

# AXS-200/625

part of the SharpTESTER Access Line

NETWORK TESTING—ACCESS



## The all-in-one copper, ADSL1/2/2+ and triple-play testing solution

### Features/Benefits

- Multilayer copper, ADSL2+ and triple-play analysis, for minimized CAPEX and OPEX
- Straightforward and affordable triple-play testing over ADSL1/2/2+ and Ethernet 10/100
- 30 MHz spectrum analysis for single-ended VDSL2 prequalification and deployments; backward-compatible to ADSL2+
- Verification of traditional voiceband circuits
- ADSL1/2/2+ service testing at the customer premises, remote cabinet or the central office/local exchange
- IPTV and VoIP service assurance using a comprehensive range of metrics

### Applications

- Analysis of subscriber loops to ensure high-quality, consistent and error-free triple-play services (IPTV, data, VoIP)
- Prequalification of subscriber loops for carrying ADSL2+ or VDSL2
- Spectrum qualification of circuits in any VDSL2 band plan (12, 17, 30 MHz)
- Loop and fault analysis using proven TDR and FDR techniques
- IPTV analysis using STB emulation, media delivery index (MDI) QoE (RFC 4445), PCR jitter and PID viewer results



# Track Down Network Problems Before They Find Your Customers

The DSL/triple-play market is extremely competitive, and customer churn is a daily concern. When it comes to maintaining high-quality voice, video and data services and keeping customers satisfied, every minute counts. This is why installation, maintenance and troubleshooting test cycles must be as short as possible, and why a combined copper and xDSL/triple-play test solution positively impacts the bottom line.

EXFO's AXS-200/625 30 MHz Copper and ADSL2+ Triple-Play Test Set is an all-in-one, multilayer copper, ADSL1/2/2+ and triple-play test solution that lets you assess both the physical medium and triple-play services in a single test sequence, enabling field crews to speed up service turn-up, maintenance and troubleshooting operations.

Part of the SharpTESTER Access Line, the AXS-200/625 integrates the functionalities of the AXS-200/610 30 MHz Copper Test Set and the AXS-200/620 ADSL2+ Triple-Play Test Set. This highly intuitive handheld unit allows technicians to qualify and troubleshoot the copper-loop plant and triple-play services from top to bottom with one consolidated test set.

HTTP/MPEG2/MPEG4/H.264		
UDP	TCP	IGMP
IP: Ping/Traceroute		
Ethernet/xDSL		
Copper		

■ **Consolidated Multilayer Testing**  
*The AXS-200/625 can isolate faults at any layer and perform both in-service and out-of-service testing.*

The AXS-200/625's bright color screens, visual results (including graphs and histograms) and automated tests make it a straightforward, simple test solution, even for video analysis and VDSL2 transmission using a frequency spectrum of up to 30 MHz. Designed for real-life testing conditions, it provides users with reliable results, day in and day out.



■ 512 Mbyte internal memory; USB port for additional results storage

■ Status LEDs: no need to look at the display for activity and pass/fail assessment

■ Transfective color display allow users to view straightforward, pass/fail-based results screen in direct sunlight

■ Help button for immediate contextual help screens

■ Quick Test start/stop button, reducing menu navigation and saving valuable time

## Fast, Complete xDSL and Triple-Play Testing

EXFO's AXS-200/625 offers a quick, yet thorough method for testing triple-play services—ADSL1/2/2+ and Ethernet-based data, VoIP and IPTV transmission—using pass/fail-driven automated functionalities.

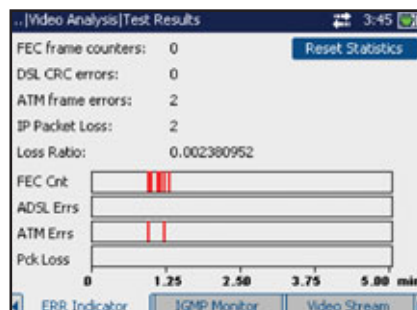
In addition to validating connectivity to the DSLAM, the AXS-200/625 provides upstream and downstream parameters such as actual data rates, attenuation and noise margin. What's more, it delivers advanced IPTV measurements—packet jitter, packet loss, PCR jitter, MDI, PID viewer and IGMP zap time—both in Terminate (stand-alone) and Through mode operation. The AXS-200/625 also monitors residential VoIP call flow and statistics, facilitating VoIP QoS assurance.



The AXS-200/625's IPTV test summary screen.



IP arrival jitter test results.



Multilayer fault analysis histogram: a critical part of IPTV testing.

### Key Features

<b>User-definable automated test routines</b>	Present easy-to-interpret pass/fail results.
<b>Four modes of operation</b>	Enables ADSL2+ and 10/100 Mbit/s Ethernet assessment of triple-play services in both Terminate and Pass Through modes.
<b>IPTV analysis</b>	Provides key IPTV qualification parameters with features such as set-top box (STB) emulation, join/leave requests, PCR jitter analysis and PID viewer.
<b>MDI reporting</b>	Supports media delivery index (RFC 4445) for evaluating the IPTV quality of experience.
<b>VoIP analysis</b>	Ensures VoIP services are not affected by packet loss or jitter.
<b>Data analysis</b>	Offers a common set of measures such as ping, traceroute, HTTP speed testing and FTP speed testing to ensure reliable and consistent Internet connectivity.
<b>Multilayer fault analysis histogram</b>	Visually indicates when and at what layer errors are occurring, helping to identify the source of the problem as well as facilitating quick and efficient troubleshooting.

# 30 MHz DSL Testing: Get the True Picture of the Local Copper Loop

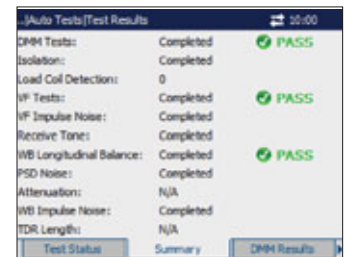
For many telcos, installing ADSL links has gone quite smoothly; however, preparing the copper loop plant for triple-play services is another story. EXFO's AXS-200/625 provides a full VDSL2 spectrum analysis in order to identify and locate disturbances and signal interferers affecting voice and video delivery over the last mile. It also offers an extensive range of single-ended tests that help you quickly locate and repair the faults that affect quality of service (QoS).

## Advanced Local-Loop Testing for Advanced Services

With a 30 MHz bandwidth and wide dynamic range, the AXS-200/625 can test the local loop for almost every service that can be carried. Ideal for VDSL2, ADSL2+, ADSL2, ADSL, G.SHDSL, HDSL, HDSL2, T1/E1, ISDN and voice circuits, it simplifies loop qualification thanks to service-specific automated tests, reference cursors, specific noise filters and specialized loop evaluation algorithms.

## Automated Test with Pass/Fail Indication

Providing complete feedback for quick pass/fail analysis thanks to its Auto Test feature, the AXS-200/625 simplifies the technician's job. This convenient, single-ended test tool allows for fast cable assessment to determine whether or not it is acceptable for VDSL2 and ADSL2+ services, based on predefined pass/fail criteria.



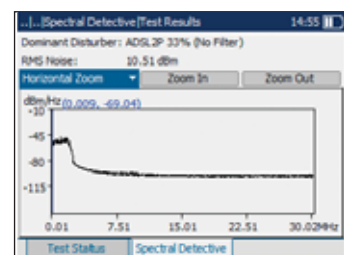
## Loop Mapper Makes It Simple

The AXS-200/625's convenient and powerful Loop Mapper tool simplifies the detection of faults, bridge taps or cable ends. By automatically selecting the time-domain reflectometer (TDR) and/or the frequency-domain reflectometer (FDR), based on the line conditions, Loop Mapper displays a straightforward wiring diagram that includes the loop distances, for easy interpretation.



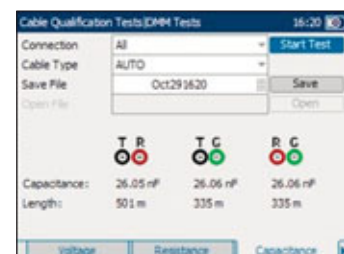
## Detecting Excessive Spectral Noise

Use the AXS-200/625's Power Spectral Noise feature to manage the spectrum in the cable bundle. The unit's graphic display helps to determine which service is deployed on the loop and at what power level. This is the best technique to use in identifying signals that are running too strong for the bundle, and it is essential in unbundled local loop environments for spectral policing.



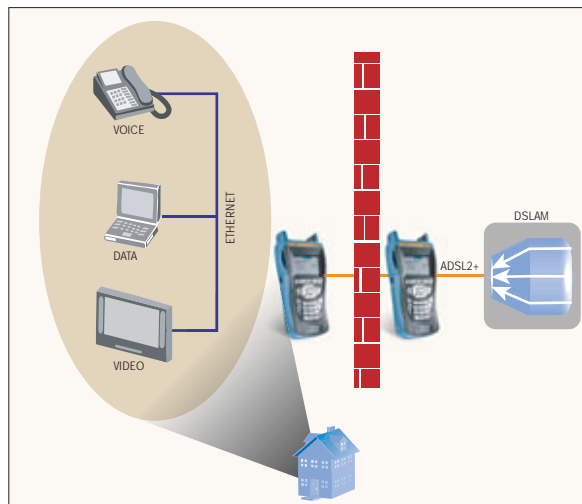
## Complete Metallic Testing with DMM and VF

With the AXS-200/625, AC and DC voltage measurements are automatically performed and documented, without having to press countless buttons or having to move the test leads. The AXS-200/625 also measures AC and DC current to offer a complete picture of the electrical stability on the circuit under test. Additionally, it measures capacitance and resistance, while automatically converting measured capacitance/resistance into distance values for loop length assessment.



### Test In, Test Out

Service providers use the “test in, test out” rule of troubleshooting. The AXS-200/625 takes this rule a step further by allowing technicians and engineers alike to test outside the customer premises over ADSL1/2/2+ or inside the customer premises over Ethernet to mitigate and remove performance issues. The AXS-200/625 can also conduct the same triple-play testing over ADSL1/2/2+ or Ethernet 10/100. This methodology ensures trouble spots are detected and dealt with accordingly and quickly.



### Multiple Applications, One Test Set

EXFO's AXS-200/625 integrates the capabilities of both the AXS-200/610 30 MHz Copper Test Set and AXS-200/620 ADSL2+ Triple-Play Test Set. It's the all-in-one solution for complete copper/DSL/triple-play assessment on the local loop.

Application	AXS-610	AXS-620	AXS-625
Copper fault location	✓		✓
Copper troubleshooting	✓		✓
Narrowband testing	✓		✓
ADSL2+ physical layer qualification	✓		✓
VDSL2 physical layer qualification	✓		✓
ADSL2+ service verification		✓	✓
IPTV analysis (DSL and Ethernet)		✓	✓
VoIP analysis (DSL and Ethernet)		✓	✓

### The Essential Triple-Play Last Mile Deployment Tool

Ideal for prequalifying and troubleshooting the local loop for xDSL services up to VDSL2, the AXS-200/625 enables telcos and contractor personnel to identify the causes of unsuccessful triple-play, DSL and/or VF circuit deployment, while helping cable repair crews to locate with precision and to eliminate loop faults. This instrument puts an end to the guesswork involved in locating loop faults, freeing up valuable staff and company resources and saving precious time. Thanks to its single-ended test capabilities, service providers not only see a reduction in CAPEX but also in OPEX—making the AXS-200/625 a money-saving tool.

# xDSL/Triple-Play Testing Specifications

## SPECIFICATIONS

### IPTV-OVER-DSL/ETHERNET TESTING SUITE

Physical-layer support	ADSL1/2/2+ Ethernet 10/100
Recognized video compression/standards	MPEG2, MPEG4 part 2 and 10 (H.264/AVC), WM9
Video streaming control	Video streaming (channels) detection IGMP joins/leaves
Operation	Through mode or stand-alone with STB IGMP emulation
Analysis and statistics	ADSL, ATM, IP layer analysis Bandwidth usage per channel IGMP packets Set-top box (STB) traffic Key IP video QoS parameters: packet loss, packet jitter, zap time PCR jitter, PID statistics Media delivery index (MDI) (option) QoS pass/fail indicators
Graphic results	Bandwidth usage and multilayer fault analysis histogram IP packet and PCR jitter histograms

### VoIP-OVER-DSL/ETHERNET ANALYSIS SUITE (VoIP TESTING)

Signaling protocols	Session initiation protocol (SIP) v2 (RFC 3261) Media gateway control protocol (MGCP) Skinny client control protocol (SCCP)
Operation	Through mode over DSL and 10/100 Ethernet
Call monitoring/analysis	ADSL, ATM, IP layer call statistics Gateway/ATA initialization Call flow Codec indicator (G.711, G.729, G.726, G.723) Key VoIP QoS parameters: packet loss, packet jitter QoS pass/fail indicators
Graphic results	Delay distribution, jitter histogram

### DATA ANALYSIS MODE

Layer 1/2 support	ADSL2+ and Ethernet (stand-alone and Through mode)
Login format	Username and password using PAP and/or CHAP
IP options	Routing functionality, NAT, DNS support
Ping	Pings another device on the network Device: gateway, destination IP address or URL Configurable number of pings (1 to 99) Packet size: 32 to 1500 bytes (32 is default) Results: indicate packet size, packets sent/received, minimum/average/maximum round-trip times in milliseconds (ms)
Traceroute	Determines the path used to reach device on the network Timeout in seconds Time to live (TTL) (default is 100 ms, maximum is 5 s) Packet size: 32 bytes Number of hops: 1 to 30 (default is 30) Results indicate IP address of hop and round-trip time in milliseconds (ms)
HTTP speed test	Downloads a Web page and indicates speed of download Address: IP or URL Protocol: HTTP
FTP speed test	FTP upload, FTP download or both Displays speed to upload and/or download a file

### ADSL2+ ATU-R MODULE

Chipset	Conexant
Standards	Annex A option (over POTS): ITU-T G.992.5 (ADSL2+), ITU-T G.992.3 (ADSL2 and RE-ADSL), ITU-T G.992.1 (G.DMT) and ANSI T1.413 Issue 2 Annex B option (over ISDN): ITU-T G.992.5 (ADSL2+), ITU-T G.992.3 (ADSL2 and RE-ADSL), ITU-T G.992.1 (G.DMT)
Rates supported	Downstream: up to 24 Mbit/s Upstream: up to 1.3 Mbit/s
Measurements	Maximum bit rates Actual bit rates Mode: Fast, Interleaved Latency capacity Signal-to-noise ratio (SNR) margin Output power Attenuation Carrier load (bits/bin) ATM F4 and F5 OAM loopback
Link errors	FEC, CRC, HEC
Bits/bin	Graphical display
Encapsulation methods	PPPoE (RFC 2516), RFC 2684 supporting bridged Ethernet (IPoE), IPoA (RFC 1577), PPPoA/LLC and PPPoA/VC-MUX (RFC 2364)

# Copper Testing Specifications

## SPECIFICATIONS

### RECEIVER CHARACTERISTICS <sup>a</sup>

Receive frequency	200 Hz to 10 kHz: 1 Hz
Receive frequency	10 kHz to 20 kHz: 10 Hz
Receive frequency	20 kHz to 30 MHz: 1 kHz
Frequency uncertainty (accuracy)	±0.1%
Receive level	-90 to +10 dBm at 100 Ω or 135 Ω resolution 0.1 dB -100 to +10 dBm at 600 Ω resolution 0.1 dB
Level uncertainty (accuracy)	±1.0 dB for 200 Hz to 20 kHz at 0 dBm ±1.0 dB for 20 kHz to 30 MHz at 0 dBm
Impedance (Ω)	100, 135 and 600 bridging (100 kΩ)

### TRANSMITTER CHARACTERISTICS

Transmit frequency	200 Hz to 20 kHz, resolution 1 Hz steps
Transmit frequency	20 kHz to 30 MHz, resolution 1 kHz steps
Transmit level	-10 to +10 dBm at 100 Ω or 135 Ω -20 to +10 at 600 Ω
Frequency accuracy	±50 ppm, ±0.5 (Hz)
Level uncertainty (accuracy)	±0.6 dB 200 Hz to 1 MHz ±1 dB 1 MHz to 2.2 MHz ±2 dB 2.2 MHz to 17 MHz ±3 dB 17 MHz to 30 MHz
Impedance (Ω)	100, 135 and 600

### VF NOISE MEASUREMENT

Range (dBm)	0 to -90, subject to instrument noise floor
Uncertainty (accuracy)	±1 dB
Filters	None, 3 kHz flat, C-message, psophometric, notched and D filter (IEEE 743-1995)
Graphic results	Delay distribution and jitter histogram

### VF IMPULSE NOISE

Low threshold (dBm)	0 to -40, in 1 dB steps
Mid threshold	Low threshold plus separation
High threshold	Mid threshold plus separation
Separation (dB)	1 to 6 in 1 dB steps
Dead time (ms)	125
Filters	None, 3 kHz flat, C-message, psophometric, notched and D filter (IEEE 743-1995)
Counter	Maximum 999 for each threshold
Timer	1 minute to 24 hours, default is 15 minutes

### POWER INFLUENCE (NOISE TO GROUND)

Noise range	-60 to +10 dBm
Accuracy (dB)	±1.0
Level uncertainty (accuracy)	±1.0 dB at -60

### VF LONGITUDINAL BALANCE

Frequency (Hz)	1004
Frequency uncertainty (accuracy)(ppm)	±50
Level range (dB)	0 to 80
Level uncertainty (accuracy)(dB)	±0.5

### TIME DOMAIN REFLECTOMETRY (TDR)

Mode	One shot, continuous (auto-repeat) with cursor and zoom
Distance range (m)	3 to 6000 (10 ft up to 20,000 ft)
Pulse width	15 ns to 20 μs (auto-selected in auto TDR test)
Test signals	Sine wave, compensated sine wave, half-sine wave and square wave
Amplitude	10 V p-p on cable, 20 V p-p open circuit
V.O.P.	0.400 to 0.999 or 120 to 299 m/μs
Distance uncertainty <sup>b</sup> (accuracy) (m)	±(0.3 + 1 % x distance) or ±(1 ft + 1 % x distance)
Units	Feet, meters and nanoseconds
Horizontal scale (m)	Automatic or 30 (100 ft), 300 (1000 ft), 600 (2000 ft), 1500 (5000 ft), 3000 (10,000 ft), 6000 (20,000 ft), 13,500 (45,000 ft) and 15,000 (50,000 ft)

### LOAD COIL DETECTION

Count	Five
Plot (kHz)	up to 10
Distance range	up to 8,000 (up to 27,000 ft)

### SINGLE-END FREQUENCY RESPONSE

Distance range (m)	10 to 5000 (30 ft to 16,000 ft)
Frequency range (MHz)	Up to 30
Frequency uncertainty (accuracy)(ppm)	±50
Uncertainty (accuracy) (dB)	±1.0 typical
Resolution (dB)	0.1 dB
Horizontal scale (MHz)	ADSL2+ = 2.208, VDSL2-12 = 12, VDSL2-17 = 17.66, VDSL2-30 = 30
Vertical scale	0 to +90

**NOTE** a. Characteristics are subject to instrument noise floor (approx -70 dBm). Levels below -70 dBm can be measured using the PSD noise test.

b. Does not include the uncertainty due to VOP.

SPECIFICATIONS (CONTINUED)

PSD NOISE MEASUREMENT

Test type	Continuous or peak-hold
Vertical scale	-10 to -145 dBm/Hz or +20 to -110 dBm
Horizontal scale	4.3125 kHz to 17 MHz, in 4.3125 kHz steps or 8.625 kHz to 30 MHz, in 8.625 kHz steps
Noise filters	None or E, F, G, VDSL2-8, VDSL2-12, VDSL2-17 and VDSL2-30

DSL IMPULSE NOISE MEASUREMENT

Threshold	-50 dBm (40 dBrn) to 0 dBm (90 dBrn) in 1 dB steps
Counter	Maximum 65,000
Test duration	1, 5, 10, 15 and 60 min, 24 h or continuous (up to 360 h)
Histogram plot interval	1, 5, 10, 15 or 60 min
Uncertainty (accuracy)	±2 dB

SWEPT LONGITUDINAL BALANCE TEST

Frequency accuracy (ppm)	±50 ppm
Uncertainty (accuracy)(dB)	±2.0 dB
Vertical scale	0 to 80.0 dB
Horizontal scale	0 to 60.0 dB 2.2 MHz to 30 MHz ADSL/2+: 26 kHz to 2.2 MHz, SHDSL: 26 kHz to 1 MHz, VDSL/VDSL2-12: 26 kHz to 12 MHz, VDSL2-17: 26 kHz to 17.66 MHz, VDSL2-30: 26 kHz to 30 MHz

DMM (DIGITAL MULTIMETER)

Measurement	Range	Resolution	Accuracy
DC voltage	0 to 200 V	1 V	±2 %, ±1 V
AC voltage	0 to 140 Vrms	1 V	±2 %, ±1 V
Resistance	0 to 999 MΩ	3 digits	±2 % or ±5 Ω ±2 % ±1 digit ±5 % ±1 digit
	0 to 999 Ω		
	1 kΩ to 99 MΩ		
	100 MΩ to 999 MΩ		
Capacitance	1 nF to 10 μF	3 digits	±2 % ±1 digit
	Distance up to 30,000 m (100,000 ft)		
DC current	0 to 110 mA	1 mA	±2 % ±1 digit
AC current	0 to 77 mA	1 mA	±2 % ±1 digit

SPECTRAL DETECTIVE

Allows the AXS-200/610 to bridge (high-impedance) onto a live circuit to display a plot of transmitted levels and spectrum (PSD). The Spectral Detective test can be referenced to any user-selected impedance. The impedance reference setting is required to display proper readings in dBm/Hz or dBm.

Test type	Continuous or peak-hold
Bridging impedance (kΩ)	15 kΩ
Vertical scale	-10 to -145 dBm/Hz or +20 to -110 dBm
Horizontal scale	4.3125 kHz to 17 MHz, in 4.3125 kHz steps or 8.625 kHz to 30 MHz, in 8.625 kHz steps
Noise filters	None or E, F, G, VDSL2-8, VDSL2-12, VDSL2-17 and VDSL2-30

STRESS/LEAKAGE (ISOLATION RESISTANCE)

Source	100 VDC, current safely limited to < 1.0 mA
Range (MΩ)	0 to 999 auto-ranging
Resolution	3 significant digits
Uncertainty (accuracy)	0 to 999 Ω ±1 % or ±5 Ω
	1 kΩ to 99 MΩ ±1 % ±1 digit
	100 MΩ to 999 MΩ ±5 % ±1 digit
Soak timer (s)	1 to 99

RFL

Test type	Single pair and separate good pair
Fault detection (MΩ)	0 to 20 resolution three digits
Loop resistance (kΩ)	7 maximum
Multiple cable sections	Five (includes gauge and temperature setting)
Fault location	*Total resistance, near-end to fault resistance, fault to strap resistance (four significant digits) *Total length, distance to fault, distance from fault to strap (3 m/1 ft resolution)
Uncertainty (accuracy) (Ω)	0.2, ±02 %



### GENERAL SPECIFICATIONS

Module size (H x W x D)	283 mm x 125 mm x 92 mm	(11 1/8 in x 4 7/16 in x 3 5/8 in)
Module weight (with battery and transceivers)	1.2 kg	(2.6 lb)
Temperature		
operating	0 °C to 50 °C	(32 °F to 122 °F)
storage	-20 °C to 70 °C	(-4 °F to 158 °F)
Humidity	5 % to 95 % relative, non-condensing	
Power supply input	110-240 V to AC at 1.8A, 50 Hz to 60 Hz	
Output	18 V to 24 V DC at 3.33 A to 2.50 A, 60 W	
Battery	Internal rechargeable Li-Ion battery, with battery state indication	
Test connections	Five colored banana for T, R, G, T1, R1	
Differential voltage protection	125 VRMS or 400 VDC max	
Common mode voltage protection	1000 VRMS	
Self-test	Routine on power-up	
Voltage detection	> 20 V will trigger alarm message	
Results storage	128 Mbytes	
Languages	English, French, German, Spanish, Chinese (Simplified)	

Specifications based on 24 AWG (0.5 PE mm) cabling and subject to change without notice.

### STANDARD ACCESSORIES

Hand strap, Certificate of Compliance  
ACC-RJTC: Test Cable: RJ45 to Telco Clip  
ACC-RJR: RJ45 Ethernet cable  
ACC-5COLR: 5 colors 4 mm banana conn. tel.  
ACC-STRP: RFL StrapModel

### ORDERING INFORMATION

#### AXS-625-XX-XX-XX

##### Model ■

AXS-625 = 30 MHz Triple Play Module

##### Software option ■

00 = Without software upgrade

VDSL2WB = 30 MHz Wideband Option

LOOPMAPPER = LOOPMAPPER

##### DSL module ■

ADSL2+A = ADSL2+ Annex A configuration

ADSL2+B = ADSL2+ Annex B configuration

##### ■ DSL Software Options

MDI = IPTV analysis w/MDI

ADSL2+AB = ADSL2+ Annex A + and ADSL2+Annex B

Example: AXS-625-VDSL2WB-ADSL2+A-MDI

**Rugged Handheld Solutions**

- OPTICAL**
  - OTDRs
  - OLTs
  - Power meters
  - Light sources
  - Talk sets
- COPPER ACCESS**
  - ADSL/ADSL2+, SHDSL, VDSL test sets
  - VoIP and IPTV test sets
  - Ethernet test sets
  - POTS test sets

**Platform-Based Solutions**

- OPTICAL FIBER**
  - OTDRs
  - OLTs
  - ORL meters
  - Variable attenuators
- DWDM TEST SYSTEMS**
  - OSAs
  - PMD analyzers
  - Chromatic dispersion analyzer
- TRANSPORT AND DATACOM**
  - Next-generation SONET/SDH and OTN testers
  - SONET/DSn (DS0 to OC-192) testers
  - SDH/PDH (64 kbit/s to STM-64) testers
  - T1/T3, E1 testers
  - 10/100 Mbit/s and Gigabit Ethernet testers
  - Fibre Channel testers
  - 10 Gigabit Ethernet testers

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EXFO is certified ISO 9001 and attests to the quality of these products. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. EXFO has made every effort to ensure that the information contained in this specification sheet is accurate. However, we accept no responsibility for any errors or omissions, and we reserve the right to modify design, characteristics and products at any time without obligation. Units of measurement in this document conform to SI standards and practices. In addition, all of EXFO's manufactured products are compliant with the European Union's WEEE directive. For more information, please visit [www.EXFO.com/recycle](http://www.EXFO.com/recycle). Contact EXFO for prices and availability or to obtain the phone number of your local EXFO distributor.

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In case of discrepancy, the Web version takes precedence over any printed literature.