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Mission Critical Push to Talk (MCPTT) over LTE;  
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## Introduction

The present document covers requirements for Mission Critical Push To Talk (MCPTT) service (represented by the term, MCPTT Service). The MCPTT Service can be used for public safety applications and also for general commercial applications (e.g., utility companies and railways). The specifications contained within the present document can also form the basis for a non-mission critical Push To Talk service (called a PTT service).

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# 1 Scope

The present document provides the service requirements for operation of the MCPTT Service. MCPTT makes use of capabilities included in Group Communications System Enablers for LTE (GCSE\_LTE) and Proximity Services (ProSe), with additional requirements specific to the MCPTT Service. The MCPTT Service can be used for public safety applications and also for general commercial applications (e.g., utility companies and railways).

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# 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] TSB-102-B: "Project 25 TIA-102 Document Suite Overview".
- [3] TIA-603-D: "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards".
- [4] TIA-102.BABA: "Vocoder Description".
- [5] 3GPP TS 22.278: "Service requirements for the Evolved Packet System (EPS)".
- [6] 3GPP TS 22.468: "Group Communication System Enablers for LTE (GCSE\_LTE)".
- [7] ITU-T Recommendation P.862: "Perceptual evaluation of speech quality (PESQ): An objective method for end-to-end speech quality assessment of narrow-band telephone networks and speech codecs".
- [8] ITU-T Recommendation P.862.1: "Mapping function for transforming P.862 raw result scores to MOS-LQO".
- [9] ITU-T Recommendation P.863: "Perceptual objective listening quality assessment".
- [10] TIA-102.BABG: "Enhanced Vocoder Methods of Measurement for Performance", March 2010.
- [11] 3GPP TS 26.190: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; Transcoding functions".
- [12] 3GPP TS 26.194: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; Voice Activity Detector (VAD)".
- [13] 3GPP TS 22.011: "Service accessibility".
- [14] 3GPP TS 23.122: "Non-Access-Stratum (NAS) functions related to Mobile Stations (MS) in idle mode".

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## 3 Definitions and abbreviations

### 3.1 Definitions

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

**Affiliated MCPTT Group Member:** An MCPTT Group Member who has indicated an interest in the group and is prepared to receive and/or transmit Group Communications from/to the particular MCPTT Group.

**Automatic Commencement Private Call:** A Private Call in which the initiation of the Private Call does not require any action on the part of the receiving MCPTT User.

**Broadcast Group Call:** A group call where the initiating MCPTT User expects no response from the other MCPTT Users, so that when his transmission is complete, so is the call.

**Call Commencement Mode:** This is a setting that determines the conditions under which a call is started.

**Dispatcher:** An MCPTT User who participates in MCPTT communications for command and control purposes.

**Floor control:** An arbitration system in an MCPTT Service that determines who has the authority to transmit (talk) at a point in time during an MCPTT call.

**Group-Broadcast Group:** A collection of groups defined by the MCPTT Administrator (e.g., representing a particular organizational structure) and intended to be the recipients of Broadcast Group Calls.

**Group Regroup:** The temporary combining of a multiplicity of groups into a single group.

**Hang Time:** A configurable maximum length of the inactivity (silence) period between consecutive MCPTT transmissions within the same call.

**Imminent Peril Call:** An urgent MCPTT Group call that highlights the potential of death or serious injury, but is less critical than an MCPTT Emergency Group Call. For example a call prioritized in the event of immediate threat to any human life such as resulting from an MCPTT User's observation of or engagement in a situation involving imminent peril to the general public (e.g., a forest fire about to encircle campers, tanker truck ready to explode near a school, casualties at the scene of a car bombing).

**In-progress Emergency:** An emergency condition for a group that has been accepted by the MCPTT Service, but has not yet been cancelled by an authorized user.

**In-progress Imminent Peril:** An imminent peril condition for a group that has been accepted by the MCPTT Service and has not yet been cancelled by an authorized MCPTT User.

**Late call entry:** An Affiliated MCPTT Group Member joins in an in progress MCPTT Group Call.

**Location:** The current physical location (i.e., co-ordinates plus estimated accuracy and timestamp) of the MCPTT UE that can be cross-referenced to a map.

**Losing audio:** Audio of an overridden talker that is routed to selected authorized MCPTT Users.

**Manual Commencement Private Call:** A Private Call in which the initiation of the Private Call requires the receiving MCPTT User to perform some action to accept or reject the Private Call setup.

**MCPTT Administrator:** An individual authorized to control parameters of the MCPTT Service for an organization including, for example, user and group definition, user/group aliases, user priorities, group membership/priorities/hierarchies, security and privacy controls.

**MCPTT Emergency Alert:** A notification from the MCPTT UE to the MCPTT Service that the MCPTT User has an emergency condition.

**MCPTT Emergency Group Call:** An urgent MCPTT Group call that highlights the potential of death or serious injury to the initiator.

**MCPTT Emergency Private Call:** An urgent MCPTT Private Call that highlights the potential of death or serious injury to the initiator.

**MCPTT Emergency State:** A heightened condition of alarm for an MCPTT User indicating a need for immediate assistance due to a personal life-threatening situation.

**MCPTT Group:** A defined set of MCPTT Users identified independently of transport or network type.

**MCPTT Group Member:** An MCPTT User who has been authorized to participate in Group Communications of a particular MCPTT Group.

**MCPTT Request:** The action taken by an MCPTT User to request the permission to transmit voice on a call.

**MCPTT Service:** A Push To Talk communication service supporting applications for Mission Critical Organizations and mission critical applications for other businesses and organizations (e.g., utilities, railways) with fast setup times, high availability, reliability and priority handling.

**MCPTT system:** The collection of applications, services, and enabling capabilities required to provide Mission Critical Push To Talk for a Mission Critical Organization.

**MCPTT UE:** A UE that enables an MCPTT User to participate in MCPTT Service.

**MCPTT User:** A user of an MCPTT Service, who has a device with the capability to participate in MCPTT Services.

**MCPTT User Profile:** The set of information that allows an MCPTT User to employ the MCPTT Service in a given role and/or from a given MCPTT device.

**Mission Critical Organization:** An end-user organization that includes MCPTT Users and/or UEs, and can include MCPTT Administrators, and can be organized hierarchically, with administrative control delegated within the organization or to an outside entity.

**Mission Critical Push To Talk:** A group communication service with fast setup times, ability to handle large groups, strong security and priority handling.

**Off-Network MCPTT Service:** The collection of functions and capabilities required to provide MCPTT using ProSe Discovery and the ProSe Communication path for MCPTT Users using Public Safety ProSe-enabled UEs as a direct communication between UEs using E-UTRA.

**Participant:** An MCPTT User who is currently receiving and/or transmitting in an MCPTT Group Call or a Private Call.

**Participant type:** Functional category of the Participant (e.g., first responder, second responder, dispatch, dispatch supervisor), typically defined by the MCPTT Administrators.

**Partner MCPTT System:** Allied MCPTT system that provides MCPTT Services to an MCPTT User based on the MCPTT User Profile that is defined in the Primary MCPTT System of that MCPTT User.

**Pre-emption:** The act of terminating on-going calls in order to free up resources for a higher priority call request.

**Primary MCPTT System:** MCPTT system where the MCPTT User Profile of an MCPTT User is defined.

**Private Call:** A call between a pair of MCPTT Users using the MCPTT Service with or without MCPTT Floor control.

**Project 25 RFSS:** A Project 25 Radio Frequency (RF) Subsystem as defined in TSB-102-B [2].

**Receiving MCPTT Group Member:** An Affiliated MCPTT Group Member who is currently receiving Group Communication from an MCPTT Group.

**Selected MCPTT Group:** The MCPTT Group that a particular Affiliated MCPTT Group Member uses for transmission.

**System Call:** A special case of a Broadcast Group Call that is transmitted to all users in a dynamically defined geographic area.

**Transmitting MCPTT Group Member:** An Affiliated MCPTT Group Member who is currently transmitting a Group Communication to a Selected MCPTT Group.

**User-Broadcast Group:** A collection of users defined by the MCPTT Administrator (e.g., representing a particular organizational structure) and intended to be the recipients of Broadcast Group Calls.

**User ID:** The main unique identifier for an MCPTT User.

**User Regroup:** The temporary combining of a multiplicity of users into a new group.

## 3.2 Abbreviations

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

FIFO	First In First Out
GCSE_LTE	Group Communication System Enablers for LTE
KPI	Key Performance Indicator
MCPTT	Mission Critical Push To Talk
MOS-LQO	Mean Opinion Score – Listening Quality Objective
P25	Project 25
PESQ	Perceptual Evaluation of Speech Quality
POLQA	Perceptual Objective Listening Quality Assessment
ProSe	Proximity Services
PTT	Push To Talk
RFSS	Radio Frequency (RF) Subsystem as defined in the TIA-102 specifications (P25)
TETRA	Terrestrial Trunked Radio
TIA	Telecommunications Industry Association

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## 4 Mission Critical Push To Talk overview

### 4.1 General

A Push To Talk service provides an arbitrated method by which two or more users may engage in communication. Users may request permission to transmit (e.g., traditionally by means of a press of a button). The Mission Critical Push To Talk over LTE (MCPTT) service supports an enhanced PTT service, suitable for mission critical scenarios, based upon 3GPP Evolved Packet System (EPS) services. The requirements for Mission Critical Push To Talk (MCPTT) service defined within can also form the basis for a non-mission critical Push To Talk (PTT) service.

The MCPTT Service is intended to support communication between several users (a group call), where each user has the ability to gain access to the permission to talk in an arbitrated manner. However, the MCPTT Service also supports Private Calls between pairs of users. The MCPTT Service builds on the existing 3GPP transport communication mechanisms provided by the EPS architectures to establish, maintain, and terminate the actual communication path(s) among the users.

The MCPTT Service also builds upon service enablers: GCSE\_LTE and ProSe. To the extent feasible, it is expected that the end user's experience to be similar regardless if the MCPTT Service is used under coverage of an EPC network or based on ProSe without network coverage. To clarify this intent, the requirements are grouped according to applicability to on-network use, off-network use, or both.

Though the MCPTT Service primarily focuses on the use of LTE there might be users who access the MCPTT Service through non-3GPP access technology, dispatchers and administrators are examples of this. Dispatchers and administrators are special users who have particular admin and call management privileges which normal users might not have. In MCPTT dispatchers can use an MCPTT UE (i.e., LTE) or a non-3GPP access connection to the MCPTT Service based on a "dispatcher and Administrator" interface. Through this interface a user is able to access and manage the services related to on the network and those common to on the network and off the network.

The MCPTT Service allows users to request the permission to talk (transmit voice/audio) and provides a deterministic mechanism to arbitrate between requests that are in contention (i.e., Floor control). When multiple requests occur, the determination of which user's request is accepted and which users' requests are rejected or queued is based upon a number of characteristics (including the respective priorities of the users in contention). MCPTT Service provides a means for a user with higher priority (e.g., MCPTT Emergency condition) to override (interrupt) the current talker.

MCPTT Service also supports a mechanism to limit the time a user talks (hold the floor) thus permitting users of the same or lower priority a chance to gain the floor.

The MCPTT Service provides the means for a user to monitor activity on a number of separate calls and enables the user to switch focus to a chosen call. An MCPTT Service user may join an already established MCPTT Group call (Late call entry). In addition the MCPTT Service provides the User ID of the current speaker(s) and user's Location determination features.

The users of an MCPTT Service may have more stringent expectations of performance than the users of a commercial PTT service.

MCPTT is primarily targeting to provide a professional Push To Talk service to e.g., public safety, transport companies, utilities or industrial and nuclear plants. In addition to this a commercial PTT service for non-professional use (e.g., groups of people on holiday) may be delivered through an MCPTT system. Based on their operational model, the performance and MCPTT features in use vary per user organization, where functionality which is more mission critical specific (e.g., Ambient Listening and Imminent Peril Call) might not be available to commercial customers.

MCPTT Users expect to communicate with other MCPTT Users as outlined above, however MCPTT Users also need to be able to communicate with non MCPTT Users using their MCPTT UEs for normal telephony services.

## 4.2 Typical use of the MCPTT Service

NOTE: Even though this subclause is written from an organization specific perspective the text is illustrative for typical use of MCPTT Services by all MCPTT Users.

Public safety workers often operate in groups and perform different tasks during the day/week. Many tasks and operations are controlled, assisted and/or coordinated by a dispatcher.

For their communications public safety workers are organized in groups. People that are working together communicate in the same MCPTT Group, the group communication helping them to coordinate quickly.

People with different tasks often communicate in separate MCPTT Groups.

Many of the public safety tasks are routine tasks, that are handled by standard procedures and communication structures, using dedicated MCPTT Groups. Communication structures and MCPTT Groups are also prepared for the handling of large incidents and control of large events. Similarly there are MCPTT Groups and procedures for coordination with public safety workers from other organizations and/or other countries.

The standard procedures and communication structures help the public safety workers to do their work successfully. This results in a long list of (>100) MCPTT Groups available to a public safety worker, from which the correct one is selected depending on the task. To help the public safety worker to quickly find and select the correct MCPTT Group for the task, the MCPTT Groups in the radio are often structured in folders and/or accessible via key-shortcuts. In addition to pre-established MCPTT Groups that users select, there are also provisions in MCPTT systems to merge MCPTT Groups and to select on behalf of a user which group they should be using and for a dispatcher to push them onto it. The large number of MCPTT Groups provisioned on devices is helpful for the device to be able to operate on the network and off the network. However the ability to provision over the air is also seen as a very useful feature, as currently Land Mobile Radio devices often have to be locally re-programmed, rather than updated over the air.

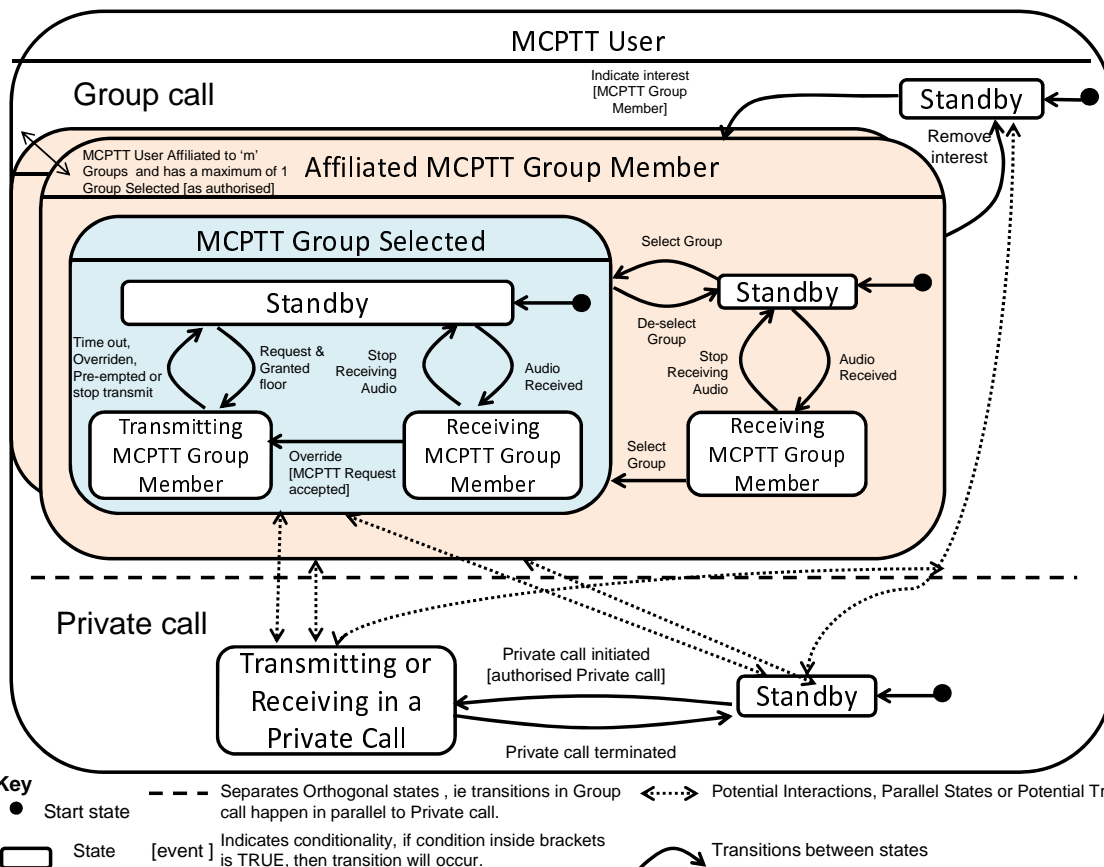
## 4.3 Overview of MCPTT Group affiliation, call and transmission

An MCPTT Service provides Group Call and Private Call capabilities, which have various process flows, states and permissions associated with them. The figure 4.3.1, figure 4.3.2, and figure 4.3.3 indicate the high level flows, states and permissions associated with Group Calls and Private Calls. The diagrams apply to the on-network case and off-network case, as from a user perspective the service and concepts should appear similar on the network and off the network. From a technical perspective there might be differences between the on-network states and off-network states (e.g., off the network Affiliation might not require notifying an application server of a user's affiliation and there might also be other differences in the detail depending on the extent to which the off-network capabilities can match the on-network capabilities).

If an MCPTT User wants to communicate with an MCPTT Group they have to be allowed to access the MCPTT Group (i.e., be an MCPTT Group Member), they then have to affiliate and then can have an MCPTT Group as their Selected MCPTT Group. If an MCPTT User is only affiliated to a group this is so that they can receive from the group, however

if an MCPTT User has a Selected MCPTT Group this is their group for transmitting on. The differences in states enable an MCPTT User to receive from multiple MCPTT Groups, but specify which MCPTT Group they would like to transmit on.

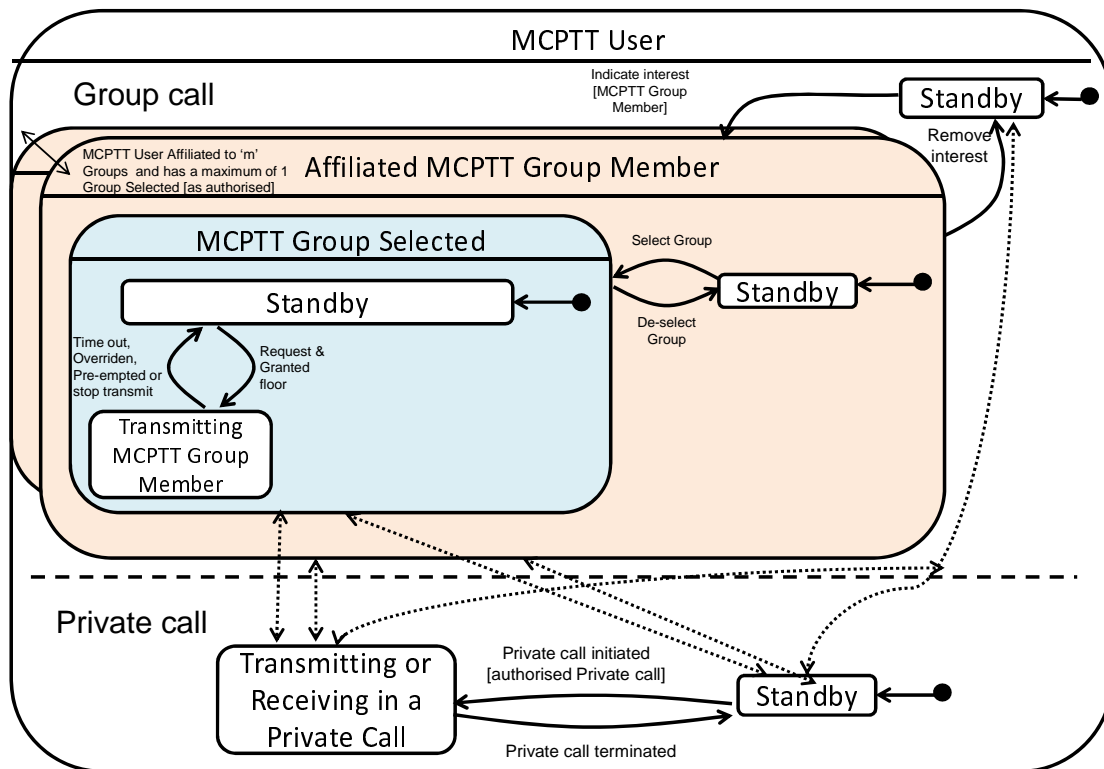
Both receive and transmit allowed for an MCPTT User with respect to a particular MCPTT Group.



NOTE: This diagram is for illustrative purposes only and does not supersede the requirements. The diagram is not exhaustive and does not include all the different scenarios.

Figure 4.3.1: MCPTT User state diagram- transmit and receive for a particular MCPTT Group

Transmit only allowed for an MCPTT User with respect to a particular MCPTT Group.



**Key**

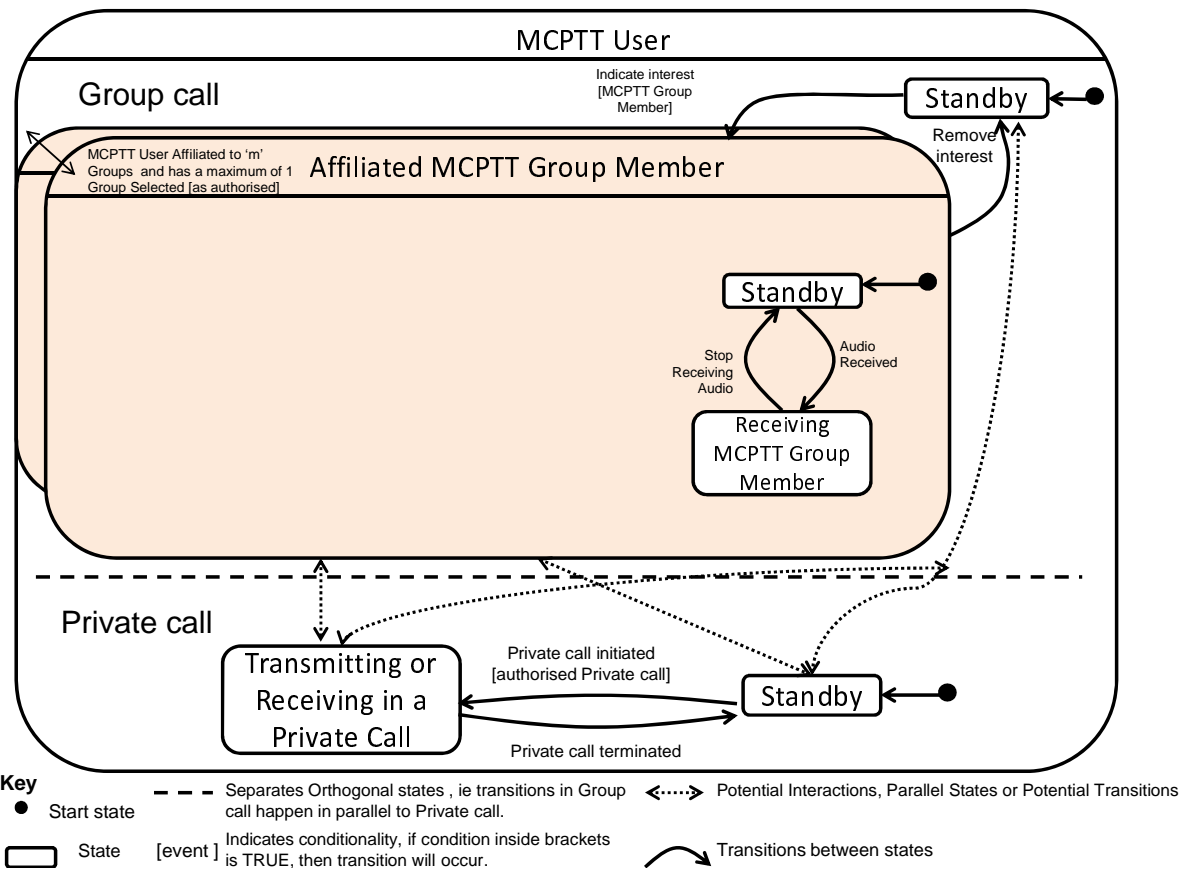
- Start state
- State
- Separates Orthogonal states, i.e. transitions in Group call happen in parallel to Private call.
- [event] Indicates conditionality, if condition inside brackets is TRUE, then transition will occur.
- ◀.....▶ Potential Interactions, Parallel States or Potential Transitions
- ↔ Transitions between states

NOTE: This diagram is for illustrative purposes only and does not supersede the requirements. The diagram is not exhaustive and does not include all the different scenarios.

**Figure 4.3.2: MCPTT User state diagram- transmit only for a particular MCPTT Group**



Receive only allowed for an MCPTT User with respect to a particular MCPTT Group.



NOTE: This diagram is for illustrative purposes only and does not supersede the requirements. The diagram is not exhaustive and does not include all the different scenarios.

**Figure 4.3.3: MCPTT User state diagram- receive only for a particular MCPTT Group**

It is possible for an MCPTT User to be affiliated with one or more MCPTT Groups. Normally, while in operation, an MCPTT User informs the MCPTT Service about which MCPTT Groups he would like to be affiliated to. These affiliations remain in effect until the MCPTT User removes them, or changes them, or signs out of the service. Some MCPTT Users have permanent affiliations to certain MCPTT Groups and those affiliations are set up implicitly (i.e., automatically) when operating on the network. For those users, the MCPTT Group affiliation starts when the MCPTT Service successfully signs in the user and ends when the MCPTT User's explicit or implicit (e.g., due to inactivity or the turning off of all its devices) request to sign out of the MCPTT Service is acknowledged.

Every time a PTT request is granted a user can start an MCPTT transmission or "talk burst". An MCPTT Group Call consists of one or more MCPTT transmissions. Whether two consecutive transmissions from same or different users are part of the same call, or the second transmission starts a new call, depends on the configurable maximum length of the inactivity period between the consecutive MCPTT transmissions. This inactivity period can be seen as a Hang Time that starts at the end of the preceding transmission. While this timer is running, the resources associated with the call stay assigned to the call (except in case of pre-emption), which could reduce the latency of future floor requests for this group versus groups who are not involved in a call. When a new transmission starts during the inactivity period, the timer is stopped, reset and restarted again at the end of that transmission.

The MCPTT Service recognizes a number of "special" group calls including: Broadcast Group Call, Emergency Group Call and Imminent Peril group call.

A Broadcast Group Call can be seen as a special group call with only one MCPTT transmission.

While the In-progress Emergency state or In-progress Imminent Peril state is active, the inactivity period is conceptually set to infinity; i.e., the resources assigned to calls during these states are never released (except in case of pre-emption). An MCPTT Emergency Group Call or an Imminent Peril group call can be seen as having an unspecified number of transmissions: essentially, all the transmissions to a group during In-progress Emergency state or In-progress Imminent Peril are part of the same MCPTT Group Call.

Conditions on starting ("commencement") and continuing an MCPTT call can be established. Usually at least the call initiator (but also other users) are kept informed via notifications of the starting, stopping, queuing, etc., of a call.

In general, commencement conditions are related to the presence on the call (i.e., participation) of certain members of the group, and/or of a minimum number of members, as well as on the availability of resources (e.g., GBR bearers) of proper ARP. If the commencement conditions are not met, the call does not start (it can be queued or rejected). Normally, commencement conditions are not checked for individual transmission within a call.

Continuation conditions are similar (though not required to be identical) to commencement conditions and get re-evaluated when pre-emption, degradation of priority, motion out of communication range, de-selection of the group or de-affiliation (explicit or implicit) occur. If the continuation conditions are not met, the call stops.

## 4.4 General handling of requests

Request handling is by no means specific only to MCPTT Service, but it plays a central role in its functionality.

Requests appear in the MCPTT Service in many forms and under many circumstances: e.g., requests for the floor during a call, requests for starting a call, requests for resources. Conceptually, requests are accompanied by priority information that is used in the arbitration, in case of contention; see also subclause 4.6 for a brief explanation and examples on how priority processing is modelled.

Upon arrival, a request is immediately granted, denied, or queued.

If queued, a request can be dropped due to queue overflow (i.e., too many items queued) or can be cancelled by an authorized user, who is usually the initiator of the request. Either way, the net result is that the request is denied.

When a request denial is communicated, the request may be re-requested either manually by user action or automatically. In the automatic case, while the request remains denied, it may be automatically repeated a configurable number of times where a minimum time interval between re-transmissions may also be applied.

There are many "queuing disciplines" possible that govern the placement of items in a queue and their subsequent removal from the queue: e.g., FIFO, priority order. Assuming that the queuing discipline chosen places the highest priority requests towards the top of the queue, the granted request is either, depending on the design and configuration, the front-most entry in the queue or the first entry counting from the top that can be satisfied by the available resources. For example, if the topmost entry in the queue is awaiting for ten GBR bearers of given characteristics to become available and the second entry in the queue is waiting for seven GBR bearers to become available, and at some point in time eight GBR bearers become available, then it is possible that the second request is granted ahead of the first one, which continues to wait. Alternatively, neither the first request nor the second request is granted and the wait continues until at least ten GBR bearers become available, at which time the first request is granted while the second request continues to wait.

## 4.5 Overview of MCPTT UE and MCPTT User in the MCPTT Service

The MCPTT Service supports MCPTT User Profiles. The MCPTT User Profile contains important information related to the MCPTT User receiving the MCPTT Service, including the MCPTT User identity, which is globally unique and independent of the mobile subscriber identity (IMSI) assigned by a 3GPP network operator. Part of the content of the MCPTT User Profile (e.g., containing some display preferences, some UE audio settings, some address books) can be set/modified/updated by the MCPTT User, but significant portions might be set/modified/updated only by authorized persons. The MCPTT User Profile is stored permanently in database(s) associated with the infrastructure providing the MCPTT Service. Relevant parts of the profile might be downloaded to and cached temporarily or permanently on certain MCPTT UEs. When stored on an MCPTT UE, the MCPTT User Profile associated with an MCPTT User might be confidentiality and integrity protected, with the information available only to a trusted application client associated to the MCPTT User, upon authentication. The MCPTT User Profile information can be synchronized automatically or on demand between the cache on the MCPTT UE and the main copy held in the database(s) of the MCPTT Service infrastructure. The MCPTT User Profile is part of the MCPTT application service domain and forms the basis of MCPTT application layer security and identifies an MCPTT User to the MCPTT Service.

Each MCPTT User has at least one MCPTT User Profile, and possibly several. Typically, one of the MCPTT User Profiles is designated as the default MCPTT User Profile, to be used unless an MCPTT User Profile is explicitly selected. In general, a user profile is associated with a specific device, with a specific mode of operation (i.e., on the

network or off the network) and/or with a specific situation (e.g., user being off-duty, in a certain city, or playing a certain role). When an MCPTT User Profile is synchronized between the infrastructure and an MCPTT device, information could be downloaded to the device and updated, as necessary. Subsequently and subject to permissions, the MCPTT User might choose a different associated MCPTT User Profile to be downloaded and stored on the device. Only one MCPTT User Profile is active at a time. Authorized users are allowed to create, delete and alter MCPTT User Profiles for an MCPTT User and/or pre-stored MCPTT User Profiles.

The MCPTT Service supports MCPTT UEs which connect to the MCPTT Service. The capabilities of an MCPTT UE are specified in the present document. The MCPTT Application that is resident on the MCPTT UE establishes this connection, employing application layer security in its connection to the MCPTT Service. An MCPTT UE is capable of operating in on-network and off-network modes.

#### 4.5.1 MCPTT User association to MCPTT UE in on-network mode

Consistent with the EPS paradigm, when an MCPTT UE is powered on, it accesses the LTE system, and connects to the EPC. During this phase, the credentials from a USIM application (or possibly, an ISIM application, if IMS is used) on a UICC associated with the MCPTT UE is used for authentication with an HSS. This is followed by the MCPTT Application, resident on the MCPTT UE, establishing a connection, employing application layer security in its connection to the MCPTT Service.

Possibilities for the MCPTT UE, when connecting to the MCPTT Service:

- An MCPTT UE, with credentials of an MCPTT User at the time of connection to the MCPTT Service, is able to authenticate using a specific MCPTT User identity (e.g., via an Identity Management service). After successful user authentication the MCPTT User Profiles are made available to the MCPTT UE for use in both on-network and off-network operation modes.
- An MCPTT UE, without credentials of a specific MCPTT User at the time of connection to the MCPTT Service, proceeds using a default identity associated with the MCPTT UE itself. In this case, the MCPTT Service is capable of assigning a temporary MCPTT User Identity to this MCPTT UE. Some level of authentication might be attempted, and, depending on the results, an appropriate MCPTT User Profile associated with this temporary MCPTT User Identity and with the circumstances of the access is made available to the MCPTT UE for use in both on-network and off-network operation modes.
- The MCPTT Administrator is able to retrieve hardware and software parameters to define specific parameters and attributes (e.g., groups, MCPTT Emergency behaviour, priority and QoS attributes) associated with a temporary MCPTT User Identity for operation of the MCPTT UE for use in both on-network and off-network operation modes.

#### 4.5.2 MCPTT User and MCPTT UE relationship

A user can enter his identifying/authenticating credentials (e.g., user name/ password, PIN, biometrics, asserted identity from a remote, trusted device). This step typically gives the MCPTT User access to local information and applications stored on the MCPTT UE, and in particular, to the MCPTT client application.

The MCPTT Service allows the same MCPTT User to sign in (and stay simultaneously signed in) from different MCPTT UEs. For example, an incident manager or commander might use a portable phone, a command tablet, or a separate messaging unit.

#### 4.5.3 MCPTT Users accessing the service through non-3GPP access interface

This document primarily focuses on MCPTT Users accessing and managing the MCPTT Service through MCPTT UEs, however there might be some dispatchers and administrators who might access the service through a non-3GPP access interface.

#### 4.5.4 Shareable MCPTT UEs and gateway UEs

The conceptual model for shareable MCPTT UEs is that of a pool of UEs, each UE being interchangeable with any other, and users randomly choosing one or more UEs from the pool, each user for his temporary exclusive use. A shareable MCPTT UE can be used by user who can gain access to the MCPTT client application stored on it and can

become an authenticated MCPTT User. A shareable MCPTT UE can serve only one MCPTT User at a time. An MCPTT User who signs into a shareable MCPTT UE that is already in-use causes the sign-off of the previous MCPTT User.

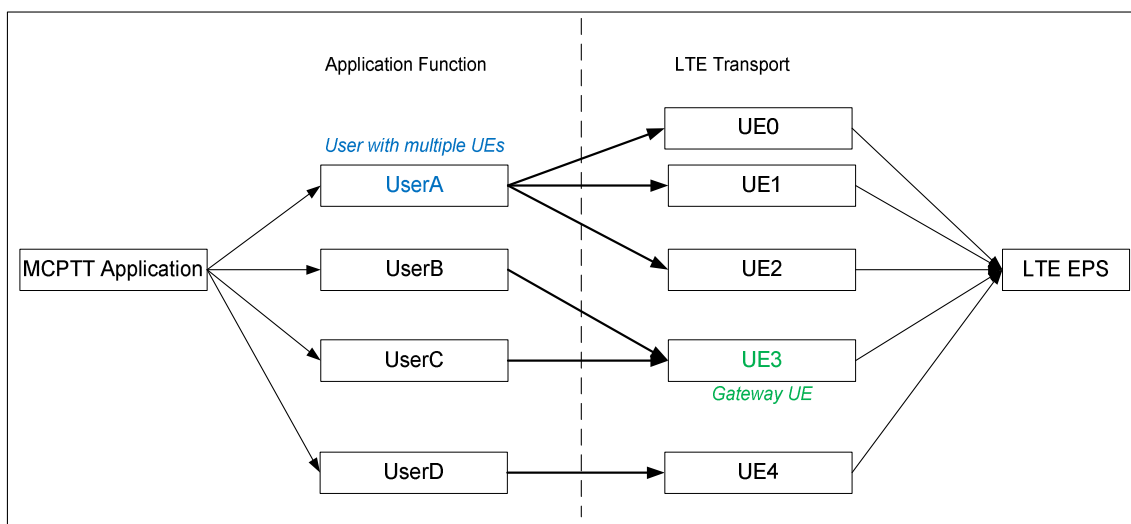
An MCPTT User can simultaneously have several active MCPTT UEs, which, from an MCPTT Service point of view, are addressable individually and/or collectively within the context of their association to the MCPTT User.

The conceptual model for a gateway UE is that of a UE capable of providing service to an MCPTT User employing a non-3GPP device. A gateway UE is usable simultaneously by multiple MCPTT Users. Unlike a shareable MCPTT UE, if a new person enters his valid credentials towards signing in the MCPTT Service, his successful signing in and becoming an MCPTT User does not affect the initial MCPTT Users already served by the gateway UE.

A gateway UE is typically installed in a vehicle (e.g., a police car, fire truck) and has wired and/or wireless connections to various devices in use by the MCPTT Users.

A gateway UE differs functionally from a ProSe relay node. In the ProSe paradigm, the relay node and the devices served by it are all (ProSe enabled) LTE UEs, and are "visible" to the EPS as UEs. In the gateway UE paradigm, only the gateway UE is an LTE device and only it is "visible" at the EPS layer.

Figure 4.5.4.1 shows schematically some of the relationships between MCPTT Users and MCPTT UEs.



**Figure 4.5.4-1: Relationships between MCPTT Users and MCPTT UEs**

#### 4.5.5 MCPTT User association to MCPTT UE in off-network mode

A user can enter his identifying/authenticating credentials (e.g., user name/ password, PIN, biometrics, asserted identity from a remote, trusted device). This step typically gives the MCPTT User access to local information and applications stored on the MCPTT UE, and in particular, to the MCPTT client application.

After successful local user authentication an MCPTT User Profile, which was previously made available to the MCPTT UE, is used for off-network operation mode. This previously configured MCPTT User Profile information allows the MCPTT User to be identified using the same MCPTT User Identity as in the on-network mode.

An MCPTT UE, without credentials of a specific MCPTT User, operates in off-network mode, if so configured by an MCPTT Administrator. The MCPTT Administrator defines specific parameters and attributes (e.g., groups, MCPTT Emergency behaviour, priority and QoS attributes) associated with a temporary MCPTT User Identity for operation of the MCPTT UE in off-network operation mode.

## 4.6 Overview of MCPTT priorities

### 4.6.1 MCPTT priority model

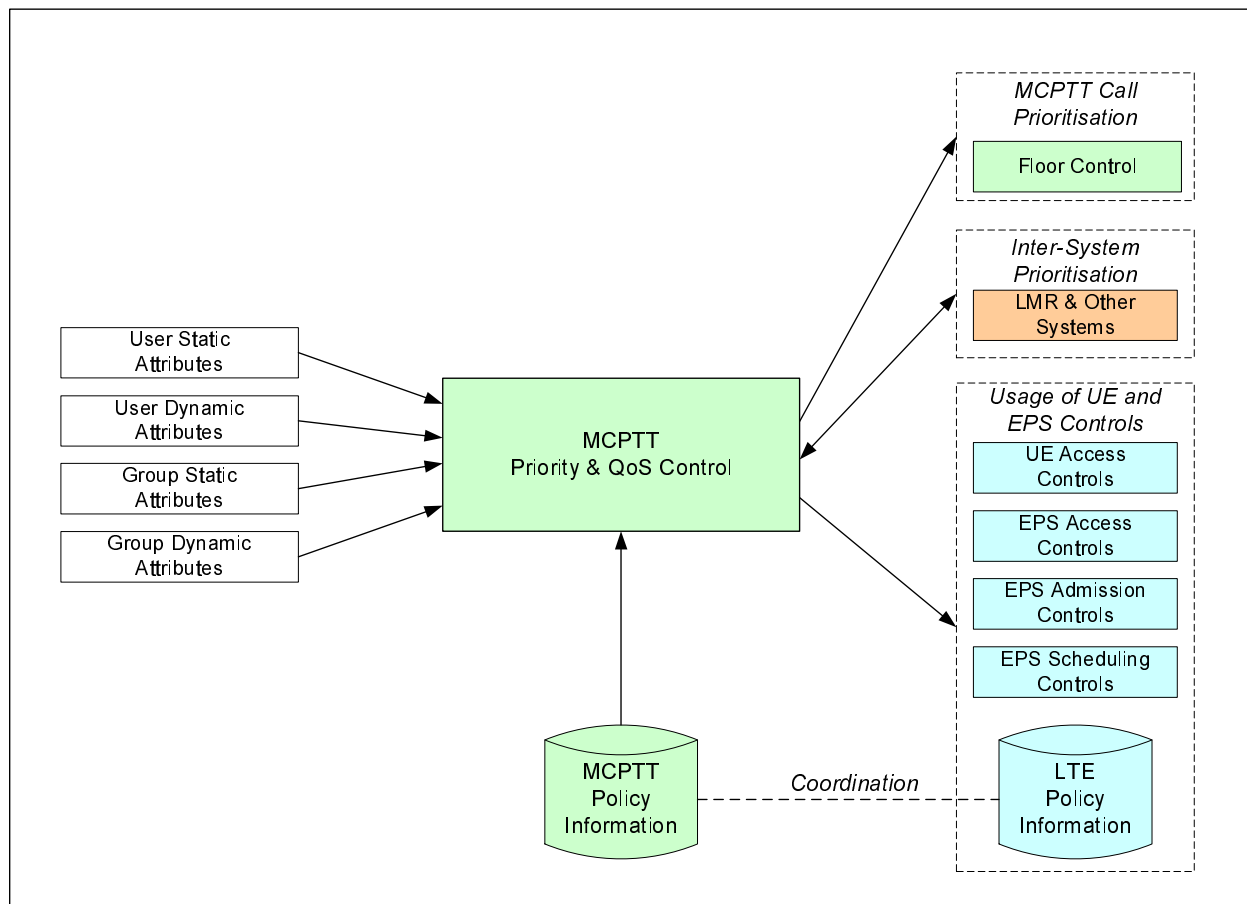
Many LTE non-public safety users today subscribe to one particular priority and QoS level of service (e.g., "gold", "silver" or "bronze"), which always provides fixed differentiation. This model, effective and relatively straightforward for non-public safety users, falls short when it comes to the needs of the public safety applications.

MCPTT Priority and QoS is situational. The MCPTT Service is intended to provide a real-time priority and QoS experience for MCPTT calls, as public safety users have significant dynamic operational conditions that determine their priority. For example, the type of incident a responder is serving or the responder's overall shift role needs to strongly influence a user's ability to obtain resources from the LTE system.

Another feature of a mission critical service is transparency of interactions between the users and the system. A first responder that needs to change the QoS of his communications is not to be distracted from his mission due to complicated UE behaviours or service interactions. Instead, the service acts in an anticipatory and adaptive manner to provide the proper quality of experience to the user, automatically, or with simple and minimal interaction.

The mission critical service is also expected to provide the ability to interface with public safety systems (e.g., Computer Aided Dispatch) in order to determine the user's state (e.g., incident severity), environment and conditions and to affect the most appropriate priority and QoS experience for the user.

The MCPTT Priority handling for on-network use for MCPTT Calls is conceptually modelled as shown in figure 4.6.1.1. The conceptual model identifies three areas of prioritization: prioritization between and within calls, inter-system prioritization, and prioritization at the transport layer (EPS and UE). At the Application Layer a generic, network side, functional entity, "MCPTT Priority and QoS Control", processes with each request static, preconfigured information about users and groups participating in MCPTT, as well as dynamic (or situational) information about them. Based on the results of this processing, the "MCPTT Priority and QoS Control" provides information to and directs interactions with other functional entities, systems, or layers to ensure, to the extent possible, that from a quality of experience point of view, calls and transmissions are handled properly in accordance to established policy rules.



**Figure 4.6.1-1: A conceptual on-network MCPTT priority model**

The User Static Attributes include information categorizing the user, possibly by several criteria (e.g., first responder, second responder, supervisor, dispatcher, administrator), as well as jurisdictional boundaries and possibly a preconfigured system-wide individual priority level.

The Group Static Attributes include information about the nature/type of the group and the owning organization(s), the jurisdictional boundaries for transmitters and receivers within the group, the normal hours of operation for the group, pre-emption dispositions relative to other groups, and the default minimum priority of the group, i.e., the minimum priority characteristics that are provided to all the Participants in a group call associated with this group, regardless of their individual priority characteristics.

The User Dynamic Attributes include the user/Participant's operational status (e.g., on/off duty), his location, the type of incident (e.g., MCPTT Emergency or Imminent Peril) he might be involved in and whether or not he initiated it, whether or not he is individually involved in a formally managed incident and if yes, the boundaries of the incident area, the incident severity and his assigned role in the resolution of the incident.

The Group Dynamic Attributes include the type of incident (e.g., MCPTT Emergency or Imminent Peril), if any, the group is currently handling and in case of involvement in a formally managed incident the boundaries of the incident area and the incident severity.

## 4.6.2 Generic processing of priority information

This functionality applies to MCPTT Call initiations and transmissions for the management of potentially contended resources (e.g., GBR bearers) and also for Floor control during an MCPTT Group Call.

Each request for exclusive access to resource(s) or for preferential treatment over a contending request arrives accompanied by priority information. This information stays associated with the companion request, whether the request is granted or is queued. The priority information is used for comparison between requests and facilitates the adding and removing of requests from queues and/or authorized interruption of service associated with a previously granted request, if still active. For each request, whether initially queued or not, the requesting party is informed (directly or indirectly) when his request is granted or denied. Other users/Participants are also notified of the disposition

of a request and the notification includes the identity of the requestor, as needed. In addition, each requestor can be notified of the position of his request in the queue and he is allowed to cancel his requests while queued.

### 4.6.3 Handling of MCPTT priority information for Floor control

Floor control is applied in the context of a single MCPTT Call and is triggered by a Participant request for the permission to transmit. Priority information accompanies each grant request.

### 4.6.4 Handling of MCPTT priority information for interactions at the transport layer

At the Transport Layer, the MCPTT Service uses LTE controls to adapt the overall behaviour of the MCPTT System to the needs for resources and/or preferential treatment over other contenders, based on the priority information accompanying the request.

The following four LTE controls are available, to be used as necessary, based on the phase of the MCPTT call:

- EPS Access Controls;
- UE Access Controls;
- EPS Admission Controls; and
- EPS Scheduling Controls.

EPS Access Controls and UE Access Controls are used to allow preferential treatment of public safety UEs in situations of access congestion. The controls use LTE priority and QoS mechanisms (e.g., using mechanisms like Access Class Barring, Service Specific Access Control, Access Control for Circuit Switched Fallback, Extended Access Barring).

Admission Controls are used for the establishment and maintenance of the priority levels and of the pre-emption vulnerability and capability of bearers associated with transmissions and calls. At the start of an MCPTT call, the MCPTT Service requires bearers with proper ARP and pre-emption characteristics are in place prior to the call proceeding.

Scheduling Controls (e.g., QCI and bandwidth for the bearers) are used for assuring the appropriate QoS necessary for meeting the Participants' expectation in the perceived quality of the delivered information, primarily in terms of when the service starts and the real-time characteristics of the delivered traffic (e.g., perceived delay, choppiness, clarity).

### 4.6.5 Handling of MCPTT priority information for interactions with non-LTE PTT systems

An MCPTT call can be mixed, with some Participants served by one network/system and other Participants served by a different network(s)/system(s). In general the systems can be quite different. For example, some Participants use MCPTT/LTE, while others could use a P25-based system.

### 4.6.6 MCPTT priority for Private Call

The MCPTT Service uses User Static Attributes of the Participants, potentially adjusted based on User Dynamic Attributes, if applicable. By default, the priority of an MCPTT Private Call is the same as the priority of the originator of the call. Similar to group calls there are MCPTT Emergency Private Calls (with Floor control), which also have a similarly high priority. These are used where there is immediate danger to the user and are typically used to communicate with a dispatcher.

## 4.7 Overview of MCPTT identifiers

The main identifiable entities in use by the MCPTT Service are Mission Critical Organizations, MCPTT Groups, MCPTT Users, and MCPTT Administrators. The UEs are identified at the transport or network layer, but in some situations they might also be identified by the MCPTT Service. Each identifiable entity is distinct from all others and has an identifier (ID) associated to it, unique within a proximate identity domain. Those domains correspond to identifiable entities and can be nested within other domains in a multi-level hierarchical fashion. For example an

MCPTT User might have an identifier unique within the domain corresponding to a Mission Critical Organization. The top-down concatenation of identifiers can generate unique identifiers within larger contexts, eventually leading to the identifiers being globally unique.

Each identifier can be associated with one or more aliases, which can be used for displaying and selection purposes. Some aliases are shortened equivalents of the identifier used for efficient signalling and are not intended for human interactions. At a minimum, each entity has one alias (default) which is the alphanumeric representation of its identifier. Most entities have a main alias, which is the entity's name. Some aliases can be pictures, icons or other graphic representations. It is up to the implementation to decide if aliases have to be unique and if so, within which domain. Finally, some aliases are public, can be created/deleted only by authorized persons and are available to the MCPTT Service, while other aliases are private, can be created/deleted by their owners and might be residing only on certain UEs or be part of some private address books.

It is possible in principle for User IDs, Group IDs, as well as for aliases, to be defined system wide with certain values, but have different values for each application: e.g., the system wide User ID might be different from the MCPTT User ID and different from the video User ID for the same user. However, this type of separation might not be beneficial, and in practice only one identifier is likely to be used.

For simplicity, the term "User ID" is employed to identify an MCPTT User, without distinction of whether it is an identifier or an alias.

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## 5 MCPTT Service requirements common for on the network and off the network

### 5.1 General group call requirements

#### 5.1.1 General aspects

[R-5.1.1-001] The MCPTT Service shall allow an MCPTT User utilizing one or more MCPTT UE(s), concurrently, to sign-in and receive service on each of the MCPTT UE(s).

[R-5.1.1-002] The MCPTT Service shall provide a mechanism by which an MCPTT UE makes a 1-to-many MCPTT transmission to any MCPTT Group(s) for which the current MCPTT User is authorized.

NOTE: For off-network use, only group members with MCPTT UEs within communication range receive the transmission.

[R-5.1.1-003] The MCPTT Service shall be able to notify the Affiliated MCPTT Group Members when the group communication is set up (e.g., this can be provided as an audible tone on the MCPTT UE).

[R-5.1.1-004] The MCPTT Service shall provide a mechanism to disable notifications (e.g., audible tone) on an MCPTT UE when receiving normal MCPTT Group calls (not MCPTT Emergency or Imminent Peril Calls).

[R-5.1.1-005] At any moment in time in a call, only one Participant type shall be used per Participant.

#### 5.1.2 Group/status information

[R-5.1.2-001] The MCPTT Service shall provide a mechanism by which an MCPTT UE determines in which of the MCPTT Groups for which it is authorized there is an ongoing MCPTT Group Call.

[R-5.1.2-002] The MCPTT Service shall provide a mechanism by which an authorized MCPTT User determines in which MCPTT Groups there is an ongoing MCPTT Group Call.

#### 5.1.3 Group configuration

[R-5.1.3-001] The MCPTT Service shall allow the MCPTT Administrator to restrict who can be a member of specific MCPTT Groups, so that those MCPTT Groups shall be inaccessible to other users, including dispatchers or supervisors.



[R-5.1.3-002] The MCPTT Service shall enable a properly provisioned and authorized MCPTT UE operating on the network to receive its application layer level parameters (e.g., group id, group keys) necessary for initiating and participating in selected group and Private Calls at a future time, while off the network.

NOTE: This is a "run-time" requirement applicable to an already configured MCPTT UE, when groups and/or users, in addition to what was already configured, need to participate in future off-network calls.

#### 5.1.4 Identification

[R-5.1.4-001] The MCPTT Service shall support identifiers using character sets for international languages specified via configuration.

#### 5.1.5 Membership/affiliation

[R-5.1.5-001] The MCPTT Service shall provide a mechanism by which an MCPTT User determines the currently defined MCPTT Groups for which the user is authorized.

[R-5.1.5-002] The MCPTT Service shall provide a mechanism by which an MCPTT UE determines the currently defined MCPTT Groups for which it is authorized.

[R-5.1.5-003] The MCPTT Service shall support an MCPTT User's ability to affiliate to one or more MCPTT Groups.

[R-5.1.5-004] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to limit the total number (N2) of MCPTT Groups that an MCPTT User can be affiliated to simultaneously.

[R-5.1.5-005] An MCPTT User may simultaneously be an MCPTT Group Member of one or more MCPTT Groups.

[R-5.1.5-006] The MCPTT Service shall provide a mechanism for an MCPTT Group Member to select zero or one Selected MCPTT Group.

[R-5.1.5-007] The MCPTT Service shall require that MCPTT Users affiliate with MCPTT Groups prior to participation in the communications of those groups.

[R-5.1.5-008] An MCPTT User shall be able to affiliate with a multiplicity of MCPTT Groups, subject to restrictions configured by the MCPTT Administrator.

#### 5.1.6 Group Call administration

[R-5.1.6-001] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure the maximum duration for MCPTT Group Calls for MCPTT Users within their authority.

#### 5.1.7 Prioritization

[R-5.1.7-001] The MCPTT Service shall provide a mechanism to organize MCPTT Groups into a hierarchy(ies).

[R-5.1.7-002] The MCPTT Service shall provide a mechanism to prioritize MCPTT Group Calls based on the priorities associated with elements of the call (e.g., service type, requesting identity, and target identity).

#### 5.1.8 Charging requirements for MCPTT

[R-5.1.8-001] The MCPTT service shall support charging for MCPTT Group Calls.

[R-5.1.8-002] The MCPTT service shall support charging for Private Calls.

[R-5.1.8-003] The MCPTT service shall support time-of-day sensitive charging based on actual resource utilization, provided QoS and provided priority.

[R-5.1.8-004] The MCPTT service shall generate charging data that identifies the device(s) involved in a call.

[R-5.1.8-005] The MCPTT service shall support confidentiality of the charging between the service provider and the network operator.

[R-5.1.8-006] The MCPTT service shall support confidentiality of the identity of the Mission Critical Organization.

[R-5.1.8-007] The MCPTT service shall support reconciliation of the charging records between the service provider and the network operator.

[R-5.1.8-008] The MCPTT service shall support offline charging.

[R-5.1.8-009] The MCPTT service shall support online charging.

[R-5.1.8-010] The MCPTT service shall be able to generate charging data for on-network mode.

[R-5.1.8-011] The MCPTT service shall be able to generate charging data for off-network mode.

## 5.2 Broadcast Group

### 5.2.1 General Broadcast Group Call

[R-5.2.1-001] The MCPTT Service shall support Broadcast Group Calls from authorized MCPTT Group Members as determined by the MCPTT Administrator.

[R-5.2.1-002] The MCPTT Service shall only allow the initiating MCPTT Group Member to transmit on a Broadcast Group Call, unless overridden (e.g., by a supervisor).

### 5.2.2 Group-Broadcast Group (e.g., announcement group)

[R-5.2.2-001] The MCPTT Service shall provide for the creation of Group-Broadcast Groups with up to B1 levels of group hierarchy.

[R-5.2.2-002] The MCPTT Service shall be configurable to create a Group-Broadcast Group from one or more Group-Broadcast Groups with any other non-Broadcast Group.

[R-5.2.2-003] The MCPTT Service shall enable an MCPTT Administrator to create a Group-Broadcast Group.

[R-5.2.2-004] A Broadcast Group Call transmitted on a Group-Broadcast Group shall have priority over Group Calls on its subordinate groups.

### 5.2.3 User-Broadcast Group (e.g., System Call)

[R-5.2.3-001] The MCPTT Service shall provide for the creation of User-Broadcast Groups with up to B2 levels of user hierarchy.

[R-5.2.3-002] A Broadcast Group Call transmitted on a User-Broadcast Group shall have priority over Group Calls involving users within the user hierarchy.

## 5.3 Late call entry

[R-5.3-001] The MCPTT Service shall provide a mechanism by which an Affiliated MCPTT Group Member can join an ongoing MCPTT Group Call.

[R-5.3-002] The MCPTT Service shall provide the identities of the Transmitting MCPTT Group Member, and of the MCPTT Group and, if available, the aliases of the Transmitting MCPTT Group Member and the identity of the Mission Critical Organization to the MCPTT UEs that enter the call late.

[R-5.3-003] The MCPTT Service shall provide the Transmitting MCPTT Group Member's Location information to MCPTT UEs that are late entering a call in progress, subject to permissions.

[R-5.3-004] If an MCPTT Group call proceeds without all Affiliated MCPTT Group Members (e.g., due to one or more members being temporarily out of coverage during the call setup or in one or more higher priority calls), the MCPTT Service shall attempt to add those affiliated members as the call proceeds and they become available.

[R-5.3-005] If during an ongoing MCPTT Group call, additional MCPTT Group Members affiliate with the group, the MCPTT Service shall add those members to the group call.

## 5.4 Dynamic group management (i.e., dynamic regrouping)

NOTE: No common on-network and off-network dynamic group management requirements have been identified.

## 5.5 Receiving from multiple MCPTT calls

### 5.5.1 Overview

MCPTT Users receive call traffic of their affiliated MCPTT Groups. This multiple receiving, called monitoring by some organizations, provides MCPTT Users current information about police, fire or critical medical events that are occurring within their jurisdictions. This is useful for dispatchers or those that might not be the primary support for that event at that moment. The information gained by monitoring might be useful for the dispatcher to determine any actions to take or be useful later if the MCPTT User is deployed to provide additional support for that event. The MCPTT User might be assigned to support the activities of more than one MCPTT Group on the same shift. This means that the MCPTT User receives multiple MCPTT Groups.

An MCPTT User with limited speaker resources (e.g., a handheld UE) might find that playing out concurrent received audio from multiple active MCPTT Groups becomes confusing and could also cause undesired voice distortion for the receiving user. During periods of time when the MCPTT User is receiving audio from multiple MCPTT Groups, which MCPTT Group's audio is presented to the MCPTT User is determined by the MCPTT User's choice, the priority associated with the talker of the Selected MCPTT Group(s), other considerations or combinations of these. The MCPTT UE is aware of all the active groups to which the MCPTT User has affiliated or selected and the identity of the other active receiving groups is available for display on the MCPTT UE. When the receive activity from the Selected MCPTT Group stops, the MCPTT UE might present the audio from the next group per the MCPTT User's choice or by other means.

If none of the multiple groups to which the MCPTT User has affiliated or selected is active, the MCPTT UE would continue to monitor for activity by any of the multiple affiliated or Selected MCPTT Groups. Monitoring for activity of multiple MCPTT Groups is also known as scanning and the list of the multiple groups is also known as a scan list.

### 5.5.2 Requirements

[R-5.5.2-001] Void

[R-5.5.2-002] Void

[R-5.5.2-003] Void

[R-5.5.2-004] The MCPTT Service shall allow an MCPTT UE to be receiving or transmitting in one MCPTT Group while simultaneously receiving additional MCPTT Groups.

[R-5.5.2-005] The MCPTT Service shall provide a mechanism to configure the number (N4) of MCPTT Group calls to be simultaneously received by an MCPTT UE, authorized by an MCPTT Administrator and/or authorized user.

[R-5.5.2-006] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to limit the total number (N5) of MCPTT Group transmissions that an MCPTT UE simultaneously receives in one MCPTT Group call in case of override.

[R-5.5.2-007] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to limit the total number (N10) of MCPTT Private Calls (with Floor control) in which an MCPTT UE simultaneously participates.

[R-5.5.2-008] The MCPTT Service shall provide a mechanism to configure the number (N6) of MCPTT Group calls to be simultaneously received by an MCPTT User, authorized by an MCPTT Administrator and/or authorized user.

[R-5.5.2-009] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to limit the total number (N7) of MCPTT Group transmissions that an MCPTT User simultaneously receives in one MCPTT Group call in case of override.

[R-5.5.2-010] The MCPTT Service should provide a mechanism for an MCPTT Administrator and/or authorized user to prioritize the order in which multiple MCPTT Groups are presented by the MCPTT UE.

[R-5.5.2-011] The MCPTT Service shall provide multiple User IDs to an MCPTT UE when multiple MCPTT Groups that have a talker are received by the MCPTT UE.

[R-5.5.2-012] The MCPTT Service shall allow an authorized MCPTT UE to receive on-network MCPTT Groups and off-network MCPTT Groups simultaneously.

[R-5.5.2-013] The MCPTT Service shall ensure that if there is an MCPTT Emergency Group Call on one of the MCPTT Groups that an MCPTT User is affiliated to, but that user is already in a lower priority MCPTT Group call or Private Call (with floor control), that the MCPTT User automatically hears the MCPTT Emergency Group Call.

NOTE: Depending on the MCPTT User's settings and/or the MCPTT UE capability the above requirement could mean that the MCPTT User stops receiving from another MCPTT Group (which might normally have a higher priority) or a Private Call (with floor control).

## 5.6 Private Call

### 5.6.1 Private Call overview

Private Calls allow two MCPTT Users to communicate directly with each other without the use of MCPTT Groups. They leverage many of the functions and features of MCPTT Group Calls, such as MCPTT User identity and alias information, location information, encryption, privacy, priority, and administrative control. Private Calls can use Floor control or not (i.e., be full voice duplex calls between users), though Private Calls without Floor control are only supported on the network.

Two commencement modes of Private Calls are supported: Manual Commencement Private Call and Automatic Commencement Private Call. The two commencement modes can be used in conjunction with Private Calls with/without Floor control.

Manual Commencement Private Calls mimic a telephone conversation where the called party receives a notification that they are being requested to join a Private Call, and the called party may accept, reject, or ignore the call request. Once the call setup is accepted, the Private Call is established and both Participants may communicate with each other.

Automatic Commencement Private Calls mimic the immediate setup and voice propagation of Group Call operation between two users where the calling party initiates an Automatic Commencement Private Call to another user and sends audio without any additional call setup delay beyond Group Calls. If available and able to accept the Private Call from the calling party, the called party immediately joins the Private Call and processes the calling party's audio.

### 5.6.2 Private Call (with Floor control) general requirements

NOTE: The requirements in this subclause should mirror requirements in 6.7.1 for Private Call (without Floor control).

[R-5.6.2-001] The MCPTT Service shall provide the status (e.g., ringing, accepted, rejected, active) of an MCPTT Private Call (with Floor control) to the relevant MCPTT User that is a Participant of the MCPTT Private Call (with Floor control).

[R-5.6.2-002] The MCPTT Service shall support Private Calls with Floor control.

[R-5.6.2-003] The MCPTT Service shall provide a mechanism for an authorized MCPTT User that is a called party in an MCPTT Private Call (with Floor control), to restrict providing the reason why an MCPTT Private Call (with Floor control) setup has failed to the calling MCPTT User.

[R-5.6.2-004] The MCPTT Service shall provide a mechanism for the Private Call (with Floor control) to be set up with the MCPTT UE designated by the called MCPTT User to be used for Private Calls (with Floor control) when the called MCPTT User has signed on to the MCPTT Service with multiple MCPTT UEs.

[R-5.6.2-005] Void

### 5.6.3 Private Call (with Floor control) commencement requirements

NOTE 1: The requirements in this subclause should mirror the requirements in 6.7.4 for Private Call (without Floor control).

[R-5.6.3-001] The MCPTT Service shall support Call Commencement Modes for Private Calls (with Floor control), which determine the conditions under which Private Calls (with Floor control) are set up.

[R-5.6.3-002] Void.

[R-5.6.3-003] The MCPTT Service shall provide a mechanism for an MCPTT User to cancel an MCPTT Private Call (with Floor control) prior to the call setup.

[R-5.6.3-004] The MCPTT Service shall provide a means by which an authorized MCPTT User initiates an MCPTT Private Call (with Floor control).

[R-5.6.3-005] The MCPTT Service shall provide a means by which an MCPTT UE initiates an MCPTT Private Call (with Floor control) to any MCPTT User for which the MCPTT UE's current MCPTT User is authorized.

NOTE 2: For off-network use, only an MCPTT UE within communication range (possibly via a ProSe UE-to-UE Relay) receives the transmission.

[R-5.6.3-006] The MCPTT Service shall provide a means by which an MCPTT User initiates a Manual Commencement Private Call (with Floor control) to any MCPTT User for which the MCPTT User is authorized.

[R-5.6.3-007] The MCPTT Service shall require that the called MCPTT User accepts a Manual Commencement Private Call (with Floor control) setup request before the call proceeds.

[R-5.6.3-008] The MCPTT Service shall provide a means for an MCPTT User to accept a Manual Commencement Private Call (with Floor control) request from another MCPTT User.

[R-5.6.3-009] The MCPTT Service shall provide a means by which an MCPTT User initiates an Automatic Commencement Private Call (with Floor control) to any MCPTT User for which the MCPTT User is authorized.

[R-5.6.3-010] The MCPTT UE shall support automatic commencement mode and manual commencement mode for Private Calls (with Floor control).

[R-5.6.3-011] The MCPTT Service shall provide a manual commencement mode countermand by which an authorized MCPTT User may request that the invited MCPTT UE answer automatically.

[R-5.6.3-012] The MCPTT Service shall provide a means by which the calling authorized MCPTT User is notified the called MCPTT User received the Private Call (with Floor control) request.

[R-5.6.3-013] The MCPTT Service shall require that the called MCPTT UE acknowledge receipt of an Automatic Commencement Private Call (with Floor control) setup request before the audio transmission proceeds.

### 5.6.4 Private Call (with Floor control) termination

NOTE 1: The requirements in this subclause should mirror the requirements in 6.7.5 for Private Call (without Floor control).

[R-5.6.4-001] The MCPTT Service shall provide a mechanism for an MCPTT User to reject an MCPTT Private Call (with Floor control).

[R-5.6.4-002] The MCPTT Service shall provide a means by which an authorized MCPTT User ignores a Manual Commencement Private Call (with Floor control) request from another MCPTT User.

NOTE 2: Ignoring a Manual Commencement Private Call (with Floor control) results in no indication of the reason for call failure being sent to the calling MCPTT User.

[R-5.6.4-003] The MCPTT Service shall provide a means by which an MCPTT User ends a Private Call (with Floor control) in which the MCPTT User is a Participant.

## 5.6.5 Private Call (with Floor control) administration

NOTE: The requirements in this subclause should mirror requirements in 6.7.2 for Private Call (without Floor control), except [R-5.6.5-005] which is specific to Private Call with Floor control.

[R-5.6.5-001] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure which MCPTT Users, within their authority, are authorized to place a Manual Commencement Private Call (with Floor control).

[R-5.6.5-002] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure which MCPTT Users, within their authority, are authorized to place an Automatic Commencement Private Call (with Floor control).

[R-5.6.5-003] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure for a particular authorized MCPTT User, a set of MCPTT Users under the same authority to which an MCPTT Private Call (with Floor control) can be made.

[R-5.6.5-004] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure the maximum duration for MCPTT Private Calls (with Floor control) for MCPTT Users within their authority.

[R-5.6.5-005] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure a timeout value in which an MCPTT Private Call (with Floor control) without a transmitting or receiving MCPTT User ends, for MCPTT Users within their authority.

[R-5.6.5-006] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure whether an MCPTT User, within their authority, that is a called party in an MCPTT Private Call (with Floor control), may restrict providing the reason why an MCPTT Private Call (with Floor control) setup has failed to the calling MCPTT User.

## 5.7 MCPTT priority requirements

### 5.7.1 Overview

MCPTT Emergency Group Call and MCPTT Imminent Peril group call are MCPTT Group Calls that provide the MCPTT User elevated priority towards obtaining resources of the MCPTT system. The MCPTT Emergency Private Call similarly provides elevated priority to resources of the MCPTT system. The MCPTT Emergency Alert provides a notification of an MCPTT Emergency situation from an MCPTT UE, regardless if the user is signed in with the MCPTT Service or not.

The MCPTT Emergency Alert is initiated from an MCPTT UE to inform the MCPTT Service of the user's immediate need of assistance due to the user's personal, life-threatening situation. If the user is not properly authenticated, he is treated as a temporary MCPTT User with limited permissions. The user initiates this notification by actuating a user interface on the MCPTT UE. The notification to the MCPTT Service includes the MCPTT User's ID, potentially an MCPTT Group ID, the user's Mission Critical Organization name and the most current location available for the user's MCPTT UE.

The user profile/group configuration determines which MCPTT Group ID is used, if any. If the user profile indicates that a dedicated (i.e., not used for everyday traffic) MCPTT Emergency Group is to be used, then the MCPTT Emergency call traffic moves to a different group. MCPTT Users that support MCPTT Emergency situations are required to monitor the dedicated MCPTT Emergency Group(s) for call activity. If the user profile indicates that the selected (i.e., currently active) MCPTT Group is to be used, then its Group ID is used, unless no group is selected.

After the MCPTT User has initiated an MCPTT Emergency Alert, MCPTT Emergency Private Call or MCPTT Emergency Group Call, the MCPTT User is considered to be in the MCPTT Emergency State. The user remains in the MCPTT Emergency State until the MCPTT User cancels the MCPTT Emergency State.

An MCPTT Group Call started by an MCPTT User while in the MCPTT Emergency State or previously started but followed by an MCPTT Emergency Alert becomes an MCPTT Emergency Group Call. The MCPTT Group ID used for the MCPTT Emergency Group Call is the same MCPTT Group ID included in the MCPTT Emergency Alert. An MCPTT User or dispatcher might initiate an MCPTT Emergency Group Call without an MCPTT Emergency Alert. The start of an MCPTT Emergency Group Call starts an In-progress Emergency condition for the MCPTT Group. Any subsequent MCPTT Group Call made by any MCPTT Group Member of an MCPTT Group which has an In-progress

Emergency is treated as an MCPTT Emergency Group Call. MCPTT Emergency Group priority is removed when the In-progress Emergency for the group is cancelled.

An MCPTT Private Call started by an MCPTT User while in the MCPTT Emergency State becomes an MCPTT Emergency Private Call.

MCPTT Imminent Peril group call is differentiated from MCPTT Emergency Group Call based on for whom the assistance is required. The MCPTT Emergency Group Call is initiated by an MCPTT User for assistance for the MCPTT Emergency condition involving that user. The MCPTT Imminent Peril group call is initiated by an MCPTT User for assistance to other MCPTT Users or persons of the general public observed to be in trouble and may soon need assistance.

There is no MCPTT Imminent Peril Alert and no MCPTT Imminent Peril State for MCPTT Users. The granting of an MCPTT Imminent Peril group call starts an In-progress Imminent Peril condition for the MCPTT Group. Any subsequent MCPTT Group Call made by any MCPTT Group Member of an MCPTT Group which has an In-progress Imminent Peril condition is treated as an MCPTT Imminent Peril group call. MCPTT Imminent Peril Group priority is removed when the In-progress Imminent Peril for the group is cancelled.

## 5.7.2 Call types based on priorities

### 5.7.2.1 MCPTT Emergency Group Call

#### 5.7.2.1.1 MCPTT Emergency Group Call requirements

[R-5.7.2.1.1-001] The MCPTT Service shall support MCPTT Emergency Group Calls from an authorized MCPTT Group Member on the currently Selected MCPTT Group or on an MCPTT Group designated for MCPTT Emergency Group Calls.

[R-5.7.2.1.1-002] When an MCPTT User initiates an MCPTT Emergency Group Call this may trigger an MCPTT Emergency Alert for that MCPTT User.

[R-5.7.2.1.1-003] When an MCPTT User initiates an MCPTT Emergency Group Call this shall put that MCPTT User into an MCPTT Emergency State.

[R-5.7.2.1.1-004] The MCPTT Service shall ensure that MCPTT Emergency Group Calls have the highest priority over all other MCPTT Group transmissions, except System Calls, MCPTT Emergency Private Calls (with Floor control), and other MCPTT Emergency Group Calls.

[R-5.7.2.1.1-005] The MCPTT Service shall be capable of changing a group call in progress to an MCPTT Emergency Group Call.

[R-5.7.2.1.1-006] MCPTT Emergency Group Calls, including their content and signalling, shall have pre-emptive priority over all other types of MCPTT calls, except System Calls, MCPTT Emergency Private Calls (with Floor control), and other MCPTT Emergency Group Calls.

[R-5.7.2.1.1-007] The MCPTT Service shall provide the User ID of the initiator of an MCPTT Emergency Group Call and an indication that it is an MCPTT Emergency Group Call to Affiliated MCPTT Group Members.

[R-5.7.2.1.1-008] The MCPTT Service shall add the MCPTT Emergency priority to the group when an In-progress Emergency on that group is initiated.

[R-5.7.2.1.1-009] The MCPTT Service shall remove the MCPTT Emergency priority associated with the group when an In-progress Emergency on that group is cancelled.

**Editor's Note: The interaction of MCPTT Emergency call and Imminent Peril Call is FFS.**

[R-5.7.2.1.1-010] The Affiliated MCPTT Group Members shall be notified when their group call transitions to an In-progress Emergency.

[R-5.7.2.1.1-011] The MCPTT Service shall maintain knowledge of the Affiliated MCPTT Group Member(s) that initiated the MCPTT Emergency Group Call(s) until the In-progress Emergency is cancelled.

[R-5.7.2.1.1-012] The MCPTT Service shall maintain an In-progress Emergency condition for a group from the time the initial MCPTT Emergency Group Call was requested until the In-progress Emergency condition is cancelled.

[R-5.7.2.1.1-013] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure which MCPTT Group (i.e., user's selected group or dedicated MCPTT Emergency Group) is used for the MCPTT Emergency Group Call by an MCPTT User.

[R-5.7.2.1.1-014] While In-progress Emergency status is maintained for an MCPTT Group call, the MCPTT Service shall provide the User ID of the initiator of the In-progress Emergency status and an indication that it is an MCPTT Emergency group call to existing and Late call entry Affiliated MCPTT Group Members.

### 5.7.2.1.2 MCPTT Emergency Group Call cancellation requirements

[R-5.7.2.1.2-001] The MCPTT Service shall support cancellation of an In-progress Emergency by an authorized MCPTT User for an MCPTT Group.

[R-5.7.2.1.2-002] The MCPTT Service shall support cancellation of an In-progress Emergency for an MCPTT Group when criteria established by the MCPTT Administrator are met (e.g., timeout).

[R-5.7.2.1.2-003] The MCPTT Service shall support cancellation of an In-progress Emergency for an MCPTT Group and MCPTT Emergency State for an MCPTT User by the MCPTT Emergency Group Call initiator.

[R-5.7.2.1.2-004] The MCPTT Service shall notify Affiliated MCPTT Group Members of the cancellation of the In-progress Emergency and the identity of the cancelling MCPTT User.

[R-5.7.2.1.2-005] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to authorize an MCPTT User to cancel in-progress Emergencies.

### 5.7.2.2 Imminent Peril group call

#### 5.7.2.2.1 Imminent Peril group call requirements

[R-5.7.2.2.1-001] The MCPTT Service shall support Imminent Peril group calls from authorized Affiliated MCPTT Group Members.

[R-5.7.2.2.1-002] The MCPTT Service shall ensure that Imminent Peril group calls have priority over all other MCPTT Group transmissions, except System Calls, MCPTT Emergency Group Calls, Emergency Private Calls (with Floor control), and other Imminent Peril group calls.

[R-5.7.2.2.1-003] The MCPTT Service shall be capable of changing an MCPTT Group call in progress to an Imminent Peril group call.

[R-5.7.2.2.1-004] Imminent Peril group calls, including their content and signalling, shall have pre-emptive priority over all other types of MCPTT calls, except MCPTT Emergency Group Calls, Emergency Private Calls (with Floor control), System Calls, and other Imminent Peril group calls.

[R-5.7.2.2.1-005] The Affiliated MCPTT Group Members shall be notified when an MCPTT Group call transitions to In-progress Imminent Peril status.

[R-5.7.2.2.1-006] While Imminent Peril status is maintained for an MCPTT Group call, the MCPTT Service shall provide the User ID of the initiator of the Imminent Peril status and an indication that it is an Imminent Peril group call to existing and Late call entry Affiliated MCPTT Group Members.

[R-5.7.2.2.1-007] The MCPTT Service shall add the Imminent Peril priority to the group when an In-progress Imminent Peril on that group is initiated.

[R-5.7.2.2.1-008] The MCPTT Service shall remove the Imminent Peril priority associated with the MCPTT Group when the In-progress Imminent Peril status of that MCPTT Group is cancelled.

**Editor's note: The interaction of emergency call and Imminent Peril Call is FFS.**

[R-5.7.2.2.1-009] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure which MCPTT Group (i.e., user's selected group or dedicated imminent peril group) shall be used for the Imminent Peril communications for an MCPTT User.



#### 5.7.2.2.2 Imminent Peril group call cancellation requirements

[R-5.7.2.2.2-001] The MCPTT Service shall support cancellation of an In-progress Imminent Peril by an authorized MCPTT User.

[R-5.7.2.2.2-002] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to authorize MCPTT Users to cancel an In-progress Imminent Peril.

[R-5.7.2.2.2-003] The MCPTT Service shall support cancellation of an In-progress Imminent Peril by the Imminent Peril group call initiator.

[R-5.7.2.2.2-004] The MCPTT Service shall support cancellation of an In-progress Imminent Peril when criteria created by the MCPTT Administrator are met.

#### 5.7.2.3 MCPTT Emergency Private Call (with Floor control)

##### 5.7.2.3.1 MCPTT Emergency Private Call (with Floor control) requirements

[R-5.7.2.3.1-001] The MCPTT Service shall support MCPTT Emergency Private Calls (with Floor control) from authorized MCPTT Users.

NOTE: This functionality out of network relies on the MCPTT User being called being within ProSe Communication range. For this reason this functionality is more likely to be used on the network.

[R-5.7.2.3.1-002] When an MCPTT User initiates an MCPTT Emergency Private Call (with Floor control) this may trigger an MCPTT Emergency Alert for that MCPTT User.

[R-5.7.2.3.1-003] When an MCPTT User initiates an MCPTT Emergency Private Call (with Floor control) this shall put that MCPTT User into an MCPTT Emergency State.

##### 5.7.2.3.2 MCPTT Emergency Private Call (with Floor control) cancellation requirements

[R-5.7.2.3.2-001] The MCPTT Service shall support cancellation of the MCPTT Emergency priority of an MCPTT Emergency Private Call (with Floor control) by an authorized MCPTT User.

[R-5.7.2.3.2-002] The MCPTT Service shall support cancellation of the MCPTT Emergency priority of an MCPTT Emergency Private Call (with Floor control) when criteria established by the MCPTT Administrator are met (e.g., timeout).

[R-5.7.2.3.2-003] The MCPTT Service shall support an MCPTT User cancelling their own MCPTT Emergency State.

#### 5.7.2.4 MCPTT Emergency Alert

##### 5.7.2.4.1 MCPTT Emergency Alert requirements

[R-5.7.2.4.1-001] The MCPTT Service shall support an MCPTT Emergency Alert capability, which on initiation by an MCPTT User shall put that MCPTT User into the MCPTT Emergency State and cause that MCPTT UE to send an MCPTT Emergency Alert.

[R-5.7.2.4.1-002] The MCPTT Service shall provide a means for an authorized user to be able to activate the MCPTT Emergency Alert capability.

[R-5.7.2.4.1-003] The MCPTT Emergency Alert shall contain the following information: Location, User ID and group ID (i.e., user's selected group or dedicated MCPTT Emergency Group, as per group configuration) and the user's Mission Critical Organization name.

[R-5.7.2.4.1-004] The MCPTT Emergency Alert shall be distributed to affiliated members of the group that was used in the MCPTT Emergency Alert, where it is associated with an MCPTT Emergency Private Call (with Floor control) the MCPTT Emergency Alert shall be distributed to the MCPTT User that the call was initiated to.

[R-5.7.2.4.1-005] The MCPTT Service shall provide a mechanism for an authorized MCPTT User to configure an MCPTT Emergency Alert to send a notification to MCPTT Users within a configurable geographic area of the MCPTT User entering the MCPTT Emergency State, independent of the MCPTT Group Membership.

[R-5.7.2.4.1-006] The MCPTT UE shall maintain knowledge of the MCPTT Emergency State, until cancelled.

[R-5.7.2.4.1-007] Until the MCPTT Emergency State is cancelled on the MCPTT UE, all MCPTT Group call or Private Call (with Floor control) transmissions by the MCPTT User shall be an MCPTT Emergency Group Call or Emergency Private Call (with Floor control).

[R-5.7.2.4.1-008] The MCPTT UE shall be configurable as to which group (i.e., user's selected group or dedicated MCPTT Emergency Group) or MCPTT User is used for the MCPTT Emergency communications.

[R-5.7.2.4.1-009] The MCPTT UE shall immediately affiliate to the group configured for MCPTT Emergency Group Call, if not already affiliated to the group, after activating an MCPTT Emergency Alert.

[R-5.7.2.4.1-010] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure how an MCPTT User is notified of an incoming MCPTT Emergency Alert (e.g., visual, audio).

[R-5.7.2.4.1-011] The MCPTT Service shall provide a mechanism for an MCPTT User to configure, subject to MCPTT Service policy, how they are notified of an incoming MCPTT Emergency Alert (e.g., visual, audio).

[R-5.7.2.4.1-012] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure which MCPTT Group (i.e., user's selected group or dedicated MCPTT Emergency Group) or MCPTT User (e.g., dispatcher) is used for the MCPTT Emergency Alert by an MCPTT User.

#### 5.7.2.4.2 MCPTT Emergency Alert cancellation requirements

[R-5.7.2.4.2-001] The MCPTT UE shall only provide a means for cancelling the MCPTT Emergency State locally by an authorized user of that MCPTT UE.

[R-5.7.2.4.2-002] The MCPTT Service shall support MCPTT Emergency Alert cancellation by authorized MCPTT Users.

[R-5.7.2.4.2-003] The MCPTT Service shall distribute MCPTT Emergency Alert cancellation to all affiliated members of the group identified in the cancellation.

## 5.8 User ID

[R-5.8-001] The MCPTT Service shall provide a mechanism for the creation and deletion of aliases for an MCPTT User and its associated user profiles by authorized parties.

[R-5.8-002] The MCPTT Service shall provide a mechanism for each User ID to be associated with an alphanumeric identifier (with a minimum length of N3) (i.e., alias) assigned by an MCPTT Administrator.

[R-5.8-003] All UEs shall provide a configurable capability to display the User ID, aliases associated with the User ID, with the Selected MCPTT Group, and with the Mission Critical Organization name.

## 5.9 MCPTT UE management

[R-5.9-001] An MCPTT UE shall support one or more MCPTT User Profiles.

[R-5.9-002] The MCPTT Service shall provide a mechanism for an MCPTT Administrator and/or authorized MCPTT User to perform MCPTT UE Provisioning.

## 5.10 MCPTT User Profile

[R-5.10-001] The MCPTT Service shall ensure that each MCPTT User has at least one associated MCPTT User Profile that records the MCPTT User's: information, including permissions and privileges with respect to the MCPTT Service.

NOTE: Examples of profile information include: their User ID, which MCPTT Groups they are a member of, their Participant type, which authority they belong to, whether they can make/receive Private Calls.

[R-5.10-002] The MCPTT Service shall provide a means for an MCPTT Administrator to manage the MCPTT User Profile for MCPTT Users within their authority.

## 5.11 Support for multiple devices

[R-5.11-001] The MCPTT Service shall allow an MCPTT User to log in to multiple MCPTT UEs concurrently.

[R-5.11-002] The MCPTT Service shall ensure that the MCPTT User logs into each MCPTT UE separately.

## 5.12 Location

[R-5.12-001] The MCPTT Service shall support conveyance of precise Location information provided by the MCPTT UE.

[R-5.12-002] The MCPTT Service shall provide for the flexibility to convey future formats of Location information.

[R-5.12-003] The MCPTT Service shall provide a means for MCPTT Administrators to manage the privacy of Location information for MCPTT Users within their authority.

[R-5.12-004] An authorized MCPTT User shall be able to restrict the MCPTT UE from supplying Location information for MCPTT communications.

[R-5.12-005] The Location information shall represent the current Location of the talker and not the Location of the talker at the time of the MCPTT call establishment.

[R-5.12-006] The MCPTT Service shall provide a means for an MCPTT User Profile to be configured with one or more Location information update triggers (i.e., a condition that, when satisfied, causes the MCPTT UE to transmit its current Location, if known).

[R-5.12-007] The MCPTT Service shall provide a means for MCPTT Administrators to modify Location information update triggers within the MCPTT User Profile of an MCPTT User within their authority at any time while the MCPTT User is on the network.

[R-5.12-008] The MCPTT Service shall provide a means for an MCPTT UE to send a Location information update whenever a trigger condition configured in the MCPTT User's active MCPTT User Profile is satisfied (e.g., initial registration, distance travelled, elapsed time, cell change, tracking area change, PLMN change, MCPTT call initiation).

[R-5.12-009] The MCPTT Service shall provide a means for an MCPTT UE to send a Location information update whenever the MCPTT User initiates an MCPTT Emergency Alert.

[R-5.12-010] The MCPTT Service shall provide a means for an MCPTT UE to send a Location information update whenever the MCPTT User initiates an MCPTT Emergency Group Call.

[R-5.12-011] The MCPTT Service shall provide a means for an MCPTT UE to send a Location information update whenever the MCPTT User initiates an MCPTT Imminent Peril Call.

[R-5.12-012] The MCPTT Service shall provide a means for an MCPTT UE to send a Location information update if the MCPTT User is in an MCPTT Emergency State and a configured amount of time has passed since the previous location information update.

[R-5.12-013] The MCPTT Service shall provide a means for an MCPTT UE to send a Location information update whenever a trigger condition configured in an MCPTT User's active MCPTT User Profile is satisfied while the MCPTT User is in MCPTT Emergency State (e.g., initial registration, distance travelled, elapsed time, cell change, tracking area change, PLMN change, MCPTT call initiation).

NOTE 1: The Location information update triggers for an MCPTT User in an MCPTT Emergency State might be different than the Location update triggers used when the MCPTT User is not in an MCPTT Emergency State.

[R-5.12-014] The MCPTT Service shall provide a means for an MCPTT Administrator to define geographical areas to be used for Location information update triggers for MCPTT Users within their authority.

[R-5.12-015] The MCPTT Service shall provide a means for an MCPTT UE in a predefined area to send a Location information update whenever a trigger condition configured in an MCPTT User's active MCPTT User Profile is satisfied (e.g., initial registration, distance travelled, elapsed time, cell change, tracking area change, PLMN change, MCPTT call initiation).

NOTE 2: The Location information update triggers for an MCPTT User in a predefined area might be different than the Location update triggers used when the MCPTT User is not in a predefined area.

## 5.13 Security

[R-5.13-001] The MCPTT Service shall provide a means to support the confidentiality and integrity of all user traffic and signalling at the application layer.

[R-5.13-002] The MCPTT Service shall support MCPTT User with globally unique identities, independent of the mobile subscriber identity (IMSI) assigned by a 3GPP network operator to UEs.

[R-5.13-003] The MCPTT identities shall be part of the MCPTT application service domain.

[R-5.13-004] The MCPTT identities shall form the basis of the MCPTT application layer security for the MCPTT Service.

[R-5.13-005] The MCPTT Service shall provide the MCPTT User with a mechanism to perform a single authentication for access to all authorized features.

[R-5.13-006] The MCPTT Service shall provide a means for an authorized MCPTT UE to access selected MCPTT features prior to MCPTT User authentication.

[R-5.13-007] The MCPTT Service shall require authentication of the MCPTT User before service access to all authorized MCPTT features is granted.

NOTE: The MCPTT Service features available are based on the authenticated user identity(s).

[R-5.13-008] Subject to regulatory constraints, the MCPTT Service shall provide a means to support confidentiality, message integrity, and source authentication for some information exchanges (e.g., MCPTT User Profile management, kill commands) that have the potential to disrupt the operation of the target MCPTT UE.

[R-5.13-009] The MCPTT Service shall provide a means to support end-to-end security for all media traffic transmitted between MCPTT UEs.

[R-5.13-010] End-to-end security shall be supported both within and without network coverage and regardless of whether the traffic is transmitted directly or via the network infrastructure.

[R-5.13-011] Subject to regulatory constraints, the MCPTT Service shall provide a cryptographic key management service(s).

[R-5.13-012] The cryptographic key management service(s) shall support both pre-provisioning and over-the-air provisioning of cryptographic keys.

[R-5.13-013] The cryptographic key management service(s) shall ensure that cryptographic keys are confidentiality protected, integrity protected and authenticated when delivered over-the-air.

## 5.14 Audio / voice quality

[R-5.14-001] The MCPTT Service shall have the flexibility to be used with different codecs.

[R-5.14-002] MOS-LQO shall achieve the noise reduction performance of TIA-102.BABG [10] Table 3-1.

[R-5.14-003] MOS-LQO shall achieve a noise reduction performance for the 3GPP Adaptive Multi-Rate Wide Band codec (AMR-WB TS 26.190 [11] and TS 26.194 [12] that is equal to or greater than that specified for the P25 full rate and half rate voice codecs in TIA-102. BABG [10].

## 5.15 Interactions between MCPTT Group calls and MCPTT Private Calls (with Floor control)

[R-5.15-001] The MCPTT Service shall allow an MCPTT UE to be transmitting in one MCPTT Group Call while simultaneously receiving transmissions from one or more MCPTT Private Calls (with Floor control).

[R-5.15-002] The MCPTT Service shall allow an MCPTT UE to be receiving or transmitting in one MCPTT Private Call (with Floor control) while simultaneously receiving transmissions from one or more MCPTT Group Calls.

[R-5.15-003] The MCPTT Service shall allow an MCPTT UE to be receiving one or more MCPTT Group Calls while simultaneously receiving transmissions from one or more MCPTT Private Calls (with Floor control).

## 5.16 Relay requirements

[R-5.16-001] The MCPTT Service shall be able to use ProSe Relay capabilities defined in TS 22.278 [5] and TS 22.468 [6].

[R-5.16-002] An MCPTT UE which is unable to gain service from E-UTRAN should attempt to make use of one or more suitable ProSe UE-to-Network Relay(s) in its proximity (see subclause 6.19).

[R-5.16-003] In off-network situations ProSe UE-to-UE Relay functionality shall be supported (see subclause 7.16) between MCPTT UEs.

## 5.17 Gateway requirements

[R-5.17-001] The MCPTT system shall be accessible via gateway MCPTT UEs by MCPTT Users.

## 5.18 Control and management by Mission Critical Organizations

### 5.18.1 Overview

Subclause 5.18 contains general requirements for management of the MCPTT Service by Mission Critical Organizations sharing the same MCPTT system, and more specific requirements pertaining to management controls and operational visibility, and to management of security services.

### 5.18.2 General requirements

[R-5.18.2-001] The MCPTT Service shall be able to support multiple Mission Critical Organizations, each with their own MCPTT Users and MCPTT Groups, on the same MCPTT system.

[R-5.18.2-002] The MCPTT Service shall provide a means by which Mission Critical Organizations designate and manage (i.e., add, delete, change authorizations, etc.) MCPTT Administrators with authority to manage users, groups, other MCPTT Administrators, security controls, and other mission affecting parameters (e.g., authorizations and priorities) of the MCPTT Service.

[R-5.18.2-003] The MCPTT Service shall protect the operational privacy of Mission Critical Organizations by providing effective separation between the administrative and security management (e.g., key) parameters of those organizations except as authorized by the Mission Critical Organizations involved.

[R-5.18.2-004] The MCPTT Service shall protect the administrative and security management parameters of Mission Critical Organizations from viewing and manipulation by individuals (including those within and outside of the mission critical organization) not explicitly authorized by the Mission Critical Organization.

[R-5.18.2-005] The MCPTT Service shall provide a means by which Mission Critical Organizations may share subsets of their administrative and security parameters with other Mission Critical Organizations.

NOTE: The purposes of these requirements protect the operational security of organizations while still allowing for interworking of MCPTT UE and Users under the control of the Mission Critical Organizations.

### 5.18.3 Operational visibility for Mission Critical Organizations

[R-5.18.3-001] The MCPTT Service shall provide a means by which an MCPTT Administrator associated with a Mission Critical Organization has visibility into the operational status of the service (e.g., during a natural disaster).

## 5.19 General Administrative – groups and users

[R-5.19-001] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to create and define the membership of MCPTT Groups.

[R-5.19-002] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to authorize a user to request an MCPTT Group Call to one or more MCPTT Groups.

[R-5.19-003] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to determine MCPTT Users who have the role of a particular Participant type on an MCPTT Group.

[R-5.19-004] The MCPTT Service shall provide mechanisms for an MCPTT Administrator to assign and amend the identifying information of an MCPTT Group (e.g., name, alias).

[R-5.19-005] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to assign and amend the identifying information of MCPTT User Profiles (e.g., name, identifier, alias).

[R-5.19-006] The MCPTT Service shall provide a mechanism to notify MCPTT Users when they become a member of an MCPTT Group or their membership of an MCPTT Group is removed. This notification shall include any provisions required by the MCPTT User to use the MCPTT Group if the MCPTT User has been added to the MCPTT Group or remove provisions if the MCPTT User has been removed from the MCPTT Group.

[R-5.19-007] The MCPTT Service shall provide mechanisms for an MCPTT Administrator to create, amend, delete, and suspend MCPTT User Profiles.

[R-5.19-008] The MCPTT Service shall enable an MCPTT Administrator to configure which MCPTT Group Members are authorized to select to transmit to an MCPTT Group.

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## 6 MCPTT Service requirements specific to on-network use

### 6.1 General administrative – groups and users

[R-6.1-001] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to limit the total number (N11) of MCPTT Group Members of an MCPTT Group.

[R-6.1-002] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to remove MCPTT Groups from the MCPTT system.

[R-6.1-003] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to disable and re-enable MCPTT Groups.

[R-6.1-004] Void.

[R-6.1-005] Void.

[R-6.1-006] The MCPTT Service shall provide a mechanism to log MCPTT Administrators' activities (e.g., cryptographic key updates, user profile changes, password changes, invalid access attempts).

[R-6.1-007] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to define geographic areas that can be associated to dispatchers for the purpose of routing Location dependent calls and alerts, as part of handling MCPTT Private Call requests and MCPTT Group Calls, when the called/alerted party is based on the MCPTT User's current Location.

## 6.2 MCPTT calls

### 6.2.1 Commencement modes for MCPTT Group calls

[R-6.2.1-001] The MCPTT Service shall be capable of allowing an MCPTT Group call setup request to proceed without prior acknowledgement by any MCPTT User of that MCPTT Group.

[R-6.2.1-002] An MCPTT User currently affiliated to an MCPTT Group shall acknowledge receipt of an MCPTT Group call setup request, if requested to do so by the MCPTT Service.

[R-6.2.1-003] The MCPTT User's acknowledgement may require direct interaction of the MCPTT UE with the human user, or may be automatically executed by the MCPTT UE, in accordance with policy established by an MCPTT Administrator.

[R-6.2.1-004] The MCPTT Service shall be capable of requiring that a minimum number of Affiliated MCPTT Group Members acknowledges receipt of the MCPTT Group call setup request before the audio transmission proceeds.

[R-6.2.1-005] The MCPTT Service shall be capable of requiring that specific MCPTT Users acknowledge receipt of the MCPTT Group call setup request before the audio transmission proceeds, regardless of the affiliation state of those users.

NOTE 1: In this case the MCPTT Service affiliates the specific MCPTT Users who are not currently affiliated to the target MCPTT Group and then returns them to their previous affiliation state when the transmission ends.

[R-6.2.1-006] The MCPTT Service shall be capable of requiring that all MCPTT Users that are both affiliated to the MCPTT Group and in a given geographical area acknowledge receipt of an MCPTT Group call setup request before the audio transmission proceeds.

[R-6.2.1-007] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to determine the subset of Affiliated MCPTT Group Members that shall acknowledge receipt of the MCPTT Group call setup request before the audio transmission proceeds.

NOTE 2: In the following requirements, the term, "MCPTT Group Call setup request requires acknowledgement" is used when one or more of the acknowledgement conditions defined above (i.e., [R-6.2.1-004], [R-6.2.1-005], [R-6.2.1-006], and/or [R-6.2.1-007]) applies.

[R-6.2.1-008] If an MCPTT Group Call setup request requires acknowledgement from Affiliated MCPTT Group Members, and the required MCPTT Group Members do not acknowledge the call setup within a configured time (the "acknowledged call setup timeout"), the MCPTT Service may proceed with the call and then may notify the initiating MCPTT User that the acknowledgements did not include all required members.

[R-6.2.1-009] If an MCPTT Group Call setup request requires acknowledgement from Affiliated MCPTT Group Members, and the required MCPTT Group Members do not acknowledge the call setup within a configured time, the MCPTT Service may abandon the call and then may notify the initiating MCPTT User that the acknowledgements did not include all required members.

[R-6.2.1-010] If an MCPTT Group Call setup request requires acknowledgement from Affiliated MCPTT Group Members, the initiating MCPTT User shall at any time have the option of allowing the call to proceed regardless of the state of the acknowledgements (i.e., to "convert" the call to an unacknowledged call).

[R-6.2.1-011] If an MCPTT Group Call setup request requires acknowledgement from Affiliated MCPTT Group Members, the acknowledged call setup timeout shall be established by an MCPTT Administrator.

[R-6.2.1-012] If an MCPTT Group Call setup request requires acknowledgement from Affiliated MCPTT Group Members, the behaviour in response to the expiration of the acknowledged call setup timeout shall be established by an MCPTT Administrator.

[R-6.2.1-013] If an MCPTT Group Call setup request requires acknowledgement from Affiliated MCPTT Group Members, the MCPTT Service shall support an indefinite (i.e., infinite) call setup timeout.

[R-6.2.1-014] If the MCPTT Service has knowledge that some affiliated members of a group can not be Participants in an unacknowledged MCPTT Group Call, the MCPTT Service shall provide an indication to the requester that the call is

proceeding without all affiliated members, and shall provide the list of the missing members based on policy established by the MCPTT Administrator.

[R-6.2.1-015] If MCPTT User(s) are excluded from an MCPTT call as there is insufficient capacity to support their participation the MCPTT Service shall ensure that the MCPTT User(s) receive a notification that they have been excluded from the call for reasons of lack of capacity.

## 6.2.2 Queuing

[R-6.2.2-001] The MCPTT Service shall prioritize the transmit request queue based on the type of call (e.g., group, private), urgency of the call (e.g., general group, MCPTT Emergency, Imminent Peril), attributes (e.g., priority level) of the MCPTT Group (if a group call), and attributes (e.g., priority level) of the requesting MCPTT User.

[R-6.2.2-002] When prioritizing the transmit queue, the MCPTT Service may assign higher priority to calls of the MCPTT Groups and MCPTT Users operating within the boundaries of their jurisdictions, if known.

[R-6.2.2-003] When prioritizing the transmit queue, the MCPTT Service may assign higher priority to calls of the MCPTT Groups and MCPTT Users during hours of operation or while on duty, if known.

[R-6.2.2-004] The MCPTT Service shall allow MCPTT Users with queued requests for permission to transmit to cancel their requests.

[R-6.2.2-005] If an MCPTT Group Call request to transmit has been queued, the MCPTT Service shall provide, upon request, that MCPTT User's current position in the queue.

[R-6.2.2-006] If a request for an MCPTT Group call is queued, the MCPTT Service shall provide an indication to the requester when the call continues.

## 6.2.3 Floor control

### 6.2.3.1 General aspects

[R-6.2.3.1-001] The Floor control functionality in an MCPTT Service shall determine at a point in time which Participant(s) are allowed to transmit to other Participant(s).

[R-6.2.3.1-002] Receiving Participant(s) shall receive audio from one transmitting Participant. The only exception is if an MCPTT Group is configured to allow simultaneous Transmitting MCPTT Group Members in override.

[R-6.2.3.1-003] The MCPTT Service shall provide a mechanism for the MCPTT Administrator to configure the number (maximum of N9) of simultaneous audios received by an MCPTT User in a single MCPTT Group.

### 6.2.3.2 Requesting permission to transmit

[R-6.2.3.2-001] An authorized Participant shall be able to request to transmit to an MCPTT Group or an individual Participant.

[R-6.2.3.2-002] At call setup the MCPTT Service shall provide a notification, for example audio and/or visual, to the MCPTT Group Member attempting to transmit that there are no other Group Members who have affiliated to the MCPTT Group.

[R-6.2.3.2-003] The Floor control functionality shall determine the transmitting Participant(s) when there are simultaneous requests for permission to transmit within the same call.

[R-6.2.3.2-004] Following an MCPTT Request for permission to transmit on the Selected MCPTT Group, the Affiliated MCPTT Group Member that made and was granted the request shall be given an indication of being allowed to transmit.

[R-6.2.3.2-005] Following an MCPTT Request for permission to transmit on the Selected MCPTT Group, an Affiliated MCPTT Group Member that made and was not granted the request shall be given an indication that permission to transmit was rejected or queued.

[R-6.2.3.2-006] The depth of the Floor control queue shall be configurable.



[R-6.2.3.2-007] Following an MCPTT Private Call (with Floor control) request for permission to transmit, the MCPTT User that is allowed to transmit shall be given an indication that the user is allowed to transmit to the targeted MCPTT User.

[R-6.2.3.2-008] Following an MCPTT Private Call (with Floor control) request for permission to transmit, an MCPTT User that is not allowed to transmit shall be given an indication that the permission to transmit was rejected or queued.

[R-6.2.3.2-009] The MCPTT Service shall provide an indication to receiving Participants that the transmitting Participant is starting to transmit.

[R-6.2.3.2-010] The MCPTT Service shall provide a mechanism for an MCPTT Participant to remove its MCPTT Request from the Floor control queue.

[R-6.2.3.2-011] The MCPTT Service shall provide a mechanism for removal (i.e., request accepted, request denied, or expiration of a timer) of an MCPTT Request from the Floor control queue.

[R-6.2.3.2-012] The MCPTT Service shall provide a mechanism for the MCPTT Administrator to configure the parameter(s) of the Floor control queue for an MCPTT Group (i.e., timer).

### 6.2.3.3 Override

#### 6.2.3.3.1 General aspects

[R-6.2.3.3.1-001] The MCPTT Service shall enable MCPTT Administrators to create a priority hierarchy for determining what Participants, Participant types, and urgent transmission types shall be granted a request to override an active MCPTT transmission.

[R-6.2.3.3.1-002] The MCPTT Service shall enable an MCPTT Administrator to configure which MCPTT Group transmission a Participant(s) receives, overriding and/or overridden for cases where an authorized Participant overrides an MCPTT transmission.

[R-6.2.3.3.1-003] The MCPTT Service shall enable the MCPTT Administrator to configure the MCPTT Group to allow only the overriding Participant to transmit or to allow both the overriding and overridden Participant to transmit.

[R-6.2.3.3.1-004] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure MCPTT Private Calls (with Floor control) to allow only the overriding Participant to transmit or to allow both the overriding and overridden Participant to transmit.

[R-6.2.3.3.1-005] The priority hierarchy used for granting a request to override an active MCPTT transmission shall contain at least four (4) levels.

[R-6.2.3.3.1-006] The transmitting Participant shall be determined by the relative Floor control priorities of the Participants and Call type based on priority (e.g MCPTT Emergency).

[R-6.2.3.3.1-007] The MCPTT Service shall provide a mechanism for Participants, to override an active MCPTT transmission of a transmitting Participant when the priority level of the overriding Participant or Call type based on priority (e.g MCPTT Emergency) are ranked higher than the priority level of the transmitting Participant or Call type based on priority.

[R-6.2.3.3.1-008] If an authorized Participant overrides an MCPTT transmission, the MCPTT Service shall provide a means of notifying the overridden Participant(s) that the transmission has been overridden.

#### 6.2.3.3.2 Override – one transmitting Participant

[R-6.2.3.3.2-001] If the MCPTT Group has been configured to only allow the overriding transmitting Participant, the MCPTT Service shall revoke the transmit permission of the overridden transmitting Participant.

#### 6.2.3.3.3 Override – simultaneously Transmitting MCPTT Group Members

[R-6.2.3.3.3-001] If the MCPTT Group has been configured to allow both overriding and overridden transmitting Participants, authorized receiving Participants shall be enabled to listen to both the overriding and overridden Participant transmissions, dependent on configuration.

[R-6.2.3.3.3-002] The MCPTT Service shall allow successive overrides of an MCPTT Group Call when the request to override is made by an MCPTT User having a higher Floor control priority than the currently transmitting Participants.

[R-6.2.3.3.3-003] In the case of successive overrides, the MCPTT Service shall enable only two transmissions, one overriding transmission, from the highest priority MCPTT User, and one overridden transmission, chosen from among the two overridden Participants based upon configured rule(s). (i.e., this could be based simply on priority of user, it could be based on a policy that an overridden MCPTT Emergency transmission shall remain as the overridden transmission or a rule could be established that the MCPTT system shall not allow two dispatchers to be both the overriding and overridden transmitters.).

#### 6.2.3.4 Terminating permission to transmit

[R-6.2.3.4-001] The MCPTT Service shall enable an authorized MCPTT User to terminate the permission to transmit of a transmitting Participant at any time.

[R-6.2.3.4-002] A transmitting Participant shall be able to indicate to the MCPTT Service that the Participant no longer wants to transmit.

NOTE: In this case audio stops being transmitted to the receiver Participant(s) until an authorized Participant sends a subsequent request for permission to transmit.

[R-6.2.3.4-003] The MCPTT Service shall provide an indication to receiving Participants that the transmitting Participant has finished transmitting.

#### 6.2.3.5 Transmit time limit

[R-6.2.3.5-001] The MCPTT Service shall enable an MCPTT Administrator to configure the limit for the length of time that a Participant transmits from a single request to transmit.

[R-6.2.3.5-002] The Floor control functionality shall have a configurable limit for the length of time that a Participant transmits from a single request to transmit.

[R-6.2.3.5-003] The Floor control functionality shall provide an indication to the transmitting Participant that the Participant is within a configurable amount of time before his transmit time limit is reached.

[R-6.2.3.5-004] The Floor control functionality shall provide an indication to the transmitting Participant that the Participant's transmit time limit has been reached.

[R-6.2.3.5-005] The Floor control functionality shall remove the permission to transmit from the transmitting Participant when the Participant's transmit time limit has been reached.

### 6.2.4 Call termination

[R-6.2.4-001] If a Participant of an MCPTT Group call is pre-empted, the MCPTT Service shall terminate the call or continue the call with an indication to the transmitting Participant that one or more receiving Participants was pre-empted.

[R-6.2.4-002] If MCPTT User(s) are pre-empted from an ongoing MCPTT call as there is insufficient capacity to support their ongoing participation, the MCPTT Service shall ensure that the MCPTT User(s) receive a notification that they have been removed from the call for reasons of lack of capacity.

[R-6.2.4-003] The MCPTT Service shall terminate a call after the Hang Time expires.

[R-6.2.4-004] Void.

[R-6.2.4-005] The MCPTT Service shall provide an indication to the Participants that the call is within a configurable amount of time before the call time limit is reached.

[R-6.2.4-006] The MCPTT Service shall release the call when the call time limit has been reached.

[R-6.2.4-007] The MCPTT Service shall provide an indication to the Participants that the call time limit has been reached.

[R-6.2.4-008] The MCPTT Service shall release an MCPTT Group call if any of the termination conditions are met (e.g., last Participant leaving, second last Participant leaving, initiator leaving) or the minimum number of Affiliated MCPTT Group Members are not present.

## 6.3 General requirements

[R-6.3-001] A PLMN shall support multiple MCPTT systems.

[R-6.3-002] An MCPTT system shall be capable of providing MCPTT Services to MCPTT Users in multiple PLMNs.

[R-6.3-003] The MCPTT Service shall provide a means by which changes performed by an MCPTT Administrator take effect immediately.

[R-6.3-004] The MCPTT Service shall provide a means by which changes performed by an MCPTT Administrator take effect at a specified date/time.

## 6.4 General group call

### 6.4.1 General aspects

[R-6.4.1-001] Interruption to an MCPTT Group Call shall be minimized when participants move from one area to another.

### 6.4.2 Group status/information

[R-6.4.2-001] The MCPTT Service shall provide a mechanism by which an authorized MCPTT User determines which MCPTT Groups have at least one other MCPTT User affiliated.

[R-6.4.2-002] The MCPTT Service shall provide a mechanism by which an authorized MCPTT UE determines what MCPTT Groups have at least one active receiving member.

[R-6.4.2-003] The MCPTT Service shall provide a mechanism by which an authorized MCPTT UE determines that a number (N1) of receiving members are present for an MCPTT Group.

[R-6.4.2-004] The MCPTT Service shall provide a mechanism by which an authorized MCPTT UE determines that a particular receiving member(s) is present for an MCPTT Group.

[R-6.4.2-005] The MCPTT Service shall provide a notification, for example audio and/or visual, to a user that there are no members on an MCPTT Group being used/monitored by the user and that the user is the only user affiliated to that MCPTT Group.

[R-6.4.2-006] The MCPTT Service shall provide a mechanism by which an authorized MCPTT User can determine which MCPTT Group(s) another MCPTT User has affiliated to.

[R-6.4.2-007] The MCPTT Service shall provide a mechanism by which an authorized MCPTT User can determine which MCPTT Group(s) another MCPTT User has selected.

### 6.4.3 Identification

[R-6.4.3-001] The MCPTT Service shall provide the User ID, associated User ID alias(es), group ID, group aliases and, if available, the identity of the Mission Critical Organization name of the transmitting Participant to the receiving MCPTT UEs unless the transmitting Participant's identity is restricted.

[R-6.4.3-002] The MCPTT Service shall present users with human readable identifiers (with a minimum length of N3) for MCPTT Users (i.e., user ID alias(es)) and for the MCPTT Groups (i.e., group alias(es)).

### 6.4.4 Membership/affiliation

[R-6.4.4-001] The MCPTT Service shall support automatic affiliation of the MCPTT UE to a Group-Broadcast Group or User-Broadcast Group.

[R-6.4.4-002] The MCPTT Service shall support an MCPTT User's ability to revoke his affiliation with an MCPTT Group.

## 6.4.5 Membership/affiliation list

[R-6.4.5-001] The MCPTT Service shall provide, upon request, the list of currently affiliated members on an MCPTT Group to an authorized user regardless of the user's affiliation.

[R-6.4.5-002] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to authorize an MCPTT User to request the list of currently affiliated members on an MCPTT Group regardless of the MCPTT User's affiliation or group membership.

[R-6.4.5-003] The MCPTT Service shall provide, upon request, the list of currently affiliated members of an MCPTT Group to an authorized MCPTT UE.

[R-6.4.5-004] When a list of affiliated members is provided, the list shall reference each member by User ID and/or associated aliases.

[R-6.4.5-005] The MCPTT Service shall provide, upon request, the current list of members of an MCPTT Group to an authorized user.

[R-6.4.5-006] The MCPTT Service shall provide, upon request, the current list of members of an MCPTT Group to an authorized MCPTT UE regardless of the MCPTT UE's membership.

[R-6.4.5-007] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to authorize an MCPTT User to request the complete list of members of an MCPTT Group, regardless of the MCPTT User's membership.

[R-6.4.5-008] When a list of members is provided, the list shall reference each member by user ID and/or associated aliases.

## 6.4.6 Authorized user remotely changes another MCPTT User's affiliated and/or Selected MCPTT Group(s)

### 6.4.6.1 Mandatory change

[R-6.4.6.1-001] The MCPTT Service shall provide a mechanism that allows an authorized MCPTT User (e.g., dispatcher) to change an on-network MCPTT User's Selected MCPTT Group(s) and then the MCPTT Service shall send a notification to the on-network MCPTT User.

[R-6.4.6.1-002] The MCPTT Service shall provide a mechanism that allows an authorized MCPTT User (e.g., dispatcher) to make changes to the group(s) that an on-network MCPTT User is affiliated to and then the MCPTT Service shall send a notification to the on-network MCPTT User.

[R-6.4.6.1-003] The MCPTT Service shall provide a mechanism that allows an authorized MCPTT User (e.g., dispatcher) to change multiple other on-network MCPTT Users' Affiliated MCPTT Group(s) to a specific MCPTT Group, and the MCPTT Service shall notify this to the on-network MCPTT Users.

[R-6.4.6.1-004] The MCPTT Service shall provide a mechanism that allows an authorized MCPTT User (e.g., dispatcher) to change multiple other on-network MCPTT Users' Selected MCPTT Group(s) to a specific MCPTT Group, and the MCPTT Service shall notify this to the on-network MCPTT Users.

### 6.4.6.2 Negotiated change

[R-6.4.6.2-001] The MCPTT Service shall provide a mechanism that allows an authorized MCPTT User (e.g., dispatcher) to send a notification that proposes that another on-network MCPTT User should affiliate to a specific MCPTT Group.

[R-6.4.6.2-002] The MCPTT Service shall provide a mechanism that allows an authorized MCPTT User (e.g., dispatcher) to send a notification that proposes that multiple other on-network MCPTT Users should affiliate to a specific MCPTT Group.

[R-6.4.6.2-003] The MCPTT Service shall provide a mechanism that allows an authorized MCPTT User (e.g., dispatcher) to send a notification that proposes that another on-network MCPTT User should select a specific MCPTT Group.

[R-6.4.6.2-004] The MCPTT Service shall provide a mechanism that allows an authorized MCPTT User (e.g., dispatcher) to send a notification that proposes that multiple on-network MCPTT Users should select a specific MCPTT Group.

[R-6.4.6.2-005] The MCPTT Service shall provide a mechanism to the on-network MCPTT User to accept or reject a proposed change in selected or affiliated MCPTT Group(s).

[R-6.4.6.2-006] The MCPTT Service shall provide a notification to the authorized MCPTT User (e.g., dispatcher) if the change that they proposed to another on-network MCPTT User(s) affiliated/Selected MCPTT Group was accepted/rejected by the MCPTT User(s).

## 6.4.7 Prioritization

[R-6.4.7-001] The MCPTT Service shall provide a mechanism to establish, dynamically and in real-time, the relative priorities of different MCPTT Group Calls with respect to transport.

[R-6.4.7-002] The MCPTT Service shall provide a mechanism to establish, dynamically and in real-time, the relative priorities of different MCPTT Group Calls with respect to presentation.

[R-6.4.7-003] The MCPTT Service shall provide a mechanism to establish, dynamically and in real-time, the relative priorities of MCPTT Groups Calls and other traffic with respect to transport.

[R-6.4.7-004] The MCPTT Service shall provide a mechanism to establish, dynamically and in real-time, the relative priorities of MCPTT Groups Calls and other traffic with respect to presentation.

## 6.4.8 Relay requirements

[R-6.4.8-001] The MCPTT UE-to-Network Relay service shall provide on-network MCPTT Service to MCPTT UEs not currently connected to the serving network.

## 6.4.9 Administrative

[R-6.4.9-001] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure the conditions under which MCPTT calls shall be terminated (e.g., last Participant leaving, second last Participant leaving, initiator leaving).

[R-6.4.9-002] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to set a predefined time period (Hang Time) without any traffic in MCPTT calls (with Floor control), after which the MCPTT calls shall terminate.

[R-6.4.9-003] The MCPTT Service shall provide a mechanism for MCPTT Administrators to configure the maximum allowed time duration for MCPTT Group calls to remain active.

[R-6.4.9-004] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to determine how many MCPTT Users shall remain participating for MCPTT Group calls to remain active.

[R-6.4.9-005] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure MCPTT Groups to be receive-only for specified MCPTT Group Members.

[R-6.4.9-006] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to set the preferred voice codecs for an MCPTT Group.

[R-6.4.9-007] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to confine use of an MCPTT Group to MCPTT Group Members in a particular geographic area.

## 6.5 Broadcast group

### 6.5.1 General Broadcast Group Call

[R-6.5.1-001] The MCPTT Service shall deliver an on-Network Broadcast Group Call to the members of a Broadcast Group who are on-Network, and who may be all of the MCPTT system users, or a subset thereof.

[R-6.5.1-002] The MCPTT Service shall support Broadcast Group Calls to a dynamically defined geographic area.

### 6.5.2 Group-Broadcast Group (e.g., announcement group)

[R-6.5.2-001] The MCPTT Service shall optionally support termination of all, or a subset of, subordinate group calls upon initiation of a Broadcast Group Call transmitted on a Group-Broadcast Group.

### 6.5.3 User-Broadcast Group (e.g., System Call)

[R-6.5.3-001] The MCPTT Service shall optionally support termination of all group calls that are not MCPTT Emergency Group Calls involving those users within the user hierarchy upon initiation of a Broadcast Group Call transmitted on a User-Broadcast Group.

## 6.6 Dynamic group management (i.e., dynamic regrouping)

### 6.6.1 General dynamic regrouping

[R-6.6.1-001] Group Regroup and User Regroup operations shall be manageable by authorized MCPTT Users.

[R-6.6.1-002] The temporary group formed by Group Regroup or User Regroup operations shall persist until torn down by an authorized MCPTT User.

[R-6.6.1-003] The priority of the temporary group formed by a Group Regroup or User Regroup operations shall be established by the creator of the group within bounds established by MCPTT Administrators.

[R-6.6.1-004] The MCPTT Service shall enable an MCPTT Administrator to authorize MCPTT Users to be able to perform dynamic regrouping operations.

[R-6.6.1-005] The MCPTT Service shall enable an MCPTT Administrator to configure whether a temporary group is encrypted.

[R-6.6.1-006] The temporary group formed by Group Regroup or User Regroup operations shall support all of the calling features of any other MCPTT Group, except the ability for a temporary group formed by a Group Regroup operation to be included in another Group Regroup operation.

### 6.6.2 Group Regrouping

#### 6.6.2.1 Service description

Group Regrouping enables dispatchers or any authorized user to temporarily combine MCPTT Groups. A dispatcher uses Group Regrouping for different reasons.

Due to an incident in an area it can be necessary to temporarily enable MCPTT Users from different MCPTT Groups to communicate to each other to coordinate. After the incident the dispatcher cancels the Group Regrouping and the MCPTT Users continue with their original configured MCPTT Groups.

During quiet periods control room managers can decide to combine MCPTT Groups and handle their operations and communications with one dispatcher. In the busier period the Group Regrouping is cancelled and the MCPTT Groups are handled by separate dispatchers.

## 6.6.2.2 Requirements

[R-6.6.2.2-001] The MCPTT Service shall provide a means of dynamically combining a multiplicity of groups into a new, temporary group (i.e., to perform a "Group Regroup operation").

[R-6.6.2.2-002] The MCPTT Service shall notify MCPTT Users when any of their affiliated groups are affected by a Group Regroup operation.

[R-6.6.2.2-003] The MCPTT Service shall provide information to an authorized MCPTT User if that user is attempting to Group Regroup MCPTT Groups of different security levels.

[R-6.6.2.2-004] The MCPTT Service shall enable an authorized MCPTT User to set the security level of the Group created from a Group Regroup operation. Where an MCPTT User does not specify the security level the MCPTT Service shall default the security level to be set to the lower security level of the constituent Groups.

[R-6.6.2.2-005] The MCPTT Service shall notify Affiliated MCPTT Group Members of a constituent MCPTT Group when the security level of the MCPTT Group that they are using lowers as a result of a Group Regroup operation.

[R-6.6.2.2-006] The MCPTT Service shall enable an authorized MCPTT User to set the priority level of the group formed from a Group Regroup operation. Where an MCPTT User does not specify the priority level the MCPTT Service shall default the priority level to be set to the higher priority level of the constituent Groups.

[R-6.6.2.2-007] Broadcast Groups shall be able to be included in a Group Regroup operation.

## 6.6.3 Temporary Group-Broadcast Group

[R-6.6.3-001] The MCPTT Service shall enable an authorized MCPTT User to create a temporary Group-Broadcast Group from a multiplicity of MCPTT Groups.

[R-6.6.3-002] The MCPTT Service shall only allow the creator of the temporary Group-Broadcast Group to transmit on it.

## 6.6.4 User regrouping

### 6.6.4.1 Service description

In the operational MCPTT environment most tasks are covered by standard procedures and communication structures and MCPTT Users can easily access the MCPTT Groups to handle their tasks.

Exceptionally it could happen that there is an urgent need for a dedicated set of individual MCPTT Users to communicate in an MCPTT Group, but that this is not foreseen in the communication structure. This could be due to extreme conditions or due to a cooperation that is outside normal procedures.

User Regrouping enables dispatchers or authorized users to instantaneously provide a dedicated MCPTT Group to these MCPTT Users to enable the required communication. Depending on configuration the MCPTT Users could be automatically affiliated to this MCPTT Group. After the operation this MCPTT Group is removed by the dispatcher or authorized user.

### 6.6.4.2 Requirements

[R-6.6.4.2-001] The MCPTT Service shall provide a means for combining a multiplicity of MCPTT Users into a new, temporary group (i.e., to perform a "User Regroup operation").

[R-6.6.4.2-002] The MCPTT Service shall provide a means for combining a multiplicity of MCPTT Users into a new, temporary group based on a parameter or a combination of parameters (e.g., particular geographic area, Participant type).

[R-6.6.4.2-003] The MCPTT Service shall provide a mechanism to preconfigure the parameters for a particular User Regroup operation, such that an authorized MCPTT User activates this preconfigured User Regroup and communicate with this temporary group with minimal delay.

NOTE: An example of the use of this functionality is for an MCPTT User to communicate with particular other MCPTT Users within a predefined radius of the MCPTT User's Location. This functionality is likely to be for urgent type calls such as MCPTT Emergency Group Calls.

[R-6.6.4.2-004] The MCPTT Service shall notify MCPTT Users when they are affected by a User Regroup operation.

[R-6.6.4.2-005] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure whether an MCPTT system shall automatically affiliate the MCPTT Users included in the temporary group created by the User Regroup operation.

## 6.7 Private Call

### 6.7.0 Overview

Private Calls can use Floor control or not. Private Calls (without Floor control) are only supported on network, whereas Private Calls (with Floor control) are supported both on and off network. Private Calls (without Floor control) are intended to have the same functionality as specified for Private Calls (with Floor control) in subclauses 5.6.2, 5.6.3, 5.6.4, 5.6.5. Comparable requirements are included in subclauses 6.7.1, 6.7.2, 6.7.4 and 6.7.5, with the exception of R-5.6.5-005, which is specific to Private Calls (with Floor control).

### 6.7.1 General requirements

[R-6.7.1-001] The on-network MCPTT Service shall support two types of Private Calls, one which uses Floor control and one which does not.

NOTE: An MCPTT Private Call (without Floor control) is effectively a full voice duplex call between two users.

[R-6.7.1-002] The MCPTT Service should provide a mechanism for authorized MCPTT Users to query whether a particular MCPTT User is present on the network.

[R-6.7.1-003] The MCPTT Service should provide a mechanism for an MCPTT Administrator to configure which MCPTT Users, within their authority, are authorized to place a Private Call (without Floor control).

[R-6.7.1-004] The MCPTT Service should provide a mechanism for authorized MCPTT Users to query whether a particular MCPTT User is capable of participating in an MCPTT Private Call.

[R-6.7.1-005] Void

[R-6.7.1-006] Void

[R-6.7.1-007] Void

[R-6.7.1-008] Void

[R-6.7.1-009] Void

[R-6.7.1-010] The MCPTT Service shall provide a mechanism by which specified Participants or Participant types (e.g., dispatch) have the ability to override an active PTT transmission of the other Participant in the Private Call.

[R-6.7.1-011] The MCPTT Service shall provide a mechanism by which an MCPTT User can make a Private Call to the local dispatcher based on the MCPTT User's current Location.

[R-6.7.1-012] The MCPTT Service shall provide the status (e.g., ringing, accepted, rejected, active) of an MCPTT Private Call (without Floor control) to the relevant MCPTT User that is a Participant of the MCPTT Private Call (without Floor control).

[R-6.7.1-013] The MCPTT Service shall provide a mechanism for an authorized MCPTT User that is a called party in an MCPTT Private Call (without Floor control), to restrict providing the reason why an MCPTT Private Call (without Floor control) setup has failed to the calling MCPTT User.

[R-6.7.1-014] The MCPTT Service shall provide a mechanism for the Private Call (without Floor control) to be set up with the MCPTT UE designated by the called MCPTT User to be used for Private Calls (without Floor control) when the called MCPTT User has signed on to the MCPTT Service with multiple MCPTT UEs.



## 6.7.2 Administrative

[R-6.7.2-001] The MCPTT Service should provide a mechanism for an MCPTT Administrator to configure whether the presence on the network of a particular MCPTT User is available.

[R-6.7.2-002] The MCPTT Service should provide a mechanism for an MCPTT Administrator to configure which MCPTT Users may determine whether a particular MCPTT User is present on the network.

[R-6.7.2-003] The MCPTT Service should provide a mechanism for an MCPTT Administrator to configure whether the ability to participate in Private Calls of a particular MCPTT User is available.

[R-6.7.2-004] The MCPTT Service should provide a mechanism for an MCPTT Administrator to configure which MCPTT Users may determine whether a particular MCPTT User is capable of participating in an MCPTT Private Call.

[R-6.7.2-005] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure which MCPTT Users, within their authority, are authorized to place a Manual Commencement Private Call (without Floor control).

[R-6.7.2-006] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure which MCPTT Users, within their authority, are authorized to place an Automatic Commencement Private Call (without Floor control).

[R-6.7.2-007] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure for a particular authorized MCPTT User, a set of MCPTT Users under the same authority to which an MCPTT Private Call (without Floor control) can be made.

[R-6.7.2-008] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure the maximum duration for MCPTT Private Calls (without Floor control) for MCPTT Users within their authority.

## 6.7.3 Prioritization

[R-6.7.3-001] The MCPTT Service shall provide a mechanism to establish, dynamically and in real-time, the relative priorities of MCPTT Private Calls and MCPTT Group Calls with respect to transport.

[R-6.7.3-002] The MCPTT Service shall provide a mechanism to establish, dynamically and in real-time, the relative priorities of MCPTT Private Calls and MCPTT Group Calls with respect to presentation.

[R-6.7.3-003] The MCPTT Service shall provide a mechanism to establish, dynamically and in real-time, the relative priorities of different MCPTT Private Calls with respect to transport.

[R-6.7.3-004] The MCPTT Service shall provide a mechanism to establish, dynamically and in real-time, the relative priorities of different MCPTT Private Calls with respect to presentation.

[R-6.7.3-005] The MCPTT Service shall provide a mechanism to establish, dynamically and in real-time, the relative priorities of MCPTT Private Calls and other traffic with respect to transport.

[R-6.7.3-006] The MCPTT Service shall provide a mechanism to establish, dynamically and in real-time, the relative priorities of MCPTT Private Calls and other traffic with respect to presentation.

[R-6.7.3-007] The MCPTT Service shall provide a mechanism to prioritize MCPTT Private Calls based on the priorities associated with elements of the call (e.g., service type, requesting identity, and target identity).

## 6.7.4 Private Call (without Floor control) commencement requirements

[R-6.7.4-001] The MCPTT Service shall support Call Commencement Modes for Private Calls (without Floor control), which determine the conditions under which Private Calls (without Floor control) are set up.

[R-6.7.4-002] The MCPTT Service shall provide a mechanism for an MCPTT User to cancel an MCPTT Private Call (without Floor control) prior to the call setup.

[R-6.7.4-003] The MCPTT Service shall provide a means by which an authorized MCPTT User initiates an MCPTT Private Call (without Floor control).

[R-6.7.4-004] The MCPTT Service shall provide a means by which an MCPTT UE initiates an MCPTT Private Call (without Floor control) to any MCPTT User for which the MCPTT UE's current MCPTT User is authorized.

[R-6.7.4-005] The MCPTT Service shall provide a means by which an MCPTT User initiates a Manual Commencement Private Call (without Floor control) to any MCPTT User for which the MCPTT User is authorized.

[R-6.7.4-006] The MCPTT Service shall require that the called MCPTT User accepts a Manual Commencement Private Call (without Floor control) setup request before the call proceeds.

[R-6.7.4-007] The MCPTT Service shall provide a means for an MCPTT User to accept a Manual Commencement Private Call (without Floor control) request from another MCPTT User.

[R-6.7.4-008] The MCPTT Service shall provide a means by which an MCPTT User initiates an Automatic Commencement Private Call (without Floor control) to any MCPTT User for which the MCPTT User is authorized.

[R-6.7.4-009] The MCPTT UE shall support automatic commencement mode and manual commencement mode for Private Calls (without Floor control).

[R-6.7.4-010] The MCPTT Service shall provide a manual commencement mode countermand by which an authorized MCPTT User may request that the invited MCPTT UE answers automatically.

[R-6.7.4-011] The MCPTT Service shall provide a means by which the calling authorized MCPTT User is notified the called MCPTT User received the Private Call (without Floor control) request.

[R-6.7.4-012] The MCPTT Service shall require that the called MCPTT UE acknowledge receipt of an Automatic Commencement Private Call (without Floor control) setup request before the audio transmission proceeds.

## 6.7.5 Private Call (without Floor control) termination

[R-6.7.5-001] The MCPTT Service shall provide a mechanism for an MCPTT User to reject an MCPTT Private Call (without Floor control).

[R-6.7.5-002] The MCPTT Service shall provide a means by which an authorized MCPTT User ignores a Manual Commencement Private Call (without Floor control) request from another MCPTT User.

NOTE: Ignoring a Manual Commencement Private Call (without Floor control) results in no indication of the reason for call failure being sent to the calling MCPTT User.

[R-6.7.5-003] The MCPTT Service shall provide a means by which an MCPTT User ends a Private Call (without Floor control) in which the MCPTT User is a Participant.

## 6.7.6 Call back request requirements

[R-6.7.6-001] The MCPTT Service shall provide a mechanism (i.e., MCPTT Private Call call back request) for the calling party of an MCPTT Private Call to request that the called party (at earliest convenience) place a call to the calling party.

[R-6.7.6-002] The MCPTT Service shall provide a mechanism for the calling party of an MCPTT Private Call to assign an urgency indication (i.e., low, normal, urgent) to any call back request.

[R-6.7.6-003] The MCPTT Service shall provide an MCPTT UE receiving an MCPTT Private Call call back request with an indication of the assigned call back urgency assigned by the calling party.

[R-6.7.6-004] The MCPTT Service shall provide a mechanism for an MCPTT User to cancel a call back request.

[R-6.7.6-005] The MCPTT Service shall provide an MCPTT UE receiving an MCPTT Private Call call back request with an indication of which MCPTT User called and when.

## 6.8 MCPTT priority requirements

### 6.8.1 General

[R-6.8.1-001] The MCPTT Service shall support multiple MCPTT Application priorities which are mapped to EPS priority levels, based on network operator policy.

[R-6.8.1-002] The MCPTT Service shall provide an access control mechanism to support multiple Access Priorities to prioritize MCPTT MO call initiation attempts, depending on their access priorities.

[R-6.8.1-003] MCPTT Service shall support multiple pre-emptive priorities.

[R-6.8.1-004] The MCPTT Service shall provide a mechanism for MCPTT Administrators to create, a pre-emption hierarchy for MCPTT Group transmissions and their associated users (i.e., to facilitate local management of the service and its resources).

[R-6.8.1-005] The MCPTT Service shall support MCPTT Groups with the permission to pre-empt other MCPTT calls.

[R-6.8.1-006] In case of resource shortage a call made to a group with pre-emption permissions shall be given resources to complete this call by pre-empting lower priority calls.

NOTE: An MCPTT call that needs the use of pre-emption still needs to satisfy the call setup requirements.

[R-6.8.1-007] MCPTT Service shall support queuing and retention by priority.

[R-6.8.1-008] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to establish the priority hierarchy and characteristics of MCPTT Group transmissions.

[R-6.8.1-009] The MCPTT Service shall enable an MCPTT Administrator to prioritize MCPTT Groups in relation to other MCPTT Groups (with respect to transport and presentation).

[R-6.8.1-010] The MCPTT Service shall enable an MCPTT Administrator to set the priority for a subset of a Mission Critical Organization's MCPTT Groups relative to other subsets of a Mission Critical Organization's MCPTT Groups subordinate to the MCPTT Administrator's authority.

[R-6.8.1-011] When determining priority for an MCPTT call, the MCPTT Service shall use the MCPTT User/Participant's attributes (e.g., first/second responder, supervisor, dispatcher, on/off duty) and the MCPTT Group's attributes (e.g., type of group, owning organization of the group, MCPTT Emergency, Imminent Peril).

[R-6.8.1-012] When determining priority for an MCPTT transmission, the MCPTT Service shall use the MCPTT User/Participant's attributes (e.g., first/second responder, supervisor, dispatcher, on/off duty) and the MCPTT Group's attributes (e.g., type of group, owning agency of the group, MCPTT Emergency, Imminent Peril).

[R-6.8.1-013] The MCPTT Service shall provide a means for the attributes used for determining the priority for MCPTT Users and Groups to influence the Priority and QoS for all MCPTT UEs associated with the MCPTT User.

[R-6.8.1-014] Based on the attributes used for determining the priority for MCPTT Users and Groups, the MCPTT Service shall provide consistent and deterministic priority for all MCPTT Users within their Primary MCPTT System.

[R-6.8.1-015] Based on the attributes used for determining the priority for MCPTT Users and Groups, subject to roaming capabilities and operator agreement, the MCPTT Service shall provide consistent and deterministic priority for all MCPTT Users that roam into Partner MCPTT Systems.

[R-6.8.1-016] The MCPTT Service shall provide a means for an MCPTT User to monitor the attributes used for determining priority of his calls and transmissions.

[R-6.8.1-017] The MCPTT Service shall provide a means for an authorized MCPTT User to monitor and affect a change of the attributes used for determining the priority of another MCPTT User's calls and transmissions.

### 6.8.2 EPS access controls

[R-6.8.2-001] The EPS shall, subject to operator policy, provide a means for the MCPTT Service to influence the modification of the LTE access parameters used by the network to admit MCPTT UEs within a defined area.

NOTE: It is believed that the existing UE network access mechanisms could be utilized to meet the above requirement.

### 6.8.3 EPS admission controls

[R-6.8.3-001] The EPS shall, subject to operator policy, provide a means for the MCPTT Service to influence the selection and/or modification of admission and retention controls for the bearers assigned or about to be assigned to an MCPTT UE based on the MCPTT User's and MCPTT Group attributes used for the priority determination.

NOTE: It is believed that the existing EPS mechanisms for network priority and QoS could be utilized to meet the above requirement.

### 6.8.4 EPS scheduling controls

[R-6.8.4-001] The EPS shall, subject to operator policy, provide a means for the MCPTT Service to influence the selection and/or modification of the bearer scheduling controls for the bearers assigned or about to be assigned to an MCPTT UE based on the MCPTT User's and MCPTT Group attributes used for the priority determination.

NOTE: It is believed that the existing EPS mechanisms for network priority and QoS could be utilized to meet the above requirement.

### 6.8.5 UE access controls

[R-6.8.5-001] The MCPTT Service shall allow the MCPTT UE to temporarily modify selected LTE access parameters, according to configuration established by an MCPTT Administrator in agreement with the operator's policy.

NOTE: It is believed that the existing network access mechanisms, e.g., ACDC (see 3GPP TS 22.011 [13] and 3GPP TS 23.122 [14]), could be utilized to meet the above requirement.

### 6.8.6 Application layer priorities

#### 6.8.6.1 Overview

Dispatchers from different critical communication organizations access the same networks and network resources. Depending on the event, the priority is given to an organization and/or a group rather than to another. For instance, in case of a fire priority is given to the fire brigades dealing with it, while in case of a criminal arrest priority is given to the police officers in charge of the arrest.

#### 6.8.6.2 Requirements

[R-6.8.6.2-001] The MCPTT system shall be able to give application priorities to each call according to the event in addition to the priority given according to groups.

[R-6.8.6.2-002] The EPS shall inform the MCPTT system if a new MCPTT call can not be set up.

[R-6.8.6.2-003] The MCPTT system shall assign to each call:

- an application layer pre-emption capability;
- a capability to be pre-empted; and
- an application layer priority value.

[R-6.8.6.2-004] The MCPTT system may stop already established MCPTT calls with the capability to be pre-empted and a lower application layer priority to allow a new MCPTT call with pre-emption capability enabled for pre-emption to be established.

[R-6.8.6.2-005] If there are no MCPTT calls with the capability to be pre-empted, the MCPTT calls with the lowest application layer priorities may be terminated, even if the MCPTT calls are set as not pre-emptable.

[R-6.8.6.2-006] There shall be at least 8 and preferably 30 configurable levels of priority.

## 6.8.7 Call types based on priorities

### 6.8.7.1 MCPTT Emergency Group Call requirements

[R-6.8.7.1-001] The MCPTT Service shall be capable of requesting increased priority for all Participants of an MCPTT Emergency Group Call.

[R-6.8.7.1-002] The MCPTT Service may inform affiliated group members that an MCPTT Emergency Group Call was requested but resources were not available for the call to be granted.

[R-6.8.7.1-003] The MCPTT Service shall provide a mechanism for an MCPTT Emergency Group Call to transmit to a temporary MCPTT Group created by a preconfigured User Regroup operation.

NOTE: This type of MCPTT Emergency Group Call could be used by MCPTT Users who need to communicate urgently to specific other MCPTT Users within a predefined radius of their current Location.

[R-6.8.7.1-004] The MCPTT Service shall ensure that if there is an MCPTT Emergency Group Call on one of the MCPTT Groups that an MCPTT User is affiliated to, but that user is already in a Private Call (without Floor control), that the MCPTT User automatically hears the MCPTT Emergency Group Call.

### 6.8.7.2 MCPTT Emergency Private Call (with Floor control) requirements

[R-6.8.7.2-001] The MCPTT Service shall ensure that MCPTT Emergency Private Calls (with Floor control) have the highest priority over all other MCPTT Private Calls.

[R-6.8.7.2-002] The MCPTT Service shall be capable of requesting increased priority for the Participants of an MCPTT Emergency Private Call.

[R-6.8.7.2-003] The MCPTT Service shall be capable of changing a Private Call (with Floor control) in progress to an MCPTT Emergency Private Call (with Floor control).

[R-6.8.7.2-004] MCPTT Emergency Private Calls (with Floor control), including their content and signalling, shall have pre-emptive priority over all other types of MCPTT calls, except System Calls, MCPTT Emergency Group Calls and other MCPTT Emergency Private Calls (with Floor control).

### 6.8.7.3 Imminent Peril group call requirements

[R-6.8.7.3-001] The MCPTT Service shall be capable of requesting increased priority for all Participants of an Imminent Peril group call.

[R-6.8.7.3-002] The MCPTT Service shall maintain knowledge of the Affiliated MCPTT Group Member(s) that initiated the Imminent Peril group call.

[R-6.8.7.3-003] The MCPTT Service shall maintain an In-progress Imminent Peril condition for a group from the time the initial Imminent Peril group call was requested until the In-progress Imminent Peril condition is cancelled.

**Editor's Note: Whether imminent peril and MCPTT Emergency Group Calls can be generalized is FFS.**

### 6.8.7.4 MCPTT Emergency Alert

#### 6.8.7.4.1 Requirements

[R-6.8.7.4.1-001] The MCPTT Service may allow MCPTT UEs that are unauthorized, not registered, or authenticated to activate the MCPTT Emergency Alert capability.

[R-6.8.7.4.1-002] The MCPTT User shall be notified that the MCPTT Emergency Alert was received by the MCPTT Service.

[R-6.8.7.4.1-003] The MCPTT Service shall be configurable on how the user is notified (e.g., visual, audio).

[R-6.8.7.4.1-004] The MCPTT Service shall maintain knowledge of the MCPTT Emergency State of the MCPTT UE, until cancelled.

[R-6.8.7.4.1-005] The MCPTT Service shall inform an MCPTT UE of active MCPTT Emergency Alerts after successful registration/authentication with the MCPTT Service.

[R-6.8.7.4.1-006] The MCPTT Service shall provide a mechanism for an MCPTT Emergency Alert to transmit to a temporary MCPTT Group created by a preconfigured User Regroup operation.

NOTE: This type of MCPTT Emergency Alert could be used by MCPTT Users who need to communicate urgently to specific other MCPTT Users within a predefined radius of their current Location.

#### 6.8.7.4.2 MCPTT Emergency Alert cancellation requirements

[R-6.8.7.4.2-001] The MCPTT Service shall allow authorized users to cancel any MCPTT UE's MCPTT Emergency Alert from the system.

[R-6.8.7.4.2-002] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to authorize a user to cancel, from the system, an MCPTT Emergency Alert initiated by another MCPTT User.

## 6.9 IDs and aliases

[R-6.9-001] The MCPTT Service shall provide a mechanism for permanent and temporary assignment of IDs and aliases.

[R-6.9-002] The MCPTT Service shall provide a mechanism for the enforcement of uniqueness of IDs and aliases.

[R-6.9-003] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure IDs and aliases.

[R-6.9-004] The MCPTT Service shall provide the User ID and /or associated aliases, the identity of the Selected MCPTT Group, and, if available, the identity of the Mission Critical Organization name of the transmitting MCPTT User to all MCPTT UEs that are receiving for display by each MCPTT UE.

## 6.10 User Profile management

[R-6.10-001] The MCPTT Service shall be able to dynamically modify one or more pieces of information within the MCPTT User Profile (e.g., the list of MCPTT Groups for which the user has access credentials) while in use by the MCPTT User.

[R-6.10-002] The MCPTT Service shall provide a means by which an MCPTT Administrator designates that new or updated MCPTT User Profiles are to be installed at the MCPTT UE for immediate use by the MCPTT User.

[R-6.10-003] The MCPTT Service shall provide a means by which an MCPTT Administrator designates a particular time and date when new or updated MCPTT User Profiles are to be installed at the MCPTT UE for use by the MCPTT User.

[R-6.10-004] The MCPTT User Profile shall be construed to be sensitive user information and shall be provided end-to-end confidentiality when transferred between the MCPTT Service and MCPTT UE.

## 6.11 Support for multiple devices

[R-6.11-001] The MCPTT Service shall provide a notification to the MCPTT User if the MCPTT User is already logged on to another MCPTT UE.

[R-6.11-002] The MCPTT Service shall provide the mechanisms to allow an MCPTT User to log off remotely from other MCPTT UEs.

[R-6.11-003] The MCPTT Service shall provide the mechanism to allow an authorized MCPTT User to remotely log off another MCPTT User from an MCPTT UE.

## 6.12 Location

[R-6.12-001] The MCPTT Service shall provide Location information of the transmitting MCPTT UE to receiving MCPTT UEs subject to privacy restrictions.

[R-6.12-002] The MCPTT Service shall support conveyance of Location information provided by 3GPP/LTE location services.

[R-6.12-003] The MCPTT Service shall provide a means for an authorized MCPTT User to restrict the dissemination of his Location information.

[R-6.12-004] The MCPTT Service shall provide end-to-end confidentiality of Location information.

[R-6.12-005] The MCPTT Service shall provide authentication of messages carrying Location information.

[R-6.12-006] The MCPTT Service shall provide a means for an authorized MCPTT User to activate a one-time Location information report of an MCPTT User and periodic Location information update reports of an MCPTT User.

[R-6.12-007] The MCPTT Service shall provide a means for an authorized MCPTT User to deactivate periodic Location information update report of an MCPTT User.

## 6.13 Security

### 6.13.1 Overview

Security covers areas designed to protect the confidentiality, integrity, and availability of information that is processed, stored, and transmitted. The security requirements listed here cover the areas of cryptographic protocols, authentication, access control, and regulatory issues.

### 6.13.2 Cryptographic protocols

[R-6.13.2-001] The MCPTT Service shall employ open cryptographic standards, subject to applicable local policy (e.g., Federal Information Processing Standards (FIPS) 140-2).

[R-6.13.2-002] The MCPTT Service shall allow for update to new cryptographic operations and methods without obsoleting existing operations and methods, or requiring upgrade of all user equipment simultaneously.

[R-6.13.2-003] The MCPTT Service shall allow for the coexistence of a multiplicity of cryptographic suites.

NOTE 1: A "cryptographic suite" is a consistent collection of cryptographic operations (e.g., encryption and message authentication) spanning the totality of required cryptographic operations for MCPTT. That is, if MCPTT requires a stream cipher, a message authentication code, and a secure hash, then counter-mode AES-256, CMAC with AES-256 as an underlying cipher, and SHA-512 would constitute a cryptographic suite for MCPTT.

NOTE 2: The definition and identification of cryptographic suites and algorithms need not all be within the scope of 3GPP.

### 6.13.3 Authentication

[R-6.13.3-001] The MCPTT Service shall provide a means by which an MCPTT UE can require authentication of the MCPTT Service.

### 6.13.4 Access control

[R-6.13.4-001] The MCPTT Service shall support suspending or disabling of access from an MCPTT UE or an MCPTT User to the MCPTT Service.

[R-6.13.4-002] An MCPTT User who has a profile that has been deleted or suspended shall be prevented from using that User Profile to access the MCPTT Service.

[R-6.13.4-003] The MCPTT Service shall provide a mechanism to temporarily disable an MCPTT UE remotely by the MCPTT Administrator or an authorized MCPTT User.

[R-6.13.4-004] The MCPTT Service shall only allow a user to affiliate to or select an enabled MCPTT Group (i.e., not disabled).

[R-6.13.4-005] A temporarily disabled MCPTT UE, which has limited access capability per Mission Critical Organization policy, shall be able to be re-enabled by the MCPTT Administrator or an authorized MCPTT User.

[R-6.13.4-006] The MCPTT Service shall provide a mechanism to re-enable a temporarily disabled MCPTT UE by the MCPTT Administrator or an authorized MCPTT User.

[R-6.13.4-007] The MCPTT Service shall provide a mechanism to permanently disable an MCPTT UE by the MCPTT Administrator or an authorized MCPTT User.

[R-6.13.4-008] The permanently disabled MCPTT UE shall remove all MCPTT User Profiles stored in the MCPTT UE.

[R-6.13.4-009] The permanently disabled MCPTT UE shall have no access to MCPTT Services.

[R-6.13.4-010] The security solution for the MCPTT Service shall minimize the impact of a compromised MCPTT UE on other MCPTT UEs.

## 6.13.5 Regulatory issues

[R-6.13.5-001] The MCPTT Service shall support lawful interception.

## 6.14 Interactions for MCPTT Group Calls and MCPTT Private Calls

[R-6.14-001] The MCPTT Service shall allow an MCPTT UE to be receiving and transmitting in one MCPTT Private Call (without Floor control) while simultaneously receiving transmissions from other MCPTT Group calls.

[R-6.14-002] The MCPTT Service shall allow an MCPTT UE to be receiving and transmitting in one MCPTT Private Call (without Floor control) while simultaneously receiving transmissions from other MCPTT Private Calls (with Floor control).

[R-6.14-003] The MCPTT Service shall only allow an MCPTT User to participate in one MCPTT Private Call (without Floor control) at a time.

## 6.15 Audio MCPTT call performance

### 6.15.1 General overview

Meeting the KPIs defined in the following subclauses is based on a number of factors, including the selection of appropriate protocols, minimizing messaging, the backhaul technology used, and appropriate configuration of the deployed network. The corresponding requirements are intended to convey the resulting KPIs when all of those factors are taken into account. For example, where there is significant backhaul delay, that delay is expected to be added to the KPIs.

### 6.15.2 General requirements

[R-6.15.2-001] The architecture and protocols providing the MCPTT Service shall be designed in a way to eventually allow a deployed network to meet the KPIs specified hereafter (subclause 6.15.3.2 and subclause 6.15.4.2).



## 6.15.3 MCPTT access time and mouth-to-ear latency

### 6.15.3.1 General overview

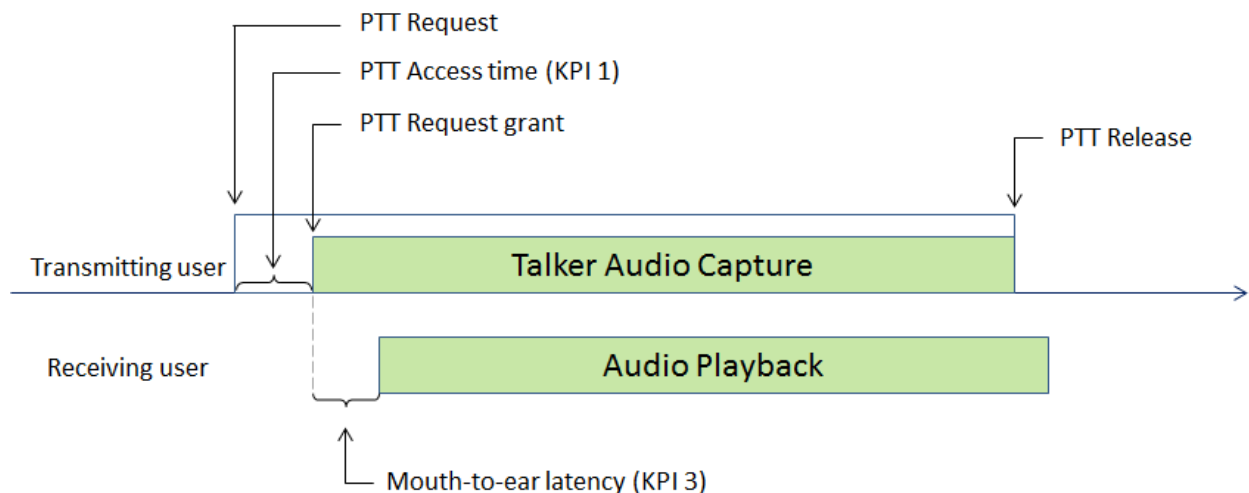
For MCPTT Users, one of the most important performance criteria is the MCPTT Access time (KPI 1). The MCPTT Access time is defined as the time between when an MCPTT User request to speak (normally by pressing the MCPTT control on the MCPTT UE) and when this user gets a signal to start speaking. This time does not include confirmations from receiving users.

The MCPTT Access time (KPI 1) does not include the time for an MCPTT User to affiliate to the group. This is a common scenario within public safety, meaning that affiliations to MCPTT Groups are long lived during several working hours. KPI 1 is applicable in both an MCPTT Group call setup request and subsequent MCPTT Requests that are part of the same call. KPI 1 for subsequent MCPTT Requests might take a slightly shorter time than the first MCPTT setup request of the same call due to its potential need of resource allocation in terms of bearer establishment. However from an end user perspective there is no need to differentiate required performance for an MCPTT Group call setup request and subsequent MCPTT Requests.

The End-to-end MCPTT Access time (KPI 2) is defined as the time between when an MCPTT User requests to speak (normally by pressing the MCPTT control on the MCPTT UE) and when this user gets a signal to start speaking, including MCPTT call establishment (if applicable) and possibly acknowledgement from first receiving user before voice can be transmitted. Group calls can be set up with or without acknowledgements from receiving users. A typical case for the End-to-end MCPTT Access time including acknowledgement is an MCPTT Private Call (with Floor control) request where the receiving user's client accepts the call automatically.

**NOTE:** The End-to-end MCPTT Access time (KPI 2) is not applicable for an MCPTT Group transmission call setup when no acknowledgement is requested from any Affiliated MCPTT Group Member.

The Mouth-to-ear latency (KPI 3) is the time between an utterance by the transmitting user, and the playback of the utterance at the receiving user's speaker. Figure 6.15.3.1.1 illustrates the MCPTT Access time and Mouth-to-ear latency.



**Figure 6.15.3.1.1: Illustration of MCPTT access time and mouth-to-ear latency**

### 6.15.3.2 Requirements

[R-6.15.3.2-001] KPI 1, KPI 2, and KPI 3 should be measured where there is negligible backhaul delay.

[R-6.15.3.2-002] The MCPTT Service shall provide the MCPTT Access time and Mouth-to-ear latency specified in this subclause to all MCPTT Users related to an MCPTT call regardless of call type (e.g., group, Private Call), group size and/or user density.

**NOTE:** This ensures that all MCPTT Users experience the same performance regardless of whether the audio is transferred over unicast or multicast delivery.

[R-6.15.3.2-003] The MCPTT Service shall be capable of providing the performance specified herein for all Affiliated MCPTT Group Members in the Group Call when there is not a transcoder in the bearer path.

[R-6.15.3.2-004] The MCPTT Service shall be capable of providing the performance specified herein for all Participants in a Private Call when there is not a transcoder in the bearer path.

[R-6.15.3.2-005] The KPIs defined in this subclause shall apply in an LTE network under traffic load not exceeding 70% of each network nodes capacity.

[R-6.15.3.2-006] On networks with QOS services, the KPIs defined in this subclause shall apply when the total sector loading of the serving sector by MCPTT Users with equal or greater priority than the subject MCPTT User is less than 70%.

[R-6.15.3.2-007] The KPIs defined in this subclause shall apply to group calls when the transmitting MCPTT User is connected to the MCPTT Service and has selected an MCPTT Group.

[R-6.15.3.2-008] The KPIs defined in this subclause shall apply to group calls when the receiving MCPTT User is connected to the MCPTT Service and affiliated with the MCPTT Group.

[R-6.15.3.2-009] The KPIs defined in this subclause shall apply to Automatic Commencement Private Calls when both the transmitting and receiving MCPTT Users are connected to the MCPTT Service.

[R-6.15.3.2-010] The KPIs, except KPI 2, defined in this subclause shall apply when the call under consideration is set up without acknowledgement from the receiving MCPTT UEs.

[R-6.15.3.2-011] When there are transcoding functions in the bearer path of the MCPTT Service, the performance provided by the MCPTT Service shall be no more than 40 ms greater than the performance specified herein when there are no transcoding functions in the bearer path.

[R-6.15.3.2-012] The MCPTT Service shall provide an MCPTT Access time (KPI 1) less than 300 ms for 95% of all MCPTT Request.

[R-6.15.3.2-013] For MCPTT Emergency Group Calls and Imminent Peril Calls the MCPTT Service shall provide an MCPTT Access time (KPI 1) less than 300 ms for 99% of all MCPTT Requests.

[R-6.15.3.2-014] The MCPTT Service shall provide an End-to-end MCPTT Access time (KPI 2) less than 1000 ms for users under coverage of the same network when the MCPTT Group call has not been established prior to the initiation of the MCPTT Request.

[R-6.15.3.2-015] The MCPTT Service shall provide a Mouth-to-ear latency (KPI 3) that is less than 300 ms for 95% of all voice bursts.

[R-6.15.3.2-016] There shall be no (0 ms) initial lost audio at receiving user.

[R-6.15.3.2-017] There shall be no (0 ms) trailing lost audio at the end of the voice burst at receiving user.

## 6.15.4 Late call entry performance

### 6.15.4.1 General overview

An MCPTT User is able to join or leave already ongoing MCPTT Group calls. Late call entry is the activity when an Affiliated MCPTT Group Member joins an MCPTT Group call in which other Affiliated MCPTT Group Members are already active. The Late call entry time (KPI 4) is the time to enter an ongoing MCPTT Group call measured from the time that a user decides to monitor such an MCPTT Group Call, to the time when the MCPTT UE's speaker starts to play the audio. The performance requirements for Late call entry time only applies to when there is ongoing voice transmitted at the time the MCPTT User joins the call.

In a Late call entry there might be an initial lost audio of the voice burst sent to the new Receiving MCPTT Group Member. Figure 6.15.4.1.1 illustrates the Late call entry time.

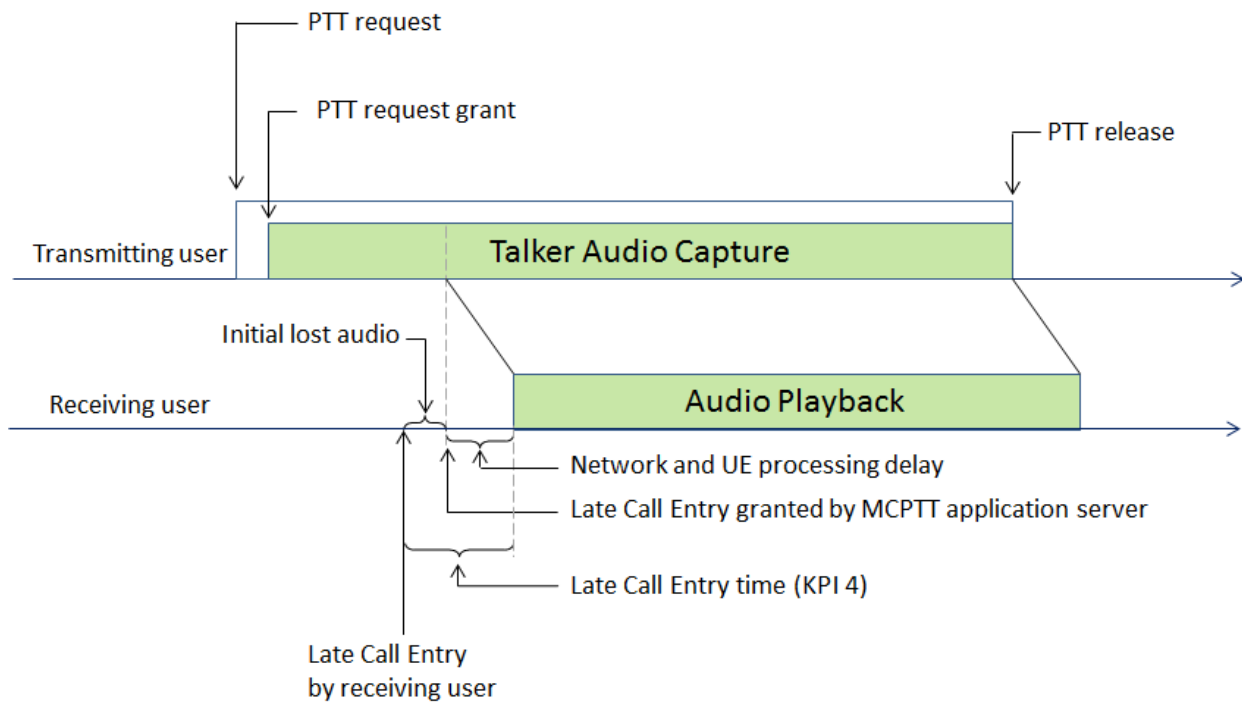


Figure 6.15.4.1.1: Illustration of Late call entry time

## 6.15.4.2 Requirements

[R-6.15.4.2-001] The KPIs in this subclause shall apply for terrestrial use only, and when users are under coverage of the same network.

[R-6.15.4.2-002] The KPIs defined in this subclause shall apply in an LTE network under traffic load not exceeding 70% of each network nodes capacity.

[R-6.15.4.2-002a] The KPIs defined in this subclause shall apply to MCPTT users who have affiliated or have been affiliated by the network and are now performing late call entry due to activity on the affiliated group.

NOTE: Cases of UE mobility, or loss of coverage and re-establishment, are not covered.

[R-6.15.4.2-003] The maximum Late call entry time (KPI 4<sup>b</sup>) for calls without application layer encryption within one MCPTT system shall be less than 150 ms for 95% of all Late call entry requests.

[R-6.15.4.2-004] The maximum Late call entry time (KPI 4<sup>b</sup>) for application layer encrypted calls within one MCPTT system should meet the requirements for KPI 4 for unencrypted calls.

[R-6.15.4.2-005] The maximum Late call entry time (KPI 4<sup>b</sup>) for application layer encrypted calls within one MCPTT system shall be less than 350 ms for 95% of all Late Call Entries into encrypted calls.

[R-6.15.4.2-006] The Late call entry Time for encrypted calls interworking with other non-LTE PTT systems should meet the requirements for KPI 4<sup>b</sup> for application layer encrypted calls within one MCPTT system.

NOTE: Additional delay deriving from the non-LTE PTT system is not included in this KPI.

[R-6.15.4.2-007] The additional Late call entry Time for an MCPTT UE late entering an application layer encrypted call interworking with other non-LTE PTT systems shall not exceed the difference in the encrypted and unencrypted Late call entry Times for the interworking system.

## 6.15.5 Audio / voice quality

[R-6.15.5-001] The MCPTT UE shall support at least one mandatory 3GPP voice codec.

NOTE 1: The UE implementation could include other non-3GPP voice codecs, e.g., TETRA voice codecs, P25 voice codecs [4].

NOTE 2: Refer to [R-6.4.9-006], which enables an MCPTT Administrator to set the preferred voice codec for an MCPTT Group.

[R-6.15.5-002] When an MCPTT call is within one MCPTT system the average MOS-LQO shall be greater than or equal to 3.0 measured according to the ITU standard Perceptual Evaluation of Speech Quality (PESQ) as defined in P.862 [7] and P.862.1 [8].

[R-6.15.5-003] When an MCPTT call involves interworking with other non-LTE PTT systems the average MOS-LQO shall be greater than or equal to 2.7 measured according to the ITU standard PESQ as defined in P.862 [7] and P.862.1 [8].

[R-6.15.5-004] When an MCPTT call is within one MCPTT system the average MOS-LQO shall be greater than or equal to 3.0 measured according to the ITU standard Perceptual Objective Listening Quality Assessment (POLQA) as defined in P.863 [9].

[R-6.15.5-005] When an MCPTT call involves interworking with other non-LTE PTT systems the average MOS LQO shall be greater than or equal to 2.7 measured according to the ITU standard POLQA as defined in P.863 [9].

## 6.15.6 Radio Resource Efficiency Performance

[R-6.15.6-001] Radio resource shall be able to be utilized in an efficient manner for the MCPTT Service up to a certain threshold, the radio resource allocation for MCPTT Service shall be on-demand basis and flexible, or in a predefined manner.

[R-6.15.6-002] The network shall be able to assign radio resource so that MCPTT resources stay below a threshold, subject to the agreement between the LTE network operator and the MCO (e.g., LTE network can be operated by MCO, or LTE network is operated by commercial operator), to be used for MCPTT Service without impacting other services.

## 6.16 Additional services for MCPTT calls

### 6.16.1 Discreet listening capabilities

[R-6.16.1-001] The MCPTT Service shall provide a mechanism for an authorized MCPTT User to receive MCPTT Group or Private Call transmissions from any MCPTT User within their authority without noticeable impact on or knowledge of the MCPTT User.

### 6.16.2 Ambient listening

#### 6.16.2.1 Overview of ambient listening

Ambient Listening is a feature that allows an authorized MCPTT User, typically a dispatcher, to cause an MCPTT UE to initiate a call which results in no indication on the MCPTT UE that it is transmitting. Ambient Listening can be initiated by an authorized MCPTT User who wants to be listened to by another remote authorized MCPTT User or can be initiated by a remote authorized MCPTT User who wants to listen to another MCPTT User. The purpose of this feature allows a dispatcher to listen to activities at the Location of the remote MCPTT UE to find out what is happening around that MCPTT UE without providing an indication to the MCPTT User or people around the user (whom the MCPTT User does not want to make aware of this action) that this is happening. This type of call is different from other types of call, as for Ambient Listening audio is only transmitted to one party in the call (i.e., a dispatcher or an authorized MCPTT User that is acting in a similar role to a dispatcher).

This is used for stolen MCPTT UEs, monitoring officers, officer safety and particular operations, where it is important that the MCPTT UE does not indicate what is happening.

## 6.16.2.2 Ambient listening requirements

### 6.16.2.2.1 General Ambient Listening requirements

[R-6.16.2.2.1-001] The MCPTT UE that is being listened to shall be the only transmitting party in the Private Call.

[R-6.16.2.2.1-002] For an MCPTT UE that is being listened to there shall be no indication on the MCPTT UE that it is transmitting.

[R-6.16.2.2.1-003] If someone attempts to turn off an MCPTT UE that is being listened to it shall appear to be turned off even while Ambient Listening continues to be active.

[R-6.16.2.2.1-004] The MCPTT Service shall terminate Ambient Listening if the MCPTT User being listened to starts to transmit in an MCPTT Private Call or an MCPTT Group Call.

NOTE: An authorized MCPTT User could initiate Discreet Listening at this point if needed.

### 6.16.2.2.2 Remotely initiated Ambient Listening requirements

[R-6.16.2.2.2-001] The MCPTT Service shall provide a mechanism to allow an MCPTT Administrator and/or an authorized user to set up Ambient Listening on a remote MCPTT UE within their authority.

[R-6.16.2.2.2-002] The MCPTT Service shall ensure that Ambient Listening triggered remotely is terminated only by the remote authorized MCPTT User (e.g., a dispatcher).

### 6.16.2.2.3 Locally initiated Ambient Listening requirements

[R-6.16.2.2.3-001] The MCPTT Service shall provide a mechanism to allow an authorized MCPTT User to use the MCPTT UE that the MCPTT User is currently using to initiate Ambient Listening to another authorized MCPTT User (e.g., a dispatcher).

[R-6.16.2.2.3-002] The MCPTT Service shall ensure that Ambient Listening triggered locally can be terminated by the MCPTT User being listened to or by the remote MCPTT Administrator and/or authorized user, who was the listening Participant.

## 6.16.3 Remotely initiated MCPTT call

### 6.16.3.1 Overview

A Remotely initiated MCPTT Call is a feature that allows an authorized user, typically a dispatcher, to cause a remote MCPTT UE to initiate a call by itself, without its user explicitly initiating the call by depressing the PTT switch. The purpose of this feature allows the dispatcher to listen to activities at the Location of the remote MCPTT UE to find out what is happening around that MCPTT UE. This feature is also known as "Remote Unit Monitoring" in P25 systems.

There are two typical use cases for this feature.

The first one is the case where a user could have been incapacitated. This could be both accidentally, say a traffic accident, or deliberately, for example a violent attack. In both cases it would be necessary to remotely open the microphone of the MCPTT UE in order to allow another user or a group of users to listen to what is happening to prepare assistance. The communication that is set up is either a Private Call or a Group Call, and the call could optionally be visible to the remote MCPTT UE's user.

The second one is the case of a stolen MCPTT UE. Here it is just necessary to activate the radio so that a dispatcher can listen to any background noise or speech in order to make an analysis of the situation. In this situation, the initiation of the call from the remote MCPTT UE, typically a Private Call in that case, is not visible by that MCPTT UE's user.

Other use cases, such as undercover operations, discreet surveillance of users or investigations, could exist depending on the missions of the critical communications users and on legislations.

The behaviour of the remotely initiated Call is not different from a normal call initiated by the local user. The same rules for resource allocation and interactions with other services apply, but the initiator of the feature can have the

capability to request a pre-emptive or high priority for that Call to ensure it is set up even in case of resource congestion or to limit disturbance by other services.

### 6.16.3.2 Requirements

[R-6.16.3.2-001] The MCPTT Service shall provide a mechanism for an MCPTT Administrator and/or authorized MCPTT User to cause an MCPTT UE that is within their authority to initiate an MCPTT Private Call (with Floor control) to the MCPTT Administrator and / or authorized MCPTT User and then begin transmitting to the MCPTT Administrator or authorized MCPTT User.

[R-6.16.3.2-002] The MCPTT Service shall provide a mechanism for an MCPTT Administrator and/or authorized user to provide a notification to the user of the MCPTT UE when a remote MCPTT Private Call is initiated.

[R-6.16.3.2-003] The MCPTT Service shall provide a mechanism for an MCPTT Administrator and/or authorized user to cause an MCPTT UE that is within their authority to initiate an MCPTT Group Call and then to begin transmitting to the Affiliated MCPTT Group Members.

[R-6.16.3.2-004] The MCPTT Service shall provide a mechanism for an MCPTT Administrator and/or authorized user to provide a notification to the user of the MCPTT UE when a remote MCPTT Group call is initiated.

### 6.16.4 Recording and audit requirements

[R-6.16.4-001] The MCPTT Service shall provide a mechanism for a Mission Critical Organization to log the metadata of the MCPTT Group Calls and MCPTT Private Calls under the organization's authority.

[R-6.16.4-002] Metadata shall be logged for both the transmitting Participant and the receiving Participant(s).

[R-6.16.4-003] The MCPTT Service shall provide a mechanism for a Mission Critical Organization to record the talker audio of the MCPTT Group Calls and MCPTT Private Calls under the organization's authority.

[R-6.16.4-004] The MCPTT Service shall provide a mechanism for a Mission Critical Organization to log at least the following metadata per call: start of call time, date, MCPTT User ID, MCPTT Group ID, Location information of the transmitting Participant, end of call time, call end reason, and call type (e.g., MCPTT Emergency, regroup, private).

[R-6.16.4-005] If an MCPTT Group Call or MCPTT Private Call uses end-to-end confidentiality, the MCPTT Service shall provide a mechanism for a Mission Critical Organization to maintain the end-to-end confidentiality when the MCPTT Group Call or MCPTT Private Call is logged.

[R-6.16.4-006] The MCPTT Service shall provide a mechanism for a Mission Critical Organization to log the metadata of non-call related user activities under the agency's authority.

[R-6.16.4-007] The MCPTT Service shall provide a mechanism for a Mission Critical Organization to log at least the following non-call activity types: MCPTT Emergency Alert, MCPTT Emergency Alert cancellation, In-progress Emergency cancellation, registration state change, overridden event, user remote logout, changing another user's affiliations, affiliation change, and change of Selected MCPTT Group.

[R-6.16.4-008] The MCPTT Service shall provide a mechanism for a Mission Critical Organization to log at least the following metadata per non-call activity: time, date, MCPTT User identity, and activity type. The following metadata should be logged if applicable to the activity type: Group ID, Location information of the MCPTT User, affiliation list, target User ID and success/failure indication.

[R-6.16.4-009] The MCPTT Service shall provide a mechanism for a Mission Critical Organization to log metadata for all failed authorization attempts (e.g., invalid login password) by an MCPTT User.

[R-6.16.4-010] The MCPTT Service shall provide a mechanism to collect metadata for network access events (e.g., pre-emption of EPS bearer, loss of signal, failed registration attempts).

## 6.17 Interaction with telephony services

[R-6.17-001] The MCPTT Service shall provide a mechanism to allow an MCPTT Administrator to configure whether an MCPTT User using an MCPTT UE is able to make and/or receive telephony calls.

[R-6.17-002] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to configure the interaction between telephony calls and MCPTT calls for an MCPTT User.

[R-6.17-003] The MCPTT Service shall provide a mechanism for an MCPTT User authorized to use telephony services to block incoming telephony calls.

## 6.18 Interworking

### 6.18.1 Non-3GPP access

[R-6.18.1-001] Subject to security and operational constraints and limitations of the underlying access technology, the MCPTT Service shall provide a mechanism to allow IP-based non-3GPP access to the MCPTT system.

NOTE: An example of non-3GPP access is a dispatcher connecting to the system via a console.

### 6.18.2 Interworking between MCPTT systems

[R-6.18.2-001] An MCPTT Service shall provide mechanisms to allow an MCPTT User to operate in a Partner MCPTT System, subject to authorization from both the Partner and the Primary MCPTT Systems of the MCPTT User.

[R-6.18.2-002] The authentication of an MCPTT User with an MCPTT Service in a Partner MCPTT System shall be based on security parameters obtained from the Primary MCPTT System of the MCPTT User.

NOTE 1: This is an application layer authentication and not 3GPP network authentication.

[R-6.18.2-003] Any functionality needed from the visited PLMN network is subject to roaming capabilities and operator agreement.

[R-6.18.2-004] An MCPTT Service shall provide mechanisms to allow an MCPTT User on the Primary MCPTT System to affiliate to an MCPTT Group from a Partner MCPTT System, subject to authorization from the Primary MCPTT System and the Partner MCPTT System where the MCPTT Group is defined.

[R-6.18.2-005] An MCPTT Service shall provide mechanisms to allow a roaming MCPTT User to affiliate to an MCPTT Group from the Partner MCPTT System, subject to authorization from the Partner MCPTT System where the MCPTT Group is defined.

[R-6.18.2-006] An MCPTT Service shall provide mechanisms to allow an MCPTT User that receives service from a Partner MCPTT System to affiliate to an MCPTT Group from another Partner MCPTT System, subject to authorization from the Partner MCPTT System where the MCPTT Group is defined.

NOTE 2: It is assumed that once affiliation from a User to a Group is successful, subsequent communication within that Group are available to the User.

[R-6.18.2-007] End to end security of an MCPTT Group communication (including in Partner MCPTT Systems) shall be based on parameters obtained from the MCPTT system where the MCPTT Group is defined.

### 6.18.3 Interworking with non-LTE PTT systems

#### 6.18.3.1 Overview

Mission critical users currently employ a wide range of narrowband mission critical Push To Talk services. Project 25 (governed by the TIA-102 standards) and TETRA (governed by ETSI standards) are digital public safety grade PTT systems. In addition, "legacy" or "conventional FM" systems are common throughout the world. These systems provide PTT and related services that are analogous to those provided by MCPTT, including group calls, Private Calls, broadcast calls, dynamic group management and other services.

The MCPTT Service is intended to interwork with these non-LTE PTT systems.

### 6.18.3.2 Project 25

[R-6.18.3.2-001] The MCPTT Service shall enable interworking with non-LTE PTT Systems that are compliant with the TIA-102 (P25) standards.

[R-6.18.3.2-002] Interworking between the MCPTT Service and P25 shall be capable of interworking with a multiplicity of independently administered Project 25 Radio Frequency Subsystems (RFSS).

[R-6.18.3.2-003] Interworking between the MCPTT Service and P25 shall support interoperable MCPTT Group Calls between MCPTT Users and P25 subscriber units and consoles.

[R-6.18.3.2-004] Interworking between the MCPTT Service and P25 shall support interoperable MCPTT Emergency Group Calls and P25 emergency calls.

[R-6.18.3.2-005] Interworking between the MCPTT Service and P25 shall support end-to-end encrypted MCPTT Group Calls between MCPTT Users and P25 subscriber units and consoles.

[R-6.18.3.2-006] Interworking between the MCPTT Service and P25 shall provide a means for an authorized user to initiate an override of a PTT Group call between MCPTT Users and P25 subscriber units and consoles.

[R-6.18.3.2-007] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to authorize an MCPTT User to be able to initiate an override of a PTT Group call between MCPTT Users and P25 subscriber units and consoles.

[R-6.18.3.2-008] Interworking between the MCPTT Service and P25 shall provide a means for an authorized P25 subscriber units and consoles to initiate an override of a PTT Group call between MCPTT Users and P25 subscriber units and consoles.

[R-6.18.3.2-009] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to authorize a P25 subscriber unit or P25 console to be able to initiate an override of a PTT Group call between MCPTT Users and P25 subscriber units and consoles.

[R-6.18.3.2-010] Interworking between the MCPTT Service and P25 shall support Group Regrouping that includes both MCPTT Groups and P25 groups.

[R-6.18.3.2-011] Interworking between the MCPTT Service and P25 shall support User Regrouping that includes both MCPTT Users and P25 subscriber units.

[R-6.18.3.2-012] Interworking between the MCPTT Service and P25 shall support interworking of Group-Broadcast Group Calls and P25 announcement group calls.

[R-6.18.3.2-013] Interworking between the MCPTT Service and P25 shall support interoperable User IDs and P25 subscriber IDs.

[R-6.18.3.2-014] Interworking between the MCPTT Service and P25 shall support interoperable PTT Private Calls (with Floor control) between an MCPTT User and a P25 subscriber unit or console.

[R-6.18.3.2-015] Interworking between the MCPTT Service and P25 shall provide a mechanism to reconcile the Private Call (with Floor control) commencement mode between an MCPTT User and a P25 subscriber unit or console.

[R-6.18.3.2-016] Interworking between the MCPTT Service and P25 shall support end-to-end encrypted PTT Private Calls (with Floor control) between an MCPTT User and a P25 subscriber unit or console.

[R-6.18.3.2-017] Interworking between the MCPTT Service and P25 shall support a means of reconciling codecs between interoperable calls.

[R-6.18.3.2-018] Interworking between the MCPTT Service and P25 shall support conveyance of Losing audio from P25 subscriber units and consoles to authorized MCPTT Users.

[R-6.18.3.2-019] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to authorize MCPTT Users to be able to receive Losing audio from P25 subscribers units and consoles.

[R-6.18.3.2-020] For Private Calls (with Floor control) interworking between the MCPTT Service and non-LTE PTT systems that do not support Private Call override (e.g., Project 25 Phase 1 systems), the Participant attempting to override shall be notified that the override can not be accomplished.



[R-6.18.3.2-021] For Private Call (with Floor control) interworking, between the MCPTT Service and non-LTE PTT systems that do support Private Call override (e.g., Project 25 Phase 2 systems), the MCPTT Service shall provide a mechanism for Participants to override an active MCPTT transmission of a transmitting Participant when the priority level of the overriding Participant is ranked higher than the priority level of the transmitting Participant.

### 6.18.3.3 TETRA

[R-6.18.3.3-001] The MCPTT Service shall enable interworking with non-LTE PTT Systems that are compliant with the ETSI TETRA standards.

[R-6.18.3.3-002] Interworking between the MCPTT Service and TETRA shall be capable of interworking with a multiplicity of independently administered TETRA systems (Switching and management Infrastructures).

[R-6.18.3.3-003] Interworking between the MCPTT Service and TETRA shall support interoperable MCPTT Group Calls between MCPTT Users and TETRA mobile stations and consoles.

[R-6.18.3.3-004] Interworking between the MCPTT Service and TETRA shall support interoperable MCPTT Emergency Group Calls and TETRA emergency calls.

[R-6.18.3.3-005] Interworking between the MCPTT Service and TETRA shall support end-to-end encrypted MCPTT Group Calls between MCPTT Users supporting the TETRA voice codec and end-to-end encryption and TETRA mobile stations and consoles.

[R-6.18.3.3-006] Interworking between the MCPTT Service and TETRA shall provide a means for an authorized user to initiate an override of a PTT Group call between MCPTT Users and TETRA mobile stations and consoles.

[R-6.18.3.3-007] Interworking between the MCPTT Service and TETRA shall provide a means for an authorized TETRA mobile station or console to initiate an override of a PTT Group call between MCPTT Users and TETRA mobile stations and consoles.

[R-6.18.3.3-008] Interworking between the MCPTT Service and TETRA shall support Group Regrouping that includes both MCPTT Groups and TETRA groups.

[R-6.18.3.3-009] Interworking between the MCPTT Service and TETRA shall support User Regrouping that includes both MCPTT Users and TETRA mobile stations.

[R-6.18.3.3-010] Interworking between the MCPTT Service and TETRA shall support interoperable User IDs and TETRA IDs.

[R-6.18.3.3-011] Interworking between the MCPTT Service and TETRA shall support interoperable PTT Private Calls between an MCPTT User and a TETRA mobile station or console.

[R-6.18.3.3-012] Interworking between the MCPTT Service and TETRA shall support end-to-end encrypted PTT Private Calls between an MCPTT User supporting TETRA codec and encryption and a TETRA mobile station or console.

[R-6.18.3.3-013] Interworking between the MCPTT Service and TETRA shall support a means of reconciling codecs between interoperable calls when not end-to-end encrypted.

[R-6.18.3.3-014] For Private Call (with Floor control) interworking, between the MCPTT Service and non-LTE PTT systems that do support Private Call override, the MCPTT Service shall provide a mechanism for Participants to override an active MCPTT transmission of a transmitting Participant when the priority level of the overriding Participant is ranked higher than the priority level of the transmitting Participant.

### 6.18.3.4 Legacy land mobile radio

[R-6.18.3.4-001] The MCPTT Service shall enable interworking with legacy Land Mobile Radio systems that are compliant with the TIA-603-D [3] Standard.

[R-6.18.3.4-002] Interworking between the MCPTT Service and TIA-603 systems shall be capable of interworking with a multiplicity of independently administered systems based on the TIA-603-D [3] Standard.

[R-6.18.3.4-003] Interworking between the MCPTT Service and TIA-603 systems shall support interoperable PTT Group calls between MCPTT Users and TIA-603 subscriber units and consoles.

[R-6.18.3.4-004] Interworking between the MCPTT Service and TIA-603 systems shall provide a mechanism for an authorized MCPTT User to initiate an override within a PTT Group call that has both MCPTT Users and TIA 603 subscriber units and consoles.

[R-6.18.3.4-005] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to authorize an MCPTT User to be able to initiate an override of a PTT Group call between MCPTT Users and TIA-603 subscriber units and consoles.

[R-6.18.3.4-006] Interworking between the MCPTT Service and TIA-603 systems shall provide a mechanism for an authorized TIA-603 subscriber unit or console to initiate an override within a PTT Group call that has both MCPTT Users and TIA 603 subscriber units and consoles.

[R-6.18.3.4-007] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to authorize a TIA-603 subscriber unit or TIA-603 console to be able to initiate an override of a PTT Group call between MCPTT Users and TIA-603 subscriber units and consoles.

[R-6.18.3.4-008] Interworking between the MCPTT Service and TIA-603 systems shall support interoperable PTT Private Calls (with Floor control) between MCPTT Users and TIA-603 subscriber units or consoles.

[R-6.18.3.4-009] Interworking between the MCPTT Service and TIA-603 systems shall support a means of reconciling codecs between interoperable calls.

[R-6.18.3.4-010] Interworking between the MCPTT Service and TIA-603 systems shall support conveyance of Losing audio from TIA 603 subscribers units and consoles to suitably privileged MCPTT Users.

[R-6.18.3.4-011] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to authorize MCPTT Users to be able to receive Losing audio from TIA-603 subscribers units and consoles.

## 6.19 MCPTT coverage extension using ProSe UE-to-Network Relays

[R-6.19-001] A ProSe-enabled UE authorized to act as a ProSe UE-to-Network Relay shall, if authorized, support the bi-directional relay of signalling (control plane) and data (user plane) between an MCPTT UE and the on-network MCPTT Service.

[R-6.19-002] A ProSe UE-to-Network Relay authorized to act as an MCPTT relay shall advertise, at the ProSe interface, those MCPTT Services (Groups) which it is currently relaying.

[R-6.19-003] An MCPTT UE which is unable to gain service from E-UTRAN shall search for ProSe UE-to-Network Relay(s) offering MCPTT Services for the affiliated MCPTT Groups of the MCPTT User.

[R-6.19-004] A ProSe UE-to-Network Relay authorized to support MCPTT coverage extension relay between an MCPTT UE and the on-network MCPTT Service shall provide a mechanism for an off-network MCPTT UE to affiliate to one or more MCPTT Groups using the on-network MCPTT Service.

[R-6.19-005] The ProSe UE-to-Network Relay that has enabled an MCPTT UE to affiliate to an MCPTT Group using the on-network MCPTT Service shall subsequently support the bi-directional relay of signalling (control plane) and data (user plane) between the MCPTT UE and the on-network MCPTT Service for that MCPTT Group.

[R-6.19-006] A ProSe UE-to-Network Relay authorized to support the bi-directional relay of signalling (control plane) and data (user plane) between an MCPTT UE and the on-network MCPTT Service shall provide a mechanism for an off-network MCPTT UE to initiate and/or receive Private Calls using the on-network MCPTT Service.

## 7 MCPTT Service requirements specific to off-network use

### 7.1 Off-network Push To Talk overview

The MCPTT Service while operating in off-network mode comprises a set or collection of functions necessary to provide Mission Critical Push To Talk over LTE (MCPTT) using a ProSe E-UTRA direct (UE-to-UE) Communication path (ProSe direct communication path) for transport. The ProSe direct communication path does not traverse the network infrastructure.

Users operating off the network are either out of network coverage (not served by E-UTRAN) (e.g., in a remote mountain area fighting a forest fire 20 miles from the nearest network) or have selected a ProSe direct communication path for MCPTT while in network coverage. MCPTT Users operating off the network need to be in ProSe direct communication range in order to communicate.

NOTE 1: While the network is likely to be a primary, reliable transport of MCPTT communications, there are many situations where MCPTT communications are needed in areas where the network is not available, or coverage is not reliable.

MCPTT Users outside of the coverage of the fixed network might be first responders in a rural area assisting in a response to a plane crash, fire fighters in a remote mountain area fighting a forest fire or police officers inside a residence responding to a domestic issue. Off-network MCPTT communications are expected to be immediately accessible to users in the absence of the network.

MCPTT Users in network coverage might be working in a confined area, such as fire fighters fighting a structure fire where direct UE-to-UE communication is more desirable and reliable. Users can communicate directly with one another without having to overcome the resistance of a building and distance to the nearest base station to communicate with other members of their team inside the building that are nearby.

To operate off the network, an MCPTT UE is capable of automatically switching to a ProSe direct communication path for use of MCPTT when detecting an off-network (out of coverage) condition. In addition a mechanism is provided for an authorized user to select (manually switch to) a ProSe direct communication path for use of off-network MCPTT communications (e.g., while in network coverage).

When operating off the network, the MCPTT Service is provided by the MCPTT application on the UE as compared to operations on the network, where the MCPTT Application on the UE interacts with an MCPTT server and the network to provide the MCPTT Service.

NOTE 2: For MCPTT UEs that have selected a ProSe E-UTRA Direct Communication path for use of MCPTT while in network coverage, signalling with the network and MCPTT Service might be available (e.g., radio resource allocation, MCPTT User Profile management updates and cryptographic key management updates), while the MCPTT User transmissions would be direct between the MCPTT UEs (e.g., not traversing the network).

The Off-Network MCPTT Service builds upon ProSe enablers to establish, maintain and terminate the signalling and communication path(s) among the off-network users. To the extent feasible, it is expected that the end user's experience is similar regardless if the MCPTT Service is used with an EPC network or based on the use of a ProSe direct communication path.

The Off-Network MCPTT Service is intended to support communication between a group of users (a group call), where each user has the ability to gain access to the permission to talk in an arbitrated manner. However, the MCPTT Service also supports Private Calls between pairs of users.

When operating off the network the MCPTT Service allows users to request the permission to talk (transmit voice/audio) and provides a deterministic mechanism to arbitrate between requests that are in contention (i.e., Floor control).

The Off-Network MCPTT Service provides a means for a user with higher priority (e.g., MCPTT Emergency condition) to override (interrupt) the current talker. The Off-Network MCPTT Service also supports a mechanism to limit the time a user talks (hold the floor) thus permitting users of the same or lower priority a chance to gain the floor.

The Off-Network MCPTT Service provides the means for a user to monitor activity on a number of separate calls and enables the user to switch focus to a chosen call. An Off-Network MCPTT Service user might join an already established MCPTT Group call (Late call entry). In addition the Off-Network MCPTT Service supports User IDs, aliases and user Location determination features.

For operation off the network (e.g., when out of network coverage), an MCPTT UE is (pre-)provisioned by an MCPTT Administrator and/or authorized user with the following in order to use MCPTT:

- a) An MCPTT User Profile associated with each of the intended MCPTT Users of the MCPTT UE that might be used for off-network operation;
  - 1) An alphanumeric identifier (with a minimum length of N3) (i.e., alias) for each MCPTT User;
  - 2) A number of off-network MCPTT Groups for use by the MCPTT User;
  - 3) An alphanumeric identifier (i. e., alias) for the authorized off-network MCPTT Groups;
  - 4) A Mission Critical Organization name if available, associated with each of the intended MCPTT Users or Administrator;
  - 5) A number of off-network MCPTT Users for Private Call for which the MCPTT User is authorized;
- b) Authentication and end to end security keys.

NOTE 3: MCPTT UEs can be provisioned for off-network use by either configuration outside of network coverage or by attaching to the network.

An MCPTT UE operating off the network is capable of transmitting the talker Location information, User ID, alias(es), off-network MCPTT Group ID, group alias and, if available, Mission Critical Organization name of the user who is talking (i.e., whose UE is transmitting) to all other users in a call including MCPTT UEs operating off the network that are late entering a call in progress.

The Off-Network MCPTT Service uses the capabilities defined in ProSe TS 22.278 [5], including the ProSe Relay capabilities defined in ProSe TS 22.278 [5] and GCSE\_LTE TS 22.468 [6].

NOTE 4: As indicated in TS 22.278 [5] use of a ProSe Direct Communication path outside of network coverage is only applicable for Public Safety ProSe enabled UEs. For non-Public Safety ProSe enabled UEs the selection of the most appropriate communication path (ProSe Communication path (direct or routed via local eNB) or EPC path) is under network control and based on operator preferences.

MCPTT Service requirements specific to off-network use are defined in clause 7. Common MCPTT service requirements defined in clause 5 apply whether the MCPTT Service is in use on the network or off the network.

## 7.2 General off-network MCPTT requirements

[R-7.2-001] In order to operate off the network using the direct communication path over E-UTRA, an MCPTT UE shall be a Public Safety ProSe-enabled UE.

[R-7.2-002] The Off-Network MCPTT Service shall make use of the ProSe capabilities related to ProSe Communication using the direct communication path between Public Safety ProSe-enabled UEs using E-UTRA as defined in TS 22.278 [5].

[R-7.2-003] The MCPTT Service shall provide a mechanism for an MCPTT Administrator and/or authorized user to pre-provision MCPTT UEs that may not be served by the network with the following in order to operate using off-network MCPTT:

- a) An MCPTT User Profile associated with each of the intended MCPTT Users of the MCPTT UE that might be used for off-network operation:
  - 1) alphanumeric identifier (i.e., Alias ID) for the authorized off-network MCPTT Groups;
  - 2) a number of off-network MCPTT Groups for use by an MCPTT User;
  - 3) a User ID associated with each of the intended MCPTT Users;

- 4) an alphanumeric identifier (with a minimum length of N3) (i.e., alias) for each User ID.
- b) authentication and end to end security keys.

NOTE: MCPTT UEs can be provisioned for off-network use by either configuration outside of network coverage or by attaching to the network.

[R-7.2-004] An MCPTT UE operating off the network shall be capable of transmitting the User ID, alias(es), off-network MCPTT Group and, if available, Mission Critical Organization name of the user who is talking (i.e., whose UE is transmitting) to all other users in the call including MCPTT UEs operating off the network that enter the call late.

[R-7.2-005] An MCPTT UE operating off the network shall be capable of transmitting the talker's Location information (i.e., whose UE is transmitting) to all other users in the call including MCPTT UEs operating off the network that enter the call late.

## 7.3 Floor control

### 7.3.1 General aspects

[R-7.3.1-001] The off-network Floor control functionality in an MCPTT Service shall determine at a point in time which off-network Participant(s) are allowed to transmit to other off-network Participants.

[R-7.3.1-002] The off-network Floor control functionality in an MCPTT Service shall determine at a point in time which received transmission(s) from off-network Participant(s) shall be presented to the receiving off-network Participant(s).

### 7.3.2 Requesting permission to transmit

[R-7.3.2-001] A Participant in an off-network MCPTT Group call, with the authority to transmit, shall be able to request to transmit to the off-network MCPTT Group.

[R-7.3.2-002] The off-network Floor control functionality shall have a mechanism for resolving simultaneous requests for permission to transmit within the same call.

[R-7.3.2-003] Following an MCPTT Request for permission to transmit, the Affiliated MCPTT Group Member that is allowed to transmit shall be given an indication that the member is allowed to transmit on the member's Selected MCPTT Group.

[R-7.3.2-004] Following an MCPTT Request for permission to transmit, an Affiliated MCPTT Group Member that is not allowed to transmit on the Selected MCPTT Group shall be given an indication that permission to transmit was rejected or queued.

[R-7.3.2-005] Following an MCPTT Private Call (with Floor control) request for permission to transmit, the MCPTT User that is allowed to transmit shall be given an indication that the user is allowed to transmit to the targeted MCPTT User.

[R-7.3.2-006] Following an MCPTT Private Call (with Floor control) request for permission to transmit, an MCPTT User that is not allowed to transmit shall be given an indication that the permission to transmit was rejected.

### 7.3.3 Override

[R-7.3.3-001] An MCPTT UE shall be pre-provisioned by an MCPTT Administrator and/or authorized user with the necessary information in order that Floor control override may operate during off-network MCPTT.

[R-7.3.3-002] The MCPTT Service shall provide a mechanism for MCPTT Administrators to create a priority hierarchy for determining what Participants, Participant types, and urgent transmission types, when operating off the network, be granted a request to override an active off-network MCPTT transmission.

[R-7.3.3-003] The priority hierarchy used for granting a request to override an active MCPTT transmission shall contain at least four (4) levels.

[R-7.3.3-004] The MCPTT Service shall provide a mechanism for Participants, to override an active MCPTT transmission of a transmitting Participant when the priority level of the overriding Participant or call type are ranked higher than the priority level of the transmitting Participant or call type.

[R-7.3.3-005] If an authorized Participant overrides an MCPTT transmission, the MCPTT Service shall provide a means of notifying the overridden Participant(s) that the transmission has been overridden.

[R-7.3.3-006] The MCPTT Service shall provide a mechanism to enable an MCPTT Administrator to configure which MCPTT Group transmission a Participant(s) receives, overriding and/or overridden for cases where an authorized Participant overrides an off-network MCPTT transmission. This mechanism, at the receiving Participant, shall also determine which transmission should be presented to the MCPTT User when an unauthorized transmission override has occurred due to a failure of transmit Floor control (e.g., due to the best effort nature of ProSe direct communication).

[R-7.3.3-007] If the MCPTT Group has been configured to only allow the overriding transmitting Participant to transmit, the MCPTT Service shall revoke the transmit permission of the overridden transmitting Participant.

[R-7.3.3-008] If the MCPTT Group has been configured to allow both overriding and overridden transmitting Participants to transmit, the MCPTT Service shall provide a mechanism for authorized receiving Participants to be able to listen to both the overriding transmission and any overridden Participant transmissions, dependent on configuration.

### 7.3.4 Terminating permission to transmit

[R-7.3.4-001] A transmitting Participant shall be able to indicate to the Off-Network MCPTT Service that the Participant no longer wants to transmit.

[R-7.3.4-002] The MCPTT Service shall provide an indication to receiving Participants that the transmitting Participant has finished transmitting.

### 7.3.5 Transmit time limit

[R-7.3.5-001] An MCPTT UE shall be pre-provisioned by an MCPTT Administrator and/or authorized user with the necessary information in order that a transmit time limit function may operate during off-network MCPTT.

[R-7.3.5-002] The MCPTT Service shall enable an MCPTT Administrator to configure the limit for the length of time that a Participant transmits from a single request to transmit.

[R-7.3.5-003] The Floor control functionality shall have a configurable limit for the length of time that a Participant transmits from a single request to transmit.

[R-7.3.5-004] The Floor control functionality shall provide an indication to the transmitting Participant that the Participant is within a configurable amount of time before his transmit time limit is reached.

[R-7.3.5-005] The Floor control functionality shall provide an indication to the transmitting Participant that the Participant's transmit time limit has been reached.

[R-7.3.5-006] The Floor control functionality shall remove the permission to transmit from the transmitting Participant when the Participant's transmit time limit has been reached.

## 7.4 Call Termination

[R-7.4-001] The MCPTT Service when operating off the network shall terminate a call after a period of inactivity.

[R-7.4-002] The MCPTT Service when operating off the network shall provide a mechanism for an MCPTT Administrator to preconfigure the inactivity timer.

[R-7.4-003] The MCPTT Service when operating off the network shall provide a mechanism for an MCPTT Administrator to preconfigure separately the limit for the total length of time of an MCPTT Group Call and an MCPTT Private Call.

[R-7.4-004] The MCPTT Service when operating off the network shall provide an indication to the Participants that the call is within a configurable amount of time before the call time limit is reached.

[R-7.4-005] The MCPTT Service when operating off the network shall provide an indication to the Participants that the call time limit has been reached.

[R-7.4-006] The MCPTT Service when operating off the network shall release the call when the call time limit has been reached.

## 7.5 Broadcast Group

[R-7.5-001] The MCPTT Service when operating off the network shall support Broadcast Group Calls.

[R-7.5-002] The MCPTT Service shall deliver an off-Network Broadcast Group Call to the members of a Broadcast Group who are within communication range, and who may be all of the MCPTT system users, or a subset thereof.

## 7.6 Dynamic group management (i.e., dynamic regrouping)

NOTE: No specific off-network MCPTT requirements for dynamic group management have been identified.

## 7.7 MCPTT priority requirements

[R-7.7-001] The Off-Network MCPTT Service shall assign to each MCPTT Group or Private Call:

- an application layer pre-emption capability;
- a capability to be pre-empted; and
- an application layer priority value.

[R-7.7-002] The Off-Network MCPTT Service shall pass these attributes to the ProSe transport layer for the purposes of prioritizing the associated user data.

[R-7.7-003] The Off-Network MCPTT Service shall support at least 8 configurable levels of priority.

## 7.8 Call types based on priorities

### 7.8.1 MCPTT Emergency Group Call requirements

[R-7.8.1-001] The Off-Network MCPTT Service shall provide a mechanism for an authorized Participant of an off-network MCPTT Group call to change the status of the off-network MCPTT Group Call in progress to an off-network MCPTT Emergency Group Call.

[R-7.8.1-002] An off-network MCPTT UE that has initiated the MCPTT Emergency Group Call shall maintain knowledge of the in progress off-network MCPTT Emergency Group Call until it is cancelled.

[R-7.8.1-003] An off-network MCPTT UE initiating an off-network MCPTT Emergency Group Call shall be capable of transmitting its User ID and an indication that it is an off-network MCPTT Emergency Group Call to all other users in the call.

### 7.8.2 MCPTT Emergency Group Call cancellation requirements

[R-7.8.2-001] An indication of the cancellation of an off-network MCPTT Emergency Call and the identity of the cancelling user shall be transmitted to Affiliated MCPTT Group Members of the off-network MCPTT Emergency Group Call.

## 7.8.3 Imminent Peril Call

### 7.8.3.1 Imminent Peril group call requirements

[R-7.8.3.1-001] The Off-Network MCPTT Service shall provide a mechanism for an Affiliated MCPTT Group Member to initiate (or join) an off-network MCPTT Group call and set (or change) the status of the call to Imminent Peril.

[R-7.8.3.1-002] If an MCPTT Group has previously been configured to be used for Imminent Peril communications by the MCPTT User, that MCPTT Group shall be used for the call.

[R-7.8.3.1-003] The MCPTT Service when operating in off-network mode shall provide a mechanism, for an authorized Participant of an in progress off-network MCPTT Group call, to change the status of the call to an off-network MCPTT Imminent Peril group call.

[R-7.8.3.1-004] The off-network MCPTT UE that has initiated an MCPTT Imminent Peril group call shall be responsible for maintaining the knowledge of the Imminent Peril status until it is cancelled.

[R-7.8.3.1-005] The Off-Network MCPTT Service shall provide a mechanism to inform and keep updated other Participants of the MCPTT Group call regarding the Imminent Peril status of the call and regarding the User ID of the MCPTT User setting the status to Imminent Peril.

### 7.8.3.2 Imminent Peril group call cancellation requirements

[R-7.8.3.2-001] An indication of the cancellation of the Imminent Peril status of an off-network MCPTT Imminent Peril group call and the User ID of the cancelling user shall be transmitted to Affiliated MCPTT Group Members of an off-network MCPTT Imminent Peril group call.

[R-7.8.3.2-002] If the Imminent Peril status of an MCPTT Imminent Peril group call is cancelled by an MCPTT User other than the user initiating the Imminent Peril status, then the Off-Network MCPTT Service shall provide a mechanism to clear the knowledge of the Imminent Peril status maintained at the UE of the initiating MCPTT User.

## 7.9 Location

[R-7.9-001] An MCPTT UE shall be capable of transmitting its Location, if known, to other MCPTT UEs when operating off the network, subject to privacy restrictions.

## 7.10 Security

[R-7.10-001] MCPTT UEs operating off the network shall be capable of protecting the confidentiality of Location and identity information conveyed to or from other MCPTT UEs.

[R-7.10-002] MCPTT UEs operating off the network shall be capable of authenticating the sender of messages carrying Location and identity information.

## 7.11 Audio MCPTT Call performance

### 7.11.1 MCPTT Access time and Mouth-to-ear latency

#### 7.11.1.1 General overview

For MCPTT Users, one of the most important performance criteria is the MCPTT Access time (KPI 1). The MCPTT Access time is defined as the time between when an MCPTT User requests to speak (normally by pressing the MCPTT control on the UE) and when this user gets a signal to start speaking. This time does not include confirmations from receiving users.

The Mouth-to-ear latency (KPI 3) is the time between an utterance by the transmitting user, and the playback of the utterance at the receiving user's speaker. Figure 7.11.1.1.1 illustrates the MCPTT Access time and Mouth-to-ear latency.



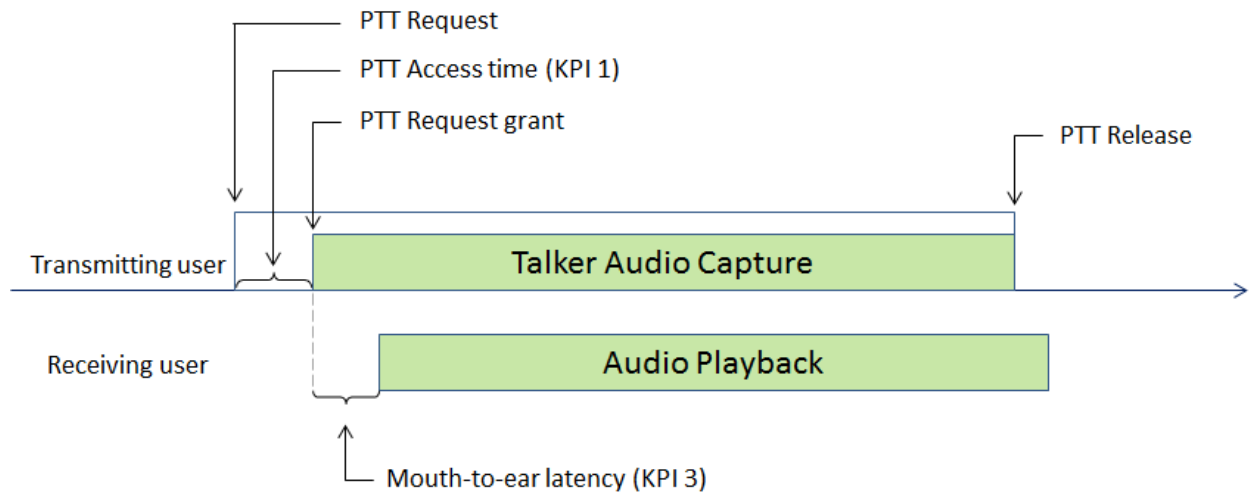


Figure 7.11.1.1-1: Illustration of MCPTT Access time and Mouth-to-ear latency

### 7.11.1.2 Requirements

NOTE: The MCPTT Access time and Mouth-to-ear latency for off-network use is FFS.

## 7.11.2 Late call entry performance

### 7.11.2.1 General overview

An MCPTT User is able to join or leave an already ongoing MCPTT Group Call. Late call entry is the activity when an Affiliated MCPTT Group Member joins an MCPTT Group Call in which other Affiliated MCPTT Group Members are already active. The Late call entry time (KPI 4) is the time to enter an ongoing MCPTT Group Call measured from the time that the user decides to monitor such an MCPTT Group Call, to the time when the UE's speaker starts to play the audio. The performance requirements for Late call entry time only applies to when there is ongoing voice transmitted at the time the MCPTT User joins the call.

In a Late call entry there might be an initial lost audio of the voice burst sent to the new Receiving MCPTT Group Member.

### 7.11.2.2 Requirements

NOTE: The Late call entry time (KPI 4) for off-network use is FFS.

## 7.11.3 Audio / Voice quality

[R-7.11.3-001] Void.

## 7.12 Off-network MCPTT operations

[R-7.12-001] Off-Network MCPTT Services shall be able to operate in the complete absence of any fixed infrastructure.

[R-7.12-002] Off-Network MCPTT Services shall only be available for authorized users.

[R-7.12-003] The MCPTT Service shall provide a mechanism for an MCPTT Administrator to authorize users for Off-Network MCPTT Services.

## 7.13 Off-network UE functionality

[R-7.13-001] An MCPTT UE shall be capable of off-network MCPTT communications and on-network MCPTT communications at the same time.

NOTE: Subclause 7A.2 in TS 22.278 specifies requirements for concurrent communications on and off the network within the same group, concurrent communications on and off the network with different groups, and concurrent communications on and off the network involving both groups and Private Calls. This concurrent communication is not defined as a ProSe relay.

[R-7.13-002] When switching from on-network to off-network operation (either manually or automatically), an MCPTT UE should attempt to notify the MCPTT Service that it is leaving the network.

[R-7.13-003] Prior to automatically going off the network an MCPTT UE should attempt to make use of suitable ProSe UE-to-Network Relay in its proximity.

[R-7.13-004] Off-network MCPTT UEs shall support a minimum number of (N8) simultaneous off-network MCPTT calls.

## 7.14 Switching to off-network MCPTT

[R-7.14-001] An MCPTT UE shall be capable of automatically switching to a ProSe direct communications path for use of MCPTT when detecting an off-network (out of coverage) condition.

[R-7.14-002] A means shall be provided for an authorized MCPTT User to be able to manually switch between on-network operation and a ProSe direct communication path for use of Off-Network MCPTT Service while in network coverage.

[R-7.14-003] Subject to operator policy and/or network authorization, a means shall be provided for an authorized MCPTT User using a Public Safety ProSe-enabled UE to be able to manually switch between the on-network operation and a ProSe direct communication path for use of Off-Network MCPTT Service while in network coverage or out of network coverage.

## 7.15 Off-network recording and audit requirements

[R-7.15-001] The Off-Network MCPTT Service shall provide a mechanism to collect metadata for MCPTT Group Calls and MCPTT Private Calls (e.g., initiating MCPTT User ID, MCPTT Group ID) and non-call activities (e.g., changing group settings) from MCPTT UEs operating in off-network mode. Metadata shall be logged for both the transmitting Participant and the receiving Participant(s).

[R-7.15-002] Upon return to on-network operation, the MCPTT Service shall provide a mechanism to retrieve call and non-call activity metadata from an MCPTT UE that has collected such metadata while operating in off-network mode.

## 7.16 Off-network UE-to-UE Relay

### 7.16.1 Private Calls

[R-7.16.1-001] The Off-Network MCPTT Service shall provide a means by which the MCPTT User of a (source) UE can make an MCPTT Private Call to the MCPTT User of a (target) UE via a ProSe UE-to-UE Relay.

[R-7.16.1-002] The Off-Network MCPTT Service shall provide a mechanism for a source MCPTT User to query whether a particular target MCPTT User is within ProSe direct communication range.

[R-7.16.1-003] An MCPTT UE shall be able to:

- discover whether the UE of the target MCPTT User is itself within direct communication range of the source UE; and if not
- instead discover whether the UE of the target MCPTT User is within communication range of a ProSe UE-to-UE Relay that is within direct communication range of the source UE.

## 7.16.2 Group Calls

[R-7.16.2-001] An MCPTT Administrator or authorized user shall be able to configure a ProSe-enabled UE, authorized to act as a ProSe UE-to-UE Relay, to relay any received MCPTT transmissions for one (or more) specified MCPTT Groups.

[R-7.16.2-002] An MCPTT UE receiving both the original MCPTT Group transmission and a relayed transmission shall be able to associate the two transmissions, correctly order a mixture of packets (received directly and indirectly) and identify duplicate packets.

## Annex A (informative): Variables

**Table A.1: List of variables**

Variable	Meaning	Value	Reference
B1	Number of levels of group hierarchy		5.2.2
B2	Number of levels of user hierarchy		5.2.3
KPI 1	MCPTT Access time	< 300 ms	6.15.3.2
KPI 2	End-to-end MCPTT Access time	< 1000 ms	6.15.3.2
KPI 3	Mouth-to-ear latency	< 300 ms	6.15.3.2
KPI 4 <sup>a</sup>	Maximum Late call entry time (without application layer encryption)	< 150 ms	6.15.4.2
KPI 4 <sup>b</sup>	Maximum Late call entry time (with application layer encryption)	< 350 ms	6.15.4.2
N1	Number of receiving members present for an MCPTT Group.		6.4.2
N2	Total number of MCPTT Groups that an MCPTT User can be affiliated to simultaneously		5.1.5
N3	Minimum length of alphanumeric identifiers (i.e., Alias ID)		5.8, 6.4.3, 7.1, and 7.2
N4	Number of simultaneous MCPTT Group calls received by a UE		5.5.2
N5	Total number of MCPTT Group transmissions that a UE can receive		5.5.2
N6	Number of simultaneous MCPTT Group calls received by a user		5.5.2
N7	Total number of MCPTT Group transmissions that a user can receive		5.5.2
N8	Minimum number of simultaneous off-network MCPTT calls supported by an off-network MCPTT UE.		7.13
N9	Maximum number of simultaneous audios received by an MCPTT User in a single MCPTT Group		6.2.3.1
N10	Total number of MCPTT Private Calls (with Floor control) in which a UE simultaneously participates		5.5.2
N11	Total number of MCPTT Group Members of an MCPTT Group		6.1

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## Annex B (informative): Bibliography

- 3GPP TS 22.115: "Service aspects; Charging and billing".

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## Annex C (informative): MCPTT scalability guide

The MCPTT Service might support an authorized MCPTT UE to be an MCPTT member of at least 5,000 MCPTT Groups.

The MCPTT Service might support a minimum of 500,000 MCPTT Groups.

The MCPTT Service might support MCPTT Group membership from two MCPTT Users to all the MCPTT Users signed on the MCPTT system.

The MCPTT Service might support an MCPTT Group Call where all the Participants are located in one cell of the MCPTT system.

The MCPTT Service might support an MCPTT Group Call with one or more Participants located in every cell of the MCPTT system.

The MCPTT Service might support a range of 36 to 150 simultaneous MCPTT Group Calls in every cell of the MCPTT system per regional regulatory requirement.

The MCPTT Service might support a minimum of 2000 MCPTT Users within an MCPTT Group or a combination of different MCPTT Groups, in every cell of the MCPTT system.

NOTE: The concurrent number of Participants in a cell is subject to radio capacity limitation in a cell per operator policy.

## Annex D (informative): Change history

Change history											
TSG SA#	SA Doc.	SA1 Doc	Spec	CR	Rev	Rel	Cat	Subject/Comment	Old	New	Work Item
SP-66	SP-140844							Raised by MCC to version 13.0.0 following SA's approval	2.1.0	13.0.0	
SP-66	-	-						Correction of Figure 4.6.1-1 (previously corrupted) and of some typos, including: consistent use of capital and spaces instead of hyphens in "Push To Talk", removal of the requirement numbering for the three paragraph of sections 6.6.2.1 and 6.6.4.1 since they are not requirements	13.0.0	13.0.1	
SP-67	SP-150040	S1-150011	22.179	1	-	Rel-13	F	Replacement of Home and Visited by Primary and Partner	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150225	22.179	2	1	Rel-13	F	Completion of application of S1-144278	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150226	22.179	3	1	Rel-13	F	Clarification of number and types of Private Calls	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150228	22.179	5	1	Rel-13	F	Completion of application of S1-144570	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150016	22.179	6	-	Rel-13	F	Improper use of 'emergency'	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150230	22.179	7	2	Rel-13	D	Correct use of MCPTT terminology	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150229	22.179	8	1	Rel-13	F	Clarifying KPI requirement	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150019	22.179	9	-	Rel-13	D	Wording correction	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150021	22.179	11	-	Rel-13	F	Change the title of TS 22.179 to align with MCPTT WID and agreed contribution S1-144232	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150022	22.179	12	-	Rel-13	D	Changing Ues to UEs	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150023	22.179	13	-	Rel-13	D	Editorial clean ups	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150342	22.179	14	2	Rel-13	F	Correction of type of Private Calls supported in for both on and off the network use.	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150025	22.179	15	-	Rel-13	F	Clarification of dedicated MCPTT Group type used for Imminent Peril Group call communication by MCPTT User	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150026	22.179	16	-	Rel-13	F	Replacement of personality management with user profile management	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150027	22.179	17	-	Rel-13	F	Modify text in first sentence of third paragraph for clause 7.1 Off-Network Push-to-Talk overview.	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150028	22.179	18	-	Rel-13	F	Replacement of clause 5.14 title Audio/ video quality with Audio/ voice quality.	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150232	22.179	19	1	Rel-13	F	Convert 2nd sentence of 5th requirement in clause 6.2.4 Call Termination into a new requirement	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150309	22.179	20	2	Rel-13	F	Move two requirements from clause 6.1 General Administrative -groups and users into common clause 5.19 General Administrative -groups and users.	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150234	22.179	21	1	Rel-13	B	Charging for MCPTT usage	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150092	22.179	22	-	Rel-13	F	Reinstatement of MCPTT User Profile	13.0.1	13.1.0	MCPTT-SA1
SP-67	SP-150040	S1-150093	22.179	23	-	Rel-13	F	Fix improper multiple requirements	13.0.1	13.1.0	MCPTT-SA1
SP-67	SP-150040	S1-150094	22.179	24	-	Rel-13	F	Remove implementation-specific requirement for default value	13.0.1	13.1.0	MCPTT-SA1

Change history											
TSG SA#	SA Doc.	SA1 Doc	Spec	CR	Rev	Rel	Cat	Subject/Comment	Old	New	Work Item
SP-67	SP-150040	S1-150236	22.179	26	1	Rel-13	F	CR- to clarify requirements in 6.4.9 and 6.2.4.	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150265	22.179	28	1	Rel-13	F	CR to clarify what call type refers to in 6.2.3.3.1	13.0.1	13.1.0	MCPTT
SP-67	SP-150040	S1-150107	22.179	30	-	Rel-13	D	Separation of supplementary service, callback, requirements	13.0.1	13.1.0	MCPTT
SP-68	SP-150354	-	22.179	31	1	Rel-13	F	Clarification on the update and use of codecs in MCPTT	13.1.0	13.2.0	MCPTT
SP-68	SP-150355	-	22.179	32	1	Rel-13	F	Clarification on Broadcast Groups Off-Network Requirement R-7.5-002	13.1.0	13.2.0	MCPTT
SP-70	SP-150750	S1-154482	22.179	0033	1	Rel-13	F	Edits, formatting, and style corrections	13.2.0	13.3.0	MCPTT
SP-70	SP-150750	S1-154483	22.179	0034	1	Rel-13	F	MCPTT Emergency Group Call correction	13.2.0	13.3.0	MCPTT
SP-70	SP-150750	S1-154546	22.179	0035	1	Rel-13	F	KPI 4 when MBMS is used	13.2.0	13.3.0	MCPTT



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# History

<b>Document history</b>		
V13.3.0	January 2016	Publication