

**DS2500Q**  
Digital TV QAM Analyzer

Key Benefits

- High Speed Spectrum Analysis: 4~1000MHz
- 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

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 Generator, 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.



FSK Communication  
RF Input USG Output



### High-Speed Spectrum Analysis

The DS2500Q offers enhanced spectrum analysis performance with a frequency range of 4MHz ~ 1000MHz and sensitivity to signals as low as -55dBmV (@300KHz).

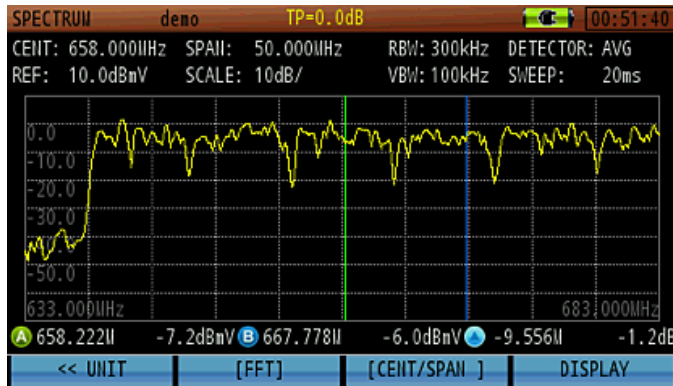


Figure 1: Spectrum Analysis

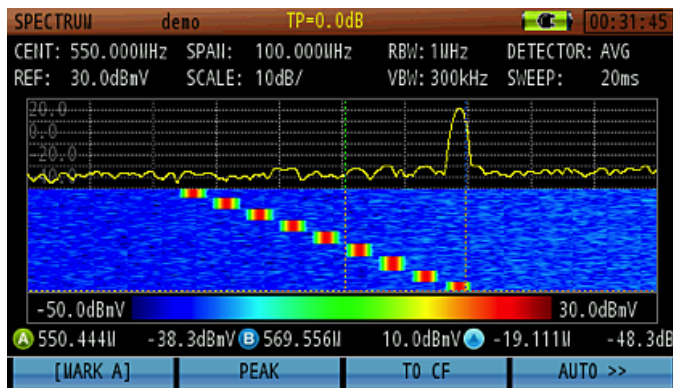


Figure 2: Spectrogram

The spectrogram provides a scrolling three-dimensional display, allowing users to track frequency and level over time - excellent for analyzing intermittent signals.

### DVB-C Signal Analysis

The DS2500Q supports the ITU-T J.83 Annex A/B/C standard, providing Channel Power, MER, BER, Constellation, and Digital HUM measurements.

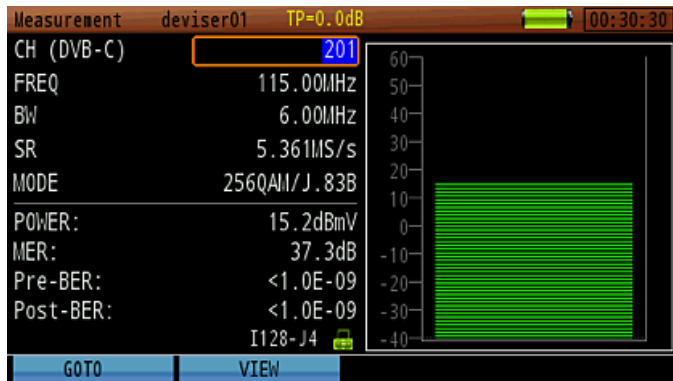


Figure 3: DVB-C Channel Measurement

The DS2500Q also offers Digital HUM distortion measurement, from the fundamental frequency to 4th harmonic components.

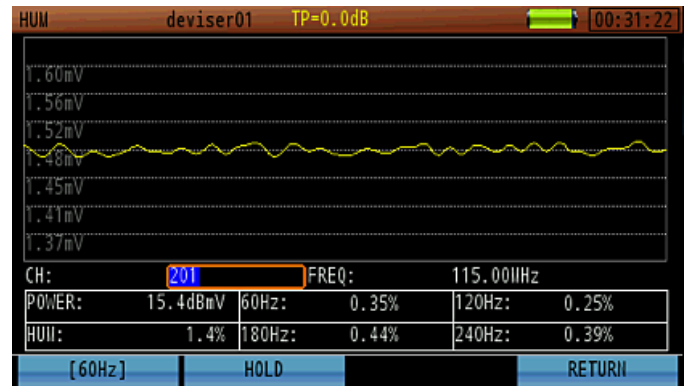


Figure 4: Digital HUM

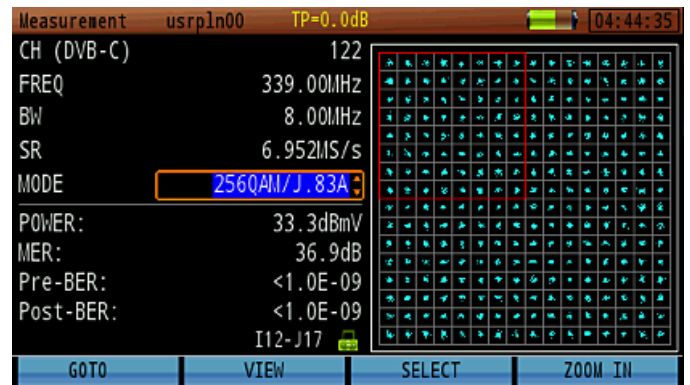


Figure 5: Constellation Display

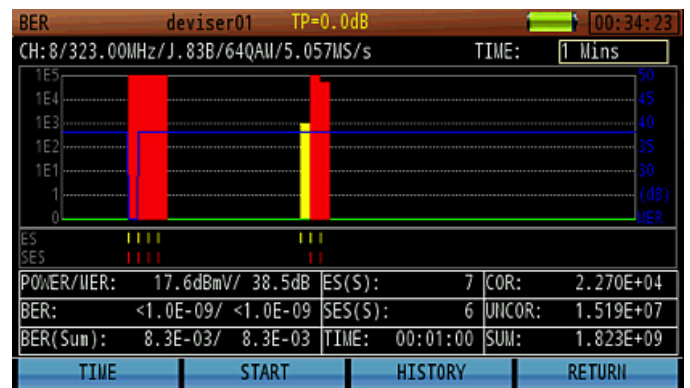


Figure 6: BER and MER Statistical Analysis

### EVS In-service Interference Detection

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

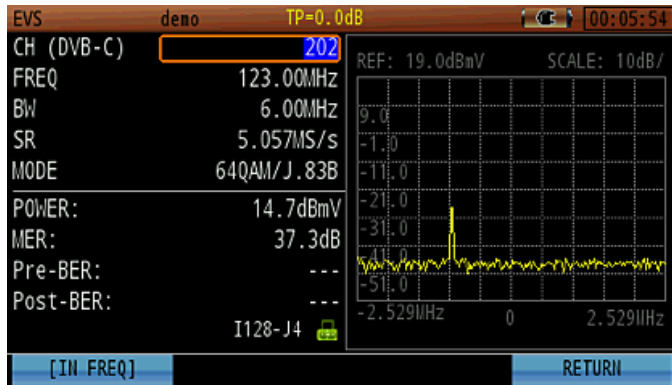


Figure 7: The EVS mode finds narrow band interference signals with supreme clarity and ease.

### 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 Browser.

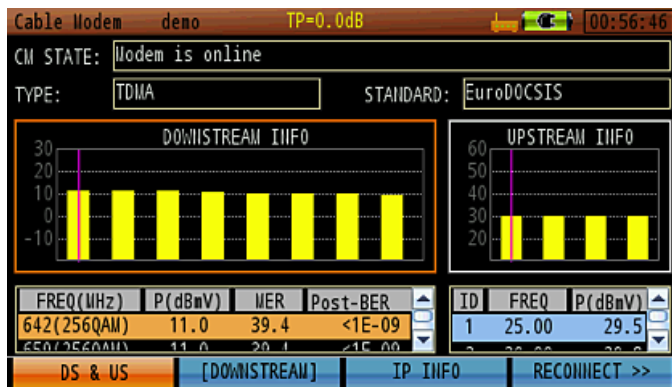


Figure 8: DOCSIS 3.0 Statistical Information Display

### Upstream Signal Generator

The Upstream signal generator can generate a CW carrier or a QAM signal. A sweeping mode is also available.

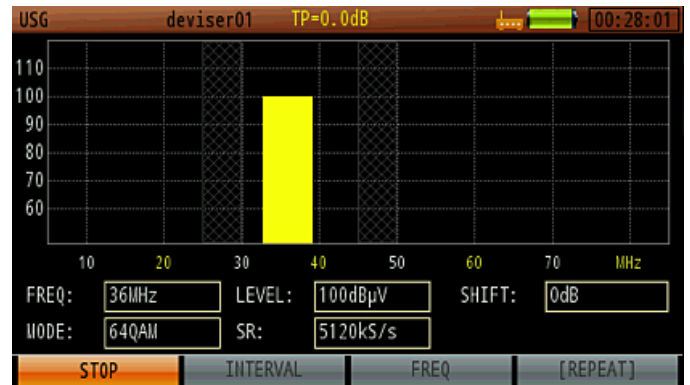


Figure 9: Upstream Signal Generator

### 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 MHz ~ 1000 MHz
Frequency Stability	$\pm 1$ PPM (0°C ~ 50°C )
Frequency Span	0 MHz ~ Full span
Frequency Step	1 kHz
Resolution Bandwidth filters (-3dB)	30kHz, 100kHz, 300kHz, 1 MHz, 3 MHz
Video Bandwidth filters	30 Hz, 100 Hz, 300 Hz, 1kHz, 3kHz, 10kHz, 30kHz, 100kHz, 300kHz, 1 MHz, 3 MHz
Display Scale and Range	1, 2, 5, 10, 20 dB/Div; 8 vertical divisions
Sweep Time	20ms ~ 25s
Input Level Range	-60dBmV ~ +60dBmV
Dynamic Range	65dB (300kHz RBW)
Sensitivity	-50dBmV (300 kHz RBW, Pre-amplifier On)
Attenuation	0~40dB in 1dB steps
Pre-amplifier	Manual, 18dB Gain
Accuracy of Measurements	$< \pm 1.0$ dB@+25 $\pm 5$ °C (typical value)
Measurement Detector	Positive Peak, Negative Peak, Sample, Average, RMS
Reference Level	-80dBmV ~ +70dBmV
Markers	2 vertical markers
Upstream Spectrum Analysis	
Frequency Range	4~46 MHz (DOCSIS); 4~68 MHz (Euro DOCSIS 2.0); 4~88 MHz (Euro DOCSIS 3.0); 4~120 MHz (DOCSIS 3.1); 4~210 MHz (DOCSIS 3.1)
Frequency Span	42/64/84/116/206 MHz, zero span or manual selections (max 200 MHz)
RBW	100kHz, 300kHz
VBW	30 Hz, 100 Hz, 300 Hz, 1kHz, 3kHz, 10kHz, 30kHz, 100kHz, 300kHz, 1 MHz, 3 MHz
Display Scale and Range	1, 2, 5, 10, 20 dB/Div
Sweep Time	20ms ~ 25s
Input Level Range	-60dBmV ~ +60dBmV
Attenuation	Automatic, 0~40dB
Pre-amplifier	Manual, 18dB Gain
Accuracy of Measurements	$< \pm 1.0$ dB@+25 $\pm 5$ °C (typical value)
Measurement Detector	Positive Peak, Negative Peak, Sample, Average
Markers	2 vertical markers
Analog TV Measurement	
Standards	B/G, I, D/K, L/L', M/N
Color Standards	NTSC, PAL, SECAM
Level Measurement Range	40dBmV
Level Measurement Range	-40dBmV ~ +60dBmV
Accuracy	$< \pm 1.0$ dB @+25 $\pm 5$ °C (S/N >30dB)
Level Resolution	0.1dB
Resolution Bandwidth	300 kHz
CCN	>51dB (Requires +10 dBmV carrier level)
CTB/CSO	$\geq 61$ dB with $\pm 2.0$ dB Accuracy
HUM Measurement	1 ~ 20%: $\pm 0.5\%$ (1~5%); $\pm 1.0\%$ (5~20%)
Tilt	Up to 16 channels
Pre-amplifier	Automatic, 18dB Gain
Attenuator	Automatic, 40dB

Digital TV Measurement	
Frequency Range	46 ~ 1050 MHz
Power Level Range	-30dBmV ~ +50dBmV
Level Resolution	0.1dB
Accuracy	< ±1.5dB@+25 ±5°C (C/N>20dB)
Modulation Type	16, 32, 64, 128, 256 QAM (J.83 Annex A and C); 64, 256 QAM (J.83 Annex B)
Interleave Depth	(128, 1) ~ (128, 4) for J.83B; (12, 17) for J.83 A/C
Symbol Rate	4.0 MS/s ~ 7.0 MS/s
SNR	>43dB; Accuracy: ±2.0dB
MER	>41dB; Accuracy: ±2.0dB
BER	1E-3 ~ 1E-9
Constellation	16, 32, 64, 128, 256 QAM
Cable Modem Measurement	
Supported Standards	DOCSIS 1.1, 2.0, 3.0; EuroDOCSIS 1.0, 1.1, 2.0, 3.0
Downstream Demodulation	64, 256 QAM
Downstream Frequency Range	>91 MHz (US); >100 MHz (EU)
Downstream Maximum Speed	Up to 304 Mbps (6 MHz) and 400 Mbps (8 MHz)
Downstream Channel Bonding	Up to 8 channels
Downstream Bandwidth	6 MHz / 8 MHz
Downstream Input Signal Level	-15dBmV ~ +15dBmV
Upstream Frequency Range	5 ~ 42 MHz; 5 ~ 65 MHz; 5 ~ 85 MHz
Upstream Signal Bandwidth	TDMA: 200/400/800/1600/3200/6400kHz; S-CDMA: 1600/3200/6400kHz
Upstream Output Signal Level	QAM level range: +17 to +58dBmV; QPSK level range: +17 to +61dBmV
Upstream Channel Bonding	Up to 4 channels
Upstream Maximum Speed	120 Mbps (4 channels bonding)
Upstream Signal Generator	
Signal Modulation	CW, QPSK, 16 QAM, 64 QAM, 256 QAM
Symbol Rate	1.28 MS/s, 2.56 MS/s, 5.12 MS/s
MER	>38dB; Accuracy ±2dB
Frequency Range	5 MHz ~ 85 MHz
Frequency Adjustable Steps	1 MHz
Signal Level Range	8.0 ~ 58dBmV (CW, QPSK)
Level Adjustable Step	1dB
Others	
RF Input	75Ω F-type connector
USB	USB 1.1
Ethernet	RJ45, 10/100T Ethernet
Display	4.3" 480x272 TFT LCD
AC/DC Adapter	100 ~ 240 V/50 ~ 60Hz (AC); 12V / 3A (DC)
Battery	Li-ion, 7.4 V/7.8Ah
Charge Time	~ 4 hours
Working Time	> 6 Hours
Dimension (W×H×L)	245mm×130mm×60mm (9.6in x 5.1in x 2.4in)
Weight	About 1.5kg (3.3 lbs)
Work Temperature	-10 ~ +50 °C
Storage Temperature	-20 ~ +60 °C