DS2400Q
QAM Analysis Multifunction

Key Benefits

- Comprehensive tool for construction and installation of cable networks
- Automatically learns channel plan from cable drop
- A rugged, handheld unit for field use
- Auto test with pass/fail limits speed up tests and simplifies result interpretation
- Toolbox management software enables user to quickly configure the unit

The DS2400Q is a multifunction instrument, which supports QAM constellation and analog signals for CATV networks. It is the ideal tool for initial network construction, for subscriber installations as well as for service and troubleshooting tasks. Its ruggedized design, which includes a shock protector, combined with icon display GUI and auto pass/fail specified limit feature provides increased efficiency and productivity for all types of technicians.

Other features such as return path & forward spectrum scan, 12 favorite tilt frequencies, AC line voltage test, HUM and DC voltage measurements, combined with complete data logging and a management software, makes this unit a versatile tool for cable installations.

MER, PRE & Post BER measurements and BER statistics feature allows quick testing of loose connections related to pixelating or slow DS internet data flow. This function can identify mismatches caused by open coaxial lines or corroded devices.

Key Features

- 5 MHz ~1 GHz range (analog/digital signals)
- Multiple user channel plans with learn mode
- QAM, QPSK, COFDM power measurements
- QAM MER w/constellation display
- Pre and Post BER analysis
- BER, ES, SES, COR/UNCOR bps
- Return Path & FWD spectrums scan

- Pass/Fail limit test functions w/AUTO storage
- Tilt measurements display (12 frequencies)
- AC-DC voltage measurements including HUM
- Measurement data storage capability
- User-friendly operation (ICON-GUI)
- Color display 2.8" (320×240 TFT LCD)
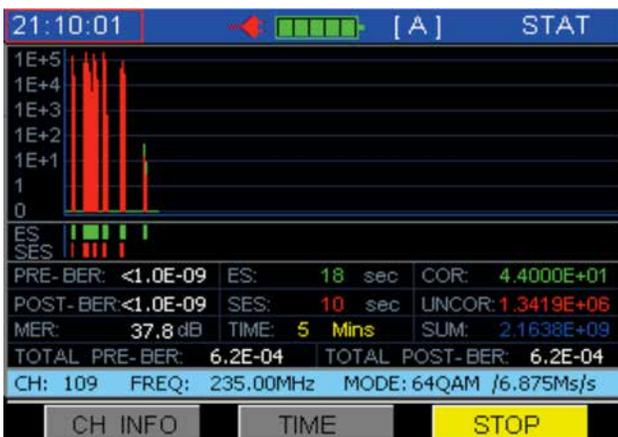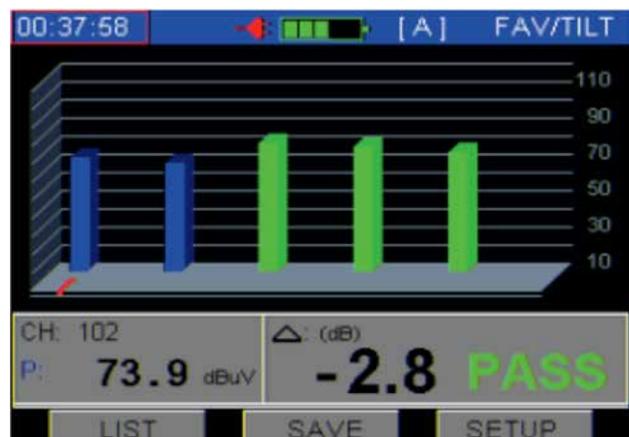- Management PC software included – Toolbox

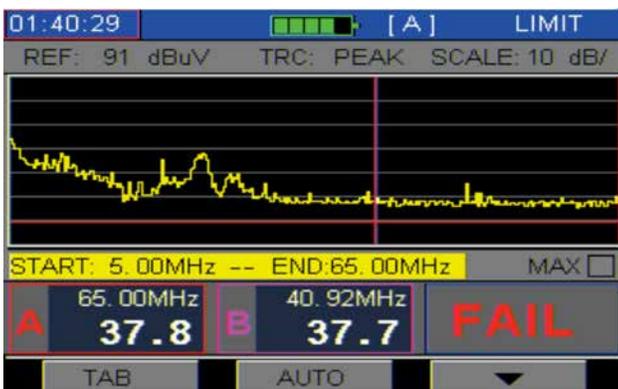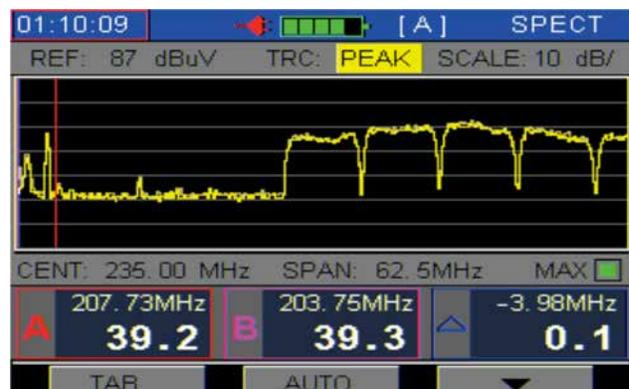MER with Pre & Post Ber

Scan Test

ES & SES = CORR & UNCORR

TilT (Max 12 Freg.)

Return Path Spectrum (5-65)

Foward Spectrum

Features

Five Multi-user Defined Channel Plans

Several technicians or contractors work with more than one HFC network and it is very practical to have different channel lineups to choose from. The unit allows up to five (5) different user defined channel plans. Analog, digital and custom frequencies can be configured in the unit by using the automated learned channel plan from an RF drop or by downloading from the PC file using the Toolbox software. The user can select up to 12 frequencies in each of the 5 user defined plans and assign them to a favorite/tilt channel plan.

QAM Analysis and Channel Measurements

MER plus PRE & Post BER measurements with a several time slots (5 minutes, 15 minutes, 30 minutes, 60 minutes, 2 hours, 6 hours, 12 hours, 24 hours, and 48 hours) can be analyzed with the DS2400. This includes viewing of the constellation diagram. The unit is compatible with 16/32/64/128/256 QAM modulation and provides power measurements feature of QPSK and COFDM digital carriers.

Spectrum Analysis and Measurements

The DS2400Q has a spectrum mode, which allows viewing of the full spectrum. For troubleshooting reverse path challenges, the unit can set to display 5 to 65 MHz frequency spans providing an additional feature to the technician when dealing with upstream data signals. The marker function is included with the spectrum mode and transient anomalies can be captured with the max hold feature.

Full Spectrum Scans with Marker Feature

The DS2400Q supports 160 channels scanning function allowing testing the flatness and the amplitude of the HFC network quickly. With the help of the marker, the technician can quickly determine the anomalies related to mismatches caused by poor grounding or damaged transmission lines.

HUM Network Measurement

The Hum measurement helps the technician identify and troubleshoot anomalies which may result from defective capacitors, faulty line splitters, or couplers due to lightning or excessive current overloads. Both 60 & 120 Hz tests are performed w/400Hz LPF measurements.

Auto Diagnostic User-defined Limit Test (Pass/Fail)

The auto test simplifies the test by displaying pass/fail results. The pass/fail limit can be set for Power levels, MER, PRE-BER, POST-BER, Spectrum Analysis, Tilt, and HUM measurements. With its simple save function, the technician will no longer be required to manually take note of the results. As a result, more installations or service calls may be performed in a day. Additionally, every measurement is recorded; there is no room for errors. This forces performance accountability of each location, thus avoiding churn, which may be costly to the organization.

User-defined Tests

The five (5) channel plans and the ability to group various tests, which can be performed with a simple icon selection, enables the technician to be very efficient and productive. The tests include Level, Tilt, Spectrum Analysis, HUM and Performance related Test Limits for both analog and digital carriers.
Once the test data results are stored in the instrument, they can be recalled, viewed, and analyzed.

File Management - Test Data Storage

Several test data can be saved and stored as analog carriers or frequencies, QAM carriers or digital frequencies, channel scan, tilt, frequency spectrum measurement and HUM.
The results are saved in the File Directory menu, with name of the file, time and date. These data records may be uploaded to a PC with the Toolbox software for reports, analysis, and printing.

Voltage Measurement - Battery and Charging

The unit can measure battery voltage, trunk & distribution line voltage of the cable system, identifying AC or DC automatically. With the intelligent power management system, the battery provides approximately 5 hours of continued operations when fully charged.

Standard Accessories

The DS2400Q includes the following accessories:
Protector rubber bumper, carrying bag with shoulder strap, data cable (serial to USB), two (2) "F" connectors, AC/DC power adaptor/charger, Toolbox software and user's manual.

Frequency	
Frequency Range	5 MHz to 1000 MHz
Frequency Accuracy	± 50 ppm (@ 20°C ±5°C)
Frequency Resolution	10kHz
Channel Type	
Analog TV	NTSC
Digital TV	QAM 16/32/64/128/256 with constellation diagram plus QPSK and COFDM
FM Radio	Single frequency
Digital Channel	
Demodulation type	Standard ITU-T J.83 Annex A/B/C
Support	QAM 16/32/64/128/256
Symbol rate	1 MS/sec to 7 MS/sec
Bandwidth	280 kHz to 10 MHz
MER (Modulation Error Ratio)	39 dB (QAM)
Accuracy	±2.0 dB
BER (Bit Error Rate)	$1E^{-3}$ to $1E^{-8}$ before and after R-S decoding (QAM)
Power measurement type	QAM, QPSK and COFDM
Digital Channel Average Power	
Level range	-30 dBmV to +60 dBmV
Constellation	
Accuracy	±2.0 dB from 10°C to 30°C and ±3.0 dB from -10°C to 40°C
Resolution	0.1 dB
Display mode	QAM 64 and QAM 256 with zoom in and zoom out capability
Analog Level Measurement	
Range	-35 dBmV to +60 dBmV
Accuracy	±1.5 dB
Resolution	0.1 dB
Input impedance	75Ω ("F" type connector)
HUM Modulation	
Range	2% to 5%
Channel Scan	
Number of Channels	160 channels max
Scanning Speed	5 channels per second
Scale	1, 2, 5, 10 dB/div
Zoom	1X, 2X, 3X, 4X, 5X five levels of magnification or full channel scan
Frequency Spectrum	
Bandwidth	2.5MHz, 6.25 MHz, 12.5 MHz, 25 MHz, 62.5 MHz and full span
Scale	1 dB, 2 dB, 5 dB and 10 dB/div
Tilt Measurement	
Number of Frequencies	maximum 12 with 0.1 dB of resolution
Limit Test Parameters	
Minimum/Maximum Video Level	0 dBmV to + 30 dBmV
Minimum/Maximum Δ V/A	10 dB to 20 dB
Minimum/Maximum Power Level	10 dBmV to +30 dBmV
Minimum MER	33 dB (varies with modulations and systems)
Max PRE/POST BER	$1.0 E^{-9}$
Auto-Test	
Number of programs	Maximum 7 test parameters
Line Voltage Measurement	
Range	0 V to 100 V (AC/DC) with accuracy of ±2 V
Storage	
Memory	512K byte
Power	
Battery	11.1V 1.6AH Lithium battery (5 hours of operation)
Charger	AC 100V to 240V 50-60Hz; charge time approximately 3 hours
Communication Port	
Adaptor	RS 232C (With Serial to USB data cable included)
Dimensions (H x W x D) & Weight	
218mm × 95mm × 49mm (8.52" x 3.74" x 1.93")	700 grams (1.54 lb)