

# MP1590B 10 GbE Measurements Supporting Detailed Physical Layer Analysis

– Supporting High-Quality and Reliable Networks –

## MP1590B Network Performance Tester MU150110A-008 10.3G

Network speeds are becoming increasingly faster as demand for rich-content services grows and more customers need assured high quality. Anritsu's MP1590B Network Performance Tester is a multifunction, high-performance tester supporting quality measurements of next-generation SDH/SONET, OTN, PDH/DSn, EoS, Jitter, Ethernet and IP at speeds from 1.5M/2M to 11.1G.

### 1. Introduction

Various Internet services, including voice, video, and data, require larger network capacity and higher speeds. To meet this need, access networks are now switching over to 10 GbE used in core metro networks. Assuring larger network capacity and higher speeds as well as high quality is becoming increasingly important as more customers start using rich-content network services.

Securing high-quality data transport requires function and quality evaluations of equipment and networks; performing physical layer measurements that largely affect line quality and reliability is a key theme for equipment vendors and network operators.

### 2. Applications

#### 2-1 10 GbE Physical layer measurements

To offer high-quality 10GbE equipment, 10GbE vendors are pressing ahead with R&D and manufacturing, which requires both 10GbE frame Tx/Rx tests as well as physical layer tests. In addition, even when the individual parts have no problems, sometimes compatibility and other unexpected problems can occur in the physical layer after system (network) integration, which can have a serious impact on the equipment and network reliability.

Since the MP1590B offers very powerful support for physical layer measurements, it is the perfect solution for both detailed testing at equipment R&D and manufacturing as well as for troubleshooting problems occurring in equipment and networks.

<MP1590B 10GbE Physical layer measurements>

- PCS (Physical Coding Sublayer) measurements
- LFS (Link Fault Signaling) measurements
- CRPAT (Continuous Random Test Pattern)/CJPAT (Continuous Jitter Test Pattern) BER measurements
- Unframed (without frame) measurements
- Variable transmission frequency and frequency monitor (frequency tolerance measurements)
- Optical power monitor
- Jitter measurements\*1

#### 2-2 PCS measurements for reliability and quality improvement

The 10GbE (10GBASE-R) PCS (Physical Coding Sublayer) layer uses 64B/66B coding, which has a smaller speed increase than Gigabit Ethernet, to improve the reliability of signal transmissions by scrambling and to achieve 66-bit block alignment by the synchronization header. As a result, at equipment development and manufacturing, full verification of the PCS function is linked directly with increased equipment reliability and quality.

Since the MP1590B has a full line of PCS analysis functions not found in normal Ethernet measuring equipment, it supports detailed tests at development and production and plays a key role in improving equipment reliability. In addition, easy troubleshooting of problems on real networks helps support quick network recovery.

<MP1590B PCS measurements>

- 66B pattern editing/transmission
- 66B pattern capture/decode display
- IEEE 802.3 standards test pattern error/alarm measurements
  - Square Wave, Pseudorandom, PRBS31
- PCS error insertion/measurements

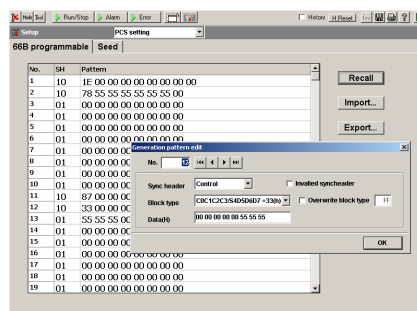


Figure 1 66B Pattern Editing Display

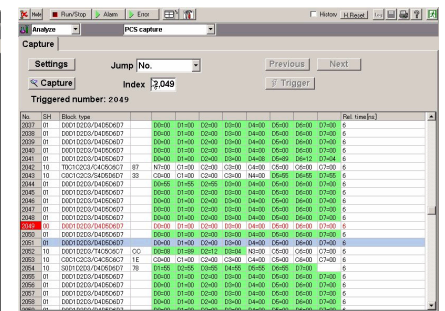


Figure 2 66B Pattern Capture Display

## 2-3 LFS function evaluation and link faults monitoring

10 GbE equipment has a link fault function called LFS (Link Fault Signalling) to announce faults on physical layers. This is a very important function.

The MP1590B LFS (LF (Local Fault)/RF (Remote Fault)) generator/detector and XGMII (10 Gigabit Media Independent Interface) data capture analysis functions support LFS function evaluation of equipments and monitoring of link faults on networks.

Moreover, the LFS (RF) automatic response function by the MP1590B confirms LFS operation using just one equipment with the MP1590B.

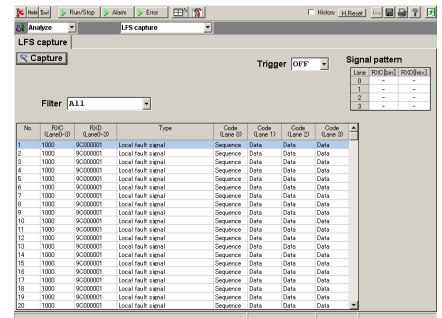


Figure 3 XGMII Data Capture Display

## 2-4 10 GbE frame quality assurance

10 GbE equipment vendors and network operators define some quality parameters to indicate the quality of the equipment and networks, such as error rate, frame loss, and frame transfer delay time. Equipment and network users make their network and service decisions based on these quality parameters, so parameter assurance by equipment vendors and network operators is very important.

The MP1590B has a full line of versatile measurement functions to evaluate 10 GbE frame quality and guarantee network performance.

<MP1590B 10 GbE frame measurements>

- Full wire rate measurements
- Stream setting/transmission
- Throughput measurements
- BER (Bit Error Rate) measurements
- Error measurements (oversize, undersize, fragments, FCS error, sequence error)
- Latency (delay time) measurements

## 3. Summary

The versatile frame and physical layer measurement and analysis functions for 10G equipment and networks supported by the all-in-one MP1590B help cut development time and manufacturing costs as well as assure fast troubleshooting to recover services as soon as possible.

## 4. Key Features (10 GbE measurements)\*2

- **PCS (Physical Coding Sublayer) measurements**
  - 66B pattern editing/transmission
  - 66B pattern capture/decode display
  - IEEE 802.3 standards test pattern error/alarm measurements
    - ◇ Square Wave, Pseudorandom, PRBS31
  - PCS error insertion/measurements
- **LFS (Link Fault Signalling) measurements**
  - LFS (LF (Local Fault)/RF (Remote Fault)) Generator/Detector
  - XGMII (10 Gigabit Media Independent Interface) data capture/decode display
  - LFS (RF) automatic response
- **CRPAT (Continuous Random Test Pattern)/CJPAT (Continuous Jitter Test Pattern) BER measurements**
- **Unframed (without frame) measurements**
- **Variable transmission frequency and frequency monitor (frequency tolerance measurements)**
- **Optical power monitor**
- **Jitter measurements \*1**
- **Full wire rate measurements**
- **Stream setting/transmission**
- **Throughput measurements**
- **BER (Bit Error Rate) measurements**
- **Error measurements (oversize, undersize, fragments, FCS error, sequence error)**
- **Latency (delay time) measurements**

## 5. Ordering Information

	Model	Name
Main frame	MP1590B	Network Performance Tester
Plug-in unit	MU150110A	Multirate Unit
Option	MU150110A-008	10.3G
Optional accessory	G0194A	1310 nm XFP Module
	G0195A	1550 nm XFP Module

\*Visit the following URL for details about the MP1590B and MU150110A:

[http://www.us.anritsu.com/products/MP1590B\\_MP1591A\\_Network-Performance-Tester\\_ARSPG\\_ARQQSidZ656.aspx](http://www.us.anritsu.com/products/MP1590B_MP1591A_Network-Performance-Tester_ARSPG_ARQQSidZ656.aspx)

\*1: Jitter measurements for 10GbE require the MU150121B, MU150124B and MU150125A. Jitter measurement only supports unframed 10.3G.

\*2: In addition to the MU150110A Multirate Unit, the MU120138A 10 Gigabit Ethernet Module is also available for 10 GbE multiport measurement.



MP1590B  
Network Performance Tester



MU150110A  
Multirate Unit