

Agilent RouterTester 900

PPPoX Protocol Software

E5152A

Technical Datasheet



Agilent Technologies' PPPoX test solution provides realistic Internet-scale simulation for testing the performance of edge aggregation devices that terminate PPPoX sessions and forward the associated IP payload across a public network like the Internet. Agilent's RouterTester platform offers an easy way for:

- **Measuring session related performance**
- **Measuring traffic related QoS parameters**
- **Functional and stress testing of PPP-enabled edge aggregation devices**
- **Integrated testing of control and data plane with PPPoE and PPPoA emulation**



Agilent Technologies

Key Features

- **Generate wire-speed IP traffic and measure QoS parameters**
- **Establish thousands of authenticated PPPoX sessions under varying conditions for stress testing the SUT**
- **Measure session capacity and session set-up and tear-down rates of the SUT**
- **Session flapping for testing the behavior of the SUT under real life network conditions**
- **Verify protocol implementations**
- **Easy-to-use GUI that quickly configures physical interfaces and protocol parameters**
- **Includes pre-defined scripts (QuickTest) for automated measurement of performance metrics**
- **Tcl Application Programming Interface speeds the creation of custom test**

Product Overview

Agilent Technologies' PPPoX test solution is ideally suited for integrated control and data plane testing. With emulation of PPP (PPPoE and PPPoA) and associated protocols (CHAP, PAP, LCP, IPCP), the fundamental test scenarios involving both the control plane and the data plane are easily achieved through the RouterTester GUI. While session scalability is important in itself, it is also important to measure the rates at which these sessions are established, especially under real-life conditions when many subscribers attempt to initiate sessions simultaneously. Equally important, once these sessions are established, it is necessary to determine that these sessions will be maintained with the desired Quality of Service (QoS) or traffic related performance. That means testing a PPPoX-enabled edge device's ability to forward traffic at a high rate with minimal packet loss.

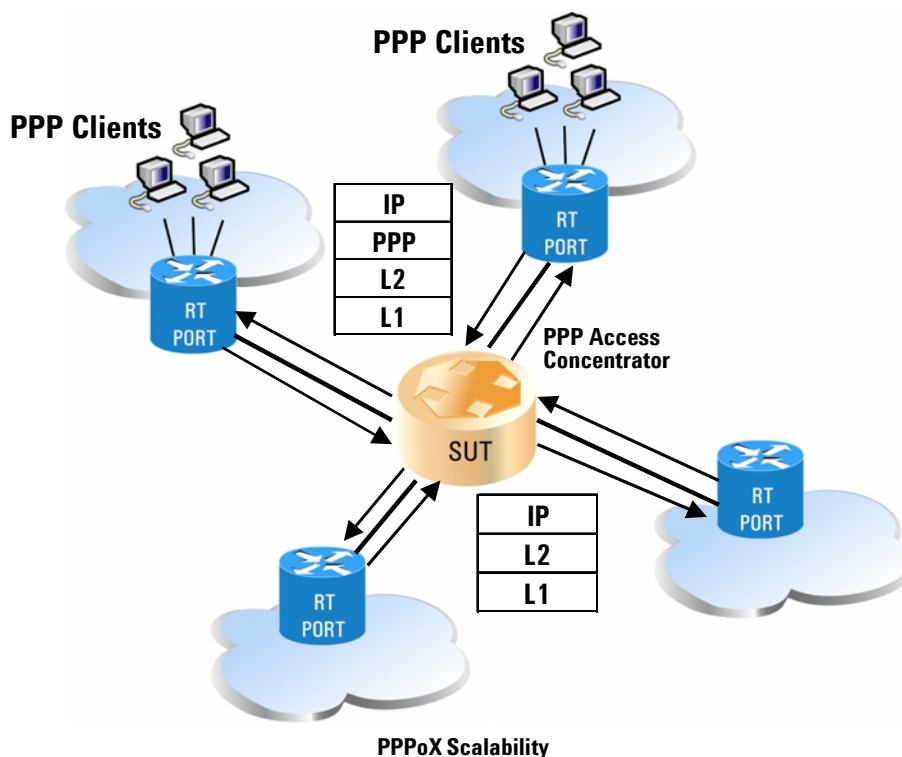
The concept of a Session Pool in RouterTester allows users to define a range of PPP clients, establish PPP sessions from these simulated clients with the SUT, and send wire-speed IP

traffic through these sessions. The ability of the SUT to forward this traffic with acceptable QoS can then be measured with a RouterTester port acting as the destination. In summary, RouterTester allows edge devices to be stressed fully to determine their performance under real network conditions involving thousands of subscribers.

Typical Test Scenario

A typical configuration for testing an edge device that acts as termination points for PPPoX sessions is shown below. PPPoX clients are simulated in two different test ports. Two test ports act as destination for receiving the IP traffic and analyzing it for measuring various QoS parameters (packet per second, packet loss, jitter). A simpler test configuration can also be used with just two test ports - one to set up the sessions and the other for receiving and analyzing the IP payload. The basic test steps are as follows:

- Remote PPPoX clients are simulated in two test ports
- The simulated clients initiate sessions with the SUT on the relevant link
- Clients respond to authentication



requests and go through various PPP establishment phases (LCP, PAP/CHAP, IPCP)

- The SUT accepts the session requests and sessions are established
- RouterTester sends IP traffic to the SUT, which in turn forwards the traffic to destination ports on RouterTester.

This scenario can be used to measure the following parameters:

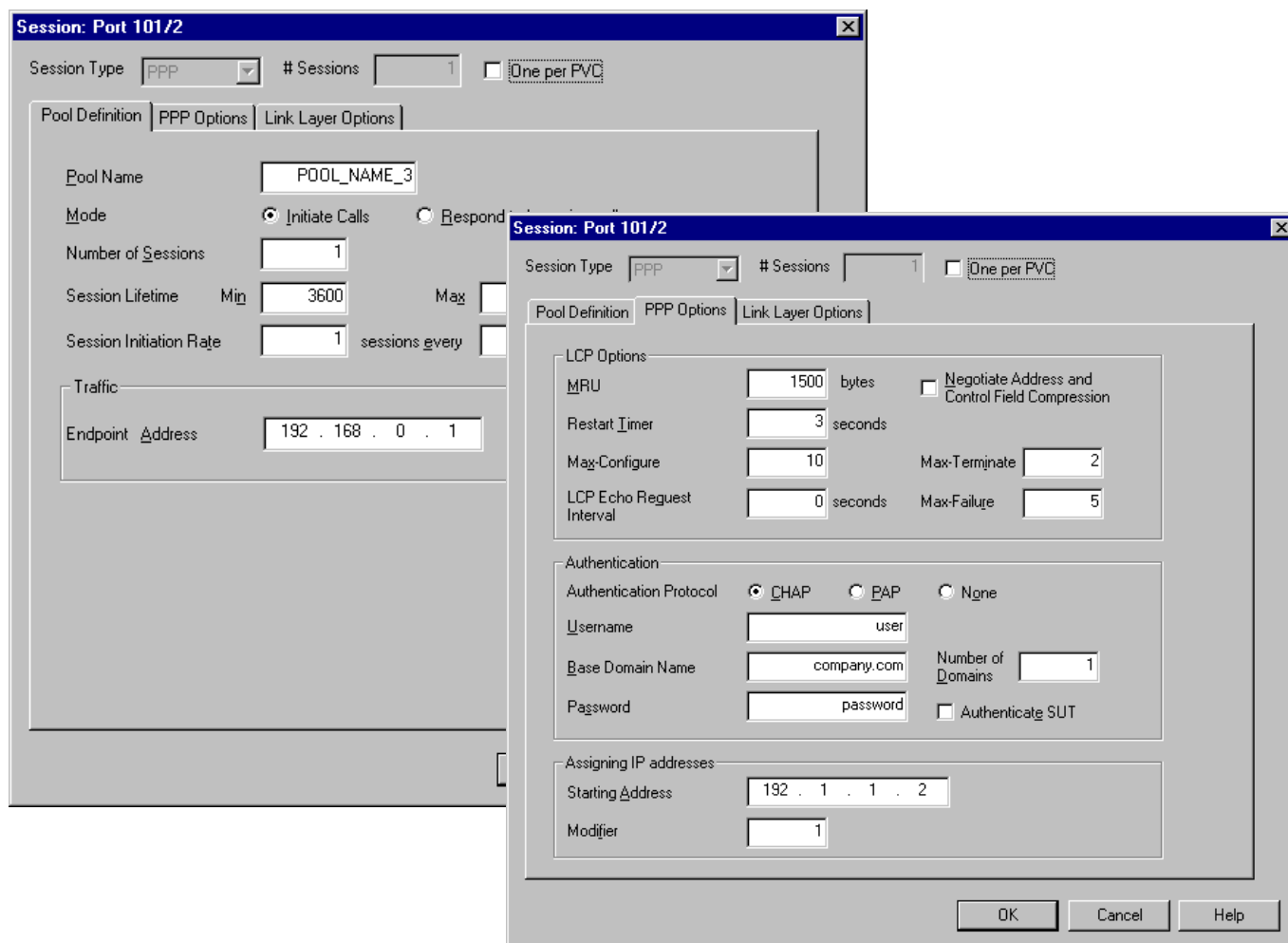
- Session capacity of the SUT
- Session set-up and tear-down rate of the SUT
- Traffic forwarding performance of the SUT

Additionally, this scenario can also be used to further stress test the SUT by initiating “session flapping”.

Product Features

Generate wire-speed IP traffic for measuring QoS

RouterTester provides an easy way to generate IP traffic on multiple interfaces to test performance limits of edge devices. The GUI guides the user to define multiple session pools with varying number of sessions per pool, select ports to be associated with each, and direct traffic stream (bursty or constant) to the ports assigned. The traffic is synchronized across multiple ports, thus allowing for real-time measurements of QoS parameters such as throughput, packet loss, and latency by intelligently correlating input to output traffic streams. For more details, please refer to the E7850A IP Performance Test Software technical datasheet.



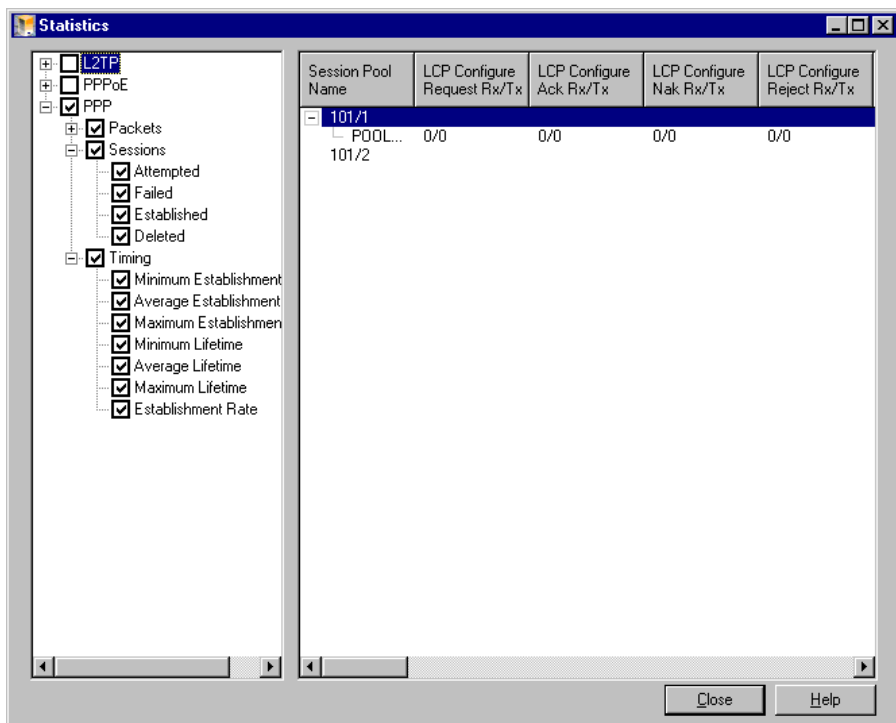
Verify and stress PPP protocol implementations

RouterTester provides an easy way to verify the robustness of the protocol implementations under various stress conditions. The PPP protocol software (RFC 1661) follows the link establishment options (LCP Phase) including CHAP/PAP (RFC 1994) authentication and establishes sessions after proper IPCP (RFC 1332) negotiation. Both PPPoE (RFC 2516) and PPPoA (RFC 2364) are supported. The tester can act as both initiator of and responder to session establishment. Additionally, the tester can generate or respond to LCP Echo Requests and keep PPP sessions alive for user-configured durations. All protocol options can be changed easily from both the GUI and the Tcl API to allow the user to set up various test scenarios:

- Establish thousands of PPP sessions and measure session set-up and tear-down rate
- Verify a SUT's ability to authenticate sessions using CHAP or PAP

- Abruptly terminate sessions to simulate link down condition and verify the ability of the SUT to handle a flood of LCP Configure Requests.
- Perform session flapping by establishing, terminating and re-establishing sessions on an iterative basis to verify the SUT's ability to manage sessions under flapping at high set-up rates.
- Set up and delete sessions to simulate dynamic changes in the network

For users who require testing of edge devices involving scenarios where PPP sessions are carried across a public network utilizing L2TP tunnels, the complete RouterTester solution involving both the PPPoX and the L2TP protocols is recommended (E5151A).



Easy-to-use graphical user interface

A single dialog displays the complete status of the router test system. Physical/link layer status and alarms are highlighted. Traffic stream definitions and statistics are displayed in real-time. The RouterTester configuration is easily saved to restore complex network and traffic simulations.

Tcl application programming interface

The Tcl-based API enables the user to create automated test sequences or pre-defined test configurations. It allows RouterTester to integrate with other instruments. Tcl scripts can run on the RouterTester System Controller, a remote PC, or Unix workstation attached to the Controller via a TCP/IP connection.

Online Help

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

Configuration

The system controller manages the test module and provides the common point of control for the multi-port test system. All test modules are connected to the system controller through a Fast Ethernet Hub.

Minimum Requirements

RouterTester

Hardware: A system controller and two test ports. Only RouterTester 900 interfaces are supported.

Software: Product Number E5152A PPP Protocol Software

QA Robot

Not Supported.

Applicable Standards

- CHAP (RFC 1994)
- IPCP (RFC 1332)
- L2TPv2 (RFC 2661)
- PAP (RFC 1334)
- PPP (RFC 1661)
- PPPoA (RFC 2364)
- PPPoE (RFC 2516)

Technical Specifications

The following protocol-specific parameters are configurable through the GUI or the Tcl.

PPP Parameters

Parameter	Type	Range	Default
MRU	Integer	1 - 65,535	1,500
Address and Control Field Compression	Boolean	True/False	False
Authentication Protocol	Enumerated	CHAP, PAP, None	CHAP
Authentication Username	String	256 characters	"user"
Authentication Domain Name	String	256 characters	"company.com"
Number of Domains	Integer	0 - 65,535	1
Authentication Password	String	256 characters	"password"
Starting IP address for IPCP address assignment	IP address	Valid IP address values	192.1.1.2
IP address Modifier for IPCP address assignment	Integer	0 - 65,535	1
Restart Timer	Seconds	0 - 999,999	3
Max-Configure	Integer	0 - 999,999	10
Max-Failure	Integer	0 - 999,999	5
Max-Terminate	Integer	0 - 999,999	2
LCP Echo Request Interval	Seconds	0 - 999,999	0

PPPoA Parameters

Item	Description
Encapsulation	Both LLC Encapsulation and VC-based Multiplexing are supported.

PPPoE Parameters

Parameter	Type	Range	Default
Number of sessions per source MAC address	Integer	1 - 65,535	1
Service Name	String	256 characters	"AGILENT"
Initial Ack Timeout	Seconds	1 - 999,999	2
Maximum Tx Retries	Integer	1 - 999,999	5

Types of Statistics

Types of Packets	Transmitted/Received
LCP (Config Req, Config Ack, Config Nak, Config Reject, Echo Request/Reply, Terminate Request Ack)	yes
CHAP (Challenge, Response, Success, Failure)	yes
IPCP (Config Req, Config Ack, Config Nak, Config Reject)	yes
PPPoE (PADI, PADO, PADR, PADT)	yes
PAP (Authentication Request/Ack/Nak)	yes
Number of sessions	Attempted, failed, set-up, deleted
Session Timing	Min, Max and Average set-up time and set-up rate
Session Lifetime	Min, Max and Average

Acronyms

API	Application Programming Interface
CHAP	Challenge Handshake Authentication Protocol
GUI	Graphical User Interface
IP	Internet Protocol
IPCP	Internet Protocol Control Protocol
L2TP	Layer Two Tunneling Protocol
LCP	Link Control Protocol
PAP	Password Authentication Protocol
PPP	Point-to-Point Protocol
PPPoA	PPP over ATM
PPPoE	PPP over Ethernet
PPPoX	PPP over Any Link Layer (ATM, Ethernet or L2TP)
QoS	Quality of Service
SUT	System Under Test
Tcl	Tool Command Language
VC	Virtual Circuit
VCI	Virtual Channel Indicator
VP	Virtual Path

This page intentionally left blank.

Agilent's RouterTester system

Agilent's RouterTester system offers a powerful and versatile test platform to address the evolving test needs of metro/edge platforms, core routers and optical switches. RouterTester provides Network Equipment Manufacturers and Service Providers with the industry's leading tools for wire speed, multiport traffic generation and performance analysis of today's networking devices.

Warranty and Support

Hardware Warranty

Agilent warrants all RouterTester and QA Robot hardware against defects in materials and workmanship for a period of 3 years from the date of delivery. Agilent further warrants that the RouterTester and QA Robot hardware will conform to specifications. During the warranty period, Agilent will, at its option, repair or replace the defective hardware. Services provided under this warranty will normally require return of the hardware to Agilent.

Software Warranty

Agilent warrants all RouterTester and QA Robot software for a period of 90 days. Agilent warrants that the software will not fail to execute its programming instructions due to defects in materials and workmanship when properly installed and used on the hardware designated by Agilent. 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 RouterTester system 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.
2660 Matheson Blvd. E
Mississauga, Ontario
L4W 5M2
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/RouterTester

