



## **EMTEL;**

**Testing - Conformance test specifications for  
core elements for network independent access to  
emergency services (NG112);**

**Part 2: Abstract Test Suite (ATS) and  
Protocol Implementation eXtra Information for Testing (PIXIT)**

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# Foreword

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

The present document is part 2 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)".

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# 1 Scope

The present document contains the Abstract Test Suite (ATS) for core elements for network independent access to emergency services (NG112) as defined in standards listed in clause 2.1 of the present document.

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## 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 103 650-1 (V1.2.1): "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)".

### 2.2 Informative references

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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 9646-2 (1994): "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 2: Abstract Test Suite specification".
- [i.3] ETSI ETS 300 406 (1995): "Methods for testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".
- [i.4] ETSI ES 201 873-1 (V4.5.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language".

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## 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], ISO/IEC 9646-2 [i.2] and ETSI ETS 300 406 [i.3] apply.

## 3.2 Symbols

Void.

## 3.3 Abbreviations

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

AML	Advanced Mobile Location
ASP	Abstract Services Primitives
ATM	Abstract Test Method
ATS	Abstract Test Suite
BCF	Border Control Function
ECRF	Emergency Call Routing Function
ESRP	Emergency Service Routing Proxy
IP	Internet Protocol
IUT	Implementation Under Test
LIS	Location Information Server
MTC	Main Test Component
NAPTR	Naming Authority Pointer
NG	Next Generation
PICS	Protocol Implementation Conformance Statement
PIXIT	Partial Protocol Implementation Extra Information for Testing
PSAP	Public Safety Answering Point
PTC	Parallel Test Component
SIP	Session Initiation Protocol
SIPP	Session Initiation Protocol packetize
SMS	Short Message Service
SRS	Spatial Reference System
SUT	System Under Test
TC	Test Case
TP	Test Purposes
TTCN	Testing and Test Control Notation
TTCN-3	Testing and Test Control Notation 3
UoM	Unit of Measure
URI	Uniform Resource Identifier
URN	Uniform Resource Name
XML	Extensible Markup Language
XSD	XML Schema Definition

# 4 Abstract Test Method (ATM)

## 4.1 Test Configuration

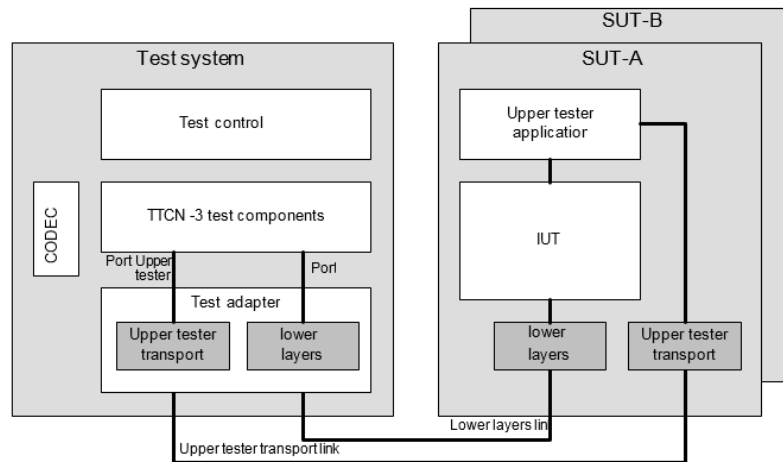
The test configurations as defined in ETSI TS 103 650-1 [1], clause 5, shall apply.

## 4.2 Test architecture

The present document implements the general TTCN-3 test architecture as shown in figure 1.

In single-component testcases, the MTC communicates with SUT over a port. In multi-component testcases, the MTC is used to synchronize the different PTCs. The PTCs communicate with the SUT over ports.

The Upper tester entity in the SUT enables triggering functionalities by simulating primitives from application.



**Figure 1: Test system architecture**

## 4.3 Ports and ASPs (Abstract Services Primitives)

### 4.3.1 Introduction

Two ports are used by the NG112 test suite:

- The httpPort, of type HttpPort
- The SIP port of type SipPort

### 4.3.2 Primitives on httpPort

One type of primitives is used in the httpPort:

- HttpMessage type which can be either a Request message or a Response message

### 4.3.3 Primitives on SIP

Several types of primitives are used in the SIP:

- Request type, which is a generic SIP request message type
- REGISTER\_Request type, which is a REGISTER SIP request message type
- INVITE\_Request type, which is an INVITE SIP request message type
- OPTIONS\_Request type, which is an OPTIONS SIP request message type
- INFO\_Request type, which is an INFO SIP request message type
- BYE\_Request type, which is a BYE SIP request message type
- CANCEL\_Request type, which is a CANCEL SIP request message type
- NOTIFY\_Request type, which is a NOTIFY SIP request message type
- SUBSCRIBE\_Request type, which is a SUBSCRIBE SIP request message type
- Response type, which is a generic SIP response message type

## 5 Untestable Test Purposes

Not applicable.

## 6 ATS conventions

### 6.1 Introduction

The ATS conventions are intended to give a better understanding of the ATS but they also describe the conventions made for the development of the ATS. These conventions shall be considered during any later maintenance or further development of the ATS.

The ATS conventions contain two clauses, the testing conventions and the naming conventions. The testing conventions describe the functional structure of the ATS. The naming conventions describe the structure of the naming of all ATS elements.

To define the ATS, the guidelines of ETSI ETS 300 406 [i.3] were considered.

### 6.2 Testing conventions

#### 6.2.1 Testing states

##### 6.2.1.1 Initial state

All test cases start with the function `f_prInitialState`. This function brings the IUT in an "initialized" state by invoking the upper tester primitive `UtInitialize`.

##### 6.2.1.2 Final state

All test cases end with the function `f_poDefault`. This function brings the IUT back in an "idle" state. As no specific actions are required for the idle state in the base standard, the function `f_poDefault` does not invoke any action.

As necessary, further actions may be included in the `f_poDefault` function.

### 6.3 Naming conventions

#### 6.3.1 General guidelines

The naming convention is based on the following underlying principles:

- in most cases, identifiers should be prefixed with a short alphabetic string (specified in table 1) indicating the type of TTCN-3 element it represents;
- suffixes should not be used except in those specific cases identified in table 2;
- prefixes and suffixes should be separated from the body of the identifier with an underscore ("\_");

EXAMPLE 1: `c_sixteen`, `t_wait`.

- only module names, data type names and module parameters should begin with an upper-case letter. All other names (i.e. the part of the identifier following the prefix) should begin with a lower-case letter;
- the start of second and subsequent words in an identifier should be indicated by capitalizing the first character. Underscores should not be used for this purpose.



EXAMPLE 2: `f_initialState.`

Table 1 specifies the naming guidelines for each element of the TTCN-3 language indicating the recommended prefix, suffixes (if any) and capitalization.

**Table 1: ETSI TTCN-3 generic naming conventions**

Language element	Naming convention	Prefix	Example identifier
Module	Use upper-case initial letter	none	NG112Templates
Group within a module	Use lower-case initial letter	none	messageGroup
Data type	Use upper-case initial letter	none	SetupContents
Message template	Use lower-case initial letter	m_	m_setupInit
Message template with wildcard or matching expression	Use lower-case initial letters	mw_	mw_anyUserReply
Signature template	Use lower-case initial letter	s_	s_callSignature
Port instance	Use lower-case initial letter	none	signallingPort
Test component instance	Use lower-case initial letter	none	userTerminal
Constant	Use lower-case initial letter	c_	c_maxRetransmission
Constant (defined within component type)	Use lower-case initial letter	cc_	cc_minDuration
External constant	Use lower-case initial letter	cx_	cx_macId
Function	Use lower-case initial letter	f_	f_authentication()
External function	Use lower-case initial letter	fx_	fx_calculateLength()
Altstep (incl. Default)	Use lower-case initial letter	a_	a_receiveSetup()
Test case	Use ETSI numbering	TC_	TC_COR_0009_47_ND
Variable (local)	Use lower-case initial letter	v_	v_macId
Variable (defined within a component type)	Use lower-case initial letters	vc_	vc_systemName
Timer (local)	Use lower-case initial letter	t_	t_wait
Timer (defined within a component)	Use lower-case initial letters	tc_	tc_authMin
Module parameters for PICS	Use all upper case letters	PICS_	PICS_DOOROPEN
Module parameters for other parameters	Use all upper case letters	PX_	PX_TESTER_STATION_ID
Formal Parameters	Use lower-case initial letter	p_	p_macId
Enumerated Values	Use lower-case initial letter	e_	e_syncOk

ETSI TS 103 650-2 V1.2.1 (2022-08)

<https://standards.ietf.org/catalog/standards/sis/329783cc-bcc8-414e-9f43-75ff35d4da19/etsi-ts-103-650-2-v1-2-1-2022-08>

### 6.3.2 NG112 specific TTCN-3 naming conventions

Next to such general naming conventions, table 2 shows specific naming conventions that apply to the NG112 TTCN-3 test suite. The <ng112\_entity> tag indicates the NG 112 entity: LIS, ESRP, ECRF, PSAP or BCF.

**Table 2: NG112 specific TTCN-3 naming conventions**

Language element	Naming convention	Identifier
Module containing the control part	Use upper-case initial letter	Ats<ng112_entity>_TestControl
Module containing test cases	Use upper-case initial letter	Ats<ng112_entity>_TestCases
Module containing types and values	Use upper-case initial letter	Ats<ng112_entity>_TypesAndValues
Module containing Templates	Use upper-case initial letter	Ats<ng112_entity>_Templates
Module containing functions	Use upper-case initial letter	Ats<ng112_entity>_Functions
Module containing external functions	Use upper-case initial letter	Ats<ng112_entity>_ExternalFunctions
Module containing components, ports and message definitions	Use upper-case initial letter	Ats<ng112_entity>_Interface
Module containing main component definitions	Use upper-case initial letter	Ats<ng112_entity>_TestSystem

### 6.3.3 Usage of Log statements

All TTCN-3 log statements use the following format using the same order:

- Three asterisks.
- The TTCN-3 test case or function identifier in which the log statement is defined.

- One of the categories of log: INFO, WARNING, ERROR, PASS, FAIL, INCONC, TIMEOUT.
- Free text.
- Three asterisks.

EXAMPLE 1:

```
log("*** TC_XX: INFO: Preamble: Received and answered Location Service Request ***");
```

Furthermore, the following rules are applied:

- Log statements are used in the body of the functions, so that invocation of functions are visible in the test logs.
- All TTCN-3 setverdict statement are combined (as defined in TTCN-3 as defined in ETSI ES 201 873-1 [i.4]) with a log statement following the same above rules (see example 2).

EXAMPLE 2:

```
setverdict(pass, "*** TC_XX: PASS: Header correctly formatted ***");
```

### 6.3.4 Test Case (TC) identifier

The test case naming convention shall follow the same naming convention as defined in ETSI TS 103 650-1 [1], clause 7.1.2.

EXAMPLE:      TP identifier:    TP\_ESRP\_FIND\_SERVICE\_BV\_01  
                 TC identifier:   TC\_ESRP\_FIND\_SERVICE\_BV\_01

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