

Handheld Log-Periodic Antenna

R&S[®] HL300

450 MHz to 8 GHz

Technical Information

Subject to change [2013-06, 8GEP-re]

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Technical Information

1. Uses

The handheld log-periodic antenna R&S[®]HL300 in conjunction with portable spectrum analyzers (e.g. R&S[®]FSH4/813/20) is used for determination of RF parameters as well as for localizing potential interfering sources. The direction of signal sources is found by pointing the antenna towards the direction of maximum signal voltage.

The overall frequency range from 450 MHz to 8 GHz is covered by a log-periodic dipole array antenna structure with a distinct directional pattern. The antenna does not have to be tuned within its frequency range.

A built-in GPS receiver with an integrated patch antenna and an electronic compass provides position and bearing data for further processing in the connected spectrum analyzer. A toggle switch at the antenna handle activates or deactivates the LNA (Low Noise Amplifier) inside R&S[®]FSH4/8/13/20 thus allowing the use of the system in the vicinity of strong transmitters.

R&S[®]HL300 is characterized by the following features:

- Unambiguous direction finding, i.e. distinct directional pattern with the receive maximum pointing to the front in the frequency range from 450 MHz to 8 GHz.
- The maximum of the antenna output signal serves as a directional criterion (maximum direction finding).
- Handy size despite extreme broadband capability.
- Fatigue-free operation due to the antenna design and the material used, which keep weight to a minimum.
- Mainly used for vertical polarization but for test purposes horizontal polarization can also be used by turning the antenna by 90°.
- May be mounted on a tripod (1/4" mounting thread).
- Power supply via the connected R&S[®]FSH4/8/13/20 through the data and control cable.

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2. Description

The R&S[®]HL300 comprises the following elements:

- Log-periodic dipole array antenna with a nearly frequency-independent directional pattern
- GPS receiver and electronic compass
- Toggle switch for activating or bypassing the LNA of R&S[®]FSH4/8/13/20, indication with adjacent LED
- Cable to spectrum analyzer (length approx. 1.5m with N-type connector and control connector)
- Tripod mounting thread

The R&S[®]HL300 should only be switched to "Active" mode if there are no strong transmitters in close vicinity and the sensitivity of the receiving system (antenna with spectrum analyzer) in "Passive" mode is not sufficient to detect the signal.

When the LNA inside of R&S[®]FSH4/8/13/20 is activated, a green LED on the rear of the supply and display unit indicates this.

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3. Specifications

3.1. Electrical data

3.1.1. RF characteristics

Frequency range	450 MHz to 8 GHz
Polarization	vertical (also horizontal polarization is possible by turning the antenna 90°)
Nominal impedance	50 Ω
VSWR	< 2.5 (500 MHz to 8 GHz) < 3 (below 500 MHz) for typical values see Fig. 1
RF output	N-male
Practical gain	for typical values see Fig. 2
Antenna factor	for typical values see Fig. 2
Typical directional patterns	see Fig. 3a/b

3.1.2. GPS / Electronic compass characteristics

Control connector	“Binder” 7 pin male
Supply voltage	5 V ± 0.2 V (supplied by spectrum analyzer)
Current consumption	max. 100 mA
GPS	
Acquisition time	typ. 26 s (cold start, all satellites with -130 dBm)
Time pulse frequency	1 Hz
Time pulse accuracy	30 ns RMS (under good GPS signal conditions)
Navigation update rate	1 Hz
Electronic compass	
Azimuth	0° to 360° in 1° steps
Elevation	-60° to 60° in 1° steps
Accuracy	typ. 2° RMS for 0° elevation typ. 4° RMS for ± 60° elevation

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3.2. Mechanical data

Dimension

Max. length approx. 580 mm

Max. width approx. 310 mm

Max. depth approx. 90 mm

Weight

Antenna approx. 1 kg

Transport bag approx. 0.3 kg

Operating temperature range -30°C to +55°C ¹

Nominal temperature range -10°C to +50°C

Storage temperature range -30°C to +60°C

Vibration resistance (acc. to DIN EN 60068-2-64)
random 10 Hz to 300 Hz: 0.01 g²/Hz
300 Hz to 500 Hz: 0.003 g²/Hz
every 30 minutes in the three orthogonal axes;
acceleration approx. 1.9 g rms

Shock resistance (acc. to DIN EN 60068-2-27 and MIL STD 810 E)
max. 40 g,
crossover frequency 45 Hz
in 3 orthogonal axes

MTBF >100.000 h
(according to SN29500, ground benign, 45°C)

¹ No condensation

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4. Equipment Supplied

Delivery of the R&S®HL300 includes:

- 1 transport bag
- 1 carrying belt
- 1 manual (CD-ROM)

5. Recommended Extras

The following extras are recommended:

Handheld spectrum analyzer R&S®FSH4/8/13/20 1309.6000.xx
1314.2000.xx

Commercial tripod available in specialist shops

6. Ordering Information

Handheld log-periodic antenna R&S®HL300 4097.3005.02

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7. Figures

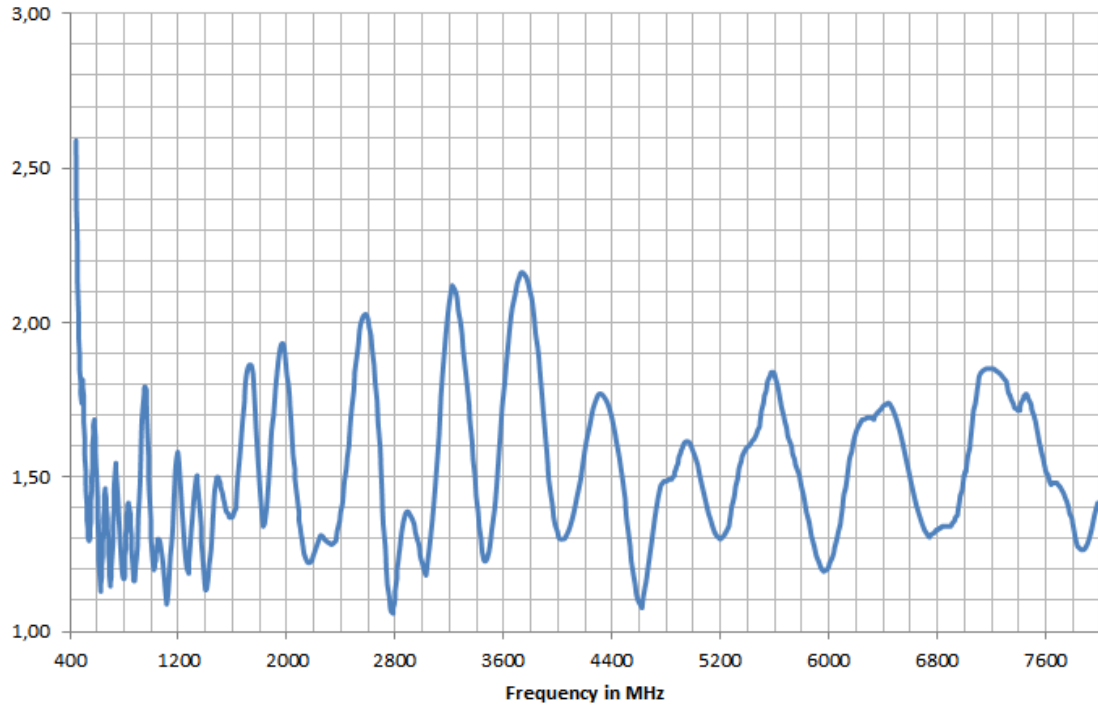


Fig. 1: Typical VSWR

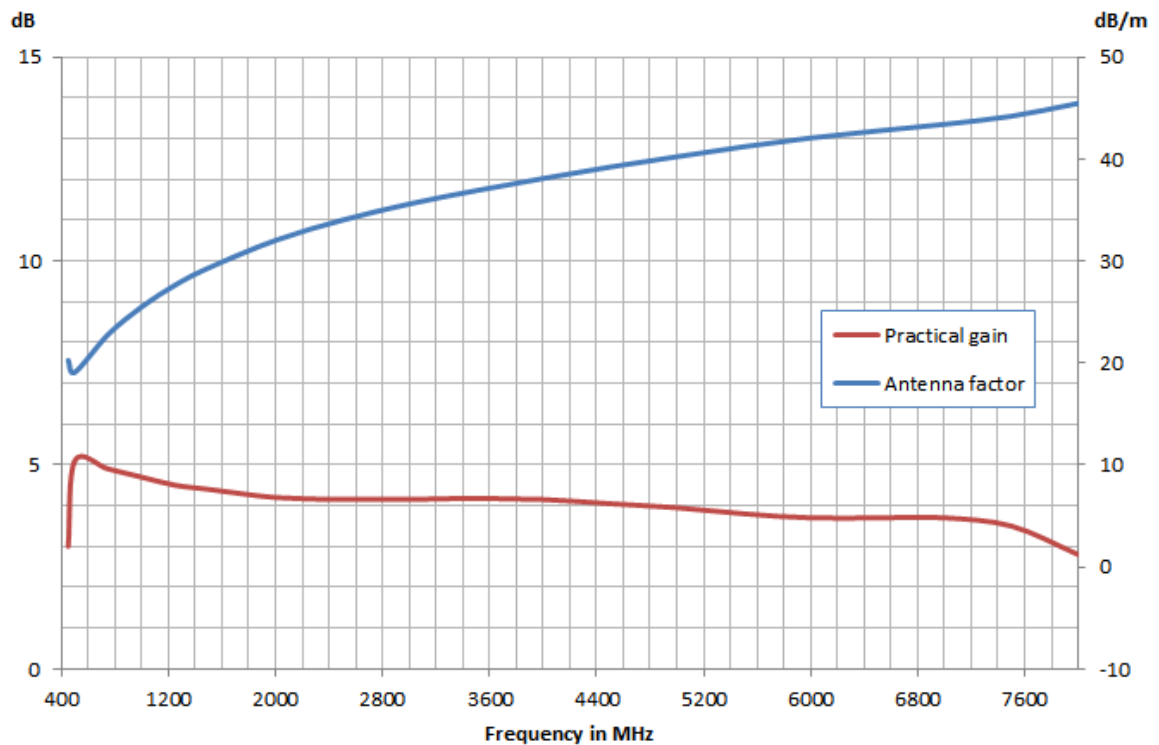


Fig. 2: Typical antenna factor and practical gain

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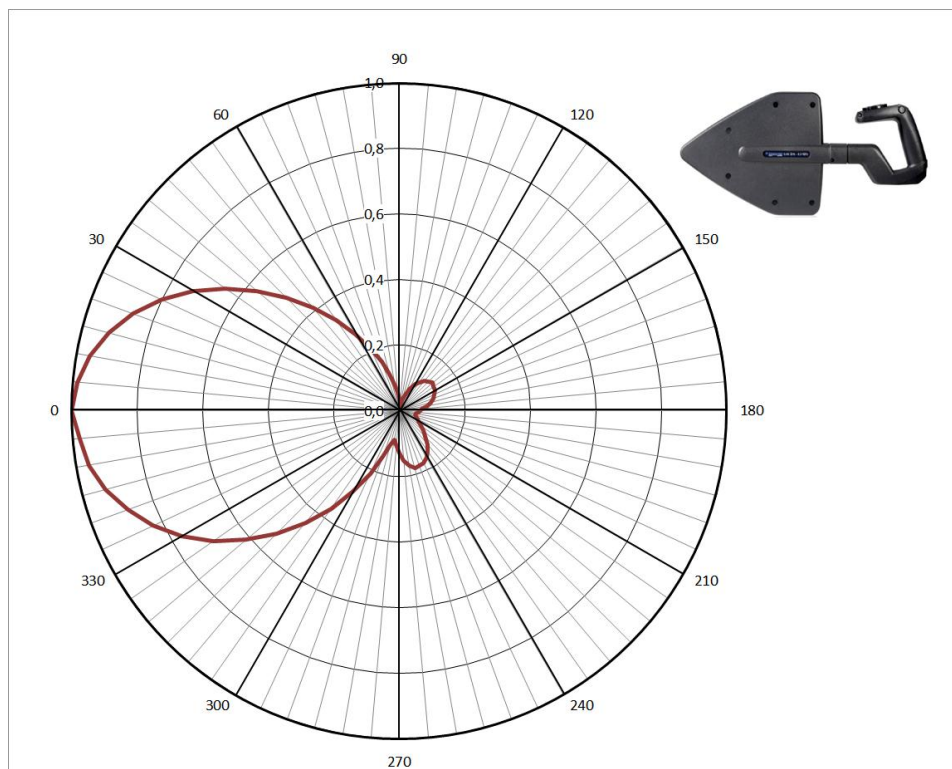


Fig. 3a: Typ. E field pattern, 450 MHz to 8 GHz

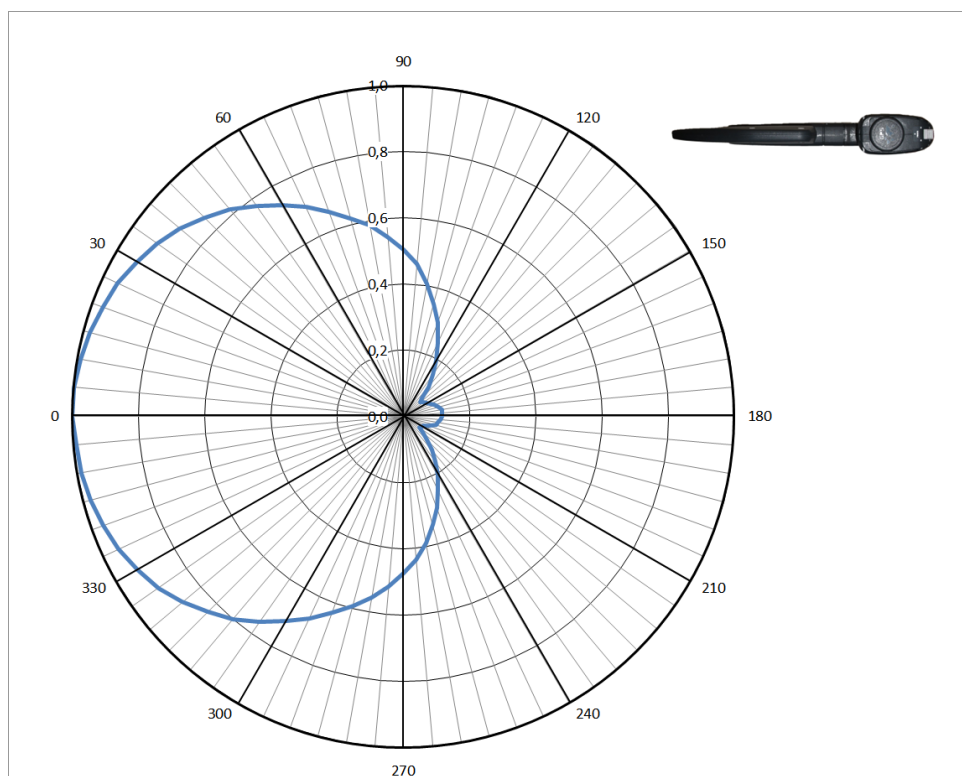


Fig. 3b: Typ. H field pattern, 450 MHz to 8 GHz