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Test & Measurement

- sales
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Complimentary Reference Material

This PDF has been made available as a complimentary service for you to assist in evaluating this model for your testing requirements.

TMG offers a wide range of test equipment solutions, from renting short to long term, buying refurbished and purchasing new. Financing options, such as Financial Rental, and Leasing are also available on application.

TMG will assist if you are unsure whether this model will suit your requirements.

Call TMG if you need to organise repair and/or calibrate your unit.

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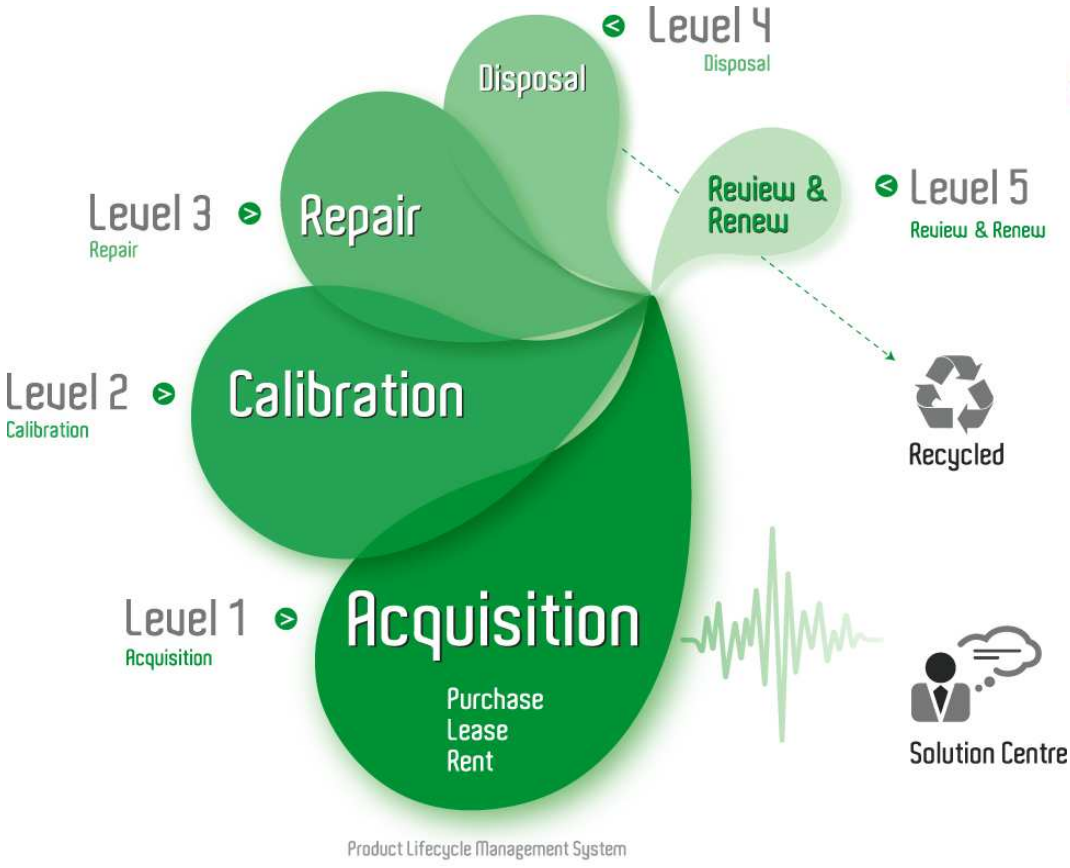

DLS 400

DLS 400HN

ADSL & HDSL Wireline Simulator

Specifications

The DLS 400HN is the latest DLS TestWorks simulator to address the growing xDSL market. As with its predecessor it simulates industry standard test loops to evaluate the performance of xDSL technologies. The unit is available in 3 models, each covering a different loop set:

DLS 400H: Simulates all the loops necessary for testing to ANSI HDSL and HDSL2 specifications. It also includes an extended 26 gauge reach loop, variable from 0 to 18 kft.

DLS 400N: Simulates all the loops necessary for testing to North American ADSL specifications, covering both ANSI and ITU G.Lite loops. It includes an extended 26 gauge reach loop, variable from 0 to 18 kft. It also includes 5 TR 30.3 loops for evaluating the interaction of DSL modems and voiceband products.

DLS 400HN: Combines the loops of both the DLS 400H and the DLS 400N into one single chassis.

All units simulate a single twisted pair cable with the accuracy users have come to expect from the DLS 400 series of simulators. Each can also accommodate up to 2 optional Noise and Impairment Modules.

Description

Technology:	Cable simulation using networks of discrete R, L & C components.
Cable simulated:	Balanced twisted copper pair.
Cable impedance:	Complex, varies over frequency with length and gauge.
# of conductors:	2.
Types of cables:	22, 24 & 26 AWG PIC cables as specified in Bell Pub 62310.
D.C. Rating:	up to 300 VDC, between tip and ring, 100 mA (150 mA peak)
Bandwidth:	D.C. to 2.0 MHz.
Accuracy:	For the specified bandwidth; ±0.5 dB for all attenuations up to 20 dB, for attenuation from 20 to 70 dB the tolerance is within 5% of design to a maximum of 1.5 dB.

DLS TestWorks

DLS 400HN Loop Coverage

DLS 400H

BYPASS	CSA #1
VARIABLE	CSA #2
	CSA #3
15 KFT 24 AWG	CSA #4
12 KFT 24 AWG + TAP	CSA #5
18 KFT 26 AWG	CSA #6
15 KFT 26 AWG + TAP	CSA #7
	CSA #8
	EXT-CSA #9
	EXT-CSA #10

As per ANSI Technical Report on HDSL, and Draft for HDSL2 Standard.

DLS 400N

BYPASS	CSA #4	ANSI #1	EIA #1
VARIABLE	CSA #6	ANSI #2	EIA #2
15 KFT 24 AWG	CSA #7	ANSI #5	EIA #3
12 KFT 24 AWG + TAP	CSA #8	ANSI #7	EIA #4
18 KFT 26 AWG	MID-CSA #6	ANSI #8	EIA #5
15 KFT 26 AWG + TAP		ANSI #9	
		ANSI #13	
		MID-ANSI #7	

As per ANSI T1.413 Specification, ITU–T G.992.2 (G.lite) Specification and EIA Specifications.

DLS TestWorks

DLS 400HN

BYPASS	CSA #1	ANSI #1
VARIABLE 24 AWG	CSA #2	ANSI #2
15 KFT 24 AWG	CSA #3	ANSI #5
12 KFT 24 AWG + TAP	CSA #4	ANSI #7
18 KFT 26 AWG	CSA #5	ANSI #8
15 KFT 26 AWG + TAP	CSA #6	ANSI #9
	CSA #7	ANSI #13
EIA #1	CSA #8	MID-ANSI #7
EIA #2	EXT-CSA #9	
EIA #3	EXT-CSA #10	
EIA #4	MID-CSA #6	
EIA #5		

As per ANSI T1.413 Specification, ITU–T G.992.2 (G.lite) Specification and EIA Specifications.

Impairments Generators

The DLS 400HN consists of seven discrete generation sections. The features associated with one generator operate independently of the others. However, the options within a section can only be activated one at a time. The seven sections are:

- White noise generator
- 2 x low frequency (500 kHz) NEXT PSD generator
- 1 x high frequency (2.0 MHz) NEXT PSD generator
- Shaped noise generator
- Powerline related noise
    - Metallic Noise
    - Longitudinal Noise
- Impulse Noise

The output circuit is balanced with a minimum Thevenin impedance of 4000 ohms over the range 50 Hz to 2.0 MHz.

White Noise Generator

Level: –85.0 to –140.0 dBm/Hz, variable in 0.1 dB steps

Form: Gaussian amplitude distribution to 5 sigma

Bandwidth: 50 Hz to 2.0 MHz

Crosstalk Generators A and B

Level: Levels are varied in 0.1 dB steps over a range from 6 dB below the 1 disturber level to 6 dB above the 49 disturber level. The absolute power associated with each will vary according to the NEXT PSD shape selected. The minimum level of any point on a shape is –130 dBm/Hz.

Power: The total power of each shape is accurate to within ±0.5 dBm

Accuracy: Each shape will track the reference shape to within ±1.0 dB, down to a level 45 dB below the peak. Each reference may deviate its null frequencies by ±5.0%.

Shapes: The following shapes are available in Generators A and/or B:

- ANSI T1.601 - 320 KHz bandwidth
- ANSI HDSL Technical report – DSL Next
- ANSI HDSL Technical report – HDSL Next
- ANSI T1.413, Issue I – ADSL Next
- ANSI T1.413, Issue II – ADSL upstream NEXT
- ANSI T1.413, Issue II – ADSL upstream FEXT (9 kft, 26 AWG)
- ANSI Proposed Working Draft for HDSL2 Standard – HDSL2 downstream NEXT (H2TUC)
- ANSI Proposed Working Draft for HDSL2 Standard – HDSL2 upstream NEXT (H2TUR)
- ITU Standard for G. Lite – FDM ADSL downstream NEXT
- ITU Standard for G. Lite – FDM ADSL downstream FEXT (13.5 kft of 26 AWG)
- ITU Standard for G. Lite – ADSL upstream FEXT (13.5 kft of 26 AWG)
- ITU-T Standard for G.Lite – Euro-K

Crosstalk Generator C

Level: Levels are varied in 0.1 dB steps over a range from 10 dB below the 1 disturber level to 10 dB above the 49 disturber level. The absolute power associated with each will vary according to the NEXT PSD shape selected. The minimum level of any point on a shape is –130 dBm/Hz.

Power: The total power of each shape is accurate to within ±1.5 dBm

Accuracy: Each shape will track the reference shape to within ±1.0 dB, down to a level 40 dB below the peak. Each reference may deviate its null frequencies by ±5.0%.

Shapes: The following shapes are available in the High Frequency Crosstalk Generator C:

- ANSI T1.413, Issue I - ADSL FEXT
- ETSI ETR 328 – Model A
- ETSI ETR 328 – Model B
- North American 1.544 MBps T1
- International 2.048 MBps AMI
- ANSI T1.413, Issue II – T1 (AMI) NEXT
- ANSI T1.413, Issue II – EC ADSL downstream NEXT
- ANSI T1.413, Issue II – FDM downstream FEXT (9 kft, 26 AWG)
- ITU Standard for G.lite – EC ADSL downstream NEXT
- ITU Standard for G.lite – FDM ADSL downstream NEXT

Shaped Noise Generator

This section is used to generate a series of discrete tones. Its main application is to generate either the shaped noise called for in both the ETSI ISDN and HDSL recommendations or the 10 discrete tones called for in ETSI ETR 328.

Noise: Shaped to either ETSI, ISDN, ETSI HDSL or FTZ 1TR 220

Level: –10.0 to +20.0 dB relative to the published reference level

“10 Tone”: As per ETSI ETR 328

Level: –20.0 to +20.0 dB relative to the published reference level

Impulses

Types: This generator produces 7 different impulses. 4 are standard multi-level (unipolar + & -, bipolar, 3-level), 2 are complex as per ANSI T1.413 Annex “C”, and one is the ETSI Cook pulse.

Timing: The duration of the 4 multi-level impulses can be varied between 20 and 120 microseconds in 1 microsecond steps.

Levels:

Multi-level:	0.5 to 100.0 mVolts, 0.1 mV steps
ANSI:	5.0 to 100.0 mVolts, 0.1 mV steps.
Cook:	–20 to +6 dB relative to the reference, 0.1 dB steps

Powerline Related Metallic Noise

Type: Dual tones as per ANSI T1.601

Level: –15.0 to +9.0 dB relative to ANSI reference levels, 0.1 dB steps

Longitudinal Noise

Type:	Triangular waveform
Frequency:	50 or 60 Hz
Level:	0–60 Volts RMS at 60 Hz. 0-50 Volts at 50 Hz, 1 volt steps using external balanced transformer

Externally Generated Signals

In addition to the generators, this section conditions externally-generated signals, and applies them to the line.

Frequency:	50 Hz to 2.0 MHz at all levels up to –30 dBm.
	1 kHz to 2.0 MHz at levels up to –10 dBm.
Input:	50 ohm BNC
Output:	External signals are attenuated by 20 dB and summed with other noise signals and injected through the standard output circuit.

Mechanical

Construction:	Main chassis plus plug-in controller and noise modules.
Connectors:	Bantam jacks and 3-pin balanced CF for differential output. 2-pin terminal block for longitudinal output. BNC connector for external signals input.

IEEE 488 Remote Control

The unit can be controlled via an IEEE 488 interface. The unit supports the following functions:

- Listener
- Talker
- Local Lockout
- Serial Poll
- Selective Device Reset
- Bus Reset
- Primary Addressing from 0 to 30

RS-232 Remote Control

The unit can be controlled via an RS-232 serial interface. The unit is configured with 9600 bps baud rate, no parity, 8 data bits per character, 1 stop bit and RTS/CTS hardware flow control.

System

NSA 400 Chassis

- NSA 400 Control Software
- Manual
- Power cord
- 2 fuses

Options

National Instruments GPIB-PCII / ZZA interface card.

Electrical

AC Power

Rated Input Voltage	100–240 VAC (±10%) (Automatic line voltage sensing)
Rated Frequency:	50–60Hz.
Rated Power Consumption:	120VA max
Line Fuses:	Type "T" 2A/250V SLOW BLOW (2 required, 5mm x 20mm)

Environmental

Operating Temperature:	+10°C to +40°C.
Storage Temperature:	+10°C to +40°C.
Humidity:	90% (non-condensing) max.

DLS TestWorks products are designed and manufactured in very strict accordance with national and international telecommunications standards.

DLS400HN/Specifications/Revision 2
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