



Access Networks Verification

Test & Measurement Solutions for Access Networks



Access Networks Come in Multiple Flavors

Access and Local Area Network Technologies

Access Network Technologies

- xDSL
 - ADSL2+, VDSL2, G.Fast
- FTTH
 - 1000Base-X
 - GPON
 - SDH/SONET
- CATV
 - DOCSIS3.0/3.1
- Cellular
 - LTE

Customer Premises Network Technologies

- Ethernet
 - 10/100/1000Base-T – Home/Business
 - 1000Base-X – Business
- Wi-Fi
 - 2.4 GHz + 5 GHz – Home/Business
- Telephony
 - POTS – Home/Business
 - ISDN PRI – Business
 - VoIP – Home/Business
 - SDH/SONET, PDH/DSn, Circuit Emulation – Business



Access Network Requirements

- xDSL
 - xDSL CPE Emulation with Measurements
 - Copper Pair Testing and Troubleshooting
- FTTH
 - Fiber Optics: OTDR, Link Mapper, OPM, LS, VFL, Fiber Scope,...
 - PON: Multi-wavelength PON OPM, GPON Analyzer
 - 1GE: Ethernet Testing (Throughput, SAM,...)
 - SDH/SONET: BERT, Alarm/Error monitoring,...
- CATV
 - DOCSIS3.0/3.1 Modem emulation with measurements
 - OFDM Analysis, Spectrum Analysis, QAM Analysis,...
 - Performance verification

Customer Network Requirements

- Ethernet
 - Link Health, Throughput, Down/Upload speed tests,...
 - IP Connectivity
 - Troubleshooting tools
- Wi-Fi
 - 2.4 GHz + 5 GHz – Home/Business
- Telephony
 - POTS: Place/Receive test calls
 - ISDN: Place/Receive test calls, Troubleshoot settings, Protocol Capture/Decode,...
 - VoIP: Place/Receive test calls, Troubleshoot settings, Protocol Capture/Decode,...
 - SDH/SONET, PDH/DSn, Circuit Emulation: Point-to-point Connectivity tests, BERT, Alarm/Error monitoring,...



MTTplus – Modular Test Platform

Field-oriented Modular Handheld Test Solution





MTTplus Test Platform for Field Applications

VeEX's Modular Handheld Test Solutions for Access Networks

- Modern, modular test platform with a growing range of available test modules covering legacy and modern Access (copper and fiber), FTTx, LAN, WLAN, Metro, Carrier Ethernet and Transport technologies
- Application-oriented GUI
- Multi-technology: xDSL, G.fast, Fiber Optics, PON, Teleprotection, Datacom, DSn/PDH, SONET/SDH, OTN, Ethernet, Fibre Channel, CPRI/OBSAI, Wi-Fi
- Expand its test functionality with a growing list of new test modules and technologies
- Future-proof cost-effective platform

2x USB-A (permanent storage & Wi-Fi)

* Do Not remove the 8GB USB storage

Optional GPS Receiver Module slot

Shoulder Strap

Shoulder Strap

Light Sensor

Microphone

Headset Jack

Power Status

Micro USB-B

USB-A 2.0

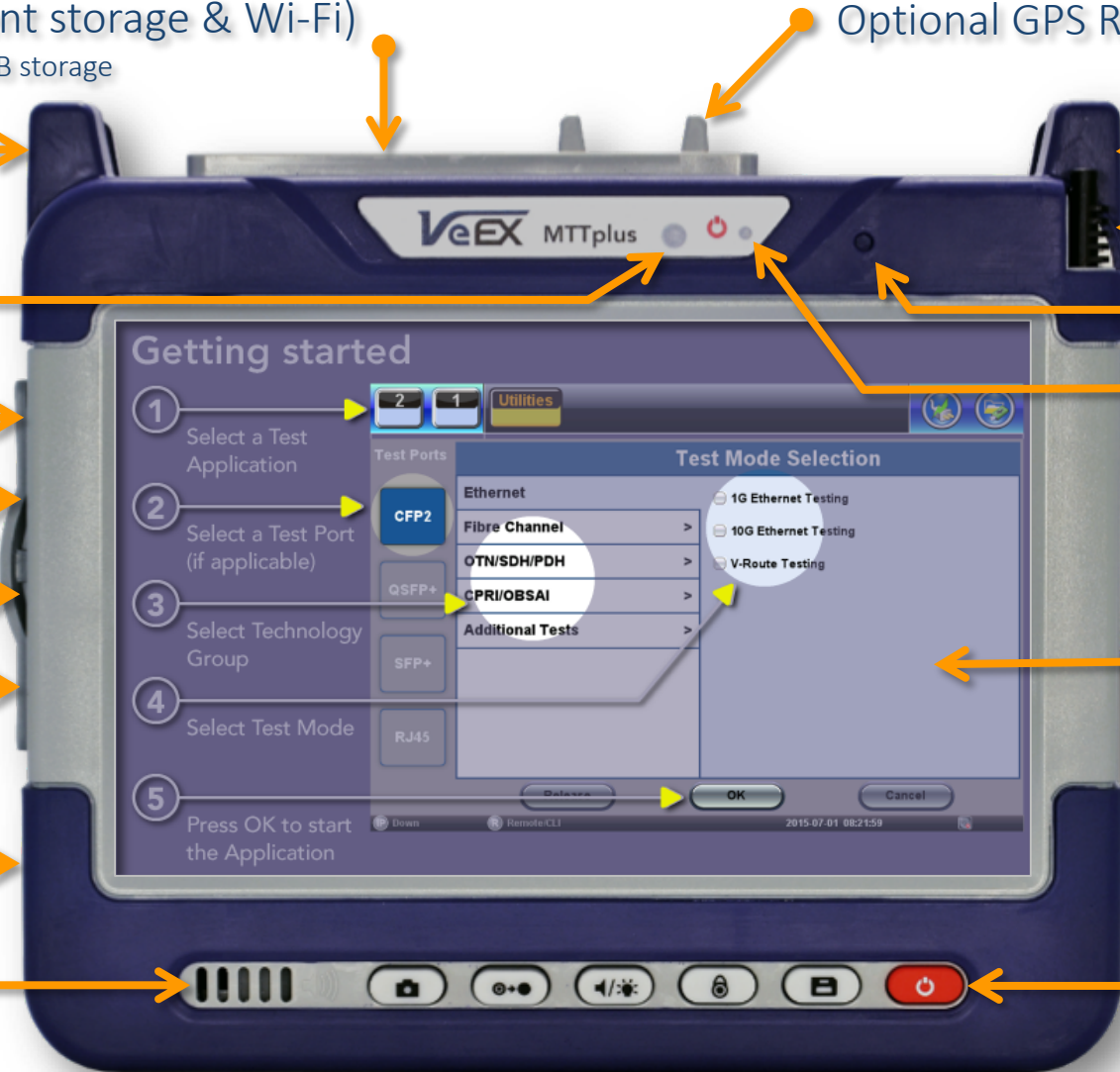
LAN Port

Touch Screen

DC Power

Speaker

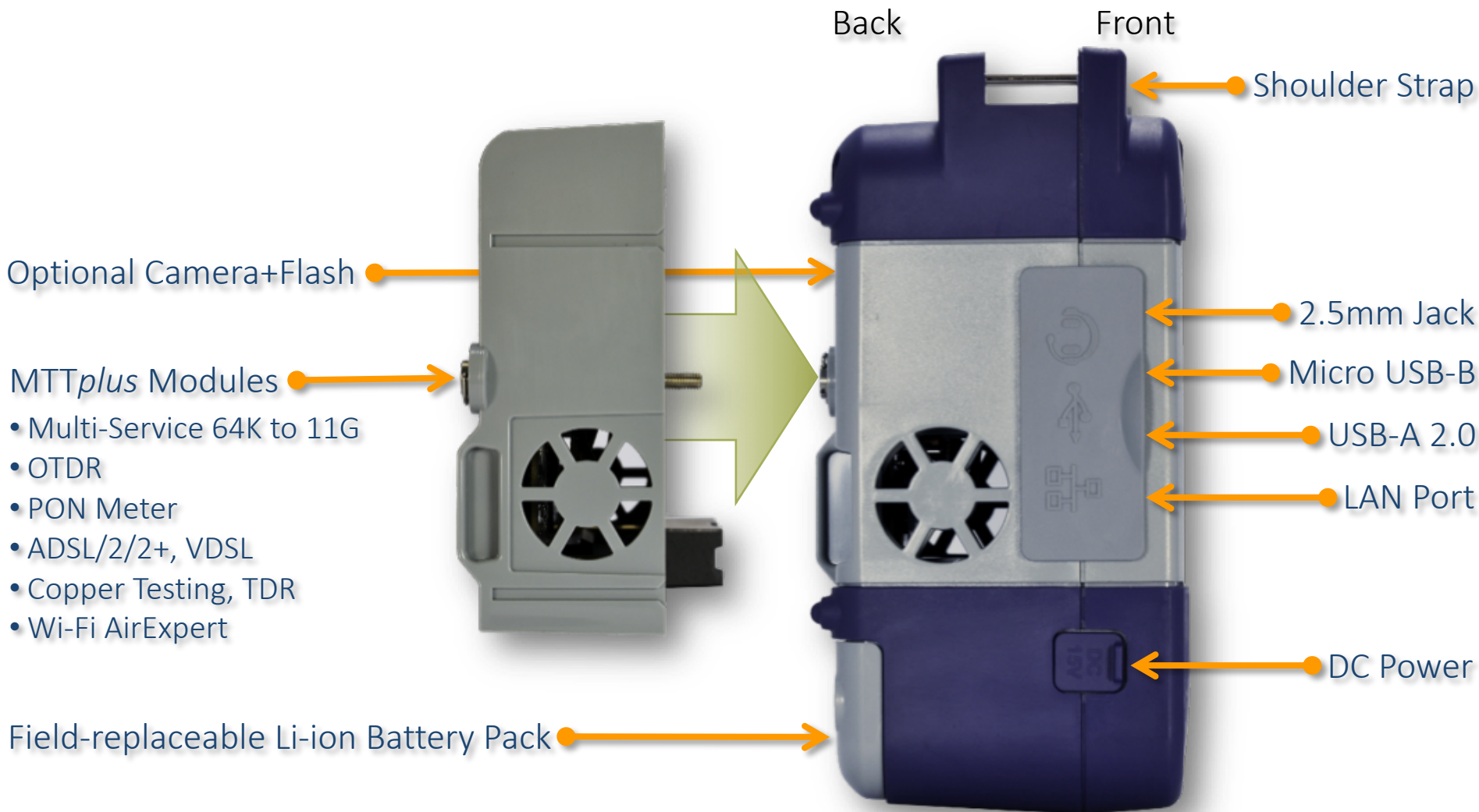
Function Keys





MTTplus Test Platform for Field Applications

VeEX's Modular Handheld Test Solutions for Access Networks

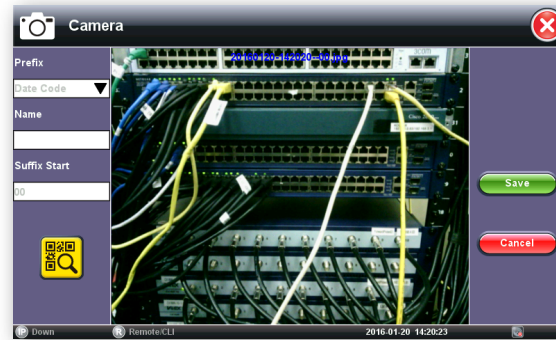


Built-in Camera (optional)

Augment job site documentation with before/after pictures, read QR and Bar Codes using the built-in camera

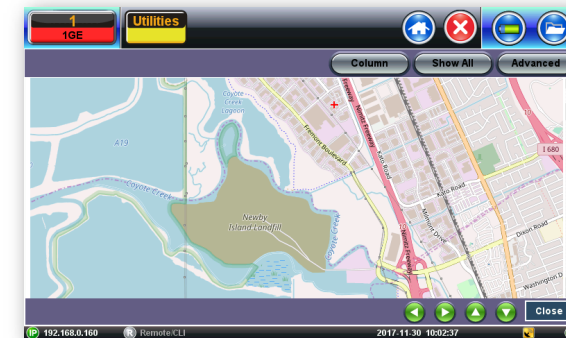


- Auto-Focus
- Built-in LED Flash
- Direct access button
- Pre and post-visit job site documentation to user for future references.
- Damage documentation
- Auto QR Code or Bar Code detection and decoding
 - Capture Serial Numbers, MAC addresses



Built-in GPS (optional)

- Download Local Maps directly to the MTTplus
 - Multiple cities can be downloaded and stored in the test set
 - Uses optional GPS Receiver's accurate coordinates and ToD to tag test results and reports
 - Coordinates Hold function for indoors use (e.g. capture location at front door).
 - Off-line use (only requires LAN/WiFi internet connection for initial download)
- Map with accurate Location and Time stamp can be added to reports
 - Verify/Audit contractors' job





MTTplus – Test Modules

Application and Technology-oriented Modules



MTTplus-320 Multi-Service Test Module

Covers a wide range of communication technologies used in carrier-grade links, networks and services.

Wide Area Networks (Metro)

- Ethernet
 - 1GE, 10GE and SyncE testing and monitoring
 - BERT, Throughput, RFC2544, Y.1564SAM,...
 - OAM, Q-in-Q, VLAN, MPLS, IP connectivity, VoIP,...
- OTN/SDH/SONET
 - OTU2e/1e/2/1, STM64/16/4/1/0, OC192/48/12/3/1
 - BERT, Error/Alarm, Overhead, RTD, SDT, Jitter/Wander,
 - Mapping/Multiplexing verification, Troubleshooting,...
- PDH/DSn
 - E4, E3, E1, T3, T1
 - BERT, Error/Alarm, RTD, Jitter/Wander, Troubleshoot,...



Local Area Networks & Customer Premises

- Ethernet & IP Connectivity
 - 10/100/1000Base-T, 100/1000Base-X and 10GBase-X
 - IP Connectivity tests, Throughput, Speed Test, VoIP
- SDH/PDH/PDH/DSn
 - BERT, Error/Alarm, Troubleshooting, ISDN PRI,...

MTTplus-900 Air Expert – Wi-Fi Test Module

WLAN Service Testing

- Complete performance testing that measures true end user's experience under traffic load.
- Supports IEEE 802.11a/b/g/n/ac devices
- Network Discovery
 - Lists Access Points, Clients and Channels
 - Table and graphical format
- AP detailed capabilities discovery
 - SSID, BSSID, channels, security, supported data rates, signal and noise levels, co-channel and adjacent APs and associated clients
- Analyze Channel Usage
 - Utilization and number of APs



Wired LAN Service Testing

- 10/100/1000Base-T and 1000Base-X ports to verify end-to-end access performance and LAN connectivity
- Tests DHCP connection to APs, Ping, Trace Route and ARP
- V-Probe: Verify network performance with dual-ended V-Perf Upload/ Download throughput testing



MTTplus-900 Air Expert – Wi-Fi Test Module

Wi-Fi and RF Analysis

- Survey coverage and identify problems with signal and noise levels tracking
- Spectrum Analyzer
 - Dual band 2.4 GHz and 5 GHz
 - Discover and identify WiFi and non-WiFi interference
- Directional antenna to locate and track APs or clients

“Independent of the Access Technology deployed, WiFi is now embedded in most residential CPE. Poor WiFi performance would affect customers QoS experience and service providers’ perception.”



MTTplus-522* OSP+ Expert Module

- XTU-R CPE Emulation with universal DSL support
 - ADSL, ADSL2, ADSL2+
 - VDSL2
 - G.fast (G.9700/G.9701, Frequency band up to 106 MHz)
- Twisted-pair TDR
- Wide-band Twisted-Pair Test Suite (up to 12 MHz)
 - Near-end Crosstalk, Far-end Crosstalk, Insertion Loss Swep, Impulse Noise, Power Spectral Density
 - Resistive Fault Locator, Longitudinal Balance
- Two-pair Outside Plant Digital Multi-meter
 - Capacitance, Resistance, DC Voltage, AC Voltage, DC Current
- Impairment Detection
- POTS (Voice frequency tests)

- All-in-one DSL test solution



- Far-end Device (for dual-ended tests)
 - Used for Insertion Loss, RFL and FEXT testing
 - Battery operated



**Preliminary Information*

MTTplus-410 Fiber Optics Module

- OTDR
 - Multimode options - 850 & 1300 nm
 - Singlemode options - 1310, 1490, 1550, 1625 & 1650 nm
 - Filtered 1625 or 1650 nm port for in-service PON tests
 - Dynamic range up to 45 dB
 - Live fiber detection to avoid service disruptions
- Fiber Link Mapper (V-Scout)
- Optical Power Meter (OPM)
 - Optional PONT Wavelength-selective for GPON testing
 - WaveID detection of incoming wavelength
- Optical Light Source (OLS)
- Optical Loss Test Set (OLTS)
- Visual Fault Locator (VFL)

- All-in-one Fiber Optics test solution



- Optical Network Architectures
 - Point-to-point
 - PON

MTTplus-420 PON Module

Designed for service activation at the ONT location, measures optical levels and non-intrusively decodes messages exchanged between OLT and ONT, allowing technicians to perform advanced troubleshooting.

■ Basic Test Functions

- Up/Downstream Signal Levels
- Up/Downstream Frame Sync
- Up/Downstream Alarm/Errors

■ Advanced Data Analysis

- OMCI capture/decode
- PLOAM capture/decode

■ Up/Downstream Status

- Signal, Frame, Error, Alarm, FEC detection and TC-Sync

■ Display all active ONT IDs and Serial Numbers

■ Good Signal Levels Don't Guarantee Quality of Service



- Two-port pass through mode for up/downstream level measurements at 1310, 1490 and 1550 nm (optional)
- Simultaneous measurement of calibrated PON signals
- Automatic ODN class detection and power-level pass/fail
- Filtered, in-service loss measurements for each PON signal
- Low insertion loss ≤ 1.5 dB typ.
- User defined Pass/Fail thresholds



CELEBRATING 10 YEARS
VeEX
The Verification Experts

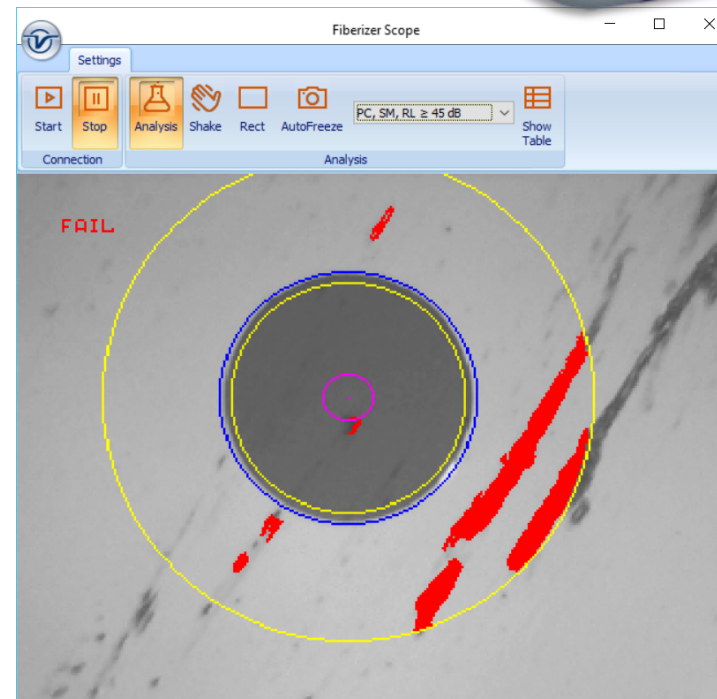
Fiber Optics Tools

Other Important Fiber Optics Tools & Accessories

DI-1000 & VIS-500 Fiber Inspection Scopes

- Inspect patch cords and bulkheads
- Quick tip replacement
 - Comprehensive line of tips available
- Ergonomic design
 - One hand operation
 - Precise and stable single-finger focus knob
- Compatible with all VeEX products, PCs and Tablets
 - Auto Focus-Detection function
 - IEC 61300-3-35 Connector Face Analysis (pass/fail)
 - Report generation (html and PDF) directly from test se
 - Direct USB 2.0 connection to test set or PC
 - Powered by USB
- Robust for field use (no motors or batteries)

■ VIS-500 Fiber Scope





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Thank you!

Any questions?

