



EMTEL;
Testing - Conformance test specifications for
core elements for network independent access to
emergency services (NG112);
Part 1: Protocol Implementation
Conformance Statement (PICS),
Test Suite Structure and Test Purposes (TSS & TP)

Reference

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Foreword

This Technical Specification (TS) has been produced by ETSI Special Committee Emergency Communications (EMTEL).

The present document is part 1 of a multi-part deliverable covering Conformance test specifications for core elements for network independent access to emergency services (NG112), as identified below:

- Part 1: "Protocol Implementation Conformance Statement (PICS), Test Suite Structure and Test Purposes (TSS & TP)";**
- Part 2: "Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)".

Modal verbs terminology

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1 Scope

The present document provides the Protocol Implementation Conformance Statement (PICS) and Test Suite Structure and Test Purposes (TSS & TP) for core elements for network independent access to emergency services (NG112) as defined in standards listed in clause 2.1 of the present document.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are necessary for the application of the present document.

[1] ETSI TS 103 479 (V1.2.1): "Emergency Communications (EMTEL); Core elements for network independent access to emergency services".

[2] Void.

[3] IETF RFC 5985: "HTTP-Enabled Location Delivery (HELD)".

NOTE: Available at <https://tools.ietf.org/html/IETF RFC 5985>.

[4] IETF RFC 6753: "A Location Dereference Protocol Using HTTP-Enabled Location Delivery (HELD)".

NOTE: Available at <https://tools.ietf.org/html/rfc6753>.

[5] IETF RFC 5222: "LoST: A Location-to-Service Translation Protocol".

NOTE: Available at <https://tools.ietf.org/html/IETF RFC 5222>.

[6] IETF RFC 3261: "SIP: Session Initiation Protocol".

NOTE: Available at <https://tools.ietf.org/html/IETF RFC 3261>.

[7] IETF RFC 5031: "A Uniform Resource Name (URN) for Emergency and Other Well-Known Services".

NOTE: Available at <https://tools.ietf.org/html/rfc5031>.

[8] IETF RFC 5491: "GEOPRIV Presence Information Data Format Location Object (PIDF-LO) Usage Clarification, Considerations, and Recommendations".

NOTE: Available at <https://tools.ietf.org/html/rfc5491>.

[9] Void.

[10] IETF RFC 6442: "Location Conveyance for the Session Initiation Protocol".

NOTE: Available at <https://datatracker.ietf.org/doc/html/rfc6442>.

[11] ETSI TS 103 698 (V1.1.1): "Emergency Communications (EMTEL); Lightweight Messaging Protocol for Emergency Service Accessibility (LMPE)".

2.2 Informative references

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NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] ISO/IEC 9646-1 (1994): "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 1: General concepts".
- [i.2] ISO/IEC 9646-7 (1995): "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 7: Implementation Conformance Statements".
- [i.3] EENA: "Next Generation 112 Long Term Definition", Version 1.1, March 2013.

NOTE: Available at <https://eena.org/document/ng112-long-term-definition-standard-for-emergency-services/>.

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in ISO/IEC 9646-1 [i.1] and ISO/IEC 9646-7 [i.2] apply.

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ACK	Acknowledge
AML	Advanced Mobile Location
ATS	Abstract Test Suite
BCF	Border Control Function
BI	Invalid Behavior
BV	Valid Behaviour
ECRF	Emergency Call. Routing Function
EENA	European Emergency Number Association
EES	European Emergency Services
ESRP	Emergency Service Routing Proxy
HELD	HTTP Enabled Location Discovery
HTTP	Hyper-text Transfer Protocol
ICS	Implementation Conformance Statement
ID	Identity
IM	Instant Messaging
ISO	International Organization for Standardization
IUT	Implementation Under Test
LI	Location Information
LIS	Location Information Server
LO	Location Object
LoST	Location to Service Translation

LTD	Long Term Definition
PICS	Protocol Implementation Conformance Statement
PIDF	Presence Information Data Format
PIXIT	Protocol Implementation eXtra Information for Testing
PSAP	Public Safety Answer Point
SDP	Session Description Protocol
SIP	Session Initiation Protocol
SMS	Short Message Service
TCP	Transmission Control Protocol
TLS	Transport Layer Security
TP	Test Purposes
TS	Test Suite
TSS	Test Suite Structure
UDP	User Datagram Protocol
URI	Uniform Resource Identifier
URN	Universal Resource Name

4 Protocol Implementation Conformance Statement (PICS)

4.1 Introduction

The purpose of a PICS is to identify those standardized functions which an IUT shall support, those which are optional and those which are conditional on the presence of other functions. It helps to identify which functions an IUT will support when performing conformance testing. It is possible that with different choices in an ICS proforma, several different sets of TPs will be necessary.

In the following clauses assessments are made on whether requirements, features, components and other capabilities are required according to a referenced standard and in order to achieve compliance. This assessment provides the following options:

m	mandatory - the capability is required to be supported.
o	optional - the capability may, or may not, be supported.
c.i	conditional - the requirement on the capability ("m", "o", "x" or "n/a") depends on the support of other optional or conditional items. "i" is an integer identifying a unique conditional status expression which is defined immediately following the table.
n/a	not applicable - in the given context, it is not possible to use the capability.
x	prohibited (excluded) - there is a requirement not to use this capability in the given context.
o.i	qualified optional - for mutually exclusive or selectable options from a set: "i" is an integer which identifies a unique group of related optional items and the logic of their selection which is defined immediately following the table.

4.2 Entities

Table 1: Entities

Item	Name of field	Reference	Status	Support
1	LIS	ETSI TS 103 479 [1], clause 5.5	o.1	
2	ESRP	ETSI TS 103 479 [1], clause 5.2	o.1	
3	ECRF	ETSI TS 103 479 [1], clause 5.3	o.1	
4	PSAP	ETSI TS 103 479 [1], clause 5.4	o.1	
5	BCF	ETSI TS 103 479 [1], clause 5.1	o.1	
o.1: At least one of the items shall be supported.				

4.3 LIS features

Table 2: LIS features

Prerequisite: Table 1/1				
Item	Name of field	Reference	Status	Support
1	HELD by Value	IETF RFC 5985 [3], clause 4.2	m	
2	HELD by Reference	IETF RFC 5985 [3], clause 4.3	m	
3	HELD by Reference GET	ETSI TS 103 479 [1], clause 8	o	
4	Does the IUT support Point	IETF RFC 5985 [3], clause 6.2 IETF RFC 5491 [8], clause 5.2.1	m	
5	Does the IUT support Circle	IETF RFC 5985 [3], clause 6.2 IETF RFC 5491 [8], clause 5.2.3	m	
6	Does the IUT support Civic Address	IETF RFC 5985 [3], clause 6.2 IETF RFC 5491 [8], clause 3.2	m	
7	Does the IUT support SIP Subscriptions	ETSI TS 103 479 [1], clause 5.5	o	
8	Does the IUT support subscriptions to Element State	ETSI TS 103 479 [1], clause 5.5	o	
9	Does the IUT support subscriptions to Service State	ETSI TS 103 479 [1], clause 5.5	o	
10	Does the IUT support subscriptions to Security Posture	ETSI TS 103 479 [1], clause 5.5	o	
11	Does the IUT support AML via HTTP	ETSI TS 103 479 [1], clause 5.5	o	
12	Does the IUT support AML via Data SMS	ETSI TS 103 479 [1], clause 5.5	o	
13	Does the IUT support AML via Text SMS	ETSI TS 103 479 [1], clause 5.5	o	
14	Does the IUT support mutual TLS authentication	ETSI TS 103 479 [1], clause 6.1.1	m	

4.4 ESRP features

Table 3: ESRP features

Prerequisite: Table 1/2				
Item	Name of field	Reference	Status	Support
1	Does the IUT support SIP SUBSCRIPTION		o.1	
2	Does the IUT support dequeue registration		o.1	
3	Does the IUT support fixed target		o.1	
4	Does the IUT support queue state		o	
5	Does the IUT support security posture		o	
6	Does the IUT support element stats		o	
7	Does the IUT support service state		o	
8	Does the IUT support LoST protocol	ETSI TS 103 479 [1], clause 5.2.2	m	
9	Does the IUT support LoST protocol with redirection	ETSI TS 103 479 [1], clause 5.2.2	o	
10	Does the IUT support HELD protocol	ETSI TS 103 479 [1], clause 5.2.2	o	
11	Does the IUT support HELP protocol with location reference	ETSI TS 103 479 [1], clause 5.2.2	o	
12	Does the IUT support TLS mutual authentication	ETSI TS 103 479 [1], clause 5.5	o	
13	Does the IUT support adding Call Identifier	ETSI TS 103 479 [1], clause 6.1.2.7	m	
14	Does the IUT support adding Incident Identifier	ETSI TS 103 479 [1], clause 6.1.2.7	m	

o.1: At least one of the items shall be supported.

4.5 ECRF features

Table 4: ECRF features

Prerequisite: Table 1/3				
Item	Name of field	Reference	Status	Support
1	Does the IUT support Find Service	IETF RFC 5222 [5], clause 14	m	
2	Does the IUT support List Services	ETSI TS 103 479 [1], clause 6.4	m	
3	Does the IUT support List Services by Location			
4	Does the IUT support Point	IETF RFC 5222 [5], clause 12.2 IETF RFC 5491 [8], clause 5.2.1	m	
5	Does the IUT support Circle	IETF RFC 5222 [5], clause 12.2 IETF RFC 5491 [8], clause 5.2.3	m	
6	Does the IUT support Ellipse	IETF RFC 5222 [5], clause 12.2 IETF RFC 5491 [8], clause 5.2.3	o	
7	Does the IUT support Arcband	IETF RFC 5222 [5], clause 8.2 IETF RFC 5491 [8], clause 3.2	o	
8	Does the IUT support Polygon	IETF RFC 5222 [5], clause 12.2 IETF RFC 5491 [8], clause 5.2.3	o	
9	Does the IUT support Loop detection	IETF RFC 5222 [5], clause 6	m	
10	Does the IUT support Redirection	IETF RFC 5222 [5], clause 8.3.3	m	
11	Does the IUT support subscriptions to Element State	ETSI TS 103 479 [1], clause 5.3	o	
12	Does the IUT support subscriptions to Security Posture	ETSI TS 103 479 [1], clause 5.3	o	
13	Does the IUT support subscriptions to Service State	ETSI TS 103 479 [1], clause 5.3	o	
14	Does the IUT support TLS mutual authentication	ETSI TS 103 479 [1], clause 5.5	o	

4.6 PSAP features

Table 5: PSAP features

Prerequisite: Table 1/4				
Item	Name of field	Reference	Status	Support
1	PSAP service	ETSI TS 103 479 [1], clause 5.4	m	
2	UDP handling	ETSI TS 103 479 [1], clause 6.1.1	o.1	
3	TCP handling	ETSI TS 103 479 [1], clause 6.1.1	o.1	
4	Does the IUT support Dequeue registration/deregistration	ETSI TS 103 479 [1], clause 6.2.1	o	
5	Does the IUT support HELD protocol	ETSI TS 103 479 [1], clause 6.5.1	o	
6	Does IUT support LoST protocol	ETSI TS 103 479 [1], clause 6.4.1	o	
7	Does the IUT support TLS mutual authentication	ETSI TS 103 479 [1], clause 5.5	o	

o.1: At least one of the items shall be supported.

4.7 BCF features

Table 6: BCF features

Prerequisite: Table 1/5				
Item	Name of field	Reference	Status	Support
1	BCF service	ETSI TS 103 479 [1], clause 5.1	m	
2	UDP handling	ETSI TS 103 479 [1], clause 6.1.1	o.1	
3	TCP handling	ETSI TS 103 479 [1], clause 6.1.1	o.1	
4	Does the IUT support TLS mutual authentication	ETSI TS 103 479 [1], clause 5.5		

o.1: At least one of the items shall be supported.

4.8 Mnemonics for PICS reference

To avoid an update of all related documents when the PICS document is changed, the table below introduces mnemonic names and the correspondence with the PICS item number.

Table 7: Mnemonics for PICS reference

Mnemonic	PICS item
PICS LIS HELD BY VALUE	Table 2/1
PICS LIS HELD BY REFERENCE	Table 2/2
PICS LIS HELD BY REFERENCE_GET	Table 2/3
PICS LIS GEOMETRY POINT	Table 2/4
PICS LIS GEOMETRY_CIRCLE	Table 2/5
PICS LIS CIVIC	Table 2/6
PICS LIS SIP SUBSCRIPTION	Table 2/7
PICS LIS SIP ELEMENT STATE	Table 2/8
PICS LIS SIP SERVICE STATE	Table 2/9
PICS LIS SIP SECURITY POSTURE	Table 2/10
PICS LIS AML HTTP	Table 2/11
PICS LIS AML DATA SMS	Table 2/12
PICS LIS AML TEXT SMS	Table 2/113
PICS LIS TLS AUTHENTICATION	Table 2/14
PICS ESRP TARGET SIP REGISTER SUPPORT	Table 3/1
PICS ESRP TARGET DEQUEUE REGISTRATION SUPPORT	Table 3/2
PICS ESRP FIXED TARGET SUPPORT	Table 3/3
PICS ESRP QUEUE STATE SUPPORT	Table 3/4
PICS ESRP SIP SECURITY POSTURE	Table 3/5
PICS ESRP SIP ELEMENT STATE	Table 3/6
PICS ESRP SIP SERVICE STATE	Table 3/7
PICS ESRP LOST	Table 3/8
PICS ESRP LOST REDIRECT	Table 3/9
PICS ESRP HELD	Table 3/10
PICS ESRP HELD LOCATION REFERENCE	Table 3/11
PICS ESRP TLS AUTHENTICATION	Table 3/12
PICS ESRP CALL IDENTIFIER SUPPORT	Table 3/13
PICS ESRP INCIDENT IDENTIFIER SUPPORT	Table 3/14
PICS ECRF FIND SERVICE	Table 4/1
PICS ECRF LIST SERVICES	Table 4/2
PICS ECRF LIST SERVICES BY LOCATION	Table 4/3
PICS ECRF GEOMETRY POINT	Table 4/4
PICS ECRF GEOMETRY_CIRCLE	Table 4/5
PICS ECRF GEOMETRY_ELLIPSE	Table 4/6
PICS ECRF GEOMETRY_ARCBAND	Table 4/7
PICS ECRF GEOMETRY_POLYGON	Table 4/8
PICS ECRF LOOP DETECTION	Table 4/9
PICS ECRF REDIRECT	Table 4/10
PICS ECRF SIP_ELEMENT_STATE	Table 4/11
PICS ECRF SIP_SECURITY_POSTURE	Table 4/12
PICS ECRF SIP_SERVICE_STATE	Table 4/13
PICS ECRF TLS AUTHENTICATION	Table 4/14
PICS A SIP_BSC1	Table 5/1
PICS E SIP_URN1	Table 5/1
PICS E SIP_URN2	Table 5/1
PICS E SIP_URN3	Table 5/1
PICS PSAP B SDP ULA1	Table 5/1
PICS PSAP B SDP ALA1	Table 5/1
PICS PSAP S SIP_BYE1	Table 5/1
PICS M SIP_URN1	Table 5/1
PICS E SIP_OPT1	Table 5/1
PICS E SIP_NO_REGISTRATION	Table 5/1
PICS PSAP S SIP_REGISTRATION	Table 5/1
PICS PSAP S SIP_UDP1	Table 5/2
PICS PSAP S SIP_TCP1	Table 5/3
PICS PSAP S HTTP_DEQUEUE_REGISTRATION	Table 5/4
PICS PSAP S HTTP_HELD	Table 5/5

Mnemonic	PICS item
PICS_PSAP_S_HTTP_LOST	Table 5/6
PICS_PSAP_TLS_AUTHENTICATION	Table 5/7
PICS_BCF_S_SIP_TCP1	Table 6/3
PICS_BCF_M_SIP_CALL_INFO	Table 6/1
PICS_BCF_M_SIP_CALL_INFO_INCIDENT_TRACKING_ID	Table 6/1
PICS_BCF_M_SIP_CALL_INFO_CALL_ID	Table 6/1
PICS_BCF_M_SIP_CALL_INFO_SOURCE_ID	Table 6/1
PICS_BCF_S_SIP_TCP1	Table 6/3
PICS_BCF_TLS_AUTHENTICATION	Table 6/4

5 Test Configurations

5.1 LIS Test Configurations

5.1.1 CFG_LIS_01



Figure 1: CFG_LIS_01

5.2 ESRP Test Configurations

5.2.1 CFG_ESRP_01

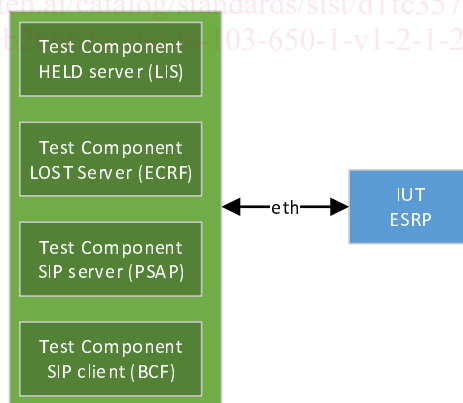


Figure 2: CFG_ESRP_01

5.3 ECRF Test Configurations

5.3.1 CFG_ECRF_01



Figure 3: CFG_ECRF_01

5.4 PSAP Test Configurations

5.4.1 CFG_PSAP_01



Figure 4: CFG_PSAP_01

5.5 BCF Test Configurations

5.5.1 CFG_BCF_01



Figure 5: CFG_BCF_01

6 Test Suite Structure (TSS)

6.1 Structure for NG112 tests

The test grouping is organized on three (3) levels. The first level is the reference to the base Document that contains the requirements for the tests. The second level is the Group and identifies the protocol (LIS, ESRP, ECRF, PSAP and BCF) component that is providing the Service or Interface to be tested. The third level is called Subgroup and identifies a set of functionalities.

Moreover, test purposes are identified and categorized by a sequential two-digits number (uniquely assigned upon definition of the each test purpose) and by the type of test performed. The type of test helps quickly identify the type of behaviour that is expected by the IUT in the test purpose.

6.2 Test groups

6.2.1 Root

The root identifies the entities to be tested.

6.2.2 Test group

This level contains the protocols and protocol operations.

6.2.3 Test sub-group

This level identifies the sub categories of each Group.

6.2.4 Categories

This level contains the standard conformance test categories: behaviour for valid, invalid, inopportune events and timers.

7 Test Purposes (TP)

7.1 Introduction

7.1.1 TP definition conventions

The TPs are defined by the rules shown in table 8.

Table 8: TP definition rules

TP Header	
TP ID	The TP ID is a unique identifier. It shall be specified according to the TP naming conventions defined in the above clause.
Test objective	Short description of test purpose objective according to the requirements from the base standard.
Reference	The reference indicates the clauses of the reference standard specifications in which the conformance requirement is expressed.
Config Id	The Config Id references the GeoNetworking configuration selected for this TP.
PICS Selection	Reference to the PICS statement involved for selection of the TP. Contains a Boolean expression.
TP Behaviour	
Initial conditions	The initial conditions define in which initial state the IUT has to be to apply the actual TP. In the corresponding Test Case, when the execution of the initial condition does not succeed, it leads to the assignment of an Inconclusive verdict.
Expected behaviour (TP body)	Definition of the events, which are parts of the TP objective, and the IUT are expected to perform in order to conform to the base specification. In the corresponding Test Case, Pass or Fail verdicts can be assigned there.

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<https://standards.iteh.ai/catalog/standards/sist/d1fc357b-64b3-484a-ba00-7339cb2bbb1a/etsi-ts-103-650-1-v1-2-1-2022-08>

7.1.2 TP Identifier naming conventions

The identifier of the TP is built according to table 9.

Table 9: TP naming convention

Identifier:	TP_<root>_<gr>_<sgr>_<x>_<nn>	
	<root> = root	LIS
		ESRP
		ECRF
		PSAP
		BCF
	<gr> = group	HELD
		HELD BY REFERENCE
		Error
		LOST
		AML
		FindService
		Fixed_TARGET
		SIP_REGISTER_TARGET
		HTTP_DEQUEUE_REGISTRATION
		QUEUE_STATE
		SIP
		TLS
	<sgr> =sub-group	GET
		PUT
		POST
		INVITE
		REGISTER
		ACK
		BYE
		MESSAGE
		OPTIONS
		CANCEL
		INFO
		SECURITY
	<x> = type of testing	BV
		BI
	<nn> = sequential number	

7.1.3 Rules for the behaviour description

In the TP the following wordings are used:

- "receives": for packets coming from the network to the IUT
- "sends": for packets sent by the IUT to the network
- "forwards": forwards the previously received message to the next hop
- "generates": for internal event generation
- "rejects": connection rejected due to security issue
- "isRequestedToSend": an upper layer requests the IUT to send a packet
- "havingLocationMappingFor": IUT is provisioned with the relevant location data
- "havingReturnedLocationUriFor": IUT returned a locationURI for the relevant location data after a HELD request
- "isConfiguredWith": IUT is configured to use a specific service/parameter set
- "isReachableWith": the IUT is reachable via the specified URI