

# DLS 400HE

## SPECIFICATIONS

The DLS 400HE is a two wire ETSI HDSL / ETSI SDSL / ITU-T G.shdsl cable simulator which can be equipped with up to two xDSL DLS 5A01 Impairment Generator Modules. The DLS400HE is offered in three pre configured versions designed to provide an effective partial or complete solution for the simulation of ETSI HDSL & SDSL.

As with other Spirent Communications DLS Systems wireline simulators, wireline length, line configuration, and various noise impairments are set using the IEEE 488 or the RS-232 interface. The command language used is based on the Standard Commands for Programmable Interfaces (SCPI) standard (a subset of IEEE 488.2 (GPIB)).

### DLS 400HE System Configurations:

System	Simulation Strategy	Description	Hardware Implication
DLS 400HE	Testloop based	Covers testloops 1 – 7. Comprised of DLS 400HE1 and DLS 400HE2 systems	3 chassis system
DLS 400HE1	Testloop based	Covers testloops 1 – 4, 6 & 7	1 chassis system
DLS 400HE2	Testloop based	Covers testloop 5 only	2 chassis system

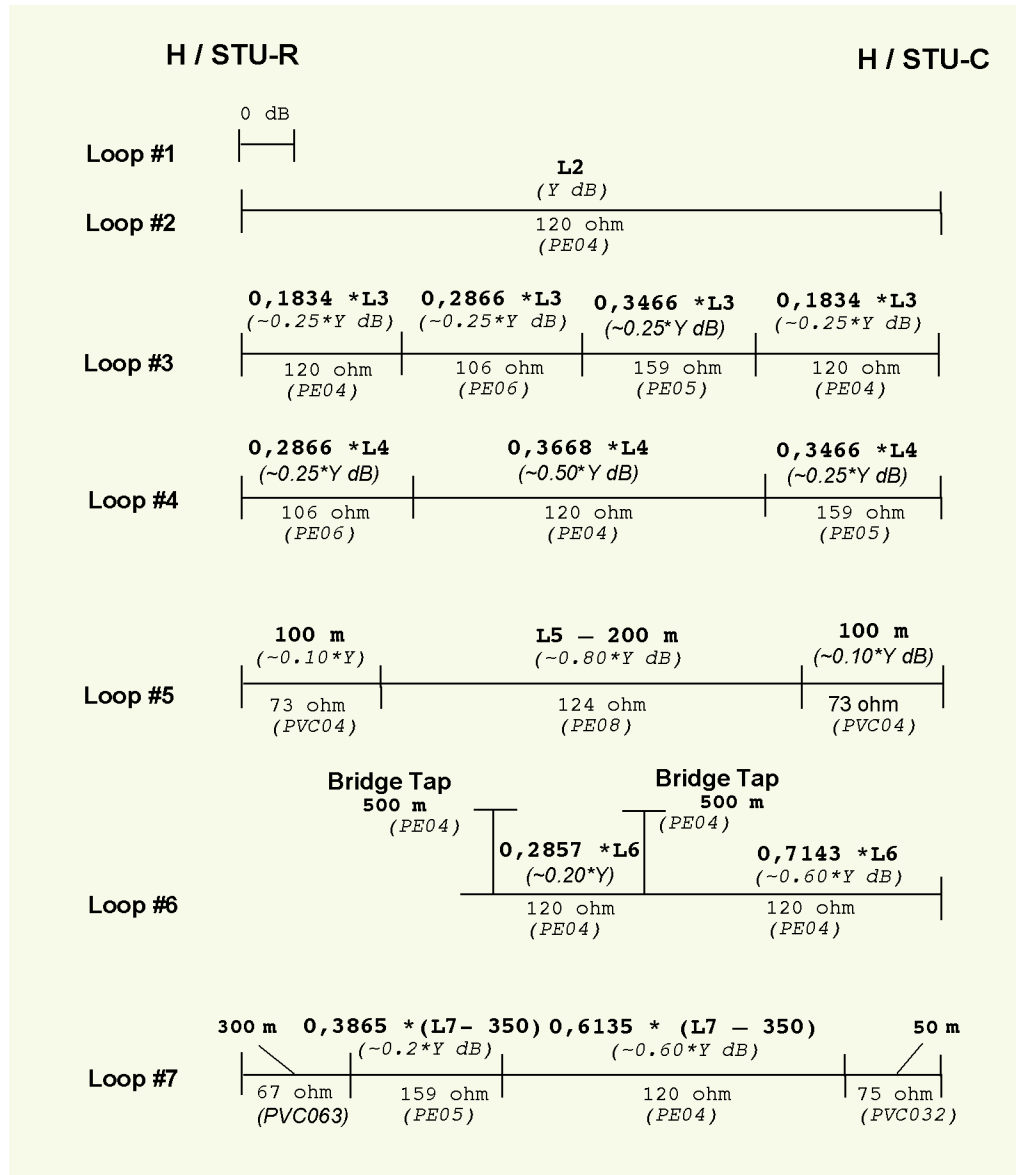
### Wireline Simulator Specifications:

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:	PE04, PE05, PE06, PE08, PVC032, PVC04, PVC063 type cables as specified in ETSI ETR152, ETSI TM6(98)08 (SDSL) and and ITU-T G.991.2 (G.shdsl).
D.C. Rating:	Up to 300 V peak AC+DC across tip & ring.
DC Current Rating:	100 mA (150ma peak).
Bandwidth:	D.C. to 2.0 MHz.
Accuracy:	For the specified bandwidth; $\pm 0.5$ 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 400HE Specifications

Test Loop Topologies: The DLS 400HE is fully compatible with testloop requirements as stated in the ETSI HDSL, ETSI SDSL & TU-T G.shdsl (Annex B) specifications. These test loops are reproduced here:



NOTE 1: The values for Y and L are found in the following Table.

NOTE 2: Due to mismatches and bridged taps, the total attenuation of the test loops differs from the sum of the attenuation of the parts.

NOTE 3: The impedances are for information only. They refer to the characteristic impedances of the test cables as defined in Annex B of TM6(98)08 and measured at 300 kHz.

## SDSL Test Loop Length (per Specification)

The length of each test loop for SDSL / SHDSL transmission systems is specified in the following two tables. This is as per the ETSI SDSL and ITU-T G.shdsl specifications.

The specified insertion loss "Y" at the specified test frequency measured with a 135 Ω termination (*electrical* length) is mandatory and reproduced by the DLS 400HE. If implementation tolerances of one test loop causes that its resulting *electrical* length is out of specification, then its total physical length is scaled accordingly to adjust for this deviation. Refer to the DLS 400HE Operations manual for adjusted settings for both SDSL and HDSL operation.

The test frequency  $f_T$  is chosen to be a typical mid-band frequency in the spectrum of long range SDSL / SHDSL (Annex B) systems. The length is chosen to be a typical maximum value that can be handled correctly by the transceiver under test. This value is bit rate dependent; the higher the payload bit rate, the lower is the insertion loss that can be handled in practice.

**Table 1: Approximation for the Physical Length of the SDSL Test Loops, Calculated Using Different Electrical Lengths When Using Noise Model A**

Payload Bit rate [kbit/s]	$f_T$ [kHz]	$Y$ [dB] @ $f_T$ , @135 $\Omega$	$L1$ [m]	$L2$ [m]	$L3$ [m]	$L4$ [m]	$L5$ [m]	$L7$ [m]	$f_T$ [kHz]	$Y$ [dB] @ $f_T$ , @135 $\Omega$	$L6$ [m]
384	150	43.0	< 3	4106	5563	5568	11064	4698	115	40.5	3165
512	150	37.0	< 3	3535	4787	4789	9387	3996	115	35.0	2646
768	150	29.0	< 3	2773	3747	3753	7153	3062	275	34.5	1904
1024	150	25.5	< 3	2439	3285	3291	6174	2668	275	30.0	1547
1280	150	22.0	< 3	2105	2829	2837	5193	2266	275	26.0	1284
1536	150	19.0	< 3	1820	2453	2455	4357	1900	250	21.5	1052
2048 (s)	200	17.5	< 3	1558	2046	2052	3285	1550	250	18.5	748
2304 (s)	200	15.5	< 3	1381	1815	1820	2789	1331	250	16.5	583
2048 (a)	250	21.0	< 3	1743	2264	2272	3618	1726	250	21.0	1001
2304 (a)	250	18.0	< 3	1494	1927	1937	2915	1402	250	18.0	702

**Table 2: Approximation for the Physical Length of the SDSL Test Loops, Calculated Using Different Electrical Lengths When Using Noise Models B, C or D**

Payload Bit rate [kbit/s]	$f_T$ [kHz]	$Y$ [dB] @ $f_T$ , @135 $\Omega$	$L1$ [m]	$L2$ [m]	$L3$ [m]	$L4$ [m]	$L5$ [m]	$L7$ [m]	$f_T$ [kHz]	$Y$ [dB] @ $f_T$ , @135 $\Omega$	$L6$ [m]
384	150	50.0	< 3	4773	6471	6477	13021	5508	115	47.5	3859
512	150	44.0	< 3	4202	5692	5698	11344	4814	115	41.5	3261
768	150	35.5	< 3	3392	4592	4596	8970	3815	275	42.0	2536
1024	150	32.0	< 3	3058	4135	4141	7990	3403	275	38.0	2223
1280	150	28.5	< 3	2725	3678	3684	7011	3006	275	33.5	1816
1536	150	25.5	< 3	2439	3285	3291	6174	2673	250	29.0	1680
2048 (s)	200	24.0	< 3	2135	2812	2820	4886	2271	250	25.5	1426
2304 (s)	200	21.5	< 3	1913	2509	2518	4257	2010	250	23.0	1208
2048 (a)	250	28.0	< 3	2323	3030	3034	5189	2389	250	28.0	1607
2304 (a)	250	25.0	< 3	2075	2699	2705	4514	2102	250	25.0	1387

The data in the tables above are subject to change by the ETSI TM6 Working Group

## 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.

## System

DLS 400 Chassis.

- DLS 1100 Series Software
- Manual
- Power cord
- 2 fuses

## Options

National Instruments IEEE 488 card.

## Electrical (AC Power)

Rated Input Voltage: 100–240 VAC ( $\pm 10\%$ ) (Automatic line voltage sensing).

Rated Frequency: 50–60Hz.

Rated Power Consumption: 120 VA max.

Line Fuses: Type "T" 2A/250V SLOW BLOW (2 required, 5mm x 20mm).

## Environmental

Operating Temperature: +10°C to +40°C (50°F to 104°F).

Storage Temperature: +10°C to +40°C (50°F to 104°F).

Humidity: 90% (non-condensing) max.

## Mechanical

Weight: 28 kg per chassis.

Dimensions: 194mm x 452mm x 494mm (7.6" x 17.8" x 19.4").  
(H x W x D).



## Sales Information:

North America: (800) 927 2660

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