

# ETSI TS 136 579-5 V15.1.0 (2023-01)



**LTE;  
Mission Critical (MC) services over LTE;  
Part 5: Abstract test suite (ATS)  
(3GPP TS 36.579-5 version 15.1.0 Release 15)**

[ETSI TS 136 579-5 V15.1.0 \(2023-01\)](https://standards.iteh.ai/catalog/standards/sist/6bcd6723-dbdb-4570-b170-a27cb6150681/etsi-ts-136-579-5-v15-1-0-2023-01)

<https://standards.iteh.ai/catalog/standards/sist/6bcd6723-dbdb-4570-b170-a27cb6150681/etsi-ts-136-579-5-v15-1-0-2023-01>



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Reference

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RTS/TSGR-0536579-5v10

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Keywords

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# Modal verbs terminology

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# Foreword

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

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- z the third digit is incremented when editorial only changes have been incorporated in the document.

The present document is part 1 of a multi-part conformance test specification for Mission Critical services over LTE consisting of:

3GPP TS 36.579-1 [2]: "Mission Critical (MC) services over LTE; Part 1: Common test environment"

3GPP TS 36.579-2 [3]: "Mission Critical (MC) services over LTE; Part 2: Mission Critical Push To Talk (MCPTT) User Equipment (UE) Protocol conformance specification"

3GPP TS 36.579-3 [4]: "Mission Critical (MC) services over LTE; Part 3: Mission Critical Push To Talk (MCPTT) Server Application conformance specification"

3GPP TS 36.579-4 [5]: "Mission Critical (MC) services over LTE; Part 4: Test Applicability and Implementation Conformance Statement (ICS) proforma specification"

**3GPP TS 36.579-5: "Mission Critical (MC) services over LTE; Part 5: Abstract test suite (ATS)" (the present specification)**

3GPP TS 36.579-6 [59]: "Mission Critical (MC) services over LTE; Part 6: Mission Critical Video (MCVideo) User Equipment (UE) Protocol conformance specification"

3GPP TS 36.579-7 [60]: "Mission Critical (MC) services over LTE; Part 7: Mission Critical Data (MCData) User Equipment (UE) Protocol conformance specification"

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# 1 Scope

The present document specifies the protocol and signalling conformance testing in TTCN-3 for the Mission Critical services over LTE signalling and protocol requirements defined by 3GPP.

The following TTCN test specification and design considerations can be found in the present document:

- the test system architecture;
- the overall test suite structure;
- the test models and ASP definitions;
- the test methods and usage of communication ports definitions;
- the test configurations;
- the design principles and assumptions;
- TTCN styles and conventions;
- the partial Implementation eXtra Information for Testing (IXIT) proforma;
- the test suites.

The Abstract Test Suites designed in the document are based on the test cases specified in 3GPP TS 36.579-2 [3], TS 36.579-6 [59] and TS 36.579-7 [60]. The test cases specified in 3GPP TS 36.579-3 [4] are out of scope of the present document.

The applicability of the individual test cases is specified in the test ICS proforma specification in 3GPP TS 36.579-4 [5]. Where appropriate the Abstract Test Suites belonging to the present specification may refer to other Abstract Test Suites e.g. 3GPP TS 36.523-3 [27] for test requirements related to the EPS (LTE) bearers which carry the Mission Critical services data.

The present document is valid for TTCN development for Mission Critical services clients' conformance tests according to 3GPP Releases starting from Release 14 up to the Release indicated on the cover page of the present document.

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# 2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document* unless the context in which the reference is made suggests a different Release is relevant (information on the applicable release in a particular context can be found in e.g. test case title, description or applicability, message description or content).

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 36.579-1: "Mission Critical (MC) services over LTE; Part 1: Common test environment".
- [3] 3GPP TS 36.579-2: "Mission Critical (MC) services over LTE; Part 2: Mission Critical Push To Talk (MCPTT) User Equipment (UE) Protocol conformance specification".
- [4] 3GPP TS 36.579-3: "Mission Critical (MC) services over LTE; Part 3: Mission Critical Push To Talk (MCPTT) Server Application conformance specification".



- [5] 3GPP TS 36.579-4: "Mission Critical (MC) services over LTE; Part 4: Test Applicability and Implementation Conformance Statement (ICS) proforma specification".
- [6] 3GPP TS 36.523-1: "User Equipment (UE) conformance specification; Part 1: Protocol conformance specification"
- [7] 3GPP TS 22.179: "Mission Critical Push To Talk (MCPTT) over LTE; Stage 1".
- [8] Void.
- [9] 3GPP TS 24.379: "Mission Critical Push To Talk (MCPTT) call control; Protocol specification".
- [10] 3GPP TS 24.380: "Mission Critical Push To Talk (MCPTT) floor control; Protocol specification".
- [11] 3GPP TS 24.481: "Mission Critical Services (MCS) group management; Protocol specification".
- [12] 3GPP TS 24.482: "Mission Critical Services (MCS) identity management; Protocol specification".
- [13] 3GPP TS 24.483: "Mission Critical Services (MCS) Management Object (MO)".
- [14] 3GPP TS 24.484: "Mission Critical Services (MCS) configuration management; Protocol specification".
- [15] 3GPP TS 33.179: "Security of Mission Critical Push-To-Talk (MCPTT)".
- [16] 3GPP TS 24.229: "IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".
- [17] 3GPP TS 24.237: "IP Multimedia Subsystem (IMS) Service Continuity; Stage 3".
- [18] 3GPP TS 29.468: "Group Communication System Enablers for LTE (GCSE\_LTE); MB2 Reference Point; Stage 3".
- [19] 3GPP TS 24.301: "Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3".
- [20] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols; Stage 3".
- [21] 3GPP TS 23.003: "Numbering, addressing and identification".
- [22] ISO/IEC 9646-1: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".
- [23] ISO/IEC 9646-7: "Information technology - Open systems interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".
- [24] 3GPP TS 23.303: "Proximity-based services (ProSe); Stage 2".
- [25] IETF RFC 4566 (July 2006): "SDP: Session Description Protocol".
- [26] 3GPP TS 26.171: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; General description".
- [27] 3GPP TS 36.523-3: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification; Part 3: Test suites".
- [28] 3GPP TS 34.229-3: "Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 3: Abstract Test Suites (ATS)".
- [29] ISO/IEC 9646-1: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".
- [30] ISO/IEC 9646-7: "Information technology - Open systems interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".



- [31] ETSI ES 201 873: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3".
- [32] IETF RFC 3711: "The Secure Real-time Transport Protocol (SRTP)".
- [33] 3GPP TS 27.007: "AT command set for User Equipment (UE)".
- [34] IETF RFC 4661: "An Extensible Markup Language (XML)-Based Format for Event Notification Filtering".
- [34] IETF RFC 4826: "Extensible Markup Language (XML) Formats for Representing Resource Lists".
- [35] W3C: "XML Encryption Syntax and Processing Version 1.1", <https://www.w3.org/TR/xmlenc-core1/>.
- [36] W3C: "XML Signature Syntax and Processing (Second Edition)", <http://www.w3.org/TR/xmldsig-core/>.
- [37] OMA - poc\_listService-v1\_0: "List Service".
- [40] OMA - xdm\_commonPolicy-V1\_0: "XDM - Common Policy".
- [39] OMA - xdm\_extensions-v1\_0: "XDM - XDM2 - Extensions".
- [40] OMA - xdm\_rsrcList\_uriusage-v1\_0: "Resource List - URI usage".
- [41] W3C: "XML Encryption Syntax and Processing Version 1.1", <https://www.w3.org/TR/xmlenc-core1/>.
- [42] W3C: "XML Signature Syntax and Processing (Second Edition)", <http://www.w3.org/TR/xmldsig-core/>.
- [43] 3GPP TS 33.180: "Security of the mission critical service".
- [44] IETF RFC 6507: "Elliptic Curve-Based Certificateless Signatures for Identity-Based Encryption (ECCSI)".
- [45] IETF RFC 6508: "Sakai-Kasahara Key Encryption (SAKKE)".
- [46] IETF RFC 6509 (February 2012): "MIKEY-SAKKE: Sakai-Kasahara Key Encryption in Multimedia Internet KEYing (MIKEY)".
- [47] IETF RFC 3394: "Advanced Encryption Standard (AES) Key Wrap Algorithm".
- [48] W3C: "XML Signature Syntax and Processing (Second Edition)", <http://www.w3.org/TR/xmldsig-core/>.
- [49] IETF RFC 7515: "JSON Web Signature (JWS)".
- [50] IETF RFC 5261: "An Extensible Markup Language (XML) Patch Operations Framework Utilizing XML Path Language (XPath) Selectors".
- [51] IETF RFC 5874: "An Extensible Markup Language (XML) Document Format for Indicating a Change in XML Configuration Access Protocol (XCAP) Resources".
- [52] IETF RFC 4354: "A Session Initiation Protocol (SIP) Event Package and Data Format for Various Settings in Support for the Push-to-Talk over Cellular (PoC) Service".
- [53] IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax".
- [54] 3GPP TS 23.280: "Common functional architecture to support mission critical services".
- [55] 3GPP TS 24.281: "Mission Critical Video (MCVideo) signalling control; Protocol specification".
- [56] 3GPP TS 24.581: "Mission Critical Video (MCVideo) media plane control; Protocol specification".

- [57] 3GPP TS 24.282: "Mission Critical Data (MCData) signalling control; Protocol specification"
- [58] 3GPP TS 24.582: "Mission Critical Data (MCData) media plane control; Protocol specification"
- [59] 3GPP TS 36.579-6: "Mission Critical (MC) services over LTE; Part 6: Mission Critical Video (MCVideo) User Equipment (UE) Protocol conformance specification"
- [60] 3GPP TS 36.579-7: "Mission Critical (MC) services over LTE; Part 7: Mission Critical Data (MCData) User Equipment (UE) Protocol conformance specification"
- [61] 3GPP TS 36.508: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); Common Test Environments for User Equipment (UE) Conformance Testing".
- [62] IETF RFC 4122: "A Universally Unique IDentifier (UUID) URN Namespace"
- [63] IETF RFC 5245: "Interactive Connectivity Establishment (ICE): A Protocol for Network Address Translator (NAT) Traversal for Offer/Answer Protocols"
- [64] IETF RFC 3830: "MIKEY: Multimedia Internet KEYing".
- [65] IETF RFC 6509 (February 2012): "MIKEY-SAKKE: Sakai-Kasahara Key Encryption in Multimedia Internet KEYing (MIKEY)".
- [66] IETF RFC 6043: "MIKEY-TICKET: Ticket-Based Modes of Key Distribution in Multimedia Internet KEYing (MIKEY)".
- [67] IETF RFC 3550: "RTP: A Transport Protocol for Real-Time Applications".
- [68] IETF RFC 4975: "The Message Session Relay Protocol (MSRP)".
- [69] IETF RFC 2616: "Hypertext Transfer Protocol -- HTTP/1.1".

---

## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

In addition for the purposes of the present document, the following terms, definitions, symbols and abbreviations apply:

- such given in ISO/IEC 9646-1 [22] and ISO/IEC 9646-7 [23]

NOTE: Some terms and abbreviations defined in [22] and [23] are explicitly included below with small modification to reflect the terminology used in 3GPP.

**Implementation eXtra Information for Testing (IXIT):** A statement made by a supplier or implementer of an UEUT which contains or references all of the information (in addition to that given in the ICS) related to the UEUT and its testing environment, which will enable the test laboratory to run an appropriate test suite against the UEUT.

**IXIT proforma:** A document, in the form of a questionnaire, which when completed for an UEUT becomes an IXIT.

**Protocol Implementation Conformance Statement (PICS):** An ICS for an implementation or system claimed to conform to a given protocol specification.

**Protocol Implementation eXtra Information for Testing (PIXIT):** An IXIT related to testing for conformance to a given protocol specification.

## 3.2 Symbols

No specific symbols have been identified so far.

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

ASP	Abstract Service Primitive
ICS	Implementation Conformance Statement
IXIT	Implementation eXtra Information for Testing
MC	Mission Critical
MCDATA	Mission Critical Data
MCPTT	Mission Critical Push To Talk
MCS	Mission Critical Services
MCVideo	Mission Critical Video
PTC	Parallel Test Component
RTCP	RTP Control Protocol
RTP	Real-time Transport Protocol
SRTCP	Secure RTCP
SRTP	Secure RTP
SS	System Simulator
SSRC	Synchronization SouRCe
TC	Test Case
UE	User Equipment

---

## 4 Test system architecture

### 4.1 General system architecture

The architecture specified in TS 36.523-3 [27] applies to the present document.

### 4.2 Component architecture

The architecture specified in TS 36.523-3 [27] applies to the present document, with the exception that only one RAT, E-UTRAN, is within the scope of the present document.

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## 5 Test models

### 5.1 MCX test model with TTCN based E-UTRA/EPC implementation (MCX EUTRA test model)

#### 5.1.1 MCX Client on-network test model

The MCX Client on-network test model is depicted in figure 5.1.1-1. The test model consists of an IMS component and an HTTP component, on top of the multi-testers test model (E-UTRA) specified in TS 34.229-3 [28]. These parallel test components (PTCs) handle the IMS and HTTP signalling asynchronously.

The IMS PTC controls the IPCanEmu and the IP PTC. IPCanEmu is responsible for handling the E-UTRA cell(s) configuration in the SS as well as the E-UTRA/EPC level signalling and related procedures. The IPCanEmu is based on the TTCN implementation used for E-UTRA/EPC conformance testing according to TS 36.523-3 [27]. The IP PTC

controls the IP related configurations as described in TS 36.523-3[27]. In addition there is an SRTP port at the MCX IMS PTC mapped to the system interface to configure SRTP/SRTCP for media streams and media control messages (see clause 7.1.1.3). The media control messages are exchanged between TTCN and the system simulator via the IP PTC's IP SOCK port (see clause 7.1.1.4 and clause 7.1.1.5) whereas the media stream messages are handled by the SS (see clause 7.1.1.5).

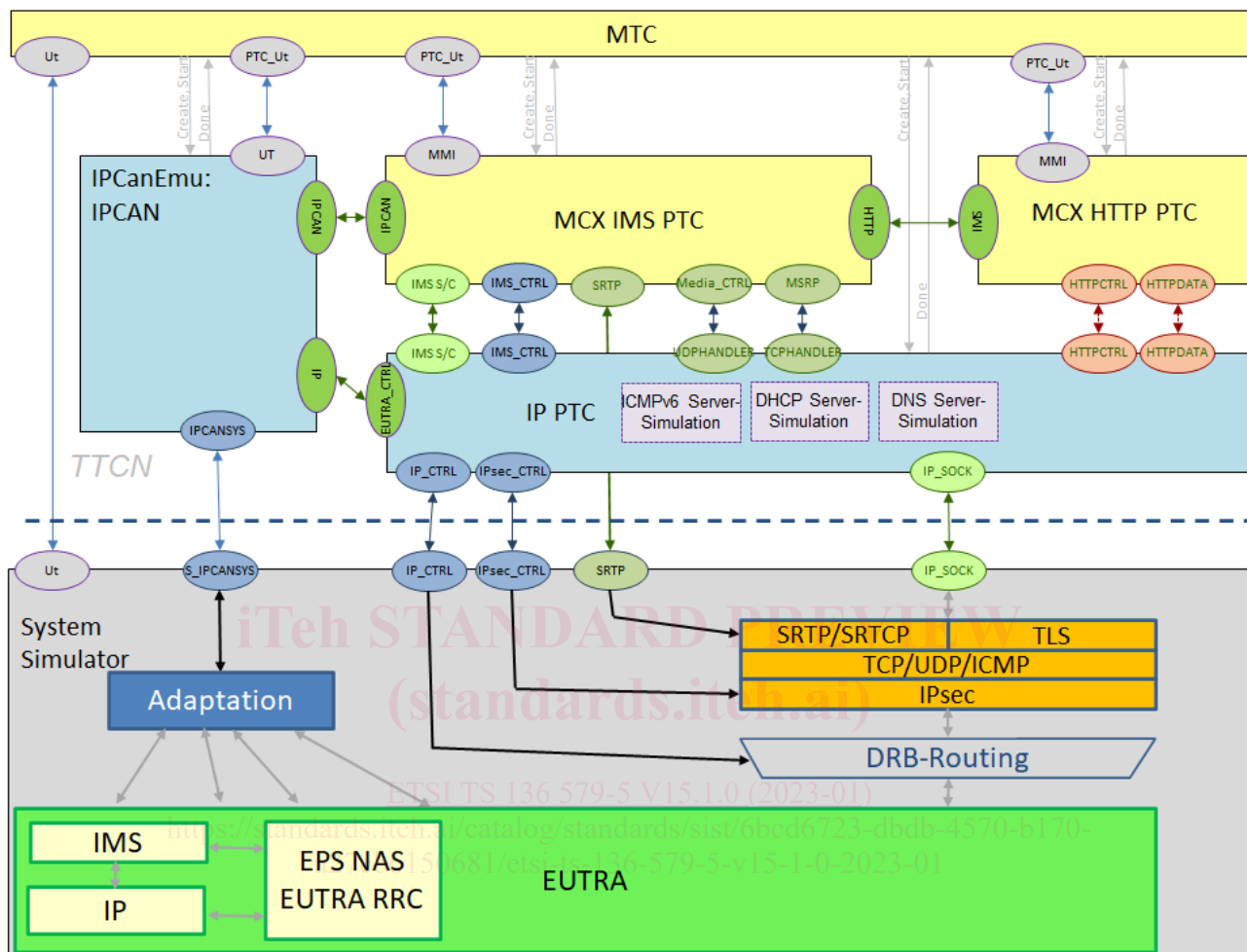


Figure 5.1.1-1: MCX Client on-network test model with TTCN based E-UTRA/EPC implementation

## 5.1.2 MCX Client off-network test model

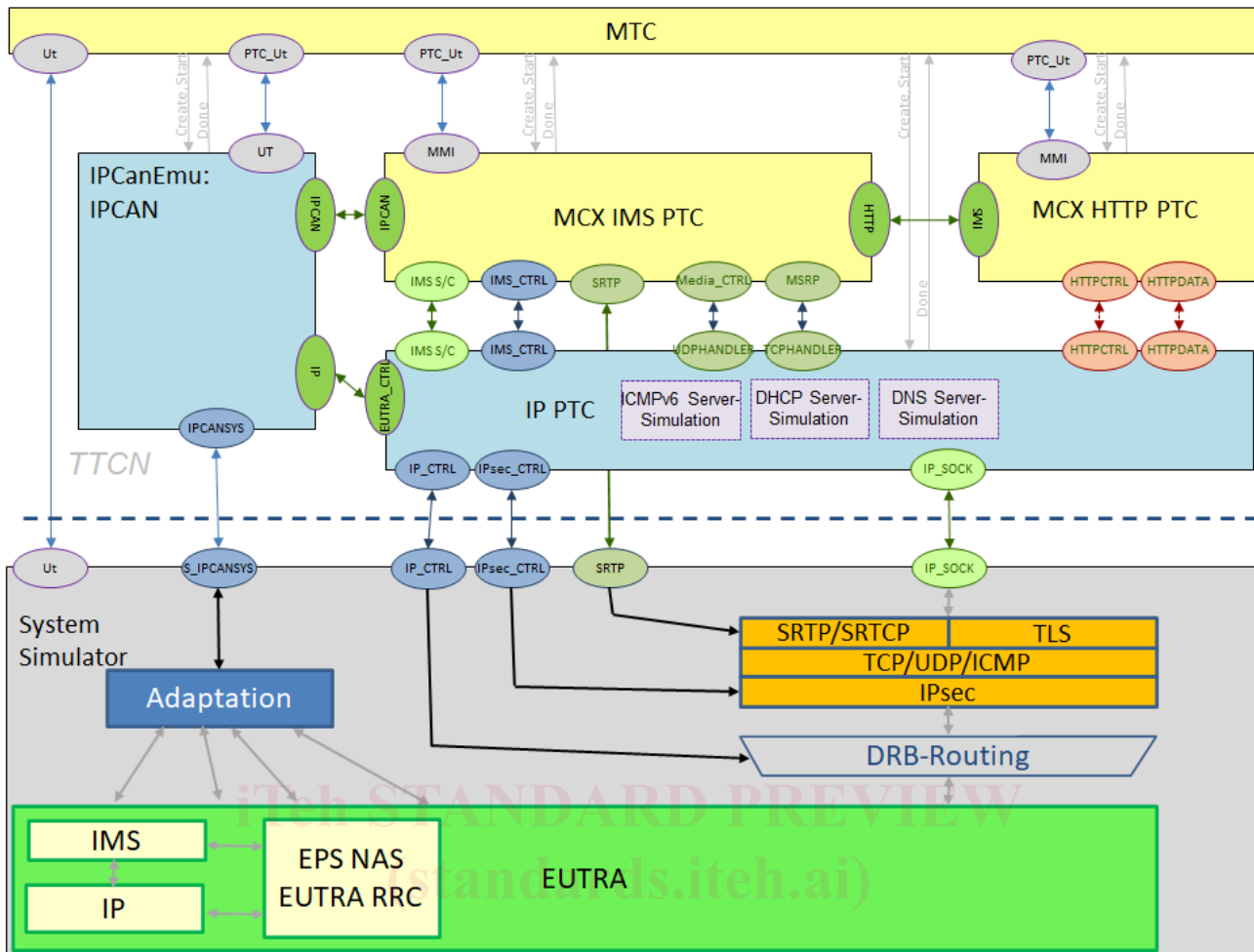
This test model is not supported by the present version of the specification.

## 5.2 MCX test model with SS based E-UTRA/EPC implementation (MCX IPCAN test model)

### 5.2.1 MCX Client on-network test model

In contrast to the MCX EUTRA test model the MCX IPCAN test model shown in figure 5.2.1-1 uses an external E-UTRA/EPC (black-box) implementation which is integrated in the system simulator. In general this E-UTRA/EPC implementation shall be conformant in terms of TS 36.508 [61] but this is out of the scope for the MCX IPCAN test model as long as the E-UTRA/EPC implementation obeys the commands at the system interface as specified in annex E.

NOTE: Whether or how the MCX IPCAN test model may use other IP-connectivity access networks is out of scope of this specification.



**Figure 5.2.1-1: MCX Client on-network test model with SS based E-UTRA/EPC implementation**

<https://standards.iteh.ai/catalog/standards/sist/6bcd6723-dbdb-4570-b170-a27cb6150681/etsi-ts-136-579-5-v15-1-0-2023-01>

As described in clause 5.4.1A of TS 36.579-1 [2] after switch on the UE may register to an internet PDN, an IMS PDN and the MCX PDN. Nevertheless in TTCN the MCX IPCAN test model supports signalling for the MCX PDN only: The IPCAN test model does not handle any signalling for the other PDNs and especially not the SIP signalling for an IMS registration to the IMS PDN.

⇒ It is up to SS implementation to handle the potential registrations to an internet PDN and/or an IMS PDN.

To avoid conflicts due to use of one and the same value at the SS and in TTCN, the SS gets configured at the IPCAN configuration port (IPCANSYS) with the information shown in table 5.2.1-1 and table 5.2.1-2.

**Table 5.2.1-1: Default EPS bearer(s)**

Parameter	PDN	Value/Comment (NOTE 1)
Bearer ID (NOTE 2)	MCX	px_MCX_IPCAN_EpsBearerId_MCX
	IMS	px_MCX_IPCAN_EpsBearerId_IMS
	Internet	px_MCX_IPCAN_EpsBearerId_INTERNET
NW IP address	MCX	Not configured at IPCAN interface but used by TTCN: px_IPv4_Address1_NW, px_IPv6_Address1_NW
	IMS	px_IPv4_Address2_NW, px_IPv6_Address2_NW
	Internet	px_IPv4_Address3_NW, px_IPv6_Address3_NW
UE IP address	MCX	Not configured at IPCAN interface but used by TTCN: px_IPv4_Address1_UE, px_IPv6_Address1_UE
	IMS	px_IPv4_Address2_UE, px_IPv6_Address2_UE
	Internet	px_IPv4_Address3_UE, px_IPv6_Address3_UE
NOTE 1: Values may change depending on TTCN implementation		
NOTE 2: The DRB associated with the EPS bearer shall have the DRB ID := EPS Bearer ID – 4.		

**Table 5.2.1-2: Dedicated EPS bearer(s)**

Parameter	Service	Value/Comment (NOTE 1)		
Bearer ID (NOTE 2)	MCPTT	px_MCX_IPCAN_DedicatedEpsBearerId_MCPTT		
	MCVideo	px_MCX_IPCAN_DedicatedEpsBearerId_MCVideo		
	MCDData	px_MCX_IPCAN_DedicatedEpsBearerId_MCDData		
Packet filters	MCPTT	Audio	Remote port range	tsc_MCX_MediaPort_Audio .. tsc_MCX_MediaPort_Audio + 1
			Protocol	UDP
		Media Control	Single remote port	tsc_MCX_MediaControlPortNW
			Protocol	UDP
	MCVideo	Audio	Remote port range	tsc_MCX_MediaPort_Audio .. tsc_MCX_MediaPort_Audio + 1
			Protocol	UDP
		Video	Remote port range	tsc_MCX_MediaPort_Video .. tsc_MCX_MediaPort_Video + 1
			Protocol	UDP
		Media Control	Single remote port	tsc_MCX_MediaControlPortNW
			Protocol	UDP
		MCDData	Single remote port	tsc_MCDData_MediaPort_MSRP
			Protocol	TCP
NOTE 1, 2: see Table 5.2.1-1.				

## 6 System interface

### 6.1 Upper tester interface

The Upper Tester (UT) interface is the same as defined in TS 36.523-3 [27] clause 5, with additional IMS-specific AT commands as specified in TS 34.229-3 [28] clause 8.4 and IMS-specific MMI commands as specified in TS 34.229-3 [28] annex B.2.

The following MMI commands are defined.

**Table 6.1-1: MMI commands**

Command	Parameters		ResultString
	Name	Value	
"MCX_USERACTION"	"UserAction"	<charstring>	(none)
"MCX_USERCHECK"	"UserCheck"	<charstring>	"YES" if the check is successful, "NO" otherwise
"MCX_GROUP_CALL"	*Uri	<charstring>	(none)

The following AT commands are applied in TTCN.

**Table 6.1-2.: AT Commands**

Command	Reference
AT+CAPTT	TS 27.007 [33]

### 6.2 Abstract system primitives

This clause specifies the abstract system primitives (ASPs) used on the system interface to configure and control the SS. The MCX test system interface re-uses the ASPs specified in TS 36.523-3 [27] (see clause 6 and Annex D) and TS 34.229-3 [28] (see clause 6).

## 7 Test methods and design considerations

### 7.0 Introduction

The present document focusses on on-network client test cases for MCPTT (TS 36.579-2 [3]), MCVideo (TS 36.579-6 [59]) and MCData (TS 36.579-7 [60]). The major test behaviour and the verdict assignment of the test cases happens at the MCX IMS PTC and the MCX HTTP PTC as shown in Figure 5.2.1-1 and Figure 5.2.1-2.

### 7.1 Media plane signalling

In addition to the HTTP and SIP signalling over control plane as used for the procedures in TS 24.379 [9], TS 24.281 [55] and TS 24.281 [57] there are MCX-specific procedures using the media plane as specified in TS 24.380 [10], TS 24.581 [56] and TS 24.581 [58].

#### 7.1.1 MCPTT

##### 7.1.1.1 Void

##### 7.1.1.2 UDP/IP handling

The same mechanisms specified in TS 36.523-3 [27] for UDP/IP configuration and Routing Table configuration are applied.

For MCPTT test cases with RTP/RTCP media streams, the TTCN shall configure the loopback mode specified in TS 36.523-3 [27] subclause 4.2.4.4.

##### 7.1.1.3 RTP/RTCP handling

The RTP/RTCP loopback mechanism specified in TS 36.523-3 [27] applies as baseline.

MCPTT test cases require SRTP (secure RTP) for their media stream, which means that the loopback mechanism needs to be enhanced: the RTP/RTCP packet in uplink needs to be decrypted with the Rx or uplink key, encrypted with the Tx or downlink key and then sent back to the UE.

TTCN controls the usage of security for SRTP/SRTCP and provides the necessary security parameters to the SS via the SRTP port. Once security has been configured by TTCN, the SS shall handle media plane encryption and decryption.

The SRTP system interface is defined in Annex C.

##### 7.1.1.4 Media Control handling

MCPTT requires that media control messages for floor control and pre-established session control according to TS 24.380 [10] are made available and handled in TTCN as structured messages.

TTCN uses the IP PTC to handle the UDP socket for media plane control messages: Encoded UDP datagrams are exchanged between the MCX IMS PTC and the IP PTC. The Client's port number is retrieved from the SDP signalling during connection establishment.

Media plane security is configured at the SRTP system port: The SS gets the information how to identify the UDP packets to be encrypted and decrypted together with the key material and the security policy parameters (see annex C).

##### 7.1.1.5 SS pseudo-algorithm for RTP / RTCP / Media Plane Control handling

The following summarizes the requirements on the SS with regards to RTP / RTCP / Media Control handling within the SS:

- Uplink direction: