ETSI TS 103 530-3 V1.1.1 (2018-02)

TECHNICAL SPECIFICATION

Core Network and Interoperability Testing (INT);
NAS Conformance Testing for the S1-MME interface;
(3GPP™ Release 13);
Part 3: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) pro forma specification

Reference

DTS/INT-00136-3

Keywords

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Core Network and Interoperability Testing (INT).

The present document is part 3 of a multi-part deliverable. Full details of the entire series can be found in part 1 [2].

Modal verbs terminology

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

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1   Scope

The present document specifies the Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) pro forma for the test specification for the S1AP protocol on the S1-MME interface as specified in ETSI TS 124 301 [1] in compliance with the relevant requirements and in accordance with the relevant guidance given in ISO/IEC 9646-7 [7] and ETSI ETS 300 406 [8].

The test notation used in the ATS is TTCN-3 (see ETSI ES 201 873-1 [9]).

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

- the overall test suite structure;

- the testing architecture;

- the test methods and port definitions;

- the test configurations;

- TTCN styles and conventions;

- the partial PIXIT pro forma;

- the modules containing the TTCN-3 ATS.

Annex A provides the Partial Implementation Extra Information for Testing (PIXIT) pro forma.

Annex B provides the Abstract Test Suite (ATS) part of the ATS.

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.

Referenced documents which are not found to be publicly available in the expected location might be found at https://docbox.etsi.org/Reference/.

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

[1]   ETSI TS 124 301 (V13.8.0): "Universal Mobile Telecommunications System (UMTS); LTE; Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3 (3GPP TS 24.301 version 13.8.0 Release 13)".

[2]   ETSI TS 103 497-1 (V1.1.1): "Core Network and Interoperability Testing (INT); S1AP Conformance Testing for the S1-MME interface; (3GPPTM Release 13); Part 1: Protocol Implementation Conformance Statement (PICS)".

[3]   ETSI TS 103 497-3: "Core Network and Interoperability Testing (INT); S1AP Conformance Testing for the S1-MME interface; (3GPPTM Release 13); Part 3: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) pro forma specification".

[4]   ETSI TS 103 530-2: "Core Network and Interoperability Testing (INT); NAS Conformance Testing for the S1-MME interface; (3GPP Release 13); Part 2: Test Suite Structure (TSS) and Test Purposes (TP)".

[5] ISO/IEC 9646-1: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 1: General concepts".

[6] ISO/IEC 9646-6: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 6: Protocol profile test specification".

[7] ISO/IEC 9646-7: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 7: Implementation Conformance Statements".

[8] ETSI ETS 300 406: "Methods for testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

[9] ETSI ES 201 873-1: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language".

[10] ETSI TS 103 530-1: "Core Network and Interoperability Testing (INT); NAS Conformance Testing for the S1-MME interface; (3GPPTM Release 13); Part 1: Protocol Implementation Conformance Statement (PICS)".

2.2 Informative 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 not necessary for the application of the present document but they assist the user with regard to a particular subject area.

Not applicable.

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ISO/IEC 9646-7 [7] and ETSI TS 124 301 [1] apply.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in ISO/IEC 9646-1 [5], ISO/IEC 9646-6 [6], ISO/IEC 9646-7 [7] and ETSI TS 124 301 [1] apply.

4 Abstract Test Method (ATM)

The ATM used to test the NAS protocol within the S1AP protocol on the S1-MME interface at the MME side is described in ETSI TS 103 530-2 [4], clause 4.

5 ATS conventions

5.1 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 naming conventions describe the structure of the naming of all ATS elements.

To define the ATS, the guidelines of the document ETSI ETS 300 406 [8] were considered.

5.2 Testing conventions

5.2.1 Test cases Preamble and Postamble

As described in the test method clause the test tool shall behave as an eNB that tunnels NAS messages from UEs over eNB encapsulated to the MME. The test case preambles and postambles are named as follows:

IUT is a S1AP with NAS/MME (example TC_NAS_MME_MGR_01)

```
f_S1AP_init
```

5.3 Naming conventions

5.3.1 General guidelines

The naming conventions are 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_max.

- 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_authenticateUser.

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: TTCN-3 naming convention

Language element	Naming convention	Prefix	Suffix	Example	Notes
Module	Use upper-case initial letter	NAS_	*none*	NAS_Steps	
TSS grouping	Use all upper-case letters	*none*	*none*	TP_NAS_MGR_TC	
Message template	Use lower-case initial letter	m_	none	m_authApplicationId	
Message template with wildcard or matching expression	Use lower-case initial letters	mw_	none	mw_subscriptionId	
Port instance	Use upper-case initial letter	*none*	*none*	S1APPort	
Constant	Use lower-case initial letter	c_	*none*	c_maxRetransmission	
Function	Use lower-case initial letter	f_	*none*	f_authentication()	
Altstep	Use lower-case initial letter	a_	*none*	a_receive()	
Variable	Use lower-case initial letter	v_	*none*	v_basicId	
PICS values	Use all upper case letters	*PICS_*	*none*	PICS_NAS_MME_	Note
PIXIT values	Use all upper case letters	*PX_*	*none*	PX_NAS_	Note
Parameterization	Use lower-case initial letter	p_	*none*	p_macId	
Enumerated Value	Use lower-case initial letter	e_	*none*	e_synCpk	
NOTE: In this case it is acceptable to use underscore as a word delimiter.					

5.3.2   Test case grouping

The ATS structure is based on the Test Purposes for the NAS protocol on the S1-MME interface as defined in ETSI TS 103 530-2 [4].

5.3.3   Test case identifiers

The test cases have been divided according to the functionalities into several groups.

The test case names are built up according to the following scheme.

Table 2: TC identifier naming convention scheme

Identifier: **<TC>_<iut>_<scope>_<nn>**			
<tp>	=	Test Case:	fixed to "TC"
<interface>		Interface:	NAS
<iut>	=	type of IUT:	MME
<scope>		= group	EPS Mobility Management
		MGR	GUTI relocation procedure
		MAU	Authentication procedure
		MSM	Security mode control procedure
		MID	Identification procedure
		MEI	EMM information procedure
		MAT	Attach procedure
		MDE	Detach procedure
		MTA	Tracking area updating procedure (S1 mode only)
		MSR	Service request procedure
		MPA	Paging procedure
		MTR	Transport of NAS messages procedure
		MGT	Generic transport of NAS messages procedure
		MES	EMM Status
		EPS Session Management	
		SDF	Default EPS bearer context activation procedure
		SDE	Dedicated EPS bearer context activation procedure
		SCM	EPS bearer context modification procedure
		SCD	EPS bearer context deactivation procedure
		SPC	UE requested PDN connectivity procedure
		SPD	UE requested PDN disconnect procedure
		SRA	UE requested bearer resource allocation procedure
		SRM	UE requested bearer resource modification procedure
		SEI	ESM information request procedure
		SNO	Notification procedure
		SRR	Remote UE Report procedure
		STU	Transport of user data via the control plane procedure
<nn>	=	sequential number	(01 to 99)

NOTE: This naming scheme results into a one-to-one correspondence between the test purpose identifiers as defined in ETSI TS 103 530-2 [4] and the test case identifiers.
The TP identifier of the test case TC_NAS_MME_xxx_01 is TP_NSA_MME_xxx_01.

Annex A (normative):
NAS S1-MME Partial PIXIT pro forma

A.1 The right to copy

Notwithstanding the provisions of the copyright clause related to the text of the present document, ETSI grants that users of the present document may freely reproduce the Partial PIXIT pro forma in this annex so that it can be used for its intended purposes and may further publish the completed Partial PIXIT.

The PIXIT Pro forma is based on ISO/IEC 9646-6 [6]. Any additional information which may be needed can be found in this international standard document.

A.2 Identification summary

Table A.1

PIXIT Number:	
Test Laboratory Name:	
Date of Issue:	
Issued to:	

A.3 ATS summary

Table A.2

Protocol Specification:	ETSI TS 124 301 [1] version 13.8.0 (Release 13)
Protocol to be tested:	NAS
ATS Specification:	ETSI TS 103 530-2 [4]
Abstract Test Method:	ETSI TS 103 530-3, clause 4

A.4 Test laboratory

Table A.3

Test Laboratory Identification:	
Test Laboratory Manager:	
Means of Testing:	
SAP Address:	

A.5 Client identification

Table A.4

Client Identification:	
Client Test manager:	
Test Facilities required:	

A.6   SUT

Table A.5

Name:	
Version:	
SCS Number:	
Machine configuration:	
Operating System Identification:	
IUT Identification:	
PICS Reference for IUT:	
Limitations of the SUT:	
Environmental Conditions:	

A.7   Protocol layer information

A.7.1   Protocol identification

Table A.6

Name:	ETSI TS 124 301 [1]: " Universal Mobile Telecommunications System (UMTS); LTE; Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3"
Version:	Version 13.8.0 (Release 13)
PICS References:	ETSI TS 103 530-1 [10]

A.8   PIXIT items

A.8.1   Introduction

Tables in this clause need to be filled by the IUT Manufacturer to specify how the IUT needs to be configured with IUT specific values or describe IUT specific procedures required for complete testing of the IUT.

Each PIXIT item corresponds to a Module Parameter of the ATS.

A.8.2   Port and Address items

Table A.7: Test system ports and addresses

It.	Identifier	Type	Description
1	PX_S1AP_ETS_IPADDR	Charstring	IP address of the test system
2	PX_S1AP_ETS_PORT	Integer	Port number of the test system
3	PX_S1AP_ETS_IPADDR2	Charstring	Second IP address of the test system

Table A.8: SUT ports and addresses

It.	Identifier	Type	Description
1	PX_S1AP_SUT_IPADDR	Charstring	IP address of the MME system under test
2	PX_S1AP_SUT_PORT	Integer	Port number of the MME system under test
3	PX_DETACH_TYPE_VAL	Bit3	Variant selection

A.8.3   LibCommon items

Table A.9: PIXIT for LibCommon

It.	Identifier	Type	Description
1	PX_TSYNC_TIME_LIMIT	Float	Default time limit for a sync client to reach a synchronization point
2	PX_TSHUT_DOWN_TIME_LIMIT	Float	Default time limit for a sync client to finish its execution of the shutdown default

A.8.4   LibNAS items

Table A.10: PIXIT for LibNAS

It.	Identifier	Type	Description
1	PX_EPSBEARERIDENTITY	Bitstring	EPS bearer identity
2	PX_PROC_ID	Octetstring	Procedure transaction identity
3	PX_IMSI	Bitstring	IMSI Element
4	PX_IMSI_DIGIT_1	Bitstring	First digits of the IMSI
5	PX_IMSI_OTHER_DIGITS	Octetstring	Other digits of the IMSI
6	PX_IMEI	Bitstring	IMEI Element
7	PX_AUTHENTICATION_RES	Bitstring	RES authentication vector

In addition to the PIXITs define in table A.10, the NAS conformance ATS refer also to the S1AP ATS&PIXIT document (ETSI TS 103 497-3 [3]).

Annex B (normative):
NAS S1-MME Abstract Test Suite (ATS)

B.1 The TTCN-3 Module

This ATS has been produced using the Testing and Test Control Notation (TTCN-3) according to ETSI ES 201 873-1 [9].

The TTCN-3 library modules corresponding to the ATS are contained in archive ts_10353003v010101p0.zip which accompanies the present document.

History

Document history		
V1.1.1	February 2018	Publication