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Agilent N2X

1000BASE-X (GBIC) XR Test Card

E7919A



Technical Datasheet

Wire-speed traffic generation, Internet-scale routing protocol emulation and analysis for 1000BASE-SX , 1000BASE-LX and 1000BASE-T interfaces throughout development and deployment.

Agilent Technologies

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Key Features

- **Full support for all common Ethernet features**
- **Unprecedented capture and analysis capabilities**
- **Industry's highest scalability**
- **Threshold 'triggers' that isolate performance issues**
- **Seamless integration of traffic and protocol testing**
- **Full control over traffic generation parameters**
- **Comprehensive open-library of automated test scripts**

Product Overview

Agilent N2X is the industry's most comprehensive test solution for testing the development and deployment of network services for converging network infrastructures. Service providers, network equipment manufacturers (NEMs), and component manufacturers can verify service attributes of entire networks end-to-end, while also isolating problems down to individual networking devices and subsystems.

Agilent N2X incorporates the strength of the RouterTester 900 to deliver unparalleled test realism to verify the ultimate performance, scalability and resilience of carrier grade services and infrastructure.

The Agilent N2X 1000BASE-X (GBIC) XR Test Card in conjunction with the N2X Packets and Protocols application provides multiport traffic generation, scalable protocol emulation, and unprecedented performance analysis of today's Ethernet networking devices. From wire-speed traffic generation and analysis, to full emulation of Internet-scale routing topologies using the latest protocols and technologies, Agilent provides the most comprehensive and easy-to-use system available today.

Agilent N2X's innovative "flexible PDU builder" technology delivers the most advanced solution for traffic generation and analysis available. Any kind of data-plane frames and packets can be generated, including custom formats. For more complex testing, N2X provides emulation of the most popular routing protocols, including BGP, OSPF, ISIS and RIP and the latest MPLS protocols, including RSVP-TE, LDP/CR-LDP, L2oMPLS (Martini), and VPLS. Multicast protocols can be verified easily with our IGMP and PIM-SM protocol emulations.

Agilent is the industry leader in testing MPLS implementations. Users can quickly build thousands of VPNs and simulate up to 500 edge devices per port or 11,000 edge routers per system, with wire-speed traffic generated and measured on up to 200,000 tunnels per port.

The powerful Packets and Protocols application enables off-line data and capture analysis, graphing, decodes, and easy diagnosis of erratic or transient network behavior.

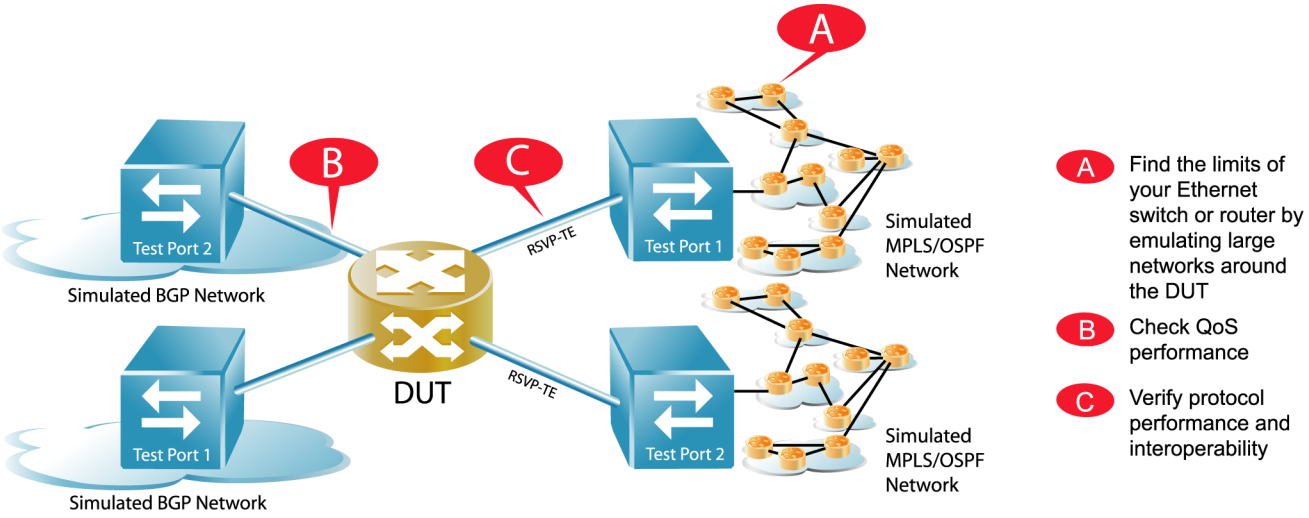


Figure 1: Typical test scenario using the 1000Base SE-X (GBIC) XR Test Card

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Full support for all common Ethernet features

Agilent N2X 1000Base-X (GBIC) XR Test Card ensures testing under realistic conditions by supporting all common Ethernet features including:

- Auto-negotiation that ensures parameters like A, B,C,D,E, are automatically established, as they would be in a live network.
- Jumbo frames up to 9022 octects can be generated to analyze the device under test's ability to efficiently transmit and receive large payloads
- Flow control can be analyzed to ensure the device under test can correctly initiate and respond to pause frames, ensuring efficient buffer management.
- Optical and electrical Gigabit Interface Converters that are compliant with version 5.5 of the GBIC standard

Unprecedented capture and analysis capabilities

Agilent N2X allows users to set a specific event threshold as a 'trigger'. This trigger can initiate capture and provides the capacity to quickly isolate, analyze and debug performance issues. N2X provides the industries highest capture capacity, of 256Mb for detailed analysis from a single test session.

Industry's highest scalability

Agilent N2X generates and analyzes more traffic streams and emulate more peers, sessions and tunnels than any other test tool in the industry . You will be able to make simultaneous measurements on 32,000 individual traffic streams and emulate thousands of protocol sessions on each port to quickly identify the performance limitations of your device, network or service implementation.

Seamless integration of traffic and protocol testing

Agilent N2X's traffic generator and receiver capabilities allow you to automatically retrieve network addresses configured during topology emulation so you can quickly transmit and measure packets across simulated routes. This integration will ensure your devices are tested within the most realistic environment possible and removes the need to manually configure addresses.

Full control over traffic generation parameters

Agilent N2X's flexible packet generator lets you manipulate and define the contents of all protocol fields. You no longer have to wait for industry standards, or write unique test scripts to test new and proprietary protocol encapsulations. Agilent's unique PDU builder (patent pending) allows you to define all known (any many unknown) parameters quickly.

Comprehensive open-library of automated test scripts

Agilent N2X's automated QuickTests, based on Agilent's Journal of Internet Test Methodologies, make it easy to perform even the most complex tests. N2X's powerful API makes it easy to customize scripts to match your specific test needs. In addition proprietary scripts can be created effortlessly using the Tcl/Tk scripting environment. With only a few lines of code, thousands of networks are easily advertised from simulated peers on any or all of the N2X ports.

Multi-User Remote Access

Agilent N2X can be controlled via the local system controller, or multiple sessions can be controlled remotely from any PC attached to a corporate LAN.

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Technical Specifications

Physical layer specifications

Connectivity

Port Density	2 full duplex test port
Connection Type	Supports GBIC rev 5.5

Interface Operation Modes

Terminal	Normal operation - transmit and receive interfaces operate independently
Transmit loop-back	Transmitted data is electrically looped back to the receive interface. The optical receive interface is disabled in this mode.
Monitor	Received data is looped back to the transmit interface. Received data is also copied into the test port where all real time Rx measurements are made. Capture and subsequent analysis are also fully functional in this mode.

Transmit Clock Sources

Two clock sources are possible	• Internally generated, • Recovered (loop timed) from the received signal

Front Panel Indicators:

Common Indicators	**Power**: Green when module has power **Status**: Yellow - Card start-up Green - Test application running Red - Card error **Laser/TXEN**: Green when GBIC transmitter is enabled. **Tx**: Green when an Ethernet frame is transmitted. Does not indicate integrity of the transmitted frame. **Rx**: Green when an Ethernet frame is received. Indicates integrity of the received frame
Ethernet Indicators	**Link**: Yellow - Ethernet framing is detected on the receive interface

Alarms and Errors

Real-Time Alarm Detection	• Current module status is indicated on the user interface and front panel LEDs • Alarm events are reported in a trace log during the measurement interval • Number of errored seconds is reported per alarm type (count of 1s intervals in which the alarm is detected at least once)
Error Monitoring	For the selected Ethernet statistics the following parameters are recorded: • Number of individual occurrences of the event • Number of seconds during which at least one event occurred Statistics are User selectable, dependant on the application. These may include, but are not limited to, the following: Frames transmitted, Valid frames received, Octets transmitted, Octets received, Runts, Short events, Jumbo frames, Jabbers, FCS errored frames, ARP frames, Flow control frames, VLAN tagged frames.

Link layer specifications

Auto-negotiation

The Test Card supports auto-negotiation. This may be disabled independently on each port.

PAUSE Frames

The Test Card can generate, count and respond to PAUSE frames.

Measurement System

Measurements are synchronized across all cards within the test system

Result types	• **Cumulative**: Measurements are reported from the start of the measurement interval • **Sampled**: Measurements are reported from the most recently completed sampling interval • **Measurement Interval**: 1 second to 7 days • **Sampling Interval**: 1 second to 1 hour • **Measurement clock**:10 ns resolution +/- 0.5 ppm/year clock drift • **3 ppm** max. difference between systems

Real-time Statistics

Unless otherwise specified all statistics are on a per port basis.

Glossary

Short event	A sequence of bytes of insufficient length to form a valid Ethernet frame (<18 bytes)
Runt	A frame with less than 64 bytes (excluding preamble) and a valid FCS.
Long frame	A frame longer than 1522 bytes (or 9022 for jumbo frames) with a valid FCS.
Jumbo frame	A frame between 1519 and 9022 bytes with a valid FCS and an Ethertype of 0x8870.
Jabber frame	A frame longer than 1522 bytes (or 9022 for jumbo frames) with an invalid FCS.
Pattern Match	Count of frames matching specified fields in the header
PPIC	Packet Payload Integrity Check. The PPIC field contains a 16-bit CRC calculated over the "protected payload . The "protected payload" refers to any of the following: IP packet payload (default) MPLS frame payload L2 frame payload User-defined

General Statistics

Per Port Stats.	• Tx and Rx % line use • Misdirected packets • Error rate
Per Stream Stats.	• Rx and Tx stream packets and octets • Misordered packets

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Per Stream & Port Stats.	• Tx and Rx test packets and octets • Expected Rx packets • Throughput • Packets not received • Average latency • Minimum/maximum latency • PPIC violations (ie. Count on payload error)
IPv4	• Tx and Rx octet counts • Header checksum errors • Fragmented packet count • Throughput
IPv6	• Tx and Rx packet and octet counts • Throughput counts
MPLS	• Tx and Rx packets
Ethernet	• Tx and Rx frame and Octet counts • Tx and Rx Throughput • Tx and Rx MAC control frames • Short events received • Runt frames received • Tx & Rx long frames • Jabber frames received • Tx & Rx invalid FCS frames
VLAN	• Tagged Tx and Rx frame and Octet counts
User Defined Statistics	• Powerful features allow statistics collection on a per stream, per-MPLS tag, per-VLAN tag or other user-defined-index basis

Physical and Environmental

Physical	Width 206 mm Depth 313 mm Height 31.0 mm Weight 875g
Electrical	Power consumption 40W
Environmental	
Operating temperature	0 °C to 40 °C 50% to 95% relative humidity at 5°C to l40 °C
Storage temperature	-40 °C to 70 °C
Maximum Relative Humidity	Humidity 50% to 95% relative humidity at 5°C to l40 °C

Regulatory Compliance

Electrical (Electromagnetic Compliance - EMC)

As per IEC 61326-1:1997 + A1:1998 / EN 61326-1:1997 + A1:1998.

Electrical equipment for measurement, control and laboratory use. (ClassA)

EMC Directive 89/336/EEC (including 93/68/EEC)

For complete compliance information refer to Declaration of Conformity E7900-91300

Electrical (Safety)

IEC 61010-1:1990 + A1:1992 + A2:1995 / EN 61010-1:1993 + A2:1995.

Safety requirements for electrical equipment for measurement, control, and laboratory use

Low voltage directive 73/23/EEC

Optical (Safety)

Complies with IEC 60825/CDRH Class 1, and 21 CFR 1040 - Class 1 Laser Products

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Agilent N2X

Agilent's N2X multi-service tester combines leading-edge services with carrier grade infrastructure testing and emulation. The N2X solution set allows network equipment manufacturers and service providers to more comprehensively test new services end-to-end, resulting in higher quality of service and lower network operating costs.

Warranty and Support

Hardware Warranty

All N2X hardware is warranted against defects in materials and workmanship for a period of 1 year from the date of shipment.

Software Warranty

All N2X software is warranted for a period of 90 days. The applications are warranted to execute and install properly from the media provided.

This warranty only covers physical defects in the media, whereby the media is replaced at no charge during the warranty period.

Software Updates

With the purchase of any new system controller Agilent will provide 1 year of complimentary software updates. At the end of the first year you can enroll into the Software Enhancement Service (SES) for continuing software product enhancements.

Support

Technical support is available throughout the support life of the product. Support is available to verify that the equipment works properly, to help with product operation, and to provide basic measurement assistance for the use of the specified capabilities, at no extra cost, upon request.

Ordering Information

To order and configure the test system consult your local Agilent field engineer.

United States:

Agilent Technologies
Test and Measurement Call Center
P.O. Box 4026
Englewood, CO 80155-4026
1-800-452-4844

Canada:

Agilent Technologies Canada Inc.
5150 Spectrum Way
Mississauga, Ontario
L4W 5G1
1-877-894-4414

Europe:

Agilent Technologies
European Marketing Organisation
P.O. Box 999
1180 AZ Amstelveen
The Netherlands
(31 20) 547-2323

United Kingdom
07004 666666

Japan:

Agilent Technologies Japan Ltd.
Measurement Assistance Center
9-1, Takakura-Cho, Hachioji-Shi,
Tokyo 192-8510, Japan
Tel: (81) 426-56-7832
Fax: (81) 426-56-7840

Latin America:

Agilent Technologies
Latin American Region Headquarters
5200 Blue Lagoon Drive, Suite #950
Miami, Florida 33126
U.S.A.
Tel: (305) 269-7500
Fax: (305) 267-4286

Asia Pacific:

Agilent Technologies
19/F, Cityplaza One, 1111 King's Road,
Taikoo Shing, Hong Kong, SAR
Tel: (852) 3197-7777
Fax: (852) 2506-9233

Australia/New Zealand:

Agilent Technologies Australia Pty Ltd
347 Burwood Highway
Forest Hill, Victoria 3131
Tel: 1-800-629-485 (Australia)
Fax: (61-3) 9272-0749
Tel: 0-800-738-378 (New Zealand)
Fax: (64-4) 802-6881

www.agilent.com/comms/N2X

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