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Contents

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Integrated broadband cable telecommunication networks (CABLE).

The present document is part 3 of a multi-part deliverable covering the conformance test specification for NAT64 technology:

Part 1**:** "Test requirements and Protocol Implementation Conformance Statement (PICS) proforma";

Part 2: "Test Suite Structure and Test Purposes (TSS&TP)";

Part 3: "Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)".

The development of the present document follows the guidance provided in the ETSI EG 202 798 [i.1]. Therefore the present document is also based on the guidance provided in ETSI EG 202 798 [i.1].

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**may not**", "**need**", "**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 contains the Abstract Test Suite (ATS) for NAT64 technology as defined in RFC 6052 [1] and RFC 6146 [2] which address specific cable industry requirements as defined in ETSI TS 101 569-1 [11] in compliance with the relevant requirements and in accordance with the relevant guidance given in ISO/IEC 9646-7 [6].

The objective of the present document is to provide a basis for conformance tests for NAT64 technology equipment giving a high probability of inter-operability between different manufacturer's equipment.

The ISO standards for the methodology of conformance testing (ISO/IEC 9646-1 [3] and ISO/IEC 9646-2 [4]) as well as the ETSI rules for conformance testing (ETSI ETS 300 406 [7]) are used as a basis for the test methodology.

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 reference document (including any amendments) applies.

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

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 necessary for the application of the present document.

[1] IETF RFC 6052: "IPv6 addressing of IPv4/IPv6 translators".

[2] IETF RFC 6146: "Stateful NAT64: Network Address and Protocol Translation from IPv6 Clients to IPv4 Servers".

[3] ISO/IEC 9646-1 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".

[4] ISO/IEC 9646-2 (1994): "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 2: Abstract Test Suite specification".

[5] ISO/IEC 9646-6 (1994): "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 6: Protocol profile test specification".

[6] ISO/IEC 9646-7 (1995): "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 7: Implementation Conformance Statements".

[7] ETSI ETS 300 406 (1995): "Methods for testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

[8] 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".

[9] ETSI TS 103 238-1: "Integrated broadband cable telecommunication networks (CABLE); Integrated Broadband Cable and Television Networks Cable IPv6 Transition Test Plan for NAT64; Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma".

[10] ETSI TS 103 238-2: "Integrated broadband cable telecommunication networks (CABLE); Integrated Broadband Cable and Television Networks Cable IPv6 Transition Test Plan for NAT64; Part 2: Test Suite Structure and Test Purposes (TSS&TP)".

[11] ETSI TS 101 569-1: "Integrated Broadband Cable Telecommunication Networks (CABLE); Cable Network Transition to IPv6 Part 1: IPv6 Transition Requirements".

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 reference 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.

[i.1] ETSI EG 202 798: "Intelligent Transport Systems (ITS); Testing; Framework for conformance and interoperability testing".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ETSI TR 101 569-1 [11], ISO/IEC 9646-1 [3] and ISO/IEC 9646-7 [6] apply.

3.2 Abbreviations

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

ALG	Application Layer Gateway
ASP	Abstract Services Primitives
ATM	Abstract Test Method
ATS	Abstract Test Suite
CPE	Customer Premises Equipment
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
FTP	File Transfer Protocol
GRT	Global Routing Table
HTTP	HyperText Transfer Protocol
ICMP	Internet Control Message Protocol
IETF	Internet Engineering Task Force
IP	Internet Protocol
IPv4	IP version 4
IPv6	IP version 6
IUT	Implementation Under Test
LAN	Local Area Network
LSN	Large Scale NAT
MSS	(TCP) Maximum Segment Size
MTC	Main Test Component
MTS	Methods for Testing and Specification
MTU	Maximum Transmission Unit
NAT	Network Address Translation / Network Address Translator
NPU	Network Processing Unit
PA	Platform Adaptor
PIXIT	Protocol Implementation eXtra Information for Testing
PPTP	Point-to-Point Tunneling Protocol
PTC	Parallel Test Component
RSTP	Rapid Spanning Tree Protocol

RTSP	Real-Time Streaming Protocol
SA	System Adaptor
SIP	Session Initiation Protocol
SUT	System Under Test
TA	Test Adaptor
TC	Test Case
TCP	Transmission Control Protocol
TP	Test Purpose
TSS	Test Suite Structure
TTCN	Testing and Test Control Notation
VRF	Virtual Routing and Forwarding

4 Abstract test method

This clause describes the ATM used to test the NAT64 technology.

4.1 Abstract protocol tester

An abstract protocol tester presented in figure 1 is a process providing the test behaviour for testing an IUT. Thus it will emulate an entity which is capable of proving the IUT functionalities. This type of test architecture provides a situation of communication which is equivalent to real operation between real devices. The test system will simulate valid and invalid behaviours, and will analyse the reaction of the IUT. Then the test verdict, e.g. pass or fail, will depend on the result of this analysis. Thus this type of test architecture enables to focus the test objective on the IUT behaviour only.

In order to access an IUT, the corresponding abstract protocol tester needs to use lower layers to establish a proper connection to the system under test (SUT) over a physical link (Lower layers link).

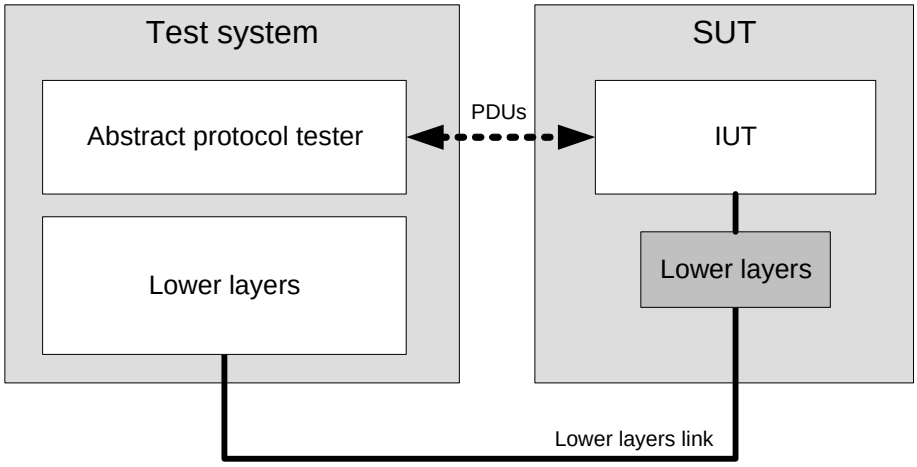
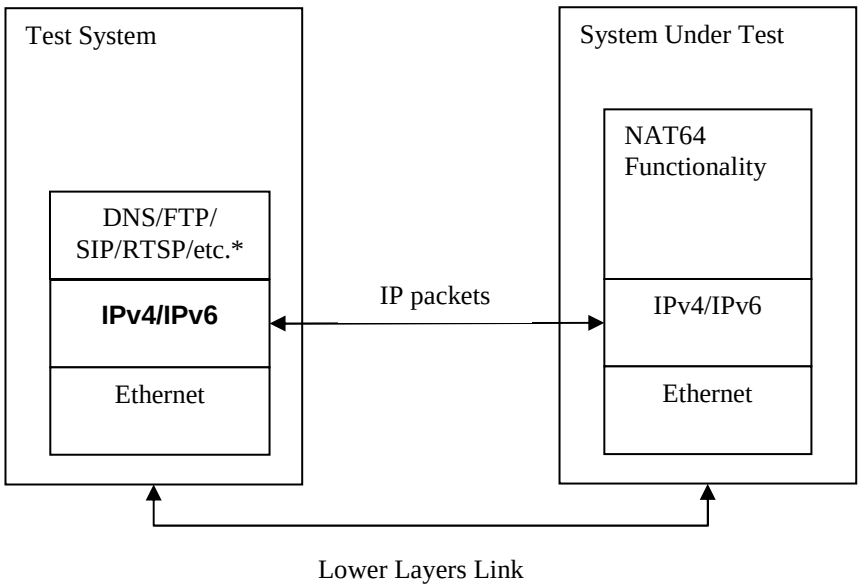


Figure 1: Generic abstract protocol tester

The "Protocol Data Units" (PDUs) are the messages exchanged between the IUT and the abstract protocol tester which permits to trigger the IUT and to analyse its reactionThe result of the analysis allows to assign the test verdict.

Further control actions on the IUT may be necessary from inside the SUT, for instance to simulate a primitive from the upper layer or the management/security entity. Further details on such control actions are provided by means of an upper tester presented in clause 4.3.

The above "Abstract Test Method" (ATM) is well defined in ISO/IEC 9646-1 [3] and supports a wide range of approaches for testing including the TTCN-3 abstract test language [8].The abstract protocol tester used for NAT64 test suite is described in figure 2. The test system will send and receive IP packets, by using other upper layer protocols such as DHCP, DNS and FTP, in order to analyse NAT64 functionality.



NOTE: * Those protocols are used to prove certain NAT64 functionalities.

Figure 2: Abstract Protocol Tester - NAT64

4.2 Test configurations

The test suite for NAT64 uses only a test configuration to cover the different test scenarios where Large Scale NAT (LSN) is the IUT.

4.2.1 CF01: LSN as IUT

In this configuration, the LSN is the IUT and the test system simulates an IPv6 client in one side and a IPv4 server in the other side.

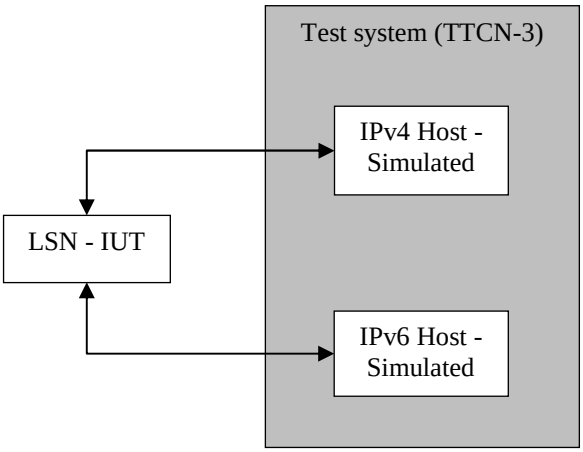


Figure 3: CF01, LSN equipment is the IUT

4.3 TTCN-3 Test architecture

In general, a conformance test system architecture based on TTCN-3 is as figure 4 shows.

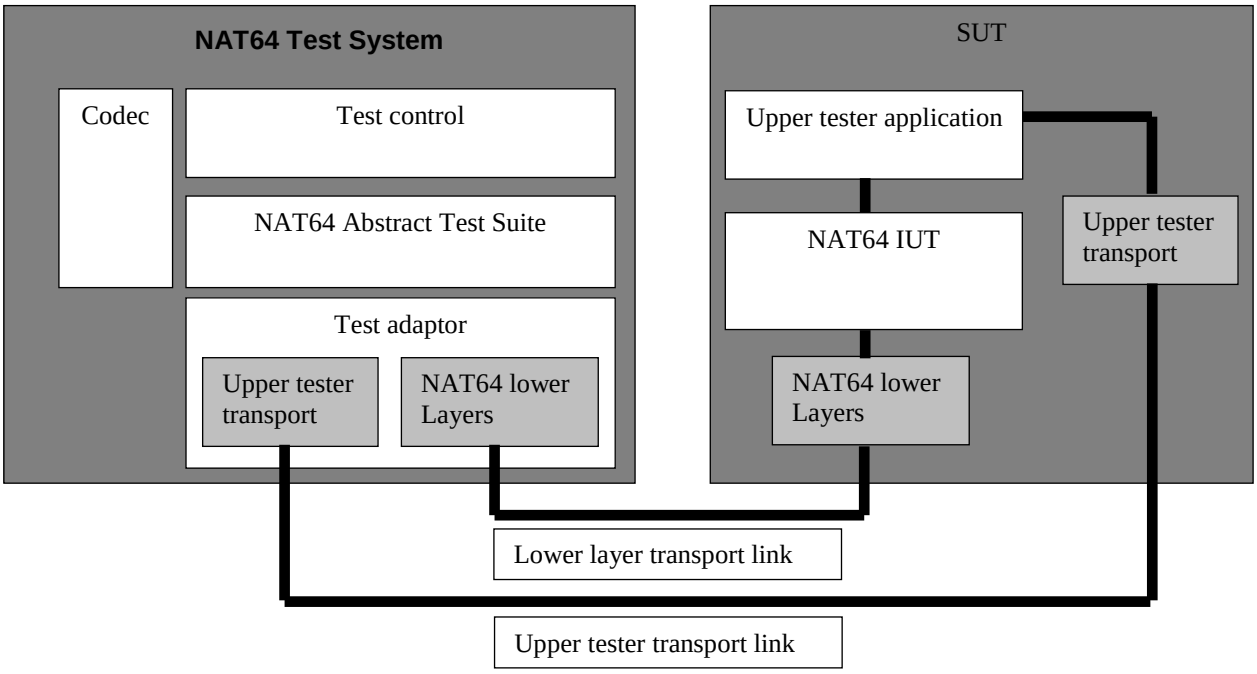


Figure 4: Global test architecture

The "System Under Test" (SUT) contains:

- The "Implementation Under Test" (IUT), i.e. the object of the test.
- The "Upper tester application" enables to trigger or capture some actions (i.e. higher layer service primitives) on the IUT.
- The "NAT64 lower layers" enable to establish a proper connection to the system under test (SUT) over a physical link (Lower layer transport link).
- The "Upper tester transport" is a functionality, which enables the test system to communicate with the upper tester application. Then the upper tester can be controlled by a TTCN-3 test component as part of the test process.

The "NAT64 test system" contains:

- The "TTCN-3 test components" are processes providing the test behaviour. The test behaviour may be provided as one single process or may require several independent processes.
- The "Codec" is a functional part of the test system to encode and decode messages between the TTCN-3 internal data representation and the format required by the related base standard.
- The "Test Control" enables the management of the TTCN-3 test execution (parameter input, logs, test selection, etc.).
- The "Test adaptor" (TA) realizes the interface between the TTCN-3 ports using TTCN-3 messages, and the physical interfaces provided by the IUT.

Based on the above test architecture, figure 5 shows a detailed test architecture used for the NAT64. The NAT64 ATS requires using several Parallel Test Components (PTC) dealing with specific communication protocols and a Main Test Component (MTC) dealing with PTCs' synchronization. The different test components communicate with the NAT64 SUT over several ports (described in section 4.4) which are used to exchange protocol messages between the test components and the NAT64 IUT.

The Upper tester entity enables triggering some functionalities by simulating actions or primitives from above applications.

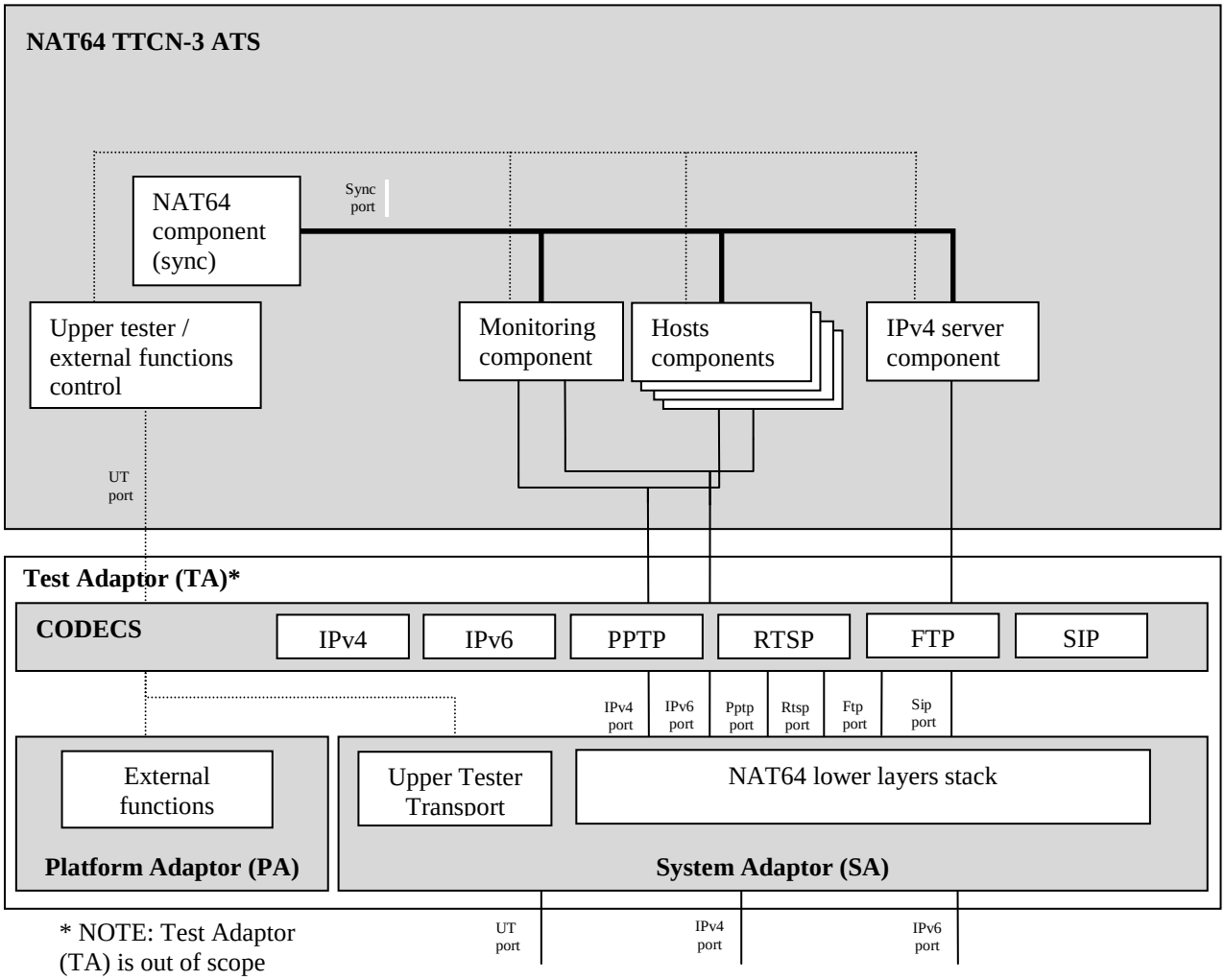


Figure 5: NAT64 TTCN-3 test architecture

The following protocol test components are available. Each of these components can be mapped to either a "Main Test Component" (MTC), when only one component shall be executed, or to a "Parallel Test Component" (PTC), if several components shall be used:

- **IPv4Server:** This component simulates an IPv4 server entity and ist functionality.
- **HOST:** These components simulate one or more hosts (one component per host).
- **MONITORING:** This component is used to monitor traffic from the IUT.

The **Sync** component is mapped to the MTC and is used to trigger and synchronize the PTCs in order to orchestrate the test environment executed by the PTCs. In addition, it starts and terminates the test cases.

The **upper tester external functions control** represents the functions which the protocol test components may use to control the upper tester which is located in the SUT. These functions may use either external functions or dedicated messages and a dedicated port to realize synchronization. These functions can be executed in the protocol test components.

4.4 Ports and ASPs (Abstract Services Primitives)

4.4.1 TTCN-3 ports

The NAT64 Test Suite implements the following ports:

- **Ipv6Port**, to send and receive IPv6 packets.
- **Ipv4Port**, to send and receive IPv4 packets.
- **SipPort**, to trigger the following SIP actions: authentication and data sending. It can monitor incoming traffic.
- **RstpPort,** to trigger the following RSTP actions: session setup and data sending. It can monitor incoming traffic.
- **FtpPort**, to trigger the following FTP actions: login, logout, and data sending (both IPv4 and IPv6). It can monitor incoming traffic.
- **PptpPort**, to trigger the following PPTP actions: session setup and data sending. It can monitor incoming traffic.
- **UtPort**, included in order to be able to stimulate the IUT and receive extra information from IUT upper layers (it is not used in the current implementation and is provided for future expansion).

4.4.2 Abstract Service Primitives

Abstract service primitives are commands or actions that need to be performed on the IUT in order to trigger certain behaviour or to obtain information about the IUT state.

The list of ASP used in the NAT64 ATS is shown in table 1.

Table 1: NAT64 Abstract Service Primitives

TTCN-3 text	Action/Command	Description
Are routing tables configured GRT upstream ingress & VRF upstream egress?	Action	To check that routing tables are properly configured
Are routing tables configured VRF upstream ingress & GRT upstream egress?	Action	To check that routing tables are properly configured
Is Gateway Prefix withdrawn?	Action	To check that the gateway prefix is withdrawn
Remove the routes for the next hop	Command	To remove the routes from IUT routing tables
Remove the cache	Command	To remove the IUT cache
Simulate a hardware failure	Command	To simulate an IUT hardware failure
Remove the active NPU	Command	To remove the active NPU
Are all NPUs in the system used according to load-balancing rules?	Action	To check that all NPUs are properly configured
Remove all NPUs	Command	To remove all NPUs
Shut down the NAT64 function	Command	To shut down the IUT
Is the IPv6 prefix withdrawn?	Action	To check that the IPv6 prefix is withdrawn

5 Implemented Test Purposes

Table 2 shows the test purposes from [10] which have been implemented and included in the present document.

Table 2: Implemented Test Purposes

TP Identifier	TC Identifier	Group	Subgroup	PICS	Untestable	Implemented
TP/NAT64/LSN/BF/BV/01	TC_NAT64_LSN_BF_BV_01	LSN	Basic Function			Yes
TP/NAT64/LSN/BF/BV/02	TC_NAT64_LSN_BF_BV_02					Yes
TP/NAT64/LSN/NP/BV/01	TC_NAT64_LSN_NP_BV_01		NAT Pools			Yes
TP/NAT64/LSN/AW/BV/01	TC_NAT64_LSN_AW_BV_01		Address Withdrawal			Yes
TP/NAT64/LSN/AW/BV/02	TC_NAT64_LSN_AW_BV_02					Yes
TP/NAT64/LSN/AW/BV/03	TC_NAT64_LSN_AW_BV_03					Yes
TP/NAT64/LSN/FRAG/BV/01	TC_NAT64_LSN_FRAG_BV_01		Packet Fragmentation			Yes
TP/NAT64/LSN/MSSC/BV/01	TC_NAT64_LSN_MSSC_BV_01		MSS Clamping			Yes
TP/NAT64/LSN/SPR/BV/01	TC_NAT64_LSN_SPR_BV_01		Static Port Reservation			Yes
TP/NAT64/LSN/NT/BV/01	TC_NAT64_LSN_NT_BV_01		NAT Timers			Yes
TP/NAT64/LSN/ALG/BV/01	TC_NAT64_LSN_ALG_BV_01		Application Layer Gateway			Yes
TP/NAT64/LSN/ALG/BV/02	TC_NAT64_LSN_ALG_BV_02			PICS_SIP_TRANSLATION		Yes
TP/NAT64/LSN/ALG/BV/03	TC_NAT64_LSN_ALG_BV_03			PICS_RTSP_TRANSLATION		Yes
TP/NAT64/LSN/ALG/BV/04	TC_NAT64_LSN_ALG_BV_04			PICS_PPTP_TRANSLATION		Yes
TP/NAT64/LSN/ALG/BV/05	TC_NAT64_LSN_ALG_BV_05			PICS_ICMP_TRANSLATION		Yes
TP/NAT64/LSN/RT/BV/01	TC_NAT64_LSN_RT_BV_01		Routing Tables	PICS_RT_GRT_TO_VRF		Yes
TP/NAT64/LSN/RT/BV/02	TC_NAT64_LSN_RT_BV_02			PICS_RT_VRF_TO_GRT		Yes
TP/NAT64/LSN/AA/BV/01	TC_NAT64_LSN_AA_BV_01		Anycast Addressing	PICS_ANYCAST_GATEWAYADDRESS_CONFIGURED		Yes
TP/NAT64/LSN/RED/BV/01	TC_NAT64_LSN_RED_BV_01		Redundancy	PICS_REDUNDANCY		Yes
TP/NAT64/LSN/LB/BV/01	TC_NAT64_LSN_LB_BV_01		Load Balancing	PICS_LOAD_BALANCING		Yes
TP/NAT64/LSN/FE/BV/01	TC_NAT64_LSN_FE_BV_01		Failure Events			Yes
TP/NAT64/LSN/FE/BV/02	TC_NAT64_LSN_FE_BV_02					Yes

6 ATS conventions

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.

6.1 Naming conventions

This test suite follows the naming convention guidelines provided in [7] and [i.1].

6.1.1 General guidelines

The naming convention is based on the following underlying principles:

- Identifiers should be prefixed with a short alphabetic string (specified in table 3) indicating the type of TTCN-3 element it represents.
- Suffixes should not be used except in those specific cases identified in table 3.
- 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 3 specifies the naming guidelines for each element of the TTCN-3 language indicating the recommended prefix, suffixes (if any) and capitalization.

Table 3: ETSI TTCN-3 generic naming conventions

Language element	Naming convention	Prefix	Example identifier
Module	Use upper-case initial letter	AtsNat64_	AtsNat64_Templates
Group within a module	Use lower-case initial letter	none	lsnRole
Data type	Use upper-case initial letter	none	SetupContents
Message template	Use lower-case initial letter	m_	m_ipv4Packet_dummy
Message template with wildcard or matching expression	Use lower-case initial letters	mw_	mw_dns_dummy
Modifying message template	Use lower-case initial letter	md_	md_setupInit
Modifying message template with wildcard or matching expression	Use lower-case initial letters	mdw_	mdw_dnsData_query
Signature template	Use lower-case initial letter	s_	s_callSignature
Port instance	Use lower-case initial letter	none	dnsPort
Test component instance	Use lower-case initial letter	none	HostComponent
Constant	Use lower-case initial letter	c_	c_portExt
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_cf01Up()
External function	Use lower-case initial letter	fx_	fx_calculateLength()
Altstep (incl. Default)	Use lower-case initial letter	a_	a_default()
Test case	Use ETSI numbering	TC_	TC_NAT64_LSN_NT_BV_001
Variable (local)	Use lower-case initial letter	v_	v_dhcpMessage
Variable (defined within a component type)	Use lower-case initial letters	vc_	vc_lsnComponent
Timer (local)	Use lower-case initial letter	t_	t_wait
Timer (defined within a component)	Use lower-case initial letters	tc_	tc_ac
Module parameters for PICS	Use all upper case letters	PICS_	PICS_REDUNDANCY
Module parameters for other parameters	Use all upper case letters	PX_	PX_NAT64_PREFIX
Formal Parameters	Use lower-case initial letter	p_	p_commRef
Enumerated Values	Use lower-case initial letter	e_	e_success

6.1.2 NAT64 specific TTCN-3 naming conventions

In addition to such general naming conventions, table 4 shows specific naming conventions that apply to the NAT64 technoloy TTCN-3 test suite.

Table 4: NAT64 specific TTCN-3 naming conventions

Language element	Naming convention	Prefix	Example identifier
NAT64 Module	Use upper-case initial letter	AtsNat64_	AtsNat64_
Module containing types and values	Use upper-case initial letter	AtsNat64_TypesAndValues	AtsNat64_TypesAndValues
Module containing Templates	Use upper-case initial letter	AtsNat64_Templates	AtsNat64_Templates
Module containing test cases	Use upper-case initial letter	AtsNat64_TestCases	AtsNat64_TestCases
Module containing functions	Use upper-case initial letter	AtsNat64_Functions	AtsNat64_Functions
Module containing external functions	Use upper-case initial letter	AtsNat64_ExternalFunctions	AtsNat64_ExternalFunctions
Module containing components, ports and message definitions	Use upper-case initial letter	AtsNat64_Interfaces	AtsNat64_Interfaces
Module containing main component definitions	Use upper-case initial letter	AtsNat64_TestSystem	AtsNat64_TestSystem
Module containing the control part	Use upper-case initial letter	AtsNat64_TestControl	AtsNat64_TestControl

6.1.3 Usage of Log statements

All TTCN-3 log statements use the following format:

- Three asterisks followed by a blank character.
- The TTCN-3 test case or function identifier in which the log statement is defined followed by a colon and a blank character.
- One of the log categories: INFO, WARNING, ERROR, PASS, FAIL, INCONC, TIMEOUT followed by a colon and a blank character.
- Free text.
- A blank character followed by three asterisks.

EXAMPLE 1: log("***TC_NAT64_LSN_AA_BV_01: INFO: Preamble: IUT was setup properly ***");

Furthermore, the following rules are applied for this ATS:

- 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 statements are combined (as defined in TTCN-3) with a log statement following the same above rules (see example 2).

EXAMPLE 2: setverdict(pass, "*** TC_DSLITE_B4_DHCP_BV_01: PASS: DHCPv6 messages received ***");

6.1.4 Test Case (TC) identifier

The identifier of the TC is built according to table 5 as recommended in [7].

Table 5: TC naming convention for NAT64

TC_<root>_<gr>_<sgr>_<x>_<nn>		
<root> = root	NAT64	NAT64
<gr> = group	LSN	LSN as IUT
<sgr> = sub-group	NP	NAT Pools
	BF	Basic Function
	FRAG	Fragmentation
	ALG	Application Layer Gateway
	MSSC	Maximum Segment Size Clamping
	RT	Routing Tables
	AW	Address Withdrawal
	SPR	Static Port Reservation
	NT	NAT Timers
	AA	Anycast Addressing
	RED	Redundancy
	LB	Load-balancing
	FE	Failure Events
<x> = type of testing	BV	Valid Behaviour tests
<nn> = sequential number		01 to 99
NOTE: A sub-group may not apply for all groups.		

EXAMPLE: TP identifier: TP/NAT64/LSN/BF/BV/01 or TP/NAT64/LSN/AW/BV/01
TC identifier: TC_NAT64_LSN_BF_BV_01 or TC_NAT64_LSN_AW_BV_01.

6.2 On line documentation

Using the T3D tool enables providing on-line documentation browser in HTML, by tagging TTCN-3 comments. These tags are defined in table 6.

Table 6: TTCN-3 comment tags

Tag	Description
@author	Specifies the names of the authors or an authoring organization which either has created or is maintaining a particular piece of TTCN-3 code.
@desc	Describes the purpose of a particular piece of TTCN-3 code. The description should be concise yet informative and describe the function and use of the construct.
@remark	Adds extra information, such as the highlighting of a particular feature or aspect not covered in the description.
@see	Refers to other TTCN-3 definitions in the same or another module.
@return	Provides additional information on the value returned by a given function.
@param	Documents the parameters of parameterized TTCN-3 definitions.
@version	States the version of a particular piece of TTCN-3 code.

The HTML files result from the compilation of the TTCN-3 modules with the T3Doc tool. These HTML files are ready for browsing, and contains links enabling to navigate through the ATS.

EXAMPLE:

```
/**
 * @desc    Check that the IUT supports the functionality of NAT64 1:1 NAT mapping
 * @version 0.0.1
 * @see     ETSI TS 101 569-1 Clause 6.5.7.9 TP/NAT64/LSN/BF/VB/01
*/
```

Annex A (normative): Partial PIXIT proforma for NAT64

A.1 Identification summary

Table A.1

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

A.2 ATS summary

Table A.2: Summary

Protocol Specification:	
Protocol to be tested:	
ATS Specification:	
Abstract Test Method:	

A.3 Test laboratory

Table A.3: Test laboratory

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

A.4 Client identification

Table A.4: Client identification

Client Identification:	
Client Test manager:	
Test Facilities required:	

A.5 SUT

Table A.5: SUT identification

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

A.6 Protocol layer information

A.6.1 Protocol identification

Table A.6: Protocol identification

Name:	
Version:	
PICS References:	

A.6.2 IUT information

Table A.7: NAT64 Pixits

Identifier	Description	
PX_NAT64_PREFIX	**Comment**	Defines the NAT64 prefix
	Type	Oct8
	Def. value	
PX_IPV4_DESTINATION_INFORMATION	**Comment**	Provides destination information of the IPv4 host
	Type	Ipv4IutInfo
	Def. value	
PX_NAT64_MAPPING_TABLE_1_TO_1	**Comment**	Mapping table for 1:1 mapping
	Type	NatMappingTable_1_to_1
	Def. value	
PX_NAT64_MAPPING_TABLE_1_TO_N	**Comment**	Mapping table for 1:n mapping
	Type	NatMappingTable_1_to_n
	Def. value	
PX_NAT64_MAPPING_TABLE_POOL	**Comment**	Mapping table of a Nat64 pool
	Type	NatMappingTable_Pool
	Def. value	
PX_TCP_TIME_WAIT	**Comment**	TCP Wait Time
	Type	Float
	Def. value	
PX_FTP_CLIENT_IPV6_ADDRESS	**Comment**	Defines the FTP client IPv6 address
	Type	Ipv6Address
	Def. value	
PX_FTP_SERVER_IPV4_ADDRESS	**Comment**	Defines the FTP server IPv4 address
	Type	Ipv4Address
	Def. value	
PX_SIP_CLIENT_IPV6_ADDRESS	**Comment**	Defines the SIP client IPv6 address
	Type	Ipv6Address
	Def. value	
PX_SIP_SERVER_IPV4_ADDRESS	**Comment**	Defines the SIP server IPv4 address
	Type	Ipv4Address
	Def. value	
PX_RTSP_CLIENT_IPV6_ADDRESS	**Comment**	Defines the RTSP client IPv6 address
	Type	Ipv6Address
	Def. value	
PX_RTSP_SERVER_IPV4_ADDRESS	**Comment**	Defines the RTSP server IPv4 address
	Type	Ipv4Address
	Def. value	
PX_PPTP_CLIENT_IPV6_ADDRESS	**Comment**	Defines the PPTP client IPv6 address
	Type	Ipv6Address
	Def. value	
PX_PPTP_SERVER_IPV4_ADDRESS	**Comment**	Defines the PPTP server IPv4 address
	Type	Ipv4Address
	Def. value	
PX_NAT64_MSS_SIZE	**Comment**	The MSS value
	Type	UInt
	Def. value	
PX_NAT64_TUNNEL_MTU	**Comment**	The NAT64-Tunnel-MTU value
	Type	UInt
	Def. value	
PX_FTP_DATA_PORT	**Comment**	The FTP data port
	Type	Uint16
	Def. value	20

Identifier	Description	
PX_SIP_PORT	**Comment**	The SIP port
	Type	Uint16
	Def. value	5060
PX_RTSP_PORT	**Comment**	The RTSP port
	Type	Uint16
	Def. value	554
PX_PPTP_PORT	**Comment**	The PPTP port
	Type	Uint16
	Def. value	1723

Annex B (normative): PCTR Proforma for NAT64

The PCTR proforma is based on ISO/IEC 9646-6 [5]. Any needed additional information can be found in this International standard document.

B.1 Identification summary

B.1.1 Protocol conformance test report

Table B.1

PCTR Number:	
PCTR Date:	
Corresponding SCTR Number:	
Corresponding SCTR Date:	
Test Laboratory Identification:	
Test Laboratory Manager:	
Signature:	

B.1.2 IUT identification

Table B.2

Name:	
Version:	
Protocol specification:	
PICS:	
Previous PCTR if any:	

B.1.3 Testing environment

Table B.3

PIXIT Number:	
ATS Specification:	
Abstract Test Method:	
Means of Testing identification:	
Date of testing:	
Conformance Log reference(s):	
Retention Date for Log reference(s):	

B.1.4 Limits and reservation

Additional information relevant to the technical contents or further use of the test report, or the rights and obligations of the test laboratory and the client, may be given here. Such information may include restriction on the publication of the report.

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B.1.5 Comments

Additional comments may be given by either the client or the test laboratory on any of the contents of the PCTR, for example, to note disagreement between the two parties.

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B.2 IUT Conformance status

This IUT has or has not been shown by conformance assessment to be non-conforming to the specified protocol specification.

Strike the appropriate words in this sentence. If the PICS for this IUT is consistent with the static conformance requirements (as specified in clause B.3 in the present document) and there are no "FAIL" verdicts to be recorded (in clause B.6 in the present document) strike the words "has or", otherwise strike the words "or has not".

B.3 Static conformance summary

The PICS for this IUT is or is not consistent with the static conformance requirements in the specified protocol.

Strike the appropriate words in this sentence.

B.4 Dynamic conformance summary

The test campaign did or did not reveal errors in the IUT.

Strike the appropriate words in this sentence. If there are no "FAIL" verdicts to be recorded (in clause B.6 of the present document) strike the words "did or" otherwise strike the words "or did not".

Summary of the results of groups of test:

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B.5 Static conformance review report

If clause B.3 indicates non-conformance, this clause itemizes the mismatches between the PICS and the static conformance requirements of the specified protocol specification.

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B.6 Test campaign report

Table B.4: Test cases

ATS Reference	Selected?	Run?	Verdict	Observations (Reference to any observations made in clause B.7)
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
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	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
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	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		
	Yes/No	Yes/No		

B.7 Observations

Additional information relevant to the technical content of the PCTR is given here.

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Annex C (normative): TTCN-3 library modules

This ATS has been produced using the Testing and Test Control Notation (TTCN) according to ETSI ES 201 873-1 [8]. The ATS was developed on a separate TTCN software tool and therefore the TTCN tables are not completely referenced in the table of contents. The ATS itself contains a test suite overview part which provides additional information and references.

This test suite has been compiled error-free using three different commercial TTCN-3 compilers.

C.1 Electronic annex, zip file with TTCN-3 code

The TTCN-3 library modules, which form parts of the present technical standard, are contained in archive ts_10323803v010101p0.zip which accompanies the present document.

History

Document history		
V1.1.1	January 2015	Publication