

VeEX



2008 Global Test & Measurement
Emerging Company of the Year Award

VePAL MX300

10GbE LAN/WAN and Gigabit Ethernet and Fast Ethernet Test Set

Next Generation of Metro and Carrier Ethernet Testing

VeEX™ MX300 Ethernet Transport Expert is the next generation of Core Transport and Carrier Ethernet field test equipment for Ethernet Networks carrying Voice, Data and Video.

Platform Highlights

- Intuitive presentation of measurements with test graphics
- High resolution color touch-screen viewable in any lighting conditions fitted with protective cover
- Robust, handheld chassis packed with powerful and flexible features for demanding environments and test conditions
- Optimized for field engineers or technicians installing and maintaining Ethernet networks enabling triple play services
- Ethernet connection for back office applications, workforce management and triple play service verification
- User defined test profiles and thresholds enable fast, efficient and consistent turn-up of services
- USB memory stick and FTP upload support for test result storage/file transfer
- Maintain instrument software, manage test configurations, process measurement results and generate customer test reports using the included ReVeal™ PC software
- Extend field testing time using interchangeable LiIon battery pack/s. Greater battery autonomy provided in standby mode

Key Features

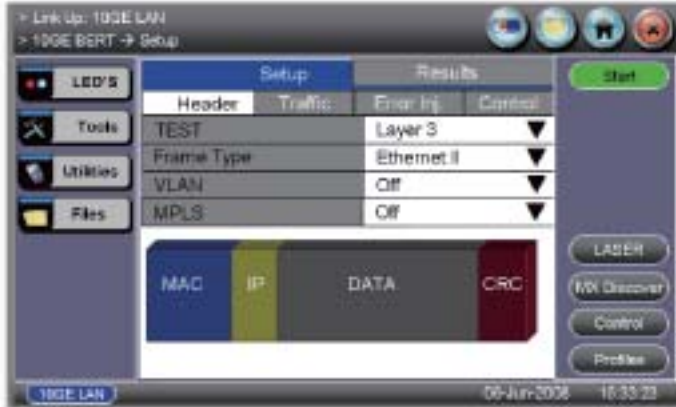
- 10GbE LAN and WAN
- One 10GbE LAN/WAN XFP port, two 1000Base-X SFP ports, and two 10/100/1000T RJ45 ports
- All-in-one 10 Gigabit Ethernet LAN/WAN, Gigabit Ethernet, and Fast Ethernet testing
- Ideal for the lab testing and field testing environments
- Throughput, latency, frame loss, and back-to-back measurements per the industry-standard RFC 2544 tests
- Unframed BER testing to validate error free fiber connections
- BER testing at layer 1, layer 2, and layer 3, with or without VLAN and MPLS tags
- Q-in-Q (VLAN stacking) capability, with up to three VLAN tags
- Multiple stream traffic generation and analysis for end-to-end QoS verification of multiple services
- MPLS stacking capability, with up to three MPLS labels
- Intelligent device discovery mode; discover other MX300s on the network for quick and easy loopback control configuration
- Smart Loop mode for layer 1, layer 2, and layer 3
- Remote control capability through the ReVeal PC software

Metro Expert

Product Features

BERT

Layer 1, layer 2, and layer 3 BER testing is supported. The BER test can be configured to use either regular PRBS test patterns, stress patterns (specifically for 10Gigabit Ethernet) or user defined test patterns to simulate various conditions. All patterns are encapsulated into an Ethernet frame to verify bit-per-bit performance of an Ethernet circuit.



Q-in-Q

For Metro and Carrier Ethernet applications VLAN stacking or Q-in-Q is supported. This feature makes provision for carrier/service provider assigned VLAN, but also retains the VLAN of customer traffic.

Smart Loopbacks

Three modes are available for looping back test traffic; layer 1, layer 2, and layer 3 mode. At layer 1 all incoming traffic is looped back unaltered. For layer 2, all incoming unicast traffic is looped back with the MAC source and destination addresses swapped. For layer 3, all incoming unicast traffic is looped back with MAC and IP source and destination addresses swapped.

Delay and Jitter Measurements

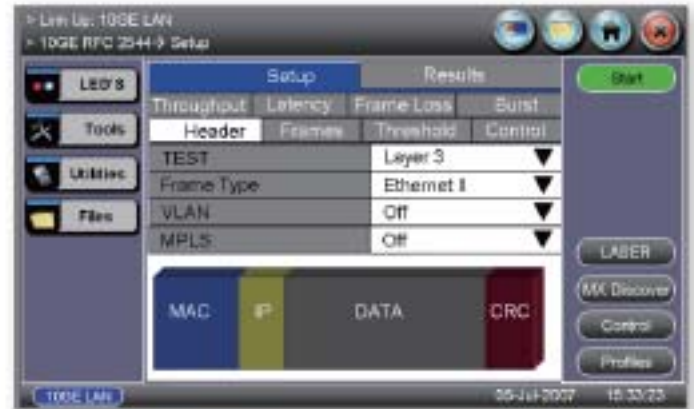
Frame Delay and Frame Delay Variation - Jitter measurements are performed on the test traffic during BER Tests or Throughput Tests.

Multiple Streams Generation

Up to 8 traffic streams can be independently configured with CoS (VLAN priority) and QoS (TOS/DSCP) prioritization. This traffic feature, simulates multiple service conditions (e.g. Triple Play), and facilitates end-to-end QoS performance verification.

RFC2544 Compliance Testing

Perform the RFC 2544 automated test suite at all recommended frame sizes including user configurable frame sizes and up to full line rate. The test suite can also be performed with the far end test partner in loopback mode or peer-to-peer mode – the latter allowing for symmetrical/asymmetrical testing. Thresholds may be configured for accurate SLA assurance and verification. The automated tests supported are throughput, latency, frame Loss, and back-to-back frames.



10GE Supported Modes

The 10GE interface supports both the 10GE LAN and 10GE WAN modes via a single XFP. All of the features available are supported in both modes. The tables below compare the LAN and WAN modes functionality and physical layer characteristics.

	10GE LAN	10GE WAN
Data Rate	10.3 Gbps	9.9 Gbps
Encapsulation	Similar to Gigabit Ethernet only 10 times faster	STM64c.0C-192c with Ethernet payload
Performance Monitoring	Limited performance monitoring ability	SDH/SONET performance monitoring ability
Compatibility	Not compatible with SDH/SONET networks	Compatible with existing SDH/SONET networks
Transport Distance	Used mainly for short distance transport networks	Used mainly for long distance transport networks

	10-Gigabit Ethernet Interface	Data Rate	Wavelength	Fiber Interface	Transmission Range
LAN	10G BASE-SR	10.3125 Gb/s	850nm	Multimode (50µm)	2 to 300m
				Multimode (62.5µm)	2 to 300m
	10G BASE-LR	1310nm	Single-mode	2m to 10km	
	10G BASE-ER		1550nm	Single-mode	2m to 30km
WAN	10GBASE-SW	9.95328 Gb/s	850nm	Multimode (50µm)	2 to 300m
				Multimode (62.5µm)	2 to 33m
	10GBASE-LW	1310nm	Single-mode	2m to 10km	
	10GBASE-EW	1550nm	Single-mode	2m to 40km	

Applications

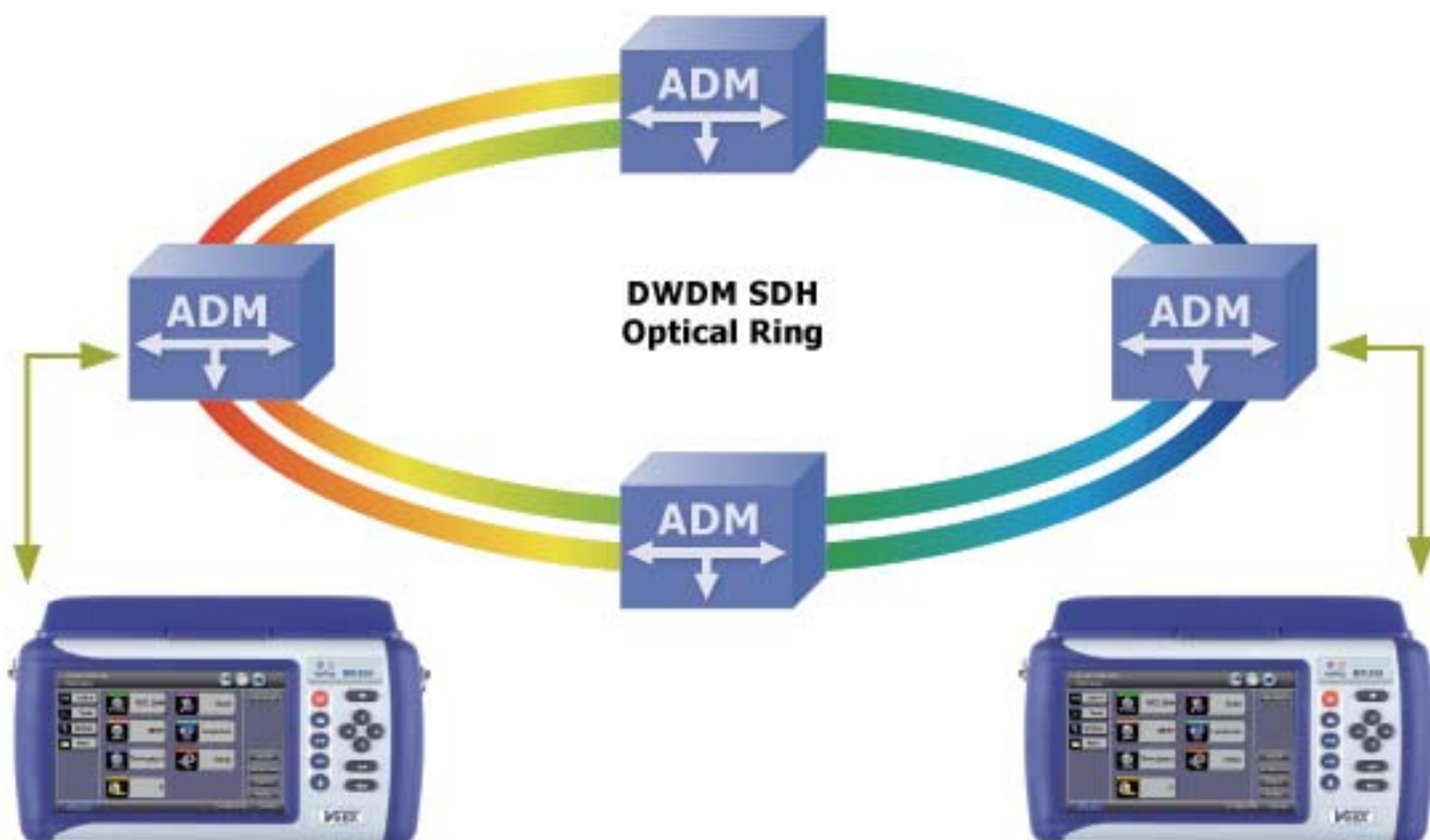
End-to-End Performance Testing

Irrespective of the Ethernet service being installed, it is always necessary to verify that the network can handle the allocated bandwidth required by the customer. Service Level Agreements (SLA) require Service Providers to measure network throughput and other performance characteristics to ensure that bandwidth associated with the types of service conform to customer expectations.



10GE DWDM-based Service Testing Application

- Perform Layer 1 Unframed BERT to verify the physical layer
- Perform Layer 2 BERT/Throughput test with valid Ethernet frames to verify end-to-end transport
- Verify end-to-end QoS parameters: throughput, frame loss, round trip delay, frame arrival delay, frame delay variation (jitter), out-of-sequence frames



BERT Testing

One traffic stream is transmitted across the network under test. Bit-per-bit error checking is performed on the received traffic. Service disruption measurements as well as CRC error checking are also performed. The BERT test can be performed with a physical loop (or plug) at the far end (for a layer 1 circuit), or a second test unit in Smart Loop mode or in Peer-to-Peer mode.

RFC 2544

A single destination stream is configured with up to 9 different frame sizes for the four recommended tests: throughput, latency, frame loss, and back-to-back. Threshold values and maximum bandwidth settings are user configurable; this allows for fine SLA verification control. The RFC 2544 test suite can be performed with a second test unit at the far end in Smart Loop mode or Peer-to-Peer mode for asymmetric testing.

Specifications

10GbE XFP Interfaces

XFP			
Optical Connector	LC	LC	LC
Wavelength	850nm	1310nm	1550nm
Optical Output Power (Rx power read)	-4 to -1.1 dBm	-6 to -1 dBm	-5 to -1 dBm
Optical Overload (min)	-1 dBm	0.5 dBm	-1 dBm
Sensitivity (min)	-11.1 dBm	-11 dBm	-14 dBm

Electrical Ethernet Interfaces

Two 10/100/1000Base-T Ports
RJ45 connector
IEEE 802.3 compliant

Optical Ethernet Interfaces

One 10GE XFP Port, LC connector
Two 1000Base-X SFP Ports
SFP, LC connector

1000Base-SX

Wavelength, 850nm
TX level: -9 to -3 dBm
RX level sensitivity: -20 dBm
Max reach: 550m
TX bit rate: 1.25 Gbps, 1.0625 Gbps, and 2.125 Gbps
RX bit rate: 1.25 Gbps, 1.0625 Gbps, and 2.125 Gbps
Jitter Compliance: IEEE 802.3
Ethernet Classification: IEEE 802.3
Eye Safety: Class 1

1000Base-LX

Wavelength, 1310nm
TX level: -9.5 to -3 dBm
RX sensitivity: -22 dBm
Max reach: 10 km
TX bit rate: 1.25 Gbps, 1.0625 Gbps, and 2.125 Gbps
RX bit rate: 1.25 Gbps, 1.0625 Gbps, and 2.125 Gbps
Jitter Compliance: IEEE 802.3
Ethernet Classification: IEEE 802.3
Eye Safety: Class 1

1000Base-ZX

Wavelength, 1550nm
TX level: 0 to +5 dBm
RX sensitivity: -22 dBm
Max reach: 80 km
TX bit rate: 1.25 Gbps, 1.0625 Gbps, and 2.125 Gbps
RX bit rate: 1.25 Gbps, 1.0625 Gbps, and 2.125 Gbps
Eye Safety: Class 1

Ethernet Features

Auto Negotiation
Full and Half Duplex
Flow Control

Modes of Operation

Terminated
Monitor
Pass through
Loopback

Traffic Generation

IEEE 802.3 and Ethernet II (DIX) frames
Configurable MAC, Ethernet Type, VLAN, MPLS, and IP fields
Constant, Ramp, and Burst traffic profiles with configurable bandwidth % utilization
Jumbo Frame Support
Fixed, multiple, and random frame size generation
Traffic prioritization via the VLAN priority field, MPLS CoS field and the IP TOS/DSCP fields
Up to 3 VLAN and MPLS tags may be added to each configurable traffic stream

RFC2544 Compliance Testing

Automated tests with configurable threshold values and maximum transmit bandwidth settings
Throughput, Latency, Frame Loss, and Back-to-back (or Burst) tests
Frame sizes: 64, 128, 256, 512, 1024, 1280, and 1518 Bytes including 2 user configurable frames

Bit Error Rate Testing

Patterns: PRBS $2^{31}-1$, PRBS $2^{23}-1$, PRBS $2^{20}-1$, PRBS $2^{15}-1$, PRBS $2^{11}-1$, CRPAT (Layer 1 only), CSPAT (Layer 1 only), CRTPAT (Layer 1 only), Normal and inverted patterns
Error Injection: Bit, CRC, Symbol, IP Checksum
One configurable stream with one fixed frame size

Traffic Filters**

Up to eight traffic filters can be configured with MAC, VLAN, and IP fields for Monitor and Loopback modes

Multiple Streams Throughput Testing**

Up to 8 independent traffic streams with configurable MAC, VLAN, MPLS, and IP fields including traffic prioritization via the VLAN tag priority field and the IP header TOS/DSCP field
% of bandwidth allocation is configurable for each stream
Different traffic profiles (constant, ramp, or bursty) may be configured for different streams
Different frame sizes are user configurable per stream

Smart Loop

Layer 1 loopback: loops back all incoming traffic
Layer 2 and Layer 3 loopback: loops back all incoming unicast traffic and drops all incoming multicast and broadcast traffic

Key Measurements

Error Measurements: Bit, CRC, symbol, IP checksum, jabber frames, runt frames, collisions, late collisions
Alarm Detection: LOS, pattern loss, service disruption
Frame/Packet Statistics: Multicast, broadcast, unicast, pause frames, frame size distribution, bandwidth utilization, frame rate, line rate, data rate, frame loss, frame delay variation

General Specifications

Size	290 x 140 x 66 mm (W x H x D) (11.40 x 5.50 x 2.60 in)
Weight	Less than 3 kg (less than 6.6 lbs)
Battery	Lilon smart battery 5200 mAh 10.8VDC
AC Adapter	Input: 100-240 VAC, 50-60 Hz Output: 15VDC, 6A
Operating Temperature	-0°C to 45°C
Storage Temperature	-20°C to 70°C
Humidity	5% to 95% non-condensing
Display	7" full color touch screen
Ruggedness	Survives 1 m drop to concrete on all sides
Interfaces	USB 2.0 , RJ45, 10/100T Ethernet, Bluetooth 2.0 (optional)
Languages	Multiple languages can be supported

Ordering Information

Z03-00-004P VePAL MX300, Portable- Ethernet Test Set

Hardware Options

Z66-00-011P Single 10GE XFP interface with LAN mode enabled.
Z66-00-012P Dual 10/100/1000T and 1000Base-X interfaces **

10GE Software Options

499-05-060 MX300 10GE WAN**
499-05-062 MX300 10GE MPLS**
499-05-066 MX300 10GE Layer 1 Unframed BERT**

10G XFP Transceiver Options

301-04-001G 850 nm 10GE XFP
301-04-002G 1310 nm 10GE XFP
301-04-003G 1550 nm 10GE XFP

Recommended Accessories

F05-00-001G LC-LC-M Patch Cord
F05-00-002G LC-LC-S Patch Cord
F05-00-003G LC-SC-M Patch Cord
F05-00-004G LC-SC-S Patch Cord

Replacement Items

A01-00-003G AC Adaptor
B02-06-001G Battery Pack
C02-00-003G Carrying Case
C03-00-001G Shoulder Strap
F02-00-001G Ethernet Cable RJ45 to RJ45 2 m (6 ft)
F04-00-001G Power Cord - US 2 m (6 ft)
F04-00-002G Power Cord - EU 2 m (6 ft)
F04-00-003G Power Cord - UK 2 m (6 ft)
Z77-00-001G Stylus (pack of 5)

** Check factory for availability



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D05-00-009P A01 2008/07