

AXS-200/610

30 MHz COPPER TEST SET



As part of the SharpTESTER Access Line, this tool identifies copper problems affecting triple-play quality

KEY FEATURES

Visual reports, graphs and histograms are generated, displaying signal and noise issues

30 MHz spectrum analysis for VDSL2 and video prequalification and troubleshooting

Single-ended tests that minimize repair time and costs

Automated, clear pass/fail results that speed up and simplify test cycles

SPEC SHEET

LOCATE, INTERPRET AND REPAIR LOCAL LOOP FAULTS WITH EASE

Ensure QoS for Triple-Play Deployments

For many telcos, the launch of ADSL technology has gone quite smoothly; however, preparing the copper loop plant for triple-play services is another story—let alone deploying IPTV over the latest DSL, VDSL2. EXFO's AXS-200/610 Copper Test Set enables field technicians to view the entire VDSL2 spectrum in order to identify and find disturbances and signal issues that affect voice and video delivery over the last mile. It also offers an extensive range of single-ended tests that help field technicians quickly locate and repair the faults that affect quality of service (QoS).

EASY OPERATION. CLEAR RESULTS. A STRAIGHTFORWARD TEST SOLUTION.

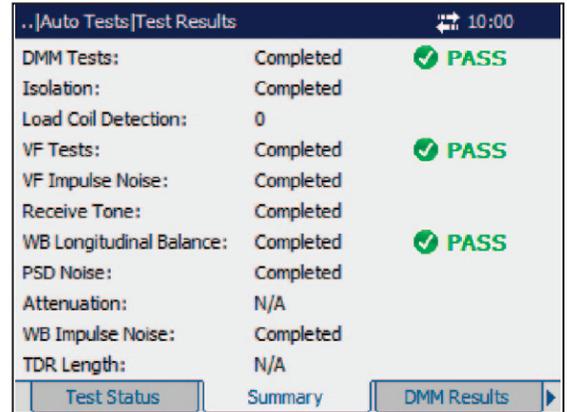


30 MHz Advanced Local-Loop Testing

Thanks to a 30 MHz bandwidth and wide dynamic range, the AXS-200/610 can test the local loop for almost every service that can be carried. Loop qualification becomes simple with the AXS-200/610's service-specific automated tests, reference cursors, specific noise filters and specialized loop evaluation algorithms. This unit is ideal for VDSL2, ADSL2+, ADSL2, ADSL, G.SHDSL, HDSL, HDSL2, T1/E1 and ISDN.

Prequalification in Seconds with the Automated Test Pass/Fail Indication

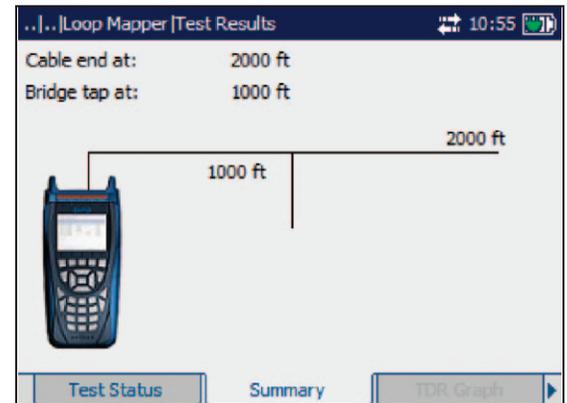
Providing complete feedback for quick pass/fail analysis thanks to its Auto Test feature, the AXS-200/610 simplifies the technician's job. This convenient, single-ended test tool allows for fast cable assessment to determine whether or not it is acceptable for VDSL2 and ADSL2+ services, based on predefined pass/fail criteria.



Auto-test screen.

No More Guesswork with the Loop Mapper

The AXS-200/610'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 current line conditions, Loop Mapper displays a straightforward wiring diagram that contains distances, for easy interpretation.



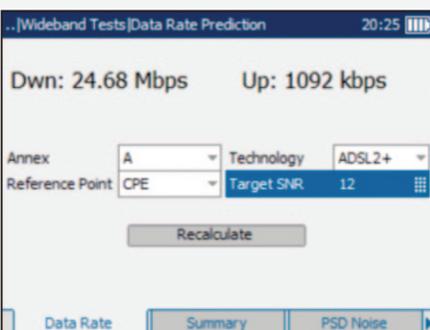
Loop Mapper Test Results screen showing bridge tap.

Single-Ended Video and Data Rate Analysis

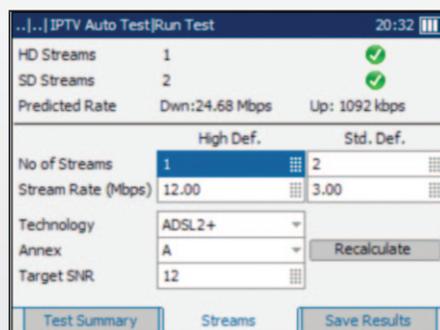
The AXS-200/610 single-ended video and data rate analyzer software option allows you to determine the xDSL data rates that a copper loop will support, prior to connecting/provisioning the circuit. With this new feature, you can evaluate a circuit's ability to carry ADSL2+ bit rates at the CO or the customer premises and find out how many IPTV channels can be supported during the pre-deployment stage.

Thanks to this industry-leading option, you can:

- › Prequalify and validate circuits without having to install terminal equipment
- › Reduce the number of false positives (failed installs)
- › Decrease the cost of identifying up-sell opportunities (customers wanting newer/faster video and network applications such as ADSL2+ and IPTV)



Data Rate Prediction screen showing the forecasted ADSL2+ data rate.



Run Test screen showing the predicted IPTV channels.

Detecting Excessive Spectral Noise

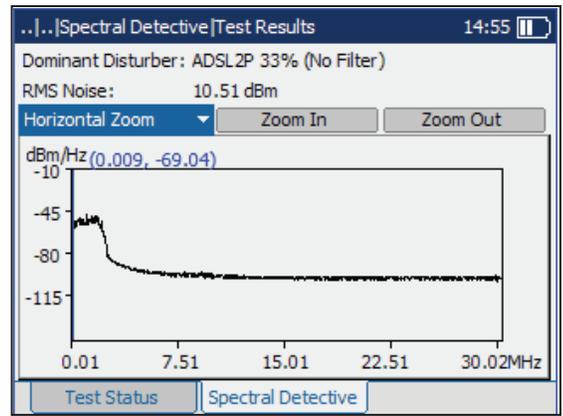
You can count on the AXS-200/610's Power Spectral Density Noise feature to manage the spectrum in your cable bundle. The unit's graphic display helps you determine which service is deployed on the loop and at what power level. This is the best technique to use in identifying signals that are too strong for the bundle, and it is essential in unbundled local loop environments for spectral policing.

Complete Metallic Testing with Digital Multimeter (DMM) and Voice Frequency (VF)

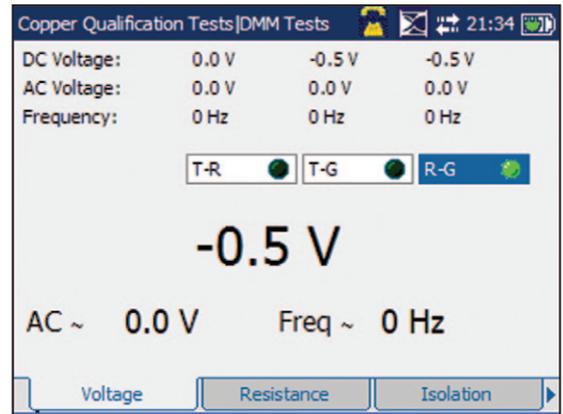
With the AXS-200/610, AC and DC voltage measurements are automatically performed and documented, without having to press countless buttons or having to move the test leads. The AXS-200/610 also measures AC and DC current to offer a complete picture of the electrical stability on the circuit under test. Additionally, it measures capacitance and resistance, including balance calculations for each. Capacitance and resistance measurements are automatically converted into distance values for loop-length assessment. The AXS-200/635 offers unique tests to detect the presence of corrosion and water in circuits to help technicians achieve faster and easier troubleshooting.

The Essential Triple-Play Last Mile Deployment Tool

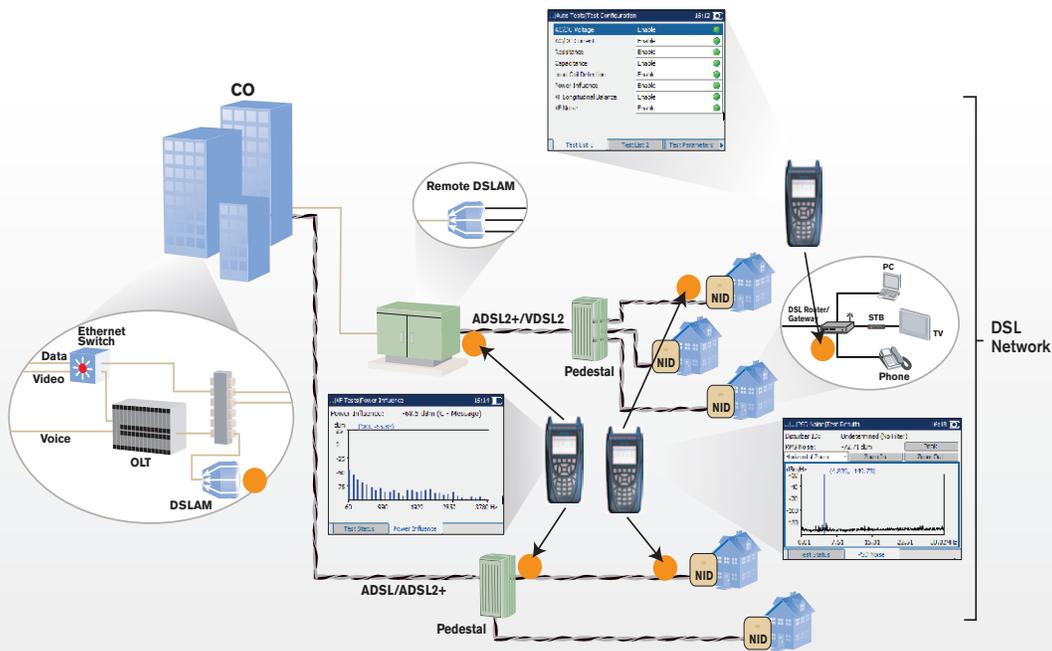
The AXS-200/610 is the ideal local-loop prequalification and troubleshooting tool for xDSL services, up to VDSL2. This instrument enables telcos and contractor personnel to identify the causes of unsuccessful triple-play, DSL and/or VF circuit deployment, while helping cable repair crews accurately locate and eliminate loop faults. The AXS-200/610 puts an end to the guesswork involved in locating loop faults, freeing up valuable staff and company resources, which saves 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-200/610 a money-saving tool.



Spectral Detective Test Results screen showing live disturber.



DMM Tests screen showing capacitive length.



Designed to Evolve with Your Network

Providing complete local-loop testing with a bandwidth of up to 30 MHz for copper/DSL/triple-play, the AXS-200/600 series is designed to evolve with your network. Additionally, these units offer accurate ADSL1/2/2+, VDSL2 and Ethernet-based analysis of triple-play services (voice, video and data).

SPECIFICATIONS^aRECEIVER 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)	±(50 ppm + 0.5 Hz)
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)	-20 to +5 at 600 Ω for 200 Hz to 499 Hz -20 to +10 at 600 Ω for 500 Hz to 20 kHz -10 to +10 at 100/135 Ω for 20 kHz to 30 MHz
Frequency uncertainty (accuracy)	±(50 ppm + 0.5 Hz)
Level uncertainty (accuracy)	±0.6 dB 200 Hz to 20 kHz at 0 dBm ±1 dB 20 kHz 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)

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

Notes

- At 23 °C ± 1 °C on batteries, unless otherwise specified.
- Characteristics are subject to instrument noise floor (approx. -70 dBm). Levels below -70 dBm can be measured using the PSD noise test.

SPECIFICATIONS (CONTINUED) ^a

VF LONGITUDINAL BALANCE

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

TIME-DOMAIN REFLECTOMETRY (TDR)

Mode	Fully automatic operation with location of most significant events
Distance range (m)	8 to 6000 (25 ft up to 20 000 ft)
Pulse width	15 ns to 20 µs
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 ^b (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), ±50 (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)	70 to 5000 (200 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

Notes

- a. At 23 °C ± 1 °C on batteries, unless otherwise specified.
- b. Does not include the uncertainty due to VOP.

SPECIFICATIONS (CONTINUED) ^a

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 dBm) to 0 dBm (90 dBm) 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)	±50 ppm
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
Isolation resistance	0 to 999 MΩ 0 to 999 Ω 1 kΩ to 99 MΩ 100 MΩ to 999 MΩ Distance up to 30 000 m (100 000 ft)	3 digits	the better of ±2 % or ±5 Ω ±(2 % + 1 digit) ±(5 % + 1 digit)
Resistance	0 to 30 MΩ 0 to 999 Ω 1 kΩ to 30 MΩ Distance up to 30 000 m (100 000 ft)	3 digits	the better of ±2 % or ±5 Ω ±(2 % + 1 digit)
Capacitance	1 nF to 10 μF Distance up to 30 000 m (100 000 ft)	3 digits	±(2 % + 1 digit)
DC current	0 to 110 mA	1 mA	±(2 % + 1 digit)
AC current	0 to 77 mA	1 mA	±(2 % + 1 digit)

Note

a. At 23 °C ± 1 °C on batteries, unless otherwise specified.

SPECIFICATIONS (CONTINUED) ^a

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	15 k Ω
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 (M Ω)	0 to 999 auto-ranging
Resolution	3 significant digits
Uncertainty (accuracy)	0 to 999 Ω , the better of $\pm 2\%$ or $\pm 5\%$ 1 k Ω to 99 M Ω , $\pm 2\%$ + 1 digit 100 M Ω to 999 M Ω , $\pm 5\%$ + 1 digit
Soak timer (s)	1 to 99

RESISTIVE FAULT LOCATION (RFL)

Test type	Single pair and separate good pair
Fault detection (M Ω)	0 to 20
Resolution	3 digits
Loop resistance (k Ω)	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 $\pm 2\%$

Note

a. At 23 °C \pm 1 °C on batteries, unless otherwise specified.

GENERAL SPECIFICATIONS^a

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)	1.2 kg (2.6 lb)
Temperature operating storage	0 °C to 50 °C (32 °F to 122 °F) -20 °C to 60 °C (-4 °F to 140 °F)
Humidity	5 % to 95 % relative, non-condensing
Power supply input	100 V to 240 V to AC at 1.8 A, 50 Hz to 60 Hz
Power supply output	18 V to 24 V DC at 3.3 A to 2.50 A, 60 W
Battery	Internal rechargeable Li-Ion battery, with battery state indication
Test connections	Five-color banana for T, R, G, T1 and 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 and Traditional), Russian, Korean

Note

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

STANDARD ACCESSORIES

Hand strap, Certificate of Compliance
 ACC-5COLR: Five-color 4 mm banana plugs terminated with telco clips, or ACC-5COLR4MM: Five-color 4 mm banana plugs terminated with 4 mm plugs with crocodile clips
 ACC-STRAP: RFL strap

ORDERING INFORMATION

AXS-610-XX

Model

AXS-610 = 30 MHz Copper Test Set

Software options

00 = Without software upgrade
 ADSL2+DRP = ADSL2+ data rate prediction
 VDSL2WB = 30 MHz wideband option
 LOOPMAPPER = Loop Mapper functionality

Example: AXS-610-VDSL2WB

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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. Contact EXFO for prices and availability or to obtain the phone number of your local EXFO distributor.

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