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Signal Generator SMY

SMY01: 9 kHz to 1040 MHz

SMY02: 9 kHz to 2080 MHz

Low-cost, ideal for receiver testing and component measurements

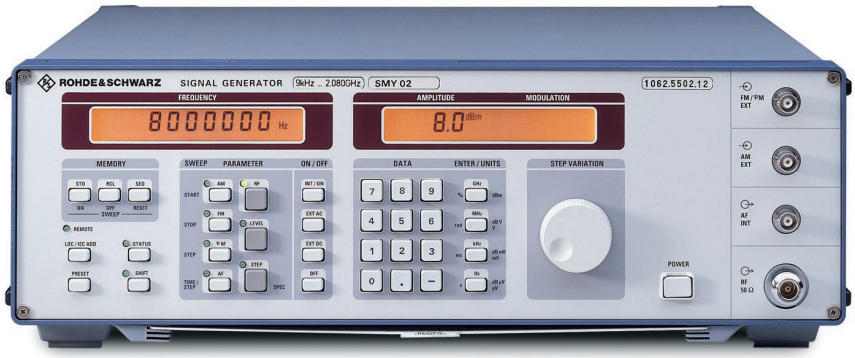

Photo 43026-3

Brief description

Signal Generator SMY from Rohde&Schwarz is a cost-effective instrument for testing AM, FM and φM receivers and for component measurements. Designed exclusively for the main applications of signal generators by cutting out the unnecessaries, the SMY features an outstanding price/performance ratio. Thanks to its comprehensive basic features and excellent signal characteristics, it is an economical solution for universal use in lab, production and service environments.

Main features

- Level range –140 dBm to +19 dBm (25 dBm overrange with option SMY-B40), sufficient even for receivers of highest sensitivity
- High level accuracy and low RF leakage allowing accurate and undegraded sensitivity measurements
- FM-DC with high accuracy of carrier frequency for testing pagers and receivers fitted with digital squelches
- Low SSB phase noise and high spurious rejection for all in-channel and blocking measurements
- Low residual FM affording ample of margin for S/N measurements
- Modulation generator 1 Hz to 500 kHz for modulation frequency response measurements
- Stereo channel separation of 50 dB and low harmonic distortion for testing FM stereo receivers
- Non-interrupting level setting over a range of 20 dB for reproducible measurement of squelch hysteresis
- Frequency resolution 1 Hz, suitable also for narrowband DUTs
- FM-DC, deviation up to 20 MHz for VCO simulation
- FM bandwidth 2 MHz for fast FSK and telemetry applications
- AF synthesizer 1 Hz to 500 kHz, separate use as AF signal source for external applications possible, eg recording of AF frequency response
- Remote-control interface IEC625/IEEE488 for use in automatic test systems
- RF sweep
- Sequence function and SEQ input for semi-automatic use

Characteristics

Cost-saving synthesis concept

Single-loop synthesis is a concept that makes for simple and cost-effective circuit design without losing out on high frequency resolution and short setting time. The fractional N-technique uses a fractional frequency division ratio, ie a frequency resolution of 1 Hz is obtained in spite of the high reference frequency. High reliability and light weight thanks to VLSI components are further advantages of this technique.

Uncomplicated operation

The panel controls are ergonomically arranged. The patented, magnetically locking spinwheel is easy to turn, nevertheless the user can exactly feel each setting step. Fast tuning and programming of the step width are also possible. Frequently used settings can be stored and recalled any time. The memory saves up to 100 complete instrument setups.

Reliability of operation, ease of maintenance

The built-in selftest facility monitors continuously the signal generator status. If there are any malfunctions, these are immediately detected and indicated. The user thus has an effective protection against invalid measurements, should the generator ever fail. The SMY requires particularly little maintenance: aging and drift are compensated for by control loops. Due to the few reference components, which are designed for maximum stability, calibration is required at intervals of 3 years only.

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Specifications in brief

Frequency

Range SMY01/SMY02	9 kHz to 1.04 GHz/9 kHz to 2.08 GHz
Underranging	down to 5 kHz (without guarantee of specs)
Resolution	1 Hz
Setting time (to within <1 x 10^{-7} for f >65 MHz or <70 Hz for f <65 MHz)	<60 ms

Reference frequency	**standard**	**option SMY-B1**
Aging (after 30 days of operation)	1 x 10^{-6}/year	<1 x 10^{-9}/day
Temperature effect (0 to 55°C)		2 x 10^{-6} <5 x 10^{-8}
Warmup time	–	10 min
Output for internal reference		
Frequency	10 MHz	
Level V_{rms} (EMF, sinewave)	1 V at 50 Ω	
Input for external reference	5 or 10 MHz ±5 x 10^{-6}	
Input level (V rms)	0.2 to 2 V at 200 Ω	

Spectral purity

Spurious signals	
Harmonics	<–30 dBc for levels <10 dBm <–25 dBc for levels <16 dBm[1]
Subharmonics	none (f >1.04 GHz: <–40 dBc)
Nonharmonics at >5 kHz from carrier	<–70 dBc (f >1.04 GHz: <–64 dBc)
Broadband noise with CW, carrier offset >1 MHz, 1 Hz bandwidth, f=>65 MHz	<–140 dBc
SSB phase noise at 20 kHz from carrier, 1 Hz bandwidth,	
CW f <65 MHz	<–114 dBc
100 MHz/500 MHz	<–132 dBc/<–120 dBc
1 GHz/2GHz	<–114 dBc/<–108 dBc
Residual FM, rms, <1% of max. deviation, f=1 GHz, 0.3 to 3 kHz (CCITT)	<10 Hz (0.03 to 20 kHz: <20 Hz)
Residual AM, rms (0.03 to 20 kHz)	<0.02%

Level

Range	–140 to +13 dBm; –134 to +19 dBm[1]
Overranging (without guarantee of specs)	up to +19 dBm; –140 to +25 dBm[1]
Resolution	0.1 dB
Accuracy for levels >–127dBm	±1 dB (f >1.04 GHz: ±1.5 dB)
Frequency response at 0 dBm	1 dB, typ. 0.3 dB
Characteristic impedance	50 Ω
VSWR	<1.5 (f >1.04 GHz: <1.8)
Setting time (IEC/IEEE bus)	<25 ms (<10 ms with electronic level setting)
Non-interrupting level setting	0 to –20 dB

Overload protection protects the instrument against externally applied RF power and DC voltage (50 Ω source)

Max. permissible RF power	30 W (SMY02: 50 W)
Max. permissible DC voltage	35 V
Max. pulse load (pulse width <10 µs)	1 mWs or 150 V (peak)

Simultaneous modulation any combination of AM, FM (φM) and pulse modulation

Amplitude modulation internal, external AC/DC

Modulation depth	0 to 100%
Resolution	0.1%
Setting error at 1 kHz (m <80%)	<4% of reading ±1%
AM distortion at 1 kHz	
m=30%	<1%; 3%[1]
m=80%	<2%; 5%[1]
Modulation frequency response (m=60%)	
30 Hz (DC) to 10 kHz	0.4 dB
10 Hz (DC) to 50 kHz	3 dB
Incidental φM at AM (30%), AF=1 kHz	<0.2 rad <0.4 rad at f >1.04 GHz (SMY02)

Frequency modulation internal, external AC/DC

Max. deviation for carrier frequency	
<65 MHz	10 MHz
65 to 130 MHz	1.25 MHz
130 to 260 MHz	2.5 MHz
260 to 520 MHz	5 MHz
520 to 1040 MHz	10 MHz
1040 to 2080 MHz	20 MHz
Resolution	<1%, min. 10 Hz
Setting error at AF=1 kHz	<3% of reading + 20 Hz
FM distortion at AF=1 kHz and 3% of max. deviation	<0.3%, typ. 0.1%
Modulation frequency response 10 Hz (DC) to 2 MHz	3 dB, typ. 1 dB
Incidental AM at AF=1 kHz, f >1 MHz, 40 kHz deviation	<0.1%
Stereo modulation at 40 kHz deviation, AF=1 kHz	
Crosstalk attenuation	>50 dB
S/N ratio	
unweighted	>76 dB
weighted	>70 dB
Distortion	typ. 0.1%
Carrier frequency offset with FM-DC	<1 Hz + 0.1% of deviation

Phase modulation internal, external AC

Max. deviation for carrier frequency	
<65 MHz	200 rad
65 to 130 MHz	25 rad
130 to 260 MHz	50 rad
260 to 520 MHz	100 rad
520 to 1040 MHz	200 rad
1040 to 2080 MHz	400 rad
Resolution	<1%, min. 0.01 rad
Setting error at AF=1 kHz	<5% of reading + 0.02 rad
Distortion at AF=1 kHz and 50% of max. deviation	<0.5% (typ. 0.2%)
Modulation frequency response 20 Hz to 20 kHz	<3 dB (typ. 1 dB)

Pulse modulation external

On/off ratio	>80 dB; >70 dB at 70 MHz [1]
Rise/fall time (10/90%)	typ. 4 µs; <20 ns [1]
Pulse delay	typ. 2.5 µs; <200 ns [1]
Modulation input	TTL/HC logic signal, polarity selectable
Input impedance	10 kΩ

Internal modulation generator

Frequency range/resolution	1 Hz to 500 kHz/0.1 Hz
Display	7 digits, floating point
Frequency drift	<5 x 10^{-5}
Frequency response up to 50 kHz	0.2 dB (up to 100 kHz: <0.3 dB)
Distortion (20 Hz to 100 kHz)	<0.1%
Output voltage (peak)	1 V ±1% (R_{out} <10 Ω, R_L >200 Ω)

RF Sweep digital sweep in discrete steps

Mode	automatic, linear
Sweep range and step width	user-selected
Step duration	10 ms to 5 s
Resolution	1 ms

General data

Remote control	IEC 625 (IEEE 488)
Memory	non-volatile, for 100 instrument setups
Power supply	100 V/230 V (AC) –10 to +15%, 120 V/220 V (AC) –12.5 to +10%, 47 to 440 Hz, max. 120 VA
Dimensions (W x H x D)	
SMY01	435 mm x 147 mm x 350 mm
SMY02	435 mm x 147 mm x 460 mm
Weight for fully equipped unit	12 kg (SMY01), 13 kg (SMY02)

Ordering information

Signal Generator	SMY 01	1062.5502.11
	SMY 02	1062.5502.12
Options, extras		
Reference Oscillator OCXO	SMY-B1	1062.7505.02
Rear Connectors for RF and LF	SMY-B10	1062.8001.02
High Output Power	SMY-B40[2]	1062.9008.02
Service Kit	SMY-Z2	1062.7805.02
Service Manual		1062.5583.24

[1] with option SMY-B40

[2] To be retrofitted by authorized service centers only.

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