

# R&S®HZ-15/R&S®HZ-17 Probe Sets

## R&S®HZ-16 Preamplifier

E and H near-field emission measurements with test receivers, spectrum analyzers and oscilloscopes



# R&S®HZ-15

# R&S®HZ-16

# R&S®HZ-17

## At a glance

Near-field measurements are often performed if, for example, a developer has to find out why an emission limit of an EMC standard is exceeded. Based on field strength measurements, the developer already knows several critical frequencies of the device or module under test. A practical way to reduce EMI is to analyze near fields, locate the sources and come up with targeted countermeasures. Furthermore, the passive near-field probes can also be used for immunity measurements.

Before you perform a near-field analysis, you first need to know how the E and H fields are distributed. The five probes from the R&S®HZ-15 probe set are well suited for this purpose. If only magnetic fields need to be analyzed, the R&S®HZ-17 probe set is sufficient.

All near-field probes are designed for ease of use, and are ideal for measuring high-frequency fields starting at 30 MHz on printed boards and on components.

The magnetic field probes include special electrically shielded probe tips. The various probe tip shapes are designed for tasks in near-field measurements. The upper limit frequency of a probe is determined by the size and design of the probe tip. All probes are passive and are connected to the 50  $\Omega$  input of a test receiver, spectrum analyzer or oscilloscope. The R&S®HZ-16 preamplifier increases sensitivity.

### Key facts

- ▮ Frequency range from 30 MHz to 3 GHz
- ▮ R&S®HZ-15 probe set comes with two E field and three H field probes
- ▮ R&S®HZ-17 probe set comes with two H field probes
- ▮ R&S®HZ-16 preamplifier with 20 dB gain increases sensitivity
- ▮ Electrically shielded magnetic field probes with easy determination of magnetic field orientation

R&S®HZ-15 near-field probe set with the R&S®FPH spectrum analyzer and the R&S®HZ-16 preamplifier.



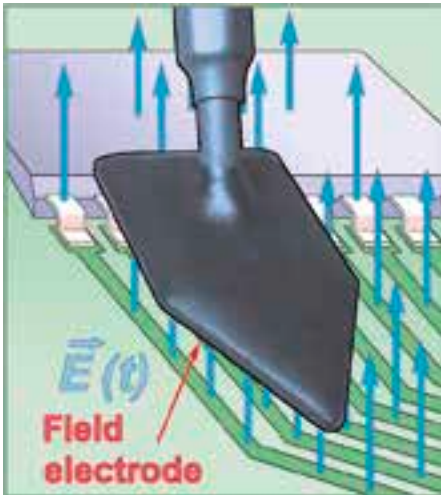
R&S®HZ-15 near-field probe set with the R&S®RTO2064 oscilloscope.



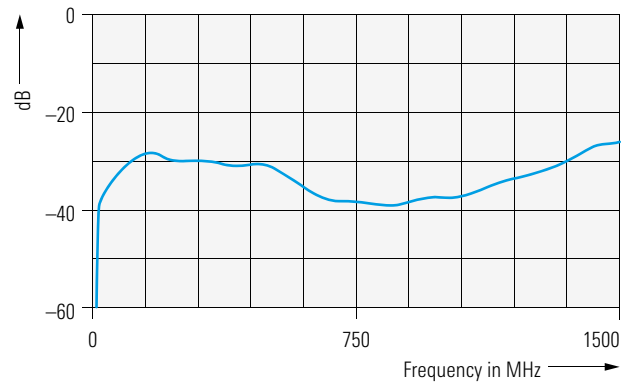
# The E field probes

## E field probe RSE02

The surfaces of bus structures, large components or supply structures emit E fields that can cause EMI. The bottom of the RSE02 probe detects these fields on an area measuring approx. 2 cm x 5 cm.

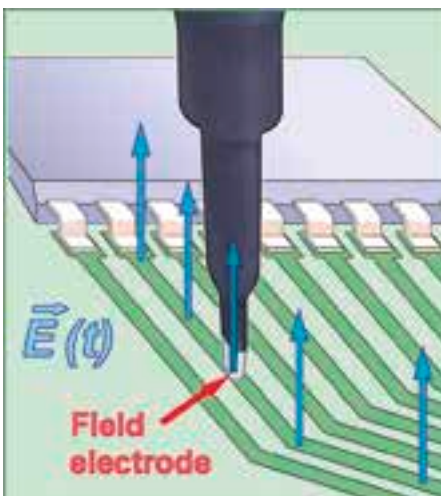


Typical characteristic in the 30 MHz to 1.5 GHz frequency range

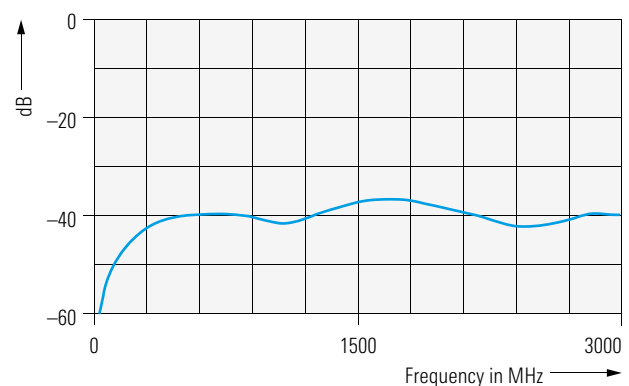


## E field probe RSE10

The narrow electrode of the RSE10 probe can select a single conductor track from a bundle of conductor tracks 0.2 mm in width. The light color of the probe tip stands out in sharp contrast to the dark green of the printed board.



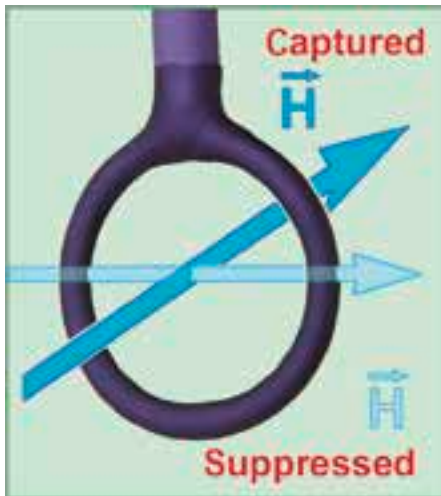
Typical characteristic in the 30 MHz to 3 GHz frequency range



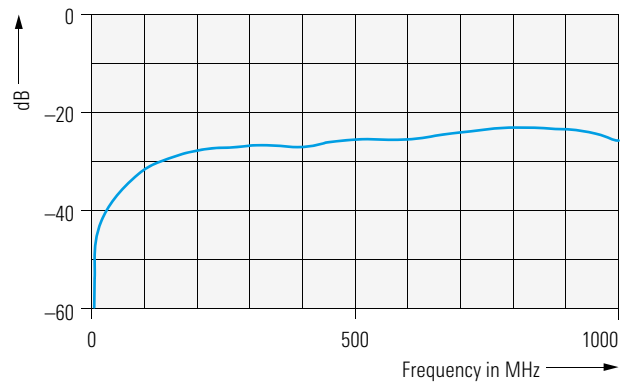
# The H field probes

## H field probe RSH400-1

Owing to its large diameter (approx. 25 mm), the RSH400-1 probe for H field is extremely sensitive and provides the average of the magnetic field strength in the loop area of the probe. You can use the probe at a 10 cm distance around modules and instruments.

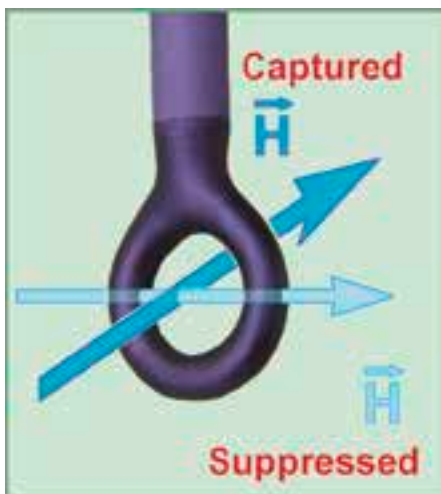


Typical characteristic in the 30 MHz to 1 GHz frequency range

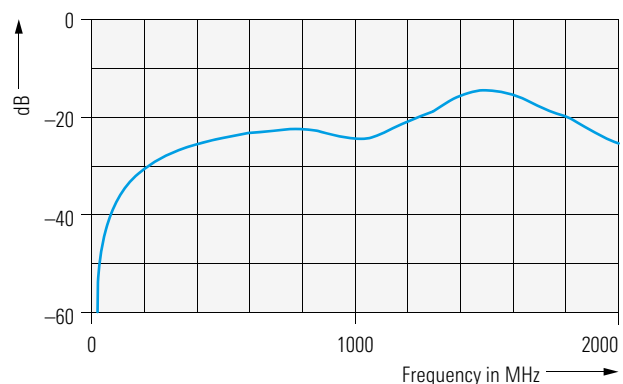


## H field probe RSH50-1

The RSH50-1 (diameter approx. 10 mm) is higher in resolution and lower in sensitivity than the RSH400-1. It is suitable for performing measurements at a smaller distance of up to approx. 3 cm. In this range, you can determine field distribution and field orientation even more precisely.

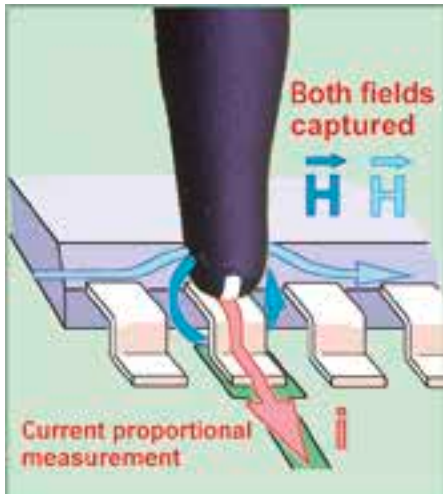


Typical characteristic in the 30 MHz to 2 GHz frequency range

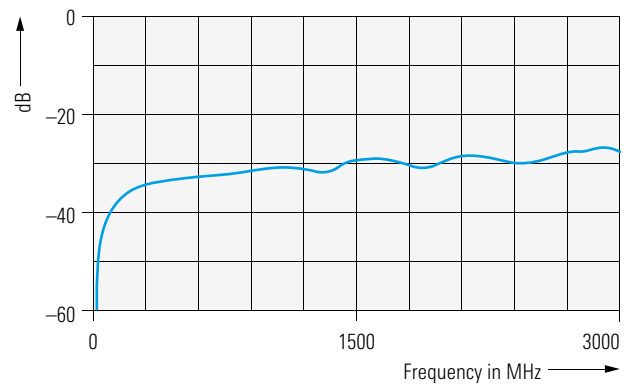


## H field probe RSH2.5-2

The RSH2.5-2 H field probe can be used to selectively detect the current spectrum in conductor tracks and component leads such as on capacitors or ICs. The probe tip has a magnetically active groove of approx. 0.5 mm in width.



Typical characteristic in the 30 MHz to 3 GHz frequency range

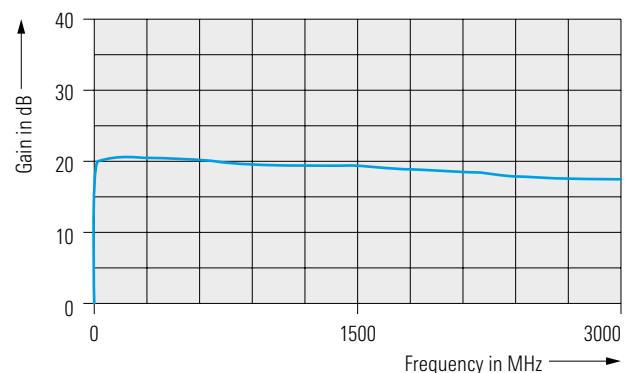


# R&S®HZ-16 preamplifier

Inserting the R&S®HZ-16 preamplifier between the near-field probe and the measuring instrument makes it easier to measure very weak high-frequency fields of up to 3 GHz. The input and output are provided as 50  $\Omega$  BNC connectors.



Typical frequency response



# Specifications in brief

Specifications in brief		
<b>R&amp;S®HZ-15 probe set</b>		
E field probes		RSE02, RSE10
H field probes		RSH400-1, RSH50-1, RSH2.5-2
Frequency range		30 MHz to 3 GHz
RF output		SMB (female), 50 Ω
Isolation voltage		60 V DC / 42.4 V AC (peak)
Maximum RF input power	RSE02, RSE10	5 W
	RSH400-1, RSH50-1	4 W
	RSH2.5-2	0.5 W
<b>R&amp;S®HZ-17 probe set</b>		
H field probes		RSH400-1, RSH2.5-2
Frequency range		30 MHz to 3 GHz
RF output		SMB (female), 50 Ω
Isolation voltage		60 V DC / 42.4 V AC (peak)
Maximum RF input power	RSH400-1	4 W
	RSH2.5-2	0.5 W
<b>R&amp;S®HZ-16 preamplifier</b>		
Frequency range		100 kHz to 3 GHz
Gain		20 dB (typ.)
Noise figure		4.5 dB (nom.)
Maximum RF input power		13 dBm
RF connector	input/output	BNC (female), 50 Ω
Operating voltage		12 V DC ±10 %
Current drain		50 mA (typ.)
Mains voltage	plug-in power supply	100 V to 240 V AC ±10 %
Mains frequency	plug-in power supply	50 Hz to 60 Hz ±5 %
Power consumption	plug-in power supply	30 W (max.)
<b>General data</b>		
Temperature range	operating	+5 °C to 45 °C
	storage	−40 °C to +70 °C
Dimensions, overall	R&S®HZ-15 and R&S®HZ-16 (W × H × D)	240 mm × 55 mm × 195 mm (9.45 in × 2.17 in × 7.7 in)
	R&S®HZ-17 (W × H × D)	175 mm × 30 mm × 145 mm (6.9 in × 1.18 in × 5.07 in)
Weight	R&S®HZ-15 in case	400 g (0.88 lb)
	R&S®HZ-16 in case	600 g (1.32 lb)
	R&S®HZ-17 in case	220 g (0.49 lb)
Electrical safety	plug-in power supply	in line with IEC/EN 60950-1
EMC	plug-in power supply	in line with IEC/EN 61204-3
Emission		class B, in line with residential environment requirements
Immunity		in line with industrial environment requirements

**Specifications with limits:** Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as <, ≤, >, ≥, ±, or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.

**Specifications without limits:** Represent warranted product performance for the specified parameter. These specifications are not specially marked and represent values with no or negligible deviations from the given value (e.g. dimensions or resolution of a setting parameter). Compliance is ensured by design.

**Nominal values (nom.):** Characterize product performance by means of a representative value for the given parameter (e.g. nominal impedance). In contrast to typical data, a statistical evaluation does not take place and the parameter is not tested during production.

# Ordering information

Designation	Type	Order No.
<b>Base unit</b>		
Near-Field Probe Set E/H-Field	R&S®HZ-15	1147.2736.02
Near-Field Probe Set H-Field	R&S®HZ-17	1339.4141.02
Preamplifier 20 dB	R&S®HZ-16	1147.2720.02
<b>Accessories supplied</b>		
The R&S®HZ-15, R&S®HZ-16 and R&S®HZ-17 each come in a robust plastic case.		
The R&S®HZ-15 and R&S®HZ-17 include a 1 m RF cable with BNC (male) and SMB (female) connectors.		
The R&S®HZ-17 additionally includes an RF adapter with N (male) and BNC (female).		
The R&S®HZ-16 includes a plug-in power supply.		

Service options		
Extended Warranty, one year	R&S®WE1	Please contact your local Rohde & Schwarz sales office.
Extended Warranty, two years	R&S®WE2	
Extended Warranty, three years	R&S®WE3	
Extended Warranty, four years	R&S®WE4	



R&S®HZ-17 near-field probe set with R&S®FPC1000 spectrum analyzer.

## Service that adds value

- | Worldwide
- | Local and personalized
- | Customized and flexible
- | Uncompromising quality
- | Long-term dependability

## Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, monitoring and network testing. Founded more than 80 years ago, the independent company which is headquartered in Munich, Germany, has an extensive sales and service network with locations in more than 70 countries.

## Sustainable product design

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

Certified Quality Management

**ISO 9001**

Certified Environmental Management

**ISO 14001**

## Rohde & Schwarz GmbH & Co. KG

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R&S®HZ-15/R&S®HZ-17 Probe Sets R&S®HZ-16 Pre-amplifier

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