

Value Instruments Catalog 2016 Test & Measurement



Value Instruments Catalog 2016

from Rohde & Schwarz

T&M instruments that meet your needs

Whether you work in a major electronics R&D facility or a small service lab, you are not always performing complex measurements and do not always need the ultimate in high-end T&M equipment. What you need are precise, reliable, universal measuring instruments. That is exactly what you get with Value Instruments from Rohde & Schwarz: instruments that combine practical features with excellent measurement characteristics, instruments that are easy to use and easy on the budget.

Service that puts you first

As an electronics company with a successful history spanning more than 80 years, we have built a strong global presence that includes a worldwide service and sales network, 24-hour support and R&D centers at technology locations around the globe. No matter how you buy our products – through direct sales channels, from a distributor or from our R&S®Shop that is available in numerous countries¹⁾ – there is always a personal contact partner ready to help you. Worldwide at all times.



¹⁾ Product portfolio may differ from country to country; please visit your local R&S®Shop or contact your local Rohde & Schwarz partner for more information.

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For more than 80 years, Rohde & Schwarz has stood for quality, precision and innovation in all fields of wireless communications.



The privately owned company group has a global presence. It develops, produces and markets a wide range of electronic capital goods for industry, infrastructure operators and government customers.

Rohde & Schwarz is among the market leaders in all of its business fields, offering innovative solutions in a wide range of areas such as wireless communications, EMC test and measurement, TV broadcasting, TV test and measurement, encryption technology and the interception and analysis of radio signals.

Numerous subsidiaries and representatives not only ensure competent and customer-oriented on-site support anywhere in the world, they also safeguard customer investments with comprehensive service and support offerings.

Our business fields

Test and measurement

T&M instruments and systems for wireless communications, automotive, general purpose electronics and aerospace and defense applications

Broadcast and media

Broadcast, T&M and studio equipment for network operators, broadcasters, studios, the film industry and manufacturers of entertainment electronics

Secure communications

Communications systems for air traffic control (ATC) and armed forces, encryption technology for government authorities and critical infrastructures

Cybersecurity

Security products to protect IT infrastructures against cyber attacks

Radiomonitoring and radiolocation

Spectrum monitoring systems and radiomonitoring equipment for regulatory authorities as well as for homeland and external security

Committed to sustainability

As an independent, privately owned company, Rohde&Schwarz can plan in the long run without having to think in terms of quarters. The resulting entrepreneurial freedom allows us to orient all our business processes toward sustainability, from product planning and employee loyalty to a trusting partnership with our customers.

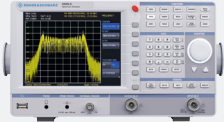
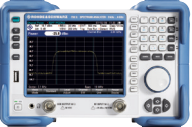


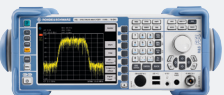
Continuity and innovative creativity are not in conflict, but are inspiring key elements of the Rohde&Schwarz culture, whose combination drives our employees to achieve the exceptional. We encourage new approaches and ways of thinking and give our developers the freedom to reach for the previously unthinkable solutions that revolutionize the market and bring our customers sustained benefit. Respect for each individual employee, self-responsibility and open, flat organizational structures shape our corporate culture and ensure fast, unbureaucratic decision-making – advantages that benefit our customers to the full. For many years, top rankings in leading surveys have proven the company's attractiveness as an employer, helping us recruit top industry talent.

Rohde&Schwarz has always placed great emphasis on environmental protection. Our manufacturing processes and materials meet the highest requirements for energy efficiency and environmental performance.

Creative space – the campus-like setting of our Munich headquarters helps ideas develop into products that set new standards around the world.



Spectrum analyzers

Type/designation	Frequency range	DANL (sensitivity)	TOI	RBW	Portability
R&S®HMS-X spectrum analyzer 	100 kHz to 1.6 GHz/3 GHz (depending on options)	<ul style="list-style-type: none"> -104 dBm (typ.) With EMC option: -135 dBm (typ.) 	<ul style="list-style-type: none"> +10 dBm +13 dBm (typ.) 	<ul style="list-style-type: none"> 10 kHz to 1 MHz, 200 kHz (-3 dB) With EMC option: 100 Hz to 1 MHz, 200 kHz (-3 dB) 	Benchtop
R&S®FSC spectrum analyzer 	9 kHz to 3 GHz/6 GHz (depending on model)	<ul style="list-style-type: none"> < -141 dBm (1 Hz), -146 dBm (1 Hz) (typ.) < -161 dBm (1 Hz), -165 dBm (1 Hz) (typ.) with R&S®FSC-B22 preamplifier option 	> 10 dBm, 15 dBm (typ.) (frequency = 1 GHz)	10 Hz to 3 MHz	<ul style="list-style-type: none"> Compact dimensions Benchtop
R&S®Spectrum Rider FPH handheld spectrum analyzer 	5 kHz to 2 GHz/3 GHz/4 GHz (depending on software options)	<ul style="list-style-type: none"> < -142 dBm (1 Hz), typ. -146 dBm (1 Hz) From 10 MHz to 3 GHz: < -158 dBm (1 Hz), typ. -163 dBm (1 Hz) with R&S®FPH-B22 preamplifier option 	f = 2.4 GHz +15 dBm (meas.)	10 Hz to 3 MHz	<ul style="list-style-type: none"> Handheld Ruggedized Low weight: 2.5 kg (5 lb) Up to 8 h battery-powered operation Ideal for field applications
R&S®FSH handheld spectrum analyzer 	9 kHz/100 kHz to 3.6 GHz/8 GHz (depending on model)	<ul style="list-style-type: none"> < -141 dBm (1 Hz), -146 dBm (1 Hz) (typ.) < -161 dBm (1 Hz), -165 dBm (1 Hz) (typ.) with preamplifier 	<ul style="list-style-type: none"> > +10 dBm, +15 dBm (typ.) (300 MHz to 3.6 GHz) > +3 dBm, +10 dBm (typ.) (3.6 GHz to 8 GHz) 	1 Hz to 3 MHz	<ul style="list-style-type: none"> Handheld Ruggedized Low weight: 3 kg (6.6 lb) with battery Up to 4.5 h battery-powered operation Ideal for field applications
R&S®FSL spectrum analyzer 	9 kHz to 3 GHz/6 GHz (depending on model)	<ul style="list-style-type: none"> < -140 dBm (1 Hz) < -152 dBm (1 Hz), -162 dBm (1 Hz) (typ.) with preamplifier 	+18 dBm (typ.)	<ul style="list-style-type: none"> 300 Hz to 10 MHz (standard) 10 Hz to 10 MHz (with R&S®FSL-B7 option) 	<ul style="list-style-type: none"> Ruggedized housing Optional battery pack and DC power supply

Other instruments with spectrum analysis capability

R&S®ZVH cable and antenna analyzer, with R&S®ZVH-K1 option

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R&S®ZVL vector network analyzer, with R&S®ZVL-K1 option

▷ [page 36](#)

R&S®ESL EMI test receiver

▷ [page 40](#)

R&S®RTM digital oscilloscope (FFT-based spectrum analysis), with R&S®RTM-K18 option

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R&S®RTE digital oscilloscope (FFT-based spectrum analysis)

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R&S®HMS-X Spectrum Analyzer



One base unit, many possibilities

- ▮ Frequency range: 100 kHz to 1.6 GHz/3 GHz¹⁾
- ▮ Spectral purity: > -100 dBc (1 Hz) (at 100 kHz)
- ▮ Sweep: 20 ms to 1000 s
- ▮ Detectors: auto/min./max. peak, sample, RMS, average, quasi-peak²⁾
- ▮ Various markers/delta markers and peak functions
- ▮ Tracking generator³⁾
 - Frequency range: 5 MHz to 1.6 GHz/3 GHz¹⁾
 - Output level: -20 dBm to 0 dBm
- ▮ Direct export of data to USB flash drive, RS-232/USB dual interface for remote control
- ▮ Fanless design and fast boot time

¹⁾ With R&S®HMS-3G (HV212) option.

²⁾ With R&S®HMS-EMC (HV213) option.

³⁾ With R&S®HMS-TG (HV211) option.

Models/options

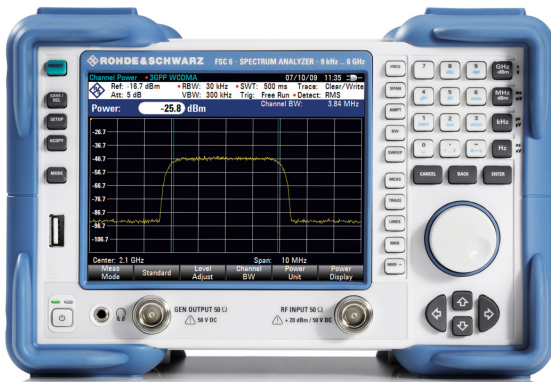
Designation	Type	Order No.
Spectrum Analyzer, 1.6 GHz	R&S®HMS-X	3593.2219K02
Options⁴⁾		
Activation of built-in tracking generator (voucher code ⁵⁾ : HV211)	R&S®HMS-TG	5800.2260.02
Bandwidth upgrade to 3 GHz (voucher code ⁵⁾ : HV212)	R&S®HMS-3G	5800.2254.02
EMC option with preamplifier (voucher code ⁵⁾ : HV213)	R&S®HMS-EMC	5800.2277.02

⁴⁾ Available only with purchase of R&S®HMS-X base unit.

⁵⁾ For activation of R&S®HMS-X options at any time after purchase.

Application	How the R&S®HMS-X meets your needs
EMI precompliance measurements	<ul style="list-style-type: none"> ▮ Free EMI software ▮ Easy-to-use optional near-field probe sets
RF measurements	<ul style="list-style-type: none"> ▮ High accuracy ▮ High sensitivity
Filter characteristics, antennas	<ul style="list-style-type: none"> ▮ Built-in tracking generator (with R&S®HMS-TG/HV211 option) ▮ Optional VSWR bridge
Education and service	<ul style="list-style-type: none"> ▮ Fast boot time ▮ Easy to use ▮ Lightweight ▮ DVI output as standard for connection to data projector or external monitor

R&S®FSC Spectrum Analyzer



Professional spectrum analysis – compact and cost-efficient

The R&S®FSC is a compact, cost-efficient solution that offers all essential features of a professional spectrum analyzer with Rohde & Schwarz quality.

Key facts

- Frequency range: 9 kHz to 3 GHz or 6 GHz
- Resolution bandwidths from 10 Hz to 3 MHz
- High sensitivity: < -141 dBm (1 Hz);
with optional preamplifier: < -161 dBm (1 Hz)
- High third-order intercept: > 10 dBm, 15 dBm (typ.)
- Low measurement uncertainty: < 1 dB
- Internal tracking generator (models .13/.16)
- Power meter and preamplifier option
- Storage of measurement results on USB flash drive
- LAN and USB interfaces for remote control and transfer of measurement data
- R&S®FSCView software for simple documentation of measurement results
- Compact dimensions
- Low power consumption (12 W)

Models

Designation	Type	Order No.
Spectrum Analyzer, 9 kHz to 3 GHz	R&S®FSC3	1314.3006.03
Spectrum Analyzer, 9 kHz to 3 GHz, with tracking generator	R&S®FSC3	1314.3006.13
Spectrum Analyzer, 9 kHz to 6 GHz	R&S®FSC6	1314.3006.06
Spectrum Analyzer, 9 kHz to 6 GHz, with tracking generator	R&S®FSC6	1314.3006.16

Application	How the R&S®FSC meets your needs
General-purpose spectrum analysis	<ul style="list-style-type: none"> ■ Quick check of spectral characteristics (harmonics, AM modulation depth, ACLR, etc.) or for diagnostic applications ■ Service and repair centers, training centers, universities or schools ■ High measurement accuracy ■ High sensitivity ■ LAN and USB interfaces
Use in compact test systems	<ul style="list-style-type: none"> ■ Compact size allows installation of two R&S®FSC or one R&S®FSC and one R&S®SMC100A signal generator in a single 19" rack ■ Remote control via USB/LAN ■ Support of R&S®NRP-Zxx power sensors ■ Only 12 W power consumption ■ Passive cooling, i.e. no built-in fan
Power measurements	Precision RF power meter with R&S®NRP-Zxx power sensors
Satellite monitoring	<ul style="list-style-type: none"> ■ Satellite dish positioning ■ Link management
Universal instrument	<ul style="list-style-type: none"> ■ Determination of transmission characteristics of cables, filters and amplifiers, up to 90 dB dynamic range (model .13 or .16 required) ■ Location of EMC problems with near-field probes

R&S® Spectrum Rider FPH Handheld Spectrum Analyzer



Key facts

- ▀ Frequency range: 5 kHz to 2/3/4 GHz; upgrade via keycode
- ▀ Capacitive touchscreen, operation like a smartphone
- ▀ Dual operation via touchscreen or robust keypad in the field
- ▀ Longest battery operation time (8 h)
- ▀ High sensitivity: -144 dBm (1 Hz) (typ.); with optional preamplifier: -161 dBm (1 Hz) (typ.)
- ▀ High TOI: + 10 dBm (meas.) at 2.4 GHz
- ▀ Low measurement uncertainty: typ. 0.5 dB
- ▀ Options for average power and pulse power measurements
- ▀ Up to 32 Gbyte storage on USB flash drive or microSD card (not supplied)
- ▀ LAN and USB interfaces for remote control and transfer of measurement data
- ▀ R&S®InstrumentView software for postprocessing and documentation of measurement results
- ▀ Rugged, dripwater proof housing for rough work in the field, tested in line with MIL-PRF-28800 class 2
- ▀ Low weight (2.5 kg (5.5 lb) with battery)

Models/options

Designation	Type	Order No.
R&S®Spectrum Rider FPH Handheld Spectrum Analyzer (5 kHz to 2 GHz)	R&S®FPH	1321.1111.02
Spectrum Analyzer Frequency Upgrade, 2 GHz to 3 GHz	R&S®FPH-B3	1321.0667.02
Spectrum Analyzer Frequency Upgrade, 3 GHz to 4 GHz	R&S®FPH-B4	1321.0673.02
Preamplifier	R&S®FPH-B22	1321.0680.02

New

Compact and cost-efficient handheld spectrum analyzer

The R&S®Spectrum Rider is a compact, cost-efficient analyzer designed for use in the field, in the lab, and in universities and schools.

Application	How the R&S®Spectrum Rider FPH meets your needs
General-purpose spectrum analysis	<ul style="list-style-type: none"> ▀ Quick check of spectral characteristics or for diagnostic applications ▀ EMI debugging with near-field probes ▀ Service and repair centers, training centers, universities and schools ▀ LAN and USB remote control interfaces
RF spectrum measurements and interference hunting	<ul style="list-style-type: none"> ▀ Detect, characterize and locate interference sources in the field ▀ Straightforward reporting
Power measurements	<ul style="list-style-type: none"> ▀ Precise RF power measurements with R&S®NRP-Zxx power sensors (average power and pulse power measurement options) ▀ Operation as a power meter (with channel power meter option)
Field use	<ul style="list-style-type: none"> ▀ Single charge for one working day of portable operation ▀ Rugged housing, low weight (2.5 kg (5.5 lb)), compact size ▀ Backlit keypad for dim environments ▀ Up to 32 Gbyte memory for saving measurement results and settings to microSD card or USB flash drive (not supplied) ▀ Portrait form factor for best handling in the field, large buttons for operation with gloves, field-tested in line with MIL-PRF-28800 class 2

R&S®FSH Handheld Spectrum Analyzer



The all-in-one handheld analyzer

The R&S®FSH spectrum analyzer is rugged, handy and designed for use in the field.

Key facts

- ▀ Spectrum analyzer, cable and antenna tester, full two-port vector network analyzer, modulation analyzer, interference analyzer and power meter in a single device
- ▀ Frequency range: 9 kHz to 3.6 GHz or 8 GHz
- ▀ Low measurement uncertainty (< 1 dB) and high sensitivity (DANL)

- ▀ Easy operation, user-configurable test sequences (wizard) and one-click customizable report
- ▀ Support of LTE FDD, TD-LTE, 3GPP WCDMA, GSM and CDMA2000® 1xEV-DO downlink analysis
- ▀ Support of LTE-Advanced carrier aggregation
- ▀ Internal channel power meter
- ▀ Easy-to-replace lithium-ion battery for up to 4.5 h of operation
- ▀ Rugged, splashproof housing for rough work in the field, tested in line with MIL-PRF-28800 class 2
- ▀ Easy handling due to low weight (3 kg (6.6 lb) with battery) and easy-to-reach function keys

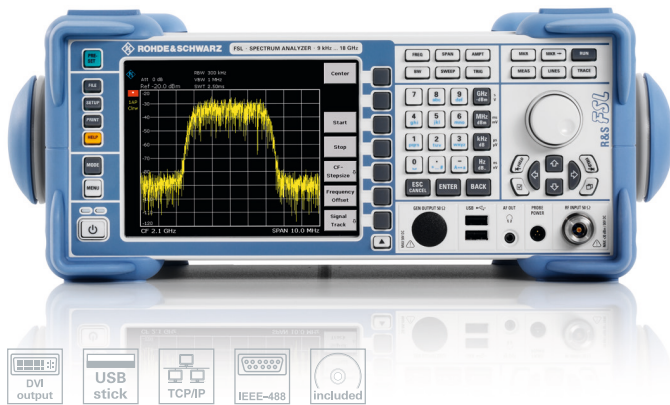
Models

Designation	Type	Order No.
Handheld Spectrum Analyzer, 9 kHz to 3.6 GHz, with preamplifier	R&S®FSH4	1309.6000.04
Handheld Spectrum Analyzer, 9 kHz to 3.6 GHz, with preamplifier and tracking generator	R&S®FSH4	1309.6000.14
Handheld Spectrum Analyzer, 100 kHz to 3.6 GHz, with preamplifier, tracking generator and internal VSWR bridge	R&S®FSH4	1309.6000.24
Handheld Spectrum Analyzer, 9 kHz to 8 GHz, with preamplifier	R&S®FSH8	1309.6000.08
Handheld Spectrum Analyzer, 9 kHz to 8 GHz, with preamplifier and tracking generator	R&S®FSH8	1309.6000.18
Handheld Spectrum Analyzer, 100 kHz to 8 GHz, with preamplifier, tracking generator and internal VSWR bridge	R&S®FSH8	1309.6000.28

For higher frequencies, please contact your local Rohde & Schwarz partner.

Application	How the R&S®FSH meets your needs
RF spectrum measurements and interference hunting	<ul style="list-style-type: none"> ▀ Various standard measurement functions (channel power, OBW, ACLR, SEM, etc.) ▀ High measurement accuracy and high sensitivity ▀ Geotagging and interference analysis
Installation and maintenance of transmitter stations	<ul style="list-style-type: none"> ▀ Cable and antenna testing (DTF, return loss, etc.) ▀ Easy operation, user-configurable test sequences (wizard) and one-click customizable report ▀ Power measurements with external directional or terminating power sensors ▀ LTE FDD, TD-LTE, 3GPP WCDMA, GSM and CDMA2000® 1xEV-DO downlink analysis ▀ Internal SWR bridge with bias tee ▀ Interference hunting
Measurements of electromagnetic fields	<ul style="list-style-type: none"> ▀ Wide frequency range ▀ Support of isotropic antenna and directional antennas ▀ Results in dBμV/m and W/m² ▀ Channel power measurement function
Field use	<ul style="list-style-type: none"> ▀ Rugged housing, low weight (3 kg (6.6 lb)) and compact size ▀ Battery-operated with long battery operating time and easy-to-replace battery ▀ Fast and easy to use ▀ SD card for storing thousands of measurement results ▀ Portrait form factor for excellent handling in the field; MIL-PRF-28800 class 2
Diagnostic applications in the lab or in service	<ul style="list-style-type: none"> ▀ Universal instrument for spectrum measurements, vector network analysis and precise power measurements ▀ Location of EMC problems with near-field probes ▀ High measurement accuracy and high sensitivity; LAN/USB remote control

R&S®FSL Spectrum Analyzer



High-end functions in an extremely lightweight, compact package

The R&S®FSL is an extremely lightweight, compact spectrum analyzer that is ideal for a large number of applications in development, service and production.

Key facts

- Cost-efficient spectrum analyzer with high-quality features
- Frequency range: 9 kHz to 3 GHz/6 GHz
- All models with and without tracking generator
- Best RF characteristics in its class
- Wide I/Q demodulation bandwidth: up to 28 MHz
- Support for WLAN and WiMAX™ testing
- High measurement accuracy
- Portable for field applications
- Compact and lightweight: < 8 kg (18 lb)
- Optional battery operation
- Easy on-site upgradeability

Application	How the R&S®FSL meets your needs
Evaluation of broadband signals	Its wide I/Q demodulation bandwidth of up to 28 MHz allows engineers to analyze broadband wireless signals such as WLAN 802.11a/b/g
Insertion loss measurements	The tracking generator models of the R&S®FSL enable the measurement of insertion loss of cables and the measurement of bandwidth filters
Power measurement option	The R&S®FSL-K9 option expands the spectrum analyzer to a high-precision RF power meter when used with the R&S®NRP-Zxx power sensors
Interference analysis	The spectrogram functionality of the R&S®FSL-K14 option enables unattended signal monitoring, providing versatile interference analysis
WLAN production testing	The WLAN option creates the basis of a WLAN TX production tester

Models/options		
Designation	Type	Order No.
Spectrum Analyzer, 9 kHz to 3 GHz	R&S®FSL3	1300.2502.03
Spectrum Analyzer, 9 kHz to 3 GHz, with tracking generator	R&S®FSL3	1300.2502.13
Spectrum Analyzer, 9 kHz to 6 GHz	R&S®FSL6	1300.2502.06
Spectrum Analyzer, 9 kHz to 6 GHz, with tracking generator	R&S®FSL6	1300.2502.16
For higher frequencies, please contact your local Rohde&Schwarz partner.		
Options		
OCXO Reference Frequency, aging 1×10^{-7} /year	R&S®FSL-B4	1300.6008.02
Additional Interfaces ¹⁾	R&S®FSL-B5	1300.6108.02
TV Trigger	R&S®FSL-B6	1300.5901.02
Narrow Resolution Filters	R&S®FSL-B7	1300.5601.02
Gated Sweep	R&S®FSL-B8	1300.5701.02
GPIO Interface	R&S®FSL-B10	1300.6208.02
RF Pre-amplifier (3 GHz/6 GHz)	R&S®FSL-B22	1300.5953.02
DC Power Supply, 12 V to 28 V	R&S®FSL-B30	1300.6308.02
NiMH Battery Pack ²⁾	R&S®FSL-B31	1300.6408.02
AM/FM/φM Measurement Demodulator	R&S®FSL-K7	1300.9246.02
Transmitter Measurements for Bluetooth® V2.0 and EDR	R&S®FSL-K8	1301.9398.02
Power Sensor Support ³⁾	R&S®FSL-K9	1301.9530.02
Spectrogram Measurements	R&S®FSL-K14	1302.0913.02
Analog and Digital Cable TV Measurements	R&S®FSL-K20	1301.9675.02
Application Firmware for Noise Figure and Gain Measurements ⁴⁾	R&S®FSL-K30	1301.9817.02
3GPP FDD BTS Application Firmware	R&S®FSL-K72	1302.0620.02
CDMA2000® Base Station Analysis	R&S®FSL-K82	1302.7803.02
1xEV-DO Base Station Analysis	R&S®FSL-K84	1302.0159.02
WLAN Transmitter Measurements for IEEE802.11a, b, g, j	R&S®FSL-K91	1302.0094.02
Upgrade of R&S®FSL-K91 to IEEE802.11n	R&S®FSL-K91n	1308.7903.02
WiMAX™ IEEE802.16-2004 OFDM Application Firmware	R&S®FSL-K92	1302.0236.02
WiMAX™ IEEE802.16-2009 OFDM/OFDMA Application Firmware	R&S®FSL-K93	1302.0736.02
Upgrade from R&S®FSL-K92 to R&S®FSL-K93	R&S®FSL-K92U	1302.0307.02
EMI Software	R&S®ES-SCAN	1308.9270.02





¹⁾ Video out, IF out, noise source control, AUX port, connector for R&S®NRP-Zxx power sensors.

²⁾ Requires R&S®FSL-B30.

³⁾ Requires R&S®FSL-B5 or R&S®NRP-Z3/-Z4 and R&S®NRP-Zxx power sensor.

⁴⁾ Requires R&S®FSL-B5 and preamplifier.

Signal generators

Type/designation	Frequency range	Max. output power/voltage	SSB phase noise	Nonharmonics	Modulation
R&S®HMF2525/ R&S®HMF2550 arbitrary function generator 	10 µHz to 25 MHz/50 MHz	10 V (V_{pp}) into 50 Ω load	< -115 dBc (1 Hz) (typ.)	<ul style="list-style-type: none"> ▪ -70 dBc ($f < 1$ MHz) ▪ -70 dBc + 6 dB/octave ($1 \text{ MHz} < f < 50 \text{ MHz}$) 	AM, FM, pulse, PWM, FSK
HM8134-3/HM8135 RF synthesizer 	1 Hz to 1.2 GHz/3 GHz	+13 dBm	≤ -95 dBc (1 Hz) ($f = 1$ GHz)	≤ -50 dBc (> 15 kHz from carrier)	AM, FM, ϕ M, pulse, FSK, PSK
R&S®SMC100A signal generator 	9 kHz to 1.1 GHz/3.2 GHz (depending on RF path option)	<ul style="list-style-type: none"> ▪ +13 dBm ($f = 200$ kHz to 3.2 GHz) ▪ +17 dBm (meas.) 	< -105 dBc (-111 dBc (typ.)) ($f = 1$ GHz, carrier offset = 20 kHz, 1 Hz measurement bandwidth)	< -60 dBc (-72 dBc (typ.)) (carrier offset > 10 kHz, $f \leq 1600$ MHz)	AM, FM, ϕ M, pulse
R&S®SMB100A RF signal generator 	9 kHz to 1.1/2.2/3.2/6 GHz (depending on RF path option)	<ul style="list-style-type: none"> ▪ +5 dBm ($9 \text{ kHz} \leq f < 200 \text{ kHz}$) ▪ +13 dBm ($200 \text{ kHz} \leq f < 1 \text{ MHz}$) ▪ +18 dBm ($1 \text{ MHz} \leq f < 6 \text{ GHz}$) ▪ +23 dBm (meas.) 	< -122 dBc (-128 dBc (typ.)) ($f = 1$ GHz, carrier offset = 20 kHz, 1 Hz measurement bandwidth)	< -70 dBc (< -84 dBc (typ.)) (carrier offset > 10 kHz, $23.4375 \text{ MHz} < f \leq$ 1500 MHz)	AM, FM, ϕ M, pulse

R&S®HMF2525/R&S®HMF2550 Arbitrary Function Generator



The latest generation of arbitrary function generators

- ▮ Frequency range: 10 μ Hz to 25 MHz/50 MHz
- ▮ Triangle waveforms up to 10 MHz
- ▮ Output voltage: 5 mV to 10 V (V_{pp}) into 50 Ω load
- ▮ Total harmonic distortion: 0.04% ($f < 100$ kHz)
- ▮ Waveforms: sine, square, triangle/ramp, pulse, arbitrary (incl. predefined waveforms such as white/pink noise, cardinal sine, exponential rise/fall)
- ▮ Modulation modes: AM, FM, pulse, PWM, FSK (internal and external)
- ▮ External connectors: TRIGGER (I/O), SWEEP (O), MODULATION (I)
- ▮ External reference input/output (10 MHz) via BNC connector
- ▮ Arbitrary waveform generator: 250 Msample/s, 14 bit, 256k points
- ▮ PC software (free of charge) to easily create user-defined waveforms
- ▮ Oscillographic signal display in realtime
- ▮ Front USB connector to easily save and recall waveforms and settings
- ▮ RS-232/USB dual interface for remote control
- ▮ Fanless design

Models/options

Designation	Type	Order No.
25 MHz Arbitrary Function Generator	R&S®HMF2525	3593.0616K02
50 MHz Arbitrary Function Generator	R&S®HMF2550	3593.0622K02
Dual Ethernet/USB Interface	HO732	5800.3209.02
IEEE-488 (GPIB) Interface, galvanically isolated	HO740	3622.3194.02

Application	How the R&S®HMF2525/R&S®HMF2550 meets your needs
Analog circuit design	<ul style="list-style-type: none"> ▮ Low-noise amplifier ▮ Many predefined curves including white and pink noise ▮ Up to 10 V (V_{pp}) into 50 Ω load
Mixed signal design and debugging	<ul style="list-style-type: none"> ▮ Pulse mode with adjustable rise time ▮ Sweep, burst mode ▮ AM, FM, pulse, PWM, FSK modulation modes
Education and service	<ul style="list-style-type: none"> ▮ Fast boot time ▮ Easy to use ▮ Fanless design

HM8134-3/HM8135 RF Synthesizer



RF synthesizers from the 8100 programmable measuring instruments series

- Frequency range: 1 Hz to 1.2 GHz/3 GHz
- Output power: -127 dBm/-135 dBm to +13 dBm
- Frequency resolution: 1 Hz
- High spectral purity, excellent sweep mode
- Modulation modes: AM, FM, pulse, phase, FSK, PSK
- Internal modulation (10 Hz to 150 kHz): sine, square, triangle, ramp
- External reference input/output (10 MHz) via BNC connector
- HM8134-3/HM8135: TCXO (temperature stability: $\pm 0.5 \times 10^{-6}$); HM8134-3X/HM8135-X: OCXO (temperature stability: $\pm 1.0 \times 10^{-8}$)
- RS-232/USB dual interface, IEEE-488 (GPIB) optional

Models/options

Designation	Type	Order No.
1.2 GHz RF Synthesizer	HM8134-3	3593.0568K02
1.2 GHz RF Synthesizer, with OCXO (temperature stability: $\pm 1.0 \times 10^{-8}$)	HM8134-3X	3593.0574K02
3 GHz RF Synthesizer	HM8135	3593.0580K02
3 GHz RF Synthesizer, with OCXO (temperature stability: $\pm 1.0 \times 10^{-8}$)	HM8135-X	3593.0597K02
IEEE-488 (GPIB) Interface, galvanically isolated	HO880	3594.3748.02

Application	How the HM8134-3/HM8135 meets your needs
Analog RF circuit design	<ul style="list-style-type: none"> ■ Low-noise amplifier, high dynamic range, up to +13 dBm output power ■ Clean sine wave due to high spectral purity
RF system design	<ul style="list-style-type: none"> ■ Sweep mode ■ Several internal modulation types: sine wave, square wave, triangle, ramp up to 150 kHz ■ Internal offset correction
Education and service	<ul style="list-style-type: none"> ■ Fast boot time ■ Easy to use

R&S®SMC100A Signal Generator



Smallest size and best price/performance ratio in its class

The analog R&S®SMC100A sets new standards for attractively priced signal generators. It has the smallest size and the best price/performance ratio in its class.

Key facts

- ▀ Frequency range: 9 kHz to 1.1 GHz or 3.2 GHz
- ▀ Maximum output level: > +17 dBm (typ.)
- ▀ Low SSB phase noise: -111 dBc (typ.) (f = 1 GHz, 20 kHz carrier offset, 1 Hz measurement bandwidth)
- ▀ Wear-free electronic attenuator with integrated overvoltage protection
- ▀ AM/FM/φM/pulse modulation provided as standard
- ▀ Signal generator with the best price/performance ratio in its class
- ▀ Signal generator with the smallest size in its class (½ 19", 2 HU)
- ▀ Low total cost of ownership

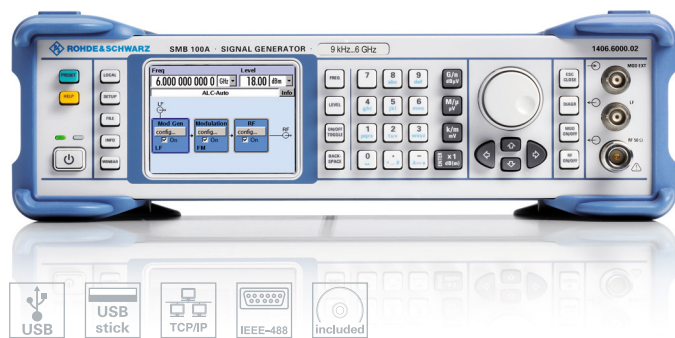
Models/options

Designation	Type	Order No.
Signal Generator ¹⁾	R&S®SMC100A	1411.4002.02
Options		
RF Path, 9 kHz to 1.1 GHz	R&S®SMC-B101	1411.6505.02
RF Path, 9 kHz to 3.2 GHz	R&S®SMC-B103	1411.6605.02
OCXO Reference Oscillator	R&S®SMC-B1	1411.6705.02
GPIO/IEEE-488 Interface	R&S®SMC-K4	1411.3506.02

¹⁾ The base unit must be ordered together with an R&S®SMC-B101/R&S®SMC-B103 frequency option.

Application	How the R&S®SMC100A meets your needs
Service and maintenance of RF components and modules	<ul style="list-style-type: none"> ▀ Good SSB phase noise and wideband noise ▀ Analog modulation modes included in instrument ▀ Perfect for simple measurements such as gain, intermodulation and distortion
RF tests in education	<ul style="list-style-type: none"> ▀ Cost-efficient instrument ▀ Easy to operate ▀ Good performance for RF experiments
Field use	<ul style="list-style-type: none"> ▀ Small size and low weight ▀ R&S®NRP-Zxx power sensors can be connected (no need for an additional power meter)
A&D development/service/maintenance	<ul style="list-style-type: none"> ▀ Sanitizing procedure for internal memory ▀ Support for self-maintainers
Simple production applications	<ul style="list-style-type: none"> ▀ Short frequency and level setting times ▀ Low total cost of ownership (TCO)

R&S®SMB100A RF Signal Generator



Key facts

- Wide frequency range: 9 kHz to 6 GHz
- Excellent signal characteristics with low SSB phase noise of -128 dBc (typ.) (at 1 GHz, 20 kHz offset)
- High output power of up to $+27$ dBm
- Wear-free electronic attenuator up to 6 GHz
- Short setting times for frequency (< 3 ms) and level (< 2.5 ms) via remote control, < 1 ms in list mode
- All important analog modulation modes with AM, FM/ ϕ M and pulse modulation supported
- Optional pulse modulator with > 80 dB; rise/fall time of < 5 ns (typ.)
- Optional pulse generator with minimum pulse width of 10 ns
- Compact size with only 2 HU and low weight

Versatile, compact solution for signal generation

The analog R&S®SMB100A RF signal generator delivers excellent signal characteristics and high flexibility at low cost of ownership – the key criteria for a signal source.

Application	How the R&S®SMB100A meets your needs
Blocking/receiver tests	Can serve as a high-quality generator of transmitter or interference signals up to 6 GHz (as specified in 3GPP TS25.141, for example)
Production testing	Compared with mechanical attenuators, the electronic attenuator offers unlimited wear-and-tear-free switching; the modular design enables on-site instrument servicing
Development of RF ICs	85 dB (typ.) suppression of unwanted and unpredictable spurs and low wideband noise of -148 dBc (typ.) meet most development needs
Car radio tests	Optional FM stereo coder with RDS signal generation capabilities (available for R&S®SMB-B101/-B102/-B103/-B106), can be used together with the R&S®UPV or R&S®UPP audio analyzer
EMC applications	Wide frequency range from 9 kHz to 6 GHz for wide coverage with only one source, for simplified EMC test setups
Test system integration	Multiple choices for remote interfaces: LAN, USB and GPIB
LO	LO substitution in various applications
General purpose	Testing components, R&D, laboratory equipment

Models/options		
Designation	Type	Order No.
RF Signal Generator ¹⁾	R&S®SMB100A	1406.6000.02
Options		
RF Path, 9 kHz to 1.1 GHz	R&S®SMB-B101	1407.2509.02
RF Path, 9 kHz to 2.2 GHz	R&S®SMB-B102	1407.2609.02
RF Path, 9 kHz to 3.2 GHz	R&S®SMB-B103	1407.2709.02
RF Path, 9 kHz to 6 GHz	R&S®SMB-B106	1407.2909.02
For higher frequencies, please contact your local Rohde & Schwarz partner.		
OCXO Reference Oscillator ²⁾	R&S®SMB-B1	1407.3005.02
OCXO Reference Oscillator, high performance ²⁾	R&S®SMB-B1H	1407.3070.02
Stereo/RDS Coder ³⁾	R&S®SMB-B5	1407.3205.02
Pulse Modulator for R&S®SMB-B101/-B102/-B103/-B106	R&S®SMB-K22	1407.3770.02
Pulse Generator	R&S®SMB-K23	1407.3786.02
Pulse Train ⁴⁾	R&S®SMB-K27	1407.3828.02

¹⁾ The base unit must be ordered together with an R&S®SMB-B101/-B102/-B103/-B106 frequency option.

²⁾ Only either the R&S®SMB-B1 or R&S®SMB-B1H option can be installed.

³⁾ Only available with an R&S®SMB-B101/-B102/-B103/-B106 frequency option.

⁴⁾ Requires the R&S®SMB-K23 option; only available for instruments with serial number > 102400 .

Oscilloscopes

New

Type/designation	Bandwidth (-3 dB)	Number of channels	Max. sampling rate (realtime)	Memory depth	Input sensitivity
R&S® Scope Rider handheld digital oscilloscope 	<ul style="list-style-type: none"> ┆ 60 MHz ┆ 100 MHz ┆ 200 MHz ┆ 350 MHz ┆ 500 MHz 	<ul style="list-style-type: none"> ┆ 2 channels ┆ 4 channels 	<ul style="list-style-type: none"> ┆ 5 Gsample/s 	<ul style="list-style-type: none"> ┆ 500 ksample 	<ul style="list-style-type: none"> ┆ 2 mV/div to 100 V/div
R&S®HMO1002 digital oscilloscope 	<ul style="list-style-type: none"> ┆ 50 MHz ┆ 70 MHz ┆ 100 MHz 	<ul style="list-style-type: none"> ┆ 2 channels 	<ul style="list-style-type: none"> ┆ 512 Msample/s per channel ┆ 1 Gsample/s interleaved 	<ul style="list-style-type: none"> ┆ 512 ksample per channel ┆ 1 Msample interleaved 	<ul style="list-style-type: none"> ┆ 1 MΩ: 1 mV/div to 10 V/div
with MSO option	350 MHz	8 digital channels	512 Msample/s	512 ksample	
R&S®HMO1202 digital oscilloscope 	<ul style="list-style-type: none"> ┆ 100 MHz ┆ 200 MHz ┆ 300 MHz 	<ul style="list-style-type: none"> ┆ 2 channels 	<ul style="list-style-type: none"> ┆ 1 Gsample/s per channel ┆ 2 Gsample/s interleaved 	<ul style="list-style-type: none"> ┆ 1 Msample per channel ┆ 2 Msample interleaved 	<ul style="list-style-type: none"> ┆ 50 Ω: 1 mV/div to 10 V/div ┆ 1 MΩ: 1 mV/div to 10 V/div
with MSO option	350 MHz	8 digital channels	1 Gsample/s	1 Msample	
R&S®HMO compact digital oscilloscope 	<ul style="list-style-type: none"> ┆ 70 MHz ┆ 100 MHz ┆ 150 MHz ┆ 200 MHz 	<ul style="list-style-type: none"> ┆ 2 channels ┆ 4 channels 	<ul style="list-style-type: none"> ┆ 1 Gsample/s per channel ┆ 2 Gsample/s interleaved 	<ul style="list-style-type: none"> ┆ 1 Msample per channel ┆ 2 Msample interleaved 	<ul style="list-style-type: none"> ┆ 50 Ω: 1 mV/div to 10 V/div ┆ 1 MΩ: 1 mV/div to 10 V/div
with MSO option	350 MHz	8 digital channels	1 Gsample/s	1 Msample	
R&S®HMO3000 digital oscilloscope 	<ul style="list-style-type: none"> ┆ 300 MHz ┆ 400 MHz ┆ 500 MHz 	<ul style="list-style-type: none"> ┆ 2 channels ┆ 4 channels 	<ul style="list-style-type: none"> ┆ 2 Gsample/s per channel ┆ 4 Gsample/s interleaved ┆ 1 Gsample/s (logic channels) 	<ul style="list-style-type: none"> ┆ 4 Msample per channel ┆ 8 Msample interleaved 	<ul style="list-style-type: none"> ┆ 50 Ω: 1 mV/div to 5 V/div ┆ 1 MΩ: 1 mV/div to 5 V/div
with MSO option	350 MHz	16 digital channels	1 Gsample/s	4 Msample	
R&S®RTM digital oscilloscope 	<ul style="list-style-type: none"> ┆ 200 MHz ┆ 350 MHz ┆ 500 MHz ┆ 1 GHz 	<ul style="list-style-type: none"> ┆ 2 channels ┆ 4 channels 	<ul style="list-style-type: none"> ┆ 2.5 Gsample/s per channel ┆ 5 Gsample/s interleaved 	<ul style="list-style-type: none"> ┆ 10 Msample per channel ┆ 20 Msample interleaved ┆ 460 Msample segmented (optional) 	<ul style="list-style-type: none"> ┆ 50 Ω: 1 mV/div to 1 V/div ┆ 1 MΩ: 1 mV/div to 10 V/div
with MSO option	400 MHz	16 digital channels	up to 5 Gsample/s	up to 20 Msample	
R&S®RTE digital oscilloscope 	<ul style="list-style-type: none"> ┆ 200 MHz ┆ 350 MHz ┆ 500 MHz ┆ 1 GHz ┆ 1.5 GHz ┆ 2 GHz 	<ul style="list-style-type: none"> ┆ 2 channels ┆ 4 channels 	<ul style="list-style-type: none"> ┆ 5 Gsample/s per channel 	<ul style="list-style-type: none"> ┆ 10 Msample per channel ┆ Optionally up to 50 Msample per channel 	<ul style="list-style-type: none"> ┆ 50 Ω: 500 μV/div to 1 V/div ┆ 1 MΩ: 500 μV/div to 10 V/div
with MSO option	400 MHz	16 digital channels	5 Gsample/s	100 Msample	
Oscilloscope probes	▶ page 28				

3

R&S®Scope Rider Handheld Digital Oscilloscope



New



Lab performance in a rugged and portable design

When debugging embedded devices in the lab or analyzing complex problems in the field, the R&S®Scope Rider offers the performance and capabilities of a lab oscilloscope as well as the form factor and ruggedness of a battery-operated handheld device.

Key facts

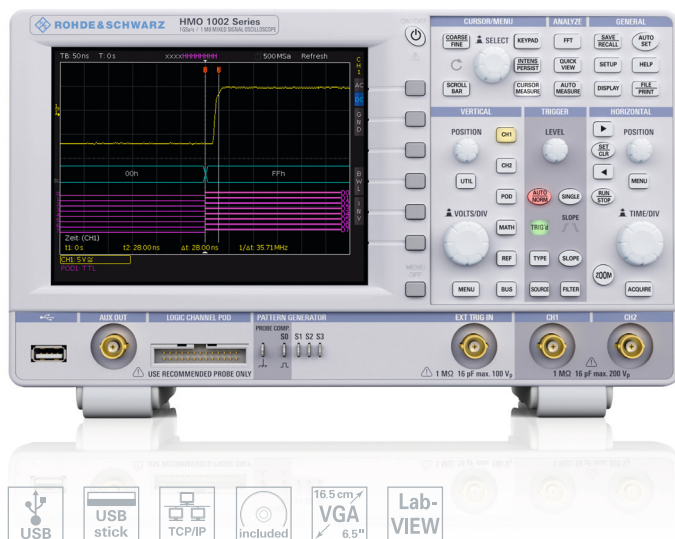
- ▮ 60 MHz to 500 MHz with 5 Gsample/s sampling rate
- ▮ Isolated channels: CAT IV 600 V/CAT III 1000 V
- ▮ 10-bit A/D converter
- ▮ Memory depth: 500 ksample
- ▮ 50 000 waveforms/s
- ▮ 5 instruments in one handheld package: lab oscilloscope, logic analyzer (MSO), protocol analyzer, data logger and digital multimeter (DMM)
- ▮ 7" capacitive touch display
- ▮ Wireless LAN and Ethernet for web-based remote control
- ▮ IP51: rugged, dust and water resistant housing

Models/options

Designation	Type	Order No.
Handheld Digital Oscilloscope		
60 MHz, 2 channels, DMM	R&S®RTH1002	1317.5000K02
100 MHz	R&S®RTH1012	1317.5000P12
200 MHz	R&S®RTH1022	1317.5000P22
350 MHz	R&S®RTH1032	1317.5000P32
500 MHz	R&S®RTH1052	1317.5000P52
60 MHz, 4 channels	R&S®RTH1004	1317.5000K04
100 MHz	R&S®RTH1014	1317.5000P14
200 MHz	R&S®RTH1024	1317.5000P24
350 MHz	R&S®RTH1034	1317.5000P34
500 MHz	R&S®RTH1054	1317.5000P54
60 MHz, 2 channels, MSO, DMM	R&S®RTH1002MSO	1317.5000P03
100 MHz	R&S®RTH1012MSO	1317.5000P13
200 MHz	R&S®RTH1022MSO	1317.5000P23
350 MHz	R&S®RTH1032MSO	1317.5000P33
500 MHz	R&S®RTH1052MSO	1317.5000P53
60 MHz, 4 channels, MSO	R&S®RTH1004MSO	1317.5000P05
100 MHz	R&S®RTH1014MSO	1317.5000P15
200 MHz	R&S®RTH1024MSO	1317.5000P25
350 MHz	R&S®RTH1034MSO	1317.5000P35
500 MHz	R&S®RTH1054MSO	1317.5000P55

Application	How the R&S®Scope Rider meets your needs
Field use	
Electric and industrial installation and maintenance	<ul style="list-style-type: none"> ▮ Electric installations ▮ Motors, fans and pumps ▮ Electric drives ▮ Sensors and transducers ▮ Industrial machinery
Electronic field service and maintenance	<ul style="list-style-type: none"> ▮ Robotic systems ▮ Solar inverters ▮ Backup power supplies ▮ Avionic and military systems ▮ Medical equipment ▮ Rail vehicle systems
Lab use	
Research and product development	<ul style="list-style-type: none"> ▮ Embedded systems ▮ Industrial controllers ▮ Power electronics ▮ General electronics ▮ Environmental testing

R&S®HMO1002 Digital Oscilloscope



Scope of the art with 50/70/100 MHz bandwidth

High sensitivity, multifunctionality and a great price – that is what makes the R&S®HMO1002 digital oscilloscope so special. With its wide range of functions, the R&S®HMO1002 addresses a broad group of users, from embedded developers to service technicians to educators. Advanced, powerful technology in a fanless design meets the high requirements of today's customers. The R&S®HMO1002 digital oscilloscope includes a wide range of upgrade options, providing true investment protection for the future.

Key facts

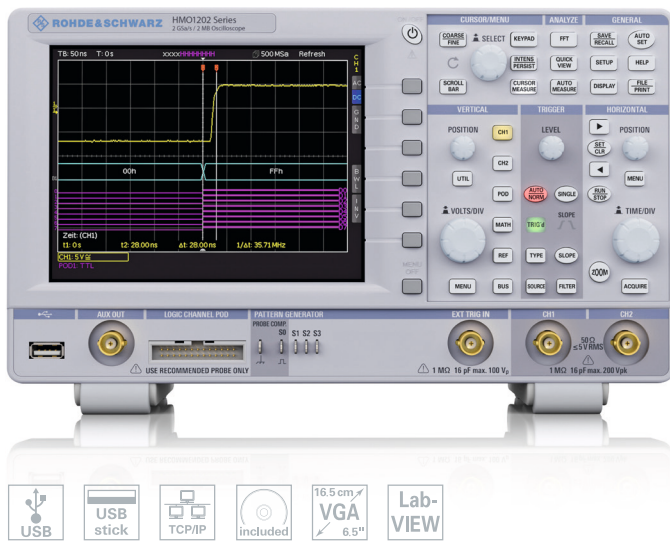
- Up to 1 Gsample/s sampling rate, up to 1 Msample memory depth
- High vertical sensitivity down to 1 mV/div
- High acquisition rate to identify signal faults
- Mixed signal function as standard
- Serial bus analysis: hardware-based triggering and decoding
- The right signal at hand: pattern generator up to 50 Mbit/s and function generator up to 50 kHz
- Voltmeter measurements using an oscilloscope
- Wide selection of automatic measurement functions
- QuickView: key results at the push of a button
- FFT: the easy way to analyze the signal spectrum
- HOO10/HV110: analysis of I²C, SPI and RS-232/UART signals on analog and logic channels
- HOO11/HV111: analysis of I²C and RS-232/UART signals on all analog channels
- HOO12/HV112: analysis of CAN and LIN signals on analog and logic channels

Models/options

Designation	Type	Order No.
Digital Oscilloscope, 50 MHz bandwidth, 2 channels	R&S®HMO1002	3593.1764K02
Digital Oscilloscope, 70 MHz bandwidth, 2 channels	R&S®HMO1002 + R&S®HV572	3593.1764K02 + 5800.2883.02
Digital Oscilloscope, 100 MHz bandwidth, 2 channels	R&S®HMO1002 + R&S®HV512	3593.1764K02 + 5800.2890.02

Application	How the R&S®HMO1002 meets your needs
Engineering lab	<ul style="list-style-type: none"> ■ Digital pattern generator with standard bus signals and ARB editor ■ Automeasurement function for 28 different parameters ■ Powerful zoom function ■ Fanless design
Analog circuit design	<ul style="list-style-type: none"> ■ Sensitivity down to 1 mV/div ■ Simultaneous voltmeter measurements on both analog channels ■ Component tester ■ FFT with 128k points
Embedded debugging	<ul style="list-style-type: none"> ■ Mixed signal function with 8 logic channels ■ Hardware-accelerated triggering and decoding of serial buses ■ Pass/fail tests based on user-defined masks with error signal output ■ 5-digit hardware counter
Education	<ul style="list-style-type: none"> ■ Function generator with all common waveforms ■ Education mode

R&S®HMO1202 Digital Oscilloscope



New

Scope of the art with 100/200/300 MHz bandwidth

High sensitivity, multifunctionality and an affordable price – that is what makes the R&S®HMO1202 digital oscilloscope so attractive. From embedded developers to service technicians to educators – with its ample scope of functions, the R&S®HMO1202 addresses a broad variety of users. Advanced, powerful technology implemented in the instrument meets the high requirements of today's customers. The R&S®HMO1202 digital oscilloscope comes with numerous upgrade options, providing true investment protection.

Key facts

- ▮ Up to 2 Gsample/s sampling rate, up to 2 Msample memory depth
- ▮ High vertical sensitivity down to 1 mV/div
- ▮ High acquisition rate to identify signal faults
- ▮ Mixed signal functionality included as standard (2 analog and 8 digital channels simultaneously available at all times)
- ▮ Serial bus analysis: hardware-accelerated triggering and decoding
- ▮ The right signal at hand: pattern generator up to 50 Mbit/s and function generator up to 50 kHz
- ▮ Voltmeter measurements using an oscilloscope
- ▮ Wide selection of automatic measurement functions
- ▮ QuickView: key results at the push of a button
- ▮ FFT: the easy way to analyze the signal spectrum
- ▮ Complex mathematical operations using equation editor
- ▮ Media transfer protocol (MTP): allows the R&S®HMO1202 to connect to a PC like a mobile phone
- ▮ HOO10/HV110: analysis of I²C, SPI and RS-232/UART signals on analog and logic channels
- ▮ HOO11/HV111: analysis of I²C and RS-232/UART signals on all analog channels
- ▮ HOO12/HV112: analysis of CAN and LIN signals on analog and logic channels

Models/options

Designation	Type	Order No.
Digital Oscilloscope, 100 MHz bandwidth, 2 channels	R&S®HMO1212	3593.8617K02
Digital Oscilloscope, 200 MHz bandwidth, 2 channels	R&S®HMO1222	3593.8700K02
Digital Oscilloscope, 300 MHz bandwidth, 2 channels	R&S®HMO1232	3593.8723K02

Application	How the R&S®HMO1202 meets your needs
Engineering lab	<ul style="list-style-type: none"> ▮ Digital pattern generator with standard bus signals and arbitrary waveform editor ▮ Automeasurement function for 28 user-defined parameters ▮ Powerful zoom function ▮ Fanless design
Analog circuit design	<ul style="list-style-type: none"> ▮ Sensitivity down to 1 mV/div ▮ Simultaneous voltmeter measurements on both analog channels ▮ Component tester ▮ FFT with 128k points
Embedded debugging	<ul style="list-style-type: none"> ▮ Mixed signal option (MSO) with 8 logic channels ▮ Optional hardware-accelerated triggering and decoding of serial buses ▮ Pass/fail tests based on user-defined masks with error signal output ▮ 5-digit hardware counter
General purpose and education	<ul style="list-style-type: none"> ▮ Function generator for all common waveforms ▮ Education mode

R&S®HMO Compact Digital Oscilloscope



Digital mixed signal oscilloscope

- 2 Gsample/s realtime sampling rate, low-noise flash A/D converter
- 2 Mpoint memory, zoom up to 50 000:1
- MSO functionality included as standard (HO3508 logic probe required)
- Component tester for capacitors, inductors and semiconductors
- Vertical sensitivity down to 1 mV/div
- Trigger modes: slope (A/B), pulse width, video, logic, serial buses (optional)

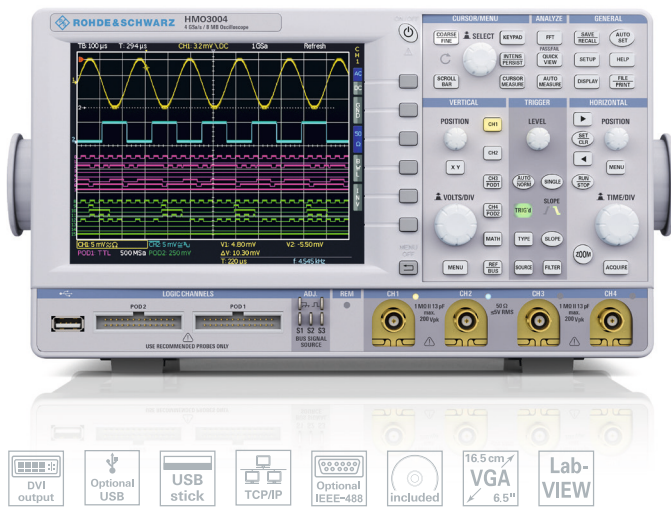
- Serial bus trigger and hardware-accelerated decode including list view options: I²C+SPI+RS-232/UART (R&S®HOO10/R&S®HOO11), CAN+LIN (R&S®HOO12)
- 28 automeasurement parameters plus statistics, formula editor, ratio cursor
- Six-digit hardware counter
- FFT up to 64k points (dBm, dBV, V (RMS))
- Pass/fail tests based on masks
- Automatic search for user-defined events
- Display: 12-div x-axis, 20-div y-axis (VirtualScreen)
- 2 × USB for mass storage, RS-232/USB dual interface for remote control

Models/options

Designation	Type	Order No.
70 MHz Four-Channel Mixed Signal Oscilloscope	R&S®HMO724	3593.1729K02
100 MHz Four-Channel Mixed Signal Oscilloscope	R&S®HMO1024	3593.1735K02
150 MHz Four-Channel Mixed Signal Oscilloscope	R&S®HMO1524	3593.1741K02
200 MHz Four-Channel Mixed Signal Oscilloscope	R&S®HMO2024	3593.1758K02
Analysis of I ² C, SPI and RS-232/UART Signals on analog and logic channels (two buses can be analyzed at the same time)	R&S®HOO10	3594.6282.02
Analysis of I ² C, SPI and RS-232/UART Signals on all analog channels (only one bus available for analysis)	R&S®HOO11	5800.0080.02
Analysis of CAN and LIN Signals on analog and logic channels for two buses	R&S®HOO12	5800.0622.02
Dual Ethernet/USB Interface	HO732	5800.3209.02
IEEE-488 (GPIB) Interface, galvanically isolated	HO740	3622.3194.02

Application	How the R&S®HMO Compact meets your needs
Engineering lab	<ul style="list-style-type: none"> Advanced math functions as standard, math on math possible Automeasurement for 28 user-defined parameters Memory zoom function up to 50 000:1
Analog circuit design	<ul style="list-style-type: none"> Low-noise amplifier and A/D converter 1 mV/div sensitivity 50 Ω/1 MΩ input impedance, switchable (R&S®HMO152x, R&S®HMO202x) Component tester
Embedded debugging	<ul style="list-style-type: none"> Mixed signal option (MSO) with 8 logic channels Optional serial bus trigger and hardware-accelerated decode 6-digit hardware counter FFT with 64k points
Production environment	<ul style="list-style-type: none"> Remote control for automated data acquisition Pass/fail tests based on user-defined masks with error signal output Automatic signal measurement at the push of a button RS-232/USB, Ethernet or GPIB (IEEE-488) interfaces
General purpose and education	<ul style="list-style-type: none"> Fast boot time; compact and lightweight design Low-noise, intelligent temperature management Extended display size through VirtualScreen technology

R&S®HMO3000 Digital Oscilloscope



Digital mixed signal oscilloscope

- 4 Gsample/s realtime sampling rate, low-noise flash A/D converter
- 8 Mpoint memory, zoom up to 200 000:1
- Automatically or manually adjustable memory depth
- Segmented memory option (R&S®HOO14)
- MSO functionality included as standard (HO3508/HO3516 logic probe required)
- Vertical sensitivity down to 1 mV/div
- Trigger modes: slope (A/B), pulse width, video, logic, serial buses (optional), hold-off

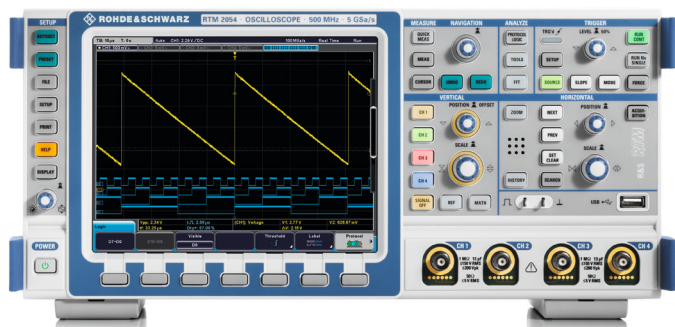
- Serial bus trigger and hardware-accelerated decode including list view options: I²C+SPI+RS-232/UART (R&S®HOO10/R&S®HOO11), CAN+LIN (R&S®HOO12)
- 28 automeasurement parameters plus statistics, formula editor, ratio cursor
- Six-digit hardware counter
- FFT up to 64k points (dBm, dBV, V (RMS))
- Pass/fail tests based on masks
- Automatic search for user-defined events
- Display: 12-div x-axis, 20-div y-axis (VirtualScreen)
- 2 × USB for mass storage, Ethernet/USB dual interface for remote control

Models/options

Designation	Type	Order No.
300 MHz Two/Four-Channel Mixed Signal Oscilloscope	R&S®HMO3032/ R&S®HMO3034	3593.1629K02/ 3593.1658K02
400 MHz Two/Four-Channel Mixed Signal Oscilloscope	R&S®HMO3042/ R&S®HMO3044	3593.1635K02/ 3593.1670K02
500 MHz Two/Four-Channel Mixed Signal Oscilloscope	R&S®HMO3052/ R&S®HMO3054	3593.1641K02/ 3593.1664K02
Analysis of I ² C, SPI and RS-232/UART Signals on analog and logic channels (two buses can be analyzed at the same time)	R&S®HOO10	3594.6282.02
Analysis of I ² C, SPI and RS-232/UART Signals on all analog channels (only one bus available for analysis)	R&S®HOO11	5800.0080.02
Analysis of CAN and LIN Signals on analog and logic channels for two buses	R&S®HOO12	5800.0622.02
Segmented Memory Option	R&S®HOO14	5800.2402.02
Bandwidth Upgrade from 300 MHz to 500 MHz for two/four-channel models	R&S®HOO352/ R&S®HOO354	5800.1893.02/ 5800.1906.02
Bandwidth Upgrade from 400 MHz to 500 MHz for two/four-channel models	R&S®HOO452/ R&S®HOO454	5800.1912.02/ 5800.1929.02

Application	How the R&S®HMO3000 meets your needs
Engineering lab	<ul style="list-style-type: none"> Adjustable memory depth Advanced math functions as standard, math on math possible Automeasurement for 28 user-defined parameters Segmented memory option
Analog circuit design	<ul style="list-style-type: none"> Low-noise amplifier and A/D converter 1 mV/div sensitivity 50 Ω/1 MΩ input impedance, switchable Bandwidth upgrades via software options
Embedded debugging	<ul style="list-style-type: none"> Mixed signal option (MSO) with 16 logic channels Optional serial bus trigger and hardware-accelerated decode 6-digit hardware counter FFT with 64k points
Production environment	<ul style="list-style-type: none"> Remote control for automated data acquisition Pass/fail tests based on user-defined masks with error signal output Automatic signal measurement at the push of a button RS-232/USB, Ethernet or GPIB (IEEE-488) interfaces
General purpose and education	<ul style="list-style-type: none"> Fast boot time Low-noise, intelligent temperature management Extended display size through VirtualScreen technology DVI-D output for external display

R&S®RTM Digital Oscilloscope



Scope of the art: compact, precise, versatile

Ease of use, combined with fast and reliable results, is precisely what users get with the R&S®RTM bench oscilloscope. While other oscilloscopes are still booting up, the R&S®RTM is already displaying signals that would otherwise be lost in the noise and evaluating results. All on one screen with two displays, with lightning fast functions.

Key facts

- ▮ Bandwidths from 200 MHz to 1 GHz, up to 5 Gsample/s sampling rate, up to 20 Msample memory depth
- ▮ Two-channel and four-channel models
- ▮ Excellent measurement accuracy due to low-noise frontends
- ▮ Input sensitivity of 1 mV/div at full bandwidth
- ▮ Fast boot time of 15 s
- ▮ High-resolution XGA display
- ▮ QuickMeas: key results at the push of a button
- ▮ Extensive cursor-based measurement functions
- ▮ Two displays instead of one: VirtualScreen
- ▮ Multilingual: choice of nine languages
- ▮ Triggering and decoding of serial protocols: I²C, SPI, RS-232/UART, I²S, CAN/LIN, MIL-STD-1553 and ARINC 429
- ▮ History written to 460 Msample segmented memory
- ▮ Automated power measurement option
- ▮ 16 digital channels with the R&S®RTM-B1 MSO option
- ▮ High-performance probes with extensive accessories

3

Application	How the R&S®RTM meets your needs
General debugging and analysis	<ul style="list-style-type: none"> ▮ QuickMeas: key results at the push of a button ▮ Logic analysis: 20 Msample with 5 Gsample/s for detailed analysis of digital signals ▮ Extensive cursor-based measurements ▮ Versatile selection of signal acquisition modes ▮ "Smooth" mode for smoothing nonperiodic signals ▮ Extensive triggering options for keeping track of important signal events ▮ Intuitive user interface for highest efficiency ▮ Two displays instead of one: VirtualScreen ▮ Active probes with innovative features, e.g. micro button and R&S®ProbeMeter ▮ Low weight; compact lab instrument
Signal validation	<ul style="list-style-type: none"> ▮ Lowest noise floor in its class: excellent measurement accuracy ▮ Full bandwidth even at an amplitude range of 1 mV/div enables true representation of weak signals ▮ No crosstalk due to good channel-to-channel isolation ▮ Active probes with premium specifications
Production testing	<ul style="list-style-type: none"> ▮ Comprehensive set of automated measurement functions ▮ Remote interface covering complete function set of instrument ▮ Installation in standard 19" racks possible
Service, maintenance and education	<ul style="list-style-type: none"> ▮ Ideal for general-purpose measurements ▮ Simple operation; lightweight and portable ▮ Short boot time
Embedded design	<ul style="list-style-type: none"> ▮ Advanced trigger and decode (I²C, SPI, RS-232/UART, I²S, CAN/LIN, MIL-STD-1553 and ARINC 429) options ▮ Logic analysis: 20 Msample with 5 Gsample/s for detailed analysis of digital signals

Models/options		
Designation	Type	Order No.
Digital Oscilloscope, 200 MHz, 2 channels	R&S®RTM2022	5710.0999.22
Digital Oscilloscope, 200 MHz, 4 channels	R&S®RTM2024	5710.0999.24
Digital Oscilloscope, 350 MHz, 2 channels	R&S®RTM2032	5710.0999.32
Digital Oscilloscope, 350 MHz, 4 channels	R&S®RTM2034	5710.0999.34
Digital Oscilloscope, 500 MHz, 2 channels	R&S®RTM2052	5710.0999.52
Digital Oscilloscope, 500 MHz, 4 channels	R&S®RTM2054	5710.0999.54
Digital Oscilloscope, 1 GHz, 2 channels	R&S®RTM2102	5710.0999.02
Digital Oscilloscope, 1 GHz, 4 channels	R&S®RTM2104	5710.0999.04
Hardware options		
Mixed Signal Option, 400 MHz	R&S®RTM-B1	5710.0901.02
GPIB Interface	R&S®RTM-B10	1305.0014.02
Bandwidth Upgrade from 350 MHz to 500 MHz	R&S®RTM-B200	5710.0918.02
Bandwidth Upgrade from 200 MHz to 350 MHz	R&S®RTM-B201	1326.0665.02
Bandwidth Upgrade from 200 MHz to 500 MHz	R&S®RTM-B202	1326.0671.02
Bandwidth Upgrade from 200 MHz to 1 GHz	R&S®RTM-B203	1326.0688.02
Bandwidth Upgrade from 350 MHz to 1 GHz	R&S®RTM-B204	1326.0694.02
Bandwidth Upgrade from 500 MHz to 1 GHz	R&S®RTM-B205	1326.0707.02
Software options		
I ² C/SPI Serial Triggering and Decoding	R&S®RTM-K1	5710.1443.02
RS-232/UART Serial Triggering and Decoding	R&S®RTM-K2	5710.1450.02
CAN/LIN Serial Triggering and Decoding	R&S®RTM-K3	710.1466.02
I ² S/LJ/RJ/TDM Serial Triggering and Decoding	R&S®RTM-K5	5710.0882.02
MIL-STD-1553 Serial Triggering and Decoding	R&S®RTM-K6	1317.6835.02
ARINC429 Serial Triggering and Decoding	R&S®RTM-K7	1317.6841.02
History and Segmented Memory	R&S®RTM-K15	5710.0899.02
Power Analysis	R&S®RTM-K31	1317.5745.02
Digital Voltmeter (DVM)	R&S®RTM-K32	1326.0907.02

R&S® RTE Digital Oscilloscope



Key facts

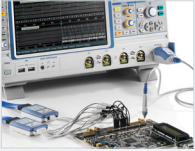
- ▮ Bandwidths from 200 MHz to 2 GHz, 5 Gsample/s sampling rate, up to 40 Msample standard memory
- ▮ Two-channel and four-channel models
- ▮ Full bandwidth even at 500 $\mu\text{V}/\text{div}$
- ▮ Single-core ADC delivers ENOB of > 7 bit
- ▮ Up to 1 million waveforms/s even when performing measurements and analysis
- ▮ High definition mode with up to 16-bit vertical resolution
- ▮ Industry best trigger jitter: < 1 ps (RMS)
- ▮ QuickMeas: key measurement results at the push of a button
- ▮ Fingertip zoom: signal details at your fingertip
- ▮ Triggering and decoding of serial protocols such as I²C, SPI and CAN
- ▮ Automated power measurement option
- ▮ Mixed signal analysis with R&S® RTE-B1 mixed signal option

3

Scope of the art: Truly uncompromised in performance and impressively user-friendly

More reliable measurements, more tools and fast results, more fun to use – that's the R&S® RTE oscilloscope. From embedded design development to power electronics analysis to general debugging, the R&S® RTE offers quick solutions for everyday T&M tasks.

Application	How the R&S® RTE meets your needs
Embedded design and debugging	<ul style="list-style-type: none"> ▮ High acquisition rate to identify rare signal faults quickly ▮ Innovative trigger system for high accuracy and trigger flexibility ▮ High definition mode with up to 16-bit vertical resolution ▮ Hardware-accelerated measurement and analysis functions (e.g. histogram, mask testing) ▮ QuickMeas: key measurement results at the push of a button ▮ History function: looking back in time ▮ Mask test: settings in only seconds ▮ Powerful and user-friendly FFT-based spectrum analysis: ideal for time-frequency correlated measurements and EMI debugging ▮ Triggering and decoding of serial protocols such as I²C, SPI and CAN ▮ Mixed signal analysis option ▮ Power measurements for SMPS and DC/DC converters with power analysis software ▮ Intuitive user interface for maximum efficiency ▮ Active probes with innovative features such as micro button and R&S® ProbeMeter ▮ Low weight; lowest acoustic noise; compact lab instrument
Signal validation	<ul style="list-style-type: none"> ▮ High signal fidelity provides additional measurement margin ▮ Digital trigger for lowest trigger jitter in realtime ▮ Full bandwidth even at an amplitude range of 1 mV/div enables true representation of weak signals ▮ High definition mode with up to 16-bit vertical resolution ▮ No crosstalk due to good channel-to-channel isolation ▮ Active probes with premium specifications
Production test	<ul style="list-style-type: none"> ▮ Comprehensive set of automated measurement functions ▮ Remote interface covering complete function set of instrument ▮ Mask test: settings in only seconds ▮ Installation in standard 19" racks possible
Service, maintenance and education	<ul style="list-style-type: none"> ▮ Ideal for general-purpose debugging ▮ Straightforward, smart user guidance ▮ Fast access to important tools ▮ Lightweight and portable

Models/options		
Designation	Type	Order No.
Digital Oscilloscope, 200 MHz, 5 Gsample/s, 10/20 Msample, 2 channels	R&S®RTE1022	1326.2000.22
Digital Oscilloscope, 200 MHz, 5 Gsample/s, 10/40 Msample, 4 channels	R&S®RTE1024	1326.2000.24
Digital Oscilloscope, 350 MHz, 5 Gsample/s, 10/20 Msample, 2 channels	R&S®RTE1032	1326.2000.32
Digital Oscilloscope, 350 MHz, 5 Gsample/s, 10/40 Msample, 4 channels	R&S®RTE1034	1326.2000.34
Digital Oscilloscope, 500 MHz, 5 Gsample/s, 10/20 Msample, 2 channels	R&S®RTE1052	1326.2000.52
Digital Oscilloscope, 500 MHz, 5 Gsample/s, 10/40 Msample, 4 channels	R&S®RTE1054	1326.2000.54
Digital Oscilloscope, 1 GHz, 5 Gsample/s, 10/20 Msample, 2 channels	R&S®RTE1102	1326.2000.62
Digital Oscilloscope, 1 GHz, 5 Gsample/s, 10/40 Msample, 4 channels	R&S®RTE1104	1326.2000.64
Hardware options		
Mixed Signal, 400 MHz, 5 Gsample/s, 16 channels, 100 Msample per channel	R&S®RTE-B1	1317.4961.02
		
GPIB Interface	R&S®RTE-B10	1317.4978.02
Replacement SSD Hard Disk, incl. firmware	R&S®RTE-B18	1317.7002.02
Replacement Hard Disk, incl. firmware	R&S®RTE-B19	1317.7019.02
Memory Upgrade, 20 Msample per channel	R&S®RTE-B101	1326.1155.02
Memory Upgrade, 50 Msample per channel	R&S®RTE-B102	1326.1161.02
Bandwidth upgrades ¹⁾		
Upgrade of the R&S®RTE1022/4 oscilloscope to 350 MHz bandwidth	R&S®RTE-B200	1326.1384.02
Upgrade of the R&S®RTE1022/4 oscilloscope to 500 MHz bandwidth	R&S®RTE-B201	1326.1390.02
Upgrade of the R&S®RTE1022/4 oscilloscope to 1 GHz bandwidth	R&S®RTE-B202	1326.1403.02
Upgrade of the R&S®RTE1022/4 oscilloscope to 1.5 GHz bandwidth	R&S®RTE-B203	1326.1410.02
Upgrade of the R&S®RTE1022/4 oscilloscope to 2 GHz bandwidth	R&S®RTE-B204	1326.1426.02
Upgrade of the R&S®RTE1032/4 oscilloscope to 500 MHz bandwidth	R&S®RTE-B205	1326.1432.02
Upgrade of the R&S®RTE1032/4 oscilloscope to 1 GHz bandwidth	R&S®RTE-B206	1326.1449.02
Upgrade of the R&S®RTE1032/4 oscilloscope to 1.5 GHz bandwidth	R&S®RTE-B207	1326.1455.02
Upgrade of the R&S®RTE1032/4 oscilloscope to 2 GHz bandwidth	R&S®RTE-B208	1326.1461.02
Upgrade of the R&S®RTE1052/4 oscilloscope to 1 GHz bandwidth	R&S®RTE-B209	1326.1478.02
Upgrade of the R&S®RTE1052/4 oscilloscope to 1.5 GHz bandwidth	R&S®RTE-B210	1326.1484.02
Upgrade of the R&S®RTE1052/4 oscilloscope to 2 GHz bandwidth	R&S®RTE-B211	1326.1490.02
Upgrade of the R&S®RTE1102/4 oscilloscope to 1.5 GHz bandwidth	R&S®RTE-B212	1326.1503.02
Upgrade of the R&S®RTE1102/4 oscilloscope to 2 GHz bandwidth	R&S®RTE-B213	1326.1510.02
Software options		
I ² C/SPI Serial Triggering and Decoding	R&S®RTE-K1	1326.1178.02
UART/RS-232/RS-422/RS-485 Serial Triggering and Decoding	R&S®RTE-K2	1326.1184.02
CAN/LIN Serial Triggering and Decoding	R&S®RTE-K3	1326.1190.02
FlexRay™ Serial Triggering and Decoding	R&S®RTE-K4	1326.1203.02
I ² S/LJ/RJ/TDM Serial Triggering and Decoding	R&S®RTE-K5	1326.1210.02
MIL-STD-1553 Serial Triggering and Decoding	R&S®RTE-K6	1326.1226.02
ARINC429 Serial Triggering and Decoding	R&S®RTE-K7	1326.1232.02
10/100BASE-T Ethernet Serial Decoding	R&S®RTE-K8	1326.1332.02
CAN-FD Serial Triggering and Decoding	R&S®RTE-K9	1326.1249.02
SENT Serial Triggering and Decoding	R&S®RTE-K10	1326.1603.02
Manchester and NRZ Serial Triggering and Decoding	R&S®RTE-K50	1326.1326.02
MDIO Serial Triggering and Decoding	R&S®RTE-K55	1326.1255.02
USB 1.0/1.1/2.0/HSIC Serial Triggering and Decoding	R&S®RTE-K60	1326.1626.02
High Definition Mode, vertical resolution up to 16 bit	R&S®RTE-K17	1326.1261.02
Power Analysis	R&S®RTE-K31	1326.1278.02

Models/options

Accessories		
Front Cover, for R&S®RTO/RTE digital oscilloscopes	R&S®RTO-Z1	1317.6970.02
Soft Case, for R&S®RTO/RTE digital oscilloscopes and accessories	R&S®RTO-Z3	1304.9118.02
Transit Case, with trolley function, for R&S®RTO/RTE digital oscilloscopes and accessories	R&S®RTO-Z4	1317.7025.02
Probe Pouch, for R&S®RTO/RTE digital oscilloscopes	R&S®RTO-Z5	1317.7031.02
Probe Deskew and Calibration Test Fixture	R&S®RT-ZF20	1800.0004.02
Probe Set for E and H Near-Field Measurements, 9 kHz to 1 GHz	R&S®HZ-14	1026.7744.03
Compact Probe Set for E and H Near-Field Measurements, 30 MHz to 3 GHz	R&S®HZ-15	1147.2736.02
Preamplifier 3 GHz, 20 dB, Power Adapter 100 V to 230 V, for R&S®HZ-15	R&S®HZ-16	1147.2720.02
19" Rackmount Kit, for R&S®RTO/RTE digital oscilloscopes with 6 HU	R&S®ZZA-RTO	1304.8286.00

¹⁾ The bandwidth upgrade is performed at a Rohde&Schwarz service center, where the oscilloscope will also be calibrated.

Oscilloscope probes

		R&S®RTH					R&S®HMO					
Scope series		1002/4	1012/4	1022/4	1032/4	1052/4	1002	1002	1002	1212	1222	1232
Model		60	100	200	350	500	50	70	100	100	200	300
Bandwidth in MHz		60	100	200	350	500	50	70	100	100	200	300
Passive probes												
HZ154	10 MHz/100 MHz						■	■	■	○	○	○
HZO10	250 MHz						○	○	○	○	○	○
HZ355	500 MHz						○	○	○	○	○	○
R&S®RT-ZP03	10 MHz/300 MHz						○	○	○	■	■	■
R&S®RTM-ZP10	500 MHz						○	○	○	○	○	○
R&S®RT-ZP10	500 MHz						○	○	○	○	○	○
Isolated passive probe												
R&S®RT-ZI10	10:1	●	●	●	●	●						
R&S®RT-ZI11	100:1	●	●	●	●	●						
Passive broadband probe												
R&S®RT-ZZ80	8 GHz											
Active probes: single-ended												
HZO30	1 GHz						●	●	●	●	●	●
R&S®RT-ZS10E	1 GHz											
R&S®RT-ZS10	1 GHz											
R&S®RT-ZS20	1.5 GHz											
R&S®RT-ZS30	3 GHz											
R&S®RT-ZS60	6 GHz											
Active probes: differential												
HZ109	30 MHz/40 MHz						●	●	○	○	○	○
HZO40	200 MHz						○	○	●	●	○	○
HZO41	800 MHz						○	○	○	○	●	●
R&S®RT-ZD10	1 GHz											
R&S®RT-ZD20	1.5 GHz											
R&S®RT-ZD30	3 GHz											
R&S®RT-ZD40	4.5 GHz											
High-voltage probes: single-ended												
HZO20	1000:1						●	●	●	●	●	●
R&S®RT-ZH10	100:1						○	○	○	○	○	○
R&S®RT-ZH11	1000:1						○	○	○	○	○	○
High-voltage probes: differential												
HZ100	700 V (V_{diff})						●	●	●	●	●	●
HZ115	1000 V (V_{diff})						●	●	●	●	●	●
R&S®RT-ZD01	1000 V						○	○	○	○	○	○
Current probes												
HZO50	±20 A (RMS)	●	●	●	●	●	●	●	●	●	●	●
HZO51	±100/1000 A (RMS)	●	●	●	●	●	●	●	●	●	●	●
R&S®RT-ZC10 ¹⁾	±150 A (RMS)	○	○	○	○	○	○	○	○	○	○	○
R&S®RT-ZC20 ¹⁾	±30 A (RMS)	○	○	○	○	○	○	○	○	○	○	○
R&S®RT-ZC20B ²⁾	±30 A (RMS)						○	○	○	○	○	○
EMC near-field probes												
R&S®HZ-15	30 MHz to 3 GHz	○	○	○	○	○						
Temperature probe												
R&S®HZ812		● ³⁾	● ³⁾	● ³⁾	● ³⁾	● ³⁾						

■ Standard delivery. One probe per oscilloscope channel.

● Recommended. Available as an option.

○ Compatible. System bandwidth may be limited on probe or base unit. Manual configuration on oscilloscope may be necessary for compensation.

								R&S®RTM				R&S®RTE			
724	1024	1524	2024	3032/4	3042/4	3052/4	2022/4	2032/4	2052/4	2102/4	1022/4	1032/4	1052/4	1102/4	
70	100	150	200	300	400	500	200	350	500	1000	200	350	500	1000	
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							○	○	○	○	●	●	●	●	

1) R&S®RT-ZA13 power supply required.
 2) With Rohde&Schwarz probe interface for receiving power from the oscilloscope.
 3) Only with 2-channel model.

Broad range of probes





▶ Rohde & Schwarz offers a broad range of oscilloscope probes for different applications. For more information, see the product brochure: [Digital oscilloscopes from Rohde & Schwarz, Probes and accessories \(PD 3606.8866.12\)](#).

Probe accessories

Designation	Type	Order No.
Accessory Set for R&S®RT-ZP10/R&S®RTM-ZP10	R&S®RT-ZA1	1409.7566.00
Spare Accessory Set for R&S®RT-ZS10/10E/20/30	R&S®RT-ZA2	1416.0405.02
Pin Set for R&S®RT-ZS10/10E/20/30	R&S®RT-ZA3	1416.0411.02
Mini Clips	R&S®RT-ZA4	1416.0428.02
Micro Clips	R&S®RT-ZA5	1416.0434.02
Lead Set	R&S®RT-ZA6	1416.0440.02
Pin Set for R&S®RT-ZD20/30	R&S®RT-ZA7	1417.0609.02
N(m) Adapter for R&S®RT-Zxx oscilloscope probes	R&S®RT-ZA9	1417.0909.02
SMA Adapter	R&S®RT-ZA10	1416.0457.02
Probe Power Supply	R&S®RT-ZA13	1409.7789.02
External Attenuator 10:1, 2.0 GHz, 1 MΩ 1.3 pF, 70 V DC, 46 V AC (peak) for R&S®RT-ZD20/30	R&S®RT-ZA15	1410.4744.02
Accessory Replacement Set for R&S®RT-ZI10 and R&S®RT-ZI11	R&S®RT-ZA20	1326.1978.02
Extended Accessory Set for R&S®RT-ZI10 and R&S®RT-ZI11	R&S®RT-ZA21	1326.1984.02
Safety Test Leads, red and black, silicone, 600 V CAT IV	R&S®RT-ZA22	1326.0988.02
Power Deskew Fixture	R&S®RT-ZF20	1800.0004.02
3 GHz, 20 dB Preamp, 100 V to 230 V Power Adapter, for R&S®HZ-15	R&S®HZ-16	1147.2720.02

RF power meters

Type/designation	Frequency range	Power range	Accuracy
R&S®NRP2 power meter 	DC to 110 GHz (depending on sensor)	-67 dBm to +45 dBm (depending on sensor)	Depending on sensor
Two-path diode power sensors 			
R&S®NRP-Z211	10 MHz to 8 GHz	1 nW to 100 mW (-60 dBm to +20 dBm)	0.054 dB to 0.110 dB
R&S®NRP-Z221	10 MHz to 18 GHz	1 nW to 100 mW (-60 dBm to +20 dBm)	0.054 dB to 0.143 dB

R&S®NRP Power Meter Family

The most important features for accurate and uncomplicated power measurements are top measurement accuracy and speed as well as simple operation on a base unit or a laptop/PC. The R&S®NRP power meter family combines all these characteristics in the R&S®NRP2 base unit, R&S®NRPV virtual power meter PC software and a comprehensive portfolio of USB-capable power sensors. The R&S®NRP family is ideal for use in production, R&D and calibration labs as well as for installation and maintenance tasks.

All R&S®NRP-Zxx power sensors are independent measuring instruments. Using an USB adapter, they can be directly connected to a laptop/PC and operated via the R&S®NRPV software.

Key facts

- Cost-effective and compact: sensor operation on a laptop/PC via USB
- Comprehensive portfolio for power measurements from DC to 110 GHz, from -67 dBm to +45 dBm
- 90 dB dynamic range with three-path diode power sensors
- Precise analysis of the envelope power with wideband power sensors
- Top accuracy with thermal power sensors
- Up to four R&S®NRP-Zxx power sensors can be simultaneously connected to the R&S®NRP2 base unit

R&S®NRP2 Power Meter



Versatile and user-friendly

The R&S®NRP2 base unit was designed to be as versatile and easy to operate as possible.

Key facts

- The right sensors for all applications
- Versatile measurement functions
- Simply plug in and measure
- Minimize measurement uncertainty
- Enhanced auto averaging filter
- Easy system integration
- Multiple ways to operate R&S®NRP-Zxx power sensors

Models/options

Designation	Type	Order No.
Power Meter	R&S®NRP2	1144.1374.02
Second Sensor Input (B)	R&S®NRP-B2	1146.8801.02
3rd and 4th Sensor Inputs (C, D)	R&S®NRP-B5	1146.9608.02
Rear Panel Sensor Inputs A and B	R&S®NRP-B6	1146.9908.02
Sensor Check Source	R&S®NRP-B7	1144.1000.02

Applications

- Power measurements on base stations and mobile equipment
- Design and production of components (e.g. power amplifiers)
- Antenna measurements
- Calibration of test and measurement equipment

How the R&S®NRP power meter family meets your needs

- Rohde & Schwarz is the world's most experienced supplier of USB power sensors – this means reliable, mature products that also meet future needs, and less investment risk
- USB sensors without compromises – the R&S®NRP-Zxx power sensors are USB sensors that can be used standalone and have no downside in terms of versatility, accuracy and functionality
- Higher accuracy thanks to R&S®Smart Sensor Technology (compared to classic designs for sensor and base unit)
- Wide variety of sensors – the right sensor for every application
- Fast and accurate measurements – high throughput paired with measurement results that can be trusted

R&S®NRP-Z211/-Z221 Two-Path Diode Power Sensor



Cost-effective solution for production applications

The R&S®NRP-Z211/-Z221 two-path diode power sensors combine all key characteristics relevant for their use in production. They are cost-effective, fast, precise and USB-capable, offering the best price/performance ratio in their class.

Key facts

- Innovative two-path diode power sensor with enhanced interrange performance
- 80 dB dynamic range for CW and modulated signals
- Continuous average, burst average, timeslot average, time gating and trace mode supported (20 kHz video bandwidth)
- Automatic burst detection and acquisition
- Up to 1500 measurements/s (buffered mode)
- Low sensitivity to harmonics

Models/options

Designation	Type	Order No.
1 nW to 100 mW, 10 MHz to 8 GHz	R&S®NRP-Z211	1417.0409.02
1 nW to 100 mW, 10 MHz to 18 GHz	R&S®NRP-Z221	1417.0309.02
USB Adapter Cable (active)	R&S®NRP-Z3	1146.7005.02
USB Adapter Cable (passive)	R&S®NRP-Z4	1146.8001.02
Sensor Hub	R&S®NRP-Z5	1146.7740.02

For higher frequencies or other power measurement ranges, please contact your local Rohde&Schwarz partner.



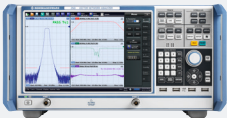
Applications

- Power measurements on base stations and mobile equipment
- Calibration of test and measurement equipment

How the R&S®NRP-Z211/-Z221 meet your needs

- USB sensors without compromises – the R&S®NRP-Zxx power sensors are USB sensors that can be used standalone and have no downside in terms of versatility, accuracy and functionality
- Higher accuracy thanks to R&S®Smart Sensor Technology (compared to classic designs for sensor and base unit)
- Fast and accurate measurements – high throughput paired with measurement results that can be trusted

Network analyzers

Type/designation	Frequency range	Dynamic range	SPA functionality	Portability
R&S®ZVH cable and antenna analyzer 	100 kHz to 3.6 GHz/8 GHz (depending on model)	<ul style="list-style-type: none"> ▮ 100 kHz ≤ f < 300 kHz > 50 dB (nom.) ▮ 300 kHz ≤ f < 2.5 GHz > 80 dB, 100 dB (typ.) ▮ 2.5 GHz ≤ f < 6 GHz > 70 dB, 90 dB (typ.) ▮ 6 GHz ≤ f < 8 GHz > 50 dB (nom.) ▮ Transmission measurement S₂₁, S₁₂ (with R&S®ZVH-K39 option) ▮ RF attenuation: 5 dB, tracking generator level: -10 dBm, RBW: 1 kHz 	channel power, occupied bandwidth, TDMA power, ACLR, spectrum emission mask, 3GPP BTS spurious emission, harmonic distortion, AM modulation depth, spectrogram	<ul style="list-style-type: none"> ▮ Handheld ▮ Ruggedized ▮ Low weight: 3 kg (6.6 lb) with battery ▮ Up to 4.5 h battery-powered operation ▮ Ideal for field applications
R&S®ZVL vector network analyzer 	9 kHz to 3 GHz/6 GHz (depending on model)	<ul style="list-style-type: none"> ▮ > 115 dB, 123 dB (typ.)¹⁾ ▮ Receiver step attenuators 0 dB to 30 dB (5 dB steps) 	<ul style="list-style-type: none"> ▮ AM/FM/φM demodulation ▮ Noise measurements ▮ Spectrogram ▮ Cable TV ▮ 3GPP, WLAN, WiMAX™ 	<ul style="list-style-type: none"> ▮ Portable ▮ Battery pack ▮ 12 V to 28 V power supply ▮ Low weight: < 7 kg (15.4 lb) ▮ Small and compact: 37 cm (14.6 in) depth ▮ Optional internal battery or 12 V car supply system ▮ Shock-resistant housing and ergonomic carrying handle
R&S®ZND vector network analyzer 	100 kHz to 4.5 GHz/8.5 GHz (depending on model)	> 120 dB, 130 dB (typ.)	–	–
Other instruments with network analysis capability R&S®FSH handheld spectrum analyzer, models .24/.28, with R&S®FSH-K42 option ▶ page 9				

¹⁾ In selected frequency subrange, depending on model.

R&S®ZVH Cable and Antenna Analyzer



The benchmark for efficiency in the field

The R&S®ZVH cable and antenna analyzer is rugged, handy and designed for use in the field. Its low weight and simple operation make it indispensable for anyone who needs an efficient measuring instrument outdoors to install and maintain antenna systems.

Key facts

- ▮ Perfect tool for cable and antenna installation
- ▮ Frequency range: 100 kHz to 3.6 GHz or 8 GHz
- ▮ Easy operation with user-configurable test sequences (wizard), one-click customizable report
- ▮ 100 dB (typ.) dynamic range for filter and antenna isolation measurements
- ▮ Built-in DC voltage supply (bias) for active components such as amplifiers
- ▮ Distance-to-fault, reflection and cable loss measurements
- ▮ Vector network analyzer, vector voltmeter, transmission measurement, spectrum analyzer, spectrogram and power meter option
- ▮ Internal channel power meter
- ▮ Saving of measurement results to SD card or USB flash drive
- ▮ Remote control via LAN or USB
- ▮ Easy-to-replace lithium-ion battery for up to 4.5 h of operation
- ▮ Rugged, splashproof housing for rough work in the field
- ▮ Easy handling due to low weight (3 kg (6.6 lb) with battery) and easy-to-reach function keys

5

Models		
Designation	Type	Order No.
Cable and Antenna Analyzer, 100 kHz to 3.6 GHz	R&S®ZVH4	1309.6800.24
Cable and Antenna Analyzer, 100 kHz to 8 GHz	R&S®ZVH8	1309.6800.28

Application	How the R&S®ZVH meets your needs
Installation of transmit systems (for mobile radio, broadcasting or radiocommunications)	<ul style="list-style-type: none"> ▮ Cable and antenna testing ▮ Wizard and reporting tool for optimized workflow ▮ Return loss and distance-to-fault measurements ▮ Two-port transmission test capability (S_{21}) for testing cables, filters and amplifiers ▮ Built-in DC voltage supply for measuring active components such as tower mounted amplifiers (TMA) ▮ Position finding using GPS receiver
Maintenance of transmit systems	<ul style="list-style-type: none"> ▮ Cable and antenna testing ▮ Full two-port network analysis ▮ Power measurements with R&S®NRP-Zxx power sensors ▮ Support of directional power sensors to measure transmitter output power and antenna matching simultaneously ▮ RF spectrum measurements (channel power, OBW, harmonics, AM modulation depth, ACLR, etc.) ▮ Spectrogram function for interference analysis ▮ Position finding using GPS receiver ▮ R&S®ZVHView software for easy documentation
Field use	<ul style="list-style-type: none"> ▮ Rugged housing, compact size and low weight ▮ Fast and easy to use ▮ SD card or USB flash drive for storing thousands of measurement results ▮ Portrait form factor for excellent handling in the field ▮ Battery-operated with long battery operating time and easy-to-replace battery

R&S®ZVL Vector Network Analyzer



Key facts

- ▀ Network analyzer and spectrum analyzer in a single box
- ▀ Digital communications standards
- ▀ Bidirectional test set for displaying all four S-parameters
- ▀ R&S®ZVL3-75: 75 Ω vector network analyzer for TV and CATV measurements
- ▀ Multitrace display for displaying all relevant parameters
- ▀ Distance-to-fault measurement for detecting cable faults
- ▀ Time domain analysis
- ▀ Operation with mouse and keyboard or hardkeys/softkeys; convenient user interface with wizards and context menus
- ▀ Undo/redo key for reversing up to six preceding operating steps
- ▀ USB connector for R&S®NRP-Zxx power sensors for precise power measurements
- ▀ Connector for external monitor

The cost-efficient compact class in network analysis

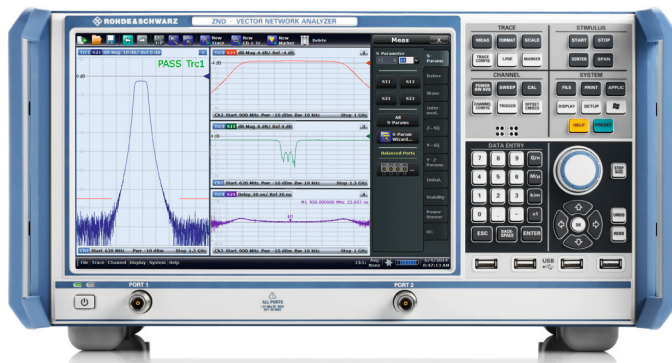
The R&S®ZVL is a compact, powerful network analyzer that also meets future needs and is therefore ideal for use in development, production and service.

Models/options

Designation	Type	Order No.
Vector Network Analyzer		
3 GHz, 2 ports, 50 Ω	R&S®ZVL3	1303.6509.03
6 GHz, 2 ports, 50 Ω	R&S®ZVL6	1303.6509.06
3 GHz, 2 ports, 75 Ω	R&S®ZVL3-75	1303.6509.75
For higher frequencies, please contact your local Rohde & Schwarz partner.		
OcXO Reference Frequency	R&S®FSL-B4	1300.6008.02
Additional Interfaces	R&S®FSL-B5	1300.6108.02
GPIB Interface	R&S®FSL-B10	1300.6208.02
Spectrum Analysis	R&S®ZVL-K1	1306.0301.02
Power Sensor Support	R&S®FSL-K9	1301.9530.02

Application	How the R&S®ZVL meets your needs
Measurements on filters, cables and amplifiers	<ul style="list-style-type: none"> ▀ Full two-port bidirectional test set to display all four S-parameters of a two-port DUT for complete device characterization ▀ Power range from -60 dBm to +10 dBm (typ.) ▀ Dynamic range: 123 dB (typ.) ▀ Noise figure measurement option (requires R&S®ZVL-K1) ▀ Time domain and distance-to-fault option ▀ Spectrum analysis function to measure output spectrum, TOI and ACP
EMC, wireless communications and satellite applications	With its frequency range from 9 kHz to 6 GHz (5 kHz to 6 GHz (typ.)), the R&S®ZVL covers the frequency range for EMC, wireless communications and satellite applications
Power measurement	The R&S®FSL-K9 option expands the R&S®ZVL to a high-precision RF power meter when used with R&S®NRP-Zxx power sensors
Full spectrum analysis	Spectrum analyzer option with a wide scope of functions
Field use	<ul style="list-style-type: none"> ▀ Operation independent of AC supply due to optional internal battery or 12 V car supply system ▀ Shock-resistant housing and ergonomic carrying handle ▀ Compact size, low weight

R&S®ZND Vector Network Analyzer



A unidirectional VNA that is easily upgraded

The R&S®ZND is a unidirectional vector network analyzer (VNA) up to 4.5 GHz that can easily be upgraded with options to a bidirectional VNA and 8.5 GHz. The user interface with flat, clear menu structures makes operation of the R&S®ZND very efficient. The large touchscreen (12.1") and the flexible arrangement of diagrams and traces allow the user to see all results of interest at a glance.

Key facts



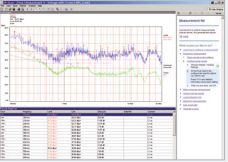
- ▮ Unidirectional two-port network analyzer up to 4.5 GHz
- ▮ Upgradeable with options to 8.5 GHz and/or a full bidirectional test set for displaying all four S-parameters
- ▮ Convenient user interface with wizards and context menus
- ▮ Undo/redo softkeys to cancel or restore the last one to six entries
- ▮ Large touchscreen (12.1")
- ▮ Time domain analysis

Models/options

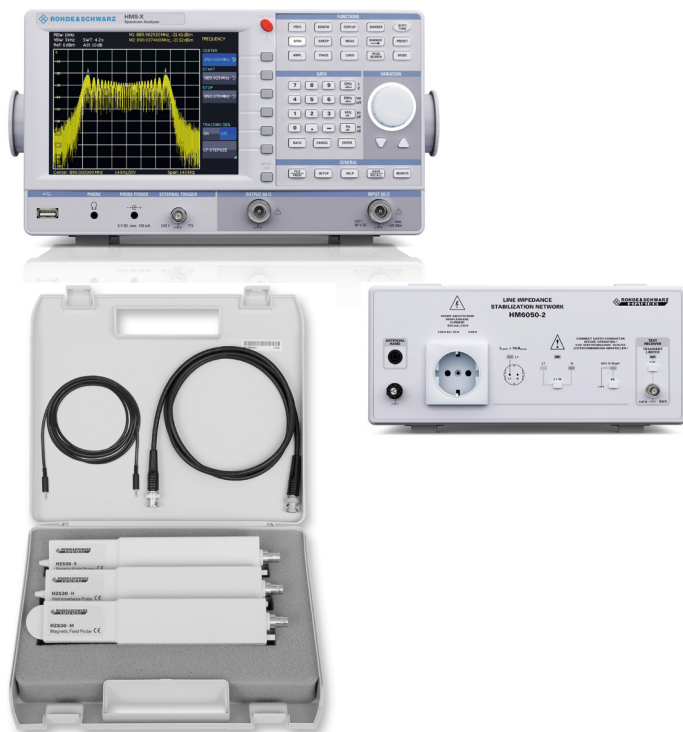
Designation	Type	Order No.
Vector Network Analyzer, 2 Ports, 4.5 GHz, N female	R&S®ZND	1328.5170.92
Options		
Extended Frequency Range, unidirectional, 8.5 GHz	R&S®ZND-K1	1328.5306.02
Time Domain Analysis (TDR)	R&S®ZND-K2	1328.5393.02
Full Test Set, Base Unit, bidirectional, 4.5 GHz	R&S®ZND-K5	1328.5312.02
Full Test Set, bidirectional, 8.5 GHz	R&S®ZND-K6	1328.5329.02
Extended Power Range	R&S®ZND-K7	1328.5335.02
Extended Frequency Range, Full Test Set, bidirectional, 8.5 GHz	R&S®ZND-K8	1328.5412.02
GPIB Interface	R&S®ZND-B10	1328.5358.02
Handler I/O	R&S®ZN-B14	1316.2459.02

Application	How the R&S®ZND meets your needs
Measurements on filters and amplifiers	<ul style="list-style-type: none"> ▮ Full bidirectional test set to display all four S-parameters of a two-port DUT for complete device characterization (with options) ▮ Large display (12.1") ▮ Power range: -45 dBm to +3 dBm (with R&S®ZND-K7) ▮ Dynamic range: up to 120 dB ▮ Determination of bandfilter parameters ▮ Use of automatic calibration units (with bidirectional test set)
Measurements on cables and antennas	<ul style="list-style-type: none"> ▮ Unidirectional test set available to display S_{11} and S_{21} ▮ Time domain analysis ▮ Extension of frequency range up to 8.5 GHz

EMC precompliance

Type/designation	Frequency range	Frequency accuracy	Measurement time	RBW	DANL (sensitivity)
EMC-SET EMC precompliance sets 	100 kHz to 1 GHz/3 GHz (depending on model)	–	20 ms to 1000 s	<ul style="list-style-type: none"> ▀ 1 kHz (100 Hz) to 1 MHz in 1/3 steps ▀ 200 Hz (–3 dB), 9 kHz, 120 kHz, 1 MHz (–6 dB) 	–115 dBm, –124 dBm (typ.); –135 dBm
R&S®ESL EMI test receiver 	9 kHz to 3 GHz/6 GHz (depending on model)	<ul style="list-style-type: none"> ▀ 1×10^{-6} (standard) ▀ 1×10^{-7} (with R&S®FSL-B4 OCXO option) 	<ul style="list-style-type: none"> ▀ Selectable from 100 μs to 100 s (receiver mode/scan, per frequency step) ▀ Selectable from 2.5 ms to 16000 s, zero span 1 μs to 16000 s (analyzer mode/sweep time) 	<ul style="list-style-type: none"> ▀ 10 Hz to 10 MHz in 1/3 sequence (–3 dB) ▀ 200 Hz, 9 kHz, 120 kHz (–6 dB), 1 MHz (impulse) 	Preamplifier on (R&S®FSL-B22 option), normalized to 1 Hz <ul style="list-style-type: none"> ▀ < –130 dBm (9 kHz to 1 MHz) ▀ < –135 dBm (1 MHz to 10 MHz) ▀ < –145 dBm (10 MHz to 50 MHz) ▀ < –152 dBm (50 MHz to 3 GHz)
R&S®ES-SCAN EMI software 	User-friendly, cost-effective Windows application for EMI testing in line with commercial standards				
EMC accessories ▶ page 42					
Other instruments that offer EMI debugging capability with R&S®HZ-15 near-field probes					
R&S®FSH handheld spectrum analyzer, channel scan with R&S®FSH-K43 option ▶ page 9					
R&S®FSL spectrum analyzer ▶ page 10					
R&S®RTE digital oscilloscope ▶ page 25					
R&S®ZVH cable and antenna analyzer, with R&S®ZVH-K1 option ▶ page 35					

EMC-SET EMC Precompliance Sets



All-round, cost-efficient EMI measuring set

The EMC-SET1 and EMC-SET2 sets provide all necessary devices and software to conduct reliable EMC precompliance measurements. These sets meet the needs of cost-conscious customers and engineers who want to perform diagnostic troubleshooting during the design phase or measure typical EMI problems.

Key facts

- R&S®HMS-X with R&S®HMS-EMC option (EMC-SET2: R&S®HMS-3G option in addition)
 - Frequency range: 100 kHz to 1.6 GHz/3 GHz
 - Fast sweep mode
 - Receiver mode with quasi-peak detector
 - Various detectors: auto peak, min./max. peak, sample, RMS
- HM6050-2 (LISN)
 - Frequency range: 9 kHz to 30 MHz
 - Built-in transient limiter
 - Artificial hand connector
- HZ530 (EMC-SET1), HZ540 (EMC-SET2)
 - Frequency range: 100 kHz to 1 GHz/3 GHz
 - Probes included: 1 × E-field probe, 1 × H-field probe, 1 × high-impedance probe
- EMC PreCom 2.00
 - EMI module part of the HMEexplorer software for conducting precompliance measurements (only with HO720 RS-232/USB interface card and Windows 32-bit version)

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Models/options

Designation	Type	Order No.
EMC Precompliance Set, including R&S®HMS-X, R&S®HMS-EMC, HM6050-2, HZ530, EMC PreCom	EMC-SET1	3593.2225K02
EMC Precompliance Set, including R&S®HMS-X, R&S®HMS-EMC, R&S®HMS-3G, HM6050-2, HZ540, EMC PreCom	EMC-SET2	3593.2231K02

Application	How the EMC-SET meets your needs
EMI precompliance measurements in engineering labs for EMC problem detection and troubleshooting during design phase	<ul style="list-style-type: none"> ■ Set with all necessary devices for measuring typical EMC disturbances in line with commercial standards ■ Reliable measurement of line-conducted interferences ■ Wide variety of active broadband probes for EMI diagnosis
Remotely controlled EMI measurements in line with commercial standards for EMC diagnosis and precompliance	<ul style="list-style-type: none"> ■ Free PC software for automated EMI measurements ■ Full remote control via SCPI-based commands ■ RS-232/USB, LAN or GPIB interfaces ■ Fanless design

R&S®ESL EMI Test Receiver



Compact, cost-effective measuring receiver

The R&S®ESL EMI test receiver combines two instruments in one, measuring EMC disturbances in line with commercial standards and also serving as a full-featured spectrum analyzer for diverse lab applications. The R&S®ESL is designed to meet the needs of cost-conscious users who want to perform diagnostic and precompliance EMI measurements up to 3 GHz or 6 GHz.

Key facts

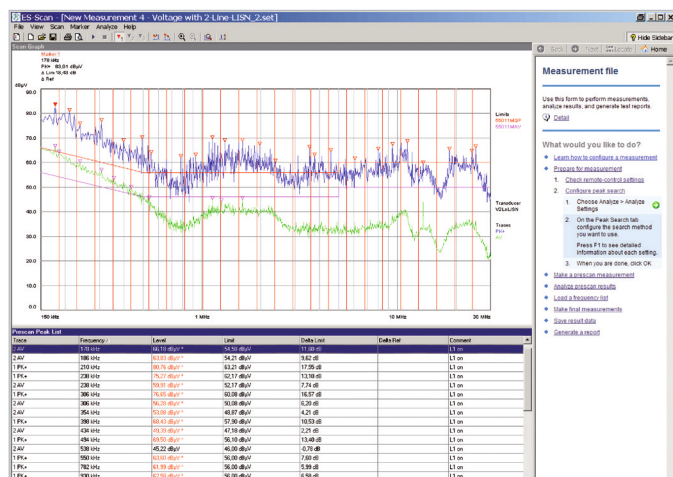
- ▀ Frequency range: 9 kHz to 3 GHz/6 GHz covering almost all commercial EMC standards
- ▀ All major functions of an advanced EMI test receiver, including fully automated test sequences
- ▀ Weighting detectors: min. peak, max. peak, average, RMS, quasi-peak, average with meter time constant (CISPR-average) and RMS-average
- ▀ Compact, lightweight instrument, can be battery-powered for mobile applications

Models/options

Designation	Type	Order No.
EMI Test Receiver, 9 kHz to 3 GHz	R&S®ESL3	1300.5001.03
EMI Test Receiver, 9 kHz to 3 GHz, with tracking generator	R&S®ESL3	1300.5001.13
EMI Test Receiver, 9 kHz to 6 GHz	R&S®ESL6	1300.5001.06
EMI Test Receiver, 9 kHz to 6 GHz, with tracking generator	R&S®ESL6	1300.5001.16

Application	How the R&S®ESL meets your needs
EMI measurements of commercial products in engineering and EMC labs for EMC problem detection and EMC troubleshooting during the design phase and for preparation of final certification (precertification)	<ul style="list-style-type: none"> ▀ Very good RF characteristics ▀ Frequency range covering the most important EMI measurements in commercial product standards ▀ All IF bandwidths in line with the latest CISPR 16 basic standard ▀ All CISPR weighting detectors included ▀ All major functions of an advanced EMI test receiver, including fully automated EMI test sequences ▀ Low investment costs ▀ Cost-saving plug&play options
Mobile use	<ul style="list-style-type: none"> ▀ Rugged case as standard ▀ Compact size ▀ Lightweight ▀ Optional battery operation for installation, maintenance and on-site applications
Standard RF spectrum measurements	Complete functionality of an R&S®FSL3/R&S®FSL6 spectrum analyzer included

R&S®ES-SCAN EMI Software



User-friendly software for EMI measurements

R&S®ES-SCAN is a cost-efficient and user-friendly Windows software application that has been developed for Rohde&Schwarz EMI test receivers as well as signal and spectrum analyzers. The main requirements of EMI measurements in line with commercial standards have been combined in an easy-to-use application: measurement settings and storage, scan data acquisition and display with automatic data reduction, peak search with acceptance limit and selection of subranges, final measurement with worst-case selection, report generation and measurement data storage.

Key facts

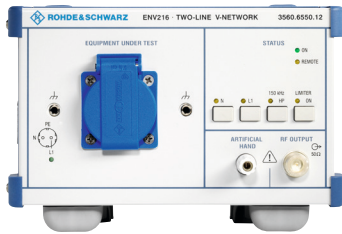
- Menu-controlled configuration of test receiver/spectrum analyzer and storage of settings on controller, including limit lines and transducer factors
- Reliable acquisition, evaluation and documentation of measurement data
- Marker function, including marker to peak and tune to marker frequency
- Automatic peak search with selectable acceptance limit and selectable subranges
- Editable frequency list for semi-automatic and manual final measurements
- Fine tuning function for reliable detection of local maxima
- Flexible configuration of test report layouts (RTF format)
- For use with the R&S®ESR, R&S®ESRP, R&S®ESCI, R&S®ESPI and R&S®ESL EMI test receivers, the R&S®FSP and R&S®FSL spectrum analyzers, the R&S®FSW and R&S®FSV signal and spectrum analyzers and the R&S®FSVR realtime spectrum analyzer

Application	How R&S®ES-SCAN meets your needs
Remotely controlled EMI measurements in line with commercial standards for EMC diagnosis and precompliance	<ul style="list-style-type: none"> ■ Works with the R&S®ESR, R&S®ESRP, R&S®ESCI, R&S®ESPI, R&S®ESL, R&S®FSL, R&S®FSP, R&S®FSW, R&S®FSV and R&S®FSVR ■ Remote control via GPIB and LAN ■ Full on-screen configuration of Rohde&Schwarz EMI receivers/signal and spectrum analyzers and setup storage on PC ■ Predefined standard limit lines, transducers and measurement setups ■ Flexible generation of meaningful test reports with different layouts ■ Help sidebar provides operational assistance for less experienced and occasional users
Small system solutions without remote control of antenna mast, turntable and sideway and without fully automated test routines	<ul style="list-style-type: none"> ■ Cost-effective tool for EMI diagnostics and development testing in line with commercial standards ■ Combines the basic requirements of EMI measurements in an easy-to-use application
Remotely controlled conducted emission measurements in line with commercial standards for EMC certification	<ul style="list-style-type: none"> ■ Support of the R&S®ESR and R&S®ESCI EMI test receivers for full compliance testing ■ Remote control of Rohde&Schwarz line impedance stabilization networks (LISN) (via test receiver user port) ■ Semi-automated measurement routines ■ Flexible generation of meaningful test reports with different layouts

EMC accessories

EMC accessories

R&S®ENV216 Two-Line V-Network

**Disturbance voltage measurements on single-phase EUTs**

- ▮ Several models for Germany, United Kingdom, France, China/Australia, USA
- ▮ Air-core design and artificial hand
- ▮ Switch-selectable highpass filter of 150 kHz
- ▮ Built-in 10 dB attenuator pad
- ▮ Built-in pulse limiter (can be switched off)
- ▮ Remote control with TTL levels (compatible with Rohde & Schwarz EMI test receivers)
- ▮ Compact, lightweight

Specifications in brief

- ▮ Frequency range: 9 kHz to 30 MHz
- ▮ Continuous current up to 16 A (depending on model)
- ▮ Simulated impedance: (50 μ H and 5 Ω) || 50 Ω in line with CISPR 16-1-2 Amd. 2:2006
- ▮ V-network in line with CISPR, EN, VDE, ANSI, FCC Part 15 and MIL-STD-461D, E and F
- ▮ Calibrated in line with CISPR 16-1-2 and ANSI C63.4

HM6050 Two-Line V-Network

**Cost-efficient line impedance stabilization network for disturbance voltage measurements on single-phase EUTs**

- ▮ Models for Germany, United Kingdom, USA
- ▮ Selectable transient limiter
- ▮ Artificial hand connector

Specifications in brief

- ▮ Single-phase V-network to measure line-conducted interferences from 9 kHz to 30 MHz (based on CISPR 16), up to 16 A
- ▮ 115 V and 230 V versions available
- ▮ RS-232 interface for remote control

R&S®EZ-25 150 kHz Highpass

**Conducted emission measurements in the presence of longwave mains disturbance signals**

For the measurement of equipment that requires higher selectivity at the transition between 130 kHz and 150 kHz as shown in Fig. 2 of CISPR 16-1-1 (e.g. signaling equipment as defined in EN 50065-1), a highpass filter may be added in front of the measuring receiver to improve the selectivity and achieve the values stipulated in EN 50065 Part 1 without impairing the passband of the measuring receiver.

- ▮ Conducted emission measurements in line with EN 50065 Part 1
- ▮ Very steep slope in line with CISPR 16-1-1
- ▮ Suitable for any CISPR measuring receiver
- ▮ Relative attenuation > 50 dB below 130 kHz
- ▮ Built-in 10 dB attenuation pad for exact 50 Ω termination of LISN
- ▮ High pulse energy capability (50 mWs)
- ▮ Calibrated response

Specifications in brief

- ▮ Passband: 150 kHz to 30 MHz
- ▮ Insertion loss in passband: 9.5 dB to 11.5 dB
- ▮ VSWR in passband: < 1.2
- ▮ Stopband: below 130 kHz
- ▮ Minimum attenuation in stopband: 60 dB
- ▮ Attenuation in transition region
 - 146 kHz: < 12 dB
 - 145 kHz: > 12 dB
 - 140 kHz: > 24 dB
 - 130 kHz: > 60 dB
- ▮ Max. input voltage (continuous): 137 dB μ V
- ▮ Max. impulse energy (50 μ s): 50 mWs
- ▮ Dimensions (L x W x H): 145 mm x 95 mm x 52 mm (5.7 in x 3.74 in x 2.05 in)
- ▮ Weight: 500 g (1.1 lb)

R&S®ESH2-Z2/-Z3 Voltage Probes, R&S®ESH2-Z31 Attenuator

**R&S®ESH2-Z2 active voltage probe**

The active voltage probe is used for measuring disturbance voltages on lines that do not carry AC supply voltage.

R&S®ESH2-Z3 passive voltage probe

The passive voltage probe is suitable for measuring disturbance voltages (on AC supply lines) in line with CISPR 16-2-1 and EN 55016-2-1.

R&S®ESH2-Z31 attenuator

For checking the disturbance source impedance in line with EN 55016-2-1 and CISPR 16-2-1

Specifications in brief (R&S®ESH2-Z2/-Z3)

- ▮ Frequency range: 9 kHz to 30 MHz
- ▮ Measurement range (AVG, 200 Hz IF bandwidth with Rohde & Schwarz test receivers): -20 dB μ V to +120 dB μ V/+10 dB μ V to +150 dB μ V
- ▮ Attenuation, uncertainty of calibration: 10 dB, 0.5 dB/30 dB, 0.5 dB
- ▮ Input impedance: 118 k Ω \pm 5% || 8 pF/1.5 k Ω \pm 5% || 8 pF
- ▮ Max. input voltage
 - f < 63 Hz: 100 V/250 V
 - f < 500 Hz: 5 V/250 V
 - 9 kHz to 30 MHz: 3 V/30 V

EMC accessories

R&S®EZ-17 Current Probe

**Emission and susceptibility measurements**

The R&S®EZ-17 model .02 with its extremely flat frequency response is optimal for current measurements and for measuring screening effectiveness. Due to its high load capacity, model .03 is recommended for EMS measurements (bulk current injection).

- ▮ Model .02 for emission measurements
- ▮ Model .03 for emission and susceptibility measurements
- ▮ High sensitivity and overload capability
- ▮ Wide frequency range
- ▮ High load capacity for DC and AC current
- ▮ Small dimensions in spite of large inner diameter (30 mm)
- ▮ Simple clamping thanks to spring-loaded mechanism

Specifications in brief (models .02/.03)

- ▮ Frequency range: 20 Hz to 100 MHz
- ▮ Range with constant transducer factor (-3 dB): 1 MHz/2 MHz to 100 MHz
- ▮ Transducer factor reduced by 20 dB/decade in range from 20 Hz to 1 MHz/2 MHz
- ▮ Source impedance: $\leq 0.8 \Omega/\leq 1 \Omega$
- ▮ Transfer impedance Z_T in range with constant transducer factor: $3.16 \Omega/7.1 \Omega$
- ▮ Transducer factor k in range with flat frequency response: -10 dB/-17 dB
- ▮ Load capacity (RF current measurement)
 - Max. DC current or peak, AC current: 300 A ($f < 1$ kHz)
 - Max. RF current (RMS): 2 A ($f > 1$ MHz)/1 A ($f > 1$ MHz)
- ▮ Load capacity of model .03 (EMS measurement)
 - Max. power at RF connector: 10 W ($f > 1$ MHz)

R&S®HZ-15 Probe Set for E and H Near-Field Emission Measurements



The R&S®HZ-15 probe set contains special probes from 30 MHz to 3 GHz for near-field emission measurements on electronic modules and can be used together with test receivers and spectrum analyzers. Inserting the R&S®HZ-16 preamplifier between the near-field probe and the spectrum analyzer makes it easier to measure very weak high-frequency fields of up to 3 GHz.

- ▮ Five probes for easy diagnostic measurements
- ▮ Special, electrically shielded magnetic field probes
- ▮ Probe tips adapted to near-field measurement
- ▮ High-resolution measurements
- ▮ Easy-to-determine magnetic field orientation
- ▮ Easy operation and handling

Specifications in brief (R&S®HZ-16 preamplifier)

- ▮ Frequency range: 30 MHz to 3 GHz
- ▮ Gain: 20 dB (from 1.5 GHz decreasing to 17 dB)
- ▮ Noise figure: 4.5 dB
- ▮ Max. input power: +13 dBm
- ▮ Operating voltage: 12 V
- ▮ Plug-in power supply: 100 V to 240 V, 50 Hz/60 Hz, Euro connector (2 mm x 4 mm), adapter for USA and Japan

HZ530 Probe Set

**Cost-efficient probe set for E and H near-field emission measurements**

The HZ530 probe set consists of three active broadband probes for EMI diagnosis:

- ▮ E-field probe
- ▮ H-field probe
- ▮ High-impedance probe

Specifications in brief

- ▮ Frequency range: 100 kHz to 1 GHz
- ▮ Supply voltage: 6 V DC from spectrum analyzer or batteries, 4 x Mignon/AA (not included)
- ▮ Supply current: approx. 10 mA to 24 mA DC

HZ540/HZ550 Probe Set

**Cost-efficient probe set for E and H near-field emission measurements**




The HZ540/HZ550 probe set consists of active broadband probes for EMI diagnosis:

- ▮ E-field probe
- ▮ H-field probe
- ▮ High impedance probe
- ▮ μ H-field probe (HZ550)
- ▮ Radiation probe (HZ550)


Specifications in brief

- ▮ Frequency range: 1 MHz to 3 GHz
- ▮ Power supply: 6 V DC, 80 mA

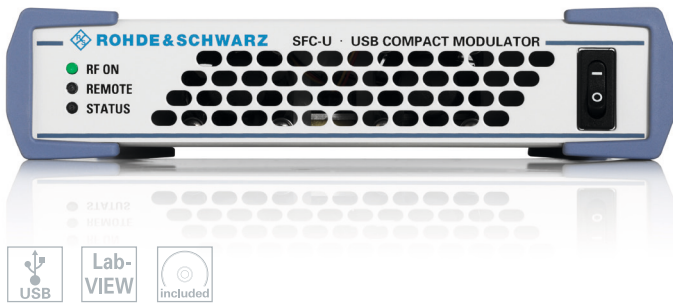
Audio and multimedia testers

Type/designation	Broadcasting standards	Transport stream formats	Video/audio formats	Instrument functions	Frequency range	Power range
R&S®SFC-U compact USB modulator 	<ul style="list-style-type: none"> ▮ Terrestrial: DVB-T2, DVB-T, DVB-H, DTMB, CMMB, T-DMB, ISDB-T, ISDB-T_{SB}, ATSC/8VSB, ATSC-M/H ▮ Cable: DVB-C2, DVB-C, J.83/B, ISDB-C, analog TV ▮ Satellite: DVB-S2, DVB-S, DIRECTV ▮ Audio: DAB, DAB+, ISDB-T_{SB}, FM radio 	MPEG-2 TS, ETI NA, ETI NI, MFS/PMS, DIRECTV	–	<ul style="list-style-type: none"> ▮ Modulator with realtime coder ▮ Transport stream player ▮ Analog A/V generator ▮ AWGN generator 	30 MHz to 3000 MHz	–110 dBm to 0 dBm
R&S®SFC compact modulator 	<ul style="list-style-type: none"> ▮ Terrestrial: DVB-T2, DVB-T, DVB-H, DTMB, CMMB, T-DMB, ISDB-T, ISDB-T_{SB}, ATSC/8VSB, ATSC-M/H ▮ Cable: DVB-C2, DVB-C, J.83/B, ISDB-C, analog TV ▮ Satellite: DVB-S2, DVB-S, DIRECTV ▮ Audio: DAB, DAB+, ISDB-T_{SB}, FM radio 	MPEG-2 TS, ETI NA, ETI NI, MFS/PMS, DIRECTV	–	<ul style="list-style-type: none"> ▮ Modulator with realtime coder ▮ Transport stream player ▮ Analog A/V generator ▮ AWGN generator 	30 MHz to 3000 MHz	–110 dBm to 0 dBm
R&S®EFL240/ R&S®EFL340 portable TV test receiver 	<ul style="list-style-type: none"> ▮ Terrestrial: DVB-T2¹⁾, DVB-T, DVB-H ▮ Cable: DVB-C, analog TV ▮ Satellite: DVB-S2, DVB-S ▮ Audio: FM radio 	–	<ul style="list-style-type: none"> ▮ MPEG-2, MPEG-4, SD, HD (1080p) ▮ MPEG-1 L2, Dolby®, AC3, AAC, DD+ ▮ PAL, SECAM, NTSC 	<ul style="list-style-type: none"> ▮ TV test receiver ▮ Spectrum analyzer ▮ MPEG decoder ▮ Video/audio decoder 	5 MHz to 2500 MHz	15 dBμV to 130 dBμV

¹⁾ R&S®EFL340 only.

Type/designation	Audio interfaces	Number of channels	Analyzer bandwidth	Analyzer voltage range
R&S®UPP200 audio analyzer 	<ul style="list-style-type: none"> ▮ Analog balanced ▮ Analog unbalanced with XLR/BNC adapter ▮ Digital professional and consumer format in line with AES3 or IEC 60958 ▮ I²S ▮ HDMI™ 	<ul style="list-style-type: none"> ▮ Analog: 2 channels ▮ Digital: 2 to 8 channels (depending on interface) 	<ul style="list-style-type: none"> ▮ Analog: DC/20 Hz to 80 kHz ▮ Digital: max. clock rate 200 kHz 	1 μV to 50 V (RMS, sine)

R&S®SFC-U Compact USB Modulator



Test signals for TV and audio broadcasting – handy and economical

The R&S®SFC-U compact USB modulator is an economical multistandard signal source. It supports realtime coding for all conventional digital and analog TV and audio broadcasting standards. The R&S®SFC-U is a USB device designed for use with a PC, enabling plug&play test signal generation.

Key facts

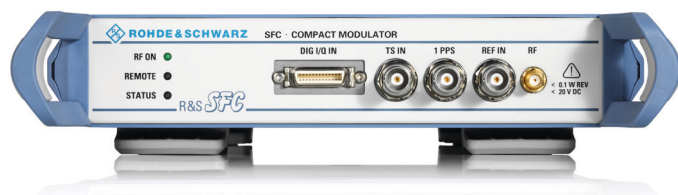
- ▀ High precision modulator with MER > 40 dB
- ▀ VHF and UHF frequency range, optionally up to 3 GHz
- ▀ Level range from 0 dBm to –31.5 dBm, optionally to –110 dBm
- ▀ Terrestrial TV standards: DVB-T2, DVB-T, DVB-H, DTMB, CMMB, T-DMB, ISDB-T, ISDB-T_B, ATSC/8VSB, ATSC-M/H
- ▀ Cable TV standards: DVB-C2, DVB-C, J.83/B, ISDB-C
- ▀ Satellite TV standards: DVB-S2, DVB-S, DIRECTV
- ▀ Analog TV standards: B/G, D/K, I, M/N, L
- ▀ Audio broadcasting standards: DAB, DAB+, ISDB-T_{SB}, AM/FM/RDS
- ▀ Transport stream player and analog audio/video generator integrated in PC software
- ▀ Optional transport stream libraries and test pattern libraries supported
- ▀ Integrated AWGN generator
- ▀ ASI transport stream input

Models/options		
Designation	Type	Order No.
Compact USB Modulator	R&S®SFC-U	2115.3540.02
Terrestrial TV Option Package (includes DVB-T, DVB-H, ISDB-T, ISDB-T _B , ISDB-T _{SB} , DTMB, CMMB, ATSC/8VSB, ATSC-M/H, MediaFLO™)	R&S®SFC-U-PK1	2115.5888.02
Cable TV Option Package (includes DVB-C, J.83/B, ISDB-C)	R&S®SFC-U-PK2	2115.5894.02
Satellite TV Option Package (includes DVB-S2, DVB-S, DIRECTV, R&S®SFC-U-K83)	R&S®SFC-U-PK3	2115.5907.02
T2/C2 Option Package (includes DVB-T2, DVB-C2)	R&S®SFC-U-PK4	2115.5913.02
Audio Broadcasting Option Package (includes DAB, DAB+, T-DMB, AM/FM/RDS) ¹⁾	R&S®SFC-U-PK5	2115.5920.02
Analog TV Option Package (includes standards B/G, D/K, I, M/N, L)	R&S®SFC-U-PK6	2115.5936.02
Frequency Extension, 30 MHz to 3 GHz	R&S®SFC-U-K83	2115.5742.02
Electronic Attenuator, 0 dB to +110 dB	R&S®SFC-U-K84	2115.5720.02
AWGN Noise Generator	R&S®SFC-U-K40	2115.5788.02
Digital I/Q Input	R&S®SFC-U-K80	2115.5765.02

¹⁾ DAB, DAB+ and T-DMB might require the R&S®SFC-U-K83 frequency extension.

Application	How the R&S®SFC-U meets your needs
Software development for TV receivers	<ul style="list-style-type: none"> ▀ Easy and convenient operation from PC ▀ Generates test signals for various TV standards ▀ Test signals can include EPG and data services ▀ Libraries with various test sequences available as options ▀ Playout of transport streams with encrypted content ▀ Endless and seamless transport stream playout
Product presentation and demonstration	<ul style="list-style-type: none"> ▀ Small, easy-to-use signal source ▀ Generates test signals for various TV standards
Set-top box service: test, repair and firmware update	<ul style="list-style-type: none"> ▀ Generates standard-compliant test signal for simple Go/NoGo test ▀ Playout of special transport streams for firmware update of set-top boxes ▀ Easy-to-use signal source for operation by inexperienced users
Testing multiplex configurations for broadcasting networks	<ul style="list-style-type: none"> ▀ Playout of transport streams with any multiplex configuration to be verified ▀ Generates standard-compliant test signal to verify multiplex settings with TV receivers
Routine functional check of TV test equipment	<ul style="list-style-type: none"> ▀ High accuracy of signal level and frequency ▀ Generates test signals for cable, satellite and terrestrial TV standards

R&S®SFC Compact Modulator



Test signals for TV and audio broadcasting – handy and economical

The R&S®SFC compact modulator is an economical multistandard signal source. It supports realtime coding for all conventional digital and analog TV and audio broadcasting standards. The R&S®SFC is equipped with a built-in computer, making it ideal for standalone operation and for integration into a signal generation system with multiple generators.

Key facts

- High precision modulator with MER > 40 dB
- VHF and UHF frequency range, optionally up to 3 GHz
- Level range from 0 dBm to –31.5 dBm, optionally to –110 dBm
- Terrestrial TV standards: DVB-T2, DVB-T, DVB-H, DTMB, CMMB, T-DMB, ISDB-T, ISDB-T_B, ATSC/8VSB, ATSC-M/H
- Cable TV standards: DVB-C2, DVB-C, J.83/B, ISDB-C
- Satellite TV standards: DVB-S2, DVB-S, DIRECTV
- Analog TV standards: B/G, D/K, I, M/N, L
- Audio broadcasting standards: DAB, DAB+, ISDB-T_{SB}, AM/FM/RDS
- Integrated transport stream player and analog audio/video generator
- Transport stream libraries and test pattern libraries supported
- Integrated AWGN generator
- ASI transport stream input
- Digital I/Q input to connect to other Rohde&Schwarz broadcast signal generators

Models/options		
Designation	Type	Order No.
Compact Modulator	R&S®SFC	2115.3510.02
Frequency Extension, 30 MHz to 3 GHz	R&S®SFC-K83	2115.5759.02
Electronic Attenuator, 0 dB to +110 dB	R&S®SFC-K84	2115.5736.02
AWGN Noise Generator	R&S®SFC-K40	2115.5794.02
Digital I/Q Input	R&S®SFC-K80	2115.5771.02
Coder Extension Board	R&S®SFC-B15	2115.5836.02
Realtime coders for the broadcasting standards and transport stream libraries are available as individual software options.		
Please visit our website for a complete list of options and order numbers.		

Application	How the R&S®SFC meets your needs
Use in central signal generation systems (transmitter room systems)	<ul style="list-style-type: none"> ■ Generates test signals for various TV standards ■ Integrated computer enables standalone operation ■ Automatic booting and start-up after power-on ■ Full remote control via LAN ■ R&S®Central TX System Control software controls and monitors multiple R&S®SFC
General-purpose broadcast signal generator	<ul style="list-style-type: none"> ■ High accuracy of signal level and frequency ■ Small, easy-to-use signal source ■ Generates test signals for various TV standards
2nd RF output for R&S®SFU broadcast test system	<ul style="list-style-type: none"> ■ Digital I/Q input to connect to other Rohde&Schwarz broadcast signal generators ■ Extends the R&S®SFU broadcast test system to a two-channel generator ■ Enables MISO and diversity reception scenarios

R&S®EFL240/R&S®EFL340 Portable TV Test Receiver



Professional installation of cable and satellite TV systems and antennas

The R&S®EFL240 and R&S®EFL340 are compact, portable TV test receivers for satellite, cable and terrestrial television. The R&S®EFL340 includes DVB-T2. Their versatile measurement functions and their operating convenience are ideal for the installation of cable TV systems, satellite receiver systems, in-building distribution systems and antennas. The favorable price makes the R&S®EFL240 and R&S®EFL340 extremely attractive for these applications.

Key facts

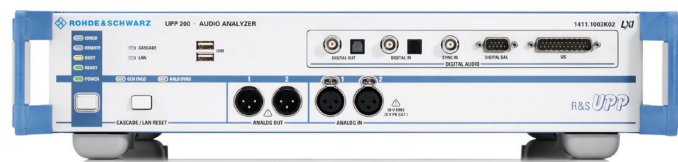
- ▮ Multistandard TV test receiver
- ▮ Frequency range: 5 MHz to 2500 MHz
- ▮ Ergonomic design and easy operation
- ▮ More than 4 h of battery operation
- ▮ Analysis of DVB-T2¹⁾, DVB-T, DVB-H, DVB-C, DVB-S and DVB-S2
- ▮ Measurement of constellation, MER(f) and echoes
- ▮ MPEG-2 and MPEG-4 decoding, SD and HD video display
- ▮ ASI input/output interface¹⁾
- ▮ Common interface for encrypted programs
- ▮ PAL, SECAM, NTSC and FM radio reception
- ▮ Combo mode for simultaneous display of video, spectrum and measurement results
- ▮ Automated measurements simplify routine work
- ▮ Ethernet/LAN interface for remote measurement and data logging¹⁾
- ▮ R&S®EFL-Suite software for transferring measurement results to a PC
- ▮ Accessories included: soft bag, carrying straps, RF adapter set, power supply, car adapter, SD card, cables, CD-ROM with manuals and R&S®EFL-Suite software

¹⁾ R&S®EFL340 only.

Models/options		
Designation	Type	Order No.
Portable TV Test Receiver	R&S®EFL240	2116.8980.02
Portable TV Test Receiver	R&S®EFL340	2116.9070.03
Rain Cover	R&S®EFL-Z1	2116.9087.00

Application	How the R&S®EFL240/R&S®EFL340 meets your needs
Analysis of reception problems in terrestrial TV networks	<ul style="list-style-type: none"> ▮ Echo measurement without receiver lock to analyze multipath propagation under poor reception conditions ▮ Pre-echo and post-echo measurement to analyze SFN configuration ▮ MER(f) measurement to detect narrowband interference effects and co-channel interference ▮ Ethernet/LAN interface enables remote measurement and long-time data logging via Internet
Installation of cable TV systems	<ul style="list-style-type: none"> ▮ Measurement of digital and analog cable TV signals ▮ Automatic scan&log function simplifies measurements in a fully loaded cable TV network ▮ Spectrum analyzer with zoom function
Installation of satellite TV receiving systems	<ul style="list-style-type: none"> ▮ Antenna positioning function simplifies satellite dish alignment ▮ Satellite identifier function ▮ Transponder lists of many satellites pre-installed ▮ Realtime FFT spectrum display in combo mode
Fast assessment of signal quality	<ul style="list-style-type: none"> ▮ Reference receiver for troubleshooting of TV tuners ▮ Combo mode provides a quick overview of signal quality ▮ Support of all relevant TV standards
Field use	<ul style="list-style-type: none"> ▮ Handy, lightweight portable instrument ▮ Exceptionally long battery operation of more than four hours ▮ Soft bag with all necessary accessories

R&S®UPP200 Audio Analyzer



Multichannel and cost-efficient, for use in the lab and in production

The compact cost-efficient R&S®UPP200 audio analyzer is designed for system applications. It features low height and comes without front panel control elements or integrated display.





Key facts

- Suitable for all interfaces: analog, digital and combined
- HDMI™ device testing
- Up to 80 kHz bandwidth and 200 kHz sampling rate
- User-programmable filters for analyzer and generator
- Compact instrument with integrated PC and low height

Models/options		
Designation	Type	Order No.
Audio Analyzer, Two Channels	R&S®UPP200	1411.1003.02
Hardware options		
Digital Audio I/O	R&S®UPP-B2	1411.2300.02
HDMI™ and Digital Audio Interfaces	R&S®UPP-B4	1411.2500.02
Software options		
Digital Audio Protocol for R&S®UPP-B2	R&S®UPP-K21	1411.0807.02
Dolby® Datastream Decoding for R&S®UPP-B4	R&S®UPP-K41	1411.0813.02
Extended Audio/Video Measurements for R&S®UPP-B4	R&S®UPP-K45	1411.0859.02
1/n Octave Analysis for R&S®UPP	R&S®UPP-K601	1411.0765.02
System components		
XLR/BNC Adapter Set, male	R&S®UP-Z1M	1411.3358.02
XLR/BNC Adapter Set, male/female	R&S®UP-Z1MF	1411.3306.02
AES/EBU Cable for R&S®UPP-B2	R&S®UP-Z2	1411.3406.02
I²S Cable for R&S®UPP-B2/R&S®UPV-B41	R&S®UP-Z3	1411.3458.02
Eight-Channel I²S Cable for R&S®UPP-B4	R&S®UP-Z4	1411.3258.02

Application	How the R&S®UPP200 meets your needs
General-purpose audio analysis	<ul style="list-style-type: none"> ■ Generation of a wide variety of analog and – optionally – digital test signals ■ Broad scope of measurements on both analog and – optionally – digital interfaces ■ Powerful and even multichannel FFT analysis ■ User-programmable filters that can be adapted in seconds to the individual measurement task ■ Integrated control PC; manual operation requires only an external monitor and a mouse and keyboard
Use in production	<ul style="list-style-type: none"> ■ Parallel measurements for high throughput ■ High measurement speed throughout the system ■ Easy, efficient creation of remote control routines using the SCPI recording function
Measurements on multichannel devices	<ul style="list-style-type: none"> ■ 2 analog analyzer channels ■ Instruments can be cascaded to up to 48 measurement channels ■ Parallel measurements on all channels save time
HDMI™ applications	<ul style="list-style-type: none"> ■ Full-fledged audio analyzer with HDMI™ function ■ Generation and analysis of audio, video and data signals ■ Display of audio and video InfoFrames ■ Support of HDMI™ standard 1.4b, including audio return channel and HDMI™ Ethernet
Measurements on mixed interfaces	<ul style="list-style-type: none"> ■ 2 analog analyzer channels in one box ■ AES/EBU and S/P DIF interfaces for measuring digital audio components ■ Digital protocol analysis and generation ■ I²S interfaces for testing audio ICs ■ HDMI™ device testing ■ Interfaces for the generator and analyzer can be set independently of one another and used together in any combination

Power supplies

Type/designation	V _{max}	I _{max}	P _{max}	Overvoltage protection	Resolution	Remote control
R&S®HMC8041/ R&S®HMC8042/ R&S®HMC8043 power supply 	<ul style="list-style-type: none"> ▮ 1 × 32 V (R&S®HMC8041) ▮ 2 × 32 V (R&S®HMC8042) ▮ 3 × 32 V (R&S®HMC8043) 	<ul style="list-style-type: none"> ▮ 10 A (R&S®HMC8041) ▮ 5 A (R&S®HMC8042) ▮ 3 A (R&S®HMC8043) 	100 W	adjustable for each channel	<ul style="list-style-type: none"> ▮ 1 mV ▮ 0.1 mA (I < 1 A) ▮ 1 mA (I ≥ 1 A) 	<ul style="list-style-type: none"> ▮ USB-TMC, USB-CDC (Virtual COM), LAN (LXI) ▮ optional: IEEE-488 (GPIB)
HM8143 three-channel arbitrary power supply 	<ul style="list-style-type: none"> ▮ 2 × 30 V ▮ 1 × 5 V 	3 × 2 A	130 W	–	<ul style="list-style-type: none"> ▮ 10 mV ▮ 1 mA 	<ul style="list-style-type: none"> ▮ RS-232/USB ▮ optional: IEEE-488 (GPIB)
R&S®HMP2020/ R&S®HMP2030 programmable two/three-channel power supply 	<ul style="list-style-type: none"> ▮ 2 × 32 V (R&S®HMP2020) ▮ 3 × 32 V (R&S®HMP2030) 	<ul style="list-style-type: none"> ▮ 1 × 10 A/1 × 5 A (R&S®HMP2020) ▮ 3 × 5 A (R&S®HMP2030) 	188 W	adjustable for each channel	<ul style="list-style-type: none"> ▮ 1 mV ▮ 0.2 mA (I < 1 A), 1 mA (I ≥ 1 A) (R&S®HMP2020) ▮ 0.1 mA (I < 1 A), 1 mA (I ≥ 1 A) (R&S®HMP2030) 	<ul style="list-style-type: none"> ▮ RS-232/USB ▮ optional: Ethernet/USB, IEEE-488 (GPIB)
R&S®HMP4030/ R&S®HMP4040 programmable three/four-channel power supply 	<ul style="list-style-type: none"> ▮ 3 × 32 V (R&S®HMP4030) ▮ 4 × 32 V (R&S®HMP4040) 	<ul style="list-style-type: none"> ▮ 3 × 10 A (R&S®HMP4030) ▮ 4 × 10 A (R&S®HMP4040) 	384 W	adjustable for each channel	<ul style="list-style-type: none"> ▮ 1 mV ▮ 0.2 mA (I < 1 A), 1 mA (I ≥ 1 A) 	<ul style="list-style-type: none"> ▮ RS-232/USB ▮ optional: Ethernet/USB, IEEE-488 (GPIB)

R&S®HMC8041/R&S®HMC8042/ R&S®HMC8043 Power Supply



100 W and one, two or three channels

One, two or three channels – the R&S®HMC804x power supplies with their specifications and wide range of functions are ideal for use in development labs and industrial environments. Thanks to their high energy efficiency, the linear power supplies remain cool and quiet, even at maximum load. Practical interfaces and connectors allow users to work quickly and conveniently with the R&S®HMC804x, even in 19" racks.

Key facts

- 0 V to 32 V per channel, 3/5/10 A per channel (model dependent)
- High energy efficiency, low heat dissipation and quiet fans
- Low residual ripple due to linear postregulation
- Convenient parallel and serial operation via V/I tracking
- Overvoltage protection (OVP) for all outputs
- Overpower protection (OPP) for all outputs
- FuseLink (freely combinable electronic fuses)
- EasyArb function for user-definable V/I curves
- EasyRamp for simulating a start-up curve (directly programmable on device)
- Sequencing (sequenced start of channels)
- Analog input for external control via voltage (0 V to 10 V) and current (4 mA to 20 mA)
- Trigger input for starting/controlling EasyArb
- Data logging to USB flash drive in CSV format

Models/options

Designation	Type	Order No.
Power Supply, 3 channels, 100 W (33 W/channel, 3 A (max.)), with GPIB interface	R&S®HMC8043-G	3593.1058K02
Power Supply, 3 channels, 100 W (33 W/channel, 3 A (max.)), without GPIB interface	R&S®HMC8043	3593.1041K02
Power Supply, 2 channels, 100 W (50 W/channel, 5 A (max.)), with GPIB interface	R&S®HMC8042-G	3593.1035K02
Power Supply, 2 channels, 100 W (50 W/channel, 5 A (max.)), without GPIB interface	R&S®HMC8042	3593.1029K02
Power Supply, 1 channel, 100 W (10 A (max.)), with GPIB interface	R&S®HMC8041-G	3593.1012K02
Power Supply, 1 channel, 100 W (10 A (max.)), without GPIB interface	R&S®HMC8041	3593.1006K02

Application	How the R&S®HMC8041/R&S®HMC8042/R&S®HMC8043 meets your needs
Engineering lab	<ul style="list-style-type: none"> ■ FuseLink (freely combinable electronic fuses) ■ EasyArb function for user-definable V/I curves ■ EasyRamp for simulating a start-up curve (directly programmable on device) ■ Built-in energy meter ■ Data logging to USB flash drive in CSV format
Automatic test equipment (ATE)	<ul style="list-style-type: none"> ■ Analog input for external control via voltage (0 V to 10 V) and current (4 mA to 20 mA) ■ Trigger input for starting/controlling EasyArb ■ Sequencing (sequenced start of channels)
Production environment	<ul style="list-style-type: none"> ■ Rear connectors for all channels, including SENSE ■ WAGO cage clamp on rear panel for easy installation and deinstallation ■ Remote control via SCPI-based commands ■ LAN interface, integrated web server, LXI-compliant ■ Optional GPIB interface (R&S®HMC804x-G models)

HM8143 Three-Channel Arbitrary Power Supply



The most versatile power supply

- ▮ 2 × 0 V to 30 V/1 × 5 V, 3 × 2 A (130 W)
- ▮ Realtime voltage and current values
- ▮ Linear regulated two-quadrant power supply (current source and sink)
- ▮ Setting and readback resolution: 10 mV, 1 mA
- ▮ Electronic fuse and tracking
- ▮ Advanced parallel (up to 6 A) and serial (up to 65 V) operation
- ▮ Front connectors: 4 mm (0.16 in) safety sockets
- ▮ SENSE connectors for line loss compensation (30 V channels)
- ▮ External modulation of output voltages up to 50 kHz
- ▮ Arbitrary module: 4096 points, 12 bit
- ▮ RS-232/USB dual interface, optionally IEEE-488 (GPIB)

Models/options

Designation	Type	Order No.
Three-Channel Arbitrary Power Supply	HM8143	3593.0445K02
IEEE-488 (GPIB) Interface, galvanically isolated	HO880	3594.3748.02

Application	How the HM8143 meets your needs
Engineering labs	<ul style="list-style-type: none"> ▮ Up to 30 V, 2 A per regulated channel ▮ Linear regulated power unit ▮ SENSE inputs for compensation of lead resistances ▮ External modulation up to 50 kHz
Production environment	<ul style="list-style-type: none"> ▮ Trigger and modulation connectors (BNC) ▮ Full remote control, several interfaces available, LabVIEW
Simulation of charging processes of batteries	<ul style="list-style-type: none"> ▮ Free PC software to program arbitrary waveforms ▮ Usable as source and sink

R&S®HMP2020/R&S®HMP2030 Programmable Two/Three-Channel Power Supply



Key facts

- R&S®HMP2020: 1 × 0 V to 32 V/0 A to 10 A;
1 × 0 V to 32 V/0 A to 5 A (188 W)
- R&S®HMP2030: 3 × 0 V to 32 V/0 A to 5 A (188 W)
- Low residual ripple due to linear postregulators
- Realtime voltage, current and power values
- High setting and readback resolution: 1 mV and
0.1/0.2/1.0 mA (depending on current and model)
- FuseLink (electronic fuse) freely combinable for all
channels
- FuseDelay tunable up to 250 ms
- EasyArb function directly programmable on device
- PC software (free of charge) for easy generation of user-
defined waveforms
- Independently adjustable overvoltage protection (OVP)
for each channel
- Advanced parallel and serial operation via V/I tracking
- Front connectors: 4 mm (0.16 in) safety sockets
- Rear connectors for all channels including SENSE
- RS-232/USB dual interface, remote control via SCPI-
based commands

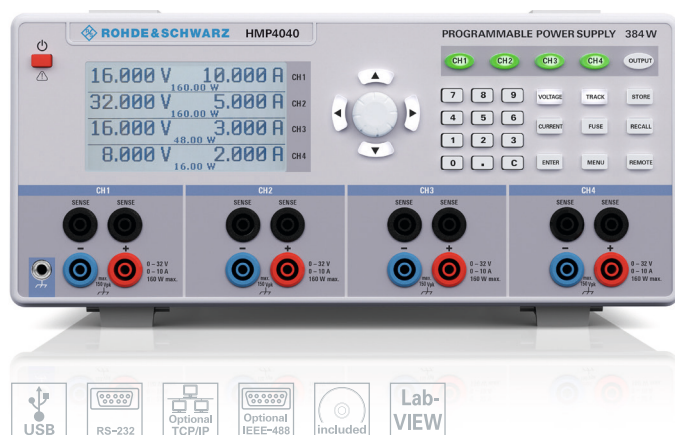
Models/options

Designation	Type	Order No.
Programmable Two-Channel Power Supply	R&S®HMP2020	3622.2075.02
Programmable Three-Channel Power Supply	R&S®HMP2030	3622.2052.02
Dual Ethernet/USB Interface	HO732	5800.3209.02
IEEE-488 (GPIB) Interface, galvanically isolated	HO740	3622.3194.02

Application	How the R&S®HMP2020/R&S®HMP2030 meets your needs
Engineering labs	<ul style="list-style-type: none"> ■ Up to 32 V and up to 10 A per channel ■ SENSE inputs ■ Overcurrent protection freely combinable with other channels (FuseLink)
Production environment	<ul style="list-style-type: none"> ■ All outputs and SENSE inputs available on rear of device ■ Remote control using RS-232/USB interface as standard, Ethernet or GPIB as an option
Simulation of charging processes of batteries	<ul style="list-style-type: none"> ■ Easy-to-program arbitrary V/I curves

R&S®HMP4030/R&S®HMP4040

Programmable Three/Four-Channel Power Supply



Key facts







- R&S®HMP4030: 3 × 0 V to 32 V/0 A to 10 A (384 W)
- R&S®HMP4040: 4 × 0 V to 32 V/0 A to 10 A (384 W)
- Low residual ripple due to linear postregulators
- Realtime voltage, current and power values
- High setting and readback resolution: 1 mV and 0.1/0.2/1.0 mA (depending on current and model)
- FuseLink (electronic fuse) freely combinable for all channels
- FuseDelay tunable up to 250 ms
- EasyArb function directly programmable on device
- PC software (free of charge) for easy generation of user-defined waveforms
- Independently adjustable overvoltage protection (OVP) for each channel
- Advanced parallel and serial operation via V/I tracking
- Front connectors: 4 mm (0.16 in) safety sockets
- Rear connectors for all channels, including SENSE
- RS-232/USB dual interface, remote control via SCPI-based commands

Models/options

Designation	Type	Order No.
Programmable Three-Channel Power Supply	R&S®HMP4030	3622.2046.02
Programmable Four-Channel Power Supply	R&S®HMP4040	3622.2023.02
Dual Ethernet/USB Interface	HO732	5800.3209.02
IEEE-488 (GPIB) Interface, galvanically isolated	HO740	3622.3194.02

Application	How the R&S®HMP4030/R&S®HMP4040 meets your needs
Engineering labs	<ul style="list-style-type: none"> ■ Up to 32 V and up to 10 A per channel ■ SENSE inputs ■ Overcurrent protection freely combinable with other channels (FuseLink)
Production environment	<ul style="list-style-type: none"> ■ All outputs and SENSE inputs available on rear of device ■ Remote control using RS-232/USB interface as standard, Ethernet or GPIB as an option
Simulation of charging processes of batteries	Easy-to-program arbitrary V/I curves

Meters and counters

Type/designation	Display	Measurements	Measurement ranges and resolution	Additional specifications
R&S®HMC8012 digital multimeter 	<ul style="list-style-type: none"> 5¼ digits (480 000 counts) Up to three values simultaneously Color TFT 	voltage, current, frequency, power, resistance (two and four-wire), temperature, capacitance, diode, continuity	<ul style="list-style-type: none"> Voltage (DC/AC): 400 mV to 1000 V/750 V (5 ranges, resolution: 1 µV) Current (DC/AC): 20 mA to 10 A (4 ranges, resolution: 100 nA) Resistance: 400 Ω to 250 MΩ (7 ranges, resolution: 1 mΩ) Capacitance: 5 nF to 500 µF (6 ranges, resolution: 1 pF) 	<ul style="list-style-type: none"> Up to 200 measurements/s Basic accuracy: 0.015% Frequency range (AC): voltage: 10 Hz to 100 kHz current: 20 Hz to 10 kHz
HM8112-3 digital multimeter 	<ul style="list-style-type: none"> 6½ digits (1 200 000 counts) Monochrome LCD 	voltage, current, resistance (two and four-wire), temperature, frequency/period, diode, continuity	<ul style="list-style-type: none"> Voltage (DC/AC): 100 mV to 600 V (5 ranges, resolution: 100 nV) Current (DC/AC): 100 µA to 1 A (5 ranges, resolution: 100 pA) Resistance: 100 Ω to 10 MΩ (6 ranges, resolution: 100 µΩ) Temperature: -270 °C to +1372 °C (depending on sensor, resolution: 0.1 °C) 	<ul style="list-style-type: none"> Up to 100 measurements/s Basic accuracy: 0.003% Frequency range (AC): voltage: 20 Hz to 300 kHz current: 45 Hz to 5 kHz
HM8118 200 kHz LCR bridge/meter 	<ul style="list-style-type: none"> 5 digits 2 values simultaneously Monochrome LCD 	inductance, capacitance, resistance, impedance, reactance, admittance, conductance, susceptance, quality factor, dissipation factor, phase angle, phase difference, ratio	<ul style="list-style-type: none"> Impedance: 3 Ω to 100 MΩ (6 ranges, resolution: 100 µΩ) Phase: -90° to +90° (resolution: 0.001°) Frequency range: 20 Hz to 200 kHz Amplitude: 50 mV to 1.5 V (RMS) Internal bias voltage: 0 V to +5 V Internal bias current: 0 A to +200 mA 	<ul style="list-style-type: none"> Up to 12 measurements/s Basic accuracy: 0.05%
HM8123 3 GHz universal counter 	<ul style="list-style-type: none"> 10 digits Monochrome LCD 	frequency/period, pulse width, duty cycle, UPM, events, frequency ratio, time interval, time difference, phase difference	<ul style="list-style-type: none"> Frequency range: DC to 3 GHz Period: 5 ns to 10 000 s 	<ul style="list-style-type: none"> Input A, B: DC to 200 MHz, input impedance: 50 Ω/1 MΩ Input C: 200 MHz to 3 GHz, input impedance: 50 Ω Basic accuracy: ±0.5 ppm
New R&S®HMC8015 power analyzer 	<ul style="list-style-type: none"> 5 digits 6 or 10 values simultaneously Harmonics as bargraph (option) Graphical signal trend (option), trend chart (option) Color TFT 	voltage, current, active power, apparent power, reactive power, power factor, phase shift, frequency, THD, energy, extended analysis (option)	<ul style="list-style-type: none"> Voltage: 15 V to 1800 V (peak, 7 ranges, resolution: 100 µV) Current: 15 mA to 60 A (peak, 12 ranges, resolution: 100 nA) 	<ul style="list-style-type: none"> Simultaneous acquisition of voltage and current with 500 ksample/s Input impedance: 2 MΩ, shunt: 500 mΩ/10 mΩ, frequency range: DC to 100 kHz Basic accuracy: 0.05%
R&S®CTH portable radio test set 	<ul style="list-style-type: none"> 2 × 16 values Monochrome LCD Display adjustable in 5 steps (max. to off) 	frequency, power, VSWR, OTA, DTF, voice reporting	<ul style="list-style-type: none"> Frequency range: 25 MHz to 500 MHz Power measurement range: 0.1 W to 50 W OTA dynamic range: 60 dB DTF measurement ranges: 3 m to 120 m/240 m/480 m, (default: 120 m) 	<ul style="list-style-type: none"> Ruggedized All-weatherproof

R&S®HMC8012 Digital Multimeter



Key facts

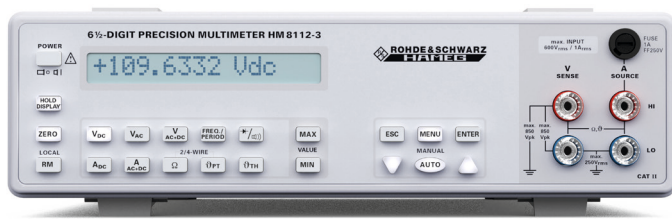
- Measurement range: DC to 100 kHz
- Resolution: 1 μV, 100 nA, 1 mΩ, 1 pF, 1 Hz, 0.1 °C/F
- Basic accuracy: 0.015% (DC)
- True RMS measurement, AC and AC+DC
- 5³/₄-digit display (480 000 counts)
- Simultaneous display of three measurement functions, e.g. DC+AC+statistics
- Measurement rate: up to 200 values/s
- Measurement functions: V (DC), I (DC), V (AC), I (AC), frequency, DC power, resistance (two- and four-wire), temperature (PT100/PT500/PT1000), capacitance, diode and continuity test
- Mathematic functions: limit testing, min./max., average, offset, DC power, dB, dBm
- Data logging to internal memory or USB flash drive in CSV format
- Interfaces: USB-TMC/-VCP, Ethernet, LXI, IEEE-488 (GPIB)
- SCPI commands largely compatible with Agilent 34410A (R&S®HMC8012-G): R&S®HMC8012 incl. IEEE-488 (GPIB) interface

Models/options

Designation	Type	Order No.
Digital Multimeter, 5 ³ / ₄ -digit	R&S®HMC8012	3593.0980K02
Digital Multimeter, 5 ³ / ₄ -digit, incl. IEEE-488 (GPIB)	R&S®HMC8012-G	3593.0997K02
IEEE-488 (GPIB) Interface, for R&S®HMC series	R&S®HOC740	5800.2419.02

Application	How the R&S®HMC8012 meets your needs
General purpose	<ul style="list-style-type: none"> ■ Clear 5³/₄-digit display ■ Quick and easy measurement ■ High resolution and accuracy ■ Highly valuable for service and repair centers, training centers, universities and schools
Engineering lab	<ul style="list-style-type: none"> ■ Wide frequency range from DC to 100 kHz ■ Accurate four-wire measurement ■ Long-term data logging capability ■ Fanless design
Production environment	<ul style="list-style-type: none"> ■ LXI-compliant Ethernet interface ■ USB and Ethernet interface, GPIB (R&S®HMC8012-G only) ■ SCPI remote control functionality ■ LabVIEW drivers available

HM8112-3 Digital Multimeter



Cost-efficient solution

The HM8112-3 offers all essential features for accurate measurement and data acquisition in laboratory and production environments.

Key facts

- Measurement range: DC to 300 kHz
- Resolution: 100 nV, 100 pA, 100 $\mu\Omega$, 1 pF, 0.01 °C/F
- High accuracy: 0.003% (DC), 0.08% (AC)
- True RMS measurement, AC and AC+DC
- 6½-digit display (1 200 000 counts)
- Measurement functions: voltage, current, resistance and temperature (PT100/PT1000 and Ni sensors) measurements, frequency and diode tests (two and four-wire)
- Measurement intervals: 0.1 s to 60 s
- Mathematic functions: limit testing, min./max., average, offset
- Internal data logger for long-term acquisition
- RS-232/USB dual interface, optionally IEEE-488 (GPIB)
- HM8112-3S: HM8112-3 with scanner card

Models

Designation	Type	Order No.
Digital Multimeter, 6½-digit	HM8112-3	3593.0500K02
Digital Multimeter, 6½-digit, with Scanner Card (8+1 channels, each two and four-wire)	HM8112-3S	3593.0516K02

Application	How the HM8112-3 meets your needs
General purpose	<ul style="list-style-type: none"> ■ Clear 6½-digit display ■ Quick and easy measurement ■ Highly valuable for service and repair centers, training centers, universities or schools ■ Remote control for automated long-term data logging
Engineering lab	<ul style="list-style-type: none"> ■ High resolution and accuracy ■ Wide frequency range from DC to 300 kHz ■ Accurate four-wire measurement ■ Fanless design
Production environment	<ul style="list-style-type: none"> ■ Optional scanner card (8+1 channels) ■ RS-232, USB or GPIB interfaces, galvanically isolated ■ LabVIEW drivers available

HM8118 200 kHz LCR Bridge/Meter



Key facts

- Measurement range: 20 Hz to 200 kHz (69 steps)
- Basic accuracy: 0.05%
- Measurement rate: up to 12 values/s
- Automatic or manual selection of circuit type (serial, parallel)
- Measurement functions: L, C, R, |Z|, X, |Y|, G, B, D, Q, ϕ , Δ , M, N
- Transformer measurement: mutual inductance and ratio
 - Internal: 0 V to 5 V/0 mA to 200 mA (resolution: 10 mV/1 mA)
 - External: 0 V to 40 V (bias voltage only)
- RS-232/USB dual interface for remote control
- Fanless design

Models/options

Designation	Type	Order No.
200 kHz LCR Bridge/Meter	HM8118	3593.0539K02
Binning Interface, for automatic sorting of components	HO118	3594.6224.02
IEEE-488 (GPIB) Interface, galvanically isolated	HO880	3594.3748.02

Application	How the HM8118 meets your needs
Component incoming inspection	<ul style="list-style-type: none"> ■ High accuracy and automatic modes ensure reliable, reproducible results
Component validation (variation/quality)	<ul style="list-style-type: none"> ■ Easy-to-use user interface ■ Fast measurements shorten test time ■ Optional accessories make transformer measurements possible
Test of SMD components	<ul style="list-style-type: none"> ■ Standard test fixture for SMD components allows out-of-the-box measurements
Easy integration into factory lines using optional HO118 binning interface	<ul style="list-style-type: none"> ■ Binning interface can control handler/sorter in factory line ■ Fast measurement mode and remote control using RS-232/USB or optional GPIB interface

HM8123 3 GHz Universal Counter



Key facts

- Measurement range: DC to 3 GHz
 - Input A/B (BNC): DC to 200 MHz
 - Input C (SMA): 100 MHz to 3 GHz
- Input impedance
 - Input A/B: 50 Ω or 1 MΩ (switchable), sensitivity: 25 mV
 - Input C: 50 Ω, sensitivity: 30 mV
- 10-digit resolution (at 10 s gate time)
- Nine measurement functions, external GATE and ARMING connectors (BNC)
- External reference input/output (10 MHz) via BNC connector
- HM8123: TCXO (temperature stability: $\pm 0.5 \times 10^{-6}$), HM8123-X: OCXO (temperature stability: $\pm 1.0 \times 10^{-8}$)
- RS-232/USB dual interface, optionally IEEE-488 (GPIB)
- Fanless design

Models/options

Designation	Type	Order No.
3 GHz Universal Counter	HM8123	3593.0545K02
3 GHz Universal Counter, OCXO (temperature stability: $\pm 1.0 \times 10^{-8}$)	HM8123-X	3593.0551K02
Test Cable BNC/BNC	HZ33/HZ34	3594.4073.02/ 3594.4096.02
19" Rackmount Kit, 2 HU	HZ42	3622.3207.02
Adapter, BNC to 4 mm banana	HZ20	3594.3977.02
IEEE-488 (GPIB) Interface, galvanically isolated	HO880	3594.3748.02

Application	How the HM8123 meets your needs
Analog RF circuit design	<ul style="list-style-type: none"> ■ High sensitivity and frequency range up to 3 GHz ■ 10-digit resolution for precise measurement results ■ Optional OCXO for even higher accuracy
Development of clock and clock distribution systems	<ul style="list-style-type: none"> ■ Interchannel measurements: frequency/period/time interval/phase A:B ■ Burst measurements
Education and service	<ul style="list-style-type: none"> ■ Fast boot time ■ Easy to use

R&S®HMC8015 Power Analyzer



Key facts

- ▮ Measurement range: DC to 100 kHz
- ▮ Measurement rate: 500 ksamples/s
- ▮ Simultaneous display of voltage and current, each with 16-bit resolution
- ▮ Basic accuracy: 0.05%
- ▮ 26 measurement and mathematical functions
- ▮ Data logging to USB flash drive in CSV format or remotely via interface
- ▮ Oscillographic waveform diagram (option)
- ▮ Display of harmonics as a bargraph or table (option)
- ▮ Realtime integrator
- ▮ Limit tests with pass/fail indication (option)
- ▮ In line with ENERGY STAR, EN 50160, EN 50564, EN 61000-3-2, IEC 62301 (option)

New

Simultaneous acquisition of voltage and current, high resolution, and a perfect balance between sampling rate and bandwidth: top-class technical characteristics and a wide range of functions make the R&S®HMC8015 power analyzer a practical choice for development labs and industrial environments, for service and support and for educational settings. State-of-the-art, powerful technology coupled with versatile and practical connection options meet the needs of a broad variety of users while satisfying demanding customer requirements.

Models/options

Designation	Type	Order No.
Power Analyzer	R&S®HMC8015	3593.8646.02
Power Analyzer, incl. IEEE-488 (GPIB) interface	R&S®HMC8015-G	3593.8875.02
Advanced Analysis Option, voucher	HVC151	3622.0795.02
Advanced I/O Option, voucher	HVC152	3622.3788.02
OneBox Tester Option, voucher	HVC153	3622.3794.02
Power Adapter for R&S®HMC8015, EU plug	R&S®HMC815-EU	3593.8850.02
Power Adapter for R&S®HMC8015, GB plug	R&S®HMC815-GB	3622.2246.02
Power Adapter for R&S®HMC8015, USA plug	R&S®HMC815-USA	3622.2252.02
AC/DC Current Probe, 30 A, 4 mm connector	R&S®HMC50	3622.4690.02
AC/DC Current Probe, 1000 A, 4 mm connector	R&S®HMC51	3622.4684.02

Application	How the R&S®HMC8015 meets your needs
General purpose	<ul style="list-style-type: none"> ▮ Easy setup and fast startup through autoranging and automated AC/DC switchover ▮ Simultaneous display of up to 10 measured or calculated values ▮ Simultaneous logging of up to 10 measured values on USB stick in CSV format ▮ Remote control via standard interfaces and driver suite
Measurement of power requirements (battery life) on low-power devices (LPDs)	<ul style="list-style-type: none"> ▮ High measurement accuracy due to measurement ranges for low voltages and low currents ▮ Low-resistance shunt for current measurements and high input impedance for voltage measurements for minimal influence on measurement results ▮ Long-term evaluation via integrator, with a six-month capacity
Measurements in the test lab or field	All measurements and related documentation are possible without a PC (also applies to FFT, inrush currents and voltages, trend charts, etc.)

R&S®CTH Portable Radio Test Set



Always on duty

The R&S®CTH allows dependable testing of analog FM radio systems, even under challenging environmental conditions. In addition, it can also be used for distance-to-fault measurements and over-the-air verification. The radio test set was designed especially for outdoor use.

Key facts

- Extensive measurement capabilities
 - Receiver test with flexible frequency setting
 - Frequency measurement
 - Power measurement
 - VSWR
 - Over-the-air measurement
 - Distance-to-fault measurement
 - Voice reporting
- Rugged and all-weatherproof
 - Robust and shockproof
 - Splashproof
 - Wide temperature range

Models/options

Designation	Type	Order No.
Portable Radio Test Set	R&S®CTH200A	1207.1000.02
Transit Case	R&S®CTH-Z20	1207.1900.02
50 Ω Load, BNC Adapter and Cables	R&S®CTH-Z30	1207.1700.02

Application	How the R&S®CTH meets your needs
Verification of FM radios	<ul style="list-style-type: none"> ■ Quick check of FM radios before use or on a regular basis ■ TX test to verify power and frequency ■ RX test to check receiver sensitivity with 150 Hz subaudio and 900 Hz audio tone
Over-the-air measurements	<ul style="list-style-type: none"> ■ On-the-go check of basic operation and frequency setting ■ Verification of transmission and correct frequency setting before going into the field
Cable fault measurements	<ul style="list-style-type: none"> ■ Verification of fault-free cabling in the field such as remote antennas ■ Display of the distance to a cable fault and help to identify the problem

Appendix

Service and support



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Rohde & Schwarz

worldwide

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At company headquarters in Munich, around 2600 employees work in research and development, central sales and service, marketing and administration.

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Service that adds value

Dear Customers,

I am often asked what has made Rohde & Schwarz so successful over so many decades and enabled the company to drive technological progress in its fields of business. One aspect is the passion with which we work every day in our development labs to push the limits of what is physically feasible. Another is our desire to create only products that meet customer expectations in terms of technology, functionality and quality.

Our service philosophy is another key factor to our success. For us it goes without saying that we offer our customers the best possible support in all phases of the product lifecycle. We therefore provide a wide variety of customized service offerings, which we plan in dialog with our customers and our specialists as early as the product development phase. This lets us identify and cater to individual needs early on, in order to minimize costs while maximizing availability and autonomy. Our comprehensive and continually growing range of services is designed to ensure that you are satisfied with every aspect of our products. I am convinced that this commitment, implemented by our worldwide network of dedicated, expert service personnel, is one of the major factors behind the success of our company.

Sincerely yours,

Christian Leicher (President and COO)

Investment protection, tailor-made

Rohde & Schwarz offers full-range service at your command. You can mix and match our services according to your technical and budgetary requirements.

R&S® Extended Warranty

The R&S® Extended Warranty offers cost control while giving you full service from the start. If there is a problem, you are insured against extra service costs. For a fraction of the purchase price, you can rest easy for years with the security afforded by manufacturer service.

- ▮ Low, predictable costs
- ▮ Safe and dependable
- ▮ Transparent and flexible

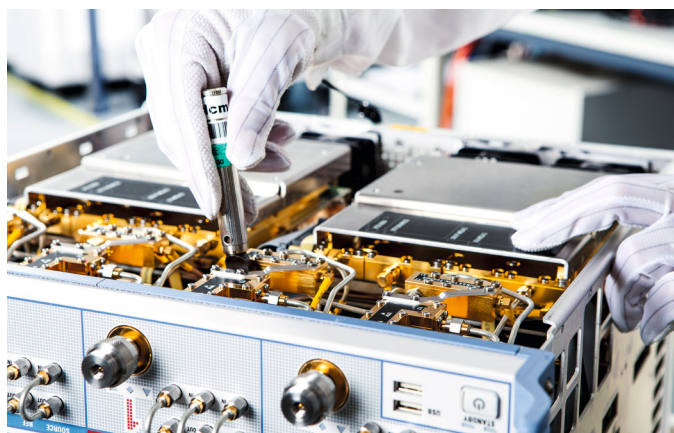
To make sure you get the full benefit of the functionality and precision of your instruments for the longest possible time, we offer a range of services that are tailored to your specific needs. Choose extended warranty for complete protection in case of repair, or the attractive extended warranty with calibration coverage package for additional regular calibration of your instrument. Both are available with terms of one to four years.

Warranty extension:

- ▮ Repair in case of malfunction
- ▮ R&S® Manufacturer Calibration if necessary during repair
- ▮ Firmware updates
- ▮ Preventive maintenance and reliability modifications

Warranty extension with calibration coverage additionally covers:

- ▮ Planned calibrations in line with Rohde & Schwarz guidelines and ISO/IEC 17025
- ▮ Calibration as needed during technical upgrades



Rohde & Schwarz calibration services

Our various calibration products enable us to tailor our services to your individual needs. Whether you choose our R&S®Manufacturer Calibration or a R&S®Accredited Calibration – you will always receive a service package that is more complete and comprehensive than what a pure service provider can provide. We offer attractive contract solutions for all our products. Our sales and service representatives will be happy to help you determine the right solution for your requirements.

R&S®Accredited Calibration

R&S®Accredited Calibrations ensure compliance with international standards and calibration data traceability. Many standards require accredited calibrations as proof of competence. Our accredited service centers not only measure accredited parameters, they also verify all product characteristics. An R&S®Accredited Calibration is as comprehensive and in-depth as an R&S®Manufacturer Calibration and provides additional accreditation documentation.

R&S®Manufacturer Calibration

An R&S®Manufacturer Calibration ensures you a comprehensive range of services. As the manufacturer, we take care of all required adjustments, software updates and hardware modifications. We document each calibration with a certificate that contains both the incoming and outgoing status of your instrument. This enables you to evaluate your instrument's past performance and draw conclusions

about future performance. Like all Rohde & Schwarz calibrations, the R&S®Manufacturer Calibration is based on national and international standards.

Multivendor performance calibration

We also service other manufacturers' instruments. As an equipment manufacturer, we know the relevant parameters for a definitive calibration. That is what makes us a competent partner for calibrating other manufacturers' instruments. During multivendor performance calibration, all required manufacturer-specified instrument parameters are measured. You receive a calibration certificate and documentation of measurement results. These services are also available as accredited services.

Depot calibration

Take advantage of all the benefits of our fast and efficient depot service. With Rohde & Schwarz depot calibration, your instrument is returned after just a few days. Express depot calibration takes just one day plus shipping time. We will be happy to take care of the logistics for you – just ask.

On-site calibration

Would you like to reduce your downtime even more? We can come to you with our mobile calibration system – no need for time-consuming packing and shipping. Our sales and service representatives will be happy to sit down with you and tailor a calibration concept to your needs.

	R&S®Accredited Calibration	R&S®Manufacturer Calibration	Multivendor performance calibration
ISO 17025 accredited	•		◦
ISO 9001 certified	•	•	•
Calibrated in line with ISO 17025	•	•	•
Traceability to national/international standards	•	•	•
Virus and malware scan for Rohde & Schwarz products	•	•	•
Incoming results	•	•	•
Comprehensive measurement in line with manufacturer specifications	•	•	•
Firmware update	•	•	
Required adjustments	•	•	
Preventive maintenance/performance modifications	•	•	
Outgoing results (after repair or adjustment)	•	•	
Calibration certificate	•	•	•
R&S®Online Service Management	•	•	•
Service report	•	•	•
Cleaning	•	•	•
Electrical safety test	•	•	•

◦ Optionally accredited.

Rohde&Schwarz standard price repair

If a Rohde&Schwarz product ever does need to be repaired, smooth handling is required: without hassle, without losing time and without any unpleasant surprises regarding costs. That's why Rohde&Schwarz offers its customers a standard price repair option: an intelligent comprehensive solution featuring guaranteed all-inclusive fixed prices, little handling effort and efficient procedures.

Scope of the Rohde&Schwarz standard price repair:

- ▀ Repair of the equipment
- ▀ Full calibration in line with ISO 17025, including documentation of the test results¹⁾
- ▀ 12-month service warranty on the entire equipment²⁾
- ▀ Latest firmware and hardware updates³⁾

With the standard price repair, you are always on the safe side:

- ▀ Defined fixed price
- ▀ Smooth handling
- ▀ Minimum effort
- ▀ Reliable repair by the manufacturer
- ▀ Updates and calibration included
- ▀ Extensive service warranty

R&S®Online Service Management

R&S®Online Service Management provides you with a clear overview and helps you save time by simplifying the management of instrument data, service cases and test equipment. You also benefit from numerous service management functions. A clear user interface makes operation intuitive.

Advantages

- ▀ **Secure:** R&S®Online Service Management gives you secure access to all service-related data, 24/7. Just log on to the password-protected area at my.rohde-schwarz.com/service to conveniently manage your service requests and calibration schedule, wherever you are
- ▀ **Comprehensive:** To make sure that you have more time for your core business, we put all your instrument data together in one place for an easy overview. It shows you all the documentation and configuration data for your instruments as well as the status of repairs and calibrations. At a glance, you can track service cases, make new requests and see active and inactive warranties

¹⁾ For equipment requiring calibration.

²⁾ Applies to the repaired component if the system consists of several components, e.g. amplifier modules. Please see our General Conditions of Delivery and Service for more warranty information.

³⁾ Such modifications, e.g. precautionary component replacement, are performed as part of the continuous product improvement process and do not change the specifications or other product characteristics.

- ▀ **Efficient:** A good management system should make even complex things easier. The R&S®Online Service Management helps you organize your service cases, making previous, current and scheduled calibrations easy to enter and manage. The easy operation and clear navigation save you time as well as unnecessary paperwork

Functions and operation

- ▀ **Equipment:** Manage your equipment – see at a glance whether an instrument was recently calibrated or needs to be in the near future
- ▀ **Service requests:** Place service requests, track the status of orders or review past services. You can also download calibration and service reports
- ▀ **Contracts and more:** Keep your contracts in view and store your personal data – user, division, contact information and much more



Global service and sales locations



Trademarks

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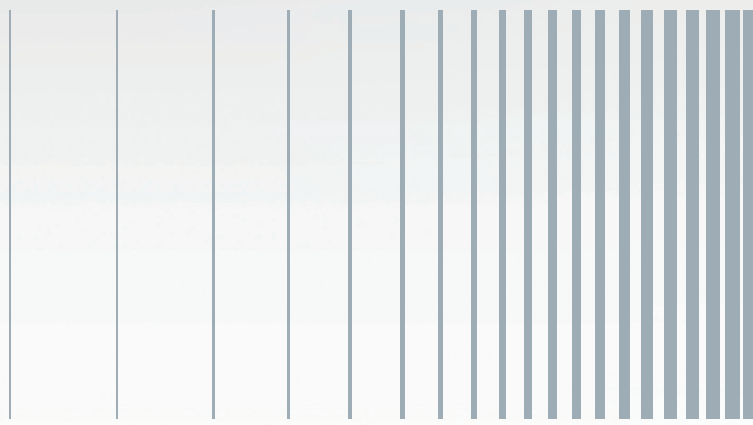
Explanation of icons

In this catalog, the instrument interfaces are represented by icons underneath the picture of the respective instrument. These icons are explained below.

Icon	Explanation
	HDMI The instrument can be connected to a computer via the high-definition multimedia interface (HDMI™).
	DVI output An external monitor can be connected via a digital visual interface (DVI).
	USB The instrument can be connected to a computer via universal serial bus (USB) using a USB cable with a standard B type plug.
	Optional USB An option is available that upgrades the instrument with a USB interface so that it can be connected to a computer via universal serial bus (USB) using a USB cable with a standard B type plug.
	Mini USB The instrument can be connected to a computer via universal serial bus (USB) using a USB cable with a mini-B type plug.
	RS-232 The instrument is equipped with an RS-232 interface.
	USB stick The instrument is equipped with a universal serial bus (USB) upstream interface that can be used to connect a USB flash drive or other USB mass storage devices with a standard A type plug.
	SD card An SD card can be inserted, e.g. for saving measurement results.
	TCP/IP The instrument is equipped with an Ethernet interface that can be connected to a local area network (LAN).
	Optional TCP/IP An option is available that upgrades the instrument with an Ethernet interface so that it can be connected to a local area network (LAN).
	Optional optical TCP/IP An option is available that upgrades the instrument with an optical Ethernet interface so that it can be connected to a local area network (LAN) with an FDDI PMD, 100 Mbit/s, duplex SC connector.
	IEEE-488 The instrument is equipped with an IEEE-488 interface, also referred to as general-purpose interface bus (GPIB). This bus is widely used for controlling instruments in laboratories.
	Optional IEEE-488 An option is available that upgrades the instrument with an IEEE-488 interface, also referred to as general-purpose interface bus (GPIB). This bus is widely used for controlling instruments in laboratories.
	Software included The instrument is shipped with a CD or DVD that contains PC software for controlling the instrument or processing measurement results.
	LabVIEW The instrument can be controlled using the LabVIEW software from National Instruments.
	WLAN The instrument can be remote controlled via a wireless local area network (WLAN).
	VGA screen Settings, results, etc. are shown on the integrated 16.5 cm (6.5") display with VGA resolution (640 × 480 pixel).
	Wide VGA screen Settings, results, etc. are shown on the integrated 17.7 cm (7") display with WVGA resolution (800 × 480 pixel).
	Touchscreen The user can control the instrument by touching the screen with a special pen and/or one or more fingers.
	50 Ω/1 MΩ The input impedance of the instrument can be switched between 50 Ω and 1 MΩ.



Rohde & Schwarz representative



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