

ROHDE & SCHWARZ

SMR27

The Rohde & Schwarz SMR27 is a high-performance microwave signal generator designed for applications in production, research, and development. Operating over a frequency range of 10 MHz to 27 GHz, the SMR27 provides standard pulse modulation alongside optional AM, FM, phase modulation, and an analog ramp sweep. Featuring excellent spectral purity, a compact 2 HU form factor, and a 3-year calibration cycle, it serves as an ideal CW generator, sweep generator, or tracking generator.

SPECIFICATIONS

Frequency

Minimum Frequency	10 MHz Hz
Maximum Frequency	27 GHz Hz
Frequency Resolution	1 kHz (0.1 Hz with option R&S SMR-B3)

Output

Maximum Output Power	+11 dBm (f ≤ 20 GHz); +9 dBm (f > 20 GHz) dBm
Output Power Range	-20 dBm to +11 dBm (f ≤ 20 GHz, standard; +9 dBm for f > 20 GHz); -130 dBm to +11 dBm (with option R&S SMR-B9; +9 dBm for f > 20 GHz)
Phase Noise	<-83 dBc/Hz (typical -89 dBc/Hz) at 10 kHz offset (10 GHz carrier)

Modulation

Modulation	Pulse (standard); AM, FM, Phase Modulation (with option R&S SMR-B5)
Sweep Modes	Digital frequency and level sweep (standard); Analog ramp sweep (with option R&S SMR-B4)

General

Reference Oscillator	TCXO (standard); OCXO (with option R&S SMR-B1)
Interfaces	GPIB (IEEE-488), RS-232
Display	Backlit monochrome LCD (240 x 64 pixels)
Instrument Setup Storage	50 complete instrument setups
Warm-up Time	approx. 10 min / 30 min (with Option SMR-B1)

Physical

Power Supply	90 V to 264 V AC, 47 Hz to 440 Hz
Dimensions (W×H×D)	427 mm x 88 mm x 450 mm mm
Weight	< 12 kg (without options) kg

Frequency Specifications

Frequency Range	10 MHz to 27 GHz
Frequency Settling Time	< 10 ms
Aging per Year	< 1×10^{-6} (standard TCXO); < 1×10^{-7} (with option R&S SMR-B1 OCXO)
Temperature Coefficient of Reference	< 2×10^{-6} (0 °C to 55 °C, standard); < 5×10^{-9} (with option R&S SMR-B1)
External Reference Input Frequency	10 MHz
External Reference Input Level	0.2 V to 2 V (RMS)
Internal Reference Output Frequency	10 MHz
Internal Reference Output Level	approx. 1 V (RMS) into 50 ohms

Level Specifications

Maximum Output Level (Without Attenuator)	+11 dBm ($f \leq 20$ GHz); +9 dBm ($f > 20$ GHz)
Minimum Output Level (Without Attenuator)	-20 dBm
Minimum Output Level (With Attenuator)	-130 dBm (with option R&S SMR-B9)
Maximum Output Level (With Attenuator)	+11 dBm (10 MHz to 20 GHz); +9 dBm (20 GHz to 27 GHz)
Level Resolution	0.01 dB
Level Accuracy (high levels)	< 0.9 dB (level > -10 dBm, $f \leq 20$ GHz); < 1.2 dB (level > -10 dBm, $f > 20$ GHz)
Level Accuracy (low levels)	< 0.9 dB (level > -90 dBm, $f \leq 20$ GHz); < 1.2 dB (level > -90 dBm, $f > 20$ GHz)
Level Settling Time	< 20 ms
Output Impedance	50 ohms
Maximum Safe Reverse Power (RF)	1 W ($f \leq 20$ GHz); 0.5 W ($f > 20$ GHz)
Maximum Safe Reverse Power (DC)	0 V

Spectral Purity

Harmonics (at specified output level)	<-30 dBc (at levels $\leq +8$ dBm)
Subharmonics	none ($f \leq 20$ GHz); <-50 dBc ($f > 20$ GHz)
Non-Harmonic Spurious (at carrier offset)	<-55 dBc (for > 10 kHz offsets, carrier ≤ 20 GHz)
SSB Phase Noise (10 GHz carrier, 10 kHz offset)	<-83 dBc/Hz (typically -89 dBc/Hz)
SSB Phase Noise (10 GHz carrier, 100 kHz offset)	<-103 dBc/Hz (typically -109 dBc/Hz)
Wideband Noise Floor	<-135 dBc/Hz (typically <-140 dBc/Hz)

Pulse Modulation

Pulse Modulation On/Off Ratio	> 80 dB
Pulse Rise/Fall Time	< 10 ns (typically < 5 ns)
Minimum Pulse Width	50 ns

Pulse Generator (Option R&S SMR-B14)

Pulse Generator Modes	Single pulse, double pulse, delayed pulse, gated
Pulse Period Range	100 ns to 100 s
Pulse Period Resolution	10 ns or 5 digits
Pulse Width Range	20 ns to 100 s
Pulse Width Resolution	10 ns or 5 digits
Pulse Delay Range	40 ns to 100 s
Pulse Delay Resolution	10 ns or 5 digits
Double Pulse Spacing	40 ns to 100 s

Amplitude Modulation (Option R&S SMR-B5)

Modulation Depth Range	0% to 90%
AM Modulation Frequency Range	10 Hz to 50 kHz
AM Depth Accuracy	< 4% of setting + 1% (at 1 kHz, depth ≤ 80%)
AM Distortion	< 2% (at 1 kHz, 30% depth)
AM Input Impedance	100 kohms

Frequency Modulation (Option R&S SMR-B5)

Maximum Deviation	up to 8 MHz (carrier frequency dependent)
FM Modulation Frequency Range	10 Hz to 1 MHz
FM Deviation Accuracy	< 5% at 1 kHz
FM Input Impedance	100 kohms

Phase Modulation (Option R&S SMR-B5)

Maximum Phase Deviation	up to 80 rad (carrier frequency dependent)
Phase Modulation Frequency Range	10 Hz to 100 kHz
Phase Deviation Accuracy	< 5% at 1 kHz
Phase Modulation Input Impedance	100 kohms

Sweep Capabilities

Sweep Type (Frequency / Level / LF)	Frequency, Level, LF (with option R&S SMR-B5)
Sweep Modes (Step / Ramp)	Digital step sweep (standard); Analog ramp sweep (with option R&S SMR-B4)
Dwell Time Range	1 ms to 10 s (digital sweep)
Sweep Trigger Sources	Automatic, single, manual, external

Rear Panel and Control Interfaces

RF Output Connector Type	PC 2.92 mm male
GPIB Interface (IEEE-488)	Yes, IEEE-488.2 compatible
RS-232 Interface	Yes, 9-pin D-Sub
Reference Input/Output Connectors	BNC female, rear panel

Hardware Options and Configurations

Electronic/Mechanical Attenuator Option	Mechanical RF Attenuator (Option R&S SMR-B9)
Pulse Modulator Option	Standard pulse modulator included
Pulse Generator Option	Option R&S SMR-B14
Fine Frequency Resolution Option	Option R&S SMR-B3 (0.1 Hz resolution)
Analog Ramp Sweep Option	Option R&S SMR-B11
AM/FM/PhiM Modulator Option	Option R&S SMR-B5
High-Stability OCXO Option	Option R&S SMR-B1
Rear Panel Connectors Option	Option R&S SMR-B19

Power and Physical Characteristics

AC Input Voltage Range	90 V to 264 V AC
AC Input Frequency Range	47 Hz to 440 Hz
Power Consumption	approx. 120 W (without options)
Dimensions (W x H x D)	427 mm x 88 mm x 450 mm
Display Type and Resolution	Backlit monochrome LCD graphics display, 240 x 64 pixels
Rackmount Form Factor Compatibility	2 HU (Height Units), 19-inch rack-mountable

Environmental and Compliance

Operating Temperature Range	0 °C to +55 °C
Storage Temperature Range	-40 °C to +70 °C
Recommended Calibration Interval	3 years

Interfaces & Programming

Command Set	SCPI
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Environmental

Operating Altitude Limit	4600 m
Storage Altitude Limit	12000 m
Vibration Resistance	5 Hz to 55 Hz, 0.15 mm amplitude (complies with IEC 60068-2-6)
Permissible Relative Humidity	95% at +40 °C (non-condensing)

Compliance

EMC Standards	Complies with EN 55011 Class B and EN 61326
Safety Standards	Complies with EN 61010-1

LF Generator (Option SMR-B5)

LF Generator Frequency Range	10 Hz to 1 MHz (with Option SMR-B5)
LF Generator Frequency Resolution	0.1 Hz (with Option SMR-B5)
LF Generator Waveforms	Sine, square (with Option SMR-B5)
LF Generator Output Voltage Range	1 mV to 1 V (Vp, peak, open circuit, with Option SMR-B5)

Analog Ramp Sweep (Option SMR-B11)

Analog Sweep Time Range	10 ms to 100 s (with Option SMR-B11)
Analog Sweep Span	10 MHz to full frequency range (with Option SMR-B11)

Options

SMR-B3 Fine Frequency Resolution	0.1 Hz
SMR-B17 RF Attenuator Range	0 dB to 110 dB
SMR-B17 RF Attenuator Step Size	10 dB

Control & Programming

Compatible Emulation Modes	HP 83732, HP 8360, HP 8340, HP 8673, HP 8662, HP 8663, Rohde & Schwarz SMP/SME/SMY
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Sweep

Number of Sweep Steps	2 to 65535
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TECHNOLOGY

Synthesized Microwave Signal Generator

APPLICATIONS

Radar and EMC testing, scalar network analysis tracking generator, microwave synthesizer, local oscillator, upconversion of digitally modulated IF signals

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