ATM Signaling Automated Applications

E7846A

Agilent Technologies Broadband Series Test System

The Agilent E7846A ATM Signaling Automated Applications provide a set of 1,878 test cases in 7 automated test suites designed to cost-effectively test the ATM signaling layer.

Agilent Technologies

ATM Signaling Automated Applications

ATM equipment manufacturers and operators use these applications during development, system testing, network design, and network upgrades to achieve higher confidence of the functionality, conformance, and interoperability of their ATM signaling implementations.

The applications broadly cover ATM Forum UNI signaling standards, including both network and user-side behavior of the UNI 3.0, 3.1 and 4.0 and ILMI protocols. Test suits conform to the published ATM Forum Abstract Test Suites (ATSs) as developed and defined by the ATM Forum Test working group. Test campaigns are easily configured and support PICS, PIXIT, and other statement types.

A Test Manager environment automates stimulus/response testing. Savable configurations and results enable users to test stability and reliability of new software in a repeatable manner during regression testing and network upgrades. If test cases fail, built-in data recording and playback allow users to rapidly pinpoint and debug faults.

ATM Forum UNI 3.0, 3.1, and 4.0 signaling and ILMI 3.x address registration network-side and user-side conformance test suites for the BSTS.

This is a bundle that combines 7 separate BSTS ATM signaling conformance test suite products:

- UNI 3.0 signaling conformance test suite for the Network Side
- UNI 3.1 signaling conformance test suite for the Network Side
- UNI 3.1 signaling conformance test suite for the User Side
- UNI 4.0 signaling conformance test suite for the Network Side
- UNI 4.0 signaling conformance test suite for the User Side
- UNI 3.0/3.1 ILMI address registration conformance test suite for the Network Side
- UNI 3.0/3.1 ILMI address registration conformance test suite for the User Side.

Protocol Coverages

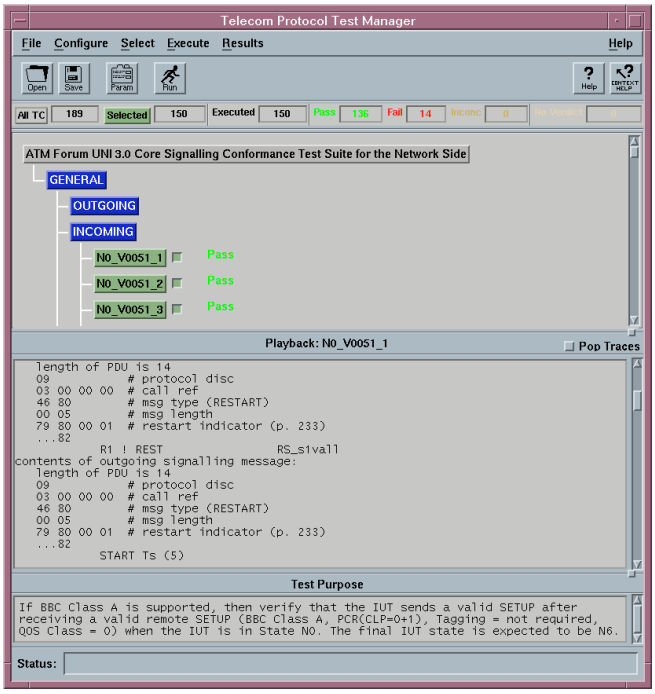
Protocol	Network Side	User-Side
UNI 3.0 Signaling	Yes	
UNI 3.1 Signaling	Yes	Yes
UNI 4.0 Signaling	Yes	Yes
ILMI 3.0/3.1 Address Registration	Yes	Yes

Number of test cases (1,878 total)

Protocol	Network Side	User-Side
UNI 3.0 Signaling	189	-
UNI 3.1 Signaling	661	125
UNI 4.0 Signaling	552	289
ILMI 3.0/3.1 Address Registration	26	36

Product Features

- Fully automated stimulus-response test suite based on a recognized ATM Forum test matrix simplifies the verification process of ATM products at all phases of R&D.
- A complete, automated suite of tests in a single package can help reduce design cycle costs by producing results more quickly and with less operator intervention.
- Flexible test case selection translates into either exhaustive testing or tailoring test case selection to suit the implementation.
- Flexible data recording and playback capabilities built-in to the interface's trace window simplify the review of frames and cells transmitted.
- The operator can either pop traces to a separate window or keep track of overall results by generating variable-detail test campaign summary reports.
- The full exchange of messages produced by the test cases is recorded for later analysis.
- Clear verdict assignments for each test case run (such as PASS or FAIL) can help solve implementation errors whereas diagnostic information in test case traces can help pinpoint errors.
- Test repeatability is achieved by saving test session setups and results. This allows quick regression testing of product enhancements or bug fixes.
- Test campaigns are easily configured via interactive True/False or value setting questions for most PICS, PIXIT and other types of statements. Furthermore, the test suite follows an internationally recognized protocol testing standard methodology as defined in ISO 9646.



The Test Manager test execution environment that runs on the Agilent Broadband Series Test Systems

Broadband Series Test System

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ATM Forum UNI 3.0 Signaling Conformance ETS for the Network Side

This test suite is designed to test the UNI 3.0 for ATM Intermediate Systems (Network Side), such as ATM switches.

It is based on the ATM Forum UNI Specification Version 3.0, derived from the ITU Recommendations Q.2931. Agilent Technologies has developed the ATS, which has been approved by the ATM Forum.

This test suite tests the behavior of the network side equipment. It contains 189 test cases in 3 test groups and tests normal behavior: Outgoing, Incoming and Clearing.

- ATM Network Equipment Manufacturers (NEMs) and network operators can expect to achieve higher confidence with regard to their signaling implementation with this automated conformance test software.

Applicable Standards

The following protocols are covered by the present test suite:

ATM Forum

ATM Forum UNI Signaling Specification Version 3.0.

Abstract Test Suite (ATS)

The ATS has been approved by the ATM Forum

ATM Forum approval of any abstract will be sought.

Areas Tested

Test Case Group Name		Test Cases
General	Outgoing	89
	Incoming	61
	Clearing	39
Total		**189**

Configuration & Use With other BSTS Line Interfaces, Hardware Modules & Test Software

Hardware Requirements

- E4200/E4210 BSTS Base Platform
- E4209A Cell Protocol Processor and one LIF
- E4206A Frame Processor T1/E1 or E4207A V-Interface Frame Processor

Software Requirements

- Base System V3.02 or higher
- E4214A UNI Signaling Test Software 2.01 or higher

ATM Forum UNI 3.1 Signaling Conformance Test Suites, Network Side

This test suite is designed to test the UNI 3.1 for ATM Intermediate Systems (Network Side), such as ATM switches. It is based on the ATM Forum UNI specification Version 3.1, derived from the ITU Recommendations Q.2931. Agilent Technologies has developed the ATS, which has been approved by the ATM Forum.

ATM network equipment manufacturers (NEMs) and network operators can expect to achieve higher confidence with regard to their Signaling implementation with this automated conformance test software.

From this test suite development, two products have been included:

- Part 1 only to test Normal behavior (189 test cases in 3 groups)
- Parts 1, 2 and 3, adding tests for Error (256 test cases in 13 groups) and Abnormal (226 test cases in 7 groups) behavior

The complete test suite contains 661 test cases.

Application Standards

The following protocols are covered by the present test suite;

ATM Forum

ATM Forum UNI Signaling Specification Version 3.1.

Abstract Test Suite (ATS)

The ATS has been approved by the ATM Forum.

Areas Tested

Test Case Group Name		Test Case
General	Outgoing	89
	Incoming	61
	Clearing	39
Error	General Call Ref Message Sequence Mandatory IE Non-Man. IE AAL Reset AAL Failure	435
Timers		22
Status Enquiry Procedures		15
Total		661

Configuration & Use With Other BSTS Line Interfaces, Hardware Modules & Test Software

Hardware Requirements

- E4200/2410 BSTS Base Platform
- 2 E4209A Cell Protocol Processors
- 2 compatible LIFs

Software Requirements

- Base Software 3.02 or higher
- E4214 UNI Signaling Test Software 3.02 or higher

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ATM Forum UNI 3.1 Core Signaling Conformance Test Suite for the User Side

The Agilent Technologies ATM Forum UNI 3.1 Core Signaling Conformance Test Suite for the User Side is designed to test the Signaling layer at the UNI 3.1 for ATM End Systems (User Side), such as ATM interface cards. It is based on the ATM Forum UNI Specification Version 3.1, derived from the ITU Recommendations Q.2931. Agilent has developed the ATS, which is pending approval by the ATM Forum.

This test suite is designed to test the signaling layer at the UNI 3.1 for ATM End Systems (User Side), such as ATM interface cards. The suite tests the normal behavior of user side equipment, and includes 3 test groups: General Outgoing, Incoming and Clearing.

ATM Network equipment manufacturers (NEMs) and network operators can expect to achieve higher confidence with regard to their signaling implementation with this automated conformance test software.

Application Standards

The following protocols are covered by the present test suite:

ATM Forum

ATM Forum UNI Signaling Specifications Version 3.1.

Abstract Test Suite (ATS)

The ATS has been approved by the ATM Forum.

Areas Tested

Test Case Group Name		Test Cases
General	Outgoing	4
	Incoming	83
	Clearing	38
Total		**125**

Configuration & Use with other BSTS Line INterfaces, Hardware, Modules & Test Software

Hardware Requirements

E4200/E4210 BSTS Base Platform

E4209A Cell Protocol Processor

Any Compatible LIF

Software Requirements

Base Software v3.02 or higher

E4214A UNI Signaling Test Software, v3.02 or higher

ATM Forum UNI 3.0/3.1 ILMI Address Registration ETS for User & Net Side

These test suites verify conformance to the ATM Forum UNI 3.0/3.1 Interim Local Management Interface (ILMI) Address Registration procedures, that is, the ILMI procedures for exchanging address information, which are essential in an SVC environment.

The ILMI protocol allows the user and network to exchange management information across the UNI. By exchanging ILMI messages, each side of the UNI can gather information on its peer.

Using ILMI, the network can pass the network prefix in use at the switch (the first part of an ATM address) to the user. In turn, the user can pass the terminal portion of the ATM address to the network.

The test suites can be used at all phases of the product life cycle, by R&D engineers in the early stages of development to QA engineers (by selecting all applicable test cases); as well as for automatic regression testing. They can help NEMs and network operators to quickly and accurately verify the conformance of their products and implementations, or equipment being evaluated for use in a network, prior to market introduction.

NEMs need to perform exhaustive, automated testing of signaling implementations, with a recognized set of tests.

These automated test suites have been submitted to the ATM Forum for approval, ensuring even greater acceptance of test results.

They complement the comprehensive family of available BSTS ATM signaling applications and conformance test suites.

Key Features

An ILMI test tool is provided to complement the test suite. The test tool decodes incoming ILMI messages and sends ILMI messages on operator command.

There is also a simple scripting facility included.

Applicable Standards

ATM Forum ATM User-Network Interface Specification, versions 3.0 and 3.1

Abstract Test Suite (ATS)

The ATS is written in English with Message Sequence Charts (MSC) (not in TTCN).

The ATS has been approved by the ATM Forum.

Areas Tested - User Side

Test Case Group Name	Test Cases
Restart	1
Retrieving Addresses	10
Awaiting Network Prefix	12
Registering Addresses	4
Verifying	9
Total	**36**

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Areas Tested - Network Side

Test Case Group Name	Test Cases
Restart	1
Retrieving Network Prefixes	8
Registering Network Prefixes	5
Verifying	12
Total	**26**

Configuration & Use With BSTS Line Interfaces, Hardware Modules & Test Software

The ATM Forum UNI 3.0/3.1 ILMI Address Registration Test Suite for the User or Network Side requires a minimum configuration of the Broadband Series Test System consisting of a Model A or B chassis, one Cell Protocol Processor, and one compatible ATM cell-based line interface.

The BSTS must be running the following software: Base System V3.02 or higher.

ATM Forum UNI 4.0 Signaling Conformance ETS for Network Side

This ATM Forum UNI 4.0 signaling conformance automated test suite is designed to verify the conformance of an ATM intermediate system, such as an ATM switch, to the network side signaling requirements of the ATM Forum UNI 4.0 specification.

It contains 552 test cases and covers all basic aspects of call establishment and clearing for point-to-point calls.

It can be used at all phases of the product life cycle, by R&D engineers in the early stages of development (by selecting only the desired test cases) to QA engineers (by selecting all applicable test cases); as well as for automatic regression testing.

Agilent is among the first to offer the capability of UNI 4.0 signaling conformance testing. With this new automated test suite, NEMs and network operators can quickly and accurately verify the conformance of their products and implementations, or equipment being evaluated for use in a network, prior to market introduction. It can also be used to check the interoperability of UNI products from different vendors.

It is expected that most if not all NEMs will implement the signaling requirements of the ATMF UNI 4.0 specification since they were generally adopted in the ATM Forum's Anchorage Accord.

NEMs need to perform exhaustive, automated testing of signaling implementations, with a recognized set of tests.

This automated test suite has been submitted to the ATM Forum for approval, ensuring even greater acceptance of test results.

It complements the comprehensive family of available BSTS ATM signaling applications and conformance test suites.

Key Features

The first version of the test suite covers the following aspects of the UNI 4.0 specification:

UNI 4.0 Features Covered in This Test Suite

The ATM Forum UNI 4.0 signaling conformance automated test suite can emulate all UNI 4.0 signaling functions, including:

- Point-to-point call establishment (outgoing and incoming calls) and call clearing
- ATM Any cast capability (Section 7.0 of UNI 4.0 specification)
- Connection characteristics negotiation during call establishment (Section 8.0)
- Signaling of individual Quality-of-Service (QoS) parameters (Section 9.0.
- Available Bit Rate (ABR) capability (Section 10.0)
- Frame discard capability

UNI 4.0 Features Not Covered in This Version

- Point-to-Multipoint calls & Leaf Initiated Join capability (LIJ)
- Abnormal behavior
- Timers
- Status enquiry procedures
- Proxy signaling
- Virtual UNIs
- Supplementary services (such as Direct Dialling In, Calling Line Identification Presentation, etc.)

Applicable Standards

The following protocols are covered by the present test suite:

ATM Forum

ATM Forum UNI Signaling Specification Version 4.0 (af-sig-0061.000), July 1996.

ITU-T

Sections of ITU-T Recommendation Q.2931, Feb. 1995 that are referenced in the ATM Forum UNI Signaling Specification Version 4.0.

Abstract Test Suite (ATS)

The test matrix for this test suite has been submitted to the ATM Forum. The ATS has been written by Agilent and will be submitted to the ATM Forum for approval in the near future.

Areas Tested

Test Case Group Name		Test Cases
General	Outgoing	357
	Incoming	82
	Clearing	113
Total		**552**

Configuration & Use With BSTS Line Interfaces, Hardware Modules & Test Software

The ATM Forum UNI 4.0 Signaling Conformance Test Suite requires a minimum configuration of the Broadband Series Test System consisting of a Model A or B chassis, two E4209 Cell Protocol Processors, and any two compatible ATM cell-based line interfaces.

The BSTS must be running the following software: Base System V3.02 or higher; E4214A UNI Signaling Test Application, V3.02 or higher.

The equipment under test must support deactivation of the keep-alive feature of UNI 4.0.

NOTE: E4214B Enhanced UNI Signaling Test Software is not required to run this test suite.

ATM Forum UNI 4.0 Signaling Conformance ETS for User Side

This ATM Forum UNI 4.0 Signaling conformance automated test suite is designed to verify the conformance of ATM terminal equipment, such as an ATM NIC card, to the user side signaling requirements of the ATM Forum UNI 4.0 specification.

It contains 289 test cases and covers all basic aspects of call establishment and clearing for point-to-point calls.

It can be used at all phases of the product life cycle, by R&D engineers in the early stages of development (by selecting only the desired test cases) to QA engineers (by selecting all applicable test cases); as well as for automatic regression testing.

Agilent is among the first to offer the capability of UNI 4.0 signaling conformance testing. With this new automated test suite, NEMs and network operators can quickly and accurately verify the conformance of their products and implementations, or equipment being evaluated for use in a network, prior to market introduction. It can also be used to check the interoperability of UNI products from different vendors.

It is expected that most if not all NEMs will implement the signaling requirements of the ATMF UNI 4.0 specification since they were generally adopted in the ATM Forum's Anchorage Accord.

NEMs need to perform exhaustive, automated testing of signaling implementations, with a recognized set of tests.

The Agilent automated test suite has been submitted to the ATM Forum for approval, ensuring even greater acceptance of test results.

It complements the comprehensive family of available BSTS ATM signaling applications and conformance test suites.

Key Features

The first version of the test suite covers the following aspects of the UNI 4.0 specification:

UNI 4.0 Features Covered in This Test Suite

This suite can emulate all UNI 4.0 signaling functions, including:

- Point-to-point call establishment (outgoing and incoming calls) and call clearing
- ATM Anycast capability (Section 7.0 of UNI 4.0 specification)
- Connection characteristics negotiation during call establishment (Section 8.0)
- Signaling of individual QoS parameters (Section 9.0)
- Available Bit Rate (ABR) capability (Section 10.0)
- Frame discard capability

UNI 4.0 Features Not Covered in This Version

- Point-to-Multipoint calls & Leaf Initiated Join capability (LIJ)
- Abnormal Behavior
- Timers
- Status Enquiry Procedures
- Proxy signaling
- Virtual UNIs
- Supplementary services (such as Direct Dialling In, Calling Line Identification Presentation, etc.)

Applicable Standards

The following protocols are covered by the present test suite:

ATM Forum

ATM Forum UNI Signaling Specification Version 4.0 (af-sig-0061.000), July 1996.

ITU-T

Sections of ITU-T Recommendation Q.2931, Feb. 1995 that are referenced in the ATM Forum UNI Signaling Specification Version 4.0.

Abstract Test Suite (ATS)

The test matrix for this test suite has been submitted to the ATM Forum. The ATS has been written by Agilent.

Test Case Group Name		Test Cases
General	Outgoing	7
	Incoming	177
	Clearing	105
Total		**289**

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Configuration & Use With BSTS Line Interfaces, Hardware Modules & Test Software

The ATM Forum UNI 4.0 Signaling Conformance Test Suite requires a minimum configuration of the E4200/E4210 Broadband Series Test System consisting of a Model A or B chassis, one E4209 Cell Protocol Processor, and any compatible ATM cell-based line interface.

The BSTS must be running the following software: Base System V3.02 or higher; E4214A UNI Signaling Test Application, V3.02 or higher.

The equipment under test must support deactivation of the keep-alive feature of UNI 4.0.

NOTE: E4214B Enhanced UNI Signaling Test Software is not required to run this test suite.

Product Numbers

- **E4214A** UNI Signaling Test Software
- **E4214B** Enhanced UNI Signaling Test Software
- **E4217B** NNI Signaling Test Software
- **E6273B** ILMI Emulation Test Software

Warranty & Support Options

Agilent Broadband Series Test System software and firmware products are supplied on transportable media such as disk, CD-ROM or integrated circuits. The warranty covers physical defects in the media, and defective media is replaced at no charge during the warranty period. When installed in an Agilent Broadband Series Test System, the software/firmware media has the same warranty period as the product.

This test software has no components requiring calibration.

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Agilent Technologies Broadband Series Test System

The Agilent Technologies BSTS is the industry-standard ATM/BISDN test system for R&D engineering, product development, field trials and QA testing. The latest leading edge, innovative solutions help you lead the fast-packet revolution and reshape tomorrow's networks. It offers a wide range of applications:

- ATM traffic management and signalling
- Packet over SONET/SDH (POS)
- switch/router interworking and performance
- third generation wireless tesing
- complete, automated conformance testing

The BSTS is modular to grow with your testing needs. Because we build all BSTS products without shortcuts according to full specifications, you'll catch problems other test equipment may not detect.

www.Agilent.com/comms/BSTS

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Specifications subject to change.
February 28, 2001.
5988-2293EN

Agilent Technologies