

# Gigabit Ethernet Testing

## MD1230B/MP1590B/CMA5000a

Select the Right Gigabit Ethernet Test Solution for Your Application



### Introduction

The explosion of Internet traffic and broadband access technologies such as multimedia applications has led to an increasing demand for bandwidth. To meet this need, service providers turn to Optical Ethernet network architectures that are purpose-built for this new data-centric environment. Optical Ethernet supports the delivery of a full suite of carrier-class Ethernet services up to 1 Gbps. Anritsu Ethernet testing products provide customers with a number of key technology benefits to handle bandwidth demands. Both the MD1230B and CMA5000a test devices are strong physical layer testing tools, with framed and unframed BER test capabilities and quality QoS test functions. Not all competitors offer a benchtop and a portable solution that feature these capabilities.

1. **PRODUCT SUMMARY.** As services diversify into triple and quadruple play, network connections employ a wide variety of methods including LAN, FTTH, ADSL, CATV, WLAN and mobile. This drives the trend towards multi-port transmission equipment and network expansion. Additionally, QoS becomes crucial for Internet and Ethernet networks that use previous best-effort protocols. The following Anritsu testing solutions meet the unique needs of various service providers.
  - A. Anritsu model: MD1230B / MP1590B. Anritsu's MD1230/MP1590B family includes the high-cost performance MU120131A/132A modules for performing multi-port high-density measurements of transmission equipment on all these types of networks. It offers these features:
    - 1) High port density for multi-port applications.
    - 2) Clock Measurements.
    - 3) BER Measurements.
    - 4) Multi-flow QoS Measurements.
    - 5) Strong Protocol emulation / decode capabilities.
    - 6) Remote scripting control capability
    - 7) Remote GUI control capability
  - B. Anritsu model: CMA5000a. The CMA5000a Gigabit Ethernet module is a powerful field-portable 10/100/1000 Mbps optical and electrical tester that facilitates field installation and maintenance of Ethernet networks. It provides all required installation verifications, including automated RFC 2544 tests – plus the unique channel statistics option to identify the root causes of network errors, not just the symptoms. It offers these features:
    - 1) Portable device with Battery backup.
    - 2) Easy to use interface – designed for quick setup & measurements.
    - 3) Strong Monitoring Channel capabilities.
    - 4) Simple Customize Report tool.
    - 5) Remote GUI control capability

2. **PHYSICAL LAYER REQUIREMENTS.** This information helps the user select the proper Gigabit Ethernet Test Solution – according to these physical layer test requirements. The following three aspects of physical layers aid in the selection of proper equipment for different network capabilities.
- A. **Network performance testing of a Gigabit Ethernet** routed network. 1000BASE-X refers to gigabit Ethernet transmission over fibre, where options include 1000BASE-SX, -LX, -BX10, or the non-standard -LH/-ZX implementations. 1000BASE-T (also known as IEEE 802.3ab) is a standard for gigabit Ethernet over copper wiring (Category 5 cable).
- 1) Anritsu model: MD1230B / MP1590B provide network performance testing of Gigabit Ethernet routed network.
    - a. MU120122A: (2) 1000BASE-T / (2) 1000BASE-X.
    - b. MU120131A: (12) 1000BASE-T.
    - c. MU120132A: (8) 1000BASE-X.
  - 2) Anritsu model: CMA5000a provides network performance testing of Gigabit Ethernet routed network.
    - a. CMA 5710: (2) 1000BASE-T / (2) 1000BASE-X.
- B. **Feature industry standard removable optics.** Optical modules are commonly available in three different categories: 850 nm (SX), 1310 nm (LX), & 1550 nm (ZX).
- 1) The Small Form-factor Pluggable (SFP) is a compact optical transceiver used in optical communications for both telecommunication and data communications applications. SFP transceivers are commercially available with capability for data rates up to 4.25 Gbps.
  - 2) SFP transceivers are designed to support SONET, Gigabit Ethernet, Fibre Channel, and other communications standards.
    - a. Anritsu model: MD1230B / MP1590B. Anritsu utilizes industry standard removable optics SFP.
      - i. MU120122A: (2) SFP 1000BASE-SX, LX, LE, & LR.
      - ii. MU120132A: (8) SFP 1000BASE- SX, LX, LE, & LR.
    - b. Anritsu model: CMA5000a. CMA5000a utilizes industry standard removable optics SFP.
      - i. CMA 5710: (2) SFP 1000BASE- SX, LX, LE, & LR.
- C. **Loopback testing.** This is a useful mode when measuring delay time by performing remote loop-back.
- 1) In the MD1230B/MP1590B Address Swap mode, frame sending cannot be performed, but resending can be performed by swapping the received-frame MAC and IP source and destination addresses, respectively. Since the return is performed by hardware, the actual time can be approximated from the round-trip time result (delay due to return trip).
  - 2) The CMA5000a Ethernet / IP address swap allows for all measurements that may be performed in loopback or point-to-point networks.
    - a. Anritsu model: MD1230B / MP1590B. Anritsu provides the ability to perform Address Swap at full line rate per port.
    - b. Anritsu model: CMA5000a. CMA5000a provides the ability to perform Address swap at full line rate per port.

3. **ETHERNET TEST REQUIREMENTS.** This information helps the user select the proper Gigabit Ethernet Test Solution – according to their Ethernet layer test requirements. The following aspects of Ethernet requirements aid in the selection of proper equipment for different network capabilities.
- A. **RFC based network performance testing** of a 1-Gigabit Ethernet routed network. RFC testing defines a specific set of tests that vendors can use to measure and report the performance characteristics of network devices. The results of these tests provide the user comparable data from different vendors with which to evaluate these devices. RFC 2889 is intended to provide methodology for the benchmarking of local area network (LAN) switching devices. It extends the methodology already defined for benchmarking network interconnecting devices in RFC 2544 to switching devices.
- 1) Anritsu model: MD1230B / MP1590B. Performs the suite of tests as defined by RFC 2544 & 2889.
  - 2) Anritsu model: CMA5000a. The CMA5000a performs the suite of tests as defined by RFC 2544, but does not perform the suite of tests as defined by RFC 2889, typical Field test requirements are in compliance to RFC 2544.
- B. **Testing across both layers 2 Ethernet and layer 3 IP Gigabit Ethernet network.** Layer 2 Ethernet (data link layer) transfers data between adjacent network nodes in a Wide Area Network (WAN) or between nodes on the same Local Area Network (LAN) segment. Layer 3 IP (Network or Internet layer) is responsible for end to end (source to destination) packet delivery, whereas the layer 2 Ethernet is responsible for node to node (hop to hop) packet delivery.
- 1) Anritsu model: MD1230B / MP1590B. Provides Layer 2 Ethernet and Layer 3 IP network testing over 1 GigE ARP, IPv4, IGMP/IPv4, ICMP/IPv4, TCP/IPv4, UDP/IPv4, RIP/UDP/IPv4, DHCP/UDP/IPv4, IPv6, IPv6 Extension Header, IPX, IS-IS, MAC Control Frame & more.
  - 2) Anritsu model: CMA5000a. Provides Layer 2 Ethernet and Layer 3 network testing over 1 GigE Ethernet EtherType II, LLC1, SNAP encapsulation IPv4.
- C. **The ability to generate and monitor multiple streams at full line rate.** Multiple stream generation is required to test Quality of Service (QoS) measurements for a Device or Network under test. The amount of data, delay, etc., of each stream can be measured to verify the quality of each service and check the priority control system.
- 1) Anritsu model: MD1230B / MP1590B. Anritsu provides the ability to generate, monitor and filter up to 255 streams at full line rate per port.
  - 2) Anritsu model: CMA5000a. CMA5000a provides the ability to generate up to 8 streams at full line rate per port. CMA5710/CMA5000a has the ability to monitor and filter packets up to 300 streams at full line rate.
- D. **The capability to capture and analyze incoming traffic at full line rate** and provide statistics, according to a set of user defined filters. As network technologies evolve and become more complicated, network analysis and fault detection become ever more important. To help network professionals build, operate and maintain their data networks, Anritsu offers Ethereal®/ Wireshark® for the MD1230B and MP1590B. The protocol decode function decodes over 300 protocols for nearly all LAN and WAN network topology.
- \* Ethereal® is registered trademarks of Ethereal, Inc.  
\* Wireshark® is registered trademarks of Gerald Comb.
- 1) Anritsu model: MD1230B / MP1590B.
    - a. Anritsu provides the ability to decode over 300 protocols at full line rate per port.
    - b. Anritsu provides 64 MB per port Buffer size.

## Conclusion

This document illustrates how Anritsu up to 1 Gigabit Ethernet testing products provide customers with key technology benefits to handle bandwidth demands. Both the MD1230B and CMA5000a test devices are strong physical layer testing tools, with framed and unframed BER test capabilities and quality QoS test functions. By outlining the Anritsu product options – and their physical layer and Ethernet test requirements, this document serves as a tool for sales professionals and their customers to understand the optimal Anritsu testing solution for each user's needs.

## ● United States

### **Anritsu Company**

1155 East Collins Blvd., Suite 100, Richardson,  
TX 75081, U.S.A.  
Toll Free: 1-800-267-4878  
Phone: +1-972-644-1777  
Fax: +1-972-671-1877

## ● Canada

### **Anritsu Electronics Ltd.**

700 Silver Seven Road, Suite 120, Kanata,  
Ontario K2V 1C3, Canada  
Phone: +1-613-591-2003  
Fax: +1-613-591-1006

## ● Brazil

### **Anritsu Eletrônica Ltda.**

Praça Amadeu Amaral, 27 - 1 Andar  
01327-010 - Bela Vista - São Paulo - SP - Brazil  
Phone: +55-11-3283-2511  
Fax: +55-11-3288-6940

## ● Mexico

### **Anritsu Company, S.A. de C.V.**

Av. Ejército Nacional No. 579 Piso 9, Col. Granada  
11520 México, D.F., México  
Phone: +52-55-1101-2370  
Fax: +52-55-5254-3147

## ● United Kingdom

### **Anritsu EMEA Ltd.**

200 Capability Green, Luton, Bedfordshire, LU1 3LU, U.K.  
Phone: +44-1582-433200  
Fax: +44-1582-731303

## ● France

### **Anritsu S.A.**

12 avenue du Québec, Bâtiment Iris 1- Silic 612,  
91140 VILLEBON SUR YVETTE, France  
Phone: +33-1-60-92-15-50  
Fax: +33-1-64-46-10-65

## ● Germany

### **Anritsu GmbH**

Nemetschek Haus, Konrad-Zuse-Platz 1  
81829 München, Germany  
Phone: +49-89-442308-0  
Fax: +49-89-442308-55

## ● Italy

### **Anritsu S.r.l.**

Via Elio Vittorini 129, 00144 Roma, Italy  
Phone: +39-6-509-9711  
Fax: +39-6-502-2425

## ● Sweden

### **Anritsu AB**

Kistagången 20B, 164 40 KISTA, Sweden  
Phone: +46-8-534-707-00  
Fax: +46-8-534-707-30

## ● Finland

### **Anritsu AB**

Teknobulevardi 3-5, FI-01530 VANTAA, Finland  
Phone: +358-20-741-8100  
Fax: +358-20-741-8111

## ● Denmark

### **Anritsu A/S (Service Assurance)**

**Anritsu AB (Test & Measurement)**  
Kay Fiskers Plads 9, 2300 Copenhagen S, Denmark  
Phone: +45-7211-2200  
Fax: +45-7211-2210

## ● Russia

### **Anritsu EMEA Ltd.**

#### **Representation Office in Russia**

Tverskaya str. 16/2, bld. 1, 7th floor.  
Russia, 125009, Moscow  
Phone: +7-495-363-1694  
Fax: +7-495-935-8962

## ● United Arab Emirates

### **Anritsu EMEA Ltd.**

#### **Dubai Liaison Office**

P O Box 500413 - Dubai Internet City  
Al Thuraya Building, Tower 1, Suit 701, 7th Floor  
Dubai, United Arab Emirates  
Phone: +971-4-3670352  
Fax: +971-4-3688460

## ● India

### **Anritsu India Private Limited**

2nd & 3rd Floor, #837/1, Binnamangla 1st Stage,  
Indiranagar, 100ft Road, Bangalore - 560038, India  
Phone: +91-80-4058-1300  
Fax: +91-80-4058-1301

## ● Singapore

### **Anritsu Pte. Ltd.**

11 Chang Charn Road, #04-01, Shriro House  
Singapore 159640  
Phone: +65-6282-2400  
Fax: +65-6282-2533

## ● P.R. China (Shanghai)

### **Anritsu (China) Co., Ltd.**

Room 2701-2705, Tower A,  
New Caohejing International Business Center  
No. 391 Gui Ping Road Shanghai, 200233, P.R. China  
Phone: +86-21-6237-0898  
Fax: +86-21-6237-0899

## ● P.R. China (Hong Kong)

### **Anritsu Company Ltd.**

Unit 1006-7, 10/F., Greenfield Tower, Concordia Plaza,  
No. 1 Science Museum Road, Tsim Sha Tsui East,  
Kowloon, Hong Kong, P.R. China  
Phone: +852-2301-4980  
Fax: +852-2301-3545

## ● Japan

### **Anritsu Corporation**

8-5, Tamura-cho, Atsugi-shi, Kanagawa, 243-0016 Japan  
Phone: +81-46-296-1221  
Fax: +81-46-296-1238

## ● Korea

### **Anritsu Corporation, Ltd.**

502, 5FL H-Square N B/D, 681  
Sampyeong-dong, Bundang-gu, Seongnam-si,  
Gyeonggi-do, 463-400 Korea  
Phone: +82-31-696-7750  
Fax: +82-31-696-7751

## ● Australia

### **Anritsu Pty. Ltd.**

Unit 21/270 Ferntree Gully Road, Notting Hill,  
Victoria 3168, Australia  
Phone: +61-3-9558-8177  
Fax: +61-3-9558-8255

## ● Taiwan

### **Anritsu Company Inc.**

7F, No. 316, Sec. 1, NeiHu Rd., Taipei 114, Taiwan  
Phone: +886-2-8751-1816  
Fax: +886-2-8751-1817

Please Contact: