

MaxTester 635G

HANDHELD SOLUTION FOR ULTRA-BROADBAND INSTALLATION AND MAINTENANCE



EXFO Sync



EXFO Connect
Compatible



smart R™



SPEEDTEST
by OOKLA

Efficient copper characterization to 35 MHz and DSL/Gfast analysis for the installation and maintenance of ultra-broadband deployments

Feature(s) of this product is/are protected by US patents 7,583,727 and equivalent patent(s) pending and/or granted in other countries.

KEY FEATURES

Gfast with backwards compatibility to VDSL2 and ADSL2+ with one test tool

Compatible with EXFO Connect for cloud-based test asset management

Spectrally compatible VDSL2 35b support and, VDSL2 and ADSL2+ bonding

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

High resolution 6-inch touchscreen with dual 1 GigE ports and single test lead connection supporting both Gfast/DSL and copper testing to 35 MHz bandwidth

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

APPLICATIONS

FTTx / MDU, Gfast, VDSL2 35b and VDSL2 vectored installations

Bonded-VDSL2 and ADSL2+ deployments

Multiplay service assurance (Internet, IPTV, and VoIP), inclusive of Internet throughput validation using Speedtest™ by Ookla®)

FTTdp deployments

Gfast-based mobile backhaul, DAS or small cell deployments

Validate bandwidth performance and speed, using Speedtest by Ookla, HTTP, FTP, or iPerf

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

THE MAXTESTER SERIES



MaxTester 600 Series
Copper, VDSL2, Multiplay test solutions



MaxTester 700B
QTRD Series



MaxTester 940
Fiber Certifier OLTs



Specifications and descriptions are subject to change without prior notice.

INSTALLATION AND REPAIR OF VOICE, BROADBAND, AND ULTRA-BROADBAND DEPLOYMENTS

The MaxTester 635G (MAX-635G) is a complete DSL and copper test set that features the latest in ADSL2+, VDSL2, and Gfast (ITU-T G Series 9700 and 9701 recommendations for fast access to subscriber terminals) chipset based connectivity technologies. Featuring traditional copper measurements (voltage, resistance, capacitance and time domain reflectometry) and highly automated scripted tests, the MAX-635G offers everything a technician needs to complete jobs efficiently.

For service providers considering Gfast as a possible future offering, the MAX-635G provides operators today with support for enhanced VDSL2 35b, VDSL2 and ADSL2+ single pair and bonding, in addition to copper testing capabilities. Coupled with the MAX-635G's small form factor, rugged design, easy-to-use menus and clear pass/fail test result conclusions technicians can close their jobs quickly and efficiently. The large touchscreen display makes it intuitive and user friendly. When it comes to saving results, it provides technicians with many connectivity options for uploading tests and compiling reports.

WORK SMARTER WITH THE MAX-635G

Equipped with SmartR™, the MAX-635G allows technicians to work smarter, not harder. SmartR is a suite of intelligent and automated tests that enable 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.

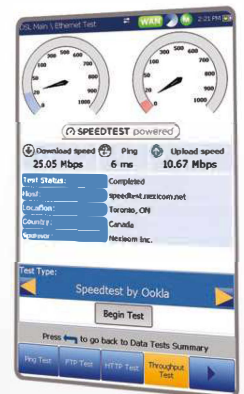
COMPREHENSIVE METALLIC TESTING

Verification of copper quality is a snap with the copper measurement capabilities of the MAX-635G. Thanks to its industry standard AC and DC voltage, resistance (shorts), capacitance (opens), power influence, balance and impulse noise measurements, technicians obtain clear graphical results with simple pass/fail indications. The MAX-635G also features a POTS dialer, an optional TDR with dual-trace comparison capability, and optional 2/4 wire RFL & K-test measurements for pinpointing loop faults. Technicians have the choice of running single-ended tests, or running tests against an optional far-end device (FED).

MULTIPLAY PERFORMANCE MANDATE

Ultra-broadband Gfast and enhanced VDSL2 deployments such as VDSL2 35b are driven by subscriber requirements for flawless IPTV and over-the-top (OTT) video, high speed downloads and uploads, social networking push and pulls, and online gaming (e.g., MMORPG), to name a few. The MAX-635G allows technicians to connect subscriber equipment (e.g., PC, STB, gaming console) to its LAN port to transfer Gfast data at speeds up to 1000 Mbit/s. The MAX-635G offers service providers and contractors the same TCP throughput test methods that subscribers use today; namely the Speedtest by Ookla, which is the industry's standard solution. With Speedtest by Ookla, technicians will be able to validate the bandwidth available to the subscriber.

The MAX-630G offers 2.4/5 GHz WiFi scanning capability to provide technicians the ability to validate signal strength (RSSI) in the customer premise. Improperly placed modems, residential gateways (RG), routers, and/or set top boxes (STB) can impact WiFi performance and frustrate the customer if quality WiFi is not available.



NOISE MITIGATION FEATURES

Ensuring the highest quality multiplay services to customers is critical for service providers deploying ultra-fast broadband connectivity. With an aging copper plant and the need to maximize the use of all pairs in the cable bundle, it is imperative that the appropriate mechanisms are in place to mitigate the impact of noise. Noise is a significant service-affecting condition that can have a major affect on the multiplay quality of experience. The MAX-635G has a number of measurements to help mitigate noise. Starting with determining the copper's ability to mitigate noise using stressed balance, longitudinal balance and impulse noise detection, the DSL chipset offers INP (impulse noise protection), G.INP (impulse noise protection and physical-layer retransmission as defined by ITU-T G.998.4) and vectoring (ITU-T G.993.5) plus a complete set of DELT measurements for attenuation, noise and SNR for tone analysis up to 106 MHz.



KEY CHARACTERISTICS



- 1 Two, 1 GigE RJ45 ports—sealed against the environment
- 2 Gfast, VDSL2, and ADSL2+ RJ11 port—sealed against the environment
- 3 Single test lead connection—banana connectors supporting Gfast/DSL and copper testing
- 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

ALL THE RIGHT FEATURES FOR INSTALLATION TECHNICIANS

With its small form factor, the MAX-635G can go anywhere the technician needs to go. It is rugged and lightweight, and protected from the rain—just what is needed for the demanding outside plant environment. The user interface of the MAX-635G was designed with simplicity and efficiency 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-635G. Users can save the data to a USB memory device or upload to EXFO Connect’s File Manager.

AUTOMATED SERVICE TESTING

Testing ultra-broadband circuits with the MAX-635G is easy with customizable profiling. Setup the unit to do routine jobs or setup custom profiles for special projects. Test profiles can easily be transferred between units using USB or EXFO Connect to ensure that all technicians from the same organization are testing to the same specifications. In addition, the MAX-635G boasts customizable thresholds allowing all technicians to visualize pass or failed conditions so they can quickly move on to the next job or investigate further.

DATA MINING OF RESULTS

In today’s highly competitive network service provider environment, quality of service delivered to subscribers is paramount. With a solution such as EXFO Connect and EXFO Sync combined with the MAX-635G, 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 MAX-635G also make it possible for service providers to have test results in hand for data mining and post-visualization purposes, thereby enabling them to proactively manage loop plants and ensure that they are of the highest quality.



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 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

| | | |
|---|--|---|
|  <p>TEST EQUIPMENT MANAGER Automated inventory tracking and software download</p> |  <p>FILE MANAGER Download/upload files, work orders, test configurations or procedure documents</p> |  <p>CONTRACTOR MODE Secure, segregated access for test-result upload, and automated file download</p> |
|---|--|---|

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



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

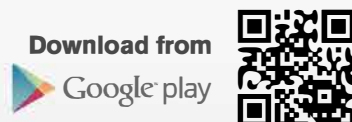
**Working in the field with an Android™ or iOS™ device?
Download the EXFO Sync application for your smart device.***

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

With EXFO Sync, 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 or HTTPS server
- › Secure, password-protected connection to upload and access results

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



Note
Android and Google Play are trademarks of Google Inc. iOS is a registered trademark of Cisco System, Inc. and/or its affiliates in the U.S. and certain other countries.



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GFAST/DSL SPECIFICATIONS

| DSL chipset | Broadcom 63138 | |
|----------------------|--|---|
| Standards compliance | ADSL1/2/2+ | <ul style="list-style-type: none"> › ITU-T G.992.5 (ADSL2+ including Annex A, B, J, and M) › ITU-T G.992.3 (ADSL2 including Annex A, B, J and L) › ITU-T G.992.1 (G.DMT including Annex A and B) › ITU-T G.994.1 › ATIS/ANSI T1.413 Issue 2 › IEEE 802.3ah (PTM) › ITU-T G.998.1, 2 (ATM, Ethernet bonding) › ITU-T G.998.4 (G.INP) › ITU-T G.992.5 (INP Amendment 3) › DT 1 TR 112 U-R |
| | VDSL2 | <ul style="list-style-type: none"> › ITU-T G.993.2 Annexes A, B, Q and Y › Profiles: 8a/b/c/d, 12a/b, 17a, 30a, 35b › 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-RV) |
| | Gfast | <ul style="list-style-type: none"> › ITU-T G.9700, G.9701 |
| DSL parameters | <ul style="list-style-type: none"> › Maximum attainable bit rates › Actual achieved bit rates › Actual bonded achieved rates › Latency mode: fast, interleaved › Data modes: ATM, PTM › Capacity (%) › SNR margin › Output power › Attenuation › Bits/tone › Hlog/tone (attenuation/tone) › QLN/tone › SNR/tone › ALN/tone | <ul style="list-style-type: none"> › Interleave depth › Interleave delay › Trellis coding › Bit swapping › INP value › PhyR, G.INP state, performance counters › Vectoring state, performance counters › LOS, FEC, CRC, HEC, SES › LATN per band › SATN per band › EWL › kIO and kIO per band › Vendor code, revision |



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MULTIPLAY TESTING SPECIFICATIONS

| | | |
|---------------------------------------|---|--|
| Test interfaces | <ul style="list-style-type: none"> › Gfast › VDSL2 | <ul style="list-style-type: none"> › ADSL1/2/2+ › Ethernet 10/100/1000 BT |
| Encapsulation methods | <ul style="list-style-type: none"> › RFC 2684/Bridged Ethernet/IPoE (IPv4 and IPv6) › IPoA (RFC 1577) | <ul style="list-style-type: none"> › PPPoE (RFC 2516) › PPPoA/LLC and PPPoAVC-MUX (RFC 2364) |
| Operating modes | <ul style="list-style-type: none"> › DSL Terminate › DSL to Ethernet pass through | <ul style="list-style-type: none"> › Ethernet Terminate › Ethernet to Ethernet bridged pass through |
| Login format | User name and password using PAP/CHAP | |
| Connectivity support | <ul style="list-style-type: none"> › IPv4 and IPv6 LAN/WAN status › IPv4 and IPv6 DNS, gateway › IPv4 DHCP client/server, DHCP vendor class › IPv6 DHCP client › NAT | <ul style="list-style-type: none"> › VLAN ID, VLAN tagging › VPI/VCI › IP release › Multi-VLAN support |
| Throughput test | <ul style="list-style-type: none"> › Methods supported: Speedtest by Ookla, iPerf3 › Address: auto-configured for Speedtest, URL or IPv4 address for iPerf3 › Direction: upload and/or download › Speedtest results displayed: download and upload speed in Mbit/s, ping in milliseconds (ms), host, location, country and sponsor › iPerf results displayed: download and upload speed in kbit/s | |
| Ping test | <ul style="list-style-type: none"> › Ping destination: gateway, IPv4 or IPv6 address or URL › Number of pings: 1 to 99 › Packet size: 32 to 1200 bytes (32 is default) › Timeout period: 1 to 10 s › Results displayed: packets sent/received and average round-trip delay (ms) | |
| Traceroute test | <ul style="list-style-type: none"> › Traceroute destination: gateway, IPv4 address or URL › Timeout period: in seconds, default is 1 s, maximum is 10 s › Packet size: 32 bytes › Number of hops: 1 to 32 (default is 30) › Results displayed: indicates IPv4 address of hop and round-trip time in ms | |
| FTP test | <ul style="list-style-type: none"> › Address: IPv4 address or URL › Direction: upload and/or download › Results displayed: time, kB transferred, bit rate in kbit/s | |
| HTTP test | <ul style="list-style-type: none"> › Address: URL › Direction: download › Simultaneous download sessions: 1 to 4 › Results displayed: kB transferred, bit rate in kbit/s | |
| WiFi scanning (option) | <ul style="list-style-type: none"> › 2.4 GHz support › View channel number, SSID, MAC address, RSSI value › Sort by channel number or RSSI value | |
| Web browser | <ul style="list-style-type: none"> › Address: IPv4 address or URL › Bookmarks: user-definable | |
| VoIP testing (software option) | <ul style="list-style-type: none"> › Protocol support: SIP (IPv4) › Codecs: G.711 μ-Law, G.711 A-Law › Interface support: ADSL1/2/2+, VDSL2, Gfast, Ethernet › Parameter/functionality: <ul style="list-style-type: none"> – 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) | <ul style="list-style-type: none"> › Supported video standards: MPEG2, MPEG4 part 2 and 10 (H.264/AVC), Mediaroom/WM9/VC1 › Operating modes: DSL Terminate and Ethernet Terminate › IPTV parameters/functionality: <ul style="list-style-type: none"> – IGMP version 2 and 3 (IPv4) join/leave requests with STB emulation – Automatic tests to join/leave and analyze up to 5 (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 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) | $\pm(50 \text{ ppm} + 1 \text{ Hz})$ | | |
| | Level range (dBm) | -20 to 10 at 600 Ω | | |
| | Level resolution (dB) | 0.1 | | |
| | Level uncertainty (accuracy) (dB) | ± 1 | | |
| | Impedance (Ω) | 600 | | |
| Frequency range (20 kHz to 2.2 MHz) | Frequency resolution | 1 kHz steps | | |
| | Frequency uncertainty (accuracy) | $\pm(50 \text{ ppm} + 100 \text{ Hz})$ | | |
| | Level range (dBm) | -20 to 10 at 100 Ω | | |
| | Level resolution (dB) | 0.1 | | |
| | Level uncertainty (accuracy) (dB) | ± 1 | | |
| | Impedance (Ω) | 100, 120, 135, 150 | | |
| Frequency range (2.2 MHz to 30 MHz) | Frequency resolution | 1 kHz steps | | |
| | Frequency uncertainty (accuracy) | $\pm(50 \text{ ppm} + 100 \text{ Hz})$ | | |
| | Level range (dBm) | -20 to 0 at 100 Ω | | |
| | Level resolution (dB) | 0.1 | | |
| | Level uncertainty (accuracy) (dB) | ± 1 | | |
| | 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) | $\pm(50 \text{ ppm} + 1 \text{ digit})$ for 20 kHz to 30 MHz | | |
| | 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) $\pm 2 \text{ dB}$ -50 dBm to 15 dBm, uncertainty (accuracy) $\pm 1 \text{ dB}$ | | |
| | 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) $\pm 2 \text{ dB}$ -50 dBm to 15 dBm, uncertainty (accuracy) $\pm 1 \text{ dB}$ 2.2 MHz to 30 MHz -90 dBm to -50 dBm, uncertainty (accuracy) $\pm 2 \text{ dB}$ -50 dBm to 15 dBm, uncertainty (accuracy) $\pm 1 \text{ dB}$ | | |
| | 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 k Ω , 1 M Ω | | |
| | 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 | $\pm(1 \% + 0.5 \text{ VDC})$ |
| | AC voltage | 0 to 280 Vrms | 0.1 V for 0 to 99.9 V 1 V for 100 V to 280 V | $\pm(1 \% + 0.5 \text{ VAC})$ |
| | Isolation resistance (stress/leakage) | 0 to 1 G Ω , auto-ranging 1 k Ω to 99 M Ω 100 M Ω to 999 M Ω | Three digits | $\pm(2 \% + 1 \text{ digit})$ $\pm(5 \% + 1 \text{ digit})$ |
| | Resistance | 0 to 100 M Ω 0 to 999 Ω 1 k Ω to 100 M Ω | Three digits | $\pm(1 \% + 5 \Omega)$ $\pm(2 \% + 1 \text{ digit})$ |
| | Capacitance | 0.1 nF to 2 μF | Four digits | $\pm(2 \% + 50 \text{ pF})$ |
| | DC current | 0 to 110 mA | 0.1 mA | $\pm(2 \% + 1 \text{ mA})$ |
| | AC current | 0 to 110 mA | 0.1 mA | $\pm(2 \% + 1 \text{ mA})^d$ |
| | Station ground | 0 to 1 M Ω 0 to 999 Ω 1 k Ω to 1 M Ω | Up to three digits | $\pm(1 \% + 3 \Omega)$ $\pm(2 \% + 1 \text{ digit})$ |

Notes

- a. Subject to change without notice.
b. Typical, at 23 °C \pm 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.



Specifications and descriptions are subject to change without prior notice.

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 (Ω) | 600 |
| 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 (Ω) | 600 |
| 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 μ s |
| | 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) | $\pm(0.5 \text{ m} + 1 \% \times \text{distance})$ |
| | 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 (dB) | 0 to 90 |
| | Level resolution (dB) | 0.1 |
| | 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 (Ω) | 100, 120, 135, 150 |
| Return loss | Test Type | Single, Sweep |
| | Frequency range | 20 kHz to 2.2 MHz |
| | Dynamic range (dB) | 0 to 40 |
| | Resolution (dB) | 0.1 |
| | Uncertainty (accuracy) (dB) | ± 0.5 , for dynamic range 0 to 20 |
| | Horizontal scale | 4.3125 kHz to 2.2 MHz, in 4.3125 kHz steps |
| | Vertical scale (dB) | 0 to 50 |

Notes

- a. Subject to change without notice.
b. Typical, at 23 °C \pm 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.



Specifications and descriptions are subject to change without prior notice.

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 dBm) to 0 dBm (90 dBm) in 1 dB steps |
| | Termination (Ω) | Bridging (Hi-Z), 100, 120, 135, 150 |
| | Counter maximum | 65 000 000 |
| | Test duration (h) | Maximum 100 |
| | 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 (dB) | 0.1 |
| | 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) | $\pm(50 \text{ ppm} + 1 \text{ digit})$ | |
| 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) | $\pm(50 \text{ ppm} + 1 \text{ digit})$ for 20 kHz to 30 MHz |
| | 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 = 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 K pfm ller (K-test) |
| | Fault detection ($M\Omega$) | 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 ($k\Omega$) | 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) | $\pm(0.1 \Omega + 1 \% \text{ RTS})$ | |
| K-test uncertainty (accuracy) ^e | $\pm(1 \Omega + 1 \% \text{ RTS})$ | |
| Stressed balance | Level range (dBmC) | 0 to 82 |
| | Resolution (dBmC) | 0.1 |
| | Longitudinal excitation | 135 VDC (0 dBm, ± 1 dB reproducibility) |

Notes

- Subject to change without notice.
- Typical, at 23 °C \pm 3 °C, on batteries, with no type B USB connection.
- Specifications based on 24 AWG (PE 0.5 mm) cabling.
- Specification based on 1 kft 24 AWG cabling. Range depends on cable type and condition.
- 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 Gfast/ADSL2+/VDSL2 Five-color banana connector for T/A, R/B, G, T1/A1, R1/B1 and for Gfast/ADSL2+/VDSL2 RJ45 for Ethernet 10/100/1000 WAN RJ45 for Ethernet 10/100/1000 LAN |
| Results management | > 2 GB internal memory Single and bulk file export to USB memory devices FTP upload |
| Temperature range | |
| Operating | 0 °C to 40 °C (32 °F to 104 °F) |
| Storage | -20 °C to 60 °C (-4 °F to 140 °F) |
| Relative humidity (%) | 5 to 95, non-condensing |
| Shock | 1 m (39 in) drop per GR-196-CORE |
| Altitude | 3000 m (9842 ft) |
| Input power | 12 VDC, 4.16 A, 48 W via 90-264 VAC adapter, or 12 VDC, 5 A, vehicle adapter |
| Battery | Internal rechargeable lithium polymer, with battery state and level indication, adjustable auto-power down. Standard battery is 10 000 mAh; extended battery is 20 000 mAh |
| 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 standard 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, German, Italian, Polish and Spanish |

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/DSL 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 (ACC-48WPS) |
| Soft carrying case (GP-10-072) |



Specifications and descriptions are subject to change without prior notice.

OPTIONAL ACCESSORIES

| |
|--|
| Copper/Bonded DSL 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) or 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) |
| RFL strap (ACC-STRP) |
| RJ45 Ethernet cable (ACC-RJRJ-UTP) |
| USB host/client cable (GP-2053) |
| 12 VDC vehicle charger (ACC-12VLGB) |
| Form fitting, protective soft glove with shoulder strap (ACC-GLOVE for standard battery, ACC-XGLOVE for extended battery) |
| 16 GB USB memory stick (GP-2144) |
| Headset (GP-1002) |
| WiFi Pico Adapter (GP-2223) |
| Teletch TS125 Far-End Device (TS125) |
| Bluetooth Nano USB Dongle V4.0 + EDR (GP-2260) |
| High Impedance (Hi-Z) test cable (ACC-HIZ). Requires WBAND software option. |
| MAX-600 Screen Protector Film (Pkg 2) (GP-2272) |
| RJ11 to Coax Balun for Gfast operation over in-home coaxial networks (ACC-GFAST-BALUN) |
| Large extended battery pack (LGBATT) |



Specifications and descriptions are subject to change without prior notice.

ORDERING INFORMATION

MAX-635G-XX-XX-XX-XX

Model

MAX-635G = ADSL2+ test set

DSL Version

GVXAA = ADSL2+ Annex A

GVXAB = ADSL2+ Annex A+B

Platform Options

00 = Without software options

FTPUPLD = Result upload via FTP over WiFi, Ethernet or DSL

LGBATT = Large Extended Battery Pack

DSL Software Options

00 = Without software options

BOND = ADSL2+ and VDSL2 bonding support^{a, b}

GFAST = Gfast modem emulation

IPTV = IPTV analysis

IPV6 = IPv6 support for LAN/WAN connectivity

MOS = MOS/R-factor for VoIP calls^c

VDSL2MOD = VDSL2 modem emulation

VDSL2-35B = VDSL2-35b profile support^a

VOIP = VoIP emulation support (Ethernet and DSL ports)

SPEED = Bandwidth speed test^h

WIFI = 2.4 GHz WiFi scanning capability

MPP = Combines IPTV, VOIP, and MOS options

Copper Software Options

00 = Without software options

ADRP = ADSL2+ and VDSL2-17a data rate prediction option^dV35DRP = VDSL2-35b data rate predictionⁱFED = Support for Teletch TS125 far-end device^e

HIVOLT = Enables 500V isolation resistance

NEXT = Near-end crosstalk^f

RFL = Resistive fault location/K-test option

RLOSS = Return loss to 2.2 MHz option^f

SBAL = Stressed balance

SMARTR = Pair Detective and FaultMapper^g

TDR = Time-domain reflectometry

WBAND = Extend frequency range from 20 kHz to 35 MHz

Example: MAX-635G-GVXAA-FTPUPLD-SMARTR-SBAL-VDSL2MOD-GFAST-BOND-IPTV

Notes

- VDSL2MOD option required to enable VDSL2-35b capability.
- VDSL2MOD option required to enable VDSL2 bonding capability (BOND available for GVXAA version only).
- VoIP option required.
- Requires WBAND and TDR option, or WBAND and SmartR option.
- Teletch TS125 far-end device sold separately.
- Requires the WBAND option.
- Includes TDR option.
- SPEED included with base unit.
- 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.comEXFO serves over 2000 customers in more than 100 countries. To find your local office contact details, please go to www.EXFO.com/contact.

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