DS2500Q
Digital TV QAM Analyzer

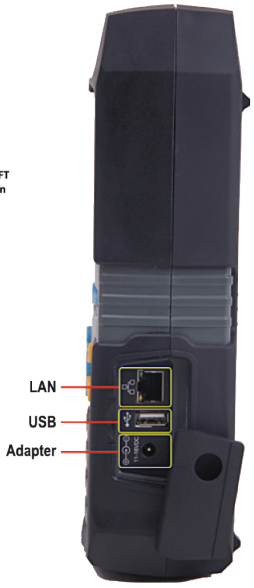
Key Benefits

- High-speed Spectrum Analysis: 4 ~ 1000 MHz
- Integrated DOCSIS 3.0 Cable Modem
- Integrated Upstream Signal Generator (no FEC)
- Supports ITU-T J.83 Annex A/B/C
- Error Vector Spectrum: identifies interference signals under QAM carriers, with no break in service
- Auto Test

Overview

Integrating multiple functions in a single handheld instrument, the new DS2500Q is a powerful Digital TV QAM Analyzer with a comprehensive measurement suite specifically designed for HFC network testing, troubleshooting, and maintenance.

The DS2500Q's main functions include Enhanced Spectrum Analysis, Analog & Digital TV analysis, DOCSIS 3.0 analysis, Upstream Signal Generation, Ethernet testing, and Auto Test. The revolutionary EVS function enables users to detect coherent distortions hiding under QAM carriers - without interrupting service. The DS2500Q supports Deviser's PC software toolkit, included with each unit, to make data transfer a snap.



DVB-C Signal Analysis

The DS2500Q supports the ITU-T J.83 Annex A/B/C standard, providing Channel Power, MER, BER, and Constellation. It also offers Digital HUM distortion measurements, from thefundamental frequency to 4th harmonic components.

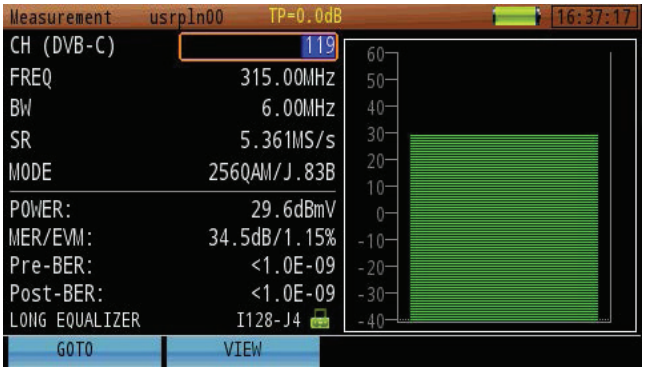


Figure 1: DVB-C Channel Measurement

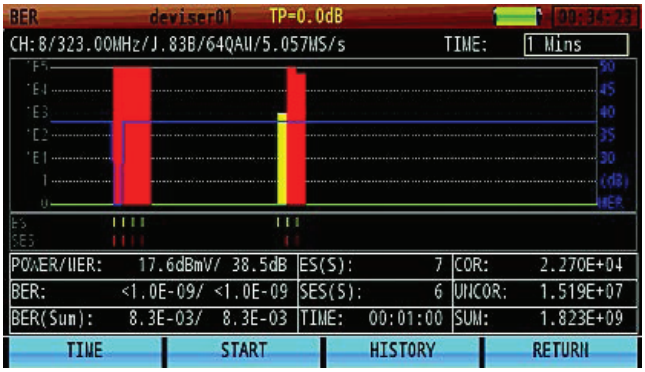


Figure 2: BER and MER Statistical Analysis

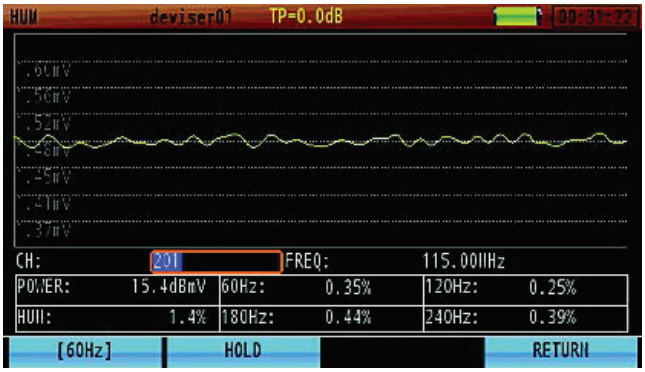


Figure 3: Digital HUM

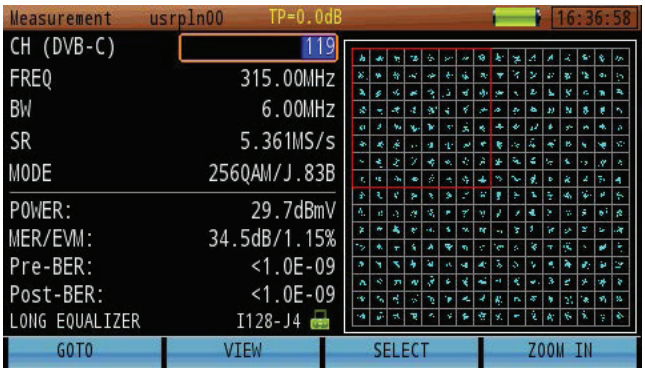


Figure 4: Constellation Display

High-Speed Spectrum Analysis

The DS2500Q offers an enhanced spectrum analysis function, with a frequency range from 4MHz to 1000MHz and sensitivity down to -55dBmV (@300KHz). The spectrogram provides a scrolling three-dimensional display, allowing users to track frequency and level over time - excellent for analyzing intemittent signals.

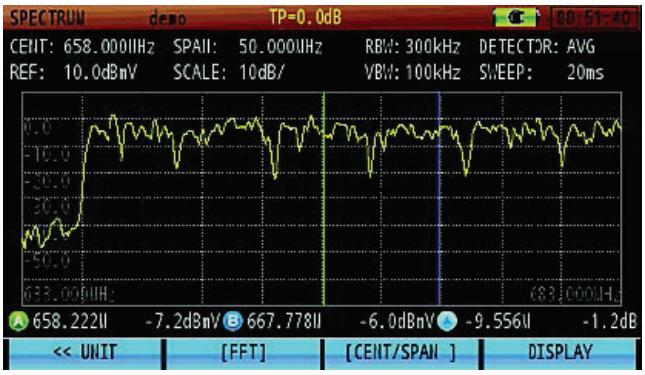


Figure 5 Spectrum Analysis

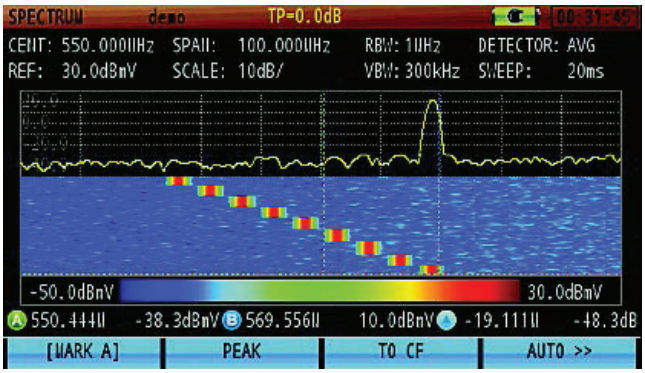


Figure 6: Spectrograph

EVS In-Service Interference Detection

The Error Vector Spectrum feature can find interference signals under a QAM carrier without service interruptions.

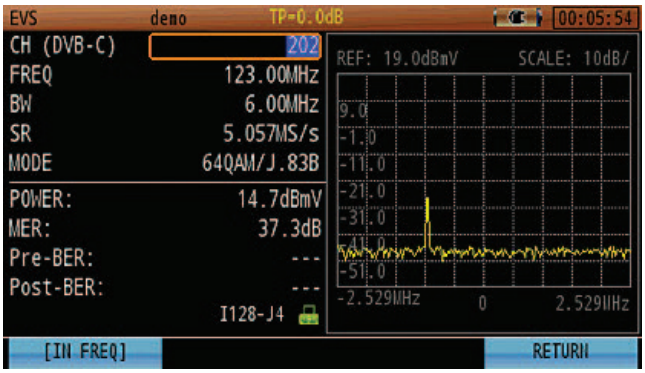


Figure 7: The EVS mode finds narrow-band interference signals with supreme clarity and ease.

Upstream Signal Generator

The DS2500Q can generate a CW carrier or QAM signal. Sweep mode is also available.

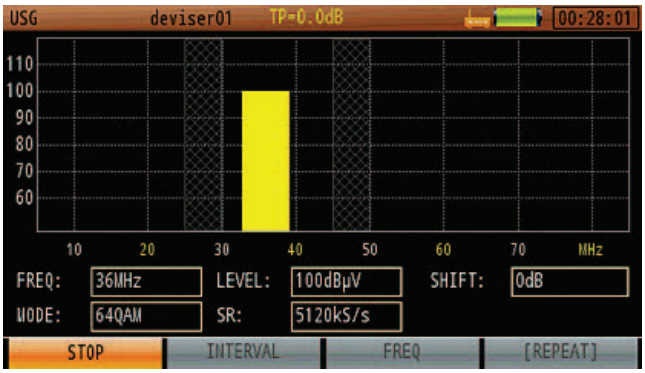


Figure 8: Upstream Signal Generator

Cable Modem Measurement

The DS2500Q incorporates a standard DOCSIS 3.0 cable modem, compatible with DOCSIS 1.X, 2.0 & 3.0. The built-in modem supports 8x DS and 4x US bonded carriers. Figure 8 (below) shows the CM statistical info screen - including downstream signal level, modulation type, bandwidth, symbol rate, MER, BER, upstream signal level, symbol rate, & UCD (Upstream Channel Descriptor).

Users can select the desired DOCSIS mode, downstream channel, and UCD. Basic network test tools include Ping, Traceroute, PPPoE, FTP, and a web browser.

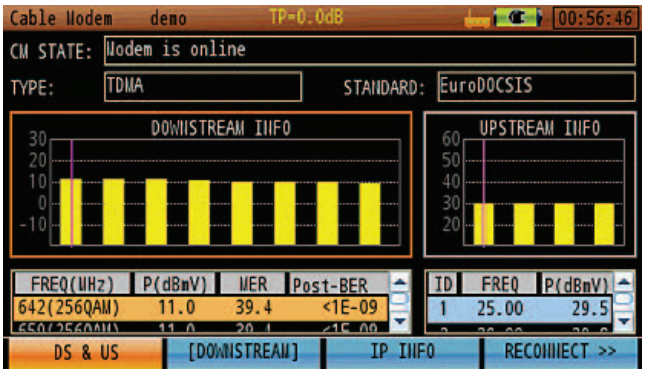


Figure 9 DOCSIS 3.0 Statistical Information Display

Auto Test

The DS2500Q comes equipped with a wide range of region-standard channel plans spanning (in part) North America, Asia, and Europe, as well as several sets of limit profiles - allowing users to design automatic tests. Tasks that can be automated include Analog TV, Digital TV and Cable Modem testing. Once the analyzer completes an auto test, all items in the test results will indicate Pass or Fail according to the limit profile. Results are automatically saved for later analysis.

Figure 10: Auto Test Project

Specifications

Downstream Spectrum Analysis		
Frequency Range		4 ~ 1000 MHz
Frequency Stability		± 1 PPM (0°C ~ 50°C)
Frequency Span		Zero span ~ full span
Frequency Step		1kHz
Resolution BW filters (-3dB)		30kHz; 100kHz; 300kHz; 1 MHz; 3 MHz
Display Scale & Range		1, 2, 5, 10, 20dB/division; 8 vertical divisions
Sweep Time		20ms ~ 25s
Input Level Range		-60 ~ +60dBmV
Dynamic Range		65dB (300kHz RBW)
Sensitivity		-50dBmV (300kHz RBW, pre-amplifier on)
Attenuation		0 ~ 40dB in 1dB steps
Pre-amplifier		Manual; 18dB gain
Accuracy		< ±1dB @ 25 ± 5°C (typical)
Measurement Detector		Positive/negative peak; sample; average; RMS
Reference Level		-80 ~ +70dBmV
Markers		2 vertical markers
Upstream Spectrum Analysis		
Frequency Range		4 ~ 210 MHz
Resolution Bandwidth		100kHz; 300kHz
Video Bandwidth		30 Hz; 100Hz; 300Hz; 1kHz; 3kHz; 10kHz; 30kHz; 100kHz; 300kHz; 1 MHz; 3 MHz
Display Scale & Range		1, 2, 5, 10, 20dB/division
Sweep Time		20ms ~ 25s
Input Level Range		-60 ~ +60dBmV
Attenuation		Automatic, 0 ~ 40dB
Pre-amplifier		Manual, 18dB gain
Accuracy		< ±1dB @ 25 ± 5°C (typical)
Measurement Detector		Positive/negative peak; sample; average
Markers		2 vertical markers
Digital TV Measurement		
Frequency Range		46 ~ 1000 MHz
Power Level Range		-30 ~ +50dBmV
Level Resolution		0.1dB
Accuracy		< ±1.5dB @ 25 ± 5°C (typical); C/N > 20dB
Modulation Type	J.83 Ax. A/C	16 / 32 / 64 / 128 / 256 QAM
	J.83 Ax. B	64 / 256 QAM
Interleave Depth	J.83 Ax. A/C	(12, 17)
	J.83 Ax. B	(128, 1) ~ (128, 4)
Symbol Rate		4 ~ 7 MS/s
MER		>41dB; accurate to within ± 2dB
BER		1E-3 ~ 1E-9
Constellation		16 / 32 / 64 / 128 / 256 QAM

Analog TV Measurement		
Supported Standards		B/G; I; D/K; L/L'; M/N
Color Standards		NTSC, PAL, SECAM
Frequency Step		10kHz
Power Level Range		-40 ~ +60dBmV
Accuracy		< ±1dB @ 25 ± 5°C (typical); S/N >30dB
Level Resolution		0.1dB
Resolution Bandwidth		300kHz
CCN		>51dB (@ +10dBmV carrier level)
CTB/CSO		≥ 61dB; accurate to within ±2dB
HUM Measurement		1 ~ 15%: ±5% (1 ~ 5%): ±1.0% (5 ~ 20%)
Tilt		Up to 16 channels
Attenuation		Automatic, 40dB
Pre-amplifier		Automatic, 18dB gain
Cable Modem Measurement		
Downstream		
Supported Standards		DOCSIS 1.1, 2.0, 3.0; EuroDOCSIS 1.0, 1.1, 2.0, 3.0
Demodulation		64 / 256 QAM
Frequency Range		>91 MHz (US); >100 MHz (EU)
Max Speed	6 MHz BW	Up to 304 Mbps
	8 MHz BW	Up to 400 Mbps
Channel Bonding		Up to 8 channels
Bandwidth		6 MHz / 8 MHz
Input Level Range		-15 ~ +15dBmV
Upstream		
Frequency Range		5 ~ 85 MHz
Signal Bandwidth (TDMA)		200 / 400 / 800 / 1600 / 3200 / 6400kHz
Signal Bandwidth (CDMA)		1600 / 3200 / 6400kHz
Channel Bonding		Up to 4 channels
Output Level (TDMA)	QPSK	8 ~ 58dBmV
	8 / 16 QAM	8 ~ 55dBmV
	32 / 64 QAM	8 ~ 54dBmV
Output Level (CDMA)		8 ~ 53dBmV (all modes)
Max Speed		120 Mbps (4 channel bonding)
Upstream Signal Generator		
Signal Modulation		8 / 16 / 32 / 64 / 256 QAM; CW; QPSK
Symbol Rate		0.16; 0.32; 0.64; 1.28; 2.56; 5.12 MS/s
MER		>38dB; accurate to within ± 2dB
Frequency Range		5 ~ 85 MHz
Frequency Step		1 MHz
Power Level Range		8 ~ 58dBmV (CW, QPSK)
Power Step		1dB

Specifications (cont'd)

General		
RF Input		75Ω F-type connector
USB		USB 1.1
LAN		RJ45, 10/100T Ethernet
Display		4.3" 480x272 TFT LCD
Power Adapter	AC	100~240V/ 50~60 Hz
	DC	12V / 3A
Battery		Li-ion, 7.4V / 7.8Ah
Charging Time		~4 hours
Operation Time		>6 hours
Storage Temperature		-20 ~ +60°C
Operation Temperature		-10 ~ +50°C
Dimensions (LxWxH)		9.6" x 5.1" x 2.4" (245mm x 130mm x 60mm)
Weight		3.3 lbs (~1.5kg)

Ordering Information

DS2500Q Base Model
DS2500Q Digital Cable TV QAM Analyzer, 4 ~ 1000 MHz, 75Ω or BNC
Options
DOCSIS 3.0 8x4 Cable Modem and Upstream Signal Generator (no FEC)
SYNCOR Asset Management
SYNCOR Certificate
ATSC (8VSB) Measurement
2-Prong Power Cord plus Ground (Europe except UK)
3-Prong Power Cord plus Ground (US)
3-Prong Power Cord plus Ground (UK)
3-Prong Power Cord plus Ground (Australia)
English Instruction Manual (hard copy)
Toko Type F(f) to F(f) Connector

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