

Agilent N2X  
**IGMP Protocol  
Emulation Software**

E7828A  
Technical Data Sheet



**The E7828A IGMP emulation integrates industry's most scalable IGMPv2 and IGMPv3 testing into the N2X multiprotocol test solution for verifying the functionality, performance and scalability of IPv4 multicast replication and snooping devices and Multiplay services.**



**Agilent Technologies**

## Key Features

- **Powerful IGMP Emulation**
  - Full emulation of IGMPv2 and IGMPv3
  - Highly scalable solution scales to thousands of clients per test port
  - Supported on all N2X routing cards, including POS, ATM and Ethernet interfaces
  - Operates over VLANs and stacked VLANs
- **Integrated Multiplay Solution**
  - Emulation can run simultaneously with other protocol emulations (e.g., DHCP, PPPoX), on the same port
  - Can be used as part of IPTV test scenarios
  - Can operate over PPP sessions or using DHCP-assigned addresses
- **Partial emulation of IGMP querier to test IGMP snooping devices**

## 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 Internet Group Management Protocol (IGMP) is used by clients to join and leave IPv4 multicast groups and by multicast routers to learn group membership information from clients. IPTV is one of the most important applications of multicast. With IPTV and other types of multicast deployments becoming more prevalent, it is important for service providers and network equipment manufacturers to validate the performance of devices participating in multicast distribution to ensure that they provide the required service quality. Such tests must be performed at scale and in the presence of a realistic traffic and protocol mix.

The N2X IGMP emulation enables the testing of IPv4 multicast replication devices such as BNG, BSA, BSR, and B-RAS. Using the client emulation with the provided IGMP querier emulation, multicast snooping mechanisms can be exercised and tested on devices such as OLT, DSLAM, and Ethernet switch. These tests can be conducted in isolation or as part of an integrated Multiplay services test including IPTV, simulated VoIP traffic, data and additional access protocols such as DHCP, PPPoX or MLD. (additional licenses required).

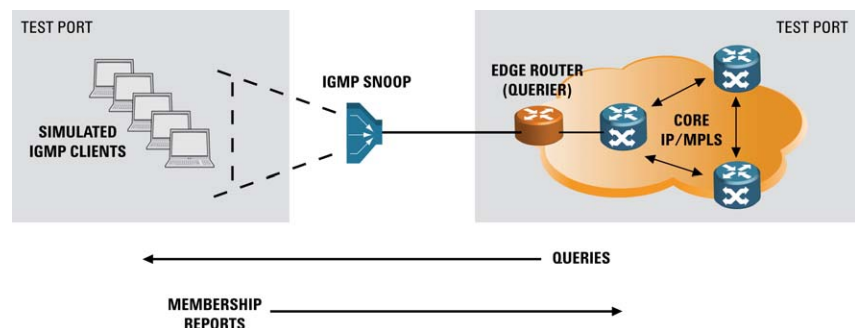


Figure 1: Emulate both Queriers and clients to verify IGMP snooping

## Product Features

### Powerful IGMP Emulation

N2X supports IGMPv2 and IGMPv3 emulation for thousands of simulated subscribers per port. Some of the key considerations when testing the IGMP performance of a multicast device include the forwarding of traffic within a specific latency budget, the integrity of the traffic and the effect of IGMP control plane activity on forwarding behavior. N2X provides the ability to easily test these characteristics. With the free companion QuickTest or the more sophisticated N5570A IPTV Quality of Experience solution, IGMP join and leave latency can be measured. The IGMP emulation can run over PPP sessions (Access Protocol Emulation Software E7888A license required) and VLANs (or stacked VLANs).

### Integrated Multiplay Solution

Devices in the access network encounter many types of traffic and, for this reason, a realistic test environment must be based on a holistic approach that simulates a variety of traffic and protocol activity. N2X enables realistic testing of access networks by simultaneously emulating multiple protocols and traffic types on each single test port. IGMP, DHCPv6, MLD, DHCP, PIM, PIMv6, and PPPoX, among others, can run concurrently with IPTV and VoIP traffic (additional licenses required), creating the industry's most comprehensive Multiplay test tool.

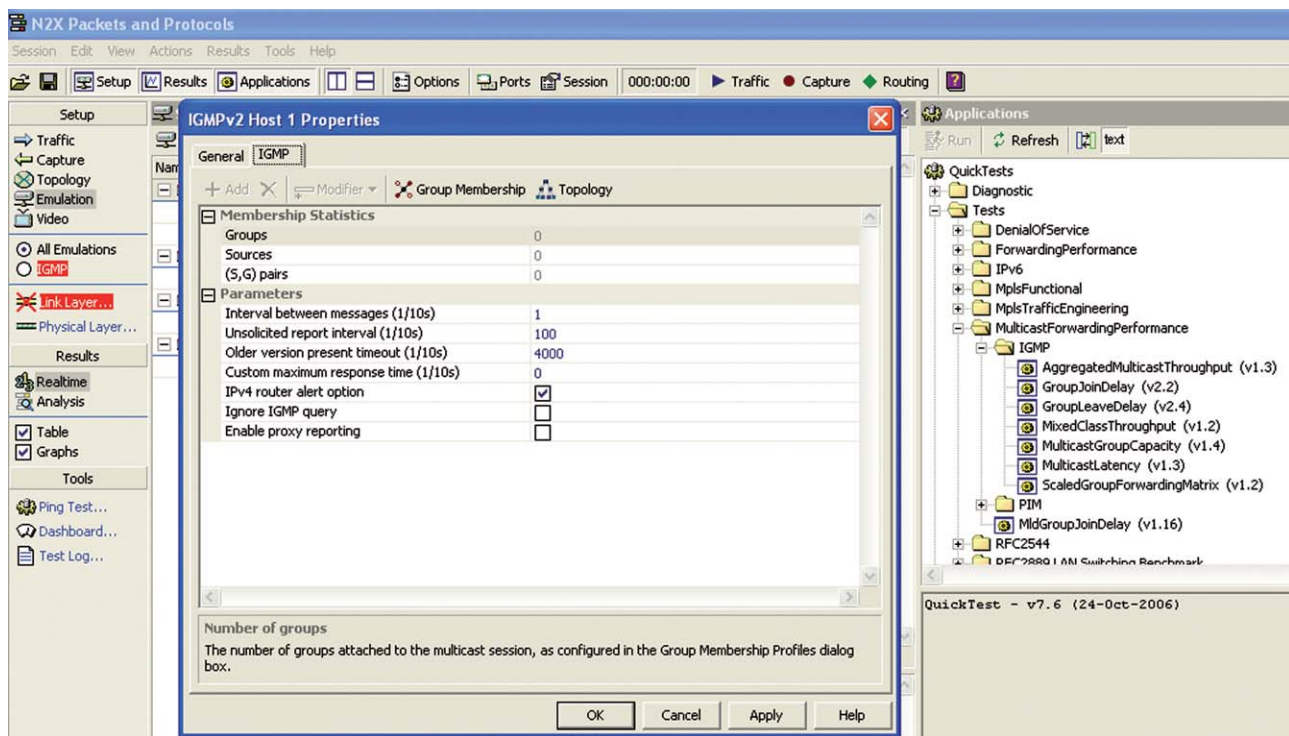


Figure 2: Powerful IGMP emulation enables full control of parameters and display of protocol state

## IGMP Querier Emulation

It is common in access networks to employ aggregation devices that perform IGMP snooping. Such devices (e.g., DSLAMs, OLTs) inspect group membership queries sent by the multicast router (the querier) and the corresponding IGMP group membership reports from the subscribers. N2X makes it easy to test such devices by providing a partial IGMP querier emulation. Although it is not a complete emulation of a multicast router, it is sufficient to generate the queries necessary to exercise IGMP snooping functions. On the other side of the device, N2X-simulated IGMP clients respond to queries by sending membership reports.

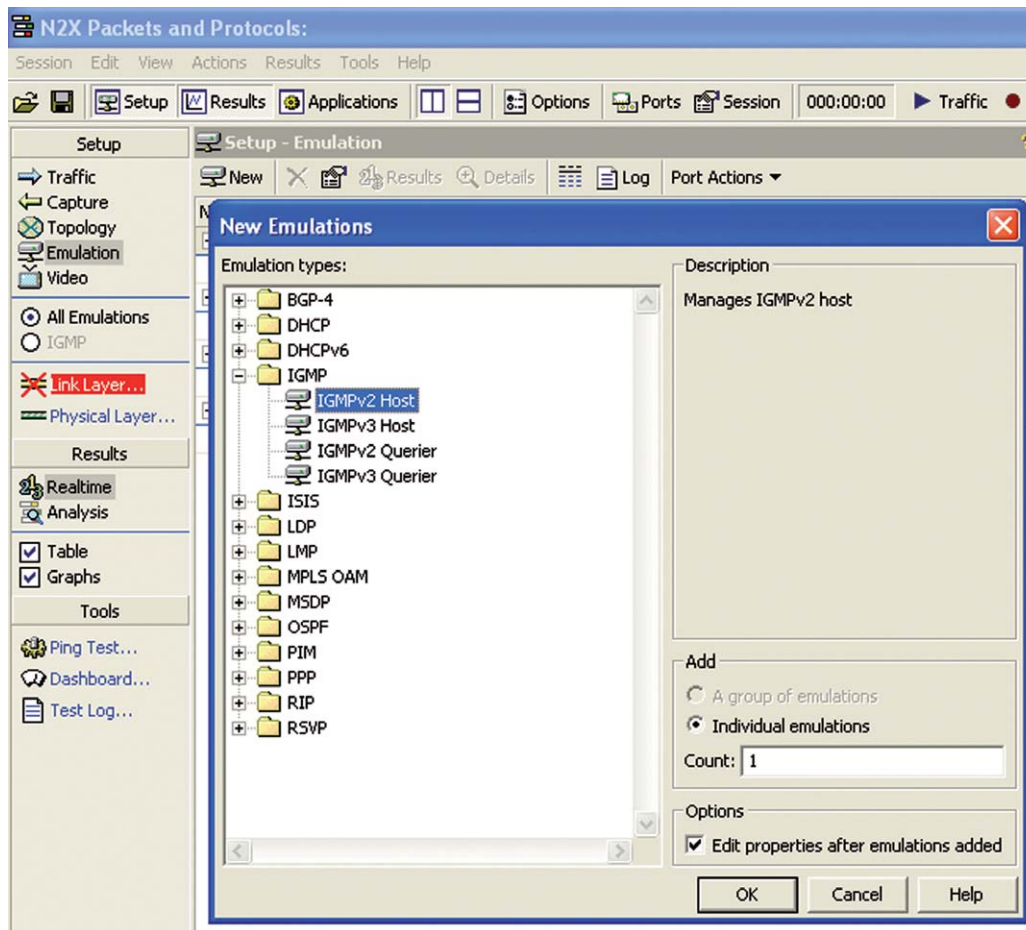


Figure 3: Flexible emulation of both IGMPv2 and IGMPv3

## Technical Specifications.

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

### IGMPv2 Client Configurable Parameters

- |             |  |
|-------------|--|
| <b>IGMP</b> | <ul style="list-style-type: none"> <li>• Interval between messages</li> <li>• Unsolicited report interval</li> <li>• Older version present timeout</li> <li>• Custom maximum response time</li> <li>• IPv4 router alert option</li> <li>• Ignore IGMP query</li> <li>• Enable proxy reporting</li> </ul> |
|-------------|--|

### IGMPv3 Client Configurable Parameters

- |             |  |
|-------------|--|
| <b>IGMP</b> | <ul style="list-style-type: none"> <li>• Interval between messages</li> <li>• Unsolicited report interval</li> <li>• Robustness variable</li> <li>• Custom max groups per packet</li> <li>• Custom maximum response time</li> <li>• IPv4 router alert option</li> <li>• Ignore IGMP query</li> <li>• Enable proxy reporting</li> </ul> |
|-------------|--|

### IGMPv2 Querier Configurable Parameters

- |             |  |
|-------------|--|
| <b>IGMP</b> | <ul style="list-style-type: none"> <li>• Robustness variable</li> <li>• Maximum response time</li> <li>• IPv4 router alert option</li> <li>• Enable proxy reporting</li> </ul> |
|-------------|--|

### IGMP Statistics

- |   |   |
|---|---|
| <b>IGMP</b>   | <ul style="list-style-type: none"> <li>• Groups (count)</li> <li>• Sources (count)</li> <li>• (S, G) pairs</li> </ul>   |
| <b>Group latency (through QuickTest or IPTV QoE PA)</b> | <ul style="list-style-type: none"> <li>• Group join latency</li> <li>• Group leave latency</li> <li>• Group leave-join latency (channel zapping latency) – only through QoE PA</li> </ul> |

### Data Plane Statistics

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

## Applicable Standards

- RFC 2236 Internet Group Management Protocol, Version 2
- RFC 3376 Internet Group Management Protocol, Version 3
- RFC 4604 Using Internet Group Management Protocol Version 3 (IGMPv3) and Multicast Listener Discovery Protocol Version 2 (MLDv2) for Source-Specific Multicast
- RFC 4605 Internet Group Management Protocol (IGMP) / Multicast Listener Discovery (MLD)-Based Multicast Forwarding (IGMP/MLD Proxying)
- RFC 4541 Considerations for Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) Snooping Switches

## Configuration and Ordering Details

### Hardware

A N2X system is required with:

- System controller
- Chassis
- POS, ATM or Ethernet Test Cards

The E7828A IGMP emulation is supported on all N2X XR, XR-2, XS, and XS-2 interfaces.

### Software

The IGMP emulation software license can be purchased with these Software and Support Agreement (SSA) options:

- PS-S12-001 – 1-year agreement included with initial purchase
- PS-S12-102 – 1-year agreement extended to 2 years
- PS-S12-103 – 1-year agreement 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 licenses are a pre-requisite to supporting the IGMP emulation:

- E7881A or E7881B - Packets and Protocols Application Software

In order to operate IGMP over PPPoX sessions, the E7888A Access Protocols Emulation license is required in addition to the IGMP license. To operate IGMP using DHCP-assigned IP addresses, the E7887A DHCP Protocol Emulation license is required in addition to the IGMP license.

The following N2X software license includes the IGMP emulation and is considered mutually exclusive with the E7828A license:

- E7829A – DHCP, IGMP, PPPoX and L2TP emulation bundle

Your local Agilent field engineer can provide more details on how to order and configure a test system.

## 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

- N5570A IPTV Quality of Experience Productivity Application
- N5709A IGMPv3 Conformance Test Suite
- E7829A DHCP, IGMP, PPPoX and L2TP Emulation bundle
- E7886A PIM Multicast Routing Emulation Software
- E7887A DHCP Protocol Emulation Software
- E7888A Access Protocol Emulation Software
- E7897A MLD Emulation Software

## Agilent Network Tester



The Agilent Network Tester N4192A is a highly scalable and flexible solution for performance testing of Layer 4-7 devices. As a companion to N2X, the NetworkTester is able to generate real-world, stateful traffic of over 21 application protocols, including Internet data, VoD, IPTV and VoIP, enabling developers to verify the enduser experience and performance of applications running over a broadband network. Legitimate traffic can be complemented with supported DoS attacks, virus/worm simulations and traffic impairments for security and stress testing. Network Tester also supports PPPoE, 802.1x, IPsec and IPsecv6 access protocols.

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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.

## 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.

### 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.  
2660 Matheson Blvd. E  
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L4W 5M2  
1-877-894-4414

### Europe:

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(31 20) 547-2323

### United Kingdom

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### Japan:

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Printed on recycled paper

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Printed in USA October 03, 2008

5989-6940EN

