SPIRENT DLS

EUROPEAN ADSL2+ AND ADSL2++ TESTING

DLS-A2PE INTEGRATED SYSTEM

OVERVIEW

Over years of ADSL interoperability and deployment, a need to improve performance and support new applications, services and deployment scenarios, with minimized replacement of existing equipment, has been seen by carriers worldwide. Echoing this, improvements, clarifications and changes to conventional ADSL technology have been reflected in different versions of ADSL standards, namely G.992.1 (G.dmt), G.992.3 (G.dmt.bis) and G.992.5 (G.adslplus), which are also known as ADSL, ADSL2, ADSL2+ (or ADSL2++) respectively.

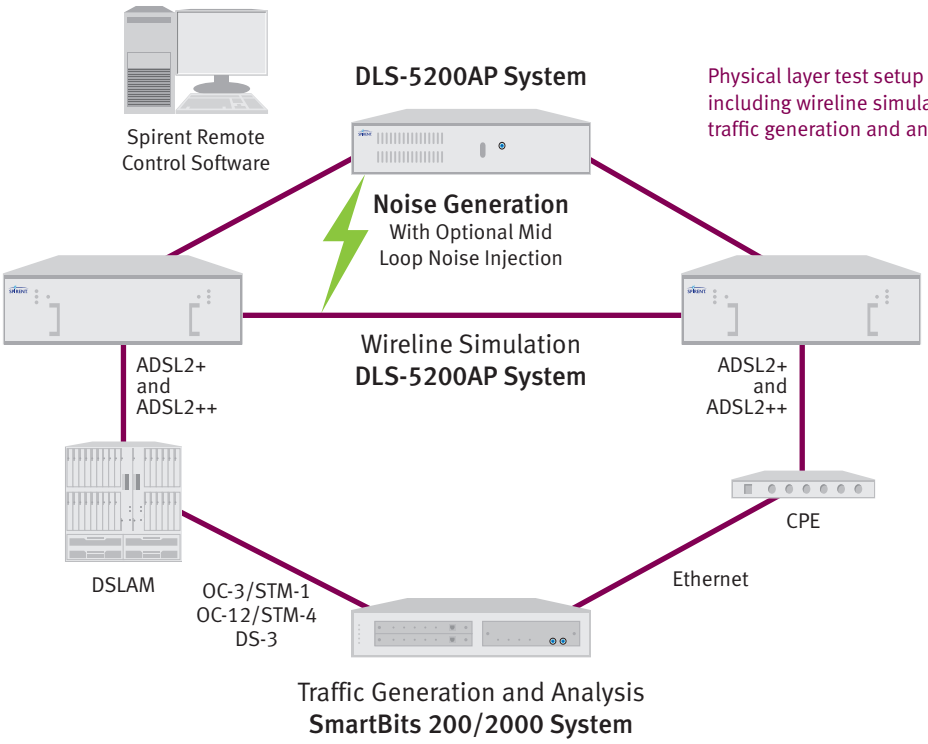
Specifically, the newest technology ADSL2++ features improved interoperability, enhanced rate and reach, as well as new functionality including diagnostics, seamless rate adaptation, power-down mode, channelized VoDSL, etc. ADSL2+ supports bandwidths up to 2.2 MHz, while ADSL2++ is often used to indicate bandwidth up to 4.4 MHz.

Spirent presents the first ADSL2++ lab test solution for the European market, the DLS-A2PE, consisting of the DLS-410E wireline simulator and the DLS-5200EP noise generation system.

This integrated system, which builds on proven high accuracy and realistic simulation technology from the Spirent ADSL TR-048 interoperability test solution, provides a seamless Layer-l test platform for all known ADSL flavors, including ADSL, ADSL2, ADSL2+, and ADSL2++.

The system enables highly accurate and repeatable test results, not only between different sets of test equipment but also between different test labs. Network equipment manufacturers, chipset designers and service providers seek competitive advantage by being first to deliver reliable products or services to the market. Spirent supports these efforts by providing testing solutions that enable fast results for exacting conformance and performance standards.

The DLS-A2PE integrated system is the most comprehensive and accurate test bed available for ADSL2++ applications on European copper networks. Spirent solution users know that this advantage translates into robust performance, earlier product delivery and greater market share.



Physical layer test setup for ADSL2+ and ADSL2++ including wireline simulation, noise generation, traffic generation and analysis

DLS-A2PE INTEGRATED SYSTEM

INTEGRATED EUROPEAN ADSL2+ AND ADSL2++ WIRELINE SIMULATOR & NOISE GENERATOR SYSTEM

Features

- High degree of accuracy
- Repeatability
- Simple to use Windows™ based GUI
- Designed for precision testing with the ability to generate ADSL2+ and ADSL2++ impairments with a crest factor of 5 or greater
- Uses the Spirent DLS-5800-02 xDSL 8-Output Custom Noise Generator
- Uses the DLS-5410DC Differential Common Mode Injector
- Uses the DLS-5B30 ADSL2+ pre-packaged noise files
- DLS products are the worldwide standard for physical layer equipment used in conformance, performance and interoperability testing

Benefits

- Spirent's integrated system enables simulation of real-world environments. This provides the user with a high level of confidence that the behavior of the equipment in the field is thoroughly understood.
- Using Spirent's wireline simulators enables the user to obtain consistent and repeatable results, time after time, as compared to an in-house assembled test set-up. This allows comparison of results regardless of time, location or test environment. The DLS-410E System is the ideal regression test bed for ADSL2+ and ADSL2++ applications.
- The DLS-410E Control Software provides a flexible GUI
- As stated in ITU-T xDSL specifications, testing with a noise crest factor of less than 5 does not represent real world conditions hence, your modem and DSLAM test results may be inaccurate. Using the DLS-5200EP as part of Spirent's European test solution ensures that tested modems and DSLAMs work where it counts—in the field.
- Can easily be integrated into an automated test environment allowing for control of the system in a customer's own scripting environment or by using Spirent Communications' ScriptCenter™
- Provides the efficiency of having 8 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 for both ends of the loop.
- Provides the integrated interface for the application of ADSL2+ and ADSL2++ noise impairments from the DLS-5800, to two points on a real or simulated wireline, and the ability to combine noise files
- Provides pre-packaged individual or combination impairments, accessible by test number or noise file type
- With extensive market and technology expertise leveraged from Spirent's active participation at all major standards meetings including ETSI, ANSI, ITU-T, IEEE 802.3, and DSL Forum, Spirent DLS equipment provides the industry's most accurate and repeatable results—ensuring your equipment is designed for peak performance

EUROPEAN ADSL2+ AND ADSL2++ TEST LOOPS

Spirent worked closely with ADSL carriers and vendors to define the test loop topologies for European ADSL2+ and ADSL2++ testing. As the xDSL industry continues to implement and support new equipment and services based on ADSL2+ and ADSL2++ technology, Spirent Communications is playing a leading role in the industry and in the standards bodies in building consensus towards the full definition of the appropriate test loops, cable models and noise models. As testing standards have evolved, Spirent has been ready to support existing and new customers with the testing solutions they need. .

INCLUDED WITH DLS-410E SYSTEM

- DLS-414E chassis
- DLS-415E chassis
- AC power cord
- DLS-410E Control Software
- DLS-410E-OM Operating Manual
- RS-232 and IEEE 488 cables

INCLUDED WITH DLS-5200EP SYSTEM

- DLS-5800 Custom Noise Generator
- DLS-5410DC Differential Common Mode Noise Injector
- DLS-5B36 RFI Generator
- DLS-5B30 ADSL2++ Noise Files Europe
- DLs-5C60 Cutom Noise Creation Tool
- DLS-5C80 Custom Impulse Spiker Creation Tool

DLS-410E SYSTEM SPECIFICATIONS

Technology

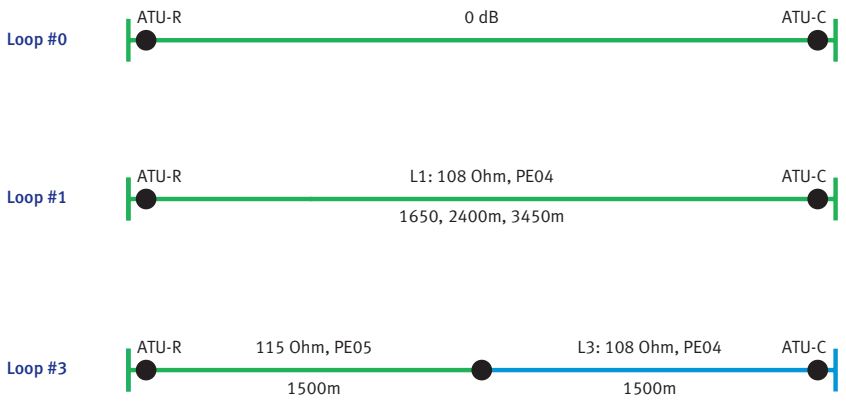


Figure 1: Proposed G.adslplus Annex G test loop topologies

- Cable & Bridged Tap simulation using passive circuits

Type of Wire

- European 0.4mm, 0.5mm as defined by TS 101 388

Number of Conductors

- Two

Standard

- ITU-T G.992.5/G.adslplus

Simulated Loops

- ADSL2++ Loops: Straight PE04, Straight PE05, and Mismatch of PE04 & PE05

Bandwidth

- DC to 4.5 MHz continuous frequency response

Impedance

- Typically ‹ ±5% variation

Group Delay

- Typically ‹ ±5% variation for straight loops, and ‹ ±2% for Bridged Tap Loops

DC Rating

- 200 V between Tip and Ring

DC Resistance

- Typically ‹ ±10% variation

Attenuation (Insertion Loss)

- Max. Mean Absolute Error (MAE)Typically: ≤0.5 dB MAE for the proposed ADSL2++ standard loops as per figure lover the range from 20kHz to 4.5MHz and attenuation up to 90 dB

Noise Floor

- ≤-150dBm/Hz within the ADSL2++ band

Termination

- 135 Ohm

Power Supply

- External power supply: 100-240 VAC (50-60 Hz)

Environmental

- Operating Temperature: +10°C to +40°C (50°F to 104°F)
- Storage Temperature: -4°F t 158°F (-20°C to +70°C)
- Humidity: 90% (non-condensing) max.

Mechanical

- Weight per chassis: 28 kg (61lbs)
- Dimensions per chassis: 194 mm x 452 mm x 494 mm (7.5” x 18” x 20”) [H x W x D]

DLS-5200EP SYSTEM SPECIFICATIONS

The DLS-5800-2 is a PC-based, 8-independent channel Arbitrary Waveform Generator with deep (16Meg 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-5800 generates impairments such as white noise, RFI tones and crosstalk noise (PSD and time domain). In addition, the DLS-5800 has hardware capability to generate many impulses including C1 and C2 impulses from ANSI Tl.413 and the Cook pulse. These impairments are applied to simulated or real wireline via the DLS-5410DC Noise Injector or DLS 5409 mini Passive Noise Injector.

DLS-5800 Performance Specification

- **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:** +/- 10V (20V pop) unloaded, +/- 5V (10 V pop) into 50 Ohms
- **Maximum RMS Output:** + 13 dBm into 50 Ohms with a crest factor of 5
- **DLS-5410DC:** Supports differential noise injection into one or both sides of European (135 Ohm) wireline simulators when used with a DLS-5800 and DLS-414E/415E/410E system

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 (CE certified)

Mechanical

- DLS-5800 (rack mountable): 7.5” (179mm) x 19” (482mm) x 17.7” (450mm) [H x W x D], 26lbs (20 kg)
- DLS-5410DC (rack mountable): 1.75” (44mm) x 19” (482mm) x 14.75” (375mm) [H x W x D], 5lbs (2.3 kg)

WIRELINE SIMULATOR EVOLUTION PATHS

Spirent understands the importance of providing our customers with an evolution path which permits migration to new technologies and provides protection of their test system investment. For customers with existing DLS-400 based testing platforms, evolution paths are available to meet a variety of requirements.

Evolution paths to DLS-410E

- Upgrade DLS-414E to DLS-410E (P/N DLS-414E-410E)
- Upgrade DLS-415E to DLS-410E (P/N DLS-415E-410E)

Trade-in programs for DLS-400 units other than those listed above are also available. Please contact your Spirent representative for further information.

SPIRENT GLOBAL SERVICES

Spirent Global Services provides a variety of professional services, support services and education services—all focused on helping customers meet their complex testing and service assurance requirements. For more information, visit the Global Services Web site at www.spirent.com/gs or contact your Spirent sales representative.

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