

# R&S® HZ-14 Probe Set for E and H Near-Field Measurements

## Detecting EMC trouble spots



# R&S®HZ-14 Probe Set for E and H Near-Field Measurements At a glance

The R&S®HZ-14 probe set for E and H near-field measurements is a tool for detecting EMC trouble spots. It allows the identification and elimination of disturbance sources as well as the detection of spots sensitive to electromagnetic interference at an early stage of product development, which reduces the time to market.

The near-field probe set comes in a handy transit case accommodating all parts of the set and providing effective protection during transportation.



The R&S®HZ-14 is mainly used for diagnosing radiated emissions from printed boards, ICs, cables, leakage spots in shielded enclosures and similar sources of electromagnetic interference. The ergonomic design of the probes ensures easy handling. Radiated emission sources can be easily located owing to the small size of the probe tips.

Since the H-field probes are passive when operated without a preamplifier, they can also be used to find EMI-sensitive components and modules forming part of instruments or printed boards. The effectiveness of RFI suppression measures or the shielding provided by various types of enclosures and designs can be easily tested with the R&S®HZ-14 probe set.

## Key facts

- Passive H-field probe from 9 kHz to 30 MHz
- Passive H-field probe from 30 MHz to 1 GHz
- Active E-field probe from 9 kHz to 1 GHz
- 30 dB broadband preamplifier for H-field probes from 9 kHz to 1 GHz
- DC supply to operate the E-field probe
- Test jig to allow functional testing of the H-field probes
- DC power to E-field probe and preamplifier is supplied by Rohde&Schwarz measuring receivers and spectrum analyzers

Detailed view of the R&S®HZ-14 probe set.



# R&S®HZ-14 Probe Set for E and H Near-Field Measurements Benefits and key features

## H-field probes

The two H-field probes cover the frequency ranges from 9 kHz to 30 MHz and 30 MHz to 1 GHz. They have the directivity of loop antennas and are electrically shielded so that capacitive coupling is suppressed and electric fields are rejected. Each probe comes with typical correction factors to determine the magnetic field strength for an input impedance of 50  $\Omega$  of the measuring receiver. This ensures a high reproducibility of measurements. The two H-field probes are passive and can be operated bidirectionally so that local immunity tests can be performed. It is therefore possible to induce currents into lines and test signals into components by applying a known signal source to the probe input.

## E-field probe

The active E-field probe is designed for omnidirectional signal reception over the entire frequency range. When approaching a radiation source, the probe is capacitively coupled. The E-field probe is powered by the included DC supply.

## DC supply

The E-field probe is operated on DC power. It can be powered from almost all Rohde&Schwarz measuring receivers and spectrum analyzers. The corresponding connecting cables are included in the equipment supplied.

## Test jig

An included test jig allows functional testing of the H-field probes as well as simplified normalization of H-field measurements using tracking generators integrated in the measuring receivers and spectrum analyzers. The test jig includes a terminated stripline shaped to take up H-field probes.

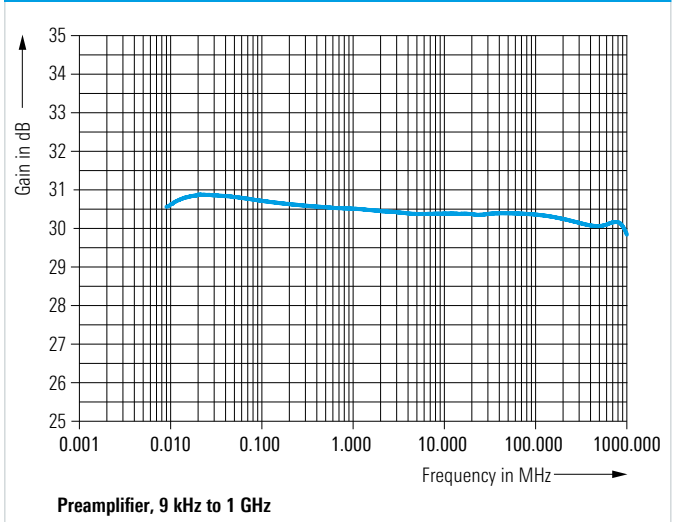
## Broadband preamplifier

The 30 dB broadband preamplifier improves the S/N ratio in low-level measurements using H-field probes. Providing a gain of 30 dB in the frequency range from 9 kHz to 1 GHz, it has a noise figure of typ. < 3 dB and a 1 dB compression point of 8 dBm (output level). It can be powered from almost all Rohde&Schwarz measuring receivers and spectrum analyzers using the supplied connecting cables.

Using the R&S®HZ-14 probes.



Frequency response of preamplifier (typ.)



# Specifications in brief

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### H-field probe (9 kHz to 30 MHz)

Frequency range		9 kHz to 30 MHz
Usable frequency range		9 kHz to 100 MHz
Maximum permissible voltage of uninsulated conductor	0 Hz to 120 Hz	500 V ( $V_p$ )
Maximum input power	EMS testing	0.5 W
RF connector		SMA female
Dimensions	W x H x D, including RF connector	256 mm x 38 mm x 18 mm (10.1 in x 1.5 in x 0.7 in)

### H-field probe (30 MHz to 1 GHz)

Frequency range		30 MHz to 1 GHz
Usable frequency range		1 MHz to 2 GHz
Maximum permissible voltage of uninsulated conductor	0 Hz to 120 Hz	500 V ( $V_p$ )
Maximum input power	EMS testing	0.25 W
RF connector		SMA female
Dimensions	W x H x D, including RF connector	256 mm x 38 mm x 18 mm (10.1 in x 1.5 in x 0.7 in)

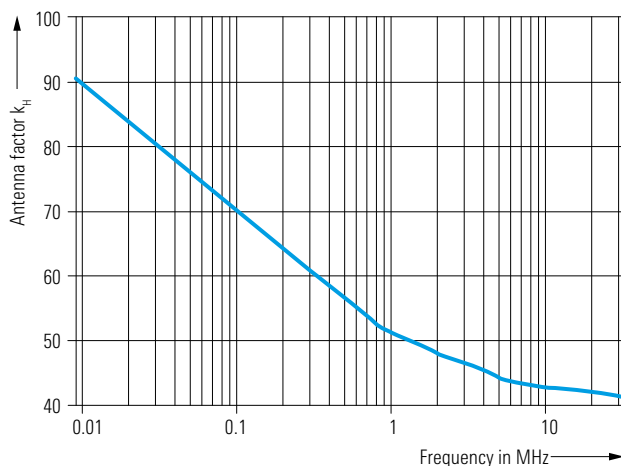
### E-field probe (9 kHz to 1 GHz)

Frequency range		9 kHz to 1 GHz
Frequency response		$\pm 3$ dB
Antenna factor with capacitive coupling		13 mV/V
Antenna factor		typ. 67 dB (1/m)
Maximum permissible voltage at probe tip		20 V
RF connector		SMA female
Dimensions	W x H x D, including RF connector	267 mm x 38 mm x 18 mm (10.5 in x 1.5 in x 0.7 in)

### DC supply

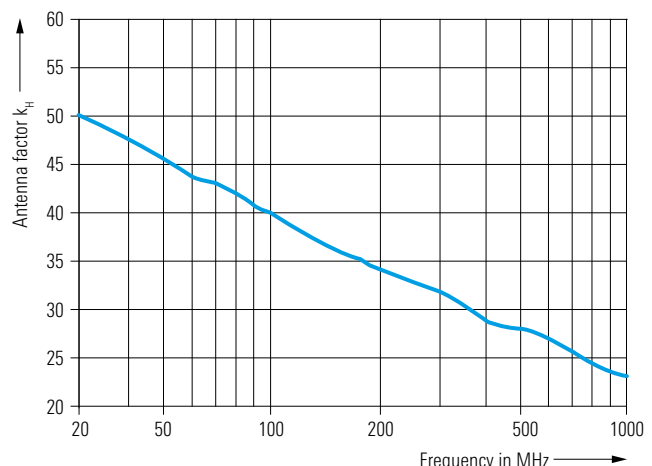
Required DC voltage	with E-field probe	10/15 V $\pm$ 0.1 V
DC connector		LEMO (2 contacts with screen)
RF connector	input	BNC female
	output	N male
Dimensions	W x H x D, including RF connector	97 mm x 26 mm x 28 mm (3.8 in x 1.0 in x 1.1 in)

### H-field probe, 9 kHz to 30 MHz, antenna factor



Typical antenna factor in dB [( $\mu$ A/m)/ $\mu$ V] versus frequency

### H-field probe, 30 MHz to 1000 MHz, antenna factor



Typical antenna factor in dB [( $\mu$ A/m)/ $\mu$ V] versus frequency

## Specifications in brief

### 30 dB broadband preamplifier

Frequency range		9 kHz to 1 GHz
Usable frequency range		9 kHz to 2 GHz
Gain		30 dB $\pm$ 2 dB, typ. 30 dB $\pm$ 1 dB
VSWR (RF input)		< 1.5
Noise figure		< 4 dB (at +25°C, 100 MHz), typ. < 3 dB
Maximum output level	1 dB compression	8 dBm
Maximum input level	damage limit	10 dBm
Third-order intercept (TOI)	RF output	typ. 25 dBm
Reverse attenuation	decoupling	> 47 dB, typ. 50 dB
Maximum DC voltage at RF input		5 V
Required DC voltage	with H-field probe	10/15 V $\pm$ 0.1 V
Current drain		< 100 mA
DC connector		LEMO (2 contacts with screen)
RF connector	input	BNC female, 50 $\Omega$
	output	N male, 50 $\Omega$
Dimensions	W $\times$ H $\times$ D, including RF connector	95 mm $\times$ 31 mm $\times$ 31 mm (3.7 in $\times$ 1.2 in $\times$ 1.2 in)
<b>Test jig</b>		
Maximum input level		20 dBm
Impedance		50 $\Omega$
RF connector	output	N male
<b>General data</b>		
Operating temperature range		0°C to +45°C
Storage temperature range		-20°C to +70°C
Overall dimensions of transit case	W $\times$ H $\times$ D	390 mm $\times$ 290 mm $\times$ 105 mm (15.4 in $\times$ 11.4 in $\times$ 4.1 in)
Weight	fully equipped	1.9 kg (4.2 lb)

# Ordering information

Designation	Type	Order No.
Probe Set for E and H Near-Field Measurements (9 kHz to 1 GHz)	R&S®HZ-14	1026.7744.03

