



## 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.

### 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

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

### 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.



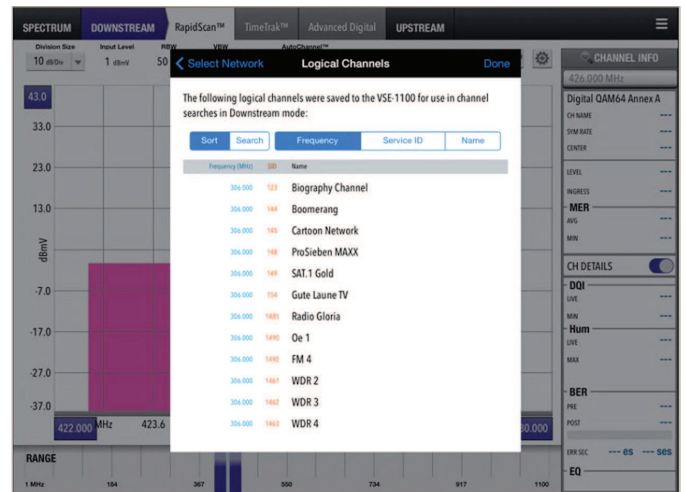
Full downstream channel scan screen

#### 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 stand out.

#### 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.



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.



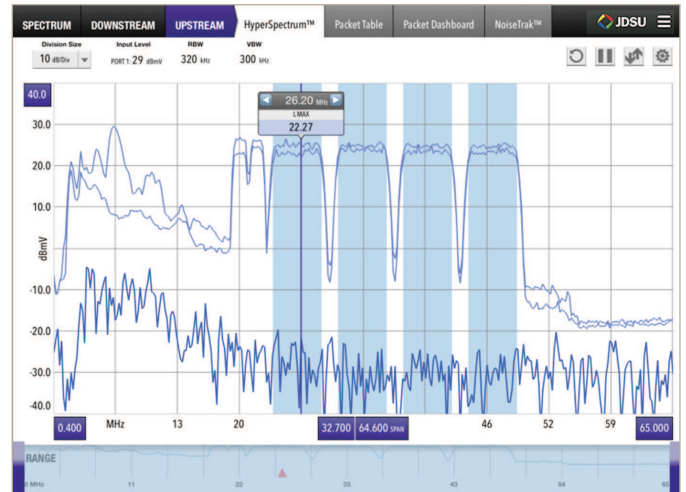
The Packet Table interface provides a detailed view of individual packet measurements. The table below shows columns for Time, MAC Address, Unrecoverable Codewords, Fecm/Lw Errors, Mer (dB), Mer (dB), Micro Reflection (dB), In-Band Response (dB/MHz), Group Delay (ns/MHz), Packets Above the Carrier (dBc), and Impulse Noise (dB).

TIME	MAC ADDRESS	UNRECOVERABLE CODWORDS	FECM/LW ERRORS	MER (dB)	MER (dB)	MICRO REFLECTION (dB)	IN-BAND RESPONSE (dB/MHz)	GROUP DELAY (ns/MHz)	PACKETS ABOVE THE CARRIER (dBc)	IMPULSE NOISE (dB)	
2014-06-20-09:10:44	Sc#F198.04.v3.99	0	0	41.45	13.04	11.60	-16.14	3.96	187.00	-48.82	4.16
2014-06-20-09:10:47	Sc#F198.04.v3.99	0	0	41.23	12.98	11.63	-16.19	3.97	230.00	-50.59	6.32
2014-06-20-09:10:52	Sc#F198.04.v3.99	0	0	40.77	12.98	11.60	-16.26	4.01	211.00	-49.90	5.75
2014-06-20-09:10:53	Sc#F198.04.v3.99	0	0	40.73	12.98	11.73	-16.19	4.03	203.00	-48.38	4.73
2014-06-20-09:10:55	Sc#F198.04.v3.99	0	0	41.21	13.01	11.58	-16.26	3.96	306.00	-50.53	6.24
2014-06-20-09:10:56	Sc#F198.04.v3.99	0	0	41.37	12.97	11.72	-16.33	3.98	228.00	-51.37	5.33
2014-06-20-09:10:57	Sc#F198.04.v3.99	0	0	41.17	13.00	11.60	-16.25	4.01	217.00	-49.67	5.03
2014-06-20-09:10:58	Sc#F198.04.v3.99	0	0	42.84	13.02	11.36	-16.25	3.97	224.00	-51.21	3.97
2014-06-20-09:11:00	Sc#F198.04.v3.99	0	0	42.91	13.00	11.42	-16.30	3.99	203.00	-50.75	3.78
2014-06-20-09:11:01	Sc#F198.04.v3.99	0	0	41.40	13.01	11.49	-16.20	3.99	219.00	-48.97	5.84
2014-06-20-09:11:02	Sc#F198.04.v3.99	0	0	41.01	12.98	11.60	-16.26	4.01	229.00	-49.40	6.52
2014-06-20-09:11:04	Sc#F198.04.v3.99	0	0	41.03	12.98	11.63	-16.29	3.97	269.00	-48.37	5.09
2014-06-20-09:11:07	Sc#F198.04.v3.99	0	0	40.29	12.90	11.58	-16.30	4.00	205.00	-47.17	4.73
2014-06-20-09:11:08	Sc#F198.04.v3.99	0	0	41.80	12.98	11.59	-16.29	4.01	237.00	-48.99	3.54
2014-06-20-09:11:10	Sc#F198.04.v3.99	0	0	42.00	12.98	11.72	-16.30	3.98	241.00	-49.76	4.27

Packet dashboard and packet table screens

### Hyper-Spectrum™

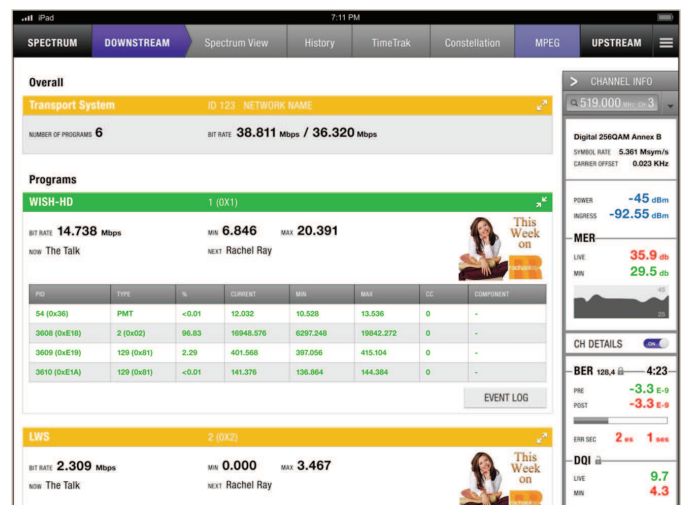
It is challenging to sort noise and interference from system signals in an upstream spectrum that is loaded with service signals. VSE-1100 real-time, no-gap FFT analysis and hyper-speed discerns noise/interference vs. service signals. The real-time analyzer has persistence in an 85 MHz band making interfering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



Hyper-Spectrum with upstreams screen

### MPEG Analysis

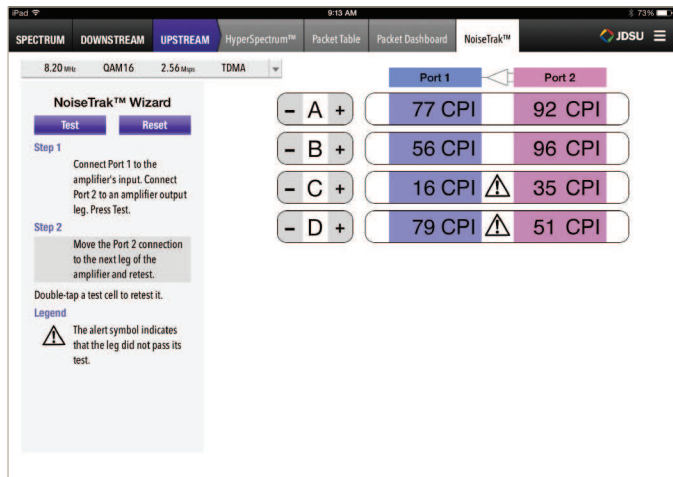
In addition to content-intelligent tuning, the VSE-1100 gives technicians insight into the actual customer experience with MPEG signal analysis—an unprecedented test capability for a field instrument. Technicians are able to track issues and see MPEG errors with live transport stream analysis.



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		

## Specifications

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	
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

Tabular text file for downstream results

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

Description	Part Number
42 MHz diplexer	VSE-1100-BASE-PKG-42MHZ
65 MHz diplexer	VSE-1100-BASE-PKG-65MHZ

Note: port 2 cutoff frequency is 85 MHz.

### Included Features

Downstream analysis

RapidScan

AutoChannel

HyperSpectrum

MACTrak Local

NoiseTrak

Remote access (via Wi-Fi connection)

Basic reporting capability

### Included Accessories

Case with detachable tablet holder and shoulder strap

AC power supply with choice of country-specific adapter plug

12VDC automobile power supply

Quick-start guide

First year of StrataSync asset and data management

One year standard warranty

### Optional Accessory

VSE-1100 interface (Air)



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