xs:element name="mcptt-called-party-id" type="xs:anyURI" minOccurs="0" maxOccurs="1"/>
      <xs:element name="mcptt-calling-group-id" type="xs:anyURI" minOccurs="0" maxOccurs="1"/>
      <xs:element name="required" type="xs:boolean" minOccurs="0" maxOccurs="1"/>
      <xs:element name="emergency-ind" type="xs:boolean" minOccurs="0" maxOccurs="1"/>
      <xs:element name="alert-ind" type="xs:boolean" minOccurs="0" maxOccurs="1"/>
      <xs:element name="imminentperil-ind" type="xs:boolean" minOccurs="0" maxOccurs="1"/>
      <xs:element name="broadcast-ind" type="xs:boolean" minOccurs="0" maxOccurs="1"/>
      <xs:element name="mc-org" type="xs:string" minOccurs="0" maxOccurs="1"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>

  <xs:complexType name="anyExtType">
    <xs:sequence>
      <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>

</xs:schema>
```

### F.1.3 Semantic

The <mcpttinfo> element is the root element of the XML document. The <mcpttinfo> element can contain subelements.

NOTE: The subelements of the <mcptt-info> are validated by the <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/> particle of the <mcptt-info> element

If the <mcpttinfo> contains the <mcptt-Params> element then:

1) the <mcptt-access-token> can be included with the access token received during authentication procedure as described in 3GPP TS 24.382 [49];

2) the <session-type> can be included with:

   a) a value of "chat" to indicate that the MCPTT client wants to join a chat group call

   b) a value of "prearranged" to indicate the MCPTT client wants to make a prearranged group call; or

   c) a value of "private" to indicate the MCPTT client wants to make a private call;

3) the <mcptt-request-uri> can be included with:

   a) a value set to an MCPTT group ID or temporary MCPTT group ID when the <session-type> is set to a value of "prearranged" or "chat"; and

   b) a value set to the MCPTT ID of the called MCPTT user when the <session-type> is set to a value of "private";

4) the <mcptt-calling-user-id> can be included, set to MCPTT ID of the originating user;

5) the <mcptt-called-party-id> can be included, set to the MCPTT ID of the terminating user;

6) the <mcptt-calling-group-id> can be included to indicate the MCPTT group identity to the terminating user;

7) the <required> can be included in a SIP 183 (Session Progress) from a non-controlling MCPTT function of an MCPTT group to inform the controlling MCPTT function that the group on the non-controlling MCPTT function has "required" members;

8) the <emergency-ind> can be:

   a) set to "true" to indicate that the call that the MCPTT client is initiating is an emergency MCPTT call; or

   b) set to "false" to indicate that the MCPTT client is cancelling an emergency MCPTT call (i.e. converting it back to a non-emergency call)

9) the <alert-ind> can be:

   a) set to "true" in an emergency call initiation to indicate that an alert to be sent; or

   b) set to "false" when cancelling an emergency call which requires an alert to be cancelled also

10) if the <session-type> is set to "chat" or "prearranged":

   a) the <imminentperil-ind> set to "true" to indicate that the call that the MCPTT client is initiating is an imminent peril group MCPTT call;

11) the <broadcast-ind>:

   a) set to "true" indicates that the MCPTT client is initiating a broadcast group call; or

   b) set to "false" indicates that the MCPTT client is initiating a non-broadcast group call; and

12) the <mc-org>:

   a) set to the MCPTT user's Mission Critical Organization in an emergency alert sent by the MCPTT server to terminating MCPTT clients.

Absence of the <emergency-ind>, <alert-ind> and <imminentperil-ind> in a SIP INVITE request indicates that the MCPTT client is initiating a non-emergency private call or non-emergency group call.

Absence of the <broadcast-ind> in a SIP INVITE request indicates that the MCPTT client is initiating a non-broadcast group call.

The recipient of the XML ignores any unknown element and any unknown attribute.

# F.1.4    IANA registration template

Your Name:

<MCC name>

Your Email Address:

<MCC email address>

Media Type Name:

Application

Subtype name:

vnd.3gpp.mcptt-info+xml

Required parameters:

None

Optional parameters:

"charset"  the parameter has identical semantics to the charset parameter of the "application/xml" media type as specified in section 9.1 of IETF RFC 7303.

Encoding considerations:

binary.

Security considerations:

Same as general security considerations for application/xml media type as specified in section 9.1 of IETF RFC 7303. In addition, this media type provides a format for exchanging information in SIP, so the security considerations from IETF RFC 3261 apply.

The information transported in this media type does not include active or executable content.

Mechanisms for privacy and integrity protection of protocol parameters exist. Those mechanisms as well as authentication and further security mechanisms are described in 3GPP TS 24.229.

This media type does not include provisions for directives that institute actions on a recipient's files or other resources.

This media type does not include provisions for directives that institute actions that, while not directly harmful to the recipient, may result in disclosure of information that either facilitates a subsequent attack or else violates a recipient's privacy in any way.

This media type does not employ compression.

Interoperability considerations:

Same as general interoperability considerations for application/xml media type as specified in section 9.1 of IETF RFC 7303. Any unknown XML elements and any unknown XML attributes are to be ignored by recipient of the MIME body.

Published specification:

3GPP TS 24.379 "Mission Critical Push To Talk (MCPTT) call control" version 13.0.0, available via http://www.3gpp.org/specs/numbering.htm.

Applications which use this media type:

Applications supporting the service continuity as described in the published specification.

Fragment identifier considerations:

The handling in section 5 of IETF RFC 7303 applies.

Restrictions on usage:

None

Provisional registration? (standards tree only):

N/A

Additional information:

1. Deprecated alias names for this type: none

2. Magic number(s): none

3. File extension(s): none

4. Macintosh File Type Code(s): none

5. Object Identifier(s) or OID(s): none

Intended usage:

Common

Person to contact for further information:

- Name: <MCC name>

- Email: <MCC email address>

- Author/Change controller:

   i) Author: 3GPP CT1 Working Group/3GPP_TSG_CT_WG1@LIST.ETSI.ORG

   ii) Change controller: <MCC name>/<MCC email address>

# F.2 XML schema for MBMS usage information

## F.2.1 General

This subclause defines XML schema and MIME type for "application/vnd.3gpp.mcptt-mbms-usage-info+xml".

## F.2.2 XML schema

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema attributeFormDefault="unqualified" elementFormDefault="qualified"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="urn:3gpp:ns:mcpttMbmsUsage:1.0"
xmlns:mbms="urn:3gpp:ns:mcpttMbmsUsage:1.0">
    <!-- the root element -->
    <xs:element name="mcptt-mbms-usage-info" type="mbms:mcptt-mbms-usage-info-Type"/>
    <xs:complexType name="mcptt-mbms-usage-info-Type">
        <xs:sequence>
            <xs:element name="mbms-listening-status" type="mbms:mbms-listening-statusType"
            minOccurs="0"/>
            <xs:element name="announcement" type="mbms:announcementTypeParams" minOccurs="0"/>
            <xs:element name="GPMS" type="xs:positiveInteger" minOccurs="0" maxOccurs="1"/>
```

```
                <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:anyAttribute namespace="##any" processContents="lax"/>
        </xs:complexType>
        <xs:complexType name="mbms-listening-statusType">
            <xs:sequence>
                <xs:element name="mbms-listening-status" type="xs:string"/>
                <xs:element name="session-id" type="xs:anyURI" minOccurs="0"/>
                <xs:element name="general-purpose" type="xs:boolean" minOccurs="0"/>
                <xs:element name="version" type="xs:integer"/>
                <xs:element name="TMGI" type="xs:hexBinary" maxOccurs="unbounded"/>
            </xs:sequence>
        </xs:complexType>
        <xs:complexType name="announcementTypeParams">
            <xs:sequence>
                <xs:element name="TMGI" type="xs:hexBinary" minOccurs="1"/>
                <xs:element name="MBSFN-area-id" type="xs:byte" minOccurs="0"/>
                <xs:element name="QCI" type="xs:integer" minOccurs="1"/>
                <xs:element name="frequency" type="xs:unsignedLong" minOccurs="0"/>
                <xs:element name="mbms-service-areas" type="xs:hexBinary" minOccurs="1"
maxOccurs="unbounded"/>
                <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:anyAttribute namespace="##any" processContents="lax"/>
        </xs:complexType>
        <xs:complexType name="anyExtType">
            <xs:sequence>
                <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
        </xs:complexType>
</xs:schema>
```

# F.2.3    Semantic

This subclause describes the elements of the MBMS usage information XML Schema.

<mbms-listening-status>:    The <mbms-listening-status> element is used to indicate the MCPTT listening status.

- The value "listening" indicates that the MCPTT client now is receiving RTP media packets and floor control messages over the MBMS subchannel in the session identified by the <session-id> element or if the <general-purpose> element is set to "true", that the MCPTT client is now listening to the general purpose MBMS subchannel.

- The value "not-listening" indicates that the MCPTT client has stopped listening to the MBMS subchannel in the session identified by the <session-id> element or, if the <general-purpose> element is set to "false", that the MCPTT client no longer listens to the general purpose MBMS subchannel.

Table F.2.3-1 shows the ABNF of the <mbms-listening-status> element.

**Table F.2.3-1: ABNF syntax of values of the <mbms-listening-status> element**

```
mbms-listening-status = listening-value / not-listening-value
listening-value = %x6c.69.73.74.65.6e.69.6e.67 ; "listening"
not-listening-value = %x6e.6f.74.2d.6c.69.73.74.65.6e.69.6e.67 ; "not-listening"
```

<session-id>: contains the value of the URI received in the Contact header field received from the controlling MCPTT function when on on-demand session was established, or from the participating MCPTT function in the Connect message when the session was established over a pre-established session.

<TMGI>:          Contains the TMGI. The <TMGI> element is coded as described in 3GPP TS 24.008 [43] subclause 10.5.6.13 excluding the Temporary Mobile Group Identity IEI and Length of Temporary Mobile Group Identity contents (octet 1 and octet 2 in 3GPP TS 24.008 [43] subclause 10.5.6.13).

<MBSFN-area-id>:  Contains the 8-bit Multimedia Broadcast multicast service Single Frequency Network (MBSFN) Area Id from SIB-13.

Editor's note [CT1#95-bis, C1-160397]: The reference to where the coding of the MBSFN Area Id is FFS

<QCI>: QCI information used by the ProSe UE-Network Relay to determine the ProSe Per-Packet Priority value to be applied for the multicast packets relayed to Remote UE over PC5. QCI values are defined in 3GPP TS 23.203 [41].

<mbms-service-area>: A list of MBMS service area identifiers for the applicable MBMS broadcast area as specified in 3GPP TS 23.003 [40] for Service Area Identifier (SAI).

<Frequency>: Identification of frequency in case of multi carrier support. The <Frequency> element is coded as specified in 3GPP TS 29.468 [42].

NOTE: In the current release the frequency in the <frequency> element is the same as the frequency used for unicast.

<SDP-ref>: A URL with a cid url as specified in IETF RFC 5368 [38] referring to a SDP MIME body in the SIP MESSAGE request.

<general-purpose> An integer referring to which media line in the SDP where the general purpose MBMS subchannel is declared.

<GPMS> A positive integer that gives the number of the media line containing the general purpose MBMS subchannel in the "application/sdp" MIME body attached to the SIP MESSAGE request containing the MBMS announcements.

<version> this element indicates the version of the "application/vnd.3gpp.mbmb-usage-info" MIME body. In this version the <version element> indicates "1".

The recipient of the XML ignores any unknown element and any unknown attribute.

# F.2.4 IANA registration template

Editor"s note [CT1#95-bis, C1-160397]: The MIME type "application/vnd.3gpp.mcptt-mbms-usage-info+xml" as defined in this subclause is to be registered in the IANA registry for Application Media Types based upon the following template. The registration is to be started when work on the MCPTT-CT WID completes.

Your Name:

<MCC name>

Your Email Address:

<MCC email address>

Media Type Name:

Application

Subtype name:

vnd.3gpp.mcptt-mbms-usage-info+xml

Required parameters:

None

Optional parameters:

"charset" the parameter has identical semantics to the charset parameter of the "application/xml" media type as specified in section 9.1 of IETF RFC 7303.

Encoding considerations:

binary.

Security considerations:

Same as general security considerations for application/xml media type as specified in section 9.1 of IETF RFC 7303. In addition, this media type provides a format for exchanging information in SIP, so the security considerations from IETF RFC 3261 apply.

The information transported in this media type does not include active or executable content.

Mechanisms for privacy and integrity protection of protocol parameters exist. Those mechanisms as well as authentication and further security mechanisms are described in 3GPP TS 24.229.

This media type does not include provisions for directives that institute actions on a recipient's files or other resources.

This media type does not include provisions for directives that institute actions that, while not directly harmful to the recipient, may result in disclosure of information that either facilitates a subsequent attack or else violates a recipient's privacy in any way.

This media type does not employ compression.

Interoperability considerations:

Same as general interoperability considerations for application/xml media type as specified in section 9.1 of IETF RFC 7303. Any unknown XML elements and any unknown XML attributes are to be ignored by recipient of the MIME body.

Published specification:

3GPP TS 24.379 "Mission Critical Push To Talk (MCPTT) call control" version 13.0.0, available via http://www.3gpp.org/specs/numbering.htm.

Applications which use this media type:

Applications supporting the service continuity as described in the published specification.

Fragment identifier considerations:

The handling in section 5 of IETF RFC 7303 applies.

Restrictions on usage:

None

Provisional registration? (standards tree only):

N/A

Additional information:

1. Deprecated alias names for this type: none

2. Magic number(s): none

3. File extension(s): none

4. Macintosh File Type Code(s): none

5. Object Identifier(s) or OID(s): none

Intended usage:

Common

Person to contact for further information:

- Name: <MCC name>

- Email: <MCC email address>

- Author/Change controller:

    i)   Author: 3GPP CT1 Working Group/3GPP_TSG_CT_WG1@LIST.ETSI.ORG

    ii)  Change controller: <MCC name>/<MCC email address>

# F.3    XML schema for MCPTT location information

## F.3.1    General

This subclause defines the XML schema and the MIME type for location information.

## F.3.2    XML schema

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:mcpttloc="urn:3gpp:ns:mcpttLocationInfo:1.0"
targetNamespace="urn:3gpp:ns:mcpttLocationInfo:1.0" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <xs:element name="location-info">
        <xs:annotation>
            <xs:documentation>Root element, contains all information related to location
configuration, location request and location reporting for the MCPTT service</xs:documentation>
        </xs:annotation>
        <xs:complexType>
            <xs:choice>
                <xs:element name="Configuration" type="mcpttloc:tConfigurationType"/>
                <xs:element name="Request" type="mcpttloc:tRequestType"/>
                <xs:element name="Report" type="mcpttloc:tReportType"/>
                <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
            </xs:choice>
            <xs:anyAttribute namespace="##any" processContents="lax"/>
        </xs:complexType>
    </xs:element>
    <xs:complexType name="tConfigurationType">
        <xs:sequence>
            <xs:element name="NonEmergencyLocationInformation"
type="mcpttloc:tRequestedLocationType" minOccurs="0"/>
            <xs:element name="EmergencyLocationInformation" type="mcpttloc:tRequestedLocationType"
minOccurs="0"/>
            <xs:element name="TriggeringCriteria" type="mcpttloc:TriggeringCriteriaType"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="ConfigScope">
            <xs:simpleType>
                <xs:restriction base="xs:string">
                    <xs:enumeration value="Full"/>
                    <xs:enumeration value="Update"/>
                </xs:restriction>
            </xs:simpleType>
        </xs:attribute>
        <xs:anyAttribute namespace="##any" processContents="lax"/>
    </xs:complexType>
    <xs:complexType name="tRequestType">
        <xs:complexContent>
            <xs:extension base="mcpttloc:tEmptyType">
                <xs:attribute name="RequestId" type="xs:string" use="required"/>
            </xs:extension>
        </xs:complexContent>
    </xs:complexType>
    <xs:complexType name="tReportType">
        <xs:sequence>
            <xs:element name="TriggerId" type="xs:string" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="CurrentLocation" type="mcpttloc:tCurrentLocationType"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="ReportID" type="xs:string" use="optional"/>
        <xs:attribute name="ReportType" use="required">
            <xs:simpleType>
                <xs:restriction base="xs:string">
                    <xs:enumeration value="Emergency"/>
```

```
                    <xs:enumeration value="NonEmergency"/>
                </xs:restriction>
            </xs:simpleType>
        </xs:attribute>
        <xs:anyAttribute namespace="##any" processContents="lax"/>
    </xs:complexType>
    <xs:complexType name="TriggeringCriteriaType">
        <xs:sequence>
            <xs:element name="CellChange" type="mcpttloc:tCellChange" minOccurs="0"/>
            <xs:element name="TrackingAreaChange" type="mcpttloc:tTrackingAreaChangeType"
minOccurs="0"/>
            <xs:element name="PlmnChange" type="mcpttloc:tPlmnChangeType" minOccurs="0"/>
            <xs:element name="MbmsSaChange" type="mcpttloc:tMbmsSaChangeType" minOccurs="0"/>
            <xs:element name="MbsfnAreaChange" type="mcpttloc:tMbsfnAreaChangeType" minOccurs="0"/>
            <xs:element name="PeriodicReport" type="mcpttloc:tIntegerAttributeType" minOccurs="0"/>
            <xs:element name="TravelledDistance" type="mcpttloc:tIntegerAttributeType"
minOccurs="0"/>
            <xs:element name="McpttSignallingEvent" type="mcpttloc:tSignallingEventType"
minOccurs="0"/>
            <xs:element name="GeographicalAreaChange" type="mcpttloc:tGeographicalAreaChange"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:anyAttribute namespace="##any" processContents="lax"/>
    </xs:complexType>
    <xs:complexType name="tCellChange">
        <xs:sequence>
            <xs:element name="AnyCellChange" type="mcpttloc:tEmptyTypeAttribute" minOccurs="0"/>
            <xs:element name="EnterSpecificCell" type="mcpttloc:tSpecificCellType" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="ExitSpecificCell" type="mcpttloc:tSpecificCellType" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:anyAttribute namespace="##any" processContents="lax"/>
    </xs:complexType>
    <xs:complexType name="tEmptyType"/>
    <xs:simpleType name="tEcgi">
        <xs:restriction base="xs:string">
            <xs:pattern value="\d{3}\d{3}[0-1]{28}"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="tSpecificCellType">
        <xs:simpleContent>
            <xs:extension base="mcpttloc:tEcgi">
                <xs:attribute name="TriggerId" type="xs:string" use="required"/>
            </xs:extension>
        </xs:simpleContent>
    </xs:complexType>
    <xs:complexType name="tEmptyTypeAttribute">
        <xs:complexContent>
            <xs:extension base="mcpttloc:tEmptyType">
                <xs:attribute name="TriggerId" type="xs:string" use="required"/>
            </xs:extension>
        </xs:complexContent>
    </xs:complexType>
    <xs:complexType name="tTrackingAreaChangeType">
        <xs:sequence>
            <xs:element name="AnyTrackingAreaChange" type="mcpttloc:tEmptyTypeAttribute"
minOccurs="0"/>
            <xs:element name="EnterSpecificTrackingArea" type="mcpttloc:tTrackingAreaIdentity"
minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="ExitSpecificTrackingArea" type="mcpttloc:tTrackingAreaIdentity"
minOccurs="0" maxOccurs="unbounded"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:anyAttribute namespace="##any" processContents="lax"/>
    </xs:complexType>
    <xs:simpleType name="tTrackingAreaIdentityFormat">
        <xs:restriction base="xs:string">
            <xs:pattern value="\d{3}\d{3}[0-1]{16}"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="tTrackingAreaIdentity">
        <xs:simpleContent>
            <xs:extension base="mcpttloc:tTrackingAreaIdentityFormat">
                <xs:attribute name="TriggerId" type="xs:string" use="required"/>
            </xs:extension>
        </xs:simpleContent>
```

```
        </xs:complexType>
        <xs:complexType name="tPlmnChangeType">
            <xs:sequence>
                <xs:element name="AnyPlmnChange" type="mcpttloc:tEmptyTypeAttribute" minOccurs="0"/>
                <xs:element name="EnterSpecificPlmn" type="mcpttloc:tPlmnIdentity" minOccurs="0"
maxOccurs="unbounded"/>
                <xs:element name="ExitSpecificPlmn" type="mcpttloc:tPlmnIdentity" minOccurs="0"
maxOccurs="unbounded"/>
                <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:anyAttribute namespace="##any" processContents="lax"/>
        </xs:complexType>
        <xs:simpleType name="tPlmnIdentityFormat">
            <xs:restriction base="xs:string">
                <xs:pattern value="\d{3}\d{3}"/>
            </xs:restriction>
        </xs:simpleType>
        <xs:complexType name="tPlmnIdentity">
            <xs:simpleContent>
                <xs:extension base="mcpttloc:tPlmnIdentityFormat">
                    <xs:attribute name="TriggerId" type="xs:string" use="required"/>
                </xs:extension>
            </xs:simpleContent>
        </xs:complexType>
        <xs:complexType name="tMbmsSaChangeType">
            <xs:sequence>
                <xs:element name="AnyMbmsSaChange" type="mcpttloc:tEmptyTypeAttribute" minOccurs="0"/>
                <xs:element name="EnterSpecificMbmsSa" type="mcpttloc:tMbmsSaIdentity" minOccurs="0"/>
                <xs:element name="ExitSpecificMbmsSa" type="mcpttloc:tMbmsSaIdentity" minOccurs="0"/>
                <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:anyAttribute namespace="##any" processContents="lax"/>
        </xs:complexType>
        <xs:simpleType name="tMbmsSaIdentityFormat">
            <xs:restriction base="xs:integer">
                <xs:minInclusive value="0"/>
                <xs:maxInclusive value="65535"/>
            </xs:restriction>
        </xs:simpleType>
        <xs:complexType name="tMbmsSaIdentity">
            <xs:simpleContent>
                <xs:extension base="mcpttloc:tMbmsSaIdentityFormat">
                    <xs:attribute name="TriggerId" type="xs:string" use="required"/>
                </xs:extension>
            </xs:simpleContent>
        </xs:complexType>
        <xs:complexType name="tMbsfnAreaChangeType">
            <xs:sequence>
                <xs:element name="EnterSpecificMbsfnArea" type="mcpttloc:tMbsfnAreaIdentity"
minOccurs="0"/>
                <xs:element name="ExitSpecificMbsfnArea" type="mcpttloc:tMbsfnAreaIdentity"
minOccurs="0"/>
                <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:anyAttribute namespace="##any" processContents="lax"/>
        </xs:complexType>
        <xs:simpleType name="tMbsfnAreaIdentityFormat">
            <xs:restriction base="xs:integer">
                <xs:minInclusive value="0"/>
                <xs:maxInclusive value="255"/>
            </xs:restriction>
        </xs:simpleType>
        <xs:complexType name="tMbsfnAreaIdentity">
            <xs:simpleContent>
                <xs:extension base="mcpttloc:tMbsfnAreaIdentityFormat">
                    <xs:attribute name="TriggerId" type="xs:string" use="required"/>
                </xs:extension>
            </xs:simpleContent>
        </xs:complexType>
        <xs:complexType name="tIntegerAttributeType">
            <xs:simpleContent>
                <xs:extension base="xs:integer">
                    <xs:attribute name="TriggerId" type="xs:string" use="required"/>
                </xs:extension>
            </xs:simpleContent>
        </xs:complexType>
        <xs:complexType name="tTravelledDistanceType">
            <xs:sequence>
```

```xml
            <xs:element name="TravelledDistance" type="xs:positiveInteger"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:anyAttribute namespace="##any" processContents="lax"/>
    </xs:complexType>
    <xs:complexType name="tSignallingEventType">
        <xs:sequence>
            <xs:element name="InitialLogOn" type="mcpttloc:tEmptyTypeAttribute" minOccurs="0"/>
            <xs:element name="GroupCallNonEmergency" type="mcpttloc:tEmptyTypeAttribute"
minOccurs="0"/>
            <xs:element name="PrivateCallNonEmergency" type="mcpttloc:tEmptyTypeAttribute"
minOccurs="0"/>
            <xs:element name="LocationConfigurationReceived" type="mcpttloc:tEmptyTypeAttribute"
minOccurs="0"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:anyAttribute namespace="##any" processContents="lax"/>
    </xs:complexType>
    <xs:complexType name="tEmergencyEventType">
        <xs:sequence>
            <xs:element name="GroupCallEmergency" type="mcpttloc:tEmptyTypeAttribute"
minOccurs="0"/>
            <xs:element name="GroupCallImminentPeril" type="mcpttloc:tEmptyTypeAttribute"
minOccurs="0"/>
            <xs:element name="PrivateCallEmergency" type="mcpttloc:tEmptyTypeAttribute"
minOccurs="0"/>
            <xs:element name="InitiateEmergencyAlert" type="mcpttloc:tEmptyTypeAttribute"
minOccurs="0"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:anyAttribute namespace="##any" processContents="lax"/>
    </xs:complexType>
    <xs:complexType name="tRequestedLocationType">
        <xs:sequence>
            <xs:element name="ServingEcgi" type="mcpttloc:tEmptyType" minOccurs="0"/>
            <xs:element name="NeighbouringEcgi" type="mcpttloc:tEmptyType" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="MbmsSaId" type="mcpttloc:tEmptyType" minOccurs="0"/>
            <xs:element name="MbsfnArea" type="mcpttloc:tEmptyType" minOccurs="0"/>
            <xs:element name="GeographicalCordinate" type="mcpttloc:tEmptyType" minOccurs="0"/>
            <xs:element name="minimumIntervalLength" type="xs:positiveInteger"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:anyAttribute namespace="##any" processContents="lax"/>
    </xs:complexType>
    <xs:complexType name="tCurrentLocationType">
        <xs:sequence>
            <xs:element name="CurrentServingEcgi" type="mcpttloc:tEcgi" minOccurs="0"/>
            <xs:element name="NeighbouringEcgi" type="mcpttloc:tEcgi" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="MbmsSaId" type="mcpttloc:tMbmsSaIdentity" minOccurs="0"/>
            <xs:element name="MbsfnArea" type="mcpttloc:tMbsfnAreaIdentity" minOccurs="0"/>
            <xs:element name="CurrentCoordinate" type="mcpttloc:tPointCoordinate" minOccurs="0"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:anyAttribute namespace="##any" processContents="lax"/>
    </xs:complexType>
    <xs:complexType name="tGeographicalAreaChange">
        <xs:sequence>
            <xs:element name="AnyAreaChange" type="mcpttloc:tEmptyTypeAttribute" minOccurs="0"/>
            <xs:element name="EnterSpecificAreaType" type="mcpttloc:tSpecificAreaType"
minOccurs="0"/>
            <xs:element name="ExitSpecificAreaType" type="mcpttloc:tSpecificAreaType"
minOccurs="0"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="tSpecificAreaType">
        <xs:sequence>
            <xs:element name="GeographicalArea" type="mcpttloc:tGeographicalAreaDef"/>
        </xs:sequence>
        <xs:attribute name="TriggerId" type="xs:string" use="required"/>
    </xs:complexType>
    <xs:complexType name="tPointCoordinate">
        <xs:sequence>
            <xs:element name="longitude" type="mcpttloc:tThreeByteType"/>
            <xs:element name="latitude" type="mcpttloc:tThreeByteType"/>
        </xs:sequence>
    </xs:complexType>
```

```
    <xs:simpleType name="tThreeByteType">
        <xs:restriction base="xs:integer">
            <xs:minInclusive value="0"/>
            <xs:maxInclusive value="16777215"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="tGeographicalAreaDef">
        <xs:sequence>
            <xs:element name="PolygonArea" type="mcpttloc:tPolygonAreaType" minOccurs="0"/>
            <xs:element name="EllipsoidArcArea" type="mcpttloc:tEllipsoidArcType" minOccurs="0"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="tPolygonAreaType">
        <xs:sequence>
            <xs:element name="Corner" type="mcpttloc:tPointCoordinate" minOccurs="3"
maxOccurs="15"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="tEllipsoidArcType">
        <xs:sequence>
            <xs:element name="Center" type="mcpttloc:tPointCoordinate"/>
            <xs:element name="Radius" type="xs:nonNegativeInteger"/>
            <xs:element name="OffsetAngle" type="xs:unsignedByte"/>
            <xs:element name="IncludedAngle" type="xs:unsignedByte"/>
        </xs:sequence>
    </xs:complexType>
</xs:schema>
```

# F.3.3   Semantic

The <location-info> element is the root element of the XML document. The <location-info> element contains the <Configuration>, <Request> and <Report> subelements, of which only one can be present.

<Configuration> element has a <ConfigScope> attribute that can assume the values "Full" and "Update". The value "Full" means that the Configuration> element contains the full location configuration which replaces any previous location configuration. The value "Update" means that the location configuration is in addition to any previous location configuration. To remove configuration elements a "Full" configuration is needed. The <Configuration> element contains the following child elements:

1) <NonEmergencyLocationInformation>, an optional element that specifies the location information requested in non-emergency situations. The <NonEmergencyLocationInformation> has the subelements:

   a) <ServingEcgi>, an optional element specifying that the serving E-UTRAN Cell Global Identity (ECGI) needs to be reported;

   b) <NeighbouringEcgi>, an optional element that can occur multiple times, specifying that neighbouring ECGIs need to be reported;

   c) <MbmsSaId>, an optional element specifying that the serving MBMS Service Area Id needs to be reported;

   d) <MbsfnArea>, an optional element specifying that the MBSFN area Id needs to be reported;

   e) <GeographicalCoordinate>, an optional element specifying that the geographical coordinate specified in subclause 6.1 in 3GPP TS 23.032 [54] needs to be reported; and

   f) <minimumIntervalLength>, a mandatory element specifying the minimum time the MCPTT client needs to wait between sending location reports. The value is given in seconds;

2) <EmergencyLocationInformation>, an optional element that specifies the location information requested in emergency situations. The <EmergencyLocationInformation> has the subelements:

   a) <ServingEcgi>, an optional element specifying that the serving ECGI needs to be reported;

   b) <NeighbouringEcgi>, an optional element that can occur multiple times, specifying that neighbouring ECGIs need to be reported;

   c) <MbmsSaId>, an optional element specifying that the serving MBMS Service Area Id needs to be reported;

   d) <MbsfnArea>, an optional element specifying that the MBSFN area Id needs to be reported;

e) <GeographicalCoordinate>, an optional element specifying that the geographical coordinate specified in subclause 6.1 in 3GPP TS 23.032 [54] needs to be reported; and

f) <minimumIntervalLength>, a mandatory element specifying the minimum time the MCPTT client needs to wait between sending location reports. The value is given in seconds; and

3) <TriggeringCriteria>, a mandatory element specifying the triggers for the MCPTT client to perform reporting. The <TriggeringCriteria> element contains the following sub-elements:

   a) <CellChange>, an optional element specifying what cell changes trigger location reporting. Consists of the following sub-elements:

      I) <AnyCellChange>, an optional element. The presence of this element specifies that any cell change is a trigger. Contains a mandatory <TriggerId> attribute that shall be set to a unique string;

      II) <EnterSpecificCell>, an optional element specifying an ECGI which when entered triggers a location report. Contains a mandatory <TriggerId> attribute that shall be set to a unique string; and

      III)<ExitSpecificCell>, an optional element specifying an ECGI which when exited triggers a location report. Contains a mandatory <TriggerId> attribute that shall be set to a unique string;

   b) <TrackingAreaChange>, an optional element specifying what tracking area changes trigger location reporting. Consists of the following sub-elements:

      I) <AnyTrackingAreaChange>, an optional element. The presence of this element specifies that any tracking area change is a trigger. Contains a mandatory <TriggerId> attribute that shall be set to a unique string;

      II) <EnterSpecificTrackingArea>, an optional element specifying aTracking Area Id which when entered triggers a location report. Contains a mandatory <TriggerId> attribute that shall be set to a unique string; and

      III)<ExitSpecificTrackingArea>, an optional element specifying a Tracking Area Id which when exited triggers a location report. Contains a mandatory <TriggerId> attribute that shall be set to a unique string;

   c) <PlmnChange>, an optional element specifying what PLMN changes trigger location reporting. Consists of the following sub-elements:

      I) <AnyPlmnChange>, an optional element. The presence of this element specifies that any PLMN change is a trigger. Contains a mandatory <TriggerId> attribute that shall be set to a unique string;

      II) <EnterSpecificPlmn>, an optional element specifying a PLMN Id which when entered triggers a location report. Contains a mandatory <TriggerId> attribute that shall be set to a unique string; and

      III)<ExitSpecificPlmn>, an optional element specifying a PLMN Id which when exited triggers a location report. Contains a mandatory <TriggerId> attribute that shall be set to a unique string;

   d) <MbmsSaChange>, an optional element specifying what MBMS changes trigger location reporting. Consists of the following sub-elements:

      I) <AnyMbmsSaChange>, an optional element. The presence of this element specifies that any MBMS SA change is a trigger. Contains a mandatory <TriggerId> attribute that shall be set to a unique string;

      II) <EnterSpecificMbmsSa>, an optional element specifying an MBMS SAI which when entered triggers a location report. Contains a mandatory <TriggerId> attribute that shall be set to a unique string; and

      III)<ExitSpecificMbmsSa>, an optional element specifying an MBMS SAI which when exited triggers a location report. Contains a mandatory <TriggerId> attribute that shall be set to a unique string;

   e) <MbsfnAreaChange>, an optional element specifying what MBSFN changes trigger location reporting. Consists of the following sub-elements:

      I) <AnyMbsfnAreaChange>, an optional element. The presence of this element specifies that any MBSFN area change is a trigger. Contains a mandatory <TriggerId> attribute that shall be set to a unique string;

II) <EnterSpecificMbsfnArea>, an optional element specifying an MBSFN area which when entered triggers a location report. Contains a mandatory <TriggerId> attribute that shall be set to a unique string; and

III) <ExitSpecificMbsfnArea>, an optional element specifying an MBSFN area which when exited triggers a location report. Contains a mandatory <TriggerId> attribute that shall be set to a unique string;

f) <PeriodicReport>, an optional element specifying that periodic location reports shall be sent. The value in seconds specifies the reporting interval. Contains a mandatory <TriggerId> attribute that shall be set to a unique string;

g) <TravelledDistance>, an optional element specifying that the travelled distance shall trigger a report. The value in metres specified the travelled distance. Contains a mandatory <TriggerId> attribute that shall be set to a unique string;

h) <McpttSignallingEvent>, an optional element specifying what signalling events triggers a location report. The <McpttSignallingEvent> element has the following sub-elements:

I) <InitialLogOn>, an optional element specifying that an initial log on triggers a location report. Contains a mandatory <TriggerId> attribute that shall be set to a unique string;

II) <GroupCallNonEmergency>, an optional element specifying that a non-emergency group call triggers a location report. Contains a mandatory <TriggerId> attribute that shall be set to a unique string;

III) <PrivateCallNonEmergency>, an optional element specifying that a non-emergency private call triggers a location report. Contains a mandatory <TriggerId> attribute that shall be set to a unique string; and

IV) <LocationConfigurationReceived>, an optional element specifying that a received location configuration triggers a location report. Contains a mandatory <TriggerId> attribute that shall be set to a unique string; and

i) <GeographicalAreaChange>, an optional element specifying what geographical are changes trigger location reporting. Consists of the following sub-elements:

I) <AnyAreaChange>, an optional element. The presence of this element specifies that any geographical area change is a trigger. Contains a mandatory <TriggerId> attribute that shall be set to a unique string;

II) <EnterSpecificArea>, an optional element specifying a geographical area which when entered triggers a location report. Contains a mandatory <TriggerId> attribute that shall be set to a unique string. The <EnterSpecificArea> element has the following sub-elements:

A) <GeographicalArea>, an optional element containting a <TriggerId> attibute and the following two subelements:

x1) <PolygonArea>, an optional element specifying the area as a polygon specified in subclause 5.2 in 3GPP TS 23.032 [54]; and

x2) <EllipsoidArcArea>, an optional element specifying the area as an Ellipsoid Arc specified in subclause 5.7 in 3GPP TS 23.032 [54]; and

III) <ExitSpecificAreaType>, an optional element specifying a geographical area which when exited triggers a location report. Contains a mandatory <TriggerId> attribute that shall be set to a unique string.

<Request> is an element with a <RequestId> attribute. The <Request> element is used to request a location report. The value of the <RequestId> attribute is returned in the corresponding <ReportId> attribute in order to correlate the request and the report.

<Report> is an element used to include the location report. It contains a <ReportId> attribute and a <ReportType> attribute. The <ReportId> attribute is used to return the value in the <RequestId> attribute in the <Request> element. The <ReportType> attribute has two values "Emergency" and "NonEmergency" used to inform whether the client is sending the report in an emergency situation or not. The <Report> element contains the following sub-elements:

1) <TriggerId>, an optional element which can occur multiple times that contain the value of the <TriggerId> attribute associated with a trigger that has fired; and

2) <CurrentLocation>, a mandatory element that contains the location information. The <CurrentLocation> element contains the following sub-elements:

a) <CurrentServingEcgi>, an optional element containing the ECGI of the serving cell;

b) <NeighbouringEcgi>, an optional element that can occur multiple times. It contains the ECGI of any neighbouring cell the MCPTT client can see;

c) <MbmsSaId>, an optional element containing the MBMS SAI the MCPTT client is using;

d) <MbsfnArea>, an optional element containing the MBSFN area the MCPTT is located in; and

e) <CurrentCoordinate>, an optional element containing the longitude and latitude coded as in subclause 6.1 in 3GPP TS 23.032 [54].

The recipient of the XML ignores any unknown element and any unknown attribute.

# F.3.4    IANA registration template

Editor"s note [CT1#95-bis, C1-160453]: The "application/vnd.3gpp.mcptt-location-info+xml" MIME type as defined in this subclause needs to be registered at completion of Release-13.

Your Name:

<MCC name>

Your Email Address:

<MCC email address>

Media Type Name:

Application

Subtype name:

vnd.3gpp. mcptt-location-info+xml

Required parameters:

None

Optional parameters:

"charset"  the parameter has identical semantics to the charset parameter of the "application/xml" media type as specified in section 9.1 of IETF RFC 7303.

Encoding considerations:

binary.

Security considerations:

Same as general security considerations for application/xml media type as specified in section 9.1 of IETF RFC 7303. In addition, this media type provides a format for exchanging information in SIP, so the security considerations from IETF RFC 3261 apply.

The information transported in this media type does not include active or executable content.

Mechanisms for privacy and integrity protection of protocol parameters exist. Those mechanisms as well as authentication and further security mechanisms are described in 3GPP TS 24.229.

This media type does not include provisions for directives that institute actions on a recipient's files or other resources.

This media type does not include provisions for directives that institute actions that, while not directly harmful to the recipient, may result in disclosure of information that either facilitates a subsequent attack or else violates a recipient's privacy in any way.

This media type does not employ compression.

Interoperability considerations:

Same as general interoperability considerations for application/xml media type as specified in section 9.1 of IETF RFC 7303. Any unknown XML elements and any unknown XML attributes are to be ignored by recipient of the MIME body.

Published specification:

3GPP TS 24.379 "Mission Critical Push To Talk (MCPTT) call control" version 13.0.0, available via http://www.3gpp.org/specs/numbering.htm.

Applications which use this media type:

Applications supporting the service continuity as described in the published specification.

Fragment identifier considerations:

The handling in section 5 of IETF RFC 7303 applies.

Restrictions on usage:

None

Provisional registration? (standards tree only):

N/A

Additional information:

1. Deprecated alias names for this type: none

2. Magic number(s): none

3. File extension(s): none

4. Macintosh File Type Code(s): none

5. Object Identifier(s) or OID(s): none

Intended usage:

Common

Person to contact for further information:

- Name: <MCC name>

- Email: <MCC email address>

- Author/Change controller:

  i) Author: 3GPP CT1 Working Group/3GPP_TSG_CT_WG1@LIST.ETSI.ORG

  ii) Change controller: <MCC name>/<MCC email address>

# F.4 XML schema for MCPTT (de)-affiliation requests

## F.4.1 General

This subclause defines XML schema and MIME type for MCPTT (de)-affiliation requests.

# F.4.2  XML schema

<span style="color:red">Editor's Note [CT1ah, C1ah-160083]: The XML schema below is not yet complete.</span>

```xml
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" attributeFormDefault="unqualified"
elementFormDefault="qualified">
  <xs:complexType name="affiliate-command">
    <xs:sequence>
      <xs:element type="xs:anyURI" name="group" minOccurs="1" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="de-affiliate-command">
    <xs:sequence>
      <xs:element type="xs:anyURI" name="group" minOccurs="1" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:element name="command-list">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="affiliate" type="affiliate-command" minOccurs="0" maxOccurs="1"/>
        <xs:element name="de-affiliate" type="de-affiliate-command" minOccurs="0" maxOccurs="1"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
</xs:schema>
```

# F.4.3  Semantic

The <command-list> element is the root element of the XML document. The <command-list> element may contain <affiliate-command>, or <de-affiliate-command> subelements or both.

If the <command-list> contains the <affiliate-command> element then:

1) the <affiliate-command> element contains a list of <group> subelements having at least one subelement. The recipient shall perform an affiliation for all the MCPTT groups contained in the list for the clients for which the <command-list> applies.

If the <command-list> contains the <de-affiliate-command> element then:

1) the <de-affiliate-command> element contains a list of <group> subelements having at least one subelement. The recipient shall perform a de-affiliation for all the MCPTT groups contained in the list for the clients for which the <command-list> applies.

The recipient of the XML ignores any unknown element and any unknown attribute.

# F.4.4  IANA registration template

<span style="color:red">Editor"s note [CT1onMCPTT, C1ah-160012]: The MIME type "application/ vnd.3gpp.mcptt-affiliation-command+xml" as defined in this subclause is to be registered in the IANA registry for Application Media Types based upon the following template. The registration is to be started when work on the MCPTT-CT WID completes.</span>

Your Name:

<MCC name>

Your Email Address:

<MCC email address>

Media Type Name:

Application

Subtype name:

vnd.3gpp.mcptt-affiliation-command+xml

Required parameters:

None

Optional parameters:

"charset"  the parameter has identical semantics to the charset parameter of the "application/xml" media type as specified in section 9.1 of IETF RFC 7303.

Encoding considerations:

binary.

Security considerations:

Same as general security considerations for application/xml media type as specified in section 9.1 of IETF RFC 7303. In addition, this media type provides a format for exchanging information in SIP, so the security considerations from IETF RFC 3261 apply.

The information transported in this media type does not include active or executable content.

Mechanisms for privacy and integrity protection of protocol parameters exist. Those mechanisms as well as authentication and further security mechanisms are described in 3GPP TS 24.229.

This media type does not include provisions for directives that institute actions on a recipient's files or other resources.

This media type does not include provisions for directives that institute actions that, while not directly harmful to the recipient, may result in disclosure of information that either facilitates a subsequent attack or else violates a recipient's privacy in any way.

This media type does not employ compression.

Interoperability considerations:

Same as general interoperability considerations for application/xml media type as specified in section 9.1 of IETF RFC 7303. Any unknown XML elements and any unknown XML attributes are to be ignored by recipient of the MIME body.

Published specification:

3GPP TS 24.379 "Mission Critical Push To Talk (MCPTT) call control" version 13.0.0, available via http://www.3gpp.org/specs/numbering.htm.

Applications which use this media type:

Applications supporting the service continuity as described in the published specification.

Fragment identifier considerations:

The handling in section 5 of IETF RFC 7303 applies.

Restrictions on usage:

None

Provisional registration? (standards tree only):

N/A

Additional information:

1. Deprecated alias names for this type: none

2. Magic number(s): none

3. File extension(s): none

4. Macintosh File Type Code(s): none

5. Object Identifier(s) or OID(s): none

Intended usage:

Common

Person to contact for further information:

- Name: <MCC name>

- Email: <MCC email address>

- Author/Change controller:

    i) Author: 3GPP CT1 Working Group/3GPP_TSG_CT_WG1@LIST.ETSI.ORG

    ii) Change controller: <MCC name>/<MCC email address>

# Annex G (informative):
# On-network emergency related states

Editor's Note [CT1#95-bis, C1-160414]: state transition diagrams are needed in addition to the current content of this Annex.

# G.1 MCPTT emergency state

The MCPTT emergency state is managed by the MCPTT client and MCPTT user. High-level characteristics of this state are captured in table G-1.1.

**Table G.1-1: MCPTT emergency state**

| MCPTT emergency state | State-setting events | State-clearing events | Comments |
|---|---|---|---|
| **Values:**<br><br>"set": MCPTT user is in a life-threatening situation<br><br>"clear": MCPTT user is not in a life-threatening situation<br><br>**Managed by:**<br>MCPTT client and MCPTT user | MCPTT emergency alert initiated<br><br>MCPTT emergency group call initiated<br><br>MCPTT emergency private call initiated | MCPTT emergency alert cancelled (by initiator)<br><br>MCPTT emergency alert cancelled (by authorised-user)<br><br>MCPTT emergency call cancelled by initiator (if there is no outstanding MCPTT emergency alert)<br><br>MCPTT user manually clears the state | While the MCPTT client is in the MCPTT emergency state, all group calls it makes will be MCPTT emergency group calls, providing the group is authorised for MCPTT emergency group calls. While in an emergency group call while in the MCPTT emergency state, the MCPTT user is an "emergency talker" and will have pre-emptive priority over non-emergency talkers in the emergency group call. |

# G.2 In-progress emergency group state

This state is described in both 3GPP TS 22.179 [2] and 3GPP TS 23.179 [3]. It is managed by the controlling MCPTT function. High-level characteristics of this state are captured in table G.2-1.

**Table G.2-1: in-progress emergency group state**

| In-progress emergency group state values | State-entering events | Comments |
|---|---|---|
| "true" | acceptance by the controlling MCPTT function of an MCPTT emergency group call request (as per subclause 10.6.2.6.1.1 of 3GPP TS 23.179 [3]). | |
| "false" | initialization<br><br>acceptance by the controlling MCPTT function of an MCPTT emergency group cancel request (as per subclause 10.6.2.6.1.3 of 3GPP TS 23.179 [3]). | |

# G.3 MCPTT emergency group state

The MCPTT emergency group state is the MCPTT client's perspective of the in-progress emergency group state which is managed by the controlling MCPTT function. The MCPTT emergency group (MEG) state is managed by the MCPTT client to enable the requesting of MCPTT emergency-level priority as early as possible in the origination of an MCPTT emergency group call. High-level characteristics of this state are captured in table G.3-1.

**Table G.3-1: MCPTT emergency group state**

| MCPTT emergency group state values | State-entering events | Comments |
|---|---|---|
| MEG 1: no-emergency | initialization<br><br>Emergency group call cancel request received on behalf of another user from the MCPTT server<br><br>Emergency group call cancel response (success) in response to initiator's request | |
| MEG 2: in-progress | Emergency group call response received (confirm) to initiator's emergency group call request<br><br>Emergency group call request received (on behalf of another user) | In this state, all participants in calls on this group will receive emergency level priority whether or not they are in the MCPTT emergency state themselves. |
| MEG 3: cancel-pending | Emergency group call cancel request sent by initiator | The controlling MCPTT server may not grant the cancel request for various reasons, e.g., other users in an MCPTT emergency state remain in the call. |
| MEG 4: confirm-pending | Emergency group call request sent by initiator | The controlling MCPTT server may not grant the call request for various reasons, e.g., the MCPTT group is not configured as being emergency-capable so it can't be assumed that the group will enter the in-progress state. |

# G.4 MCPTT emergency group call state

Table G.4-1 provides the semantics of the MCPTT emergency group call (MEGC) state values. This internal state of the MCPTT client and is managed by the MCPTT client. These states aid in the managing of the information elements of MCPTT emergency group calls and MCPTT emergency alerts and their cancellations.

**Table G.4-1: MCPTT emergency group call state**

| MCPTT emergency group call state values | Semantics | Comments |
|---|---|---|
| MEGC 1: emergency-gc-capable | MCPTT client emergency-capable client is not currently in an MCPTT emergency group call that it has originated, nor is it in the process of initiating one. | **MCPTT emergency state:** may or may not be set in this state, depending upon the MCPTT client's MEA state |
| MEGC 2: emergency-call-requested | MCPTT client has initiated an MCPTT emergency group call request. | **MCPTT emergency state:** is set |
| MEGC 3: emergency-call-granted | MCPTT client has received an MCPTT emergency group call grant. | If the MCPTT user initiates a call while the MCPTT emergency state is still set, that call will be an MCPTT emergency group call, assuming that group is authorised for the client to initiate emergeny group calls on. **MCPTT emergency state:** is set |

# G.5 MCPTT emergency alert state

Table G.5-1provides the semantics of the MCPTT emergency alert (MEA) state values. This is an internal state of the MCPTT client and is managed by the MCPTT client. These states aid in the managing of the information elements of MCPTT emergency group calls and MCPTT emergency alerts and their cancellations.

**Table G.5-1: MCPTT emergency alert state**

| MCPTT emergency alert state values | State-entering events | Comments |
|---|---|---|
| MEA 1: no-alert | initialization<br>emergency alert cancelled<br>emergency alert request denied | emergency alerts can be cancelled in several ways:<br>MCPTT emergency alert cancel request with <alert-ind> set to "false" (by initiator)<br>MCPTT emergency alert cancel request with <alert-ind> set to "false" (by authorised user)<br>MCPTT emergency group call cancel request with <alert-ind> set to "false"<br>**MCPTT emergency state:** may be set or clear, depending on MCPTT emergency call status |
| MEA 2: emergency-alert-confirm-pending | emergency alert request sent | emergency alerts can be requested in several ways:<br>MCPTT emergency alert request with <alert-ind> set to "true"<br>MCPTT emergency group call request with <alert-ind> set to "true"<br>**MCPTT emergency state:** is set |
| MEA 3: emergency-alert - initiated | emergency alert response (success) received | **MCPTT emergency state:** is set |

# Annex H (informative): On-network routing considerations

## H.1 General

The following subclauses summarise the identities placed into SIP headers and SIP bodies during session establishment.

## H.2 Group Call.

Table H.2-1 describes the contents of the SIP headers and SIP bodies inserted by MCPTT clients and MCPTT servers involved in a group call.

**Table H.2-1: Routing considerations for group call**

| Interface | Content of SIP headers | Content of "mcptt-info" MIME body | Notes |
|---|---|---|---|
| originating MCPTT client to originating participating MCPTT function (O-PF). | Request-URI contains PSI of O-PF. P-Preferred-Identity may contain IMPU of originating user. | "mcptt-request-uri" contains the group identity. | PSI of O-PF configured for each client. MCPTT-id of each client is never sent in session initiation. |
| O-PF to controlling MCPTT function (CF). | Request-URI contains PSI of CF. P-Asserted-Identity contains IMPU of originating user. | "mcptt-request-uri" contains the group identity. "mcptt-calling-user-id" contains MCPTT ID of originating user. | CF finds the MCPTT ID of the originating user from the stored IMPU-MCPTT ID binding and locates the PSI of the controller that serves the group identity. O-PF contains configuration of the PSIs of the CFs. |
| CF to terminating participating MCPTT function (T-PF). | Request-URI contains the address of the T-PF. P-Asserted-Identity contains the address of the CF. | "mcptt-request-uri" contains the MCPTT ID of the terminating user. "mcptt-calling-user-id" contains MCPTT ID of originating user. "mcptt-group-id" contains the group identity. | For each client in the group, CF maps the MCPTT-ID of the terminator to the address of the T-PF. If the terminator is in another domain, the CF can map the MCPTT ID of the terminator to a PSI identifying a interrogating function in the partner network that is able to find the T-PF using the MCPTT ID. |
| CF to non-controlling MCPTT function of an MCPTT group (NCF). | Request-URI contains the PSI of the NCF. P-Asserted-Identity contains the PSI of the CF. | "mcptt-request-uri" contains the group identity. "mcptt-calling-user-id" contains MCPTT ID of originating user. | - |
| T-PF to terminating MCPTT client. | Request-URI contains the IMPU of the terminating user. P-Asserted-Identity contains the address of the CF. | "mcptt-request-uri" contains the MCPTT ID of the terminating user. "mcptt-calling-user-id" contains MCPTT ID of originating user. "mcptt-group-id" contains the group identity. | T-PF finds the IMPU of the terminating user from the stored IMPU-MCPTT ID binding at the time of registration. |
| terminating MCPTT client to T-PF (response). | as in TS 24.229. | "mcptt-called-party-id" contains contacted client's MCPTT ID. | invited user may have forwarded communications to another client. |
| T-PF to CF (response). | as in TS 24.229. | "mcptt-called-user" contains contacted client's MCPTT ID. | invited user may have forwarded communications to another client. |
| NCF to CF (response) | as in TS 24.229. | - | In the case of trusted mutual aid, the NCF returns the identities of the group in a "resources-list" MIME body. |
| CF to O-PF (response) | as in TS 24.229. | "mcptt-called-party-id" contains contacted client's MCPTT ID. | - |
| O-PF to originating MCPTT client (response) | as in TS 24.229. | "mcptt-called-party-id" contains contacted client's MCPTT ID. | - |

# H.3    Private Call.

Table H.3-1 describes the contents of the SIP headers and SIP bodies inserted by MCPTT clients and MCPTT servers involved in a private call.

**Table H.3-1: Routing considerations for private call**

| Interface | Content of SIP headers | Content of SIP bodies (body in brackets) | Notes |
|---|---|---|---|
| originating MCPTT client to originating participating MCPTT function (O-PF) | Request-URI contains the PSI for the private call service. P-Preferred-Identity may contain IMPU of originating user | MCPTT ID of called user (resources-list) "mcptt-calling-user-id" (mcptt-info) | PSI for private call is configured on the client. |
| O-PF to controlling MCPTT function (CF) | Request-URI contains the PSI for the private call service. P-Asserted-Identity contains IMPU of originating user. | MCPTT ID of called user (resources-list) MCPTT ID of calling user contained in "mcptt-calling-user-id" (mcptt-info) | - |
| CF to terminating participating MCPTT function (T-PF) | Request-URI contains the address of the T-PF. P-Asserted-Identity contains IMPU of originating user. | MCPTT ID of calling user contained in "mcptt-calling-user-id" (mcptt-info). MCPTT ID of called user contained in "mcptt-called-party-id" (mcptt-info). | If the terminator is in another domain, the CF can map the MCPTT ID of the terminator to a PSI identifying an interrogating function in the partner network that is able to find the T-PF using the MCPTT ID. |
| T-PF to terminating MCPTT client | Request-URI contains the IMPU of the terminating user. P-Asserted-Identity contains IMPU of originating user. | MCPTT ID of calling user contained in "mcptt-calling-user-id" (mcptt-info). MCPTT ID of called user contained in "mcptt-called-party-id" (mcptt-info). | - |
| terminating MCPTT client to T-PF (response) | as in TS 24.229 | "mcptt-called-party-id" contains contacted client's MCPTT ID. | invited user may have forwarded communications to another client. |
| T-PF to CF (response) | as in TS 24.229 | "mcptt-called-user" contains contacted client's MCPTT ID. | invited user may have forwarded communications to another client. |
| CF to O-PF (response) | as in TS 24.229 | "mcptt-called-party-id" contains contacted client's MCPTT ID. | - |
| O-PF to originating MCPTT client (response) | as in TS 24.229 | "mcptt-called-party-id" contains contacted client's MCPTT ID. | - |

# Annex I (informative):
# Change history

| Change history | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Date | TSG # | TSG Doc. | CR | Rev | Subject/Comment | | Old | New |
| 2015-07 | | | | | Initial version. | | - | 0.0.0 |
| 2015-08 | | | | | Implementation of the following P-CRs from CT1#92-bis MCPTT: C1ah-150007; C1ah-150042; C1ah-150046 | | 0.0.0 | 0.1.0 |
| 2015-08 | | | | | Implementation of the following P-CRs from CT1#93: C1-152952; C1-152956; C1-153125; C1-153177; C1-153178; C1-153179; C1-153180; C1-153220; C1-153229 ;changes by Rapporteur | | 0.1.0 | 0.2.0 |
| 2015-08 | | | | | Minor fixes from the rapporteur | | 0.2.0 | 0.2.1 |
| 2015-09 | | | | | Modifying the cover sheet to add the TS number and replacing MCPTT TS references with their allocated numbers. Changes by the rapporteur. | | 0.2.1 | 0.2.2 |
| 2015-10 | | | | | Implementation of the following P-CRs from CT1#94: C1-153730; C1-153736; C1-153739; C1-153740; C1-154748; C1-153749; C1-153750; C1-153751; C1-153762;C1-153763; C1-153764; C1-153765; C1-153766; C1-153802; C1-153804; C1-153805; C1-153926; C1-153975; | | 0.2.2 | 0.3.0 |
| 2015-11 | | | | | Implementation of the following P-CRs from CT1#95: C1-154472; C1-154473; C1-154326; C1-154480; C1-154103; C1-154477; C1-154478; C1-154479; C1-154858; C1-154355; C1-154398; C1-154535; C1-154536; C1-154537; C1-154539; C1-154540; C1-154542; C1-154544; C1-154548; C1-154549; C1-154550; C1-154552; C1-154553; C1-154712; C1-154715; C1-154716; C1-154717; C1-154731; C1-154732;C1-154399; C1-154401; Editorial changes by rapporteur. | | 0.3.0 | 0.4.0 |
| 2015-11 | | | | | Minor editorial fixes from the rapporteur | | 0.4.0 | 0.4.1 |
| 2015-12 | CT-70 | CP-150733 | | | Version 1.0.0 created for presentation for information | | 0.4.1 | 1.0.0 |
| 2016-01 | | | | | Implementation of the following P-CRs from CT1#95-bis: C1-160322; C1-160323; C1-160326; C1-160380; C1-160392; C1-160393; C1-160394; C1-160395; C1-160396, C1-160397; C1-160400; C1-160414; C1-160415; C1-160416; C1-160417; C1-160418; C1-160419; C1-160420; C1-160421; C1-160422; C1-160423; C1-160453, C1-160455; C1-160456; C1-160457; C1-160458; C1-160466; C1-160489; C1-160490; C1-160491; C1-160612; C1-160617; C1-160770; Editorial changes by rapporteur. | | 1.0.0 | 1.1.0 |
| 2016-02 | | | | | (1) Implementation of the following P-CRs from CT1 MCPTT-adhoc: C1ah-160039; C1ah-160074; C1ah-160075; C1-ah160080; C1ah-160083; C1ah-160100; C1ah-160101; C1ah-160102; C1ah-160107; C1ah-160108;<br><br>(2) Implementation of the following P-CRs from CT1#96: C1-161042; C1-161045; C1-161047; C1-161048; C1-161050; C1-161058; C1-161108; C1-161109; C1-161139; C1-161206; C1-161208; C1-161209; C1-161212; C1-161213; C1-161214; C1-161234; C1-161302; C1-161304; C1-161305; C1-161308; C1-161312; C1-161357; C1-161358; C1-161359; C1-161360; C1-161361; C1-161364; C1-161366; C1-161367; C1-161368; C1-161369; C1-161389; C1-161390; C1-161391; C1-161393; C1-161394; C1-161395; C1-161396; C1-161438; C1-161439; C1-161440; C1-161441; C1-161505; C1-161507; C1-161508; C1-161512; C1-161520; C1-161521.<br><br>(3) Editorial changes by rapporteur. | | 1.1.0 | 1.2.0 |

| 2016-02 | | | | | Further corrections by rapporteur | 1.2.0 | 1.2.1 |
|---------|-------|------------|--|--|---------------------------------------------------|-------|-------|
| 2016-03 | CT-71 | CP-160059 | | | Version 2.0.0 created for presentation for approval | 1.2.1 | 2.0.0 |
| 2016-03 | CT-71 | | | | Version 13.0.0 created after approval | 2.0.0 | 13.0.0 |
| 2016-03 | | | | | Minor editorial changes from TS rapporteur | 13.0.0 | 13.0.1 |

# History

| Document history | | |
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