



ABN 43 064 478 842

> 231 osborne avenue clayton south, vic 3169  
PO box 1548, clayton south, vic 3169  
t 03 9265 7400 f 03 9558 0875  
freecall 1800 680 680  
www.tmgtestequipment.com.au

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## Complimentary Reference Material

This PDF has been made available as a complimentary service for you to assist in evaluating this model for your testing requirements.

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# R&S® HZ-12/-13 Precision Halfwave Dipole Sets

Maximum precision for antenna calibration, field strength measurements, and test site attenuation measurements

- ◆ R&S® HZ-12:  
for 30 MHz to 300 MHz
- ◆ R&S® HZ-13:  
for 300 MHz to 1000 MHz

## At a glance

Antenna calibration, critical cases of field strength measurement, as well as the validation of antenna and field strength test sites call for special measures when establishing test reference standards. To satisfy this requirement, the R&S®HZ-12 and R&S®HZ-13 precision halfwave dipole sets include built-in attenuators on both the balanced and unbalanced sides of the balun. These attenuators allow broadband stabilization matching and define the total power attenuation between the dipole elements and the 50  $\Omega$  connector. Thus, a pair of dipoles coupled head to head will always exhibit exactly calibrated attenuation.

The R&S®HZ-12 and R&S®HZ-13 precision halfwave dipole sets offer maximum precision when performing the following:

- ◆ Antenna calibration
- ◆ Field strength attenuation measurements
- ◆ Test site attenuation measurements

Halfwave dipoles are especially important in the VHF/UHF range for two reasons: They exhibit the same radiation patterns at all frequencies

because they are tuned to  $0.5\lambda$ , and they have characteristics that can be calculated precisely if the elements are thin enough.

## Application

Broadband antennas usually exhibit a frequency-dependent radiation pattern that is also subject to ambient conditions. The antenna factors cannot be calculated with the same accuracy as that of halfwave dipoles.

VHF/UHF broadband antennas thus have to be calibrated with a precision test site (reference test site) or by means of a precision dipole. Antenna and field strength test sites are validated in accordance with CISPR 16-1-4. A deviation of  $\pm 4$  dB from the theoretical values of normalized test site attenuation is permissible. Calculated coupling correction factors providing the theoretical prerequisites for accurate measurements are available for the validation of test sites with halfwave dipoles. Halfwave dipoles are thus the only tool for testing the suitability of calibration test sites, i.e. test sites for calibrating antennas in accordance with ANSI C 63.5.

The R&S®HZ-12 and R&S®HZ-13 precision halfway dipole sets have attenuators on the balanced and unbalanced sides of the balun. These attenuators provide broadband termination of the elements with 73  $\Omega$  and match and adjust the total power attenuation between the dipole elements and 50  $\Omega$  connector to approx. 10 dB.

A pair of dipoles coupled head to head yields an average attenuation of 20 dB. The balun and attenuators of the individual dipole heads are practically identical, thus making it possible to exactly define the antenna factors of the individual dipole. The sum of the antenna factors, which is required when validating test sites, is obtained from the precisely measured attenuation of the dipole pair, the voltage transformation, and the logarithm of the antenna factor.

## Scope of delivery

The R&S®HZ-12 dipoles consist of two sets of telescopic elements, and the R&S®HZ-13 dipoles consist of thin, replaceable elements. The R&S®HZ-12 and R&S®HZ-13 are supplied with flanges for the R&S®HFU-Z mast system and similar mast systems suitable for Rohde & Schwarz antennas.

Each set of dipoles is supplied in a convenient carrying case that holds all hardware and protects the dipoles during transport. The manual which is included contains attenuation charts and a table for the height-dependent correction of antenna factors above a conducting ground plane.



*Precision halfwave dipole sets: R&S®HZ-12 (left) and R&S®HZ-13 in convenient carrying case*

## Specifications

### R&S®HZ-12 precision halfwave dipole set

Frequency range	30 MHz to 300 MHz
Power attenuation of a dipole pair (head to head)	20 dB (calibration curve supplied)
Power attenuation of matching pad per dipole	10 dB
VSWR	<1.1
Antenna factor	7.5 dB to 27.6 dB
Connectors	N female, 50 $\Omega$
Power-handling capacity if used as transmit antenna	<0.5 W
Dimensions, length of support	0.58 m (22.8 in)
1st dipole pair (telescopic)	0.66 m to 2.5 m each (26.0 in to 98.4 in each)
2nd dipole pair (telescopic)	0.24 m to 0.67 m each (9.4 in to 26.3 in each)
Weight, dipole set in carrying case	7.8 kg (17.2 lb)
1 complete dipole	1.9 kg (4.2 lb)
Operating temperature range	0 °C to +50 °C

### R&S®HZ-13 precision halfwave dipole set

Frequency range	300 MHz to 1000 MHz
Power attenuation of a dipole pair (head to head)	20 dB (calibration curve supplied)
Power attenuation of matching pad per dipole	10 dB
VSWR	<1.2 (300 MHz to 800 MHz) <1.3 (800 MHz to 1000 MHz)
Antenna factor	27.4 dB to 38.0 dB
Connectors	N female, 50 $\Omega$
Power-handling capacity if used as transmit antenna	<0.5 W
Dimensions, length of support	0.58 m (22.8 in)
Dipole elements	4 pairs of dipole elements, adjustable in length
Weight, dipole set in carrying case	7.5 kg (16.5 lb)
1 complete dipole	1.2 kg (2.6 lb)
Operating temperature range	0 °C to +50 °C

## Ordering information

Designation	Type	Order No.
Precision Halfwave Dipole Set, 30 MHz to 300 MHz	R&S®HZ-12	0816.2870.02
Precision Halfwave Dipole Set, 300 MHz to 1000 MHz	R&S®HZ-13	0816.2940.02



More information at  
[www.rohde-schwarz.com](http://www.rohde-schwarz.com)  
(search term: HZ-12, HZ-13)



[www.rohde-schwarz.com](http://www.rohde-schwarz.com)

Europe: +49 1805 12 4242, [customersupport@rohde-schwarz.com](mailto:customersupport@rohde-schwarz.com)  
USA and Canada: +1-888-837-8772, [customer.support@rsa.rohde-schwarz.com](mailto:customer.support@rsa.rohde-schwarz.com)  
Asia: +65 65 130 488, [customersupport.asia@rohde-schwarz.com](mailto:customersupport.asia@rohde-schwarz.com)