SPIRENT DLS

NORTH AMERICAN ADSL2++, TR-067 AND TR-100 TESTING

DLS-A2PA INTEGRATED SYSTEM

OVERVIEW

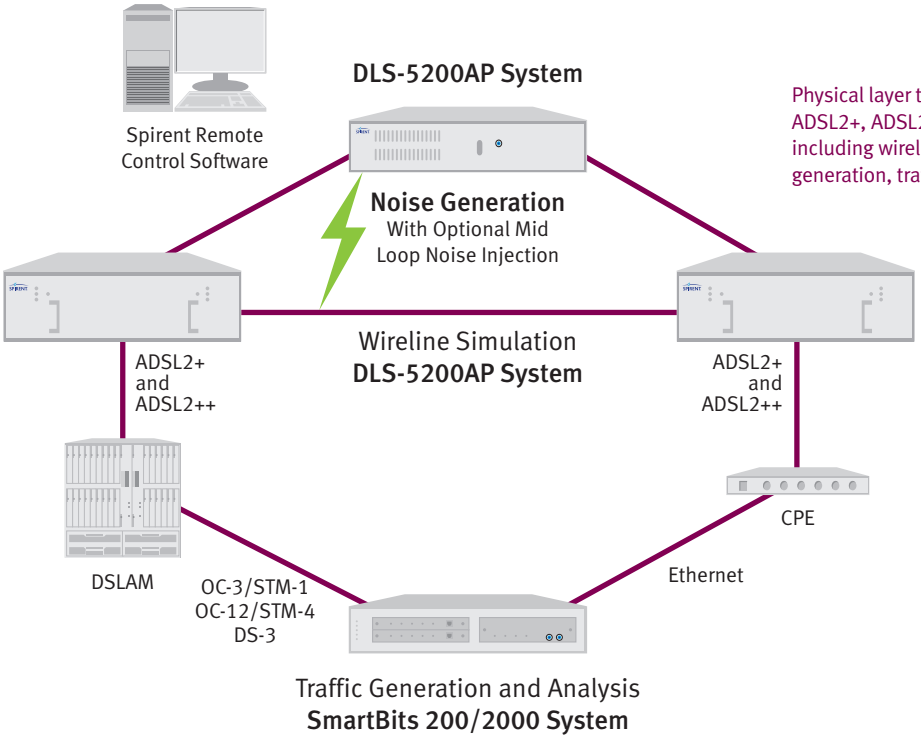
Over years of ADSL interoperability and deployment, a need to improve performance and support new applications, services and deployment scenarios, with minimized replacement of existing equipment, has been seen by carriers worldwide. Echoing this, improvements, clarifications and changes to conventional 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 North American market, the DLS-A2PA, consisting of the DLS-410B wireline simulator and the DLS-5200AP noise generation system. This integrated system, which builds on proven high accuracy and realistic simulation technology from the Spirent ADSL TR-067, TR-100 interoperability test solution, provides a seamless Layer-1 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-A2PA integrated system is the most comprehensive and accurate test bed available for ADSL2++ applications on North American 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 North American ADSL2+, ADSL2++, TR-067 and TR-100, including wireline simulation, noise generation, traffic generation and analysis

DLS-A2PA INTEGRATED SYSTEM

HIGH DEGREE OF ACCURACY

Spirent's integrated system enables simulation of the real-world environment. This provides the user with a high level of confidence that the behavior of the equipment in the field is well-understood.

REPEATABILITY

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-410B System is the ideal regression test bed for ADSL2+ and ADSL2++ applications.

SIMPLE TO USE WINDOWS® BASED GUI

The DLS-410B Control Software provides a flexible GUI.

DESIGNED FOR PRECISION TESTING

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. This solution is designed with the ability to generate ADSL2++ impairments with a crest factor of 5 or greater. Using the DLS-5200AP as part of Spirent's North American test solution ensures that tested modems and DSLAMs work where it counts in the field.

THE INTEGRATED SYSTEM FROM SPIRENT

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™.

USES THE SPIRENT DLS-5800-2 XDSL 8-OUTPUT CUSTOM NOISE GENERATOR

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.

USES THE DLS-5410DC NOISE INJECTOR

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.

PRE-PACKAGED INDIVIDUAL OR COMBINATION IMPAIRMENTS

Provides the DLS-5B18 TR-048/TR-067, DLS-5B41 TR-100 and DLS-5B29 ADSL2+ pre-packaged noise files, accessible by test number or noise file type.

A WORLDWIDE STANDARD

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

NORTH AMERICAN ADSL2++ TEST LOOPS

Spirent has taken the initiative to work closely with ADSL carriers and vendors to define the test loop topologies for North American ADSL2++ testing. The DLS-410B ADSL2++ Wireline Simulator will be based on the test loops as defined in the appropriate DSL Forum standard.

INCLUDED WITH DLS-410B SYSTEM

- DLS-411B chassis
- DLS-412B chassis
- AC power cord
- DLS-410B Control Software
- DLS-410B-OM Operating Manual
- RS-232 and IEEE 488 cables
- Integrated compensation software

INCLUDED WITH DLS-5200AP SYSTEM

- DLS-5800-2 Custom Noise Generator (with 2 noise cards)
- DLS-5410DC Differential and Common mode Noise Injector
- DLS-5B36 RFI Generator (incl: CD & license key)
- DLS-5B18 DLS Forum TR-067 noise files
  - DLS-9814 DLS 5B18 Noise Files S Service
- DLS-5B29 North American ADSL2++ noise files
  - DLS-9821 DLS 5B29 Noise Files NA S Service
- DLS-5C60 xDSL Custom Noise File Creation Tool
  - DLS-9711 DLS 5C60 1 Year software service agreement
- DL-5C80 Custom Impulse Noise Creation tool
- DLS-5B41 DSL Forum TR-100 Noise Files
  - DLS-9829 DLS Forum TR-100 Noise Files S Agreement

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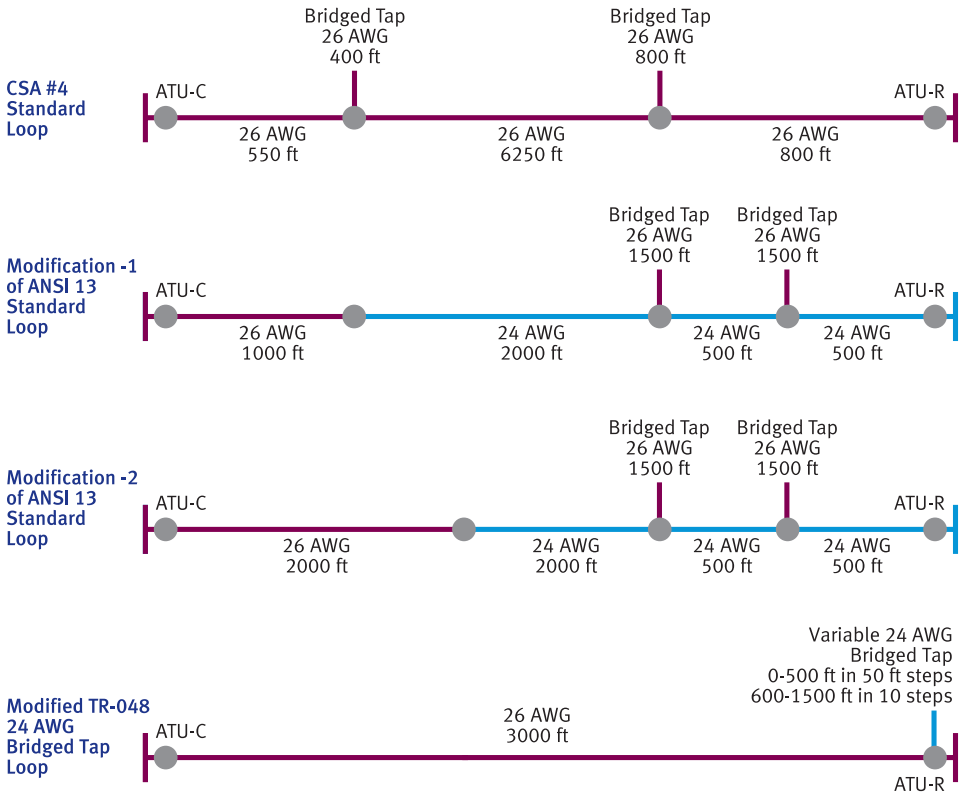

Figure 1: Sample test loop topologies

DLS-410B SYSTEM SPECIFICATIONS

- **Technology:** Cable and Bridged Tap simulation using passive circuits
- **Type of Wire:** 24 AWG and 26 AWG as defined by T1.417 and G.996.1
- **Number of Conductors:** Two (Twisted Pair)
- **Standard:** ITU-T G.992.5/G.adslplus
- **Simulated Loops**
  - TR-067, TR-100 loops: CSA #4 Standard Loop, ANSI #13 Standard Loop, 24 AWG Bridged Tap
  - ADSL2++ Loops: CSA #4 Standard Loop, ANSI #13 (with modifications), 24 AWG bridged Tap (with modifications)
- **Bandwidth:** DC to 4.5 MHz continuous frequency response
- **Attenuation (Insertion Loss):** ‹ 0.5 dB MAE for all loop and bridged tap combinations from 20kHz to 2.208MHz and attenuation up to 90 dB
- **Impedance:** Typically ‹ ±5% variation
- **Group Delay:** Typically ‹ ±5% variation for straight loops, and ‹ ±2% for Bridged Tap Loops
- **DC Resistance:** Typically ‹ ±10% variation
- **DC Rating (steady state):** 200 V between Tip and Ring, 135mA Max.
- **Noise Floor:** ‹ -150dBm/Hz within the ADSL2++ band
- **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 to 158°F (-20°C to +70°C)
  - Humidity: 90% (non-condensing) max.
- **Mechanical**
  - 27.2 kg (10 lbs.)
  - 194 mm x 452 mm x 494 mm (7.5” x 18” x 20”) [H x W x D]

DLS-5200AP SYSTEM SPECIFICATIONS

The DLS-5800 is a PC-based four 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 crosstalk noise, white noise, up to 30 AM 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 T1.413 and the Cook Pulse. These impairments are applied to simulated or real wireline via the DLS-5410DC Noise Injector or DLS 5409 mini Passive Injector.

DLS-5200AP 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:** +/- 6.5V (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
- **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], 26 lbs. (20 kg)
  - DLS-5410DC (rack mountable): 1.75” (44mm) x 19” x 14.75” (375mm) [H x W x D], 5 lbs. (2.3 kg)

ORDERING INFORMATION

- **Part Number:** DLS-A2PA
- **Upgrades**
  - DLS-410A-410B: Upgrade 410A wireline simulator system to 410B
  - DLS-410B-UPG: Upgrade 410A wireline simulator system to 410B including new DLS-5405 Custom Noise Injector

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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