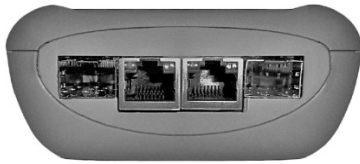


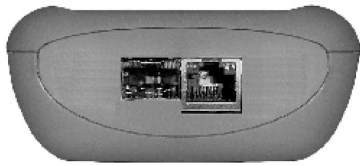
# GiLaner

## Handy Giga Ethernet Service Tester

The smallest size, the most comprehensive, the best feature/value proposition Gigabit Ethernet test set in the market, specially designed for developing Gigabit Ethernet networks, service assessment and verification.



GL-222 Dual RJ45 Electrical and SFP Optical Interfaces



GLI-111 Single RJ45 Electrical and SFP Optical Interfaces



Graphic User Interface

### Functions

- Dual 10/100/1000Base-T and 100/1000Base-X ports
- 10/100/1000 Mbps line rate Ethernet stream generation
- Layer 1 to layer 4 BER test with 8 streams per port
- IPv6 and IPv4 throughput and bandwidth performance
- ITU-T Y.1564 Service Activation Methodology (SAM)
- Independent stream configuration and measurement
- QoS analysis through VLAN/CoS and IP ToS/DSCP
- Carrier Ethernet service portfolio - PTN, PBB-TE, MPLS-TP
- Ping, trace-route, ARP/VLAN scan
- Web/FTP access/connection test
- RFC2544 benchmarking suite
- Layer 1 to layer 4 Smart loopback and remote loopback
- In-service pass through and monitoring
- Link 802.3ah OAM discovery and loopback
- Service OAM (802.1ag) performance monitoring

### Productivity

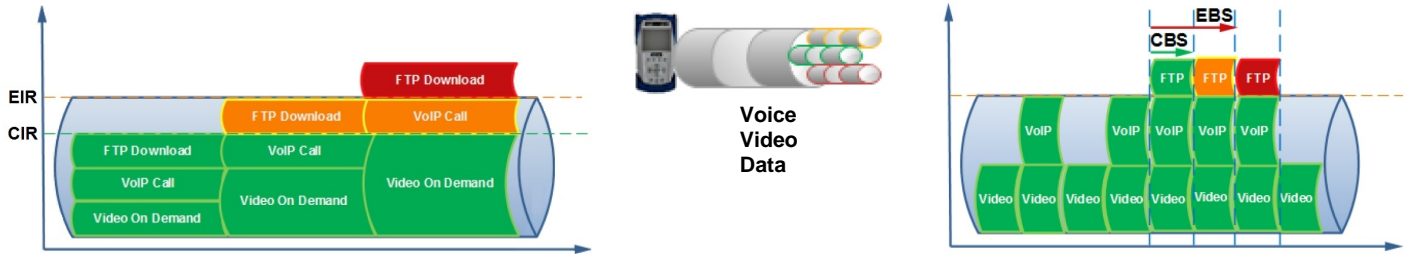
- Fast power-up time
- Bright TFT LCD and short-key operation
- Long battery life with power saving mode
- Test profiles and measurement reports
- USB interface for firmware upgrade and file transfer
- Ethernet management port
- Remote operation and back office (OSS) integration

### Integrity

- Rugged, compact and light weight
- Interoperable with other Ethernet testers
- Ethernet service performance and quality assurance
- Adoption of advanced Ethernet testing standards

## Y.1564 Service Activation Methodology

Network Configuration and Service Tests provide faster and easier verification of SLA KPIs for differentiated services validation with multiple profiles in committed information rate (CIR), extended information rate (EIR), maximum information rate (MIR). 8 independent and simultaneous services with user defined pass/fail KPI criteria in CIR, Frame Delay (FD), Frame Delay Variation (FDV), Frame Loss Rate (FLR) and Out-of-Sequence (OOS) frames.

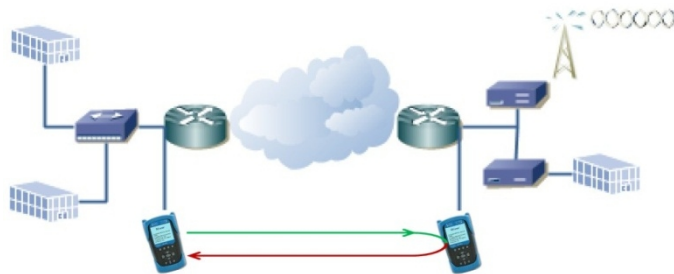


## IPv6 and IPv4 Compatibility

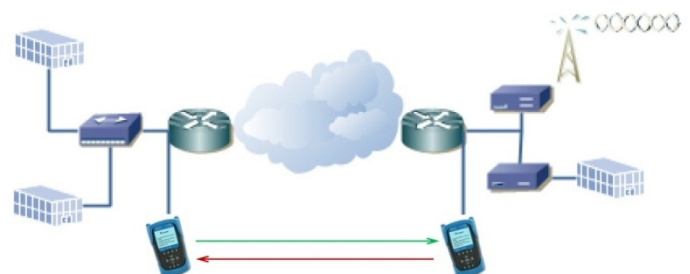
IPv6 benefits include increased address space, better mobility support, multi-homing, better network security, scoped address space, efficient routing and management. Full IPv6 configuration is supported in Throughput/BERT, Y.1564, RFC2544, Ping and DHCP testing.

## Applications

### Bidirectional or Round-trip Measurement



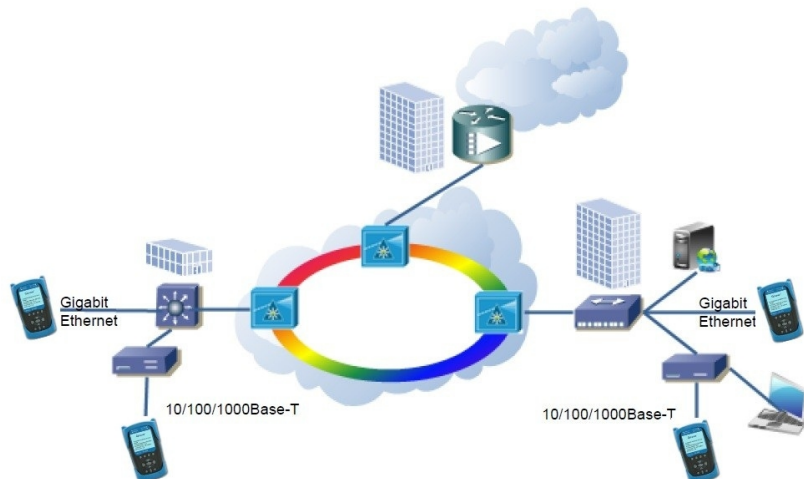
Round-trip Measurement



Bidirectional One-way Measurement

With Bit-Error-Rate (BER), ITU-T Y.1564 and RFC2544 tests, major Service Level Agreement (SLA) parameters are measured with independent stream configuration and statistics for first-time-right Ethernet service validation.

### Ethernet Services Installation, Maintenance and Emulation Testing



GL-222 validates the Ethernet services to deliver next-generation telecommunication services for business, enterprise and mobile back-haul. To ensure quality of performance, GL-222 supports various testing methodology for field technician to install, turn-up and maintain these Ethernet services.

End-to-end test between two nodes connected to the core or edge network devices in Layer 2 or Layer 3 depending on the Service Level Agreement (SLA).

## Quality of Service (QoS) and Service Level Agreement (SLA)

New and more multimedia services, such as voice, video, SMS, e-mail, gaming and online transaction, are carried over Ethernet circuits. Due to the differentiated nature and priority handling of these services, the bandwidth performance is affected by network configuration characteristics such as latency, packet delay variation, packet loss and errors. GL-222 supports up to 8 independent streams per port to represent different application services and allows simultaneous traffic generation, measurement and error injection to emulate live network performance for validation.

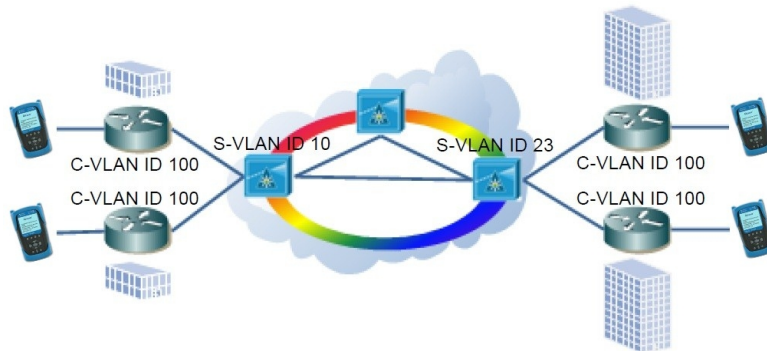
## RFC2544 Benchmarking Test Suite

Throughput, Latency, Frame Loss, Back-to-Back tests are included with user-configured bandwidth range, frame size, test duration, number of iterations and pass/fail threshold. GL-222 supports round-trip, bidirectional, symmetrical and asymmetrical RFC2544 tests. Iteration of each test can be justified with pass/fail criteria based on the threshold value. Automatic test configuration can also be saved and executed without re-configuration.

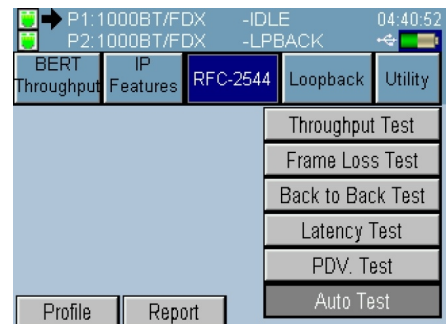
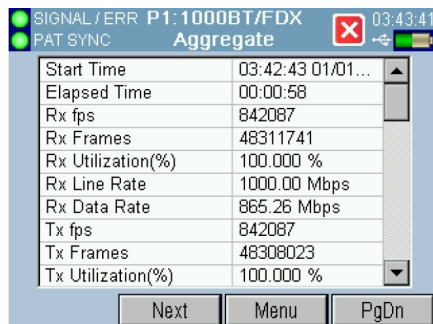
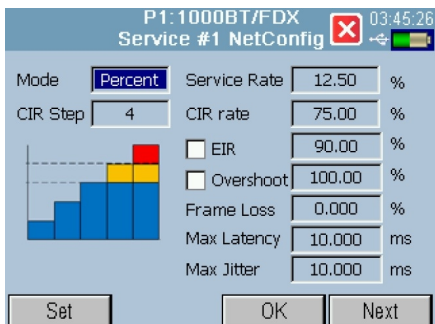
## Carrier Ethernet Transport Solution - PBB-TE (802.1ah), T-MPLS, OAM (802.3ah/802.1ag)

Packet transport network (PTN) technologies are evolved by broadband and telecom service providers worldwide to improve their network infrastructure in order to offer high and reliable bandwidth to support quality intensive services such as video, voice and critical data transactions. In-expensive and scalable Ethernet/IP convergence are expanded to the edge and Metro access network from the Core transport network. Connection-less Ethernet solution has to meet the QoS expectations without giving up the benefits of connection-oriented traditional TDM (SONET/SDH) solutions. In addition to the OAM features Implemented on GL-111/GL-222, Provider Backbone Bridge Traffic Engineering (PBB-TE) and MPLS Transport Profile (MPLS-TP) are also offered to validate differentiated Ethernet services from end-to-end and tunnelling topologies.

## Stream Prioritization - VLAN, Q-in-Q, CoS, ToS and DSCP



Various data services, such as triple-play services, are now supported over the same Ethernet network. The needs to measure and qualify SLA parameters and statistics are required to ensure the satisfaction of QoS and Quality of Experience (QoE). GL-222 stream configuration allows user-defined VLAN ID, VLAN priority (802.1p), VLAN stacking (802.1ad Q-in-Q), DiffServ, IP ToS (RFC 791) and DSCP (RFC 2475) parameters to transmit voice, video and data streams. Bandwidth throughput, latency, frame loss, packet delay variation (RFC3393) and error statistics are measured and displayed for each stream.



## Bit Error Rate Test (BERT)

Ethernet frames are carried across different physical media over long haul network in bit basis. BERT encapsulates pseudo-random binary sequence (PRBS) payload for frame-based error and bit-error-rate tests to support bit-error accuracy measurement for validation of physical layer transport systems such as DWDM, Ethernet over DWDM or dark fiber.

## Specifications

### General Specifications

Size (H x W x D)	160 x 90 x 62 mm	Operating Temperature	0° ~ 45°C (32° ~ 113°F)
LCD Display	320 x 240 TFT	Storage Temperature	-20° ~ 70°C (-4° ~ 158°F)
Power Supply	100~240VAC, 50/60Hz	Relative Humidity	5% ~ 85% non-condensing
I/O	12V DC, 1.2A	LED	Link/Activity, Power, Battery
Weight	< 800g with battery	Language	English, Chinese
USB Type	A (host)	Battery	Li-Ion rechargeable
Memory	64MB		

### Ethernet Interfaces (Two ports at 10/100/1000Base-T MDI/X and 100/1000Base-X)

#### Optical Interface – SFP, LC Connector Class 1 Laser

Type	100Base-FX	100Base-LX	1000Base-SX	1000Base-LX	1000Base-ZX
Wavelength (nm)	1310	1310	850 MM	1310 SM	1550 SM
Tx Level (dBm)	-20 ~ -15	-15 ~ -8	-9.5 ~ -4	-9.5 ~ -4	-2 ~ +3
Rx Sensitivity Level (dBm)	-31	-28	-21 ~ 0	-25.5 ~ -3	-24 ~ -3
Maximum Distance (km)	2	15	0.55	10	80
Tx/Rx Bit Rate (Gbps)	0.125	0.125	1.25	1.25	1.25
Tx Operational Wavelength Range (nm)	1280 ~ 1380	1260 ~ 1360	770 ~ 860	1270 ~ 1360	1540 ~ 1570
Frequency Accuracy (ppm)	±4.6	±4.6	±4.6	±4.6	±4.6
Optical Power Accuracy (dBm)	±2	±2	±2	±2	±2
Laser Type	LED	FP	VCSEL	FP	DFB
Auto-Negotiation and Flow Control	√	√	√	√	√
Compliance	ANSI X3.166	IEEE 802.3	IEEE 802.3z	IEEE 802.3z	

#### Electronic Interface - RJ45 UTP

Type	10Base-T	100Base-T	1000Base-T
Tx Level (dBm)	-20 ~ -15	-15 ~ -8	-9.5 ~ -4
Maximum Distance (m)	100	100	100
Tx/Rx Bit Rate	10 Mbps	125 Mbps	1 Gbps
Tx Accuracy (ppm)	±100	±100	±100
Rx Accuracy (ppm)	±4.6	±4.6	±4.6
Duplex Mode	Half and Full	Half and Full	Full
Auto-Negotiation, Flow Control and MDI/X	√	√	√
Compliance	IEEE 802.3	IEEE 802.3u	IEEE 802.3ab

### Functional Specifications

#### BERT Testing

8 streams per port, layer 1 to layer 4 user defined headers, payload, bandwidth

Configuration	Unframed, MAC source/destination address, stacked 802.1Q VLAN, 802.1p VLAN priority, LLC/SNAP, IPv6/IPv4 source/destination address, IP header (ToS, DSCP, TTL, protocol, fragment offset), layered MPLS tags, TCP/UDP source/destination port, frame size (48 - 11,000), frame size, payload, constant/ramp/burst bandwidth control (0%-100% with 0.01% resolution), continuous or timed measurement cycle.
Patterns	PRBS 2 <sup>31</sup> -1, 2 <sup>23</sup> -1, 2 <sup>20</sup> -1, 2 <sup>15</sup> -1, 2 <sup>7</sup> -1, all 1s, all 0s, user defined patterns. Normal or inverted.
Ethernet Statistics	Start/Elapse time. Per-stream and aggregate Tx/Rx line/data bit rate, utilization rate, frame count, frame rate, frame size distribution, VLAN, MPLS, broadcast, multicast, unicast, TCP/UDP, runt, jumbo (> 9K), Inter-Frame Gap (IFG/IPG) and non-test frames.
Latency Statistics	Per-stream and aggregate latency, packet delay variation, lost, pause, out-of-sequence frames.
Error Statistics	Per-stream and aggregate bit error count, bit error rate, error injected, FCS/CRC error, IP checksum, jabber, alignment, collision frames.
Error Injection	Per-stream and aggregate BIT, FCS/CRC, IP checksum error injection in count or rate.
Alarm Detection	LOS, link down, pattern synchronization/loss, error frames, out-of-service time, non-test traffic.
Q-in-Q and MPLS	3 stacked VLAN and 3 layered MPLS tags.
Asymmetrical Test	Unbalanced upstream and downstream traffic generation and measurement
MPLS-TP	MPLS-TP data traffic generation and analysis in line rate, comprehensive MPLS-TP OAM (ITU-T G.8114, Y.1731 and IETF). OAM messages generation and monitoring at pseudo wire, LSP and section. OAM Continuity Check (CC), Loopback (LB), Alarm Indication Signal (AIS).
PBB-TE	Configuration of B-MAC source/destination, B-VLAN and I-Tag (802.1ah).

#### ITU-T Y.1564 SAM (Service Activation Methodology)

Independent service stream and SLA KPIs parameters

Network Config Test	8 configuration tests in sequence, min. data rate to CIR, CIR to EIR, EIR to overshoot, QoS KPIs Pass/Fail conditions.
Service Test	8 real-life CIR service tests, QoS KPIs enforcement with committed Pass/Fail conditions.

## RFC2544 Testing

Throughput, Latency, Frame Loss Rate, Packet Delay Variation and Back-to-Back benchmarking test suite. End-to-end (bidirectional) or loopback (roundtrip) mode. Symmetrical or asymmetrical test.

Configuration	Frame sizes (48 - 11,000), bandwidth range, test duration, number of iterations, pass/fail threshold values, MAC/IP source/destination address, IP header.
Batch and Quick Mode	Automatic batch and quick mode by combining multiple tests in sequence.

## Loopback\*\*

Smart loopback with or without swapping MAC/IP source/destination address and TCP/UDP source/destination port.

Filter	User defined loopback filter parameters: broadcast, multicast, MAC/IP source/destination address, VLAN ID and priority, TCP/UDP source/destination port.
Responder Scan	IP address range scan for remote Loopback units.
Remote Loopback	802.3ah loopback, loop up/down control and respond.
Link OAM	IEEE 802.3ah connection, OAM frame statistics, active/passive discovery and Loopback control.

\*\* *FibreOptica also provides low cost remote loopback device GRL-100/200*

## Others

Event Log	Logging of critical events with timestamp like LOS, BIT errors, pattern synchronization error, frame loss, start/stop measurement time.
TCP/IP Tools	DNS client, HTTP/FTP connection test, ping, trace route (30 hops).
Ping	User defined TTL, source/destination IP/URL, gateway address, packet length, rate.
DHCP Client	Connectivity to IP network in static IP or DHCP mode.
Monitor Pass Through (GL-222 only)	In-service pass through mode for application monitoring or media conversion.
Cable Test	CAT 5/5e/6 UTP/STP cable length ( $\leq 150m$ ), open/short status.
Optical Power Measurement	SFP DDMI diagnostics of Tx/Rx power level (dBm or $\mu w$ ), wavelength, temperature, vendor name, laser bias current/voltage.
ARP Monitoring	Interception of ARP spoofing/attack/poison and IP conflict. Active defence. ARP cache protection. Attacker trace.
VLAN Scan	VLAN ID and priority discovery.
Port Flashing	Remote port LED flashing to identify network device wiring.
Profile and Report	16 configuration profiles and 80 CSV report files to be saved, loaded, and transferred to/from non-volatile or USB memory.
USB Interface	Firmware upgrade, configuration profiles and report files transfer.
Management	RJ-45 port 1 can be used for firmware upgrade, file transfer and remote control.

*Note: Specifications subject to change without notice*

## Ordering Information

GL-111	Single-port 10/100/1000Base-T and 100Base-X/1000Base-X handheld Gigabit Ethernet tester. Includes AC adapter, user's manual, carrying case and one-year warranty in hardware, software and battery.
GL-222	Dual-port 10/100/1000Base-T and 100Base-X/1000Base-X handheld Gigabit Ethernet tester. Includes AC adapter, user's manual, carrying case and one-year warranty in hardware, software and battery.

## Options

GL-100X	100Base-FX and 100Base-LX support
GL-PTN	Packet Transport Network option includes PBB-TE and MPLS-TP feature set
GL-MON	Pass through monitoring mode support
GL-VoIP	VoIP (SIP) testing and analysis (4 simultaneous calls)
GL-IPTV	IPTV testing and analysis (10 simultaneous streams)
GL-IPv6	IPv6 test suite

## Accessories

PA-1000SX	Optical SFP transceiver module, 850 nm, MM, LC, 1.25 Gbps, 500 m reach
PA-1000LX	Optical SFP transceiver module, 1310 nm, SM, LC, 1.25 Gbps, 10 km reach
PA-1000ZX	Optical SFP transceiver module, 1550 nm, SM, LC, 1.25 Gbps, 90 km reach
PA-100FX	Optical SFP transceiver module, 1310 nm, MM, LC, 125 Mbps
PA-100LX	Optical SFP transceiver module, 1310 nm, SM, LC, 125 Mbps
PA-MLCLC6	Optical patch cord, LC-LC duplex, SMF, 6 ft.
PA-SLCLC6	Optical patch cord, LC-LC duplex, MMF, 62.5/125 $\mu m$ , 6 ft.
PA-CAT5E	CAT5e cable, 100 $\Omega$ , RJ-45(M)-RJ45(M), 6 ft.