ETSI TS 103 243-3 V1.1.1 (2014-12)

Integrated broadband cable telecommunication networks (CABLE);
Testing;
Conformance test specifications for 6rd technology;
Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)

Reference
DTS/CABLE-00015-3

Keywords
6rd, ATS, BR, CPE, IP, IPv6, transition

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:
http://www.etsi.org

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at
http://portal.etsi.org/tb/status/status.asp

If you find errors in the present document, please send your comment to one of the following services:
http://portal.etsi.org/chaircor/ETSI_support.asp

Contents

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (http://ipr.etsi.org).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

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 6rd 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 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).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

1 Scope

The present document contains the Abstract Test Suite (ATS) for 6rd technology as defined in RFC 5969 [1] and RFC 5569 [2] which address specific cable industry requirements as defined in ETSI TS 101 569-1 [10] 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 6rd 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

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.

2.1 Normative references

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

[1] IETF RFC 5969: "IPv6 Rapid Deployment on IPv4 infrastructures - 6rd - Protocol Specification".

[2] IETF RFC 5569: "IPv6 Rapid Deployment on IPv4 infrastructures - 6rd".

[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 103 243-2: "Integrated broadband cable telecommunication networks (CABLE); Testing; Conformance test specifications for 6rd technology; Part 2: Test Suite Structure and Test Purposes (TSS&TP)".

[10] 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

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 TS 101 569-1 [10], 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.

3GPP	Third Generation Partnership Project
6rd	IPv6 Rapid Deployment
ALG	Application Layer Gateway
ASP	Abstract Service Primitives
ATM	Abstract Test Method
ATS	Abstract Test Suite
BR	Border Router
CE	Customer Edge router
CPE	Customer Premises Equipment
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
FTP	File Transfer Protocol
HTML	HyperText Markup Language
HTTP	HyperText Transfer Protocol
IP	Internet Protocol
IPv4	IP version 4
IPv6	IP version 6
IUT	Implementation Under Test
MSS	(TCP) Maximum Segment Size
MTC	Main Test Component
MTS	Methods for Testing and Specification
MTU	Maximum Transmission Unit
NAT	Network Address Translation
OSI	Open System Interconnection
PA	Platform Adaptor
PDU	Protocol Data Unit
PIXIT	Protocol Implementation Extra Information for Testing
PTC	Parallel Test Component
SUT	System Under Test
TA	Test Adaptor
TC	Test Case
TP	Test Purpose
TSS	Test Suite Structure
TTCN	Testing and Test Control Notation

4 Abstract test method

This clause describes the ATM used to test the 6rd 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).

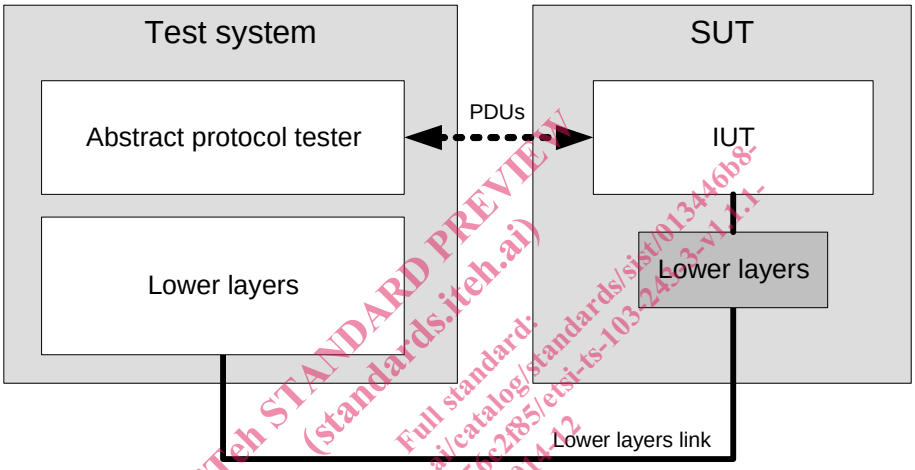
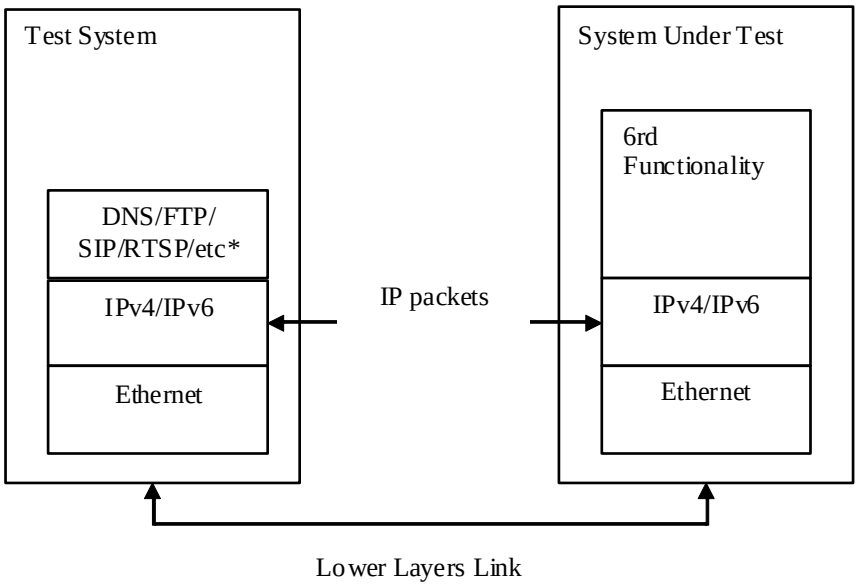


Figure 1: Generic abstract protocol tester

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 reaction. The 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 6rd 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 6rd functionality.



NOTE: * Those protocols are used to prove certain 6rd functionalities.

Figure 2: Abstract Protocol Tester - 6rd

4.2 Test configurations

The test suite for 6rd uses two test configurations to cover the different test scenarios. Distinction between the two configurations is given by the two main components in 6rd, which are the Customer Edge router (CE), also referred to as a Customer Premises Equipment (CPE) and Border Relay router (BR).

4.2.1 CF01: CPE as IUT

In this configuration, the CPE is the IUT and the test system simulates a 6rd BR in one side and a IPv6 host in the other side.

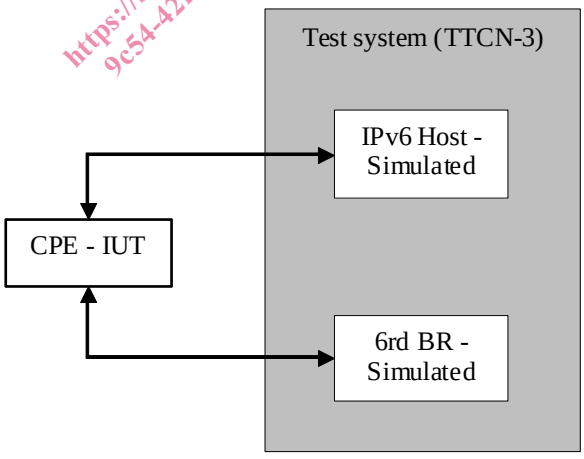


Figure 3: CF01, CPE device is the IUT

4.2.2 CF02: BR as IUT

In this configuration, the BR is the IUT and the test system simulates a 6rd CPE in one side and a IPv6 server in the other side.

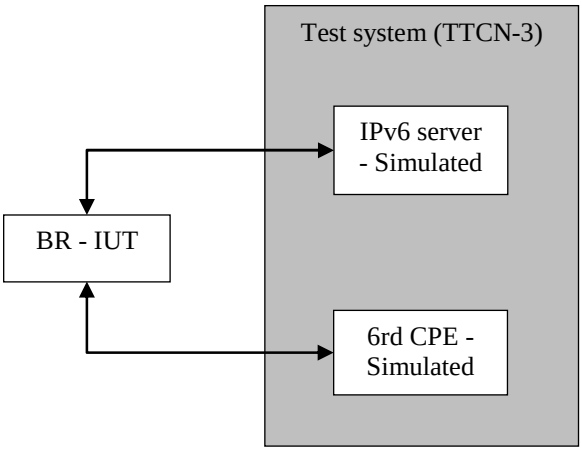


Figure 4: CF01, BR device is the IUT

4.3 TTCN-3 Test architecture

In general, a conformance test system architecture based on TTCN-3 is as figure 5 shows.

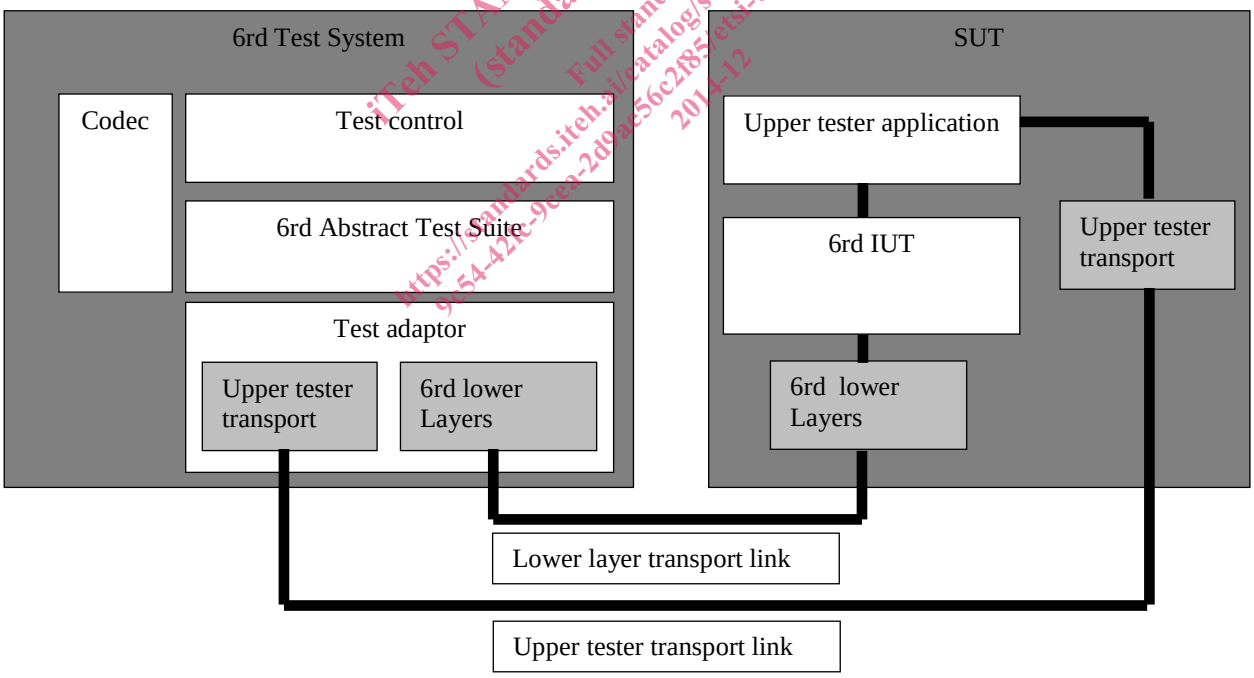


Figure 5: Global test architecture

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.