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

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

<table>
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<tr>
<th>Designation, functions</th>
<th>Option</th>
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<tr>
<td>Reference Oscillator OCXO: aging &lt;1 x 10^{-9}/day</td>
<td>SM-B1</td>
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<tr>
<td>LF Generator: supplies sinewave, noise 0.1 Hz to 500 kHz, triangular, squarewave 0.1 Hz to 50 kHz signals</td>
<td>SM-B2</td>
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<tr>
<td>Pulse Modulator: on/off ratio &gt;80 dB, rise/fall time &lt;10 ns</td>
<td>SME02: SM-B3</td>
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<td>SME03E: SM-B4</td>
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<td>SME06:  SM-B5</td>
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<td>Pulse Generator: only in conjunction with SM-B3/SM-B8/SM-B9; provides single, delayed and double pulses</td>
<td>SM-B9</td>
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<tr>
<td>FM/αM Modulator: FM DC to 2 MHz, αM DC to 100 kHz</td>
<td>SM-B5</td>
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<tr>
<td>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</td>
<td>SM-B6</td>
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<tr>
<td>DM Coder: generates FSK, FFSK, 4FSK, GFSK, GMSK, QPSK, π/4 QPSK, π/4 DQPSK, O-QPSK; user-programmable data sequences and PRBS</td>
<td>SME-B11*</td>
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<tr>
<td>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</td>
<td>SME-B12</td>
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<tr>
<td>FLEX Protocol: generates call signals to FLEX standard for testing pagers</td>
<td>SME-B41</td>
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<tr>
<td>POCSAG Protocol: generates call signals to POCSAG standard for testing pagers</td>
<td>SME-B42</td>
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<tr>
<td>Rear Connectors for RF and LF: to replace front-panel connectors</td>
<td>SMT-B19</td>
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* Already included in basic model of SME03E
Specifications in brief

**Frequency**
- Range: SME02/03 5 kHz to 1.5/3 GHz, SME03E/06 5 kHz to 2.2/6 GHz
- Resolution: 0.1 Hz
- Setting time: after IEC/IEEE-bus delimiter <10 ms, after trigger pulse in list mode <500 μs
- Phase offset: adjustable in steps of 1°

**Reference frequency**
- Aging (after 30 days of operation): 1 x 10^-8/year, <1 x 10^-6/day

**Temperature effect** (0 to 55°C)
- Standard 2 x 10^-6/°C/year, <5 x 10^-7/°C/day

**Spectral purity**
- Harmonics: <-30 dBc, <-26 dBc with SMB3/88/89
- Nonharmonics at >6 kHz from carrier, f <1.5 GHz: <-80 dBc
- SSB phase noise at 20 kHz from carrier, 1 Hz bandwidth, FM/qm deviation: <3% of max. deviation, <-129° to <160°, 0.5 MHz
- Residual FM, rms (f = 137 MHz): 0.3 to 3 kHz (CCITT) <1 Hz, 0.03 to 20 kHz <4 Hz

**Level**
- Accuracy for levels: <144 to +13 dBm
- Resolution: 0.1 dB
- f <1 kHz: ±1 dB, ±1.5 dB, f >3 kHz: ±2 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/V

**Simultaneous modulation**
- Any combination of AM, FM, FSK, pulse modulation and DM (DM = FSK, 4FSK, FFSK, GFSK, GMSK or QPSK)

**Frequency modulation**
- Operating modes: internal, external AC/DC, two-tone with two separate channels FM1 and FM2 depending on carrier frequency: 500 kHz to 4 MHz (6 GHz)
- Maximum deviation: 5 rad [f, <93.75 MHz] to 40 rad [f, 6 GHz]
- Setting error at AF = 1 kHz: <3% of setting + 0.01 rad
- Distortion at AF = 1 kHz and 50% of max. deviation: DC to 100 kHz

**Phase modulation**
- Operating modes: internal, external AC/DC, two-tone with two separate channels FM1 and FM2 depending on carrier frequency: 5 rad [f, <93.75 MHz] to 40 rad [f, 6 GHz]
- Maximum deviation: <1% of setting + 0.01 rad
- Distortion at AF = 1 kHz and 50% of max. deviation: DC to 100 kHz

**Digital modulation**
- with option SME-B1, standard in SME03E
- with option SME-B2, standard in SME06
- with option SME-B3, standard in SME02

**Operating modes**
- Internal data generator (for RF and LF)
- Storage capacity: 3 x 8192 bit
- Frequency accuracy: same as reference frequency
- PRBS (pseudo-random bit sequence) selectable lengths: 2^1-1, 2^2-1, 2^3-1, 2^4-1

**Digital modulation modes**
- FSK, 4FSK, FFSK, GFSK, GMSK, QPSK, n/4 DQPSK
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