

Signal Generators SMG, SMH, Power Signal Generator SMGL

SMG: 0.1 to 1 GHz

SMH: 0.1 to 2 GHz

SMGL: 9 kHz to 1 GHz

High-end general-purpose generators, SMGL with output level up to +36 dBm



SMGL (photo 39736)

Brief description of SMG, SMH

SMG and SMH are fast, high-resolution synthesizers featuring great ease of operation as well as versatile modulation and sweep capabilities. High spectral purity and short setting times make the SMG and SMH ideal signal generators for communications systems, EMC/EMS measuring systems, IF components of satellite transmission as well as radar, avionics and navigation equipment.

Brief description of SMGL

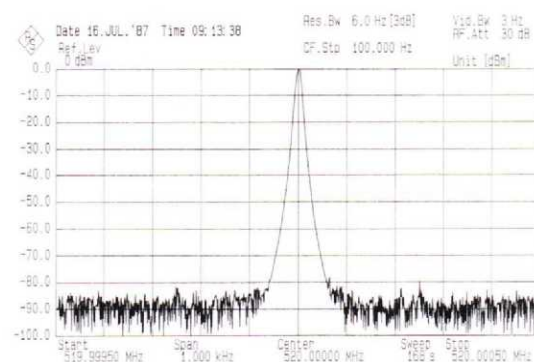
The SMGL is a versatile power signal generator with built-in broadband power amplifier and ideal for driving power stages, frequency multipliers, power semiconductors and high-level mixers. When using the option SMGL-B4 (two additional RF interfaces), the power amplifier as well as the level control and attenuator can also be used separately.

Typical measurement applications

- Antenna patterns
- Overload capabilities of receivers
- Intermodulation, crossmodulation
- Electromagnetic compatibility
- Linearity of amplifiers
- Shielding effectiveness

Main features

- Short frequency setting time of 15 ms, fast sweep, high measurement rate in automatic test systems
- RF and AF sweep without level transients; phase-continuous frequency steps
- Spectral purity, excellent weighted and unweighted S/N ratio, low spurious FM
- Excellent RF shielding allowing accurate measurements even on the smallest of signal levels
- Non-interrupting level variation within a range of 20 dB
- Modulation generator with 8 fixed frequencies
- AM, FM AC and FM DC, phase and pulse modulation; two-tone modulation possible
- Great ease of operation: nonvolatile storage of 50 instrument setups, memory sequence, level and frequency offset adjustable



Signal quality close to carrier at 520 MHz, 10 dB and 100 Hz/division

Overview of options

Designation, functions

Designation, functions	Option
OCXO Reference Oscillator: aging $<1 \times 10^{-9}$ /day	SMG-B1
AF Synthesizer: frequency range 10 Hz to 100 kHz	SMG-B2
X Output: for control of oscilloscopes and recorders	SMG-B3
Additional RF Signal Inputs/Outputs on rear panel: for SMGL only	SMGL-B4

Specifications in brief

Frequency	
Range	100 kHz to 1000 MHz (SMG) 100 kHz to 2000 MHz (SMH) 9 kHz to 1000 MHz (SMGL) 1 Hz
Resolution	<15 ms
Setting time	<0.5 × 10 ⁻⁹ + error of reference standard
Frequency drift f ≥ 31.25 MHz	OCXO oscillator
Reference frequency	2 × 10 ⁻⁶ /year <1 × 10 ⁻⁹ /day 2.5 × 10 ⁻⁶ / 0 to 50°C <2 × 10 ⁻⁹ /°C
Aging (after 30 days of operation)	
Temperature effect	
Input/output for external/internal reference frequency	5 or 10 MHz, selectable

Level	
Range	-140 to +13 dBm (SMG, SMH) -118 to +30 dBm (SMGL)
Underrange and overrange without guarantee of specs	-140 to +16 dBm (SMG, SMH) -130 to +36 dBm (SMGL)
Accuracy for levels	
>-127 dBm (SMG, SMH)	±1.5 dB
>-118 dBm (SMGL)	
Frequency response at 0 dBm output level	1 dB (typ. 0.3 dB)
Characteristic impedance	50 Ω
VSWR	<1.5 for level ≤ 0 dBm (SMG, SMH) <1.5 for level ≤ 16 dBm (SMGL)
Setting time	<25 ms
Non-interrupting level setting	0 to 20 dB
Overload protection (maximum permissible RF power)	50 W

Spectral purity	
Spurious signals	
Harmonics	<-30 dBc (SMGL: level ≤ 27 dBm)
Subharmonics	none
SMG, SMGL	<-40 dBc (f ≥ 1 GHz)
SMH	<0.02%
Residual AM, rms (0.03 to 20 kHz)	
Nonharmonic spurious signals at >5 kHz from carrier	see line a in table below
Residual FM, rms	
0.3 to 3 kHz (CCITT)	see line b in table below
SSB phase noise, carrier offset 20 kHz, 1 Hz bandwidth, typical	see line c in table below

f <	31.25	62.5	125	250	500	1000	2000	MHz
a <	-70	-80	-80	-80	-76	-70	-64	dBc
b <	2	1	1	1	2	4	8	Hz
c	-139	-148	-142	-136	-130	-124	-118	dBc

Amplitude modulation	
Modes	INT, EXT AC, EXT DC, two-tone
Modulation depth	0 to 99%
AM distortion at 1 kHz	
0 to 30% AM	<1%
Modulation frequency	
AM EXT AC (DC)	10 Hz (DC) to 50 kHz
AM INT	40/150/300/400 Hz 1/3/6/15 kHz ±3%
AM INT with option SMG-B2	10 Hz to 100 kHz (SMG, SMH) 10 Hz to 50 kHz (SMGL)

Frequency modulation	
Modes	INT, EXT AC, EXT DC, two-tone
f <	31.25 62.5 125 250 500 1000 2000 MHz
Max. dev.	200 50 100 200 400 800 1600 kHz
FM distortion at 1 kHz and 50% of maximum deviation	<0.5% (typ. 0.1%)

Modulation frequency	
FM EXT AC (DC)	10 Hz (DC) to 100 kHz
FM INT	40/150/300/400 Hz/ 1/3/6/15 kHz ±3%
FM INT with option SMG-B2	10 Hz to 100 kHz
Frequency drift with FM DC, carrier frequency offset when switching on FM DC for f _{carrier} ≥ 31.25 MHz	1% of deviation + 1 × 10 ⁻⁹ × f _{carrier}

Phase modulation	
Modulation	INT, EXT AC, two-tone
f <	31.25 62.5 125 250 500 1000 2000 MHz
Max. dev.	20 5 10 20 40 80 160 rad

Phase modulation distortion at 1 kHz and 50% of max. deviation	<0.5% (typ. 0.1%)
Modulation frequency	
φM EXT	10 Hz to 10 kHz
φM INT	40/150/300/400 Hz/ 1/3/6 kHz ±3%
φM INT with option SMG-B2	10 Hz to 10 kHz

Pulse modulation	
Mode	external
On/off ratio	>70 dB (typ. >80 dB)
Rise/fall time (10/90%)	
f _c > 200 MHz	typ. 20 ns
Pulse repetition frequency	0 to 10 MHz
Modulation signal	TTL levels

AF Synthesizer (option SMG-B2)	
Frequency	10 Hz to 100 kHz
Readout	3 digits
Frequency drift	<4 × 10 ⁻⁵
Level error at 1 kHz	<3% (typ. 1%)
Distortion	<0.1% (typ. 0.03%)
Phase-continuous frequency change, response time between setting command and frequency change	<10 ms

RF sweep, AF sweep	
(AF sweep with option SMG-B2)	digital start-stop sweep in discrete steps
Modes	automatic following ramp function, single-shot, manual control via spin-wheel, linear or logarithmic user-selectable over entire frequency range
Sweep range	user-selectable
Step size	10 ms to 10 s
Time per step	

X output (with option SMG-B3)	
X output	0 to 10 V staircase ramp, max. 1000 steps

Remote control	IEC 625-1 (IEEE 488)
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General data	
Power supply	100/120/220/240 V ±10% 47 to 440 Hz max. 130 VA (SMG, SMH) max. 250 VA (SMGL)
Power consumption	

Ordering information

Signal Generator	SMG	0801.0001.52
Signal Generator	SMH	0845.4002.52
Power Signal Generator	SMGL	1020.2005.52

Options		
Reference Oscillator OCXO	SMG-B1	0802.0005.02
AF Synthesizer	SMG-B2	0802.0405.02
X Output	SMG-B3	0801.9609.02
Additional RF Signal Inputs/Outputs on rear panel (for SMGL only)	SMGL-B4	1020.6100.02