

# 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)
- VOR/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 LCD 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
Reference Oscillator OCXO: aging $<1 \times 10^{-9}$ /day	SM-B1
LF Generator: supplies sinewave, noise 0.1 Hz to 500 kHz, triangular, squarewave 0.1 Hz to 50 kHz signals	SM-B2
Pulse Modulator: on/off ratio $>80$ dB, rise/fall time $<10$ ns	SMT02: SM-B3 SMT03: SM-B8 SMT06: SM-B9
Pulse Generator: only in conjunction with SM-B3/SM-B8/SM-B9; provides single, delayed and double pulses	SM-B4
Multifunction Generator: produces stereo multiplex and VOR/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
Rear Connectors for RF and LF: to replace front-panel connectors	SMT-B19

## Specifications in brief

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

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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)	<8 Hz
0.3 to 3 kHz (CCITT)	<20 Hz
0.03 to 20 kHz	

<b>Level</b>	-144 to +13 dBm
Resolution	0.1 dB
Accuracy for levels >-127dBm	
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 LF 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 LF socket	1 mV to 4 V ( $R_{out}=10\ \Omega$ , $R_L>200\ \Omega$ )
<b>Multifunction generator</b>	option SM-B6
Modulation signals	sinewave, triangular, sawtooth, square-wave, noise, stereo MPX, VOR/ILS
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 LF socket	1 mV to 4 V ( $R_{out}=10\ \Omega$ , $R_L>200\ \Omega$ )
<b>Stereo multiplex signal</b>	with option SM-B6
Stereo operating modes	R, L, R=L, R=-L, ARI (pilot tone or MPX signal can be connected to LF socket)
Frequency range of L, R signal	0.1 Hz to 15 kHz
Preemphasis	50 $\mu$ s, 75 $\mu$ s
Pilot-tone frequency	19 kHz $\pm$ 1 Hz
Pilot phase/resolution	0 to 360°/0.1°
<b>VOR 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 $\pm$ 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 LF LF sweep with option SM-B2 or SM-B6
<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 OCXO	SM-B1	1036.7599.02
LF 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 LF	SMT-B19	1039.4003.02