Agilent N2X

# MLD Protocol Emulation Software

E7897A
Technical Data Sheet

**The N2X MLD protocol emulation can be used to verify multicast behavior within IPv6 networks, to ensure deployments can meet subscriber scalability and service quality expectations. This software complements the N2X DHCPv6 emulation software and powerful IPv6 traffic generation capabilities to offer a complete IPv6 test solution.**

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## Key Features

- **Powerful MLD Emulation**
  - Emulate complete MLD exchanges to verify functionality
  - Scale to thousands of simulated MLD devices per port
  - Support for both MLDv1 and MLDv2
- **Mixed IPv6/IPv4 Network Simulation**
  - Combine MLD and IGMP protocol emulations over the same port to create mixed IPv4/IPv6 scenarios
  - Combine IPv4/IPv6 traffic generation over the same test port
- **Integrated Solution for Testing Multiplay Services**
  - Use in conjunction with N2X's IPTV Quality of Experience Test Solution
  - Test alongside N2X-simulated VoIP traffic and unicast data traffic
  - Emulate MLD and DHCPv6 simultaneously to build realistic IPv6 network topologies

## 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 delivers unparalleled test realism to verify the ultimate performance, scalability and resilience of carrier grade services and infrastructure.

The N2X MLD protocol emulation can be used to quickly verify channel selection within IPv6 IPTV networks, to ensure IPv6 multicast deployments can meet subscriber scalability and service quality expectations. This software complements the N2X DHCPv6 emulation software and powerful IPv6 traffic generation capabilities to offer a complete IPv6 test solution.

The MLD emulation enriches N2X's protocol coverage and allows for a complete and integrated test solution for access nodes (DSLAMs), access aggregation equipment (BSAs and Ethernet Switches) and Broadband Network Gateways (BSRs and B-RAS devices). Devices participating in the distribution of IPv6 multicast traffic must be tested at high scale and in the presence of a realistic mix of protocol and data traffic to ensure they will meet subscriber needs once they are deployed.

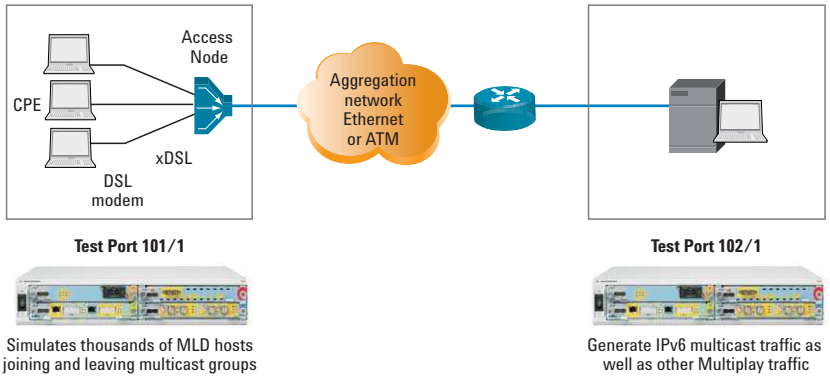


**Figure 1: End-to-end measurements for thousands of MLD clients in an integrated solution.**

# Product Features

## Powerful MLD Emulation

N2X supports MLDv1 and MLDv2 emulation, which are required both in the access network and the core. MLD emulation can run in the same session (and over the same port) with N2X's PIM emulation to create a realistic multicast test scenario. In addition to supporting MLD emulation, N2X can act as a multicast traffic source, allowing accurate end-to-end measurements for thousands of MLD clients in an integrated solution.

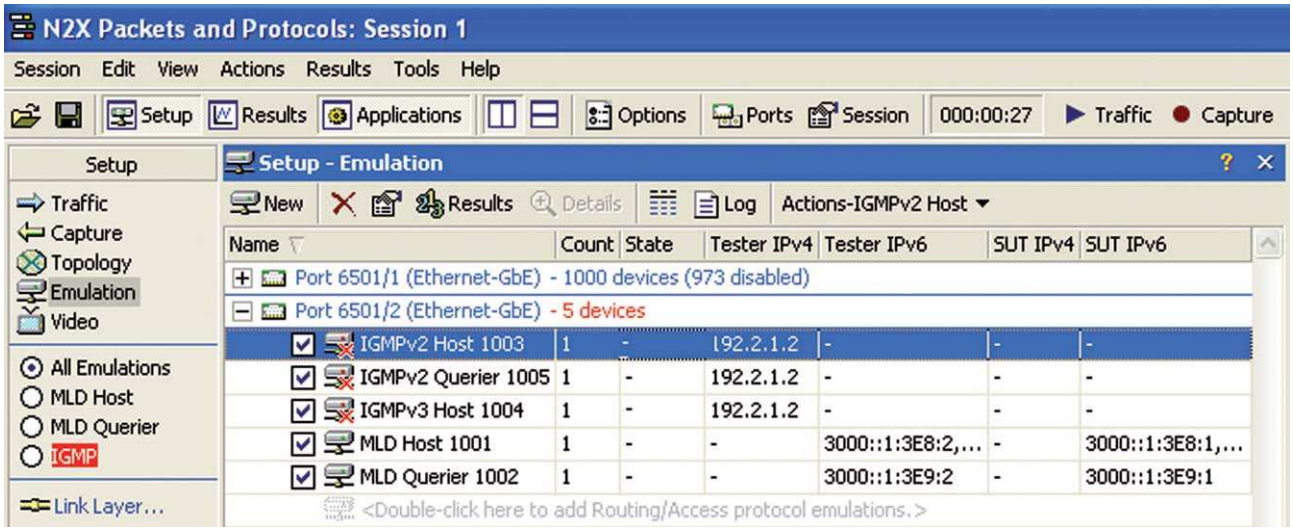


**Figure 2: Mixing IPv4 and IPv6 multicast test scenarios.**

## Mixed IPv4 / IPv6 Network Simulation

N2X's MLD emulation can coexist with IGMPv2 or IGMPv3 sessions on the same test port, enabling mixed IPv4 and IPv6 multicast test scenarios, which is required as the network transitions from IPv4 to IPv6. IPv4 and IPv6 unicast traffic can be generated over the same test interface, enabling verification of IPv4/IPv6 transition mechanisms.

## Integrated Multiplay Solution

With the deployment of Multiplay video, voice and high speed internet services, access network equipment must process many different traffic types and protocols simultaneously.

N2X can emulate multiple protocols and traffic types on the same test port at once to reflect realistic Multiplay network conditions. N2X combines DHCP, DHCPv6, MLD, IGMP, PIM, PIMv6, and PPPoX emulations and IPTV, VoIP and High Speed Internet traffic generation to deliver the industry's most comprehensive Multiplay test tool. MLD emulation is supported on all N2X routing cards, including the 10Gb versions.

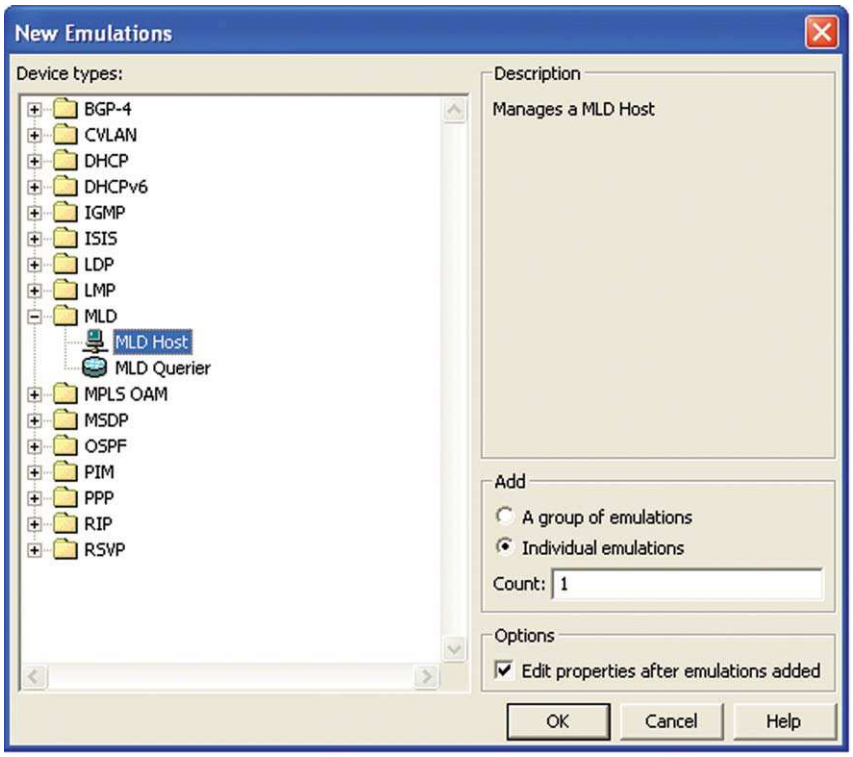


**Figure 3: Emulate multiple protocols and traffic types on the same test port.**

# Technical Specifications

This section contains the protocol-specific parameters that are configurable through the GUI or the TCL scripting environment.

## MLD Host Configurable Parameters

| | |
|---|---|
| **Ethernet Subinterface** | • Local MAC address<br>• VLAN ID (two VLAN tags may be stacked) |
| **MLD Host Options** | • MLD Version (v1 or v2)<br>• Interval between messages (ms)<br>• Unsolicited report interval (ms)<br>• Use max response delay from query message<br>• IPv6 router alert option<br>• Ignore MLD query<br>• Enable proxy reporting |

## MLD Statistics

| | |
|---|---|
| **MLD Host and Querier Statistics** | • Invalid packets received<br>• Dropped packets received<br>• General queries received and transmitted (v1 and v2)<br>• Group-specific queries transmitted (v1 and v2)<br>• Membership reports transmitted (v1 and v2)<br>• Leave reports received and transmitted<br>• Group-source-specific queries received and transmitted |

## Data Plane Statistics

All standard N2X data plane multicast statistics are supported. Refer to the E7881B datasheet for more details.

## Applicable Standards

- RFC 2710 Multicast Listener Discovery (MLD) for IPv6
- RFC 3590 Source Address Selection for Multicast Listener Discovery (MLD) Protocol
- RFC 3810 Multicast Listener Discovery Version 2 (MLDv2) for IPv6
- RFC 4541 Internet Group Management (IGMP) and Multicast Listener Discovery (MLD) Snooping Switches

## Configuration and Ordering Details

To use the E7897A MLD Protocol Emulation software, the following Agilent N2X hardware and software is required.

### Hardware

A N2X system is required with:

- System controller
- Chassis
- Interface cards

The E7897A MLD emulation is supported on all N2X Ethernet routing cards.

### Software

The MLD emulation software license has a Software and Support Agreement (SSA) contract options associated with it

- PS-S12-001 - 1 year contract included with initial purchase
- PS-S12-102 - 1 year contract extended to 2 years
- PS-S12-103 - 1 year contract extended to 3 years

Please ensure that you have a current SSA in order to automatically receive future releases and technical product support.

The following N2X software license is a pre-requisite to supporting the MLD emulation:

- E7881B - Packets and Protocols Application Software

The following N2X software license includes the MLD emulation and is considered mutually exclusive with the E7897A license:

- E7898A – DHCPv6 + MLD Bundle

## Online Help

An extensive online help system provides complete descriptions and detailed usage instructions for every component of N2X. Dialog-level, context-sensitive help provides rapid access to the relevant sections of the online help.

## Related Products

The Agilent NetworkTester is a highly scalable and flexible solution for performance testing of Layer 4-7 devices. As a companion to N2X, the NetworkTester provides real-world, stateful application layer traffic generation over PPP sessions, enabling developers to verify the end user experience and performance of applications running over a broadband network. It also supports 802.1x, IPsec and IPsecv6 access protocols.

**Agilent Network Tester**

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www.agilent.com/find/n2x

## 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.

## Software and Support Agreement

To protect your investment in the Agilent N2X, every new system includes an initial 12-month comprehensive system-based warranty and Software and Support Agreement (SSA).

Renewing Agilent support services ensures uninterrupted technical support and software upgrades, giving you confidence in N2X throughout the life of your system.

The N2X technical support portion of your SSA includes assistance with product operation and measurements, and verification that the N2X equipment is in correct working order.

## 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.

## Ordering Information

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

## Sales, Service and Support

N2X must be serviced by an approved Agilent Technologies service centre, please contact us for more information.


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