

R&S® EVSG1000

VHF/UHF Airnav/Com

Analyzer

Getting Started



1329872102

Version 05

ROHDE & SCHWARZ

Make ideas real



This document describes the following R&S EVSG1000 models with firmware version 1.50 or later:

- R&S EVSG1000 VHF/UHF nav/drone analyzer (1330.0350K02)
- R&S®EVSG1000 (1329.8009.02)

Furthermore, it covers the following options:

- R&S EVSG-B1 Second Signal Processing Unit (1329.8809.02)
- R&S EVSG-B2 Battery Management (1329.8815.02)
- R&S EVSG-B3 Battery Pack (1329.8821.02)
- R&S EVSG1-K7 LF-Analysis (1329.9163.02)
- R&S EVSG1-K20 GPS Support(1329.9092.02)
- R&S EVSG-Z1 carrying bag
- R&S EVSG-Z7 rack adapter kit

© 2023 Rohde & Schwarz GmbH & Co. KG
Muehldorfstr. 15, 81671 Muenchen, Germany
Phone: +49 89 41 29 - 0
Email: info@rohde-schwarz.com
Internet: www.rohde-schwarz.com

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1329.8721.02 | Version 05 | R&S®EVSG1000

The following abbreviations are used throughout this manual: R&S®EVSG1000 is abbreviated as R&S EVSG1000.

Contents

1 Safety information.....	7
1.1 Safety instructions.....	8
1.2 Labels on the product.....	10
1.3 Warning messages in the documentation.....	11
2 Documentation overview.....	12
2.1 Getting started manual.....	12
2.2 User manuals and help.....	12
2.3 Service manual.....	12
2.4 Printed safety instructions.....	13
2.5 Data sheets and brochures.....	13
2.6 Release notes and open-source acknowledgment (OSA).....	13
2.7 Calibration certificate.....	13
3 Key features.....	14
4 Preparing for use.....	15
4.1 Unpacking and checking.....	15
4.2 Lifting and carrying.....	15
4.3 Setting up the R&S EVSG1000.....	16
4.3.1 Placing the R&S EVSG1000 on a bench top.....	16
4.3.2 Mounting the R&S EVSG1000 in a rack.....	16
4.3.3 Portable operation.....	17
4.4 Connecting to power.....	17
4.4.1 Connecting the provided AC/DC power supply connector.....	18
4.4.2 Connecting an external DC power source.....	18
4.4.3 Using an optional battery pack.....	19

4.5 Switching on or off.....	20
4.6 Connecting devices for signal input and output.....	22
4.7 Connecting to LAN.....	22
4.8 Setting up a data link (Wi-Fi) connection.....	24
4.9 Performing an autocalibration.....	25
5 Instrument tour.....	26
5.1 Front panel.....	26
5.1.1 Power key.....	27
5.1.2 Display.....	27
5.1.3 RX1 IN / RX2 IN.....	27
5.1.4 USB.....	28
5.1.5 AF out.....	28
5.1.6 12 v DC out.....	28
5.1.7 System keys.....	28
5.1.8 Softkeys.....	29
5.1.9 Function keys.....	29
5.1.10 Keypad.....	30
5.1.11 Rotary knob.....	30
5.1.12 Navigation keys.....	31
5.2 Rear panel.....	32
5.2.1 Power supply.....	33
5.2.2 Li-Ion battery pack.....	33
5.2.3 LAN (ethernet).....	33
5.2.4 RS232 GPS.....	34
5.2.5 PPS in.....	34
5.2.6 Trigger in.....	34
5.2.7 LF in (Baseband/Low frequency input).....	34

5.2.8 Demod out.....	34
5.2.9 Loudspeaker.....	34
5.2.10 Device ID.....	35
5.3 Accessories.....	35
 6 Operating basics.....	 39
6.1 Understanding the display information.....	39
6.2 Manual operation.....	41
6.2.1 Changing settings and activating functions.....	42
6.2.2 Entering data.....	42
6.2.3 Getting help.....	44
6.3 Manual operation from a VNC viewer.....	47
6.4 Remote control.....	49
 7 Contacting customer support.....	 50
 Index.....	 51

1 Safety 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 R&S EVSG1000 is a signal level and modulation analyzer to be used on the ground. It performs measurements on instrument landing systems (ILS), ground-based augmentation systems (GBAS), very high frequency omnidirectional range (VOR) and marker beacon ground stations. It analyzes air traffic control communications (ATC COM) signals measured during startup, maintenance and servicing. The portable, robust design and the integrated battery allow for network-independent measurements also outdoors.

Use the product only for its designated purpose. Observe the operating conditions and performance limits stated in the data sheet.

Target audience

The R&S EVSG1000 and its documentation is targeted at air navigation service providers (ANSP), ground inspection service providers, national authorities for air traffic control, and manufacturers and airport technicians for ILS, GBAS and VOR ground equipment. Users require basic knowledge of ILS, GBAS and VOR ground equipment, as well as the International Civil Aviation Organization (ICAO) specifications in document 8071, annex 10.

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 8. 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>.

Operating the product

The product is intended for mobile use. The maximum weight of the product is provided in the data sheet. If the product casing is not waterproof, use an adequate weather protection to carry the product outdoors with you.

When using the product in a vehicle or aircraft, make sure that the product is properly secured. If stacking is possible, secure the whole stack of products so that they cannot fall over and cause injury.

Observe the ambient conditions such as altitude, operating temperature and climatic loads; see the data sheet.

Due to their exposed location, mobile communications systems are at risk of damage from lightning. This also poses a risk to persons nearby. Vehicles carrying mobile communications systems require an electrically conductive body, a grounded antenna and also equipotential bonding that includes the cables routed into the vehicle.

Connecting to power

The product runs on DC voltage. For the specifications of the supply voltage for the product, refer to the data sheet. Under normal conditions, contact with DC voltage in this range poses a low risk of electric shock.

Take the following measures for your safety:

- If you connect the product to an external power supply, use one recommended in the product documentation.
- Before switching on the product, ensure that the voltage and frequency indicated on the product match the available power source.
- Only use intact cables and route them carefully so that they cannot be damaged. Also ensure that nobody can trip over loose cables.

Handling batteries safely

The product contains exchangeable or built-in lithium polymer or lithium ion cells or batteries. The use of the word battery in the following always means all types. Only the battery contents are potentially hazardous. As long as a battery is undamaged and the seals remain intact, there is no danger.

Impact, shock or heat can cause damage such as dents, punctures and other deformations. A damaged battery poses a risk of personal injury. Handle a damaged or leaking battery with extreme care. Immediately ventilate the area since the battery releases harmful gases. If you come into contact with the battery fluid, immediately remove all contaminated clothing. Irritation can occur if the battery fluid comes in contact with your skin or eyes. Immediately and thoroughly rinse your skin or eyes with water and seek medical aid.

For safe handling, follow these rules:

- Do not short-circuit the battery.
- Do not mechanically damage the battery. Do not open or disassemble the battery.
- Do not expose the battery to high temperatures such as open flames, hot surfaces and sunlight.
- Only use the battery with the designated Rohde & Schwarz product.
- Only use the appropriate Rohde & Schwarz charger to charge the batteries. If the batteries are improperly charged, there is a risk of explosion. For charging and discharging temperature ranges, see the product documentation.
- Replace exchangeable batteries only with the same battery type.
- Store the battery in the product or use the product packaging.

Labels on the product

- Dispose of exchangeable batteries separately from normal household waste as specified by the local waste disposal agency.

If you disregard these rules, you risk serious personal injury or even death due to explosion, fire or hazardous chemical substances. The product documentation provides further details.



If exchangeable batteries or products with built-in batteries are defective, contact the Rohde & Schwarz customer service. Rohde & Schwarz classifies the severity of the defect. When returning batteries or Rohde & Schwarz products containing batteries, use a carrier qualified to transport dangerous goods and notify the carrier of this classification. Follow the carrier's transport stipulations in line with IATA-DGR, IMDG-Code, ADR or RID.

Using headphones

Take the following measures to prevent hearing damage. Before using headphones, check the volume and reduce it if necessary. If you monitor varying signal levels, take off the headphones and wait until the signal has settled. Then adjust the volume.

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.
	DC - direct current Connect to a DC power supply of the specified voltage range.



1.2 Labels on the product

Labels on the casing inform about:

- Personal safety, see ["Meaning of safety labels"](#) on page 10
- Product and environment safety, see [Table 1-1](#)

Warning messages in the documentation

Table 1-1: Labels regarding product 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 R&S EVSG1000 user manual, chapter "Disposal".
	Labeling in line with directive 2006/66/EC for disposal of batteries after they have come to the end of their service life. For more information, see the R&S EVSG1000 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.

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.

2 Documentation overview

This section provides an overview of the R&S EVSG1000 user documentation. Unless specified otherwise, you find the documents at:

www.rohde-schwarz.com/manual/EVSG

Further documents are available at:

www.rohde-schwarz.com/product/EVSG

2.1 Getting started manual

Introduces the R&S EVSG1000 and describes how to set up and start working with the product. 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 manual are also available as online help on the R&S EVSG1000.

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):

2.4 Printed safety instructions

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

2.5 Data sheets and brochures

The data sheet contains the technical specifications of the R&S EVSG1000. It also lists the firmware applications 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/EVSG/

2.6 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/EVSG.

2.7 Calibration certificate

The document is available on <https://gloris.rohde-schwarz.com/calcert>. You need the device ID of your instrument, which you can find on a label on the rear panel.

3 Key features

The R&S EVSG1000 offers the following key features:

- Detailed analysis of ILS, VOR and Marker Beacon ground measurements (based on ICAO Doc. 8071 and ICAO Annex 10)
- Spectrum preview and detailed signal analysis in frequency and time range
- Dynamic measurements up to 100 measurements per second in high measurement rate modus
- Parallel course and clearance signal analysis in two-frequency systems (ILS)
- Simple remote operation via standard interfaces
- Software options for specific use cases
- Integrated data recording

4 Preparing for use

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

• Unpacking and checking	15
• Lifting and carrying	15
• Setting up the R&S EVSG1000	16
• Connecting to power	17
• Switching on or off	20
• Connecting devices for signal input and output	22
• Connecting to LAN	22
• Setting up a data link (Wi-Fi) connection	24
• Performing an autocalibration	25

4.1 Unpacking and checking

1. Unpack the R&S EVSG1000 carefully.
2. Retain the original packing material. Use it when transporting or shipping the product later.
3. Using the delivery notes, check the equipment for completeness.

The instrument comes with the following accessories:

- AC/DC power supply connector with cable
- Printed Getting Started manual

4. Check the equipment for damage.

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

4.2 Lifting and carrying

The carrying handle on the top of the instrument is designed to lift or carry the instrument. Do not apply excessive external force to the handle.

4.3 Setting up the R&S EVSG1000

The R&S EVSG1000 is designed for use either on a bench top or in a rack, or as a portable instrument (with optional battery operation) in a transport bag in the field.

See also:

- "Intended use" on page 7

4.3.1 Placing the R&S EVSG1000 on a bench top

To place the R&S EVSG1000 on a bench top

1. Place the R&S EVSG1000 on a stable, flat and level surface. Ensure that the surface can support the weight of the R&S EVSG1000. For information on the weight, see the data sheet.
2. The top surface is not designed for stacking. If you want to stack the R&S EVSG1000 together with other products:
 - a) Follow the instructions given for the other products.
 - b) Place the R&S EVSG1000 on top.

4.3.2 Mounting the R&S EVSG1000 in a rack

A 19"-adapter is available as an accessory (R&S EVSG-Z7 rack adapter kit) to mount the R&S EVSG1000 in a 19" rack (e.g. in a measurement vehicle).

To mount the R&S EVSG1000 in a rack

1. **NOTICE!** Insufficient airflow can cause overheating and damage the product. Design and implement an efficient ventilation concept for the rack.
2. Use the adapter kit R&S EVSG-Z7 rack adapter kit to prepare the R&S EVSG1000 for rack mounting. For the order number, see the data sheet. Mount the adapter kit. Follow the assembly instructions provided with the adapter kit.
3. Lift the R&S EVSG1000 to shelf height.

4. Grab the handles and push the product onto the shelf until the rack brackets fit closely to the rack.
5. Tighten all screws in the rack brackets with a tightening torque of 1.2 Nm to secure the R&S EVSG1000 in the rack.

To unmount the R&S EVSG1000 from a rack

1. Loosen the screws at the rack brackets.
2. Remove the R&S EVSG1000 from the rack.
3. If placing the R&S EVSG1000 on a bench top again, unmount the adapter kit from the R&S EVSG1000. Follow the instructions provided with the adapter kit.

4.3.3 Portable operation

The R&S EVSG1000 was designed as a portable, robust instrument that can also be operated outdoors.

An optional weather protection carrying bag (R&S EVSG-Z1 carrying bag, see [Chapter 5.3, "Accessories"](#), on page 35) designed specifically for the R&S EVSG1000 allows you to protect the instrument while working in the field. The bag includes ventilation areas at the position of the ventilation outlets in the casing to ensure air circulation. The transparent cover allows you to operate the instrument without removing it from the bag. Together with the optional battery pack (see [Chapter 4.4.3, "Using an optional battery pack"](#), on page 19), and packed in the dedicated carrying bag, the R&S EVSG1000 is ideally suited for operation directly in the field, even in rough environments.

See also [Chapter 4.2, "Lifting and carrying"](#), on page 15.

4.4 Connecting to power

To ensure high mobility and flexibility while using the R&S EVSG1000, it is equipped with a DC power supply connector on the rear panel of the instrument.

There are various options to supply DC power to the R&S EVSG1000:

- Using the AC/DC power supply provided with the R&S EVSG1000.

Connecting to power

- Using the internal battery, if options R&S EVSG-B2 Battery Management and R&S EVSG-B3 Battery Pack are installed.
- Using an external DC power source with a voltage of 10 V DC to 28 V DC and a current of 3.0 A.

For safety information, see ["Connecting to power"](#) on page 9.

- [Connecting the provided AC/DC power supply connector](#)..... 18
- [Connecting an external DC power source](#)..... 18
- [Using an optional battery pack](#)..... 19

4.4.1 Connecting the provided AC/DC power supply connector

To operate the R&S EVSG1000 on a 230 V AC power supply, use only the provided AC/DC power supply connector.

1. Connect the DC connector on the provided AC/DC power supply connector to the Power Supply connector on the back of the R&S EVSG1000 (see [Chapter 5.2.1, "Power supply"](#), on page 33).
2. Plug the AC power cable into the AC/DC power supply connector. Only use the AC power cable delivered with the R&S EVSG1000.
The required ratings are listed next to the AC power connector and in the data sheet.
3. Plug the AC power cable into a two-pin power outlet with ground contact.
The green operating LED of the AC/DC power supply connector lights up.
The green Power LED on the front panel of the R&S EVSG1000 lights up.

4.4.2 Connecting an external DC power source

The R&S EVSG1000 can be operated directly from an external DC power source with a voltage of 10 V DC to 28 V DC and a current of 3.0 A.

If you use an external power supply unit to supply safety extra-low DC voltage (SELV) to the instrument, be sure to meet the requirements for reinforced/double insulation in accordance with DIN/EN/IEC 61010 (UL 3111, CSA C22.2 No. 1010.1) or DIN/EN/IEC 60950 (UL 1950, CSA C22.2 No. 950). Provide current limitation in accordance with DIN EN 61010-1 Appendix F2.1.

Connect the R&S EVSG1000 to an external DC power source as follows:

1. Connect a 3-pin XLR connection cable to the Power supply connector on the back of the instrument (see [Chapter 5.2.1, "Power supply"](#), on page 33).
2. Insert a 3 AT fuse to protect the connection between the instrument and the external DC power source against excessive current. A short-circuit can damage the instrument or power supply unit.
3. Connect the XLR connection cable to the DC power supply.
If the cable must be extended, ensure the entire cable has a cross-section of at least 1.5 mm².

As soon as the DC power supply is switched on, the green Power LED on the front panel of the R&S EVSG1000 lights up.

4.4.3 Using an optional battery pack

As an alternative to the fixed AC or DC power supply, the R&S EVSG1000 can be operated by a battery pack, if the R&S EVSG-B2 Battery Management and R&S EVSG-B3 Battery Pack options are installed. Use only the original battery pack R&S EVSG-B3 Battery Pack. For the order numbers, see the data sheet.

If the battery option was ordered together with the instrument, the R&S EVSG1000 comes with the battery management and battery pack already installed. Otherwise these options must be installed by Rohde & Schwarz service personnel.

For safety information, see ["Handling batteries safely"](#) on page 9.

For information on how to exchange a battery pack, see the R&S EVSG1000 user manual, chapter "Maintenance".

If the battery pack is installed and no DC power is supplied, the R&S EVSG1000 automatically switches to battery operation.

Charging batteries

Charge the battery before using it for the first time. Following a long storage period, it can be necessary to charge and discharge the battery several times to reach full capacity.

When charging the battery, observe the following:

- For charging, use only the R&S EVSG1000 or the R&S®FSV-B34 battery charger (1321.3950.02).
- If the instrument is connected to the provided AC/DC power supply connector or to an external DC power supply with more than 12 V DC, the internal battery is automatically charged, regardless whether the instrument is switched on or off.
- If the battery temperature rises above +53 °C, charging is interrupted until the temperature drops below +45 °C. Large temperature variations can also cause the charger to be switched off too early.
- Try not to overcharge the battery too often because overcharging reduces the service life of the battery.

Look up the following details in the data sheet:

- Charging conditions
- Recharging interval to avoid deep discharge



When the battery is being charged, the Power LED blinks. During operation, the status bar also indicates that the battery is being charged. See ["Status bar"](#) on page 41.

For charging times, see the R&S EVSG1000 user manual, chapter "Maintenance".

4.5 Switching on or off

The Power LEDs on the front panel indicate the power and operation state of the R&S EVSG1000.

The left LED indicates the operating state:

Table 4-1: Overview of operating states

Status	LED
Off	● gray
Booting	● green, blinking
Ready for operation	● green

The right LED indicates the power state:

Table 4-2: Overview of power states

Status	LED
Not connected to power	● gray
Connected to power	● green
Battery charging	● green, blinking

To switch on the R&S EVSG1000

The instrument is off but connected to power.

- ▶ Press the power key.

See [Chapter 5.1.1, "Power key"](#), on page 27.

The left power LED starts blinking. The instrument boots.

The boot process of the R&S EVSG1000 takes about 30 seconds. Then the instrument automatically starts the measurement mode used before the instrument was switched off. The power LED stops blinking.

If valid data for automatic calibration is not available, the message "UNCAL" is displayed in the status line. It is recommended that you perform an autocalibration every 2 months or if the difference of the environment temperature changes by more than 10 °C.

See [Chapter 4.9, "Performing an autocalibration"](#), on page 25.

To shut down the R&S EVSG1000

The instrument is switched on.

- ▶ Press the power key.

The operating system shuts down. The LED is no longer lit.

To disconnect from power

The instrument is switched off.

NOTICE**Risk of data loss**

If you disconnect the R&S EVSG1000 from power when it is switched on and no (charged) battery is installed, you can lose settings and data. Switch off the instrument before disconnecting it from power.

- Disconnect the R&S EVSG1000 from the power source.

4.6 Connecting devices for signal input and output

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

1. Connect the RF input connector ("RX 1 IN"/"RX 2 IN") with the receiving antenna (see [Chapter 5.1.3, "RX1 IN / RX2 IN"](#), on page 27).
2. Optionally, connect the power supply for an active receiving antenna (see [Chapter 5.1.6, "12 v DC out"](#), on page 28).
3. Optionally, connect the GPS receiver (see [Chapter 5.2.4, "RS232 GPS"](#), on page 34).
4. Optionally, connect a headset (see [Chapter 5.1.5, "AF out"](#), on page 28).

4.7 Connecting to LAN

You can connect the instrument to a LAN for remote operation via a remote device. For details on the connector, see [Chapter 5.2.3, "LAN \(ethernet\)"](#), on page 33.

Provided the network administrator has assigned you the appropriate rights and adapted the Windows firewall configuration, you can use the interface, for example:

- To stream measurement data from the R&S EVSG1000 to a connected device

- To access or control the measurement from a remote computer using a VNC client
- To connect external network devices (e.g. printers)

NOTICE**Risk of network failure**

Consult your network administrator before performing the following tasks:

- Connecting the instrument to the network
- Configuring the network
- Changing IP addresses
- Exchanging hardware

Errors can affect the entire network.

1. Connect the R&S EVSG1000 to the LAN via the LAN interface on the right panel of the instrument.
2. Start a VNC client on the connected remote device.
3. Enter the IP address of the R&S EVSG1000. The default address is the static IP address 10.255.255.98. Note that without a DHCP server, the network adapter on the remote device must use an IP address within the same TCP/IP netmask. (Usually, that means only the last number of the IP address differs.)

The used IP address is indicated in the "Setup" menu on the R&S EVSG1000 display.



When using DHCP, the IP address is assigned to the devices dynamically. In this case, if a dynamic name server (DNS) is available, you can use the permanent instrument name to access the R&S EVSG1000. The default instrument name is EVSG<serial_number>, for example, EVSG1000-123456. For information on determining the serial number, see [Chapter 5.2.10, "Device ID"](#), on page 35.

For more information on LAN configuration, see the R&S EVSG1000 user manual.

4.8 Setting up a data link (Wi-Fi) connection

The R&S EVSG1000 can be equipped with an optional data-link-module (Wi-Fi, R&S EVSD1-Z5 Data-link-module (Wi-Fi)). Thus, you can configure the R&S EVSG1000 as a Wi-Fi access point for wireless communication from a remote device.

To connect the optional data-link-module (Wi-Fi)

1. Plug the provided USB-A to USB-C adapter cable in one of the USB-A connectors on the R&S EVSG1000.
2. Connect the other end of the adapter cable in the USB-C connector on the data-link-module (Wi-Fi).
3. Connect the provided data-link antennas to the RP-SMA connectors on the data-link-module (Wi-Fi).

To set up a data link (Wi-Fi) connection

Before you start the R&S EVSG1000, connect the data-link-module (Wi-Fi) to the R&S EVSG1000. Otherwise, the R&S EVSG1000 does not determine the IP information automatically.

1. Switch on the R&S EVSG1000.

The R&S EVSG1000 is configured as a Wi-Fi access point using a DHCP server. By default, the following settings are defined.

Setup - Wi-Fi Access Point	
Wi-Fi	On
SSID	EVSD900252
WPA-PSK key	RS900252
Channel	1 (2.4 GHz Wi-Fi 4)
Wi-Fi Speed	Low
Country	DE
IP	192.168.1.1
Netmask	255.255.255.0
Gateway	192.168.1.2
DHCP Server	On
Status	ON CH:1 WIDTH:20MHz

2. Usually, you can access the R&S EVSG1000 using the default IP address and Wi-Fi password without further configuration. The default IP address is 192.168.1.1. The default Wi-Fi password is RS<serial_number>, e.g. RS123456. For information on determining the serial number, see [Chapter 5.2.10, "Device ID"](#), on page 35.

Performing an autocalibration

If necessary, configure the data link information for your network.
For details, see the R&S EVSG1000 user manual.

4.9 Performing an autocalibration

After setting up the R&S EVSG1000, perform an autocalibration to ensure the accuracy of the measurements. After initial setup, it is recommended that you perform an autocalibration every 2 months or if the difference of the environment temperature changes by more than 10 °C.

If valid data for automatic calibration is not available, the message "UNCAL" is displayed in the status line of the R&S EVSG1000 display.

To perform an autocalibration

Before performing an autocalibration, make sure that the instrument has reached its operating temperature (after about 15 minutes of operation; for details, refer to the data sheet).

A message in the status bar ("Instrument warming up...") indicates that the operating temperature has not yet been reached.

During the autocalibration procedure, do not apply any input signal to the R&S EVSG1000.

1. Select [Setup] > "Cal".
2. Select "Start Autocal".
3. Press [Enter].

The "Setup - CAL" display shows the status for each calibration step. When completed, after a few minutes, all entries must have the status "OK".

For more information on autocalibration, see the R&S EVSG1000 user manual.

5 Instrument tour

5.1 Front panel

This chapter describes the front panel, including all function keys and connectors.



Figure 5-1: R&S EVSG1000 - Front panel view

- 1 = Power key
- 2 = System keys
- 3 = Display
- 4 = Softkeys
- 5 = Keypad
- 6 = Function keys
- 7 = Rotary Knob
- 8 = Navigation keys
- 9 = RX 1 IN
- 10 = 12 V DC Out
- 11 = AF Out
- 12 = USB connectors
- 13 = RX2 IN

Front panel

• Power key.....	27
• Display.....	27
• RX1 IN / RX2 IN.....	27
• USB.....	28
• AF out.....	28
• 12 v DC out.....	28
• System keys.....	28
• Softkeys.....	29
• Function keys.....	29
• Keypad.....	30
• Rotary knob.....	30
• Navigation keys.....	31

5.1.1 Power key

The [Power] key is located on the lower left corner of the front panel. It starts up and shuts down the instrument.


See also ["Connecting to power"](#) on page 9 and [Chapter 4.4, "Connecting to power"](#), on page 17.

5.1.2 Display

The TFT color display shows all measurement and configuration details.

5.1.3 RX1 IN / RX2 IN

The RX input connectors are 50 Ω N connectors. Use the RX inputs to connect a receiving antenna (max. +13 dBm) to the R&S EVSG1000 for RF signal input.

 "RX2 In" is supplied as an option (R&S EVSG-B1 Second Signal Processing Unit).

This option allows you to perform two independent measurements simultaneously, for example on different frequencies. This capability is vital in flight inspection systems because localizer and glidepath signals must be measured at the same time. An additional application required in flight inspection systems is the parallel measurement of two different VOR stations.

5.1.4 USB

The front panel provides two female USB connectors (USB-A, 2.0 standard) to connect a memory device.

The memory device is used to store and reload instrument settings, to provide software updates and to export measurement data.

5.1.5 AF out

Connector for a headset with a 3.5 mm jack plug


5.1.6 12 v DC out

DC output for an active receiving antenna.

5.1.7 System keys

System keys set the instrument to a predefined state, change basic settings, and provide print and display functions.

Table 5-1: System keys

System key	Assigned functions
[Preset]	Opens the "Preset" menu.
 [Screenshot]	Creates screenshot and stores it internally.
[Audio]	Opens the "Audio" menu.
[Display]	Opens the "Display" menu.
[Help]	Opens the online help.
[Setup]	Opens the "Setup" menu containing general instrument settings.
[Mode]	Opens the measurement mode selection (for example ILS LOC, VOR, COM)

5.1.8 Softkeys

Softkeys are virtual keys provided by the software. Thus, more functions can be provided than those that can be accessed directly via the function keys on the instrument. Softkeys are dynamic, i.e. depending on the selected function key, a different list of softkeys is displayed on the right side of the screen. A list of softkeys for a certain function key is also called a menu. Softkeys can either perform a specific function or open a dialog box.

5.1.9 Function keys


Function keys provide access to the most common measurement settings and functions.

Table 5-2: Function keys

Function key	Assigned functions
[CH Freq]	Sets the center frequency and the start and stop frequencies
[Ampt]	Sets the reference level, the displayed dynamic range, and the RF attenuation for the level display
[BW]	Sets the resolution bandwidth
[Meas]	Provides the measurement settings for the active measurement mode
[Config]	Configures measurements and data input and output
[MTime]	Configures the measurement time
[Marker]	Sets and positions the absolute and relative measurement markers (markers and delta markers)
[Mkr]->	Provides search functions for the measurement markers (maximum/minimum of the trace) Sets the center frequency to the current marker frequency
[Mkr Fct]	Provides further marker functions, such as removing all markers
[Record]	Starts and stops the continuous data recording.
[Trigger]	Opens the Trigger Menu.
[Single]	Saves a single dataset.

5.1.10 Keypad

The keypad is used to enter numeric parameters, including the corresponding units. It contains the following keys.


Type of key	Description
Decimal point	Inserts a decimal point "." at the cursor position.
Sign key	Changes the sign of a numeric parameter. In the case of an alphanumeric parameter, inserts a "-" at the cursor position.
Unit keys (GHz/-dBm MHz/dBm, kHz/dB, Hz/dB etc.)	Adds the selected unit to the entered numeric value and complete the entry. In the case of 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.
ESC	Closes all kinds of dialog boxes, if the edit mode is not active. Quits the edit mode, if the edit mode is active. In dialog boxes that contain a "Cancel" button it activates that button. For "Edit" dialog boxes the following mechanism is used: <ul style="list-style-type: none"> • 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.
	If an alphanumeric entry has already been started, this key deletes the character to the left of the cursor.
ENTER	<ul style="list-style-type: none"> • Concludes the entry of dimensionless entries. The new value is accepted. • With other entries, this key can be used instead of the "Hz/dB" unit key. • In a dialog box, selects the default or focused element.

5.1.11 Rotary knob

The rotary knob has several functions:

- For numeric entries: increments (clockwise direction) or decrements (counter-clockwise direction) the instrument parameter at a defined step width

- In lists: toggles between entries
- For markers, limit lines, and other graphical elements on the screen: moves their position
- For active scroll bars: moves the scroll bar vertically
- For dialog boxes: Acts like the ENTER key when pressed

 While you turn the rotary knob, the settings are applied immediately, and the results are updated accordingly.

5.1.12 Navigation keys

The navigation keys can be used alternatively to the rotary knob to navigate through dialog boxes, diagrams or tables.

- **Arrow Up/Arrow Down Keys**

The <arrow up> or <arrow down> keys do the following:

- For numeric entries: increments (Arrow Up) or decrements (Arrow Down) the instrument parameter at a defined step width
- In a list: scrolls forward and backward through the list entries
- In a table: moves the selection bar vertically
- In windows or dialog boxes with a vertical scroll bar: moves the scroll bar

- **Arrow Left/Arrow Right Keys**

The <arrow left> or <arrow right> keys do 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 scroll bar, move the scroll bar.

5.2 Rear panel

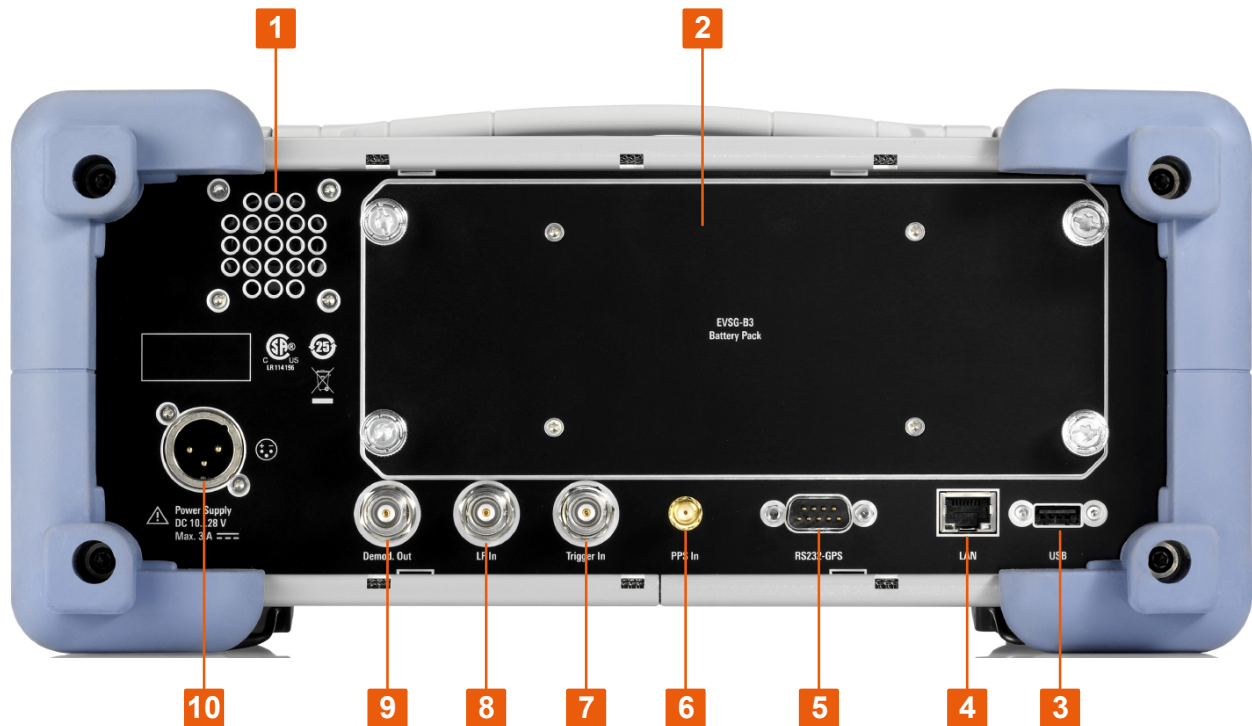


Figure 5-2: R&S EVSG1000 - Rear panel view

- 1 = Loudspeaker
- 2 = Li-Ion battery pack
- 3 = USB
- 4 = LAN
- 5 = RS232-GPS
- 6 = PPS In
- 7 = Trigger In
- 8 = LF In
- 9 = Demod Out
- 10 = Power Supply

The meanings of the labels on the product are described in [Chapter 1.2, "Labels on the product"](#), on page 10 and [Chapter 5.2.10, "Device ID"](#), on page 35.

• Power supply.....	33
• Li-Ion battery pack.....	33
• LAN (ethernet).....	33
• RS232 GPS.....	34
• PPS in.....	34
• Trigger in.....	34
• LF in (Baseband/Low frequency input).....	34

Rear panel

• Demod out	34
• Loudspeaker	34
• Device ID	35

5.2.1 Power supply

XLR connector for an external DC power source (10 V DC to 28 V DC)

For details, refer to ["Connecting to power"](#) on page 9 and [Chapter 4.4, "Connecting to power"](#), on page 17.

5.2.2 Li-Ion battery pack

With the Li-Ion battery pack (options (R&S EVSG-B2 Battery Management and R&S EVSG-B3 Battery Pack), the R&S EVSG1000 can be operated independently of an AC or DC power supply.

The charging circuit is protected by an overload protection and an overheating protection.

Generally, the internal battery pack can be charged during operation with the AC/DC power supply or with an external DC voltage supply providing more than 12 V DC. Note, however, that charging can take longer when the instrument is in use.

For details, see ["Handling batteries safely"](#) on page 9 and [Chapter 4.4.3, "Using an optional battery pack"](#), on page 19.

5.2.3 LAN (ethernet)

Through the LAN connection (Fast Ethernet), all functions of the R&S EVSG1000 can be remotely operated. The LAN connection can also be used to stream measurement data (TCP port 8000; for I/Q data: 8001 (RX1) or 8002 (RX2)). IP Addresses and subnet mask are defined in the setup menu. The data transfer rate is 100 Mbit/s.

5.2.4 RS232 GPS

2-port RS232, 9-pin D-Sub connector for a GPS receiver providing NMEA protocol data. The NMEA protocol data is displayed and stored with the recorded data (requires option R&S EVSG1-K20 GPS Support).

5.2.5 PPS in

SMA connector with 1 M Ω impedance. Provides a PPS signal from an external GPS device for precise synchronization during data logging (requires option R&S EVSG1-K20 GPS Support).

5.2.6 Trigger in

BNC connector to provide an external trigger for data recording. The voltage level is 3.3 V to 12 V. The typical input impedance is 1 M Ω .

5.2.7 LF in (Baseband/Low frequency input)

BNC socket, 50 Ω /20 k Ω to input an AF signal or signals with a very low IF (<25 kHz) to the R&S EVSG1000 for further analysis of typical AF parameters. Furthermore, LF input allows for analysis of non-directional beacon (NDB) signals from 190 kHz to 1750 kHz.

Analyzing LF input requires option R&S EVSG1-K7 LF-Analysis.

5.2.8 Demod out

BNC connector to output a demodulated signal for connected devices, for example an oscilloscope

5.2.9 Loudspeaker

Provides the AF output also available via the [Chapter 5.1.5, "AF out"](#), on page 28 headphone connector.

5.2.10 Device ID

The unique device identifier is provided as a barcode sticker on the rear panel of the R&S EVSG1000.

It consists of the device order number and a serial number.



The serial number is used to define the **default instrument name**, which is:

<Type><variant>-<serial_number>

For example, EVSG1000-123456.

The instrument name is required to establish a connection to the instrument in a LAN.

5.3 Accessories

Following accessories are available for the operation of the R&S EVSG1000.

- Weather protection bag (R&S EVSG-Z1 carrying bag)
The weather protection bag has a transparent cover that allows you to use the R&S EVSG1000 in the field even under adverse weather conditions. The front pocket can be used to transport accessories, such as the external power supply.



Figure 5-3: Weather protection bag

- Rugged Transport case (R&S EVSG-Z2 Rugged transport case)
A hard-top case with trolley functionality.



Figure 5-4: Transport Case

- ILS / VOR Dipole Antenna (R&S EVS-Z3)
The lightweight design of the ILS/VOR dipole antenna and its compact size makes this antenna ideal for mobile measurements in the field. The antenna comes with two sets of rods of different lengths to support the two frequency ranges. The telescopic mast can be extended to 3.1 m.

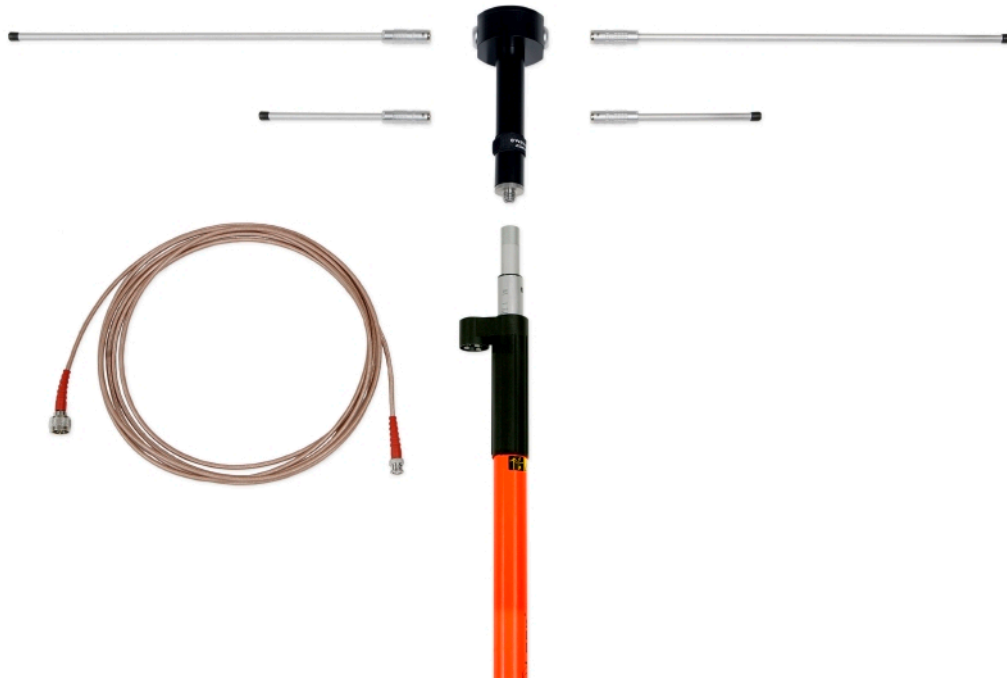


Figure 5-5: ILS / VOR Dipole Antenna

- Antenna bag (R&S EVS-Z4)
The carrying bag allows you to transport all the antenna elements and the telescopic mast safely.



Figure 5-6: Antenna bag

- Display protection cover (R&S EVS-Z6)
The protective hard cover protects the front panel during transport.



Figure 5-7: Display protection cover

- 19"-adapter (R&S EVSG-Z7 rack adapter kit)
This option is required to mount the R&S EVSG1000 in a 19" rack (e.g. in a measurement vehicle).

6 Operating basics

The R&S EVSG1000 is designed for ground inspection and is thus optimized for manual operation, via the graphical user interface.

Nevertheless, the instrument can also be controlled remotely, either by executing predefined commands, or by simulating the user interface on a remotely connected device.

This chapter provides an overview on how to work with the R&S EVSG1000. It describes what kind of information is displayed on the screen and how to operate the R&S EVSG1000 manually and remotely.

- [Understanding the display information](#)..... 39
- [Manual operation](#)..... 41
- [Manual operation from a VNC viewer](#)..... 47
- [Remote control](#)..... 49

6.1 Understanding the display information

The following figure shows a typical screen display for the R&S EVSG1000. All different screen elements are labeled. They are explained in more detail in the following sections.

Understanding the display information

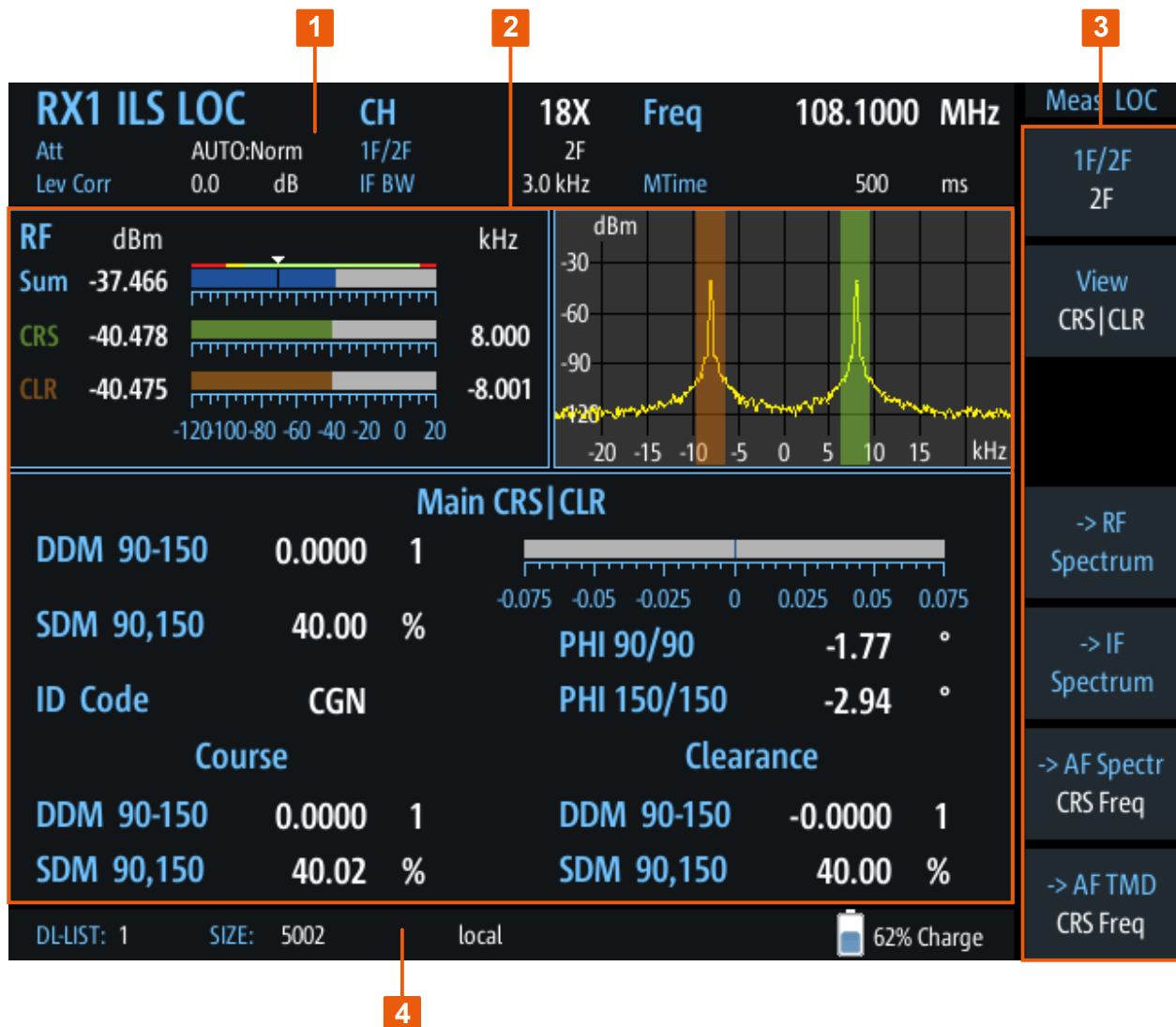


Figure 6-1: R&S EVSG1000 - GUI overview

- 1 = Measurement settings area (numeric modes only)
- 2 = Measurement result area
- 3 = Softkeys to edit settings and activate functions
- 4 = Status bar

Measurement settings and results area

During a measurement, the available settings are displayed at the top of the screen; the measurement results at the bottom. If a general instrument setting or data management function is selected, the settings and information are displayed in the main part of the screen.

Softkeys

Softkeys are virtual function keys whose actual function is defined by the software, depending on the currently selected measurement mode or key, or both.

1/2 ▼ Sometimes, more functions are available than softkeys can be displayed at the same time. In this case, a second menu of functions is available, indicated by "1/2" and "2/2" beneath the softkeys in the display.

To switch between the two menus of softkey functions, press the "More softkeys" key beneath the softkeys on the front panel of the R&S EVSG1000.

Softkeys can perform a function directly, or open a dialog or submenu with further settings and functions. Some softkeys are directly associated with an input field in the measurement settings area of the window. If the softkey shows a vertical blue line at the edge, you can edit the value of the corresponding setting directly in the measurement settings area of the window. If the blue line is not shown, the setting is read-only. To toggle between the edit mode and read-only mode, select the softkey again.

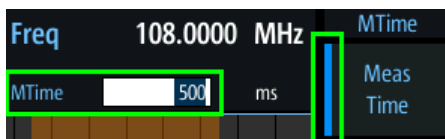


Figure 6-2: Softkey with an associated input field

Status bar

The status bar at the bottom of the screen contains information on the operating status of the instrument.

- Current list of data recording and size of this list
- Local or remote operation (see [Chapter 6.4, "Remote control"](#), on page 49)
- Battery status and charge status (in %)

6.2 Manual operation

This chapter describes how to operate the R&S EVSG1000 directly on the instrument, using graphical interaction methods. During manual operation, the R&S EVSG1000 display indicates "Local" in the status bar.

6.2.1 Changing settings and activating functions

All functions available on the R&S EVSG1000 can be accessed using the keys on the front panel of the instrument. Some keys provide a softkey menu on the display with further functions and settings.

1. Select a key on the front panel of the instrument to activate a function directly, or to display a softkey menu.
2. Select the softkey for the setting or function as required.

1/2 ▼

If necessary, select the "More softkeys" key to switch to the second softkey menu.

The function is activated, or a new window is displayed to view or change specific settings.

3. To set the focus on a specific setting in the displayed window, scroll through the individual settings by turning the rotary knob or pressing the Up and Down arrow keys on the front panel (see [Chapter 6.2.2, "Entering data"](#), on page 42).
4. Scroll through the available setting values by turning the rotary knob or pressing the Up and Down arrow keys on the front panel, or enter a numeric or alphanumeric value as described in [Chapter 6.2.2, "Entering data"](#), on page 42.

Note: While you turn the rotary knob, the settings are applied immediately. If you enter a value using the keypad, you must confirm the setting before the settings are applied.

5. Confirm the new setting and remove the focus by pressing the rotary knob or the [ENTER] key on the front panel.

6.2.2 Entering data

You enter data in input fields using elements provided by the front panel, e.g. the keypad, rotary knob, or navigation keys.

Entering numeric parameters

If a field requires numeric input, the keypad provides only numbers.

1. Enter the parameter value using the keypad, or change the currently used parameter value by turning the rotary knob or pressing the Up or Down arrow keys.
2. After entering the numeric value via keypad, press the corresponding unit key. The unit is added to the entry.
3. If the parameter does not require a unit, confirm the entered value by pressing the [ENTER] key or any of the unit keys.

Entering numbers and (special) characters via the keypad

If a field requires alphanumeric input, use the keypad on the external keyboard. Every alphanumeric key represents several characters and one number. The decimal point key (.) represents special characters, and the sign key (-) toggles between capital and small letters. The assignment of keys to characters is provided in [Table 6-1](#).

1. Press the key once to enter the first possible value.
All characters available via this key are displayed.
2. To choose another value provided by this key, press the key again, until your desired value is displayed.
3. With every key stroke, the next possible value of this key is displayed. If all possible values have been displayed, the series starts with the first value again. For information on the series, refer to [Table 6-1](#).
4. To change from capital to small letters and vice versa, press the sign key (-).
5. After entering a value, wait for 2 seconds to use the same key again.

Entering a blank

- Press the "0" key for 2 seconds.

Correcting an entry

1. Using the arrow keys, move the cursor to the right of the entry you want to delete.
2. Press the [BACK] key.
The entry to the left of the cursor is deleted.

3. Enter your correction.

Completing the entry

- Press the [ENTER] key or the rotary knob.

For numeric values, the default unit is appended to the numeric input.

To enter a value using a different unit, select the corresponding key.

Aborting the entry

- Press the [ESC] key.

The previous entry is restored.

Table 6-1: Keys for alphanumeric parameters

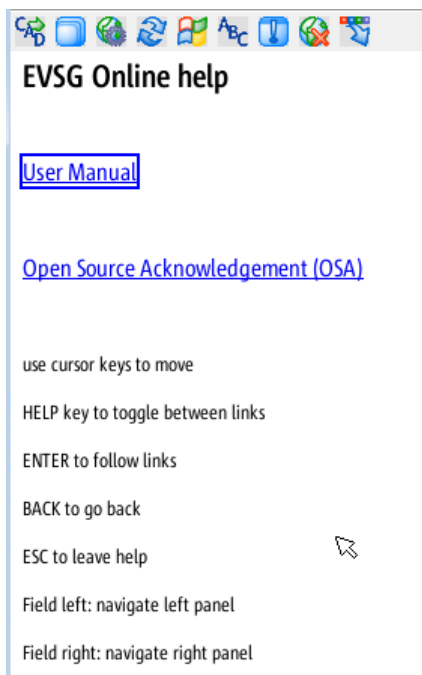
Key name (upper inscription)	Series of (special) characters and number provided
7	7 μ Ω ° € ¥ \$ ¢
8	A B C 8 Ä Å Ç
9	D E F 9 É
4	G H I 4
5	J K L 5
6	M N O 6 Ñ Ö
1	P Q R S 1
2	T U V 2 Ü
3	W X Y Z 3
0	<blank> 0 – @ + / \ < > = % &
.	. * : _ , ; " ' ? () #
–	<toggles between capital and small letters>

6.2.3 Getting help

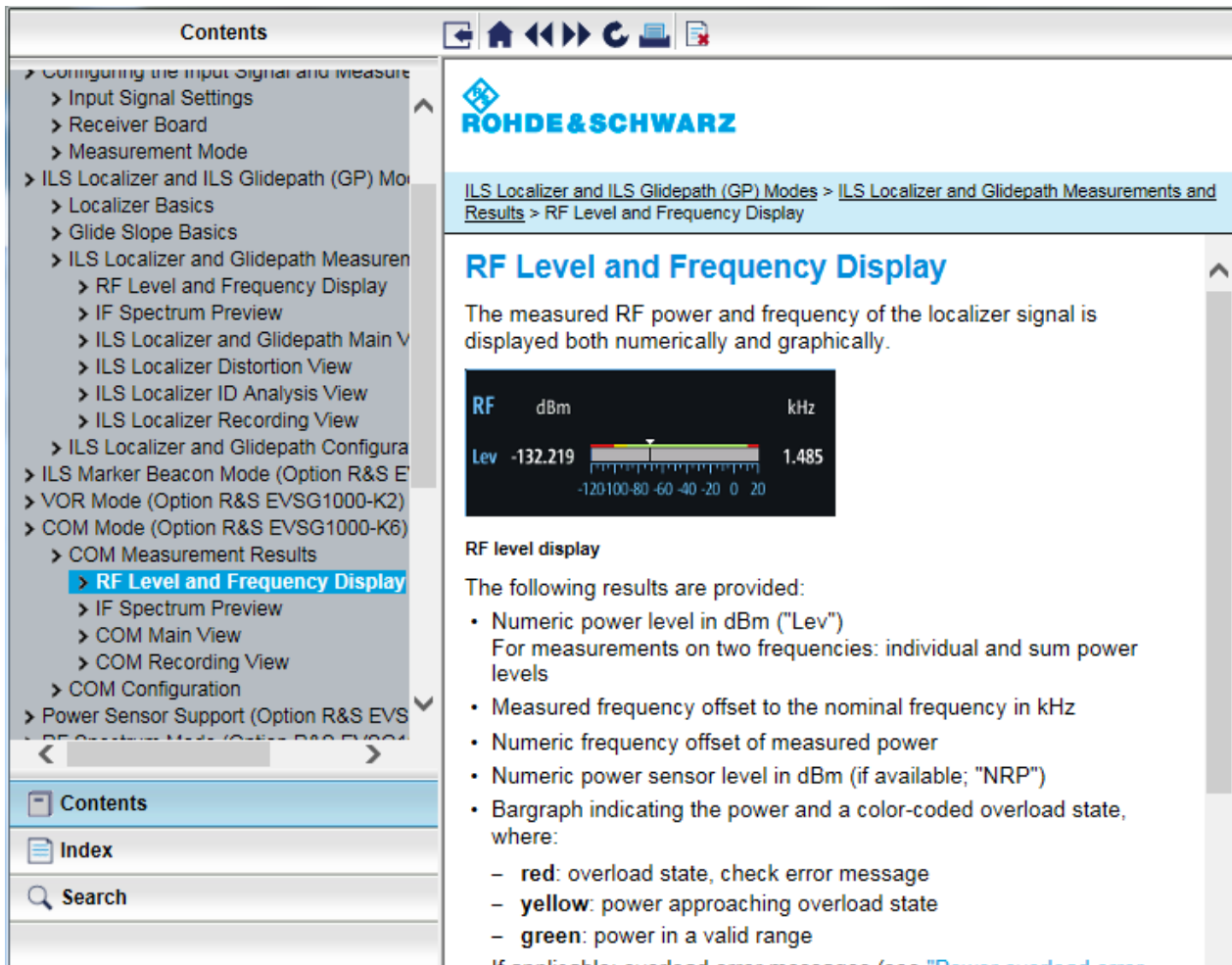
If any questions or problems concerning the R&S EVSG1000 arise, an online help system is provided on the instrument and can be consulted at any time.

Displaying the online help system on the instrument

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



2. Press [Enter] to display the user manual contents.



Navigating in the help system

To move up and down

- Use the arrow keys.

To switch between areas

- Press the Field left and Field right keys.
VNC:
Press the [PAGE UP] and [PAGE DOWN] keys.

To follow a link

- Press [Enter].


To exit the online help and return to the firmware view

- Press [ESC].

6.3 Manual operation from a VNC viewer

As an alternative to operating the R&S EVSG1000 directly on the instrument, you can perform the same tasks from a connected PC using a keyboard. You merely require a VNC viewer application, of which a variety is available on the Internet free of charge.

Using a VNC viewer application, you simply connect to the instrument, defined by its IP address. The display of the R&S EVSG1000 is shown on the control PC. The keys and other graphical user interface elements are operated using associated keyboard shortcuts on the connected keyboard.

 Operation via VNC is not possible during remote control (indicated by "Remote" in the status bar). To switch from remote control to manual operation, press [ESC].

Access to the R&S EVSG1000 via VNC can be protected by a password. In this case, enter *instrument* as the password in the login window.


Keyboard commands for operation via a VNC viewer

[Keyboard commands \(VNC viewer\)](#) shows the mapping between the keyboard shortcut and the interface element on the R&S EVSG1000.

Table 6-2: Keyboard commands (VNC viewer)

Keyboard	Usage
y	Preset
c	Audio
v	Display
b	Help
n	Setup
m	Mode
z	Undo
r	Redo

Manual operation from a VNC viewer

Keyboard	Usage
PAGE UP	Field right
PAGE DOWN	Field left
x	Screenshot
a	Meas
s	Config
F1	Softkey 1
F2	Softkey 2
F3	Softkey 3
F4	Softkey 4
F5	Softkey 5
F6	Softkey 6
F7	Softkey 7
F8	 Show additional softkeys
k	Trigger
l	Single
ESC	ESC
0	0
1	1
4	4
7	7
q	CH/FREQ
d	MTime
BACKSPACE	Back
ENTER	Enter
.	.
2	2
5	5
8	8

Keyboard	Usage
w	Ampt
F9	Hz
3	3
6	6
9	9
e	BW (Bandwidth)
F10	kHz
F11	MHz
F12	GHz
p	Record
i	Marker

6.4 Remote control

You can control the R&S EVSG1000, including data transfer, remotely from another device using the LAN connection (Fast Ethernet).

You define the IP address and subnet mask in the "Setup" menu.

Remote control is performed using predefined remote commands which are sent from the control device to the R&S EVSG1000. The R&S EVSG1000 can also return queried data to the control device.

While in remote control, the R&S EVSG1000 display indicates "Remote" in the status bar. During remote control, the instrument is locked for manual operation via VNC. To return to manual operation, press [ESC].

7 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 7-1: QR code to the Rohde & Schwarz support page

Index

A

Accessories	35
Adapter, 19"	38
Antenna	36
Antenna bag	37
Display protection cover	37
R&S EVS-Z3	36
R&S EVS-Z4	37
R&S EVS-Z6	37
R&S EVSG-Z1 carrying bag	35
R&S EVSG-Z2 Rugged transport case	36
R&S EVSG-Z7 rack adapter kit	38
Transport case	36
Weather protection bag	35

B

Brochures	13
-----------------	----

C

Customer support	50
------------------------	----

D

Data sheets	13
-------------------	----

F

Front Panel	26
-------------------	----

G

Getting started	12
-----------------------	----

H

Help	12
------------	----

K

Keypad	
Key layout	44

L

LVD-M safety information MAN signal_words TEMPLATE	11
--	----

O

Open source acknowledgment (OSA)	13
--	----

R

Rear Panel	32
Release notes	13

S

Safety instructions	8, 13
Service manual	12

U

User manual	12
-------------------	----

V

VNC Viewe	47
-----------------	----