

ETSI TS 124 380 V13.3.0 (2017-01)



**LTE;
Mission Critical Push To Talk (MCPTT) media plane control;
Protocol specification
(3GPP TS 24.380 version 13.3.0 Release 13)**



Reference

RTS/TSGC-0124380vd30

Keywords

LTE

ETSI

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

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

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:
<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at
<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:
<https://portal.etsi.org/People/CommiteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2017.
All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.
3GPP™ and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.
GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights	2
Foreword.....	2
Modal verbs terminology.....	2
Foreword.....	14
1 Scope	15
2 References	15
3 Definitions and abbreviations.....	16
3.1 Definitions	16
3.2 Abbreviations	17
4 General	18
4.1 Overview	18
4.1.1 Floor Control	18
4.1.1.1 General	18
4.1.1.2 On-network floor control	18
4.1.1.3 Off-network floor control.....	19
4.1.1.4 Determine on-network effective priority.....	19
4.1.1.5 Determine off-network effective priority	20
4.1.2 Pre-established session call control.....	20
4.1.2.1 General	20
4.1.2.2 Call setup over pre-established session	20
4.1.2.3 Release of a call which uses a pre-established session.....	21
4.1.3 MBMS subchannel control	21
4.1.3.1 General	21
4.1.3.2 Start of a conversation.....	22
4.1.3.3 During a conversation	22
4.1.3.4 Ending the conversation.....	22
4.2 Internal structure of media plane control entities	22
4.2.1 Controlling MCPTT function	22
4.2.2 MCPTT client.....	24
4.2.3 Participating MCPTT function	26
4.2.3.1 General	26
4.2.3.2 Internal structure of the participating MCPTT function.....	26
4.2.3.3 The roles of the participating MCPTT function	27
4.2.3.3.1 For the floor control procedures	27
4.2.3.3.2 For the call over pre-established session procedures.....	27
4.2.3.3.3 For the use of MBMS bearer procedures.....	27
4.2.4 Non-controlling MCPTT function of an MCPTT group.....	28
4.3 The media plane control channel.....	29
4.3.1 General.....	29
4.3.2 Control channel realization	29
4.3.3 Establishing a media plane control channel.....	30
4.3.3.1 General	30
5 Entities.....	30
5.1 General	30
5.2 MCPTT client.....	30
5.2.1 Introduction.....	30
5.2.2 Floor participant in on-network mode	31
5.2.3 Floor participant in off-network mode.....	31
5.3 Controlling MCPTT function	31
5.4 Participating MCPTT function	32
5.5 Non-controlling MCPTT function.....	32

6	On-network floor control.....	32
6.1	General	32
6.2	Floor participant procedures.....	33
6.2.1	Floor participant procedures at MCPTT session initialization.....	33
6.2.2	Floor participant procedures at MCPTT call release	33
6.2.3	Floor participant procedures at MCPTT call modification	33
6.2.4	Floor participant state transition diagram for basic operation.....	33
6.2.4.1	General	33
6.2.4.2	State: 'Start-stop'.....	35
6.2.4.2.1	General	35
6.2.4.2.2	MCPTT call initiated, originating MCPTT user.....	35
6.2.4.2.3	MCPTT call established, terminating MCPTT user	35
6.2.4.3	State: 'U: has no permission'	35
6.2.4.3.1	General	35
6.2.4.3.2	Receive Floor Idle message (R: Floor Idle).....	35
6.2.4.3.3	Receive Floor Taken message (R: Floor Taken)	36
6.2.4.3.4	Receive RTP media packets (R: RTP media).....	36
6.2.4.3.5	Send Floor Request message (PTT button pressed)	36
6.2.4.3.6	Timer T103 (End of RTP media) expired.....	36
6.2.4.4	State: 'U: pending Request'	37
6.2.4.4.1	General	37
6.2.4.4.2	Receive Floor Granted message (R: Floor Granted).....	37
6.2.4.4.3	Receive Floor Taken message (R: Floor Taken)	37
6.2.4.4.4	Receive Floor Deny message (R: Floor Deny).....	38
6.2.4.4.5	Timer T101 (Floor request) expired	38
6.2.4.4.6	Timer T101 (Floor Request) expired N times	38
6.2.4.4.7	Receive RTP media packets (R: RTP Media)	38
6.2.4.4.8	Send Floor Release message (PTT button released).....	39
6.2.4.4.9	Receive Floor Queue Position Info message (R: Floor Queue Position Info)	39
6.2.4.5	State: 'U: has permission'	39
6.2.4.5.1	General	39
6.2.4.5.2	Send RTP media packets (RTP media)	39
6.2.4.5.3	Send Floor Release message (PTT button released).....	40
6.2.4.5.4	Receive Floor Revoke message (R: Floor Revoke).....	40
6.2.4.5.5	Receive Floor Granted message (R: Floor Granted).....	40
6.2.4.5.6	Receive RTP media packets (R: RTP Media)	41
6.2.4.5.7	Receive Floor Idle message (R: Floor Idle).....	41
6.2.4.5.8	Receive Floor Taken message (R: Floor Taken)	41
6.2.4.6	State: 'U: pending Release'	41
6.2.4.6.1	General	41
6.2.4.6.2	Timer T100 (Floor Release) expired	41
6.2.4.6.3	Timer T100 (Floor release) expired N times	42
6.2.4.6.4	Receive Floor Idle message (R: Floor Idle).....	42
6.2.4.6.5	Receive Floor Taken message (R: Floor Taken)	42
6.2.4.6.6	Receive RTP media packets (R: RTP Media)	42
6.2.4.6.7	Receive Floor Revoke message (R: Floor Revoke).....	43
6.2.4.6.8	Receive Floor Granted message (R: Floor Granted).....	43
6.2.4.7	In any state	43
6.2.4.7.1	General	43
6.2.4.7.2	Receive MCPTT call release – step 1 (R: MCPTT call release - 1)	43
6.2.4.7.3	Receive a Floor Control message with a Floor Indicator field (R: Floor Indicator).....	43
6.2.4.8	State: 'Releasing'	43
6.2.4.8.1	General	43
6.2.4.8.2	Receive MCPTT call release – step 2 (R: MCPTT call release - 2)	44
6.2.4.9	State: 'U: queued'.....	44
6.2.4.9.1	General	44
6.2.4.9.2	Receive RTP media packets (R: RTP media).....	44
6.2.4.9.3	Receive Floor Taken message (R: Floor Taken)	44
6.2.4.9.4	Receive Floor Granted message (R: Floor Granted).....	44
6.2.4.9.5	Receive Floor Deny message (R: Floor Deny).....	45
6.2.4.9.6	Send Floor Release message (PTT button released).....	45
6.2.4.9.7	Receive Floor Queue Position Info message (R: Floor Queue Position Info)	45

6.2.4.9.8	Receive Floor Idle message (R: Floor Idle).....	46
6.2.4.9.9	Send Floor Queue Position Request message (S: Floor Queue Position Request)	46
6.2.4.9.10	Timer T104 (Floor Queue Position Request) expired.....	46
6.2.4.9.11	Timer T104 (Floor Queue Position Request) expired N times	46
6.2.4.9.12	User indication for accept of pending request	46
6.2.4.9.13	Timer T132 (Queued granted user action) expires	47
6.3	Floor control server procedures	47
6.3.1	General.....	47
6.3.2	Controlling MCPTT function procedures at MCPTT call initialization	47
6.3.2.1	General	47
6.3.2.2	Initial procedures.....	47
6.3.2.3	Switching from a non-controlling MCPTT function mode to a controlling MCPTT function mode.....	48
6.3.3	MCPTT floor control procedures at MCPTT call release.....	48
6.3.4	Floor control server state transition diagram for general floor control operation	49
6.3.4.1	General	49
6.3.4.2	State: 'Start-stop'.....	51
6.3.4.2.1	General	51
6.3.4.2.2	MCPTT call initialization	51
6.3.4.3	State: 'G: Floor Idle'	51
6.3.4.3.1	General	51
6.3.4.3.2	Enter the 'G: Floor Idle' state	51
6.3.4.3.3	Receive Floor Request message (R: Floor Request)	52
6.3.4.3.4	Timer T7 (Floor Idle) expired	53
6.3.4.3.5	Timer T4 (Inactivity) expired	53
6.3.4.3.6	Receive an implicit floor request (R: Implicit floor request).....	53
6.3.4.4	State: 'G: Floor Taken'.....	54
6.3.4.4.1	General	54
6.3.4.4.2	Enter the 'G: Floor Taken' state	54
6.3.4.4.3	Timer T1 (End of RTP media) expired.....	55
6.3.4.4.4	Timer T2 (Stop talking) expired.....	55
6.3.4.4.5	Receive RTP media packets (R: RTP media).....	55
6.3.4.4.6	Receive Floor Release message (R: Floor Release)	55
6.3.4.4.7	Receive Floor Request message with pre-emptive priority (R: pre-emptive Floor Request)	55
6.3.4.4.8	Receive Floor request message from permitted floor participant (R: Floor Request)	56
6.3.4.4.9	Timer T20 (Floor Granted) expired.....	56
6.3.4.4.10	Timer T20 (Floor Granted) expired N times	57
6.3.4.4.11	Permitted MCPTT client release (R: client release)	57
6.3.4.4.12	Receive an implicit floor request (R: Implicit floor request).....	57
6.3.4.5	State: 'G: pending Floor Revoke'.....	57
6.3.4.5.1	General	57
6.3.4.5.2	Enter the 'G: pending Floor Revoke' state	57
6.3.4.5.3	Receive RTP media packets (R: RTP media).....	58
6.3.4.5.4	Receive Floor Release message (R: Floor Release)	58
6.3.4.5.5	Timer T3 (Stop talking grace) expired	58
6.3.4.5.6	Timer T1 (End of RTP media) expired.....	58
6.3.4.6	In any state	58
6.3.4.6.1	General	58
6.3.4.6.2	Receive MCPTT call release - 1	59
6.3.4.6.3	Receive an instruction to merge group calls (R: Merge)	59
6.3.4.7	State: 'Releasing'	59
6.3.4.7.1	General	59
6.3.4.7.2	Receive MCPTT call release - 2.....	59
6.3.4.8	State: 'G: Floor Initialising'.....	59
6.3.4.8.1	General	59
6.3.4.8.2	Enter the 'G: Initialising' state.....	59
6.3.4.8.3	Receiving a floor request from a constituent MCPTT group (R: mcptt-floor-request)	59
6.3.4.8.4	All final SIP responses received (R: final SIP responses)	60
6.3.5	Floor control server state transition diagram for basic floor control operation towards the floor participant	61
6.3.5.1	General	61
6.3.5.2	State: 'Start-stop'.....	62

6.3.5.2.1	General	62
6.3.5.2.2	SIP Session initiated	62
6.3.5.3	State: 'U: not permitted and Floor Idle'	65
6.3.5.3.1	General	65
6.3.5.3.2	Enter state 'U: not permitted and Floor Idle'	65
6.3.5.3.3	Send Floor Taken message (S: Floor Taken).....	65
6.3.5.3.4	Receive Floor Request message (R: Floor Request)	66
6.3.5.3.5	Send Floor Grant message (S: Floor Grant)	66
6.3.5.3.6	Send Floor Deny message (S: Floor Deny)	66
6.3.5.3.7	Receive Floor Release message (R: Floor Release)	67
6.3.5.3.8	Receive RTP media packets (R: media)	67
6.3.5.3.9	Receive an implicit floor request (R: Implicit floor request).....	68
6.3.5.3.10	Send Floor Idle message (S: Floor Idle).....	68
6.3.5.4	State 'U: not permitted and Floor Taken'.....	68
6.3.5.4.1	General	68
6.3.5.4.2	Enter state 'U: not permitted and Floor Taken'	68
6.3.5.4.3	Send Floor Idle message (S: Floor Idle).....	68
6.3.5.4.4	Receive Floor Request message (R: Floor Request)	69
6.3.5.4.5	Receive Floor Release message (R: Floor Release)	72
6.3.5.4.6	Receive RTP media packets (R: media)	73
6.3.5.4.7	Send Floor Queue Position Info message (R: Floor Queue Position Request).....	73
6.3.5.4.8	Receive an implicit floor request (R: Implicit floor request).....	74
6.3.5.4.9	Send Floor Granted message (S: Floor Granted).....	74
6.3.5.4.10	Send Floor Taken message (S: Floor Taken).....	74
6.3.5.5	State: 'U: permitted'	74
6.3.5.5.1	General	74
6.3.5.5.2	Enter state 'U: permitted'	74
6.3.5.5.3	Receive Floor Release message (R: Floor Release)	75
6.3.5.5.4	Send Floor Idle message (S: Floor Idle).....	75
6.3.5.5.5	Send Floor Revoke message (S: Floor Revoke)	75
6.3.5.5.6	Receive RTP media packets (R: media)	75
6.3.5.5.7	Receive Floor Request message (R: Floor Request)	76
6.3.5.5.8	Send RTP Media (S: media).....	76
6.3.5.5.9	Send Floor Taken message (S: Floor Taken).....	76
6.3.5.6	State: 'U: pending Floor Revoke'.....	76
6.3.5.6.1	General	76
6.3.5.6.2	Enter state 'U pending Floor Revoke'	76
6.3.5.6.3	Timer T8 (media Revoke) expired	76
6.3.5.6.4	Receive RTP media packets (R: media)	77
6.3.5.6.5	Receive Floor Release message (R: Floor Release)	77
6.3.5.6.6	Send Floor Idle message (S: Floor Idle).....	78
6.3.5.6.7	Send Floor Taken message (S: Floor Idle)	78
6.3.5.7	State 'U: not permitted but sends media'	78
6.3.5.7.1	General	78
6.3.5.7.2	Enter state 'U: not permitted but sends media'	78
6.3.5.7.3	Timer T8 (Floor Revoke) expired.....	78
6.3.5.7.4	Receive Floor Release message (R: Floor Release)	79
6.3.5.8	In any state	80
6.3.5.8.1	General	80
6.3.5.8.2	Receive MCPTT call release – 1	80
6.3.5.8.3	Receiving a merging instruction (R: Merge)	80
6.3.5.9	State: 'Releasing'	80
6.3.5.9.1	General	80
6.3.5.9.2	Receive MCPTT call release - 2.....	81
6.3.5.10	State: 'U: not permitted and initiating'.....	81
6.3.5.10.1	General	81
6.3.5.10.2	Enter the 'U: not permitted and initiating' state	81
6.3.5.10.3	Send Floor Taken message (S: Floor Taken).....	81
6.3.5.10.4	Send Floor Idle message (S: Floor Idle).....	81
6.3.5.10.5	Receive Floor Request message (R: Floor Request)	81
6.3.5.10.6	Send Floor Granted message (S: Floor Granted).....	82
6.3.5.10.7	Receive a Floor Release message (S: Floor Release).....	82

6.3.6	Dual floor control	83
6.3.6.1	General	83
6.3.6.2	State: 'Start-stop'	84
6.3.6.2.1	General	84
6.3.6.2.2	Receive Floor Request message with overriding pre-emptive floor priority (R: Floor Request)	84
6.3.6.3	State: 'D: Floor Taken'	84
6.3.6.3.1	General	84
6.3.6.3.2	Enter state 'D: Floor Taken'	84
6.3.6.3.3	Timer T11 (End of RTP dual) expired	85
6.3.6.3.4	Timer T12 (Stop talking dual) expired	86
6.3.6.3.5	Receive RTP media packets (R: media)	87
6.3.6.3.6	Receive Floor Release message (R: Floor Release)	87
6.3.6.3.7	Receive Floor request message from permitted floor participant (R: Floor Request)	88
6.3.6.3.8	Permitted MCPTT client release	88
6.3.6.3.9	Receive Terminate (Terminate)	89
6.3.6.4	In any state	89
6.3.6.4.1	General	89
6.3.6.4.2	Receive MCPTT call release - 1	89
6.3.6.5	State: 'Releasing'	89
6.3.6.5.1	General	89
6.3.6.5.2	Receive MCPTT call release - 2	89
6.4	Participating MCPTT function floor control procedures	89
6.4.1	General	89
6.4.2	Receive floor control messages	90
6.4.3	Receive RTP media packets (R: RTP Media)	90
6.4.4	Release of session	91
6.5	Non-controlling MCPTT function of an MCPTT group	91
6.5.1	General	91
6.5.2	The MCPTT call initialization procedure in the non-controlling MCPTT function of an MCPTT group	91
6.5.2.1	General	91
6.5.2.2	Initial procedures when a new SIP session is establishing a group session or a private session with floor control	91
6.5.2.3	Switching from a controlling MCPTT function mode to a non-controlling MCPTT function mode	92
6.5.2.3.1	Overview	92
6.5.2.3.2	Preparing for the switch to non-controlling MCPT function (Step 1)	92
6.5.2.3.3	Start acting as a non-controlling MCPT function (Step 2)	92
6.5.3	The MCPTT call release procedure in the non-controlling MCPTT function of an MCPTT group	93
6.5.4	Floor control server interface procedures	93
6.5.4.1	General	93
6.5.4.2	Receiving a Floor Request message	93
6.5.4.3	Receive Floor Release message	94
6.5.4.4	Receive Floor Queue Position Request message	94
6.5.4.5	Receive Floor Ack message	94
6.5.4.6	Receive Floor Granted message	95
6.5.4.7	Receive Floor Deny message	96
6.5.4.8	Receive Floor Idle message	96
6.5.4.9	Receive Floor Taken message	97
6.5.4.10	Receive Floor Revoke message	98
6.5.4.11	Receive Floor Queue Position Info message	99
6.5.4.12	Receive RTP media packets from controlling MCPTT function	99
6.5.4.13	Receive RTP media packets from an MCPTT client	99
6.5.4.14	MCPTT session release step 1	100
6.5.4.15	MCPTT session release step 2	100
6.5.4.16	Receiving a split instruction (R: Split)	100
6.5.5	Floor participant interface procedures	100
6.5.5.1	General	100
6.5.5.2	State: 'Start-Stop'	101
6.5.5.2.1	General	101
6.5.5.2.2	Participant invited to session	101
6.5.5.3	State: 'P: has no permission'	102

6.5.5.3.1	General	102
6.5.5.3.2	Receive Floor Idle message (R: Floor Idle).....	102
6.5.5.3.3	Receive Floor Taken message (R: Floor Taken)	102
6.5.5.3.4	Receive Floor Request message (R: Floor Request)	102
6.5.5.3.5	Receive Floor Granted message (R: Floor Granted).....	102
6.5.5.3.6	Receive Floor Deny message (R: Floor Deny).....	102
6.5.5.3.7	Receive Floor Queue Position Info message (R: Floor Queue Position Info)	103
6.5.5.3.8	Receive Floor Queue Position Request message (R: Floor Queue Position Request).....	103
6.5.5.3.9	Receive RTP media packets (R: RTP media).....	103
6.5.5.3.10	Receive Floor Release message (R: Floor Release)	103
6.5.5.3.11	Receive split instruction (R: Split)	104
6.5.5.4	State: 'P: has permission'	104
6.5.5.4.1	General	104
6.5.5.4.2	Receive RTP media packets	104
6.5.5.4.3	Receive Floor Release message.....	104
6.5.5.4.4	Receive Floor Ack message	104
6.5.5.4.5	Receive Floor Idle message.....	105
6.5.5.4.6	Receive Floor Taken message	105
6.5.5.4.7	Receive Floor Revoke message.....	105
6.5.5.4.8	Receive split instruction (R: Split)	105
6.5.5.5	In any state	105
6.5.5.5.1	General	105
6.5.5.5.2	Receive Floor Ack message (R: Floor Ack).....	105
6.5.5.5.3	MCPTT session release step 1 (MCPTT call release - 1).....	106
6.5.5.6	State: 'P: Releasing'.....	106
6.5.5.6.1	General	106
6.5.5.6.2	MCPTT session release step 2 (MCPTT call release - 2).....	106
7	Off-network floor control.....	106
7.1	General	106
7.2	Floor participant procedures.....	107
7.2.1	Floor participant procedures at MCPTT session initialization.....	107
7.2.1.2	Determine off-network floor priority	107
7.2.2	Floor participant procedures at MCPTT call release	109
7.2.3	Floor participant state diagram – basic operation	109
7.2.3.1	General	109
7.2.3.2	State: 'Start-stop'.....	110
7.2.3.2.1	General	110
7.2.3.2.2	MCPTT call established – originating MCPTT user	111
7.2.3.2.3	MCPTT group call established – terminating MCPTT user	111
7.2.3.2.4	MCPTT private call established – terminating MCPTT user	111
7.2.3.2.5	Send Floor Request message (PTT button pressed)	111
7.2.3.2.6	Receive Floor Taken message (R: Floor Taken)	111
7.2.3.2.7	Receive Floor Granted message (R: Floor Granted to other)	112
7.2.3.2.8	Receive RTP media (R: RTP media).....	112
7.2.3.2.9	MCPTT broadcast call established – terminating MCPTT user	112
7.2.3.3	State: 'O: silence'	112
7.2.3.3.1	General	112
7.2.3.3.2	Send Floor Request message (PTT button pressed)	113
7.2.3.3.3	Receive RTP media (R: RTP media).....	113
7.2.3.3.4	Receive Floor Granted message (R: Floor Granted to other)	113
7.2.3.3.5	Receive Floor Request message (R: Floor Request)	114
7.2.3.3.6	Receive Floor Taken message (R: Floor Taken)	114
7.2.3.3.7	Timer T230 (Inactivity) expired.....	114
7.2.3.4	State: 'O: has no permission'	114
7.2.3.4.1	General	114
7.2.3.4.2	Sending Floor Request message (PTT button pressed)	114
7.2.3.4.3	Receive Floor Release message (R: Floor Release)	115
7.2.3.4.4	Timer T203 (End of RTP media) expired.....	115
7.2.3.4.5	Receive Floor Granted message (R: Floor Granted to other)	115
7.2.3.4.6	Receive RTP media (R: RTP media).....	115
7.2.3.5	State: 'O: has permission'	116

7.2.3.5.1	General	116
7.2.3.5.2	Send RTP Media packets (S: RTP Media)	116
7.2.3.5.3	Receive Floor Release message (R: Floor Release)	116
7.2.3.5.4	Receive Floor Request message (R: Floor Request)	117
7.2.3.5.5	Send Floor Release message (PTT button released with no pending request in queue)	117
7.2.3.5.6	Send Floor Granted message (PTT button released with pending request(s) in queue)	118
7.2.3.5.7	Receive Floor Request message with pre-emption indication (R: Floor Request with pre-emption).....	118
7.2.3.5.8	Receive Floor Queue Position Request message (R: Floor Queue Position Request).....	119
7.2.3.5.9	Transmission time limit warning (Timer T206 expires).....	119
7.2.3.5.10	Transmission time limit reached with pending request(s) in queue (Timer T207 expires)	119
7.2.3.5.11	Transmission time limit reached with no pending request in queue (Timer T207 expires).....	120
7.2.3.6	State: 'O: pending request'	120
7.2.3.6.1	General	120
7.2.3.6.2	Receive RTP media (R: RTP media).....	120
7.2.3.6.3	Receive Floor Queue Position Info message (R: Floor Queue Position Info)	121
7.2.3.6.4	Receive Floor Deny message (R: Floor Deny).....	122
7.2.3.6.5	Send Floor Release message (PTT button released).....	122
7.2.3.6.6	Send Floor Taken message (Timer T201 expired N times).....	123
7.2.3.6.7	Receive Floor Granted message (R: Floor Granted to me).....	123
7.2.3.6.8	Receive Floor Granted message (R: Floor Granted to other)	124
7.2.3.6.9	Timer T201 (Floor Request) expired (Timer T201 expired)	124
7.2.3.6.10	Receive Floor Request message (R: Floor request).....	125
7.2.3.6.11	Receive Floor Taken message (R: Floor Taken)	125
7.2.3.7	State: 'O: pending granted'	125
7.2.3.7.1	General	125
7.2.3.7.2	Receive RTP media (R: RTP Media)	125
7.2.3.7.3	Timer T205 (Floor Granted) expired (timer T205 expired).....	125
7.2.3.7.4	Timer T205 (Floor Granted) expired N times with pending request(s) in the queue (Timer T205 expired N times AND pending request(s) in queue)	126
7.2.3.7.5	Timer T205 (Floor Granted) expired N times with no pending request in the queue (Timer T205 expired N times AND no pending request in queue)	126
7.2.3.7.6	Timer T233 (Pending user action) expires with no pending request in the queue (Timer T233 expired AND no pending request in queue)	126
7.2.3.7.7	Timer T233 (Pending user action) expires with pending request(s) in the queue (Timer T233 expired AND pending request(s) in queue)	126
7.2.3.7.8	PTT button pressed.....	127
7.2.3.7.9	Receive Floor Release message (R: Floor Release)	127
7.2.3.7.10	Receive Floor Request message (R: Floor Request)	127
7.2.3.8	State: 'O: queued'.....	127
7.2.3.8.1	General	127
7.2.3.8.2	Receive RTP media (R: RTP media).....	127
7.2.3.8.3	Receive Floor Queue Position Info message (R: Floor Queue Position Info)	128
7.2.3.8.4	Receive Floor Deny message (R: Floor Deny).....	128
7.2.3.8.5	User indication for release of pending request	129
7.2.3.8.6	Receive Floor Granted message (R: Floor Granted to me).....	129
7.2.3.8.7	Timer T233 (Pending user action) expires	129
7.2.3.8.8	User indication for accept of pending request	130
7.2.3.8.9	Receive Floor Granted message (R: Floor Granted to other)	130
7.2.3.8.10	Timer T203 (End of RTP media) expires	130
7.2.3.8.11	Send Floor Queue Position Request message (R: Request queue position info).....	130
7.2.3.8.12	Timer T204 (Floor Queue Position request) expires	131
7.2.3.8.13	Timer T204 (Floor Queue Position request) expires N times	131
7.2.3.9	In any state	131
7.2.3.9.1	General	131
7.2.3.9.2	Receive MCPTT call release (R: MCPTT call release).....	131
8	Coding	131
8.1	Introduction	131
8.1.1	General.....	131
8.1.2	RTCP: APP message format.....	132
8.1.3	Application specific data field	133

8.1.4	Handling of unknown messages and fields.....	133
8.2	Floor control.....	134
8.2.1	Introduction.....	134
8.2.2	Floor control messages	134
8.2.2.1	General.....	134
8.2.2.2	Void.....	135
8.2.3	Floor control specific fields	135
8.2.3.1	Introduction.....	135
8.2.3.2	Floor Priority field	135
8.2.3.3	Duration field.....	136
8.2.3.4	Reject Cause field	136
8.2.3.5	Queue Info field	137
8.2.3.6	Granted Party's Identity field	137
8.2.3.7	Permission to Request the Floor field	137
8.2.3.8	User ID field.....	138
8.2.3.9	Queue Size field.....	138
8.2.3.10	Message Sequence Number field	139
8.2.3.11	Queued User ID field	139
8.2.3.12	Source field	140
8.2.3.13	Track Info field	140
8.2.3.14	Message Type field	141
8.2.3.15	Floor Indicator field	141
8.2.4	Floor Request message	142
8.2.5	Floor Granted message	143
8.2.6	Floor Deny message.....	145
8.2.6.1	General.....	145
8.2.6.2	Rejection cause codes and rejection cause phrase.....	146
8.2.7	Floor Release message.....	147
8.2.8	Floor Idle message.....	148
8.2.9	Floor Taken message	148
8.2.10	Floor Revoke message.....	150
8.2.10.1	General	150
8.2.10.2	Floor revoke cause codes and revoke cause phrases	151
8.2.11	Floor Queue Position Request message.....	151
8.2.12	Floor Queue Position Info message	152
8.2.13	Floor Ack message.....	153
8.3	Pre-established session call control	154
8.3.1	Introduction.....	154
8.3.2	Pre-established session call control message	154
8.3.3	Pre-established session call control fields.....	155
8.3.3.1	Introduction.....	155
8.3.3.2	Media Streams field	155
8.3.3.3	MCPTT Session Identity field.....	155
8.3.3.4	Warning Text field	156
8.3.3.5	MCPTT Group Identity field.....	157
8.3.3.6	Answer State field.....	157
8.3.3.7	Inviting MCPTT User Identity field.....	158
8.3.3.8	Reason Code field	158
8.3.3.9	Handling of unknown fields and messages	159
8.3.3.10	PCK I_MESSAGE field.....	159
8.3.4	Connect message	159
8.3.5	Disconnect message.....	161
8.3.6	Acknowledgement message.....	161
8.4	MBMS subchannel control.....	162
8.4.1	Introduction.....	162
8.4.2	MBMS subchannel control messages	162
8.4.3	MBMS subchannel control specific fields	162
8.4.3.1	Introduction.....	162
8.4.3.5	Void.....	163
8.4.3.2	MCPTT Group ID field.....	163
8.4.3.3	MBMS Subchannel field.....	163
8.4.3.4	TMGI field	164

8.4.4	Map Group To Bearer message	164
8.4.5	Unmap Group To Bearer message	165
9	Call setup control over pre-established session	166
9.1	General	166
9.2	MCPTT client	166
9.2.1	General	166
9.2.2	Call setup control over pre-established session state machine	166
9.2.2.1	General	166
9.2.2.2	State: 'Start-stop'	167
9.2.2.2.1	General	167
9.2.2.2.2	Pre-established session started	167
9.2.2.3	State: 'U: Pre-established session not in use'	167
9.2.2.3.1	General	167
9.2.2.3.2	Receive Connect message (R: Connect)	168
9.2.2.3.3	Pre-established session stopped	168
9.2.2.3.4	Receive Disconnect message (R: Disconnect)	168
9.2.2.3.5	Receive SIP 2xx response (R:2xx response)	168
9.2.2.3.6	Receive SIP re-INVITE request (R: re-INVITE)	168
9.2.2.4	State: 'U: Pre-established session in use'	168
9.2.2.4.1	General	168
9.2.2.4.2	Receive Connect message (R: Connect)	169
9.2.2.4.4	Receive RTP media packets (R:RTP packet)	169
9.2.2.4.5	Receive Disconnect message (R: Disconnect)	169
9.2.2.4.6	Receive SIP 2xx response (R: 2xx response)	169
9.3	Participating MCPTT function	169
9.3.1	General	169
9.3.2	Call setup control over pre-established session state machine for the participating MCPTT function	170
9.3.2.1	General	170
9.3.2.2	State: 'Start-stop'	170
9.3.2.2.1	General	170
9.3.2.2.2	Pre-established session started	171
9.3.2.3	State: 'G: Pre-established session not in use'	171
9.3.2.3.1	General	171
9.3.2.3.2	Receive SIP REFER request (R: SIP REFER)	171
9.3.2.3.3	Receive SIP INVITE request (R: SIP INVITE)	171
9.3.2.3.4	Pre-established session stopped	172
9.3.2.3.5	Receive SIP 200 (OK) response to the SIP re-INVITE request (R: 200 OK)	172
9.3.2.4	State: 'G: Pre-established session in use'	173
9.3.2.4.1	General	173
9.3.2.4.2	Receive floor control message (R: Floor control message)	173
9.3.2.4.3	Receive RTP media packets (R: RTP Media)	173
9.3.2.4.4	Receive call session release indication from MCPTT client (R: Call Release from MCPTT client)	173
9.3.2.4.5	Receive call session release indication from the controlling MCPTT function (R: Call Release from MCPTT server)	173
9.3.2.4.6	Receive pre-established session stopped indication from the MCPTT client (R: Pre-established Session Stopped from MCPTT client)	174
9.3.2.4.7	Receive Acknowledge message ((R: successful Ack) or (R: failure Ack))	174
9.3.2.4.8	Timer T55 (Connect) expired	174
9.3.2.4.9	Timer T55 (Connect) expired N times	175
9.3.2.4.10	Receive SIP 200 (OK) response (R: 200 OK)	175
9.3.2.4.11	Receive failed SIP response from the controlling MCPTT function (R: Call Release from the MCPTT server)	175
9.3.2.5	State: 'G: Call releasing'	176
9.3.2.5.1	General	176
9.3.2.5.2	Receive Acknowledge message (R: Ack)	176
9.3.2.5.3	Timer T56 (Disconnect) expired	176
9.3.2.5.4	Timer T56 (Disconnect) expired N times	176
10	MBMS subchannel control procedure	176
10.1	General	176

10.2	MBMS subchannel control procedure for the participating MCPTT function.....	177
10.2.1	General.....	177
10.2.2	State: 'Start-stop'.....	177
10.2.2.1	General.....	177
10.2.2.2	Send Map Group To Bearer message (R: Floor Request or Floor Taken).....	178
10.2.3	State: 'M: A conversation is active'.....	178
10.2.3.1	General.....	178
10.2.3.2	Send Floor Idle message (R: Floor Idle).....	178
10.2.3.3	Send Floor Taken message (R: Floor Taken).....	179
10.2.3.4	Send any other floor control message (R: Any other message).....	180
10.2.3.5	Send RTP media packet over the MBMS subchannel (R: RTP packet).....	180
10.2.3.7	Timer T15 (Conversation) expired.....	180
10.2.3.8	Timer T16 (Map Group To Bearer) expired.....	180
10.2.3.9	Timer T17 (Unmap Group To Bearer) expired.....	181
10.2.3.10	Timer T17 (Unmap Group To Bearer) expired Nth time.....	181
10.2.3.11	End conversation over the MBMS bearer (End conversation).....	181
10.2.3.12	Group call released.....	181
10.3	MBMS subchannel control procedure for the MCPTT client.....	181
10.3.1	General.....	181
10.3.2	Conversation over a pre-activated MBMS bearer is started.....	182
10.3.3	Receive floor control messages and RTP media packets over a MBMS subchannel.....	182
10.3.4	Conversation ended.....	182
11	Configurable parameters.....	182
11.1	Timers.....	182
11.1.1	Timers in the on-network floor participant.....	182
11.1.2	Timers in the off-network floor participant.....	183
11.1.3	Timers in the floor control server.....	186
11.1.4	Timers in the participating MCPTT function.....	189
11.2	Counters.....	190
11.2.1	Counters in the on-network floor participant.....	190
11.2.2	Counters in the off-network floor participant.....	191
11.2.3	Counters in the controlling MCPTT function.....	191
11.2.4	Counters in the participating MCPTT function.....	192
12	Extensions within the present document.....	193
12.1	Session description types defined within the present document.....	193
12.1.1	General.....	193
12.1.2	SDP "fntp" attribute for MCPTT.....	193
12.1.2.1	General.....	193
12.1.2.2	Semantics.....	193
12.1.2.3	Syntax.....	194
13	Media plane security.....	194
13.1	General.....	194
13.2	Derivation of SRTP/SRTCP master keys.....	196
13.3	Media plane encryption and decryption.....	197
13.3.1	General.....	197
13.3.2	The participating MCPTT function.....	197
13.3.3	The MCPTT client.....	198
13.3.4	The controlling MCPTT function.....	202
13.3.5	The non-controlling MCPTT function.....	203
14.	SDP offer/ answer procedures.....	204
14.1	General.....	204
14.2	Generating an SDP offer.....	205
14.2.1	General.....	205
14.2.2	"mc_queueing" fntp attribute.....	205
14.2.3	"mc_priority" fntp attribute.....	205
14.2.4	"mc_granted" fntp attribute.....	205
14.2.5	"mc_implicit_request" fntp attribute.....	205
14.3	Generating the SDP answer.....	205
14.3.1	General.....	205

14.3.2	"mc_queueing" fmp attribute	205
14.3.3	"mc_priority" fmp attribute	206
14.3.4	"mc_granted" fmp attribute	206
14.3.5	"mc_implicit_request" fmp attribute.....	206
14.4	Offerer processing of the SDP answer	207
14.5	Modifying the media plane control channel	207
14.6	The use of SDP offer / answer procedures in off-network mode	207
14.6.1	General	207
14.6.2	fmp attribute "mc_queueing"	207
Annex A (informative): Signalling flows		208
A.1	Scope of signalling flows	208
A.2	Introduction	208
A.2.1	General	208
A.2.2	Key required to interpret signalling flows.....	208
A.3	On-network floor control signalling flows.....	209
A.3.1	General	209
A.3.2	Floor request when the floor is idle.....	209
A.3.3	Floor request when floor is taken and queueing is not applied	211
A.3.4	Floor request when floor is taken and queueing is applied.....	212
A.3.5	Pre-emptive floor request when floor is taken.....	213
A.4	Off-network floor control signalling flows	214
A.4.1	General	214
A.4.2	Off-network floor control during an MCPTT group call.....	215
A.4.2.1	Floor request when the floor is idle	215
A.4.2.2	Floor request when floor is taken and queueing of floor requests is not applied.....	216
A.4.2.3	Floor request when floor is taken and queueing is applied	216
A.4.2.4	Pre-emptive floor request when floor is taken	218
A.5	Pre-established session signalling flows	219
A.5.1	General	219
A.5.2	Call Initialization.....	219
A.5.2.1	Originating Side when initialization accepted	219
A.5.2.2	Originating Side when initialization rejected.....	221
A.5.2.3	Termination Side when call initialization accepted	222
A.5.3	Call release	223
A.6	MBMS subchannel control signalling flows	224
A.6.1	General	224
A.6.2	Announcing MBMS subchannels.....	224
A.6.3	Initiating a conversation and requesting floor, originating side	227
A.6.4	Releasing floor and ending a conversation.....	228
Annex B (informative): Media encapsulation for end-to-end distribution using MBMS bearers		231
Annex C (Informative): Floor control state machine transitions tables		233
C.1	Introduction	233
C.2	Off-network tables.....	233
C.2.1	Off-network call floor control state machine transitions	233
Annex D (informative): Change history		237
History		240

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document specifies the media plane control protocols and interactions with the media needed to support Mission Critical Push To Talk (MCPTT).

The present document specifies protocol for using pre-established session to setup calls, floor control and managing MBMS subchannels over MBMS bearers on-network and off-network protocols for floor control.

Mission critical communication services are services that require preferential handling compared to normal telecommunication services, e.g. in support of police or fire brigade. Floor control provides a mechanism for managing the right to transmit at a point in time during an MCPTT call.

The MCPTT service and its associated media plane control protocols can be used for public safety applications and also for general commercial applications (e.g., utility companies and railways).

The present document is applicable to User Equipment (UE) supporting the floor participant functionality, setting up calls using pre-established SIP sessions and using MBMS bearers for group communication and to floor control servers supporting these functions in the MCPTT system.

2 References

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

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

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 24.379: "Mission Critical Push To Talk (MCPTT) call control Protocol specification".
- [3] IETF RFC 3550: "RTP: A Transport Protocol for Real-Time Applications".
- [4] 3GPP TS 24.383: "Mission Critical Push To Talk (MCPTT) Management Object (MO)".
- [5] 3GPP TS 23.179: "Functional architecture and information flows to support mission critical communication services; Stage 2".
- [6] 3GPP TS 29.468: "Group Communication System Enablers for LTE (GCSE_LTE); MB2 Reference Point; Stage 3".
- [7] IETF RFC 5761: "Multiplexing RTP Data and Control Packets on a Single Port".
- [8] IETF RFC 3711: "The Secure Real-time Protocol (SRTP)".
- [9] 3GPP TS 25.446: "MBMS synchronization protocol (SYNC)".
- [10] 3GPP TS 29.281: "General Packet Radio System (GPRS) Tunnelling Protocol User Plane (GTPv1-U)".
- [11] 3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core Network protocols; Stage 3".
- [12] 3GPP TS 24.381: "Mission Critical Push To Talk (MCPTT) group management Protocol specification".