AXS-200/635

part of the SharpTESTER Access Line

NETWORK TESTING–ACCESS

The more-in-one 30 MHz copper, DSL and triple-play testing solution

Based on industry-leading Broadcom DSL chipset for proven VDSL2 and ADSL2+ interoperability and support for impulse noise protection (INP) and Broadcom PhyR™ configurations.

Features/Benefits

- Multilayer copper, DSL and triple-play analysis, for minimized CAPEX and OPEX

- Affordable triple-play testing over VDSL2 and ADSL1/2/2+ including Ethernet in/out operation for FTTx deployments

- 30 MHz spectrum analysis for single-ended VDSL2, for a truck roll reduction

- DSL, IPTV and VoIP service assurance using a comprehensive range of metrics such as DSL link speeds, multilayer fault analysis histogram, MDI as well as IP packet loss and jitter

- VDSL2 and ADSL2+ Annexes A, B, L and M support for ultimate network flexibility

Applications

- Detection of potential bottlenecks on subscriber loops to ensure high-quality, consistent and error-free triple-play services (IPTV, Internet and VoIP)

- 30 MHz spectrum analysis for circuit qualification in any VDSL2 band plan (12, 17, 30 MHz)

- Loop and fault analysis using proven TDR and FDR techniques for VDSL2 or ADSL2+ prequalification

- Triple-play deployment verification inside the subscriber premises using Ethernet in/out testing

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EXPERTISE REACHING OUT

30 MHz Copper and VDSL2 Triple-Play Services Testing

Benefit from optimal performance and flexibility for your FTTx-based triple-play services deployments thanks to EXFO's AXS-200/635 module for the AXS-200 SharpTESTER. This test set provides you with a wide range of measurements so that no matter what stage of VDSL2 or ADSL1/2/2+ deployment you are at–prequalification, installation, troubleshooting or repair–you have all the measurement tools you need to get the job done efficiently and properly. Moreover, by keeping test cycles as short as possible, the AXS-200/635 allows you to save money; thus, positively affecting your bottom line.

The AXS-200/635 combines multilayer 30 MHz copper spectrum, VDSL2 speed verification with backward compatibility to ADSL1/2/2+ and triple-play testing–making it the only test set you need. It also enables field crews to speed up service turn-up, maintenance and troubleshooting operations by assessing the physical medium or triple-play services in a single test sequence.

Part of the SharpTESTER Access Line, the AXS-200/635 integrates the functionalities of the AXS-200/610 30 MHz Copper Test Set and the AXS-200/630 VDSL2, ADSL2+ and IP 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.

The AXS-200/635's bright color LCD display provides a sharp graphical user interface for showing clear results (including graphs), making it a straightforward, user-friendly test solution, perfect for triple-play services analysis. Designed for real-life testing conditions, the AXS-200/635's display is ideally suited for use in direct sunlight thanks to its transflective color display.

512 MB internal memory;
USB port for additional results storage

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

Transflective 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

You need VDSL2 and Ethernet to deliver HD IPTV

VDSL2's high-speed capability not only breathes new life into your existing copper plant but it allows you to reduce churn and gain market share in delivering triple-play services to your customers. High-definition (HD) IPTV service is the killer application for VDSL2 deployment as it requires the most bandwidth and the best quality of service (QoS) that your customers have come to expect.
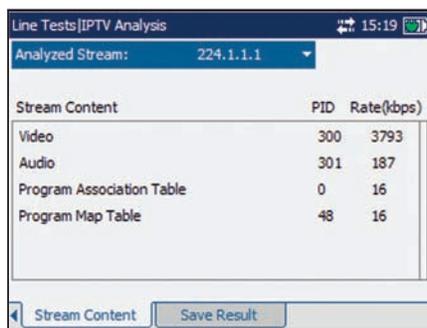
EXFO's AXS-200/635 offers a quick, yet thorough method for testing triple-play services–VDSL2 and Ethernet-based data, VoIP and IPTV testing–using pass/fail-driven automated functionalities.

In addition to validating connectivity to the DSLAM, the AXS-200/635 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-200/635 also monitors residential VoIP call flow and statistics, facilitating VoIP QoS assurance.
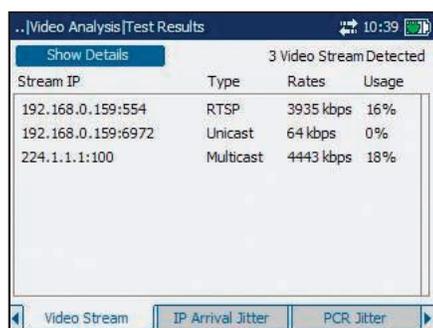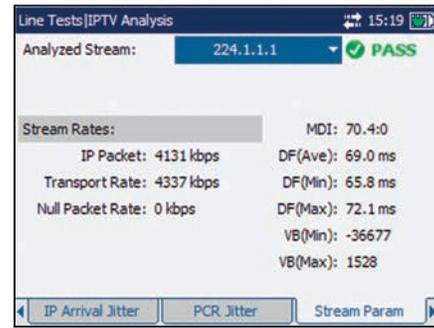

Simultaneous detection of multicast (RTP/UDP), unicast (RTP/UDP) and TCP/RTSP VOD streams.

IPTV Test Results screen showing PID Viewer.

Test Results screen showing stream parameters such as MDI.

Impulse Noise Protection +

You need to provide your customers with comprehensive assurance against poor triple-play services. With this in mind, the telecom industry has adopted the DSL-based impulse noise protection (INP) parameter, which is particularly important when deploying IPTV services based on VDSL2 and ADSL2+. For example, the INP helps reduce the amount of macro-blocking in an IPTV stream caused by short duration and intermittent impulse noise spikes. However, the downside of standard INP implementation is that it can limit the speed of VDSL2 (or ADSL2+) offered to customers as well as the addressable service area (distance).

The AXS-200/635 supports the traditional INP parameter as well as Broadcom's innovative approach to INP called PhyR™. This technology allows for significantly lower BER, higher DSL rate and longer reach compared to standard INP implementations. As a result, the AXS-200/635 can be used to verify and ensure consistent QoS for DSL-based IPTV deployments without impacting speed or performance of the DSL link.
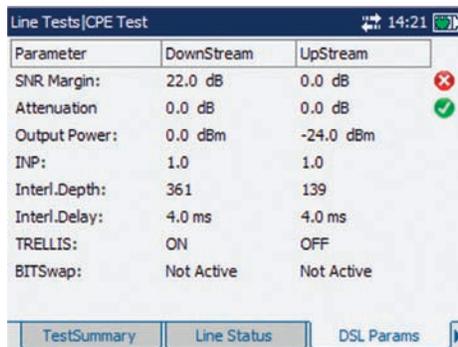
DSL Results screen.

True Backward-Compatible and Interoperable Testing

Since the AXS-200/635 is based on the industry-leading Broadcom chipset, you are assured of excellent interoperability for VDSL2 and ADSL2+ when testing against other Broadcom chipset-based devices as well as other manufacturer chipsets.

Thanks to the AXS-200/635's Broadcom chipset, you can use the Broadcom's Nitro mode when testing ADSL2+ to effectively negotiate with DSLAM (also using a Broadcom chipset) in order to achieve data rates as high as 30 Mbit/s (depending on DSLAM setup, loop length, noise influences and circuit quality).

ADSL2+ Test Results screen.

VDSL2 Test Results screen.

Key Features

|	
INP and PhyR™	Supports Broadcom's PhyR™ functionality and legacy impulse noise protection parameters
User-definable automated test routines	Presents easy-to-interpret pass/fail results
FTTx support	Enables DSL and 10/100 Mbit/s Ethernet assessment of triple-play services in Terminate and Pass Through mode
IPTV analysis	Provides key IPTV qualification parameters with features such as set-top box (STB) emulation, join/leave requests, PCR jitter analysis and PID viewer
MDI reporting	Supports media delivery index (RFC 4445) for evaluating the IPTV quality of experience
VoIP analysis	Ensures VoIP services are not affected by packet loss or jitter
Data analysis	Offers a common set of measures such as ping, traceroute, HTTP speed testing and FTP speed testing to ensure reliable and consistent Internet connectivity
Multilayer fault analysis histogram	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 Testing: Get the Whole Picture

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-200/635 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).

Test Results screen—Auto tests.
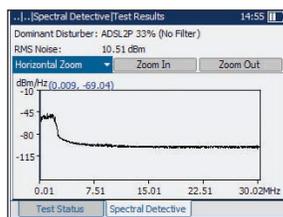
Test Results screen—PSD noise.
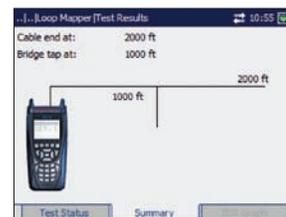
Test Results screen—Loop Mapper.

## Detecting Excessive Spectral Noise
Use the AXS-200/635's 30 MHz Power Spectral Density 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.

Loop Mapper Makes It Simple
The AXS-200/635'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.

Complete Metallic Testing Including Digital Multimeter (DMM) and Voice Frequency (VF)
With the AXS-200/635, 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-200/635 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.
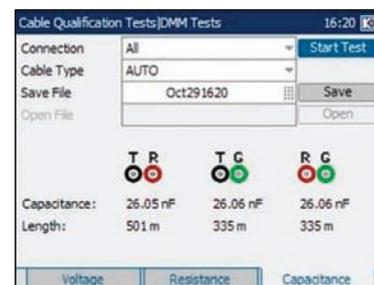
DMM capacitance test screen.

Multiple Applications, One Test Set
EXFO's AXS-200/635 integrates the capabilities of both the AXS-200/610 30 MHz Copper Test Set and the AXS-200/630 VDSL2, ADSL2+ and IP Triple-Play Test Set. It's the all-in-one solution for complete copper/DSL/triple-play assessment on the local loop.

Application	AXS-200/610	AXS-200/630	AXS-200/635
Copper fault location	✔		✔
Copper troubleshooting	✔		✔
Narrowband testing	✔		✔
ADSL2+/VDSL2 prequalification	✔		✔
VDSL2 service verification		✔	✔
ADSL2 service verification		✔	✔
IPTV analysis (DSL and Ethernet)		✔	✔
VoIP analysis (DSL and Ethernet)		✔	✔
Data analysis (DSL and Ethernet)		✔	✔
INP and/or PhyR™ support		✔	✔
DSL Annexes A, B and L support		✔	✔
Annex M support		✔	✔

xDSL/Triple-Play Testing Specifications

VDSL2 VTU-R-MODULE

Chipset	Broadcom
Standard Compliance	
VDSL2	ITU-T G.993.2
ADSL1/2/2+	Annex A option (over POTS): ITU-T G.992.5 (ADSL2+), ITU-T G.992.3 (ADSL2), 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), ITU-T G.992.1 (G.DMT) and UR2 Annex L (RE-ADSL) and Annex M are also supported
DSL measurements (upstream and downstream)	Maximum attainable bit rates
	Actual achieved bit rates
	Latency mode: fast, interleaved
	Capacity
	Signal-to-noise ratio (SNR) margin
	Output power
	Attenuation
	Carrier load (bits/bin)
	Interleave depth
	Interleave delay
	Trellis coding
	Bit swapping
Miscellanous functions/measurements	PhyR™ and INP support
	ATM F4 and F5 OAM loopback (ADSL1/2/2+ modes only)
	Link errors FEC, CRC, HEC
	Loss of sync counter
	VDSL2 per band information

IPTV-OVER-DSL/ETHERNET TESTING

Physical-layer support	VDSL2
	ADSL1/2/2+
	Ethernet 10/100
Supported video compression/standards	MPEG2, MPEG4 part 2 and 10 (H.264/AVC), WM9
Operation	Terminate and Pass Through
IPTV parameters/functionality	Video streaming (channels) detection
	IGMP join/leave requests with STB emulation
	Bandwidth usage per channel
	IGMP packets information
	Set-top box (STB) traffic/setup information
	Key IP video QoS parameters: packet loss, packet jitter, zap time, PCR jitter, PID statistics
	Media delivery index (MDI) showing delay factor, media loss rate and virtual buffer
	QoS pass/fail indicators
	Graphic results: bandwidth usage and multilayer fault analysis histogram
	IP packet and PCR jitter histograms
	Multicast/unicast RTP/UDP IP stream support
	TCP/RTSP VOD support
	Multiple downstream PVC in ATM mode for IPTV
IP connectivity support	DNS, DHCP client/server, NAT, VLAN

VoIP-OVER-DSL/ETHERNET TESTING

Physical-layer support	VDSL2
	ADSL1/2/2+
	Ethernet 10/100
Recognized signalling protocol	Session initiation protocol (SIP) v2 (RFC 3261)
Operation	Pass Through
Recognized codecs	G.711, G.729, G.726, G.723
VoIP parameters/functionality	Call monitoring/analysis/statistics
	Call flow
	Key VoIP QoS parameters: packet loss, packet jitter
	QoS pass/fail indicators
	Graphic results: delay distribution, jitter histogram
IP connectivity support	DNS, DHCP client/server, NAT, VLAN

xDSL/Triple-Play Testing Specifications (continued)

DATA ANALYSIS MODE

Physical-layer support	VDSL2 ADSL1/2/2+ Ethernet 10/100
Encapsulation methods	PPPoE (RFC 2516), RFC 2684 supporting bridged Ethernet (IPoE), IPoA (RFC 1577), PPPoA/LLC and PPPoA/VC-MUX (RFC 2364)
Operation	Terminate and Pass Through
Login format	Username and password using PAP or CHAP
IP connectivity support	DNS, DHCP client/server, NAT, VLAN
Ping	Pings another device on the network Ping device: Gateway, destination IP address or URL 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 Results: Time, speed in kbit/s
FTP speed test	Displays speed to upload and/or download a file Address: IP or URL Protocol: FTP Results: Time, speed in kbit/s

Copper Testing Specifications [a]

RECEIVER CHARACTERISTICS [b]

Receive frequency	200 Hz to 10 kHz, resolution 1 Hz
Receive frequency	10 kHz to 20 kHz, resolution 10 Hz
Receive frequency	20 kHz to 30 MHz, resolution 1 kHz
Frequency uncertainty (accuracy)	±0.1 %
Receive level (dBm)	−90 to +10 at 100 Ω or 135 Ω, resolution 0.1 dB
	−100 to +10 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, 600 and 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 (dBm)	−10 to +10 at 100 Ω or 135 Ω	
	−20 to +10 at 600 Ω	
Frequency uncertainty (accuracy)	The better of ±50 ppm or ±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) (dB)	±1
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 (dBm)	−60 to +10
Uncertainty (accuracy) (dB)	±1.0
Level uncertainty (accuracy) (dB)	±1.0 at −60 dBm

VF LONGITUDINAL BALANCE

Frequency (Hz)	1004
Frequency uncertainty (accuracy)	±50 ppm
Level range (dB)	0 to 80
Level uncertainty (accuracy) (dB)	±1

TIME-DOMAIN REFLECTOMETRY (TDR)

Mode	One shot, continuous (auto-repeat) with cursor and zoom
Distance range (m)	8 to 6000 (25 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	7.5 V p-p on cable, 9 V p-p open circuit
Velocity of propagation (VOP)	0.400 to 0.999 or 120 m/µs to 299 m/µs
Distance uncertainty [c] (accuracy) (m)	±(1.4 m + 2 % x distance) or ±(4.5 ft + 2 % x distance)
Units	Feet and meters
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)

FREQUENCY-DOMAIN REFLECTOMETRY (FDR)

Distance range (m)	1.5 to 5000 (5 ft to 18 000 ft)
Velocity of propagation (VOP)	0.400 to 0.999 or 120 m/µs to 299 m/µs
Distance uncertainty (accuracy) (m)	±(3, 3 to 1000) ±(15, 1000 to 1500) ±(30, 1500 to 5000)
Units	Feet and meters

LOAD COIL DETECTION

Count	Five
Plot (kHz)	Up to 10
Distance range (m)	Up to 8000 (up to 27 000 ft)

SINGLE-END FREQUENCY RESPONSE (ATTENUATION)

Distance range (m)	12 to 5000 (40 ft to 16 000 ft)
Frequency range	4.3 kHz to 30 MHz
Frequency uncertainty (accuracy)	±50 ppm
Level uncertainty (accuracy) (dB)	2 dB, 4 dB at 30 MHz
Resolution (dB)	0.1
Horizontal scale (MHz)	ADSL2+ = 2.208, VDSL2-12 = 12, VDSL2-17 = 17.66, VDSL2-30 = 30
Vertical scale (dB)	0 to +100

NOTE a. At 23 °C ± 1 °C on batteries, unless otherwise specified.
b. Characteristics are subject to instrument noise floor (approx. −70 dBm). Levels below −70 dBm can be measured using the PSD noise test.
c. Does not include the uncertainty due to VOP.

Copper Testing Specifications (continued)

POWER SPECTRAL DENSITY (PSD) NOISE MEASUREMENT

Test type	Continuous or peak-hold
Vertical scale	−10 dBm/Hz to −145 dBm/Hz or +20 dBm 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) (dB)	±2

SWEPT LONGITUDINAL BALANCE TEST

Frequency uncertainty (accuracy) (ppm)	±50
Level uncertainty (accuracy)(dB)	±2.0
Vertical scale (dB)	0 to 80.0 up to 2.2 MHz
	0 to 60.0 up to 30 MHz
Horizontal scale	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

DIGITAL MULTIMETER (DMM)

Measurement	Range	Resolution	Uncertainty (accuracy)
DC voltage	0 to 200 V	1 V	the better of ±2 % or ±1 V
AC voltage	0 to 140 Vrms	1 V	the better of ±2 % or ±1 V
Resistance	0 to 999 MΩ	3 digits	
	0 to 999 Ω		the better of ±2 % or ±5 Ω
	1 kΩ to 99 MΩ		±(2 % + 1 digit)
	100 MΩ to 999 MΩ		±(5 % + 1 digit)
	Distance up to 30 000 m (100 000 ft)		
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-200/635 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	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, the better of ± 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

RESISTIVE FAULT LOCATION (RFL)

Test type	Single pair and separate good pair
Fault detection (MΩ)	0 to 20
Resolution	3 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 ft/1 m resolution)
Uncertainty (accuracy)	The better of 0.2 Ω or ±2 %

GENERAL SPECIFICATIONS

Module size (H x W x D)	283 mm x 125 mm x 92 mm	(11 $^1/_8$ in x 4 $^{15}/_{16}$ in x 3 $^5/_8$ in)
Module weight (with battery)	1.3 kg	(2.8 lb)
Temperature		
operating	0 °C to 50 °C	(32 °F to 122 °F)
storage	−20 °C to 60 °C	(−4 °F to 140 °F)
Humidity	5 % to 95 % relative, non-condensing	
Power supply		
input	100-240 VAC at 1.8 A, 50 Hz to 60 Hz	
output	18-24 VDC at 3.33 A to 2.50 A, 60 W	
Battery	Internal rechargeable Li-Ion battery, with battery state indication	
Test connections	Five-color banana connector for T, R, G, T1, R1	
	RJ-45 for ADSL2+ and Ethernet 10/100 WAN	
	RJ-45 for Ethernet 10/100 LAN	
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 MB	
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: RJ-45 to telco clip
ACC-RJRJ: RJ-45 Ethernet cable
ACC-5COLR: Five-color 4 mm banana connector
ACC-STRP: RFL strap

ORDERING INFORMATION

AXS-635-XX-XX-XX

Model
AXS-635 = Copper, VDSL2, ADSL2+ and IP Triple-Play Test Set

DSL modules
V2XA = VDSL2 with ADSL2+ Annex A
V2XB = VDSL2 with ADSL2+ Annex B

Copper software options
00 = Without software ugrade
LOOPMAPPER = Loop Mapper functionality
VDSL2WB = 30 MHz support

DSL software options
00 = Without software ugrade
MDI = Media delivery index [a]
ADSL2+M = Annex M support
TPP-BUNDLE = Triple-play bundle (IPTV, VoIP and data analysis support)

Example: AXS-635-V2XA-ADSL2+M-LOOPMAPPER

Note
a. Available only if TPP-Bundle is selected.

Rugged Handheld Solutions

OPTICAL
— OTDRs
— OLTSs
— 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
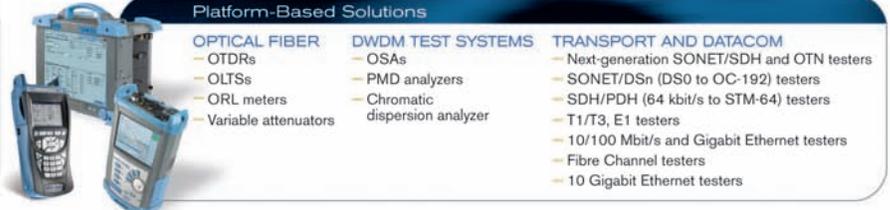
Platform-Based Solutions

OPTICAL FIBER
— OTDRs
— OLTSs
— 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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