R&S®SMA100B
RF Signal Generator
Getting Started

ROHDE & SCHWARZ
Make ideas real

This document describes the R&S®SMA100B, stock no. 1419.8888.02 and its options.

The following abbreviations are used throughout this manual: R&S®SMA100B is abbreviated as R&S SMAB, Linux® is abbreviated as Linux, R&S®VISA is abbreviated as R&S VISA

Contents

1   Safety and regulatory information

The product documentation helps you use the product safely and efficiently. Follow the instructions provided here and in the following chapters.

Intended use

The product generates radio frequency (RF) signals for the development, production and verification of electronic components, modules or devices. The product is intended for industrial use, for example for production and conformance testing, maintenance and engineering laboratories.

Use the product only for its designated purpose. Any other use is considered improper use. Observe the operating conditions and performance limits stated in the data sheet.

Target audience

This document targets at all users, including technicians, operators, administrators and maintenance personnel. The required skills and experience of the users depend on the test setup and application of the product.

Where do I find safety information?

Safety information is part of the product documentation. It warns you of potential dangers and gives instructions on how to prevent personal injury or damage caused by dangerous situations. Safety information is provided as follows:

● In Chapter 1.1, "Safety instructions", on page 7. The same information is provided in many languages as printed "Safety Instructions". The printed "Safety Instructions" are delivered with the product.

● Throughout the documentation, safety instructions are provided when you need to take care during setup or operation.

1.1   Safety instructions

Products from the Rohde & Schwarz group of companies are manufactured according to the highest technical standards. To use the products safely, follow the instructions provided here and in the product documentation. Keep the product documentation nearby and offer it to other users.

Use the product only for its intended use and within its performance limits. Intended use and limits are described in the product documentation such as the data sheet, manuals and the printed "Safety Instructions". If you are unsure about the appropriate use, contact Rohde & Schwarz customer service.

Using the product requires specialists or specially trained personnel. These users also need sound knowledge of at least one of the languages in which the user interfaces and the product documentation are available.

Reconfigure or adjust the product only as described in the product documentation or the data sheet. Any other modifications can affect safety and are not permitted.

Never open the casing of the product. Only service personnel authorized by Rohde & Schwarz are allowed to repair the product. If any part of the product is damaged or broken, stop using the product. Contact Rohde & Schwarz customer service at https://www.rohde-schwarz.com/support.

Lifting and carrying the product

The maximum weight of the product is provided in the data sheet. You can lift or carry the product by yourself, if you can manage the weight on your own. Alternatively, you can use lifting or transporting equipment. Follow the instructions provided by the equipment manufacturer.

Choosing the operating site

Only use the product indoors. The product casing is not waterproof. Water that enters can electrically connect the casing with live parts, which can lead to electric shock, serious personal injury or death if you touch the casing. If Rohde & Schwarz provides accessories designed for your product, e.g. a carrying bag, you can use the product outdoors.

Unless otherwise specified, you can operate the product up to an altitude of 2000 m above sea level. The product is suitable for pollution degree 2 environments where nonconductive contamination can occur. For more information on environmental conditions such as ambient temperature and humidity, see the data sheet.

Setting up the product

Always place the product on a stable, flat and level surface with the bottom of the product facing down. If the product is designed for different positions, secure the product so that it cannot fall over.

If the product has foldable feet, always fold the feet completely in or out to ensure stability. The feet can collapse if they are not folded out completely or if the product is moved without lifting it. The foldable feet are designed to carry the weight of the product, but not an extra load.

If stacking is possible, keep in mind that a stack of products can fall over and cause injury.

If you mount products in a rack, ensure that the rack has sufficient load capacity and stability. Observe the specifications of the rack manufacturer. Always install the products from the bottom shelf to the top shelf so that the rack stands securely. Secure the product so that it cannot fall off the rack.

Connecting to power

The product is an overvoltage category II product. Connect the product to a fixed installation used to supply energy-consuming equipment such as household appliances and similar loads. Keep in mind that electrically powered products have risks, such as electric shock, fire, personal injury or even death. Replace parts that are relevant to safety only by original parts, e.g. power cables or fuses.

Take the following measures for your safety:

- Before switching on the product, ensure that the voltage and frequency indicated on the product match the available power source. If the power adapter does not adjust automatically, set the correct value and check the rating of the fuse.
- Only use the power cable delivered with the product. It complies with country-specific safety requirements. Only insert the plug into an outlet with protective conductor terminal.
- Only use intact cables and route them carefully so that they cannot be damaged. Check the power cables regularly to ensure that they are undamaged. Also ensure that nobody can trip over loose cables.
- If you connect the product to an external power supply, use the one delivered with the product or recommended in the product documentation. The external power supply must conform to the country-specific regulations.
- Only connect the product to a power source with a fuse protection of maximum 20 A.
- Ensure that you can disconnect the product from the power source at any time. Pull the power plug to disconnect the product. The power plug must be easily accessible. If the product is integrated into a system that does not meet

these requirements, provide an easily accessible circuit breaker at the system level.

Cleaning the product

Use a dry, lint-free cloth to clean the product. When cleaning, keep in mind that the casing is not waterproof. Do not use liquid cleaning agents.

Meaning of safety labels

Safety labels on the product warn against potential hazards.

⚠	Potential hazard Read the product documentation to avoid personal injury or product damage.
⚡	Electrical hazard Indicates live parts. Risk of electric shock, fire, personal injury or even death.
♨	Hot surface Do not touch. Risk of skin burns. Risk of fire.
⏚	Protective conductor terminal Connect this terminal to a grounded external conductor or to protective ground. This connection protects you against electric shock if an electric problem occurs.

1.2   Labels on R&S SMA100B

Labels on the casing inform about:

- Personal safety, see "Connecting to power" on page 9.
- Product and environment safety, see Table 1-1.
- Identification of the product, see the serial number on the rear panel.

Table 1-1: Labels regarding R&S SMA100B and environment safety

🗑	Labeling in line with EN 50419 for disposal of electrical and electronic equipment after the product has come to the end of its service life. For more information, see the product user manual, chapter "Disposal".

1.3 Warning messages in the documentation

A warning message points out a risk or danger that you need to be aware of. The signal word indicates the severity of the safety hazard and how likely it will occur if you do not follow the safety precautions.

WARNING

Potentially hazardous situation. Could result in death or serious injury if not avoided.

CAUTION

Potentially hazardous situation. Could result in minor or moderate injury if not avoided.

NOTICE

Potential risks of damage. Could result in damage to the supported product or to other property.

1.4 Where to find key documents on Rohde & Schwarz

Certificates issued to Rohde & Schwarz that are relevant for your country are provided at www.rohde-schwarz.com/key-documents, e.g. concerning:

- Quality management
- Environmental management
- Information security management
- Accreditations

1.5   Korea certification class A

이 기기는 업무용(A급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

2   Documentation overview

This section provides an overview of the R&S SMA100B user documentation. Unless specified otherwise, you find the documents at:

www.rohde-schwarz.com/manual/sma100b

2.1   Getting started manual

Introduces the R&S SMA100B and describes how to set up and start working with the product. Includes basic operations, typical measurement examples, and general information, e.g. safety instructions, etc. A printed version is delivered with the instrument.

2.2   User manuals and help

Contains the description of all instrument modes and functions. It also provides an introduction to remote control, a complete description of the remote control commands with programming examples, and information on maintenance, instrument interfaces and error messages. Includes the contents of the getting started manual.

The contents of the user manuals are available as help in the R&S SMA100B. The help offers quick, context-sensitive access to the complete information.

All user manuals are also available for download or for immediate display on the Internet.

2.3   Service manual

Describes the performance test for checking compliance with rated specifications, firmware update, troubleshooting, adjustments, installing options and maintenance.

The service manual is available for registered users on the global Rohde & Schwarz information system (GLORIS):

https://gloris.rohde-schwarz.com

2.4 Instrument security procedures

Deals with security issues when working with the R&S SMA100B in secure areas. It is available for download on the internet.

2.5 Printed safety instructions

Provides safety information in many languages. The printed document is delivered with the product.

2.6 Data sheets and brochures

The data sheet contains the technical specifications of the R&S SMA100B. It also lists the options and their order numbers and optional accessories.

The brochure provides an overview of the instrument and deals with the specific characteristics.

See www.rohde-schwarz.com/brochure-datasheet/sma100b

2.7 Release notes and open source acknowledgment (OSA)

The release notes list new features, improvements and known issues of the current firmware version, and describe the firmware installation.

The software makes use of several valuable open source software packages. An open-source acknowledgment document provides verbatim license texts of the used open source software.

See www.rohde-schwarz.com/firmware/sma100b

2.8   Application notes, application cards, white papers, etc.

These documents deal with special applications or background information on particular topics.

See www.rohde-schwarz.com/application/sma100b

2.9   Videos

Find various videos on Rohde & Schwarz products and test and measurement topics on YouTube: https://www.youtube.com/@RohdeundSchwarz

On the menu bar, search for your product to find related videos.

Figure 2-1: Product search on YouTube

3   Key features

The R&S SMA100B is a new high-performance signal generator developed to meet demanding customer requirements. Offering excellent signal characteristic and straightforward and intuitive operation, the signal generator makes signal generation fast and easy.

Outstanding key features of the R&S SMA100B are:

- Frequency range from 8 kHz to up to 20 GHz (overrange 72 GHz)
- Excellent signal quality
- Excellent single sideband (SSB) phase noise
- Nearly no wideband noise
- Very high output power
- Low harmonics
- Unique pulse train generation
- High-stability reference oscillator
- Intuitive operation via touchscreen with the tile diagram as key element

For more information, see data sheet.

4   Preparing for use

Here, you can find basic information about setting up the product for the first time.

4.1   Lifting and carrying

Use the handles at the side, for lifting and carrying the R&S SMA100B, see "Lifting and carrying the product" on page 8. Use the handles at the front, for mounting the R&S SMA100B in a rack.
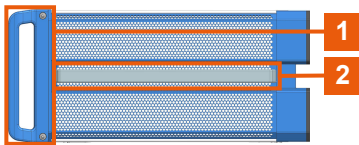
Figure 4-1: Instrument side view with front handles (1) and side handles (2)

4.2   Unpacking and checking

1. Unpack the R&S SMA100B carefully.

2. Retain the original packing material. Use it to protect the control elements and connectors when transporting or shipping the R&S SMA100B later.
    See also chapter "Transporting" in the user manual.

3. Using the delivery notes, check the equipment for completeness.

4. Check the equipment for damage.

    If the delivery is incomplete or equipment is damaged, contact Rohde & Schwarz.

4.3   Choosing the operating site

Specific operating conditions ensure proper operation and avoid damage to the product and connected devices. For information on environmental conditions such as ambient temperature and humidity, see the data sheet.

See also "Choosing the operating site" on page 8.

Electromagnetic compatibility classes

The electromagnetic compatibility (EMC) class indicates where you can operate the product. The EMC class of the product is given in the data sheet.

* Class B equipment is suitable for use in:
  – Residential environments
  – Environments that are directly connected to a low-voltage supply network that supplies residential buildings
* Class A equipment is intended for use in industrial environments. It can cause radio disturbances in residential environments due to possible conducted and radiated disturbances. It is therefore not suitable for class B environments.
  If class A equipment causes radio disturbances, take appropriate measures to eliminate them.

4.4   Setting up the R&S SMA100B

See also:
* "Setting up the product" on page 8
* "Intended use" on page 7

4.4.1   Placing the R&S SMA100B on a bench top

To place the product on a bench top

1. Place the product on a stable, flat and level surface. Ensure that the surface can support the weight of the product. For information on the weight, see the data sheet.

2. **CAUTION!** Foldable feet can collapse. See "Setting up the product" on page 8.

   Always fold the feet completely in or out. With folded-out feet, do not place anything on top or underneath the product.

3. **WARNING!** A stack of products can fall over and cause injury. Never stack more than three products on top of each other. Instead, mount them in a rack.

   Stack as follows:

   ● If the products have foldable feet, fold them in completely.
   ● It is best if all products have the same dimensions (width and length). If the products have different dimensions, stack according to size and place the smallest product on top.
   ● Do not exceed the permissible total load placed on the product at the bottom of the stack:
     – 50 kg when stacking products of identical dimensions (left figure).
     – 25 kg when stacking smaller products on top (middle figure).
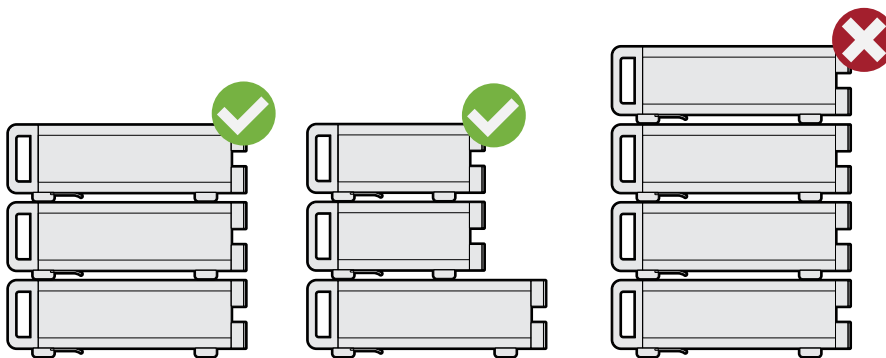
   Left   = Stacked correctly, same dimensions
   Middle = Stacked correctly, different dimensions
   Right   = Stacked incorrectly, too many products

4. **NOTICE!** Overheating can damage the product.

   Prevent overheating as follows:

   ● Keep a minimum distance of 10 cm between the fan openings of the product and any object in the vicinity to provide sufficient airflow and ventilation.
   ● Do not place the product next to heat-generating equipment such as radiators or other products.

4.4.2   Mounting the R&S SMA100B in a rack

To prepare the rack

1. Observe the requirements and instructions in "Setting up the product" on page 8.

2. **NOTICE!** Insufficient airflow can cause overheating and damage the product.

   Design and implement an efficient ventilation concept for the rack.

To mount the R&S SMA100B in a rack

1. Use an adapter kit that fits the dimensions of the R&S SMA100B to prepare the instrument for rack mounting.
   a) Order the rack adapter kit designed for the R&S SMA100B. For the order number, see the data sheet.
   b) Mount the adapter kit. Follow the assembly instructions provided with the adapter kit.

2. **WARNING!** The R&S SMA100B is heavy. Lift the R&S SMA100B with a lifting equipment, see "Lifting and carrying the product" on page 8.

   Lift the R&S SMA100B to shelf height.

3. Grab the handles at the front.

4. Push the R&S SMA100B onto the shelf until the rack brackets fit closely to the rack.

5. Tighten all screws at the rack brackets with a tightening torque of 1.2 Nm to secure the R&S SMA100B in the rack.

To unmount the R&S SMA100B from a rack

1. Loosen the screws at the rack brackets.

2. **WARNING!** The R&S SMA100B is heavy. Lift the R&S SMA100B with a lifting equipment, see "Lifting and carrying the product" on page 8.

   Bring the lifting equipment to shelf height.

3. Remove the R&S SMA100B from the rack.

4. If placing the R&S SMA100B on a bench top again, unmount the adapter kit from the R&S SMA100B. Follow the instructions provided with the adapter kit.

4.5   Considerations for test setup

Cable selection and electromagnetic interference (EMI)

Electromagnetic interference (EMI) can affect the measurement results.

To suppress electromagnetic radiation during operation:

* Use high-quality shielded cables, especially for the following connector types:
  – BNC
    Double-shielded BNC cables.
    How to: "To connect to pluggable connectors" on page 25
  – SMA
    Double-shielded SMA cables.
    How to: "To connect to screwable connectors" on page 25
  – USB
    Double-shielded USB cables.
    How to: Chapter 4.8, "Connecting USB devices", on page 23.
  – LAN
    At least CAT6 STP cables.
    How to: Chapter 4.7, "Connecting to LAN", on page 22
* Always terminate open cable ends.
* Ensure that connected external devices comply with EMC regulations.

Signal input and output levels

Information on signal levels is provided in the data sheet. Keep the signal levels within the specified ranges to avoid damage to the R&S SMA100B and connected devices.

Preventing electrostatic discharge (ESD)

Electrostatic discharge is most likely to occur when you connect or disconnect a DUT.

► **NOTICE!** Electrostatic discharge can damage the electronic components of the product and the device under test (DUT).

  Ground yourself to prevent electrostatic discharge damage:

  a) Use a wrist strap and cord to connect yourself to ground.

b) Use a conductive floor mat and heel strap combination.

4.6   Connecting to power

For safety information, see "Connecting to power" on page 9.

1. Plug the AC power cable into the AC power connector on the rear panel. Only use the AC power cable delivered with the R&S SMA100B.

2. Plug the AC power cable into a power outlet with ground contact.

   The required ratings are listed next to the AC power connector and in the data sheet.

4.7   Connecting to LAN

Network environment

Before connecting the product to a local area network (LAN), consider the following:

● Install the latest firmware to reduce security risks.

● For internet or remote access, use secured connections if applicable.

● Ensure that the network settings comply with the security policies of your company. Contact your local system administrator or IT department before connecting your product to your company LAN.

● When connected to the LAN, the product may potentially be accessed from the internet, which may be a security risk. For example, attackers might misuse or damage the product.

To connect to LAN

► Connect the LAN socket on the rear panel via an RJ-45 cable to the LAN.

   Using DHCP (dynamic host configuration protocol), the R&S SMA100B assigns the IP address automatically.

   If connected to the LAN, the R&S SMA100B displays the IP address and the hostname at the left bottom of the home screen.

```
       System Config
Host: inst-123456 ─────── 1
IP: 10.100.10.10 ─────── 2
```

1 = Hostname
2 = IP address

If disconnected from the LAN, the R&S SMA100B displays the IP address
0.0.0.0.

See also chapter "To configure the instrument for remote access" in the user
manual.

4.8   Connecting USB devices

You can connect or disconnect all USB devices from the R&S SMA100B during
operation.

To connect USB storage devices

USB storage devices, such as memory sticks, allow data transfer from or to the
R&S SMA100B. You can also use them for firmware updates.

► Connect the USB storage device to any of the USB connectors.

To connect USB devices with external power supply

1. **NOTICE!** Connected devices with external power supply can feed back current into the 5 V power supply of the USB interface and thus damage the R&S SMA100B.

   Ensure that there is no connection between the positive pole of the power supply and the +5 V power pin of the USB interface (VBUS).

2. Connect the USB storage device to any of the USB connectors on the front panel or rear panel.

To connect a keyboard

► Connect the keyboard to any of the USB connectors on the front panel or rear panel.

When connected, the R&S SMA100B detects the keyboard automatically. A detected keyboard has the default layout English – US.

To connect a mouse

► Connect the mouse to any of the USB connectors.

When connected, the R&S SMA100B detects the mouse automatically.

To connect power sensors

You can connect power sensors of the R&S NRP families to any of the USB connectors on the front panel or rear panel.

See chapter "Using power sensors" in the user manual.

4.9   Connecting to RF coaxial connectors

Here, you find information on how to prepare and to connect to RF coaxial connectors of the R&S SMA100B. Use these RF connectors, for example, for output of the RF signal or for input of an external reference signal.

To prepare for connecting

1. **NOTICE!** Damaged or not clean connections can lead to RF insertion loss and mismatch, and even premature wear of the connectors.

   Before connecting to the port, inspect the RF connector visually. Check that it is clean, undamaged and mechanically compatible.

2. **NOTICE!** DC voltage at the RF connector can damage the instrument. Never apply DC voltage to the RF input connectors.

   Make sure that the values are within the DC limits given in the data sheet.

3. If your test setup has a DC component at the RF input, insert a DC blocker.

4. Use a high-quality RF cable that matches the RF connector type.
   See "Cable selection and electromagnetic interference (EMI)" on page 21.

5. You can connect to two kinds of connectors:
   ● "To connect to screwable connectors" on page 25
   ● "To connect to pluggable connectors" on page 25

To connect to screwable connectors

The R&S SMA100B provides screwable RF connectors as in Table 4-1.

► **NOTICE!** Excessive tightening can damage the connectors.

To connect the cable with the connector, proceed as follows:

a) Carefully align the connector of the cable and the connector along a common axis.
b) Mate the connectors along the common axis until the male pin of the inner connector engages with the female socket of the outer connector.
c) Turn the nut of the outer connector until the connectors are firmly coupled.
d) Using a calibrated torque wrench torque the nut to the limit as in the table below. Hold the opposite connector part stationary with a spanner.

Table 4-1: Connector name, type, size, torque limit and nut opening

Connector		Torque limit		Nut opening	
Type	Name	lb-Inch	Nm	Inch	mm
N	RF 50 Ω*)	13.3	1.5	3/4	20
SMA	Clk Syn Clk Syn N Ref In 1 GHz Ref Out 1 GHz	5	0.56	5/16	8
2.92 mm	RF 50 Ω*)	8	0.9	5/16	8
1.85 mm	RF 50 Ω*)	8	0.9	5/16	8

*) maximum frequency f_{max} depends on the connector type:
f_{max}(N) ≤ 7 GHz, f_{max}(2.92 mm) ≤ 40 GHz, f_{max}(1.85 mm) ≤ 67 GHz

To connect to pluggable connectors

The R&S SMA100B provides pluggable Bayonet Neill-Concelman (BNC) connectors.

► To connect the RF cable with the BNC connector, proceed as follows:

a) Carefully align the connector of the cable and the BNC connector along a common axis.
b) Mate the connectors along the common axis until the male pin of the connector of the cable engages with the female socket of the BNC connector.

For information on how to handle and maintain the RF port, to minimize measurement deviations and ensure its longevity, see the application note 1MA99.

If you want to mount test port adapters to your RF connector, see the application note 1MA100.

4.10   Connecting to RF 50 Ω

To connect to "RF 50 Ω"

1. Before connecting to the "RF 50 Ω" connector on the front panel, proceed as follows:
   a) Prepare the "RF 50 Ω" connector. See "To prepare for connecting" on page 24.
   b) If activated, deactivate the RF output. In the home screen, select the block "Level" > "RF On > Off".

   If equipped with an option for rear panel connectors, prepare the "RF 50 Ω" connector on the rear panel.

2. Connect to the "RF 50 Ω" connector. See "To connect to screwable connectors" on page 25.

To prevent RF output switch-off

► **NOTICE!** If you set a too high output level without a load connected to the instrument, the reverse power can exceed a limit forcing the R&S SMA100B to switch off the RF output.

Connect a load with sufficient return loss as given in the data sheet.

4.11   Connecting to Ref In/Ref Out

To connect to "Ref In"/"Ref Out"

For connection, the R&S SMA100B provides BNC connectors (reference signal frequency f_{ref} < 1 GHz) or SMA connectors (f_{ref} = 1 GHz).

1. Before connecting, prepare the Ref In/Ref Out connectors on the rear panel. See "To prepare for connecting" on page 24.

2. Connect to the "Ref In"/"Ref Out" connectors:
   - f_{ref} < 1 GHz: "To connect to pluggable connectors" on page 25
   - f_{ref} = 1 GHz: "To connect to screwable connectors" on page 25

4.12 Switching on or off

The following table provides an overview of power states, LEDs and positions of the power switch.

Table 4-2: Overview of power states

State	LED	Position of power switch
Off	⚪ gray	[0]
Standby	🟠 orange	[I]
Ready	🟢 green	[I]

To switch on the R&S SMA100B

The R&S SMA100B is off but connected to power. See Chapter 4.6, "Connecting to power", on page 22.

1. Set the switch on the power supply to position [I] on the rear panel.

   The LED of the [On/Standby] key on the front panel is orange.

2. Press the [On/Standby] key on the front panel.

   The LED changes to green. The R&S SMA100B boots.

   After booting, the R&S SMA100B starts up displaying the home screen on the screen on the front panel.

To check start-up functions

When starting for the first time, the R&S SMA100B starts with the default settings. When restarting, the R&S SMA100B recalls the instrument configuration before shut-down.

See chapter "Saving and recalling instrument settings" in the user manual.

When switched on, the R&S SMW automatically monitors main functions. You can query erroneous functions. In addition to automatic monitoring, you can perform maintenance tasks. See the following:

- Chapter "Querying notifications" in the user manual.
- Chapter "Performing maintenance tasks" in the user manual.

To shut down the product

The product is in the ready state.

► Press the [On/Standby] key.

The operating system shuts down. The LED changes to orange.

In the standby state, the power switch circuits are active. To deactivate them, disconnect the instrument from the power supply.

To disconnect from power

The R&S SMA100B is in the standby state.

1. **NOTICE!** Risk of data loss. If you disconnect the product from power when it is in the ready state, you can lose settings and data. Shut it down first.

   Set the toggle switch on the power supply to position [0].

   The LED of the [On/Standby] key is switched off.

2. Disconnect the R&S SMA100B from the power source.

5   Instrument tour

This chapter explains the control elements and the connectors of the R&S SMA100B. The views of the front panel and the rear panel help you to get familiar with the instrument and to perform first steps. For specifications of the interfaces, see the data sheet.

The meanings of the labels on the R&S SMA100B are described in Chapter 1.2, "Labels on R&S SMA100B", on page 10.

5.1   Front panel tour

This section provides an overview of the control elements at the front panel of the R&S SMA100B. Most of the connectors are at the rear panel and are described in Chapter 5.2, "Rear panel tour", on page 38.

Figure 5-1: Front panel view of the R&S SMA100B RF Signal Generator with height unit 2HU (option R&S SMAB-B92)

1 = Utility keys
2 = Touchscreen
3 = Function keys
4 = Navigation controls
5 = Display keys
6 = SD card slot
7 = USB connector
8 = RF 50 Ω
9 = Sensor
10 = Keypad
11 = On/Standby
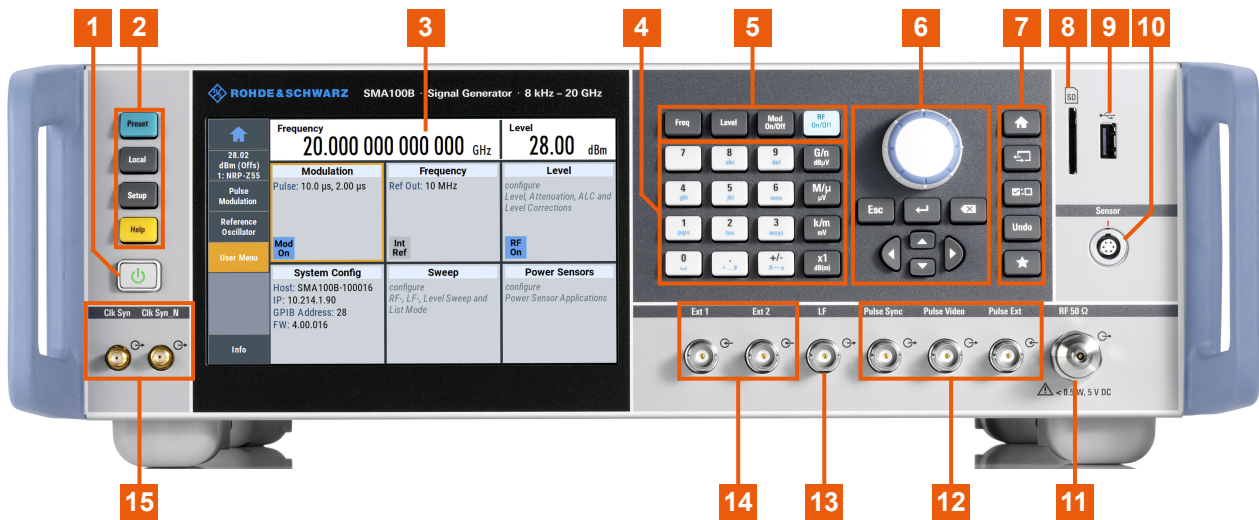
Figure 5-2: Front panel view of the R&S SMA100B RF Signal Generator with height unit 3HU (option R&S SMAB-B93)

1 = On/Standby
2 = Utility keys
3 = Touchscreen
4 = Keypad
5 = Function keys
6 = Navigation controls
7 = Display keys
8 = SD card slot
9 = USB connector
10 = Sensor
11 = RF 50 Ω
12 = Pulse signal connectors
13 = LF
14 = Ext 1/2
15 = Clock synthesizer connectors

5.1.1   Touchscreen

The screen at the front panel is the graphical user interface. It shows the settings dialogs and parameters, and the current configuration at a glance, see Chapter 7.3, "Understanding the display information", on page 54.
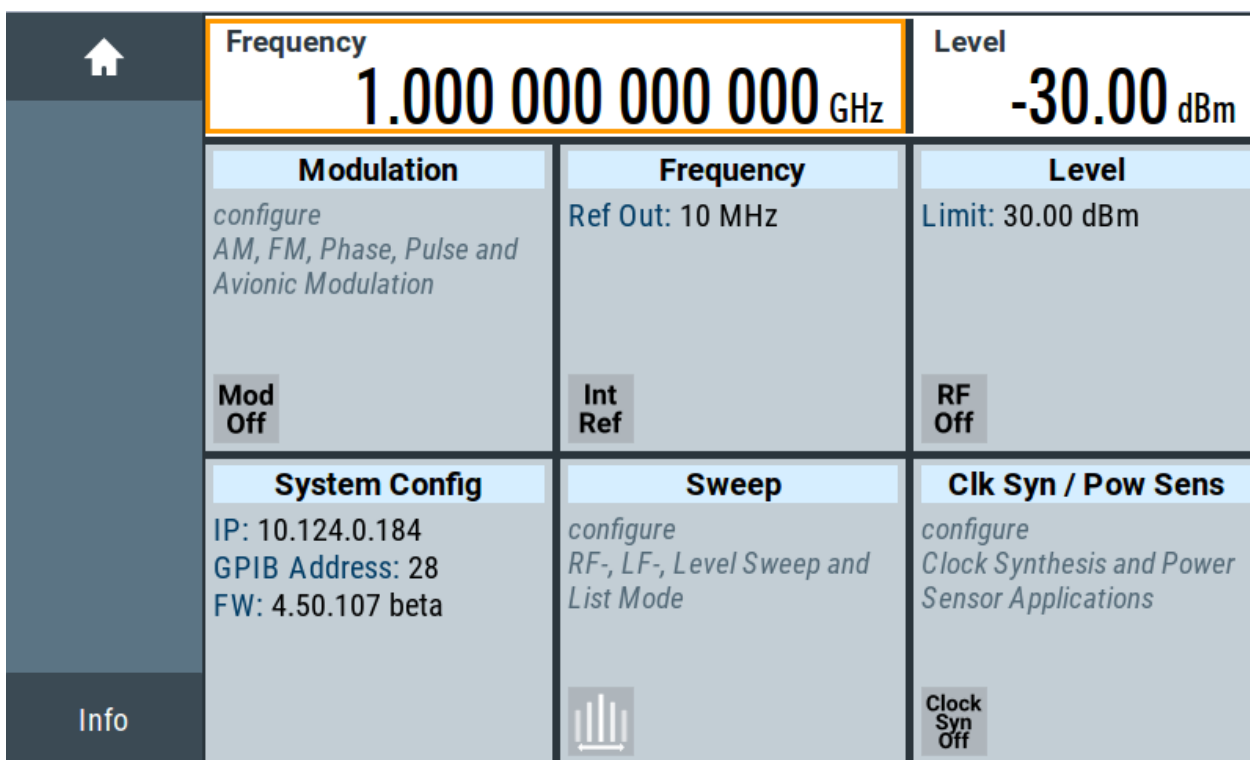
Figure 5-3: Touchscreen

The touch-sensitive panel provides an alternative means of user interaction for quick and easy handling of the instrument, see Chapter 7.2, "Means of manual interaction", on page 54.

See also:

● Chapter 7, "Instrument control", on page 53, for operating the touchscreen.
● Chapter "Cleaning" in the user manual, for instructions on cleaning the product.

5.1.2   Utility keys

The utility keys set the R&S SMA100B to a defined state, and provide access to basic settings and information on assistance.

Table 5-1: Utility keys

Utility Key	Assigned functions
[Preset]	Sets the instrument to a defined state
[Local]	Switches from remote control to local (manual) control

Utility Key	Assigned functions
[Setup]	Accesses the general instrument settings
[Help]	Displays context-sensitive help text

5.1.3   On/Standby

The [On/Standby] key switches the instrument from the standby to the ready state or vice versa.

The LED above the [On/Standby] key indicates the instrument state, see Chapter 4.12, "Switching on or off", on page 27.

5.1.4   Function keys

Function keys provide access to the most common generator settings and functions. You can find a detailed description of the corresponding functions in the user manual.

Table 5-2: Function keys

Function key	Assigned functions
[Freq]	Activates frequency entry.
[Level]	Activates level entry.
[Mod on/off]	Switches the modulation on and off.
[RF on/off]	Switches the RF output on and off.

5.1.5   Keypad

The keypad enables you to enter alphanumeric parameters, including the corresponding units. It contains the following keys:

Table 5-3: Keys on the keypad

Type of key	Description
Alphanumeric keys	Enter numbers and (special) characters in edit dialog boxes.
Decimal point	Inserts a decimal point "." at the cursor position.

Type of key	Description
Sign key	Changes the sign of a numeric parameter. For an alphanumeric parameter, inserts a "-" at the cursor position.
Unit keys (G/n dBµV, M/µ µV, k/m mV and x1 dB(m))	These keys add the selected unit to the entered numeric value and complete the entry. For level entries (e.g. in dB) or dimensionless values, all units have the value "1" as multiplying factor. Thus, they have the same function as an [Enter] key.

5.1.6   Navigation controls

The navigation controls include a rotary knob, navigation keys, and the display keys. They allow you to navigate within the display or within dialog boxes.

5.1.6.1   Rotary knob

The rotary knob has several functions:

- Increments (clockwise direction) or decrements (counterclockwise direction) numeric instrument parameters at a defined step width.
- Moves the selection, e.g. to a function block in the block diagram
- Shifts the selection bar within focused areas (e.g. lists).
- Acts like the [Enter] key, when it is pressed.
- Opens a context-sensitive menu, when it is pressed and held.

5.1.6.2   Editing keys

Editing keys enable you to confirm an entry, delete individual characters, or exit the current operation.

Table 5-4: Editing keys

Type of key	Description
[Esc] key	Closes all kinds of dialog boxes, if the edit mode is not active. Quits the edit mode, if the edit mode is active. Equals selecting the "Cancel" button in dialogs, if provided. For "Edit" dialog boxes, the following applies: ● If data entry has been started, it retains the original value and closes the dialog box. ● If data entry has not been started or has been completed, it closes the dialog box.
[Enter] key	Has the same effect as pressing the rotary knob. ● Concludes the entry of dimensionless entries. The new value is accepted. ● With other entries, this key can be used instead of the default unit key. ● In a dialog box, selects the default or focused element. ● Calls the next dialog level. ● Confirms and closes open input windows.
[Backspace] key	Deletes the character to the left of the cursor in editing mode.

5.1.6.3 Navigation keys

As an alternative to the rotary knob or the touchscreen, you can use the navigation keys to navigate through dialog boxes, diagrams, or tables.

Table 5-5: Navigation keys

Type of key	Description
[Up/Down] Key	The [Up] and the [Down] key does the following: ● In a numeric edit dialog box, increase or decrease the instrument parameter. ● In a list, scroll forward and backward through the list entries. ● In a table, move the selection bar vertically. ● In windows or dialog boxes with vertical scrollbar, move the scrollbar.
[Left/Right] Key	The [Left] and the [Right] key does the following: ● In an alphanumeric edit dialog box, move the cursor. ● In a list, scroll forward and backward through the list entries. ● In a table, move the selection bar horizontally. ● In windows or dialog boxes with horizontal scrollbar, move the scrollbar.

5.1.7   Display keys

The display keys arrange different windows on the display.

Table 5-6: Display keys

Display key	Assigned functions
[Home]	Returns to the initial feature screen.
[Next window]	Toggles between the entry fields in the taskbar.
[On/Off]	• Switches highlighted elements or a function block on and off. • Switches between two or more settings, e.g. items of selection lists. At the end of a list, the cursor is set on the first entry again.
[Undo]	Reverts the last operation.
[★ (User)]	Adds a parameter to the user menu for quick access.

5.1.8   SD card slot

Option: R&S SMAB-B85

Slot for removable mass storage.

To prevent from unauthorized removal, the SD card holder includes wholes that provide the opportunity of sealing the SD card. We recommend that you seal the SD card crosswise.

5.1.9   USB connector

Female USB type A connector, to connect devices like a keyboard, a mouse, a memory stick, or the R&S NRP-Z3/Z4 cable for the R&S NRP power sensors.

How to: Chapter 4.8, "Connecting USB devices", on page 23

5.1.10   Sensor

Connector for R&S NRP sensors.

A power sensor is connected to the R&S SMA100B by inserting the male connector. To disconnect, pull the connector by its sleeve. You cannot disconnect the sensor simply by pulling at the cable or the rear part of the connector.

The R&S SMA100B supports the use of R&S NRP power sensors in various ways including the use as a power viewer.

ⓘ   The female connector allows the mechanical connection of 6-pole and 8-pole male connectors.

It mates with the interface cables R&S NRP-ZK8 and R&S NRP-ZK6, used for connecting R&S NRPxx power sensors, and also with the six-pole push-pull plugs of the R&S NRP-Zxx series.

However, the signal pair of the common time base clock assigned to the two pins in the center of the male connectors is not available. These pins are used by Rohde & Schwarz power meters to synchronize several power sensors.

How to: Chapter "Using power sensors" in the user manual

5.1.11 RF 50 Ω

Output of the RF signal.

The connector type depends on the installed frequency option.

Table 5-7: RF connector types of the frequency options

Installed RF frequency option	Connector type	Frequency range
R&S SMAB-B103	N female	f_{max} ≤ 6 GHz
R&S SMAB-B106		
R&S SMAB-B112	PC 2.92 mm female Instrument equipped with interchangeable PC 2.92 mm test port adapter.	f_{max} ≤ 40 GHz
R&S SMAB-B120		
R&S SMAB-B131		
R&S SMAB-B140(N)		
R&S SMAB-B150(N)	PC 1.85 mm female Instrument equipped with PC 1.85 mm interchangeable female/female wear and tear adapter.	f_{max} ≤ 67 GHz
R&S SMAB-B167(N)		

ⓘ   The PC 1.85 mm male connector for up to 67 GHz comes with a protective 1.85 mm female adapter to prevent the sensitive connector from damage.

It is available as a spare part, and can be replaced if damaged. Contact your Rohde & Schwarz support center or www.rohde-schwarz.com/support for information.

How to: Chapter 4.10, "Connecting to RF 50 Ω", on page 26

5.1.12   Pulse signal connectors

Pulse Sync

BNC connector for output of a signal to synchronize the pulse generator signal. The synchronization signal is generated at the beginning of each pulse. For double-pulse generation, the synchronization signal is generated at the beginning of the first pulse.

Pulse Video

BNC connector for output of the internal pulse generator signal or the looped through pulse signal from Pulse Ext connector (video signal).

Pulse Ext

BNC connector for input of an external pulse modulation signal or an external trigger/gate signal for the pulse generator.

5.1.13   LF modulation connectors

LF

BNC connector for output of the internal LF generator signal.

See the data sheet and in the user manual, section "Analog modulation".

Ext

BNC connector for input of external analog modulation signals.

5.1.14   Clock synthesizer connectors

Clk Syn/Clk Syn N

SMA connectors for output of the clock synthesizer signal, or the inverted signal.

5.2   Rear panel tour

This section provides an overview of the connectors at the rear panel of the instrument. For technical data of the connectors, refer to the data sheet.
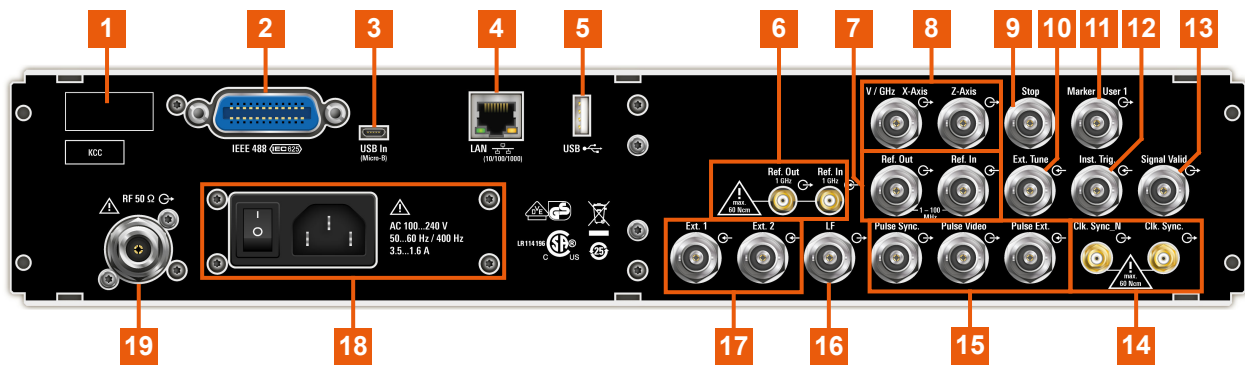
Figure 5-4: R&S SMA100B rear panel with height unit 2HU (option R&S SMAB-B92)

1   = Serial number (six digits in the string 1419.8888.02-<serial number>-<checksum>)
2   = IEC 625/IEEE 488
3, 5 = USB/USB In
4   = LAN
6, 7 = Ref In/Ref Out
8   = V/GHz X-Axis and Z-Axis
9   = Stop
10   = EFC
11   = Marker User1
12   = Inst Trig
13   = Signal Valid
14   = Clk Syn/Clk Syn N
15   = Pulse Sync, Pulse Video and Pulse Ext
16   = LF
17   = Ext 1/2
18   = AC power supply connector and switch
19   = RF 50 Ω
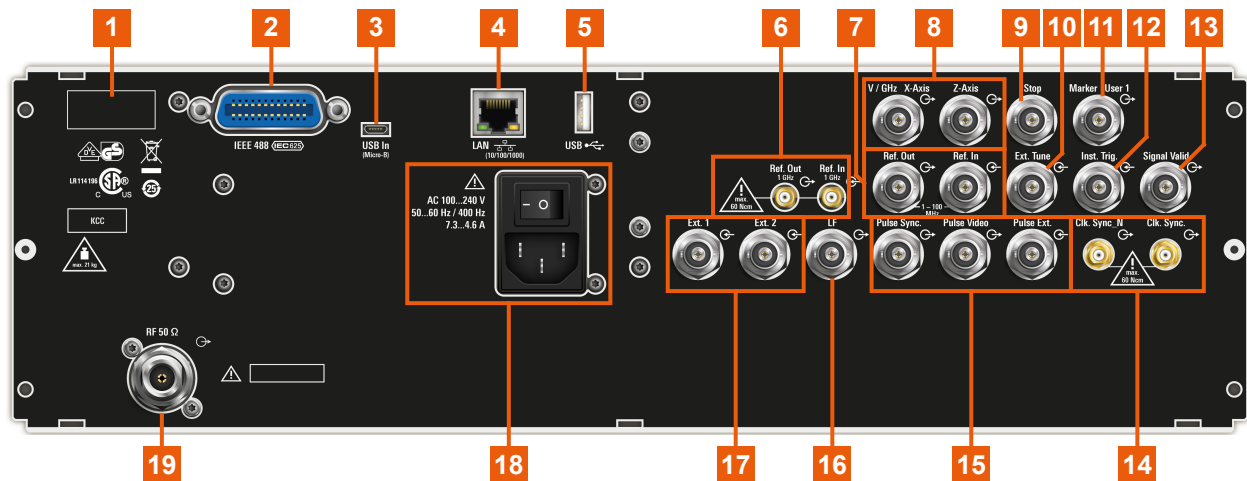
*Figure 5-5: Rear panel view of the R&S SMA100B RF Signal Generator with height unit
3HU (option R&S SMAB-B93)*

1   = Serial number (six digits in the string 1419.8888.02-<serial number>-<checksum>)
2   = IEC 625/IEEE 488
3, 5 = USB/USB In
4   = LAN
6, 7 = Ref In/Ref Out
8   = V/GHz X-Axis and Z-Axis
9   = Stop
10   = EFC
11   = Marker User1
12   = Inst Trig
13   = Signal Valid
14   = Clk Syn/Clk Syn N
15   = Pulse Sync, Pulse Video and Pulse Ext
16   = LF
17   = Ext 1/2
18   = AC power supply connector and switch
19   = RF 50 Ω

5.2.1   Connectors

IEC 625/IEEE 488

Option: R&S SMAB-B86

General purpose interface bus (GPIB) interface for remote control of the instrument. The interface is in compliance with the standards IEC 625, IEEE 488 and SCPI.

Use this interface to connect a computer for remote control of the R&S SMA100B. To set up the connection, use high-quality shielded cables. See "Cable selection and electromagnetic interference (EMI)" on page 21.

See also "Annex: Hardware interfaces" and chapter "Network and remote control" in the user manual.

USB/USB In
- Female USB (universal serial bus) 2.0 connector of type A (host USB), to connect devices like a keyboard, a mouse, a memory stick, or the R&S NRP-Z3/Z4 cable for the R&S NRP power sensors
- Option: R&S SMAB-B86
  Female USB 3.0 connector of type Micro-B (USB In), for example, for remote control.

How to: Chapter 4.8, "Connecting USB devices", on page 23

LAN
RJ-45 connector to connect the R&S SMA100B to a LAN for remote control, remote operation, and data transfer.

How to: Chapter 4.7, "Connecting to LAN", on page 22

Ref In/Ref Out
Input/output for external reference signal.

BNC connectors for reference signals from 1 MHz to 100 MHz.

SMA connectors for 1 GHz reference signals.

How to: Chapter 4.11, "Connecting to Ref In/Ref Out", on page 26

V/GHz X-Axis
BNC connectors for output of a voltage ramp signal:
- "V / GHz": the voltage is proportional to the frequency.
- "X-Axis": output of a voltage ramp for the X deflection of an oscilloscope or an XY recorder.

Z-Axis
BNC connector for output of a voltage pulse signal, e.g. for the combined blanking and marker generation of network analyzers.

Stop
BNC connector for input and output signals to stop a sweep in all modes.

This connector is bidirectional. Used as:
- "Input": enables you to stop a sweep triggered by an external network analyzer.
- "Output": enables the R&S SMA100B to stop the sweep of an external network analyzer.

EFC

BNC connector for input of an EFC (external frequency control) signal for electronic tuning of the internal reference frequency.

Marker User1

BNC connector for output of a marker or trigger signal.

Inst Trig

BNC connector for input of external trigger signals. The signals trigger sweeps and list mode.

See chapter "Signal generation and triggering in the sweep and list modes" in the user manual.

Signal Valid

BNC connector for output of a signal that determines the valid signal times (valid level and frequency) for all analog modulations.

Clk Syn/Clk Syn N

SMA connectors for output of the clock synthesizer signal, or the inverted signal.

Pulse Ext

BNC connector for input of an external pulse modulation signal or an external trigger/gate signal for the pulse generator.

Pulse Video

BNC connector for output of the internal pulse generator signal or the looped through pulse signal from Pulse Ext connector (video signal).

Pulse Sync

BNC connector for output of a signal to synchronize the pulse generator signal. The synchronization signal is generated at the beginning of each pulse. For double-pulse generation, the synchronization signal is generated at the beginning of the first pulse.

LF

BNC connector for output of the internal LF generator signal.

See the data sheet and in the user manual, section "Analog modulation".

Ext 1/2

BNC connectors for input of external analog modulation signals.

AC power supply connector and switch

Mains power switch for performing the following tasks:
● Connecting the internal power supply to the power source
● Disconnecting the internal power supply from the power source

How to: Chapter 4.6, "Connecting to power", on page 22.

RF 50 Ω

Rear panel connector for the RF signal. This connector is for use of the instrument in a 19" rack.

How to:
● Chapter 4.4.2, "Mounting the R&S SMA100B in a rack", on page 20
● Chapter 4.10, "Connecting to RF 50 Ω", on page 26

6   Trying out the instrument

This chapter introduces the first steps with the R&S SMA100B. It shows how to operate and configure the instrument using simple examples. The complete description of the functionality and its usage is given in the R&S SMA100B user manual. Basic instrument operation is described in Chapter 7, "Instrument control", on page 53.

Prerequisites

The instrument is set up, connected to the power supply, and started up as described in Chapter 4, "Preparing for use", on page 17.

The first signal generation tasks explain how to generate an unmodulated signal, to configure the RF signal output, and how you can vary the RF frequency and level in sweep mode.

The instrument is manually operated via the touchscreen. Try out the following:

6.1   Generating an unmodulated carrier

We start to generate a simple unmodulated signal. In this example, the R&S SMA100B can be in its minimal configuration.

1. On the R&S SMA100B front panel, press the [Preset] key to set a defined initial instrument state.

2. Set the frequency:
   a) In the "Status Bar", tap the "Frequency" field.
   b) On the on-screen keypad, enter "6" and press the "GHz" key.
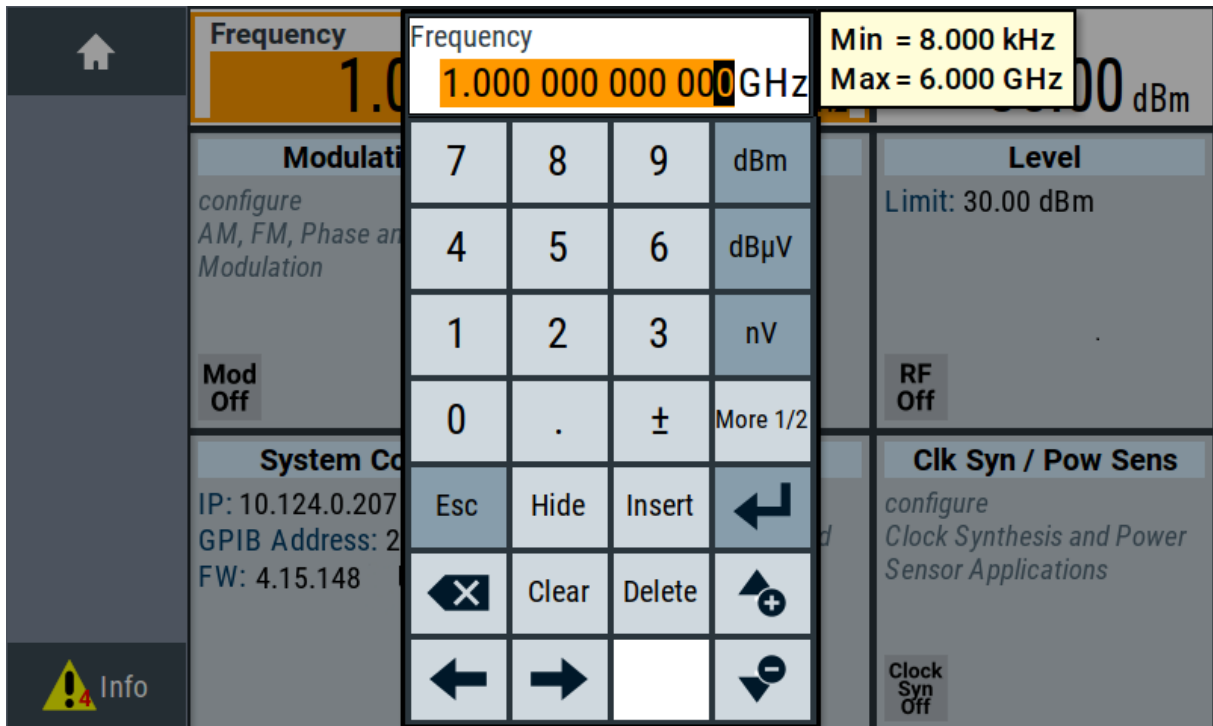
The on-screen key pad closes and the frequency value is displayed.

3. To set the signal level, tap the "Level" field and enter the level in the same way.

4. To activate RF signal output, select "Level" > "RF On" in the tile diagram.

Frequency			Level	
6.000 000 000 000 GHz			**-25.00** dBm	

Modulation	**Frequency**	**Level**
configure AM, FM, Phase and Pulse Modulation	Ref Out: 10 MHz	Limit: 30.00 dBm
		Level
Mod Off	Int Ref	☑ **RF ON**
System Config	**Sweep**	Level...
IP: 10.124.0.207 GPIB Address: 28 FW: 4.15.148	*configure RF-, LF-, Level Sweep List Mode*	Attenuator...
		Automatic Level Control...

The blue colored "RF On" icon indicates that the RF output is activated.

The R&S SMA100B provides the 6 GHz signal at the RF A connector at the front panel.

Figure 6-1: Generating an unmodulated signal

Alternative ways to access the instrument functions

To fulfill the same task, you can also use the front panel keys or the setting parameters provided in the frequency and level dialogs.

Try out the settings dialogs

1. In the "Frequency" tile, select "Frequency...".
   a) In the "RF Frequency" tab, tap the "Frequency" field.
   b) Set the frequency via the on-screen keypad.

2. Access the "RF Level" dialog via the "Level" tile.
   a) In the "RF Level" tab, select "Amplitude".
   b) Set the amplitude (level) via the on-screen keypad.

3. Select "RF State > On" to activate the RF signal generation.

Try out the front panel keys

► Use the [Freq], [Level], and [RF on/off] key on the front panel.

Connect RF 50 Ω of the R&S SMA100B to a signal analyzer, for example R&S®FSW, to display the generated signal.

For the required settings of the signal analyzer, refer to its user manual or its online help.

6.2   Generating an RF frequency sweep signal

The "Sweep" operating mode allows you to generate an RF signal with periodically varying frequencies or amplitudes.

This example deals with an RF signal with varying frequency and constant level. To configure the sweep, you need to determine a defined start and end frequency with constant time intervals between the frequency steps.

The sweep function does not require specific options.

1. On the front panel, press the [Preset] key to set a defined initial instrument state.

2. Set the signal output level, if required, e.g. set "Level > -25 dBm".

3. In the tile diagram, select "Sweep" > "Frequency Sweep".

4. In the "General" tab:

General Auto	Frequency Range		✕

State	0	Current Frequency	570.000 000 000 MHz

Mode — Auto

Shape — Sawtooth

Spacing — Linear | Dwell Time — 15.0 ms

◀ Reset Sweep
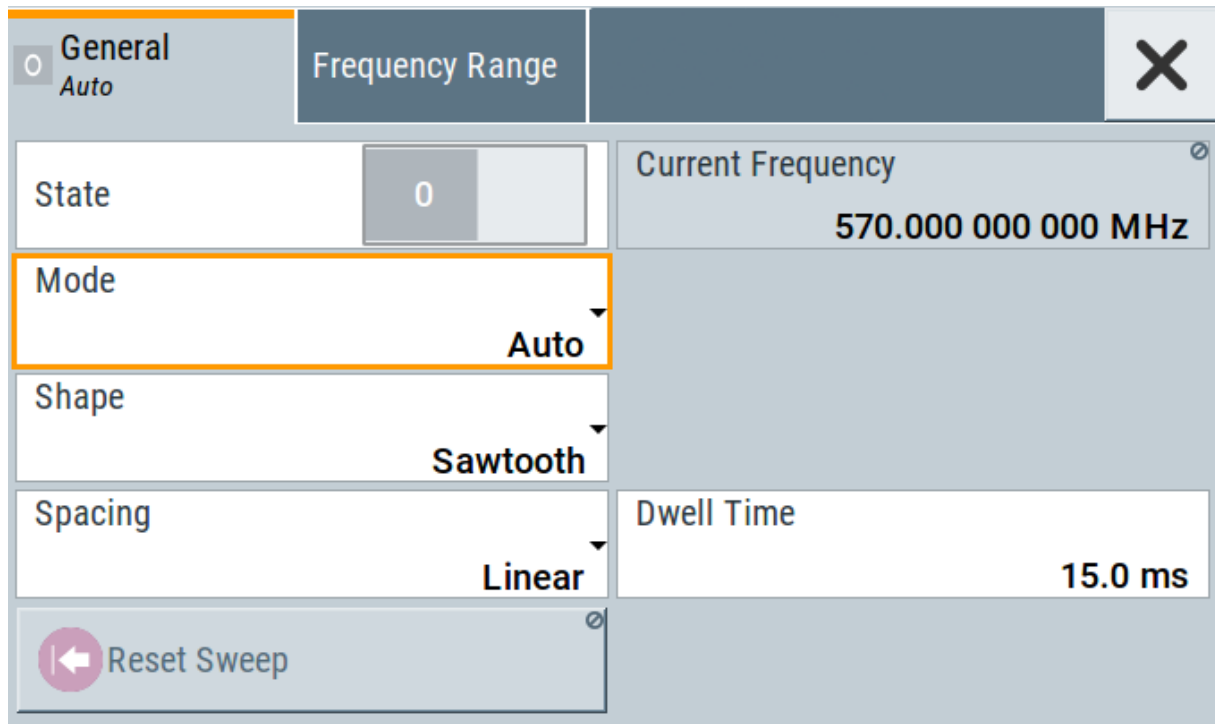
a) Select "Mode > Auto" to run the sweep continuously.
b) Select "Shape > Sawtooth" to set the waveform shape of the sweep signal.
c) Select "Spacing > Linear", to determine the calculation method for the frequency shift of a step.
d) Set "Dwell Time > 15.0 ms", to determine the time interval of the sweep steps.

5. Select the "Frequency Range" tab.

General Single	Frequency Range	Output	Edit Marker	✕

Start Frequency	100.000 000 000 MHz	Stop Frequency	500.000 000 000 MHz
Center Frequency	300.000 000 000 MHz	Span	400.000 000 000 MHz
Spacing	Linear	Step Linear	1.000 000 000 MHz

    a) Set "Start Freq > 200 MHz" and "Stop Freq > 600 MHz" to determine the frequency sweep range.

    b) Set the step width "Step Lin > 10.0 MHz" to determine the width for a frequency step.

6. In the "General" tab, activate the frequency sweep with "State > On".

7. Close the sweep dialog.
   (Alternatively, tap the "Home" button to minimize the dialog. The R&S SMA100B indicates the "Sweep" dialog as active dialog in the task bar.)

8. To activate the RF signal output, select "Level" > "RF On".
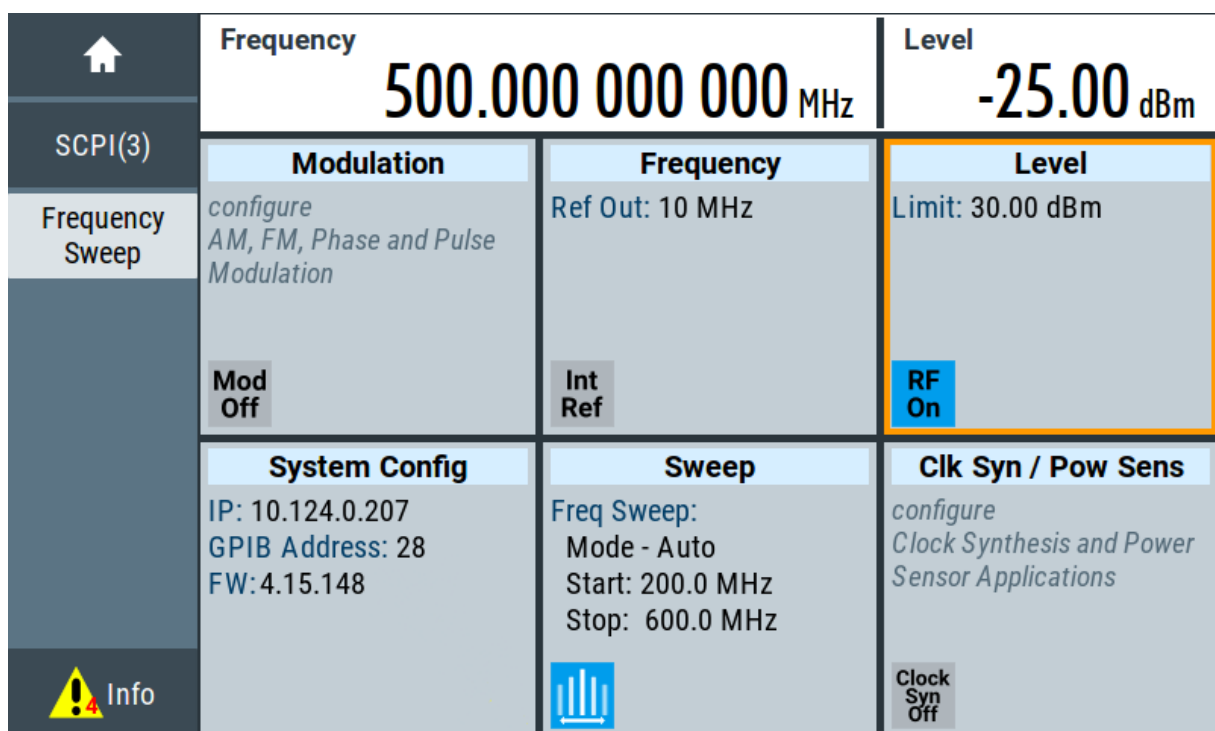
Figure 6-2: Generating a frequency sweep signal

The frequency field in the status bar indicates the continuously changing frequency, i.e. the running sweep.

6.3   Saving and recalling settings

To restore the results of our measurements later, we save the instrument settings in a file.

To save the instrument settings in a file

We assume, a test configuration as described in Chapter 6.2, "Generating an RF frequency sweep signal", on page 47.

1. Press the [Setup] key on the front panel.

2. In the "Setup" menu, select "Settings > Save/Recall".

3. In the "Save/Recall" dialog, select "Operation Mode > Save".
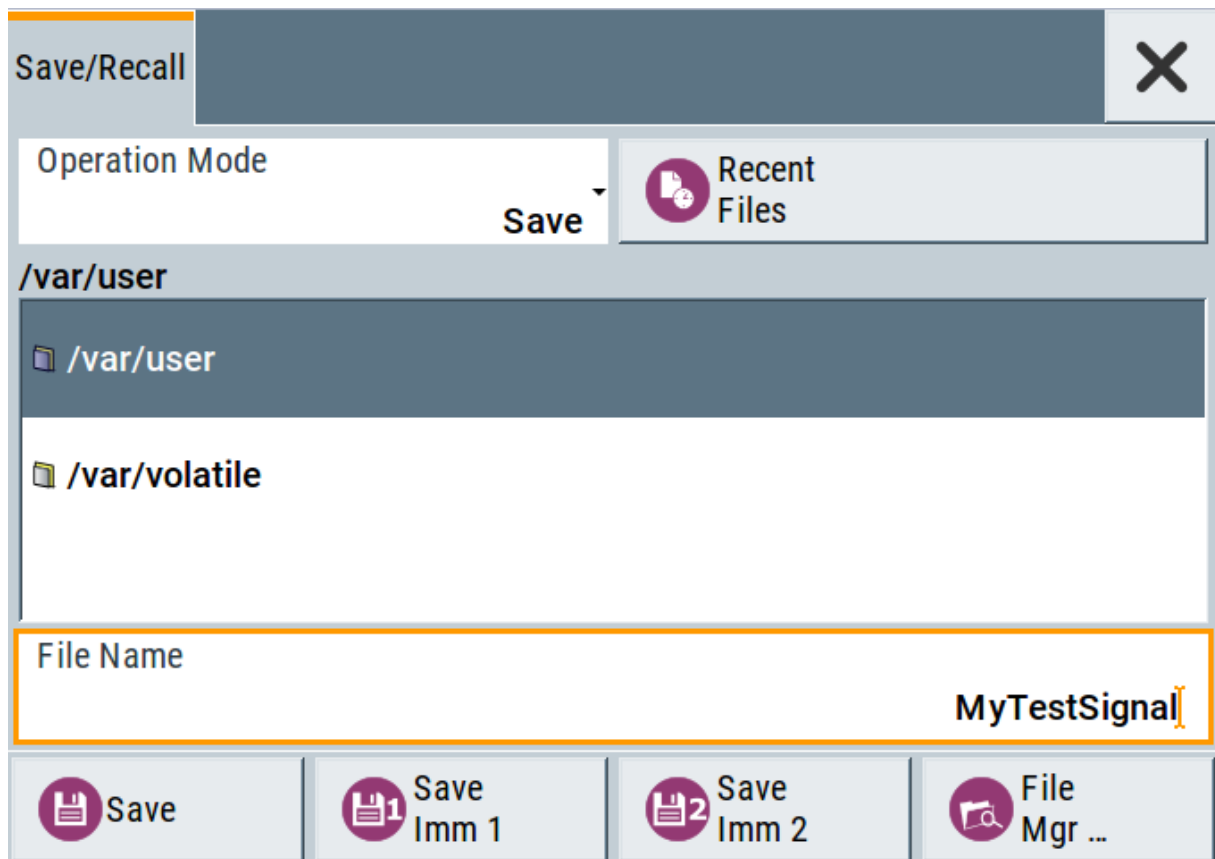
4. Tap the "Filename", use the on-screen keyboard, and enter *MyTestSignal*.

5. Tap the "Save" button.

   The file `MyTestSignal.savrcltxt` is stored in the default directory `/var/user/`.

To load saved instrument settings

You can restore the settings to the instrument at any time using the settings file.

1. Press the [Preset] button to restore the default instrument settings so you can check that the stored user settings are restored afterwards.

2. Press the [Setup] key on the front panel.

3. In the "Setup" menu, select "Settings > Save/Recall".

4. In the "Save/Recall" dialog, select "Operation Mode > Recall".
   Navigate to the directory the file is saved in and select the `MyTestSignal` file.
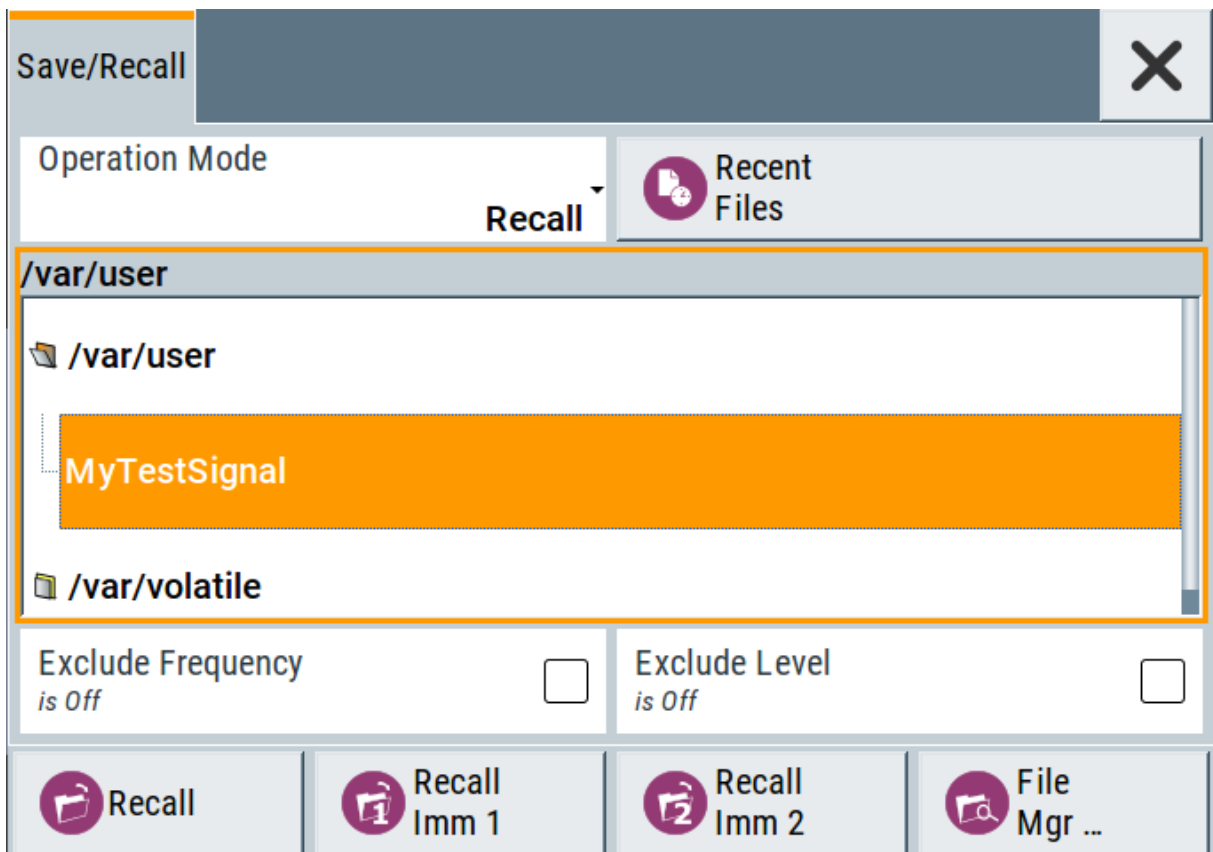
5. Tap the "Recall" button.

   All instrument settings are restored and the display resembles Chapter 6.2, "Generating an RF frequency sweep signal", on page 47, which shows the instrument display right before the settings were saved.

   How to display all parameters with values different to their preset values

   When you load a file to your instrument, you do not have enough information on the changed settings. In such case, it is useful to visualize all parameters that have been changed from their default state.

Try out the following:

- Touch and hold a spot in the tile diagram for at least 1 second to access the context-sensitive menu.

- Select "Mark All Parameters Changed from Preset".
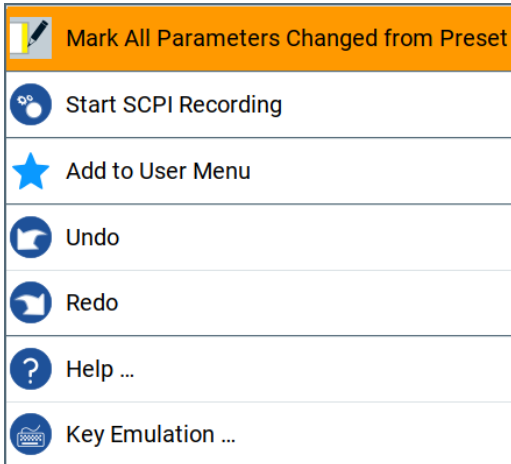
- All changed parameters are highlighted.

7   Instrument control

This chapter provides an overview on how to work with the R&S SMA100B.

It covers the following topics:

7.1   Possible ways to operate the instrument

There are three ways to operate the R&S SMA100B:

● Manual operation:
  Use the touchscreen, hard keys and rotary knob, or an optional mouse and/or keyboard.

● Remote control:
  Create programs to automatize repeating settings, tests and measurements. The instrument is connected to a computer running the program.
  This way of operation is described in the user manual, chapter "Network and Remote Control Operation".

● Remote operation from a computer:
  Remote monitoring and control of the instrument from a connected computer is based on the common cross-platform technology VNC (Virtual Network Computing). On the remote computer, any standard web browser (supporting Java) or a dedicated VNC client (like Ultr@VNC) can be used. See also .

The following sections show how to operate the instrument manually.

7.2 Means of manual interaction

For the manual interaction with the R&S SMA100B, you have several methods that you can use as an alternative to perform a task:

- Touchscreen:
  Touchscreen operation is the most direct way to interact. Almost all control elements and actions on the screen are based on the standard operating system concept. You can tap any user interface element to set parameters in dialog boxes, enter data, scroll within a dialog etc., as if you work with a mouse pointer.

  Tapping the screen works like clicking mouse buttons:
  - Touch quickly = click: Selects a parameter or provokes an action.
  - Touch and hold = right-click: Opens a context-sensitive menu.
  - Touch and swipe = drag: Scrolls through the contents of a display element larger than the screen, e.g. a list or a table.

- Function keys and rotary knob:
  The front panel provides nearly all functions and controls to operate the instrument in the classic way, without touchscreen.

- Optional mouse and/or keyboard:
  These devices work like known from PCs. The navigation keys on the front panel correspond to the keys on the keyboard.

This manual describes the manual interaction with the instrument via the touchscreen. It mentions the alternative methods using the keys on the instrument or the on-screen keypads if it deviates from the standard operating procedures. The usage of the touchscreen and navigation keys is described in Chapter 7.4, "Accessing the functionality", on page 59.

Throughout the manual, the term "select" refers to any of the following methods:

- Using a finger on the touchscreen
- Using a mouse pointer in the display
- Using a key on the instrument or on a keyboard

7.3 Understanding the display information

The home screen of the R&S SMA100B displays all main settings and generator states, divided into three main operation areas.
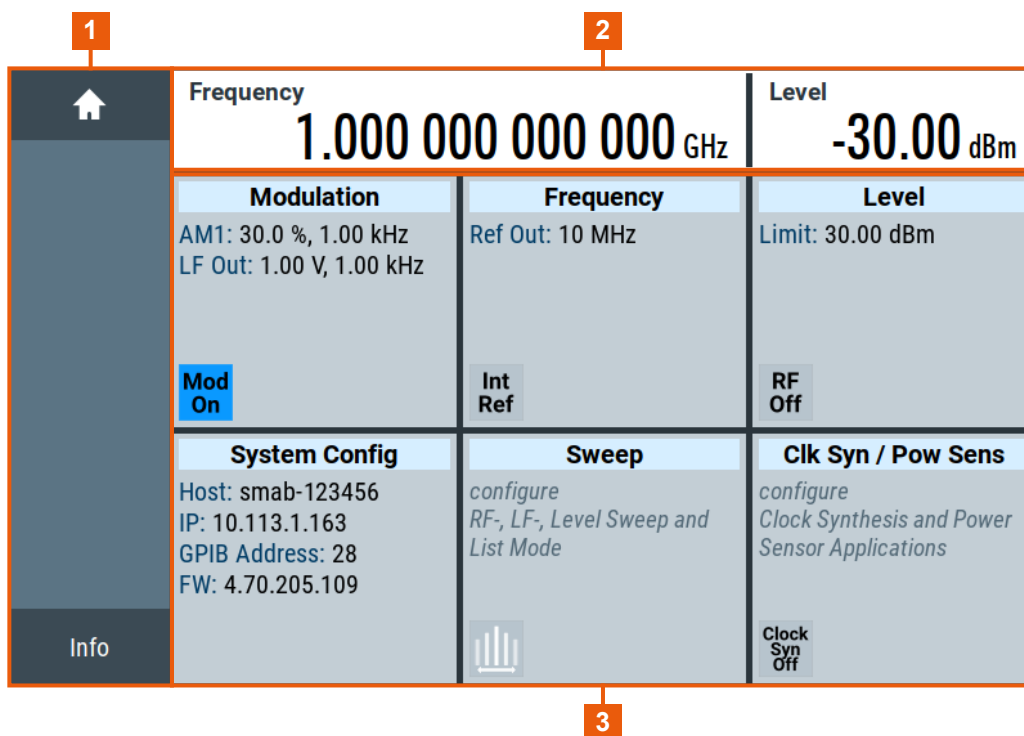
Figure 7-1: Home screen

1 = Taskbar/softkey bar with "Home" and "System Config" key
2 = Status bar
3 = Tile diagram

7.3.1 Status bar

The status bar at the top of the screen indicates the RF frequency and the level of the output signal provided to the DUT. You can set both parameters directly here.

7.3.2 Tile diagram

The tile diagram is the main entry to the settings of the R&S SMA100B.

Tile	Access to:
"Modulation"	• Analog and stereo[1], and pulse[1] modulation settings • Built in LF generator
"System Config"	• "Save/Recall": settings for saving and loading instrument configurations • "Remote access": Network and emulation settings. • "Setup": general system configuration
"Sweep"	• Frequency and level sweeps • List mode
"Frequency"	• RF frequency and phase • Reference frequency
"Level"	• RF level • Attenuator • Automatic level control • User correction
"Clk Syn / Pow Sens"	• Clock synthesis[1] • Power sensors
[1] requires additional options	

7.3.3 Taskbar

The "Taskbar" shows a home and an info button, and assigns a labeled button whenever you open a dialog. If more dialogs are open than the taskbar can display, touch and swipe the taskbar to scroll up and down.

The buttons shown in the following example represent the variants.

Table 7-1: Example of buttons in the taskbar

 "Home" button
Returns to the home screen.

 "Busy" indicator
Indicates a running process.
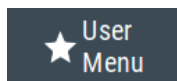
 "User Menu"
Lists parameters that can be defined for quick access.

SCPI, VNC, SMB	Shows the current remote access connections when the instrument is remotely controlled. **Tip:** An indicator in the "System Config" tile shows the current remote control status.
-67.74 dBm 1: NRP18S	R&S NRP power sensors Shows a connected external power sensor. The button displays the current readings when the sensor is active.
RF Level/EMF ALC/UCOR **Pulse Modulation**	Active dialogs Indicates the dialog name of each active dialog in a separate button.
⚠ Info	"Info" key Provides access to status and error messages. **Note:** The warning symbol signifies a permanent error message.

7.3.4   Additional display characteristics

The following section provides a short insight on the indication of the screen in general, and significant elements that you see under specific operating modes, in dialogs or settings.

- **Appearance of active elements**
  - *Active* elements like On/Off switches, state buttons have a **blue** background.
  - *Selected* elements are framed or highlighted **orange**.
  - *Inactive* elements are **gray**.
- **On-Screen keypads**
  As additional means of interacting with the instrument without having to connect an external keyboard, either a numerical or alphanumerical on-screen keypad appears when you activate an entry field (see Chapter 7.5, "Entering data", on page 60).
- **Info line**
  The "Info line" shows brief status information and error messages. It appears when an event generates a message. If selected, the R&S SMA100B shows information on static errors and the error history.

ⓘ select modulation first   ▶ ✖ Close
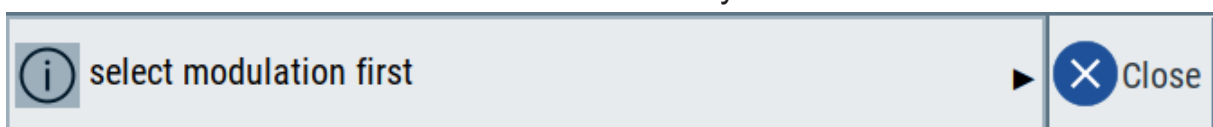
- **Key parameters indicated in tab labels**
  Most dialogs are divided into tabs with logically grouped parameters. The tab label expresses the content and can also contain status indicators or the set value of a key parameter.

- **Scroll bar handle**
  An arrow icon that appears when you touch a scroll bar helps you to scroll in a dialog or list.
  If no scrollbar handle appears, you can touch and swipe an element to scroll up and down.

- **Progress indicators**
  A busy icon indicates a currently running process. If a process takes some time, a progress bar shows the current state.

- **Context-sensitive menus**
  Within the entire screen display, including single parameters, you can access context-sensitive menus that provide some additional functions.
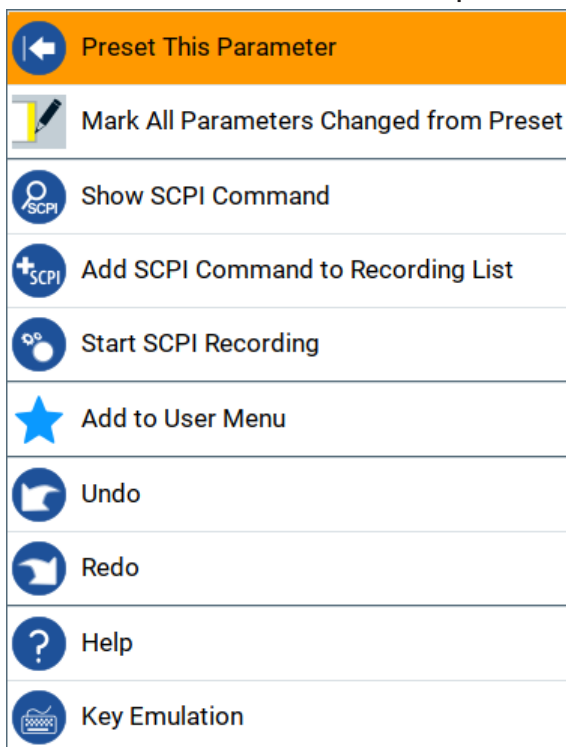
7.4   Accessing the functionality

All functionalities are provided in dialog boxes as known from computer programs. You can control the instrument intuitively with the touchscreen. This section provides an overview of the accessing methods.

The instrument's functions and settings can be accessed by selecting one of the following elements:

- System and function keys on the front panel of the instrument
- Taskbar/softkeys on the touchscreen
- Context-sensitive menus for specific elements on the touchscreen, or with the rotary knob (press and hold).
- Elements on the status bar in the touchscreen
- Displayed setting on the touchscreen that means block diagram and all settings available in dialogs.

To open a dialog box

► Perform one of the following actions:
  - Tap the required tile, and then the menu entry.
  - Tap the minimized view (button) on the taskbar.

  Some of the utility keys access a dedicated dialog, too.

To minimize a dialog box

1. To return to the home screen, tap the "Home" button.

2. To switch to another dialog, press the [Next Window] button.

To close a dialog box

To close a dialog box, you have the same controls as you know from computers or devices with touchscreen.

► Perform one of the following actions:
  - Tap the "Close" icon in the upper right corner.
  - Press the [Esc] key on the front panel.
  - Drag and drop a minimized dialog from the taskbar to the tile diagram.

To select an option in a dialog box

► Tap the required option.

7.5   Entering data

Some parameters have their own key on the front panel.

For data input in dialog boxes, the instrument provides on-screen keypads for entering numeric and alphanumeric values. Thus, you can always set the parameters via the touchscreen, the front panel, or an external keyboard.

To correct an entry

1. Using the arrow keys, move the cursor to the right of the entry you want to delete.

2. Press the [Backspace] key.

3. Deletes the entry to the left of the cursor.

4. Enter your correction.

To complete the entry

► Press the [Enter] key or the rotary knob.

To abort the entry

► Press the [Esc] key.
The dialog box closes without changing the settings.

7.5.1   Entering numeric parameters

To enter values with the on-screen keypad

For numeric settings, the instrument displays the numeric keypad. The units specified correspond to the units of the parameter.

1. Enter the numeric value.

Tip: For quick entry, you can enter a value in exponential representation, e.g. *1e7* for *10000000*.

2. Tap the unit button to complete the entry.

   The unit is added to the entry.

   Tip: For quick unit change, you can enter shortcuts, e.g. for a frequency value *1e8h* for *100 MHz*.
   For an overview of shortcuts supported by the R&S SMA100B, see chapter "Unit Shortcuts" in the appendix of the user manual.

3. If the parameter does not require a unit, confirm the entered value by pressing "Enter".

To enter values by using the front panel controls

1. Change the currently used parameter value by using the rotary knob or the [Up/Down] keys.

2. If the parameter does not require a unit, confirm the entered value by pressing the [Enter] key or any of the unit keys.
   The instrument highlights the editing line to confirm the entry.

If you edit numeric data in tables, the entry field must be in edit mode: Press [Enter], or the rotary knob to activate the edit mode.

7.5.2 Entering alphanumeric parameters

If a field requires alphanumeric input, you can use the on-screen keyboard to enter letters and (special) characters.

7.5.3 Undo and redo actions

Accessed via the context-sensitive menus, "Undo" allows you to restore one or more actions on the instrument. Depending on the available memory, the "Undo" steps can restore all actions.

"Redo" restores a previously undone action.

7.6   Getting information and help

In some dialog boxes, graphics are included to explain the way a setting works.

For further information, you can use the following sources:

- Tooltips give the value range of the parameter.
- The context help provides functional description on a setting.
- The general help explains a dialog box, provides instructions, and general information.

To display context help

► To access a help topic, perform one of the following:

a) Tap and hold the parameter for which you need information and tap "Help" in the context menu.
b) Tap the parameter and press the [Help] key.

The "Help" dialog opens. You can browse the help for further information.
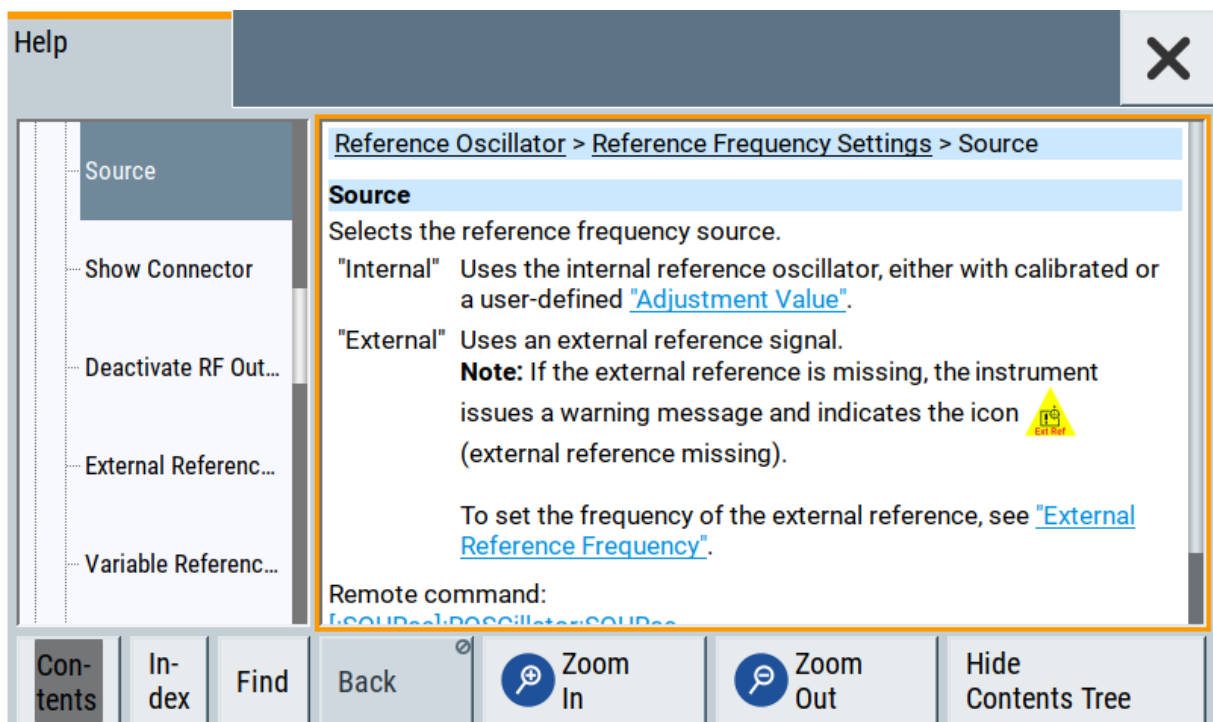
Contents of the help dialog box

The help dialog box covers two main areas:

- "Contents" - contains a table of help contents

- "Topic" - contains a specific help topic

The help system also provides an "Index" and a "Find" area, and "Zoom" functions that are accessed via the corresponding buttons.

To open general help

► Press the yellow [Help] key on the front panel.

If a dialog box is opened, the help topic for the current tab is shown. Otherwise the "Contents" page appears.

Navigating in the table of contents and in the help topics

1. To move through the displayed contents entries, tap on an entry and scroll or use a connected mouse or the [Up/Down] keys.
   Entries with a plus sign contain further entries.

2. To display a help topic, tap on the topic name or double-click the topic name or press the [Enter] key.

3. To follow a cross-reference, tap on the link text.

4. To return to the previous page, select "Back".
   This function scrolls back all steps you have performed before.

5. Use the "scroll bars" to shift the visible section of content shown.

6. To maximize the "Topics" area, tap the "Hide Contents Tree" button to hide the contents tree.

Using the index

1. Select the "Index" button.

2. Enter the first characters of the topic you are interested in.
   The entries starting with these characters are displayed.

3. Tap on the index entry.

   The corresponding help topic is displayed.

7.7   Remote control

In addition to working with the R&S SMA100B interactively, located directly at the instrument, it is also possible to operate and control it from a remote PC.

The R&S SMA100B supports various methods for remote control:

- Connecting the instrument to a LAN (see Chapter 4.7, "Connecting to LAN", on page 22)
- Using the LXI browser interface in a LAN
- Connecting a PC via the IEC-bus (IEEE 488) interface
- Remote control via the USB interface

> 💡 For remote control over LAN or USB, you can use the R&S VISA (Virtual Instrument Software Architecture) library provided for download at the Rohde & Schwarz website http://www.rohde-schwarz.com/rsvisa.

How to configure the remote control interfaces is described in the user manual, chapter "Network and remote control operation".

7.8   Remote operation over VNC

The VNC is an application which can be used to access and control the instrument from a remote computer through a LAN connection. While the instrument is in operation, the instrument screen contents are displayed on the remote computer, and VNC provides access to all applications, files, and network resources of the instrument. Thus, remote operation of the instrument is possible.

> 💡 **Instrument control from a remote computer**
>
> To access the basic utility functions of the R&S SMA100B, perform a right mouse click the block diagram and select "Key Emulation".
>
> A key panel to the right of the block diagram gives access to the utility functions provided by the front panel keys.

The VNC is an add-on program, included in operating system Linux/Unix, and available as a free-of-charge download on the internet.

See also the R&S SMA100B user manual, chapter "To operate the instrument using VNC".

8   Contacting customer support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz product, contact our customer support center. A team of highly qualified engineers provides support and works with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz products.

Contact information

Contact our customer support center at www.rohde-schwarz.com/support, or follow this QR code:

Figure 8-1: QR code to the Rohde & Schwarz support page

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