

8821Q-R

Spectrum Analyzer

- Increases Productivity by Providing a Complete Set of Spectrum Analysis Tests in One Instrument
- Intuitive User Interface Shortens Learning Curve
- Full-Featured, High-Performance, Remote Operation
- Automated FCC Proof Testing Simplifies Reporting



Comprehensive signal analysis

This portable analyzer can be used anywhere in the cable network for analyzing RF signals with a comprehensive scope of measurements.

From analysis of digitally modulated signals to tests of distortion and noise parameters in the field, this spectrum analyzer is an industry workhorse. The analyzer is specifically focused on the cable TV industry with application specific test features.

Head-end and field applications

Cable operators typically use spectrum analyzers in the head-end, and as a tool for in-depth testing and troubleshooting. They are also used for FCC proof of performance tests. The 8821Q-R™ meets the precision testing needs of the customer, with a familiar look and feel.

Engineer/head-end technician - This person is responsible for ensuring that the signal quality is as good as possible. The signal quality will be naturally degraded by the network as it makes its way to the subscriber. It is

important for the engineer or head-end technician to be able to test all types of signals with a wide variety of analysis/measurement techniques to give them every advantage in alignment and troubleshooting.

SR Tech - This person is called in when lower-tier technicians are unable to find the source of a problem. Frequently, the same person is responsible for proof-of-performance testing because they have experience, familiarity with the tests, and equipment and can efficiently perform the tests.

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SPECIFICATIONS

Frequency

Range	1 MHz to 1 GHz
Resolution Bandwidth	1 kHz to 3 MHz in 1-3-10 sequence
Accuracy	±15%
Video Bandwidths	10 Hz to 1 MHz in 1-3-10 sequence
Frequency Reference	Aging: ±1 PPM per year
Frequency Reference	Temperature stability: ±2 PPM @ 0° to 50° C (32° to 122° F)
Phase Noise	>90 dBc/Hz @ ±10 kHz
Frequency Counter	Accuracy: ±2 PPM, ±1 count Resolution: 1 Hz

Frequency Span

Range	0 Hz, 200 Hz to 1.0 GHz
Sweep Time Range	20 µsec to 500 sec (span = 0 Hz) 30 msec to 500 sec (span > 0 Hz)
Sweep Trigger	Free run, single, video, TV

Analog Channel Measurements (Visual and aural carrier levels)

Channel plans	NTSC, PAL and custom
File Transfer	LAN and USB
High Speed Channel Scan	50 channels ≈ 1 minute
Multi-Channel Mode	Variable, up to 8 channels
Single Channel Mode	With spectrum display
Tuning Range	5 MHz to 1.0 GHz
TV Channel Amplitude Range	-40 dBmV to +65 dBmV, ± 1.0 dB for S/N > 30 dB
Visual/Aural Delta Amplitude	±1.0 dB for S/N > 30 dB

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Amplitude

Response Flatness	±1.0 dB (1 MHz to 1.0 GHz)
Level Accuracy	±1.0 dB @ 20° C (68° F)
Impedance at RF Input	75 Ω
Input return loss	>14 dB (>10 dB attenuation)
Maximum safe input	+68 dBmV, 100 VDC
DANL	Without preamp: < -95 dBmV/Hz With preamp (typical) < -115 dBmV/Hz
Noise figure	14 dB
2nd Harmonic Distortion	< -68 dBc for +29 dBmV tone at input mixer
3rd Order Distortion	< -68 dBc for (2) +29 dBmV tones at input mixer
Residual Responses	< -55 dBmV
Vertical Scale	0.1 to 1.0 dB/div in 0.1 dB steps; 1 to 40 dB/div in 1 dB steps
Input Attenuator	0 to 55 dB in 5 dB steps
Internal Calibrator	150 MHz at +28.7 dBmV, ± 0.5 dB

TV Visual Frequency

Accuracy	±2 PPM
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FM Deviation

Range	100 kHz
Accuracy	±2 kHz, 1 to 80 kHz ±3 kHz to 100 kHz

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Hum Modulation

Modes	CW or modulated
Range	1% to 20%
Accuracy	$\pm 0.5\%$ from 1 to 5%; $\pm 1\%$ from 5 to 20%

Cross Modulation

Range	-45 dB to -65 dB
Accuracy	$\pm 0.5\%$ from 1 to 5% $\pm 1\%$ from 5 to 20%

Depth of Modulation

AM Range	40% to 95%
Accuracy	$\pm 1.5\%$ (C/N > 40 dB)
Signal Type	Use VITS line with white reference

In-Channel Response

Signal Type	Multi-burst or GCR VITS signal
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Carrier-to-Composite Noise

Optimum Input Range	> +5 dBmV
Maximum C/N	55 dB with ± 2 dB accuracy; 60 dB with ± 3 dB accuracy

CSO/CTB

Optimum Input Range	> +5 dBmV
Maximum	63 dBc with ± 1.5 dB accuracy 70 dBc with ± 4.0 dB accuracy

Cross-Modulation

Range	60 dB, usable to 65 dB
Resolution	0.1 dB
Accuracy	± 2.0 dB for xmod. < 40 dB, C/N > 40 dB: ± 2.6 dB for xmod. < 50 dB, C/N > 40 dB: ± 4.6 dB for xmod. < 60 dB, C/N > 40 dB

DIGITAL CHANNEL MEASUREMENTS

Average Channel Power

Amplitude Range	-30 to +60 dBmV
Accuracy	±1.0 dB
Channel Bandwidth Range	200 kHz to 200 MHz

Digital Modulation

Modulation Format	QPSK, 16, 32, 64, 128, 256 QAM ITU-T J.83 annex A, B, and C
Symbol Rates	1 to 7 MSPS
Interleave Capability	Up to 128 x 4 in annex B 12 x 17 in annex A and C
Constellation Display	Full constellation with zoom
Adaptive Equalizer Display	8 FFE taps, 24 DFE taps

Modulation Error Ratio (MER)

Range	22 to 40 dB
Accuracy	±0.5 dB 22 to 30 dB ±1.0 dB 30 to 35 dB ±1.8 dB 35 to 40 dB

Error Vector Magnitude (EVM)

Range	0.65% to 4.1%
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Bit Error Ratio (BER) (Before and after R-S decoding)

User-Selectable Time Period	1.0×10^{-9} to 2.0×10^{-3}
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MISCELLANEOUS SPECIFICATIONS

Display

Display Type	TFT active matrix color VGA LCD
Display Size (Width)	6.4" (163 mm)

Power

Battery Type	14.4 V @ 6 Ah Lithium-ion
Run Time	>2.5 hours
Charge Time	<6.0 hours
Charger Type	External AC adapter

Mechanical

Dimensions (H x W x D)	(6.3" x 13.4" x 13.8") 160mm x 340mm x 350mm
Weight	19.8 lbs (9 Kg)

Environmental

Operating Temperature	0° to 50° C (32° to 122° F)
Storage Temperature	-20° to +55° C (-4° to +131° F)

INCLUDES THE FOLLOWING:

8821Q-R spectrum analyzer

P/N 2011094001

Battery charger

Lithium-ion battery

F-type to F-type connector

F-type to BNC connector

BNC calibration cable

RJ-45 network cable

RJ-45 network crossover cable

512 MB USB flash drive

User's manual (for 8821Q-R and Q-Lab™ software)

Carrying case with wheels

OPTIONAL ACCESSORIES:

F-type push-on adaptors

P/N 0200622000

I-Stop test probe

P/N 2010838001

I/O-15 precision test cable

P/N 2071527048

VF-4 tunable bandpass filter

P/N 2010537006

VF-5 tunable bandpass filter

P/N 2010725006

AM-1000 preamplifier

P/N 2070760000