ETSI Plugtests Report V1.0.0 (2021-12)

6th ETSI MCX Plugtests
Hybrid Event
08 November – 19 November 2021

ETSI

Keywords
Testing, Interoperability, Mission-Critical, LTE,
MCPTT, MCData, MCVideo

ETSI

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Executive Summary

The capabilities of Mission Critical Push to Talk (MCPTT), Mission Critical Data (MCData) and Mission Critical Video (MCVideo) were tested during the sixth MCX Plugtests from 08th November to 19th November 2021 remotely using VPN connections and with the possibility to test onsite at the University of Malaga (UMA) with their lab LTE network. More than 1300 test cases were executed between vendors, based on 3GPP Release-16.

The 6th ETSI MCX Plugtests have concluded with a success rate of 97.6% of the executed tests in the validation of 3GPP mission critical services vendor interoperability.

These tests are essential to ensure seamless access to mission critical services over 4G networks across different vendors' products and implementations.

The MCX (collectively for MCPTT, MCVideo and MCData services) ETSI Plugtests series is the first independent testing of public safety and other mission critical LTE services. Rail specific features as well as for the first time the Interworking Function (IWF-1) to LMR systems were tested in these 6th MCX Plugtests. The preparations for the sixth Plugtests started in June 2021, were followed by one week pre-testing, and were finalized with a one week of LTE assisted testing and one week of remote testing.

Note: TETRA and P25 IWF implementations were based on draft standards from ETSI and ATIS/TIA.

The tests were based on 3GPP Release-16 and more than 1300 tests were executed between the different vendors in more than 200 test sessions. The test cases have been amended with additional test scenarios which will be included in a future version of ETSI TS 103 564 (after the ETSI committee TCCE approval). Besides the MCPTT, MCData and MCVideo Application Servers and Clients, the testing also included devices, railways-oriented features, Interworking with TETRA and P25, IMS (IP Multimedia Subsystem), eMBMS (Evolved Multimedia Broadcast Multicast Services) components and Server to Server communication. A test stream was dedicated for test equipment.

The observations from the Plugtests events provide essential feedback to 3GPP Working Groups as work continues on mission critical communication specifications.

The testing during the 6th MCX Plugtests was complemented by an observer program with presentations and demos for the observers.

This Sixth MCX Plugtests was organized by ETSI with the support of the European Commission, EFTA, TCCA and UIC.

The Plugtests event was a pure interoperability testing event, and no products were certified.

The next FRMCS and MCX Plugtests events are planned for June and November 2022 respectively.

The following equipment was tested by the companies participating in this MCX Plugtests:

MCX Application Servers:

- Airbus
- Alea
- Aselsan
- Ericsson
- Frequentis
- Huawei
- Hytera
- Kontron Transportation
- Leonardo
- MCLabs
- Motorola Solutions
- Nemergent Solutions
- Streamwide
- TASSTA
- TD Tech

- Valid8

MCX Clients:

- Alea
- Atos
- Ericsson
- Etelm
- Frequentis
- Huawei
- Hytera
- Kontron Transportation
- Leonardo
- Motorola Solutions
- Nemergent Solutions
- Samsung
- Sepura
- Siemens
- Softil
- TASSTA
- TD Tech
- Teltronic
- Zetron

User Equipment (UE)

- Leonardo
- Sonim
- TDtech
- Teltronic

Land Mobile Radio (LMR)

- Rohill (TETRA System)
- Teltronic (TETRA System)
- Nemergent and Valid8 (P25 Gateway and P25 Simulator)

Evolved Node B (eNB)

- Ericsson
- University of Malaga test system

Evolved Packet Core (EPC):

- Athonet
- Ericsson
- University of Malaga test system (Polaris)

Evolved Multimedia Broadcast Multicast Services (eMBMS) Components:

- Athonet

IP Multimedia Subsystem (IMS):

- Athonet

Test Tool Vendors:

- MCS-TaaSting
- Polaris Networks (a Motorola Solutions company)

- Valid8


PLUGTESTS Vendors
ETSI
AIRBUS
ATHONET
aselsan
telm
LEONARDO
ALEA
a LEONARDO company
Atos
Hytera
HUAWEI
ERICSSON
sonim.
FREQUENTIS
MOTOROLA
SOLUTIONS
SAMSUNG
ELECTRONICS
kontron
mclabs
nemergent
solutions
ROHILL
teltronic
MCS – TaaSting
Mission Critical Services
Testing as a Service
sepura
SOFTIL
INNOVATIVE COMMUNICATIONS
TASSTA
SIEMENS
STREAMWIDE
VALID8.com
ZETRON
TD Tech


PLUGTESTS Observers
ETSI
astrid
DOLPHIN
TELECOM
ERILLISVERKOT
dsb
Norwegian
Directorate for
Civil Protection
ineco
DB
STRATIVIA
*Endorsed by NIST
Pro • M Zrt.
Rail Baltic
Estonia
MINISTÈRE
DE L'INTÉRIEUR
Liberté
Égalité
Fraternité
SNCF
RÉSEAU
TCCA
UIC
Home Office
UNIVERSIDAD
DE MÁLAGA
*HOST

1 Introduction

Mission Critical Push To Talk (MCPTT) is a 3GPP standardized voice service for LTE systems which ensures that LTE (and 5G) systems support mission-critical communications.

The Global Mission-Critical Communication Market was valued at USD 13.63 Billion in 2018 and is estimated to reach USD 26.66 Billion by 2025 growing at a CAGR of 10.5% during the forecast period 2019–2025, according to the market research. The first nationwide rollouts in the United States, South Korea, the UK, the Middle East and Asian countries are expected to trigger significant large-scale investments in mission-critical LTE.

Mission Critical Push To Talk (MCPTT) was the first of a number of Mission Critical features which was standardized by 3GPP in Release-13. Mission Critical Video and Mission Critical Data were standardized in Release-14. With the standardization of MCX (Mission-Critical PTT, Video & Data), IOPS (Isolated Operation for Public Safety), and other critical communications features by 3GPP, LTE and 5G NR networks are increasingly gaining recognition as an all-inclusive communications platform for public safety, rail and other critical communications sectors.

Preparations for the 6th ETSI MCX Plugtests event started in June 2021 with the registrations of vendors and observers. During bi-weekly conference calls from June to November 2021 the setup of the tests, the test specification and organizational issues were agreed between the participants. Before the main event, the vendors have done remote pre-testing of their implementations via VPN tunnels which connected their labs to a central exchange hub.

All the information required to organise and manage the 6th MCX Plugtests event was compiled and shared with participants in a dedicated private WIKI which was put in place by ETSI. All participants were provided with credentials that allowed them to access and update their details. All the information presented in this document has been extracted from the 6th MCX Plugtests event wiki: https://wiki.plugtests.net/6th-MCX-Plugtests/index.php?title=Main_Page (login required). Clause 4 describes the management of the Plugtests event.

The following equipment was tested – please see also clause 5:

- MCX Application Servers (MCX AS)
- MCX Clients
- Evolved Node B (eNB)
- User Equipment (UE)
- Land Mobile Radio (LMR) Systems – TETRA and P25
- Evolved Packet Core (EPC)
- IP Multimedia Subsystem (IMS)
- Broadcast Multicast Service Center (BMSC)
- MCX Test Tools

In this Plugtests the railways oriented Application Servers and Clients were evaluated in a dedicated Rail test stream and Interworking with LMR systems was evaluated in another dedicated IWF test stream.

Note: TETRA and P25 IWF implementations were based on draft standards from ETSI and ATIS/TIA.

A LTE test stream was available for vendors to evaluate their equipment for end-to-end interoperability testing with a LTE network. For this test stream the equipment under test had to be sent to the University of Malaga. The university personal assisted in doing tests at the university.

A dedicated Test Tools test stream was available for test tool vendors and other vendors to check their tools and the conformance of the implementations with the test tools.

The remote test infrastructure is described in clause 6; the test procedures are described in clause 7.

The vendors and ETSI have set up VPN-Tunnels from the vendors' premises to the ETSI VPN hub. This allowed the vendors to start integration work and pre-testing of MCX services.

For the 6th MCX Plugtests 36 additional test cases were developed by ETSI. In total, the MCX test specification has now more than 250 test cases. See clause 8. An updated version of the test specification will be published as a new version of ETSI document ETSI TS 103 564 (after ETSI TC TCCE approval).

More than 1300 tests were conducted by the vendors. 97.6% of the tests were successful, the remaining 2.4% failed for various reasons. The detailed results of the tests are available for the involved vendors in these test sessions but are not disclosed to the other vendors or to the public. All participants had to sign a Non-Disclosure Agreement and Rules of Engagement before joining the Plugtests event. The statistics of the test results are listed in clause 9.

The failed tests give the vendors valuable information to improve their implementations. They also help to discover ambiguities in the standards and to clarify and improve the specifications.

ETSI plan to conduct more MCX Plugtests in the future. The next MCX Plugtests sessions are planned for Q2 and Q4 2022. Vendors who have not participated in the previous MCX Plugtests events are welcomed and encouraged to join the next MCX Plugtests event.

2 References

The following documents have been used as references in the Plugtests. The participants in the Plugtests agreed on a set of specific documents and Release 16 versions for the sixth MCX Plugtests. Please see also the test specification document for the references.

[1] ETSI TS 103 564: Plugtests scenarios for Mission Critical Services.

[2] 3GPP TS 22.179: Mission Critical Push to Talk (MCPTT) over LTE.

[3] 3GPP TS 23.280: Common functional architecture to support mission critical services.

[4] 3GPP TS 23.379: Functional architecture and information flows to support Mission Critical Push To Talk (MCPTT)

[5] 3GPP TS 24.229: IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP).

[6] 3GPP TS 24.281: Mission Critical Video (MCVideo) signalling control.

[7] 3GPP TS 24.282: Mission Critical Data (MCData) signalling control.

[8] 3GPP TS 24.379: Mission Critical Push To Talk (MCPTT) call control.

[9] 3GPP TS 24.380: Mission Critical Push To Talk (MCPTT) media plane control.

[10] 3GPP TS 24.481: Mission Critical Services (MCS) group management.

[11] 3GPP TS 24.482: Mission Critical Services (MCS) identity management.

[12] 3GPP TS 24.483: Mission Critical Services (MCS) Management Object (MO).

[13] 3GPP TS 24.484: Mission Critical Services (MCS) configuration management.

[14] 3GPP TS 24.581: Mission Critical Video (MCVideo) media plane control.

[15] 3GPP TS 24.582: Mission Critical Data (MCData) media plane control.

[16] 3GPP TS 26.179: Mission Critical Push To Talk (MCPTT); Codecs and media handling.

[17] 3GPP TS 26.346: Multimedia Broadcast/Multicast Service (MBMS).

[18] 3GPP TS 29.212: Policy and Charging Control (PCC).

[19] 3GPP TS 29.214: Policy and Charging Control over Rx reference point.

[20] 3GPP TS 29.468: Group Communication System Enablers for LTE(GCSE_LTE); MB2 reference point.

[21] 3GPP TS 33.180: Security of the mission critical service.

[22] IETF RFC 3515: The Session Initiation Protocol (SIP) Refer Method.

[23] IETF RFC 3856: A Presence Event Package for the Session Initiation Protocol (SIP).

[24] IETF RFC 3903: Session Initiation Protocol (SIP) Extension or Event State Publication.

[25] IETF RFC 4488: Suppression of Session Initiation Protocol (SIP) REFER Method Implicit Subscription,.

[26] IETF RFC 4825: The Extensible Markup Language (XML) Configuration Access Protocol (XCAP).

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

[28] IETF RFC 5373: Requesting Answering Modes for the Session Initiation Protocol (SIP).

[29] IETF RFC 5875: An Extensible Markup Language (XML) Configuration Access Protocol (XCAP) Diff Event Package.

[30] IETF RFC 6135: An Alternative Connection Model for the Message Session Relay Protocol (MSRP).

[31] IETF RFC 6665: SIP-Specific Event Notification.

[32] IETF RFC 7647: Clarifications for the use of REFER with RFC6665.

[33] OMA. OMA-TS-XDM_Core-V2_1-20120403-A: XML Document Management (XDM) Specification.

[34] OMA. OMA-TS-XDM_Group-V1_1_1-20170124-A: Group XDM Specification.

[35] IETF RFC 7230: Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing.

[36] IETF RFC 5246: The Transport Layer Security (TLS).

[37] IETF RFC 6101: The Secure Sockets Layer (SSL).

[38] IETF RFC 4975: The Message Session Relay Protocol (MSRP).

[39] 3GPP TR 21.905: Vocabulary for 3GPP Specifications.

[40] ETSI TS 100 392-19-1: Interworking between TETRA and Broadband systems: Critical Communications Architecture for Interworking between TETRA and Broadband applications. (not published)

[41] ETSI TS 100 392-19-2: Interworking between TETRA and Broadband systems: Format for the transport of TETRA speech over mission critical broadband systems.

[42] TIA-102.BACA-B-3: Project 25 Inter-RF Subsystem Interface Messages and Procedures for Voice Services, Mobility Management, and RFSS Capability Polling Services.

[43] TIA-102.BACD-B-3: Inter-RF Subsystem Interface (ISSI) - Messages and Procedures for Supplementary Data.

3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [39] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [39].

AMR	Adaptative Multi-Rate Audio Codec
AMR-WB	Adaptative Multi-Rate Audio Codec Wideband
APP	Application
AS	Application Server
CMS	Configuration Management Server
CSC	Common Services Core
CSCF	Call Session Control Function
CSK	Client-Server Key
DUT	Device Under Test
E-UTRAN	Evolved Universal Terrestrial Radio Access Network
EPC	Evolved Packet Core
EPS	Evolved Packet System
ETSI	European Telecommunications Standard Institute
EUT	Equipment Under Test
FD	File Distribution
FE	Functional Element
FRMCS	Future Railway Mobile Communication System
GCSE	Group Communication Service Enabler
GMK	Group Master Key
GMS	Group Management Server
iFC	Initial Filter Criteria
IFS	Interoperable Functions Statement
IMPI	IP Multimedia Private Identity
IMPU	IP Multimedia Public identity
IMS	IP Multimedia Subsystem
IP	Internet Protocol
IdMS	Identity Management Server
IWF	Interworking Function
KMS	Key Management Server
MBMS	Multimedia Broadcast and Multicast Service
MCData	Mission Critical Data
MCPTT ID	MCPTT user identity
MCPTT	Mission Critical Push-To-Talk
MCVideo	Mission Critical Video
MCX	Mission Critical Services (X stands for PTT, Data and Video)
OAM	Operation and Maintenance
OTT	Over the Top
P25	Project 25
PCC	Policy and Charging Control
PCRF	Policy and Charging Rules Function
PES	Pre-established Sessions
PSI	Public Service Identity
PSTA	Public Safety Technology Association
PTT	Push-To-Talk
ProSe	Proximity-based Services
RAN	Radio Access Network
RTP	Real-time Transport Protocol
SDS	Short Data Service
SIP	Session Initiation Protocol
SPK	Signalling Protection Key
TCCA	The Critical Communications Association
TD	Test Description
TETRA	Terrestrial Trunked Radio
TR	Technical Recommendation
TRT	Test Reporting Tool

TS	Technical Specification
UE	User Equipment
UIC	International union of railways (Union Internationale des Chemins de fer)
UMA	University of Malaga

4 Technical and Project Management

4.1 Scope

The main goal of the sixth MCX Plugtests was testing the interoperability of the MCPTT, MCData and MCVideo ecosystem signalling and media plane at different levels. The railway related functionalities and interworking (IWF) with LMR was also tested during the event.

The basic scenario tested comprised MCX application server(s) -both controlling and participating- and MCX clients deployed over a generic SIP/IMS core, LTE access network with and without MCX required PCC capabilities with native multicast support (i.e. Release-14 -and higher- eMBMS) and UEs. The following figure (Fig 1) illustrates the basic test infrastructure. Additionally, the server-to-server interface between controlling and non-controlling controlling server for temporary groups has been addressed.

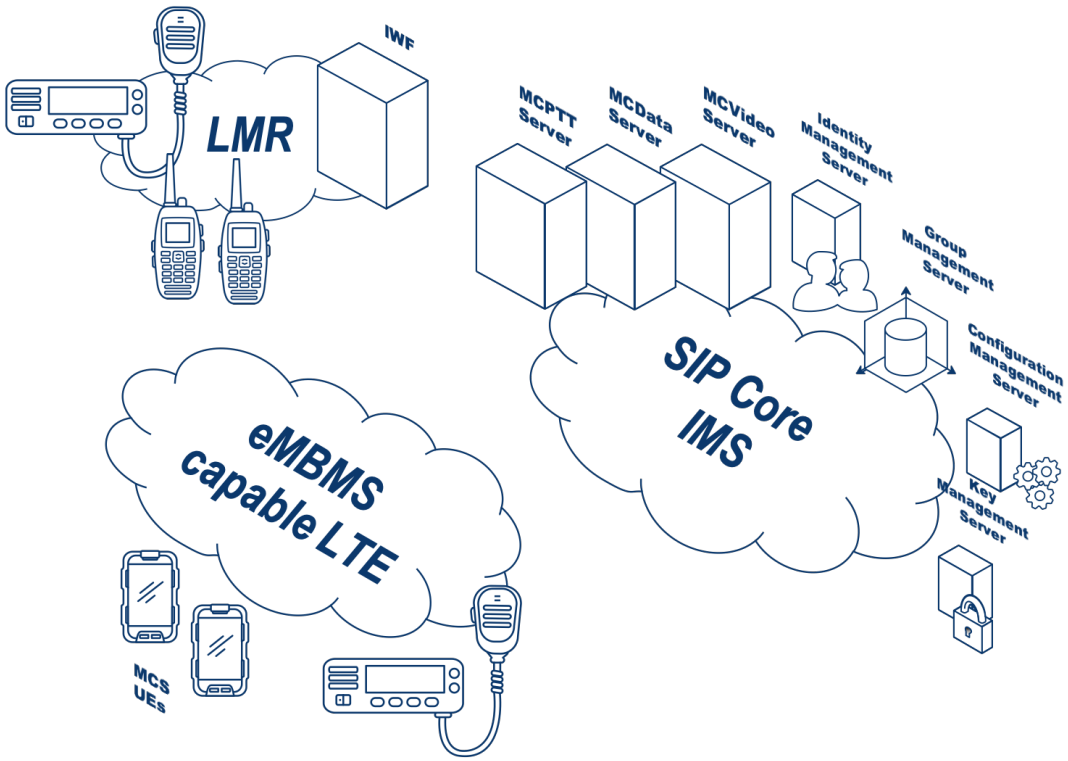


Figure 1. Typical MCPTT/MCData/MCVideo scenario to be considered in the Plugtests

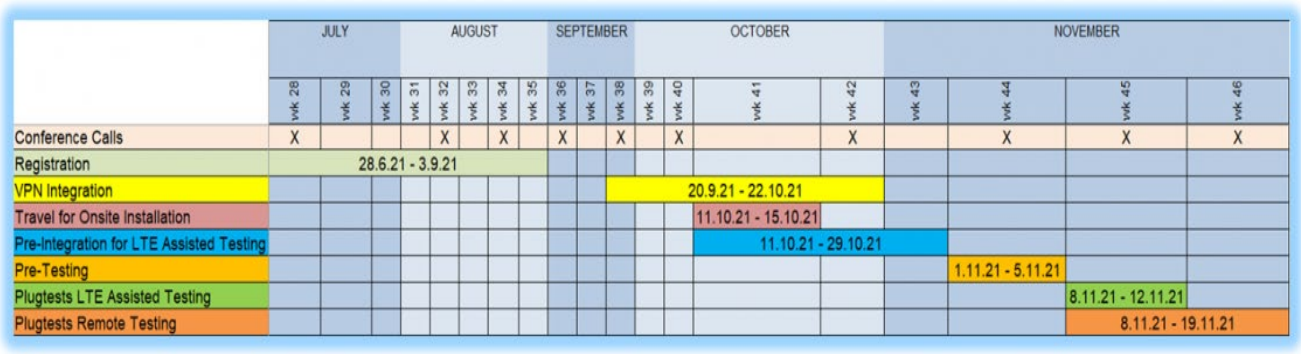
In the scope of this Plugtests event, the following high level test objectives were performed

- **Connectivity (CONN)**: Tests covered basic connectivity between functional elements at different levels including Access Network (LTE), IP Network, SIP/IMS and MCPTT/MCData/MCVideo Application level. At LTE level, unicast and more particularly eMBMS multicast connectivity was evaluated. Tests at IP layer targeted pure OTT connectivity regardless the underlying access network. SIP connectivity tests checked proper deployment of MCX AS over the selected SIP Core/IMS so that all SIP messages were successfully delivered from MCX Clients to Participating/Controlling MCPTT Servers and vice versa. In this 5th Plugtests, again, some AS vendors provided their own built in SIP/IMS cores so that Clients registered into different cores depending of the specific test session. Application level refers to e2e signalling, media, floor controlling (and other involved) protocols in use. Although for this Plugtests participants were encouraged to carry on CONN tests over Mission Critical LTE for unicast – or UNI-MC-LTE – and Mission Critical LTE with multicast eMBMS-capabilities – so called MULTI-MC-LTE -, most tests used the OTT (i.e. using WIFI / wired connections) one for its flexibility and the possibility of scheduling parallel test easily. Additionally, low level configuration-specific details (i.e. MCPTT. MC QCI and eMBMS bearer management) were considered in the PCC and eMBMS specific objectives. MCData and MCVideo features were mostly analysed in test cases associated to the CONN objective while sibling procedures (i.e. registration to different MCPTT/MCData/MCVideo servers) were carried out when needed.

- **Floor Controlling (FC):** Apart from the basic Floor Controlling procedures considered during the first CONN objective, FC comprised comprehensive interoperability analysis of more complex interactions, including prioritization and pre-emptive mechanisms. Additional test cases comprising more advanced floor controlling (i.e. timeouts and revokes) were evaluated.
- **Policing (PCC)**: Comprised specific checking proper LTE dynamic bearer signalling and allocation by eUTRAN/EPC.
- **eMBMS (EMBMS)**: Comprised checking of eMBMS specific signalling both in the MB2-U/C interface and e2e.
- **Registration and authorization (REGAUTH)**: Comprised MCX Client registration.
- **Affiliation (AFFIL)**: Comprised MCX Client explicit and implicite affiliation
- **Location (LOC)**: In the test specification document several location configuration, retrieval and submission procedures were considered.
- **OAM procedures (CSC):** Comprised OAM related IdMS, CMS, GMS and KMS interfacing procedures. Mostly MCPTT mechanisms were evaluated since MCData/MCVideo implementations were not as mature as MCPTT implementations and are also mainly equivalent to MCPTT implementations.
- **Security (SEC):** Comprised security related procedures (including both signalling and media cyphering and key retrieval considered in KMS-related test cases in CSC test cases).
- **MCVideo Transmission Control (TC):** Traditional MCVideo call types and Transmission Control operations covered in previous Plugtests were newly evaluated. Several additional new MCVideo call types were also added for this plugtests.
- **Server-to-server communications (S2S)**: Controlling to non-controlling interface for temporary groups in different trust configurations.
- **FRMCS**: Functional alias (FA), multi-talker floor control and exchange of FA during call signalling and floor control were evaluated.
- **MCData**: SDS and File Distribution mechanisms and newly added emergency alerting mechanisms.
- **IOP**: Interoperability testing oriented complex test cases were added.
- **Observer Test Scenarios**: more complex test scenarios which have been developed by observers.
- **Interworking Function (IWF)**: MCPTT connectivity test cases were re-used to test interworking with LMR systems (Tetra and P25).

4.2 Timeline

The preparation was run through different phases as described in the figure below.



	JULY			AUGUST					SEPTEMBER			OCTOBER			NOVEMBER			
	wk 28	wk 29	wk 30	wk 31	wk 32	wk 33	wk 34	wk 35	wk 36	wk 37	wk 38	wk 39	wk 40	wk 41	wk 42	wk 43	wk 44	wk 45	wk 46
Conference Calls	X				X		X		X		X		X		X		X	X	X
Registration	28.6.21 - 3.9.21																		
VPN Integration											20.9.21 - 22.10.21								
Travel for Onsite Installation														11.10.21 - 15.10.21					
Pre-Integration for LTE Assisted Testing														11.10.21 - 29.10.21					
Pre-Testing																	1.11.21 - 5.11.21		
Plugtests LTE Assisted Testing																		8.11.21 - 12.11.21	
Plugtests Remote Testing																		8.11.21 - 19.11.21	

Figure 2. Plugtests event timeline

Registration to the MCX Plugtests event was open from 22nd June 2021 to 03rd September 2021 to any organisation willing to participate in testing the MCX Services Ecosystem. A total of 150 people were finally involved in the hybrid Plugtests event.

The following clauses describe the different phases of the Plugtests event preparation. It is worth noting that since the start of the documentation phase until the first week of the Plugtests event, bi-weekly conference calls were run among organisers and participants to discuss and track the progress, anticipate and solve technical issues, review the test plan, etc.

4.2.1 Documentation

Once the registration to the Plugtests event was closed, the following documentation activities were launched in parallel:

1) EUT Documentation

Participants documented their EUTs, by providing the information directly to the Plugtests event team. The Plugtests event team compiled the final EUT table for all the participating vendors and was appended to the Plugtests event Test Plan,

All the information described above was made available in the Plugtests event WIKI, so that it could be easily maintained and consumed by participants.

2) Test Plan Development

The Test Plan development was led by ETSI Centre for Testing and Interoperability following the methodology defined by 3GPP TSG SA6 and 3GPP TSG CT1. The Test Plan was scoped around 3GPP Test Specification Release-16 capabilities and concentrated on the features supported by the implementations attending the Plugtests event.

The Test Plan was developed and consolidated in an iterative way, taking into account input and feedback received from Plugtests event participants. See details in clause 8.

4.2.2 Integration & pre-testing

Participants connected their implementations remotely to the Plugtests event infrastructure, known as HIVE: Hub for Interoperability and Validation at ETSI. Some of the participants also integrated their equipment with University of Malaga LTE network to participate in the LTE stream.

During this phase, up to 25 remote labs connected to HIVE and each of them was allocated a dedicated network. The interconnection of remote labs allowed running integration and pre-testing tasks remotely among any combination of participating EUTs, in order to ensure an efficient use of the f Plugtests event time and smoother Interoperability test sessions.

A VPN connection to HIVE was highly recommended for participants providing MCX Application Servers, MCX Clients and IMS for first connectivity tests, trouble shooting and infrastructure access purposes.

Additional details on the remote test infrastructure, remote integration and pre-testing procedures are provided in Clauses 6 and 7.

For the LTE assisted testing at the University of Malaga (UMA) in Spain, MCX AS Servers have been connected to the UMA LTE test system. UEs and MCX Clients, as well as testers have been provided to UMA for local assisted testing over the LTE radio access. Assistance was provided by the UMA personal. No vendors or observers were present at UMA during the Plugtests.

During this phase, the bi-weekly conference calls were continued among organisers and participants to synchronise, track progress and get ready for the on-site phase.

4.2.3 Plugtests event

From 08th November to 12th November 2021, University of Malaga assisted vendors participating in LTE stream to test interoperability with LTE network available at the host premises.

From 08th November to 19th November 2021, participants connected their equipment's with ETSI HIVE infrastructure to collaboratively run the Interoperability Test Sessions remotely.

The scheduling of individual test combinations was done randomly using ETSI Test Reporting tool as well as participants agreed test session slots between themselves for the 1st Plugtests week (08-12 November). The schedule was adapted during the test session slots on a per need basis.

4.3 Tools

4.3.1 Plugtests event WIKI

The Plugtests event WIKI was the main source of information for the MCX Plugtests event, from logistics aspects to testing procedures. Access to the WIKI was restricted to participating companies.

The main technical information provided in the wiki was organised as follows:

- **Event Information** – Logistics aspects of the Plugtests event.
- **List of Participants** – List of participants in the event.
- **Schedule –** Complete schedule of the event.
- **Observer Program** – Information about the Observer program and Observer demo during the Plugtests event.
- **Test Tools** – Information from the Test Tool vendors about what kind of tests they are offering for the Plugtests.
- **Network Information** - HIVE connection request tool, and remote connections status overview.
- **Specifications -** High Level Test Scope including the test specification and reference to 3GPP and IETF specifications.
- **Equipment Registration** - Participating EUTs overview and contact information.
- **Provisioning Information -** Pre-configured parameters for EUTs.
- **Test Reporting Tool** - Documentation of the Test Reporting Tool.
- **Conference Calls** - Calendar, logistics, agendas and minutes of the bi-weekly conference calls run during the remote integration and pre-testing phase.
- **Plugtests Observations** - Issues found during Plugtests event.
- **Host Information** – Information about the equipment available at host University of Malaga.

In addition, Slack was used among the participants to communicate with each other during the pre-testing phase and Test Sessions, include their remote colleagues (back-office support) in the discussions.

4.3.2 Test Reporting Tool (TRT)

The Test Reporting Tool guides participants through the Test Plan test cases during the pre-testing and main Test Sessions. It allows creating Test Session Reports compiling detailed results for the individual scheduled Test Sessions.

Only the companies providing the EUTs for each specific Test Session combination have access to their Test Session Reports contents and specific results. All companies involved in a specific session and who have entered the test results were required to verify and approve the reported results at the end of each session. Only test report which has been approved by all involved parties are considered as valid.

Another interesting feature of this tool is the ability to generate real-time stats (aggregated data) of the reported results, per test case, test group, test session or overall results. These stats are available to all participants and organisers and allow tracking the progress of the testing with different levels of granularity, which is extremely useful to analyse the results.

5370	2021-11-09 14:00	240	IV	Main-MCX	ATOS - MCX Client Tassta - MCX AS	
5371	2021-11-10 14:00	240	II	Main-MCX	ATOS - MCX Client Streamwide - MCX AS	
5372	2021-11-10 14:00	240	IV	Main-MCX	Frequentis - MCX Client Aselsan - MCX AS	
5373	2021-11-10 14:00	240	V	Main-MCX	Etelm - MCX Client Nemergent - MCX AS	
5374	2021-11-09 09:00	240	IV	Main-MCX	Siemens - MCX Client TD Tech - MCX AS	
5375	2021-11-09 09:00	240	VII	Main-FRMCS	Siemens - MCX Client TD Tech - MCX AS	
5376	2021-11-08 14:00	240	II	Main-FRMCS	Kontron - MCX Client MCLabs - MCX AS	
5377	2021-11-11 09:00	240	IV	Main-MCX	Sepura - MCX Client Frequentis - MCX AS	

Figure 3. Test Reporting Tool – example screen shot

5 Equipment Under Test

The tables below summarise the different EUTs provided by the Plugtests event participants:

5.1 MCX Application Servers

Organisation	Support
Airbus	MCPTT, MCDATA, MCVIDEO
Alea	MCPTT, MCDATA, MCVIDEO, RAIL
Aselsan	MCPTT, MCDATA, MCVIDEO
Ericsson	MCPTT, IWF
Frequentis	MCPTT, MCDATA, MCVIDEO, RAIL
Huawei	MCPTT, MCDATA, MCVIDEO, RAIL
Hytera	MCPTT, MCDATA, MCVIDEO, RAIL
Kontron Transportation	MCPTT, MCDATA, MCVIDEO, RAIL
Leonardo	MCPTT, MCDATA, MCVIDEO, RAIL
MCLabs	MCPTT, MCVIDEO, RAIL
Motorola Solutions	MCPTT, MCDATA, MCVIDEO
Nemergent Solutions	MCPTT, MCDATA, MCVIDEO, RAIL, IWF
StreamWide	MCPTT, MCDATA, MCVIDEO
TASSTA	MCPTT, MCDATA, RAIL, IWF
TD Tech	MCPTT, MCDATA, MCVIDEO, RAIL
Valid8	MCPTT, MCDATA, MCVIDEO

Table 1. MCPTT Application Servers Under Test

5.2 MCX Clients

Organisation	Support
Alea	MCPTT, MCDATA, MCVIDEO, RAIL
Atos	MCPTT, MCDATA, MCVIDEO, RAIL
Ericsson	MCPTT, IWF
Etelm	MCPTT, MCDATA, RAIL
Frequentis	MCPTT, MCPTT, MCDATA, RAIL
Huawei	MCPTT, MCDATA, MCVIDEO, RAIL
Hytera	MCPTT, MCDATA, MCVIDEO, RAIL
Kontron Transportation	MCPTT, MCDATA, MCVIDEO, RAIL
Leonardo	MCPTT, MCDATA, MCVIDEO, RAIL
Motorola Solutions	MCPTT, MCDATA, MCVIDEO
Nemergent Solutions	MCPTT, MCDATA, MCVIDEO, RAIL, IWF
Samsung	MCPTT, MCDATA, MCVIDEO
Sepura	MCPTT
Siemens	MCPTT, MCDATA, RAIL
Softil	MCPTT, MCDATA, MCVIDEO, RAIL
TASSTA	MCPTT, MCDATA, RAIL, IWF
TD Tech	MCPTT, MCDATA, MCVIDEO, RAIL
Teltronic	MCPTT, MCDATA, MCVIDEO, RAIL, IWF
Zetron	MCPTT

Table 2. MCX Clients Under Test

5.3 IP Multimedia Subsystem (IMS)

Organisation	Support
Athonet	

Table 3. IP Multimedia Subsystem (IMS) Under Test

5.4 Evolved Packet Core (EPC)

Organisation	Support
Athonet	
Ericsson	
University of Malaga	Test system

Table 4. Evolved Packet Core Under Test

5.5 Evolved Node B (ENB)

Organisation	Support
Ericsson	
University of Malaga	Test system

Table 5. Evolved Node B Under Test

5.5 User Equipment (UE)

Organisation	Support
Leonardo	
Sonim	
TDTech	
Teltronic	

Table 6. User Equipment Under Test

5.6 Land Mobile Radio (LMR)

Organisation	Support
Rohill	TETRA System
Teltronic	TETRA System
Nemergent-Valid8	P25 Gateway and P25 Simulator

Table 7. Land Mobile Radio Under Test

5.7 Evolved Multimedia Broadcast Multicast Services (eMBMS) Components

Organisation	Support
Athonet	

Table 8. Evolved Multimedia Broadcast Multicast Services (eMBMS) Components Under Test

5.8 Test Tools

Organisation	Support
MCS-TaaSting	MCX Conformance Tester (network simulator)

Polaris Networks (a Motorola Solutions company)	MCX Conformance Tester (network simulator)
Valid8	MCX Conformance Tester (network simulator)

Table 9. Testers Under Test

6 Test Infrastructure

6.1 Remote Test Infrastructure

The remote testing and pre-testing phase were enabled by the setup as shown in Figure 4:

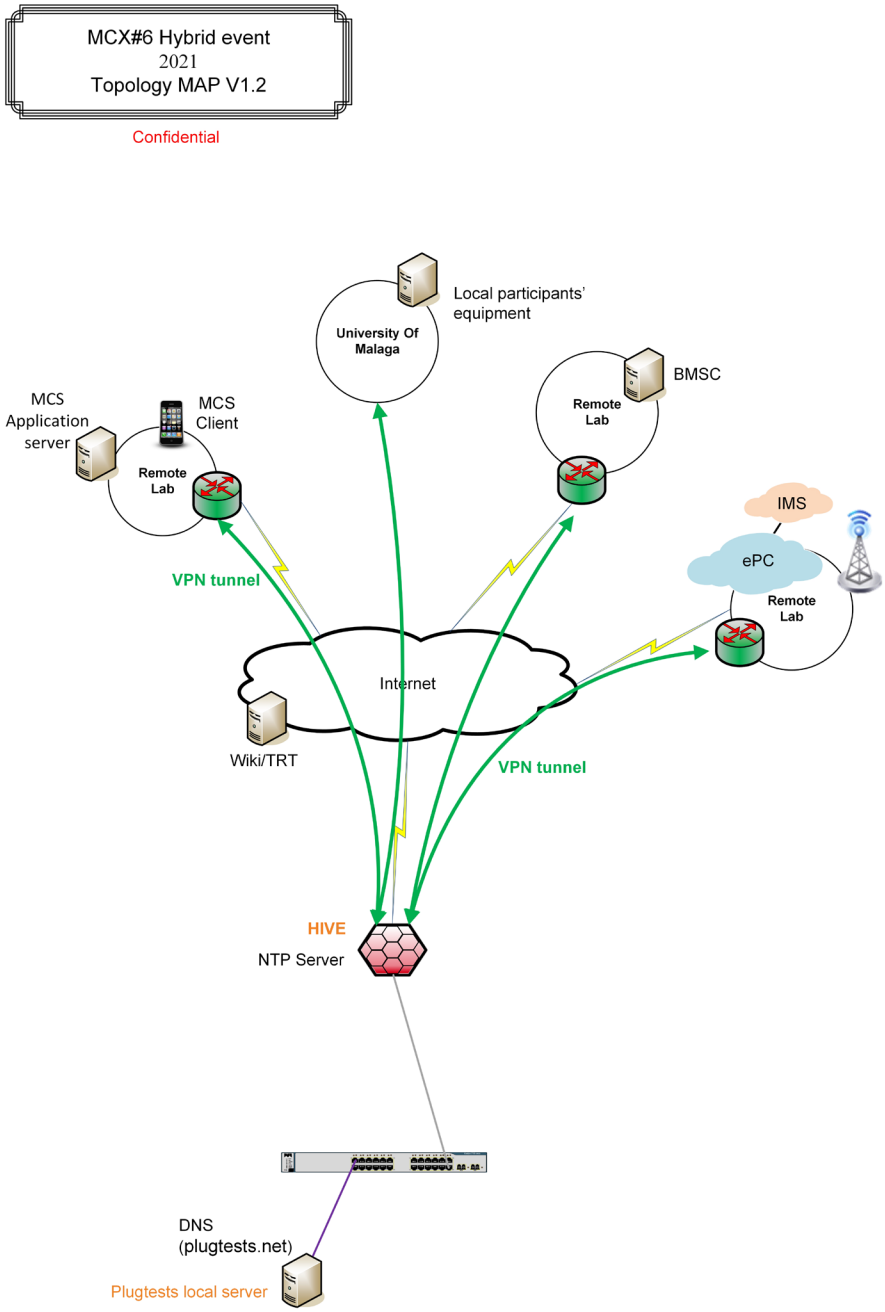


Figure 4. Remote Test Infrastructure

Once HIVE was deployed, a number of VPN tunnels were created to interconnect the equipment of the participants where the EUTs were running.

A total of 25 Remote Labs connected to the setup described above as a participant's lab.

7 Test Procedures

7.1 Remote Integration & Pre-testing Procedure

During the remote integration and pre-testing phase the following procedures were followed by the participating Equipment Under Test. Once the EUT documentation and HIVE connection had been successfully completed, the test cases from the test specifications were executed as part of the pre-testing

The progress of these procedures for the different combinations of EUTs was captured in the reporting function of TRT. The following Pre-Testing configurations were used in the pretesting phase

Config Name	Pre-testing Configuration
Pretest-MCX	MCX Client + MCX AS
Pretest-MCX-LTE	MCX Client + MCX AS (P+C) + UE + eNB + EPC
Pretest-MCX-PC	MCX Client + MCX AS (Participating) + MCX AS (Controlling)
Pretest-IWF	MCX Client + MCX AS + LMR (LMR+IWF originating/terminating bundle)
Pretest-MCX-Wifi	MCX Client + MCX AS(P+C) + UE

Table 10. Pre-testing Configuration

7.2 Interoperability Testing Procedure

During the Plugtests event, a daily Test Session Schedule was added and shared via the TRT. Test Sessions were organised in several parallel tracks, ensuring that all participants had at least one Test Session scheduled any time. The different test configurations were used for the main event.

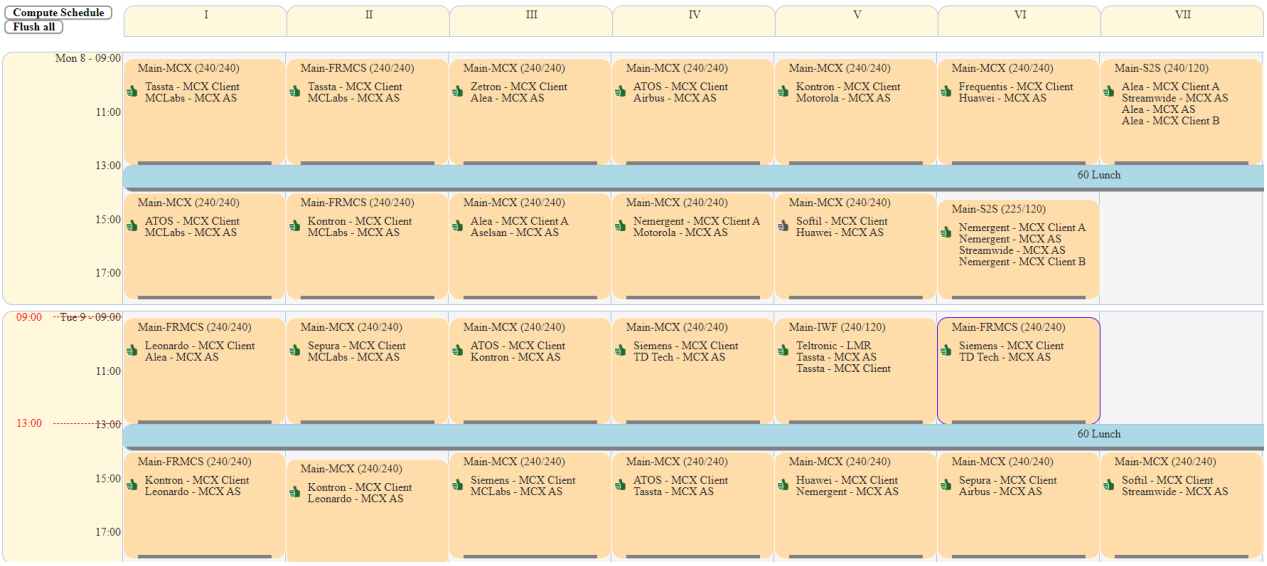


Figure 5. Daily Schedule & Test Sessions – example excerpt

Config Name	Main Test Configuration
Main-MCX	MCX Client + MCX AS (P+C)
Main-FRMCS	MCX Client + MCX AS (P+C)
Main-MCX-LTE	MCX Client + MCX AS (P+C) + UE + eNB + EPC
Main-MCX-Wifi	MCX Client + MCX AS (P+C) + UE
Main-IWF	MCX Client + MCX AS (P+C) + LMR (LMR+IWF originating/terminating bundle)
Main-S2S	MCX Client + MCX AS (P+C) + MCX Client + MCX AS (P+C)
Main-MCXAS-Tester	Tester + MCX AS
Main-MCXClient-Tester	Tester + MCX Client

Table 11. Main Test Configurations

During each test session, for each tested combinations the Interoperability testing procedure was as follows:

1. The participating vendors opened the Test Session Report and the Test Plan.

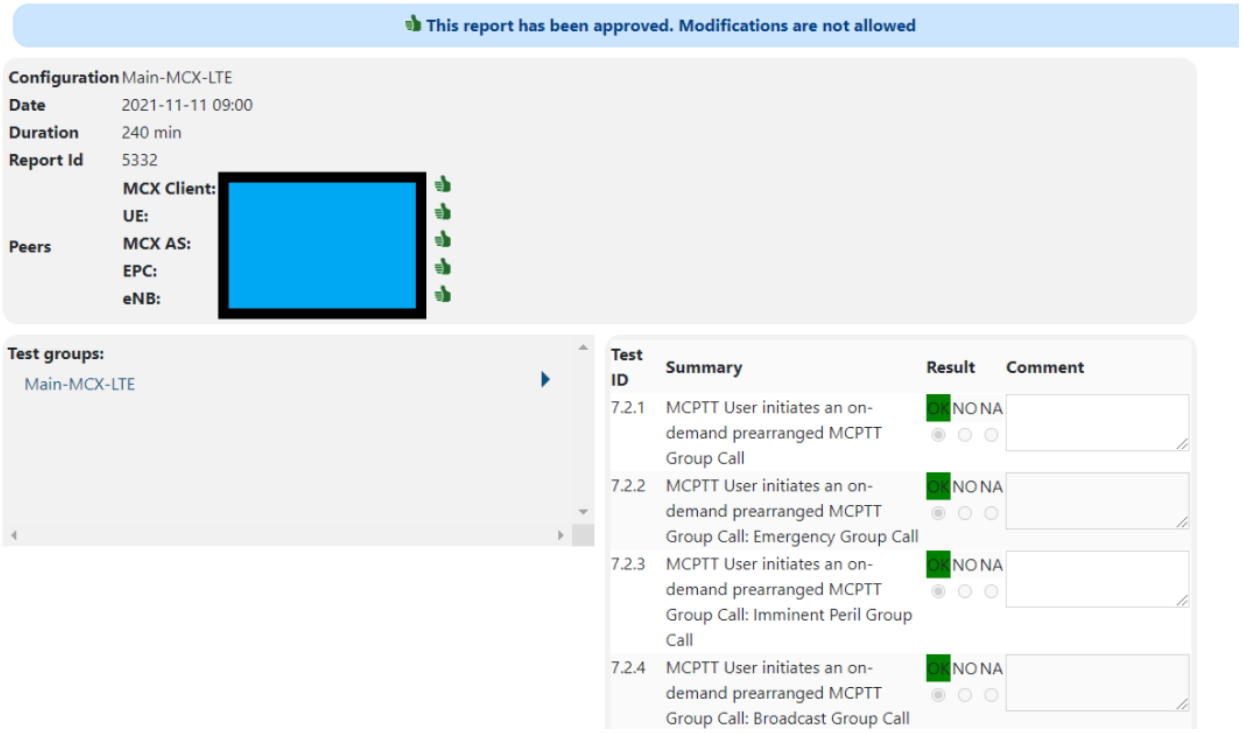


Figure 6. Test Session Report

2. For each Test in the Test Plan:

   a. The corresponding Test Description and EUT Configuration were followed.

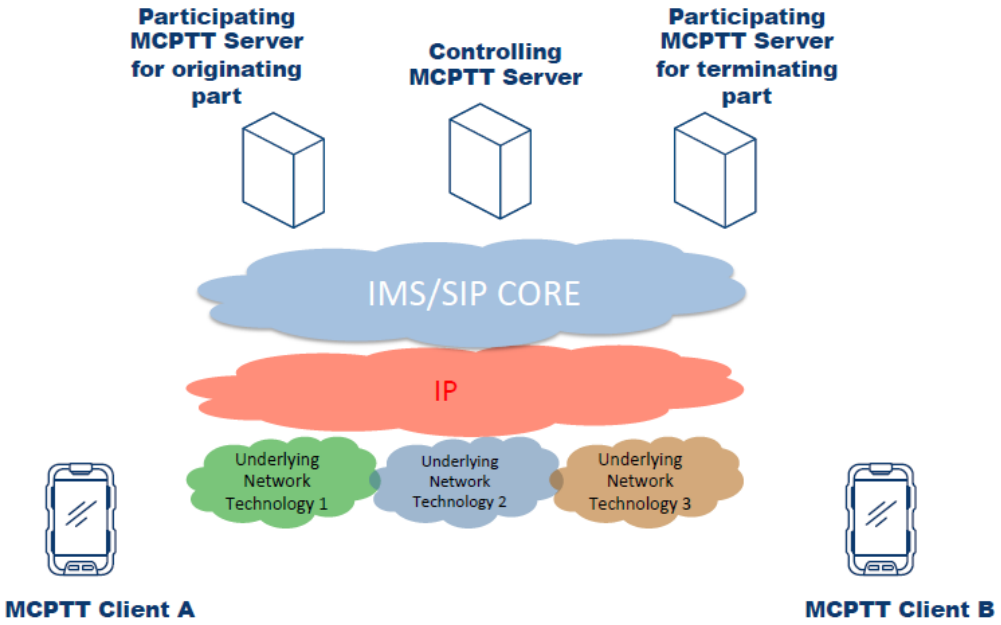


Figure 7. System Under Test (SUT) Configuration – MCPTT example

Interoperability Test Description			
Identifier	CONN/ONN/GROUP/PREA/ONDEM/NFC/01		
Test Objective	Verify IP connectivity, SIP core/IMS configuration and proper routing and SIP signaling of a pre-arranged on demand Group Call		
Configuration(s)	- CFG_ONN_OTT-1 (5.2) - CFG_ONN_UNI-MC-LTE-1 (5.3) - CFG_ONN_MULTI-MC-LTE-1 (5.4)		
References	- SIP (see [n.4] and other references in [n.5]) - MCPT (see [n.6] and other references in [n.5]) - RTP (see [n.4] and other references in [n.5])		
Applicability	- MCPTT-Client_ONN-MCPTT-CALL, MCPTT-Client_AMR-WB, MCPTT-Client_AFFIL, MCPTT-Client_MCPTT-FC (6.2) - MCPTT-Part_ONN-MCPTT-CALL, MCPTT-Part_AFFIL (see NOTE), MCPTT-Part_MCPTT-FC, MCPTT-Part_RX (CFG_ONN_UNI-MC-LTE-1 only), MCPTT-Part_GCSE (CFG_ONN_MULTI-MC-LTE-1 only), (6.5) - MCPTT-Ctrl_ONN-MCPTT-CALL, MCPTT-Ctrl_AFFIL (see NOTE) (6.6)		
Pre-test conditions	- IP connectivity among all elements of the specific scenario - Proper configuration of the SIP core/IMS to forward the signaling to the specific controlling and participating servers - UEs properly registered to the SIP core/IMS and MCPTT system - Calling user is affiliated to the called group		
Test Sequence	**Step**	**Type**	**Description**
	1	stimulus	User 1 (mcptt_id_clientA@example.com) calls mcptt-group-A
	2	check	Dialog creating INVITE received at the MCPTT participating server of mcptt_id_clientA@example.com after traversing SIP core/IMS
	3	check	INVITE received at the MCPTT controlling server
	4	check	The MCPTT controlling server loads the affiliated members of the mcptt-group-A (either preconfigured or retrieved from the GMS) and creates an INVITE per each of the "n" members
	5	check	"n" INVITEs received at the MCPTT participating servers of each mcptt_id_clientX (where X:1..n)
	6	check	"n" INVITEs received at the affiliated mcptt_id_clientX
	7	check	"n" SIP dialogs established
	8	verify	Call connected and multiple media flows exchanged

Figure 8. Test Description example

3. MCX equipment providers jointly executed the different steps specified in the test description and evaluated interoperability through the different IOP Checks prescribed in the Test Description

   b. The MCX equipment provider recorded the Test Result in the Test Session Report, as follows:

      i. OK: all IOP Checks were successful

      ii. NOK: at least one IOP Check failed. A comment was requested.

      iii. NA: the feature was not supported by at least 1 of the involved EUTs. A comment was requested.

4. Once all the tests in the Test Session Report were executed and results recorded, the participants reviewed the Report and approved it.

8 Test Plan Overview

8.1 Introduction

This 6th MCX Plugtests Test Plan was developed following ETSI guidelines for interoperability. Additional Release 16 based test cases were included comprising group regrouping, implicit affiliation, MCData Message Store and eMBMS..

The Test Plan was reviewed and discussed with participants during the preparation and pre-testing phase. Considering the huge number of resulting test cases and difference expected maturity of the implementations and differences from participants in the previous Plugtests event and new companies, vendors selected the subset of test cases to evaluate in a per-testing slot basis.

The following sections summarise the methodology used for identifying the different configuration and test objectives leading to different test cases sub groups.

8.2 Test configurations

The overall MCX ecosystem comprises both controlling and participating MCPTT/MCData/MCVideo application server(s), MCPTT Clients deployed over a generic SIP Core/IMS, LTE access network with and without MCPTT required PCC capabilities and native multicast support (i.e. Release-14 eMBMS). Furthermore, a series of support servers were integrated in the so-called Common Services Core provide configuration, identity, group and key management capabilities. Note, again 3GPP Release-16 compliant On-Network operations only were considered.

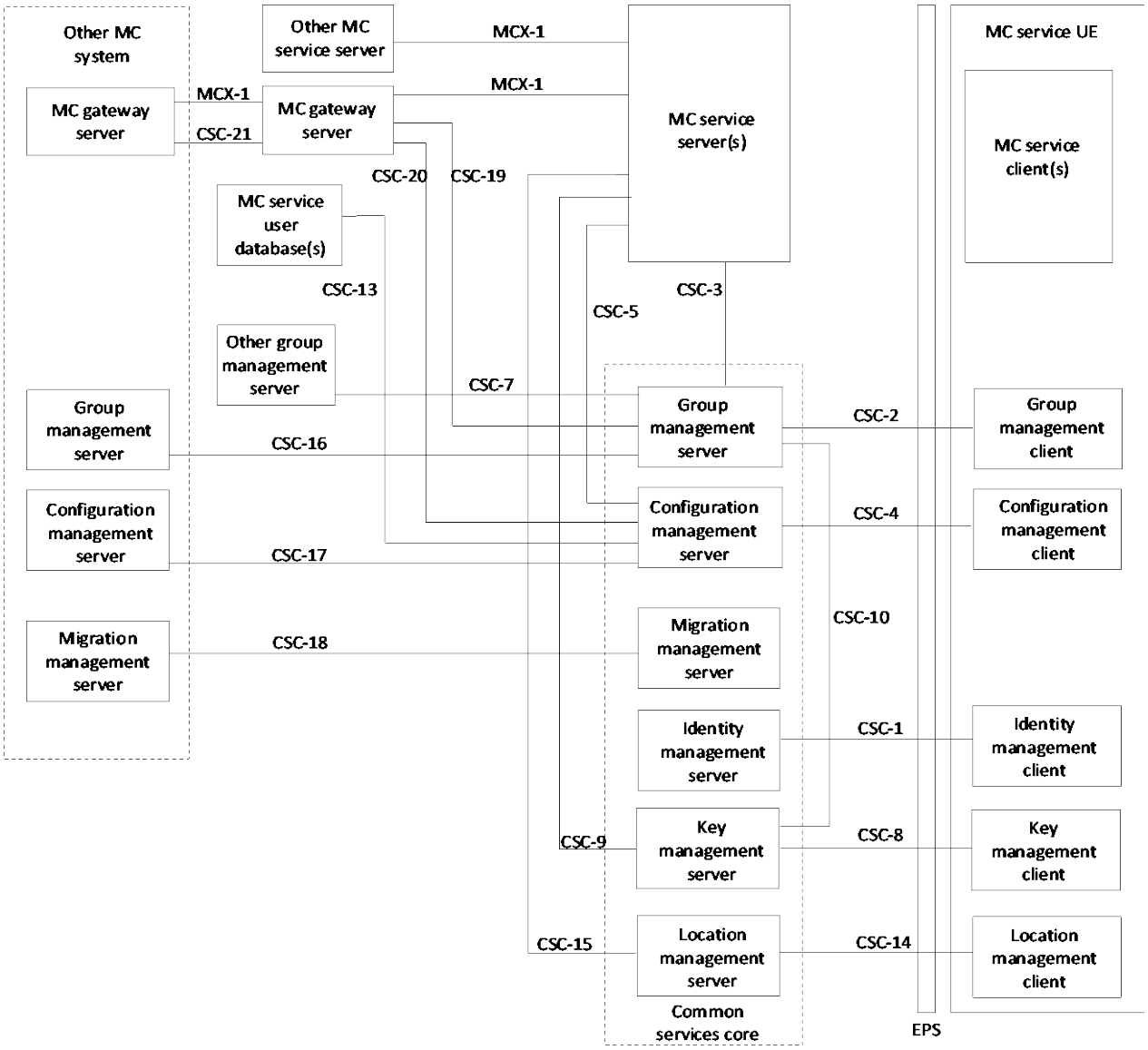


Figure 9. Functional model for application plane Figure 7.3.1-1 in 3GPP TS 23.280 [3].

Figure 7.3.1-1 in 3GPP TS 23.280 [3] describes the overall architecture and the reference points considered for the interoperability testing for any (MCPTT/MCData/MCVideo) MC Service (MCS). As can be seen, the resulting number of functional elements, interfaces and protocols involved is quite large. Furthermore, there are MCPTT/MCData/MCVideo-only specific interfaces and others (like Rx and MB2-C/MB2-U) involving other supporting technologies like LTE EPS. In order to focus on MCS signalling the following three different configuration were initially considered: MCPTT/MCData/MCVideo as an application service over IP networks (Over-the-Top), unicast Mission Critical LTE and multicast Mission Critical LTE (all of them for On-Network calls only).

8.2.1 Over-The-Top Configuration for On-Network calls (CFG_ONN_OTT-1)

This configuration considered On-Network Calls (ONN) with a pure Over-The-Top (OTT) approach. It emulated a scenario where any underlying network (i.e. commercial LTE, WiFi or any wired technology such as Ethernet) would provide a bit-pipe type only access. No QoS/prioritization enforcement neither access-layer multi/broadcasting capabilities would be provided (i.e. nor unicast PCC support or multicast mechanisms in LTE). Therefore, although not usable in a real world Mission Critical environment, it was used for connectivity tests since it did not require any binding between the IMS/SIP Core and the underlying LTE infrastructure and allowed both signalling and media plane parallel testing easily.

8.2.2 Unicast Mission Critical LTE for On-Network calls (CFG_ONN_UNI-MC-LTE-1)

In this configuration the LTE network (both EPC and eUTRAN) provided PCC capabilities and therefore enforced QoS policies in terms of prioritization and pre-emptiveness of Mission Critical unicast bearers. That included new Public Safety QCI 65/69 support in UEs and EPC/eUTRAN, and the availability of a PCRF with MCPTT compliant Rx/MCPTT-5 interface. Specific Rx/MCPTT-5 reference points and unicast bearer setup and update triggering mechanisms were tested using this configuration. Note that, although MCPTT only is mentioned and depicted in the following figure, MCVideo/MCData could follow the same approach.

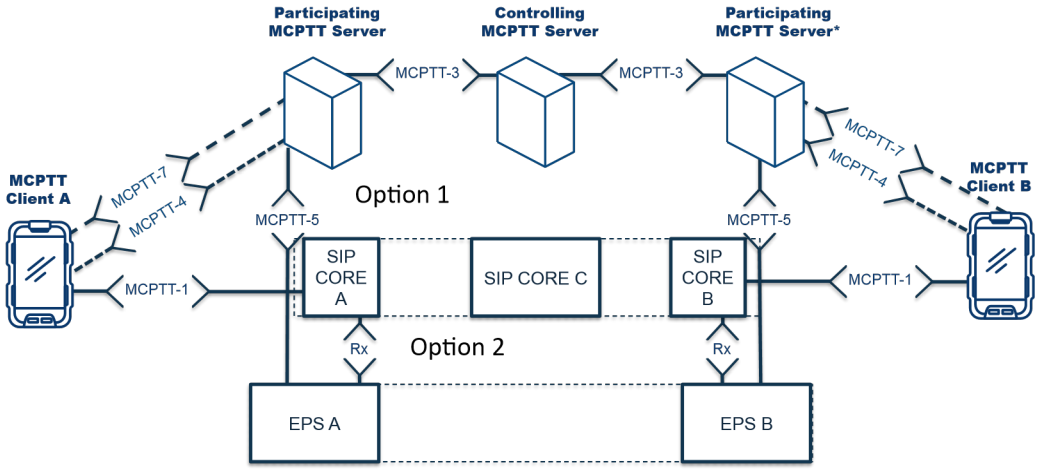


Figure 10. CFG_ONN_UNI-MC-LTE-1 configuration

8.2.3 Multicast Mission Critical LTE for On-Network calls (CFG_ONN_MULTI-MC-LTE-1)

In this configuration LTE provided multicast capability including Rel. 14 (and beyond) LTE-A Pro eMBMS and needed interfaces both in the core side (MB2-C and MB2-U with the BM-SC) and in the eUTRAN/UE side. It was used to test eMBMS bearer setup and update related test cases.

NOTE: In this hybrid 6th MCX Plugtests both configurations (unicast and multicast scenarios) were possible.

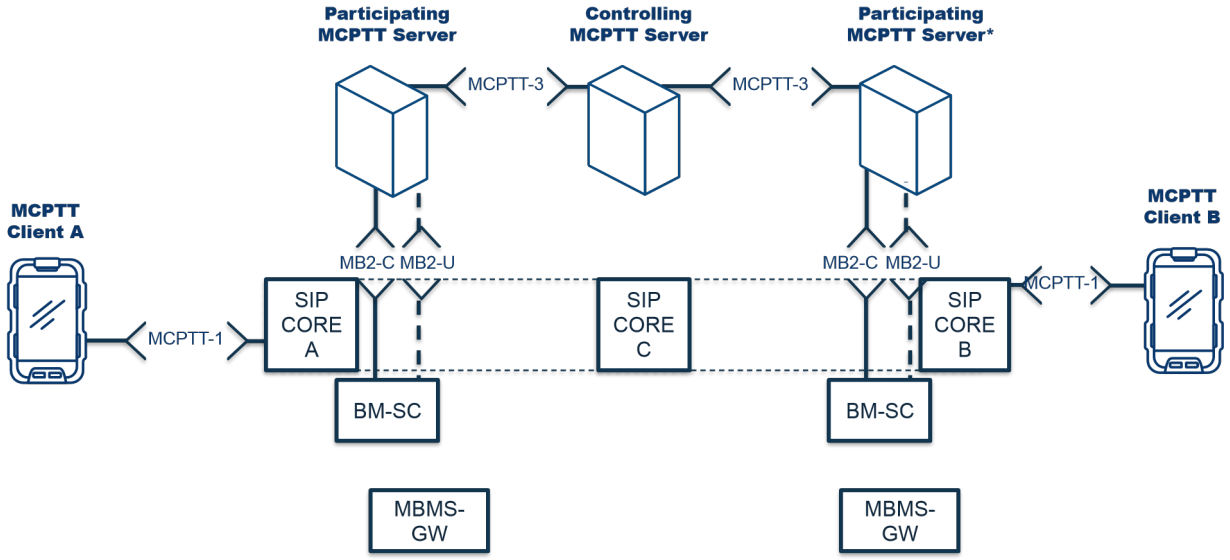


Figure 11. CFG_ONN_MULTI-MC-LTE-1 configuration

In order to deal with the different test setting according to the three aforementioned configurations and cover specific more complex test configuration involving different clients and Observer test cases, the following configuration modes were defined in the TRT tool.

Configuration	Resulting configuration mode in the Plugtests (TRT)
ONN-OTT	Main-MCX Main-IWF Main-FRMCS Main-MCX-Wifi Main-S2S Main-MCXAS-Tester Main-MCXClient-Tester
ONN-LTE	Main-MCX-LTE

Table 12. Mapping of scenario architecture configurations and Plugtests event practical configurations

8.2.4 Group of test cases

As described in the Subclause 4.1 of this document, different test objectives were considered.

In order to avoid bottlenecks, Connectivity (CONN), Floor Controlling (FC), Registration and authorization (REGAUTH) and Affiliation (AFFIL) objectives were tested on the ONN_OTT configuration only. On the other hand Policing (PCC) related test cases were evaluated using UNI-MC-LTE configuration and eMBMS (eMBMS) used MULTI-MC-LTE configuration.

The following tables collect the test cases grouped by test objective following the structure of the test specification document itself.

Test Id	Test Purpose
CONN-MCPTT/GROUP/PREA/ONDEM/NFC/01	On-demand prearranged MCPTT Group Call (Sections 10.1.1.2.1, 10.1.1.3.1.1 and 10.1.1.4 in)
CONN-MCPTT/GROUP/PREA/ONDEM/NFC/02	On-demand prearranged MCPTT Group Call (Sections 10.1.1.2.1, 10.1.1.3.1.1 and 10.1.1.4 in [9]): Emergency MCPTT Group Call (6.2.8.1.[1-8][13-17] in [9])
CONN-MCPTT/GROUP/PREA/ONDEM/NFC/03	On-demand prearranged MCPTT Group Call (Sections 10.1.1.2.1, 10.1.1.3.1.1 and 10.1.1.4 in [9]): Imminent Peril MCPTT Group Call (6.2.8.1.9-12 in [9])
CONN-MCPTT/GROUP/PREA/ONDEM/NFC/04	On-demand prearranged MCPTT Group Call (Sections 10.1.1.2.1, 10.1.1.3.1.1 and 10.1.1.4 in [9]): Broadcast MCPTT Group Call (6.2.8.2 in [9])
CONN-MCPTT/GROUP/PREA/ONDEM/NFC/05	On-demand prearranged MCPTT Group Call (Sections 10.1.1.2.1, 10.1.1.3.1.1 and 10.1.1.4 in [9] : Upgrade to in-progress emergency or imminent peril (10.1.1.2.1.3, 10.1.2.2.1.4 in [9])
CONN-MCPTT/GROUP/PREA/ONDEM/NFC/06	Termination of an on-demand prearranged MCPTT Group Calls (Sections 10.1.1.2.3.1 and 10.1.1.3.3.1 in [9])
CONN-MCPTT/GROUP/PREA/PRE/NFC/01	Prearranged MCPTT Group Call using pre-established session (Sections 10.1.1.2.2, 10.1.1.3.1.2 and 10.1.1.4 in [9]
CONN-MCPTT/GROUP/PREA/PRE/NFC/02	Termination of a prearranged MCPTT Group Call using pre-established session (Sections 10.1.1.2.3.2 and 10.1.1.3.3.2 in [9])
CONN-MCPTT/GROUP/CHAT/ONDEM/NFC/01	On-demand MCPTT Chat Group Call establishment (Sections 10.1.2.2.1.1, 10.1.2.3.1.1, 10.1.2.3.1.3 and 10.1.2.4.1.1 in [9])
CONN-MCPTT/GROUP/CHAT/ONDEM/NFC/02	Ongoing on-demand MCPTT Chat Group Call upgraded to emergency call (Sections 10.1.2.2.1.4, 10.1.2.2.1.2, 10.1.2.3.1.2, 10.1.2.3.1.4 and 10.1.2.4.1.2 in [9])
CONN-MCPTT/GROUP/CHAT/ONDEM/NFC/03	Ongoing on-demand MCPTT Chat Group Call upgraded to imminent peril (Sections 10.1.2.2.1.4, 10.1.2.2.1.2, 10.1.2.3.1.2, 10.1.2.3.1.4 and 10.1.2.4.1.3 in [9])
CONN-MCPTT/GROUP/CHAT/ONDEM/NFC/04	Cancellation of the in-progress emergency condition of an on-demand MCPTT Chat Group Call (Sections 10.1.2.2.1.3, 10.1.2.2.1.2, 10.1.2.3.1.2, 10.1.2.3.1.4 and 10.1.2.4.1.2 in [9])
CONN-MCPTT/GROUP/CHAT/ONDEM/NFC/05	Cancellation of the in-progress imminent peril condition of an on-demand MCPTT Chat Group Call (Sections 10.1.2.2.1.5, 10.1.2.2.1.2, 10.1.2.3.1.2, 10.1.2.3.1.4 and 10.1.2.4.1.3 in [9])

Test Id	Test Purpose
CONN-MCPTT/GROUP/CHAT/PRE/NFC/01	MCPTT Chat Group Call establishment within a pre-established session (Sections 10.1.2.2.2, 10.1.2.2.1.6, 10.1.2.3.2.1, 10.1.2.3.2.2 and 10.1.2.4.1.1 in [9])
CONN-MCPTT/PRIV/AUTO/ONDEM/WFC/NFC/01	On-demand private MCPTT call with floor control (Section 11.1.1.2.1 in [9]) and automatic commencement mode, see [31])
CONN-MCPTT/PRIV/MAN/ONDEM/WFC/NFC/01	On-demand private MCPTT call with floor control manual mode (Section 11.1.1.2.1 in [9]) and manual commencement mode, see [31])
CONN-MCPTT/PRIV/AUTO/PRE/WFC/NFC/01	Pre-established private MCPTT call with floor control (Section 11.1.1.2.1 in [9]) and automatic commencement mode, see [31])
CONN-MCPTT/PRIV/MAN/PRE/WFC/NFC/01	Pre-established private MCPTT call with floor control manual mode (Section 11.1.1.2.1 in [9]) and manual commencement mode, see [31])
CONN-MCPTT/PRIV/AUTO/ONDEM/WOFC/01	On-demand private MCPTT call without floor control (Section 11.1.1.2.1 in [9]) and automatic commencement mode, see [31])
CONN-MCPTT/PRIV/MAN/ONDEM/WOFC/01	On-demand private MCPTT call without floor control manual mode (Section 11.1.1.2.1 in [9]) and manual commencement mode, see [31])
CONN-MCPTT/PRIV/AUTO/PRE/WOFC/01	Pre-established private MCPTT call without floor control (Section 11.1.1.2.1 in [9]) and automatic commencement mode, see [31])
CONN-MCPTT/PRIV/MAN/PRE/WOFC/01	Pre-established private MCPTT call without floor control manual mode (Section 11.1.1.2.1 in [9]) and manual commencement mode, see [31])
CONN-MCPTT/ONN/FIRST/MANUAL/ONDEM/WFC/NFC/01	MCPTT User initiates an on-demand first-to-answer MCPTT call with floor control (Sections 11.1.1.2.1, 11.1.1.3.1.1 and 11.1.1.4 in [9])
CONN-MCPTT/ONN/FIRST/MANUAL/ONDEM/WOFC/NFC/01	MCPTT User initiates an on-demand first-to-answer MCPTT call without floor control (Section 11.1.2 in [9])
CONN-MCPTT/ONN/FIRST/MANUAL/PRE/WFC/NFC/01	MCPTT User initiates an on-demand first-to-answer MCPTT call with floor control using pre-established sessions (Sections 11.1.1.2.2, 11.1.1.3.1.2, 11.1.3.2.2 and 11.1.1.4 in [9] and [30])
CONN-MCPTT/ONN/FIRST/MANUAL/PRE/WOFC/01	MCPTT User initiates a pre-established first-to-answer MCPTT call in manual commencement mode without floor control
CONN-MCPTT/ONN/CALLBACK/SETUP/01	MCPTT User setups a private-call callback (Sections 11.1.1.2.1, 11.1.1.3.1.1 and 11.1.1.4 in [9])
CONN-MCPTT/ONN/CALLBACK/CANCEL/01	MCPTT User cancels a private-call callback (Section 11.1.2 in [9])
CONN-MCPTT/ONN/CALLBACK/FULFIL/01	MCPTT User fulfils a private-call callback
CONN-MCPTT/ONN/AMBIENT/ONDEM/LOCAL/01	MCPTT User setups locally an on-demand ambient listening call (Sections 11.1.6.2.1.1, 11.1.6.3 and 11.1.6.4 in [9])
CONN-MCPTT/ONN/AMBIENT/ONDEM/LOCAL/02	MCPTT User releases locally an on-demand ambient listening call (Section 11.1.6.2.1.3 in [9])
CONN-MCPTT/ONN/AMBIENT/PRE/LOCAL/01	MCPTT User setups locally an ambient listening call using pre-established session (Section 11.1.6.2.2 in [\ref{nr:3gpp-ts-23379}])
CONN-MCPTT/ONN/AMBIENT/PRE/LOCAL/02	MCPTT User releases locally an ambient listening call using pre-established session (Section 11.1.6.2.2.3 in [9])
CONN-MCPTT/ONN/AMBIENT/ONDEM/REMOTE/01	MCPTT User setups remotely an on-demand ambient listening call (Section 11.1.6.2.1.1 in [9])
CONN-MCPTT/ONN/AMBIENT/ONDEM/REMOTE/02	MCPTT User releases remotely an on-demand ambient listening call (Section 11.1.6.2.1.3 in [9])
CONN-MCPTT/ONN/AMBIENT/PRE/REMOTE/01	MCPTT User setups remotely an ambient listening call using pre-established session
CONN-MCPTT/ONN/AMBIENT/PRE/REMOTE/02	MCPTT User releases remotely an ambient listening call using pre-established session

Test Id	Test Purpose
CONN-MCPTT/ONN/GROUPCHANGE/01	Remote change of selected group (Section 10.1.4 in [9])
CONN-MCDATA/O2O/STANDALONE/SDS/SIP/01	One-to-one standalone SDS over SIP
CONN-MCDATA/O2O/STANDALONE/SDS/MSRP/01	One-to-one standalone SDS over media plane (MSRP)
CONN-MCDATA/O2O/SESSION/SDS/MSRP/01	One-to-one SDS session
CONN-MCDATA/GROUP/STANDALONE/SDS/SIP/01	Group standalone SDS over SIP
CONN-MCDATA/GROUP/STANDALONE/SDS/MSRP/01	Group standalone SDS over media plane (MSRP)
CONN-MCDATA/GROUP/SESSION/SDS/MSRP/01	Group SDS session
CONN-MCDATA/O2O/FD/HTTP/01	One-to-one FD using HTTP
CONN-MCDATA/GROUP/FD/HTTP/01	Group FD using HTTP
CONN-MCDATA/O2O/FD/MSRP/01	One-to-one FD using media plane (MSRP)
CONN-MCDATA/GROUP/FD/MSRP/01	Group FD using media plane (MSRP)
CONN-MCDATA/DISNOT/SDS/01	Standalone SDS with delivered and read notification
CONN-MCDATA/DISNOT/SDS/02	Group standalone SDS with delivered and read notification
CONN-MCDATA/DISNOT/FD/01	One-to-one FD using HTTP with file download completed notification
CONN-MCDATA/DISNOT/FD/02	Group FD using HTTP with file download completed notification
CONN-MCDATA/NET/FD/01	Network triggered FD notifications
CONN MCVIDEO/ONN/PRIV/AUTO/ONDEM/WTC/NTC/01	On-demand private MCVideo call in automatic commencement mode with transmission control
CONN-MCVIDEO/ONN/PRIV/AUTO/ONDEM/WOTC/01	On-demand private MCVideo call in automatic commencement mode without transmission control
CONN-MCVIDEO/ONN/GROUP/PREA/ONDEM/NTC/01	On-demand prearranged MCVideo Group Call
CONN-MCVIDEO/ONN/GROUP/CHAT/ONDEM/NTC/01	On-demand MCVideo Chat Group Call
CONN-MCPTT/ONN/GROUP/PREA/ONDEM/NFC/07	Late call entry of a MCPTT User during an on-demand prearranged MCPTT Group Call
CONN-MCPTT/ONN/GROUP/PREA/PRE/NFC/03	Late call entry of a MCPTT User during a prearranged MCPTT Group Call using pre-established session
CONN-MCPTT/ONN/GROUP/PREA/ONDEM/NFC/08	Rejoin of a MCPTT User during an on-demand prearranged MCPTT Group Call
CONN-MCPTT/ONN/GROUP/PREA/PRE/NFC/04	Rejoin of a MCPTT User during an on-demand prearranged MCPTT Group Call using pre-established session
CONN-MCPTT/ONN/GROUP/CHAT/ONDEM/SUBCONF/01	Subscription to Conference Event package
CONN-MCPTT/ONN/PRIV/AUTO/ONDEM/WFC/NFC/02	MCPTT User initiates an on-demand private MCPTT emergency call in automatic commencement model with floor control
CONN-MCPTT/ONN/EMERG-ALERT/MSG/01	MCPTT User initiates an emergency alert by sending a SIP MESSAGE
CONN-MCPTT/ONN/EMERG-ALERT/MSG/02	MCPTT User cancels an emergency alert by sending a SIP MESSAGE
CONN-MCPTT/ONN/EMERG-ALERT/MSG/03	MCPTT User cancels an emergency alert originated by other user by sending a SIP MESSAGE
CONN-MCPTT/ONN/EMERG-ALERT/MSG/04	MCPTT client receives a notification of entry into a group geographic area
CONN-MCPTT/ONN/EMERG-ALERT/MSG/05	MCPTT client receives a notification of exit from a group geographic area
CONN-MCPTT/ONN/GROUP/PREA/ONDEM/NFC/09	MCPTT User exits an ongoing an on-demand prearranged MCPTT Group Call upon de-affiliation to this group
CONN-MCDATA/ONN/O2O/FD/HTTP/02	Receive O2O FD request with mandatory download
CONN-MCDATA/ONN/O2O/FD/HTTP/03	Receive O2O FD request without mandatory download
CONN-MCDATA/ONN/DEFER/01	Request a list of deferred group communications
CONN-MCDATA/ONN/GROUP/STANDALONE/SDS/SIP/02	Send an enhanced status to an MCData group
CONN-MCVIDEO/ONN/GROUP/CHAT/ONDEM/NTC/02	MCVideo User upgrades an ongoing on-demand Chat Group Call to emergency call

Test Id	Test Purpose
CONN-MCVIDEO/ONN/GROUP/CHAT/ONDEM/NTC/03	MCVideo User upgrades an ongoing on-demand Chat Group Call to imminent-peril call
CONN-MCVIDEO/ONN/GROUP/CHAT/ONDEM/NTC/04	MCVideo User cancels the emergency condition of an on-demand Chat Group Call
CONN-MCVIDEO/ONN/GROUP/CHAT/ONDEM/NTC/05	MCVideo User cancels the imminent-peril condition of an on-demand Chat Group Call
CONN-MCVIDEO/ONN/GROUP/PREA/ONDEM/NTC/02	MCVideo User initiates an on-demand prearranged MCVideo Group Call: Emergency Group Call
CONN-MCVIDEO/ONN/GROUP/PREA/ONDEM/NTC/03	MCVideo User initiates an on-demand prearranged MCVideo Group Call: Imminent Peril Group Call
CONN-MCVIDEO/ONN/GROUP/PREA/ONDEM/NTC/04	MCVideo User initiates an on-demand prearranged MCVideo Group Call: Broadcast Group Call
CONN-MCVIDEO/ONN/GROUP/PREA/ONDEM/NTC/05	MCVideo User initiates an on-demand prearranged MCVideo Group Call: Upgrade to in progress emergency or imminent peril
CONN-MCVIDEO/ONN/GROUP/PREA/ONDEM/NTC/06	MCVideo User initiates the termination of an on-demand prearranged MCVideo Group Call
CONN-MCVIDEO/ONN/PRIV/MANUAL/ONDEM/WOTC/NTC/01	MCVideo User initiates an on-demand private MCVideo call in manual commencement mode without transmission control
CONN-MCVIDEO/ONN/PRIV/MANUAL/ONDEM/WTC/NTC/01	MCVideo User initiates an on-demand private MCVideo call in manual commencement mode with transmission control
CONN-MCVIDEO/ONN/AMBIENT/ONDEM/LOCAL/01	MCVideo User setups locally an on-demand ambient viewing call
CONN-MCVIDEO/ONN/AMBIENT/ONDEM/LOCAL/02	MCVideo User releases locally an on-demand ambient viewing call
CONN-MCVIDEO/ONN/AMBIENT/ONDEM/REMOTE/01	MCVideo User setups remotely an on-demand ambient viewing call
CONN-MCVIDEO/ONN/AMBIENT/ONDEM/REMOTE/02	MCVideo User releases remotely an on-demand ambient viewing call
CONN-MCVIDEO/ONN/ONE-TO-ONE/VIDEOPULL/01	MCVideo User initiates a one-to-one video pull in automatic commencement mode with transmission control
CONN-MCVIDEO/ONN/ONE-FROM-SERVER/VIDEOPULL/01	MCVideo User initiates a one-from-server video pull in automatic commencement mode with transmission control
CONN-MCVIDEO/ONN/ONE-TO-ONE/VIDEOPUSH/01	MCVideo User initiates a one-to-one video push in automatic commencement mode with transmission control
CONN-MCVIDEO/ONN/ONE-TO-SERVER/VIDEOPUSH/01	MCVideo User initiates a one-to-server video push in automatic commencement mode with transmission control
CONN-MCVIDEO/ONN/EMERG-ALERT/MSG/01	MCVideo User initiates an emergency alert by sending a SIP MESSAGE
CONN-MCVIDEO/ONN/EMERG-ALERT/MSG/02	MCVideo User cancels an emergency alert by sending a SIP MESSAGE
CONN-MCVIDEO/ONN/EMERG-ALERT/MSG/03	MCVideo User cancels an emergency alert originated by other user by sending a SIP MESSAGE
CONN-MCVIDEO/ONN/EMERG-ALERT/MSG/04	MCVideo client receives a notification of entry into a group geographic area
CONN-MCPTT/ONN/PRIV/AUTO/ONDEM/WFC/NFC/02	MCPTT User initiates an on-demand private MCPTT emergency call in automatic commencement model with floor control
CONN-MCPTT/ONN/EMERG-ALERT/MSG/01	MCPTT User initiates an emergency alert by sending a SIP MESSAGE
CONN-MCPTT/ONN/EMERG-ALERT/MSG/02	MCPTT User cancels an emergency alert by sending a SIP MESSAGE
CONN-MCVIDEO/ONN/EMERG-ALERT/MSG/03	MCVideo User cancels an emergency alert originated by other user by sending a SIP MESSAGE
CONN-MCVIDEO/ONN/EMERG-ALERT/MSG/04	MCVideo client receives a notification of entry into a group geographic area
CONN-MCPTT/ONN/GROUP/PREA/ONDEM/NFC/10	Participating checks the status of the functional alias during the setup an on-demand prearranged MCPTT Group Call

Test Id	Test Purpose
CONN-MCPTT/ONN/GROUP/CHAT/ONDEM/NFC/06	Participating checks the status of the functional alias during the setup of an on-demand Chat Group Call
CONN-MCPTT/ONN/PRIV/AUTO/ONDEM/WFC/NFC/03	Participating checks the status of the functional alias during the setup of on-demand private MCPTT call in automatic commencement model with floor control
CONN-MCPTT/ONN/FIRST/MANUAL/ONDEM/WFC/NFC/02	Participating checks the status of the functional alias during the setup of an on-demand first-to-answer MCPTT call with floor control
CONN-MCPTT/ONN/FIRST/MANUAL/PRE/WFC/NFC/02	MCPTT User includes the FA in an on-demand first-to-answer MCPTT call with floor control using pre-established sessions
CONN-MCPTT/ONN/PRIV/AUTO/ONDEM/WFC/NFC/04	MCPTT User includes the FA in an on-demand private MCPTT call in automatic commencement model with floor control
CONN-MCPTT/ONN/FIRST/MANUAL/ONDEM/WFC/NFC/03	MCPTT User calls a FA using an on-demand first-to-answer MCPTT call with floor control
CONN-MCPTT/ONN/FIRST/MANUAL/ONDEM/WOFC/02	MCPTT User calls a FA using an on-demand first-to-answer MCPTT call without floor control
CONN-MCPTT/ONN/FIRST/MANUAL/PRE/WFC/NFC/03	MCPTT User calls a FA using an on-demand first-to-answer MCPTT call with floor control using pre-established sessions
CONN-MCPTT/ONN/FIRST/MANUAL/PRE/WOFC/02	MCPTT User calls a FA using a pre-established first-to-answer MCPTT call in manual commencement mode without floor control
CONN-MCPTT/ONN/PRIV/AUTO/ONDEM/WFC/NFC/05	A not-authorised MCPTT User initiates an on-demand private MCPTT call in automatic commencement model with floor control
CONN-MCPTT/ONN/PRIV/MANUAL/ONDEM/WFC/NFC/02	A not-authorised MCPTT User initiates an on-demand private MCPTT call in manual commencement mode with floor control
CONN-MCPTT/ONN/PRIV/AUTO/PRE/WFC/NFC/02	A not-authorised MCPTT User initiates a pre-established private MCPTT call in automatic commencement mode with floor control
CONN-MCPTT/ONN/PRIV/MANUAL/PRE/WFC/NFC/02	A not-authorised MCPTT User initiates a pre-established private MCPTT call in manual commencement mode with floor control
CONN-MCPTT/ONN/PRIV/AUTO/ONDEM/WOFC/02	A not-authorised MCPTT User initiates an on-demand private MCPTT call in automatic commencement mode without floor control
CONN-MCPTT/ONN/PRIV/MANUAL/ONDEM/WOFC/02	A not-authorised MCPTT User initiates an on-demand private MCPTT call in manual commencement mode without floor control
CONN-MCPTT/ONN/PRIV/AUTO/PRE/WOFC/02	A not-authorised MCPTT User initiates a pre-established private MCPTT call in automatic commencement mode without floor control
CONN-MCPTT/ONN/PRIV/MANUAL/PRE/WOFC/02	A not-authorised MCPTT User initiates a pre-established private MCPTT call in manual commencement mode without floor control
CONN-MCPTT/ONN/PRIV/AUTO/ONDEM/WFC/NFC/06	A not-authorised MCPTT User initiates an on-demand private MCPTT emergency call in automatic commencement model with floor control
CONN-MCPTT/ONN/GROUP/PREA/ONDEM/NFC/11	Handling of non acknowledged user information during an on-demand prearranged MCPTT Group Call
CONN-MCPTT/ONN/GROUP/PREA/ONDEM/NFC/12	Handling of TNG1 timer during the setup of an on-demand prearranged MCPTT Group Call
CONN-MCPTT/ONN/GROUP/PREA/PRE/NFC/05	Handling of non acknowledged user information during a prearranged MCPTT Group Call using pre-established session
CONN-MCPTT/ONN/GROUP/PREA/PRE/NFC/06	Handling of TNG1 timer during the setup of a prearranged MCPTT Group Call using pre-established session
CONN-MCDATA/ONN/IPCONN/01	MCData client establishes a IP Connectivity session with another MCData client
CONN-MCDATA/ONN/IPCONN/02	MCData client establishes a IP Connectivity session with another MCData client by using the target IP Information

Test Id	Test Purpose
CONN-MCDATA/ONN/EMERG-ALERT/MSG/01	MCData User initiates an emergency alert by sending a SIP MESSAGE
CONN-MCDATA/ONN/EMERG-ALERT/MSG/02	MCData User cancels an emergency alert by sending a SIP MESSAGE
CONN-MCDATA/ONN/EMERG-ALERT/MSG/03	MCData User cancels an emergency alert originated by other user by sending a SIP MESSAGE

Table 13. Test Group for the Connectivity (CONN) objective

Test Id	Test Purpose
FC/BASIC/01	Basic FC functionality (Subclause 6 in 3GPP TS 24.380 [10])
FC/BASIC/02	Basic FC functionality. Effect of Priorities (following A.3.5 example in 3GPP TS 24.380 [10]
FC/ADV/01	Floor control revoking upon expires (T2)
FC/ADV/02	Floor control revoking upon release
FC/ADV/03	Floor control revoking upon revoke
FC/FA/BASIC/01	Sharing/Display of FA during basic FC operations
FC/MT/BASIC/01	Multi-talker basic operation

Table 14. Test Group for the Floor Controlling (FC) objective

Test Id	Test Purpose
REGAUTH/IDMSAUTH/01	MCPTT Client authentication and tokens retrieval using IdMS 3GPP TS 24.482 [12]
REGAUTH/3PRTYREG/REGISTER/01	MCPTT Client registration using 3rd party register (Subclauses 7.2.1 and 7.3.2 in 3GPP TS 24.379 [9])
REGAUTH/PUBLISH/REGISTER/01	MCPTT Client registration using SIP PUBLISH (Subclauses 7.2.2 and 7.3.3 in 3GPP TS 24.379 [9])
REGAUTH/3PRTYREG/REGISTER/02	MCPTT service server limits the number of simultaneous successful service authorisations while using third-party registration
REGAUTH/PUBLISH/REGISTER/02	MCPTT service server limits the number of simultaneous successful service authorisations while using PUBLISH mechanism

Table 15. Test Group for the Registration and Authorization (REGAUTH) objective

Test Id	Test Purpose
PCC/BEARERSETUP/01	Unicast MC Bearer Setup by SIP Core/IMS (Sections 4.4.1 and 4.4.2 in [21])
PCC/BEARERSETUP/02	Unicast MC Bearer Setup by MCPTT Participating AS (Sections 4.4.1 and 4.4.2 in [21])
PCC/BEARERUPDATE/01	Unicast MC Bearer Update by SIP Core/IMS due to a change in the Call characteristics
PCC/BEARERUPDATE/02	Unicast MC Bearer Update by MCPTT Participating AS due to a change in the Call characteristics
PCC/BEARERSETUP/03	Unicast MC Bearer Setup by SIP Core/IMS using pre-established sessions (Sections 4.4.1 and 4.4.2 in [21])
PCC/BEARERSETUP/04	Unicast MC Bearer Setup by MCPTT Participating AS using pre-established sessions (Sections 4.4.1 and 4.4.2 in [21])

Table 16. Test Group for the Policing (PCC) objective

Test Id	Test Purpose
EMBMS/ACTIVATEBEARER/WPRETMGI/01	Use of dynamically established MBMS bearers in prearranged MCPTT group calls with pre-allocated TMGIs (Subclauses 5.2.1 and 5.3.2 in 3GPP TS 29.468 [23])
EMBMS/ACTIVATEBEARER/WOPRETMGI/01	Use of dynamically established MBMS bearers in prearranged MCPTT group calls without pre-allocated TMGIs
EMBMS/PREBEARER/WPRETMGI/01	Use of pre-established MBMS bearers in prearranged group calls with pre-allocated TMGIs
EMBMS/PREBEARER/WOPRETMGI/01	Use of pre-established MBMS bearers in prearranged group calls without pre-allocated TMGIs
EMBMS/MODIFYBEARER/01	Modification of MBMS bearers upon reception of emergency upgrade request
EMBMS/DEACTIVBEARER/WTMGIDEA/01	Deactivation of MBMS bearers after termination of a prearranged MCPTT group call with TMGI deallocation
EMBMS/DEACTIVBEARER/WOTMGIDEA/01	Deactivation of MBMS bearers after termination of a prearranged MCPTT group call without TMGI deallocation
EMBMS/SWITCHTOUNITMGIEXP/01	Switching to unicast bearer after TMGI expiration
EMBMS/NOTLISTENING/01	Handling of a not-listening report sent by MCPTT Client
EMBMS/SUSPENSION/01	Handling of a suspension-sstatus report sent by MCPTT Client
EMBMS-MCVIDEO/ACTIVATEBEARER/WPRETMGI/01	Use of dynamically established MBMS bearers in prearranged MCVideo group calls with pre-allocated TMGIs
EMBMS-MCVIDEO/ACTIVATEBEARER/WOPRETMGI/01	Use of dynamically established MBMS bearers in prearranged MCvideo group calls without pre-allocated TMGIs
EMBMS-MCVIDEO/PREBEARER/WPRETMGI/01	Use of pre-established MBMS bearers in prearranged MCVideo group calls with pre-allocated TMGIs
EMBMS-MCVIDEO/PREBEARER/WOPRETMGI/01	Use of pre-established MBMS bearers in prearranged MCVideo group calls without pre-allocated TMGIs
EMBMS-MCVIDEO/MODIFYBEARER/01	Modification of MBMS bearers upon reception of emergency upgrade request in an MCVideo group call
EMBMS-MCVIDEO/DEACTBEARER/WTMGIDEA/01	Deactivation of MBMS bearers after termination of a prearranged MCVideo group call with TMGI deallocation
EMBMS-MCVIDEO/DEACTBEARER/WOTMGIDEA/01	Deactivation of MBMS bearers after termination of a prearranged MCVideo group call without TMGI deallocation
EMBMS-MCVIDEO/SWITCHTOUNITMGIEXP/01	Switching to unicast bearer after TMGI expiration in a MCVideo call
EMBMS-MCVIDEO/NOTLISTENING/01	Handling of a not-listening report sent by MCVideo Client
EMBMS-MCVIDEO/SUSPENSION/01	Handling of a suspension-sstatus report sent by MCVideo Client
EMBMS-ADDITIONAL/MB2C/FUNCT/ALLOCTMGI/01	TMGI allocation management
EMBMS-ADDITIONAL/MB2C/FUNCT/DEALLOCTMGI-/01	TMGI deallocation management
EMBMS-ADDITIONAL/MB2C/FUNCT/ACTIVATEBEARER-/01	Successful bearer activation
EMBMS-ADDITIONAL/MB2c/FUNCT/DEACTBEARER-/01	Successful bearer deactivation
EMBMS-ADDITIONAL/MB2C/FUNCT/MODBEARER/01	Successful bearer modification
EMBMS-ADDITIONAL/MB2C/FUNCT/TMGIEXP/01	Management of TMGI expiration
EMBMS-ADDITIONAL/MB2C/FUNCT/AGGREQUEST-/01	Management of aggregated requests
EMBMS-ADDITIONAL/MB2C/PRIO/PREEM/01	Management of Bearer Pre-emption
EMBMS-ADDITIONAL/MB2C/PRIO/RESUM/01	Management of Bearer Resumption
EMBMS-ADDITIONAL/MB2C/SECURITY/TLS-/01	MB2-C security using TLS over TCP
EMBMS-ADDITIONAL/MB2C/SECURITY/DTLS-/01	MB2-C security using DTLS over SCTP
EMBMS-ADDITIONAL/MB2C/ROBUSTNESS/RESTORATION/01	Restoration procedure management
EMBMS-ADDITIONAL/MB2C/ROBUSTNESS/ALLOCATE/TMGI-/01	TMGI allocation failure

Test Id	Test Purpose
EMBMS-ADDITIONAL/MB2C/ROBUSTNESS/DEALLOCATE/TMGI/01	TMGI deallocation failure
EMBMS-ADDITIONAL/MB2c/ROBUSTNESS/ACTIVATE/BEARER-/01	Bearer activation failure
EMBMS–ADDITIONAL/MB2C/ROBUSTNESS/DEACTIVATE-/BEARER/01	Bearer deactivation failure
EMBMS-ADDITIONAL/MB2C/ROBUSTNESS/MODIFY/BEARER-/01	Bearer modification failure
EMBMS-ADDITIONAL/MB2C/LOAD/MUL-TIPLEGCS-/01	Multiple GCS-AS management
EMBMS-ADDITIONAL/MB2C/LOAD/100BEARER-/01	Activation of multiple (100) bearers

Table 17. Test Group for the eMBMS (eMBMS) objective

Test Id	Test Purpose
AFFIL/DET/01	Determining self affiliation (Subclauses 9.2.1.3 and 9.2.2.2.4 in 3GPP TS 24.379 [9])
AFFIL/DET/02	Determining affiliation status of another user (Subclauses 9.2.1.3 and 9.2.2.2.4 in 3GPP TS 24.379 [9])
AFFIL/CHANGE/01	Affiliation status change triggered by the MCPTT User itself (Subclauses 9.2.1.2 and 9.2.2.2.3 in 3GPP TS 24.379 [9])
AFFIL/CHANGE/02	Affiliation status change triggered by another MCPTT User in mandatory mode (Subclauses 9.2.1.2, 9.2.2.3.3 in 3GPP TS 24.379 [9])
AFFIL/CHANGE/03	Affiliation status change triggered by another MCPTT User in negotiated mode (Subclauses 9.2.1.4 and 9.2.1.5 in 3GPP TS 24.379 [9])
AFFIL/CHANGE/04	Affiliation change triggered by a functional-alias activation criteria
AFFIL/CHANGE/05	Affiliation change triggered by a functional-alias deactivation criteria
AFFIL/CHANGE/06	Affiliation change triggered by implicit affiliation in an on demand pre-arranged group call
AFFIL/CHANGE/07	Affiliation change triggered by implicit affiliation during service authorization

Table 18. Test Group for the Affiliation (AFFIL) objective

Test Id	Test Purpose
LOC/3PRTYREG/CONFIG/01	MCPTT Client Configuration upon 3rd party register (Subclauses 13.2.2 and 13.3.2 in 3GPP TS 24.379 [9])
LOC/REQUEST/01	Request for Location Report to the MCPTT Client (Subclauses 13.2.3 and 13.3.3 in 3GPP TS 24.379 [9])
LOC/SUBMISSION/01	MCPTT Client Sends location upon trigger (Section 13.3.4 in 3GPP TS 24.379 [9])

Table 19. Test Group for the Location (LOC) objective

Test Id	Test Purpose
CSC-CMS/UECONF/UE/01	Subscription and UE configuration document retrieval from the MC UE (Sections 6.3.3 and 6.3.13 -specifically 6.3.13.2.2a and 6.3.13.3.2.3f- in [14]), OMA XDM mechanisms and procedures in [29])

Test Id	Test Purpose
CSC-CMS/UPROCONF/UE/01	Subscription and user profile configuration document retrieval from the MC UE
CSC-CMS/SERVCONF/UE/01	Subscription and service configuration document retrieval from the MC UE
CSC-CMS/SERVCONF/MCSSERV/01	Subscription and service configuration document retrieval from the MCS server
CSC-GMS/GROUP/UE/01	Subscription and group document retrieval from the MC UE
CSC-GMS/GROUP/MCSSERV/01	Subscription and group document retrieval from the MCS Server
CSC/MULTIPLESUBS/UE/01	Subscription and retrieval of multiple documents from the CMS using subscription proxy
CSC/MULTIPLESUBSGMSGROUP/UE/01	Subscription and retrieval of multiple documents from the GMS using subscription proxy

Table 20. Test Group for the OAM Procedures (CSC) objective

Test Id	Test Purpose
SEC/KEYMDOWNLOAD/WPROXY/01	Key material download from KMS to MCPTT client (CSC-8) with proxy
SEC/KEYMDOWNLOAD/WPROXY/02	Key material download from KMS to MCPTT server (CSC-9) with proxy
SEC/KEYMDOWNLOAD/WPROXY/03	Key material download from KMS to MCPTT GMS (CSC-10) with proxy
SEC/KEYMDOWNLOAD/WOPROXY/01	Key material download from KMS to MCPTT client (CSC-8) without proxy
SEC/KEYMDOWNLOAD/WOPROXY/02	Key material download from KMS to MCPTT server (CSC-9) without proxy
SEC/KEYMDOWNLOAD/WOPROXY/03	Key material download from KMS to MCPTT GMS (CSC-10) without proxy
SEC/KEYDIST/CSK/01	Key management from MC client to MC server (CSK upload)
SEC/KEYDIST/GMK/01	Key management for group communications (GMK)
SEC/KEYDIST/MUSIK/01	Key management from MC server to MC client (Key download MuSiK)
SEC/ENCRYPTION/PRIVATE/01	Encryption of MCPTT private calls (use of derived encryption keys from PCK for the audio and CSK for floor control and RTCP reports)
SEC/ENCRYPTION/GROUP/01	Encryption of MCPTT group calls (use of derived encryption keys from GMK for the audio and CSK for floor control and RTCP reports)
SEC/ENCRYPTION/GROUPEMBMS/01	Encryption of MCPTT group calls using eMBMS (use of derived encryption keys from MuSIK for the floor control and MSCCK for eMBMS control)
SEC/XMLENCRYPT/PRIVATE/01	XML contents encryption in MCPTT private calls (mcptt-info and resource-lists)
SEC/XMLENCRYPT/GROUP/01	XML contents encryption in MCPTT group calls (mcptt-info)
SEC/XMLENCRYPT/AFFIL/01	XML contents encryption in affiliation procedure
SEC/XMLENCRYPT/LOC/01	XML contents encryption in location procedure
SEC/XMLENCRYPT/REGAUTH/01	XML contents encryption in registration and authorization procedures

Table 21. Test Group for the Security (SEC) objective

Test Id	Test Purpose
TC/BASIC/01	Basic TC functionality
TC/BASIC/02	Effect of maximum number of transmitters
TC/BASIC/03	Effect of maximum number of receivers
TC/BASIC/04	Basic TC functionality. Maximum number of transmitters and pre-emptive priority request

Table 22. Test Group for the MCVideo Transmission Control (TC) objective

Test Id	Test Purpose
S2S/ONN/GROUP/PREA/ONDEM/TEMP/01	On-demand prearranged MCPTT Group Call to temporary group in trusted mode
S2S/ONN/GROUP/PREA/ONDEM/TEMP/02	On-demand prearranged MCPTT Group Call to temporary group in untrusted mode

Table 23. Test Group for the Server-to-server communications (S2S) objective

Test Id	Test Purpose
FA/CHANGE/01	MCPTT user requests to activate one or more functional aliases
FA/CHANGE/02	MCPTT user requests to deactivate one or more functional aliases
FA/CHANGE/03	MCPTT user refreshes the interest on one or more functional aliases
FA/CHANGE/04	MCPTT user takes over a functional aliases
FA/LOCCHANGE/01	MCPTT user requests to activate one or more functional aliases upon entering a location area
FA/LOCCHANGE/02	MCPTT user requests to deactivate one or more functional aliases upon entering a location area
FA/DET/01	MCPTT user determines the functional aliases successfully activated
FA/DET/02	MCPTT user determines the functional aliases successfully activated for another user
FA/RESOL/01	MCPTT server requests a resolution of the Functional alias from the MCPTT server owning that FA
FA/CHANGE/05	Automatic deactivation of FA

Table 24. Test Group for the Functional Aliasing (FA) objective

Test Id	Test Purpose
IOP/01	Effect of (de)affiliating another user during an ongoing group call
IOP/02	GEOFENCING
IOP/03	Complete group-regrouping procedure
IOP/04	Effect of adding a user to a group and CSC subscriptions
IOP/05	Missed call and private call callback
IOP/06	EMBMS switch from unicast to multicast and back to unicast
IOP/07	one-to-server video push & one-from-server video pull operation

Table 25. Test Group for the Interoperability (IOP) objective

Test Id	Test Purpose
REGRPREC/USERREG/01	MCPTT user requests a users regroup using a preconfigured group
REGRPREC/USERREG/02	MCPTT user removes a users regroup using a preconfigured group
REGRPREC/GROUPREG/01	MCPTT user requests a group regroup using a preconfigured group
REGRPREC/GROUPREG/02	MCPTT user removes a group regroup using a preconfigured group

Table 26. Test Group for Regroup using a preconfigured group (RegrPrec) objective

Test Id	Test Purpose
MCDATAMS/RETR/01	MCData message store client retrieves an object
MCDATAMS/SEARCH/01	MCData message store client searches for information about a selected set of objects
MCDATAMS/UPDATE/01	MCData message store client updates an existing object
MCDATAMS/DEL/01	MCData message store client deletes an object
MCDATAMS/DEP/01	MDData server deposits an object of an MCData user
MCDATAMS/COPY/01	MCData message store client copies object(s) and/or folder(s) to a destination folder
MCDATAMS/DEL/02	MCData message store client deletes a folder
MCDATAMS/CRE/01	MCData message store client creates a folder
MCDATAMS/MOVE/01	MCData message store client moves an object to a destination folder
MCDATAMS/SEARCH/02	MCData message store client searches for information about a selected set of folders
MCDATAMS/SUBS/01	MCData message store client subscribes to changes in the store
MCDATAMS/SUBS/02	MCData message store client cancels the subscription to changes in the store
MCDATAMS/SUBS/03	MCData message store client updates a subscription to changes in the store
MCDATAMS/UP/01	MCData message store client uploads an object
MCDATAMS/SYNC/01	MCData message store function sends a notification of changes
MCDATAMS/SYNC/02	MCData message store client searches for changes
MCDATAMS/LISTS/01	MCData message store client lists subfolders of a folder

Table 27. Test Group for MCData Message Store (MCDATAMS) objective

Test Id	Test Purpose
OS1	Emergency call
OS2	Emergency call handling
OS3	Encrypted private call
OS4.1	eMBMS MCPTT
OS4.2	eMBMS MCVideo
OS5	Switching on
OS6	Encrypted MCPTT group call
OS7.1	Enhanced status 7.2.73
OS7.2	MCDATA SDS
OS8	Encrypted MCVideo Group Call

Test Id	Test Purpose
OS9	Parallel MCPTT and MCVIDEO
OS10	Rail Emergency Call

Table 28. Observers test cases

8.2.5 Mapping of Test Cases to Test Case Numbers

Number	Name
7.2	**Connectivity (CONN)**
7.2.1	MCPTT User initiates an on-demand prearranged MCPTT Group Call [CONN-MCPTT/ONN/GROUP/PREA/ONDEM/NFC/01]
7.2.2	MCPTT User initiates an on-demand prearranged MCPTT Group Call: Emergency Group Call [CONN-MCPTT/ONN/GROUP/PREA/ONDEM/NFC/02]
7.2.3	MCPTT User initiates an on-demand prearranged MCPTT Group Call: Imminent Peril Group Call [CONN-MCPTT/ONN/GROUP/PREA/ONDEM/NFC/03]
7.2.4	MCPTT User initiates an on-demand prearranged MCPTT Group Call: Broadcast Group Call [CONN-MCPTT/ONN/GROUP/PREA/ONDEM/NFC/04]
7.2.5	MCPTT User initiates an on-demand prearranged MCPTT Group Call: Upgrade to in progress emergency or imminent peril [CONN-MCPTT/ONN/GROUP/PREA/ONDEM/NFC/05]
7.2.6	MCPTT User initiates the termination of an on-demand prearranged MCPTT Group Call [CONN-MCPTT/ONN/GROUP/PREA/ONDEM/NFC/06]
7.2.7	MCPTT User initiates a prearranged MCPTT Group Call using pre-established session [CONN-MCPTT/ONN/GROUP/PREA/PRE/NFC/01]
7.2.8	MCPTT User initiates the termination of a prearranged MCPTT Group Call using pre-established session [CONN-MCPTT/ONN/GROUP/PREA/PRE/NFC/02]
7.2.9	MCPTT User initiates an on-demand Chat Group Call [CONN-MCPTT/ONNGROUP/CHAT/ONDEM/NFC/01]
7.2.10	MCPTT User upgrades an ongoing on-demand Chat Group Call to emergency call [CONN-MCPTT/ONN/GROUP/CHAT/ONDEM/NFC/02]
7.2.11	MCPTT User upgrades an ongoing on-demand Chat Group Call to imminent-peril call [CONN-MCPTT/ONN/GROUP/CHAT/ONDEM/NFC/03]
7.2.12	MCPTT User cancels the emergency condition of an on-demand Chat Group Call [CONN-MCPTT/ONN/GROUP/CHAT/ONDEM/NFC/04]
7.2.13	MCPTT User cancels the imminent-peril condition of an on-demand Chat Group Call [CONN-MCPTT/ONNGROUP/CHAT/ONDEM/NFC/05]
7.2.14	MCPTT User initiates a Chat group Call using pre-established session [CONN-MCPTT/ONNGROUP/CHAT/PRE/NFC/01]
7.2.15	MCPTT User initiates an on-demand private MCPTT call in automatic commencement model with floor control [CONN-MCPTT/ONN/PRIV/AUTO/ONDEM/WFC/NFC/01]
7.2.16	MCPTT User initiates an on-demand private MCPTT call in manual commencement mode with floor control [CONN-MCPTT/ONN/PRIV/MANUAL/ONDEM/WFC/NFC/01]
7.2.17	MCPTT User initiates a pre-established private MCPTT call in automatic commencement mode with floor control [CONN-MCPTT/ONN/PRIV/AUTO/PRE/WFC/NFC/01]
7.2.18	MCPTT User initiates a pre-established private MCPTT call in manual commencement mode with floor control [CONN-MCPTT/ONN/PRIV/MANUAL/PRE/WFC/NFC/01]
7.2.19	MCPTT User initiates an on-demand private MCPTT call in automatic commencement mode without floor control [CONN-MCPTT/ONN/PRIV/AUTO/ONDEM/WOFC/01]
7.2.20	MCPTT User initiates an on-demand private MCPTT call in manual commencement mode without floor control [CONN-MCPTT/ONN/PRIV/MANUAL/ONDEM/WOFC/01]
7.2.21	MCPTT User initiates a pre-established private MCPTT call in automatic commencement mode without floor control [CONN-MCPTT/ONN/PRIV/AUTO/PRE/WOFC/01]
7.2.22	MCPTT User initiates a pre-established private MCPTT call in manual commencement mode without floor control [CONN-MCPTT/ONN/PRIV/MANUAL/PRE/WOFC/01]
7.2.23	MCPTT User initiates an on-demand first-to-answer MCPTT call with floor control [CONN-MCPTT/ONN/FIRST/MANUAL/ONDEM/WFC/NFC/01]
7.2.24	MCPTT User initiates an on-demand first-to-answer MCPTT call without floor control [CONN-MCPTT/ONN/FIRST/MANUAL/ONDEM/WOFC/01]
7.2.25	MCPTT User initiates an on-demand first-to-answer MCPTT call with floor control using pre-established sessions [CONN-MCPTT/ONN/FIRST/MANUAL/PRE/WFC/NFC/01]
7.2.26	MCPTT User initiates a pre-established first-to-answer MCPTT call in manual commencement mode without floor control [CONN-MCPTT/ONN/FIRST/MANUAL/PRE/WOFC/01]
7.2.27	MCPTT User setups a private-call callback [CONN-MCPTT/ONN/CALLBACK/SETUP-/01]
7.2.28	MCPTT User cancels a private-call callback [CONN-MCPTT/ONN/CALLBACK/CANCEL-/01]
7.2.29	MCPTT User fulfils a private-call callback [CONN-MCPTT/ONN/CALLBACK/FULFIL-/01]

Number	Name
7.2.30	MCPTT User setups locally an on-demand ambient listening call [CONN-MCPTT/ONN/AMBIENT/ONDEM/LOCAL/01]
7.2.31	MCPTT User releases locally an on-demand ambient listening call [CONN-MCPTT/ONN/AMBIENT/ONDEM/LOCAL/02]
7.2.32	MCPTT User setups locally an ambient listening call using pre-established session [CONN-MCPTT/ONN/AMBIENT/PRE/LOCAL/01]
7.2.33	MCPTT User releases locally an ambient listening call using pre-established session [CONN-MCPTT/ONN/AMBIENT/PRE/LOCAL/02]
7.2.34	MCPTT User setups remotely an on-demand ambient listening call [CONN-MCPTT/ONN/AMBIENT/ONDEM/REMOTE/01]
7.2.35	MCPTT User releases remotely an on-demand ambient listening call [CONN-MCPTT/ONN/AMBIENT/ONDEM/REMOTE/02]
7.2.36	MCPTT User setups remotely an ambient listening call using pre-established session [CONN-MCPTT/ONN/AMBIENT/PRE/REMOTE/01]
7.2.37	MCPTT User releases remotely an ambient listening call using pre-established session [CONN-MCPTT/ONN/AMBIENT/PRE/REMOTE/02]
7.2.38	Remote change of selected group [CONN-MCPTT/ONN/GROUPCHANGE/01]
7.2.39	One-to-one standalone SDS over SIP [CONN-MCDATA/ONN/O2O/STANDALONE/SDS-/SIP/01]
7.2.40	One-to-one standalone SDS over media plane (MSRP) [CONN-MCDATA/ONN/O2O/STANDALONE/SDS/MSRP/01]
7.2.41	One-to-one SDS session [CONN-MCDATA/ONN/O2O/SESSION/SDS/MSRP/01]
7.2.42	Group standalone SDS over SIP [CONN-MCDATA/ONN/GROUP/STANDALONE/SDS-/SIP/01]
7.2.43	Group standalone SDS over media plane (MSRP) [CONN-MCDATA/ONN/GROUP/STANDALONE/SDS/MSRP/01]
7.2.44	Group SDS session [CONN-MCDATA/ONN/GROUP/SESSION/SDS/MSRP/01]
7.2.45	One-to-one FD using HTTP [CONN-MCDATA/ONN/O2O/FD/HTTP/01]
7.2.46	Group FD using HTTP [CONN-MCDATA/ONN/GROUP/FD/HTTP/01]
7.2.47	One-to-one FD using media plane (MSRP) [CONN-MCDATA/ONN/O2O/FD/MSRP/01]
7.2.48	Group FD using media plane (MSRP) [CONN-MCDATA/ONN/GROUP/FD/MSRP/01]
7.2.49	Standalone SDS with delivered and read notification [CONN-MCDATA/ONN/DISNOT/SDS/01]
7.2.50	Group standalone SDS with delivered and read notification [CONN-MCDATA/ONN/DISNOT/SDS/02]
7.2.51	One-to-one FD using HTTP with file download completed notification [CONN-MCDATA/ONN/DISNOT/FD/01]
7.2.52	Group FD using HTTP with file download completed notification [CONN-MCDATA/DISNOT/FD/02]
7.2.53	Network triggered FD notifications [CONN-MCDATA/NET/FD/01]
7.2.54	MCVideo User initiates an on-demand private MCVideo call in automatic commencement mode with transmission control [CONN-MCVIDEO/ONN/PRIV/AUTO/ONDEM/WTC/NTC/01]
7.2.55	MCVideo User initiates an on-demand private MCVideo call in automatic commencement mode without transmission control [CONN-MCVIDEO/ONN/PRIV/AUTO/ONDEM/WOTC/01]
7.2.56	MCVideo User initiates an on-demand prearranged MCVideo Group Call [CONN-MCVIDEO/ONN/GROUP/PREA/ONDEM/NTC/01]
7.2.57	MCVideo User initiates an on-demand prearranged MCVideo Chat Group Call [CONN-MCVIDEO/ONN/GROUP/CHAT/ONDEM/NTC/01]
7.2.58	Late call entry of a MCPTT User during an on-demand prearranged MCPTT Group Call [CONN-MCPTT/ONN/GROUP/PREA/ONDEM/NFC/07]
7.2.59	Late call entry of a MCPTT User during a prearranged MCPTT Group Call using pre-established session [CONN-MCPTT/ONN/GROUP/PREA/PRE/NFC/03]
7.2.60	Rejoin of a MCPTT User during an on-demand prearranged MCPTT Group Call [CONN-MCPTT/ONN/GROUP/PREA/ONDEM/NFC/08]
7.2.61	Rejoin of a MCPTT User during an on-demand prearranged MCPTT Group Call using pre-established session [CONN-MCPTT/ONN/GROUP/PREA/PRE/NFC/04]
7.2.62	Subscription to Conference Event Package [CONN-MCPTT/ONN/GROUP/CHAT/ONDEM/SUBCONF/01]
7.2.63	MCPTT User initiates an on-demand private MCPTT emergency call in automatic commencement model with floor control [CONN-MCPTT/ONN/PRIV/AUTO/ONDEM/WFC/NFC/02]
7.2.64	MCPTT User initiates an emergency alert by sending a SIP MESSAGE [CONN-MCPTT/ONN/EMERG-ALERT/MSG/01]
7.2.65	MCPTT User cancels an emergency alert by sending a SIP MESSAGE [CONN-MCPTT/ONN/EMERG-ALERT/MSG/02]
7.2.66	MCPTT User cancels an emergency alert originated by other user by sending a SIP MESSAGE [CONN-MCPTT/ONN/EMERG-ALERT/MSG/03]
7.2.67	MCPTT client receives a notification of entry into a group geographic area [CONN-MCPTT/ONN/EMERG-ALERT/MSG/04]

Number	Name
7.2.68	MCPTT client receives a notification of exit from a group geographic area [CONN-MCPTT/ONN/EMERG-ALERT/MSG/05]
7.2.69	MCPTT User exits an ongoing an on-demand prearranged MCPTT Group Call upon de-affiliation to this group [CONN-MCPTT/ONN/GROUP/PREA/ONDEM/NFC/09]
7.2.70	Receive O2O FD request with mandatory download [CONN-MCDATA/ONN/O2O/FD/HTTP/02]
7.2.71	Receive O2O FD request without mandatory download [CONN-MCDATA/ONN/O2O/FD/HTTP/03]
7.2.72	Request a list of deferred group communications [CONN-MCDATA/ONN/DEFER/01]
7.2.73	Send an enhanced status to an MCData group [CONN-MCDATA/ONN/GROUP/STANDALONE/SDS/SIP/02]
7.2.74	MCVideo User upgrades an ongoing on-demand Chat Group Call to emergency call [CONN-MCVIDEO/ONN/GROUP/CHAT/ONDEM/NTC/02]
7.2.75	MCVideo User upgrades an ongoing on-demand Chat Group Call to imminent-peril call [CONN-MCVIDEO/ONN/GROUP/CHAT/ONDEM/NTC/03]
7.2.76	MCVideo User cancels the emergency condition of an on-demand Chat Group Call [CONN-MCVIDEO/ONN/GROUP/CHAT/ONDEM/NTC/04]
7.2.77	MCVideo User cancels the imminent-peril condition of an on-demand Chat Group Call [CONN-MCVIDEO/ONN/GROUP/CHAT/ONDEM/NTC/05]
7.2.78	MCVideo User initiates an on-demand prearranged MCVideo Group Call: Emergency Group Call [CONN-MCVIDEO/ONN/GROUP/PREA/ONDEM/NTC/02]
7.2.79	MCVideo User initiates an on-demand prearranged MCVideo Group Call: Imminent Peril Group Call [CONN-MCVIDEO/ONN/GROUP/PREA/ONDEM/NTC/03]
7.2.80	MCVideo User initiates an on-demand prearranged MCVideo Group Call: Broadcast Group Call [CONN-MCVIDEO/ONN/GROUP/PREA/ONDEM/NTC/04]
7.2.81	MCVideo User initiates an on-demand prearranged MCVideo Group Call: Upgrade to in progress emergency or imminent peril [CONN-MCVIDEO/ONN/GROUP/PREA/ONDEM/NTC/05]
7.2.82	MCVideo User initiates the termination of an on-demand prearranged MCVideo Group Call [CONN-MCVIDEO/ONN/GROUP/PREA/ONDEM/NTC/06]
7.2.83	MCVideo User initiates an on-demand private MCVideo call in manual commencement mode without transmission control [CONN-MCVIDEO/ONN/PRIV/MANUAL/ONDEM/WOTC/NTC/01]
7.2.84	MCVideo User initiates an on-demand private MCVideo call in manual commencement mode with transmission control [CONN-MCVIDEO/ONN/PRIV/MANUAL/ONDEM/WTC/NTC/01]
7.2.85	MCVideo User setups locally an on-demand ambient viewing call [CONN-MCVIDEO/ONN/AMBIENT/ONDEM/LOCAL/01]
7.2.86	MCVideo User releases locally an on-demand ambient viewing call [CONN-MCVIDEO/ONN/AMBIENT/ONDEM/LOCAL/02]
7.2.87	MCVideo User setups remotely an on-demand ambient viewing call [CONN-MCVIDEO/ONN/AMBIENT/ONDEM/REMOTE/01]
7.2.88	MCVideo User releases remotely an on-demand ambient viewing call [CONN-MCVIDEO/ONN/AMBIENT/ONDEM/REMOTE/02]
7.2.89	MCVideo User initiates a one-to-one video pull in automatic commencement mode with transmission control [CONN-MCVIDEO/ONN/ONE-TO-ONE/VIDEOPULL/01]
7.2.90	MCVideo User initiates a one-from-server video pull in automatic commencement mode with transmission control [CONN-MCVIDEO/ONN/ONE-FROM-SERVER/VIDEOPULL/01]
7.2.91	MCVideo User initiates a one-to-one video push in automatic commencement mode with transmission control [CONN-MCVIDEO/ONN/ONE-TO-ONE/VIDEOPUSH/01]
7.2.92	MCVideo User initiates a one-to-server video push in automatic commencement mode with transmission control [CONN-MCVIDEO/ONN/ONE-TO-SERVER/VIDEOPUSH/01]
7.2.93	MCVideo User initiates an emergency alert by sending a SIP MESSAGE [CONN-MCVIDEO/ONN/EMERG-ALERT/MSG/01]
7.2.94	MCVideo User cancels an emergency alert by sending a SIP MESSAGE [CONN-MCVIDEO/ONN/EMERG-ALERT/MSG/02]
7.2.95	MCVideo User cancels an emergency alert originated by other user by sending a SIP MESSAGE [CONN-MCVIDEO/ONN/EMERG-ALERT/MSG/03]
7.2.96	MCVideo client receives a notification of entry into a group geographic area [CONN-MCVIDEO/ONN/EMERG-ALERT/MSG/04]
7.2.97	Participating checks the status of the functional alias during the setup an on-demand prearranged MCPTT Group Call [CONNMCPTT/ONN/GROUP/PREA/ONDEM/NFC/10]
7.2.98	Participating checks the status of the functional alias during the setup of an on-demand Chat Group Call [CONN-MCPTT/ONN/GROUP/CHAT/ONDEM/NFC/06]
7.2.99	Participating checks the status of the functional alias during the setup of on-demand private MCPTT call in automatic commencement model with floor control [CONN-MCPTT/ONN/PRIV/AUTO/ONDEM/WFC/NFC/03]
7.2.100	Participating checks the status of the functional alias during the setup of an on-demand first-to-answer MCPTT call with floor control [CONN-MCPTT/ONN/FIRST/MANUAL/ONDEM/WFC/NFC/02]
7.2.101	MCPTT User includes the FA in an on-demand first-to-answer MCPTT call with floor control using pre-established sessions [CONN-MCPTT/ONN/FIRST/MANUAL/PRE/WFC/NFC/02]

Number	Name
7.2.102	MCPTT User includes the FA in an on-demand private MCPTT call in automatic commencement model with floor control [CONN-MCPTT/ONN/PRIV/AUTO/ONDEM/WFC/NFC/04]
7.2.103	MCPTT User calls a FA using an on-demand first-to-answer MCPTT call with floor control [CONN-MCPTT/ONN/FIRST/MANUAL/ONDEM/WFC/NFC/03]
7.2.104	MCPTT User calls a FA using an on-demand first-to-answer MCPTT call without floor control [CONN-MCPTT/ONN/FIRST/MANUAL/ONDEM/WOFC/02]
7.2.105	MCPTT User calls a FA using an on-demand first-to-answer MCPTT call with floor control using pre-established sessions [CONN-MCPTT/ONN/FIRST/MANUAL/PRE/WFC/NFC/03]
7.2.106	MCPTT User calls a FA using a pre-established first-to-answer MCPTT call in manual commencement mode without floor control [CONN-MCPTT/ONN/FIRST/MANUAL/PRE/WOFC/02]
7.2.107	A not-authorized MCPTT User initiates an on-demand private MCPTT call in automatic commencement model with floor control [CONN-MCPTT/ONN/PRIV/AUTO/ONDEM/WFC/NFC/05]
7.2.108	A not-authorized MCPTT User initiates an on-demand private MCPTT call in manual commencement mode with floor control [CONN-MCPTT/ONN/PRIV/MANUAL/ONDEM/WFC/NFC/02]
7.2.109	A not-authorized MCPTT User initiates a pre-established private MCPTT call in automatic commencement mode with floor control [CONN-MCPTT/ONN/PRIV/AUTO/PRE/WFC/NFC/02]
7.2.110	A not-authorized MCPTT User initiates a pre-established private MCPTT call in manual commencement mode with floor control [CONN-MCPTT/ONN/PRIV/MANUAL/PRE/WFC/NFC/02]
7.2.111	A not-authorized MCPTT User initiates an on-demand private MCPTT call in automatic commencement mode without floor control [CONN-MCPTT/ONN/PRIV/AUTO/ONDEM/WOFC/02]
7.2.112	A not-authorized MCPTT User initiates an on-demand private MCPTT call in manual commencement mode without floor control [CONN-MCPTT/ONN/PRIV/MANUAL/ONDEM/WOFC/02
7.2.113	A not-authorized MCPTT User initiates a pre-established private MCPTT call in automatic commencement mode without floor control [CONN-MCPTT/ONN/PRIV/AUTO/PRE/WOFC/02]
7.2.114	A not-authorized MCPTT User initiates a pre-established private MCPTT call in manual commencement mode without floor control [CONN-MCPTT/ONN/PRIV/MANUAL/PRE/WOFC/02]
7.2.115	A not-authorized MCPTT User initiates an on-demand private MCPTT emergency call in automatic commencement model with floor control [CONN-MCPTT/ONN/PRIV/AUTO/ONDEM/WFC/NFC/06]
7.2.116	Handling of non acknowledged user information during an on-demand prearranged MCPTT Group Call [CONN-MCPTT/ONN/GROUP/PREA/ONDEM/NFC/11]
7.2.117	Handling of TNG1 timer during the setup of an on-demand prearranged MCPTT Group Call [CONN-MCPTT/ONN/GROUP/PREA/ONDEM/NFC/12]
7.2.118	Handling of non acknowledged user information during a prearranged MCPTT Group Call using pre-established session [CONN-MCPTT/ONN/GROUP/PREA/PRE/NFC/05]
7.2.119	Handling of TNG1 timer during the setup of a prearranged MCPTT Group Call using pre-established session [CONN-MCPTT/ONN/GROUP/PREA/PRE/NFC/06]
7.2.120	MCData client establishes a IP Connectivity session with another MCData client [CONN-MCDATA/ONN/IPCONN/01]
7.2.121	MCData client establishes a IP Connectivity session with another MCData client by using the target IP Information [CONN-MCDATA/ONN/IPCONN/02]
7.2.122	MCData User initiates an emergency alert by sending a SIP MESSAGE [CONN-MCDATA/ONN/EMERG-ALERT/MSG/01]
7.2.123	MCData User cancels an emergency alert by sending a SIP MESSAGE [CONN-MCDATA/ONN/EMERG-ALERT/MSG/02]
7.2.124	MCData User cancels an emergency alert originated by other user by sending a SIP MESSAGE [CONN-MCDATA/ONN/EMERG-ALERT/MSG/03]
7.3	**Floor Control (FC)**
7.3.1	Basic FC functionality [FC/BASIC/01]
7.3.2	Basic FC functionality. Effect of Priorities [FC/BASIC/02]
7.3.3	Advanced FC functionality. Floor control revoking upon expires (T2) [FC/ADV/01]
7.3.4	Advanced FC functionality. Floor control queueing upon release [FC/ADV/02]
7.3.5	Advanced FC functionality. Floor control queueing upon revoke [FC/ADV/03]
7.3.6	Sharing/Display of FA during basic FC operations [FC/FA/BASIC/01]
7.3.7	Multi-talker basic operation [FC/MT/BASIC/01]
7.4	**Registration and Service Authorization (RegAuth)**
7.4.1	MCPTT User authenticates to the IdMS [REGAUTH/IDMSAUTH/01]
7.4.2	MCPTT User gets registered and authorized using third-party registration [REGAUTH/3PRTYREG/REGISTER/01]
7.4.3	MCPTT User gets authorized using PUBLISH mechanism [REGAUTH/PUBLISH/REGISTER/01]
7.4.4	MCPTT service server limits the number of simultaneous successful service authorisations while using third-party registration [REGAUTH/3PRTYREG/REGISTER/02
7.4.5	MCPTT service server limits the number of simultaneous successful service authorisations while using PUBLISH mechanism [REGAUTH/PUBLISH/REGISTER/02]

Number	Name
7.5	**Policing (PCC)**
7.5.1	Setup of a Unicast MC Bearer by SIP Core/IMS [PCC/BEARERSETUP/01]
7.5.2	Setup of a Unicast MC Bearer by MCPTT Participating AS [PCC/BEARERSETUP/02]
7.5.3	Update of a Unicast MC Bearer by SIP Core/IMS [PCC/BEARERUPDATE/01]
7.5.4	Update of a Unicast MC Bearer by MCPTT Participating AS [PCC/BEARERUPDATE/02]
7.5.5	Setup of a Unicast MC Bearer by SIP Core/IMS using pre-established sessions [PCC/BEARERSETUP/03]
7.5.6	Setup of a Unicast MC Bearer by MCPTT Participating AS using pre-established sessions [PCC/BEARERSETUP/04]
7.6	**eMBMS (EMBMS)**
7.6.2	Use of dynamically established MBMS bearers in prearranged MCPTT group calls with pre-allocated TMGIs [EMBMS/ACTIVATEBEARER/WPRETMGI/01]
7.6.3	Use of dynamically established MBMS bearers in prearranged MCPTT group calls without pre-allocated TMGIs [EMBMS/ACTIVATEBEARER/WOPRETMGI/01]
7.6.4	Use of pre-established MBMS bearers in prearranged group calls with pre-allocated TMGIs [EMBMS/PREBEARER/WPRETMGI/01]
7.6.5	Use of pre-established MBMS bearers in prearranged group calls without pre-allocated TMGIs [EMBMS/PREBEARER/WOPRETMGI/01]
7.6.6	Modification of MBMS bearers upon reception of emergency upgrade request [EMBMS/MODIFYBEARER/01]
7.6.7	Deactivation of MBMS bearers after termination of a prearranged MCPTT group call with TMGI deallocation [EMBMS/DEACTBEARER/WTMGIDEA/01]
7.6.8	Deactivation of MBMS bearers after termination of a prearranged MCPTT group call without TMGI deallocation [EMBMS/DEACTBEARER/WOTMGIDEA/01]
7.6.9	Switching to unicast bearer after TMGI expiration [EMBMS/SWITCHTOUNITMGIEXP/01]
7.6.10	Handling of a not-listening report sent by MCPTT Client [EMBMS/NOTLISTENING/01]
7.6.11	Handling of a suspension-status report sent by MCPTT Client [EMBMS/SUSPENSION/01]
7.6.12	Use of dynamically established MBMS bearers in prearranged MCVideo group calls with pre-allocated TMGIs [EMBMS-MCVIDEO/ACTIVATEBEARER/WPRETMGI/01]
7.6.13	Use of dynamically established MBMS bearers in prearranged MCVideo group calls without pre-allocated TMGIs [EMBMS-MCVIDEO/ACTIVATEBEARER/WOPRETMGI/01]
7.6.14	Use of pre-established MBMS bearers in prearranged MCVideo group calls with pre-allocated TMGIs [EMBMS-MCVIDEO/PREBEARER/WPRETMGI/01]
7.6.15	Use of pre-established MBMS bearers in prearranged MCVideo group calls without pre-allocated TMGIs [EMBMS-MCVIDEO/PREBEARER/WOPRETMGI/01]
7.6.16	Modification of MBMS bearers upon reception of emergency upgrade request in an MCVideo group call [EMBMS-MCVIDEO/MODIFYBEARER/01]
7.6.17	Deactivation of MBMS bearers after termination of a prearranged MCVideo group call with TMGI deallocation [EMBMS-MCVIDEO/DEACTBEARER/WTMGIDEA/01]
7.6.18	Deactivation of MBMS bearers after termination of a prearranged MCVideo group call without TMGI deallocation [EMBMS-MCVIDEO/DEACTBEARER/WOTMGIDEA/01]
7.6.19	Switching to unicast bearer after TMGI expiration in an MCVideo call [EMBMS-MCVIDEO/SWITCHTOUNITMGIEXP/01]
7.6.20	Handling of a not-listening report sent by MCVideo Client [EMBMS-MCVIDEO/NOTLISTENING/01]
7.6.21	Handling of a suspension-status report sent by MCVideo Client [EMBMS-MCVIDEO/SUSPENSION/01]
7.7	**Affiliation (AFFIL)**
7.7.1	MCPTT User subscribes to its own affiliation [AFFIL/DET/01]
7.7.2	MCPTT User subscribes to the affiliation of another user [AFFIL/DET/02]
7.7.3	MCPTT User requests its affiliation to a set of groups [AFFIL/CHANGE/01]
7.7.4	MCPTT User requests the affiliation of other User to a set of groups in mandatory mode [AFFIL/CHANGE/02]
7.7.5	MCPTT User requests the affiliation of other User to a set of groups in negotiated mode [AFFIL/CHANGE/03]
7.7.6	Affiliation change triggered by a functional-alias activation criteria [AFFIL/CHANGE/04]
7.7.7	Affiliation change triggered by a functional-alias deactivation criteria [AFFIL/CHANGE/05]
7.7.8	Affiliation change triggered by implicit affiliation in an on demand pre-arranged group call [AFFIL/CHANGE/06]
7.7.9	Affiliation change triggered by implicit affiliation during service authorization [AFFIL/CHANGE/07]
7.8	**Location (LOC)**
7.8.1	MCPTT Client Configuration upon 3rd party register [LOC/3PRTYREG/CONFIG/01]
7.8.2	Explicit Location reporting request sent to the MCPTT Client [LOC/REQUEST/01]
7.8.3	MCPTT Client Location submitted upon some trigger [LOC/SUBMISSION/01]
7.9	**OAM procedures (CSC)**

Number	Name
7.9.1	Subscription and UE configuration document retrieval from the MC UE [CSC-CMS/UECONF/UE/01]
7.9.2	Subscription and user profile configuration document retrieval from the MC UE [CSCCMS/UPROCONF/UE/01]
7.9.3	Subscription and service configuration document retrieval from the MC UE [CSCCMS/SERVCONF/UE/01]
7.9.4	Subscription and service configuration document retrieval from the MCS Server [CSCCMS/SERVCONF/MCSSERV/01]
7.9.5	Subscription and group document retrieval from the MC UE [CSC-GMS/GROUP/UE-/01]
7.9.6	Subscription and group document retrieval from the MCS Server [CSC-GMS/GROUP/MCSSERV/01]
7.9.7	Subscription and retrieval of multiple documents from the CMS using subscription proxy [CSC/MULTIPLESUBS/UE/01]
7.9.8	Subscription and retrieval of multiple documents from the GMS using subscription proxy [CSC/MULTIPLESUBSGMSGROUP/UE/01]
7.10	**Security mechanisms (SEC)**
7.10.1	Key material download from KMS to MCPTT client (CSC-8) with proxy [SEC/KEYMDOWNLOAD/WPROXY/01]
7.10.2	Key material download from KMS to MCPTT server (CSC-9) with proxy [SEC/KEYMDOWNLOAD/WPROXY/02]
7.10.3	Key material download from KMS to MCPTT GMS (CSC-10) with proxy [SEC/KEYMDOWNLOAD/WPROXY/03]
7.10.4	Key material download from KMS to MCPTT client (CSC-8) without proxy [SEC/KEYMDOWNLOAD/WOPROXY/01]
7.10.5	Key material download from KMS to MCPTT server (CSC-9) without proxy [SEC/KEYMDOWNLOAD/WOPROXY/02]
7.10.6	Key material download from KMS to MCPTT GMS (CSC-10) without proxy [SEC/KEYMDOWNLOAD/WOPROXY/03]
7.10.7	Key management from MC client to MC server (CSK upload) [SEC/KEYDIST/CSK/01]
7.10.8	Key management for group communications (GMK) [SEC/KEYDIST/GMK/01]
7.10.9	Key management from MC server to MC client (Key download MuSiK) [SEC/KEYDIST/MUSIK/01]
7.10.10	Encryption of MCPTT private calls (use of derived encryption keys from PCK for the audio and CSK for floor control and RTCP reports) [SEC/ENCRYPTION/PRIVATE/01]
7.10.11	Encryption of MCPTT group calls (use of derived encryption keys from GMK for the audio and CSK for floor control and RTCP reports) [SEC/ENCRYPTION/GROUP/01]
7.10.12	Encryption of MCPTT group calls using eMBMS (use of derived encryption keys from MuSIK for the floor control and MSCCK for eMBMS control) [SEC/ENCRYPTION/GROUPEMBMS/01]
7.10.13	XML contents encryption in MCPTT private calls (mcptt-info and resource-lists) [SEC/XMLENCRYPT/PRIVATE/01]
7.10.14	XML contents encryption in MCPTT group calls (mcptt-info) [SEC/XMLENCRYPT/GROUP/01]
7.10.15	XML contents encryption in affiliation procedure [SEC/XMLENCRYPT/AFFIL/01]
7.10.16	XML contents encryption in location procedure [SEC/XMLENCRYPT/LOC/01]
7.10.17	XML contents encryption in registration and authorization procedures [SEC/XMLENCRYPT/REGAUTH/01]
7.11	**MCVideo Transmission Control (TC)**
7.11.1	Basic TC functionality [TC/BASIC/01]
7.11.2	Basic TC functionality. Maximum number of transmitters [TC/BASIC/02]
7.11.3	Basic TC functionality. Maximum number of receivers [TC/BASIC/03]
7.11.4	Basic TC functionality. Maximum number of transmitters and pre-emptive priority request [TC/BASIC/04]
7.12	**Server-to-Server communications (S2S)**
7.12.1	On-demand prearranged MCPTT Group Call to temporary group in trusted mode [S2S/ONN/GROUP/PREA/ONDEM/TEMP/01]
7.12.2	On-demand prearranged MCPTT Group Call to temporary group in untrusted mode [S2S/ONN/GROUP/PREA/ONDEM/TEMP/02]
7.13	**Functional Alias (FA)**
7.13.1	MCPTT user requests to activate one or more functional aliases [FA/CHANGE/01]
7.13.2	MCPTT user requests to deactivate one or more functional aliases [FA/CHANGE/02]
7.13.3	MCPTT user refreshes the interest on one or more functional aliases [FA/CHANGE/03]
7.13.4	MCPTT user takes over a functional aliases [FA/CHANGE/04]
7.13.5	MCPTT user requests to activate one or more functional aliases upon entering a location area [FA/LOCCHANGE/01]
7.13.6	MCPTT user requests to deactivate one or more functional aliases upon entering a location area [FA/LOCCHANGE/02]
7.13.7	MCPTT user determines the functional aliases successfully activated [FA/DET/01]
7.13.8	MCPTT user determines the functional aliases successfully activated for another user [FA/DET/02]

Number	Name
7.13.9	MCPTT server requests a resolution of the Functional alias from the MCPTT server owning that FA [FA/RESOL/01]
7.13.10	Automatic deactivation of FA [FA/CHANGE/05]
7.14	**Interoperability Scenarios (IOP)**
7.14.1	Effect of (de)affiliating another user during an ongoing group call [IOP/01]
7.14.2	GEOFENCING [IOP/02]
7.14.3	Complete group-regrouping procedure [IOP/03]
7.14.4	Effect of adding a user to a group and CSC subscriptions [IOP/04]
7.14.5	Missed call and private call callback [IOP/05]
7.14.6	EMBMS switch from unicast to multicast and back to unicast [IOP/06]
7.14.7	one-to-server video push & one-from-server video pull operation [IOP/07]
7.15	**User Regroup (USERREG)**
7.15.1	MCPTT user requests a users regroup using a preconfigured group [REGRPREC/USERREG/01]
7.15.2	MCPTT user removes a users regroup using a preconfigured group [REGRPREC/USERREG/02]
7.15.3	MCPTT user requests a group regroup using a preconfigured group [REGRPREC/GROUPREG/01]
7.15.4	MCPTT user removes a group regroup using a preconfigured group [REGRPREC/GROUPREG/02]
7.16	**MCData Message Store (MCDATAMS)**
7.16.1	MCData message store client retrieves an object [MCDATAMS/RETR/01
7.16.2	MCData message store client searches for information about a selected set of objects
7.16.3	MCData message store client updates an existing object [MCDATAMS/UPDATE/01]
7.16.4	MCData message store client deletes an object [MCDATAMS/DEL/01]
7.16.5	MDData server deposits an object of an MCData user [MCDATAMS/DEP/01]
7.16.6	MCData message store client copies object(s) and/or folder(s) to a destination folder [MCDATAMS/COPY/01]
7.16.7	MCData message store client deletes a folder [MCDATAMS/DEL/02]
7.16.8	MCData message store client creates a folder [MCDATAMS/CRE/01]
7.16.9	MCData message store client moves an object to a destination folder [MCDATAMS/MOVE/01]
7.16.10	MCData message store client searches for information about a selected set of folders [MCDATAMS/SEARCH/02]
7.16.11	MCData message store client subscribes to changes in the store [MCDATAMS/SUBS/01]
7.16.12	MCData message store client cancels the subscription to changes in the store [MCDATAMS/SUBS/02]
7.16.13	MCData message store client updates a subscription to changes in the store [MCDATAMS/SUBS/03]
7.16.14	MCData message store client uploads an object [MCDATAMS/UP/01]
7.16.15	MCData message store function sends a notification of changes [MCDATAMS/SYNC/01]
7.16.16	MCData message store client searches for changes [MCDATAMS/SYNC/02]
7.16.17	MCData message store client lists subfolders of a folder [MCDATAMS/LIST/01]
8	**eMBMS complementary test cases**
8.2.1	TMGI allocation management [EMBMS-ADDITIONAL/MB2C/FUNCT/ALLOCTMGI/01]
8.2.2	TMGI deallocation management [EMBMS-ADDITIONAL/MB2C/FUNCT/DEALLOCTMGI-/01]
8.2.3	Successful bearer activation [EMBMS-ADDITIONAL/MB2C/FUNCT/ACTIVATEBEARER-/01]
8.2.4	Successful bearer deactivation [EMBMS-ADDITIONAL/MB2c/FUNCT/DEACTBEARER-/01]
8.2.5	Successful bearer modification [EMBMS-ADDITIONAL/MB2C/FUNCT/MODBEARER/01]
8.2.6	Management of TMGI expiration [EMBMS-ADDITIONAL/MB2C/FUNCT/TMGIEXP/01]
8.2.7	Management of aggregated requests [EMBMS-ADDITIONAL/MB2C/FUNCT/AGGREQUEST-/01]
8.2.8	Management of Bearer Pre-emption [EMBMS-ADDITIONAL/MB2C/PRIO/PREEM/01]
8.2.9	Management of Bearer Resumption [EMBMS-ADDITIONAL/MB2C/PRIO/RESUM/01]
8.2.10	MB2-C security using TLS over TCP [EMBMS-ADDITIONAL/MB2C/SECURITY/TLS-/01]
8.2.11	MB2-C security using DTLS over SCTP [EMBMS-ADDITIONAL/MB2C/SECURITY/DTLS-/01]
8.2.12	Restoration procedure management [EMBMS-ADDITIONAL/MB2C/ROBUSTNESS/RES-TORATION/01]
8.2.13	TMGI allocation failure [EMBMS-ADDITIONAL/MB2C/ROBUSTNESS/ALLOCATE/TMGI-/01]
8.2.14	TMGI deallocation failure [EMBMS-ADDITIONAL/MB2C/ROBUSTNESS/DEALLOCATE/TMGI/01]
8.2.15	Bearer activation failure [EMBMS-ADDITIONAL/MB2c/ROBUSTNESS/ACTIVATE/BEARER-/01]
8.2.16	Bearer deactivation failure [EMBMS–ADDITIONAL/MB2C/ROBUSTNESS/DEACTIVATE-/BEARER/01]
8.2.17	Bearer modification failure [EMBMS-ADDITIONAL/MB2C/ROBUSTNESS/MODIFY/BEARER-/01]
8.2.18	Multiple GCS-AS management [EMBMS-ADDITIONAL/MB2C/LOAD/MUL-TIPLEGCS-/01]

Number	Name
8.2.19	Activation of multiple (100) bearers [EMBMS-ADDITIONAL/MB2C/LOAD/100BEARER-/01]
9	**Observers scenarios**
9.3	Emergency call [OS1]
9.4	Emergency call handling [OS2]
9.5	Encrypted private call [OS3]
9.6	eMBMS MCPTT [OS4.1]
9.7	eMBMS MCVideo [OS4.2]
9.8	Switching on [OS5]
9.9	Encrypted MCPTT group call [OS6]
9.10	Enhanced status [OS7.1]
9.11	MCDATA SDS [OS7.2]
9.12	Encrypted MCVideo Group Call [OS8]
9.13	Parallel MCPTT and MCVIDEO [OS9]
9.14	Initiation of the Railway emergency alert [OS10]
	RAN5 Conformance Test Cases (3GPP TS 36.579-2)
5.1	Configuration / Authentication / User Authorization / UE Configuration / User Profile / Key Generation
5.3	Configuration / Group Affiliation / Remote change / De-affiliation / Home MCPTT system
5.4	MCPTT / Configuration / Pre-established Session Establishment / Pre-established Session Modification / Pre-established Session Release
6.1.1.1	On-network / On-demand Pre-arranged Group Call / Automatic Commencement Mode / End-to-end communication security / Floor Control / Upgrade to Emergency Group Call / Cancel Emergency State / Upgrade to Imminent Peril Group Call / Cancel Imminent Peril State / Client Originated (CO)
6.1.1.2	On-network / On-demand Pre-arranged Group Call / Automatic Commencement Mode / Floor Control / Upgrade to Emergency Group Call / Cancel Emergency State / Upgrade to Imminent Peril Group Call / Cancel Imminent Peril State / Client Terminated (CT)
6.1.1.3	On-network / On-demand Pre-arranged Group Call / Manual Commencement Mode / Client Originated (CO)
6.1.1.4	On-network / On-demand Pre-arranged Group Call / Manual Commencement Mode / Client Terminated (CT)
6.1.1.5	MCPTT / On-network / Pre-arranged Group Call using pre-established session / Client originated Pre-established Session Release with associated MCPTT session / Client Originated (CO)
6.1.1.6	On-network / Pre-arranged Group Call using pre-established session / Automatic Commencement Mode / Server originated Pre-established Session Release with associated MCPTT session / Client Terminated (CT)
6.1.1.7	On-network / Pre-arranged Group Call using pre-established session / Manual Commencement Mode / Client Terminated (CT)
6.1.1.8	On-network / Pre-arranged Broadcast Group Call / Client Originated (CO)
6.1.1.9	MCPTT / On-network / Pre-arranged Broadcast Group Call / Client Terminated (CT)
6.1.1.10	MCPTT / On-network / Broadcast Group Call with Temporary Group / Client Originated (CO)
6.1.1.11	On-network / Pre-arranged Emergency Group Call / Client Originated (CO)
6.1.1.12	MCPTT / On-network / Pre-arranged Emergency Group Call / Client Terminated (CT)
6.1.1.13	On-network / Pre-arranged Imminent Peril Group Call / Client Originated (CO)
6.1.1.14	MCPTT / On-network / Pre-Arranged Imminent Peril Group Call / Client Terminated (CT)
6.1.1.15	On-network / Emergency Alert / Cancel Emergency Alert / Client Originated (CO)
6.1.1.16	On-network / Emergency Alert / Client Terminated (CT)
6.1.1.17	On-network / Broadcast Group Call using pre-established session / Client originated Pre-established Session Release with associated MCPTT session / Client Originated (CO)
6.1.1.18	On-network / Broadcast Group Call using pre-established session / Automatic Commencement Mode / Server originated Pre-established Session Release with associated MCPTT session / Client Terminated (CT)
6.1.2.2	On-network / Chat Group Call Using Pre-established Session Including Emergency and Imminent Peril Calls / Client Server originated Pre-established Session Release with associated MCPTT session / Client Origination (CO)
6.1.2.7	MCPTT / On-network / Chat Group Call / Emergency Group Call / Client Originated (CO)
6.1.2.8	MCPTT / On-network / Chat Group Call / Emergency Group Call / Client Terminated (CT)
6.1.2.9	MCPTT / On-network / Chat Group Call / Imminent Peril Group Call / Client Originated (CO)
6.1.2.10	MCPTT / On-network / Chat Group Call / Imminent Peril Group Call / Client Terminated (CT)
6.1.2.11	MCPTT / On-network / Chat Group Call / Join Chat Group Session / Upgrade to Emergency / Cancel Emergency / Upgrade to Imminent Peril / Cancel Imminent Peril / Client Originated (CO)

Number	Name
6.1.2.12	MCPTT / On-network / Chat Group Call / Upgrade to Emergency / Cancel Emergency / Upgrade to Imminent Peril / Cancel Imminent Peril / Client Originated (CT)
6.2.1	MCPTT / On-network / Private Call / On-demand / Automatic Commencement Mode / With Floor Control / Upgrade to Emergency Call / Cancellation of Emergency on User request / Client Originated (CO)
6.2.2	MCPTT / On-network / Private Call / On-demand / Automatic Commencement Mode / With Floor Control / Upgrade to Emergency Call / Cancellation of Emergency on User request / Client Terminated (CT)
6.2.3	MCPTT / On-network / Private Call / On-demand / Automatic Commencement Mode / Without Floor Control / Client Originated (CO)
6.2.4	MCPTT / On-network / Private Call / On-demand / Automatic Commencement Mode / Without Floor Control / Client Terminated (CT)
6.2.5	MCPTT / On-network / Private Call / Emergency Private Call / On-demand / Automatic Commencement Mode / Force of automatic commencement mode / Without Floor Control / Client Originated (CO)
6.2.6	MCPTT / On-network / Private Call / Emergency Private Call / On-demand / Manual Commencement Mode / Force of automatic commencement mode / Without Floor Control / Client Terminated (CT)
6.2.7	MCPTT / On-network / Private Call / On-demand / Manual Commencement Mode / Without Floor Control / Client Originated (CO)
6.2.8	On-network / Private Call / On-demand / Manual Commencement Mode / Without Floor Control / Client Terminated (CT)
6.2.9	On-network / Private Call / Within a pre-established session / Automatic Commencement Mode / Without Floor Control / Client Originated (CO)
6.2.10	On-network / Private Call / Within a pre-established session / Automatic Commencement Mode / Without Floor Control / Client Terminated (CT)
6.2.11	On-network / Private Call / Within a pre-established session / Manual Commencement Mode / Without Floor Control / Release of the Call and the pre-established session / Client Terminated (CT)
6.2.12	6.2.12 On-network / Private Call / Private Call Call-Back Request / Private Call Call-Back Cancel Request / Client Originated (CO) / Private call call-back fulfilment
6.2.13	6.2.13 On-network / Private Call / Private Call Call-Back Request / Private Call Call-Back Cancel Request / Client Terminated (CT) / Private call call-back fulfilment
6.2.14	MCPTT / On-network / Private Call / Ambient listening call / Remotely initiated Ambient listening call / Remotely initiated ambient listening call release / Success / Client Originated (CO) / Server initiated ambient call release
6.2.15	MCPTT / On-network / Private Call / Ambient listening call / Remotely initiated Ambient listening call / Remotely initiated ambient listening call release / Success / Client Terminated (CT)
6.2.16	MCPTT / On-network / Private Call / Ambient listening call / Locally initiated Ambient listening call / Locally initiated ambient listening call release / Success / Client Originated (CO) / Server initiated ambient call release
6.2.17	MCPTT / On-network / Private Call / Ambient listening call / Locally initiated Ambient listening call / Locally initiated ambient listening call release / Success / Client Terminated (CT)

Table 29. Mapping of Test Case Numbers to Test Case Names

9 Interoperability Results

9.1 Overall Results

During the Plugtests event, a total of 206 Test Sessions were run: that is, 206 different combinations based on different configurations in Test Scope: MCX Client, MCX Server (Participating and Controlling), eNB, EPC, LMR, UEs and Testers were tested for interoperability. Overall, 1363 test executions were conducted and reported interoperability and conformance results.

The table below provides the overall results (aggregated data) from all the Test Cases run during all the Test Sessions with all the different combinations of Equipment Under Test from all the participating companies.

Among the executed Test Cases, the possible results were "OK", when interoperability was successfully achieved and "NO" (Not OK) when it was not.

Interoperability		Totals
OK	**NO**	**Run**
1304 (97.6%)	31 (2.4%)	1335

Table 30. Overall Interoperability Results

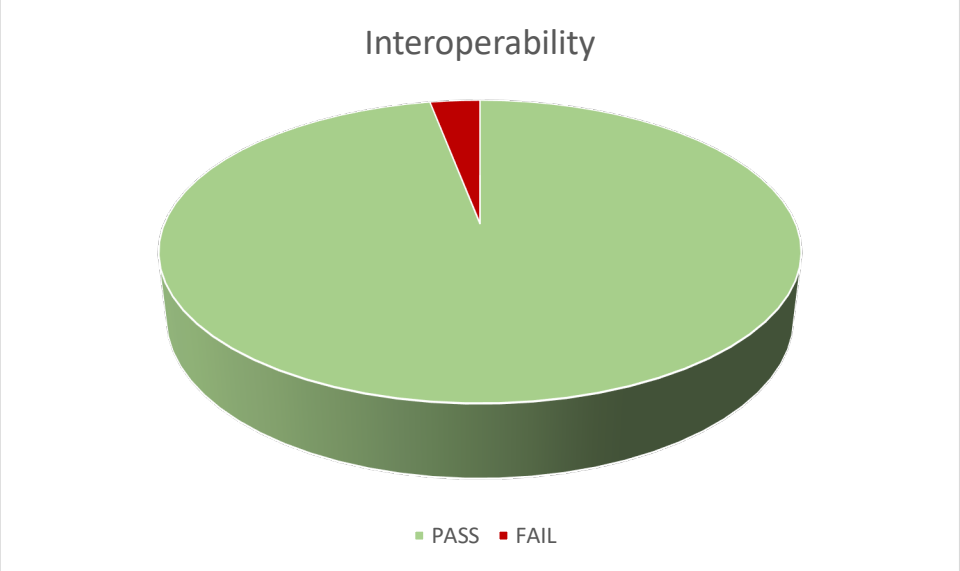


Figure 12. Overall Interoperability results (%)

A overall interoperability success rate of 97.6% was achieved, which indicates a very high degree of compatibility among the participating implementations (EUTs) in the areas of the Test Plan where features were widely supported and the test cases could be executed in most of the Test Sessions. In the next clauses, we will see that this high rate is also a consequence of the good preparation and involvement of participants during the remote integration and pre-testing phase of the Plugtests.

Conformance		Totals
OK	NO	Run
26 (92.8%)	2 (7.2%)	28

Table 31. Overall Conformance Results

Figure 13. Overall Conformance results (%)

9.2 Results per Test Configuration

The table below provides the results for each test configuration in the scope of the Plugtests event. The below configurations are defined in clause 7.2.

	Interoperability	
	OK	NO
Pretest-MCX	76 (98.7%)	1 (1.3%)
PreTest-MCX-LTE	1 (20.0%)	4 (80.0%)
Pretest-IWF	4 (100.0%)	0 (0.0%)
Pretest-MCX-PC	0 (0.0%)	0 (0.0%)
Main-MCX	1056 (97.7%)	25 (2.3%)
Main-MCX-LTE	25 (100.0%)	0 (0.0%)
Main-FRMCS	119 (99.2%)	1 (0.8%)
Main-MCXAS-Tester	0 (0.0%)	0 (0.0%)
Main-MCXClient-Tester	26 (96.3%)	1 (3.7%)
Main-IWF	10 (100.0%)	0 (0.0%)

Pretest-MCX-Wifi	3 (100.0%)	0 (0.0%)
Main-MCX-Wifi	9 (100.0%)	0 (0.0%)
Main-S2S	1 (50.0%)	1 (50.0%)

Table 32. Results per Test Configuration

The table shows that very high execution and interoperability rates for different Test Configurations were achieved.

9.3 Results per Test Case

The table below provides the results for each test case in the scope of the Plugtests event. Test Cases numbering is referred from ETSI TS 103 564.

	Interoperability	
	PASS	**FAIL**
7.2.1	71 (97.3%)	2 (2.7%)
7.2.2	41 (97.6%)	1 (2.4%)
7.2.3	24 (96.0%)	1 (4.0%)
7.2.4	19 (95.0%)	1 (5.0%)
7.2.5	3 (100.0%)	0 (0.0%)
7.2.6	39 (100.0%)	0 (0.0%)
7.2.7	2 (66.7%)	1 (33.3%)
7.2.8	1 (100.0%)	0 (0.0%)
7.2.9	24 (100.0%)	0 (0.0%)
7.2.10	1 (100.0%)	0 (0.0%)
7.2.11	0 (0.0%)	0 (0.0%)
7.2.12	1 (100.0%)	0 (0.0%)
7.2.13	0 (0.0%)	0 (0.0%)
7.2.14	0 (0.0%)	0 (0.0%)
7.2.15	31 (100.0%)	0 (0.0%)
7.2.16	48 (100.0%)	0 (0.0%)
7.2.17	3 (100.0%)	0 (0.0%)
7.2.18	2 (100.0%)	0 (0.0%)
7.2.19	25 (100.0%)	0 (0.0%)
7.2.20	51 (98.1%)	1 (1.9%)
7.2.21	0 (0.0%)	0 (0.0%)
7.2.22	0 (0.0%)	0 (0.0%)
7.2.23	7 (87.5%)	1 (12.5%)
7.2.24	6 (85.7%)	1 (14.3%)
7.2.25	0 (0.0%)	0 (0.0%)
7.2.26	0 (0.0%)	0 (0.0%)
7.2.27	4 (80.0%)	1 (20.0%)
7.2.28	3 (75.0%)	1 (25.0%)
7.2.29	2 (66.7%)	1 (33.3%)

7.2.30	3 (100.0%)	0 (0.0%)
7.2.31	3 (100.0%)	0 (0.0%)
7.2.32	0 (0.0%)	0 (0.0%)
7.2.33	0 (0.0%)	0 (0.0%)
7.2.34	6 (100.0%)	0 (0.0%)
7.2.35	6 (100.0%)	0 (0.0%)
7.2.36	0 (0.0%)	0 (0.0%)
7.2.37	0 (0.0%)	0 (0.0%)
7.2.38	0 (0.0%)	0 (0.0%)
7.2.39	19 (90.5%)	2 (9.5%)
7.2.40	0 (0.0%)	0 (0.0%)
7.2.41	0 (0.0%)	0 (0.0%)
7.2.42	16 (100.0%)	0 (0.0%)
7.2.43	0 (0.0%)	0 (0.0%)
7.2.44	0 (0.0%)	0 (0.0%)
7.2.45	1 (100.0%)	0 (0.0%)
7.2.46	1 (100.0%)	0 (0.0%)
7.2.47	0 (0.0%)	0 (0.0%)
7.2.48	0 (0.0%)	0 (0.0%)
7.2.49	7 (87.5%)	1 (12.5%)
7.2.50	8 (100.0%)	0 (0.0%)
7.2.51	1 (100.0%)	0 (0.0%)
7.2.52	1 (100.0%)	0 (0.0%)
7.2.53	0 (0.0%)	0 (0.0%)
7.2.54	0 (0.0%)	0 (0.0%)
7.2.55	6 (100.0%)	0 (0.0%)
7.2.56	2 (100.0%)	0 (0.0%)
7.2.57	1 (100.0%)	0 (0.0%)
7.2.58	20 (95.2%)	1 (4.8%)
7.2.59	0 (0.0%)	0 (0.0%)
7.2.60	13 (100.0%)	0 (0.0%)
7.2.61	0 (0.0%)	0 (0.0%)
7.2.62	0 (0.0%)	0 (0.0%)
7.2.63	15 (100.0%)	0 (0.0%)
7.2.64	1 (100.0%)	0 (0.0%)
7.2.65	1 (100.0%)	0 (0.0%)
7.2.66	0 (0.0%)	0 (0.0%)
7.2.67	0 (0.0%)	0 (0.0%)
7.2.68	0 (0.0%)	0 (0.0%)
7.2.69	0 (0.0%)	0 (0.0%)
7.2.70	0 (0.0%)	0 (0.0%)

7.2.71	0 (0.0%)	0 (0.0%)
7.2.72	0 (0.0%)	0 (0.0%)
7.2.73	1 (100.0%)	0 (0.0%)
7.2.74	0 (0.0%)	0 (0.0%)
7.2.75	0 (0.0%)	0 (0.0%)
7.2.76	0 (0.0%)	0 (0.0%)
7.2.77	0 (0.0%)	0 (0.0%)
7.2.78	0 (0.0%)	0 (0.0%)
7.2.79	0 (0.0%)	0 (0.0%)
7.2.80	0 (0.0%)	1 (100.0%)
7.2.81	0 (0.0%)	0 (0.0%)
7.2.82	1 (100.0%)	0 (0.0%)
7.2.83	5 (100.0%)	0 (0.0%)
7.2.84	1 (100.0%)	0 (0.0%)
7.2.85	0 (0.0%)	1 (100.0%)
7.2.86	1 (100.0%)	0 (0.0%)
7.2.87	0 (0.0%)	0 (0.0%)
7.2.88	0 (0.0%)	0 (0.0%)
7.2.89	0 (0.0%)	0 (0.0%)
7.2.90	0 (0.0%)	0 (0.0%)
7.2.91	0 (0.0%)	0 (0.0%)
7.2.92	0 (0.0%)	0 (0.0%)
7.2.93	0 (0.0%)	0 (0.0%)
7.2.94	0 (0.0%)	0 (0.0%)
7.2.95	0 (0.0%)	0 (0.0%)
7.2.96	0 (0.0%)	0 (0.0%)
7.2.97	2 (100.0%)	0 (0.0%)
7.2.98	0 (0.0%)	0 (0.0%)
7.2.99	0 (0.0%)	0 (0.0%)
7.2.100	0 (0.0%)	0 (0.0%)
7.2.101	0 (0.0%)	0 (0.0%)
7.2.102	4 (100.0%)	0 (0.0%)
7.2.103	11 (100.0%)	0 (0.0%)
7.2.104	11 (100.0%)	0 (0.0%)
7.2.105	0 (0.0%)	0 (0.0%)
7.2.106	0 (0.0%)	0 (0.0%)
7.2.107	0 (0.0%)	0 (0.0%)
7.2.108	3 (100.0%)	0 (0.0%)
7.2.109	0 (0.0%)	0 (0.0%)
7.2.110	0 (0.0%)	0 (0.0%)
7.2.111	0 (0.0%)	0 (0.0%)

7.2.112	3 (100.0%)	0 (0.0%)
7.2.113	0 (0.0%)	0 (0.0%)
7.2.114	0 (0.0%)	0 (0.0%)
7.2.115	0 (0.0%)	0 (0.0%)
7.2.116	0 (0.0%)	0 (0.0%)
7.2.117	0 (0.0%)	0 (0.0%)
7.2.118	0 (0.0%)	0 (0.0%)
7.2.119	0 (0.0%)	0 (0.0%)
7.2.120	3 (100.0%)	0 (0.0%)
7.2.121	3 (100.0%)	0 (0.0%)
7.2.122	0 (0.0%)	0 (0.0%)
7.2.123	0 (0.0%)	0 (0.0%)
7.2.124	0 (0.0%)	0 (0.0%)
7.3.1	51 (100.0%)	0 (0.0%)
7.3.2	17 (100.0%)	0 (0.0%)
7.3.3	15 (93.8%)	1 (6.3%)
7.3.4	9 (100.0%)	0 (0.0%)
7.3.5	5 (83.3%)	1 (16.7%)
7.3.6	5 (71.4%)	2 (28.6%)
7.3.7	5 (100.0%)	0 (0.0%)
7.4.1	62 (96.9%)	2 (3.1%)
7.4.2	102 (100.0%)	0 (0.0%)
7.4.3	53 (98.1%)	1 (1.9%)
7.4.4	0 (0.0%)	0 (0.0%)
7.4.5	0 (0.0%)	0 (0.0%)
7.5.1	0 (0.0%)	0 (0.0%)
7.5.2	0 (0.0%)	0 (0.0%)
7.5.3	0 (0.0%)	0 (0.0%)
7.5.4	0 (0.0%)	0 (0.0%)
7.5.5	0 (0.0%)	0 (0.0%)
7.5.6	0 (0.0%)	0 (0.0%)
7.6.2	0 (0.0%)	0 (0.0%)
7.6.3	0 (0.0%)	0 (0.0%)
7.6.4	1 (100.0%)	0 (0.0%)
7.6.5	0 (0.0%)	0 (0.0%)
7.6.6	0 (0.0%)	0 (0.0%)
7.6.7	0 (0.0%)	0 (0.0%)
7.6.8	0 (0.0%)	0 (0.0%)
7.6.9	0 (0.0%)	0 (0.0%)
7.6.10	0 (0.0%)	0 (0.0%)
7.6.11	0 (0.0%)	0 (0.0%)

7.6.12	0 (0.0%)	0 (0.0%)
7.6.13	0 (0.0%)	0 (0.0%)
7.6.14	0 (0.0%)	0 (0.0%)
7.6.15	0 (0.0%)	0 (0.0%)
7.6.16	0 (0.0%)	0 (0.0%)
7.6.17	0 (0.0%)	0 (0.0%)
7.6.18	0 (0.0%)	0 (0.0%)
7.6.19	0 (0.0%)	0 (0.0%)
7.6.20	0 (0.0%)	0 (0.0%)
7.6.21	0 (0.0%)	0 (0.0%)
7.7.1	49 (100.0%)	0 (0.0%)
7.7.2	7 (100.0%)	0 (0.0%)
7.7.3	44 (100.0%)	0 (0.0%)
7.7.4	0 (0.0%)	0 (0.0%)
7.7.5	0 (0.0%)	0 (0.0%)
7.7.6	3 (100.0%)	0 (0.0%)
7.7.7	3 (100.0%)	0 (0.0%)
7.7.8	0 (0.0%)	0 (0.0%)
7.7.9	0 (0.0%)	0 (0.0%)
7.8.1	15 (100.0%)	0 (0.0%)
7.8.2	5 (100.0%)	0 (0.0%)
7.8.3	16 (100.0%)	0 (0.0%)
7.9.1	2 (100.0%)	0 (0.0%)
7.9.2	4 (100.0%)	0 (0.0%)
7.9.3	2 (100.0%)	0 (0.0%)
7.9.4	0 (0.0%)	0 (0.0%)
7.9.5	2 (100.0%)	0 (0.0%)
7.9.6	0 (0.0%)	0 (0.0%)
7.9.7	1 (100.0%)	0 (0.0%)
7.9.8	1 (100.0%)	0 (0.0%)
7.10.1	1 (100.0%)	0 (0.0%)
7.10.2	0 (0.0%)	0 (0.0%)
7.10.3	0 (0.0%)	0 (0.0%)
7.10.4	9 (100.0%)	0 (0.0%)
7.10.5	0 (0.0%)	0 (0.0%)
7.10.6	0 (0.0%)	0 (0.0%)
7.10.7	1 (100.0%)	0 (0.0%)
7.10.8	11 (100.0%)	0 (0.0%)
7.10.9	0 (0.0%)	0 (0.0%)
7.10.10	11 (100.0%)	0 (0.0%)
7.10.11	12 (100.0%)	0 (0.0%)

7.10.12	0 (0.0%)	0 (0.0%)
7.10.13	0 (0.0%)	0 (0.0%)
7.10.14	0 (0.0%)	0 (0.0%)
7.10.15	0 (0.0%)	0 (0.0%)
7.10.16	0 (0.0%)	0 (0.0%)
7.10.17	0 (0.0%)	0 (0.0%)
7.11.1	1 (100.0%)	0 (0.0%)
7.11.2	0 (0.0%)	0 (0.0%)
7.11.3	0 (0.0%)	0 (0.0%)
7.11.4	0 (0.0%)	0 (0.0%)
7.12.1	0 (0.0%)	0 (0.0%)
7.12.2	1 (50.0%)	1 (50.0%)
7.13.1	41 (93.2%)	3 (6.8%)
7.13.2	36 (100.0%)	0 (0.0%)
7.13.3	15 (100.0%)	0 (0.0%)
7.13.4	12 (100.0%)	0 (0.0%)
7.13.5	13 (100.0%)	0 (0.0%)
7.13.6	14 (100.0%)	0 (0.0%)
7.13.7	39 (92.9%)	3 (7.1%)
7.13.8	11 (100.0%)	0 (0.0%)
7.13.9	0 (0.0%)	0 (0.0%)
7.13.10	8 (100.0%)	0 (0.0%)
7.14.1	0 (0.0%)	0 (0.0%)
7.14.2	0 (0.0%)	0 (0.0%)
7.14.3	0 (0.0%)	0 (0.0%)
7.14.4	0 (0.0%)	0 (0.0%)
7.14.5	1 (100.0%)	0 (0.0%)
7.14.6	0 (0.0%)	0 (0.0%)
7.14.7	0 (0.0%)	0 (0.0%)
7.15.1	0 (0.0%)	0 (0.0%)
7.15.2	0 (0.0%)	0 (0.0%)
7.15.3	0 (0.0%)	0 (0.0%)
7.15.4	0 (0.0%)	0 (0.0%)
7.16.1	0 (0.0%)	0 (0.0%)
7.16.2	0 (0.0%)	0 (0.0%)
7.16.3	0 (0.0%)	0 (0.0%)
7.16.4	0 (0.0%)	0 (0.0%)
7.16.5	0 (0.0%)	0 (0.0%)
7.16.6	0 (0.0%)	0 (0.0%)
7.16.7	0 (0.0%)	0 (0.0%)
7.16.8	0 (0.0%)	0 (0.0%)

7.16.9	0 (0.0%)	0 (0.0%)
7.16.10	0 (0.0%)	0 (0.0%)
7.16.11	0 (0.0%)	0 (0.0%)
7.16.12	0 (0.0%)	0 (0.0%)
7.16.13	0 (0.0%)	0 (0.0%)
7.16.14	0 (0.0%)	0 (0.0%)
7.16.15	0 (0.0%)	0 (0.0%)
7.16.16	0 (0.0%)	0 (0.0%)
7.16.17	0 (0.0%)	0 (0.0%)
8.2.1	0 (0.0%)	0 (0.0%)
8.2.2	0 (0.0%)	0 (0.0%)
8.2.3	0 (0.0%)	0 (0.0%)
8.2.4	0 (0.0%)	0 (0.0%)
8.2.5	0 (0.0%)	0 (0.0%)
8.2.6	0 (0.0%)	0 (0.0%)
8.2.7	0 (0.0%)	0 (0.0%)
8.2.8	0 (0.0%)	0 (0.0%)
8.2.9	0 (0.0%)	0 (0.0%)
8.2.10	0 (0.0%)	0 (0.0%)
8.2.11	0 (0.0%)	0 (0.0%)
8.2.12	0 (0.0%)	0 (0.0%)
8.2.13	0 (0.0%)	0 (0.0%)
8.2.14	0 (0.0%)	0 (0.0%)
8.2.15	0 (0.0%)	0 (0.0%)
8.2.16	0 (0.0%)	0 (0.0%)
8.2.17	0 (0.0%)	0 (0.0%)
8.2.18	0 (0.0%)	0 (0.0%)
8.2.19	0 (0.0%)	0 (0.0%)
Conformance Tests (3GPP TS 36.579-2)		
5.1	1 (50.0%)	1 (50.0%)
5.3	0 (0.0%)	0 (0.0%)
5.4	0 (0.0%)	0 (0.0%)
6.1.1.1	0 (0.0%)	0 (0.0%)
6.1.1.2	1 (100.0%)	0 (0.0%)
6.1.1.3	1 (100.0%)	0 (0.0%)
6.1.1.4	1 (100.0%)	0 (0.0%)
6.1.1.5	0 (0.0%)	0 (0.0%)
6.1.1.6	0 (0.0%)	0 (0.0%)
6.1.1.7	0 (0.0%)	0 (0.0%)
6.1.1.8	1 (100.0%)	0 (0.0%)
6.1.1.9	1 (100.0%)	0 (0.0%)

6.1.1.10	0 (0.0%)	0 (0.0%)
6.1.1.11	1 (100.0%)	0 (0.0%)
6.1.1.12	1 (100.0%)	0 (0.0%)
6.1.1.13	1 (100.0%)	0 (0.0%)
6.1.1.14	1 (100.0%)	0 (0.0%)
6.1.1.15	0 (0.0%)	0 (0.0%)
6.1.1.16	0 (0.0%)	0 (0.0%)
6.1.1.17	0 (0.0%)	0 (0.0%)
6.1.1.18	0 (0.0%)	0 (0.0%)
6.1.2.2	0 (0.0%)	0 (0.0%)
6.1.2.7	1 (100.0%)	0 (0.0%)
6.1.2.8	1 (100.0%)	0 (0.0%)
6.1.2.9	1 (100.0%)	0 (0.0%)
6.1.2.10	1 (100.0%)	0 (0.0%)
6.1.2.11	1 (100.0%)	0 (0.0%)
6.1.2.12	0 (0.0%)	0 (0.0%)
6.2.1	1 (100.0%)	0 (0.0%)
6.2.2	1 (100.0%)	0 (0.0%)
6.2.3	1 (100.0%)	0 (0.0%)
6.2.4	1 (100.0%)	0 (0.0%)
6.2.5	1 (100.0%)	0 (0.0%)
6.2.6	1 (100.0%)	0 (0.0%)
6.2.7	1 (100.0%)	0 (0.0%)
6.2.8	1 (100.0%)	0 (0.0%)
6.2.9	0 (0.0%)	0 (0.0%)
6.2.10	0 (0.0%)	0 (0.0%)
6.2.11	0 (0.0%)	0 (0.0%)
6.2.12	0 (0.0%)	0 (0.0%)
6.2.13	0 (0.0%)	0 (0.0%)
6.2.14	0 (0.0%)	0 (0.0%)
6.2.15	1 (100.0%)	0 (0.0%)
6.2.16	1 (100.0%)	0 (0.0%)
6.2.17	1 (100.0%)	0 (0.0%)

Table 33. Results per Test Case

10 Plugtests Observations

As a result of the Plugtests event activities some issues in 3GPP Technical Specifications (TSs) and related standards were identified together with practical deployment problems that may demand some clarification or feedback from the related SDOs. We have classified those aspects into the following two categories:

- **Observations to MCX Standards**: Missing, erroneous or ambiguous definition of procedures in 3GPP's MCPTT TSs.
- **Technical constraints**: Related to implementation issues, not covered by the standards, but which need to be faced by MCX vendors in most deployments.

The reader should note that 3GPP Release 16 was considered for the sixth MCX Plugtests event.

The 6th MCPTT Plugtests event team wants to thank all the participants in the Plugtests for kindly sharing the following lessons learned. Specific actions towards pushing this feedback to relevant TSGs in 3GPP have already been started at the time of the release of this report.

10.1 Observations

10.1.1 [EDITORIAL] behaviour upon not-listening report in Section 14 in 3GPP TS 24.379

Section 14.3.3.2 step iv -last "and" would be missing-

iv) if the intention is to report that the MCPTT client is no longer listening to general purpose MBMS

subchannel, shall include the <general-purpose> element set to "false"; and

10.1.2 Duplicated notification behaviour during implicit affiliation

The behaviour of the participating server according to 9.2.2.12 in 3GPP TS 24.379 would result on two asynchronous notifications of the affiliation:

a) Upon 200 OK reception from the controlling.

b) Upon completion of 9.2.2.5 procedures by the controlling (resulting NOTIFY)

10.1.3 Mapping and handling of eMBMS audio and video QCIs in MCVideo

Which QCI to be used and/or whether different MBMS bearers are to be allocated in MCVideo for audio and video streams vs. content of the SDP not specifically stated in 3GPP TS 24.281.

Note the references to "announcement(s) vs. SDP body" in Section 16.2.2.

then the MCVideo client for each <announcement> element in the application/vnd.3gpp.mcvideo-mbms-usageinfo+

xml MIME body:

1) if the <mbms-service-areas> element is present:

a) if an <announcement> element with the same value of the <TMGI> element is already stored:

i) shall replace the old <announcement> element with the <announcement> element received in the

application/vnd.3gpp.mcvideo-mbms-usage-info+xml MIME body;

b) if there is no <announcement> element with the same value of the <TMGI> element stored:

i) shall store the received <announcement> element;

c) shall associate the received announcement with the received application/sdp MIME body;

NOTE 7: Initial mappings of groups to MBMS subchannels on an MBMS bearer for the purpose of carrying media or media control can occur only where the MBMS service area for this bearer and the MBMS service area for the bearer carrying the general purpose MBMS subchannel on which the MapGroupToBearer message is sent intersect. However, once media or media control were successfully mapped to this bearer, the reception by the MCVideo client can continue (until UnmapGroupToBearer is received or until timeout) throughout the entire MBMS service area of this bearer.

Similarly, in TS 24581

The participating MCVideo function will activate MBMS bearers with general QoS characteristics suitable for MCVideo service and will map MBMS subchannels for media or media plane control only to MBMS bearers that can provide the QoS required by media or media plane control.

Finally in TS 23281

7.10.2 Use of pre-established MBMS bearers

.....

Both the media packets as well as the transmission control messages to the receiving MCVideo clients are sent on the MBMS bearer. Optionally a separate MBMS bearer could be used for the transmission control messages, due to different bearer characteristic requirements.

10.1.4 Release of queued floor request

[TS 24.380, subclause 6.2.4.9.6] states that a client in "U: queued" state shall send a Floor Release message and enter the state "U: pending Release" as soon as it receives an indication from the user to release the queued floor request.

[TS 24.380, subclause 6.2.4.6.6] states that a client in "U: pending Release" state shall enter "U: has no permission" state as soon as it receives RTP media packets.

Due to the previous statements a client releasing a queued floor request most of the time will enter the "U: has no permission state" almost immediately.

In fact since the client request was queued an other client currently has the permission to talk and is presumably sending RTP packets.

Wrapping it up, this sequence of state changes happens in rapid succession:

"U: queued" -> "Release queued floor request" -> "U: pending Release" -> "Receive RTP packets" -> "U: has no permission"

The problem with the client entering the state "U: has no permission" almost immediately is that no retransmissions of the Floor Release messages are executed.

In fact Floor Release messages are only retransmitted in "U: pending Release" state due to timer T100.

If the first Floor Release message is lost between the client and the server, since no retransmissions occur then the state of the two entities is misaligned:

- The client assumes that the queued floor request was released.

- The server assumes that the queued floor request was not released.

10.1.5 Identifying user profile index in user database

Clause 7.3.3 in 3GPP TS 24.379 states that upon receiving a "poc-settings" SIP PUBLISH request for service authorization, the participating MCPTT function shall carry out the service authorization. If successful, it shall download the MCPTT user profile from the MCPTT user database as defined in 3GPP TS 29.283 if not already stored

at the MCPTT server and use the <selected-user-profile-index> element of the poc-settings event package if included to identify the active MCPTT user profile for the MCPTT client.

The Diameter definition in 29.283 seems to use the User-Data-Id AVP for update operations but not for Pull requests. IT may seem like all profiles with different index will be retrieved with the Pull operation.

10.1.6 Late call entry at the non-controlling function

Assuming that the following steps happen:

- A temporary group call is in place involving a controlling function and a non-controlling function.

- All the clients at the non-controlling function side leave the call.

- The non-controlling function session is released due to the session release policy specified in [TS 24.379, par. 6.3.8.1] (there are only one or no participants in the MCPTT session).

- The controlling function session is still in place.

Then the late call entry initiated by the non-controlling function as specified in [TS 24.379, par. 10.1.1.5.3.2] cannot be executed, because the session is released at the non-controlling function.

Therefore in this situation there appear to be a disparity between clients at the controlling function side and clients at the non-controlling function side.

Only those at the controlling function side are able to enter the call through a late call entry invitation.

10.1.7 MCPTT Group Regrouping mcptt-regroup XML forwarding

In group regrouping procedure the non-controlling server includes the affiliated users of the regrouped group in a <users-for-regroup> tag and adds it to the incoming mcptt-regroup XML. This XML already included the <groups-for-regroup> tag when sent from the controlling side, so both tags will be present in the XML sent to the participating function. This XML is forwarded as is to the MCPTT client.

The MCPTT client is supposed to identify the type of regrouping (i.e. user or group regrouping) using the presence of the <users-for-regroup> or the <groups-for-regroup> tag, but this will not be possible if both tags are present. We suggest that if <groups-for-regroup> tag is present, the client shall also expect a <users-for-regroup> tag and if not, the client should just look for the <users-for-regroup> tag. That is, the <users-for-regroup> tag shall always be present for receiving clients.

See TS 24.379 (v17.3.1):

- 16.2.4 Non-controlling MCPTT function procedures (e),f))

- 16.2.2 Participating MCPTT function procedures (e))

- 16.2.1.3 Receiving a notification of creation of a regroup using preconfigured group (a),b))

10.1.8 Position of take-over indication in FA Presence XML

Problems with the position of the take-over indication for FA activation were encountered

Table 9A.3.1.2-1 of 3GPP TS 24.379 shows the schema:

<?xml version="1.0" encoding="UTF-8"?>

<xs:schema targetNamespace="<nowiki>urn:3gpp:ns:mcpttPresInfoFA:1.0</nowiki>" xmlns:xs="<nowiki>http://www.w3.org/2001/XMLSchema</nowiki>"xmlns:mcpttPIFA10="<nowiki>urn:3gpp:ns:mcpttPresInfoFA:1.0</nowiki>" elementFormDefault="qualified" attributeFormDefault="unqualified">

<!-- MCPTT functional alias specific child elements of tuple element -->

<xs:element name="functionalAlias" type="mcpttPIFA10:functionalAliasType"/>

<xs:complexType name="functionalAliasType">

<xs:sequence>

<xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

</xs:sequence>

<xs:attribute name="functionalAliasID" type="xs:anyURI" use="optional"/>

<xs:attribute name="user" type="xs:anyURI" use="optional"/>

<xs:attribute name="status" type="mcpttPIFA10:statusType" use="optional"/>

<xs:attribute name="expires" type="xs:dateTime" use="optional"/>

<xs:anyAttribute namespace="##any" processContents="lax"/>

</xs:complexType>

<xs:simpleType name="statusType">

<xs:restriction base="xs:string">

<xs:enumeration value="activating"/>

<xs:enumeration value="activated"/>

<xs:enumeration value="deactivating"/>

<xs:enumeration value="take-over-possible"/>

</xs:restriction>

</xs:simpleType>

<xs:element name="p-id-fa" type="xs:string"/>

<xs:element name="take-over" type="xs:boolean"/>

</xs:schema>

and it seems to miss a definition where the take-over element should be placed.

Section 7.13.4 of TS 103.564 proposes that it is sent as a child of status

...<presence entity="<nowiki>sip:mcptt_id_clientA@example.com</nowiki>"><mcpttPIFA10:p-id-fa>UNIQUEFAID</mcpttPIFA10:p-id-fa><tuple id="<nowiki>urn:uuid:00000000-0000-1000-8000-AABBCCDDEEFF</nowiki>">

<status><mcpttPIFA10:functionalAlias functionalAliasID="FA_A1"/><take-over>true</take-over>

</status>

</tuple></presence>

but other variants were also observed.

10.1.9 Size of Track info field in TS 24.380

In section 8.2.3.13: "The <Track Info length> value is a binary value and has a value indicating the total length in octets of the <Queueing Capability> value and one or more <Floor Participant Reference> value items."

It is not consistent with the other fields: it should be the size of the whole field (including Participant Type Length value and Participant Type value)

10.1.10 [EDITORIAL] Wording not clear in TS 24.379

Section 11.1.5.3.1 (and same in some others): "shall set the <mcptt-calling-user-id> element of the <mcpttinfo> element containing the <mcptt-Params>"

The <mcptt-calling-user-id> needs to be put in the <mcptt-Params>. With this formulation, it seems it should be put in the <mcpttinfo>.

10.1.11 [EDITORIAL] Wording not clear in TS 33.180

Section 7.4.2: "As a result of this mechanism, the group members share a GMK and GUK-ID"

But each one has a different GUK-ID. So could be good to be rephrased, there it suggests they share the same one.

11 Observer Program

The Observers contributed to the MCX Plugtests in the definition of the scope and scenarios, in the Observer Program and for the Observer demo.

11.1 Preparation Phase

During equipment registration, interested vendors provided their intention to showcase during the observer demo. Test cases from ETSI TS 103 564 were used for the observer demo.

11.2 Observer Program

Observer programme is a presentation program during MCX Plugtests event which focused on the deployment plans and challenges of mission critical services.
The observer program provided a platform to the various stake holders in the critical communication industry to discuss the progress of MCS technology. The speakers were from government organisations, operators, regulators, users, associations which provide updates on deployment plans in their respective countries, pilot projects and updates on standards.

The observer program was conducted during half a day on 17th November 2021. The speakers presented to program outlined in Table 34.
Presentations in the observer program and the Questions & Answers are available on the Plugtests WIKI.

Presentations included:

Date/time CET		MEDIA	Theme	Name/organization
November 17th '21 13:00	**Observer program day 1. November, 17th**			
13:00 - 13:10	1. Welcome			Saurav ARORA, ETSI Team Guillaume Gach, UIC Harald Ludwig, TCCA
13:10 – 13:40	2. Next generation railway communication systems in Japan		Standards	Kazuki Nakamura, RTRI
13:40 – 14:10	3. Update on CCBG activity 4. CCW21 highlights		Standards	Tero Pesonen, TCCA
14:10 – 14:40	5. ESN/3GPP standards work w.r.t. Bearer setup		Standards	Robert Merrick, UK Home Office
14:40 – 15:10	6. Finnish PPDR Broadband project (Virve 2.0)		Deployment	Karl Junttila, Erillisverkot
Coffee break (20')				
15:30 – 16:00	7. TCCA activities regarding testing and certification		Testing & Certification	Harald Ludwig, TCCA Technical Forum
16:00 – 16:30	8. TCCA activities regarding Test Cases for GSMA TS.11 specification as inputs to GCF field tests		Testing & Certification	Charlotte Rösener, TS.11 mission critical field testing writing group
16:30 – 17:00	9. 3GPP MCX Conformance Testing		Testing & Certification	Fidel Liberal, ETSI Team

Table 34. Observer Program

11.3 Observer Demo

The Observer Demo was a possibility for vendors to present their solutions and features to the observers. Interested vendors could book 30 minutes slots during the half day on 10 November 2021. Table 32 shows the observer demo overview.

Vendor A	Vendor B	Time Slot
Nemergent	Frequentis	9:00 – 9:30
Nemergent	Motorola	9:30 – 10:00
Nemergent	MCSTaasting	10:00 – 10:30
Alea	Athonet	10:30 – 11:00
BREAK		
Ericsson	Softil	11:30 – 12:00
Ericsson	Rohill	12:00 – 13:00

Table 35. Observer Demo

History

Document history		
V0.0.0	22/11/2021	First Draft
V0.1.0	30/11/2021	Stable Draft
V0.2.0	08/12/2021	Stable Draft with minor corrections
V0.3.0	09/12/2021	Stable Draft with formatting corrections
V1.0.0	15/12/2021	Final Draft published