R&S®SMC100A
Signal Generator
Smallest size and best price/performance ratio in its class

ROHDE&SCHWARZ

Test&Measurement

Product Brochure | 01.01

R&S®SMC100A Signal Generator

At a glance

The analog R&S®SMC100A sets new standards for attractively-priced signal generators. It has the smallest size and the best price/performance ratio in its class.

The R&S®SMC100A offers outstanding signal quality at an attractive price. It covers the frequency range from 9 kHz to 1.1 GHz or 3.2 GHz. Output power is typ. > +17 dBm. All important functions (AM/FM/φM/pulse modulation) are already integrated in the instrument. This makes the R&S®SMC100A signal generator a flexible and versatile instrument.

Total cost of ownership is an important factor when purchasing a measuring instrument. The R&S®SMC100A, apart from offering a low initial cost, also boasts low service costs since users can replace defective modules on their own and verify the level repeatability and accuracy by using the R&S®NRP-Z91/R&S®NRP-Z92 power sensors.

These outstanding features make the R&S®SMC100A ideally suited for use in service and maintenance labs. Due to its small dimensions and lightweight design, the R&S®SMC100A is also the perfect choice for field applications or training and education environments.

- Signal generator with the best price/performance ratio in its class
- Signal generator with the smallest size in its class (½ x 19", 2 height units)
- Frequency range 9 kHz to 1.1 GHz or 3.2 GHz
- Maximum output level of typ. > +17 dBm
- AM/FM/φM/pulse modulation provided as standard
- Low total cost of ownership

R&S®SMC100A Signal Generator

Benefits and key features

High performance at an attractive price

- Low SSB phase noise of typ. –111 dBc (f = 1 GHz, 20 kHz carrier offset, 1 Hz measurement bandwidth)
- Wideband noise of typ. < –146 dBc (f > 1 MHz, carrier offset > 10 MHz, 1 Hz measurement bandwidth)
- Nonharmonics of typ. < –72 dBc (f ≤ 1600 MHz, carrier offset > 10 kHz)
- Level error < 0.9 dB
- Frequency and level setting times < 5 ms
- Optional high-stability reference oscillator

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Flexible and universal all-purpose signal generator

- Frequency range 9 kHz to 1.1 GHz or 3.2 GHz
- Typical maximum level of > +17 dBm
- Analog modulation modes (AM/FM/φM/pulse modulation) integrated as standard
- Remote control compatibility with other signal generators
- Multiple language support (nine selectable GUI languages)
- Integrated overvoltage protection
- Wear-free electronic attenuator

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Space-saving operation due to small dimensions

- Smallest signal generator in the economy class: ½ x 19", 2 height units
- Lightweight

Minimized total cost of ownership

- Attractive initial cost
- Long calibration interval
- Simplified error diagnostics through built-in selftests
- Repair by users by means of precalibrated replacement modules
- Optimization of level accuracy through level correction with R&S®NRP-Zxx sensors

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Ideal tool for many application fields

- Service and maintenance
- Research and education
- Field use
- Secure areas
- Simple production applications

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High performance at an attractive price

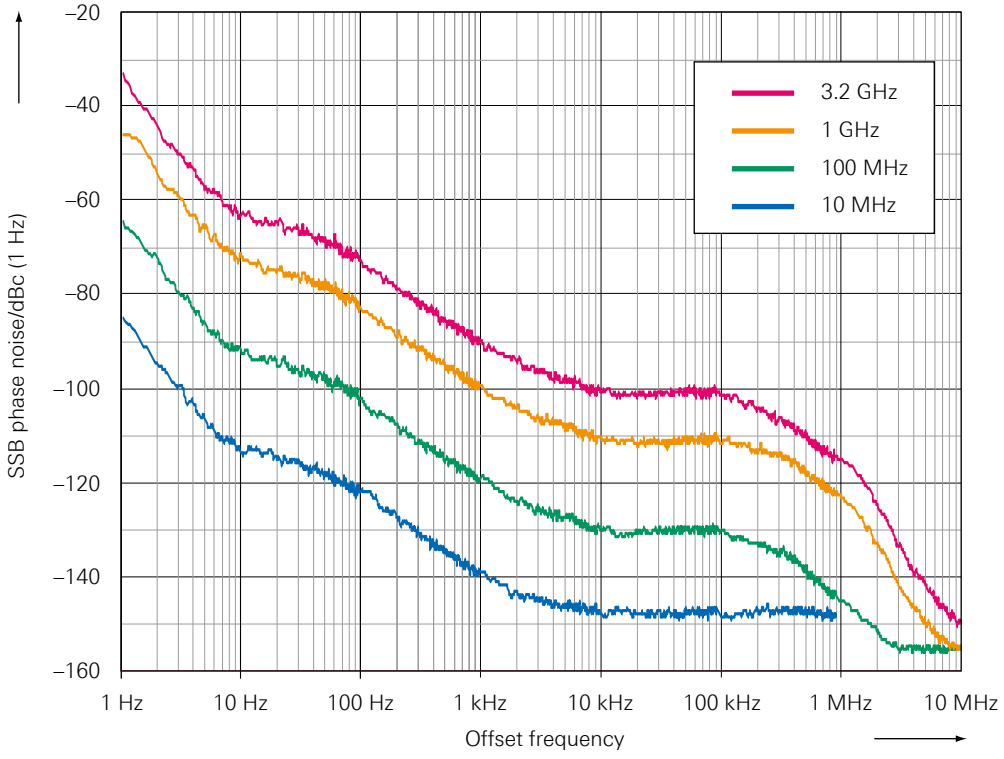
The R&S®SMC100A features an unbeatable price/performance ratio. Although the R&S®SMC100A is positioned in the economy price segment, customers nevertheless benefit from excellent performance and tried-and-tested Rohde&Schwarz quality, which is marked by precision workmanship, high reliability and ease of operation.

Due to its low SSB phase noise, low wideband noise and excellent nonharmonic suppression, the R&S®SMC100A is suitable for all applications that require spectrally pure signals. This ensures that the performance of the device under test is measured and not that of the test instrument. The frequency stability of the R&S®SMC100A can be improved even further with an optional reference oscillator (R&S®SMC-B1) that can be plugged into the instrument by the user.

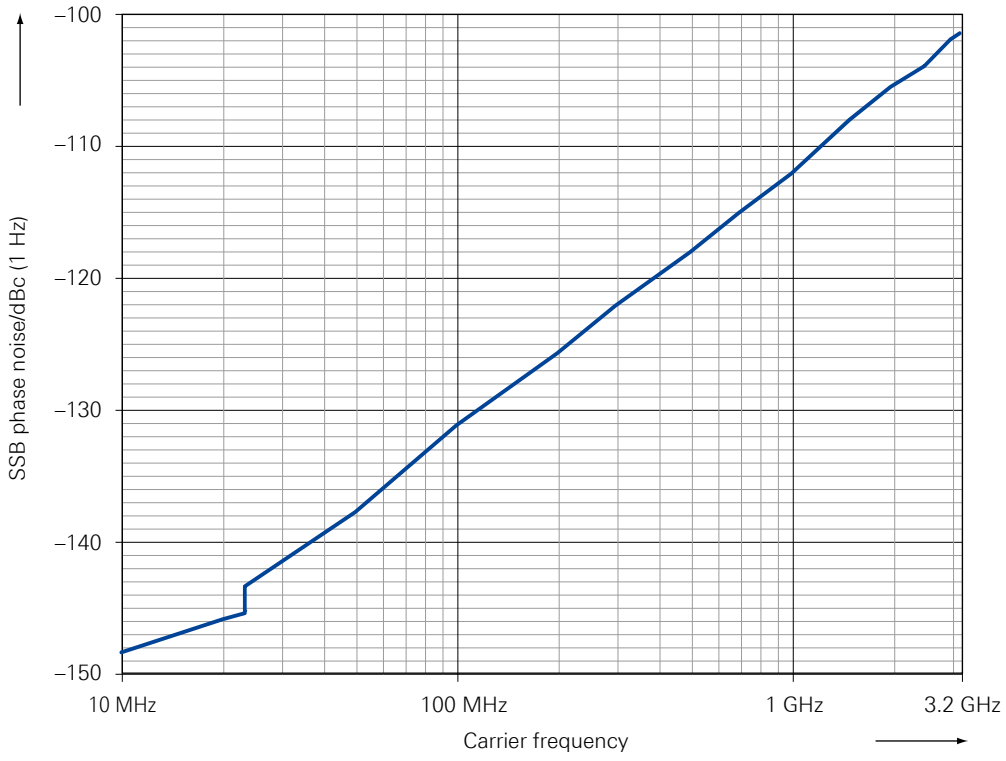
The excellent level accuracy and repeatability of the R&S®SMC100A (level error < 0.9 dB) provides users with reliable measurement results. In manufacturing for instance, this leads to high and consistent production yields.

Fast frequency and level setting permits the user to accelerate test sequences and in the end save time and money.

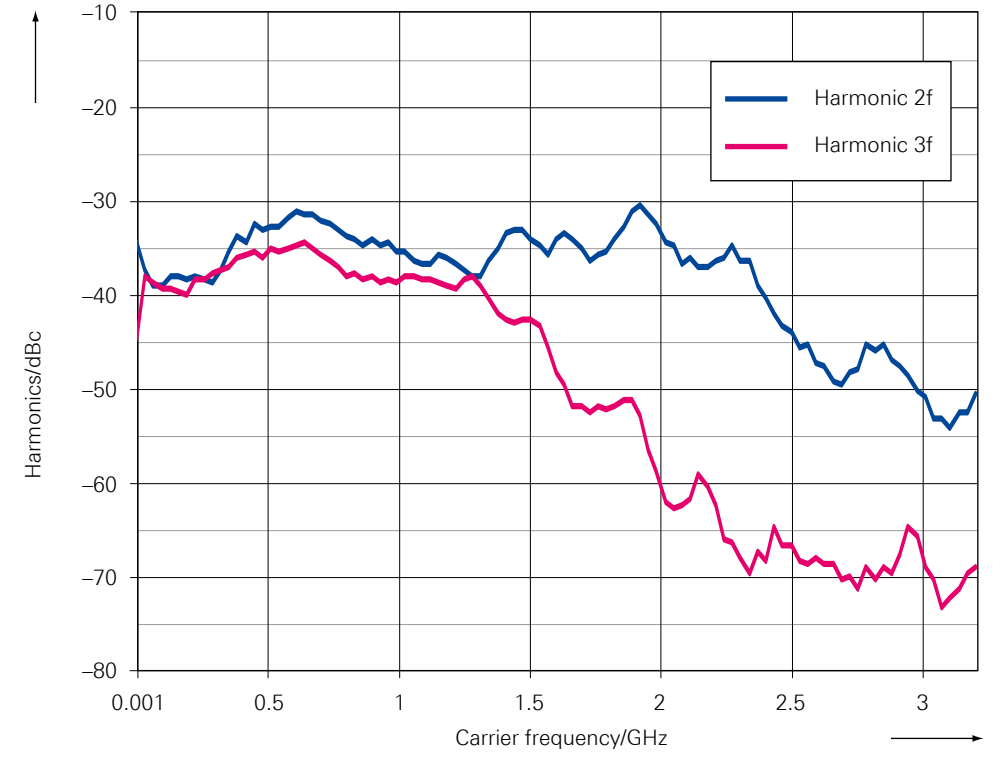
Measured SSB phase noise with R&S®SMC-B1 internal OCXO



Measured SSB phase noise at 20 kHz offset versus frequency



Measured harmonics at +13 dBm versus carrier frequency (level mode AUTO)



Flexible and universal all-purpose signal generator

The R&S®SMC100A is a flexible, analog signal generator that can be universally deployed for a variety of applications.

Broad power spectrum

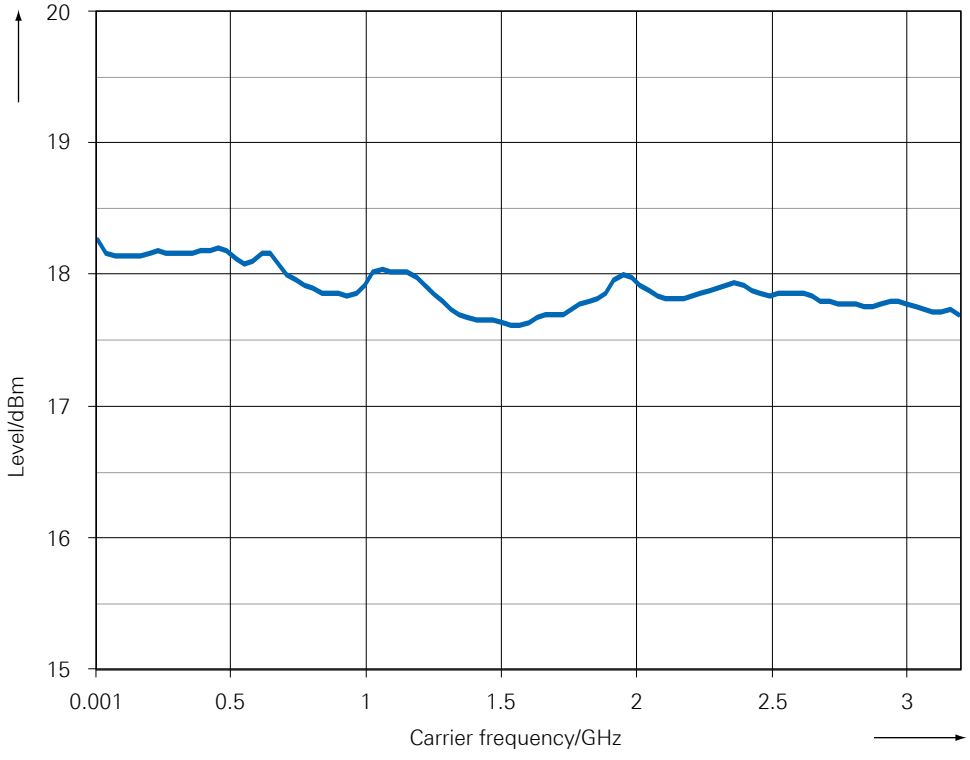
The R&S®SMC100A, with its frequency range of 9 kHz to 1.1 GHz or 3.2 GHz, is suitable for EMC applications, as well as for performing measurements in the 2.54 GHz ISM band, for example.

The high output power of typ. > +17 dBm enables measurements on DUTs such as mixers that require a high level for the local oscillator, for instance. Even attenuation caused by external components such as cables, filters or matching networks can be easily compensated by the high output power of the R&S®SMC100A. In many cases, this means the user can avoid costly driver amplifiers that can cause drifting.

Full set of standard features

The user benefits from an instrument that contains all important functions right out of the box. The R&S®SMC100A is fully equipped in its standard configuration. The analog AM, FM, φM and pulse modulation modes are integrated in the instrument as standard. An internal modulation and pulse generator supplies the required modulation signals. Special options are not required.

Measured maximum available power



Flexibility through optional add-on functions

Remote control is possible by activating the optional R&S®SMC-K4 GPIB interface. Users who do not require a GPIB interface can save costs by leaving out this option.

For applications that call for higher frequency stability, the R&S®SMC-B1 reference oscillator is available as an option. The user can plug the reference oscillator into a special slot on the rear of the R&S®SMC100A at any time. It is not necessary to disassemble or calibrate the instrument.

Easy replacement of legacy signal generators through remote control emulation

When test systems include legacy signal generators that are no longer manufactured or can no longer be repaired, switching to other types of generators is usually a costly exercise. This frequently results in the time-consuming task of modifying the remote control software, provided that the source code is still available. Since the R&S®SMC100A has remote control emulation modes for a wide variety of signal generators, it can very easily replace old instruments. By simply setting the remote control emulation mode on the R&S®SMC100A, it immediately understands the bulk of the command sets for the instrument being emulated.

High reliability through overvoltage protection and electronic attenuator

Overvoltage protection, which is integrated as a standard feature, constantly protects the R&S®SMC100A from inadvertent reverse power surges. This prevents instrument downtime.

The electronic attenuator also improves the reliability of the R&S®SMC100A since the electronic switch will not wear out even if applications require frequent level switching.

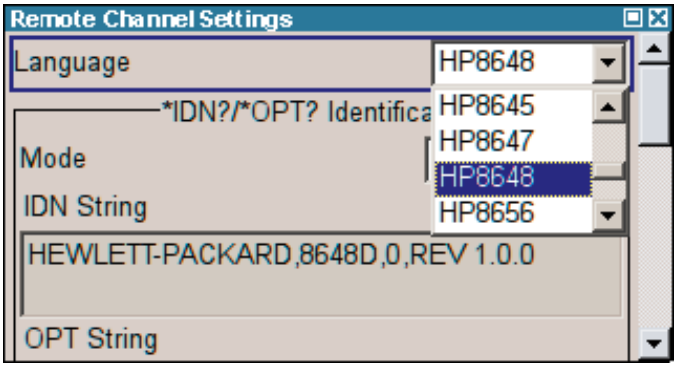
Space-saving operation due to small dimensions

The R&S®SMC100A is the smallest analog signal generator in its class. With a width of only ½ × 19", two instruments can be installed side-by-side in a single 19" rack. The R&S®SMC100A is a mere two rack units high, meaning it can still be rackmounted in installations where space is already at a premium.

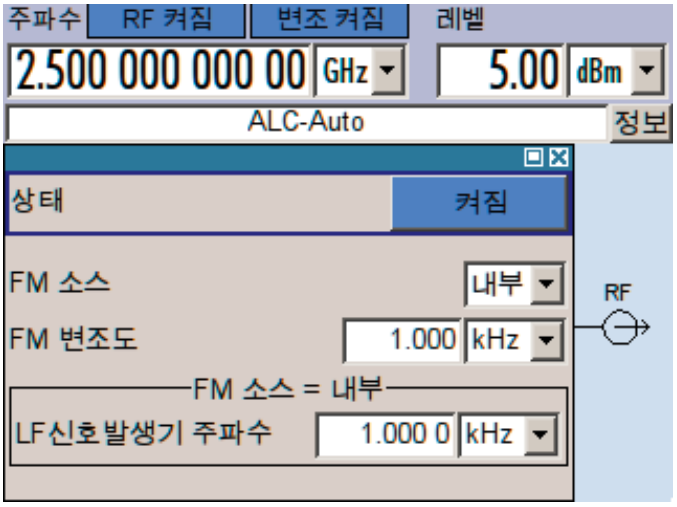
Multiple language support

For improved localization, the R&S®SMC100A provides the user interface in nine different languages: Chinese, Japanese, Korean, Russian, Spanish, Italian, French, German and English.

Selection of GPIB command set.



R&S®SMC100A with Korean GUI.



Minimized total cost of ownership

The easy-to-use error diagnostics and the option for users to replace defective modules on their own reduces instrument downtimes to a minimum. This advantage and the low service costs contribute to keeping the signal generator's total cost of ownership extremely low.

Apart from the initial cost, the costs for repairs and calibration must also be taken into consideration when calculating the total cost of ownership of a measuring instrument.

The long calibration interval of three years saves costs even after the instrument has been purchased.

In case of instrument malfunction, repairs can be carried out by a certified Rohde&Schwarz service center or users can rectify the fault on their own by replacing defective components with precalibrated replacement modules.

The modular design of the R&S®SMC100A (RF board, mainboard, front unit and power supply) enables the rapid replacement of modules. An integrated software diagnostics routine identifies and displays the defective module. In case of malfunction, the module can be replaced in around 20 minutes.

To additionally optimize level accuracy after servicing, a new level correction can be performed fully automatically by means of an R&S®NRP-Zxx power sensor that is connected to the R&S®SMC100A.

A minimum of modules in the R&S®SMC100A means high reliability and easy servicing.

R&S®SMC100A with R&S®NRP-Zxx power sensor.

Ideal tool for many application fields

Service and maintenance

The R&S®SMC100A is an excellent signal source for service or maintenance. Both CW and analog-modulated test signals can be generated over a wide range of frequencies and levels. This provides the user with test signals required to carry out measurements such as intermodulation, gain or distortion. Because of the clearly structured menus and the graphic block diagram in combination with the color display, the R&S®SMC100A is very easy to use.

Research and education

Due to its low initial cost and the aforementioned features, the R&S®SMC100A is also an ideal signal source for training and education applications at schools or universities. The generator is flexible enough for use in RF experiments.

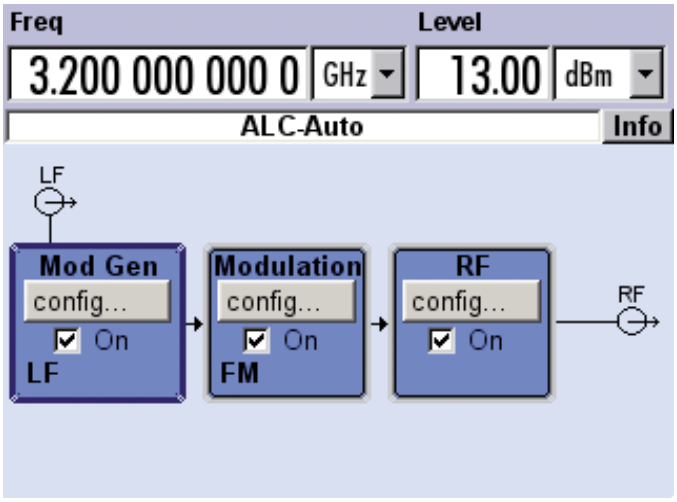
Field use

The small and lightweight design (3.9 kg) makes the R&S®SMC100A the signal generator of choice for applications in the field. Users can simply transport the instrument to any location and carry out accurate and repeatable measurements. The R&S®NRP-Zxx USB power sensors can also be connected to the R&S®SMC100A using USB adapters. This enables users to perform simple and precise power measurements without having to carry around an additional power meter base unit.

Secure areas

A sanitizing routine can be initiated through the menu on the R&S®SMC100A. This allows the deletion of all security-critical instrument settings and user data. Afterwards, the instrument can be removed from secure areas within the aerospace and defense sectors without risk. Users can also deactivate the USB and LAN interfaces.

R&S®SMC100A graphical user interface.



R&S®SMC100A and R&S®FSL for simple and highly accurate RF measurements.

Specifications in brief

Base unit		
Frequency		
Frequency range	R&S®SMC-B101 frequency option	9 kHz to 1.1 GHz
	R&S®SMC-B103 frequency option	9 kHz to 3.2 GHz
Setting time	SCPI mode	< 5 ms
Level		
Maximum output power	f = 200 kHz to 3.2 GHz	> +13 dBm
	f ≥ 500 kHz	typ. > +17 dBm in overrange mode
Level error	f = 200 kHz to 3.2 GHz ALC ON, AUTO mode, T = 18 °C to 33 °C	< 0.9 dB
Setting time	SCPI mode	< 5 ms
Back-feed	1 MHz ≤ f ≤ 1 GHz 1 GHz ≤ f ≤ 2 GHz 2 GHz ≤ f ≤ 3.2 GHz	50 W 25 W 10 W
Maximum permissible DC voltage		50 V
Spectral purity		
Nonharmonics	carrier offset > 10 kHz, f ≤ 1600 MHz	< –60 dBc (typ. < –72 dBc)
SSB phase noise	f = 1 GHz carrier offset = 20 kHz 1 Hz measurement bandwidth	< –105 dBc (typ. –111 dBc)
Wideband noise	f > 1 MHz, level > 5 dBm carrier offset > 10 MHz 1 Hz measurement bandwidth	< –138 dBc (typ. < –146 dBc)
Supported modulation modes		
AM		standard
AM depth		0% to 100%
FM/φM		standard
Maximum FM deviation	f > 1.6 GHz	4 MHz
Maximum φM deviation	f > 1.6 GHz	40 rad
Pulse		standard
Rise/fall time		< 500 ns (typ. 100 ns)
Minimum pulse width	with integrated pulse generator	1 µs
ON/OFF ratio		> 80 dB
Connectivity		
Remote control		IEC/IEEE bus (with R&S®SMC-K4 option) Ethernet (TCP/IP) USB
Peripherals		USB

For data sheet, see PD 5214.1143.22 and www.rohde-schwarz.com

Ordering information

Designation	Type	Order No.
Base unit (including power cable, quick start guide and CD-ROM with operating and service manual)		
Signal Generator [1]	R&S®SMC100A	1411.4002.02
Options		
RF Path		
9 kHz to 1.1 GHz	R&S®SMC-B101	1411.6505.02
9 kHz to 3.2 GHz	R&S®SMC-B103	1411.6605.02
OCXO Reference Oscillator	R&S®SMC-B1	1411.6705.02
GPIB/IEEE 488 Interface	R&S®SMC-K4	1411.3506.02
Service options		
Two-Year Calibration Service	R&S®CO2SMC100A	Please contact your local Rohde&Schwarz sales office.
Three-Year Calibration Service	R&S®CO3SMC100A	
Five-Year Calibration Service	R&S®CO5SMC100A	
One-Year Repair Service following the warranty period	R&S®RO2SMC100A	Please contact your local Rohde&Schwarz sales office.
Two-Year Repair Service following the warranty period	R&S®RO3SMC100A	
Four-Year Repair Service following the warranty period	R&S®RO5SMC100A	
Documentation of Calibration Values	R&S®DCV-2	0240.2193.18
DKD (ISO 17025) Calibration including ISO 9000 calibration (can only be ordered with the instrument)	R&S®SMC-DKD	1415.7512.02
Recommended extras		
19" Rack Adapter (for two 2 HU instruments side-by-side)	R&S®ZZA-T35	1109.4506.00
19" Rack Adapter (for 2 HU instrument with spacing module)	R&S®ZZA-T36	1109.4512.00
Power Sensor 9 kHz to 6 GHz, +23 dBm	R&S®NRP-Z91	1168.8004.02
Power Sensor 9 kHz to 6 GHz, +33 dBm	R&S®NRP-Z92	1171.7005.02
Keyboard with USB Interface (US character set)	R&S®PSL-Z2	1157.6870.04
Mouse with USB interface, optical	R&S®PSL-Z10	1157.7060.03

[1] The base unit must be ordered together with an R&S®SMC-B101/R&S®SMC-B103 frequency option.