

ROHDE & SCHWARZ

FSQ8

The Rohde & Schwarz FSQ8 is a premium vector signal and spectrum analyzer designed to address the demanding analysis requirements of advanced digital communication systems. Operating across a frequency range of 20 Hz to 8 GHz, it merges the comprehensive capabilities of a high-end spectrum analyzer with those of a dedicated signal analyzer, offering a standard 28 MHz demodulation bandwidth (expandable up to 120 MHz) and exceptional dynamic range.

SPECIFICATIONS

General

Interfaces	GPIO (IEEE-488), LAN (10/100 Base-T), USB (Type A & B), RS-232-C, External Monitor (VGA)
Display	21 cm (8.4") color TFT LCD, 640 × 480 pixels
Warm-up Time	20 min

Physical

Power Supply	100 V to 240 V AC, 50 Hz to 400 Hz, power consumption: max 250 VA
Operating Temperature	+5 °C to +40 °C °C
Dimensions (W×H×D)	435 mm × 192 mm × 460 mm mm
Weight	15.5 kg kg

Frequency Specifications

Frequency Range	20 Hz to 8 GHz
Reference Frequency Aging per Year	1×10^{-7}
Reference Frequency Temperature Drift	1×10^{-7}
Phase Noise at 10 kHz Offset	-123 dBc/Hz (typ., CF 640 MHz)
Phase Noise at 10 MHz Offset	-160 dBc/Hz (typ., CF 640 MHz)
Frequency Span Range	0 Hz, 10 Hz to 8 GHz
Span Uncertainty	0.1%

Sweep and Trigger

Sweep Time Range (Span $\geq$ 10 Hz)	2.5 ms to 16000 s
Sweep Time Range (Zero Span)	1 μ s to 16000 s
Remote Measurement Speed via GPIB	up to 70 measurements/s
Manual Measurement Speed (Screen Update)	up to 80 measurements/s
Trigger Source Options	Free Run, Video, External, IF Power
Trigger Delay Range	100 ns to 100 s
Gate Delay Range	1 μ s to 100 s
Gate Length Range	125 ns to 100 s

Bandwidths (RBW and VBW)

Resolution Bandwidths (3 dB RBW) Range	10 Hz to 50 MHz
Resolution Bandwidth Steps	1, 2, 3, 5, 10 sequence
Resolution Bandwidth Uncertainty	<3% (for 10 Hz to 10 MHz)
Resolution Filter Shape Factor (60 dB / 3 dB)	<4.6 (Gaussian style)
Video Bandwidths (VBW) Range	1 Hz to 10 MHz
FFT Filter Bandwidth Range	1 Hz to 30 kHz
Channel Filter Bandwidth Range	100 Hz to 5 MHz

Amplitude and Level Range

Maximum Safe RF Input Level	+30 dBm (1 W)
Maximum DC Input Voltage	50 V (AC coupled)
Input Attenuator Range	0 dB to 75 dB
Input Attenuator Step Size	5 dB
1 dB Compression Point	+13 dBm (typ.)
Display Range	10 dB to 200 dB (logarithmic), linear (10 divisions)
Level Measurement Range	DANL to +30 dBm

Level Accuracy

Total Measurement Uncertainty (up to 3.6 GHz)	0.3 dB
Display Scale Fidelity / Linearity Error	<0.1 dB (down to -70 dB)
Attenuator Switching Uncertainty (at 128 MHz)	<0.2 dB
Total Measurement Uncertainty (3.6 GHz to 8 GHz)	0.7 dB

Sensitivity and Dynamic Range

Third-Order Intercept (TOI)	+25 dBm (typ.)
3GPP ACLR (WCDMA)	77 dB (84 dB with noise correction)
ACLR for 4-carrier Scenario (with Noise Correction)	77 dB
Displayed Average Noise Level (DANL, 10 Hz RBW, 1 GHz, Preamp Off)	-155 dBm (typ.)
Spurious Responses (Image, IF)	<-70 dBc
Residual Responses (Input Terminated)	<-103 dBm

Vector Signal Analysis (IQ Demodulation)

Standard Demodulation Bandwidth	28 MHz
Maximum Demodulation Bandwidth (Optional)	120 MHz
A/D Converter Resolution	14 bit
Sampling Rate (Standard Bandwidth)	81.6 MHz
I/Q Memory Depth	16 Msample
Amplitude Flatness (inside 28 MHz Demodulation BW)	<0.1 dB
Phase Linearity (inside 28 MHz Demodulation BW)	<1°

Inputs and Outputs (RF and Analog)

RF Input Connector Type	N female
RF Input Impedance	50 Ω
RF Input VSWR (Attenuator $\geq$ 10 dB, $f < 3.6$ GHz)	<1.5
External Reference Input Frequency	1 MHz to 16 MHz (in 1 MHz steps)
Internal Reference Output Frequency	10 MHz
Internal Reference Output Level	0 dBm (typ.)
IF Output Frequency	20.4 MHz
External Trigger Input Connector	BNC female
Noise Source Control Drive Output	BNC female, 0 V / 28 V

Connectivity, Control and Interfaces

Command Emulation Languages	HP 8560E, HP 8566B, HP 8568B, HP 8594E (selectable)
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Software and Firmware Features

Standard Measurement Functions	Channel Power, ACPR, OBW, C/N Ratio, TOI, Harmonic Distortion
Supported Digital Demodulation Standards Options	Bluetooth, GSM/EDGE, 3GPP WCDMA, HSDPA, TD-SCDMA, CDMA2000, 1xEV-DV, 1xEV-DO, WLAN 802.11a/b/g/j

Physical and Environmental Specifications

Storage Temperature Range	-40 °C to +70 °C
Recommended Calibration Interval	1 year

Frequency

Frequency Resolution	0.01 Hz
Reference Frequency Aging per Day	1 x 10 ⁻¹⁰

Power Supply

Power Consumption	150 VA (typical, without options), max. 230 VA
AC Power Supply Frequency	50 Hz to 400 Hz

Sweep & Setup

Maximum Number of Sweep Points	30001
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Inputs & Outputs

Analog I/Q Input Impedance	50 Ohm / 1 MOhm selectable (with option FSQ-B71)
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Environmental

Relative Humidity Compatibility	95% at +40 °C (non-condensing, EN 60068-2-30)
Vibration Resistance	0.15 mm (5 Hz to 55 Hz), 2 g acceleration (55 Hz to 150 Hz) in line with EN 60068-2-6
Shock Resistance	40 g shock spectrum in line with MIL-STD-810D

Performance

Detector Types	Max Peak, Min Peak, Auto Peak, Sample, RMS, Average
Second Harmonic Intercept (SHI)	typical +48 dBm (f < 1.8 GHz)
Second Harmonic Intercept (SHI) with Preselector	typical +80 dBm (f > 3.6 GHz)

Phase Noise

Phase Noise at 1 kHz Offset	<-107 dBc (1 Hz) at 640 MHz carrier
Phase Noise at 100 kHz Offset	<-125 dBc (1 Hz) at 640 MHz carrier
Phase Noise at 1 MHz Offset	<-141 dBc (1 Hz) at 640 MHz carrier

Level Options

Electronic Attenuator Range (Option FSQ-B25)	0 dB to 30 dB (5 dB steps)
Preamplifier Gain (Option FSQ-B25)	20 dB nominal (up to 8 GHz)

Demodulation Options

Maximum Demodulation Bandwidth with Option FSQ-B72	120 MHz
A/D Converter Sampling Rate with Option FSQ-B72	328.125 MHz

Filters

RRC Filter Bandwidth Range	10 kHz to 7.5 MHz
RRC Filter Roll-off Factor	alpha = 0.22 / 0.35

Compliance

EMC Compliance	In line with EN 55011 Class B, EN 61326-1
Electrical Safety Compliance	In line with EN 61010-1, IEC 61010-1, UL 61010-1, CAN/CSA-C22.2 No. 61010-1

Interfaces

Parallel Printer Interface	25-pin D-Sub (rear panel)
External Monitor Interface	15-pin D-Sub (VGA, rear panel)
LAN Interface Type	RJ-45, 10/100 Base-T (rear panel)
RS-232-C Interface	9-pin D-Sub (rear panel)
PS/2 Keyboard and Mouse Interfaces	2 x PS/2 (rear panel)

TECHNOLOGY

Vector Signal and Spectrum Analysis

APPLICATIONS

RF transmitter design, wireless communications testing, signal analysis, cellular standard verification, and aerospace research.

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