



LDU 50W™

*Tollgrade's LDU 50W provides **best-in-class** loop and higher layer xDSL service testing for triple-play services.*

The LDU 50W provides best-in-class physical loop and higher layer xDSL service testing for triple play services served from traditional switched networks, broadband DSLAMs, or IP-based Fiber-To-The-Node (FTTN) networks. The LDU 50W supports full Tollgrade Test System OSS physical loop, and broadband DSL layer 1-7 test functions, enabling network operators to reduce the cost of provisioning and maintaining voice, broadband Internet, and video services over copper from a single test head.

The LDU 50W is designed as a two module enclosure. The high-frequency enhanced Loop Test Module (LTM+), residing in the left hand slot, provides the Tollgrade Test OSS physical line test functions, while the ICE™ Services Test Module (STM), residing in the right hand slot, provides the broadband services fault isolation functions.

Once provisioned, the LDU 50W can verify the services from the Class 5 switch and the DSLAM, the point in the network that most precisely reflects the experience of the customer. In addition to providing a broad set of diagnostic tools at every layer, the LDU 50W fully emulates the subscriber and operator's network, allowing for smart dispatch decisions—either out to the subscriber premises or into the network.

LDU 50W Benefits

LDU 50W, with Tollgrade's Test OSS, allows IP triple play service providers to:

- » Maximize service offering through pre-qualification
- » Verify service prior to cutover, increasing subscriber's satisfaction while minimizing costly dispatches
- » Proactively identify network issues and faults prior to subscriber trouble reports
- » Reduce trouble ticket volume and handling time via front-end handling and flow through
- » Minimize costly dispatches through expert trouble analysis

LDU 50W Features

The LDU 50W delivers PSTN, xDSL, VoIP and IPTV service assurance from network Class 5 switch and DSLAM locations. It offers a full suite of multilayered capabilities—all controlled via the Tollgrade Test System OSS—including:

POTS/ISDN Demand Testing:

- » Fault isolation to dispatch segment (Exchange, Network or Customer)
- » Cable length and balance
- » Termination detection for network termination devices
- » Hazardous Voltage Detection
- » Electronic monitoring/busy detection



LDU 50W Features (cont'd)

Extended Testing:

- » Pull and Break Dial Tone tests
- » Pair ID

Routine Testing:

- » DN/EN parametric batch testing
- » DN/EN parametric routine testing

Enhanced Voice Testing:

- » Electronic Ringer Detection
- » Enhanced Receiver Off-Hook Detection
- » Integrated routing testing

Wideband Testing with TAM Access:

- » Far end balance
- » FDR for fault location
- » PSD measurements
- » Double-ended handheld testing*
- » 'Golden' DSLAM port for CPE/DSLAM modem verification*

Supported OSS Features

Service Qualification Testing:

- » Bulk qualification testing
- » 'Speed binned' qualification results for supporting multiple services such as ADSL, ADSL2, VDSL, IPTV and VOIP

Service Performance Testing:

- » DSL fault isolation to dispatch segment (Exchange, Network, or Customer)
- » Real-time broadband performance qualification
- » Transmission capability analysis including signal loss and noise susceptibility
- » ATU-C/R detection*

Extended Signature Testing:

- » Signaturized and non-signaturized CO Splitter detection
- » Load coil identification

Broadband DSL Support

Network Service Assurance:

- » Synchronization of xDSL DSLAM and CPE modems
- » ATM connectivity to emulate actual network facilities
- » Verification of PPPoE, PPPoA, and IpoA authentication

IP Service Assurance:

- » IP connectivity and verification of layer 4-7 service performance

VoIP Service Assurance:*

- » Set-up two-way VoIP call to verify call quality and connectivity
- » Subscriber emulation to authenticate subscriber on VoIP network
- » Proactive trouble isolation

Specifications

PHYSICAL

Size (H x W x D): 44.5 x 444.5 x 267 mm
Weight: <4 kg (with modules)
Horizontal rack mount, 19"/23"/ETSI bracket options

ENVIRONMENTAL SPECIFICATION

Operating Temperature:.....-40° to +75°C ambient
Storage Temperature:.....-40° to +70°C ambient
Humidity: 5 to 95% (non-condensing)

POWER REQUIREMENTS PER MODULE

Power:.....-48VDC (15 watts)
Fusing:2A

COMMUNICATIONS AND TEST INTERFACES

10/100 Base-T Ethernet Communications
RS-232 Craft Port
4-wire test bus for metallic narrowband/wideband and xDSL higher layer look-in/look-out testing

CERTIFICATIONS

CE Mark, UL 60950-1, EN 60950-1, EN 55022 (CISPR22)
EN 300 386, FCC Part 15, ETSI 300-019-1-3 Class 3.4 compliant

LTM+

DRIVE VOLTAGES

Low range

DC: -10 to +10 VDC, ± 100 mV
AC: 0 to 7 Vrms, ± 100 mV
10 Hz – 100 kHz

High range

DC: 0 V to ±180 VDC, ±2 V
AC: 0 V to ±180 VAC, ±2 V, 0 - 100 Hz
Source Impedance: 100 Ω, 600 Ω, 10 k Ω

TRANSMISSION MEASUREMENTS

Transmit Level: -40 to +10 dBm, 1 dBm steps
Frequency: 10 Hz to 17 MHz (-10 to 10V peak)
10 Hz to 100 Hz (180 VAC)
Measurement Level: -40 to +13 dBm
Frequency: 10 Hz to 17 MHz
Detects frequency, amplitude, phase and cadence
Loop Termination Impedance: 100Ω/200Ω
600Ω/1200Ω, 10KΩ/20KΩ

MEASUREMENT ACCURACY

Range Accuracy

DC Voltage

0 to 10 V ± 1%
10 to 100 V ± 1%
100 to 622 V ± 5%

AC Voltage (RMS)

0 to 7 V ± 2%
7 to 70 V ± 2%
70 to 440 V ± 5%

Resistance

100 to 1 kohm ± 5%
1 k to 10 kohm ± 2%
10 k to 100 kohm ± 2%
100 k to 1 Mohm ± 5%
1 M to 2 Mohm ± 10%

Capacitance

10 nF to 1 fF ± 3%
1 fF to 100 fF ± 3%

Above line test measurements returned for A-B [Tip-Ring], B-A [Ring-Tip], A/B-Earth [Tip/Ring-Ground], A/B-Battery Tip/Ring-Battery].

ICE STM

DSL COMPATIBILITY

g.992.1-g.992.5 (ADSL, ADSL2+, ReADSL)
g.993.1-g.993.2 (VDSL2)

XDSL TESTING

XTU-C synchronization, XTU-R synchronization

ATM TEST SUPPORT

Set-up ATM PVC connection during testing
ATM F5 loopback requester
ATM F4/F5 loopback responder

IP TEST SUPPORT (SUBSCRIBER)

User authentication/IP address assignment on all tests
[PPPoE, PPPoA, IpoA]
PING (standard ICMP)
Traceroute
FTP Throughput
HTTP Throughput
HTTP Connectivity

IP TEST SUPPORT (ISP EMULATION)

User authentication/IP address assignment on all tests
[PPPoE, PPPoA]
DNS Resolution
HTTP Connectivity
FTP Throughput
HTTP Throughput

ACTIVE VOIP TESTING*

Protocols: SIP, RTP, RTCP
Call Quality Impairments: Delay, Loss, Jitter, MOS
Reporting: XR reporting capabilities
User Authentication: IEEE 802.1q
Class of Service: IEEE 802.1p

*Future application - contact Tollgrade for availability

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