



**ROHDE & SCHWARZ**

SMK

# Signal Generator SMK

10 Hz to 140 MHz



SMK

AM FM Synthesizer



Data sheet  
348 001  
E - 1

# SIGNAL GENERATOR SMK

The Signal Generator SMK is a fully remote-controlled AM FM synthesized generator covering continuously the frequency range 10 Hz to 140 MHz.

In terms of frequency range, frequency resolution, signal quality and excellent modulation characteristics, the SMK is an ideal choice for all kinds of measurement on short-wave receivers including SSB receivers as well as AM and hi-fi FM sound broadcasting receivers.

Remote control of all functions in accordance with IEC 625-1 or IEEE 488 makes the SMK suitable for use in semi-automatic and fully automatic test assemblies.

SMK – low-noise AM FM Synthesizer Signal Generator with special modulation characteristics:

- **Frequency range** 10 Hz to 140 MHz, setting time < 40 ms
- **Frequency resolution** 1 Hz
- **Output level** 0.025  $\mu$ V to 2 V (50  $\Omega$ )
- **Level variation** 20 dB without interrupting RF output, resolution 0.1 dB
- **RF leakage** below limit values of MIL STD 461 A (methods CE 03 and RE 02)
- **SSB test input** for generating SSB spectrum, inter-modulation  $d_3 > 60$  dB down (also within J3E sideband)
- **Intermodulation suppression** for multi-source measurements > 80 dB

## Spectral purity

- **SSB phase noise** down 135 dBc/Hz at 20 kHz from carrier
- **Spurious FM** < 1 Hz in compliance with CCITT, < 3 Hz (30 Hz to 20 kHz)
- **Nonharmonic spurious signals** down 80 dBc

## Universal modulation

- **Modulation modes** AM, FM, AM + FM, 2-tone AM, 2-tone FM, AC/DC
- **Counter display of frequency** for FM DC
- **Built-in modulation generator** 150 Hz, 400 Hz, 1 kHz, 3 kHz, 15 kHz
- **Level control** for external modulation signals
- **AM up to 100%** at  $f_{mod}$  DC to 20 kHz
- **AM distortion factor** 0.2% ( $f_{mod} = 1$  kHz,  $m = 80\%$ )
- **FM up to 500 kHz deviation** at  $f_{mod}$  DC to 100 kHz
- **FM distortion factor** 0.02% ( $f_{mod} = 1$  kHz, dev. = 100 kHz)
- **Stereo crosstalk** 60 dB (500 Hz to 10 kHz, dev. = 40 kHz)

## Built-in sweep generator

- **Sweep frequency** 3 Hz, 30 Hz, 100 Hz, counter display of centre frequency
- **Deviation** adjustable up to 500 kHz

## Ease of operation

- **Variation keys for all parameters**
- **Non-volatile memory for 40 front-panel setups**
- **Comprehensive self-test with error indication**
- **Remote control of all functions in accordance with IEC 625-1 or IEEE 488**
- **Listener, talker, service request**
- **Overload protection as standard feature**

The pull-out card with brief operating instructions also contains the special functions and IEC-bus commands (German on the front, English at the back)





**Uses/Measurement tasks****Special features of SMK****Measurements on FM broadcast receivers**

## Fidelity of reproduction

Weighted/unweighted S/N ratio  
Stereo crosstalk  
Linear distortion  
Non-linear distortion  
AM suppression  
IF check via receiver input,  
checking of transmitter search function

Low inherent noise, permitting measurements of weighted/unweighted S/N ratio up to 85 dB  
Channel separation 60 dB  
Modulation frequency response up to 100 kHz < 0.2 dB  
FM distortion 0.02 %  
Simultaneous AM and FM, incidental  $\phi$ M for AM 0.02 rad  
Sweep with simultaneous FM

## Interference rejection

Selectivity,  
image-frequency rejection,  
IF rejection,  
crossmodulation suppression

High suppression of non-harmonic spurious signals, low inherent noise, low intermodulation products in multi-source measurements

## Testing of traffic radio decoders

Transmitter identification  
Message identification,  
range identification

Modulation frequency range up to 100 kHz  
2-tone AM with high intermodulation suppression

**Measurements on AM receivers**

## Fidelity of reproduction

AM possible down to very low carrier frequencies without restriction of the modulation depth or frequency, modulation frequency response 0.3 dB, distortion 0.2 %

**Measurements on shortwave receivers**

Tuning error  
S/N ratio (J3E),  
IF selection,  
adjacent-channel selectivity,  
blocking, crossmodulation  
AF intermodulation,  
RF intermodulation

Crystal-controlled frequency, resolution 1 Hz  
Low spurious FM, < 1 Hz (CCITT), low SSB noise, spurious frequencies right up to carrier 80 dB down  
For 2-tone SSB spectrum with suppressed carrier generated via the 40-MHz test input, third-order intermodulation products at least 60 dB down

**2-signal measurements**

Intermodulation,  
crossmodulation

With a 6-dB splitter, intermodulation suppression is better than 80 dB down for signal levels up to 0 dBm; use of an R&S Power Splitter/Combiner DVS yields values > 80 dB down for levels up to 10 dBm

**Crystal measurements**

Resonant frequency and  
other crystal data

FM DC with VCO mode,  
counter display of frequency for FM DC,  
low spurious FM,  
high output level of 19 dBm

**Signal source for various test items**

Amplifiers,  
IF sections,  
mixers,  
demodulators

Levels up to 19 dBm,  
variation over 20 dB without interruption of the RF level, high spectral purity,  
internal and external sweep,  
low modulation distortion

# CHARACTERISTICS

## Characteristics, uses

**Frequency.** The frequency is adjustable between 10 Hz and 140 MHz. The high frequency resolution of 1 Hz permits measurements on SSB receivers and narrowband test items.

Instead of an internal reference source, an external reference frequency of 1 MHz, 5 MHz or 10 MHz can be used. The error in the frequency readout is equal to that of the reference frequency (except for modes Sweep int. and FM DC).

In modes Sweep int. and FM DC the phase synchronization of the output frequency is disabled. The frequency deviation thus caused is kept to a minimum by frequency control. The frequency counter contained in the SMK provides for indication of the actual output frequency in these two modes.

**Level.** The output level, which can be set in 0.1-dB steps from -138.9 to +19 dBm (2 V) is indicated in four digits in  $\mu\text{V}$ , mV, dB $\mu\text{V}$ , dBm or dBf (reference: femtowatt =  $10^{-15}$  W). The level can be varied in steps of 10 dB, 1 dB and 0.1 dB. The 0.1-dB level variation is carried out without interruption of the RF level over a range of 20 dB, a characteristic that is indispensable for squelch measurements. The total level error is smaller than  $\pm 1$  dB up to an output power of -100 dBm.

The intermodulation products generated by two SMKs combined via a resistive 6-dB splitter are better than 80 dBc down for signal levels of 0 dBm and below. When using a Power Splitter/Combiner DVS for signal combination, the intermodulation products also remain down > 80 dBc up to a level of max. 10 dBm (these values apply with special function RCL 71 active).

**Spectral purity.** The output signal is of high spectral purity. The nonharmonic spurious signals (including power-related and microphonic spuria) are typically down more

than 75 dB from the carrier level. The SSB phase noise at 20 kHz from the carrier is 135 dBc down for a bandwidth of 1 Hz. Spurious FM is smaller than 3 Hz for a test bandwidth of 30 Hz to 20 kHz and smaller than 1 Hz for CCITT weighting. Thanks to this high spectral purity, the SMK can be used for all critical adjacent-channel measurements and measurements on SSB receivers.

**Modulation.** The Signal Generator SMK provides low-distortion, broadband AM and FM, both modes being adjustable in fine steps. The versatile modulation capability includes 2-tone AM, 2-tone FM, simultaneous AM and FM, sweeping with internal or external deflection signal as well as AC and DC coupling for all modulation modes.

To connect external modulation sources, the SMK is fitted with two inputs for AM and for FM. For 2-tone modulation and simultaneous AM and FM, either the internal and an external or two external modulation sources can be used. AM and FM can be adjusted independently even with simultaneous AM and FM.

**(Internal) modulation generators.** The internal SMK modulation sources are provided by

- ▶ a generator producing low-distortion sinewave signals of 0.15/0.4/1/3/15 kHz (distortion 0.02% at 1 kHz) and
- ▶ a generator producing linear triangular sweep signals of 3/30/100 Hz.

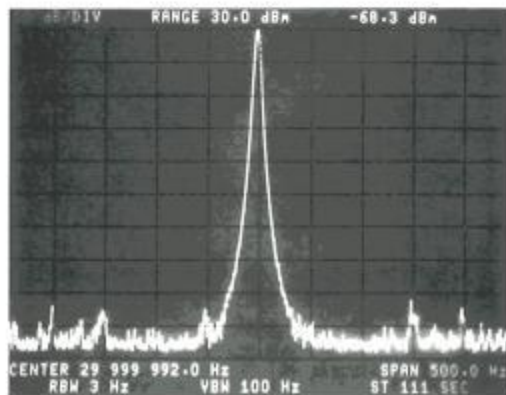
**External modulation.** One modulation input each for AM and FM (AM1 and FM1) is equipped with automatic level control. This level control facility ensures that the frequency deviation and modulation depth remain within the specified tolerances over a wide range of the modulation rms voltage (between 0.5 and 2 V).

The AM modulation input AM2, which can be used for external level control, is DC-coupled, the FM modulation input FM2 can be switched to AC or DC coupling.

**Pilot tone input FM3.** A separate pilot tone input permits variation of the stereo signal deviation while holding the pilot tone constant.

**AM DC.** The AM DC mode permits voltage-controlled variation of the signal amplitude. Examples of application are pulse modulation or ALC of the output signal at an external test point.

**FM DC.** DC coupling is required for FSK modulation. A further application, in which the SMK is used together with the Vector Analyzer ZPV, is the determination of crystal resonances in a test assembly which is self-tuning with the aid of a phase-locked loop. DC coupling permits sweep operation with an externally applied signal. With FM DC an internal frequency counter ensures correct frequency indication; the frequency can be read out via the IEC bus.



Signal quality close to carrier (suppression of power-related and microphonically generated spurious signals); resolution: 50 Hz/div, 10 dB/div.



**Sweep.** Sweeping can be controlled either by the internal triangular signal source or by an external signal via the FM2 input with DC coupling enabled. In both cases, the sweep width (max.  $\pm 500$  kHz) can be selected via keyboard.

Thanks to the extremely low spurious FM of the SMK and its high frequency stability, sweeping of crystal and ceramic filters with extremely steep skirt selectivity is possible in addition to sweeping of tuned circuits, FM demodulators, IF amplifiers or IF filters.

**FM and AM characteristics.** The wide FM range up to 100 kHz with small phase rotation permits high-quality stereo modulation plus transmission of the 57-kHz auxiliary carrier for traffic radio identification. With an inherent distortion factor of less than 0.1% (0.02% at 1 kHz), the SMK is ideal for all distortion measurements on VHF receivers. FM deviation is adjustable up to 500 kHz. Amplitude modulation is possible without restriction down to the lowest carrier frequency. Thus measurements in the low-frequency and AM-IF ranges can also be performed with full capability. The extremely low AM distortion of typically only 0.2% permits measurements on high-quality AM receivers.

For carrier levels up to 13 dBm, a modulation depth of up to 100% can be selected, for levels between 13 and 19 dBm, AM with decreasing modulation depth is possible.

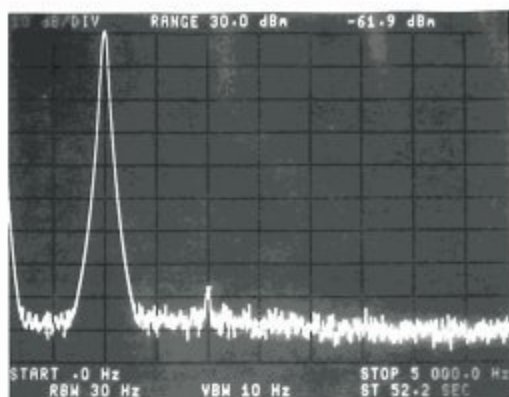
**SSB test input.** Via the SSB test input, signals can be applied in the vicinity of 40 MHz to generate an SSB spectrum of any frequency with suppressed carrier. A  $-20$ -dBm signal of  $40$  MHz  $\pm \Delta f$  applied to the test input is converted to the set output level and the set carrier frequency  $f_{\text{carrier}} \pm \Delta f$  with the correct amplitude and frequency. The carrier frequency remains suppressed (no  $f_{\text{carrier}}$  component).

For intermodulation measurements on SSB receivers, two signals are applied to the test input. The SMK-inherent third-order intermodulation products are at least 60 dB down both for signals within and outside the J3E sideband.

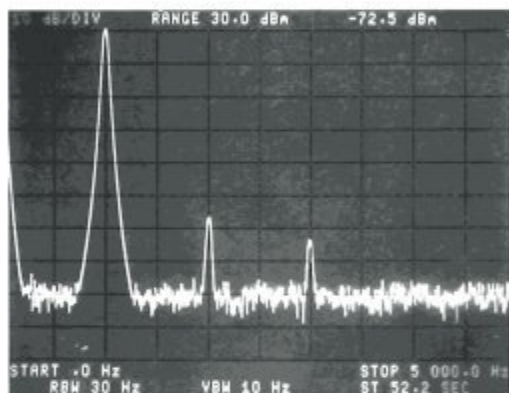
**Overvoltage protection.** A fault frequently occurring with signal generators is the destruction of the RF attenuator caused by externally applied excessive powers.

The overload protection facility included in the SMK standard version protects the RF attenuator against RF powers up to 30 W in the frequency range 1 to 500 MHz and against DC voltages up to 35 V.

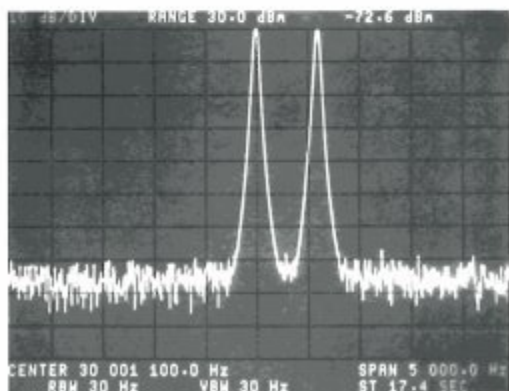
**Reference Oscillator SMS-B1 (option).** The temperature-controlled Reference Oscillator SMS-B1 provides for increased frequency stability. The temperature-dependent drift is reduced to  $< 2 \times 10^{-9}/^{\circ}\text{C}$ , and the aging rate to  $< 2 \times 10^{-9}/\text{day}$ .



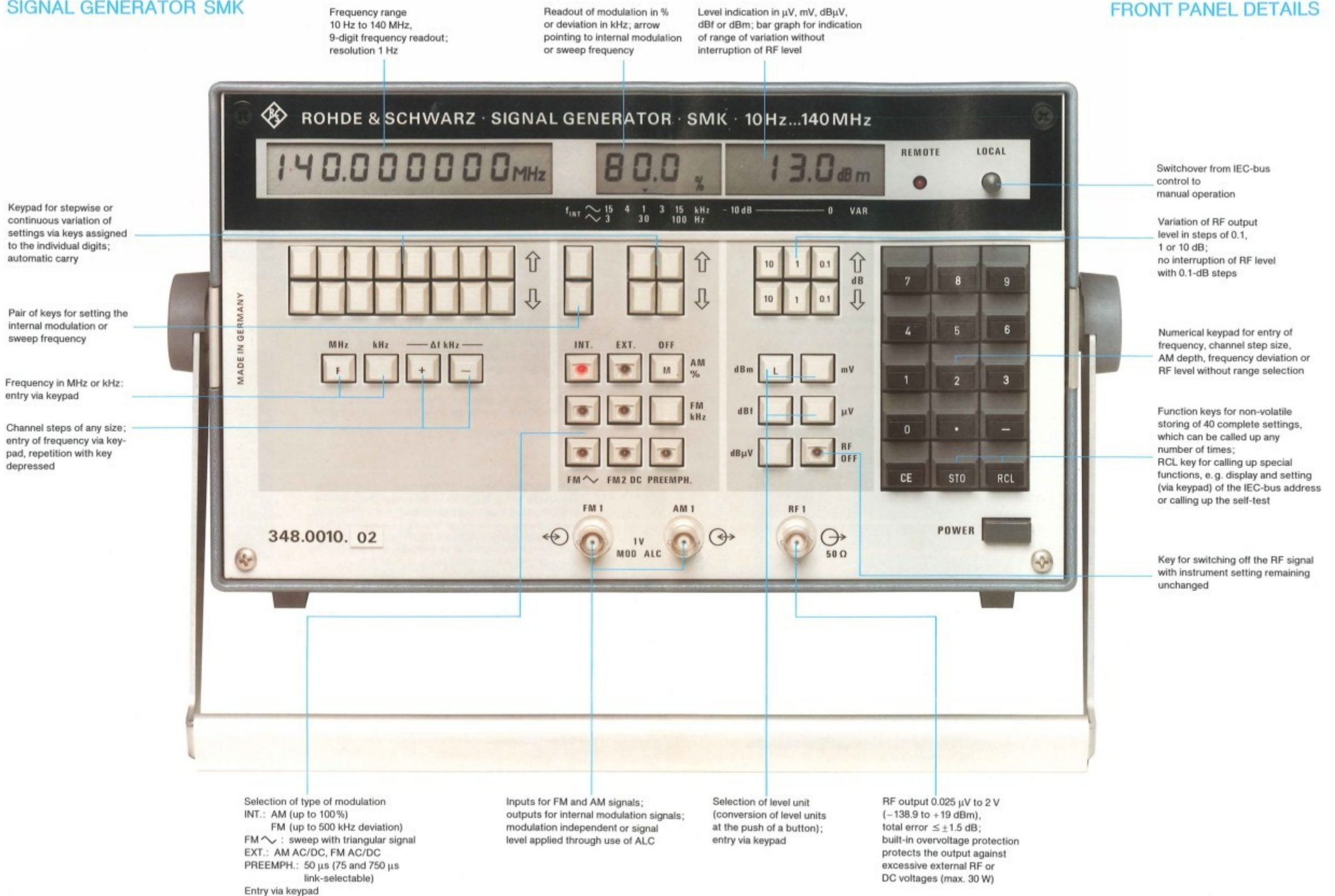
Typical FM distortion at 40 kHz deviation and  $f_{\text{mod}} = 1$  kHz



Typical AM distortion with  $m = 80\%$  and  $f_{\text{mod}} = 1$  kHz



Intermodulation products of multi-tone signal generated via SSB input of SMK



Frequency range  
10 Hz to 140 MHz,  
9-digit frequency readout;  
resolution 1 Hz

Readout of modulation in %  
or deviation in kHz; arrow  
pointing to internal modulation  
or sweep frequency

Level indication in  $\mu V$ , mV, dB $\mu V$ ,  
dBf or dBm; bar graph for indication  
of range of variation without  
interruption of RF level

Keypad for stepwise or  
continuous variation of  
settings via keys assigned  
to the individual digits;  
automatic carry

Pair of keys for setting the  
internal modulation or  
sweep frequency

Frequency in MHz or kHz:  
entry via keypad

Channel steps of any size;  
entry of frequency via key-  
pad, repetition with key  
depressed

Switchover from IEC-bus  
control to  
manual operation

Variation of RF output  
level in steps of 0.1,  
1 or 10 dB;  
no interruption of RF level  
with 0.1-dB steps

Numerical keypad for entry of  
frequency, channel step size,  
AM depth, frequency deviation or  
RF level without range selection

Function keys for non-volatile  
storing of 40 complete settings,  
which can be called up any  
number of times;  
RCL key for calling up special  
functions, e. g. display and setting  
(via keypad) of the IEC-bus address  
or calling up the self-test

Key for switching off the RF signal  
with instrument setting remaining  
unchanged

Selection of type of modulation  
INT.: AM (up to 100%)  
FM (up to 500 kHz deviation)  
FM  $\sim$ : sweep with triangular signal  
EXT.: AM AC/DC, FM AC/DC  
PREEMPH.: 50  $\mu s$  (75 and 750  $\mu s$   
link-selectable)  
Entry via keypad

Inputs for FM and AM signals;  
outputs for internal modulation signals;  
modulation independent or signal  
level applied through use of ALC

Selection of level unit  
(conversion of level units  
at the push of a button);  
entry via keypad

RF output 0.025  $\mu V$  to 2 V  
(-138.9 to +19 dBm),  
total error  $\leq \pm 1.5$  dB;  
built-in overvoltage protection  
protects the output against  
excessive external RF or  
DC voltages (max. 30 W)



# OPERATION

## Ease of operation

**Operating instructions.** A pull-out card at the bottom of the unit provides the user with all information necessary for operating the SMK. It also contains a complete list of special functions and remote control commands (see photo on p. 2).

**Simple keyboard entry.** The function keys and the associated displays for frequency, modulation and level are arranged in three sections on the front panel for user-oriented operation. The parameters are entered in ordinary notation, first the numerical value and next the unit.

**Clear-cut display.** The complete instrument setting can be seen at a glance from the LED mode indicators and the large digital readouts for RF, modulation and level. The modulation display can be selected to read out modulation depth, frequency deviation or the frequency of the internal modulation generator.

**Easy variation of all settings.** Frequency, level and modulation can be varied by means of keys  $\uparrow$  and  $\downarrow$ . Variation is either stepwise per keystroke or (if the key is held down) continuously with automatic carry to the next digit.

**Frequency variation in steps of any size** can be performed in unit steps or continuously by means of a pair of keys  $\Delta f$  kHz.

**Level variation in steps of any size** is possible by level addition or subtraction.

**Non-interrupting fine adjustment of level.** The keys  $\uparrow$  and  $\downarrow$  (0.1 dB) permit **non-interrupting** electronic adjustment of level in 0.1-dB steps over a range of 10 dB (20 dB with special function). The level display shows the corrected value. The state of the electronic level variation can be seen from a bar graph on the level display.



The state of electronic level variation can be seen from a bar graph on the level display



The 0.1-dB keys are provided for non-interrupting, electronic fine adjustment of level

**Conversion of level unit.** For conversion of any level unit into another simply the desired unit key need be pressed.

**Stored modulation and level settings.** When the modulation mode or level (RF OFF) is switched off, the settings remain stored. To recall settings, a keystroke will suffice.

**Storage of complete instrument settings.** The SMK can store 40 complete instrument settings (each setting including frequency, modulation and level) in a non-volatile memory. This greatly facilitates operation in the case of recurring measuring tasks. The battery supplying the data memory has a lifetime of several years.

**Saving data.** A non-volatile memory saves the current instrument settings. After switching on the power and, of course, after AC supply failure the settings of the SMS prior to switching off are automatically restored.

**Indication of illegal entries.** Entries that exceed the given setting range are not accepted by the SMK. The instrument setting remains unchanged. Incorrect entries are indicated by flashing of an LED.

**Self-test.** The most important functions of the frequency synthesis are continuously monitored during operation. Errors are signalled on the display and an error message is output via the IEC bus.

**Remote control.** Apart from switching the AC supply on and off, all settings on the SMK can be performed by remote control via the IEC-bus interface provided as standard equipment.

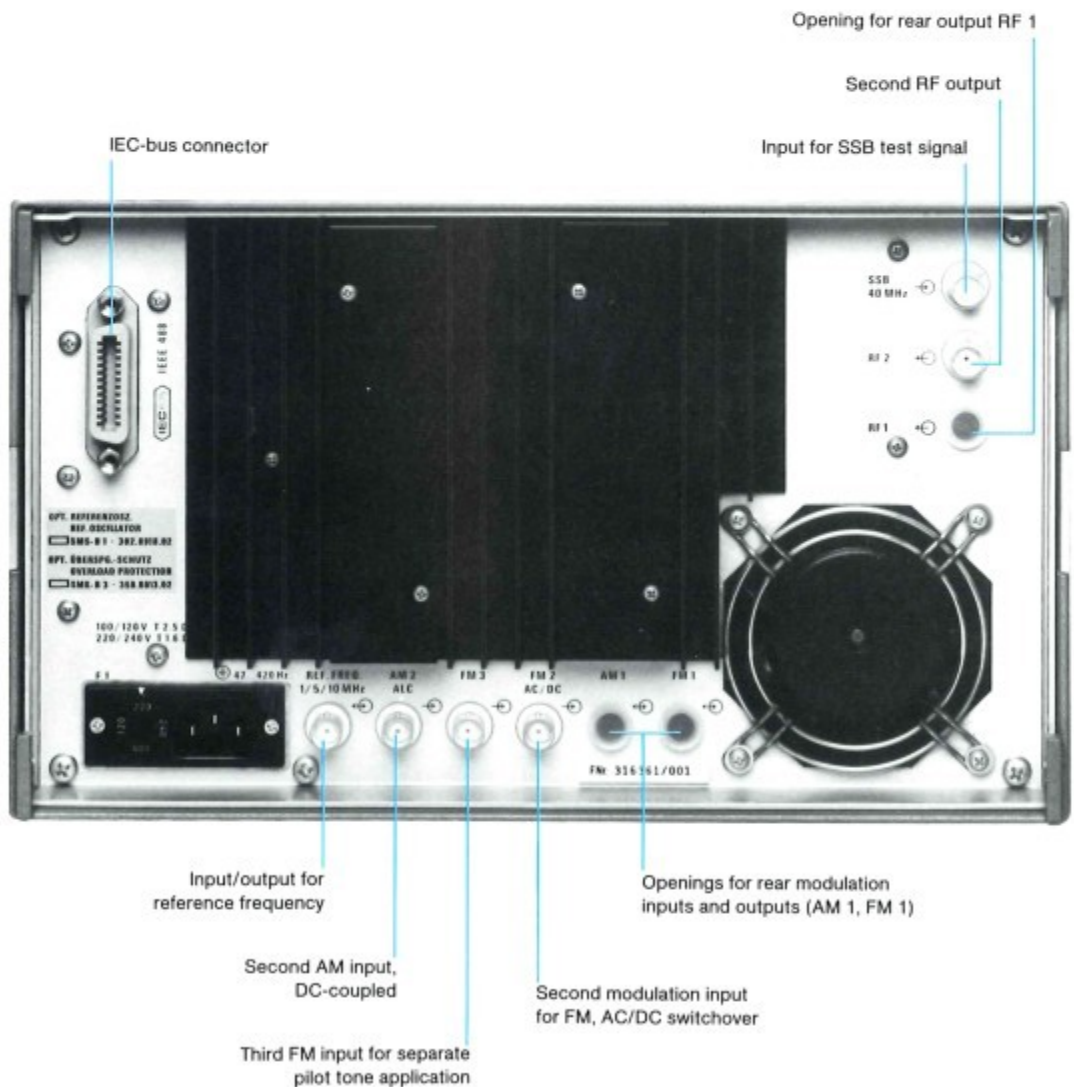
The SMK is provided with both the listener and the talker functions, enabling it to receive setting commands and send data (FM DC mode). Its service request capability permits error messages to be sent to the controller. In addition, signalling of the steady-state condition is possible after frequency changes.

Control commands are in accordance with IEC standard 625-1. Each command contains a header and delimiter as mandatory components as well as possible setting data.

The headers are in the form of mnemonics made up of several characters, e.g. RFMH for carrier frequency in MHz or AME for external amplitude modulation. The setting data are entered in unformatted form with or without sign and with or without decimal point.

The IEC-bus address is set via keypad and indicated in the frequency display.

## REAR VIEW





# SPECIFICATIONS

## Specifications

### Frequency

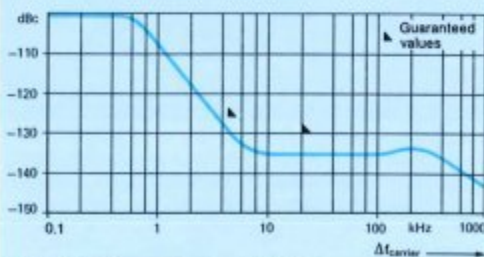
Range	10 Hz to 140 MHz
Resolution	1 Hz
Error	same as reference frequency (±2 Hz for FM DC or internal sweep)
Setting time (after receiving last character via IEC bus)	< 40 ms (for deviations < 100 Hz from final frequency)
Reference frequency	from internal reference oscillator or external source
Internal reference oscillator	standard option SMS-B1
Crystal aging	< 2 × 10 <sup>-4</sup> /day < 2 × 10 <sup>-4</sup> /day
Temperature effect	< 1 × 10 <sup>-4</sup> /°C < 2 × 10 <sup>-4</sup> /°C
Warmup time	1 h 15 min
Output/input for int./ext. reference frequency	common female connector, f <sub>int</sub> 1 MHz/5 MHz/10 MHz (internally selected) with option SMS-B1: output frequency 10 MHz
Output voltage with internal reference	TTL level
Input voltage with external reference	> 100 mV, sinewave or TTL level

### Output level

Level range	-138.9 to +19 dBm (0.025 μV to 2 V into 50 Ω)
Level units displayed	mV, μV, dBμV, dBm, dBI (reference: femtowatt = 10 <sup>-18</sup> W)
Resolution	0.1 dB
Range of variation without interruption of RF level	10 dB (20 dB with special function)
Total error of RF level (including frequency response)	< ±1.5 dB <sup>1)</sup> < ±1 dB (level > -20 dBm) <sup>1)</sup>
Frequency response flatness	< 1 dB
Output impedance	50 Ω (BNC female connector)
VSWR	< 1.2 (level < 3 dBm) < 1.35 (level ≥ 3 dBm) <sup>2)</sup>
Level switchoff (RF OFF)	switchover to minimum output level; output impedance remains unchanged (50 Ω)
Level at RF output 2	50 mV <sup>3)</sup> (for CW and FM)

### Spectral purity

Harmonics	down > 30 dBc, typ. > 36 dBc
Nonharmonics spurs	down > 65 dBc, typ. > 80 dBc in the frequency range 10 Hz to 140 MHz <sup>1)</sup>
Microphonic and power-related spurs	down > 65 dBc, typ. > 75 dBc (for CW and AM)
Noise referred to 1-Hz bandwidth (see also diagram)	
SSB phase noise (for CW, AM and FM < 10 kHz deviation)	
20 kHz from carrier	down > 130 dBc, typ. 135 dBc
5 kHz from carrier	down > 125 dBc, typ. 130 dBc
Wideband noise	
> 2 MHz from carrier	down > 140 dBc <sup>1)</sup> (for CW and FM)
Spurious FM (rms)	< 1 Hz (CCITT) < 3 Hz (30 Hz to 20 kHz)



Typical SSB phase noise, f<sub>carrier</sub> = 140 MHz  
(for CW and AM)

<sup>1)</sup> Valid for normal level setting, not applicable for non-interrupting level variation (level VAR readout 0 dB).

<sup>2)</sup> With special function RCL 71 disabled.

### Modulation

Modulation modes	internal: AM, FM and sweep with triangular signal external: AM AC/DC, FM AC/DC AM INT + AM EXT (AM2 connector) or 2 = AM EXT (AM1 and AM2 connectors) FM INT + FM EXT (FM2 connector) or 2 = FM EXT (FM1 and FM2 connectors)
2-tone AM	
2-tone FM	
AM + FM	any combination of AM, FM, ext., int.
Internal modulation	sinewave 150 Hz, 400 Hz, 1 kHz, 3 kHz, 15 kHz; sweep 3 Hz, 30 Hz, 100 Hz
Frequency error	< 0.1 %
Outputs	AM1, FM1 on front panel; EMF: 1 V sinewave (V <sub>emf</sub> ), ±5 V sweep (V <sub>p</sub> ); Z <sub>out</sub> = 600 Ω
External modulation	
Inputs	AM1, FM1 on front panel, AM2, FM2, FM3 on rear panel; inputs AM1 and FM1 provided with ALC
Input impedance	600 Ω (AM1, FM1), 10 kΩ (AM2, FM2, FM3)
Input level (V <sub>emf</sub> ) <sup>1)</sup>	0.5 < V < 2 V for AM1, FM1; 1 V for AM2, FM2, FM3
Input voltage V <sub>DC</sub> at AM2 for level reduction by approx. 50 dB	0 to -1.41 V
for level increase by approx. 6 dB (max. 19 dBm)	0 to +1.41 V

### Amplitude modulation

Modulation frequency range for AM EXT	20 Hz (DC) to 20 kHz
Modulation frequency response flatness for 20 Hz to 10 kHz	< 1 dB, typ. 0.3 dB
Modulation depth setting	
for levels ≤ 13 dBm	0.5 to 100%
for levels > 13 dBm	reduced depth of modulation
Resolution	0.5%
Error up to m = 80%	< 5% of set value <sup>1)</sup>
Distortion for m = 80% and f <sub>mod</sub> = 1 kHz	
up to 2 MHz	< 0.5%, typ. 0.2%
above 2 MHz	< 1%, typ. 0.4%
Spurious AM (rms)	< 0.01% (CCITT) < 0.02% (30 Hz to 20 kHz)
Incidental FM for m = 30% and f <sub>mod</sub> = 1 kHz	< 0.1 rad (0.02 rad for 10 to 110 MHz)

### Frequency modulation

Modulation frequency range	
for FM EXT AC	20 Hz to 100 kHz
for FM EXT DC	DC to 100 kHz
Modulation frequency response flatness	< 0.2 dB (20 Hz to 100 kHz) <sup>1)</sup>
Frequency deviation setting	0.05 to 500 kHz
Resolution up to 10 kHz dev.	0.05 kHz
up to 100 kHz dev.	0.5 kHz
up to 500 kHz dev.	2 kHz
Deviation error	< 3% of set value or 10 Hz
Distortion (deviation = 100 kHz) <sup>1)</sup>	
for f <sub>mod</sub> = 1 kHz	< 0.05%, typ. 0.02%
for f <sub>mod</sub> = 10 kHz	< 0.2%
Input FM2, 20 Hz to 20 kHz	typ. 0.05%
Distortion for stereo (deviation = 40 kHz)	< 0.1% for 1 kHz AF <sup>1)</sup>
Stereo crosstalk (deviation = 40 kHz)	down > 45 dB at 40 Hz to 15 kHz <sup>2)</sup> down > 56 dB at 500 Hz to 10 kHz <sup>2)</sup>
Unweighted S/N ratio	
Stereo (40 kHz deviation, deemphasis 50 μs)	80 dB (CCIR, quasi-peak) <sup>2)</sup> 30 Hz to 20 kHz
Mono (conditions same as above)	86 dB (CCIR, quasi-peak) <sup>2)</sup> 30 Hz to 20 kHz
Weighted S/N ratio	
Stereo (40 kHz deviation, deemphasis 50 μs)	72 dB (CCIR, quasi-peak) <sup>2)</sup> 85 dB (CCIR, quasi-peak) <sup>2)</sup>
Mono (conditions same as above)	
Preemphasis (switch-selected)	50 μs; 75 or 750 μs can be link-selected
Incidental AM on FM (f <sub>mod</sub> = 1 kHz, dev. = 40 kHz)	< 0.2% at carrier frequency > 10 MHz <sup>2)</sup>

<sup>1)</sup> Valid for normal level setting, not applicable for non-interrupting level variation (level VAR readout 0 dB).

<sup>2)</sup> Input level required for specified accuracy.

<sup>3)</sup> With FM AC.

<b>Sweeping</b>	
Internal frequencies	3/30/100 Hz
Sweep width	0.05 to 500 kHz
Resolution	same as for FM
Swept output signal	±5 V, triangular at female connector FM 1
<b>Input for SSB test signals</b>	
Frequency	40 MHz ± Δf (Δf ≤ 500 kHz)
Level	-20 dBm for set output level; lower level values yield correspondingly lower output level values
Max. level	-10 dBm
Third-order intermodulation products with two input signals	
d <sub>3</sub> in sideband with J3E	down > 60 dB
d <sub>3</sub> /Δf ≥ 30 kHz	down > 60 dB
<b>Overload protection</b>	
	protects the RF output against external RF (up to 500 MHz) or DC voltages
Max. permissible RF power	30 W
Max. permissible DC voltage	35 V
Response indication	LED in RF OFF key and "O.L." in level display
<b>Remote control and data output</b>	
System	IEC 625-1 (IEEE 488)
Connector	24-way, Amphenol
Interface functions	
T6	basic talker, serial poll, unaddress if MILA
L4	basic listener, unaddress if MTA
SR1	service request function complete capability
RL1	remote/local function complete capability
DC1	device clear function complete capability
<b>Reference Oscillator SMS-B1 (option)</b>	
	For data see "Frequency"

<b>General data</b>	
Rated temperature range	+5 to +45 °C
Storage temperature range	-40 to +70 °C
AC supply	100/120/220/240 V ± 10%, 47 to 420 Hz (135 VA, 110 W), safety class I to VDE 0411 (IEC 348) in accordance with VDE 0871 (limit values, class B) and VDE 0875 (interference suppression grade K). The SMK also corresponds to MIL STD 461 A, notice 3 (methods CE 03 and RE 02)
RF leakage	
Shock and vibration resistance	shock-tested in accordance with DIN 40046, Part 7 (30 g, 11 ms), and vibration-tested in accordance with DIN 40046, Part 8 (5 to 55 Hz, 2 g); corresponding to IEC Publications 68-2-27 and 68-2-6
Dimensions, weight	347 mm x 205 mm x 462 mm <sup>1)</sup> , 20.5 kg

## Ordering information

<b>Order designation</b>	▶ Signal Generator SMK 348.0010.03
<b>Accessories supplied</b>	power cord, manual
<b>Option</b>	
Reference Oscillator SMS-B1	302.8918.02
<b>Recommended extras</b>	
Service Kit SMK-Z1	358.8413.02
19" Rack Adapter SMK-Z6	358.8213.02

<sup>1)</sup> With 19" Rack Adapter SMK-Z6, the overall mounting height is 221 mm.



With Signal Generator SMK, Modulation Analyzer FAM, Precision Stereocoder MSC 2 and Stereodecoder MSCD 2, R&S offers a complete set of equipment for stereo measurements





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GmbH & Co. KG · D-8000 München 80 · Mühlidorfstr. 15 · Tel. (089) 4129-0 · Int. (4989) 4129-0 · Telex 523703  
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