Agilent Multi-Port testers

J7254A – 1000 BASE-LX test module (1310nm)
J7255A – 1000 BASE-SX test module (850nm)

The solution for Gigabit Ethernet production testing
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Overview

The Agilent multi-port tester has been designed with the requirements of production test engineers in mind.

Powerful automation features and simplicity of use allow production unit testing applications to be developed quickly. This means that new product introductions (NPIs) are implemented faster, helping you to meet time-to-volume production targets.

This is an IEEE 802.3 frame based Layer 2 tester. It focuses on testing the integrity of Gigabit Ethernet (GbE) transmission devices for use in metro and core telecom networks. Typical target devices are optical edge devices, optical cross connects and add-drop multiplexers.

With an easy to use Layer 2 orientation, transmission test engineers can fully test GbE hardware without the need to configure complex IP and higher layer protocol parameters.

The tester sends authentic network Ethernet frame traffic to GbE interface ports on the devices under test (DUTs), simulating the typical processing of real life operation. The traffic characteristics can be flexibly tailored to meet the testing needs and tolerances for card test, system test and environmental burn-in applications.

The tester modules have a scalable architecture that allows multiple modules to be managed as a single test system. The testers’ flexible port density will satisfy almost any conceivable production test configuration. Furthermore, testers can quickly be re-deployed should your requirements change.

The GbE tester modules have four 1000 BASE-SX/LX test interfaces (Tx/Rx). Each full-duplex interface can generate and analyze Ethernet frames in real-time at wire-speed. Up to 32 multi-port tester modules can be bundled into a single system making it one of the most powerful production test solutions available.
**Key features**

**Frame-based testing**

The Agilent multi-port tester user interfaces are specifically designed for Layer 2 transmission testing. This means the tester focuses on MAC frames and the ability of the DUT to process frames to its specification and to the IEEE 802.3z standard.

Testing becomes more straightforward and productive by concentrating on the Ethernet technology. There is no need to understand and configure complex higher layer IP protocol parameters, which are not relevant to the Layer 2 requirements.

**SCPI automation**

The tester is easily integrated into existing or new production test applications using the SCPI based application programming interface (API). The text/sockets-based commands are implemented in any programming environment quickly and simply. This removes the need to manage complicated dynamic link libraries (DLLs) or create complex C++ structures. With a few commands, development engineers can build applications to setup, run, collect and clear down sophisticated tests.

A full Tcl/Tk scripting environment is also available.

**Traffic generation**

Ethernet traffic to test the DUT is easily created by configuring data streams for the tester port. Ranges of parameters are used to build different traffic profiles to suit the test of choice. For example, frame size and throughput rate loading are used to emulate different real-life traffic profiles.

**Key measurements**

The tester constantly maintains counts of key data measurements for each port. Typical examples are:

- Frames transmitted
- Frames received
- Frame loss
- Frame throughput
- FCS errors
- Runt frames
- Long frames
- Control Frames
- Latency

IEEE 802.3Q VLAN statistics and cumulative counts for all ports are also maintained for certain measurements.

**Error generation**

The tester allows errored frames to be generated on a port basis so that the error handling of the DUT can be checked. Long, short, runt and errored FCS frames are easily created.

**Graphical statistics display**

The tester’s GUI has a measurement area that displays measurements in a real-time window. It displays the raw statistics either numerically, or formatted in graphical tabular style.

**GUI online help**

An extensive online help system provides detailed user instructions for each part of the tester. Context-sensitive help from within GUI dialogs provides rapid access to relevant sections making configuration and test execution simple and fast.

**Multi-user access**

The tester allows multiple, concurrent GUI and API sessions through a standard fast Ethernet LAN connection.

The GUI and API interoperate in a complementary way so that any action initiated by the API is viewable in the GUI and vice-versa. This means that each always has a definitive view of the tester status, removing the chances of operational mistakes.
Configuration

The Agilent multi-port tester is scalable incrementally up to 32 test modules. Each GbE module has four test ports. Modules can be stacked together or mounted within a 19-inch rack. At 1U in height, the modules combine a high port density with low space utilization.

The test modules are managed by a system controller that handles all aspects of test setup, execution and clear-down. A selection of controller models comprising two rackmount and one laptop model is available to suit module support and form factor requirements.

The test modules are connected to the system controller through a Fast Ethernet hub. The high performance controller model can have two hubs daisy-chained together to handle up to 32 modules. The tester comes complete with test control, GUI and API application software for the controller and test modules.
Warranty and support

Hardware

The tester modules are warranted for a period of 1 year. If a defect is confirmed, Agilent Technologies will ship a permanent replacement, and will also pick up the faulty module.

Support

Measurement Assistance is provided for the lifetime of the product. Measurement Assistance provides phone, fax, email or web-based support from Agilent’s call-center and support personnel. This off-site, remote support is available to assist customers in making basic measurements, operating, and verifying the correct operation of the product.

Product numbers

J7254A
1000 BASE-LX tester
(1310nm SMF)

J7255A
1000 BASE-SX tester
(850nm MMF)

Ordering information

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

System specification

<table>
<thead>
<tr>
<th>Physical interface</th>
<th>Connector: 4 duplex SC connectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical interface:</td>
<td>SX Multi-mode</td>
</tr>
<tr>
<td></td>
<td>- 850 nm receiver</td>
</tr>
<tr>
<td></td>
<td>- 850 nm Class 1 laser</td>
</tr>
<tr>
<td></td>
<td>- compliant with specifications for IEEE 802.3z Gigabit Ethernet</td>
</tr>
<tr>
<td>LX Single-Mode</td>
<td>- 1310 nm receiver</td>
</tr>
<tr>
<td></td>
<td>- 1310 nm class 1 laser</td>
</tr>
<tr>
<td></td>
<td>- compliant with specifications for IEEE 802.3z Gigabit Ethernet</td>
</tr>
</tbody>
</table>

Input sensitivity:  
-18.5 dBm (min)

Average output power:  
-9.5 dBm (min)

Measurement 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  
Range: 1 second to 7 days

Sampling interval  
Range: 1 second to 1 hour

Measurement clock  
10 ns resolution
±0.5 ppm/year clock drift
3 ppm max. difference between systems

Module synchronization  
All measurements are synchronized across all modules within the test system
Negative testing frames transmit

**Runt (Ethernet frame size):**
9 to 63 bytes

**Jumbo (Ethernet frame size):**
Up to 65,535 bytes

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**Ethernet real-time transmit statistics**

**Tx Ethernet frames**
Frames successfully transmitted, including broadcast frames and multicast frames. Not including long frames or FCS errored frames.

**Max Tx Ethernet frames**
Maximum “Tx Ethernet frames” transmitted during a sampling interval.

**Tx Ethernet octets**
A count of data and padding transmitted in “Tx Ethernet frames”.

**Max Tx Ethernet octets**
Maximum “Tx Ethernet octets” transmitted during a sampling interval.

**Tx Ethernet throughout (Mb/s)**
Rate at which Ethernet payload was sent in a sampling interval.

**Max Tx Ethernet throughout (Mb/s)**
Maximum rate at which Ethernet payload was sent during a sampling interval.

**VLAN frames**
Count of VLAN frames transmitted.

**VLAN octets**
Count of VLAN octets transmitted.
Ethernet real-time receive statistics

<table>
<thead>
<tr>
<th>Metric</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rx Ethernet frames</td>
<td>Frames successfully received, including broadcast frames and multicast frames. Not including long frames or FCS errored frames.</td>
</tr>
<tr>
<td>Max Rx Ethernet frames</td>
<td>Maximum “Rx Ethernet Frames” received during a sampling interval.</td>
</tr>
<tr>
<td>Rx Ethernet octets</td>
<td>A count of data and padding received in “Rx Ethernet Frames”.</td>
</tr>
<tr>
<td>Max Rx Ethernet octets</td>
<td>Maximum “Rx Ethernet octets” received during a sampling interval.</td>
</tr>
<tr>
<td>Rx Ethernet oversize frames</td>
<td>A count of well-formed frames received that exceed 1518 octets (excluding framing bits, but including FCS octets).</td>
</tr>
<tr>
<td>Rx Ethernet runt frames</td>
<td>A count of frames which have an Octets count less than 64.</td>
</tr>
<tr>
<td>Rx Ethernet invalid FCS frames</td>
<td>A count of received frames that do not pass the FCS check. (Excluding long and short frames).</td>
</tr>
<tr>
<td>Rx MAC control frames</td>
<td>A count of MAC control frames received.</td>
</tr>
<tr>
<td>Rx Ethernet throughput (Mb/s)</td>
<td>Rate at which Ethernet payload was received in a sampling interval.</td>
</tr>
<tr>
<td>Rx Jabber frames</td>
<td>Received frames more than 1518 Octets in length with a FCS error.</td>
</tr>
<tr>
<td>VLAN frames</td>
<td>Count of VLAN frames received.</td>
</tr>
<tr>
<td>VLAN octets</td>
<td>Count of VLAN octets received.</td>
</tr>
</tbody>
</table>

3 1522 octets in the case of VLAN tagged frames.
Mechanical specifications

Size:
441 mm (width) x 390 mm (depth) x 44 mm (height)

Weight:
4.8 kg

Supply voltage:
100 - 240 Volts AC

Supply frequency:
50 - 60 Hz

Power consumption:
100 watts maximum

Input current:
< 3.0 amps RMS, measured at 85 VAC

Input protection:
Non-user serviceable, internally located 5 amp, anti-surge AC input line fuse

Inrush current:
35 amps peak (Vin = 230 VAC, one cycle, 25º C)
Current internally limited by thermistor

Power factor:
0.95 W/VA (per EN61000-3-2)

Rear connectors:
Ethernet:
  - RJ-45
Clock line connectors (input/output):
  - SMA
Event lines (input/output):
  - Twin BNC
External trigger (input/output):
  - BNC
| **Front panel LED indicators** | **Power:**  
|                               | Green when module has power |
|                               | **Status:**  
|                               | Yellow to indicate module start-up |
|                               | Green to indicate that a test application is running |
|                               | Red to indicate a module error |
| **Module:**                   | Numerical module identifier |
| **Port LED indicators**       | **Link:**  
|                               | Green when a valid optical receive signal is detected |
|                               | **Tx:**  
|                               | Green when an Ethernet Frame is transmitted |
|                               | **Rx:**  
|                               | Green when an Ethernet Frame is received |
| **Environmental operating conditions** | **Operating temperature:**  
|                               | 0˚ C - 55˚ C |
|                               | **Storage temperature:**  
|                               | -40˚ C - 70˚ C |
|                               | **Humidity:**  
|                               | 50% - 95% relative humidity from 25˚ C - 40˚ C |
Regulatory compliance

**Electrical (Electromagnetic Compliance - EMC)**

As per EN 61326-1:1997: Electrical equipment for measurement control and laboratory use.

**Emission standards**

CISPR 11:1992 + A2: 1996 (electrical disturbance): Limits and methods of measurements of electromagnetic disturbance characteristics of industrial, scientific and medical radio frequency equipment. This equipment meets Group 1, Class A limits.


EN 61000-3-3: 1994 /IEC 1000-3-3:1994, Section 3: Limitation of voltage fluctuations and flicker

**Immunity standards**

EN 61000-4-2: 1997 /IEC 1000-4-2:1995, Section 2: Electrostatic discharge test

EN 61000-4-3: 1995 /IEC 1000-4-3: 1995, Section 3: Radiated electromagnetic field test

EN 61000-4-4: 1995 /IEC 1000-4-4: 1995, Section 4: Electrical fast transient/burst test

EN 61000-4-5: 1995 /IEC 1000-4-5: 1995, Section 5: Surge immunity test

EN 61000-4-6: 1996 /IEC 1000-4-6: 1996, Section 6: Radiated electromagnetic field test

EN 61000-4-8: 1993 /IEC 1000-4-8: 1993, Section 8: Power frequency magnetic field immunity test

Optical (safety)  Complies with IEC 825/CDRH Class 1, and 21 CFR 1040 - Class 1 laser products

Applicable standards

Optical transmitter and receiver: IEEE-802z Gigabit Ethernet
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Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

Agilent Technologies

Support, Services, and Assistance

Our Promise

Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

Your Advantage

Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

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Europe: (tel) (31 20) 547 2323 (fax) (31 20) 547 2390
Japan: (tel) (81) 428 56 7832 (fax) (81) 428 56 7840
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