Signal Generators SMY

Versatility and low cost can go hand in hand

- Frequency resolution 1 Hz
- Level range −140 to +19 dBm, overrange up to 25 dBm (option)
- Level accuracy better than 1 dB
- SSB phase noise ≤−114 dBc at 1 GHz, Δf = 20 kHz
- AM, FM, qM and pulse modulation
- Modulation generator 1 Hz to 500 kHz
- Sweep capabilities
- Nonvolatile memory for 100 complete front-panel setups
- RF overload protection 30 W (SMY01) or 50 W (SMY02)
- Low RF leakage (<0.1 µV)
- Calibration at 3-year interval
SMY – the ideal generator for receiver measurements ...

Signal generators of the SMY family from Rohde & Schwarz are cost-effective instruments for testing AM, FM and øM receivers as well as for component measurements. Two models are available:

- SMY01 with a frequency range from 9 kHz to 1040 MHz
- SMY02 from 9 kHz to 2080 MHz.

Designed exclusively for the main applications of signal generators by cutting out the unnecessaries, 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 servicing environments.

- Level range −140 dBm to +13 dBm (19 dBm overrange) *, sufficient even for receivers of highest sensitivity
- High level accuracy and low RF leakage allowing accurate and ungraded 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

... and for general-purpose applications

Thanks to the excellent spectral purity and the high accuracy of the carrier frequency with FM-DC, measurements on steep-edged crystal filters are possible without any problem.

*) With option SMY-B40 −134 dBm to +19 dBm (25 dBm overrange)
Signal Generators SMY

Level/frequency response at 0 dBm output level. The software-supported level correction reduces the frequency response to typically 0.1 dB.

Accuracy of carrier frequency with FM-DC, long-term stability.
Settings: carrier frequency = 1 GHz, FM deviation = 50 kHz, external FM-DC

With option SMY-B40: The overrange feature for the output level allows measurements on high-level mixers. To the right: output level obtained with settings of 19 dBm, 21 dBm, 23 dBm and 25 dBm

- Non-interrupting level setting over a range of 20 dB for reproducible measurement of squelch hysteresis
- Frequency resolution 1 Hz, suitable also for narrowband test items
- FM-DC, deviation up to 20 MHz for VCO simulation
- FM bandwidth 2 MHz for fast FSK and telemetry applications
- High output level up to 19 dBm (25 dBm with option SMY-B40) for component and overdrive testing
- 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

ISO 9001 Certified Quality System

DQS REG. NO: 1954-04
Cost-saving synthesis concept

Single-loop synthesis is a concept that makes for simple and cost-effective circuit design and does not entail giving up high frequency resolution and short setting time. The fractional-N technique uses a fractional frequency division ratio, i.e., 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.

Operation

The panel controls are ergonomically arranged so that there is no time wasted for familiarization. Operation is from the left to the right: parameters, data, units; each control is at its right place.

The patented, magnetically locking spinwheel is just as practical. Although easy to turn, each setting step is felt exactly by the user. Thus for instance it is not really necessary to observe the SMY display in the case of stepwise tuning. This means that the annoying procedure of looking back and forth between a measuring instrument and the signal generator can be dispensed with. Naturally 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 front-panel setups.

Low cost of ownership thanks to high reliability and easy maintenance

Like with all Rohde & Schwarz signal generators, the well-proven self-test facility is integrated in SMY monitoring continuously the signal generator status. If there are any malfunctions, these are immediately detected and reported in the form of error messages. The user thus has an effective protection against invalid measurements, should the generator ever fail.

Thanks to its advanced circuit design, 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.

If the accuracy is required to be higher than the specified data, user-specific calibration values for frequency and level may be entered and stored at any time without opening the instrument.

Further development of proven technology

Signal Generators SMY from Rohde & Schwarz stands for the economy class of generators. Well-proven features have been improved and unnecessary details omitted. It is the sum of its characteristics which makes SMY so attractive. Tangible for the user are the variety of facilities and versatility at an excellent price/performance ratio. SMY is the economical solution for universal use in lab, production and servicing environments.
Specifications

Frequency
Range
Underranging
without guarantee of specs
Resolution
Setting time (ft within:
<1 x 10^-3 for f > 65 MHz or
<70 Hz for f > 65 MHz

Reference frequency
Aging (after 30 days of operation)
Temperature effect (0 to 55 °C)
Warmup time
Output for internal reference:
Frequency
Level (EMF, sinewave)
Source impedance
Input for external reference:
Frequency
Level
Input level
Input impedance

Spectral purity
Spurious
Harmonics
Subharmonics
f < 1.04 GHz
f > 1.04 GHz
Nonharmonics
at > 5 kHz from carrier
f < 1.04 GHz
f > 1.04 GHz
Broadband noise with CW
carrier offset > 1 MHz,
1 Hz bandwidth
f = 1 to 65 MHz
f > 65 MHz
SSB phase noise at
20 kHz from carrier,
1 Hz bandwidth, CW
f = 65 MHz
100 MHz
500 MHz
1 GHz
Residual FM, rms, <1% of
maximum deviation, f = 1 GHz
0.3 to 3 kHz (CCITT)
0.03 to 20 kHz
Residual AM, rms (0.03 to 20 kHz)

Level
Range
Overranging
without guarantee of specs
Resolution
Total error for levels
f < 1.04 GHz
f > 1.04 GHz
Level flatness at 0 dBm
Output impedance
VSWR
Setting time (IEC/IEEE bus)
Non-interrupting level setting
(ATTENUATOR MODE FIXED)
Setting range

Overload protection
Max. RF power
SNY 01
SNY 02
Max. DC voltage
Max. pulse loading capacity
(pulse width < 10 μs)

Simultaneous modulation
any combination of AM, FM (μM) and
AM modulation
Modes
Modulation depth
Resolution
Setting error at 1 kHz (m < 80%)
<4% of reading ± 1%
< < 5% reading ± 3%
AM distortion at 1 kHz
f Δ 10 MHz
m = 30%
f Δ 10 MHz
m = 80%
AM distortion at 1 kHz
f > 1 MHz
m = 30%
f > 1 MHz
m = 80%
Carrier frequency offset
with FM (μM)
S/N ratio
unweighted
> 76 dB
weighted
typ. 0.1% Harmonic distortion

VSWR
Setting time (IEC/IEEE bus)
Non-interrupting level setting
(ATTENUATOR MODE FIXED)
Setting range

Overload protection
Max. RF power
SNY 01
SNY 02
Max. DC voltage
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(pulse width < 10 μs)

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AM distortion at 1 kHz
f > 1 MHz
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VSWR
Setting time (IEC/IEEE bus)
Non-interrupting level setting
(ATTENUATOR MODE FIXED)
Setting range

Overload protection
Max. RF power
SNY 01
SNY 02
Max. DC voltage
Max. pulse loading capacity
(pulse width < 10 μs)
Phase modulation
Modes
- internal, external AC
Maximum 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: <0.5% (typ. 0.2%)

Modulation frequency response
- 20 Hz to 20 kHz: <3 dB (typ. 1 dB)
- 20 kHz to 200 kHz: <0.3 dB
- 200 kHz to 1 MHz: <0.1 dB

Pulse modulation
Mode
- standard, option SMY-B40
On/off ratio
- >80 dB
Rise/fall time (10/90%)
- 0.2 µs

Internal modulation generator
Frequency range
- 1 Hz to 50 kHz
Resolution
- 0.1 Hz
Display
- 7 digits, floating point
Frequency error
- <5 x 10^-6
Frequency response flatness
- up to 50 kHz: <0.2 dB
- up to 100 kHz: <0.3 dB

Remote control
System
- IEC 625 (IEEE 488)
Connector
- Amphenol, 24-contact
IEC/IEEE-bus address
- 0 to 30
Interface functions
- SH1/AH1/6/L1/SR1/RL1/PPO/ DC1/DTO/C0

General data
Temperature range
- Guaranteed specs: 0 to 55 °C, complying with IEC68-2-1 and IEC68-2-2
- Storage temperature: -40 to +70 °C

Climatic conditions
- Humidity: 95% relative humidity at +40 °C, complying with IEC68-2-3

Electromagnetic compatibility
- complying with EN50081-1 and EN50082-1 (EMC Directives of EU)
- RF leakage: <0.1 µV (measured with a two-turn coil of 2.5 cm in diameter at a distance of 2.5 cm from any point of enclosure)
- Radiated susceptibility: 10 V/m
- Power supply: 100 V/230 V (AC) – 10 to +15%, 120 V/220 V (AC) – 12 to +10%, 47 to 440 Hz, max. 120 VA

Safety
- complying with EN61010-I

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
- 12 kg (SMY01), 13 kg (SMY02)

Ordering information
Signal Generator
- SMY01: 1062.5502.11
- SMY02: 1062.5502.12

Accessories supplied
- power cord, operating manual

Options
- Reference Oscillator OCXO
- Rear-Panel Connectors for RF and NF
- Pulse Modulator and
- High Output Power

Recommended extras
- 19” Rack Adapter: ZZA93
- Service Kit: SMY2Z
- Service Manual: 1062.5835.24

Typical harmonic distortion of AF synthesizer as a function of frequency

THD (20 Hz to 100 kHz)
- Output voltage: <0.1% (R<sub>low</sub> <10 Ω, R<sub>high</sub> >200 Ω)
- Frequency setting time: <10 ms (after receiving last IEC/IEEE-bus character)

RF sweep
Mode
- digital sweep in discrete steps automatic, linear
- Step duration: 10 ms to 5 s
- Resolution: 1 ms
- Memory: non-volatile, for 100 instrument setups

0.1
%
20 50 100 200 500 1k 2k 5k 10k 20k 50k 100k

0.01

Typical harmonic distortion of AF synthesizer as a function of frequency

1) Valid for levels ≥−127 dBm (≥−121 dBm with option SMY-B40), not with special function «non-interrupting level setting».
2) The modulation depth selectable within the guaranteed AM specifications linearly decreases for levels from 7 to 13 dBm (13 to 19 dBm with option SMY-B40). A status message appears if the modulation depth is too high.
3) Does not apply to special function »ALC – bandwidth, narrow«.
4) Valid after calibration for one hour and for temperature variations <3°C.
5) To be retrofitted by authorized service centers only.