

# Signal Generator SMT

**SMT02: 5 kHz to 1.5 GHz**

**SMT03: 5 kHz to 3 GHz**

**SMT06: 5 kHz to 6 GHz**

**For receiver and EMS measurements**



Photo 42353

## Brief description

Signal Generator SMT covers the complete range of conventional analog receiver measurements. It provides an exceptionally high signal quality for a generator in this price category, as well as outstanding level accuracy, a wide variety of modulation and signal generation modes, customized configuration, and great ease of operation. Features such as programmable RF/ LF and level sweeps as well as the correction of external frequency response make the SMT an ideal source for EMS measurements.

## Main features

- Ideal EMS signal source with specified frequency range from 5 kHz
- AM, FM,  $\phi$ M, pulse modulation
- FM DC with high carrier frequency accuracy
- Broadband FM from DC to 8 MHz, broadband  $\phi$ M from DC to 2 MHz

- Convenient RF/ LF/ level sweep
- Programmable level correction (compensation of external frequency response)
- VO R/ ILS generator (option SM-B6)
  - phase resolution 0.01°
  - DDM resolution 0.0001
- Stereo generator (option SM-B6) for measurements on FM sound broadcast transmitters and receivers
- Large, backlit ICD for clear display of all relevant settings
- Minimum RF leakage due to special shielding measures
- Calibration interval of three years

## Overview of options

Designation, functions	Option
<b>Reference Oscillator OCXO:</b> aging $<1 \times 10^{-9}$ / day	SM-B1
<b>LF Generator:</b> supplies sinewave, noise 0.1 Hz to 500 kHz, triangular, squarewave 0.1 Hz to 50 kHz signals	SM-B2
<b>Pulse Modulator:</b> on/ off ratio $>80$ dB, rise/ fall time $<10$ ns	SMT02: SM-B3 SMT03: SM-B8 SMT06: SM-B9
<b>Pulse Generator:</b> only in conjunction with SM-B3/ SM-B8/ SM-B9; provides single, delayed and double pulses	SM-B4
<b>Multifunction Generator:</b> produces stereo multiplex and VO R/ ILS signals as well as sinewave, noise 0.1 Hz to 1 MHz, triangular, sawtooth, squarewave 0.1 Hz to 50 kHz signals	SM-B6
<b>Rear Connectors for RF and LF:</b> to replace frontpanel connectors	SMTB19

## Specifications in brief

<b>Frequency</b>			
Range SMT02	5 kHz to 1.5 GHz	standard	option SM-B1
SMT03	5 kHz to 3 GHz	1 $\times$ 10 <sup>-6</sup> / year	$<1 \times 10^{-9}$ / day
SMT06	5 kHz to 6 GHz	2 $\times$ 10 <sup>-6</sup>	$<5 \times 10^{-8}$
Resolution	0.1 Hz		
Phase offset	°		
		<b>Reference frequency</b>	
		Aging (after 30 days of operation)	
		Temperature effect (0 to 55 °C)	

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## Spectral purity

Spurious signals	
Harmonics	<-30 dBc, with SM-B8/-B9: <-26 dBc
Nonharmonics	
f < 1.5 GHz	<-80 dBc
f > 1.5 GHz	<-74 dBc
f > 3 GHz	<-68 dBc
SSB phase noise at 20 kHz from carrier, 1 Hz bandwidth	
< 67.5 MHz	<-120 dBc
125 MHz	<-134 dBc
250 MHz	<-128 dBc
500 MHz	<-122 dBc
1000 MHz	<-116 dBc
2000 MHz	<-110 dBc
3000 MHz	<-109 dBc
6000 MHz	<-103 dBc
Residual FM, rms (f = 1 GHz)	
0.3 to 3 kHz (CCITT)	<8 Hz
0.03 to 20 kHz	<20 Hz

<b>Level</b>	-144 to +13 dBm
Resolution	0.1 dB
Accuracy for levels > -127 dBm	
f < 1.5 GHz	±1 dB
f > 1.5 GHz	±1.5 dB
f > 3 GHz	±2 dB
Level frequency response at 0 dBm	1 dB, typ. 0.3 dB

<b>Overload protection</b>	protects the unit from externally applied RF power (50 Ω source) and DC voltages, SMT02 and 03: ≤50 W / 35 V, SMT06: ≤1 W / 0 V
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<b>Simultaneous modulation</b>	any combination of AM, FM (φM) and pulse modulation
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<b>Amplitude modulation</b>	internal, external AC/DC
Modulation depth/ resolution	0 to 100% / 0.1%
Setting error at 1 kHz (m < 80%)	<4% of reading ±1%
AM distortion at 1 kHz	
m = 30%	<1%
m = 80%	<2%
Modulation frequency range	DC to 100 kHz

<b>Frequency modulation</b>	internal, external AC/DC, two-tone with two separate channels FM1 and FM2
Maximum deviation	depending on carrier frequency: 5 MHz (at f <sub>c</sub> < 130 MHz) to 40 MHz (at f <sub>c</sub> 6 GHz)

Setting error at AF = 1 kHz (FM AC)	<(3% of reading + 20 Hz)
FM distortion at AF = 1 kHz and 50% of max. deviation	<0.2%, typ. 0.1%
Modulation frequency response	
FM1 / 2: 20 Hz (DC) to 100 kHz	0.5 dB
FM2: 20 Hz (DC) to 8 MHz	3 dB
Stereo modulation	
Crosstalk attenuation	>50 dB
Unweighted S/ N ratio	>76 dB
Carrier frequency offset (FM DC)	<0.1% of deviation

<b>Phase modulation</b>	internal, external AC/DC, two-tone with two separate channels broadband φM or narrowband φM (broadband φM only possible with φM2)
Maximum deviation	depending on carrier frequency
φM range 1: DC to 100 kHz	12.5 to 400 rad
φM range 2: DC to 2 MHz	0.625 to 20 rad

<b>Pulse modulation</b>	with option SM-B3, SM-B8, SM-B9
Operating modes	external; internal with optional Pulse Generator SM-B4
On/ off ratio	>80 dB
Rise/ fall time (10/ 90%)	<10 ns

<b>Internal modulation generator</b>	0.4/ 1/ 3/ 15 kHz ±3%
Level (EMF) at IF socket	1 V ±1% (R <sub>out</sub> = 10 Ω, R <sub>L</sub> > 200 Ω)

<b>LF generator</b>	option SM-B2
Sinewave, noise	0.1 Hz to 500 kHz
Triangular, squarewave	0.1 Hz to 50 kHz
Distortion (20 Hz to 100 kHz)	<0.1% (level >0.5 V)
Level (EMF) at IF socket	1 mV to 4 V (R <sub>out</sub> = 10 Ω, R <sub>L</sub> > 200 Ω)

<b>Multifunction generator</b>	option SM-B6
Modulation signals	sinewave, triangular, sawtooth, squarewave, noise, stereo MPX, VO R/ IIS
Sinewave, noise	0.1 Hz to 1 MHz
Triangular, sawtooth, squarewave	0.1 Hz to 50 kHz
Distortion (20 Hz to 100 kHz)	<0.1% (level >0.5 V)
Level (EMF) at IF socket	1 mV to 4 V (R <sub>out</sub> = 10 Ω, R <sub>L</sub> > 200 Ω)

<b>Stereo multiplex signal</b>	with option SM-B6
Stereo operating modes	R <sub>L</sub> R = L <sub>R</sub> R = -L <sub>R</sub> ARI (pilot tone or MPX signal can be connected to IF socket)
Frequency range of L <sub>R</sub> R signal	0.1 Hz to 15 kHz
Preemphasis	50 μs, 75 μs
Pilot tone frequency	19 kHz ±1 Hz
Pilot phase/ resolution	0 to 360° / 0.1°

<b>VO R modulation signal</b>	with option SM-B6
Settings	30 Hz (VAR, REF)/ 9.96 kHz FM carrier, FM deviation, COM/ ID tone
Phase/ phase resolution	0 to 360° / 0.01°
Bearing error (RF output, 108 to 118 MHz)	<0.05°

<b>ILS modulation signal</b>	with option SM-B6
Settings	90 Hz, 150 Hz tone, COM/ ID tone, marker beacon
DDM setting range/ resolution	0 to ±0.8 / 0.0001
DDM error (RF output)	
Localizer (108 to 112 MHz)	<0.0004 + 1% of DDM reading
Glideslope (329 to 335 MHz)	<0.0008 + 1% of DDM reading

<b>Pulse generator</b>	option SM-B4
Operating modes	single, delayed and double pulse
Pulse repetition period	100 ns to 85 s
Pulse width	20 ns to 1 s
Pulse delay	40 ns to 1 s
Double pulse	60 ns to 1 s

<b>Sweep</b>	digital sweep in discrete steps for RF level and IF IF sweep with option SM-B2 or SM-B6
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<b>Remote control</b>	IEC 625 (IEEE 488)
Command set	SCPI 1993.0

<b>General data</b>	
Power supply	90 to 132/ 180 to 265 V, 47 to 440 Hz (300 VA)
Dimensions (W x H x D)	435 mm x 192 mm x 350 mm
Weight	20 kg for fully equipped unit

## Ordering information

<b>Signal Generator</b>	SMT02	1039.2000.02
	SMT03	1039.2000.03
	SMT06	1039.2000.06

<b>Options</b>		
Reference Oscillator O CXO	SM-B1	1036.7599.02
IF Generator	SM-B2	1036.7947.02
Pulse Modulator		
for SMT02	SM-B3	1036.6340.02
for SMT03	SM-B8	1036.6805.02
for SMT06	SM-B9	1039.5100.02
Pulse Generator (only in combination with SM-B3, SM-B8 or SM-B9)	SM-B4	1036.9310.02
Multifunction Generator	SM-B6	1036.7760.02
Rear Connectors for RF and IF	SMTB19	1039.4003.02