

Signal Generator SME

SME02: 5 kHz to 1.5 GHz

SME03: 5 kHz to 3 GHz

SME03E: 5 kHz to 2.2 GHz

SME06: 5 kHz to 6 GHz

For digital communication with all types of modulation of mobile radio

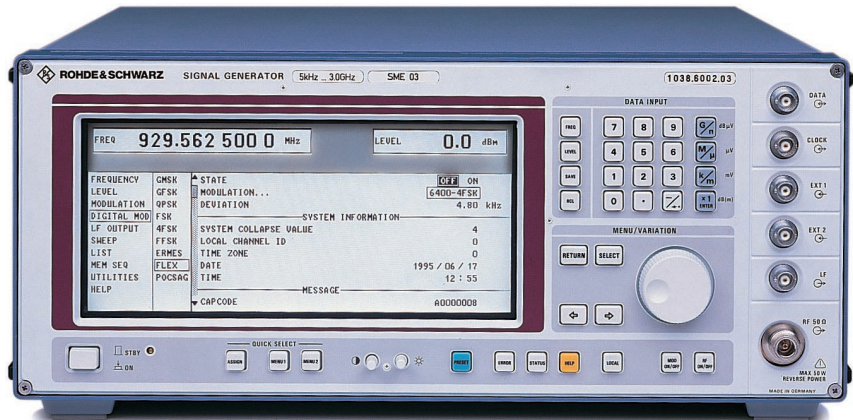


Photo 42212

Brief description

The SME supplies the complex signals required for the development and testing of digital mobile radio receivers. It is capable of generating all signals used in the main digital radio networks in line with relevant standards regarding the type of modulation, data format, TDMA structure and frequency hop patterns. The SME is completely at home also in the analog signal world of conventional signal generators.

SME02, SME03 and SME06 are identical except for the frequency range. Economy Signal Generator SME03E has been designed as an especially economical solution for applications involving digitally modulated signals. The large variety of options available allows the SME to be tailored to the specific needs of the user.

Main features

- All common digital modulation modes provided in one unit
- Great ease of operation thanks to a novel menu concept
- No external modulation and data sources required

- User-programmable data sequences and TDMA structure
- RF, LF and level sweep
- Ultra-low RF leakage for measurements on highly sensitive pagers
- List mode: programmable measurement sequence for up to 4096 frequency and level combinations, setting time <0.5 ms (not SME03E)

Overview of options

Designation, functions	Option
Reference Oscillator OCXO: aging <1 x 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	SME02: SM-B3 SME03E, SME03: SM-B8 SME06: SM-B9
Pulse Generator: only in conjunction with SM-B3/SM-B8/SM-B9; provides single, delayed and double pulses	SM-B4
FM/φM Modulator: FM DC to 2 MHz, φM DC to 100 kHz	SM-B5
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
DM Coder: generates FSK, FFSK, 4FSK, GFSK, GMSK, QPSK, π/4 QPSK, π/4 DQPSK, O-QPSK; user-programmable data sequences and PRBS	SME-B11 *
DM Memory Extension 8 Mbit: expands the 8-kbit memory of the DM Coders to 8 Mbit (data only); required for fitting SME-B41 and SME-B42	SME-B12
FLEX Protocol: generates call signals to FLEX standard for testing pagers	SME-B41
POCSAG Protocol: generates call signals to POCSAG standard for testing pagers	SME-B42
Rear Connectors for RF and LF: to replace front-panel connectors	SMT-B19

* Already included in basic model of SME03E



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Specifications in brief

Frequency

Range SME02/03 5 kHz to 1.5/3 GHz
SME03E/06 5 KHz to 2.2/6 GHz

Resolution

Setting time after IEC/IEEE-bus delimiter <10 ms
after trigger pulse in list mode <500 μ s
Phase offset adjustable in steps of 1°

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 SMB3/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/ ϕ M 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

Accuracy for levels >-127 dBm

f <1.5 GHz \pm 1 dB
f >1.5 GHz \pm 1.5 dB
f >3 GHz \pm 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: \leq 50 W/35 V; SME06: \leq 1 W/0 V

Simultaneous modulation

any combination of AM, FM (ϕ M), 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

FM distortion at AF=1 kHz and 50% of max. deviation <0.5%, typ. 0.05%

Modulation frequency range

for maximum deviation DC to 500 kHz
for <25% of max. deviation DC to 2 MHz
Carrier frequency offset with FM 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 ϕ M1 and ϕ M2

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

Distortion at AF=1 kHz and 50% of max. deviation <3% of reading + 0.01 rad

Modulation frequency range

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 data generator internal, external programming of data, level switching and burst output

Storage capacity

Frequency accuracy 3 x 8192 bit
PRBS (pseudo-random bit sequence) same as reference frequency selectable lengths: 2⁹-1, 2¹⁵-1, 2²⁰-1, 2²¹-1 or 2²³-1

FSK

Shift, filtered 4/4.5/4.8 kHz
unfiltered 0.01 to 400 kHz, maximum shift depending on carrier frequency

Data rate, filtered

unfiltered 0.05 to 90 kbit/s
0.05 to 1900 kbit/s

FFSK

Shift to Cityruf, POCSAG specifications 1.5/2/3/3.5/4/4.5 kHz

Data rate

0.05 to 90 kbit/s to APCO25, ERMES, FLEX, MODACOM specifications

4FSK

Shift 0.01 to 400 kHz, maximum shift depending on carrier frequency

Data rate

1 to 24.3/27 to 48.6 kbit/s to CT2, CT3, DECT specifications

GFSK

Shift 18/160/288 kHz as well as non-standard shifts

Data rate

10 to 585/640 to 1170 kbit/s to CDPD, GSM1800, DSRR, GSM, MC9, MD24 to MD192, MOBITE8000 specifications

GMSK

Data rate 2.4/3.6/4/4.8/6/8/9.6/10/12/16/19.2/270.833/1000 kbit/s to APCO25, MSAT, NADC, PDC, TETRA, TTFS specifications

QPSK, π /4 DQPSK

for f >3 GHz not specified

Data rate

1 to 24.3/27 to 48.6 kbit/s Filter $\sqrt{\cos 0.35/0.4/0.5/0.6}$
 $\cos 0.2/0.35/0.4/0.5/0.6$

List mode

(not SME03E) automatic, single-shot, manual, externally triggered

Max. number of channels

2000 1 ms to 1 s

Remote control

Command set IEC 625 (IEEE 488) SCPI 1992.0

General data

Power supply 90 to 132/180 to 265 V, 47 to 440 Hz, autosetting 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 OCXO	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)

FM/ ϕ M Modulator	SM-B4	1036.9310.02
Multifunction Generator	SM-B5	1036.8489.02
DM Coder	SM-B6	1036.7760.02
DM Memory Extension (8 Mbit)	SME-B11	1036.8720.02
FLEX Protocol	SME-B12	1039.4090.02
POCSAG Protocol	SME-B41	1039.5645.02
Rear Connectors for RF and LF	SME-B42	1039.5745.02
	SME-B19	1039.3907.02



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