1G DSP
Maintenance Meter

- 1 GbE SFP Optical & Electrical Ethernet Throughput Testing

- 1310 nm / 1490 nm / 1550 nm Single Mode Optical Power Measurements

- Verification and Troubleshooting of 802.11 b/g/n (2.4/5 GHz) Wireless Testing

- 650 nm VFL Source with an Operating Power of 3 mW

- Large High-Resolution Ultra-Bright Color Touch Screen

- All-in-One Maintenance and Network Analysis Tool

All of the troubleshooting tools you need in one device to maintain your entire HFC plant.

All-In-One Maintenance Meter

Trilithic's 1G DSP™ conveniently combines CATV, Gigabit Ethernet and Optical testing in a single meter for troubleshooting and maintenance of your entire HFC plant.

Maintaining the health of your plant can now be achieved with one instrument including everything needed for system wide testing. Elim inate the need for multiple instruments with CATV, Gigabit Ethernet, and Optical testing and save capital expenses at the same time.

Tailored for the challenges faced by maintenance technicians, this meter comes equipped with all of the powerful troubleshooting tools for the experienced tech, yet helps simplify decision making and streamlines standard processes and procedures for the more novice tech. This results in more efficient technicians, greater overall system health, and allows techs to continue using the same meter as they become more experienced.

Gigabit Ethernet Testing

Used in combination with either the MetroNet 5001™ or TLB-GbE™, the 1G DSP can achieve throughput testing speeds of up to 1 GbE using a dedicated test port.

The 1G DSP can perform either roundtrip or one-way measurements of Key Parameter Index (KPI) for full Ethernet service testing. With constant payload testing for Layer 2 through Layer 4, the 1G DSP is built for verification of both Ethernet Service Level Agreement (SLA) and Quality of Service (QoS) metrics.

Optical Power Measurement

The 1G DSP™ includes a single input port for measurement of single mode (1310 nm, 1490 nm, and 1550 nm) wavelengths with interchangeable FC, SC, and ST style adapters.

Next Gen Features

The 1G DSP features a large high-resolution ultra-bright color touch screen interface, simple pass/fail indicators, and powerful autotest apps to streamline troubleshooting and make the technician's job easier.

Everything about this next-gen meter was built with the technician in mind, from the included Bluetooth adapter for remote control of the meter via an iPad to the long battery life, quick charge time, and glow in the dark keypad for those dark, cramped spaces. This meter also includes a visual fault locator (VFL) that makes it easy for the technician to locate and identify loss points in patch cords, patch panels, and enclosures.

1G DSP

AVAILABLE MODELS:

- 1G DSP - US (6 MHz)
  P/N 2011691Z99

- 1G DSP - EURO (6/8 MHz)
  P/N 2011691W99

- 1G DSP - US (6 MHz)
  with OPM & VFL
  P/N 2011710000

- 1G DSP - EURO (6/8 MHz)
  with OPM & VFL
  P/N 2011711000

STANDARD INTERFACES:

- RF Test Port (F-Type)

- DOCSIS 3.0 modem 8x4 (100/304 Mbps)

- RJ45 Management Port (10/100 Mbps)

- Cable Modem Thru RJ45

- RJ45 Electrical Ethernet & SFP Optical Ethernet Test Ports (10/100/1000 Mbps)

- 802.11 "b/g/n" 2.4/5 GHz Wi-Fi

- Optical Power Meter (1310/1490/1550 nm)

- Visual Fault Locator (650 nm, 3 mW)

- Bluetooth Communications Adapter

- USB 2.0 Flash Drive Port

EXCLUSIVE MEASUREMENTS:

- Forward Sweep

- SSR/RSA Return Path Analysis

- SST Comparison

The 1G DSP supports a variety of functions, including:

- Multi-user support

- Multi-language support

- Create work orders right on the meter

- Built-in web browser, real-time data transmission

- Interactive autotesting apps

Simple Yet Powerful

Providing the widest range of standard functions for a maintenance technician available today, the 1G DSP includes virtually all the testing options a maintenance technician needs to verify plant quality and easily identify and fix problems in the headend or hub sites.
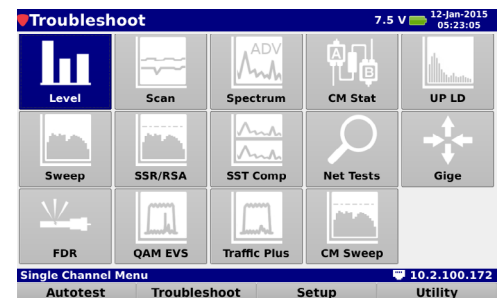

STANDARD TESTING FEATURES:

- Return Spectrum Analysis (4 to 110 MHz)

- Level Measurement

- C/N Measurement

- QAM Measurement (MER/BER/Constellation/EQ)

- Complete Channel Plan Scan with Tilt Measurement

- Ping, Trace Route, VoIP & Throughput Measurements

- Cable Modem Statistics

- Forward Spectrum Analysis (50 to 1000 MHz)

- Frequency Domain Reflectometer

- Analog & Digital HUM Measurement

- Upstream Linear Distortions Measurement

- Source Generator

- Upstream TraffiControl

- QAM Ingress Spectrum Analysis

TRILITHIC

Autotest Apps

The 1G DSP features next generation autotest applications that practically walk the technician through a job. By performing standardized measurement tests at various required locations on the job site using custom test plans, channel plans and limit sets, the meter very clearly indicates (using color and symbols) what areas still need attention, before the technician leaves the job site.
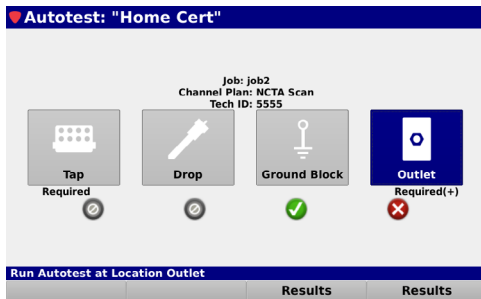
Multi-user support allows technicians that work in various territories to easily switch channel plans and standardized autotest apps and test limits or login as a completely different user. The built-in web browser allows techs to upload job data in near real-time as well as transmit and receive channel plans, autotests, work orders, and firmware.
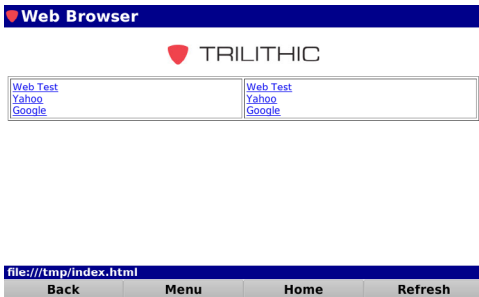
Leaving less room for entry error, this new simple user interface can translate into less training and more efficient time in the field for techs. Although the 1G DSP comes equipped with all of the required troubleshooting tools for an advanced maintenance technician, it also offers a higher comfort factor for novice technicians, reducing decision making in the field, which can ultimately result in more productive work days and more satisfied customers.

Justify ROI

Field operations managers can now easily verify that all their technicians are performing the proper tests and are doing so at the right place and time—in near-real time. The potential benefits include identifying techs who need additional training, improving team performance, reducing truck rolls, and cutting operating costs.

At a higher level, ViewPoint can deliver simple, standardized, system-wide reports and dashboards that can help a director or VP of technical operations view the entire operation at a glance to gain information that can be used to reduce service and repeat trouble calls.
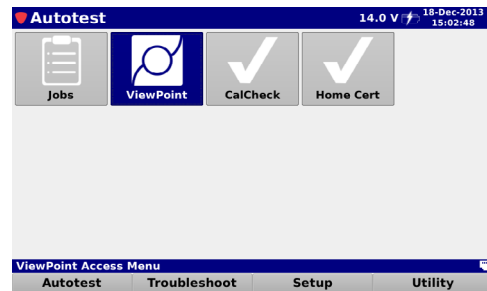
Essentially, this integrated system approach allows cable operators to see much more of their plant-wide operations and use the information in practical ways. The insights can enable them to identify both localized problems and high-level system issues to make decisions based on a clearer understanding of their overall operations and the associated ROI.

Combining 1G DSPs in the field with the new ViewPoint WFM Module in the back office, managers can view the health of their entire system—in near real-time, for total maintenance management.
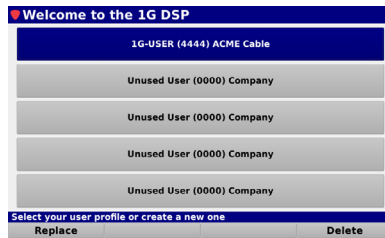
STANDARD FEATURES

The 1G DSP includes all of the following features standard.

Multiple User Profiles

■ Allows up to 5 technicians to share a 1G DSP

■ Each technician has his or her own profile, which loads in completely different sets of channel plans, autotest, etc.
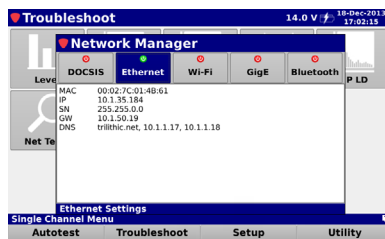
Job Management

■ Create and close out your jobs from this screen

■ Shows what channel plan and how many tests have been run on a particular job
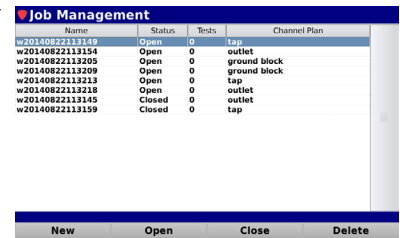
Simple Network Management

■ Choose between Ethernet or Bluetooth connection methods

■ Provides connection details such as MAC, IP, gateway and DNS

Easy Setup & Configuration

■ Global configuration settings can be applied to all users of the device while other settings can be tailored to suit each user

■ Setting adjustments can be locked out using the ViewPoint software
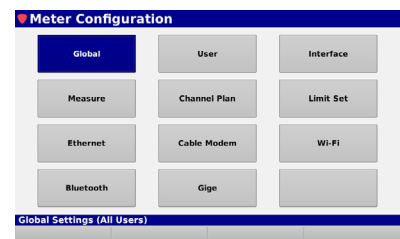
Cable Modem Statistics

■ Shows up to 8 downstream channels and 4 upstream channels

■ Provides performance metrics for all downstream and upstream channels
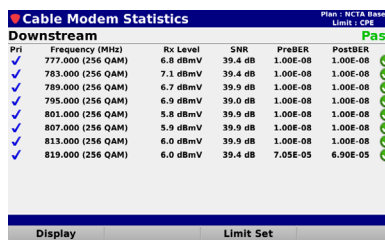
N-Speed Wi-Fi with Survey Test Mode

■ Built-In 802.11 "b/g/n" 2.4/5 GHz wireless adapter

■ Actively view live signal strengths of Wi-Fi networks in the area

■ Provides Wi-Fi details such as SSID, channel and power level
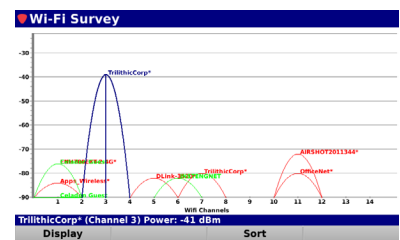
Visual Fault Locator (VFL)

■ 650 nm VFL with an operating power of 3 mW designed for both single and multimode cables

■ Used to easily locate and identify loss points in patch cords, patch panels, and enclosures
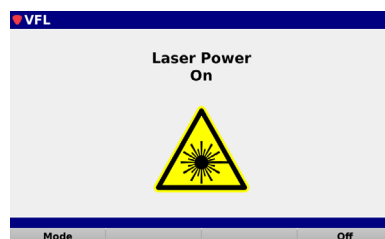
Optical Power Measurement

■ Provides the ability to measure the optical power of 1310, 1490, & 1550 nm wavelength single mode optical signals
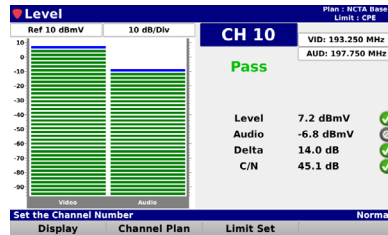
■ Performs both absolute and relative measurements
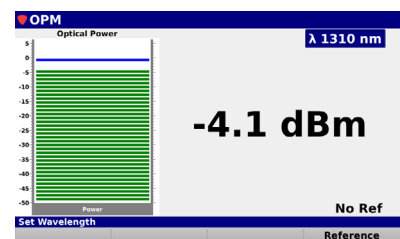
INCLUDED MEASUREMENT FUNCTIONS

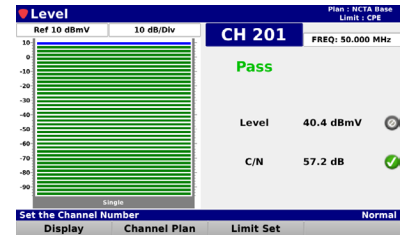The 1G DSP includes all of the following measurement functions standard.

Analog Level Measurement

■ Shows the analog channel and its associated measurements
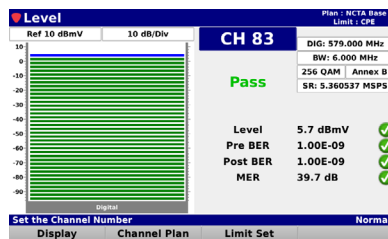
■ Provides Pass/Fail results for limit sets

Single Frequency Level Measurement

■ Shows the level of the analog carrier

■ Displays the Carrier to Noise ratio of the analog carrier

Digital Level Measurement

■ Shows the level, MER and BER of a QAM channel

■ Users can change the display to view BER over time, Equalizer Tap and Constellation

QAM Constellation

■ Shows the constellation diagram of the specified QAM channel

■ Shows the level, MER and BER and provides Pass/Fail results for limit sets
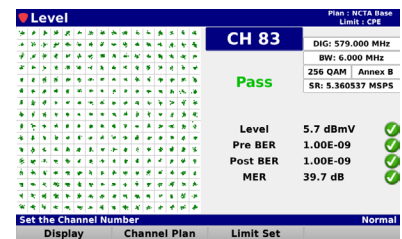
Analog & Digital HUM Measurement

■ Measure the amplitude of 50/60 Hz, 100/120 Hz, and low frequency interference present on analog or digital channels

■ Provides Pass/Fail results for limit sets
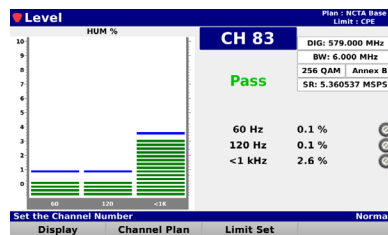
Equalizer Tap Display

■ Displays the equalizer stress and whether the DOCSIS specification is being broken

■ Shows the level, MER and BER and provides Pass/Fail results for limit sets
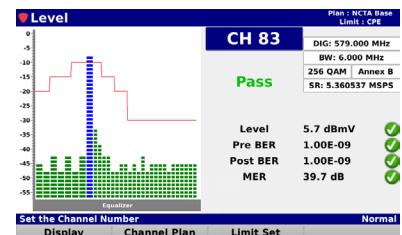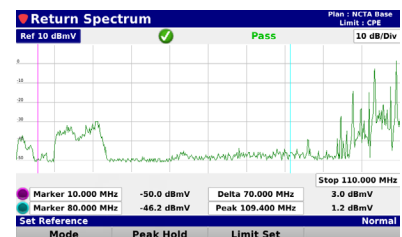
Bit-Error Rate Display

■ Shows the BER on a graph with a 150 second measurement period

■ Shows solid green lines for pre-errors and solid red lines for post-errors
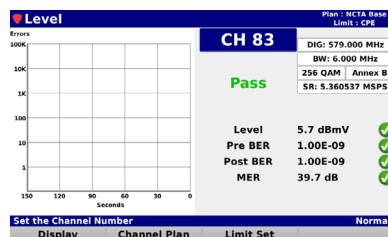
Return Spectrum Measurement

■ Provides the ability to view raw return spectrum traces from 4 to 110 MHz

■ Fast DSP spectrum snapshots give the user extreme speed to capture fast transients on the upstream
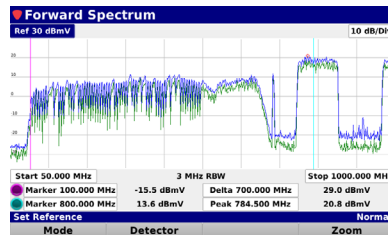
1G DSP

INCLUDED MEASUREMENT FUNCTIONS (CONTINUED)

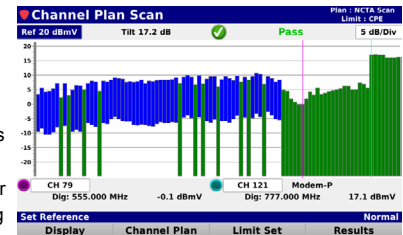The 1G DSP includes all of the following measurement functions standard.

Forward Spectrum Measurement

- Provides the ability to view raw forward spectrum traces from 50 to 1000 MHz

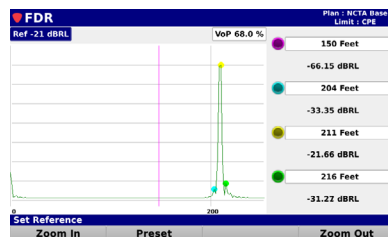- Fast DSP spectrum snapshots give the user extreme speed to capture fast transients on the downstream

Frequency Domain Reflectometer

- Determine the distance to cable faults (opens, shorts, splitters, etc.)

- Events shown on a distance versus amplitude display

- Markers to identify the distance and loss at the source of the reflection.

Source Generator

- Generate signals in the return path from 5 to 85 MHz

- Continuous wave (CW) or 16/32/64/128/256 QAM signal

- BER error injection for checking the bit stream

Gigabit Ethernet Testing

- Throughput testing speeds of up to 1 GbE using a dedicated test port

- Roundtrip or one-way constant payload testing for Layer 2-4 for verification of Ethernet SLA and QoS metrics

Scan & Tilt Measurement

- Full channel plan scan displays the frequency response of the entire channel lineup

- Provides Pass/Fail results for limit sets and color coded channels, green for digital and blue for analog
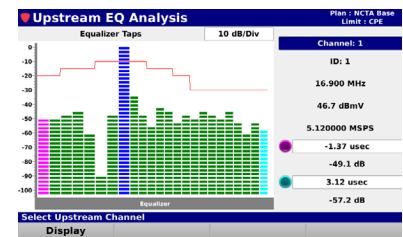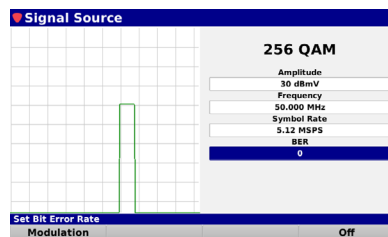
Upstream Linear Distortions Measurement

- Used to determine if equalization is hiding potential problems within the upstream

- View the pre-equalization of the upstream channel, along with the in-channel frequency response and group delay

Bluetooth Communications Adapter

- Remote control of the meter via a Class II Mini Bluetooth Adapter (v2.1) with a 10 meter range

- Connect to an iPad that has device tethering enabled by the service provider

SFP Optical Power Measurement

- Provides the ability to measure the optical power through the optical transceiver

- Provides link speed, wavelength, Tx power and Rx power measurements of active SFP connection

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INCLUDED MEASUREMENT FUNCTIONS (CONTINUED)

The 1G DSP includes all of the following measurement functions standard.

Forward Sweep Measurement

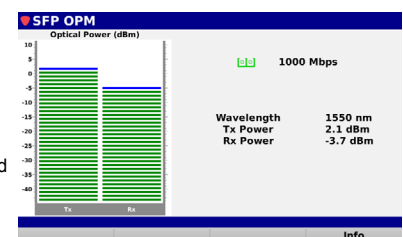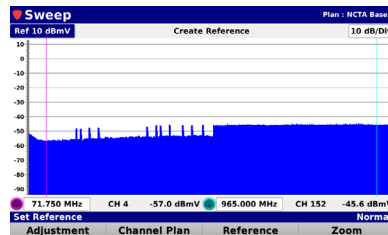- Measure the tilt/gain of distribution amplifiers and detect faults in the system that affect these parameters
- Uses the carriers already being carried by the HFC distribution system or a dedicated sweep transmitter in the headend

SST Comparison

- Compare local versus headend in one simple view
- Troubleshoot transient/bursty upstream noise using the fastest, most advanced DSP technology available

CM Sweep

- Uses the active cable modem built into the 1G DSP to align the upstream amplifiers
- No headend gear required, pre-EQ must be turned on at the CMTS

SSR/RSA Return Path Analysis

- Enables the 1G DSP to communicate with the 8310 RSA Return SpeedSweep Analyzer
- Function as an upstream return path sweep transmitter for troubleshooting micro-reflections and instances of narrow suck-outs between the test point and the headend

QAM Ingress Spectrum (QIS) Analysis

- Tune to downstream QAM channels to display Error Vector Spectrum (EVS)
- Display the ingress underneath an upstream cable modem channel, or any bursty signal
- Includes TraffiControl

Traffic Control Plus

- Allows for a high-speed view of ingress in the upstream
- Heat map allows for simplified view of ingress hotspots
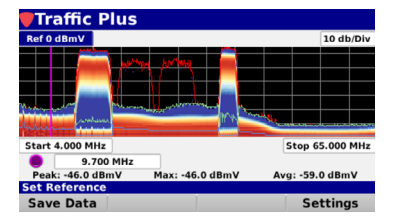
FULL ETHERNET SERVICE TESTING

The Gigabit Ethernet testing feature works in combination with a loopback device to perform BERT loopback measurements of Key Parameter Index (KPI) for full Ethernet service testing.

10/100/1000Base-T
100/1000Base-X

10/100/1000Base-T

or   TLB-GbE

CMTS

Switch

Coax RF Cable

Demarcation Point
(Drop)

>100 Mbps Cont. Mode

Home/Office
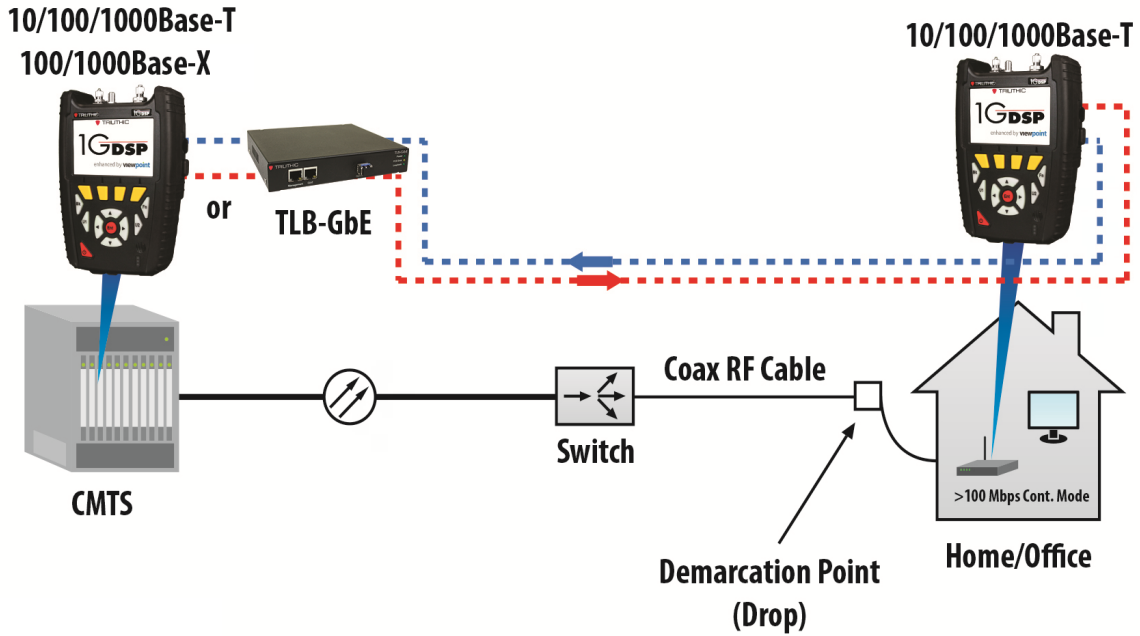
TOTAL SYSTEM MANAGEMENT

Combining the 180 DSP, 360 DSP, 720 DSP & 1G DSP meters in the field with the new ViewPoint Integrated Server in the back office, managers now have simplified access to intelligent management tools for monitoring, assessing and improving the efficiency of their total operation while making it even easier to obtain consistent, repeatable results that give supervisors that birds-eye view of the field for Total System Management.

By unifying an entire MSO's field operations in one convenient dashboard, managers can easily verify compliance and quality throughout the entire plant, either by home, system, region, division, or any other attribute from a billing system.

This simple and completely customizable integrated system of field analysis and reporting tools allows managers to watch over their entire field operations in one dashboard, comparing each location in the system, analyzing the overall health of their entire organization, and addressing concerns in near real-time.

PC Browser

Smart Phone

Tablet

WFM Module
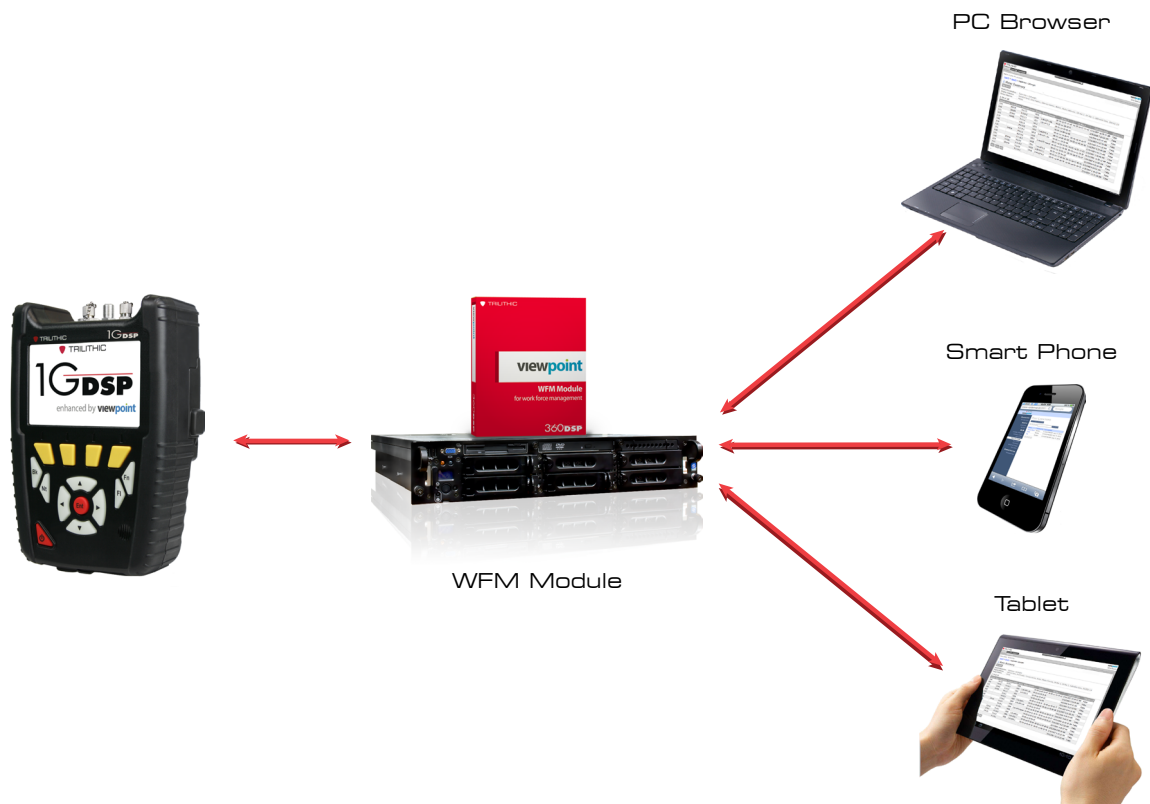
STANDARD MEASUREMENT SPECIFICATIONS

Level Measurement

Channel Bandwidth	**US Models:** 6 MHz **EURO Models:** 8 MHz
Amplitude Range	-40 dBmV to +50 dBmV
Modulation Types	Analog: NTSC, PAL B/D/G/H/I/K/N & SECAM B/D/G/H/I/K Digital: 16/32/64/128/256 QAM Annex A, 64/256 QAM Annex B
Analog Measurement Accuracy	±0.75 dB @ 77 °F (25 °C) ±2.0 dB from 0 to 122 °F (-18 to 50 °C)
Digital Measurement Accuracy	±0.75 dB @ 77 °F (25 °C) ±2.5 dB from 0 to 122 °F (-18 to 50 °C)
Resolution	0.1 dB

Spectrum Measurement

Frequency Range	Return Path: 4 to 110 MHz Forward Path: 50 to 1000 MHz
Resolution Bandwidth	10, 30, 100, and 300 kHz 1 and 3 MHz
Display Spans	Return Path: 4 to 42 MHz, 4 to 65 MHz, 4 to 85 MHz or 4 to 110 MHz Forward Path: User-selectable in 1 MHz steps
Display Scale	1, 2, 5, or 10 dB/division
Display Range	8 vertical divisions (when marker bar is hidden)
Spurious Free Dynamic Range	60 dB @ 25˚ C (77˚ F) (+50 dBmV)
Sensitivity	-40 dBmV (4 MHz to 1 GHz)

Digital Channel Measurement

Deep Interleave Compatibility	Yes
Downstream MER	40 dB @ +6 dBmV RF Input Level 34 dB @ -6 dBmV RF Input Level
Downstream BER	**Method:** True BER, derived from code words not from MER **Standard:** ITU J.83 annex A, B, C **Range:** 1 E-7 to 1 E-9 @ -6 dBmV RF Input Level
Symbol Rates	≥ 2 msps; ≤ 6.952 msps

Cable Modem Measurement

Protocol Support	DOCSIS 1.1 / 2.0 / 3.0 compliant (US & Euro DOCSIS 8x4) SNMP V1, V2c, V3 IEEE 802.3, 802.3u
Compliance Certificates	CE mark RoHS compliant CableLabs® wave 80 (DOCSIS 8x4)

Receiver Demodulation	**Demodulation:** 64 QAM, 256 QAM
	Data rate:
	    Up to 304 Mbps with 8 downstream channel bonding (DOCSIS 8x4)
	    Up to 400 Mbps with 8 downstream channel bonding (EuroDOCSIS 8x4)
	Channel bandwidth:
	    6 MHz (DOCSIS)
	    6/8 MHz (Dual mode 8x4)
	Maximum modem input signal level: 17 dBmV

Transmitter Modulation	**Modulation:** QPSK, 8 QAM, 16 QAM, 32 QAM, 64 QAM, and 128 QAM (SCDMA only)
	Data rate: Up to 108 Mbps with 4 upstream channels bonding
	Frequency (edge to edge):
	    5 to 42 MHz (DOCSIS)
	    5 to 65 MHz (EuroDOCSIS)
	Output level of CM can be controlled by CMTS though power ranging function
	Step: 1 dB

Carrier-to-Noise Measurement (In-service, non-scrambled standard channels only)

Minimum Input Level for Full Range	+10 dBmV
Dynamic Range	50 dB
Resolution	< 0.5 dB

Tilt Measurement

Max Number of Carriers	10
High/Low Delta Resolution	0.1 dB
Scan	Video, audio, pilot, and digital carriers

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Analog & Digital HUM (In-service, non-scrambled standard channels only)

Minimum Input Level	0 dBmV
Range	0 to 5%
Resolution	0.1%
Accuracy	±0.5%

Frequency Domain Reflectometer

Velocity of Propagation	Adjustable from 60.0 to 99.0% in 0.1% increments
Working Distance	Minimum: 755 feet (230 meters) @ VoP of 60.0% Maximum: 1247 feet (380 meters) @ VoP of 99.0%
Amplitude Range	0 to -80 dBRL
Distance Accuracy	5 feet

Source Generator

Modulation	CW, 16 QAM, 32 QAM, 64 QAM, 128 QAM, 256 QAM
Frequency Range	5 to 85 MHz
Amplitude	**CW:** Adjustable from 10 to 55 dBmV **16/32/64/128/256 QAM:** Adjustable from 10 to 45 dBmV
QAM Symbol Rates	0.64, 1.28, 2.56, 5.12 MSPS
QAM Source Error Rates	**BER:** Adjustable from 0 to 1.00E-2 **MER:** > 38 dB
CW Source Accuracy	±2 dB

Optical Power Meter Specifications

Detector	InGaAs (Indium Gallium Arsenide)
Port Style	FC, SC, and ST Style Adapters
Fiber Size	9/125 μm
Fiber Type	Single Mode
Wavelength	1310, 1490, & 1550 nm
Dynamic Range	-70 to 6 dBm
Accuracy	±1.0 dB @ -60 dBm or below ±0.5 dB @ above -60 dBm
Resolution	0.01 dBm, mW, uW, nW

Visual Fault Locator (VFL) Specifications

Port Style	FC Style Adapter
Fiber Size	9/125 μm
Wavelength	650 nm
Output Power	3 mW
Pulse Duration	CW (always on) or 2 Hz (0.25 sec pulse)
Maximum Radiant Power	< 5 mW
Turn-On Safety Delay	2 seconds

IEC 60825-1:2007
21 CFR 1040.10
VISIBLE LASER RADIATION
AVOID DIRECT EYE EXPOSURE
CLASS 3R LASER PRODUCT
Wavelength: 650 ± 10 nm
Max Power < 5 mW (into free space)
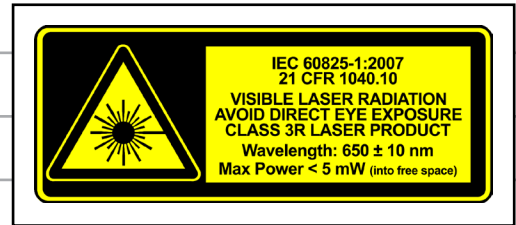
PHYSICAL & ENVIRONMENTAL SPECIFICATIONS

Physical Specifications

Construction	Rubber overmolded plastic housing
Control	Glow in the dark keypad and LCD touch screen and/or via a wireless connection to a mobile device such as a laptop, tablet, iPad® or iPhone®, or Android® handset
Display	Color LCD touch screen 800 x 480 pixels (approx 4.5" x 2.75")
Annunciators	Audible annunciator for key strokes
Antenna	Internal Wi-Fi antenna, 2 dB gain
Dimensions w/o Case (H x W x D)	8.6 x 6.1 x 2.75 in (21.84 x 15.94 x 6.99 cm)
Dimensions w/ Case (H x W x D)	9.6 x 7.1 x 3.75 in (24.38 x 18.03 x 9.53 cm)
Weight w/o Case	3.25 lbs (1.47 Kg)
Weight w/ Case	4.25 lbs (1.93 Kg)

Available Interface Types

RF Test Port	Replaceable F-Type connector DOCSIS 3.0 Modem (8x4)
Ethernet	RJ45 Management Port (10/100 Mbps) RJ45 Electrical Test Port (10/100/1000Base-T) SFP Optical Test Port (100/1000Base-X)
Wi-Fi	802.11 b/g/n 2.4/5 GHz Wi-Fi Adapter
USB	USB 2.0 Type-A Standard Port
Bluetooth	Class II Mini Bluetooth USB Adapter (v2.1) with a 10 meter range for speeds up to 3 Mbps

Battery & Power Specifications

Operating Time	12 hours plus, dependent on use
Charge Time	4 hours
Battery	Three 2600 mAh @ 7.2V Li-Ion internal batteries, factory replaceable
Power Adapter	**Input:** 100 to 240 VAC ~ 47 to 63 Hz, 1.1A Max **Output:** 15 VDC, 4.4A

Environmental Specifications

Storage & Operating Temperature	-18˚ to +50˚ C (0˚ to 122˚ F)

INCLUDES THE FOLLOWING:

1G DSP Meter

Protective Carrying Case

Shoulder Strap

AC to DC Power Adapter & Battery Charger

US AC Power Cable (US Models)

Euro AC Power Cable (Euro Models)

Touchscreen Stylus

FC, SC and ST Style Optical Adapters

SOFTWARE:

ViewPoint Express Configuration Software for the 1G DSP
P/N 0930215000

ViewPoint Integrated Server with WFM-M Module for the 1G DSP
P/N 2011656004

ACTS™ Software
P/N 0930144000

RELATED PRODUCTS:

Precision Test Cable (I/O-15)
P/N 2071527048

I-Stop 1 GHz Test Probe
P/N 2010838002

TLB-60 Return Measurement Low-Pass Filter
P/N 20110666000

TRILITHIC