R&S®SMBV100B
VECTOR SIGNAL GENERATOR

Perfect combination of performance and usability



Product Brochure
Version 09.00

ROHDE&SCHWARZ
Make ideas real

AT A GLANCE

The state-of-the-art R&S®SMBV100B vector signal generator sets standards in its class. Ultra high output power, fully calibrated wideband signal generation and intuitive touchscreen operation make the R&S®SMBV100B ideal for all kinds of applications.

The R&S®SMBV100B vector signal generator combines superior performance characteristics such as high output power, wide modulation bandwidth and excellent signal quality. With a frequency range from 8 kHz to 6 GHz, the instrument covers all important RF bands for digital wireless communications. The wide RF modulation bandwidth of up to 1 GHz satisfies the challenging requirements of fourth and fifth generation communications standards. In A&D applications, the wide bandwidth allows the generation of complex pulsed signals.

In many test setups, such as for RF component verification, it is important to provide signals at high power levels. The R&S®SMBV100B offers best-in-class signal quality up to very high power levels. No extra amplifier is needed, which simplifies the test setup.

The R&S®SMBV100B has an intuitive touchscreen GUI and is therefore very ergonomic and practical to use. The customizable instrument is also prepared to meet future requirements. Options can be added via software keycodes, making it easy to enhance the instrument with additional functionality, e.g. by extending frequency, bandwidth and output power.



Key facts

- Frequency range from 8 kHz to 3 GHz or 6 GHz
- Ultra high output power up to +33 dBm
- 1 GHz modulation bandwidth with perfect accuracy
- Excellent EVM and ACPR results up to high power levels
- Internal signal generation for all major digital communications standards, incl. 5G NR, LTE and WLAN
- Fully-fledged GNSS simulator for GPS, GLONASS, Galileo, BeiDou, IRNSS and QZSS/SBAS
- Convenient operation via 7" touchscreen



BENEFITS

Perfect for signal quality
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APPLICATIONS

Simplify your envelope tracking system
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PERFECT FOR SIGNAL QUALITY

When developing electronic products, it is very important to choose the right test instruments.

For all key RF parameters, the R&S®SMBV100B offers outstanding specifications that clearly outperform the values of typical DUTs. This ensures that measurement results are not influenced by the signal generator. The instrument serves as a "golden reference", providing a dependable signal for all receiver tests.

Engineers can focus on core development tasks without having to worry about the performance of their signal generator.

Real-time, user-defined frequency response correction to compensate for the effect of test fixtures

As with almost any other test instrument, the reference plane of the R&S®SMBV100B is at the RF connector. This means that the specifications for all parameters apply at this point. In most cases, however, there are also cables and other components (e.g. amplifiers) connected between the generator and the DUT. Especially when working with wide bandwidths, these test fixtures influence the modulated signal, degrading the amplitude and phase accuracy at the DUT input.

To take the influence of an external test fixture into account, the fixture can be characterized in terms of amplitude and phase, and the results can be saved to a Touchstone® .s2p file.

With the R&S®SMBVB-K544 option, this information can be used to precorrect the generator signal in real time to compensate for the influence of the external test fixture. This method provides the user with a test solution that delivers an extremely precise measurement signal at the DUT input, unaffected by the test setup used between the generator and the DUT.

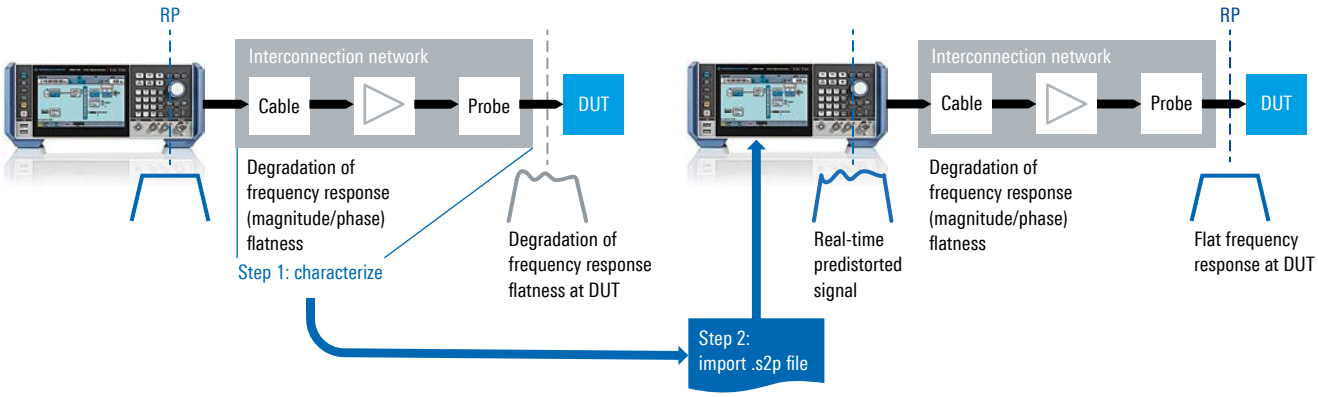
Very low single-sideband (SSB) phase noise

SSB phase noise is a key parameter when it comes to RF generator signal quality. This parameter is not only important in CW applications such as LO substitution, it also plays a significant role in the case of digitally modulated signals as it has a direct influence on the error vector magnitude (EVM).

The R&S®SMBV100B exhibits very low SSB phase noise of < –134 dBc (measured) at 1 GHz and 20 kHz offset. The close-in SSB phase noise can be reduced using the R&S®SMBVB-B1 OCXO option. The option reduces the phase noise from < –37 dBc (1 Hz) at 1 GHz and 1 Hz offset by 13 dB to < –50 dBc (1 Hz). Using the R&S®SMBVB-B1H high performance OCXO option, the close-in SSB phase noise can be further reduced by more than 20 dB compared with the standard instrument specifications, resulting in a value of < –65 dBc (1 Hz).

In addition, the R&S®SMBVB-B1 and R&S®SMBVB-B1H options significantly improve long-term stability for the reference frequency and mitigate the generator's frequency temperature drift.

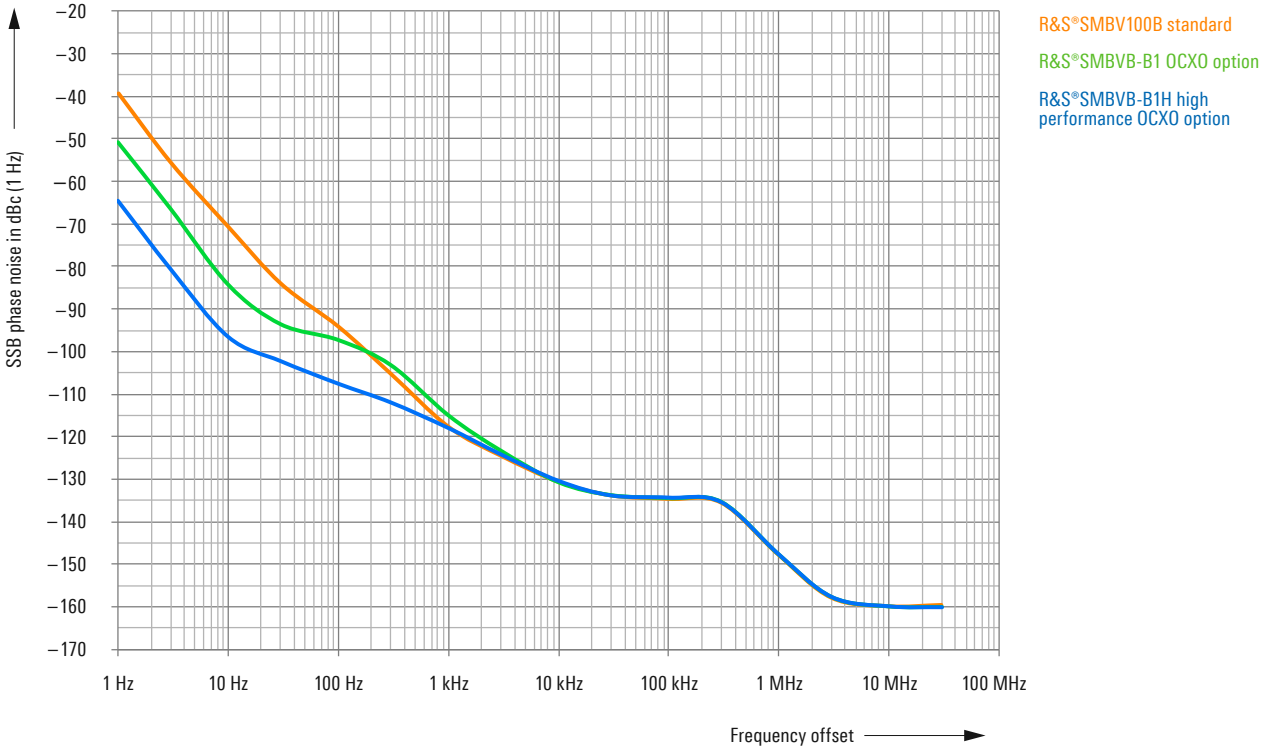
Principle of user-defined frequency response correction with R&S®SMBVB-K544 option



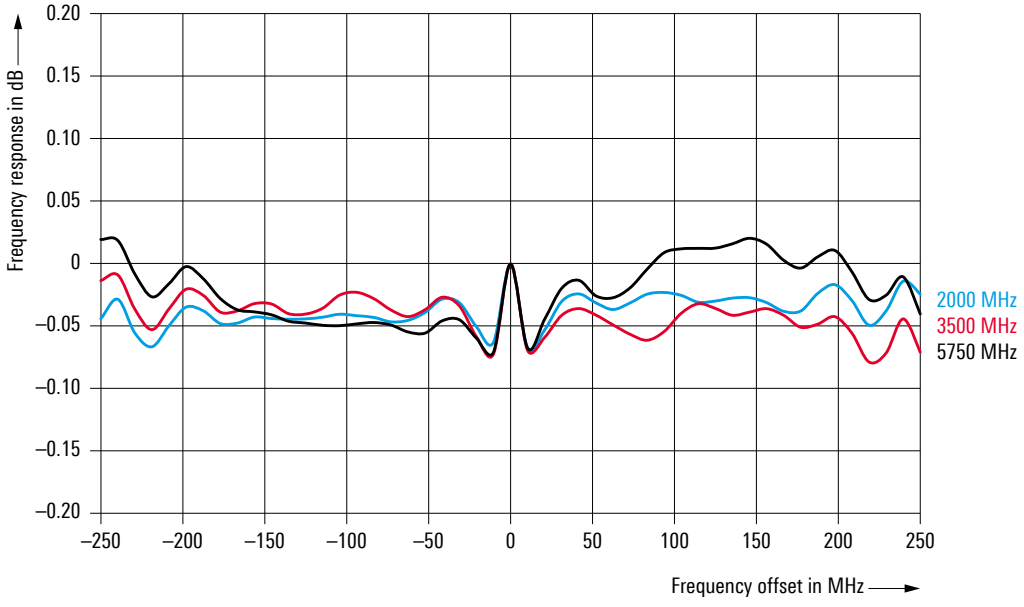
Wide modulation bandwidth with perfect accuracy

To satisfy the need for higher modulation bandwidths, the R&S®SMBV100B is equipped with a high performance baseband. Thanks to the generator's intelligent internal real-time frequency response correction, an extremely high amplitude flatness of < 0.3 dB (measured) is achieved across a bandwidth of 500 MHz.

Single-sideband phase noise (1 GHz, 1 Hz, measured)



Measured frequency response across 500 MHz RF modulation bandwidth at different carrier frequencies



Excellent EVM and ACPR up to high power levels

A receiver's data throughput is directly influenced by the input signal quality. As a result, a good EVM value for the test signal is an important prerequisite in order to reliably assess the performance of a DUT.

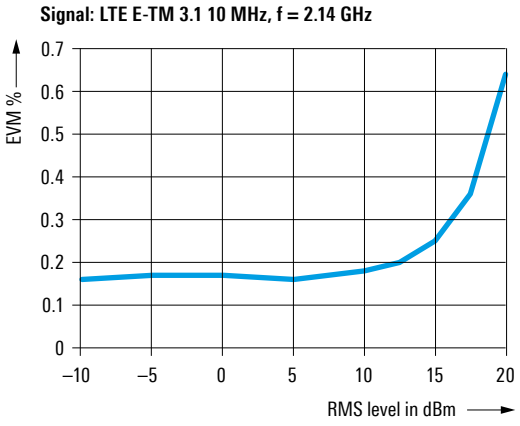
The R&S®SMBV100B combines large RF bandwidth and excellent signal quality and is therefore ideal for testing and characterizing wideband receivers and multicarrier amplifiers. With measured EVM values of less than 0.2% for LTE signals and less than 0.4% for 160 MHz IEEE802.11ac signals, the R&S®SMBV100B offers far better EVM performance than is required for measuring a DUT.

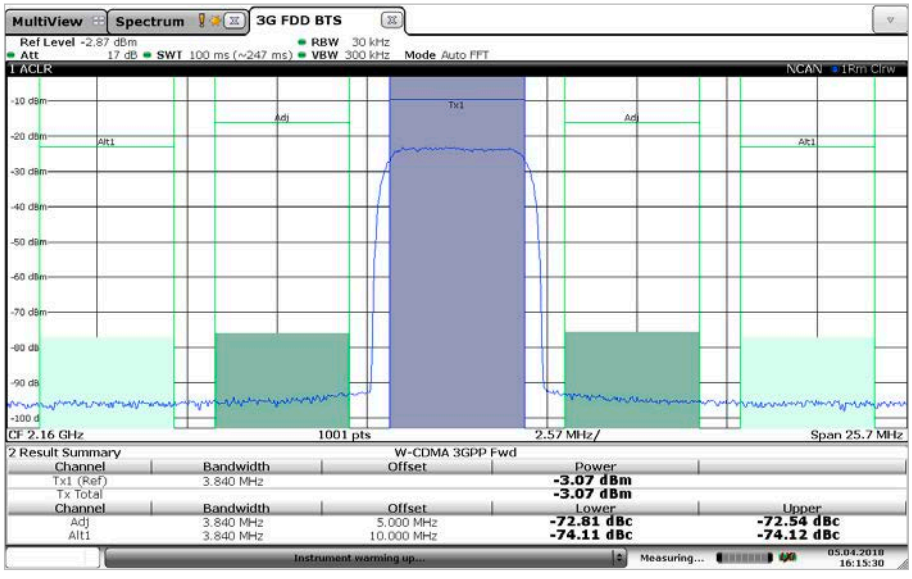
A feature unique to the R&S®SMBV100B is its excellent EVM performance even at high output power levels. An EVM value of less than 0.4% is achieved for an LTE signal with +18 dBm (RMS) output power. The R&S®SMBV100B thus outperforms conventional signal generators in terms of EVM, while at the same time simplifying the test setup since in most cases no extra amplifier is needed.

The R&S®SMBV100B was designed with a focus on delivering a practically distortion-free signal in addition to good EVM performance. This is a prerequisite for achieving a good adjacent channel power ratio (ACPR). The R&S®SMBV100B attains impressive values of < –72 dB ACPR (WCDMA test model 1, 64 DPCH, measured).

Measured EVM performance vs. RMS level

R&S®SMBV100B equipped with R&S®SMBVB-K31 and R&S®SMBVB-B32 options





Measured ACPR for WCDMA test model 1, 64 DPCH

PERFECT FOR OUTPUT POWER

Many applications call for very high output powers. This means that in many cases an amplifier is required in addition to the signal generator. Here, the R&S®SMBV100B offers a better alternative. The ultra high output power option provides users with a calibrated test solution, saving space and money, all in a single box.

Ultra high output power

When equipped with the appropriate options, the R&S®SMBV100B can produce output power of up to +33 dBm at 1 GHz and up to +31 dBm at 6 GHz (measured values). In addition, the specified level increases to +25 dBm across almost the entire frequency range.

Excellent level accuracy for CW and modulated signals

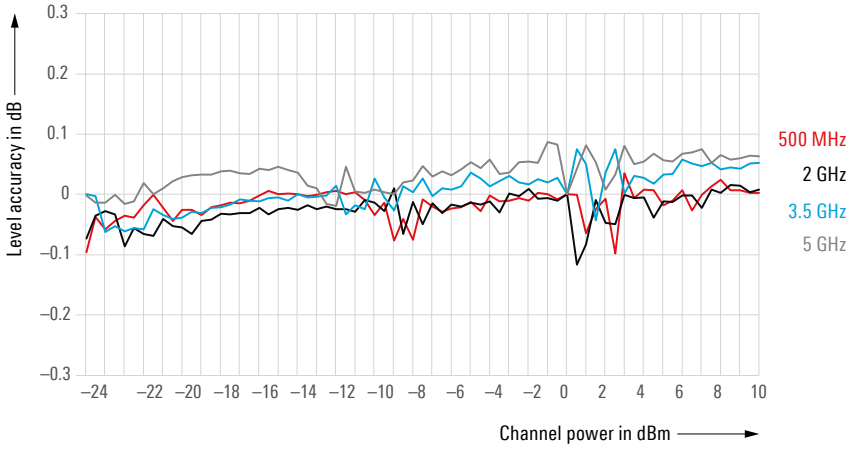
To describe the nonlinear characteristics of amplifier circuits (e.g. to determine the 1 dB compression point), the signal source must exhibit very high level accuracy. In many cases, the overall system is calibrated prior to the measurements to take into account the influence of test fixtures connected between the generator and the DUT.

After calibration, it is critical that the generator sets the level values for each test sequence repeatedly and with high precision. Here, the R&S®SMBV100B delivers top performance with a measured level repeatability of < 0.09 dB.

Another critical parameter is level linearity. It is crucial for the generator to keep deviation from nominal values extremely low across a wide amplitude range. With an accuracy of < 0.2 dB (measured), the R&S®SMBV100B excels also in this respect.

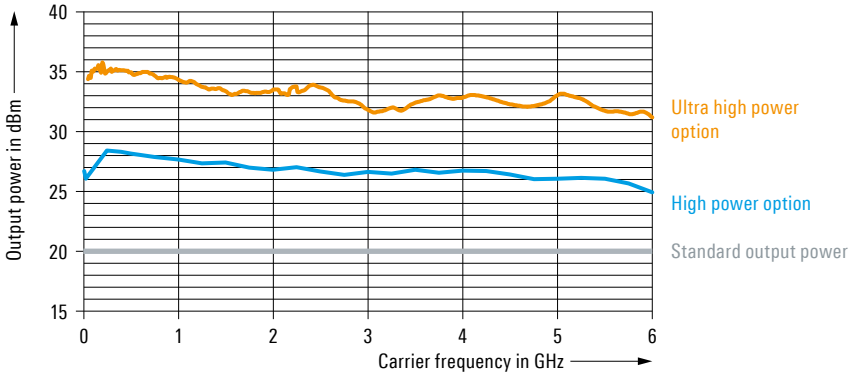
The generator's very high level accuracy simplifies the calibration procedure, enabling the generator to deliver extremely precise measurements.

Measured level linearity for an internally generated LTE downlink signal at various test frequencies



Measured output power for the base unit

With the high power option (R&S®SMBVB-K31) and with the additional ultra high power option (R&S®SMBVB-B32)



PERFECT FOR USE

Its intuitive operating concept makes the R&S®SMBV100B very ergonomic and practical to use. The customizable instrument is also prepared to meet future requirements.

Convenient operation via 7" touchscreen

The R&S®SMBV100B has a clearly structured graphical user interface with a high-resolution 7" touchscreen for efficient, intuitive operation. The functional block diagram of the R&S®SMBV100B provides a clear overview at all times. The user can immediately see the signal flow and the status of all inputs and outputs. The built-in graphics function displays the generated signals in real time.

Automation made easy with context-sensitive help system and SCPI recording

Context-sensitive online help offers comprehensive information. It describes each parameter and setup menu in detail, states the setting range and shows the associated remote control commands. Moreover, users can search for specific parameters in the user manual installed on the instrument.

The R&S®SMBV100B helps users quickly and correctly create remote control programs. The instrument's built-in SCPI macro recorder with code generator can automatically record all manual settings and create an executable MATLAB® script. The R&S®SMBV100B therefore helps minimize the time required for test automation, saving development resources.

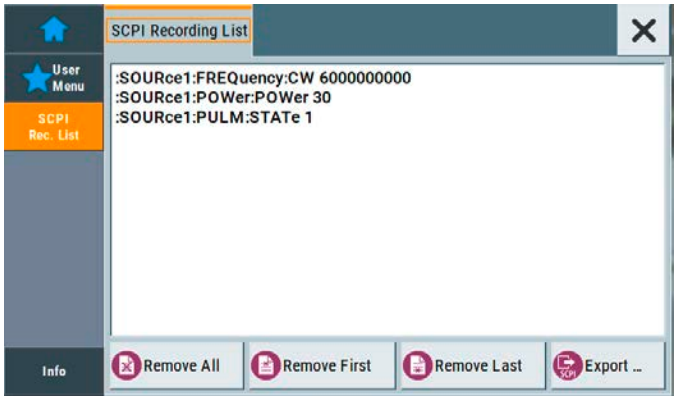
Internal real-time signal generation

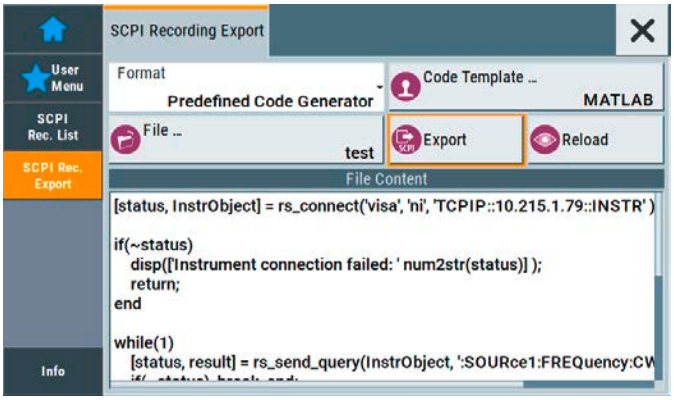
The internal baseband of the R&S®SMBV100B offers impressive real-time capabilities. Users can generate signals for all major digital communications standards right on the instrument – no external signal generation software is needed. This simplifies operation of the instrument and helps to speed up measurement tasks.

Protecting user data

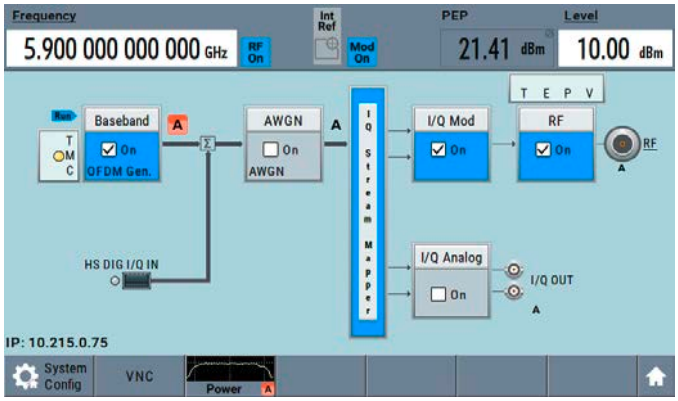
To meet requirements for secured areas, the R&S®SMBV100B can be configured to prevent user data from being saved to the instrument's nonvolatile memory. An easy-to-use erasure and sanitizing procedure is also available that removes user data from the instrument. Furthermore, the R&S®SMBV100B can be equipped with a removable solid-state drive (R&S®SMBVB-B80 option). A dedicated password can be used to disable the LAN and USB ports. The display can be disabled as well. These precautions ensure that no sensitive data will leave secured areas.

The built-in SCPI macro recorder and code generator support fast, easy generation of SCPI sequences





Functional block diagram of the R&S®SMBV100B



PERFECT FOR UPGRADING

The R&S®SMBV100B is a flexible platform that can be custom-tailored to specific needs at any time.

Easy upgrading of instrument at user premises via software keycodes

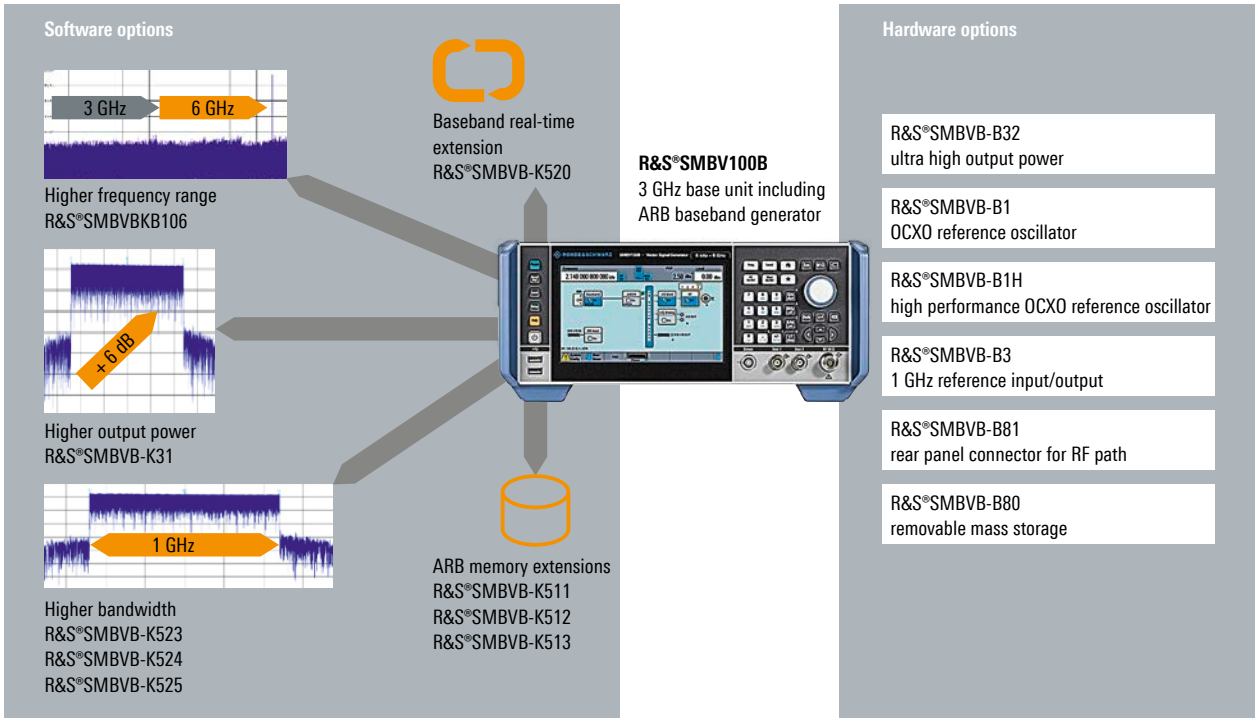
As to the instrument's hardware configuration, only a few decisions need to be made. Six hardware options are available. Software options can be added at the user premises via keycodes. The instrument is fully calibrated at the factory. There is no downtime for servicing the instrument after an upgrade, e.g. after an extension of the frequency range, bandwidth or output power. This flexibility minimizes investment risks, saves time and maximizes system uptime.

Time-limited licenses and waveform package for software options

If specific functions are not permanently needed, users can acquire licenses for R&S®SMBV100B software options for a limited period of time (e.g. 1 month or 6 months). This alternative is offered for all of the R&S®SMBV100B software options. It allows users to configure their R&S®SMBV100B platform as needed for the project at hand.

Characterizing DUTs often requires using test signals from a number of different standards. The waveform package is the ideal solution when it comes to inexpensively providing a signal for each standard. A waveform package for five signals, for example, can license one WCDMA and LTE signal and three different 5G NR signals.

Overview of important software and hardware options



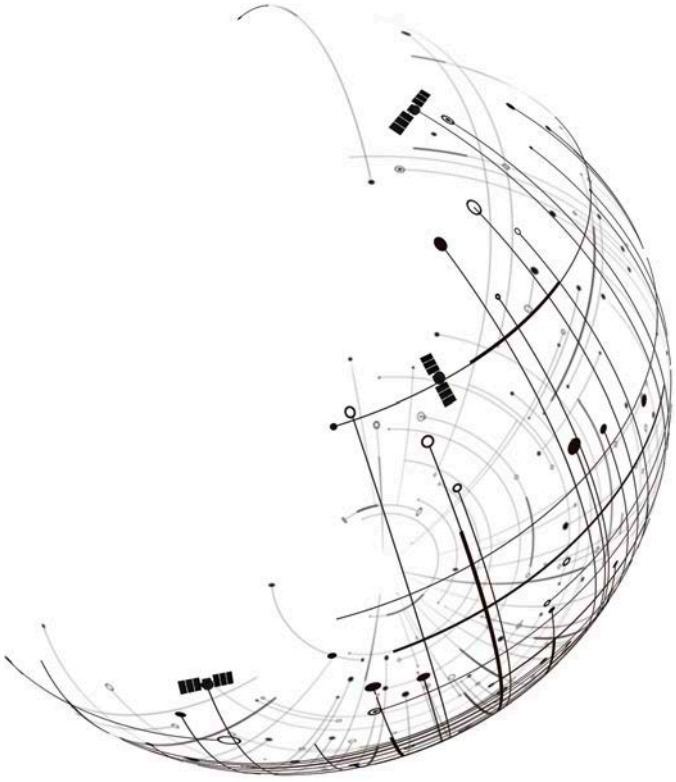
PERFECT FOR GNSS TESTING

The R&S®SMBV100B can be equipped with a multitude of GNSS options, turning the instrument into a full-featured GNSS constellation simulator.

Take control over your GNSS scenarios

Using signal generators for GNSS testing has some major advantages over using a live GNSS signal. When using live signals, test conditions are expected to change permanently and unpredictably, so that it is very unlikely that two successive test runs can be performed under identical conditions. Repeatable testing – maybe the most critical test requirement – is impossible when using live GNSS signals.

With the R&S®SMBV100B, GNSS simulations can be performed under well-defined, controlled and realistic conditions. It offers fully customizable and repeatable scenarios, so that one and the same test scenario can be replayed as often as needed and produce the same signals with the same characteristics.



Application fields/modes of operation	
Constellation simulation In this mode, the R&S®SMBV100B simulates a realistic constellation of GNSS satellites with correct Doppler shifts and ICD-compliant signals. This includes realistic modeling of GNSS orbits, signal propagation effects and system errors like orbit and clock errors.	**Hardware in the loop (HIL) operation** Externally generated trajectory data can be streamed in real time to the R&S®SMBV100B. By using a special set of SCPI commands, vehicle position, velocity, acceleration and vehicle attitude data can be fed to the instrument. This makes it possible to operate the R&S®SMBV100B in a hardware in the loop environment with high update rates and low latencies.
Receiver prototyping and production testing Instead of being used as a GNSS constellation simulator, the R&S®SMBV100B can also be operated in a mode that is based on static (nonmoving) satellites. The signals generated this way do not exhibit any signal dynamics. Alternatively, constant Doppler shifts or customizable Doppler profiles can be applied to the signals.	**Automated GNSS testing** Together with the test sequencer software R&S®CMWrun, the R&S®SMBV100B can be turned into a fully automated test system for verifying the positioning performance of eCall and ERA-GLONASS modules against the test cases defined in the standards EU2017/79/Annex VI (eCall) and GOST 33471 (ERA-GLONASS).

Signals and systems

The R&S®SMBV100B supports signal generation for all global satellite navigation systems as well as for satellite-based augmentation systems. Key capabilities are:

- Support of GPS, GLONASS, BeiDou, Galileo, SBAS and QZSS, including GPS P-Code
- Simultaneous signal generation in the GNSS frequency bands L1, L2 and L5 with up to 102 GNSS channels

Scenario configuration made easy

The R&S®SMBV100B comes with an integrated GNSS simulation software, which allows user-friendly simulation configuration, monitoring and interactive control using the instrument's large touch screen. No external PC is required for scenario configuration. Scenario generation can be fully automated making use of the extensive remote control capabilities of the R&S®SMBV100B.

Realistic GNSS scenarios

All GNSS signals are generated in real-time taking into account signal propagation, user environment and system characteristics like:

- Orbit errors, clock errors, atmospheric effects
- Signal obscuration and multipath
- Antenna gain and phase patterns
- Vehicle motion and vehicle attitude
- Pseudorange steps/ramps for RAIM testing

GNSS plus interferer in one box

The R&S®SMBV100B can be equipped with an internal noise generator adding well-defined noise or a CW interferer to the GNSS signals. This allows to test the receiver's resilience against unwanted interference or jamming attacks.



R&S®LegacyPro
REFRESH YOUR T&M EQUIPMENT

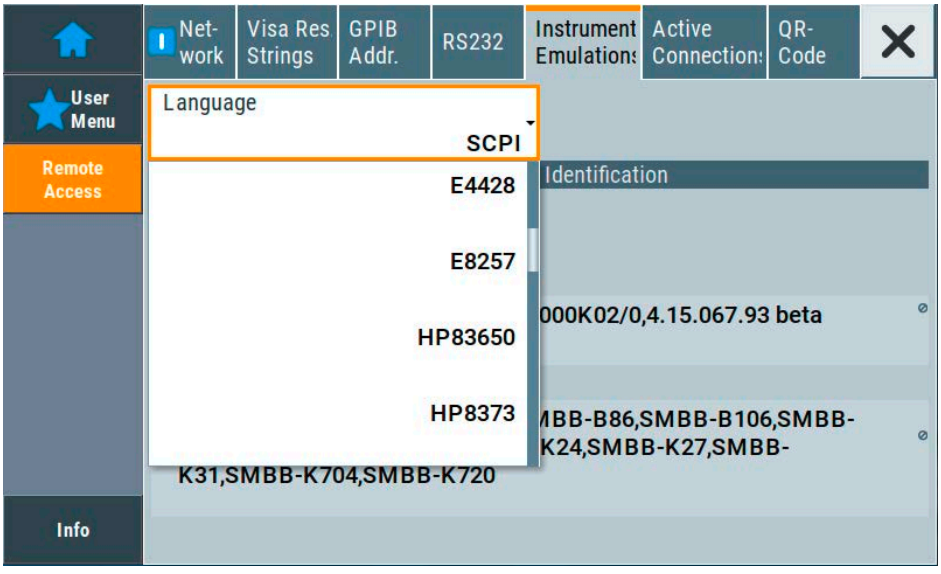
Replace your legacy signal generators

For older test systems, obsolescence is a common topic. When individual pieces of equipment become obsolete before the entire ATE system does, regular calibration and repair of obsolete equipment is an expensive, time-consuming and challenging task. Replacing obsolete test equipment with equivalent, state-of-the-art instruments should be straightforward and require minimal hardware and software changes.

The R&S®SMBV100B with R&S®LegacyPro code emulation fulfills these requirements, reducing the workload and eliminating risks. R&S®LegacyPro enables the R&S®SMBV100B to reliably emulate a wide range of legacy generators from vendors such as Keysight, Agilent, HP, Aeroflex, Anritsu and Rohde&Schwarz. As a result, the R&S®SMBV100B can be deployed in legacy ATE systems without major software changes, effectively increasing uptime, lowering the cost of ownership and extending the test system's useful life.

Enjoy plug&play replacement of your legacy signal generators with R&S®LegacyPro and the R&S®SMBV100B.

Emulation of legacy generators from Rohde&Schwarz and other vendors



SIMPLIFY YOUR ENVELOPE TRACKING SYSTEM

An increasing number of power amplifiers support envelope tracking (ET) in order to reduce power consumption and improve efficiency, for example in smartphones and tactical radios. Typical test setups for measuring power amplifiers comprise at least one signal generator and one spectrum analyzer. Envelope tracking requires an additional generator to deliver the envelope signal for the DC modulator.

RF and envelope signal out of one box

Equipped with the R&S®SMBVB-K540 envelope tracking option, the R&S®SMBV100B generates both the RF signal and the corresponding envelope signal. The envelope signal is generated from the baseband signal in real time. This means that any user-specific I/Q signals and any supported wireless communications signals, such as LTE or wireless LAN, can be used.

Generating the RF signal and the envelope signal in a single instrument makes it possible to precisely adjust the delay between the two signals.

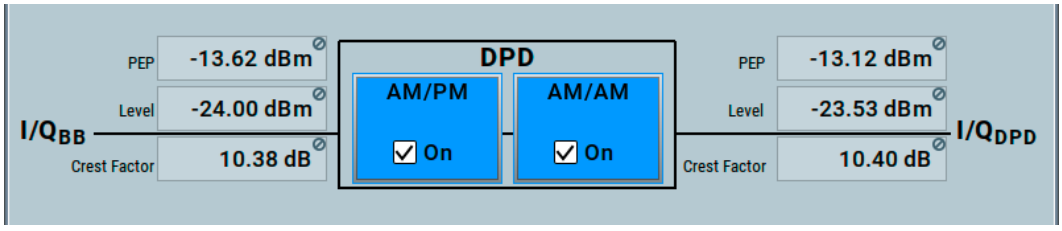
The R&S®SMBV100B adjusts the delay in picosecond steps in real time, meeting tight requirements, for example accuracy better than 1 ns for a 20 MHz LTE signal.

The envelope signal is shaped to optimize the power amplifier for efficiency or linearity. The R&S®SMBV100B offers various shaping methods, such as look-up table and polynomial, which are applied in real time. For power sweeps, the R&S®SMBV100B automatically calculates the amplitude of the envelope signal, eliminating time-consuming manual calculations. It is also possible to adjust additional parameters, such as the gain and impedance of the DC modulator.

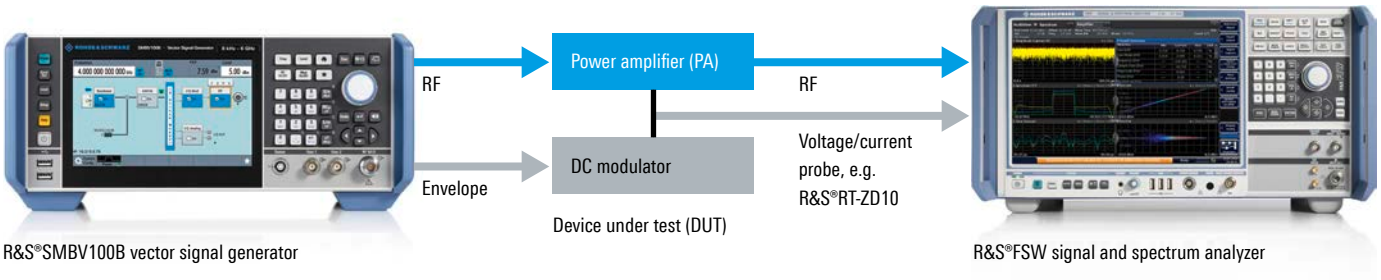
Real-time digital predistortion

With envelope tracking, the amplifier is operated close to or even in saturation, causing distortion at the amplifier output. To compensate for this effect, envelope tracking is often used in combination with digital predistortion (DPD). Equipped with the R&S®SMBVB-K541 digital predistortion option, the R&S®SMBV100B can apply real-time amplitude and phase correction to each complex I/Q sample using the values in the DPD tables. As a result, users can quickly verify the effect of predistortion, even for different power levels, without having to manually calculate the original waveform.

Digital predistortion user interface with the R&S®SMBVB-K541 option



Compact Rohde&Schwarz setup for power amplifier tests including envelope tracking



R&S®SMBV100B vector signal generator

R&S®FSW signal and spectrum analyzer

GNSS TESTING

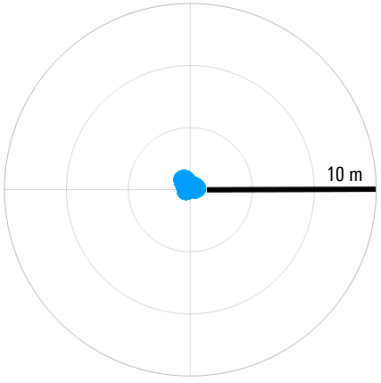
The extensive GNSS simulation capabilities of the R&S®SMBV100B make it possible to cover a multitude of single- and multi-frequency GNSS applications.

Typical GNSS tests include the determination of the receiver's time to first fix, acquisition and tracking sensitivity, reacquisition time or its ability to provide an accurate positioning solution for both static and moving receivers. In addition to these standard tests, it is often required to test the receiver's performance under special conditions such as interference or in the presence of multipath. Other applications include RAIM (receiver autonomous integrity monitoring) testing, ionospheric monitoring or atmospheric sounding.

Positioning accuracy

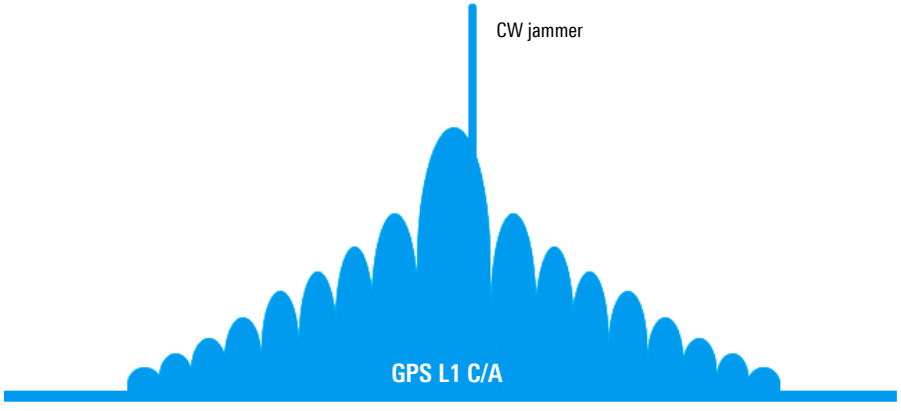
Determination of the receiver's ability to provide an accurate navigation solution for both static and moving receivers under ideal conditions.

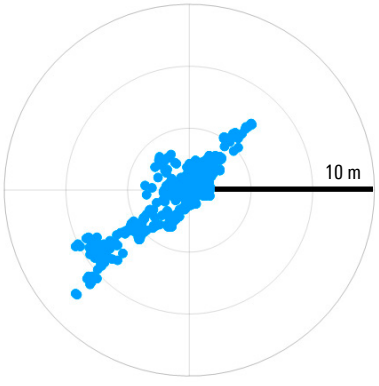




Positioning accuracy in the presence of a jammer

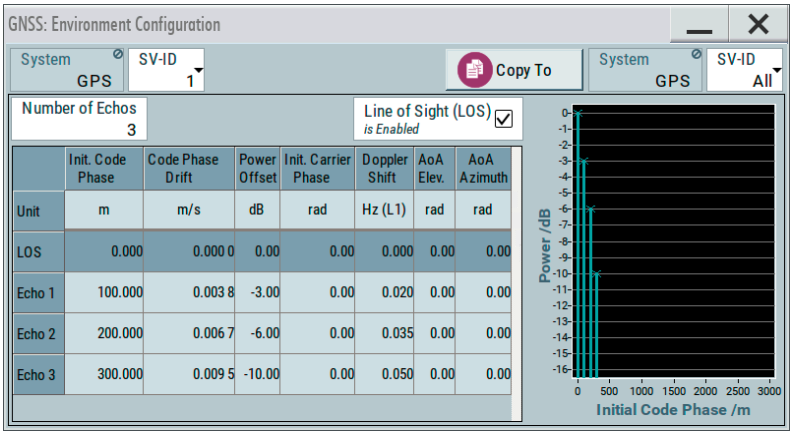
Determination of the receiver's ability to provide a navigation solution in the presence of a jammer.





Positioning accuracy in the presence of multipath

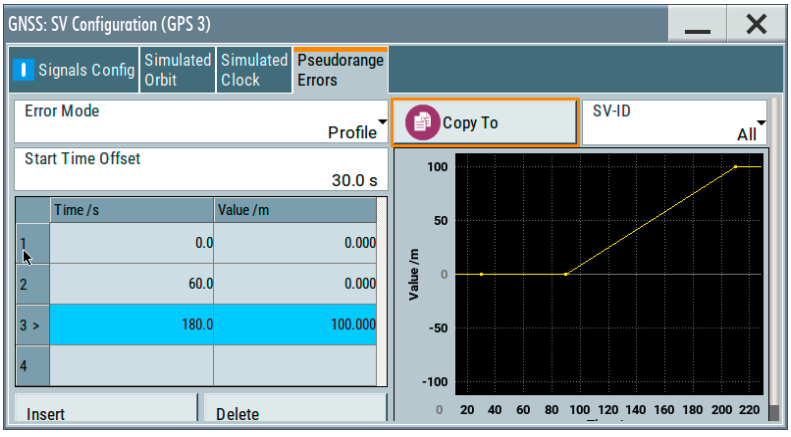
Determination of the receiver's positioning performance when multipath is present.



Simulation of multipath propagation for SV 1 with the R&S®SMBV100B. In addition to the line of sight, three reflections with different relative delays, relative amplitudes and relative Doppler shifts are present

RAIM testing

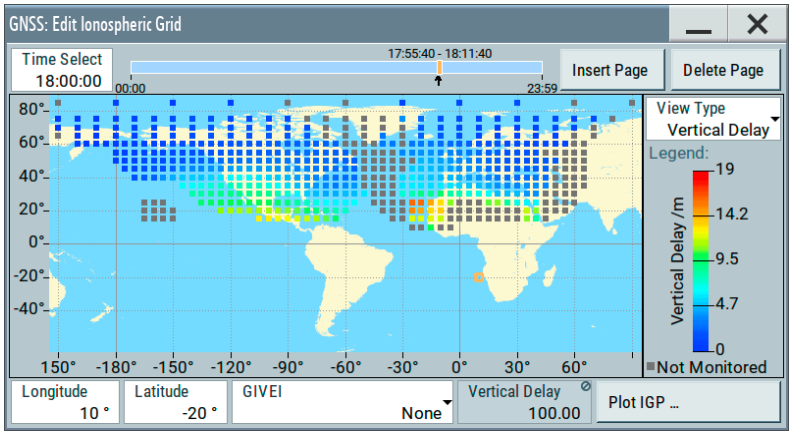
Receiver autonomous integrity monitoring is a special feature that allows a GNSS receiver to check whether the computed position is influenced by unusually high ranging errors. The objective of such tests is to verify that a DUT is able to identify affected observations and exclude them from the position solution.



Simulation of a pseudorange ramp for SV 3 with the R&S®SMBV100B for testing the RAIM capabilities of a GNSS receiver

Ionospheric monitoring

Monitoring ionospheric conditions like total electron content (TEC) or anomalies caused by scintillation based on multi-frequency GNSS observations.



Configuration and simulation of ionospheric path delays with the R&S®SMBV100B

STATE-OF-THE-ART USER INTERFACE

High-resolution touchscreen
With easy-to-use graphical user interface and block diagram

Context-sensitive help system

Signal monitoring with graphical result display
For practically every point in the signal flow





Favorite key
For simplified and fast operation via customizable user menu

RF output connector
N female

User-configurable connectors
E.g. trigger, marker, CLK

Connector
For an R&S®NRP power sensor

REAR PANEL CONNECTIONS

Single-ended and differential analog I/Q outputs
R&S®SMBVB-K17 option

Removable solid-state drive to store sensitive information
R&S®SMBVB-B80 option

Remote control via GPIB, USB or LAN

Input for external pulse modulation signal
R&S®SMBVB-K22 option



Standard and high-speed digital I/Q interfaces (I/Q in/out)
R&S®SMBVB-K19 option



LO in/out for phase coherence application
- R&S®SMBVB-K90 option
- LO frequency equals RF frequency

Analog I/Q input

1 GHz reference input/output
R&S®SMBVB-B3 option

Flexible reference input/output from 1 MHz to 100 MHz
R&S®SMBVB-K704 option

SPECIFICATIONS IN BRIEF

Specifications in brief		
Frequency range	R&S®SMBVB-B103	
	CW mode	8 kHz to 3 GHz
	I/Q mode	1 MHz to 3 GHz
	R&S®SMBVB-B103 and R&S®SMBVBKB106	
	CW mode	8 kHz to 6 GHz
	I/Q mode	1 MHz to 6 GHz
Level range	peak envelope power (PEP)	
R&S®SMBVB-B103/KB106	standard	
	1 MHz < f ≤ 6 GHz	–127 dBm to +18 dBm
	with R&S®SMBVB-K31 option	
	1 MHz < f ≤ 4 GHz	–127 dBm to +21 dBm
	4 GHz < f ≤ 6 GHz	–127 dBm to +20 dBm
	with R&S®SMBVB-K31 and R&S®SMBVB-B32 options	
	10 MHz < f ≤ 6 GHz	–127 dBm to +25 dBm
Spectral purity		
SSB phase noise	f = 1 GHz, 20 kHz offset, 1 Hz measurement bandwidth	< –126 dBc, –132 dBc (typ.)
Harmonics	1 MHz < f ≤ 6 GHz, level ≤ 13 dBm	< –30 dBc
Nonharmonics	f = 1 GHz, level > +10 dBm, offset > 10 kHz	< –76 dBc
Analog modulation	supported analog modulation modes	
	with R&S®SMBVB-K720 option	AM, FM, φM
	with R&S®SMBVB-K22 option	pulse modulation
I/Q modulation		
RF modulation bandwidth	with internal baseband I/Q, I/Q wideband on	
	1 MHz < f ≤ 1000 MHz	±25 % of carrier frequency
	f > 1000 MHz	±250 MHz
	with external I/Q inputs, I/Q wideband on	
	1 MHz ≤ f ≤ 4 GHz	±25 % of carrier frequency
	f > 4 GHz	±1 GHz
Modulation frequency response in specified RF modulation bandwidth	with internal baseband I/Q, I/Q wideband on, optimization mode: high quality	< 1.0 dB, < 0.3 dB (meas.)
I/Q baseband generator		
Signal bandwidth	standard	120 MHz
	with R&S®SMBVB-K523 option	240 MHz
	with R&S®SMBVB-K523 and R&S®SMBVB-K524 options	500 MHz
	with R&S®SMBVB-K523, R&S®SMBVB-K524 and R&S®SMBVB-K525 options	1 GHz
ARB memory depth	standard	64 Msample
	with R&S®SMBVB-K511 option	512 Msample
	with R&S®SMBVB-K511 and R&S®SMBVB-K512 options	1 Gsample
	with R&S®SMBVB-K511, R&S®SMBVB-K512 and R&S®SMBVB-K513 options	2 Gsample
Digital standards	the options are described in the Digital Standards data sheet (PD 5213.9434.22)	5G NR, cellular IoT, LTE Release 8 to 15, 3GPP FDD HSPA/HSPA+, GSM, WLAN IEEE 802.11a/b/g/n/j/p/ac/ax/be, AWGN and more
External R&S®Pulse Sequencer software or R&S®Pulse Sequencer (DFS) software	the options are described in the Pulse Sequencer options data sheet (PD 3607.1388.22)	pulse sequencing, enhanced pulse sequencing, direction finding, DFS signal generation
GNSS and avionics	the options are described in the GNSS and Avionics data sheet (PD 3607.6896.22)	GPS, Galileo, GLONASS, BeiDou, GBAS, ILS, VOR, DME

Always up to date: The firmware can be updated using a USB storage device or the LAN port. Free firmware updates are available for download from the Internet at www.rohde-schwarz.com.

ORDERING INFORMATION

Designation	Type	Order No.
Base unit		
Vector signal generator [1], including baseband generator with ARB (64 Msample, 120 MHz RF bandwidth), power cable and quick start guide	R&S®SMBV100B	1423.1003.02
Options R&S®SMBVB-Bxxx = hardware option, R&S®SMBVB-Kxxx/KBxxx = software/keycode option		
Frequency options		
8 kHz to 3 GHz (mandatory)	R&S®SMBVB-B103	1423.6270.02
Frequency extension to 6 GHz	R&S®SMBVBKB106	1423.6370.02
RF options		
OCXO reference oscillator	R&S®SMBVB-B1	1423.6470.02
High performance OCXO reference oscillator	R&S®SMBVB-B1H	1423.6570.02
1 GHz reference input/output	R&S®SMBVB-B3	1423.7260.02
Flexible reference input from 1 MHz to 100 MHz	R&S®SMBVB-K704	1423.7618.02
High output power	R&S®SMBVB-K31	1423.6670.02
Ultra high output power	R&S®SMBVB-B32	1423.6711.02
Phase coherence	R&S®SMBVB-K90	1423.7076.02
Pulse modulator	R&S®SMBVB-K22	1423.7560.02
Pulse generator	R&S®SMBVB-K23	1423.7576.02
Multifunction generator	R&S®SMBVB-K24	1423.7582.02
AM/FM/φM	R&S®SMBVB-K720	1423.7599.02
Baseband		
Differential analog I/Q outputs	R&S®SMBVB-K17	1423.7624.02
Digital baseband output	R&S®SMBVB-K19	1423.7630.02
ARB memory extension to 512 Msample	R&S®SMBVB-K511	1423.7653.02
ARB memory extension to 1 Gsample	R&S®SMBVB-K512	1423.7660.02
ARB memory extension to 2 Gsample	R&S®SMBVB-K513	1423.8589.02
Baseband real-time extension	R&S®SMBVB-K520	1423.7676.02
Baseband extension to 240 MHz RF bandwidth	R&S®SMBVB-K523	1423.7682.02
Baseband extension to 500 MHz RF bandwidth	R&S®SMBVB-K524	1423.7699.02
Baseband extension to 1 GHz RF bandwidth	R&S®SMBVB-K525	1423.8920.02
Baseband enhancements		
Additive white Gaussian noise (AWGN)	R&S®SMBVB-K62	1423.7876.02
Bit error rate tester	R&S®SMBVB-K80	1423.7647.02
Envelope tracking	R&S®SMBVB-K540	1423.7701.02
AM/AM, AM/φM predistortion	R&S®SMBVB-K541	1423.7718.02
User-defined frequency response correction	R&S®SMBVB-K544	1423.8150.02
Crest factor reduction	R&S®SMBVB-K548	1423.8820.02
Notched signals	R&S®SMBVB-K811	1423.8972.02
Digital standards		
GSM/EDGE	R&S®SMBVB-K40	1423.7724.02
EDGE evolution	R&S®SMBVB-K41	1423.7730.02
3GPP FDD	R&S®SMBVB-K42	1423.7747.02
CDMA2000®	R&S®SMBVB-K46	1423.7760.02
1xEV-DO	R&S®SMBVB-K47	1423.7776.02
TD-SCDMA	R&S®SMBVB-K50	1423.7782.02
TD-SCDMA enhanced BS/MS tests	R&S®SMBVB-K51	1423.7799.02
IEEE 802.11 (a/b/g/n/j/p)	R&S®SMBVB-K54	1423.7824.02
LTE Release 8	R&S®SMBVB-K55	1423.7830.02
Bluetooth® EDR	R&S®SMBVB-K60	1423.7853.02
Multicarrier CW signal generation	R&S®SMBVB-K61	1423.7860.02
3GPP FDD HSPA/HSPA+, enhanced BS/MS tests	R&S®SMBVB-K83	1423.7899.02
LTE Release 9	R&S®SMBVB-K84	1423.7901.02

Designation	Type	Order No.
LTE Release 10	R&S®SMBVB-K85	1423.7918.02
IEEE 802.11ac	R&S®SMBVB-K86	1423.7924.02
1xEV-DO Rev. B	R&S®SMBVB-K87	1423.7930.02
NFC A/B/F	R&S®SMBVB-K89	1423.7947.02
LTE Release 11	R&S®SMBVB-K112	1423.8037.02
LTE Release 12	R&S®SMBVB-K113	1423.8043.02
OFDM signal generation	R&S®SMBVB-K114	1423.8050.02
Cellular IoT Release 13	R&S®SMBVB-K115	1423.8066.02
Bluetooth® 5.x	R&S®SMBVB-K117	1423.8089.02
LTE Release 13/14/15	R&S®SMBVB-K119	1423.8108.02
LoRa®	R&S®SMBVB-K131	1423.8720.02
IEEE 802.11ax	R&S®SMBVB-K142	1423.8114.02
Cellular IoT Release 14	R&S®SMBVB-K143	1423.8637.02
5G NR Release 15	R&S®SMBVB-K144	1423.8608.02
Cellular IoT Release 15	R&S®SMBVB-K146	1423.8808.02
IEEE 802.11be	R&S®SMBVB-K147	1423.8950.02
5G NR Release 16	R&S®SMBVB-K148	1423.8843.02
UWB HRP	R&S®SMBVB-K149	1423.8889.02
U-plane generation	R&S®SMBVB-K175	1423.8989.02
Digital standards using R&S®WinIQSIM2 [2)]		
GSM/EDGE	R&S®SMBVB-K240	1423.8166.02
EDGE evolution	R&S®SMBVB-K241	1423.8172.02
3GPP FDD	R&S®SMBVB-K242	1423.8189.02
GPS	R&S®SMBVB-K244	1423.8195.02
CDMA2000®	R&S®SMBVB-K246	1423.8208.02
1xEV-DO Rev. A	R&S®SMBVB-K247	1423.8214.02
TD-SCDMA	R&S®SMBVB-K250	1423.8220.02
TD-SCDMA enhanced BS/MS tests	R&S®SMBVB-K251	1423.8237.02
DVB-H	R&S®SMBVB-K252	1423.8243.02
DAB/T-DMB	R&S®SMBVB-K253	1423.8250.02
IEEE 802.11a/b/g/n	R&S®SMBVB-K254	1423.8266.02
LTE Release 8	R&S®SMBVB-K255	1423.8272.02
Bluetooth® EDR	R&S®SMBVB-K260	1423.8295.02
Multicarrier CW signal generation	R&S®SMBVB-K261	1423.8308.02
Additive white Gaussian noise (AWGN)	R&S®SMBVB-K262	1423.8314.02
Galileo	R&S®SMBVB-K266	1423.8320.02
3GPP FDD HSPA/HSPA+, enhanced BS/MS tests	R&S®SMBVB-K283	1423.8337.02
LTE Release 9	R&S®SMBVB-K284	1423.8343.02
LTE Release 10	R&S®SMBVB-K285	1423.8350.02
IEEE 802.11ac	R&S®SMBVB-K286	1423.8366.02
1xEV-DO Rev. B	R&S®SMBVB-K287	1423.8372.02
NFC A/B/F	R&S®SMBVB-K289	1423.8389.02
GLONASS 1 satellite	R&S®SMBVB-K294	1423.8395.02
NavIC/IRNSS 1 satellite	R&S® SMBVB-K297	1423.8695.02
Modernized GPS	R&S®SMBVB-K298	1423.8408.02
Beidou	R&S®SMBVB-K407	1423.8489.02
LTE Release 11	R&S®SMBVB-K412	1423.8495.02
LTE Release 12	R&S®SMBVB-K413	1423.8508.02
OFDM signal generation	R&S®SMBVB-K414	1423.8595.02
Cellular IoT Release 13	R&S®SMBVB-K415	1423.8514.02
DVB-S2/DVB-S2X	R&S®SMBVB-K416	1423.8520.02
Bluetooth® 5.x	R&S®SMBVB-K417	1423.8537.02
Verizon 5GTF signals	R&S®SMBVB-K418	1423.8543.02
LTE Release 13/14/15	R&S®SMBVB-K419	1423.8550.02

Designation	Type	Order No.
LoRa®	R&S®SMBVB-K431	1423.8737.02
Modernized BeiDou	R&S®SMBVB-K432	1423.8837.02
IEEE 802.11ax	R&S®SMBVB-K442	1423.8114.02
Cellular IoT Release 14	R&S®SMBVB-K443	1423.8643.02
5G NR Release 15	R&S®SMBVB-K444	1423.8614.02
Cellular IoT Release 15	R&S®SMBVB-K446	1423.8814.02
IEEE 802.11be	R&S®SMBVB-K447	1423.8966.02
5G NR Release 16	R&S®SMBVB-K448	1423.8850.02
UWB HRP	R&S®SMBVB-K449	1423.8850.02
Waveform package for signals from R&S®WinIQSIM2, R&S®Pulse Sequencer, R&S®Pulse Sequencer (DFS) software[3]		
1 waveform	R&S®SMBVB-K200	1423.8714.71
5 waveforms	R&S®SMBVB-K200	1423.8714.72
50 waveforms	R&S®SMBVB-K200	1423.8714.75
Options with external R&S®Pulse Sequencer software or R&S®Pulse Sequencer (DFS) software		
Pulse sequencing	R&S®SMBVB-K300	1423.8414.02
Enhanced pulse sequencing	R&S®SMBVB-K301	1423.8420.02
DF	R&S®SMBVB-K308	1423.8437.02
DFS signal generation	R&S®SMBVB-K350	1423.8443.02
GNSS and avionics		
GPS	R&S®SMBVB-K44	1423.7753.02
Galileo	R&S®SMBVB-K66	1423.7882.02
GLONASS	R&S®SMBVB-K94	1423.7953.02
NAVIC/IRNSS	R&S®SMBVB-K97	1423.8708.02
Modernized GPS	R&S®SMBVB-K98	1423.7960.02
SBAS/QZSS	R&S®SMBVB-K106	1423.7982.02
BeiDou	R&S®SMBVB-K107	1423.7999.02
GNSS real world simulation	R&S®SMBVB-K108	1423.8008.02
GNSS real-time interface	R&S®SMBVB-K109	1423.8014.02
GBAS	R&S®SMBVB-K111	1423.8020.02
Modernized BeiDou	R&S®SMBVB-K132	1423.8789.02
Single satellite GNSS	R&S®SMBVB-K133	1423.8743.02
Upgrade to dual-frequency GNSS	R&S®SMBVB-K134	1423.8750.02
Upgrade to triple-frequency GNSS	R&S®SMBVB-K135	1423.8766.02
Add 6 GNSS channels	R&S®SMBVB-K136	1423.8772.02
Add 12 GNSS channels	R&S®SMBVB-K137	1423.8795.02
ILS	R&S®SMBVB-K151	1423.8120.02
VOR	R&S®SMBVB-K152	1423.8137.02
DME	R&S®SMBVB-K153	1423.8143.02
ERA-GLONASS test suite	R&S®SMBVB-K360	1423.8650.02
eCall test suite	R&S®SMBVB-K361	1423.8666.02
GNSS test suite	R&S®SMBVB-K362	1423.8672.02
Other options		
Removable mass storage	R&S®SMBVB-B80	1423.7160.02
Rear panel connector for RF path	R&S®SMBVB-B81	1423.7360.02
Recommended extras		
Spare CFAST card	R&S®SMBVB-Z10	3639.9910.02
19" rack adapter	R&S®ZZA-KNA33	1177.8090.00
USB serial adapter for RS-232 remote control	R&S®TS-USB1	6124.2531.00
Documentation of calibration values	R&S®DCV-2	0240.2193.18
R&S®SMBV100B accredited calibration (ISO 17025, ISO 9000)	R&S® ACASMBV100	3598.1027.03

[1] The base unit can only be ordered with an R&S®SMBVB-B103 frequency option.
[2] R&S®WinIQSIM2 requires an external PC.
[3] Maximum 250 waveforms per instrument can be registered.

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*) For extended periods contact your Rohde & Schwarz sales office.

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