MaxTester 635

SMARTER COPPER QUALIFICATION AND XDSL PERFORMANCE VERIFICATION

EXFO Sync

EXFO Connect Compatible

smartR™

SPEC SHEET

A fast, easy-to-use and cost-effective solution for installation and activation of multiplay services over copper/ADSL2+/VDSL2 and Ethernet

KEY FEATURES AND BENEFITS

Supports single-pair and bonded ADSL2+ and VDSL2, including vectoring and G.INP, thereby enabling service providers to recover and grow wireline revenues

IPv4 and IPv6 data testing and web browser for complete service qualification

Ethernet testing for qualification of FTTx services at the customer premises

IPTV and VoIP test suites for automated quality of service (QoS) testing

SmartR™ features allow users to quickly and accurately determine physical copper circuit quality and locate faults

Adherence to existing methods and procedures is easy with single-ended testing, or via testing to a far-end device (FED), including high-voltage stressed-balance testing; finish up by uploading closeout tests to the cloud

Configurable pass/fail thresholds for automated testing

Designed to face the challenges of the outside plant environment with an IEC IP54 rating

THE MAXTESTER 600 SERIES

MAX-610
Copper test set

MAX-630
xDSL and Multiplay test set

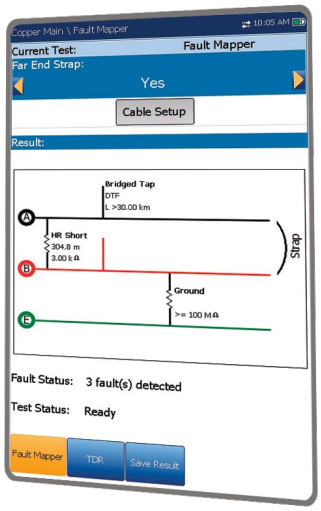
A NEXT-GENERATION TOOL FOR BROADBAND DEPLOYMENTS

EXFO's MaxTester 635 is the perfect tool for any service provider deploying multiplay services over single-pair or bonded ADSL2+ and/or VDSL2. Its small form factor, rugged design and easy-to-use menus make it the ideal tool for installation and repair technicians. With the MaxTester 635, the testing process is highly automated and technicians close their jobs quickly and efficiently. The MaxTester 635's large display makes it even more user-friendly, and when it comes to saving results, it provides technicians with many connectivity options for uploading tests and compiling reports.

WORK SMARTER WITH THE MAXTESTER 635

smartR™

Equipped with SmartR™, the MaxTester 635 allows technicians to work smarter, not harder. SmartR is a suite of intelligent and automated tests that allow any technician to quickly and easily get an understanding of the condition of the line under test, as well as to identify and locate a variety of common circuit faults. The Pair Detective feature automatically runs the most common line tests and provides graphical, color-coded results and pass/fail indications to *detect* conditions, including shorts, grounds, opens, battery, splits and imbalances. Fault Mapper utilizes time-domain reflectometry (TDR) and resistive fault location (RFL) technology to provide the additional capability of locating service-affecting line faults including bridged taps, shorts, grounds and opens. EXFO's unique SmartR presents results in an easy-to-understand, graphical format, with plain language feedback, making copper troubleshooting easier than ever before.



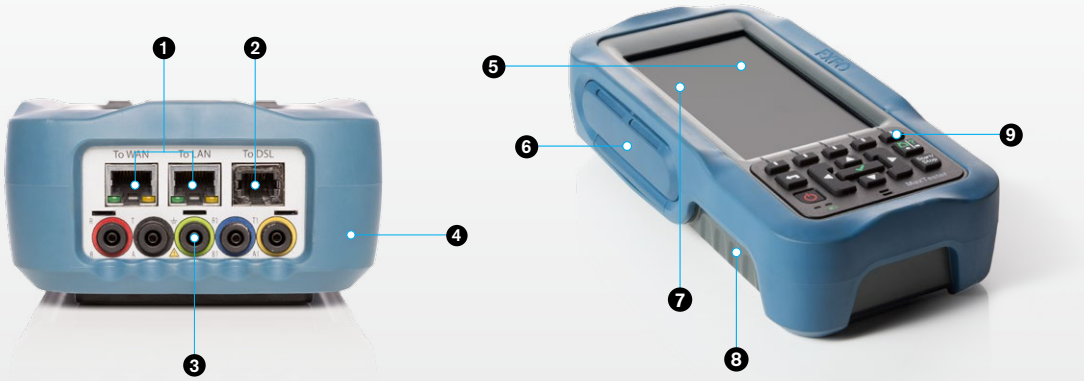
KEY DSL APPLICATIONS

- Ensures that the customer has the required bandwidth (downstream and upstream rates) for delivering triple-play services over single-pair or bonded ADSL2+ and VDSL2
- Validates that the IPTV and data services can operate on the circuit with the required QoS
- Verifies that the customer's modem/router, equipment and inside wiring are operating correctly
- Proves IPv4 and IPv6 data flow between the network and end equipment

KEY COPPER APPLICATIONS

- Detection of potential bottlenecks on subscriber loops to ensure high-quality, consistent and error-free multiplay services
- 30 MHz spectrum analysis for circuit qualification in any VDSL2 band plan (8, 12, 17, 30 and 35 MHz)
- Loop and fault analysis using proven TDR and RFL/K-test techniques for VDSL2 or ADSL2+ prequalification
- Measurement and reporting of suspect voltages, opens, shorts, and balance issues from a single end, or utilizing an FED that can be remote controlled by the MaxTester to put the necessary opens and shorts at the end of the circuit under test
- Determine the maximum ADSL2+, VDSL2-17a and VDSL2-35b data rates that a copper loop could support, prior to connecting/provisioning the circuit and equipment, with the MaxTester's Data Rate Prediction (ADRP) pre-qualification report

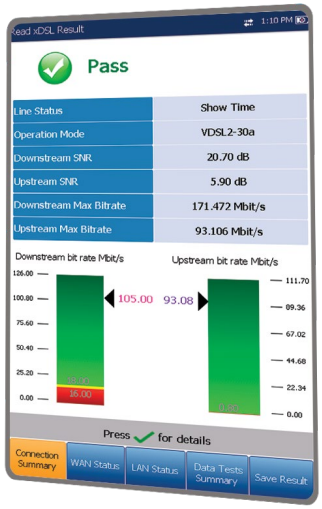
KEY CHARACTERISTICS

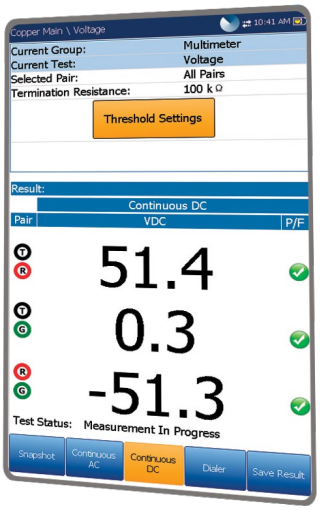


1. Dual Ethernet connectors—sealed against the environment
2. DSL connector—sealed against the environment
3. Copper connectors
4. All-round rubber bumper
5. Touchscreen color LCD—daylight visible
6. Interface connections—water and dirt protected
7. Innovative and icon driven user interface
8. Handgrip area
9. Simple keypad

SIMPLIFYING FTTx TESTING

Thanks to its DSL and dual Ethernet ports, the MaxTester 635 is a flexible tool for service providers qualifying services, from the central office or remote terminals to the customer's equipment. The MaxTester 635 also provides powerful troubleshooting applications that can be used in different modes to quickly isolate faults no matter where they are located (network, outside plant, customer equipment or inside wiring). Even in hybrid networks where FTTH is also deployed, the Ethernet ports of the MaxTester 635 can be used inside the home to test at any point where a LAN connection is available.

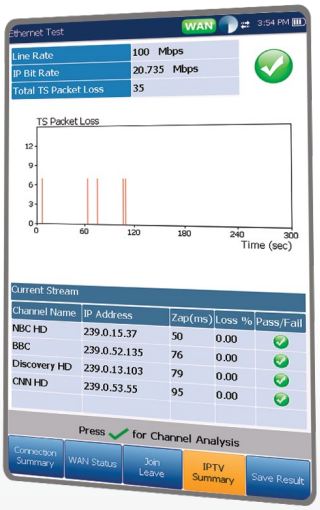




COMPREHENSIVE METALLIC TESTING

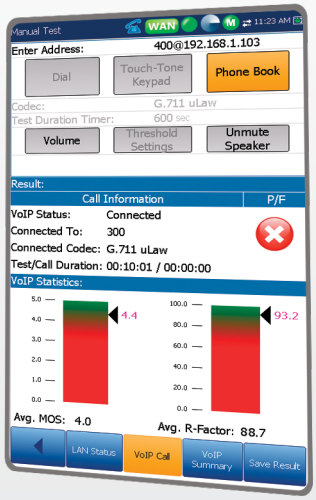
Verification of copper quality is a snap with the copper measurement capabilities of the MaxTester 635. Thanks to its industry-standard AC and DC voltage, resistance (shorts), capacitance (opens), power influence, balance and impulse noise measurements, technicians obtain results that are graphically clear and concise with pass/fail indications.

The MaxTester 635 also features a POTS dialer, an optional TDR with dual-trace comparison capability and an optional 2/4 wire RFL and K-test for pinpointing loop faults. The optional wideband testing suite allows the qualification of circuits at VDSL2 frequencies of up to 35 MHz and includes PSD, near-end crosstalk (NEXT), impulse noise and attenuation analysis. Technicians have the option of running single-ended tests, or running tests against an optional FED.



IPTV TESTING

To boost their revenues, many service providers are using DSL to deliver new multiplay services on their existing networks. Among these services, video (IPTV) is one of the fastest growing and is getting a high level of focus and investment. Knowing that customers are very sensitive when it comes to IPTV QoS (i.e., picture quality due to packet loss, zap time, etc.), technicians must be equipped with the right test sets to quickly and efficiently turn up IPTV services and meet customers' QoS expectations. With this in mind, the MaxTester 635 offers an optional IPTV test suite to provide both expert and entry-level technicians with a simple method to check the operation and quality of the offered video channels.



VoIP TESTING

The MaxTester provides SIP-based, voice-over-IP (VoIP) performance validation for service turn-up and troubleshooting. The VoIP function allows users to send or receive live VoIP calls to an FTB EXpert VoIP-enabled platform or IP phone. The MaxTester supports industry-recognized quality metrics (e.g., mean opinion score or MOS, R-factor) and performance metrics (e.g., latency, jitter).

WEB BROWSER

Many telcos require that technicians use a Web browser to confirm service operation or as visual proof to show the customer. Up to now, technicians required a PC in addition to the test set to do this. Thanks to the integrated browser of the MaxTester 635, carrying a laptop to the job location is no longer necessary. The MaxTester 635 is equipped with a browser that allows the user to access websites and load a Web page as part of any automated test, directly from the test set. Just as with any other browser, it can bookmark commonly used URLs and allows the user to save new ones in real time as needed.

ALL THE RIGHT FEATURES FOR INSTALLATION TECHNICIANS

With its small form factor, the MaxTester 635 can go anywhere the technician needs to go. It is rugged and light, and all connectors are protected from the rain–just what is needed for the demanding outside-plant environment.

Automated service testing

Thresholds can be set and saved for key copper and DSL parameters as well as for the data and IPTV service tests. When tests are run, users are given a clear graphical pass/fail result so they can quickly move on to the next job or investigate further. Test profiles can easily be transferred between units to ensure that all technicians from the same organization are testing to the same thresholds.

Easy-to-use GUI

The next-generation user interface of the MaxTester 635 was designed with first-level technicians in mind. The large touchscreen display features colored icons and graphics for easy configuration and operation, and is simple to use for both experienced and novice users. Users can “capture” important GUI screens, whether menu’s or test results with the Screen Capture capability of the MAX-610. Users can save the data to a USB memory device or upload to EXFO Connect’s File Manager.

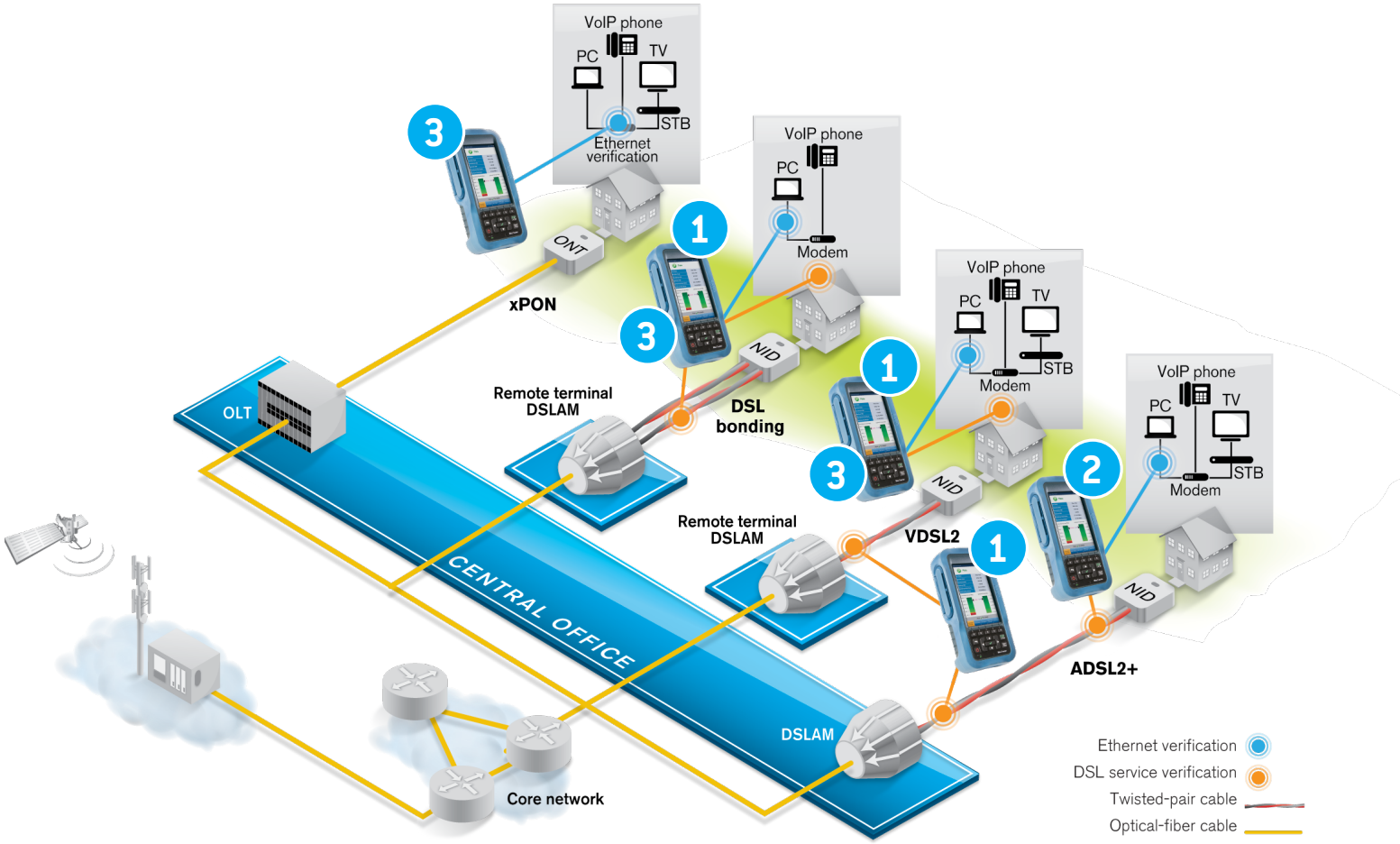
Asset and results management

In today’s highly competitive environment, quality of service delivered to subscribers is paramount for service providers. With solutions such as EXFO Connect and EXFO Sync coupled with the MaxTester 635, service providers can manage their fleet of MaxTester units and ensure that they have the most up-to-date software installed and properly configured. These solutions on the MaxTester 635 also make it possible for service providers to have test results in hand for data mining and post-analytics, thereby enabling them to proactively manage loop plants and ensure that they are of the highest quality.

Battery-powered

The MaxTester 635 is equipped with a battery using the latest technology in rechargeable cells. It provides the maximum testing time between charges, even when meeting the high-power demands of VDSL2. When charging is required, technicians can either use the optional 12 VDC vehicle charger or the supplied AC adapter.

MaxTester 635 OPERATIONAL MODES



1 ADSL2+/VDSL2 Terminate Mode

The MaxTester 635 synchronizes with the DSLAM on the circuit in the outside plant or at the NID, allowing authentication and service testing. Technicians can test ADSL2+ and VDSL2 single pair, ADSL2+ and VDSL2 bonding, as well as ADSL2+ PTM modes.

2 xDSL Pass Through Mode

The MaxTester 635 replaces the customer modem or router, synchronizes with the DSLAM, and enables authentication and service testing. It also allows the customer's applications to be used to confirm the correct operation for services such as PC Web access, IPTV viewing, STB operation and VoIP.

3 Ethernet Terminate Mode

The MaxTester 635 automatically synchronizes with 10/100Base-T ports inside the customer premises and allows authentication as well as service testing. In this configuration, the MaxTester 635 can be used in xDSL (FTTN), xPON (FTTH) or Ethernet deployments.

EXFO Connect

AUTOMATE ASSET MANAGEMENT. GET CONNECTED.

The EXFO Connect cloud-hosted solution provides an automated, secure environment that links your EXFO test instruments together and enables the management of your deployed inventory of test sets.

EXFO Connect enables automated downloads of the latest software versions to all test sets in the field to ensure consistency of testing across the organization. Test profiles and threshold settings may also be deployed to all units, to mandate testing according to the latest procedures. Enable EXFO Connect on your fleet of MaxTester units to improve operational efficiency at all levels of your business.

KEY FEATURES

TEST EQUIPMENT MANAGER
Automated inventory tracking and software download

FILE MANAGER
Download/upload files, work orders, test configurations or procedure documents

CONTRACTOR MODE
Secure, segregated access for test-result upload, and automated file download

Visit **EXFO.com/EXFOConnect** for details and features compatibility with the MaxTester handheld series.

EXFO Sync

REAL-TIME COPPER TEST RESULTS UPLOAD—STRAIGHT FROM THE FIELD

Working in the field with an Android™ device?
Download the EXFO Sync application for your Android*.

EXFO Sync is an Android application that operates together with EXFO's MAX-635 Copper, DSL and IP field test set. This application provides a fully automatic copper test script and WiFi transfer of the results files to a phone or tablet for upload to the customer's server.

With the EXFO Sync application, your copper test results can be uploaded in real-time to a central location for access and further analysis to identify trouble patterns, assess technician performance or target customers for upsell to higher revenue services.

- Copper test result are uploaded, live from the site
- GPS tagging gives visibility of location of test for mapping of test history and network performance
- Ensure compliance to service provider workflow process
- Flexibility to upload test results to an FTP server
- Secure, password-protected connection to upload and access results

* Upload to Android devices is supported only over WiFi and only for the copper and DSL autotests.

Download from Google play

EXFO

DSL SPECIFICATIONS

DSL chipset	Broadcom	
Standards compliance	ADSL1/2/2+	ITU-T G.992.5 (ADSL2+ including Annex A, B, J, M) ITU-T G.992.3 (ADSL2 including Annex A, B, J, L) ITU-T G.992.1 (G.DMT including Annex A, B) ITU-T G.994.1 ATIS/ANSI T1.413 Issue 2 IEEE 802.3ah (PTM) ITU-T G.998.x (ATM, Ethernet bonding) ITU-T G.998.4 (G.INP) DT 1 TR 112 U-R2
	VDSL2	ITU-T G.993.2 Annex A, B, Y Profiles: 8a/b/c/d, 12a/b, 17a, 30a Band Plan: 997, 998, US0 IEEE 802.3ah (PTM) ITU-T G.998.2 (Ethernet bonding) ITU-T G.998.4 (G.INP) ITU-T G.993.5 (G.Vector) DT 1 TR 112 U-R2 (U-RV2)
DSL parameters	Maximum attainable bit rates Actual achieved bit rates Actual bonded achieved rates Latency modes: fast, interleaved Data modes: ATM, PTM Capacity (%) Signal-to-noise ratio (SNR) margin Output power Attenuation Bits/bin Attenuation/bin (Hlog/bin) QLN/bin SNR/bin Vendor code, revision	Interleave depth Interleave delay Trellis coding Bit swapping INP Nitro PhyR, G.INP state, performance counters Vectoring state, performance counters Modes: PTM, ATM, Nitro LOS, FEC, CRC, HEC LATN per band SATN per band EWL kl0 and kl0 per band

MULTIPLAY TESTING SPECIFICATIONS

Test interfaces	› VDSL2 › ADSL1/2/2+ › Ethernet 10/100 BT	
Encapsulation methods	› RFC 2684/Bridged Ethernet/IPoE (IPv4 and IPv6) › IPoA (RFC 1577)	› PPPoE (RFC 2516) › PPPoA/LLC and PPPoA/VC-MUX (RFC 2364)
Operating modes	› DSL Terminate › Modem Replacement (DSL to Ethernet) Pass Through	› Ethernet Terminate
Login format	› User name and password using PAP/CHAP	
Connectivity support	› IPv4 and IPv6 LAN/WAN status › IPv4 and IPv6 DNS, gateway › IPv4 DHCP client/server, DHCP vendor class › IPv6 DHCP client › NAT	› VLAN ID, VLAN tagging › VPI/VCI › IP release › Multi-VLAN support
Ping test	› Ping destination › Number of pings › Packet size › Timeout › Results	› Gateway, IPv4 address or URL › 1 to 99 › 32 to 1200 bytes (32 is default) › 1 to 10 seconds › Packets sent/received, average round-trip delay (ms)
Traceroute test	› Traceroute destination › Timeout › Packet size › Number of hops › Results	› Gateway, IPv4 address or URL › In seconds, default is 1 s, maximum is 10 s › 32 bytes › 1 to 32 (default is 30) › Indicates IPv4 address of hop and round-trip time in milliseconds (ms)
FTP test	› Address › Direction › Results	› IPv4 address or URL › Upload and/or download › Time, kB transferred, bit rate in kbit/s
Web browser (software option)	› Address › Bookmarks	› IPv4 address or URL › User-definable
VoIP testing (software option)	› Protocol support › Codecs › Interface support › Parameter/functionality	› SIP (IPv4) › G.711 μ-Law, G.711 A-Law › ADSL1/2/2+, VDSL2, Ethernet › Test duration timer › MOS (current, average) › R-Factor (current, average) › Latency (current, average, maximum) › Jitter (current, average, maximum) › Packets (lost, total)
IPTV testing (software option)	› Supported video standards › Operating modes › IPTV parameters/functionality	› MPEG2, MPEG4 part 2 and 10 (H.264/AVC), Microsoft Mediaroom/WM9/VC1 › DSL Terminate › Ethernet Terminate › IGMP (IPv4) join/leave requests with STB emulation › Automatic tests to join/leave and analyze up to five simultaneous streams › Programmable channel list for storage of commonly used channels › Bandwidth usage per channel › IGMP (IPv4) packet and rate information per line and channel › Multicast/unicast RTP/UDP IP stream support › Key IP video QoS parameters, packet loss, zap time, PID statistics › Graphical results › Transport

COPPER SPECIFICATIONS [a, b, c]

Transmitter characteristics				
Frequency range (200 Hz to 20 kHz)	Frequency resolution		1 Hz steps	
	Frequency uncertainty (accuracy)		± (50 ppm + 1 Hz)	
	Level range (dBm)		–20 to 10 at 600 Ω	
	Level resolution		0.1 dB	
	Level uncertainty (accuracy)		±1 dB	
	Impedance (Ω)		600	
Frequency range (20 kHz to 2.2 MHz)	Frequency resolution		1 kHz steps	
	Frequency uncertainty (accuracy)		± (50 ppm + 100 Hz)	
	Level range (dBm)		–20 to 10 at 100 Ω	
	Level resolution		0.1 dB	
	Level uncertainty (accuracy)		±1 dB	
	Impedance (Ω)		100, 120, 135, 150	
Frequency range (2.2 MHz to 30 MHz)	Frequency resolution		1 kHz steps	
	Frequency uncertainty (accuracy)		± (50 ppm + 100 Hz)	
	Level range (dBm)		–20 to 0 at 100 Ω	
	Level resolution		0.1 dB	
	Level uncertainty (accuracy)		±1 dB	
	Impedance (Ω)		100, 120, 135, 150	
Receiver characteristics	Reception frequency range		200 Hz to 20 kHz 20 kHz to 35 MHz	
	Frequency uncertainty range (accuracy)		± (50 ppm + 1 digit)	
	VF reception level range (dBm)		–90 to 15 at 600 Ω	
	VF level uncertainty (accuracy)		200 Hz to 20 kHz –90 dBm to –50 dBm, uncertainty (accuracy) ±2 dB –50 dBm to 15 dBm, uncertainty (accuracy) ±1 dB	
	WB reception level range (dBm)		–90 to 15 at 100 Ω and 135 Ω	
	WB level uncertainty (accuracy)		20 kHz to 2.2 MHz –90 dBm to –50 dBm, uncertainty (accuracy) ±2 dB –50 dBm to 15 dBm, uncertainty (accuracy) ±1 dB 2.2 MHz to 30 MHz –90 dBm to –50 dBm, uncertainty (accuracy) ±2 dB –50 dBm to 15 dBm, uncertainty (accuracy) ±1 dB	
	Impedance (Ω)		100, 120, 135, 150, 600	
POTS dialer	DTMF		0 – 9, #, *	
	Phonebook		25 entries	
Digital multimeter (DMM)	Test type		Snapshot and continuous	
	Impedance selection (for voltage measurement)		100 kΩ, 1 MΩ	
	Measurement	**Range**	**Resolution**	**Uncertainty (accuracy)**
	DC voltage	0 to 400 V	0.1 V for 0 to 99.9 V 1 V for 100 V to 400 V	± (|1 %| + 0.5 VDC)
	AC voltage	0 to 280 Vrms	0.1 V for 0 to 99.9 V 1 V for 100 V to 280 V	± (1 % + 0.5 VAC)
	Isolation resistance (stress/leakage)	0 to 1 GΩ, auto-ranging 1 kΩ to 99 MΩ 100 MΩ to 999 MΩ	Three digits	 ± (2 % + 1 digit) ± (5 % + 1 digit)
	Resistance	0 to 100 MΩ 0 to 999 Ω 1 kΩ to 100 MΩ	Three digits	 ± (1 % + 5 Ω) ± (2 % + 1 digit)
	Capacitance	0.1 nF to 2 µF	Four digits	± (2 % + 50 pF)
	DC current	0 to 110 mA	0.1 mA	± (|2 %| + 1 mA)
	AC current	0 to 110 mA	0.1 mA	± (|2 %|+ 1 mA) [d]
	Station ground	0 to 1 MΩ 0 to 999 Ω 1 kΩ to 1 MΩ	Up to three digits	 ± (1 % + 3 Ω) ± (2 % + 1 digit)

Notes

a. Subject to change without notice.

b. Typical, at 23 °C ± 3 °C, on batteries, with no type B USB connection.

c. Specifications based on 24 AWG (PE 0.5 mm) cabling.

d. From 10 mA to 110 mA.

COPPER SPECIFICATIONS [a, b, c] (continued)

Isolation resistance (stress/leakage) (continued)	Source	50 to 500 VDC (current safely limited to 2 mA)
	Soak timer (s)	1 to 60
VF noise measurement	Frequency range	200 Hz to 20 kHz
	Level range (dBm)	–90 to 20
	Resolution (dB)	0.1
	Uncertainty (accuracy)	–90 dBm to –50 dBm, uncertainty (accuracy) ±2 dB –50 dBm to +20 dBm, uncertainty (accuracy) ±1 dB
	Filters	ITU: none, psophometric, P-notched, 3.4 kHz, D-filter, 15 kHz ANSI: none, C-message, C-notched, 3.4 kHz, D-filter, 15 kHz
	Impedance	600 Ω
VF impulse noise	Low threshold (dBm)	–40 to 0, 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	Maximum 100 hours
Power influence (noise to ground)	Noise range (dBm)	–60 to 10
	Uncertainty (accuracy)	–60 dBm to –50 dBm ± 2 dB –50 dBm to 10 dBm ± 1 dB
VF longitudinal balance	Frequency (Hz)	1004
	Level range (dB)	0 to 100
	Level uncertainty (accuracy) (dB)	±1
	Impedance	600 Ω
Time-domain reflectometer (TDR)	Modes	Automatic, Manual, Peak, Xtalk (Crosstalk), Differential
	Distance range (m)	0 to 6700 (0 ft up to 22 000 ft)
	Pulse width	15 ns to 20 µs
	Amplitude	7.5 V p-p on cable, 9 V p-p open circuit
	Velocity of propagation (VOP)	0.400 to 0.999
	Distance uncertainty (accuracy) [d] (m)	±(0.5 m + 1 % x distance)
	Units	Meters and feet
Load coil detection	Count	Up to 5
	Plot (kHz)	Up to 10
	Distance range (m)	Up to 8000 (up to 27 000 ft)
Near-End Crosstalk (NEXT)	Frequency range	10 kHz to 30 MHz
	Level range	0 to 90 dB
	Level resolution	0.1 dB
	Level uncertainty (accuracy)	2.2 MHz: ±2.0 dB, from 0 to 90 dB 8 MHz: ±2.0 dB, from 0 to 80 dB 12 MHz: ±2.0 dB, from 0 to 75 dB 17.6 MHz: ±3.0 dB, from 0 to 75 dB 30 MHz: ±3.0 dB, from 0 to 68 dB
	Terminations	100, 120, 135, 150 Ω
Return Loss	Test Type Frequency range Dynamic range Resolution Uncertainty (Accuracy) Horizontal scale Vertical scale	Single, Sweep 20 kHz to 2.2 MHz 0 dB to 40 dB 0.1 dB ±0.5 dB, for dynamic range 0 dB to 20 dB 4.3125 kHz to 2.2 MHz , in 4.3125 kHz steps 0 dB to 50 dB

Notes

a. Subject to change without notice.

b. Typical, at 23 °C ± 3 °C, on batteries, with no type B USB connection.

c. Specifications based on 24 AWG (PE 0.5 mm) cabling.

d. Qualified up to 300 m (1000 ft) and does not include the uncertainty due to VOP.

COPPER SPECIFICATIONS [a, b, c] (continued)

Power spectral density (PSD)	Test type	Continuous with peak-hold
	Termination	Bridging (Hi-Z), 100, 120, 135, 150 ohm
	Vertical scale	15 dBm/Hz to –140 dBm/Hz or 20 dBm to –90 dBm
	Horizontal scale	4.3125 kHz to 17 MHz, in 4.3125 kHz steps or 8.625 kHz to 35 MHz, in 8.625 kHz steps
	Noise filters	None or E, F, G, ADSL2+, VDSL2-8, VDSL2-12, VDSL2-17, VDSL2-30 and VDSL2-35b
Wideband impulse noise	Threshold	–50 dBm (40 dBrn) to 0 dBm (90 dBrn) in 1 dB steps
	Termination	Bridging (Hi-Z), 100, 120, 135, 150 ohm
	Counter maximum	65 000 000
	Test duration	Maximum 100 hours
	Uncertainty (accuracy) (dB)	±2
	Noise filters	None or E, F, G, ADSL2+, VDSL2-8, VDSL2-12, VDSL2-17 and VDSL2-30
Wideband longitudinal balance	Level scale	0 up to 100 dB
	Level range uncertainty (accuracy)	2.2 MHz: ±2.0 dB, from 0 to 55 dB 8 MHz: ±2.0 dB, from 0 to 45 dB 12 MHz: ±3.0 dB, from 0 to 45 dB 17.6 MHz: ±3.0 dB, from 0 to 40 dB
	Level resolution	0.1 dB
	Frequency scale	ADSL/2+: 8.6 kHz to 2.2 MHz, in 8.6 kHz steps VDSL2-8 : 17.25 kHz to 8 MHz, in 17.25 kHz steps VDSL2-12: 17.25 kHz to 12 MHz, in 17.25 kHz steps VDSL2-17: 34.5 kHz to 17.6 MHz, in 34.5 kHz steps
	Frequency uncertainty (accuracy)	±(50 ppm + 1 digit)
Single-ended frequency response (attenuation) [d]	Distance range (m)	100 m to 5000 m (300 ft to 16000 ft)
	Frequency range (Hz)	4.3 kHz to 35 MHz
	Frequency uncertainty (accuracy)	± (50 ppm + 1 digit)
	Level uncertainty (accuracy) (dB)	± 2.0 dB typical for 2.2 MHz and 8 MHz ranges ± 3.0 dB for VDSL2-12 and VDSL2-17 ± 4.0 dB for VDSL2-30 ranges
	Resolution (dB)	0.1
	Horizontal scale (MHz)	ADSL2+ = 2.208, VDSL2-8, VDSL2-12 = 12, VDSL2-17 = 17.66, VDSL2-30 = 30, VDSL2-35 = 35
	Vertical scale (dB)	0 to +100
Resistive fault location (RFL)	Test type	Single pair (two wire), separate good pair (four wire) and Küpfmüller (K-test)
	Fault detection (MΩ)	0 to 20 for single faults; up to a total fault resistance of 30 for K-test double faults only
	Resolution	Three digits
	Loop resistance (kΩ)	10 maximum
	Multiple cable sections	Five (includes gauge and temperature setting)
	Fault location	Total resistance, near-end to fault resistance, fault to strap resistance (three significant digits, least significant digit 0.1 Ω) Total length, distance to fault, distance from fault to strap (three significant digits, least significant digit 1 m)
	Single fault uncertainty (accuracy)	±(0.1 Ω + 1% RTS)
	K-test uncertainty (accuracy) [e]	±(1 Ω + 1% RTS)
Stressed Balance	Level range	0 to 82 dBrnC
	Resolution	0.1 dBrnC
	Longitudinal excitation	135 VDC (0 dBm, ±1 dB reproducibility)

Notes

a. Subject to change without notice.

b. Typical, at 23 °C ± 3 °C, on batteries, with no type B USB connection.

c. Specifications based on 24 AWG (PE 0.5 mm) cabling.

d. Specification based on 1 kft 24 AWG cabling. Range depends on cable type and condition.

e. For double faults only.

GENERAL SPECIFICATIONS

Display	Touchscreen TFT LCD with backlight 152 mm (6 in) diagonal 800 x 480 resolution, WVGA
Test connections	RJ11 for ADSL2+/VDSL2 Five-color banana connector for T/A, R/B, G, T1/A1, R1/B1 RJ45 for Ethernet 10/100 WAN RJ45 for Ethernet 10/100 LAN
Results management	> 2 GB internal memory Single and bulk file export to USB memory devices FTP upload
Temperature range operating storage	 0 °C to 40 °C (32 °F to 104 °F) –20 °C to 60 °C (–4 °F to 140 °F)
Humidity	5 % to 95 % relative, non-condensing
Shock	1 m (39 in) drop per GR-196-CORE
Altitude	3000 m (9842 ft)
Input power	9-24 VDC, 2 A, 18 W via 90-220 VAC adapter or 12 V vehicle adapter
Battery	Internal rechargeable lithium polymer, with battery-state and level indications, adjustable auto-power down
Safety	CE and CSA marked
Size (H x W x D)	254 mm x 124 mm x 62 mm (10 in x 4 $^{7}/_{8}$ in x 2 $^{7}/_{16}$ in)
Weight (with battery)	1.9 kg (4.2 lb)
Water/dust ingress	Designed to comply with IP54
Differential voltage protection	354 VRMS or 1000 VDC max
Common mode voltage protection	354 VRMS or 1000 VDC
Voltage detection	> 20 V will trigger alarm message
Self-test	Routine on power-up
Connectivity	Two USB 2.0 client ports One USB Type B host port Optional WiFi support
Languages	English, French, Spanish, Polish and Italian

STANDARD ACCESSORIES

DSL test cables: RJ14 to RJ11 and telco clip with bed of nails (ACC-RJ11-TC), or
RJ14 to RJ11 and 4 mm plugs with crocodile clips (ACC-RJ11-4MM)

Copper test cable: Three-color (black, red, green) 4 mm banana plugs terminated with telco clips (ACC-M3COLR), or
Three-color (black, red, green) 4 mm banana plugs terminated with shrouded crocodile clips (ACC-M4MM)

Certificate of compliance

AC adapter (GP-2146)

Soft carrying case (GP-10-072)

OPTIONAL ACCESSORIES

Copper test cables: Yellow/blue banana connectors to telco clips (ACC-MTCYB) or Yellow/blue banana connectors to 4 mm plugs/croc clips (ACC-M4MMYB)
DSL bonded test cables: RJ14 to dual RJ11 (ACC-BD-RJ) and RJ14 to four telco clips with bed of nails (ACC-BD-TC), or RJ14 to four 4 mm plugs with crocodile clips (ACC-BD-4MM)
RJ45 Ethernet cable (ACC-RJRJ-UTP)
USB host/client cable (GP-2053)
12 V vehicle charger (GP-2205)
Form fitting, protective soft glove with shoulder strap (ACC-LGLOVE)
16 GB USB memory stick (GP-2144)
Headset (GP-1002)
WiFi Pico Adapter (GP-2223)
Teletech TS125 Far-End Device (TS125)
Bluetooth Nano USB Dongle V4.0 + EDR (GP-2260)
RFL strap (ACC-STRP)
High Impedance (Hi-Z) test cable (ACC-HIZ). Requires WBAND software option.
MAX-600 Screen Protector Film (Pkg 2) (GP-2272)

ORDERING INFORMATION

MAX-635-XX-XX-XX-XX

Model
MAX-635 = Copper and DSL test set

DSL Version
V2XAA = ADSL2+ Annex A

Platform Options
00 = Without software options
FTPUPLD = Result upload via FTP over WiFi, Ethernet or DSL

DSL Software Options
00 = Without software options
BOND = ADSL2+ and VDSL2 bonding support [a]
BROWSER = Web browser
IPTV = IPTV analysis
IPV6 = IPv6 support for LAN/WAN connectivity
MOS = MOS/R-factor for VoIP calls [b]
VDSL2MOD = VDSL2 modem emulation
VOIP = VoIP Emulation support (Ethernet and DSL ports)

Copper Software Options
00 = Without software options
FED = Support for Teletech TS125 Far-End Device [c]
NEXT = Near-End Crosstalk [d]
RFL = Resistive fault location/K-test option
SBAL = Stressed Balance
SMARTR = Pair Detective and FaultMapper [f]
TDR = Time-domain reflectometry
WBAND = Extend frequency range from 20 kHz to 35 MHz
HIVOLT = Enables 500V isolation resistance
RLOSS = Return loss to 2.2 MHz option [d]
ADRP = ADSL2+ and VDSL2-17a data rate prediction option [f]
V35DRP = VDSL2-35b data rate prediction [g]

Example: MAX-635-V2XAA-FTPUPLD-BOND-IPTV

Notes

a. VDSL2 bonding requires VDSL2MOD option.
b. VoIP option required.
c. Teletech TS125 Far-End Device sold separately.
d. Requires the WBAND option.
e. Includes TDR option.
f. Requires WBAND and TDR option, or WBAND and SMARTR option
g. Requires ADRP option

EXFO Headquarters > Tel.: +1 418 683-0211 | Toll-free: +1 800 663-3936 (USA and Canada) | Fax: +1 418 683-2170 | info@EXFO.com | **www.EXFO.com**

EXFO serves over 2000 customers in more than 100 countries. To find your local office contact details, please go to **www.EXFO.com/contact**.

SPMAXTESTER635.15AN Printed in Canada 17/08