

R&S®ESW

EMI Test Receiver

Getting Started



1328492202

Version 09

ROHDE & SCHWARZ

Make ideas real



This manual describes the following R&S®ESW models:

- R&S®ESW8 (1328.4100K08)
- R&S®ESW8 (1328.4100K09)
- R&S®ESW26 (1328.4100K26)
- R&S®ESW26 (1328.4100K27)
- R&S®ESW44 (1328.4100K44)
- R&S®ESW44 (1328.4100K45)

The contents of this manual correspond to firmware version 3.20 and higher.

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Throughout this manual, products from Rohde & Schwarz are indicated without the ® symbol , e.g. R&S®ESW is indicated as R&S ESW.

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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 is intended for the development, production and verification of electronic components and devices in industrial, administrative, and laboratory environments. Use the product only for its designated purpose. Observe the operating conditions and performance limits stated in the specifications document.

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 specifications document, manuals and the printed "Safety Instructions" document. If you are unsure about the appropriate use, contact Rohde & Schwarz customer support.

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.

Safety instructions

Reconfigure or adjust the product only as described in the product documentation or the specifications document. 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 support at <https://www.rohde-schwarz.com/support>.

Lifting and carrying the product

The product is heavy. Do not move or carry the product by yourself. A single person can only carry a maximum of 18 kg safely depending on age, gender and physical condition. Look up the maximum weight in the specifications document. Use the product handles to move or carry the product. Do not lift by the accessories mounted on the product. Accessories are not designed to carry the weight of the product.

To move the product safely, you can use lifting or transporting equipment such as lift trucks and forklifts. 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 outdoor use of your product, e.g. a protective cover, you can use the product outdoors.

You can operate the product up to an altitude of 2000 m above sea level. If a higher altitude is permissible, the value is provided in the specifications document. 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 specifications document.

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 the product

Before connecting the interfaces and measuring inputs of the product to other products or electrical circuits, make sure that the other products or electrical circuits provide special protection against electric shock. This protection principle is referred to as SELV (safety extra-low voltage) and is based on a low voltage level and increased insulation. Exceptions are indicated by a measurement category on the product and given in the specifications document.

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.

Safety instructions

- 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.

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.

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.

	<p>Potential hazard</p> <p>Read the product documentation to avoid personal injury or product damage.</p>
	<p>Heavy product</p> <p>Be careful when lifting, moving or carrying the product. Carrying the product requires a sufficient number of persons or transport equipment.</p>
	<p>Electrical hazard</p> <p>Indicates live parts. Risk of electric shock, fire, personal injury or even death.</p>
	<p>Hot surface</p> <p>Do not touch. Risk of skin burns. Risk of fire.</p>



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 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.

1.3 Korea certification class B



이 기기는 가정용(B급) 전자파 적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

2 Documentation overview

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

www.rohde-schwarz.com/manual/esw

2.1 Getting started manual

Introduces the R&S ESW 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. A PDF version is available for download on the Internet.

2.2 User manuals and help

Separate user manuals are provided for the base unit and the firmware applications:

- **Base unit manual**
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.
- **Firmware application manual**
Contains the description of the specific functions of a firmware application, including remote control commands. Basic information on operating the R&S ESW is not included.

The contents of the user manuals are available as help in the R&S ESW. The help offers quick, context-sensitive access to the complete information for the base unit and the firmware applications.

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 the rated specifications, module replacement and repair, firmware update, troubleshooting and fault elimination, and contains mechanical drawings and spare part lists.

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 ESW 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 Specifications and brochures

The specifications document, also known as the data sheet, contains the technical specifications of the R&S ESW. 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/esw

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 firmware uses 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/esw

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/esw

2.9 Videos

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

3 Conventions used in the documentation

3.1 Typographical conventions

The following text markers are used throughout this documentation:

Convention	Description
"Graphical user interface elements"	All names of graphical user interface elements on the screen, such as dialog boxes, menus, options, buttons, and softkeys are enclosed by quotation marks.
[Keys]	Key and knob names are enclosed by square brackets.
<code>Filenames, commands, program code</code>	Filenames, commands, coding samples and screen output are distinguished by their font.
<i>Input</i>	Input to be entered by the user is displayed in italics.
Links	Links that you can click are displayed in blue font.
"References"	References to other parts of the documentation are enclosed by quotation marks.

3.2 Conventions for procedure descriptions

When operating the instrument, several alternative methods may be available to perform the same task. In this case, the procedure using the touchscreen is described. Any elements that can be activated by touching can also be clicked using an additionally connected mouse. The alternative procedure using the keys on the instrument or the on-screen keyboard is only described if it deviates from the standard operating procedures.

The term "select" may refer to any of the described methods, i.e. using a finger on the touchscreen, a mouse pointer in the display, or a key on the instrument or on a keyboard.

3.3 Notes on screenshots

When describing the functions of the product, we use sample screenshots. These screenshots are meant to illustrate as many as possible of the provided functions and possible interdependencies between parameters. The shown values may not represent realistic usage scenarios.

The screenshots usually show a fully equipped product, that is: with all options installed. Thus, some functions shown in the screenshots may not be available in your particular product configuration.

4 Preparing for use

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

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4.1 Lifting and carrying

The carrying handles are designed to lift or carry the instrument. Do not apply excessive external force to the handles.

See "[Lifting and carrying the product](#)" on page 8.

4.2 Unpacking and checking

1. Unpack the R&S ESW carefully.
2. Retain the original packing material. Use it when transporting or shipping the R&S ESW later.
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 specifications document.

For safety information, see ["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 specifications document.

- 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 product

See also:

- ["Setting up the product"](#) on page 8
- ["Intended use"](#) on page 7

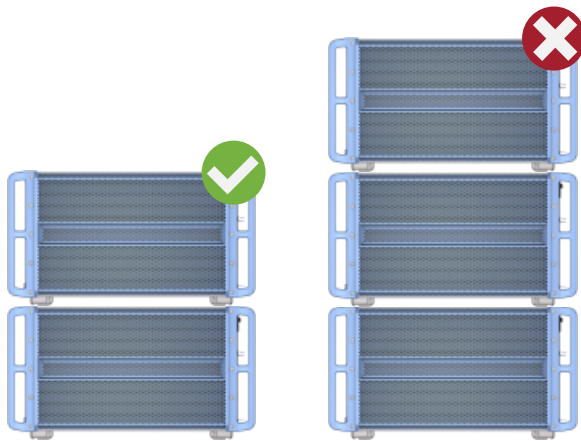
4.4.1 Placing the product on a bench top

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 specifications document.
2. **WARNING!** A stack of products can fall over and cause injury. Never stack more than two products. Otherwise, mount them in a rack.

Stack as follows:

- All products must have the same dimensions (width and length).
- Do not exceed a total load of 50 kg placed on the product at the bottom of the stack.



Left = Stacked correctly

Right = Stacked incorrectly, too many products

3. **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 ESW 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 ESW in a rack

1. Use an adapter kit to prepare the R&S ESW for rack mounting.
 - a) Order the rack adapter kit designed for the R&S ESW. For the order number, see the specifications document.
 - b) Mount the adapter kit. Follow the assembly instructions provided with the adapter kit.
2. Lift the R&S ESW to shelf height.
3. Grab the handles and push the R&S ESW onto the shelf until the rack brackets fit closely to the rack.
4. Tighten all screws in the rack brackets with a tightening torque of 1.2 Nm to secure the R&S ESW in the rack.

To unmount the R&S ESW from a rack

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

4.5 Connecting the AC power

In the standard version, the R&S ESW is equipped with an AC power supply connector.

Switching the instrument on and off

The R&S ESW can be used with different AC power voltages and adapts itself automatically to it. Refer to the specifications document for the requirements of voltage and frequency.

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

To connect the AC power

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



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 specifications document.

For details on the connector, refer to [Chapter 5.2.2, "AC power supply connection and main power switch"](#), on page 47.

4.6 Switching the instrument on and off

Table 4-1: Overview of power states

Status	LED on Power key	Position of main power switch
Off	● gray	[0]
Standby	● orange	[I]
Ready	● green	[I]

To switch on the R&S ESW

The R&S ESW is off but connected to power.

1. Set the switch on the power supply to position [I].
See [Chapter 5.2.2, "AC power supply connection and main power switch"](#), on page 47.

The LED of the Power key is orange.

See [Chapter 5.1.2, "Power key"](#), on page 38.


2. Press the Power key.
See [Chapter 5.1.2, "Power key"](#), on page 38.
The LED changes to green.
The R&S ESW boots.

After booting, the instrument is ready for operation.

To shut down the product

The product is in the ready state.

- Press the [Power] key.
The operating system shuts down. The LED changes to orange.

 If the instrument temperature exceeds the limit specified in the data sheet, the R&S ESW automatically shuts down to protect the instrument from damage.

To disconnect from power

The R&S ESW 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 switch on the power supply to position [0].
See [Chapter 5.2.2, "AC power supply connection and main power switch"](#), on page 47.
The LED of the Power key is switched off.
2. Disconnect the R&S ESW from the power source.

4.7 Connecting to LAN

You can connect the instrument to a LAN for remote operation via a PC.

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

- To transfer data between a controlling device and the test device, e.g. to run a remote control program

- To access or control the measurement from a remote computer using the "Remote Desktop" application (or a similar tool)
- To connect external network devices (e.g. printers)
- To transfer data from a remote computer and back, e.g. using network folders

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. For more information about IT security and how to operate the product in a secure LAN environment, see the Rohde & Schwarz white paper [1EF96: Malware Protection Windows 10](#).

► **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.

Connect the R&S ESW to the LAN via the LAN interface on the rear panel of the instrument.

Windows automatically detects the network connection and activates the required drivers.

By default, the R&S ESW is configured to use DHCP and no static IP address is configured.



The default instrument name is <Type><variant>-<serial_number>, for example, ESW26-123456. For information on determining the serial number, see [Chapter 5.2.14, "Device ID"](#), on page 51.

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

4.8 Connecting a keyboard

The keyboard is detected automatically when it is connected. The default input language is English – US.

However, you can also connect foreign language keyboards; currently the following languages are supported for the R&S ESW:

- German
- Swiss
- French
- Russian

To configure the keyboard language

1. To access the Windows operating system, press the Windows key on the external keyboard.
2. Select "Start > Settings > Time & language > Region & language > Add a language" .

4.9 Connecting an external monitor

You can connect an external monitor (or projector) to the "DVI" or "Display port" connector on the rear panel of the R&S ESW (see also [Chapter 5.2.3, "Display port and DVI"](#), on page 47).



Screen resolution and format

The touchscreen of the R&S ESW is calibrated for a 16:10 format. If you connect a monitor or projector using a different format (e.g. 4:3), the calibration is not correct and the screen does not react to your touch actions properly.

The touchscreen has a screen resolution of 1280x800 pixels. Usually, the display of the external monitor is a duplicate of the instrument's monitor.

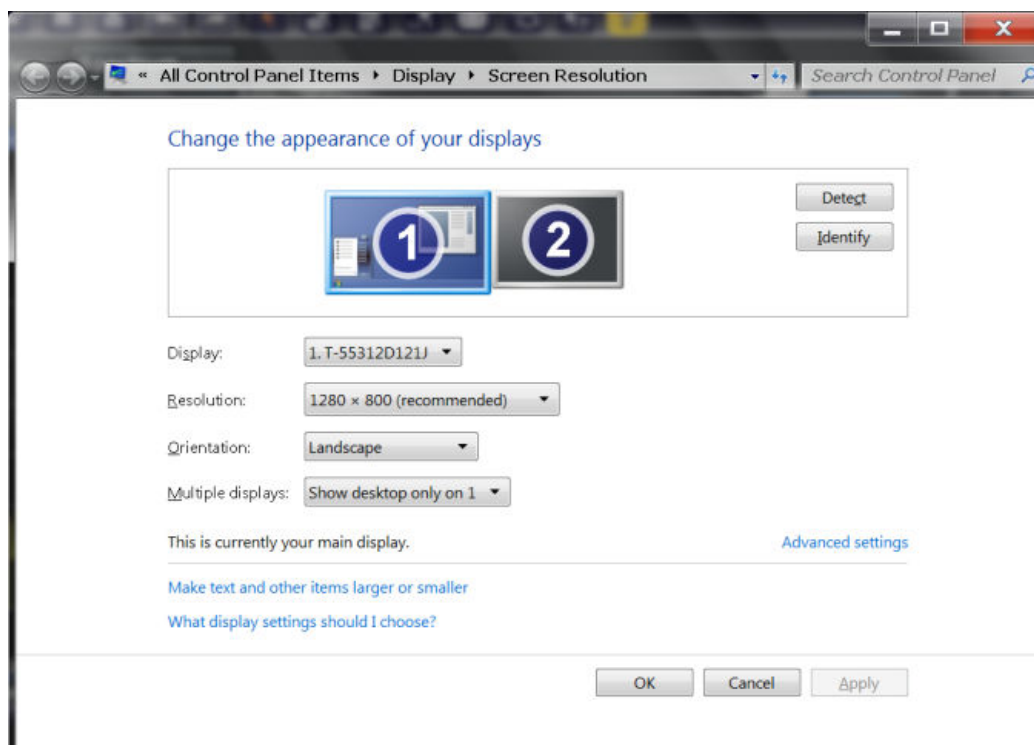
If you configure the external monitor to be used as the *only* display in the Windows configuration dialog box ("Show only on 2"), the maximum screen resolution of the monitor is used. In this case, you can maximize the R&S ESW application window and see even more details. You cannot change the monitor's screen resolution via the standard Windows configuration dialog box.

However, you can restore the default instrument resolution (1280x800) on the monitor using the instrument function "Setup" > "Display" > "Configure Monitor" > "Screen Resolution: Restore to default".

The R&S ESW supports a minimum resolution of 1280x768 pixels.

1. Connect the external monitor to the R&S ESW.
2. Press [Setup].
3. Press "Display".
4. Select the "Configure Monitor" tab in the "Display" dialog box.

The standard Windows "Screen Resolution" dialog box is displayed.



5. Select the instrument for display:
 - "Display 1": internal monitor only
 - "Display 2": external monitor only
 - "Duplicate": both internal and external monitor
6. Tap "Apply" to try out the settings before they are accepted permanently, then you can easily return to the previous settings, if necessary.
7. Select "OK" if the settings are suitable.

4.10 Windows operating system

The instrument contains the Microsoft Windows operating system which has been configured according to the instrument's features and needs. Changes in the system setup are only required when peripherals like a keyboard or a printer are installed or if the network configuration does not comply with the default settings. After the R&S ESW is started, the operating system boots and the instrument firmware is started automatically.

Tested software

The drivers and programs used on the instrument under Microsoft Windows are adapted to the instrument. Only install update software released by Rohde & Schwarz to modify existing instrument software.

You can install additional software on the instrument; however, additional software can impair instrument function. Thus, run only programs that Rohde & Schwarz has tested for compatibility with the instrument software.

The following program packages have been tested:

- Symantec Endpoint Security – virus-protection software
- FileShredder - for reliable deletion of files on the hard disk

Service packs and updates

Microsoft regularly creates security updates and other patches to protect Windows-based operating systems. They are released through the Microsoft Update website and associated update server. Update instruments using Windows regularly, especially instruments that connect to a network.

Firewall settings

A firewall protects an instrument by preventing unauthorized users from gaining access to it through a network. Rohde & Schwarz highly recommends using the firewall on your instrument. Rohde & Schwarz instruments are shipped with the Windows firewall enabled. All ports and connections for remote control are enabled.

Note that changing firewall settings requires administrator rights.

Virus protection

Take appropriate steps to protect your instruments from infection. Use strong firewall settings and scan any removable storage device used with a Rohde & Schwarz instrument regularly. It is also recommended that you install anti-virus software on the instrument. Rohde & Schwarz does NOT recommend running anti-virus software in the background ("on-access" mode) on Windows-based instruments, due to potentially degrading instrument performance. However, Rohde & Schwarz does recommend running it during non-critical hours.

For details and recommendations, see the following Rohde & Schwarz white paper:

- [1EF96: Malware Protection Windows 10](#)

To access the "Start" menu

The Windows "Start" menu provides access to the Microsoft Windows functionality and installed programs.

- ▶ Select the "Windows" icon in the toolbar, or press the "Windows" key or the [CTRL + ESC] key combination on the (external) keyboard.



The "Start" menu and the Windows taskbar are displayed.



The Windows taskbar also provides quick access to commonly used programs, for example Paint or WordPad. IECWIN, the auxiliary remote control tool provided free of charge and installed by Rohde & Schwarz, is also available from the taskbar or "Start" menu.

For details on the IECWIN tool, see the "Network and Remote Control" chapter of the R&S ESW user manual.

All necessary system settings can be defined in the "Start > Settings" menu.

For required settings, refer to the Microsoft Windows documentation and to the hardware description.

4.11 Logging on

Microsoft Windows requires that users identify themselves by entering a user name and password in a login window. By default, the R&S ESW provides the following user accounts:

- **"Instrument"**: an administrator account with unrestricted access to the computer/domain
- **"NormalUser"**: a standard user account with limited access

Some administrative tasks require administrator rights (e.g. the configuration of a LAN network). Refer to the description of the basic instrument Setup ([Setup] menu) to find out which functions are affected.

Passwords

For all default user accounts, the initial password is 894129. Note that this password is very weak, and it is recommended that you change the password for all users after initial login. An administrator can change the password in Microsoft Windows for any user at any time via "Start > Settings > Account > Sign In Options > Password > Change".

Auto-login

When shipped, the instrument automatically logs on the default "Instrument" user to Microsoft Windows (with full access) using the default password. This function is active until an administrator explicitly deactivates it or changes the password.



Changing the password and use of auto-login function

Note that when you change the default password, the default auto-login function no longer works!

In this case, you must enter the new password manually to log on.

Adapting the auto-login function to a new password

If you change the password that is used during auto-login, this function no longer works. Adapt the settings for the auto-login function first.



Changing the password for auto-login requires administrator rights.

1. Select the "Windows" icon in the toolbar to access the operating system of the R&S ESW (see also ["To access the "Start" menu"](#) on page 28).



2. Open the `C:\R_S\Instr\User\AUTOLOGIN.REG` file in any text editor (e.g. Notepad).
3. In the line `"DefaultPassword"="894129"`, replace the default password (894129) by the new password for automatic login.
4. Save the changes to the file.
5. In the Windows "Start" menu, select "Run".
The "Run" dialog box is displayed.

Checking the supplied options

6. Enter the command `C:\R_S\Instr\User\AUTOLOGIN.REG`.
7. Press [ENTER] to confirm.
The auto-login function is reactivated with the changed password. It is applied the next time you switch on the instrument.

Switching users when using the auto-login function

Which user account is used is defined during login. If auto-login is active, the login window is not displayed. However, you can switch the user account to be used even when the auto-login function is active.

1. Select the "Windows" icon in the toolbar to access the operating system of the R&S ESW (see also ["To access the "Start" menu"](#) on page 28).



2. Press [CTRL] + [ALT] + [DEL], then select "Sign out".
The "Login" dialog box is displayed, in which you can enter the different user account name and password.

For information on deactivating and reactivating the auto-login function, see the R&S ESW user manual.

4.12 Checking the supplied options

The instrument can be equipped with both hardware and firmware options. To check whether the installed options correspond to the options indicated on the delivery note, proceed as follows.

1. Press [SETUP].
2. Press "System Config".
3. Switch to the "Versions + Options" tab in the "System Configuration" dialog box.
A list with hardware and firmware information is displayed.
4. Check the availability of the hardware options as indicated in the delivery note.

4.13 Performing a self-alignment

When temperature changes occur in the environment of the R&S ESW, or after updating the firmware, you have to perform a self-alignment to align the data to a reference source.

During self-alignment, do not connect a signal to the RF input connector. Running a self-alignment with a signal connected to the RF input can lead to false measurement results.

Performing a self-alignment

Before performing this alignment, make sure that the instrument has reached its operating temperature (for details, refer to the specifications document).

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

Depending on the installation settings, an automatic self-alignment is performed after installation. A dialog box is displayed indicating how much warm-up time is still required before self-alignment can be performed.

1. Press [Setup].
2. Press "Alignment".
3. Select "Start Self Alignment" in the "Alignment" dialog box.

Once the system correction values have been calculated successfully, a message is displayed.



To display the alignment results again later

- Press [SETUP].
- Press "Alignment".

4.14 Considerations for test setup

Cable selection and electromagnetic interference (EMI)

Electromagnetic interference (EMI) can affect the measurement results.

Protecting data using the secure user mode

To suppress electromagnetic radiation during operation:

- Use high-quality shielded cables, for example, double-shielded RF and LAN cables.
- 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 specifications document and on the instrument, next to the connector. Keep the signal levels within the specified ranges to avoid damage to the R&S ESW and connected devices.

Measuring unknown signals

When measuring unknown signals, apply signal attenuation of at least 10 dB. Using a 0 dB attenuation when measuring unknown signals can damage or destroy the input mixer.

4.15 Protecting data using the secure user mode

During normal operation, the R&S ESW uses a solid-state drive to store its operating system, instrument firmware, instrument self-alignment data, and any user data created during operation.

Redirecting storage to volatile memory

Alternatively, to avoid storing any sensitive data on the R&S ESW permanently, the *secure user mode* was introduced (option R&S ESW-K33). In secure user mode, the instrument's solid-state drive is write-protected so that no information can be written to memory permanently. Data that the R&S ESW normally stores on the solid-state drive is redirected to volatile memory instead, which remains available only until the instrument is switched off. This data includes:

- Windows operating system files
- Firmware shutdown files containing information on last instrument state
- Self-alignment data
- General instrument settings such as the IP address
- Measurement settings

Protecting data using the secure user mode

- User data created during operation
- Any data created by other applications installed on the R&S ESW, for example, text editors (Notepad), the clipboard, or drawing tools.

Users can access data that is stored in volatile memory just as in normal operation. However, when the instrument's power is switched off, all data in this memory is cleared. Thus, in secure user mode, the instrument always starts in a defined, fixed state when switched on.

To store data such as measurement results permanently, it must be stored to an external storage device, such as a memory stick.

**Limited storage space**

The volatile memory used to store data in secure user mode is restricted to 256 MB. Thus, a "Memory full" error can occur although the hard disk indicates that storage space is still available.

Storing required data permanently

Any data that is to be available for subsequent sessions with the R&S ESW must be stored on the instrument permanently, *before activating the secure user mode*. This includes predefined instrument settings, transducer factors and self-alignment data.

**Self-alignment data**

Note that self-alignment data becomes invalid with time and due to temperature changes. Therefore, to achieve optimal accuracy, it can be preferable to perform a new self-alignment at the start of each new session on the R&S ESW.

**Windows updates**

In secure user mode, in rare cases, Windows updates trigger a reboot. We recommend using secure user mode on R&S ESW-K33 only in private LAN without access to the internet or disconnected to LAN to avoid unwanted Windows updates. In preparation for Windows updates, disable secure user mode temporarily.

Restricted operation

Since permanent storage is not possible, the following functions are not available in secure user mode:

- Firmware update
- Activating a new option key

Furthermore, since the "SecureUser" used in secure user mode does not have administrator rights, **administrative tasks** such as LAN configuration and some general instrument settings are not available. Refer to the description of the basic instrument setup ([SETUP] menu) to find out which functions are affected.

Activating and deactivating secure user mode

Only a user with administrator rights can activate (and deactivate) the secure user mode. Once activated, a restart is required. The special user "SecureUser" is then logged on to the R&S ESW automatically using the auto-login function. While the secure user mode is active, a message is displayed in the status bar at the bottom of the screen.



Secure passwords

By default, the initial password for both the administrator account and the "SecureUser" account is "894129". When the secure user mode is activated the first time after installation, you are prompted to change the passwords for all user accounts to improve system security. Although it is possible to continue without changing the passwords, it is strongly recommended that you do so.

You can change the password in Microsoft Windows for any user at any time via:

"Start > Settings > Account > SignIn Options > Password > Change"

To deactivate the secure user mode, the "SecureUser" must log off and a user with administrator rights must log on.



Switching users when using the auto-login function

In the "Start" menu, select the arrow next to "Shut down" and then "Log off". The "Login" dialog box is displayed, in which you can enter the different user account name and password.

Protecting data using the secure user mode

The secure user mode setting and auto-login is automatically deactivated when another user logs on. The "SecureUser" is no longer available.

For users with administrator rights, the secure user mode setting is available in the general system configuration settings ([Setup] > "System Configuration" > "Config" tab > "Secure User Mode": "ON", see the R&S ESW user manual).

Remote control

Initially after installation of the R&S ESW-K33 option, secure user mode must be enabled manually once before remote control is possible.

Manual activation is necessary to prompt for a change of passwords.

5 Instrument tour

On the instrument tour, you can learn about the different control elements and connectors on the front and back panel of the R&S ESW.

5.1 The front panel

The front panel contains the main control elements of the R&S ESW in addition to various connectors as shown in [Figure 5-1](#).



Figure 5-1: Front panel of the R&S ESW

- 1 = Display (touchscreen)
- 2 = Configuration keys
- 3 = Navigation controls
- 4 = Trigger in- and outputs
- 5 = Radiofrequency (RF) input 1
- 6 = External Mixer in- and outputs
- 7 = Radiofrequency (RF) input 2
- 8 = Probe 2 power connector
- 9 = Fast access knobs
- 10 = Volume control

- 11 = Headphone jack
- 12 = Probe 1 power connector
- 13 = USB ports
- 14 = System control keys
- 15 = Power key

5.1.1 Display (touchscreen)

The touchscreen on the front panel of the R&S ESW displays the measurement results. Additionally, the screen display provides status and setting information and allows you to switch between various measurement tasks. The screen is touch-sensitive, offering an alternative means of user interaction for quick and easy handling of the instrument.



- 1 = Channel tabs: each tab contains a measurement channel.
- 2 = Window title bar: contains diagram-specific (trace) information.
- 3 = Channel bar: shows measurement settings and allows you to change those settings easily.
- 4 = Toolbar: contains general functionality of the firmware (print, save etc.).
- 5 = Input field.
- 6 = Softkeys: provide access to measurement functions.
- 7 = Result display: contains the measurement results.
- 8 = Status bar: contains system messages, progress bar and date and time.
- 9 = Diagram footer: contains diagram-specific information.

A touchscreen is a screen that is touch-sensitive, i.e. it reacts in a specified way when a particular element on the screen is tapped by a finger or a pointing device, for example. Any user interface elements that can be clicked on by a

The front panel

mouse pointer can also be tapped on the screen to trigger the same behavior, and vice versa.

Using the touchscreen, the following tasks (among others) can be performed by the tap of your finger:

- Changing a setting
- Changing the display
- Moving a marker
- Zooming into a diagram
- Selecting a new evaluation method
- Scrolling through a result list
- Saving or printing results and settings

To imitate a right-click by mouse using the touchscreen, for example to open a context-sensitive menu for a specific item, press the screen for about 1 second.

5.1.2 Power key



The power key is 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.

5.1.3 System control keys

System control keys provide access to the basic instrument configuration.

Refer to the User Manual for an extensive description of the system configuration functionality.



Resets the instrument to its default configuration.



Selects a particular measurement application or operating mode.

The front panel



Provides functionality to configure basic instrument characteristics, for example:

- the LAN connection
- the date and time
- the display configuration
- the reference frequency
- firmware update and application installation
- service functions
- transducer configuration
- configuration of the fast access panel



Provides access to the on-screen keyboard.



Turns full screen mode on and off.



Selects a window in split screen mode or browses through active windows in full screen mode.

5.1.4 USB ports

The three USB ports on the front panel (type A) allow you to connect devices like keyboards, mice or memory sticks.



The R&S ESW provides additional USB ports (including one type B port) on the rear panel.

All USB ports support standard 2.0.

5.1.5 Probe power connector (3 and 5 pins)

The R&S ESW provides two connectors to supply accessories that require a power supply (for example probes or transducers).

The probe power connector with five pins supports supply voltages of ± 10 V and ground. The maximum permissible current is 200 mA. This probe power connector is suitable, for example, for transducers from Rohde & Schwarz.

The probe power connector with three pins supports supply voltages from +15 V to -12.6 V and ground. The maximum permissible current is 150 mA. This probe power connector is suitable, for example, for high-impedance probes from Agilent.

5.1.6 Headphone jack and volume control

The female headphone jack allows you to connect headphones (or external speakers) with a miniature jack plug.

You can control the output voltage with the volume control next to the headphone jack.

If you connect headphones or external speakers, the R&S ESW automatically turns off the internal speaker.

See also ["Using headphones"](#) on page 10.



Muting sound

You can turn the volume on and off easily by pressing the volume control.

5.1.7 Fast access knobs

The two knobs on the front panel are designed to provide fast access to a (predefined) set of settings that you are using regularly, and change these settings without using the user interface. Each knob can carry several different functions.

You can find a comprehensive description of the fast access knobs in the User Manual.

5.1.8 RF inputs (50 Ω)

The R&S ESW provides two RF inputs for connection of a device under test (DUT) to the R&S ESW. The DUT is connected to the RF Input via cable and an appropriate connector (for example a male N connector).

Do not overload the RF inputs. For maximum allowed values, see the data sheet.

For AC-coupling, a DC input voltage of 50 V must never be exceeded. For DC-coupling, DC voltage must not be applied at the input. In both cases, noncompliance will destroy the input mixers.

The first RF Input supports a frequency range from 2 Hz to f_{\max} and an attenuation range from 0 dB to 75 dB. The second RF Input supports a frequency range from 2 Hz to 1 GHz and an attenuation range from 10 dB to 75 dB. Attenuation levels smaller than 10 dB at RF Input 2 are only possible when the pulse limiter is not active (refer to the User Manual for more information).

Measuring unknown signals

When measuring unknown signals, do not use a 0 dB attenuation level. Otherwise, the input mixer may be damaged or destroyed.

When measuring unknown signals on the second RF input, turn on the pulse limiter feature. Otherwise, the input mixer may be damaged or destroyed in case of high power signals.

5.1.9 Trigger input and output

The female BNC connector labeled "Trigger Input" allows you to receive an external trigger signal.

The female BNC connector labeled "Trigger Input / Output" allows you to receive an external trigger signal or send a trigger signal to another device.

When you are using the connector as a trigger input, you can apply voltages in the range from 0.5 V to 3.5 V (the default value is 1.4 V). The typical input impedance is 10 k Ω .

When you are using the connector as a trigger output, the TTL compatible signal is transmitted (0 V / 5 V).

Note that you can find another connector for trigger input and output on the rear panel.

For more information about controlling and configuring trigger input and output, refer to the User Manual.

5.1.10 Navigation controls

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



Navigating in tables

The easiest way to navigate within tables (both in result tables and configuration tables) is to scroll through the entries with your finger on the touch-screen.

5.1.10.1 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: Same effect as the Enter key when pressed

5.1.10.2 Navigation keys

You can use the navigation keys as an alternative 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.

5.1.10.3 Undo/redo keys

- [Undo] reverts the previous action, i.e. the state before the previous action is retrieved.
The undo function is useful, for example, if you accidentally select a different measurement. In this case, many settings are lost. However, if you press [Undo] immediately afterwards, the previous state is retrieved, i.e. the previous measurement and all settings.
- [Redo] repeats the previously reverted action, i.e. the most recent action is repeated.

 The [Undo] function is not available after a [Preset] or "Recall" operation. When you use these functions, the history of previous actions is deleted.

5.1.11 Keypad

The keypad is used to enter alphanumeric parameters, including the corresponding units (see also [Chapter 6.4.2, "Entering alphanumeric parameters"](#), on page 67). It contains the following keys:

Table 5-1: 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.
Sign key	Changes the sign of a numeric parameter. For an alphanumeric parameter, inserts a "-" at the cursor position.
Unit keys (GHz/-dBm MHz/dBm, kHz/dB and Hz/dB)	<p>Adds the selected unit to the entered numeric value and complete the entry.</p> <p>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.</p>
[Esc] key	<p>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.</p> <p>For "Edit" dialog boxes the following mechanism is used:</p> <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.

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Type of key	Description
Backspace key	If an alphanumeric entry has already been started, this key deletes the character to the left of the cursor.
Enter key	<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.

5.1.12 The function keys

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

Refer to the user manual for an extensive description of the measurement settings and functions.

FREQ CHANNEL	Provides functionality to define frequency parameters, for example: <ul style="list-style-type: none"> the receiver or center frequency the frequency offset
SPAN	Provides functionality to configure the frequency span.
AMPT SCALE	Provides functionality to configure amplitude or level characteristics, for example: <ul style="list-style-type: none"> the attenuation the input impedance the scale of the level axis the preamplifier
AUTO SET	Provides functionality to automatically define various parameters like the level or frequency.
BW	Provides functionality to define various filter bandwidths.
SWEEP	Provides functionality to configure the measurement, for example: <ul style="list-style-type: none"> the measurement mode (single or continuous measurements) the number of measurement points the measurement time
TRACE	Provides functionality to configure data acquisition and analyze measured data, for example: <ul style="list-style-type: none"> the trace mode the detector

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TRIG	Provides functionality to configure triggered and gated measurements.
MKR	Provides functionality to activate and position absolute and relative markers (markers and delta markers).
PEAK SEARCH	Performs a peak search for active markers. If no marker is active, marker 1 is activated and the peak search is performed for it.
MKR FUNCT	Spectrum application only: Provides additional analysis functions of the measurement markers, for example: <ul style="list-style-type: none"> • the frequency counter • the noise measurement • the phase noise measurement • the AM/FM audio demodulator
MKR →	Provides functionality to position and control markers, for example: <ul style="list-style-type: none"> • to configure the marker search • to configure the peak excursion
MEAS	Provides the measurement functions, for example: <ul style="list-style-type: none"> • the bargraph measurement (receiver application) • the scan and final measurement (receiver application) • the AF demodulation (receiver application) • IF analysis • the channel power and ACLR measurement (spectrum application) • the occupied bandwidth measurement (spectrum application) • the Spectrum Emission Mask (SEM) measurement (spectrum application) • the spurious emission measurement (spectrum application) • the signal statistics (spectrum application)
MEAS CONFIG	Provides functionality to configure the measurement.
LINES	Provides functionality to control display and limit lines.
INPUT / OUTPUT	Provides functionality to configure inputs and outputs.
RUN SINGLE	Starts a measurement in single measurement mode.
RUN CONT	Starts a measurement in continuous measurement mode.

5.2 The rear panel

The rear panel contains various connectors as shown in [Figure 5-2](#).

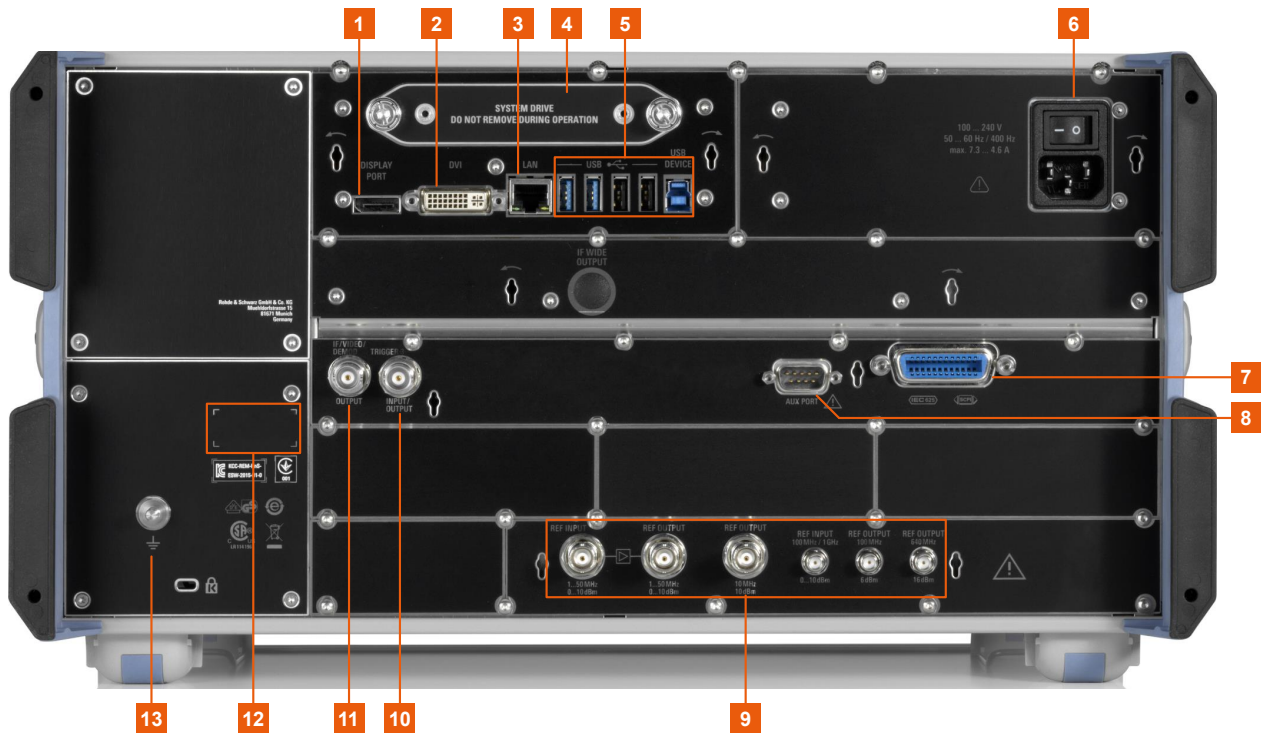


Figure 5-2: Rear panel of the R&S ESW

- 1 = DisplayPort connector
- 2 = DVI connector
- 3 = LAN connector
- 4 = Removable hard drive
- 5 = USB ports
- 6 = AC power supply and main power switch
- 7 = GPIB interface
- 8 = AUX port
- 9 = REF inputs and outputs
- 10 = Trigger in- and output
- 11 = IF / Video / Demod output
- 12 = Instrument Serial Number
- 13 = Ground connector

• Removable hard disk	47
• AC power supply connection and main power switch	47
• Display port and DVI	47
• LAN connector	48
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The rear panel

• Sync trigger input and output.....	48
• GPIB interface.....	49
• Aux. port.....	49
• External generator control option (R&S ESW-B10).....	49
• OCXO (optional).....	49
• REF INPUT / REF OUTPUT.....	50
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• Device ID.....	51

5.2.1 Removable hard disk

The removable hard disk is accessible from the rear of the instrument.

In addition to the operating system and the firmware, the R&S ESW also stores measurement data on that disk. When you remove the hard disk, you can store it and the data on it somewhere secure.

5.2.2 AC power supply connection and main power switch

An AC power supply connector and main power switch are located in a unit on the rear panel of the instrument.

Main power switch function:

Position 1: The instrument can be started via the Power key on the front panel.

The (optional) OCXO reference frequency is warmed up.

Position O: The entire instrument is disconnected from the AC power supply.

For details, refer to ["Connecting to power"](#) on page 9 and [Chapter 4.5, "Connecting the AC power"](#), on page 20.

5.2.3 Display port and DVI

You can connect an external monitor or other display device to the R&S ESW to provide an enlarged display. Two different types of connectors are provided for this purpose:

- Display Port
- DVI (digital visual interface)

For details, see [Chapter 4.9, "Connecting an external monitor"](#), on page 24.

5.2.4 LAN connector

The LAN interface allows you to connect the R&S ESW to a local network for remote control, printouts or data transfer. The assignment of the RJ-45 connector supports twisted-pair category 5 UTP/STP cables in a star configuration (UTP stands for *unshielded twisted pair*, and STP for *shielded twisted pair*).

For details see [Chapter 4.7, "Connecting to LAN"](#), on page 22.

5.2.5 USB ports

The four USB ports on the rear panel (type A) allow you to connect devices like keyboards, mice or memory sticks.

The male USB connector (type B) allows you to connect the R&S ESW to a computer and establish a remote control connection, for example.

All USB connectors support standard 2.0.

5.2.6 IF / video / demod output

The two female BNC connectors can be used for various outputs:

- Output of the intermediate frequency (IF)
- Output of the video signal
- Output of the demodulated signal (AM, FM)

Details about configuring the output type and characteristics are part of the user manual.

5.2.7 Sync trigger input and output

The "Sync Trigger Input / Output" connectors allow you to synchronize several devices (for example two R&S ESWs) with respect to the trigger signal, but also the reference frequency. A 100 MHz signal can be output as a trigger or reference signal to another device, and an external trigger or reference signal can be received at the input connector by the R&S ESW.

5.2.8 GPIB interface

The GPIB interface is in compliance with IEEE488 and SCPI. A computer for remote control can be connected via this interface. To set up the connection, a shielded cable is recommended.

For more details, refer to "Setting Up Remote Control" in the R&S ESW user manual.

5.2.9 Aux. port



A 9-pole SUB-D male connector used to provide low-voltage TTL control signals (max. 5 V). The output signals can be used to control external devices.

5.2.10 External generator control option (R&S ESW-B10)

The external generator control option provides an additional GPIB and an "AUX control" connector.

The GPIB connector can be used to connect the external generator to the R&S ESW.

The 9-pole SUB-D female "AUX control" connector is required for TTL synchronization, if supported by the generator.

For details on connecting an external generator, see the "External Generator Control" section of the R&S ESW User Manual.

5.2.11 OCXO (optional)

This optional OCXO generates a 10 MHz reference signal with a very precise frequency. If installed, and if no external signal is used, this signal is used as an internal reference. It can also be used to synchronize other connected devices via the REF OUTPUT 10 MHz connector.

**Warm-up time for OCXO**

When the instrument is switched on, the OCXO requires an extended warm-up time.

5.2.12 REF INPUT / REF OUTPUT

The REF INPUT connectors are used to provide an external reference signal to the R&S ESW.

The REF OUTPUT connectors can be used to provide an external reference signal (or the optional OCXO reference signal) from the R&S ESW to other devices that are connected to this instrument.

Various connectors are provided for different reference signals:

Connector	Reference signal	Usage
REF INPUT	1...20 MHz 0...10 dBm	To provide an external reference signal on the R&S ESW.
REF OUTPUT	1...20 MHz 0...10 dBm	To provide the same external reference signal received by the REF INPUT 1...20 MHz connector to another device, when available.
REF OUTPUT	10 MHz 10 dBm	To provide the internal reference signal from the R&S ESW to another device continuously. Also used to provide OCXO reference signal to another device.
REF INPUT	100 MHz 0...10 dBm	To provide an external reference signal on the R&S ESW.
REF OUTPUT	100 MHz 6 dBm	To provide a 100 MHz reference signal from the R&S ESW to another device.
REF OUTPUT	640 MHz 16 dBm	To provide a 640 MHz reference signal from the R&S ESW to another device.

**SYNC TRIGGER**


The SYNC TRIGGER connector can also be used to synchronize the reference frequency on several devices.

5.2.13 Labels on R&S ESW

Labels on the casing inform about:

- Personal safety, see ["Meaning of safety labels"](#) on page 10
- Product and environment safety, see [Table 5-2](#)
- Identification of the product, see [Chapter 5.2.14, "Device ID"](#), on page 51

Table 5-2: Labels regarding R&S ESW and environment safety

	<p>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.</p> <p>For more information, see the product user manual, chapter "Disposal".</p>
---	--

5.2.14 Device ID

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

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, ESW26-123456.

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

6 Operating the instrument

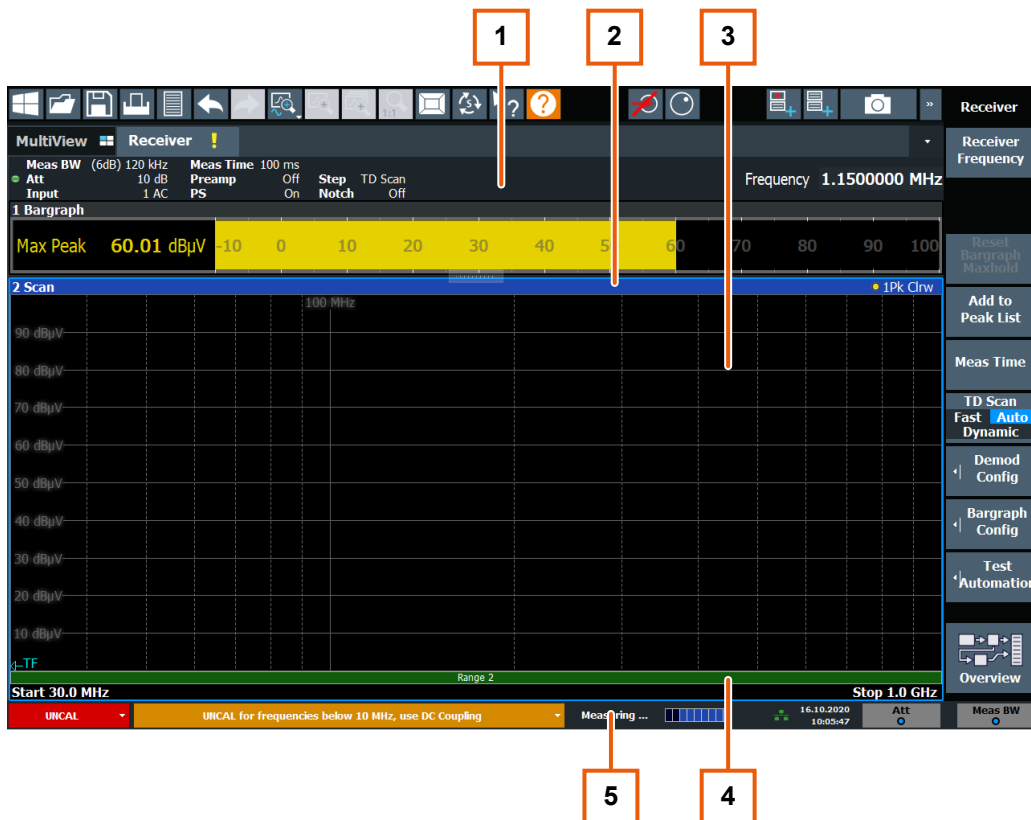
The following topics provide an overview on how to work with the R&S ESW. They describe what kind of information is displayed in the diagram area, how to interact with the R&S ESW, and how to use the online help.

- [Understanding the display information](#)..... 52
- [Accessing functions](#)..... 60
- [Changing the focus](#)..... 65
- [Entering data](#)..... 65
- [Touchscreen gestures](#)..... 68
- [Displaying results](#)..... 72
- [Getting help](#)..... 80
- [Remote control](#)..... 81

6.1 Understanding the display information

The following image shows the default display layout in the receiver application. All different information areas are labeled. They are explained in more detail in the following sections.

Understanding the display information



- 1 = Channel bar: shows firmware and measurement settings
- 2 = Window title bar: shows diagram-specific (trace) information
- 3 = Diagram area: contains the measurement results and other information related to the measurement (marker etc.)
- 4 = Diagram footer: shows diagram-specific information, depending on measurement application
- 5 = Instrument status bar: shows error messages, measurement progress, date/time etc.



Hiding elements in the display

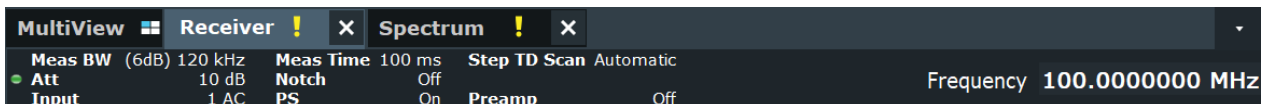
You can hide some of the elements in the display, for example the status bar or channel bar, to enlarge the display area for the measurement results ("Setup" > "Display" > "Displayed Items").

For details, see the R&S ESW user manual.

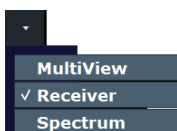
• Channel bar.....	54
• Window title bar.....	56
• Marker information.....	57
• Frequency and span information in diagram footer.....	58
• Instrument and status information.....	59
• Error information.....	60

6.1.1 Channel bar

Using the R&S ESW you can handle several different measurement tasks (channels) at the same time (although they can only be performed asynchronously). For each channel, a separate tab is displayed on the screen. To switch from one channel display to another, simply select the corresponding tab.

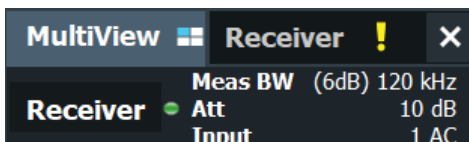


If many tabs are open, you can also select the tab selection list icon at the right end of the channel bar and select the channel you want to see.



MultiView tab

An additional tab labeled "MultiView" provides an overview of all active channels at a glance. In the "MultiView" tab, each individual window contains its own channel bar with an additional button. Tap this button to switch to the corresponding channel display quickly.



Icons in the channel bar

The star icon (★) on the tab label indicates that the displayed trace no longer matches the current instrument settings. This can be the case, for example, if a trace is frozen and the instrument settings are changed. When a new measurement is performed, the icon disappears.

The exclamation mark icon (!) indicates that an error or warning is available for that measurement channel. This is particularly useful if the MultiView tab is displayed.

The gear icon (⚙️) indicates the currently active channel during an automatic measurement sequence (**sequencer** functionality).

Understanding the display information

Beneath the channel name, information about channel-specific settings for the measurement is displayed in the **channel bar**. Channel information varies depending on the active application.

The channel bar above the diagram also contains information about instrument settings.

Table 6-1: Contents of the channel bar (receiver application)

Label	Information
"Meas BW"	Type and bandwidth of the currently selected resolution filter. The filter type label either reads "6 dB" or "MIL". For 3 dB filters, the label is not displayed.
"Att(enuation)"	Currently defined RF attenuation.
"Input"	Currently used RF input, including the input coupling (AC or DC).
"Meas Time"	Currently defined measurement time. For a scan count > 1, the measurement time is the sum of all single measurements.
"Preamp(lifier)"	Currently selected preamplifier state.
"PS"	Current state of the preselector.
"Step"	Currently selected scan type and frequency step mode. <ul style="list-style-type: none"> • "LIN": Stepped scan with linear frequency steps. The frequency step size is a fix value in Hz. • "LOG": Stepped scan with logarithmic frequency steps. The frequency step size is a percentage of the current frequency. • "TD Scan": Time domain scan. • "Fixed Freq": Fixed frequency scan.
"Notch"	Current state of the notch filter.
"Out"	Currently selected output type. If phones output is on, a corresponding icon is displayed.
"LISN"	Currently selected LISN and LISN phase. For R&S ENV216, it also shows the state of the highpass filter. Only displayed when a LISN is included in the measurement.

Understanding the display information

Label	Information
"SGL"	Indicates the progress of single measurements. The first number is the current measurement. The second number is the total number of measurements. Only displayed for single measurements and if the scan count is greater than 1.
"Frequency"	Current receiver frequency.
"75 Ω"	75 Ω input impedance has been selected.
"TRG"	Currently selected trigger source.
"TDF"	Currently selected transducers, including the input they have been assigned to.
Ext. Gen	An external generator is being controlled by the R&S ESW (requires optional hardware).

Icons for individual settings

In the **receiver application**, a bullet next to the setting indicates that automatic settings are used, not user-defined settings.

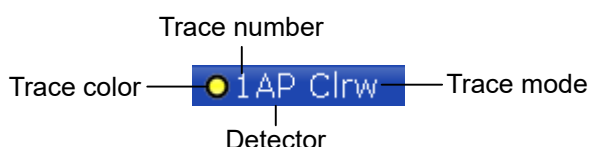
In **other applications**, a bullet next to the setting indicates that user-defined settings are used, not automatic settings. A green bullet indicates that this setting is valid and the measurement is correct. A red bullet indicates an invalid setting that does not provide useful results.

6.1.2 Window title bar

Each channel in the R&S ESW display can contain several windows. Each window can display either a graph or a table as a result of the channel measurement. Which type of result evaluation is displayed in which window is defined in the display configuration (see [Chapter 6.6, "Displaying results"](#), on page 72). The window's title bar indicates which type of evaluation is displayed.

Trace information in window title bar

Information on the displayed traces is indicated in the window title bar.



Understanding the display information

Trace color	Color of trace display in diagram
Trace no.	Number of the trace (1 to 6)
Detector	<p>Abbreviation of the detector assigned to the trace:</p> <ul style="list-style-type: none"> • AP Autopoint detector • Av Average detector • CA CISPR AV detector • Mi Min Peak / Negative Peak detector • Pk Max Peak / Positive Peak detector • QP Quasipeak detector • RA RMS Average detector • Rm RMS detector • Sa Sample detector
Trace Mode	<p>Abbreviation of the trace mode:</p> <ul style="list-style-type: none"> • Clrw Clear Write: Shows the currently measured values. • Max Max Hold: Shows the maximum values that have been measured. • Min Min Hold: Shows the minimum values that have been measured. • Average Average: Shows the averaged values that have been measured. • View View: Shows a trace which remains the same when you perform another measurement. • Transducer Transducer: Shows the correction values of active transducer factors.
Norm/NCor	Correction data is not used.

6.1.3 Marker information

Marker information is provided either in the diagram grid or in a separate marker table, depending on the configuration.

Marker information in diagram grid

Within the diagram grid, the x-axis and y-axis positions of the last 2 markers or delta markers that were set are displayed, if available, as well as their index. The value in the square brackets after the index indicates the trace to which the marker is assigned. (Example: M2[1] defines marker 2 on trace 1.) For more than 2 markers, a separate marker table is displayed beneath the diagram by default.

Marker information in marker table

In addition to the marker information displayed within the diagram grid, a separate marker table can be displayed beneath the diagram. This table provides the following information for all active markers:

Label	Information
"Wnd"	Window type the marker is positioned in.
"Type"	Marker type: N (normal), D (delta), T (temporary, internal)
"Ref"	Reference (for delta markers)
"Trc"	Trace to which the marker is assigned
"X-value"	x-value of the marker
"Y-value"	y-value of the marker

6.1.4 Frequency and span information in diagram footer

The information in the diagram footer (beneath the diagram) depends on the current application.

The contents depend on the application and the result display.

Label	Information
CF	Center frequency
Span	Frequency span (frequency domain display)
ms/	Time per division (time domain display)
Pts	Number of measurement points or (rounded) number of currently displayed points in zoom mode
Start	Start frequency of the scan
Stop	Stop frequency of the scan

6.1.5 Instrument and status information


Global instrument settings and functions, the instrument status and any irregularities are indicated in the status bar beneath the diagram.



In the MultiView tab, the status bar always displays the information for the currently selected measurement.

The following information is displayed:


Instrument status

	The R&S ESW is configured for operation with an external reference. Selecting the "Ext Ref" icon opens a dialog box to configure the external reference.
---	--

Progress

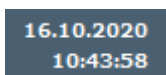
The status of the current operation is displayed in the status bar.



 In the MultiView tab, the progress bar indicates the status of the currently selected measurement, not the measurement currently being performed by a sequencer, for example.

Date and time

The date and time settings of the instrument are displayed in the status bar.



Selecting the date and time icon opens a dialog box to configure the date and time.

Error messages and warnings

If errors or irregularities are detected, a keyword and an error message, if available, are displayed in the status bar.

Knob configuration

Interfaces to configure the fast access knobs in the user interface and indicator of the currently selected knob function.

6.1.6 Error information


If errors or irregularities are detected, a keyword and an error message, if available, are displayed in the status bar.



Depending on the type of message, the status message is indicated in varying colors.

Table 6-2: Status bar information - color coding

Color	Type	Description
Red	Error	An error occurred at the start or during a measurement, e.g. due to missing data or wrong settings, so that the measurement cannot be started or completed correctly.
Orange	Warning	An irregular situation occurred during measurement, e.g. the settings no longer match the displayed results, or the connection to an external device was interrupted temporarily.
Gray	Information	Information on the status of individual processing steps.
No color	No errors	No message displayed - normal operation.
Green	Measurement successful	Some applications visualize that the measurement was successful by showing a message.

 If any error information is available for a channel, an exclamation mark is displayed next to the channel name (■). This is particularly useful when the MultiView tab is displayed, as the status bar in the MultiView tab always displays the information for the currently selected channel only.

For a description of possible errors, see the R&S ESW user manual.

6.2 Accessing functions

All tasks necessary to operate the instrument can be performed using the user interface. Apart from instrument specific keys, all other keys that correspond to an

external keyboard (for example arrow keys, [Enter] key) operate conform to Microsoft.

For most tasks, there are at least 2 alternative methods to perform them:

- Using the touchscreen
- Using other elements provided by the front panel, for example the keypad, rotary knob, or arrow and position keys.


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

- System and function keys on the front panel of the instrument
 - Softkeys on the touchscreen
 - Context menus for specific elements on the touchscreen
 - Icons on the tool bar in the touchscreen
 - Displayed setting on the touchscreen
- [Toolbar](#)..... 61
 - [Softkeys](#)..... 63
 - [Context menus](#)..... 64
 - [On-screen keyboard](#).....64




6.2.1 **Toolbar**











The icons in the toolbar provide access to general functions.












You can hide the toolbar display, for example when using remote control, in order to enlarge the display area for the measurement results ("Setup > Display > Displayed Items"). See the R&S ESW User Manual for details.

	Windows: opens the Windows "Start" menu and task bar.
	Open: opens a file from the instrument or an external device ("Save/Recall" menu).
	Store: stores data on the instrument or an external device ("Save/Recall" menu).

	Print: defines print settings ("Print" menu).
	Report Generator: opens the softkey menu to configure a report.
	Undo: reverts last operation
	Redo: repeats previously reverted operation
	<p>Measurement zoom: applies to the next display you select; Displays a dotted rectangle in the diagram that can be expanded to define the zoom area; the selected diagram is replaced by a new diagram with adapted measurement settings which displays the selected extract of the trace.</p> <p>Also provides a context menu to determine the firmware behavior for touch gestures:</p> <ul style="list-style-type: none"> • "Level Lock" (Default:) The reference level (and thus the attenuation) remains unchanged during touch gestures on the screen. • "X-Lock" The x-axis of the diagram is not changed during subsequent touch gestures. • "Y-Lock" The y-axis of the diagram is not changed during subsequent touch gestures. • "Adapt Measurement to Zoom (selected diagram)" Automatically adapts the measurement settings to the currently zoomed display
	Zoom mode: displays a dotted rectangle in the diagram that can be expanded to define the zoom area.
	Multiple zoom mode: multiple zoom areas can be defined for the same diagram.
	Zoom off: displays the diagram in its original size.
	SmartGrid: activates "SmartGrid" mode to configure the screen layout.
	Sequencer: opens the "Sequencer" menu to perform consecutive measurements.

	Help (+ Select): allows you to select an element for which context-specific help is displayed.
	Help: displays context-sensitive help topic for currently selected element.
	Create report: creates a new measurement report and deletes previous report data.
	Create report: creates a new measurement report without deleting previous report data.
	RF input off: Signal applied to the RF input is not measured (instead the signal path of the calibration signal is used). Note that this icon is only visible if you deliberately turn it on. ([SETUP] > "Display" > "Displayed Items" > "Input Terminator")
	Frequency lock: Frequency does not change when you turn the rotary knob. Only applies to the frequency. You can still change other parameters with the rotary knob.
	Print immediately: prints the current display (screenshot) as configured.

6.2.2 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: 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.

Recognizing the softkey status by color

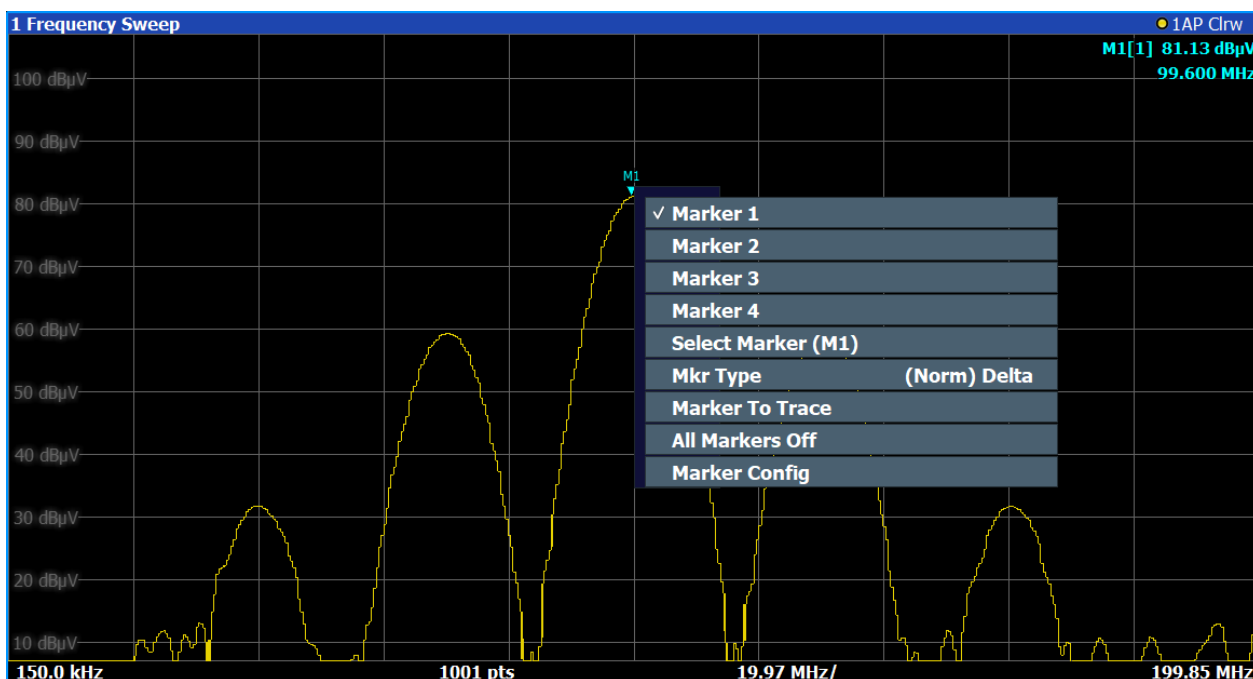
Color	Meaning
orange	associated dialog box is open
blue	associated function is active; for toggle keys: currently active state
gray text	instrument function is temporarily not available due to a specific setting or missing option



You can hide the softkey display, e.g. when using remote control, in order to enlarge the display area for the measurement results ("Setup > Display > Displayed Items"). See the User Manual for details.

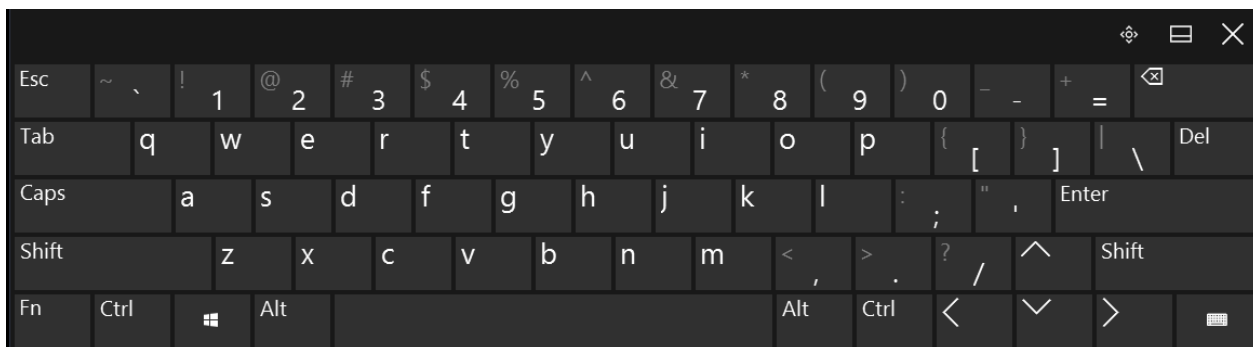
6.2.3 Context menus

Several items in the diagram area have context-sensitive menus (for example markers, traces or the channel bar). If you right-click on one of these items (or tap it for about 1 second), a menu is displayed which contains the same functions as the corresponding softkey. This is useful, for example, when the softkey display is hidden.



6.2.4 On-screen keyboard

The on-screen keyboard is an additional means of interacting with the instrument without having to connect an external keyboard.



The on-screen keyboard display can be switched on and off as desired using the "On-Screen Keyboard" function key beneath the screen.



When you press this key, the display switches between the following options:

- Keyboard displayed at the top of the screen
- Keyboard displayed at the bottom of the screen
- No keyboard displayed



You can use the TAB key on the on-screen keyboard to move the focus from one field to another in dialog boxes.

6.3 Changing the focus

Any interaction using the keypad, scrollbar or knobs always affects the currently focused element in the display, e.g. a dialog field, diagram, or table row. The currently focused element is indicated by a blue frame (diagram, window, table) or is otherwise highlighted (softkey, marker etc.). To move the focus, select the element on the touchscreen.

6.4 Entering data

You can enter data in dialog boxes using any of the following methods:

- Using the touchscreen, via the on-screen keyboard

- Using other elements provided by the front panel, e.g. the keypad, rotary knob, or navigation keys
The rotary knob acts like the [ENTER] key when it is pressed.
- Using a connected external keyboard



Transparent dialog boxes

You can change the transparency of the dialog boxes to see the results in the windows behind the dialog box. Thus, you can see the effects that the changes you make to the settings have on the results immediately.

To change the transparency, select the transparency icon at the top of the dialog box. A slider is displayed. To hide the slider, select the transparency icon again.



(The title bar of the dialog box is always slightly transparent and is not affected by the slider.)



Particularities in Windows dialog boxes

In some cases, e.g. if you want to install a printer, original Windows dialog boxes are used. In these dialog boxes, the rotary knob and function keys do not work. Use the touchscreen instead.

6.4.1 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 using the rotary knob (small steps) or the [UP] or [DOWN] keys (large steps).
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 [ENTER] or any of the unit keys.
The editing line is highlighted to confirm the entry.

6.4.2 Entering alphanumeric parameters

If a field requires alphanumeric input, you can use the on-screen keyboard to enter numbers and (special) characters (see [Chapter 6.2.4, "On-screen keyboard"](#), on page 64).

Alternatively, you can use the keypad. 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. For the assignment, refer to [Table 6-3](#).



You can change the default behavior of the keypad for text input. This is useful if you frequently enter numeric values in text fields, for example to define file names consisting of numbers.

For details, see "System Configuration Settings" in the R&S ESW base unit user manual.

To enter numbers and (special) characters via the keypad

1. Press the key once to enter the first possible value.
2. All characters available via this key are displayed.
3. To choose another value provided by this key, press the key again, until your desired value is displayed.
4. 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 6-3](#).
5. To change from capital to small letters and vice versa, press the sign key (-).
6. When you have chosen the desired value, wait for 2 seconds (to use the same key again), or start the next entry by pressing another key.

To enter a blank

- Press the "Space" bar, or press "0" and wait 2 seconds.

To correct an entry

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

2. Press [BACKSPACE].
The entry to the left of the cursor is deleted.
3. Enter your correction.

To complete the entry

- Press [ENTER] or the rotary knob.

To abort the entry

- Press [ESC].
The dialog box is closed without changing the settings.

Table 6-3: 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>

6.5 Touchscreen gestures

A touchscreen allows you to interact with the software using various finger gestures on the screen. The basic gestures supported by the software and most applications are described here. Further actions using the same gestures may be possible.



Tapping

Touch the screen quickly, usually on a specific element.

You can tap most elements on the screen; in particular, any elements you can also click on with a mouse pointer.

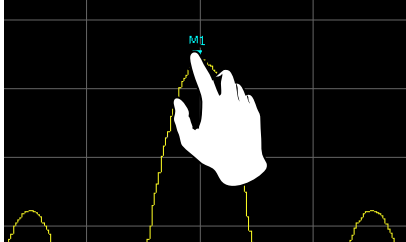


Figure 6-1: Tapping

Double-tapping

Tap the screen twice, in quick succession.

Double-tap a diagram or the window title bar to maximize a window in the display, or to restore the original size.



Dragging

Move your finger from one position to another on the display, keeping your finger on the display the whole time.

By dragging your finger over a table or diagram you can pan the displayed area of the table or diagram to show results that were previously out of view.

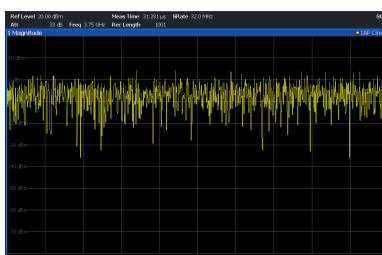
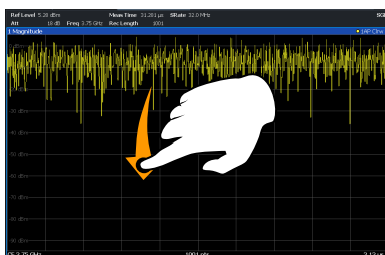


Figure 6-2: Dragging



Pinching and spreading two fingers

Move two fingers together on the display (pinch) or move two fingers apart on the display (spread).

Touchscreen gestures

When you pinch two fingers in the display, you decrease the size of the currently displayed area, showing the surrounding areas previously out of view.

When you spread two fingers in the display, you increase the size of the currently displayed area, showing more details.

You can pinch or spread your fingers vertically, horizontally, or diagonally. The direction in which you move your fingers determines which dimension of the display is changed.

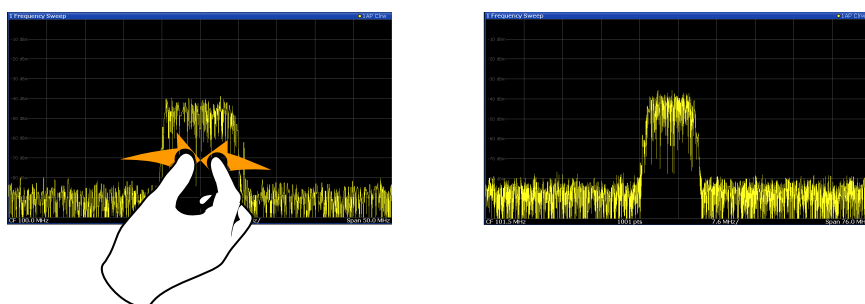


Figure 6-3: Pinching

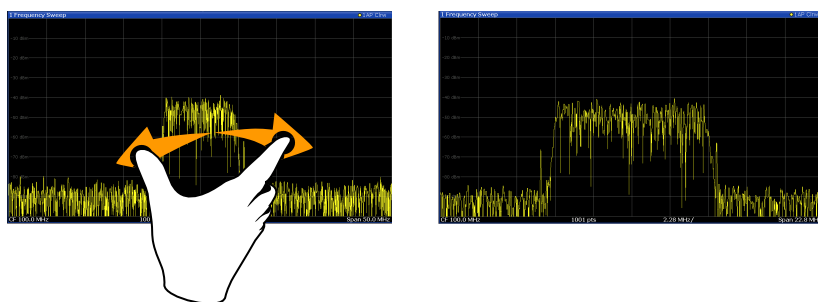


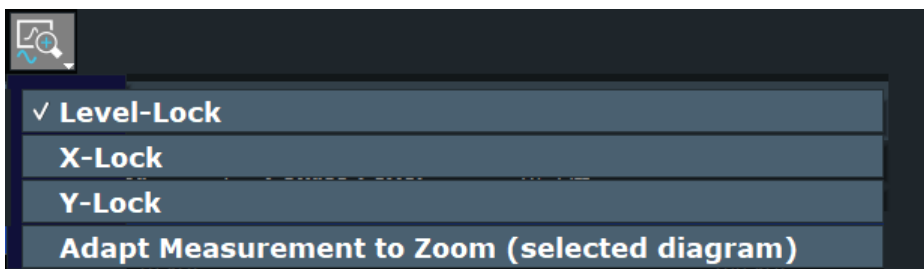
Figure 6-4: Spreading



Touch gestures in diagrams change measurement settings

When you change the display using touch gestures, the corresponding measurement settings are adapted. This is different to selecting an area on the screen in zoom mode, where merely the resolution of the displayed trace points is changed temporarily (graphical zoom).

You can prevent the firmware from changing specific settings using the options in the context menu for the measurement zoom icon. By default, the reference level is locked and thus not changed automatically due to touch gestures.



Mouse vs. touch actions

Any user interface elements that react to actions by a mouse pointer also react to finger gestures on the screen, and vice versa. The following touch actions correspond to mouse actions:

Table 6-4: Correlation of mouse and touch actions

Mouse operation	Touch operation
Click	Tap
Double-click	Double-tap
Click and hold	Touch and hold
Right-click	Touch, hold for 1 second and release
Drag-&-drop (= click and hold, then drag and release)	Touch, then drag and release
Mouse wheel to scroll up or down	Swipe
Dragging scrollbars to scroll up or down, left or right	Swipe
In (graphical) Zoom mode only: dragging the borders of the displayed rectangle to change its size	Touch, then drag and release

Example:

You can scroll through a long table in conventional mouse operation by clicking in the table's scrollbar repeatedly. In touch operation, you would scroll through the table by dragging the table up and down with your finger.

6.6 Displaying results

The R&S ESW provides several instrument applications for different analysis tasks and different types of signals, for example the Receiver application, the Spectrum application or the I/Q Analyzer. For each application, a new measurement channel is created and displayed in a separate tab on the screen.

The results of a measurement channel can be evaluated in many different ways, both graphically and numerically. For each evaluation method the results are displayed in a separate window in the tab.

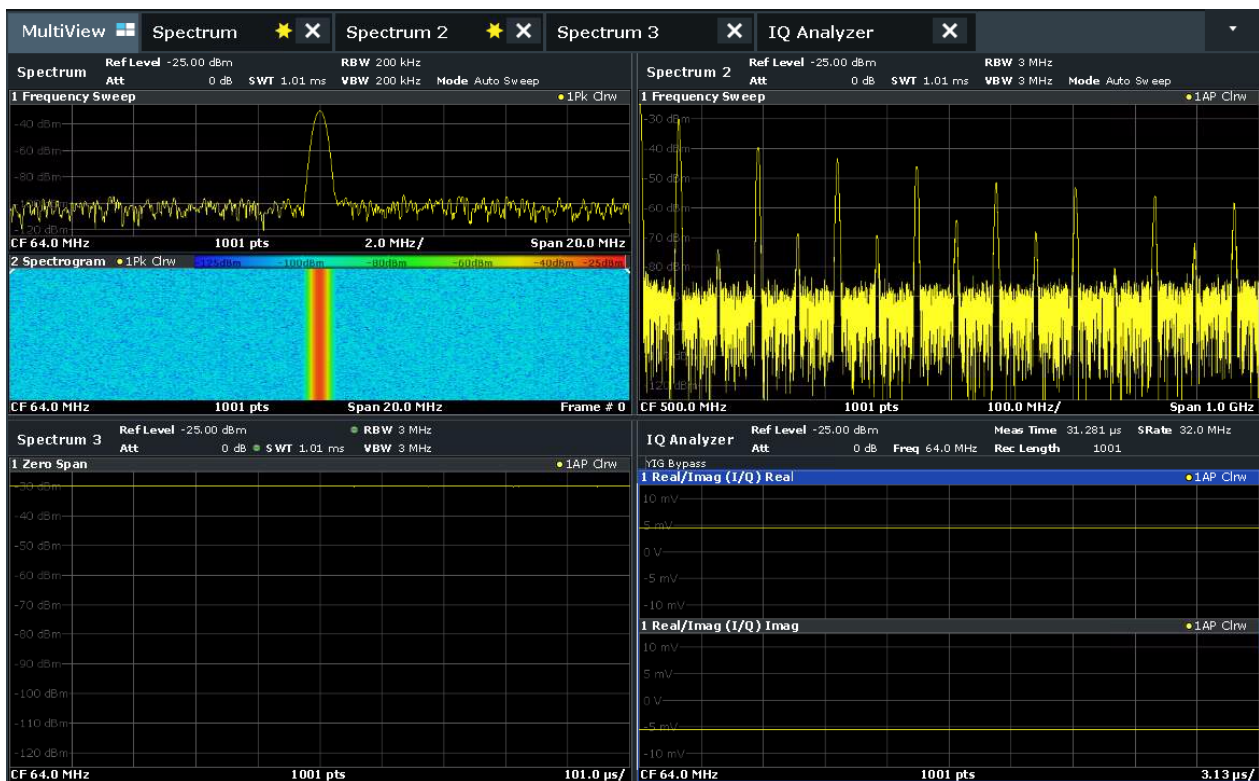
The R&S ESW allows you to configure the display to suit your specific requirements and optimize analysis.

6.6.1 Activating and deactivating channels

When you activate an application, a new measurement channel is created which determines the measurement settings for that application. The same application can be activated with different measurement settings by creating several channels for the same application. Whenever you switch channels, the corresponding measurement settings are restored. Each channel is displayed in a separate tab on the screen.

An additional tab ("MultiView") provides an overview of all currently active channels at once.

Only one measurement can be performed at any time, namely the one in the currently active channel. However, in order to perform the configured measurements consecutively, a Sequencer function is provided.



To start a new channel

1. Select [Mode].
2. In the "Mode" dialog box, select the required application on the "New Channel" tab.
A new tab is displayed for the new channel.

To change the application in an active channel

1. Select the tab of the channel you want to change.
2. Select [Mode].
3. In the "Mode" dialog box, select the new application to be displayed on the "Replace Current Channel" tab.
The selected application is displayed in the current channel.

To close a measurement channel



Select the "Close" icon on the tab of the measurement channel.

The tab is closed, any running measurements are aborted, and all results for that channel are deleted.

6.6.2 Laying out the result display with the smartgrid

Measurement results can be evaluated in many different ways, for example graphically, as summary tables, statistical evaluations etc. Each type of evaluation is displayed in a separate window in the channel tab. Up to 16 individual windows can be displayed per channel (i.e. per tab). To arrange the diagrams and tables on the screen, the Rohde & Schwarz SmartGrid function helps you find the target position simply and quickly.

(For details on evaluation methods see the User Manual.)

Principally, the layout of the windows on the screen is based on an underlying grid, the SmartGrid. However, the SmartGrid is dynamic and flexible, allowing for many different layout possibilities. The SmartGrid functionality provides the following basic features:

- Windows can be arranged in columns or in rows, or in a combination of both.
- Windows can be arranged in up to four rows and four columns.
- Windows are moved simply by dragging them to a new position on the screen, possibly changing the layout of the other windows, as well.
- All evaluation methods available for the currently selected measurement are displayed as icons in the evaluation bar. If the evaluation bar contains more icons than can be displayed at once on the screen, it can be scrolled vertically. The same evaluation method can be displayed in multiple windows simultaneously.
- New windows are added by dragging an evaluation icon from the evaluation bar to the screen. The position of each new window depends on where you drop the evaluation icon in relation to the existing windows.
- All display configuration actions are only possible in SmartGrid mode. When SmartGrid mode is activated, the evaluation bar replaces the current softkey menu display. When the SmartGrid mode is deactivated again, the previous softkey menu display is restored.

Displaying results

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- How to activate smartgrid mode..... 76
- How to add a new result window..... 77
- How to close a result window..... 77
- How to arrange the result windows..... 78

6.6.2.1 Background information: the smartgrid principle

SmartGrid display

During any positioning action, the underlying SmartGrid is displayed. Different colors and frames indicate the possible new positions. The position in the Smart-Grid where you drop the window determines its position on the screen.

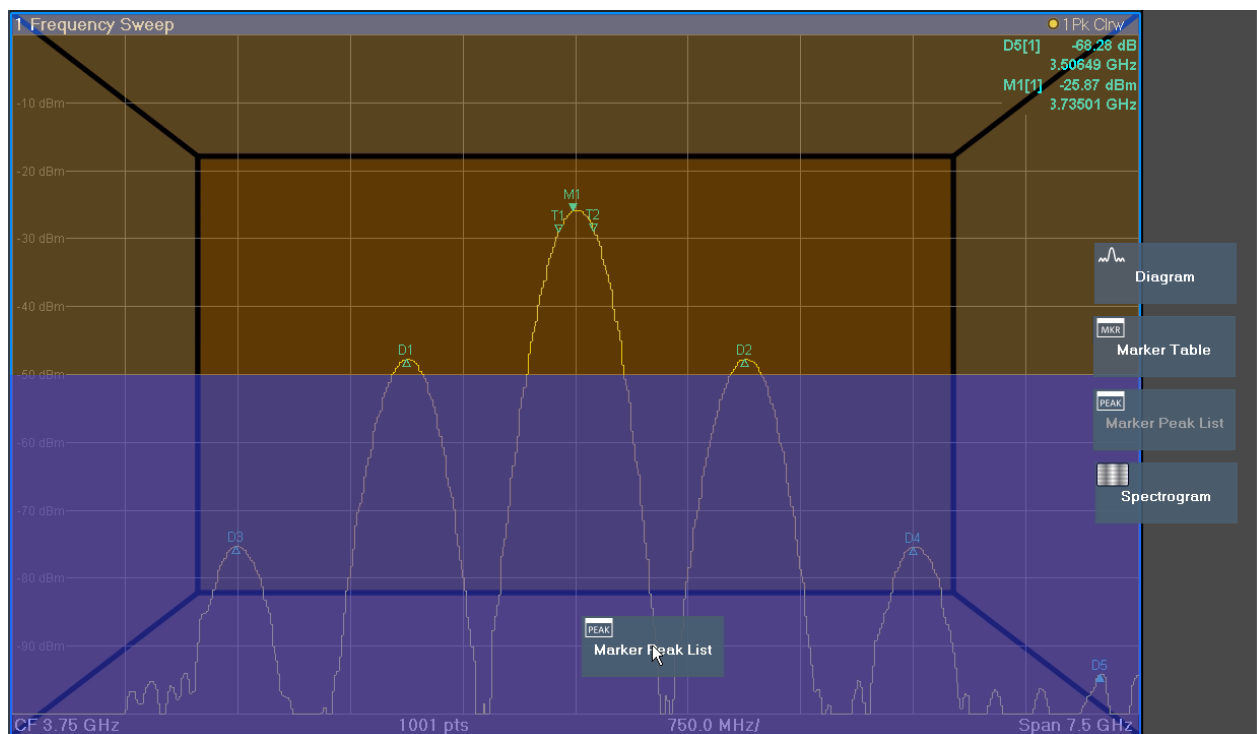


Figure 6-5: Moving a window in SmartGrid mode

The brown area indicates the possible "drop area" for the window, i.e. the area in which the window can be placed. A blue area indicates the (approximate) layout of the window as it would be if the icon were dropped at the current position. The frames indicate the possible destinations of the new window with respect to the existing windows: above/below, right/left or replacement (as illustrated in Fig-

ure 6-6). If an existing window would be replaced, the drop area is highlighted in a darker color shade.

Positioning the window

The screen can be divided into up to four rows. Each row can be split into up to four columns, where each row can have a different number of columns. However, rows always span the entire width of the screen and may not be interrupted by a column. A single row is available as the drop area for the window in the Smart-Grid. The row can be split into columns, or a new row can be inserted above or below the existing row (if the maximum of 4 has not yet been reached).

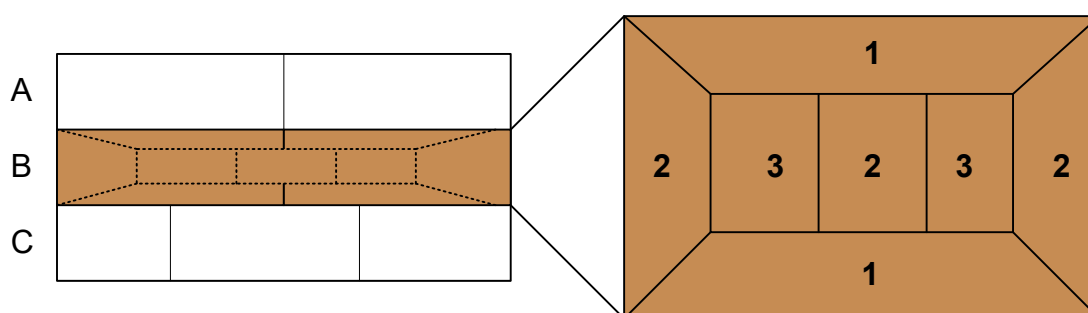


Figure 6-6: SmartGrid window positions

- 1 = Insert row above or below the existing row
- 2 = Create a new column in the existing row
- 3 = Replace a window in the existing row

SmartGrid functions

Once the evaluation icon has been dropped, icons in each window provide delete and move functions.



The "Move" icon allows you to move the position of the window, possibly changing the size and position of the other displayed windows.



The "Delete" icon allows you to close the window, enlarging the display of the remaining windows.

6.6.2.2 How to activate smartgrid mode

All display configuration actions are only possible in SmartGrid mode. In Smart-Grid mode the evaluation bar replaces the current softkey menu display. When

the SmartGrid mode is deactivated again, the previous softkey menu display is restored.

- To activate SmartGrid mode, do one of the following:



Select the "SmartGrid" icon from the toolbar.

- Select "Display Config" in the configuration "Overview".
- Select "Display Config" from the [Meas Config] menu.

The SmartGrid functions and the evaluation bar are displayed.



To close the SmartGrid mode and restore the previous softkey menu, select the "Close" icon, or press any key.

6.6.2.3 How to add a new result window

Each type of evaluation is displayed in a separate window. Up to 16 individual windows can be displayed per channel (i.e. per tab).

1. Activate SmartGrid mode.

All evaluation methods available for the currently selected measurement are displayed as icons in the evaluation bar.

2. Select the icon for the required evaluation method from the evaluation bar.
If the evaluation bar contains more icons than can be displayed at once on the screen, it can be scrolled vertically. Touch the evaluation bar between the icons and move it up or down until the required icon appears.
3. Drag the required icon from the evaluation bar to the SmartGrid, which is displayed in the diagram area, and drop it at the required position. (See [Chapter 6.6.2.5, "How to arrange the result windows"](#), on page 78 for more information on positioning the window).

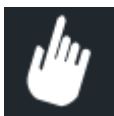
6.6.2.4 How to close a result window

- To close a window, activate SmartGrid mode and select the "Delete" icon for the window.



6.6.2.5 How to arrange the result windows

1. Select an icon from the evaluation bar or the "Move" icon for an existing evaluation window.

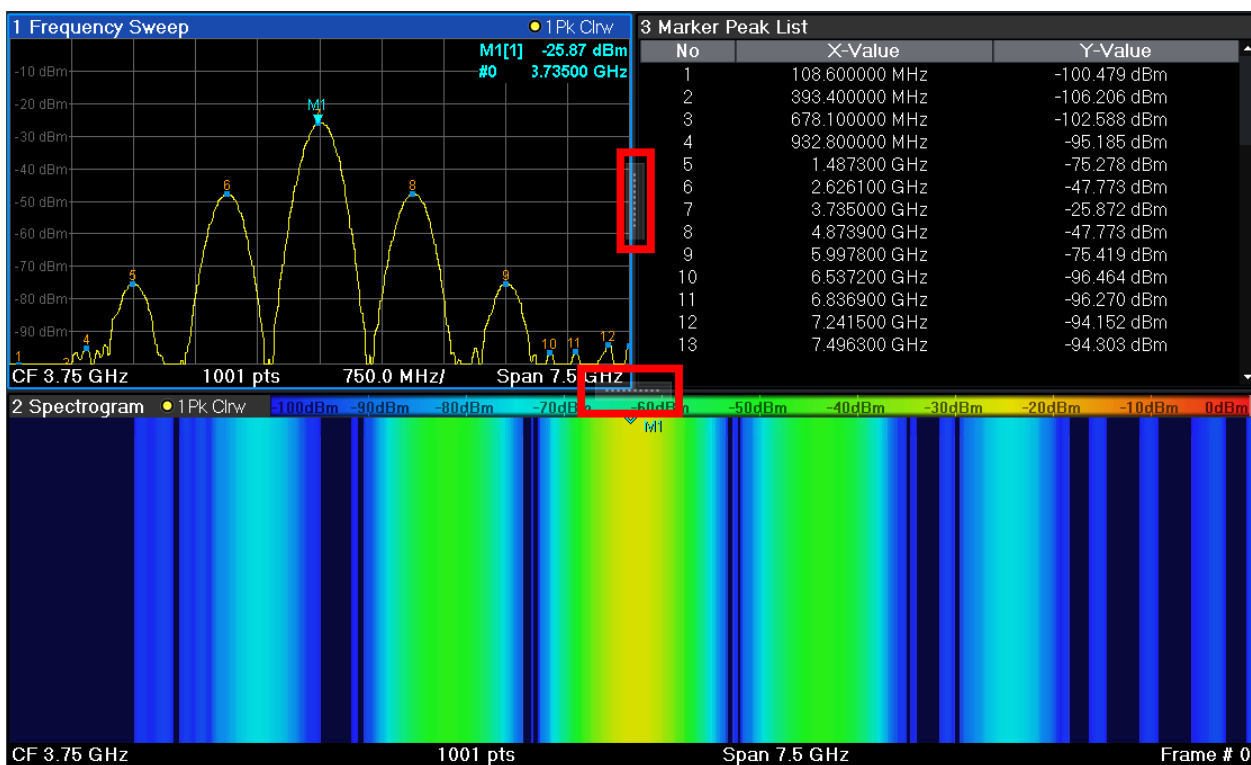


2. Drag the evaluation over the SmartGrid.
A blue area shows where the window will be placed.
3. Move the window until a suitable area is indicated in blue.
4. Drop the window in the target area.
The windows are rearranged to the selected layout, and "Delete" and "Move" icons are displayed in each window.
5. To close a window, select the corresponding "Delete" icon.



6.6.3 Changing the size of windows

Each channel tab may contain several windows to evaluate the measurement results using different methods. A "splitter" allows you to change the size of neighboring windows.



The splitters are not available in SmartGrid mode.

- To change the size of two neighboring windows, drag the splitter between the windows in either direction.

6.6.4 Switching between a split and maximized window display

To get an overview of the results, displaying several windows at the same time may be helpful. However, the individual windows may become rather small. In this case it is useful to maximize an individual window to the entire screen temporarily in order to analyze the results in more detail.



To switch between a split and a maximized display without having to close and re-open windows, press [SPLIT/MAXIMIZE] on the front panel. In maximized display, the currently focused window is maximized. In split display, all active windows are displayed.

Alternatively, double-tap the title bar of a window to maximize it.

6.6.5 Changing the display

The display can be optimized for your individual needs. The following display functions are available and are described in detail in the User Manual.

- Displaying a simulation of the entire front panel of the instrument on the screen ("Front Panel")
- Displaying the main function hardkeys in a separate window on the screen ("Mini Front Panel")
- Hiding or showing various screen elements
- Selecting a display theme and colors
- Changing the display update rate
- Activating or deactivating the touch-sensitivity of the screen
- Zooming into the diagram

6.7 Getting help

If any questions or problems concerning the R&S ESW arise, an extensive online help system is provided on the instrument and can be consulted at any time. The help system is context-sensitive and provides information specifically for the current operation or setting to be performed. In addition, general topics provide an overview on complete tasks or function groups as well as background information.

The online help can be opened at any time by selecting one of the "Help" icons on the toolbar or by pressing [F1] on an external or the on-screen keyboard.

To call context-sensitive help

- To display the "Help" dialog box for the currently focused screen element, e.g. a softkey or a setting in an opened dialog box, select the "Help" icon on the toolbar.



The "Help" dialog box "View" tab is displayed. A topic containing information about the focused screen element is displayed.

If no context-specific help topic is available, a more general topic or the "Content" tab is displayed.

 For standard Windows dialog boxes (e.g. File Properties, Print dialog etc.), no context-sensitive help is available.

To display a help topic for a screen element not currently focused

1. Select the "Help pointer" icon on the toolbar.



The pointer changes its shape to a "?" and an arrow.

2. Select the screen element to change the focus.

A topic containing information about the selected (now focused) screen element is displayed.

6.8 Remote control

In addition to working with the R&S ESW interactively, located directly at the instrument, it is also possible to operate and control it from a remote PC. Various methods for remote control are supported:

- Connecting the instrument to a (LAN) network
(See the R&S ESW user manual.)
- Using the Windows Remote Desktop application in a LAN network
- Connecting a PC via the GPIB interface

How to configure the remote control interfaces is described in the User Manual.



The R&S ESW is delivered with *IECWIN* installed, the auxiliary remote control tool provided free of charge by Rohde & Schwarz.

For details on the IECWIN tool, see the "Network and Remote Control" chapter of the R&S ESW User Manual.

6.8.1 Remote desktop connection

Remote Desktop is a Windows 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. Remote Desktop provides access to all of the applications, files, and network resources of the instrument. Thus, remote operation of the instrument is possible.

The Remote Desktop Client is part of the installed Windows operating system. For other versions of Windows, Microsoft offers the Remote Desktop Client as an add-on.

6.8.2 Connecting a PC via the GPIB interface

You can connect a PC to the R&S ESW via the GPIB interface to send remote commands to control and operate the instrument. You can configure the GPIB address and the ID response string. The GPIB language is set as SCPI by default but can be changed to emulate other instruments.

A GPIB interface is integrated on the rear panel of the instrument.

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

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