

**EURO  
ADSL**

# Spirent's ETSI ADSL / ITU-T ADSL2 / EURO Testing Solution TS 101 388 EURO / ADSL

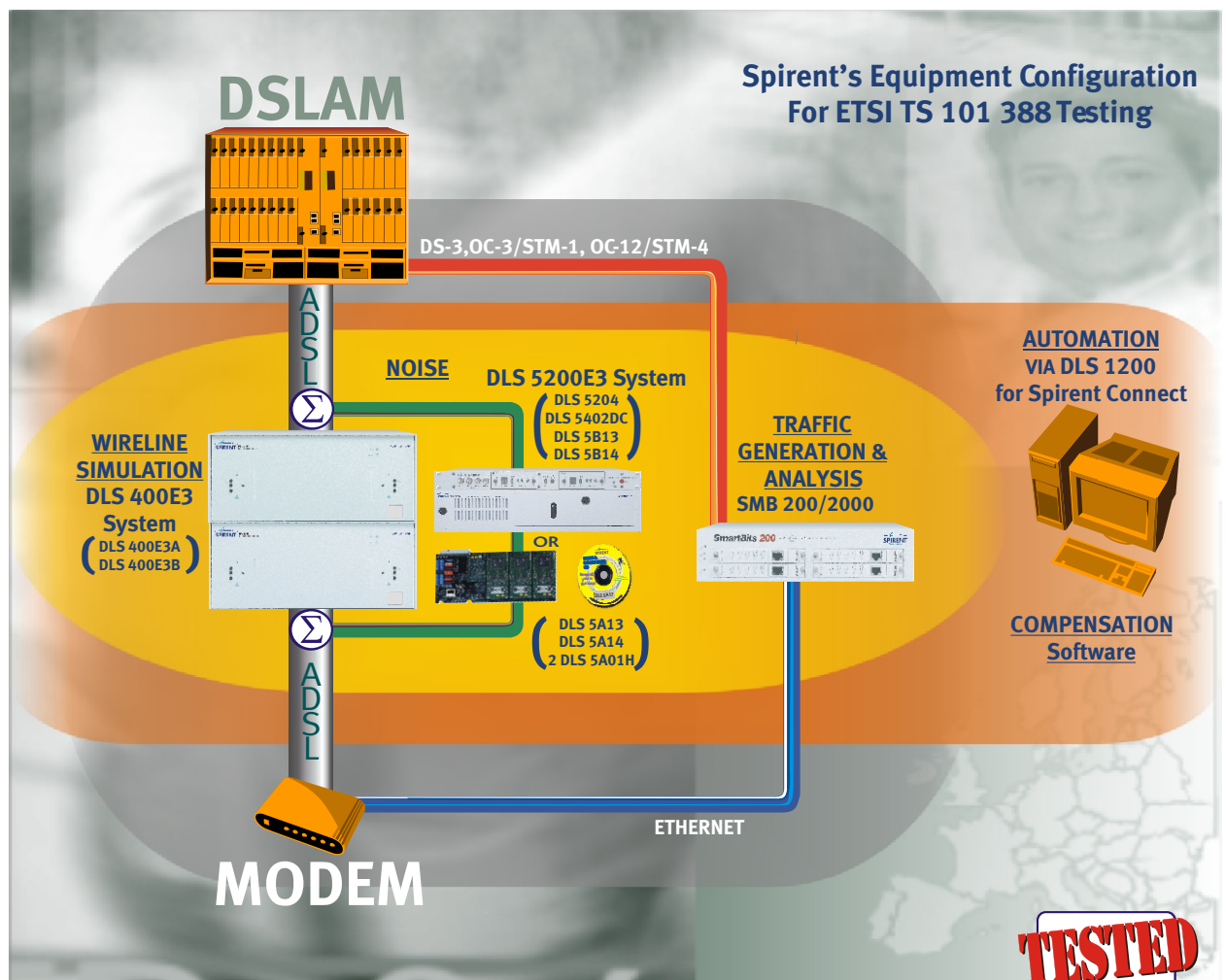
Upgrade  
Packages  
From DLS 400E2  
Available

Part Number DLS E3PKG (for TS 101 388)

The new specifications from ETSI, TS 101 388 and ITU-T ADSL2 (European) have new loop models and noise requirements for ADSL testing in Europe. The DLS E3PKG covers the complete solution for wireline simulation, noise generation and software to address these new standards.

Using the latest loop simulation technology the DLS 400E3 is the core of this solution. Available as a complete new system or as a simple upgrade to an existing DLS 400E2 the DLS 400E3 offers the highest accuracy for testing European ADSL/ADSL2 devices.

The complete DLS E3PKG solution from Spirent combines the DLS 400E3 with the DLS 5200E3 Noise Generator system, and can be used with the SmartBits SMB 200/2000 Data Generator/Analyser. This solution allows accurate, consistent and repeatable testing from the initial design stage through to deployment of ADSL devices complying with the latest specifications.



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**SPIRENT™**  
Communications

Analyze | Assure | Accelerate™

**TESTED**  
with  
**SPIRENT**

## Features

Enables ETSI, TS 101 388 and ITU ADSL2 European Testing

Upgrade Packages

High degree of accuracy and repeatability

The DLS product line is the worldwide standard for physical layer equipment used in conformance, performance, interoperability and production testing

## Benefits

- The only complete solution on the market today that permits testing ETSI, TS 101 388 and ITU ADSL2 European Testing.
- Convenient packages allow for simple and economical upgrade from your existing Spirent equipment.
- Spirent's DLS-E3PKG solution is the only solution to ensure accurate and unbiased test results. This enables the user to obtain consistent and repeatable results, regardless of time, location or test environment.
- With an overwhelming market presence, leveraged off of Spirent DLS' active participation in world standards meetings including ETSI, ANSI, ITU-T, IEEE 802.3 and DSL Forum, Spirent DLS equipment provides both accurate and repeatable results within and between companies both locally and worldwide. The DLS E3PKG, including the DLS 400E3 and DLS 5200E3 embody all of this experience and know-how from a trusted partner.

### DLS 400E3

The DLS 400E3 includes the latest technology in wireline simulation hardware and software. A feature of the DLS 400E3 is the integrated Compensation Software, which ensures the simulator achieves the highest accuracy and repeatability possible.

Customers who have a DLS 400E2 can upgrade to the DLS 400E3 system, which includes the additional test loops and software compensation package.

### The DLS 5200E3 or DLS 5A01H Noise Solutions for TS 101 388

Real world noise has a dramatic impact on the performance of ADSL modems and DSLAMs. ETSI TS 101 388 has captured many of the worst-case scenarios and specified a set of crosstalk, RFI, impulse and white noise test requirements.

In response to these requirements, Spirent has developed the DLS 5200E3 Noise Impairment System. The DLS 5200E3 provides all of the impairments specified in TS 101 388 including RFI and applies them as required, within accuracy requirements, in either common or differential mode to the wireline. Other features include “design your own noise shape” capability for both PSD and time domain noise files, a bandwidth from 12KHz to 12.5MHz, automation via Ethernet control and ETSI / ANSI compliant crest factor.

For customers not concerned about common mode noise injection and less concerned with high accuracy, the use of two DLS 5A01H Noise Impairment Generators, together with noise files from the DLS 5A13 and 5A14 Noise File CD-ROMs, will also allow for most TS 101 388 tests to be performed.

### Traffic Generation and Analysis

Using the unique capabilities of the 10/100 Ethernet and ATM SmartCards, SmartBits™ allows for unparalleled end-to-end stability, frame loss, and latency measurements up to full wire rate.

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## Compensation & Fine Data Rate Adjustment Software

Spirent Communications has developed the "Compensation and Fine Data Rate Software"; a simple to use software based analysis tool that compares setup test results to expected values and provides wireline length compensation data. This tool is recommended for use on a regular basis, prior to any extensive tests that must be performed.

### Features

Calibration of all test equipment components to one reference

Documentable results

Flexibility

### Benefits

- Eliminates the inherent inaccuracies in all components resulting in repeatable test results anywhere

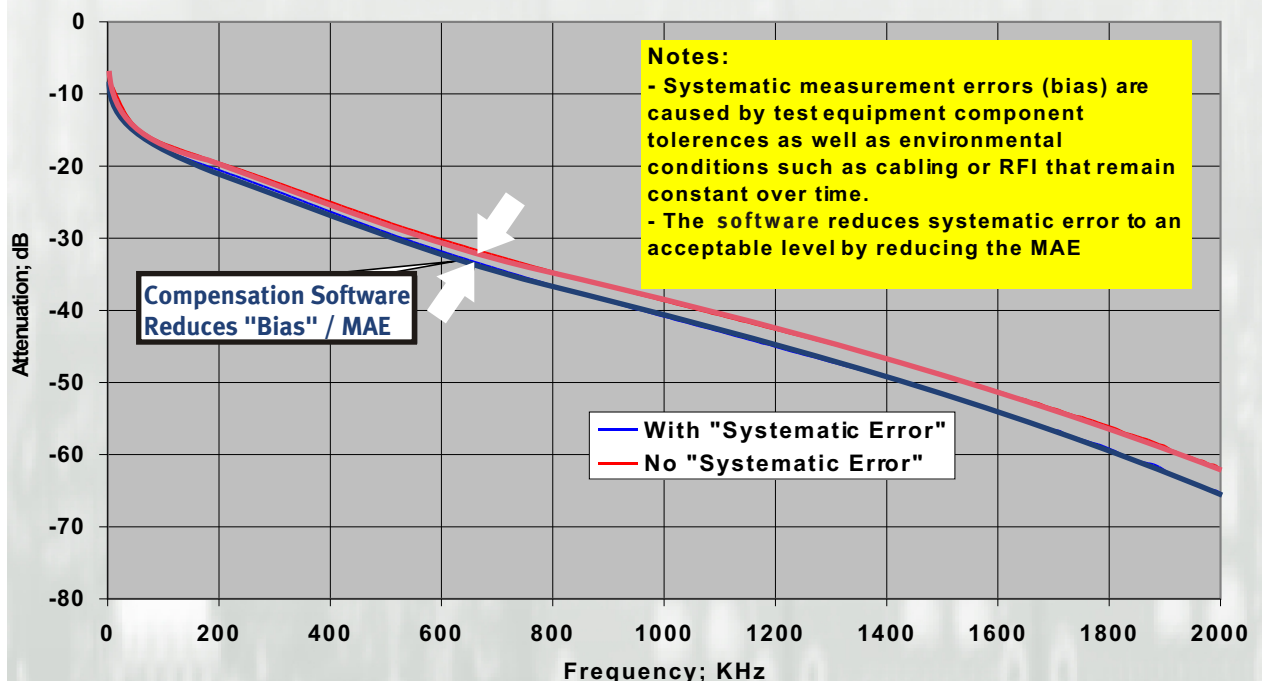
- Visibility into changing systematic errors (trends) that may highlight the need for test equipment calibration or the need for modifications to the laboratory environment

- The software can be used "stand-alone" or as part of an automated test solution

### Specifications

- CD-ROM based software application (self-installing)
- Developed for use with Spirent ScriptCenter™
- Windows™ '98, 2000 and NT compatible
- Includes 12 months of support and upgrades

Test Loop Attenuation with Illustrated Systematic Error



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## Part Number DLS 5200E3

### Adding Noise Generation to your testbed

Real world noise such as cross-talk, RFI, impulse and white noise has a dramatic impact on the performance of modems and DSLAMs. ETSI TS 101 388 has captured many of the worst case scenarios and specified testing requirements for noise impairments. In response to Service Provider demands for these requirements, Spirent has developed the DLS 5200E3 xDSL four output custom noise generator system. The DLS 5200E3 provides all the impairments specified by TS 101 388 and is able to apply them in either differential or common modes.

### Features

Designed for precision testing with the ability to generate impairments with a crest factor of 5 or greater

Configured for TS 101 388

Simple to use Windows™-based GUI

Ethernet remote control

4 Outputs

Uses the DLS 5402DC Differential & Common Mode Noise Injection System

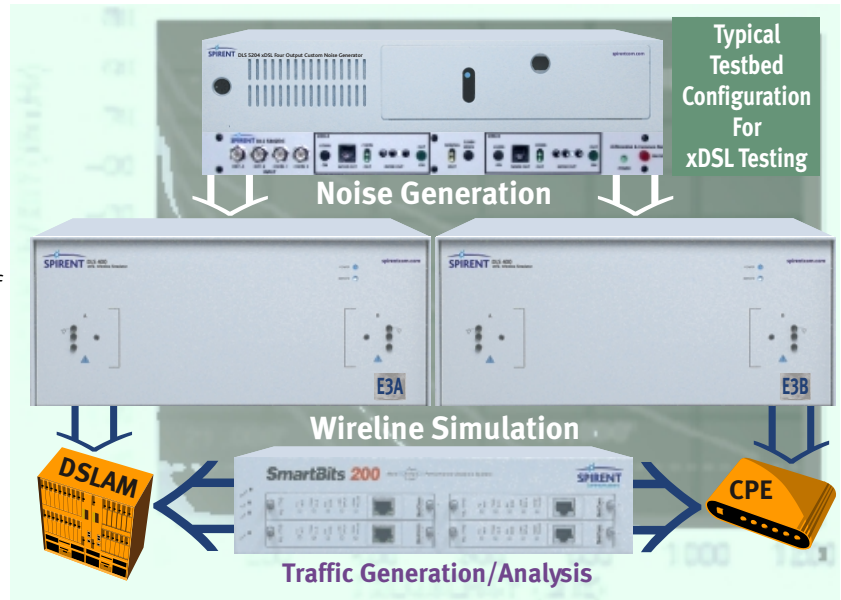
Uses DLS 5B13 pre-packaged noise files

Flexibility

DLS products are the worldwide standard for physical layer equipment used in conformance, performance and interoperability testing

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### Benefits

As stated in ANSI, ETSI & ITU-T xDSL specifications, testing with a noise crest factor of less than 5 does not represent real world conditions hence, your modem & DLSAM test results may be inaccurate. Using the DLS 5200E3 as part of Spirent's test solution ensures that tested modems and DSLAMs work where it counts in the field.

Combines noise generation, noise injection, and pre-packaged noise files into a simple to use, complete testing solution for TS 101 388.

Allows for full control of the DLS 5200E3 noise generation environment including access to user developed or DLS 5Bxx noise files.

Can easily be integrated into an automated test environment allowing for control of the DLS 5200E3 in a customer's own scripting environment or by using Spirent Communications' ScriptCenter™, and DLS 1200 ScriptCentre Library.

Provides the efficiency of having four independent xDSL noise generators in a single system. This means that noise impairments, whether crosstalk, white noise, RFI, tones or impulse noise can be generated as required by the test specification.

Provides the perfect interface for the application of xDSL noise impairments from the DLS 5204, whether in differential or common mode to two points on a real or simulated wireline. Other injection systems are also available from Spirent for specific applications. (e.g. VDSL)

Provides pre-packaged individual or combination TS 101 388 impairments.

Although developed for ETSI TS 101 388, the DLS 5200E3 can easily be configured for laboratory and production testing of ISDN, HDSL, SHDSL, SDSL, ADSL, ADSL2, ADSL+, VDSL as well as DSL Forum's TR-048 interoperability specification\*.

With an overwhelming market presence, leveraged off of Spirent DLS' active participation at world standard's meetings including ETSI, ANSI, ITU-T, Home Networking and DSL Forum, Spirent DLS equipment provides both accurate and repeatable results within and between companies both locally and worldwide.

**DLS 5200E3 Specification**

- The DLS 5200E3 is a PC based 4 channel Arbitrary Waveform Generator with deep (32 MB per channel) memory. Each generator uses a 14-bit DAC for excellent dynamic range. Designed for the testing of xDSL modems and DSLAMs, the DLS 5200E3 generates impairments such as Crosstalk Noise, White Noise, up to 30 AM RFI tones and Crosstalk Noise (PSD and time domain). In addition, the DLS 5200E3 has hardware capability to generate many impulses including C1 and C2 impulses from ANSI T1.413 and the Cook Pulse. These impairments may be applied to simulated wireline via the DLS 5402DC Differential and Common Mode xDSL Noise Injector. Other Noise injection systems are also available for specific applications. (e.g. VDSL and Home Networking)
- Crest Factor:
- Greater than 5 in ETSI compliant mode using memory of 0.5 MegaWords or less. By using a longer memory, truly Gaussian distribution and crest factor greater than 5 can also be generated.
- Execution Memory:
- 32 MB (16 Mega Samples) for each channel
- Maximum Output:
- +/- 6.5 V (12.8 V p-p) unloaded, +/- 5V (10 V p-p) into 50 ohms
- Maximum RMS Output:
- + 13 dBm into 50 ohms with a crest factor of 5

**DLS 5204 & DLS 5402DC Combined Specification\***

- Output Impedance:
- 4 Kohm (balanced) for differential mode noise and 1 Kohm (balanced) for common mode noise as determined by the DLS 5402DC
- Channel Noise Floor:
- Less than -140 dBm/Hz, when used with Spirent noise injection systems, (DLS 54XX Series) and Spirent wireline simulators.
- Spurious Response:
- Any spurious noise spike is less than -143.5 dBm/Hz, in a 4 KHz channel
- Frequency Range:
- 4 KHz to 2.208 MHz for differential mode noise and 100 KHz to 1.9 MHz for common mode noise (as limited by the DLS 5402DC, refer to DLS 5204 specification)
- Channel Dynamic Range:
- 136 dB (one single sine wave)
- Effective Dynamic Range:
- Greater than 50 dB from peak to lowest power in the impairment profile within the dynamic range of the instrument for any impairment with crest factor of 5
- Accuracy of PSD Profile:
- Less than 0.5 dB mean absolute error (MAE) for all profiles
- Accuracy of PSD Level:
- The DLS 5204 is calibrated to be within 0.5 dB mean error (ME) for all profiles, as measured using a HP 4395A Spectrum Analyzer.

**Mechanical**

- DLS 5204 (Rack mountable):
- 3.50" (89mm) x 19.00" (482mm) x 17.7" (450mm) [H x W x D] - 26 lbs (12 kg)
- DLS 5402DC (Rack mountable):
- 1.75" (44mm) x 19.00" (482mm) x 14.75" (375mm) [H x W x D] - 5 lbs (2.3 kg)

\* The DLS 5204 is also suitable for use in VDSL testing applications. For VDSL testing information and combined noise and wireline specifications, refer to the DLS 8000 series product information.

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**Environmental**

- Operating Temperature: 10°C to 40°C (50°F to 104°F)
- Relative Humidity: 10 to 95% RH non- condensing
- Electrical Power: 90 to 260 VAC, 50 or 60 Hz

**Spirent Companion Products**

- DLS 400, DLS 410 and DLS 8000 series wireline simulators
- SMB 200/2000 Traffic Generation & Analysis
- ScriptCenter and DLS 1200 ScriptCenter™ Library

**Spirent DLS Options**

- IEEE 488: ACC-GPPCINT
- DLS 5Bxx Noise Libraries
- DLS 54xx Noise injectors

### DLS 400E3 System Specifications

- The multi-chassis DLS 400E3 system includes:
  - Two wireline simulator chassis  
DLS 400E3A & DLS 400E3B
  - DLS 400E3 Control Software & Compensation Software
  - Operations manual, Power Cord, and 2 Fuses

Options include:

- National Instrument IEEE 488 card for the controlling PC
- 1 or 2 DLS 5A01 or DLS 5A01H Noise Impairment Generation Modules

### Performance Specifications

Types of Cables:

- 0.9, 0.63, 0.5, 0.4, 0.32 mm (ADSL) with R, L, C as defined in ITU-T G.996.1

Test Loops:

- Loop 1 to 8 (as per ETSI TS 101 388)

Bandwidth:

- DC to 1.5 MHz

Attenuation:

- Up to 90 dB over the specified bandwidth

Average noise floor:

- Lower than -150dBm/Hz within the ADSL band

### Electrical (AC Power) Specifications

Rated Input Voltage:

- 100 - 240 VAC ( $\pm 10\%$ ) with automatic line voltage sensing.

Rated Frequency:

- 50 - 60 Hz.

Power Consumption:

- 120 VA max.

Line Fuses:

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

### 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 (per chassis):

- 28 kg (61 lbs) per chassis.

Dimensions:

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

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**Ordering Information:****Wireline Solution  
for ETSI TS 101 388 / ITU-T  
ADSL2 (Euro)**

**Part # DL4- 400E3**  
 400E3A 1<sup>st</sup> Chassis  
 400E3B 2<sup>nd</sup> Chassis  
 Compensation Software  
 Control Software

**Noise Solution  
for ETSI TS 101 388 / ITU-T  
ADSL2 (Euro)**

**Part # DLS-5200E3**  
 DLS-5204  
 DLS-5402DC  
 DLS-5B13  
 DLS-5B14

**Complete Solution  
for ETSI TS 101 388 / ITU-T  
ADSL2 (Euro)**

**Part # DLS-E3PKG**  
 DL4-400E3  
 DLS-5200E3  
 DLS 1200  
 Spirent Connect

**Ordering Information For Upgrade Packages :****Wireline to Wireline  
Upgrades**

**DLS 400E2 to DLS 400E3 Upgrade**

**Wireline to  
Wireline and Noise  
Upgrades**

**DLS 400E2 to DLS 400E3 With  
5A01h/5103 Noise Upgrade**

**Wireline to  
Wireline and  
4 Output Noise with  
Differential / Common Mode  
Upgrades**

**DLS 400E2 to DLS-E3PKG  
Upgrade**



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