ROHDE & SCHWARZ

FSWP50

The Rohde & Schwarz FSWP50 is a high-performance Phase Noise Analyzer and VCO Tester covering a frequency range from 1 MHz to 50 GHz. Designed for demanding aerospace, defense, and telecommunications applications, the FSWP50 features a dual-channel internal local oscillator architecture enabling real-time cross-correlation. This extremely low-noise design allows for highly sensitive phase noise and amplitude noise measurements without external components. Equipped with internal DC sources for VCO characterization and offering optional signal and spectrum analyzer functionality, the FSWP50 provides an all-in-one solution for signal source analysis.

SPECIFICATIONS

General

Interfaces	2 × USB 2.0 (front), 2 × USB 3.0 (rear), 2 × USB 2.0 (rear), LAN (10/100/1000Base-T), DVI-D, DisplayPort, PCIe, GPIB (optional)
Display	12.1-inch WXGA color TFT touchscreen (1280 × 800 pixels)

Physical

Power Supply	100 V to 240 V AC (±10%), 50 Hz to 60 Hz / 400 Hz
Weight	24.3 kg

RF & Frequency Performance

Frequency Range (Phase Noise Analyzer)	1 MHz to 50 GHz
Frequency Range (with FSWP-B1 Spectrum Analyzer Option)	10 Hz to 50 GHz
Frequency Extension Range	Up to 500 GHz with external harmonic mixers
Frequency Resolution	0.01 Hz
Internal Reference Frequency	10 MHz
Internal Reference Aging per Year	1 × 10^-7 (standard), 3 × 10^-8 (with FSWP-B4 option)
Internal Reference Temp. Stability	1 × 10^-7 (standard), 5 × 10^-10 (with FSWP-B4 option)

Phase Noise & Amplitude Noise

Measurement Method	Dual-channel cross-correlation
Number of Cross-Correlations	1 to 1,000,000 (user-selectable)
AM Noise Measurement	Standard (simultaneous with phase noise)
Allan Variance / Allan Deviation	Standard

VCO Characterization (Internal DC Sources)

Tuning Voltage Range	-10 V to +28 V
Tuning Voltage Resolution	0.1 mV
Tuning Voltage Max Current	20 mA
Supply Voltage Range	0 V to 16 V
Supply Voltage Resolution	1 mV
VCO Parameters Measured	Tuning slope, frequency, power, supply current, tuning current

Signal & Spectrum Analyzer Option (R&S FSWP-B1)

Third-Order Intercept (TOI, 1 GHz, typ.)	+25 dBm
Analysis Bandwidth	10 MHz (standard), up to 320 MHz (with FSWP-B320 option)

Port & Connector Specifications

RF Input Connector	2.4 mm female (50 Ω)
External Reference Input Connector	BNC female
External Reference Output Connector	BNC female
Tuning Voltage Output Port	BNC female
Supply Voltage Output Port	BNC female
External Trigger Input	BNC female
External Noise Source Drive	BNC female, +28 V

Physical & Environmental

Form Factor	Benchtop / Rackmount
Height (EIA Units)	5U
Storage Temperature Range	-40 °C to +70 °C
Max Operating Altitude	4600 m (15,000 ft)
Safety Compliance	IEC 61010-1, EN 61010-1, CAN/CSA-C22.2 No. 61010-1, UL 61010-1
EMC / EMI Compliance	EN 55011 Class A, EN 61326-1, EN 61326-2-1
Recommended Calibration Interval	1 year

Software & System

Programming Language	SCPI (Standard Commands for Programmable Instruments)
Operating System	Windows 10 IoT Enterprise
Internal Storage Type	Solid State Drive (removable SSD)

Display

Display Size	12.1 in (30.7 cm)
Display Resolution	1280 × 800 pixels (WXGA)
Display Touchscreen Capability	Capacitive multi-touch

RF Input

RF Input Impedance	50 Ω
Maximum Input Level (RF Attenuation 0 dB)	+20 dBm (CW)
Maximum Input Level (RF Attenuation >= 10 dB)	+30 dBm (CW)
Maximum DC Input Voltage	0 V

Phase & AM Noise Performance

AM Noise Offset Frequency Range	10 mHz to 30 MHz

Reference Frequency

External Reference Input Frequency Range	1 MHz to 20 MHz (in 1 Hz steps)
External Reference Input Level	0 dBm to +16 dBm (nominal)
External Reference Output Frequency	10 MHz
Internal Reference Aging per Day (with FSWP-B4 Option)	1 × 10^-10
Internal Reference Aging per Year (with FSWP-B4 Option)	3 × 10^-8
Internal Reference Temperature Stability (with FSWP-B4 Option)	1 × 10^-9 (0 °C to +50 °C)
Reference Output Level (10 MHz)	+10 dBm (typ.)
Reference Output Level (100 MHz)	+10 dBm (with R&S FSWP-B4 option, typ.)

Noise Figure Option (R&S FSWP-K30)

Noise Figure Measurement Frequency Range	10 MHz to 50 GHz (model dependent)

Software Options

Pulsed Phase Noise Option	R&S FSWP-K4
Transient Measurements Option	R&S FSWP-K12
AM/FM/PM Demodulation Option	R&S FSWP-K7

Hardware Options

Low Noise Internal Local Oscillators Option	R&S FSWP-B60
Cross-Correlation Extension Option	R&S FSWP-B61
High-Performance Local Oscillator Option	R&S FSWP-B64 Residual Phase Noise Measurements

Interfaces

USB 2.0 Ports (Front)	2
USB 2.0 Ports (Rear)	2
USB 3.0 Ports (Rear)	2
LAN Port Speed	10/100/1000 Mbit/s
Display Output Interfaces	1 × DVI-D, 1 × DisplayPort

Power Supply

Power Consumption	150 W (typical, option-dependent); up to 350 W (max)

Options

Additive Phase Noise Option	R&S FSWP-B64
Multi-port Measurements Option	R&S FSWP-K9
Large Delay Line Cross-Correlation Option	R&S FSWP-K16
GPIB Interface Option	R&S FSWP-B10
Removable SSD Option	R&S FSWP-B3
Vector Signal Analysis Option	R&S FSWP-K70 (requires R&S FSWP-B1 option)
Real-Time Spectrum Analysis Option	R&S FSWP-K160R (requires R&S FSWP-B1 option)

Inputs & Outputs

Noise Source Drive Port Voltage	28 V DC

TECHNOLOGY

Dual-channel cross-correlation phase noise analysis

APPLICATIONS

VCO characterization, high-performance clock and synthesizer analysis, radar transmitter testing