

SCHWARZBECK MESS - ELEKTRONIK

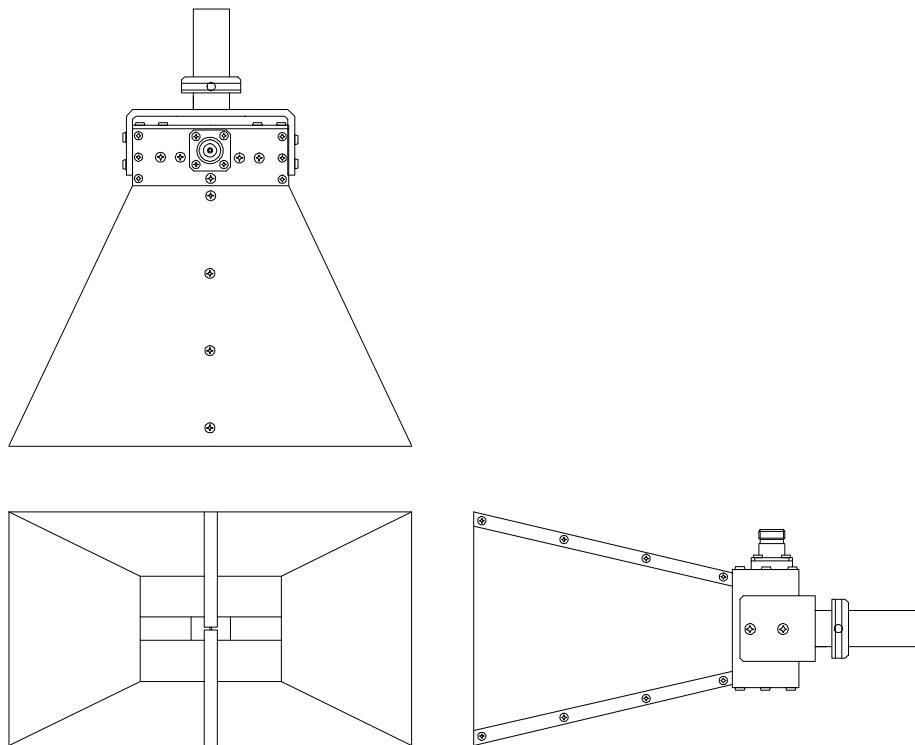
An der Klinge 29 D-69250 Schönau Tel.: (+49)6228/1001

Fax.: (+49)6228/1003 E-mail: schwarzbeck@t-online.de

BBHA 9120 D

Kalibrierte Doppelsteg Breitband Hornantenne
Calibrated Double Ridged Broadband Horn Antenna

1 GHz ... 18 GHz

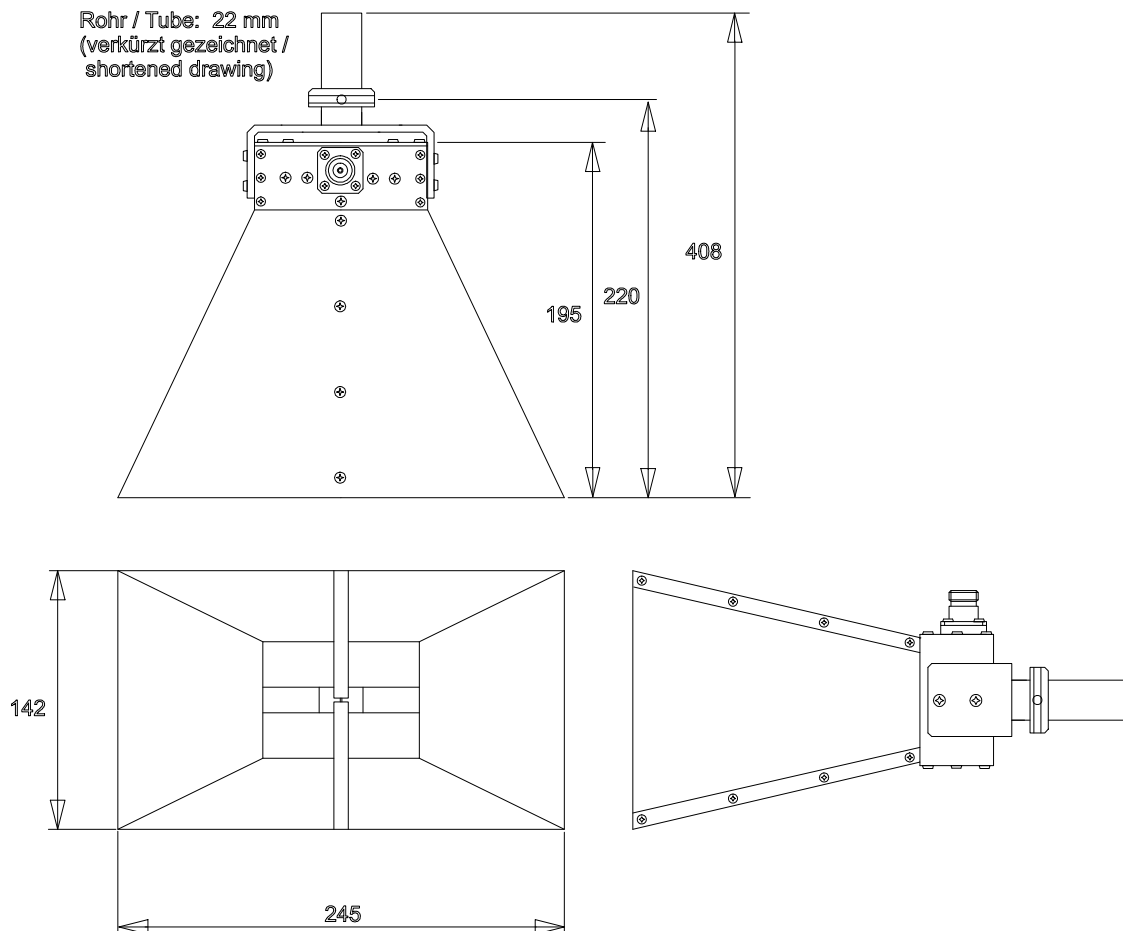


Handbuch
Manual

SCHWARZBECK MESS - ELEKTRONIK

An der Klinge 29 D-69250 Schönau Tel.: 06228/1001 Fax.: (49)6228/1003

Kalibrierte Doppelsteg Breitband Hornantenne BBHA 9120 D *Calibrated Double Ridged Broadband Horn BBHA 9120 D* 1 - 18 GHz



Technische Daten:

BBHA 9120 D

Specifications:

Bauart:

Linear polarisierte Doppelsteg
Breitband Hornantenne in Aluminium-
ausführung für Empfangs- und
Sendeanwendungen.

Type:

Linear polarized Double Ridged
Broadband Horn Antenna (Aluminium)
for Receive and Transmit Applications.

Frequenzbereich, nominell:

1 GHz...18 GHz

Nominal Frequency Range:

Nutzbarer Frequenzbereich:

800 MHz ... 18 GHz

Usable Frequency Range:

Isotropgewinn:

6 ... 16 dBi

Isotropic Gain:

Antennenfaktor:

24 ... 50 dB/m

Antenna Factor:

Impedanz, nominell:

50 Ω

Nominal Impedance:

Stehwellenverhältnis SWR typisch:

≈ 1.5

Standing Wave Ratio SWR typical:

Vor- Rückverhältnis:

> 25 dB ($f > 1.3$ GHz)

Front to Back Ratio:

Polarisationsentkopplung:

> 25 dB (1 GHz...18 GHz)

Cross Polarisation:

3 dB Öffnungswinkel typ.(E-Ebene):

90°-10°

3 dB Beamwidth typ. (E-Plane):

3 dB Öffnungswinkel typ.(H-Ebene):

60°-10°

3 dB Beamwidth typ. (H-Plane):

Max. Eingangsleistung:

300 W (cont.) 500 W (peak)

Max. Input Power:

Anschlußart: N-Buchse

N-Connector female

Halterung: 22 mm Rohr, Rastring

Mount: 22 mm Tube, Indexing Ring

Breite x Länge x Dicke:

245 x 220 (408) x 142 mm

Width x Length x Thickness:

Gewicht:

1.3 kg

Weight:

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[011220ds]

Kalibrierte Doppelsteg Breitband Hornantenne BBHA 9120 D Calibrated Double Ridged Broadband Horn BBHA 9120 D 1 - 18 GHz

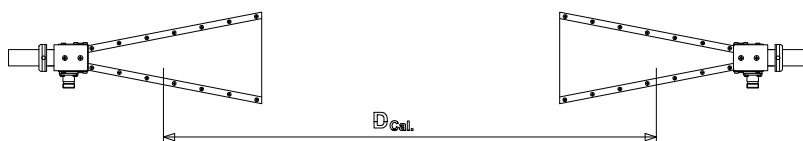
| Frequency Frequenz | Distance Abstand | Wavelength Wellen- länge | Attenuation Dämpfung | Gain(Isotr.) Isotrop- gewinn | Gain(Dipole) Gewinn über Dipol | Ant.-Factor Ant.-Wand- lungsmaß |
|-----------------------|---------------------|--------------------------------|-------------------------|------------------------------------|--------------------------------------|---------------------------------------|
| GHz | m | m | dB | dBi | dBd | dB/m |
| 0.8 | 2.36 | 0.37 | 32.91 | 2.52 | 0.37 | 25.76 |
| 0.9 | 2.36 | 0.33 | 28.80 | 5.09 | 2.94 | 24.21 |
| 1.0 | 2.36 | 0.30 | 27.96 | 5.97 | 3.82 | 24.25 |
| 1.1 | 2.36 | 0.27 | 26.96 | 6.88 | 4.73 | 24.16 |
| 1.2 | 2.36 | 0.25 | 26.57 | 7.46 | 5.31 | 24.35 |
| 1.3 | 2.36 | 0.23 | 27.23 | 7.47 | 5.32 | 25.03 |
| 1.4 | 2.36 | 0.21 | 26.81 | 8.00 | 5.85 | 25.14 |
| 1.5 | 2.36 | 0.20 | 25.75 | 8.84 | 6.69 | 24.90 |
| 1.6 | 2.36 | 0.19 | 25.10 | 9.44 | 7.29 | 24.86 |
| 1.7 | 2.36 | 0.18 | 24.24 | 10.13 | 7.98 | 24.69 |
| 1.8 | 2.36 | 0.17 | 24.30 | 10.35 | 8.20 | 24.97 |
| 1.9 | 2.36 | 0.16 | 24.58 | 10.45 | 8.30 | 25.35 |
| 2.0 | 2.36 | 0.15 | 25.23 | 10.35 | 8.20 | 25.89 |
| 2.1 | 2.36 | 0.14 | 27.29 | 9.53 | 7.38 | 27.14 |
| 2.2 | 2.36 | 0.14 | 28.27 | 9.24 | 7.09 | 27.83 |
| 2.3 | 2.36 | 0.13 | 27.83 | 9.65 | 7.50 | 27.80 |
| 2.4 | 2.36 | 0.13 | 27.11 | 10.20 | 8.05 | 27.62 |
| 2.5 | 2.36 | 0.12 | 26.66 | 10.60 | 8.45 | 27.58 |
| 2.6 | 2.36 | 0.12 | 26.67 | 10.77 | 8.62 | 27.75 |
| 2.7 | 2.36 | 0.11 | 26.59 | 10.97 | 8.82 | 27.88 |
| 2.8 | 2.36 | 0.11 | 26.32 | 11.26 | 9.11 | 27.90 |
| 2.9 | 2.36 | 0.10 | 26.26 | 11.45 | 9.30 | 28.02 |
| 3.0 | 2.36 | 0.10 | 26.40 | 11.52 | 9.37 | 28.24 |
| 3.1 | 2.36 | 0.10 | 26.41 | 11.66 | 9.51 | 28.39 |
| 3.2 | 2.36 | 0.09 | 25.77 | 12.12 | 9.97 | 28.21 |
| 3.3 | 2.36 | 0.09 | 24.72 | 12.78 | 10.63 | 27.81 |
| 3.4 | 2.36 | 0.09 | 24.61 | 12.96 | 10.81 | 27.89 |
| 3.5 | 2.36 | 0.09 | 25.57 | 12.61 | 10.45 | 28.50 |
| 3.6 | 2.36 | 0.08 | 25.91 | 12.56 | 10.41 | 28.79 |
| 3.7 | 2.36 | 0.08 | 25.89 | 12.69 | 10.54 | 28.90 |
| 3.8 | 2.36 | 0.08 | 26.00 | 12.75 | 10.60 | 29.07 |
| 3.9 | 2.36 | 0.08 | 26.38 | 12.67 | 10.52 | 29.37 |
| 4.0 | 2.36 | 0.08 | 26.74 | 12.60 | 10.45 | 29.66 |
| 4.1 | 2.36 | 0.07 | 26.89 | 12.63 | 10.48 | 29.84 |
| 4.2 | 2.36 | 0.07 | 26.97 | 12.70 | 10.55 | 29.99 |
| 4.3 | 2.36 | 0.07 | 27.11 | 12.73 | 10.58 | 30.16 |
| 4.4 | 2.36 | 0.07 | 27.36 | 12.71 | 10.56 | 30.38 |
| 4.5 | 2.36 | 0.07 | 27.64 | 12.66 | 10.51 | 30.62 |
| 4.6 | 2.36 | 0.07 | 27.84 | 12.66 | 10.51 | 30.81 |
| 4.7 | 2.36 | 0.06 | 28.23 | 12.56 | 10.41 | 31.10 |
| 4.8 | 2.36 | 0.06 | 28.36 | 12.58 | 10.43 | 31.26 |
| 4.9 | 2.36 | 0.06 | 28.49 | 12.61 | 10.46 | 31.41 |
| 5.0 | 2.36 | 0.06 | 28.59 | 12.65 | 10.50 | 31.55 |
| 5.2 | 2.36 | 0.06 | 28.49 | 12.86 | 10.71 | 31.68 |
| 5.4 | 2.36 | 0.06 | 28.29 | 13.13 | 10.98 | 31.74 |
| 5.6 | 2.36 | 0.05 | 28.56 | 13.15 | 11.00 | 32.03 |
| 5.8 | 2.36 | 0.05 | 29.00 | 13.09 | 10.94 | 32.40 |
| Frequency Frequenz | Distance Abstand | Wavelength Wellen- länge | Attenuation Dämpfung | Gain(Isotr.) Isotrop- gewinn | Gain(Dipole) Gewinn über Dipol | Ant.-Factor Ant.-Wand- lungsmaß |
| GHz | m | m | dB | dBi | dBd | dB/m |

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[011220ds]

Kalibrierte Doppelsteg Breitband Hornantenne BBHA 9120 D Calibrated Double Ridged Broadband Horn BBHA 9120 D 1 - 18 GHz

| Frequency Frequenz | Distance Abstand | Wavelength Wellen- länge | Attenuation Dämpfung | Gain(Isotr.) Isotrop- gewinn | Gain(Dipole) Gewinn über Dipol | Ant.-Factor Ant.-Wand- lungsmaß |
|-----------------------|---------------------|--------------------------------|-------------------------|------------------------------------|--------------------------------------|---------------------------------------|
| GHz | m | m | dB | dBi | dBd | dB/m |
| 6.0 | 2.36 | 0.05 | 29.46 | 13.00 | 10.85 | 32.78 |
| 6.2 | 2.36 | 0.05 | 30.09 | 12.83 | 10.68 | 33.24 |
| 6.4 | 2.36 | 0.05 | 31.34 | 12.35 | 10.19 | 34.00 |
| 6.6 | 2.36 | 0.05 | 32.02 | 12.14 | 9.99 | 34.47 |
| 6.8 | 2.36 | 0.04 | 31.90 | 12.33 | 10.18 | 34.54 |
| 7.0 | 2.36 | 0.04 | 33.51 | 11.65 | 9.50 | 35.47 |
| 7.2 | 2.36 | 0.04 | 35.38 | 10.84 | 8.68 | 36.53 |
| 7.4 | 2.36 | 0.04 | 35.26 | 11.01 | 8.86 | 36.59 |
| 7.6 | 2.36 | 0.04 | 34.60 | 11.46 | 9.31 | 36.38 |
| 7.8 | 2.36 | 0.04 | 34.86 | 11.44 | 9.29 | 36.62 |
| 8.0 | 2.36 | 0.04 | 35.44 | 11.26 | 9.11 | 37.02 |
| 8.2 | 2.36 | 0.04 | 34.53 | 11.82 | 9.67 | 36.67 |
| 8.4 | 2.36 | 0.04 | 34.36 | 12.02 | 9.87 | 36.69 |
| 8.6 | 2.36 | 0.03 | 35.18 | 11.71 | 9.55 | 37.20 |
| 8.8 | 2.36 | 0.03 | 35.61 | 11.59 | 9.44 | 37.52 |
| 9.0 | 2.36 | 0.03 | 35.20 | 11.89 | 9.74 | 37.41 |
| 9.2 | 2.36 | 0.03 | 35.70 | 11.74 | 9.59 | 37.76 |
| 9.4 | 2.36 | 0.03 | 36.19 | 11.59 | 9.44 | 38.09 |
| 9.6 | 2.36 | 0.03 | 35.66 | 11.94 | 9.79 | 37.92 |
| 9.8 | 2.36 | 0.03 | 36.01 | 11.86 | 9.71 | 38.19 |
| 10.0 | 2.36 | 0.03 | 35.73 | 12.09 | 9.94 | 38.13 |
| 10.5 | 2.36 | 0.03 | 37.01 | 11.66 | 9.51 | 38.99 |
| 11.0 | 2.36 | 0.03 | 37.70 | 11.52 | 9.37 | 39.53 |
| 11.5 | 2.36 | 0.03 | 36.67 | 12.23 | 10.08 | 39.21 |
| 12.0 | 2.36 | 0.02 | 35.14 | 13.18 | 11.02 | 38.63 |
| 12.5 | 2.36 | 0.02 | 34.13 | 13.86 | 11.71 | 38.30 |
| 13.0 | 2.36 | 0.02 | 34.98 | 13.60 | 11.45 | 38.90 |
| 13.5 | 2.36 | 0.02 | 37.01 | 12.75 | 10.60 | 40.08 |
| 14.0 | 2.36 | 0.02 | 39.47 | 11.68 | 9.53 | 41.46 |
| 14.5 | 2.36 | 0.02 | 40.04 | 11.55 | 9.40 | 41.90 |
| 15.0 | 2.36 | 0.02 | 36.32 | 13.55 | 11.40 | 40.19 |
| 15.5 | 2.36 | 0.02 | 31.40 | 16.15 | 14.00 | 37.87 |
| 16.0 | 2.36 | 0.02 | 29.51 | 17.24 | 15.09 | 37.06 |
| 16.5 | 2.36 | 0.02 | 31.69 | 16.28 | 14.13 | 38.29 |
| 17.0 | 2.36 | 0.02 | 34.35 | 15.08 | 12.93 | 39.75 |
| 17.5 | 2.36 | 0.02 | 37.87 | 13.45 | 11.30 | 41.63 |
| 18.0 | 2.36 | 0.02 | 47.28 | 8.87 | 6.71 | 46.46 |
| GHz | m | m | dB | dBi | dBd | dB/m |



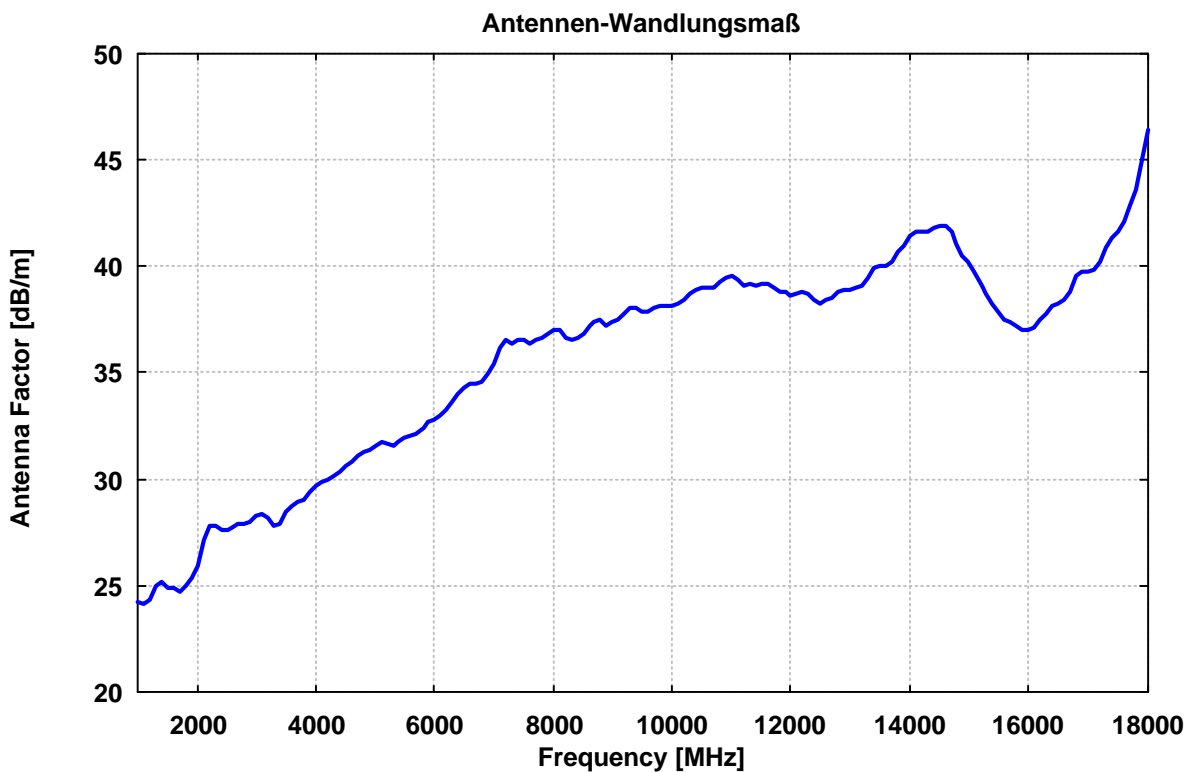
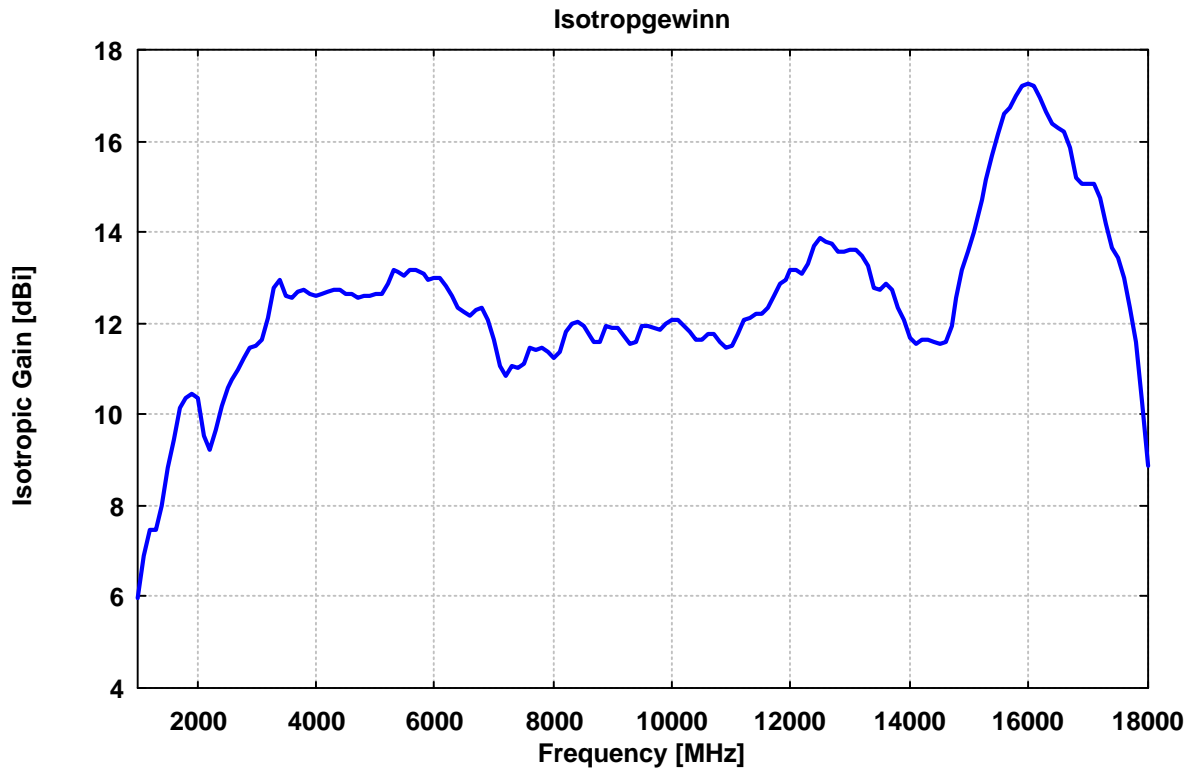
Kalibrierbezugspunkt:
Mitte zwischen Aperturöffnung und N-Buchse
(= 9 cm hinter Vorderkante)

Calibration Reference Point:
Center between N-Connector and
Aperture-Plane (=9 cm behind Apt. Plane)

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1 - 18 GHz



Kalibrier-Messunsicherheit (k=2):

Frequenzbereich $f < 10$ GHz:

Frequenzbereich $10 \text{ GHz} < f < 20 \text{ GHz}$

+/- 1.0 dB

+/- 1.5 dB

Calibration Uncertainty (k=2):

Frequency range $f < 10$ GHz

Frequency range $10 \text{ GHz} < f < 20 \text{ GHz}$

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Erzeugung definierter Feldstärken BBHA 9120 D Generating defined Field Strength BBHA 9120 D 1 - 18 GHz

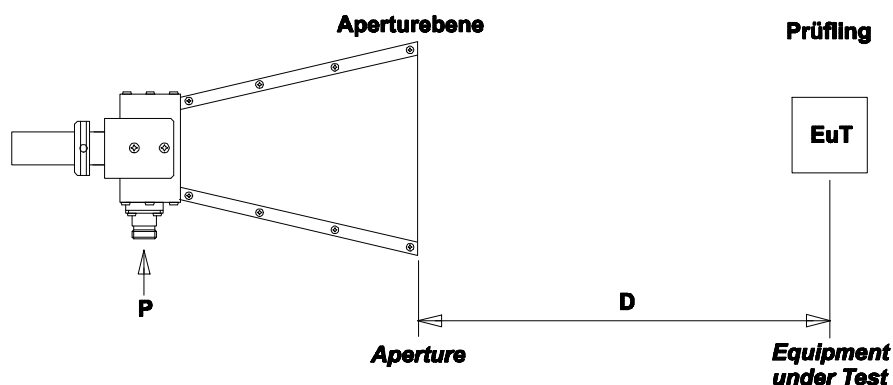
Erzeugung von Feldstärken unter Freiraumbedingungen vor der Aperturöffnung der Hornantenne (siehe Skizze und Angaben bei den Kurvenscharen). Wenn Anteile von Umgebungsreflexionen vorhanden sind, kann dies zu einer frequenz- und höhenabhängigen Änderung der Feldstärke führen. Die Leistungsangaben beziehen sich auf eine 50 Ω Quellimpedanz und unmodulierte Hochfrequenz (CW). Bei 80% Amplitudenmodulation ist die 1.8-fache Spannungsaussteuerung erforderlich, was in einem ca. 3.24-fachen Leistungsbedarf resultiert. Zur Steigerung der Feldstärke um den Faktor 10 ist die 100-fache Verstärkerleistung erforderlich.

Field strength generated under free-space conditions at a separation from the antenna aperture (see diagrams for several combinations of power and distance). If environmental reflections are present, this may lead to frequency and height dependent fieldstrengths. The power figures refer to a 50 W source and an unmodulated (cw) signal. An 80% Amplitude Modulation requires a 1.8 times higher voltage, resulting in 3.24 times higher power compared to cw. A fieldstrength increase of factor 10 requires 100 times amplifier-power.

Bei der Erzeugung von hohen Feldstärken müssen die relevanten Sicherheitsvorschriften und Normen beachtet werden! Missachtung dieser Vorschriften kann zu Schädigungen der Gesundheit führen!

The safety precautions and relevant standards must be considered while performing tests with high fieldstrength! Ignoring these standards and precautions may result in severe danger for health!

| | | | | | | | |
|-----------------------------------|------|------|------|------|------|------|-----------------------------------|
| Modulation (AM) | 50 % | 60 % | 70 % | 80 % | 90 % | 95% | Modulation (AM) |
| Leistungsfaktor | 2.25 | 2.56 | 2.89 | 3.24 | 3.61 | 3.8 | Power Factor |
| Zusätzlicher Leistungsbedarf [dB] | +3.5 | +4.1 | +4.6 | +5.1 | +5.6 | +5.8 | Additional Power Requirement [dB] |

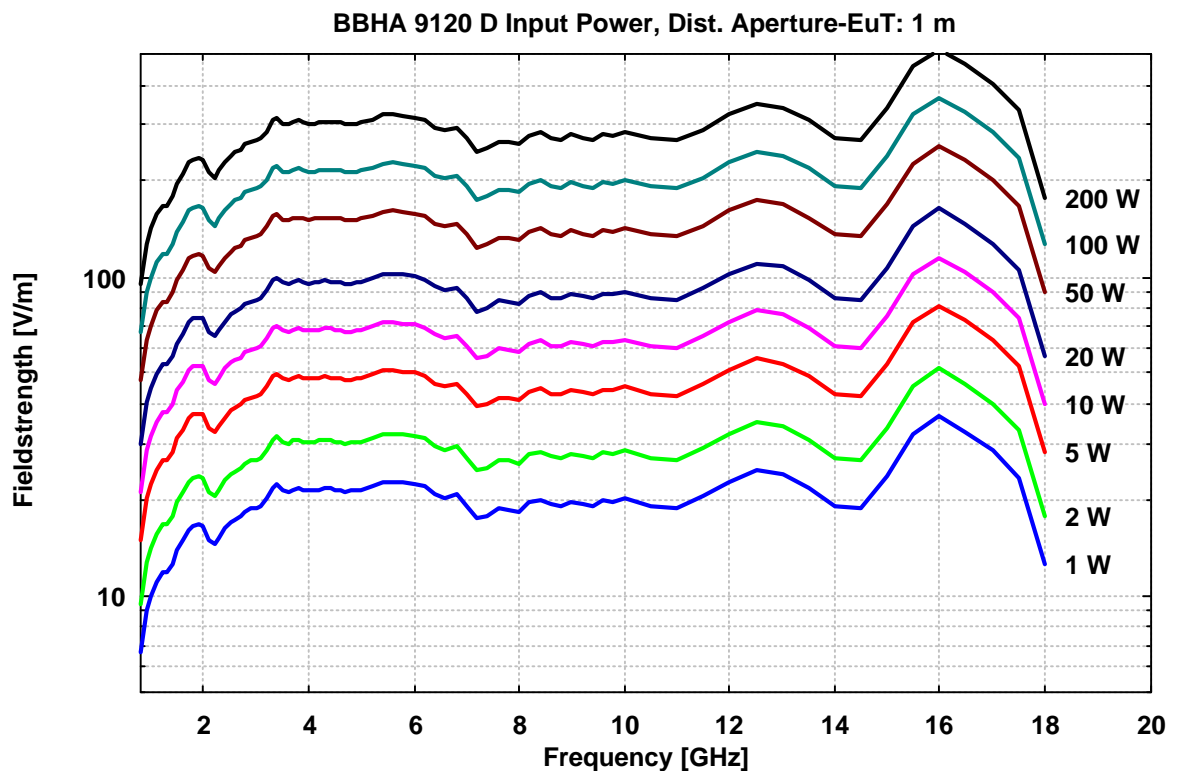
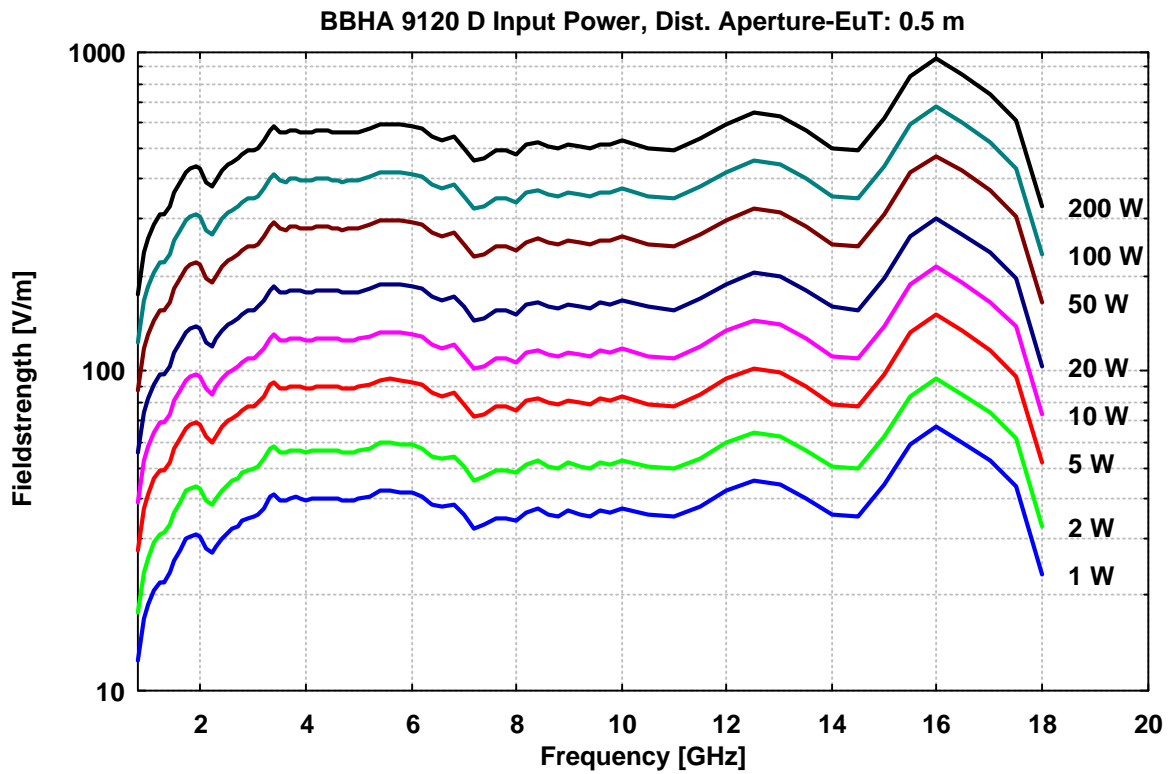


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BBHA 9120 D Erzeugte Feldstärke BBHA 9120 D Generated Fieldstrength

Erzeugte Elektrische Feldstärke vor der Antennenspitze
unmoduliert, Eingangsleistung an N-Buchse, Reflexionsfreie Umgebung
*Generated Electrical Fieldstrength in front of Antenna Tip
no modulation, Input Power at N-Connector, Anechoic Environmental Conditions*



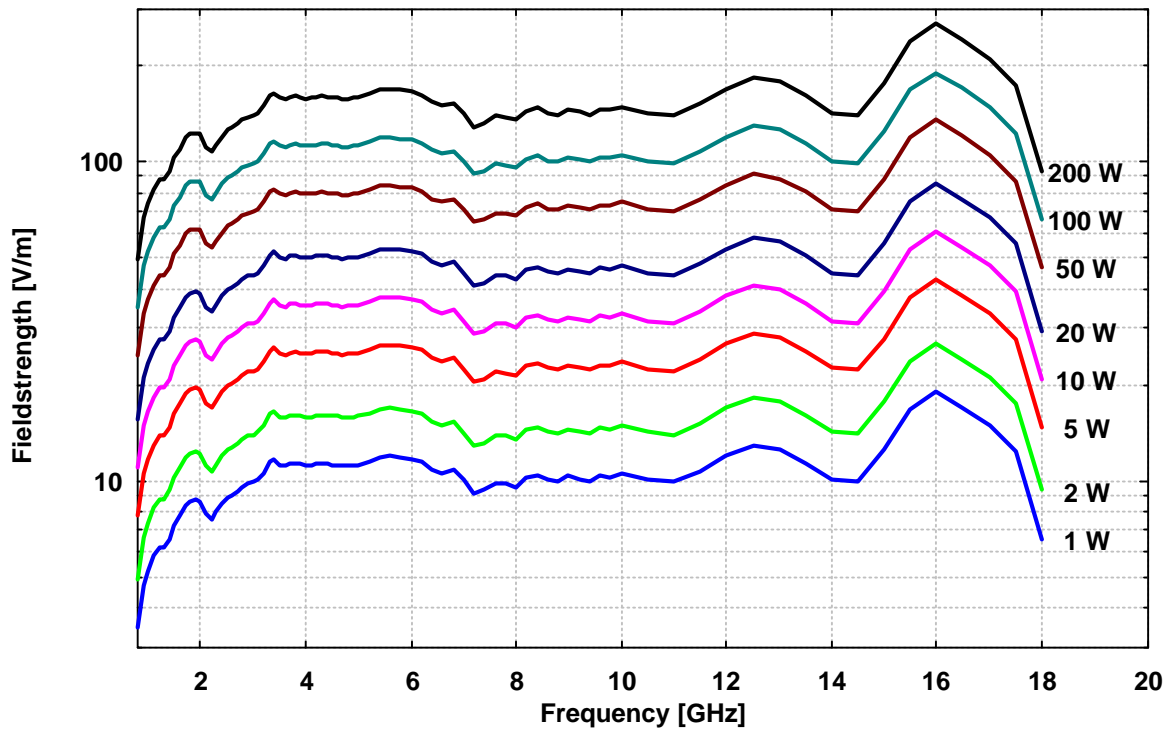
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BBHA 9120 D Erzeugte Feldstärke BBHA 9120 D Generated Fieldstrength

Erzeugte Elektrische Feldstärke vor der Antennenspitze
unmoduliert, Eingangsleistung an N-Buchse, Reflexionsfreie Umgebung
*Generated Electrical Fieldstrength in front of Antenna Tip
no modulation, Input Power at N-Connector, Anechoic Environmental Conditions*

BBHA 9120 D Input Power, Dist. Aperture-EuT: 2 m



BBHA 9120 D Input Power, Dist. Aperture-EuT: 3 m

