R&S®ESW
EMI Test Receiver
Excellent RF characteristics
and high measurement speed

ROHDE & SCHWARZ

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R&S®ESW
EMI Test Receiver
At a glance

The R&S®ESW is an EMI test receiver with outstanding RF characteristics, including high dynamic range und measurement accuracy. It meets the most stringent requirements for certification measurements in line with CISPR, EN, MIL-STD-461, DO-160 and FCC. With its FFT-based time domain scan, the R&S®ESW captures and weights disturbance spectra in virtually no time. The instrument's realtime spectrum analysis capability with spectrogram function permits a detailed analysis of disturbance signals and their history. MultiView mode delivers a straightforward display of results, even for multiple operating modes.

The R&S®ESW EMI test receiver is ideal for demanding EMI certification measurements as required in the automotive and A&D sectors. It features the widest dynamic range with a high 1 dB compression point and high sensitivity due to its low inherent noise. The preselection in the R&S®ESW offers additional highpass filters at 150 kHz and 2 MHz as well as notch filters specifically for the license-free ISM bands at 2.4 GHz and 5.8 GHz. It is thus ensured that high carrier signals in these bands – which are used by Bluetooth® and WLAN, for example – do not affect the instrument's dynamic range, and that even small disturbance signals outside these bands are detected.

The R&S®ESW comes with an FFT-based time domain scan as standard. Measurements that previously took minutes or hours are completed in just seconds. Even measurements that use two CISPR detectors (quasi-peak, CISPR-average, RMS-average) are possible, cutting overall measurement time in half. The R&S®ESW combines the functions of an EMI test receiver with those of a full-featured spectrum analyzer in a single instrument. Realtime spectrum analysis (R&S®ESW-K55 option) with a bandwidth of 80 MHz allows users to detect hidden or superimposed disturbances and analyze their causes using persistence mode and a frequency mask trigger. The spectrogram function provides seamless spectrum display in the time domain, making even rapidly changing disturbance signals visible. This saves considerable time and cost during product development and certification.

With the MultiView function, users can display different measurements and traces – including in different operating modes – simultaneously and in a straightforward manner. Clearly structured, flat menus and the touchscreen simplify operation.

Key facts
ı Frequency ranges 2 Hz to 8 GHz, 2 Hz to 26.5 GHz and 2 Hz to 44 GHz
ı Compliant with CISPR 16-1-1, ANSI C63.2, MIL-STD-461 and FCC
ı Highest dynamic range and highest accuracy for demanding certification measurement
ı Ultrafast measurements with FFT-based time domain scan
ı Preselection with selectable highpass filters and notch filters for the ISM bands
ı EMI test receiver and signal and spectrum analyzer in a single box
ı Realtime spectrum analysis (R&S®ESW-K55 option) with 80 MHz bandwidth and spectrogram function
ı MultiView function for straightforward display of multiple operating modes on a single screen

R&S®ESW models

2 Hz	8 GHz	26.5 GHz	44 GHz

R&S®ESW8

R&S®ESW26

R&S®ESW44

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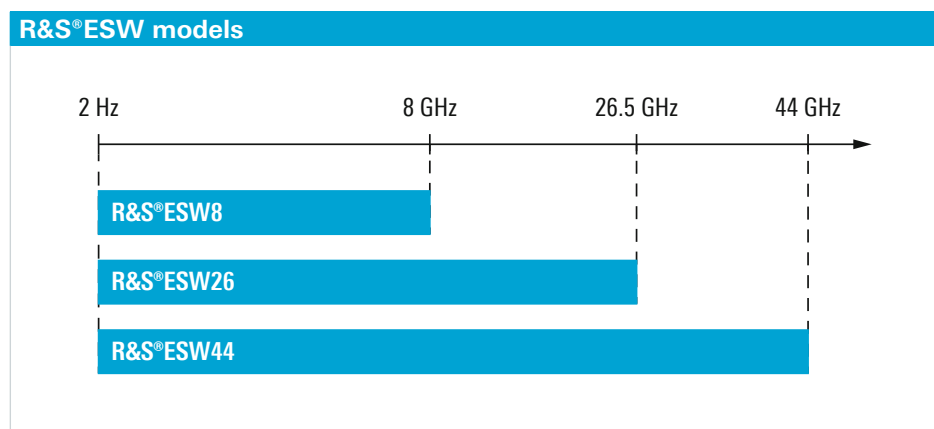
R&S®ESW
EMI Test Receiver
Benefits and key features

Standard-compliant EMI measurements
- Certification measurements
- Standard-compliant EMI measurements in spectrum analyzer mode

RF performance that meets exacting demands
- Exceptionally wide dynamic range
- Low DANL (typ. –168 dBm for f ≤ 1 GHz)
- High 1 dB compression point (+15 dBm) for RF frontend
- High third-order intercept (TOI) (typ. +25 dBm)
- Superior measurement accuracy (±0.37 dB for f ≤ 8 GHz)

Integrated preselection filters and preamplifier
- Integrated preselection filters (21 filters) as standard
- Additional highpass filter at 2 MHz for suppressing data carriers and disturbance signals on AC supply lines
- Notch filters for suppressing strong carrier signals in the license-free 2.4 GHz and 5.8 GHz ISM bands

FFT-based time domain scan for ultrafast measurements
- Realtime measurement of conducted disturbance levels with simultaneous quasi-peak and CISPR-average weighting

Realtime spectrum analysis for detailed investigation of disturbances (option)
- Realtime measurement with up to 80 MHz bandwidth
- Spectrogram for seamless spectrum display
- Persistence mode (spectral histogram) for clear identification of pulsed and continuous disturbances
- Frequency mask trigger for precise and reliable detection of sporadic spectral events

IF analysis function for displaying the spectrum around disturbance signals

Convenient operation, straightforward result display
- Straightforward scan table
- MultiView: straightforward display of multiple results
- Optimized, touchscreen-based user interface for quick access to all functions
- Integrated online help
- Saving results and instrument setups

Automated testing
- Preview measurement – data reduction – final measurement
- R&S®EMC32 EMC measurement software for remotely controlled measurements and automated EMI test routines
- Report generator for documenting measurement results

Four-channel click rate measurement
- Click rate analysis in line with CISPR 14-1
- Documentation of results

Data protection and remote control
- Removable hard disk drive (HDD) to keep test data confidential and secure
- Remote control via GPIB or LAN
- Drivers for LabView, LabWindows/CVI, VXI Plug & Play
- Free-of-charge firmware updates – always in step with new developments

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Standard-compliant EMI measurements

Certification measurements

The R&S®ESW is primarily intended for certification measurements in line with EMC standards. These measurements place very high demands on the test equipment since it must correctly detect, measure and weight all disturbance signals that occur. These include pulsed and sinusoidal as well as modulated and intermittent signals.

With its integrated preselection, 20 dB preamplifier and highly linear frontend, the R&S®ESW meets the requirements of commercial and military standards, including CISPR, EN, ETS, ANSI, FCC, VCCI, MIL-STD-461 und DO-160.

The instrument's weighting detectors such as quasi-peak, CISPR-average/RMS-average (including the time constants for meter simulation), the amplitude probability distribution (APD) measurement function and conventional peak (max. and min.), average and RMS detectors comply with the current revision of the CISPR 16-1-1 basic standard. The same holds true for the required EMI resolution bandwidths of 200 Hz, 9 kHz and 120 kHz as 6 dB bandwidths, 1 MHz as the pulse bandwidth, and the 6 dB resolution bandwidths in decade steps from 1 Hz to 10 MHz for performing measurements in line with MIL-STD-461, DO-160 and ICNIRP guidelines on exposure limits.

Standard-compliant EMI measurements in spectrum analyzer mode

The R&S®ESW is not only an EMI test receiver, but also a full-featured spectrum analyzer. With preselection activated, the R&S®ESW can perform standard-compliant EMI measurements in spectrum analyzer mode – in addition to EMI analysis during development.

Configurable markers can be placed on the frequencies of EMI signals to carry out targeted analysis. Markers can be coupled with CISPR weighting detectors to enable direct comparison with limit values. The spectrum can also be displayed along a logarithmic frequency axis, which simplifies result analysis across a wide frequency range and displays limit lines in compliance with relevant standards. Critical frequencies are presented in a peak list and are used for fast, standard-compliant comparison of EMI signals with limit lines.

EMI testing in an anechoic chamber.

RF performance that meets exacting demands

With a displayed average noise level (DANL) of –168 dBm (1 Hz) and a 1 dB compression point of +15 dBm, the R&S®ESW features an exceptionally wide dynamic range that can handle even the most challenging tasks. The R&S®ESW delivers reproducible and reliable results with a level accuracy of < 0.4 dB.

The instrument's wide dynamic range and very low phase noise make it possible to detect small signals in the vicinity of large carrier signals. The R&S®ESW phase noise lies at –137 dBc (1 Hz) at 10 kHz offset from a 1 GHz carrier signal, and at –128 dBc (1 Hz) at 10 kHz offset from a 10 GHz carrier signal. Close to the carrier, at 100 Hz offset, the phase noise is –110 dBc (1 Hz).

Displayed average noise level (DANL) up to 1 GHz. The noise figure with the preamplifier switched on is approx. 8.5 dB.
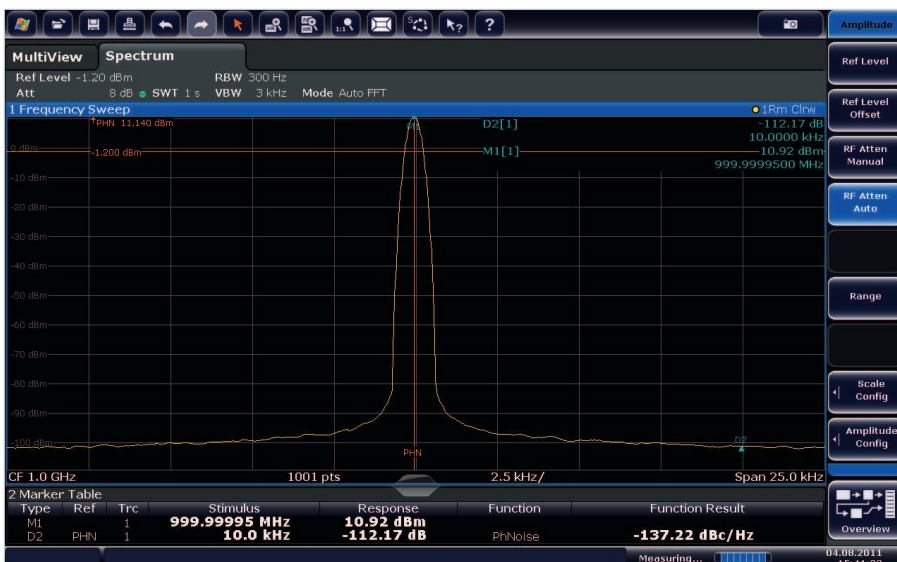

Phase noise at 10 kHz from the carrier: –137 dBc (1 Hz).

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Integrated preselection filters and preamplifier

Preselection filters are essential for test equipment such as test receivers or spectrum analyzers during EMI measurements, since wideband disturbance spectra can overload test equipment frontends. Preselection filters suppress strong out-of-band signals so that high-sensitivity mea-

surements can be performed within the passband. The built-in preamplifier can be activated to further enhance sensitivity.

The R&S®ESW offers 21 preselection filters for the range up to 8 GHz, plus a highpass filter at 2 MHz, e.g. to suppress data carriers on AC supply lines in compliance with CISPR 16-1-1. In addition, the R&S®ESW offers notch filters specifically for the license-free ISM bands at 2.4 GHz and 5.8 GHz, which are used by wireless transmission technologies such as Bluetooth® and WLAN. A switchable pulse limiter additionally protects the second, pulse-resistant, RF input against high-energy signals.
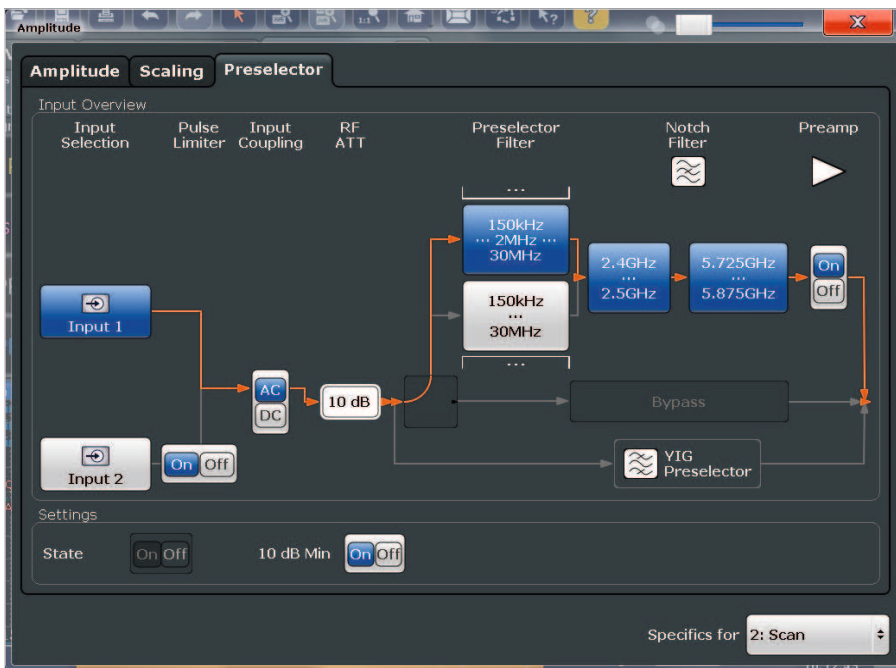
Configurable preselection filters.

Display of trace and active preselection filter.

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FFT-based time domain scan for ultrafast measurements

The R&S®ESW offers conventional stepped frequency scan plus an ultrafast FFT-based time domain scan. In FFT-based scan mode, the R&S®ESW delivers measurement speed orders of magnitudes faster than in conventional mode. Frequency scans in the CISPR bands are performed in just a few milliseconds, and conducted disturbances are measured in realtime. Spectral signal components with a bandwidth of up to 30 MHz are covered without any time gaps. With a virtual step size of ¼ of the resolution bandwidth and FFT windows overlapping by > 90 %, the R&S®ESW achieves level measurement accuracy significantly better than that required by CISPR 16-1-1.

The R&S®ESW performs disturbance voltage measurements with quasi-peak and CISPR-average weighting in just a few seconds..

In spectrum analyzer mode, the R&S®ESW measures with a resolution of up to 100 001 points. In classic test receiver mode with user-defined step width, the instrument captures and saves up to four million points per trace.

Speed is a crucial factor when testing devices that can be operated, or measured, only during a short period of time – either because they change their behavior (fluctuating or drifting disturbances), or because extended operation might be destructive, or because their operating cycle calls for high speed (as in the case of power window regulators in motor vehicles). The extremely fast time domain scan delivers results very quickly, making it easy to handle such scenarios.

Users can increase the measurement time in order to reliably detect narrowband, intermittent disturbance signals or isolated pulses. The E&S®ESW allows seamless measurement of a disturbance spectrum for a period of up to 100 s for each frequency segment.

Realtime measurement of conducted disturbance levels with simultaneous quasi-peak and CISPR-average weighting

The time domain scan function is particularly useful when carrying out weighted measurements of conducted disturbances, for example when measuring disturbance voltage in the frequency range from 150 kHz to 30 MHz in line with CISPR/EN EMI product standards. The R&S®ESW scans this range in realtime and performs the required quasi-peak and CISPR-average (CAV) weighting in parallel. This eliminates the need for a preview scan (with subsequent data reduction) and cuts measurement time in half.

Time domain scan table with total measurement times for different CISPR bands					
Band	Frequency	Resolution bandwidth	Measurement time	CISPR detectors	Total measurement time
CISPR band B	150 kHz to 30 MHz	9 kHz	100 ms	peak	110 ms
CISPR band B	150 kHz to 30 MHz	9 kHz	1 s	quasi-peak and CISPR-average	2 s
CISPR band C/D	30 MHz to 1000 MHz	120 kHz	10 ms	peak	620 ms
CISPR band C/D	30 MHz to 1000 MHz	9 kHz	10 ms	peak	840 ms
CISPR band C/D	30 MHz to 1000 MHz	120 kHz	1 s	quasi-peak	80 s
CISPR band C/D	30 MHz to 1000 MHz	9 kHz	1 s	quasi-peak and CISPR-average	67 s

Realtime spectrum analysis for detailed investigation of disturbances (option)

Realtime measurement with up to 80 MHz bandwidth

The realtime spectrum analysis function of the R&S®ESW facilitates rapid detection of EMI signals. Measuring disturbances caused by sporadic and brief events or determining the spectral behavior of devices under test during switching operations, for example, are difficult and time-consuming tasks.

With the R&S®ESW-K55 realtime spectrum analysis option, the R&S®ESW seamlessly measures these signals in the frequency domain for any length of time. As a result, it detects even sporadic disturbance signals reliably with a bandwidth of up to 80 MHz. Realtime spectrum analysis makes final product certification easier, shortens test times, and prevents costly redesigns.

Spectrogram for seamless spectrum display

The R&S®ESW offers a spectrogram function that allows users to analyze the behavior of disturbance signals in the time domain in all operating modes. Each spectrum is presented as a horizontal line with different levels assigned different colors. The individual spectral lines are joined continuously. Recording is seamless with an acquisition memory depth of up to 100 000 frames.

Realtime spectrum with spectrogram.

Persistence mode (spectral histogram) for clear identification of pulsed and continuous disturbances

Frequently occurring signals are shown in red, for example, and sporadic ones in blue. If signals no longer occur at a specific frequency with a specific amplitude, the corresponding pixel disappears after a user-definable persistence period. This allows users to clearly distinguish between pulsed disturbances, which occur only for very brief periods, and continuous disturbances. In addition, different pulsed disturbances can easily be distinguished from one another.

Realtime spectrum in persistence mode revealing disturbance that would otherwise be hidden.
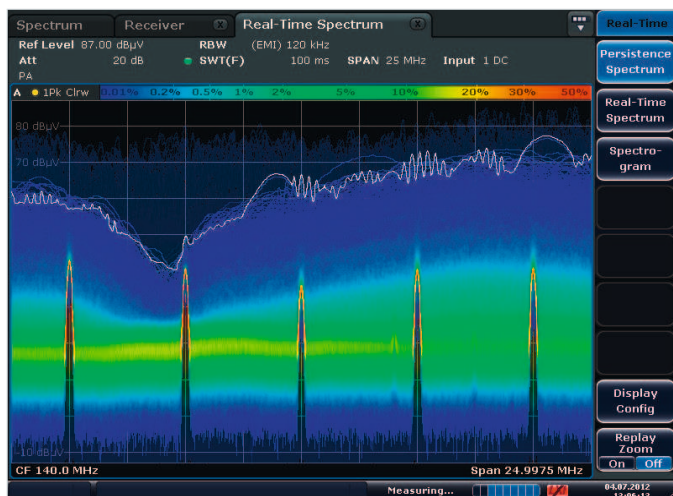
IF analysis function for displaying the spectrum around disturbance signals

The IF analysis function of the R&S®ESW provides a spectral display of an RF input signal of interest in a selectable range around the EMI receive frequency. The IF spectrum display can be coupled to the bargraph display for the current receive frequency. Alternatively, the IF spectrum can be displayed together with the stored results of the preview measurement. The marker in the preview diagram can be used to control the center frequency of the IF spectrum (marker track function).

The center frequency of the IF spectrum always corresponds to the current receive frequency. The test receiver can therefore be tuned to the signal of interest quickly and accurately. In addition, the IF spectrum provides a detailed overview of the spectrum occupancy around the measurement channel. Any signals received can be quickly classified as disturbance signals or useful signals. AM or FM audio demodulation can be activated in parallel, making it easier to identify detected signals, for example in order to identify and exclude ambient interferers in open-area measurements.

IF analysis (middle) and scanned RF spectrum (bottom).

Convenient operation, straightforward result display

The R&S®ESW features a touchscreen GUI for convenient, intuitive operation. The straightforward, menu-driven design lets users quickly find their way around the instrument. All functions and measurement parameters can be configured using either keys and knobs on the instrument, or a mouse and keyboard. The large WXGA color display (30.7 cm/12.1") with high resolution (1280 × 800 pixel) provides good readability. The large rotary knob controls the receive frequency as long as no data input field is open. Another, smaller knob sets the volume of the integrated speaker or connected earphones.

Two additional small knobs can be customized by the user by assigning functions such as resolution bandwidth, RF attenuation or measurement time. A signal of interest can immediately be analyzed by varying the selected parameters and comparing the effects. Each knob can be assigned up to five parameters.
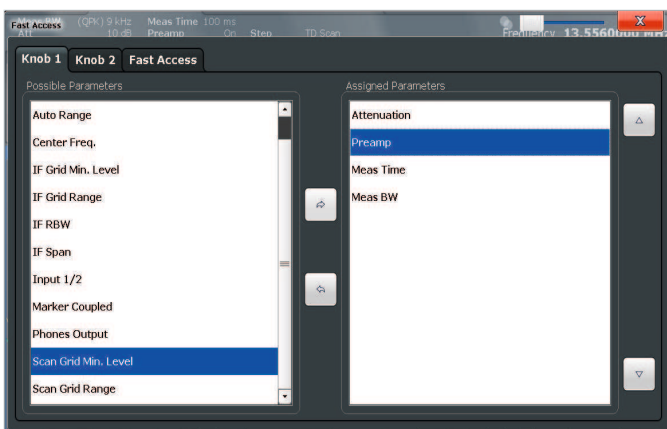
Straightforward scan table

In receiver mode, disturbance measurements in the frequency domain are controlled by the settings in the scan table. The scan parameters are presented in an easy-to-read manner and can be individually configured for each task and DUT with up to 10 independently defined subranges.

The same scan table is used for the time domain scan function, where the step size is set to ¼ of the resolution bandwidth by internal coupling.

Two rotary knobs with user-assignable functions.

Parameter selection for rotary knobs.

Scan table.

MultiView: straightforward display of multiple results

With the MultiView function, results from different operating modes are clearly displayed on the 12.1" screen. For example, the R&S®ESW can display the frequency spectrum in sweep or scan mode in one window, while presenting a single-frequency measurement – including spectrogram – in another window using the IF analysis function. Up to four different single-frequency measurements can be displayed at a time.

The individual measurements using different modes and/or coupled parameters are performed completely independently of one another. The MultiView display shows all active measurement modes, facilitating the comparison of results.

Optimized, touchscreen-based user interface for quick access to all functions

Block diagrams showing the signal flow can be edited right on the screen. The user touches a desired element and modifies the corresponding parameter(s). This provides direct and easy access to all functions. The logical, consistently flat menu structure makes it easier to define setups and configurations. For example, the preselector/preamplifier stage can be completely configured in a single dialog window.

The dialog windows are transparent so that the signal remains visible in the background. All regularly used functions are assigned hardkeys.

The toolbar provides quick access to general instrument functions such as zooming or saving the screen content.

Saving results and instrument setups

Measurement data and instrument setups can be saved to the instrument's internal hard disk or an external storage medium. The R&S®ESW accesses external media via USB or LAN. Users can store results as ASCII files for further processing. These files contain the trace data together with the most important instrument setups.

MultiView display with bargraphs, scanned RF spectrum, IF analysis and spectrogram.

Parameter coupling between receiver and spectrum analyzer mode.
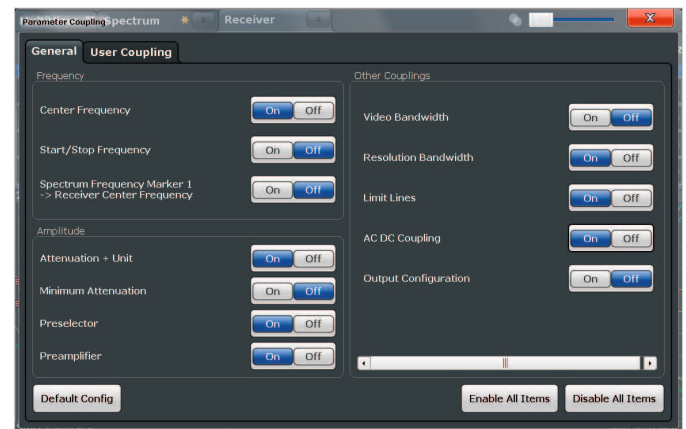
Automated testing

Preview measurement – data reduction – final measurement

A fast preview measurement with peak and average weighting, followed by a final measurement on the critical frequencies with the required CISPR weighting – this is the standard approach when performing disturbance measurements. The R&S®ESW supports this approach. It offers a choice of common limit lines defined in commercial product emission standards. The results of the preview measurement – obtained with a fast time domain scan or a stepped frequency scan – are compared with the limit lines. Next, the test receiver identifies critical frequencies according to user-defined criteria and presents them in a table (peak list). Users can edit the peak list by adding or deleting frequencies interactively. In a last step, the test receiver performs a final measurement with CISPR-conformant measurement time and detector(s). The results of the final measurement can be exported as an ASCII file for further processing.

The R&S®ESW can remotely control Rohde & Schwarz line impedance stabilization networks via its AUX port. Disturbance voltage measurements on power lines can be performed fully automatically on all phases. This ensures reliable detection of the highest disturbance level.
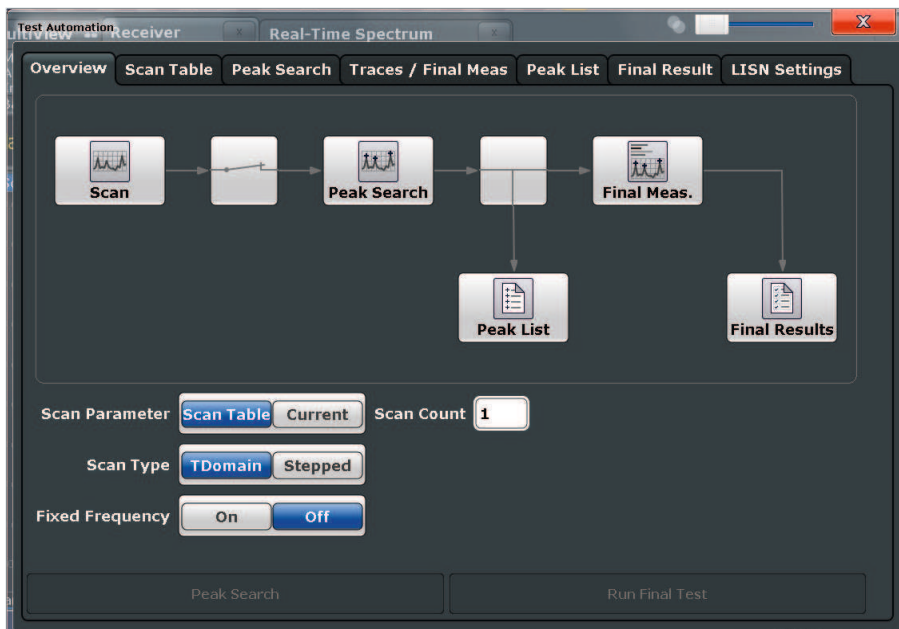
Test automation configuration menu.
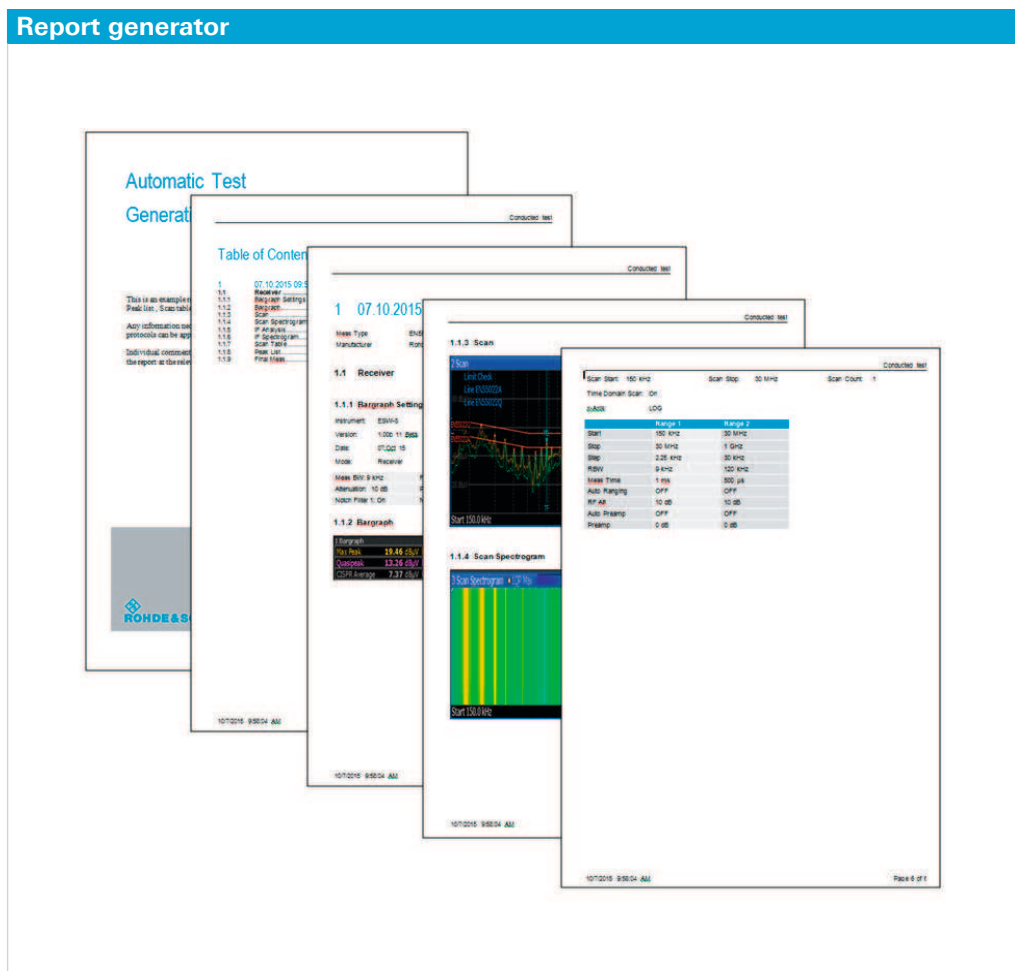
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R&S®EMC32 EMC measurement software for remotely controlled measurements and automated EMI test routines

The R&S®EMC32 EMC measurement software ideally complements the R&S®ESW. This modular test software supports manual as well as partially or fully automated electromagnetic interference and immunity measurements in line with commercial and military standards. The software provides reliable acquisition, analysis and documentation of measurement results and offers remote control capability for a wide variety of accessory components such as mast and turntable systems.

Report generator for documenting measurement results

The report generator integrated in the R&S®ESW provides all necessary capabilities for documenting EMI measurements. Reports contain a task description, the applicable standards, the test procedures used, specific user-defined procedures, any applied transducers and limit lines, plus result graphs from the preview measurement (with varying DUT load states if applicable), final measurement results in tabular form, and a graph of the final measurement. Sufficient space is provided for individual interpretation and commenting.

Reports can be saved as templates that can be reused. Different templates can be defined, for example with individual customer logos. Reports can be created, saved and exported in PDF or DOC format.

Report generator

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Four-channel click rate measurement

The R&S®ESW measures the pulse amplitude and duration automatically and in parallel on the frequencies specified by the CISPR/EN standard (150 kHz, 500 kHz, 1.4 MHz, 30 MHz). The R&S®ESW thus provides the functionality of a click rate analyzer.

Click rate analysis in line with CISPR 14-1

The R&S®ESW supports measurements in line with CISPR 14-1 and EN 55014-1. Thermostatic or program-controlled electrical appliances such as washing machines and air conditioners generate discontinuous disturbances. Due to the aperiodic nature of click-type disturbances, the limit values they need to comply with are higher than those for continuous disturbances. In order to apply these less stringent limit values, users need to measure the duration of the clicks, their repetition rate (click rate) and their amplitudes.

To carry out standard-compliant analysis, sufficient memory space must be available in order to seamlessly record peak values and quasi-peak values for a period of at least two hours. With a memory depth of up to four million values per trace, the R&S®ESW is ideally suited to this task. The click rate analysis application on the R&S®ESW documents results in a detailed report, also providing statistics and documenting any clicks that do not conform to the standard (exceptions). Finally, the R&S®ESW click rate analyzer outputs a PASS/FAIL statement to indicate whether the DUT meets the requirements of the standard.
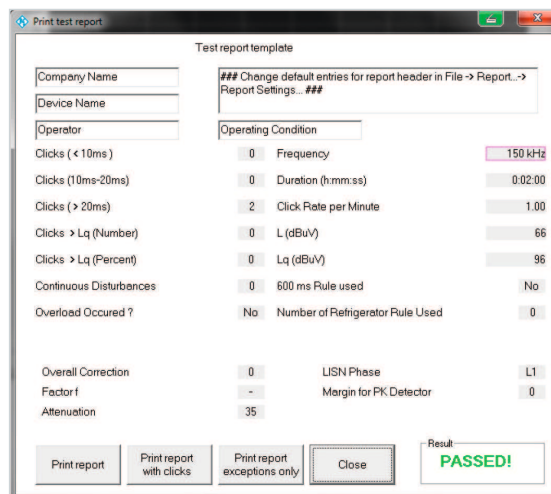
Click rate analysis – graphical display.
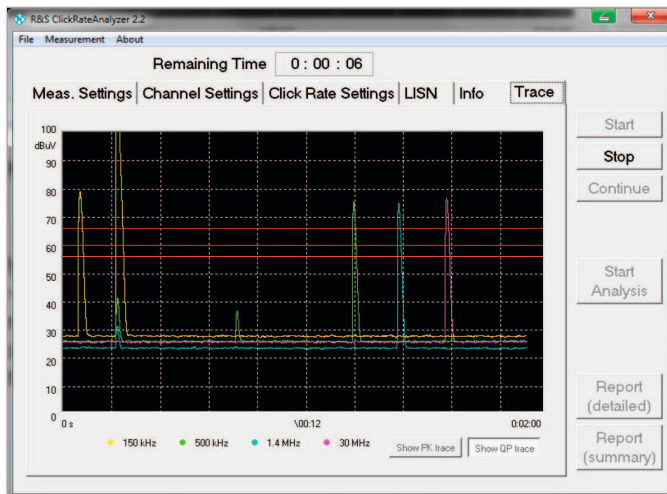
Click rate analysis – numerical results.
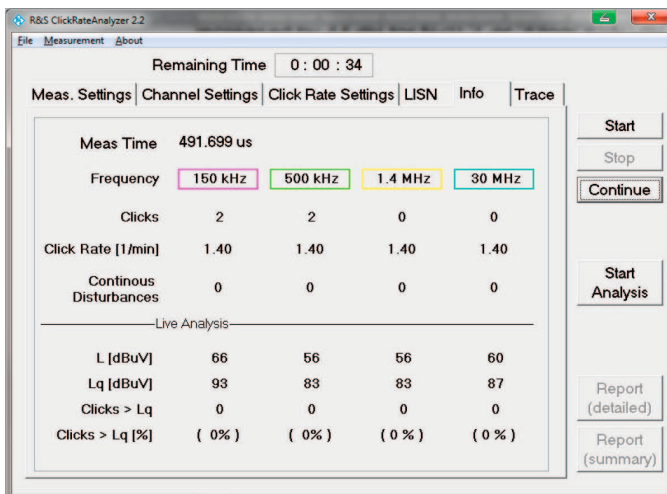
Click rate analysis report.

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Data protection and remote control

Keeping test data confidential

To keep their test data confidential and secure, users can exchange the R&S®ESW standard hard disk drive for an optional solid state drive (SSD) (R&S®ESW-B18), which contains only the operating system and the instrument firmware. The R&S®ESW can then be sent in for calibration or repair without any confidential data leaving the lab. Device-specific setups and parameter settings remain in the test receiver, where they are stored separately and independently from the user data and measurement results. Exchanging the internal hard disk drive is a simple matter of removing two screws on the back of the instrument.

To meet the most stringent security requirements, write protection (R&S®ESW-K33 option) is available for the internal hard disk drive. All data entered is written to an SDRAM and deleted when the instrument is switched off.

The USB write protection (R&S®FSW-B33 option) blocks the USB 2.0 interface and prevents data from being written to an external mass storage device. Read access is retained.

Remote control via GPIB or LAN

The R&S®ESW can be remotely controlled via its standard IEC 625-2 (IEEE 488.2) interface or a LAN interface (10/100/1000BASE-T).

Drivers for LabView, LabWindows/CVI, VXI Plug & Play

For software integration of the R&S®ESW, drivers for LabView, LabWindows/CVI and VXI Plug & Play are available free of charge.

Firmware updates – always in step with new developments

R&S®ESW firmware updates can be downloaded from a USB flash drive or via GPIB or LAN. They are available free of charge at www.rohde-schwarz.com.

R&S®ESW rear view with removable hard disk drive.

Specifications in brief

Specifications in brief		
Frequency		
Frequency range	R&S®ESW8	2 Hz to 8 GHz
	R&S®ESW26	2 Hz to 26.5 GHz
	R&S®ESW44	2 Hz to 44 GHz
Aging per year	R&S®ESW-B4 OCXO precision frequency reference	(standard value $\pm 1 \times 10^{-7}$) $\pm 3 \times 10^{-8}$
Bandwidths		
Resolution bandwidths	standard filters (–3 dB)	1 Hz to 10 MHz
	EMI filters (–6 dB)	1 Hz, 10 Hz, 100 Hz, 200 Hz, 1 kHz, 9 kHz, 10 kHz, 100 kHz, 120 kHz, 1 MHz, 10 MHz
Detectors	receiver mode	max. peak, min. peak, quasi-peak, RMS, average, average with meter time constants (CISPR-average), RMS-average (CISPR RMS)
APD measurement function	minimum amplitude probability	10^{-7}
	maximum acquisition time	120 s
	acquisition bandwidth (–6 dB)	200 Hz, 9 kHz, 120 kHz, 1 MHz
Third-order intercept (TOI)	R&S®ESW8, R&S®ESW26, R&S®ESW44, RF attenuation = 0 dB, level 2 × –15 dBm, $\Delta f > 5 \times$ RBW, preselection off, preamplifier off	10 MHz $\leq f_{in} < 1$ GHz, > +20 dBm, typ. 25 dBm
1 dB compression	RF attenuation = 0 dB, preselection off, preamplifier off	$f_{in} \leq 3$ GHz, +15 dBm (nom.)
Preselection filters		
Status	receiver mode	always on
	analyzer mode	on/off (selectable)
Number of preselection filters		21
Preamplifier (switchable)	1 kHz to 8 GHz	20 dB (nom.)
Displayed average noise level (DANL)	R&S®ESW8 (receiver mode, RF attenuation = 0 dB, termination = 50 Ω, logarithmic scaling normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 1 Hz, +5 °C to +40 °C, preselection on, preamplifier on)	
	1 MHz $\leq f < 1$ GHz	< –165 dBm, typ. –168 dBm
Receiver mode		
Time domain scan	CISPR band B, 150 kHz to 30 MHz, RBW = 9 kHz, measurement time = 100 ms, peak detector	110 ms (total measurement time)
	CISPR band B, 150 kHz to 30 MHz, RBW = 9 kHz, measurement time = 1 s, quasi-peak detector and CISPR-average detector	2 s (total measurement time)
	CISPR band C/D, 30 MHz to 1000 MHz, RBW = 120 kHz, measurement time = 10 ms, peak detector	620 ms (total measurement time)
	CISPR band C/D, 30 MHz to 1000 MHz, RBW = 9 kHz, measurement time = 10 ms, peak detector	840 ms (total measurement time)
	CISPR band C/D, 30 MHz to 1000 MHz, RBW = 120 kHz, measurement time = 1 s, quasi-peak detector	80 s (total measurement time)
	CISPR band C/D, 30 MHz to 1000 MHz, RBW = 9 kHz, measurement time = 1 s, quasi-peak detector and CISPR-average detector	67 s (total measurement time)
Total measurement uncertainty		
Preselection off	10 MHz < f $\leq$ 3.6 GHz	±0.27 dB
Dimensions (nom.)	W × H × D, including front handles and rear feet	462 mm × 240 mm × 504 mm (18.15 in × 9.44 in × 19.81 in)
Net weight, without options (nom.)	R&S®ESW8	20.6 kg (45.42 lb)
	R&S®ESW26	22.1 kg (48.72 lb)
	R&S®ESW44	25.2 kg (55.56 lb)

For data sheet, see PD 3607.2810.22 and www.rohde-schwarz.com

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Ordering information

Designation	Type	Order No.
Base unit		
EMI Test Receiver, 2 Hz to 8 GHz	R&S®ESW8	1328.4100.08
EMI Test Receiver, 2 Hz to 26.5 GHz	R&S®ESW26	1328.4100.26
EMI Test Receiver, 2 Hz to 44 GHz	R&S®ESW44	1328.4100.44
Hardware options		
OCXO Precision Frequency Reference	R&S®ESW-B4	1328.5012.02
External Generator Control	R&S®ESW-B10	1328.5006.02
Solid State Drive (SSD), including firmware for R&S®ESW	R&S®ESW-B18	1328.4997.02
Low-Noise Amplifier, 150 kHz to 8 GHz	R&S®ESW-B24	1328.4980.08
Low-Noise Amplifier, 150 kHz to 26.5 GHz	R&S®ESW-B24	1328.4980.26
Low-Noise Amplifier, 150 kHz to 44 GHz	R&S®ESW-B24	1328.4980.44
USB Mass Memory Write Protection	R&S®FSW-B33	1313.3602.02
Firmware/software options		
Security Write Protection, for solid state drive	R&S®ESW-K33	1328.4916.02
Realtime Spectrum Analysis	R&S®ESW-K55	1328.4968.02
External accessories		
EMI Measurement Software, basic version for commercial and military standards	R&S®EMC32-EB	1300.7010.02
EMI Autotest Option for R&S®EMC32-EB	R&S®EMC32-K10	1117.6840.02

Service options		
Extended Warranty, one year	R&S®WE1	Please contact your local Rohde & Schwarz sales office.
Extended Warranty, two years	R&S®WE2	
Extended Warranty with Calibration Coverage, one year	R&S®CW1	
Extended Warranty with Calibration Coverage, two years	R&S®CW2	

Your local Rohde & Schwarz expert will help you determine the optimum solution for your requirements.
To find your nearest Rohde & Schwarz representative, visit www.sales.rohde-schwarz.com

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About Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, radiomonitoring and radiolocation. Founded more than 80 years ago, this independent company has an extensive sales and service network and is present in more than 70 countries. The electronics group is among the world market leaders in its established business fields. The company is headquartered in Munich, Germany. It also has regional headquarters in Singapore and Columbia, Maryland, USA, to manage its operations in these regions.

Sustainable product design

ı Environmental compatibility and eco-footprint
ı Energy efficiency and low emissions
ı Longevity and optimized total cost of ownership

Certified Quality Management
ISO 9001

Certified Environmental Management
ISO 14001

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