

LXI Consortium

Certifying LXI Products – Testing Criteria and Process

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Agenda

- List of LXI Conformant Devices
- LXI Conformance Process
- Conformance Documents
- Tools for Conformance Testing

LXI Conformant Devices

Agilent	Oscilloscopes	6000L	DSO6104L DSO6054L DSO6014L	3	6000L Series Low Profile Oscilloscopes			x		Nov 6, 2006
Agilent	LCR Meter	E4980	E4980A	1	Precision LCR Meter			x		Nov 27, 2006
Kepeco	Power Supplies	KLP	KLP 10-200-1.2k KLP 20-120-1.2k KLP 36-60-1.2k KLP 75-33-1.2k KLP 150-16-1.2k KLP 300-8-1.2k KLP 600-4-1.2k	7	7 Power Supply Models 1200 Watt			x		Dec 4, 2006
Elgar	Power Supplies	SGA	SGA40/125 to SGA600/50	60	Sorensen Analog Control Programmable DC Power supplies 40V to 600V and 5kW to 30kW			x		Jan 8, 2007
Elgar	Power Supplies	SGI	SGI40/125 to SGI600/50	60	Sorensen Intelligent control Programmable DC power supplies 40V to 600V and 5kW to 30kW			x		Jan 8, 2007
Elgar	Power Supplies	SFA	SFA60/83 to SFA160/188	18	Sorensen Fast Slew Rate Programmable Current Source for laser diodes 60V to 160V 5kW to 30kW			x		Jan 8, 2007
Agilent	Network Analyzer	ENA ENA-L	E5071C E5061A E5062A	3	ENA Network Analyzer, 8.5GHz ENA-L Network Analyzer, 1.5GHz ENA-L Network Analyzer, 3GHz			x		Jan 15, 2007
Agilent	SI - Power Meter	N8262	N8262A	1	Dual Channel Power Meter			x		Jan 31, 2007
Product Families:		41		313	Products					

Conformance Process

Three methods to seek approval for a LXI device

- Test conformance of LXI devices in a controlled environment using approved test procedures
 - Vendor Tests
 - Plug Fests
- Technical Justification in case of a direct legacy from an existing LXI device which has already been approved
- Certification from independent Test Lab approved by the LXI Consortium



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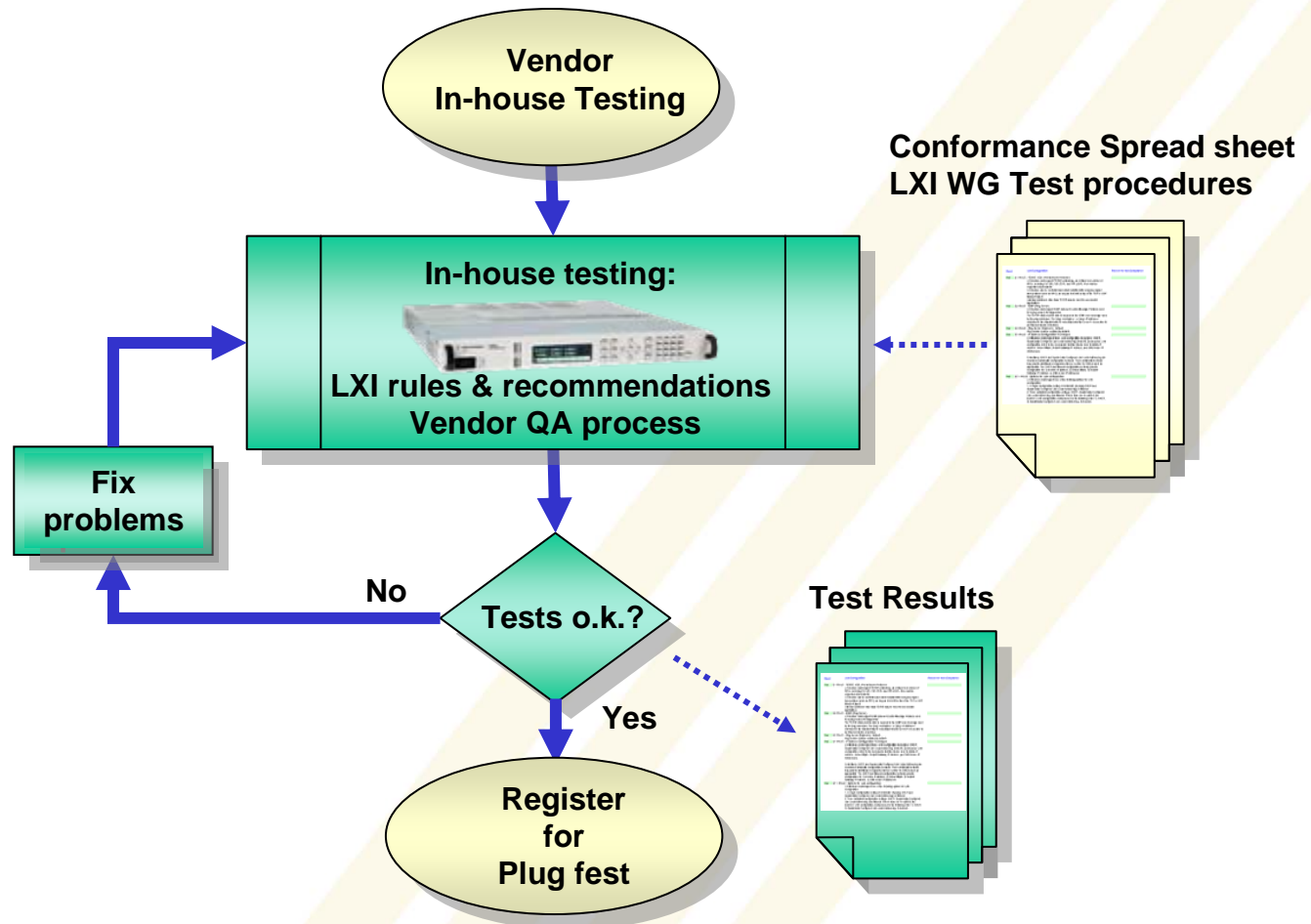
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Prior to Plug Fest (Step 1)

Vendor performs in-house testing:



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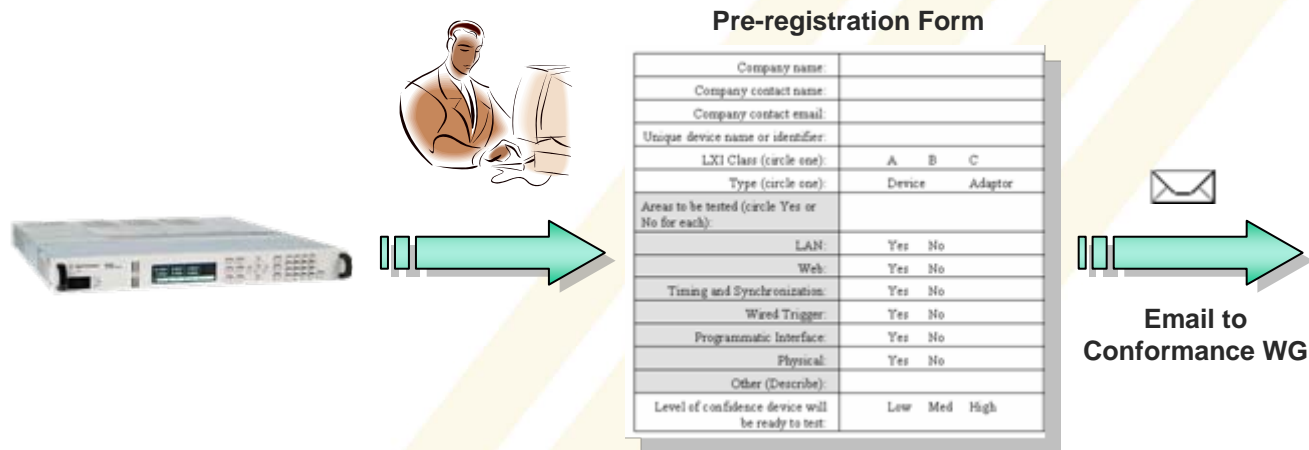
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Prior to Plug Fest (Step 2)

Vendor pre-registers device for screening at the plug fest

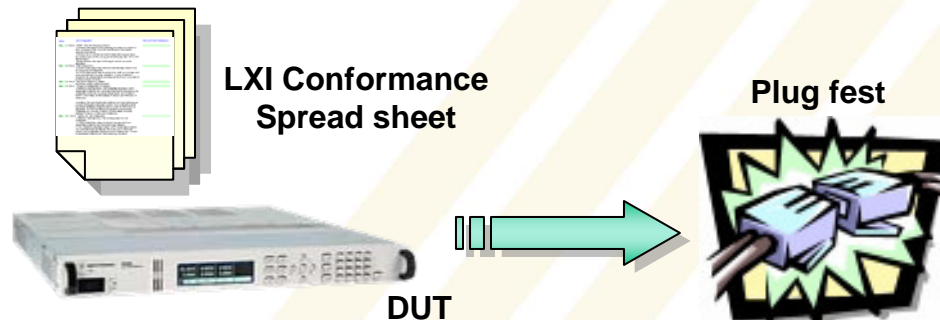
- Download Plug fest pre-registration form from LXI Consortium Web site Conformance WG - Conformance Documents Templates
- Fill out form with vendor and device information and areas to be tested
- Email form to LXI Conformance WG prior to plug fest



Plug Fest Testing (Step 1)

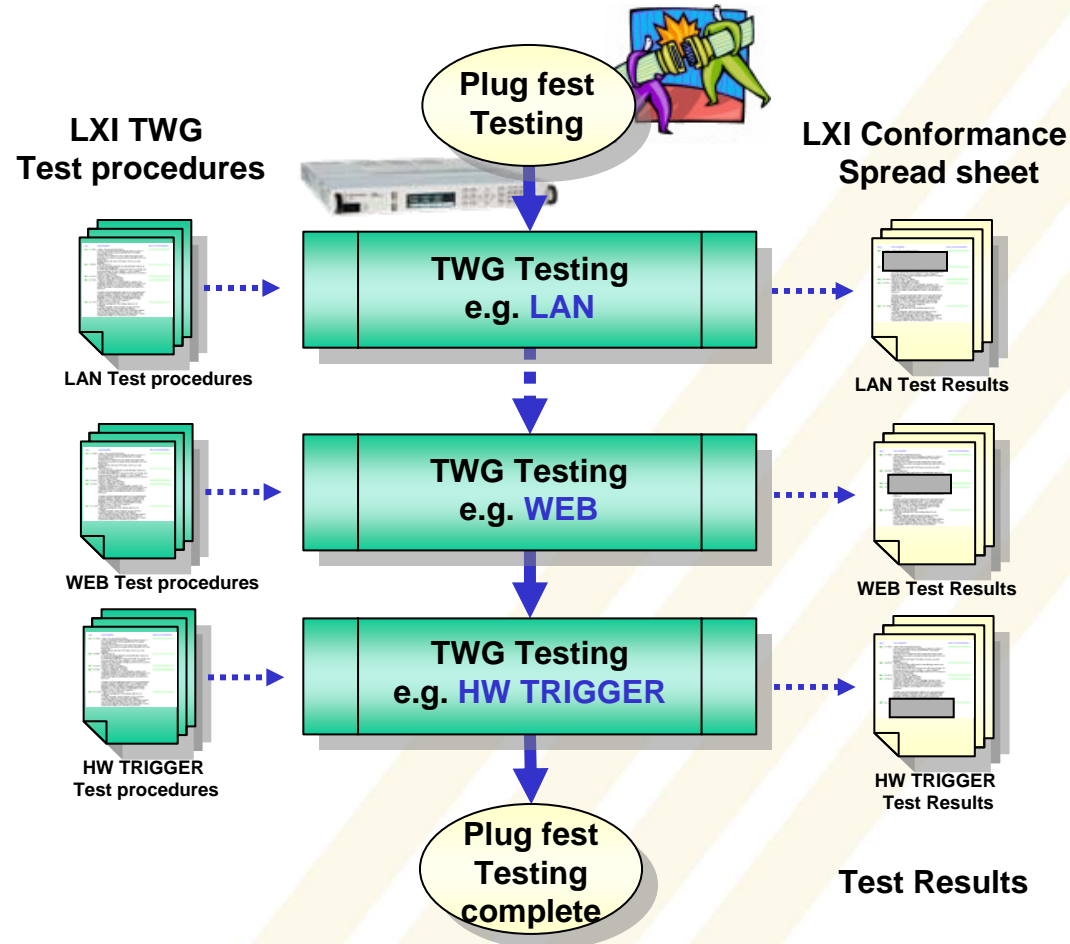
Vendor submits sample of device for screening

- Vendor must provide a representative familiar with the operation of the device to assist consortium representatives with the screening.
- DUT together with LXI Conformance spread sheet filled out with the appropriate information about DUT (including vendor declarations).



Plug Fest Testing (Step 2)

TWGs execute their test plan:

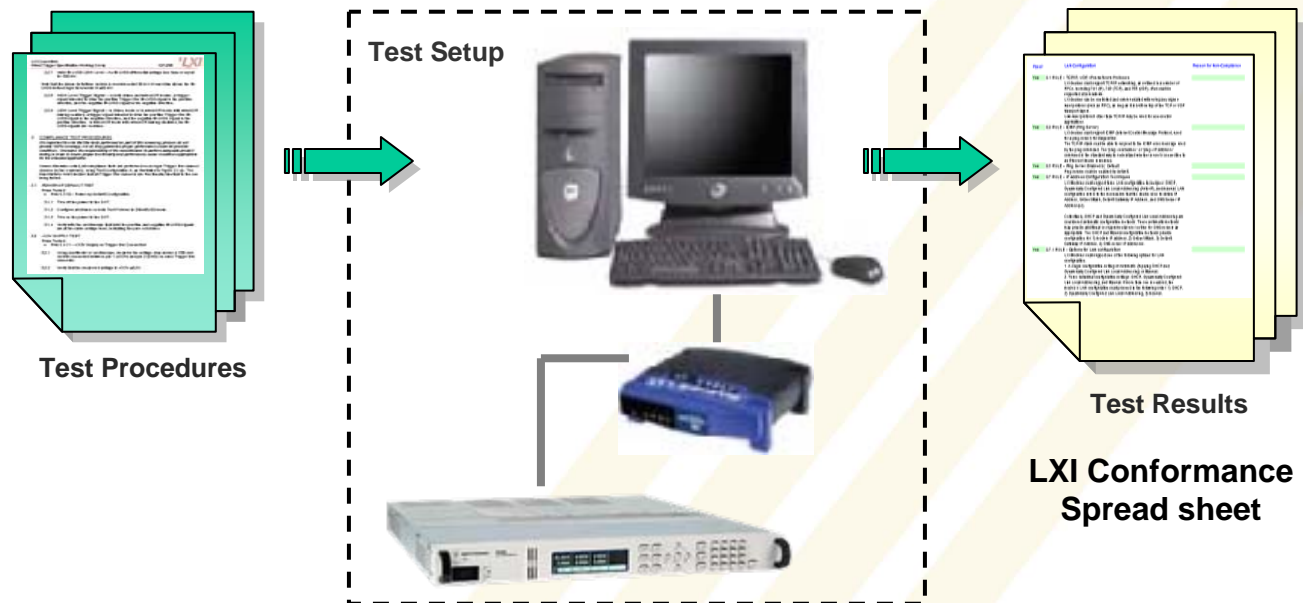


Plug Fest Testing (Step 3)



All screening test results are collected during the different tests

- LXI Conformance spread sheet of the according LXI device under test



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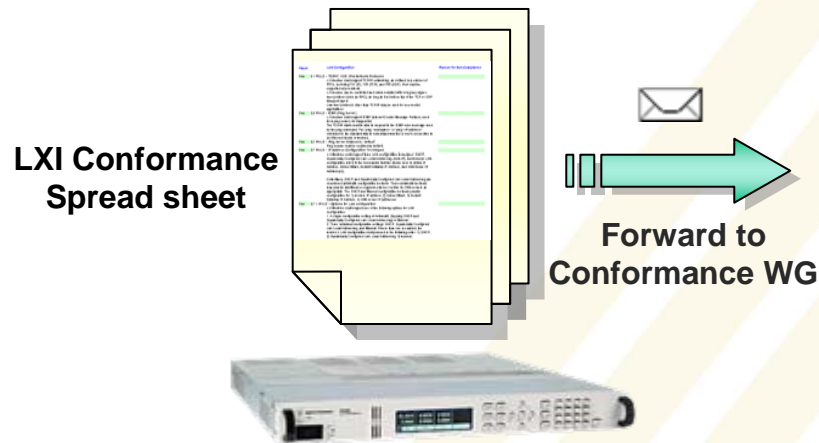
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Plug Fest Testing (Step 4)



Compile test results:

- The compiled test results are forwarded to the chair of the LXI Conformance WG at the conclusion of the plug fest.



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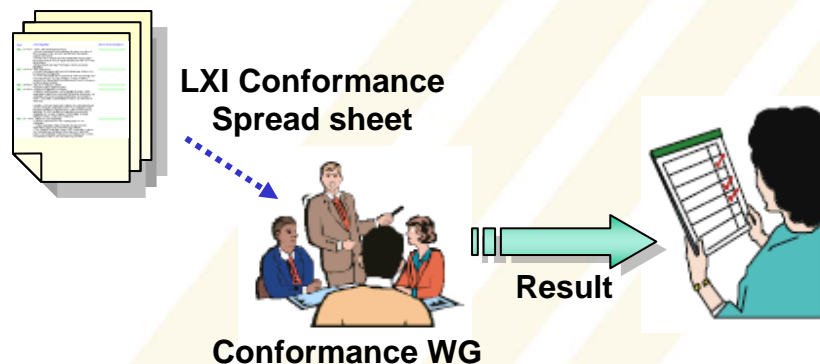
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After Plug Fest

Official result of the plug fest

- Within one week of the conclusion of a plug fest, the Conformance WG will collate the results from each TWG for each device, and provide the vendor with an official record of the test results
- The record will include a summary statement identifying the device as “Fully Conformant”, “Conditionally Conformant”, or “Not Conformant” based on the requirements for the Class of Device for which the vendor requested testing

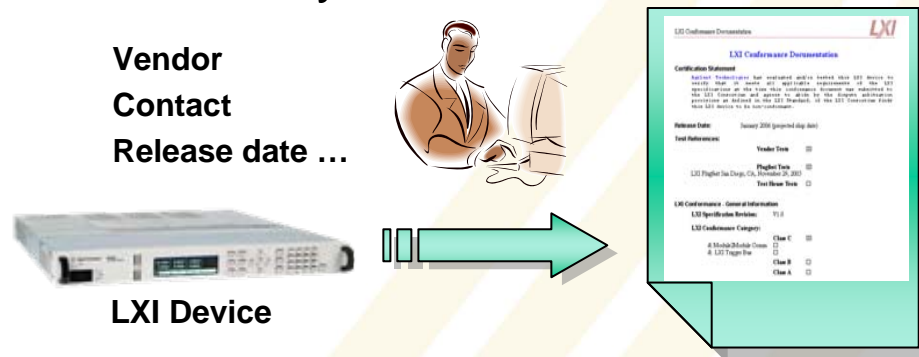


LAN eXtensions for Instrumentation

Application for LXI Conformance (Step 1)

Vendor submits an “Application for LXI Conformance Certification” to the LXI Consortium

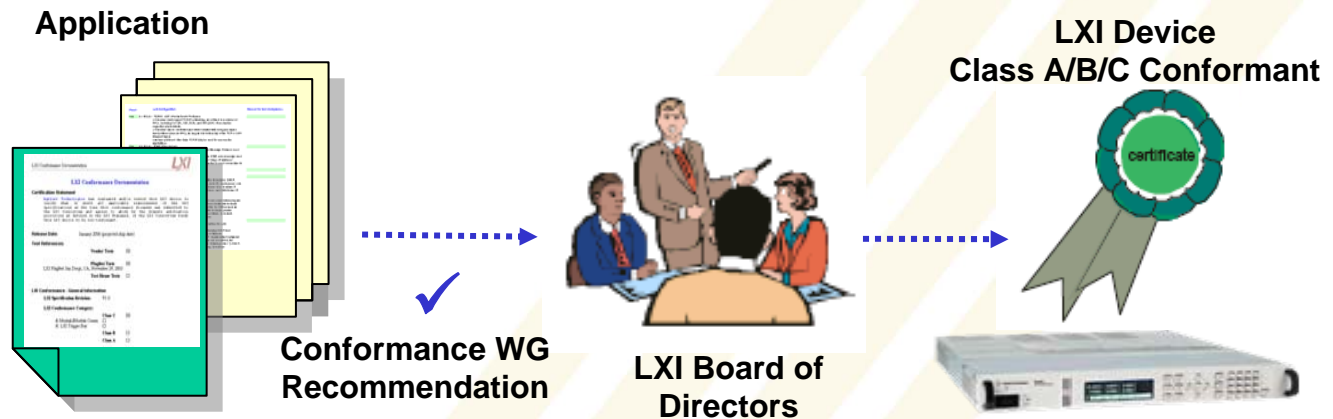
- The LXI Conformance Documentation form including certification statement and general documentation about the LXI device, vendor, contact and release date
- The LXI Conformance Spread sheet with the official screening test results from a plug fest where the device was tested showing the device as “Fully Conformant” or “Conditionally Conformant”



Application for LXI Conformance (Step 2)

Send application to Conformance WG

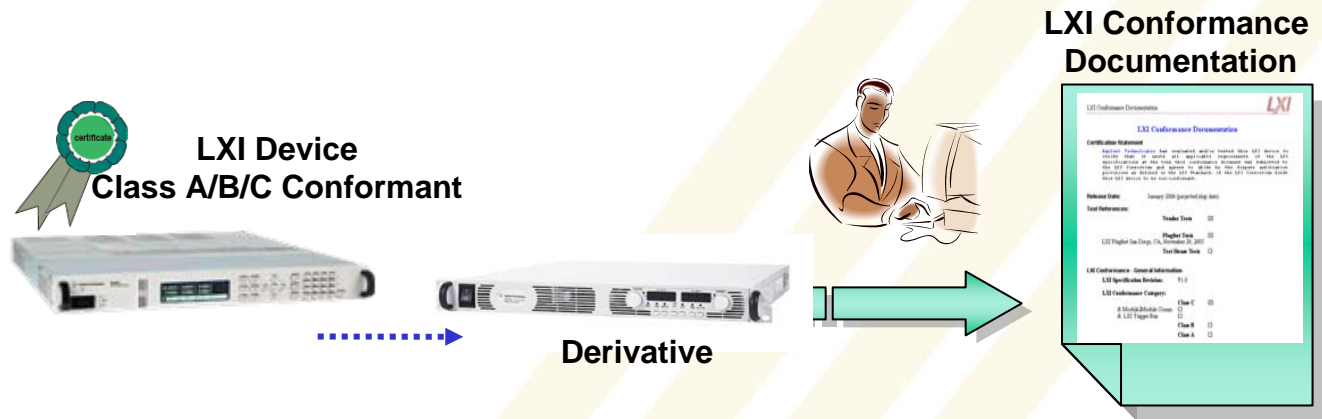
- After successful inspection of the submitted information the Conformance WG chair will forward the application to the LXI Board of Directors with recommendation for approval as LXI conformant to the according Class A/B/C.



Application based on Technical Grounds

Manufacturers can use LXI legacy to claim compliance

- If a family of devices uses a common LXI interface the passing of one device type can be used by the vendor to claim for the others, but the claim must still go through the process.



Conformance Documents – Spread Sheet

LXI Compliance Summary

V1.0

Specification Revision:	1.0
LXI Class	C
Vendor	Agilent Technologies
Vendor Website	www.agilent.com
Test Date	21. Nov 05
Firmware Version	1.12
LXI Physical Category	Half-width rack mounted - de facto standards
Class C Options	None

Specification Compliance	
Yes	Overview and Class Definition
Yes	Physical Specifications
Yes	Device Synchronization and LAN-Based Triggering
Yes	Module to Module Communications
Yes	Hardware Trigger Bus
Yes	Programmatic Interface
Yes	LAN Specifications
Yes	LAN Configuration
Yes	Web Interface
Yes	LAN Discovery
Yes	Documentation
Yes	Licensing
Yes	Conformance
Pass	Overall Compliance Summary

Instructions: Fill in all cells with a light green background color.
Cells with a light orange color are summary results.

LXI Devices	
Model	Description
34410	Digital Multimeter

M Driver Information	
Class	hwDmm
Version	1.0.6
Identification	Agilent Technologies;34410Aproto0017
Vendor	Agilent Technologies

Part 1 LAN Configuration

Reason for Non-Compliance

Yes 8.1 RULE – TCP/IP, UDP, IPv4 Network Protocol
LXI devices shall support TCP/IP networking, as outlined in a number of RFCs, including 791 (IP), 753 (TCP), and 768 (UDP). IPv4 shall be supported at a minimum.
LXI devices can be controlled and communicated with using a single 8-level protocol stack as RPC, as long as it is built on top of the TCP or UDP transport layer.
Low-level protocol other than TCP/IP may be used for non-control applications.

Yes 8.2 RULE – ICMP (Ping Server)
LXI devices shall support ICMP (Internet Control Message Protocol, used for a ping service) for diagnostics.
The TCP/IP stack shall be required to respond to the ICMP echo message used by the ping command. The 'ping -i hostname-' or 'ping -i IP address-' command is the standard way to understand whether a server's connection to an Ethernet device is working.

Yes 8.3 RULE – Ping Server Enabled by Default
Ping service shall be enabled by default.

Yes 8.7 RULE – IP Address Configuration Techniques
LXI Modules shall support the LAN configuration techniques: DHCP, Dynamically Configured Link Local Addressing (Auto-IP), and Manual LAN configuration. Refer to the mechanism that the device uses to obtain IP Address, Subnet Mask, Default Gateway IP Address, and DNS Server IP Address(es).

Collectively, DHCP and Dynamically Configured Link Local Addressing are considered automatic configuration methods. These automatic methods may provide additional or supplemental user entries for DNS server(s) as appropriate. The DHCP and Manual configuration methods provide configuration for: 1) module IP address, 2) Subnet Mask, 3) Default Gateway IP Address, 4) DNS server IP addresses.

Yes 8.7.1 RULE – Options for LAN configuration
LXI Modules shall support one or the following options for LAN configuration:
1. A single configuration setting of Automatic (implying DHCP and Dynamically Configured Link Local Addressing) or Manual.
2. Three individual configuration settings: DHCP, Dynamically Configured Link Local Addressing, and Manual. If more than one is enabled, the module's LAN configuration shall proceed in the following order: 1) DHCP, 2) Dynamically Configured Link Local Addressing, 3) manual.

Conformance Documents – Documentation

LXI Conformance Documentation



LXI Conformance Documentation

Certification Statement

Agilent Technologies has evaluated and/or tested this LXI device to verify that it meets all applicable requirements of the LXI specifications at the time this conformance document was submitted to the LXI Consortium and agrees to abide by the dispute arbitration provisions as defined in the LXI Standard, if the LXI Consortium finds this LXI device to be non-conformant.

Release Date: January 2006 (projected ship date)

Test References:

Vendor Tests

Plugfest Tests

LXI Plugfest San Diego, CA, November 29, 2005

Test House Tests

LXI Conformance - General Information

LXI Specification Revision: V1.0

LXI Conformance Category:

Class C
& Module2Module Comm
& LXI Trigger Bus
Class B
Class A



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Conformance WG Roadmap

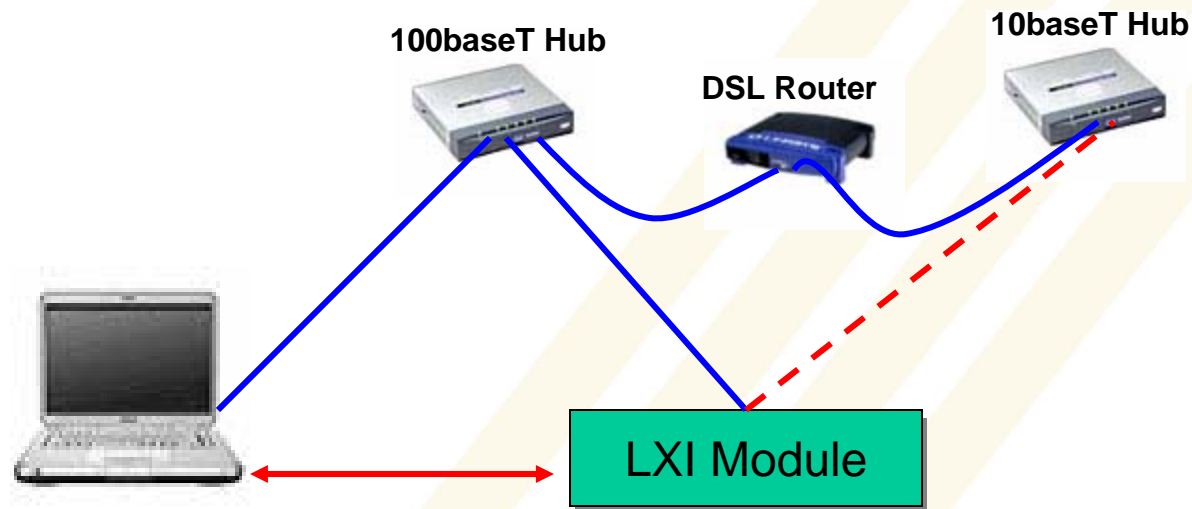
- Conformance Process Class C
 - Self Certification for Class C
 - Tool support for vendor tests
- Conformance Process Class A & B
 - Software support for tests for Class A and Class B
 - Software support for automated tests for LXI Trigger & Sync

Conformance Test Suite – Tools for Vendor Tests

- Class C equipment needs
- Software pieces for Conformance Testing
- Prototype test suite
 - What it does
 - Types of tests
 - Knowledge capture (for more consistent testing)
 - Editor for test updates (LXI Spec version changes)
- Prototype Demo

Class C Equipment Needs (Including LAN Triggers)

- PC with appropriate software
- Router with DHCP server
 - **Future: host DHCP and Dynamic DNS servers on PC, removes need for router and hub**
- Hub (for LAN Packet Sniffing)
- LXI Device to be tested



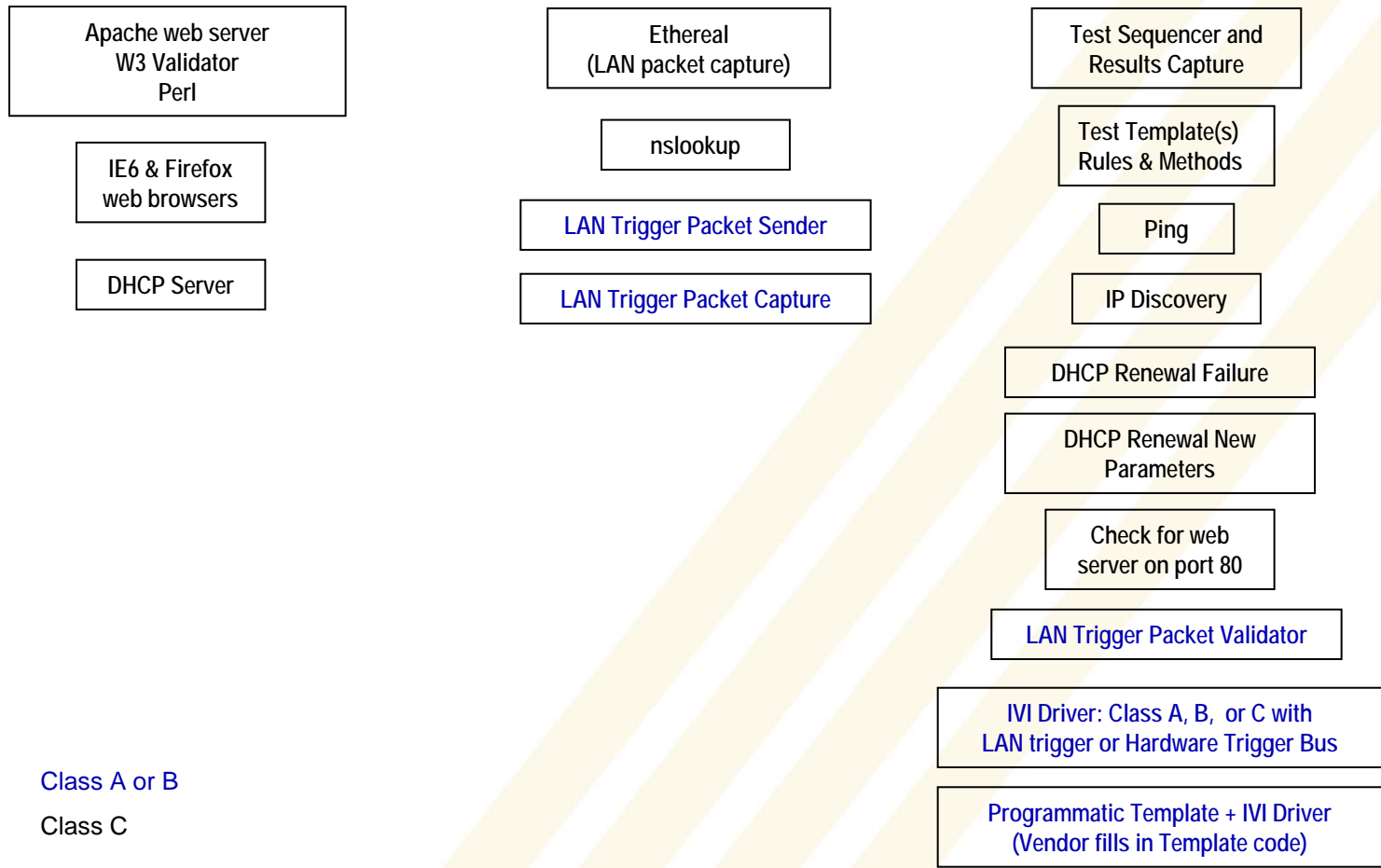
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Software pieces for Conformance Testing



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Prototype Test Suite - What it Does

- Captures Data and Description of LXI Device being tested
- Sequences tests per LXI Test Procedure
 - Shows ongoing status
 - Summarizes status on rule and chapter basis
 - Status values: Pass, Fail, Todo, NA
 - Shows Rule being tested and method of test
 - Provides a place to capture test result details.
 - Order of tests controlled by test template file (XML)
- Saves test results to an XML file
 - Can reload test results for further study or testing
- Provides edit capability for updating test template(s)

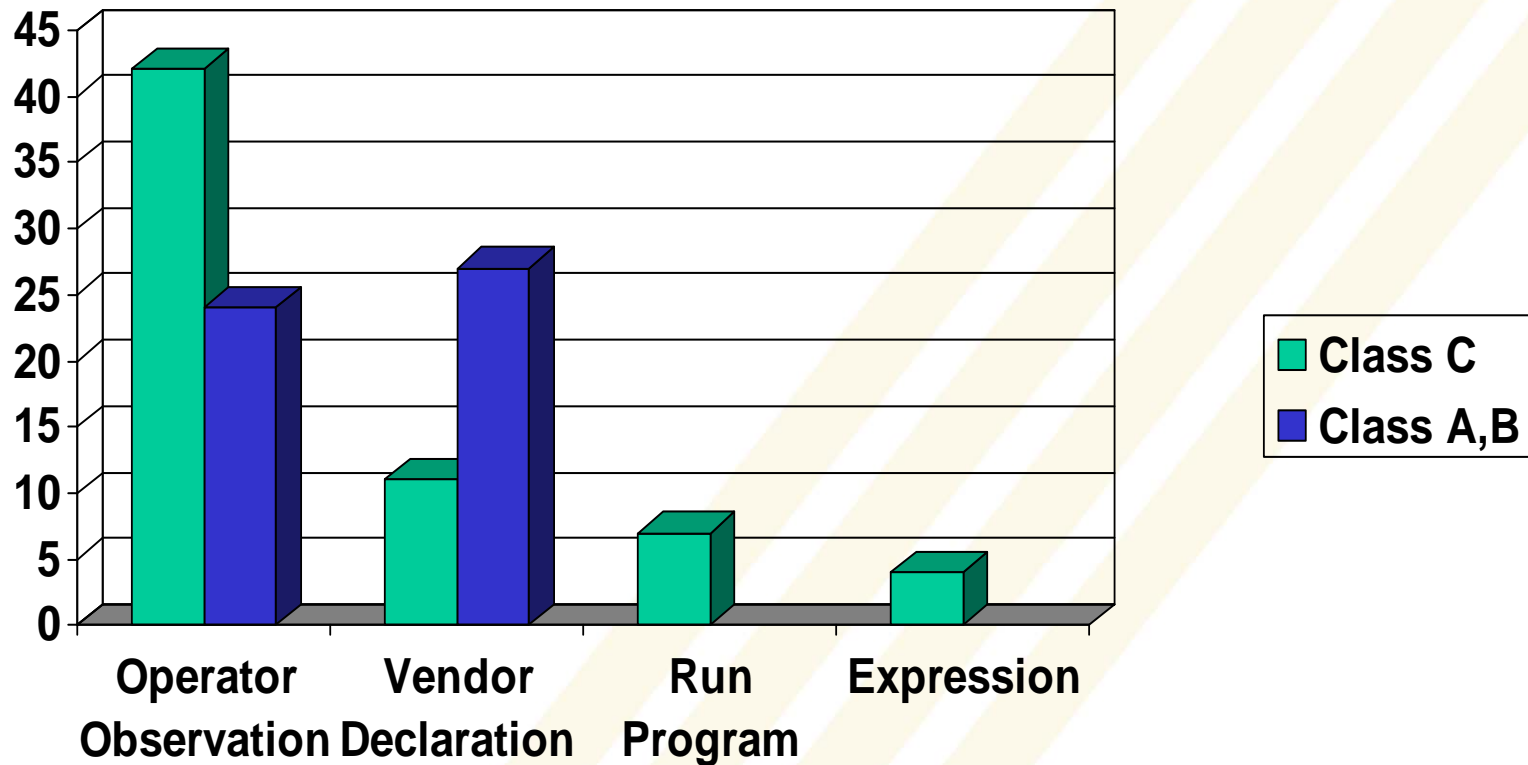


Types of Tests

- Three built-in tests:
 - Operator Observation
 - Requires knowledge and judgment by operator
 - Vendor Declaration
 - Expression Evaluation
 - Result for rule is logical combination of other rules
- External tests:
 - Runs test program for a specific rule
 - Specified in the test template file
 - Can be written in any programming language



Types of Tests - Statistics



Knowledge Capture

- Purpose: Provide guidance for the non-expert user
- Method: Provide instructions to the test operator
 - Test setup
 - How to determine if test passes.
 - Reminder and a place to document items that don't work
 - For the device developers.
- Provide automated test programs where practical
 - Discovery
 - *IDN?
 - DHCP renewal tests
 - Web server port verification



Editor for Test Templates

- Chapter Summary: Logic expression (of chapters)
- Chapter:
 - Number
 - Title
 - Logic expression (of rules in chapter)
- Rule:
 - Paragraph Number & Title
 - Rule Text
 - Test Instructions
 - Rule Qualifiers:
 - LXI Class, Physical type, Conformance Method, etc.
 - Test type:
 - Operator Observation, Vendor Declaration, Expression, External Test Program plus parameters



Prototype Demo

The screenshot shows the LXI Conformance application window. The title bar reads "LXI Conformance" and the menu bar includes "File", "Edit", "Settings", and "Help".

Left Panel (Tree View):

- Status Summary: Todo
- 1 [Todo] Overview and Class Definitions
 - 1.9.2 [Todo] Functional Class
 - 1.9.3 [Todo] Functional Class Declaration
- 2 [Todo] Physical Specifications
- 3 [NA] Device Synchronization and LAN-Based Triggering
- 4 [NA] Module-to-Module Data Communications
- 5 [Todo] Hardware Triggering
- 6 [Todo] Programmatic Interface
- 7 [Todo] LAN Specification
 - 7.1 [Todo] Ethernet Required
 - 7.1.2 [Todo] Proper Operation in Slower Networks
 - 7.2 [Todo] MAC Address Display**
 - 7.3 [Todo] Ethernet Connection Monitoring
 - 7.3.1.1 [Todo] User Control over Connection Monitoring Behavior
 - 7.5 [Todo] Label Required on Modules Without Auto-MDIX
 - 7.6 [Todo] Enable Auto-Negotiation by Default
- 8 [Todo] LAN Configuration
- 9 [Todo] Web Interface
- 10 [Todo] LAN Discovery
- 11 [NA]
- 12 [Todo] Documentation
- 13 [Todo] Licensing
- 14 [Todo] Conformance Specifications

Right Panel (Rule Details):

Rule to Test
7.2 **MAC Address Display**

LXI devices shall display the MAC address of the module via a user-accessible display or label affixed to the module. The MAC address is not changeable.

Test Procedure

Visually inspect the device for the MAC Address label. You may have to ask the vendor's representative where the label resides (it may be in the manual user interface). If the label or display is found, click the 'Yes' button; otherwise, record in the Test Result that the label was not present and click the 'No' button.

Test Result

Buttons: Run Test, Status: Yes No Abort Skip

IP Address

Idle

Questions?

Thank you !



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