

# DS2500Q

## Digital TV QAM Analyzer

### Key Benefits

- Fast Spectrum Analysis: 4~1000MHz
- Integrated DOCSISI 3.0 Cable Modem
- Integrated Upstream Signal Generator(no FEC)
- Support ITU-T J.83 Annex A/B/C
- Error Vector Spectrum: In-service Check Interference Signal which Covered by QAM Signal
- Auto Test

The new DS2500Q is a handheld Digital TV QAM Analyzer, integrating multiple functions in one single instrument, with a comprehensive and complete measurement suite specifically designed for HFC network testing, troubleshooting and maintenance work. The DS2500Q is the CATV field engineer's best tool. The DS2500Q main functions include: Enhanced Spectrum Analysis, Analog TV analysis, Digital TV analysis, DOCSIS 3.0 analysis, Upstream Signal Generator, Ethernet testing and Auto Test. The DS2500Q also provides the revolutionary EVS function to detect coherent distortions hiding under QAM carriers without service interruption. A PC installed Toolbox software is included with each unit to facilitate data transfer.



### Fast Spectrum Analysis Function

The DS2500Q offers an enhanced spectrum analysis function, with a frequency range from 4MHz to 1000MHz and sensitivity down to -55dBmV (@300KHz).

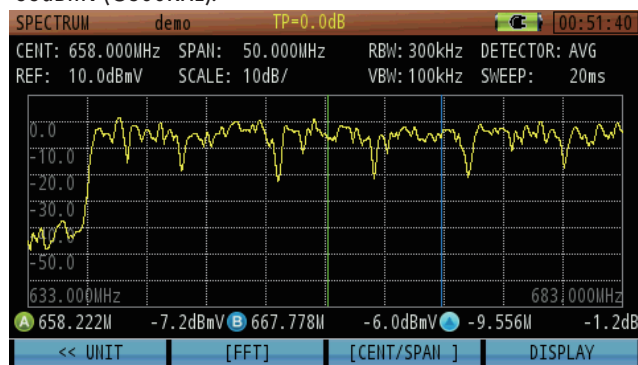


Figure 1: Spectrum Analysis

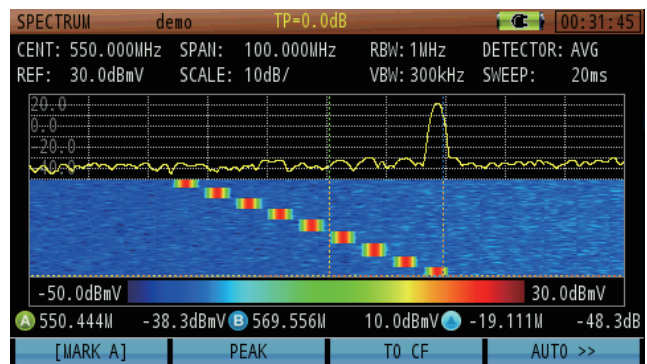


Figure 2: Spectrogram

The scrolling three-dimensional display is an excellent feature for its ability to track frequency and level over time, more relevant for intermittent signals. The user can use the spectrogram function to analyze the stability of a signal over time.

**DVB-C Signal Analysis**

DS2500Q supports ITU-T J.83 Annex A/B/C standard and provides Power level, MER, BER, Constellation, Digital HUM.

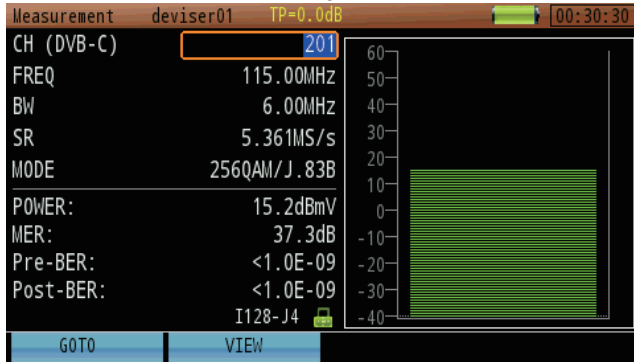


Figure 3: DVB-C Channel Measurement

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

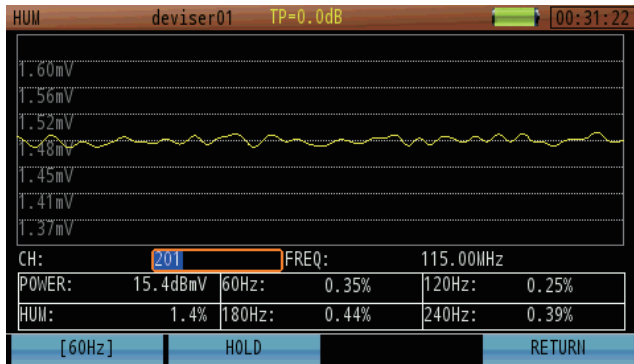


Figure 4: Digital HUM

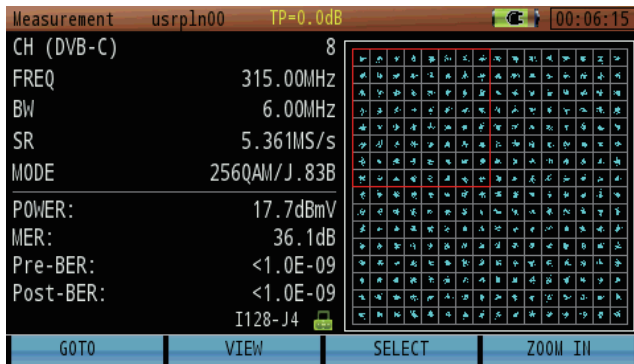


Figure 5: Constellation Display

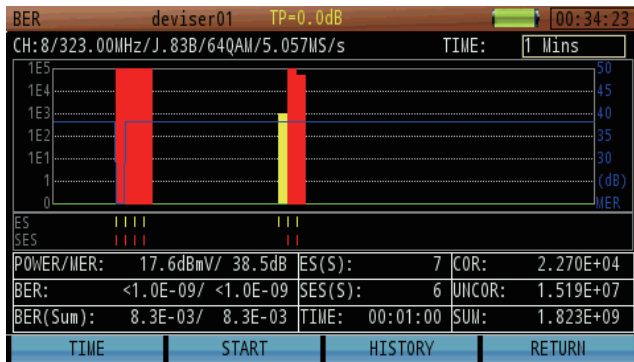


Figure 6: BER and MER Statistical Analysis

**EVS In-service Find Interference Signal**

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

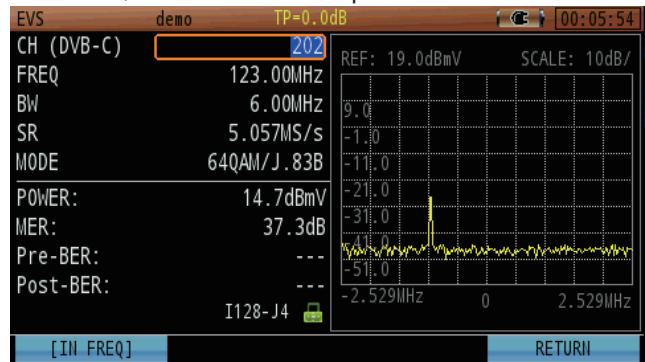


Figure 7: EVS find the narrow band interference signal

**Cable Modem Measurement**

The DS2500Q incorporates a standard DOCSIS 3.0 cable modem, compatible with DOCSIS 1.X, 2.0 & 3.0. The integrated modem supports 8x DS and 4x US bonded carriers. Figure 8 below shows the CM statistical information screen: downstream signal level, modulation type, bandwidth, symbol rate, MER, BER and upstream signal level, modulation type, bandwidth, 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.

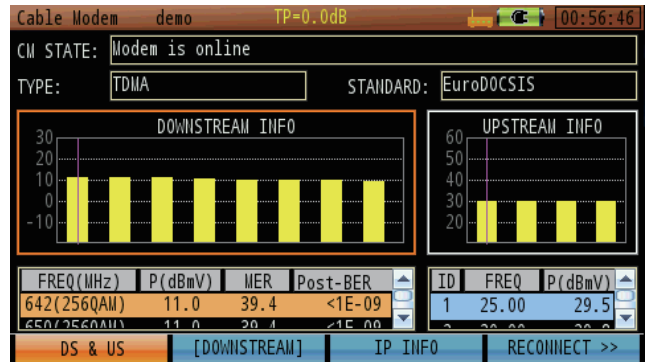


Figure 8: DOCSIS 3.0 Statistical Information Display

**Upstream Signal Generator**

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

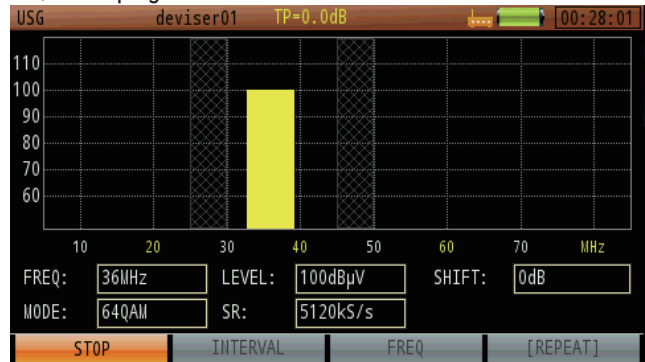


Figure 9: Upstream Signal Generator

**Auto Test**

DS2500Q default installs different country's standard channel plans and several sets of limit profiles. User can use these channel plans and limit profiles to build automatic test project. The automatic test task includes analog TV, digital TV and Cable Modem test. After the analyzer finishing auto test project, all the items in test results can be marked as pass or fail according limit profile. The test results can be saved automatically.



Figure 10: Auto Test Project

**Ordering Information**

Item/Description	Model NO.	Order No.
<b>Model</b>		
Digital TV QAM Analyzer	DS2500Q	0110.2500.03
<b>Option</b>		
DOCSIS 3.0 Cable Modem (8x4)+Upstream Signal Generator (Without FEC)	DS2500-808	2110.2500.07
SYNCOR Certificate	DS2500-811	2110.2500.10
SYNCOR Asset Management	DS2500-810	2110.2500.09
DS2500Q operation manual hard copy	DS2500-012	6110.0600.30
Power Adaptor Plug Cord (Europe)	AE4000-733	6290.0500.03
Power Adaptor Plug Cord (Unite States)	AE4000-734	6290.0500.04
Power Adaptor Plug Cord (United Kingdom)	AE4000-735	6290.0500.05
Power Adaptor Plug Cord (Australia)	AE4000-736	6290.0500.06

**Specifications**

Downstream Spectrum Analysis	
Frequency Range	4MHz ~ 1000MHz
Frequency Stability	±1 PPM(0°C ~50°C)
Frequency Span	0MHz ~ Full span
Frequency Step	1 kHz
Resolution Bandwidth (-3dB)	30kHz, 100kHz, 300kHz, 1MHz, 3MHz
Video Bandwidth	30Hz, 100Hz, 300Hz, 1kHz, 3kHz, 10kHz, 30kHz, 100kHz, 300kHz, 1MHz, 3MHz
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, Pre-amplifier On)
Sensitivity	-50dBmV (300 kHz RBW, Pre-amplifier On)
Attenuation	0~40dB in 1dB steps
Pre-amplifier	Manual, 18dB Gain
Accuracy of Measurements	<±1.0dB@+25±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	4~46MHz (DOCSIS); 4~68MHz (Euro DOCSIS 2.0); 4~88MHz (Euro DOCSIS 3.0); 4~120MHz (DOCSIS 3.1); 4~210MHz (DOCSIS 3.1)
Frequency Span	42/64/84/116/206MHz, zero span or manual selections (max 206MHz)
Resolution Bandwidth (-3dB)	100kHz, 300kHz
Video Bandwidth	30Hz, 100Hz, 300Hz, 1kHz, 3kHz, 10kHz, 30kHz, 100kHz, 300kHz, 1MHz, 3MHz
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	<±1.0dB@+25±5oC (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	10kHz
Level Measurement Range	-40dBm ~ +60dBmV
Accuracy	<±1.0dB @+25 ±5°C (S/N >30dB)
Level Resolution	0.1dB
Resolution Bandwidth	300 kHz
C/N	>51dB(Requires +10 dBmV carrier level)
CTB/CSO	≥61dB with ±2.0dB Accuracy
HUM Measurement	1 ~ 20%; ±0.5% (1~5%); ±1.0% (5~20%)
Tilt	Up to 16 channels
Pre-amplifier	Automatic, 18dB Gain
Attenuator	Automatic, 40dB
Digital TV Measurement	
Frequency Range	46 ~ 1000MHz
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	4.0MS/s ~ 7.0MS/s
MER	>41dB; Accuracy: ±2.0dB
BER	1E-3 ~ 1E-9
Constellation	16, 32, 64, 128, 256 QAM
Cable Modem Measurement	
Support Standard	DOCSIS 1.1, 2.0, 3.0; EuroDOCSIS 1.0, 1.1, 2.0, 3.0
Downstream Demodulation	64, 256QAM
Downstream Frequency Range	>91MHz (US); >100MHz (EU)
Downstream Maximum Speed	Up to 304Mbps (6MHz); And 400Mbps (8MHz)
Downstream Channel Bonding	Up to 8 channels
Downstream Bandwidth	6MHz / 8MHz
Downstream Input Signal Level	-15dBmV ~ +15dBmV
Upstream Frequency Range	5 ~ 42MHz; 5 ~ 65MHz; 5 ~ 85MHz
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	120Mbps (4 channels bonding)
Upstream Signal Generator	
Signal Modulation	CW, QPSK, 16QAM, 64QAM, 256QAM
Symbol Rate	1.28MS/s, 2.56MS/s, 5.12MS/s
MER	>38dB; Accuracy ±2dB
Frequency Range	5MHz ~ 85MHz
Frequency Adjustable Steps	1MHz
Signal Level Range	8.0 ~ 58dBmV(CW, QPSK)
Level Adjustable Step	1dB
Others	
RF Input	75Ω F
USB	USB 1.1
Ethernet	RJ45, 10/100T Ethernet
Display	4.3 inches TFT LCD 480×272 pixels
AC/DC Adapte	AC 100 ~ 240 V/50 ~ 60Hz DC 12V / 3A
Battery	Li-ion, 7.4 V/7.8Ah
Charge Time	~ 4 hours
Working Time	> 6 Hours
Dimension (W×H×L)	245mm×130mm×60mm
Weight	Around 1.5kg
Work Temperature	-10 ~ +50 °C
Storage Temperature	-20 ~ +60 °C