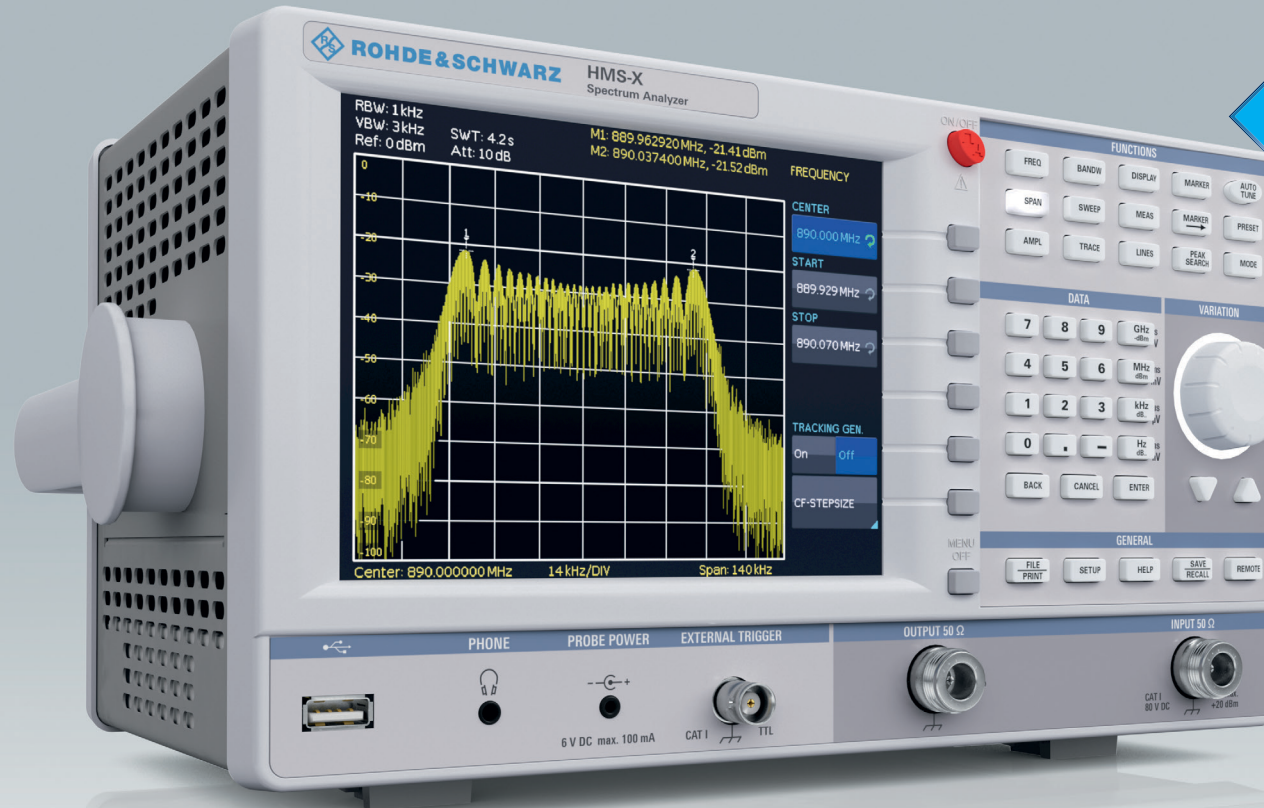


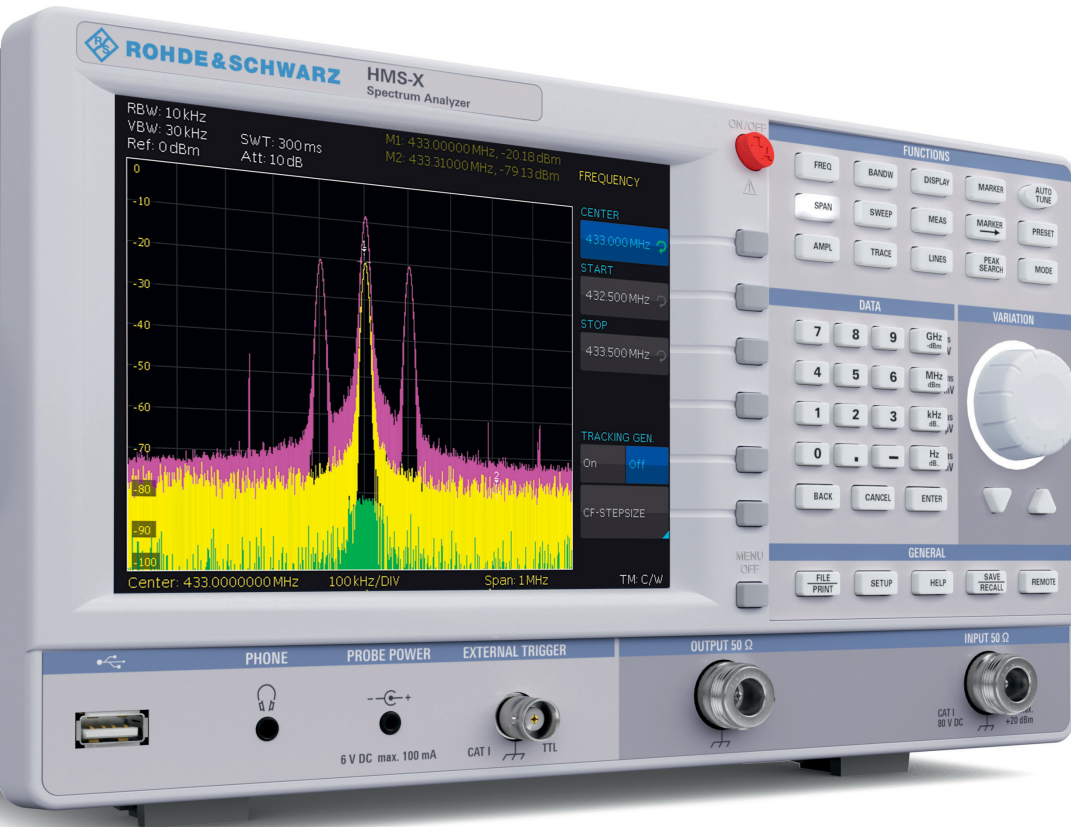
# Spectrum Analyzer

## 1.6 GHz | 3 GHz

### R&S®HMS-X



# 1 Basic Unit + 3 Options



## Key facts

- Frequency range: 100 kHz to 1.6 GHz/3 GHz <sup>1)</sup>
- Spectral purity greater than -100 dBc/Hz (at 100 kHz)
- SWEEP from 20 ms to 1000 s
- Detectors: auto-, min-/max.-peak, sample, RMS, average, quasi-peak <sup>2)</sup>
- Miscellaneous marker/ $\Delta$ marker and peak functions
- Tracking generator <sup>3)</sup>
  - Frequency range: 5 MHz to 1.6 GHz/3 GHz <sup>1)</sup>
  - Output level: -20 dBm to 0 dBm
- Directly export data to USB flash drive, RS-232/USB dual interface for remote control
- Fanless design and fast boot time

<sup>1)</sup> with R&S®HMS-3G option/R&S®HV212 voucher

<sup>2)</sup> with R&S®HMS-EMC option/R&S®HV213 voucher

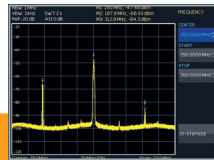
<sup>3)</sup> with R&S®HMS-TG option/R&S®HV211 voucher



| Model overview              | R&S®HMS-X with EMC Option                                               | R&S®HMS-X basic unit             |
|-----------------------------|-------------------------------------------------------------------------|----------------------------------|
| Amplitude measurement range | -114 dBm to +20 dBm                                                     | -104 dBm to +20 dBm              |
| DANL                        | typ. -135 dBm                                                           | typ. -104 dBm                    |
| Resolution bandwidth        | 100 Hz to 1 MHz, 200 kHz (-3 dB), 200 Hz, 9 kHz, 120 kHz, 1 MHz (-6 dB) | 10 kHz to 1 MHz, 200 kHz (-3 dB) |
| Video bandwidth             | 10 Hz to 1 MHz                                                          | 1 kHz to 1 MHz                   |

# Your R&S®HMS-X Spectrum Analyzer

You can create your R&S®HMS spectrum analyzer by combining a basic unit with any of three available options. In case of growing requirements, upgrade vouchers allow you to upgrade your instruments with all options at any point in time.



**R&S®HMS-EMC**

- This option activates all the functions that are required for EMC precompliance measurements. The preamplifier option has been integrated into the new R&S®HMS-EMC option.

**3 GHz**



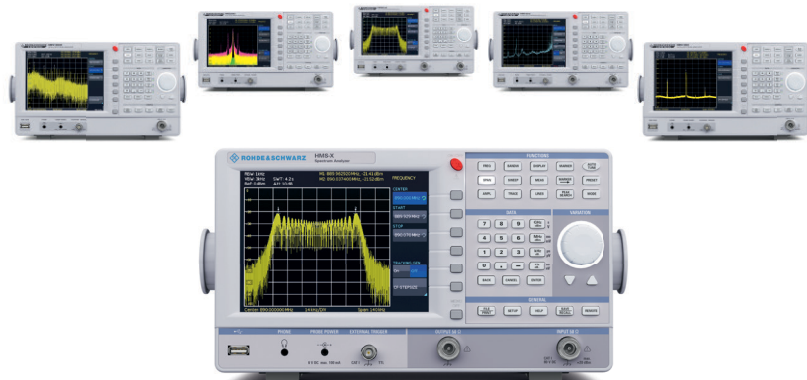
**R&S®HMS-3G**

- The frequency range is increased from 1.6GHz to 3GHz with this option.



**R&S®HMS-TG**

- This option activates the tracking generator in the instrument.



We have used the first-class hardware from our HMS spectrum analyzer and developed a new and flexible instrument concept. It can be individually configured, combined and upgraded for your applications.

| HMS previous models | R&S®HMS-X                           |
|---------------------|-------------------------------------|
| HMS1000E            | HMS-X                               |
| HMS1000             | HMS-X + EMC <sup>1)</sup>           |
| HMS1010             | HMS-X + EMC <sup>1)</sup> + TG      |
| HMS3000             | HMS-X + EMC <sup>1)</sup> + 3G      |
| HMS3010             | HMS-X + EMC <sup>1)</sup> + 3G + TG |

<sup>1)</sup> The preamplifier function is an integral part of the HMS-EMC option

# EMC Precompliance

Not only do unexpected results in test labs during EMC compliance measurements translate into extra costs, quite often they also cause a substantial delay for your project. Rohde & Schwarz offers effective and cost-efficient tools for EMC precompliance measurements which allow you to successfully prevent possible surprises before the actual onset of a problem.

Our HMEexplorer software for your EMC measurements is included with every R&S®HMS-X spectrum analyzer with activated EMC option.

## EMC precompliance sets

Rohde & Schwarz offers product sets for your EMC precompliance measurements, which include all necessary instruments to analyse typical EMC problems. Depending on your requirements, you can choose between a 1 GHz and a 3 GHz combination.

### 1 GHz EMC-SET1

- Spectrum analyzer R&S®HMS-X incl. R&S®HMS-EMC option
- Probe set R&S®HZ530
- Line impedance stabilization network (LISN) R&S®HM6050-2
- HMEexplorer software

R&S®HMS-X

R&S®HMS-EMC

### 3 GHz EMC-SET2

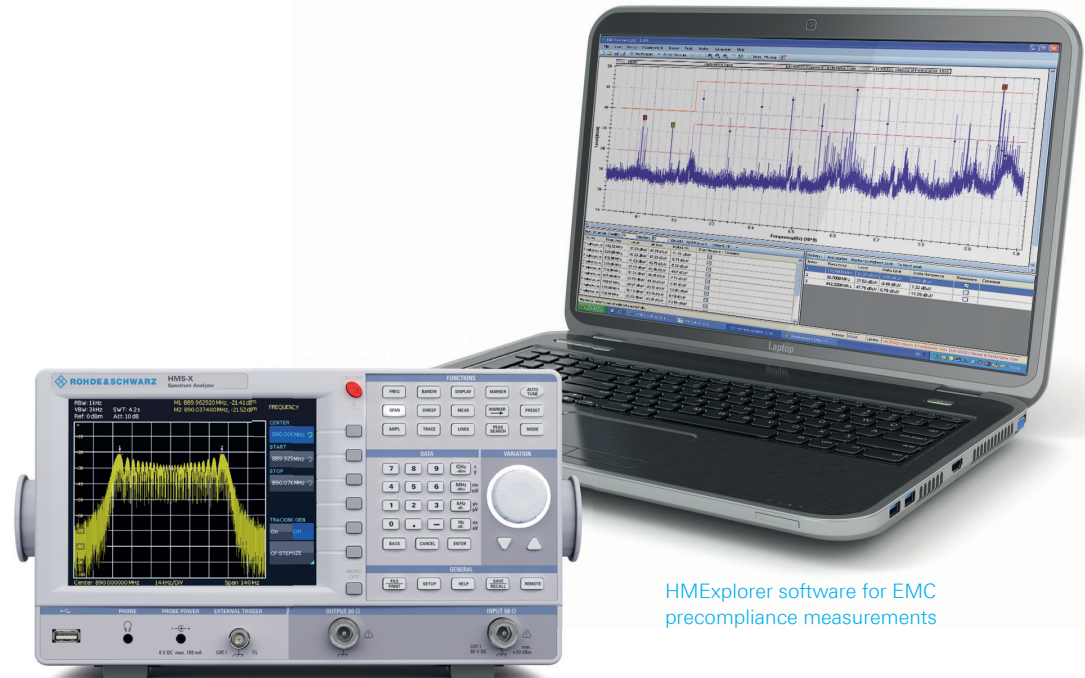
Differences to SET1:

- R&S®HMS-3G option additional
- 3 GHz probe set R&S®HZ540 instead of R&S®HZ530

R&S®HMS-X

R&S®HMS-EMC

R&S®HMS-3G



Spectrum analyzer R&S®HMS-X

HMEexplorer software for EMC precompliance measurements



Line impedance stabilization network for line conducted measurements LISN R&S®HM6050-2



1 GHz probe set R&S®HZ530



3 GHz probe set R&S®HZ540 (fig. similar)

# Recommended Accessories

## 3 GHz VSWR bridge R&S®HZ547

This unit is used to measure the voltage standing wave ratio (VSWR) and reflection coefficient of a device under test with an impedance of 50  $\Omega$ . Typical test devices include attenuators, terminations, frequency switches, amplifiers, cables and mixers.



3 GHz VSWR bridge for R&S®HMS-X, option R&S®HMS-TG required, option R&S®HMS-3G recommended

## Near-field probe set 3 GHz R&S®HZ540

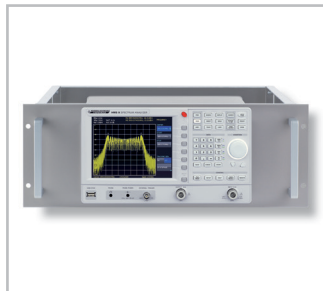
Near field probe set for comparative measurements with built-in preamplifier covering frequency ranges from 1 MHz to 3 GHz, designed for the 50  $\Omega$  N-connectors of the R&S®HMS-X series:

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



## R&S®HZ46

4RU 19" rackmount kit



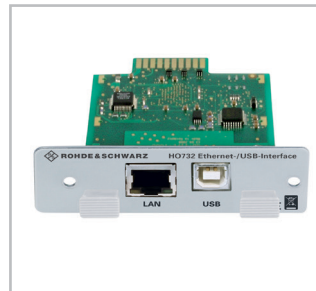
## R&S®HZ99

Carrying case for protection and transport



## R&S®HO732

Ethernet/USB dual interface card



## R&S®HO740

Interface IEEE-488 (GPIB), galvanically isolated



## R&S®HZ530

Near-field probe set 1 GHz



# Upgrade at any time

You can easily upgrade all three available options at any later point in time with option upgrade vouchers available at your dealer.

The voucher number and the serial number of your R&S®HMS-X instrument enable you to generate the respective licence key directly on our web page <http://voucher.rohde-schwarz.com>.



| R&S®HMS-X options                  | Option code <sup>1)</sup> | Voucher code <sup>2)</sup> |
|------------------------------------|---------------------------|----------------------------|
| EMC option incl. preamplifier      | R&S®HMS-EMC               | R&S®HV213                  |
| Bandwidth upgrade to 3 GHz         | R&S®HMS-3G                | R&S®HV212                  |
| Unlock built-in tracking generator | R&S®HMS-TG                | R&S®HV211                  |

<sup>1)</sup> Available only with purchase of R&S®HMS-X basic unit.

<sup>2)</sup> Activate R&S®HMS-X options at any time after purchase of R&S®HMS-X basic unit.



## Accessories included:

Line cord, printed operating manual

## Recommended accessories:

|           |                                                          |
|-----------|----------------------------------------------------------|
| R&S®HO732 | Dual-interface ethernet/USB                              |
| R&S®HO740 | Interface IEEE-488 (GPIB), galvanically isolated         |
| R&S®HZ530 | Near-field probe set 1 GHz for EMI diagnostics           |
| R&S®HZ540 | Near-field probe set 3 GHz for EMI diagnostics           |
| R&S®HZ547 | 3 GHz VSWR bridge for R&S®HMS-X, incl. R&S®HMS-TG option |
| R&S®HZ46  | 4RU 19" rackmount kit                                    |
| R&S®HZ72  | GPIB-cable 2 m                                           |
| R&S®HZ99  | Carrying case for protection and transport               |

## R&S®HMS-X Spectrum analyzer – Specifications (from firmware version 2.250, all specifications at 23 °C after 30 minutes warm-up)

| Frequency                                                                    |                                                           |
|------------------------------------------------------------------------------|-----------------------------------------------------------|
| Frequency range                                                              |                                                           |
| basic unit                                                                   | 100 kHz to 1.6 GHz                                        |
| with R&S®HMS-3G/R&S®HV212                                                    | 100 kHz to 3 GHz                                          |
| Accuracy of the internal reference                                           | $\pm 2 \times 10^{-6}$                                    |
| Temperature stability                                                        | $\pm 2 \times 10^{-6}$ (0 °C to +30 °C)                   |
| Aging (per year)                                                             | $\pm 1 \times 10^{-6}$                                    |
| Frequency counter (with R&S®HMS-EMC option/R&S®HV213 voucher)                |                                                           |
| Resolution                                                                   | 1 Hz                                                      |
| Accuracy                                                                     | $\pm$ (frequency $\times$ tolerance of reference)         |
| Span range                                                                   |                                                           |
| basic unit                                                                   | 0 Hz (Zero Span), 100 Hz to 1.6 GHz                       |
| with R&S®HMS-3G/R&S®HV212                                                    | 0 Hz (Zero Span), 100 Hz to 3 GHz                         |
| Spectral purity, SSB phase noise (with R&S®HMS-EMC option/R&S®HV213 voucher) |                                                           |
| 30 kHz from carrier (500 MHz, +20 °C to +30 °C)                              | < –85 dBc/Hz                                              |
| 100 kHz from carrier (500 MHz, +20 °C to +30 °C)                             | < –100 dBc/Hz                                             |
| 1 MHz from carrier (500 MHz, +20 °C to +30 °C)                               | < –120 dBc/Hz                                             |
| Sweep time                                                                   |                                                           |
| $f_{\text{span}} = 0$ Hz (zero span)                                         | 2 ms to 100 s                                             |
| $f_{\text{span}} > 0$ Hz                                                     | 20 ms to 1000 s, min. 20 ms per 600 MHz                   |
| Resolution bandwidths (–3 dB)                                                |                                                           |
| basic unit                                                                   | 10 kHz to 1 MHz (in 1 to 3 steps), 200 kHz                |
| with R&S®HMS-EMC/R&S®HV213                                                   | 100 Hz to 1 MHz (in 1 to 3 steps), 200 kHz                |
| Tolerance                                                                    |                                                           |
| $f \leq 300$ kHz                                                             | $\pm 5$ % typ.                                            |
| $f > 1$ MHz                                                                  | $\pm 10$ % typ.                                           |
| Resolution bandwidths (–6 dB)                                                |                                                           |
| with R&S®HMS-EMC/R&S®HV213                                                   | CISPR: 200 Hz, 9 kHz, 120 kHz, 1 MHz                      |
| Video bandwidths                                                             |                                                           |
| basic unit                                                                   | 1 kHz to 1 MHz (in 1 to 3 steps)                          |
| with R&S®HMS-EMC/R&S®HV213                                                   | 10 Hz to 1 MHz (in 1 to 3 steps)                          |
| Amplitude                                                                    |                                                           |
| Display range                                                                | Average noise level displayed up to +20 dBm               |
| Amplitude measurement range                                                  |                                                           |
| basic unit                                                                   | –104 dBm to +20 dBm (typ.)                                |
| with R&S®HMS-EMC/R&S®HV213                                                   | –114 dBm to +20 dBm (typ.)                                |
| Max. voltage at HF input                                                     | 80 V DC                                                   |
| Max. power at HF input                                                       | 20 dBm (permanently), 30 dBm (temporarily for max. 3 min) |
| Intermodulation-free range                                                   |                                                           |
| TOI products, $2 \times -20$ dBm (–10 dBm ref. level)                        | 66 dB (typ.) (typ. +13 dBm third-order-intercept)         |
| signal distance $\leq 2$ MHz                                                 | 60 dB (typ., +10 dBm TOI)                                 |
| signal distance $> 2$ MHz                                                    | 66 dB (typ., +13 dBm TOI)                                 |

| DANL (displayed average noise level) (ref. level $\leq -30$ dBm, frequency range 10 MHz to 3 GHz) |                                                                                                            |
|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 10 kHz (RBW), 1 kHz (VBW)                                                                         | –95 dBm (typ. –104 dBm)                                                                                    |
| 100 Hz (RBW), 10 Hz (VBW) with R&S®HMS-EMC/R&S®HV213                                              | –115 dBm (typ. –135 dBm)                                                                                   |
| Preamplifier with R&S®HMS-EMC/R&S®HV213                                                           | –124 dBm (typ.)                                                                                            |
| Inherent spurious                                                                                 |                                                                                                            |
| ref. level $\leq -20$ dBm, $f > 30$ MHz, RBW $\leq 100$ kHz                                       | < –80 dBm                                                                                                  |
| Input related spurious (mixer level $\leq -40$ dBm)                                               |                                                                                                            |
| Carrier offset: 1 MHz to 1.6 GHz                                                                  | –70 dBc (typ.)                                                                                             |
| 1.6 GHz to 3 GHz with R&S®HMS-3G/R&S®HV212                                                        | –55 dBc (typ.)                                                                                             |
| 2nd harmonic receive frequency                                                                    |                                                                                                            |
| Mixer level: –40 dBm                                                                              | –60 dBc (typ.)                                                                                             |
| Level display                                                                                     |                                                                                                            |
| Reference level                                                                                   | –80 dBm to +20 dBm in 1 dB steps                                                                           |
| Display range                                                                                     |                                                                                                            |
| basic unit                                                                                        | 100 dB, 50 dB, 20 dB, 10 dB                                                                                |
| with R&S®HMS-EMC/R&S®HV213                                                                        | linear                                                                                                     |
| level display error (ref. level –50 dBm, 20 °C to 30 °C)                                          | < 1.5 dB (typ. 0.5 dB)                                                                                     |
| Display scaling                                                                                   |                                                                                                            |
| logarithmical                                                                                     | dBm, dBμV, dBmV                                                                                            |
| linear, with R&S®HMS-EMC/R&S®HV213                                                                | percentaged from reference level                                                                           |
| Measured curves                                                                                   | 1 curve and 1 memory curve                                                                                 |
| Trace mathematics                                                                                 | A-B (curve-stored curve), B-A                                                                              |
| Detectors                                                                                         |                                                                                                            |
| basic unit                                                                                        | auto-, min/max. peak, sample, RMS, average                                                                 |
| with R&S®HMS-EMC/R&S®HV213                                                                        | same as basic unit, quasi-peak in addition                                                                 |
| Marker and delta marker                                                                           |                                                                                                            |
| Number of markers                                                                                 | 8                                                                                                          |
| Marker functions                                                                                  | peak, next peak, minimum, center to marker, frequency, reference level to marker level, all marker on peak |
| Marker display                                                                                    |                                                                                                            |
| basic unit                                                                                        | normal (level, logarithmic), delta marker, noise marker, normal (linear)                                   |
| mit R&S®HMS-EMC/R&S®HV213                                                                         | (frequency) counter                                                                                        |
| Connectors                                                                                        |                                                                                                            |
| HF Input                                                                                          |                                                                                                            |
| Connector                                                                                         | N socket                                                                                                   |
| Input impedance                                                                                   | 50 Ω                                                                                                       |
| VSWR (10 MHz to 3 GHz)                                                                            | < 1.5 (typ.)                                                                                               |

| Tracking generator output (with R&S®HMS-TG/R&S®HV211) |                                                                                                         |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Connector                                             | N socket                                                                                                |
| Output impedance                                      | 50 Ω                                                                                                    |
| Frequency range                                       |                                                                                                         |
| basic unit                                            | 5 MHz to 1.6 GHz                                                                                        |
| with R&S®HMS-3G/R&S®HV212                             | 5 MHz to 3 GHz                                                                                          |
| Output level                                          | –20 dBm to 0 dBm (in 1 dB steps)                                                                        |
| Trigger input                                         |                                                                                                         |
| Connector                                             | BNC socket                                                                                              |
| Trigger level                                         | TTL                                                                                                     |
| Trigger types                                         |                                                                                                         |
| basic unit                                            | free run, single trigger, external trigger                                                              |
| with R&S®HMS-EMC/R&S®HV213                            | same as basic unit, video trigger in addition                                                           |
| External reference input / output                     |                                                                                                         |
| Connectors                                            | BNC socket                                                                                              |
| Reference frequency                                   | 10 MHz                                                                                                  |
| min. level (50 Ω)                                     | 10 dBm                                                                                                  |
| Interfaces                                            |                                                                                                         |
| for mass storage                                      | 2 $\times$ USB-host (type A), FAT16/32                                                                  |
| for remote control                                    | R&S®HO720 dual interface: RS-232 / USB-device (type B)                                                  |
| Optional interfaces                                   | R&S®HO732 dual interface: Ethernet (RJ45) / USB-device (type B)<br>R&S®HO740 interface: IEEE-488 (GPIB) |
| Video output                                          | DVI-D (480p, 60Hz), HDMI compliant                                                                      |
| Save and recall                                       | on internal file system (up to 10 device settings) or external USB memory (max. 4 GB)                   |
| Additional connectors                                 |                                                                                                         |
| Supply output for field probes                        | 6V DC, max. 100 mA (2.5 mm DIN jack)                                                                    |
| Audio output                                          | 3.5 mm DIN jack                                                                                         |
| Demodulation                                          | AM and FM (via internal speaker)                                                                        |
| General Characteristics                               |                                                                                                         |
| Display                                               |                                                                                                         |
| screen size / type                                    | 16.5 cm (6.5") VGA color TFT                                                                            |
| resolution                                            | 640 $\times$ 480 (LED)                                                                                  |
| Power supply                                          |                                                                                                         |
| AC supply                                             | 105 V to 253 V, 50 Hz to 60 Hz, CAT II                                                                  |
| power consumption                                     | 40 W (typ.)                                                                                             |
| Safety                                                | safety class I (EN61010-1)                                                                              |
| Temperature                                           |                                                                                                         |
| operating temperature range                           | +5 °C to +40 °C                                                                                         |
| storage temperature range                             | –20 °C to +70 °C                                                                                        |
| Rel. humidity                                         | 5% to 80% (without condensation)                                                                        |
| Mechanical data                                       |                                                                                                         |
| dimensions (W $\times$ H $\times$ D)                  | 285 $\times$ 175 $\times$ 220 mm (11.2 $\times$ 6.9 $\times$ 8.7 in)                                    |
| weight                                                | 3.6 kg (7.9 lb)                                                                                         |



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