VSE-1100

The all-new digital spectrum/video analyzer and noise troubleshooter

The VSE-1100 helps cable service providers maintain optimal network performance in the modern digital cable environment.

Enabling fast and easy maintenance and troubleshooting, the one-of-a-kind VSE meets these challenges:

- **CCAP** — systems are moving toward a more complete spectrum of carriers on a single output, and channel line-ups change on the fly
- **Crowded upstream spectrum** — no empty spectrum is available for out-of-band spectrum tests; noise under QAM, min-hold, and other traffic-identifying techniques are not feasible because when multiple signals are time-shared and traffic is dense, the signal frequency is rarely unoccupied
- **Video-on-demand and video streaming** — more content needs monitoring, and stronger competition with more contenders increases the need to assure quality

This powerful, truly portable measurement tool includes digital and analog spectrum and video analysis as well as noise and upstream troubleshooting—the headend and the field can use the same instrument to verify problem sources and eliminate finger-pointing. And, better problem isolation means fewer truck rolls and quicker resolution.

Additional VSE-1100 features include:

- Objective and quick segmentation of service-impacting upstream issues
- Clearly-indicated impulse noise and ingress to resolve intermittent issues
- Collaborative MPEG and RF analysis—reducing MTTR by letting techs track issues through the network
- Live MPEG transport-stream analysis and file save
- Fast troubleshooting as technicians work across network segments
- Instant detection of transient interference and noise in real time

First in the Industry

- An integrated spectrum and video analyzer/noise-troubleshooting platform for converged cable access platform (CCAP) and remote PHY evolution
- The fastest and most powerful upstream verification and troubleshooting capabilities
- The smallest and lightest digital spectrum video analyzer platform available
- One screen shows all spectrum, level, and MER measurements of all channels
- Developed specifically for the digital cable world and the rise in unicast traffic

Key Features

- An easy-to-use, intuitive tablet interface that makes every technician an expert, solving complex problems the first time
- Service-layer to physical-layer testing—from the headend/hubsite to the field
- In-band and in-service detection of faults that standard tools miss
- Demodulation of upstream signals to detect code word errors and linear distortions
- Automatic detection of channel programs and channel plan building

Applications

- Spectrum, QAM, and MPEG video analysis for headend and hub sites
- Upstream analysis and troubleshooting for the HFC plant: noise, ingress, linear impairments, and codeword errors
- Objective upstream carrier and node leg performance assessment for tracking poor service quality throughout the HFC plant

Essential, Innovative Test Modes

Downstream Analysis

The VSE-1100 performs all of the downstream RF analysis you would expect from an instrument designed for cable network testing, and more.

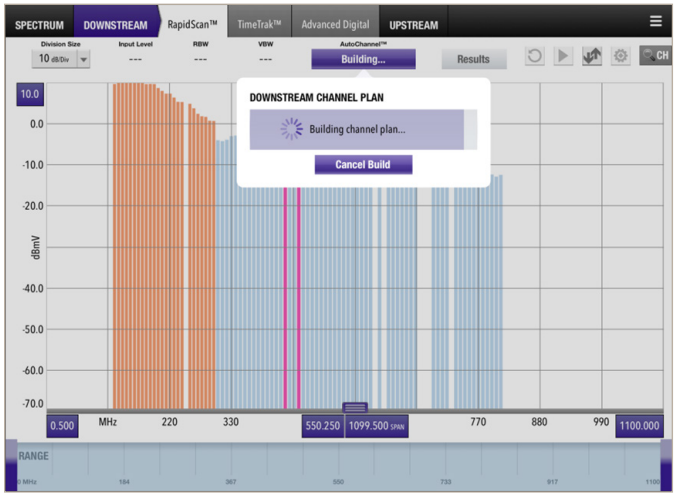
Full downstream channel scan screen

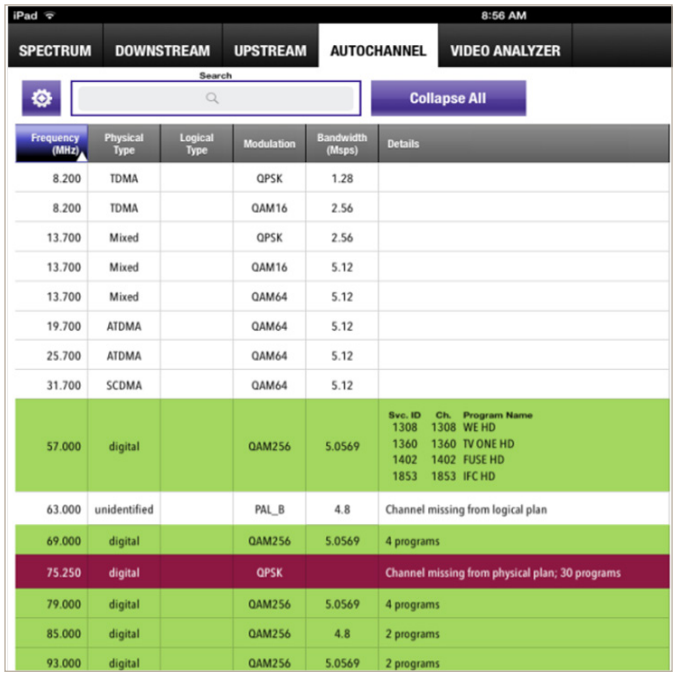
RapidScan™

Unlike traditional analyzers, the VSE-1100's RapidScan™ provides the user with a big-picture view of their cable network. With RapidScan, power level, MER, and ingress under the carrier can be compared across the full range of adjacent channels. The VSE-1100 display highlights QAM level modulation and MER levels to make potential issues standout.

AutoChannel™

One of the challenges that technicians face in the field is to determine which signal is carrying a particular channel. When a customer complains about tiling on a particular program, the tech must then find out which signal is carrying that program in order to do signal quality analysis. The VSE-1100 provides content-intelligent tuning through an innovative method of automatic channel program detection and plan building. This simplifies instrument configuration, speeds problem identification, and shortens repair times. In addition, AutoChannel selectively compares a physical channel plan with the logical (virtual) channel plan.

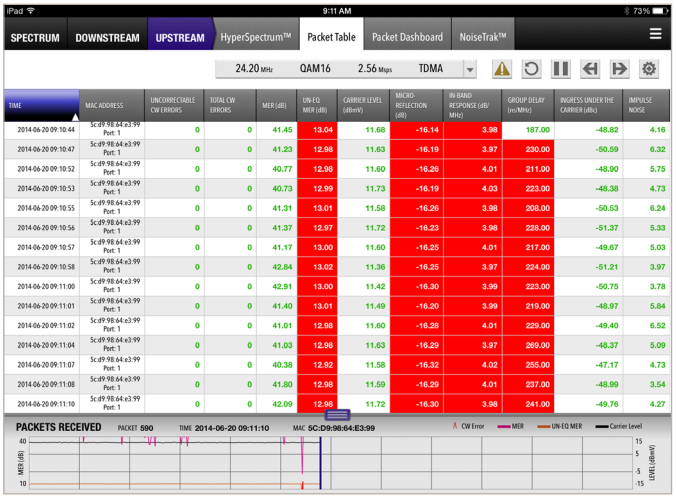




AutoChannel screens

Packet Dashboard™ and Packet Table™ (MACTrak Local™)

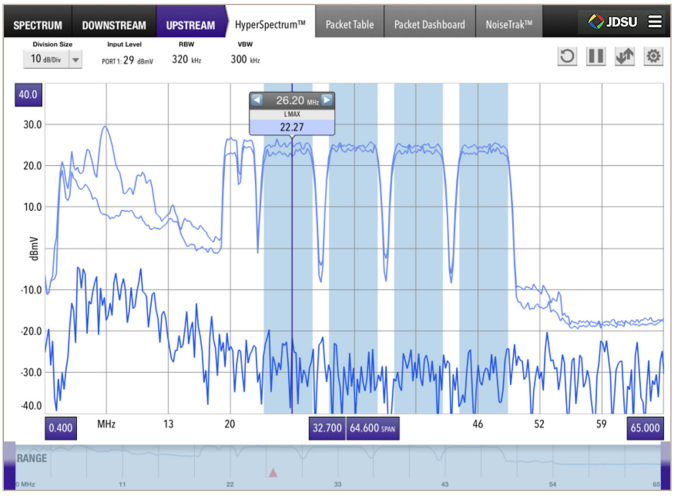
MACTrak Local is a dynamic upstream and return path troubleshooting tool that can be used locally or in the field. The VSE-1100 makes this test capability portable to enable moving the receiver from point-to-point in the return path to test and track codeword errors. The MACTrak display shows multiple measurement results on one screen through its Packet Dashboard and Packet Table display. This enables finding problematic parameters quicker. MACTrak demodulates upstream signals to detect codeword errors and linear distortions. The technician can make a direct comparison of the result at his location with the result at the headend or hub site to identify laser-clipping issues.



Packet dashboard and packet table screens

Hyper-Spectrum™

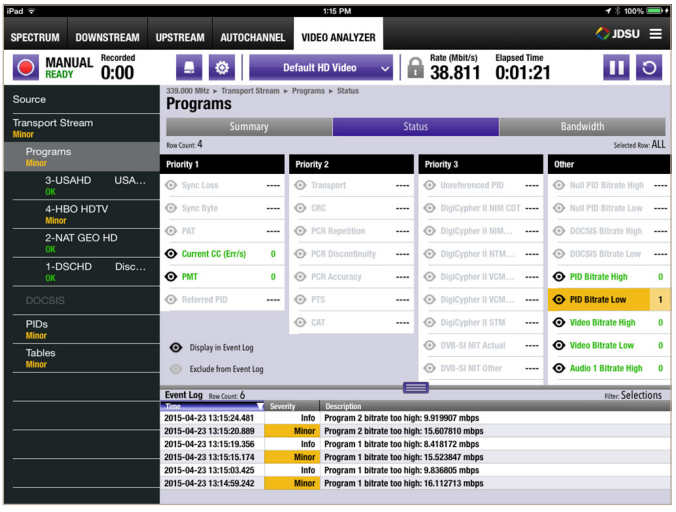
It is challenging to sort noise and interference from system signals in an upstream spectrum that is loaded with service signals. VSE-1100 real-time, no-gap FFT analysis and hyper-speed discerns noise/interference vs. service signals. The real-time analyzer has persistence in an 85 MHz band making interfering signals stand out. The innovative overlapping FFT analysis means that no transient interfering signals will go undetected.



Hyper-Spectrum with upstreams screen

MPEG Analysis

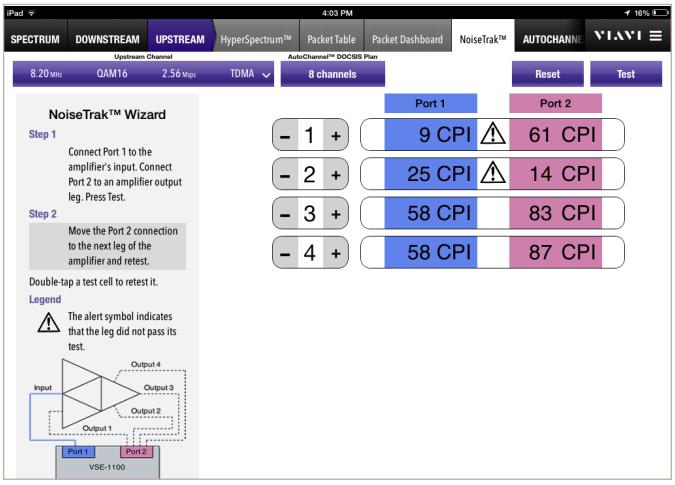
In addition to content-intelligent tuning, the VSE-1100 gives technicians insight into the actual customer experience with MPEG transport stream analysis—an unprecedented test capability for a field instrument. Technicians can now run TR101-290 verification tests and see real-time status and bandwidth use—all with an easy-to-use and intuitive interface. And, transport streams are recordable for further analysis.



MPEG analysis screen

NoiseTrak™

Impulse noise and ingress can be very difficult and time consuming to troubleshoot, as a technician uses subjective discernment to determine which leg of the return path contains the noise source. The innovative VSE-1100 dual-input NoiseTrak mode enables simultaneous viewing of spectrum and demodulated signals from both legs with an objective analysis to expose the problem leg. Another innovation is overlapping FFT analysis that ensures that no transient interference will go undetected. This unique test capability dramatically shortens repair times.



NoiseTrak screen

Teamwork and Remote Access

Sometimes a problem shows itself only over an extended period of testing. It is impractical to expect a technician to sit and monitor the analyzer screen for an extended period, so it makes sense to enable remote testing. The VSE-1100 is perfectly suited for this application: a technician can run tests from any network-accessible location, even when the measurement engine is positioned in a remote network location. This enables a completely new method of troubleshooting.

Specifications

Physical		
Weight	4.89 kg (10.8 lb)	
Size (H x W x D)	7 x 29.85 x 35.56 cm (2.75 x 11.75 x 14 in)	
Frequency		
Range	0.5 to 1,100 MHz	
Accuracy	1 ppm	
RBW	1.4 kHz to 5.12 MHz variable steps	
Spectrum update rate	10 frames/sec on full scan	
Level		
Max input level	65 dBmV	
Min detectable level	–58 dBmV (320 kHz RBW)	
Amplitude accuracy	±0.75 dB @ 25°C, 2.0/T (typical CW)	
	±2 dB over temp range (spectrum analyzer)	
	±3 dB on carriers, hyper and upstream carriers	
Return loss	14 dB typical	
	12 dB worst case	
Upstream Analysis		
Dual inputs for comparisons	Demod and spectrum	
Maximum and minimum hold for zero dead time	RBW	320 kHz
	Dual overlapping FFTs	
	No time gaps	99.99% coverage
Packet Dashboard and Packet Table (MACTrak Local)	Upstream channel details (frequency, modulation, symbol rate)	
	Codeword errors (correctable, un-correctable)	
	Equalized and unequalized MER	
	Constellation diagrams (equalized and unequalized MER)	
	Carrier performance index (CPI)	
	Carrier level (with upstream spectrum trace)	
	Synchronized spectrum with demodulation	
	Micro-reflection	
	In-channel response	
	Group delay	
	Ingress under the carrier	
	Impulse noise	
	Packets received, level, and MER (equalized and unequalized) trace	
	Source MAC address	
One second persistence in 0.4 to 85 MHz		
Minimum detectable level upstream	–58 dBmV	

Downstream Analysis	
Simultaneous display of carriers (with min and max), noise, and MER for any number of channels	
Fast level measurement — SA scan	10 updates per second
AutoChannel plan builder	Auto detection of channel parameters (analog/digital, symbols, QAM)
Spectral estimation of channel parameters	
Analog Channel Measurement	
Video and audio levels (dual)	
Standards	NTSC and PAL
Accuracy	±2 dB on analog channel measurements
Downstream Digital Channel Analysis	
QAM modulation(s)	Q64, Q128, Q256 annex A, B, and C
Regional demods	DVB-C
Full span MER	
MER scan	10 channels/sec
MER	Range to 44 dB
	Resolution 0.1 dB
	Accuracy ±2 dB (for signals less than 42 MER)
BER down to 1E-9 (pre and post FEC)	
Ingress under carrier	Full span ingress noise trace
Group delay and in-channel response (ICR)	
Digital Quality Index (DQI) (including strip charts)	
Errored/severely errored seconds	
Digital hum	
Constellation diagrams	
Level, measured symbol rate, carrier frequency, modulation, interleaver depth, AGC stress, EQ stress	
Display/Interface	
Color touch screen	
Detachable remote use via Wi-Fi	
Tablet requirements	Apple iPad (iPad Air or iPad with Lighting connector)/iOS 7.1 or greater
Will charge tablet from VSE-1100	
Usability	
Typical battery life	>6 hr
Battery charge time (AC charger)	5 hr
Boot time	15 sec
Environmental (VSE-1100)	
Hard rain	4 in/hr (10 cm/hr)
Drop	4 ft
Temp range	–4° to 122°F (–20° to 50°C)
Storage temp	–20° to 149°F (–20° to 65°C)

Input/Outputs	
RF (2)	F connectors (replaceable)
Port 1	Upstream and downstream
Port 2	Upstream only 85 MHz
USB host (thick and thin client)	
Ethernet	RJ45
Power	Polarized
Asset and Data Management	
StrataSync™ asset and data management	
Reporting Capability	
Measurement screen capture save and recall	
.csv file save via StrataSync and USB export	
StrataSync data management	
StrataSync asset management	
Remote Access/Connectivity	
Measurement unit can be left behind for longer-term measurements/recording	
Addressable via IP address or name (same subnet), Bonjour/Avahi	
Wi-Fi, Ethernet connections	
WiFi — 802.11n	
WAP and client	
Logical Channel Plan Acquisition	
DVB NIT/SDT	
DOCSIS DSG tunnel (Cisco, Motorola and Broadcast)	

Ordering Information

Feature Matrix	SA	US	DS	Base
Spectrum analyzer	✓	✓	✓	✓
RapidScan	1 channel		✓	✓
AutoChannel			✓	✓
DS advanced	✓		✓	✓
RTSA-US	✓	✓	✓	✓
MACTrak		✓		✓
NoiseTrak		✓		✓
Remote access (via WiFi)	✓	✓	✓	✓
MPEG analysis			Optional	Optional

DS = Downstream

US = Upstream

RTSA = Real Time Spectrum Analyzer

Description	Part Number
Base model, includes complete set of standard features and is option capable (choose return pass band)	VSE-1100-BASE-PKG-42MHZ
	VSE-1100-BASE-PKG-65MHZ
	VSE-1100-BASE-PKG-85MHZ
Downstream model, includes standard features related to downstream testing (choose return pass band)	VSE-1100-DS-PKG-42MHZ
	VSE-1100-DS-PKG-65MHZ
	VSE-1100-DS-PKG-85MHZ
Upstream model, includes standard features related to upstream testing (choose return pass band)	VSE-1100-US-PKG-42MHZ
	VSE-1100-US-PKG-65MHZ
	VSE-1100-US-PKG-85MHZ
Spectrum analyzer model, includes only spectrum analyzer related features (choose return pass band)	VSE-1100-SA-PKG-42MHZ
	VSE-1100-SA-PKG-65MHZ
	VSE-1100-SA-PKG-85MHZ
Options	
MPEG video analysis, factory installed	VSE-VIDEO-ANLYZ
MPEG video analysis, field upgrade	VSE-VIDEO-ANLZ-FLD
MPEG video analysis, timed option license	VSE-VIDEO-ANLYZ-TIMED
MPEG video analysis, floating license	VSE-VIDEO-ANLYZ-FLOATING
Upgrades	
Upgrade SA model to DS model	VSE-1100-SA-TO-DS
Upgrade SA model to BASE model	VSE-1100-SA-TO-BASE
Upgrade US model to BASE model	VSE-1100-US-TO-BASE
Upgrade DS model to BASE model	VSE-1100-DS-TO-BASE
Included Accessories	
Case with detachable tablet holder and shoulder strap	
AC power supply with choice of country-specific adapter plug	
12 V DC automobile power supply	
Quick-start guide	
First year of StrataSync asset and data management	
Three-year standard warranty	
Optional Accessory	
VSE-1100 interface (Air)	

Note: port 2 cutoff frequency is 85 MHz.

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To reach the Viavi office nearest you, visit viavisolutions.com/contacts.

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