

Signal Generation

Specifications in brief

Frequency		
Range	SME02/03 SME03E/06	5 kHz to 1.5/3 GHz 5 KHz to 2.2/6 GHz
Resolution		0.1 Hz
Settling time		<10 ms
after IEC/IEEE-bus delimiter		<500 μs
after trigger pulse in list mode		adjustable in steps of 1°
Phase offset		
Reference frequency		
Aging (after 30 days of operation)	standard 1 x 10 ⁻⁶ /year	option SM-B1 <1 x 10 ⁻⁹ /day
Temperature effect (0 to 55°C)	2 x 10 ⁻⁶	<5 x 10 ⁻⁸
Spectral purity		
Spurious signals		
Harmonics		<-30 dBc, <-26 dBc with SM-B3/B8/B9
Nonharmonics at		
>5 kHz from carrier, f <1.5 GHz		<-80 dBc
SSB phase noise at 20 kHz from carrier, 1 Hz bandwidth,		
FM/φM deviation <5% of max. deviation		
<93.75 125 250 MHz 0.5 1 2 3 6 GHz		
<-129 <-140 <-137 <-132 <-126 <-120 <-116 <-116 dBc		
Residual FM, rms (f=1 GHz)		
0.3 to 3 kHz (CCITT)		<1 Hz
0.03 to 20 kHz		<4 Hz
Level		
Resolution		-144 to +13 dBm
Accuracy for levels >-127 dBm		0.1 dB
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
Overload protection		
		protects the unit from externally applied RF power (50 Ω source) and DC voltage, SME02 and 03: ≤50 W/35 V; SME06: ≤1 W/0 V
Simultaneous modulation		
		any combination of AM, FM (φM), pulse modulation and DM (DM = FSK, 4FSK, FFSK, GFSK, GMSK or QPSK)
Frequency modulation		
Operating modes		with option SM-B5 internal, external AC/DC, two-tone with two separate channels FM1 and FM2
Maximum deviation		depending on carrier frequency: 500 kHz (<130 MHz) to 4 MHz (6 GHz)
Setting error at AF=1 kHz		<3% of reading + 20 Hz
FM distortion at AF=1 kHz and 50% of max. deviation		
Modulation frequency range for maximum deviation		<0.5%, typ. 0.05%
for <25% of max. deviation		
Carrier frequency offset with FM		DC to 500 kHz DC to 2 MHz depending on carrier frequency: <50 Hz (f _c <93.75 MHz) to <100/200 Hz (f _c 1.5/3 GHz) +1% of deviation
Phase modulation		
Operating modes		with option SM-B5 internal, external AC/DC, two-tone with two separate channels φM1 and φM2
Maximum deviation		depending on carrier frequency: 5 rad (f _c <130 MHz) to 40 rad (f _c 6 GHz)
Setting error at AF=1 kHz		<3% of reading + 0.01 rad
Distortion at AF=1 kHz and 50% of max. deviation		
Modulation frequency range		<1% DC to 100 kHz
Digital modulation		
Modulation modes		with option SME-B11, standard in SME03E FSK, 4FSK, FFSK, GFSK, GMSK, QPSK, π/4 DQPSK

Operating modes	internal, external
Internal data generator	programming of data, level switching and burst output
Storage capacity	3 x 8192 bit
Frequency accuracy	same as reference frequency
PRBS (pseudo-random bit sequence)	selectable lengths: 2 ⁹ -1, 2 ¹⁵ -1, 2 ²⁰ -1, 2 ²¹ -1 or 2 ²³ -1
FSK	to Cityruf, POCSAG, FLEX specs
Shift, filtered	4/4.5/4.8 kHz
unfiltered	0.01 to 400 kHz, maximum shift depending on carrier frequency
Data rate, filtered	0.05 to 90 kbit/s
unfiltered	0.05 to 1900 kbit/s
FFSK	to Cityruf, POCSAG specifications
Shift	1.5/2/3/3.5/4/4.5 kHz
Data rate	0.05 to 90 kbit/s
4FSK	to APCO25, ERMES, FLEX, MODACOM specifications
Shift	0.01 to 400 kHz, maximum shift depending on carrier frequency
Data rate	1 to 24.3/27 to 48.6 kbit/s
GFSK	to CT2, CT3, DECT specifications
Shift	18/160/288 kHz as well as non-standard shifts
Data rate	10 to 585/640 to 1170 kbit/s
GMSK	to CDPD, GSM1800, DSRR, GSM, MC9, MD24 to MD192, MOBITEK8000 specifications
Data rate	2.4/3.6/4/4.8/6/8/9.6/10/12/16/19.2/270.833/1000 kbit/s
QPSK, π/4 DQPSK	to APCO25, MSAT, NADC, PDC, TETRA, TETS specifications
for f >3 GHz	not specified
Data rate	1 to 24.3/27 to 48.6 kbit/s
Filter	√cos0.35/0.4/0.5/0.6 cos0.2/0.35/0.4/0.5/0.6

Amplitude modulation, pulse modulation, internal modulation generator, LF generator, multifunction generator, stereo multiplex signal, VOR modulation signal, ILS modulation signal, pulse generator and sweep see SMT, page 210

List mode	automatic, single-shot, manual, externally triggered
(not SME03E)	
Max. number of channels	2000
Step time	1 ms to 1 s
Remote control	IEC 625 (IEEE 488)
Command set	SCPI 1992.0

General data	
Power supply	90 to 132/180 to 265 V, 47 to 440 Hz, autosecting to AC voltage, max. 300 VA
Dimensions (W x H x D)	435 mm x 192 mm x 460 mm
Weight	25 kg for fully equipped unit

Ordering information

Signal Generator	SME02	1038.6002.02
	SME03	1038.6002.03
	SME03E	1038.6002.13
	SME06	1038.6002.06

Options		
Reference Oscillator OCOXO	SM-B1	1036.7599.02
LF Generator	SM-B2	1036.7947.02
Pulse Modulator for SME02	SM-B3	1036.6340.02
for SME03	SM-B8	1036.6805.02
for SME06	SM-B9	1039.5100.02
Pulse Generator (only in combination with SM-B3, SM-B8 or SM-B9)	SM-B4	1036.9310.02
FM/φM Modulator	SM-B5	1036.8489.02
Multifunction Generator	SM-B6	1036.7760.02
DM Coder	SME-B11	1036.8720.02
DM Memory Extension (8 Mbit)	SME-B12	1039.4090.02
FLEX Protocol	SME-B41	1039.5645.02
POCSAG Protocol	SME-B42	1039.5745.02
Rear Connectors for RF and LF	SME-B19	1039.3907.02