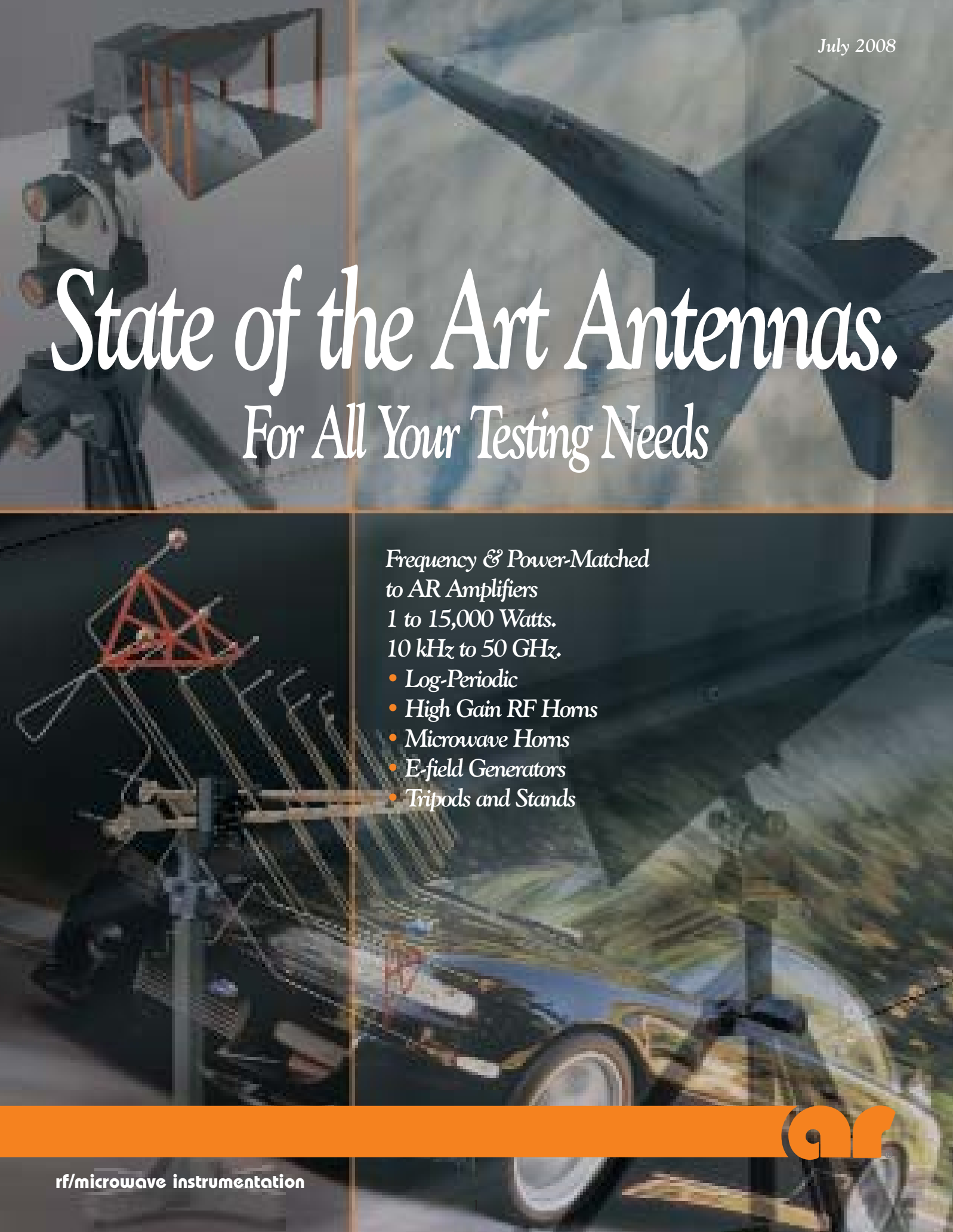
July 2008

State of the Art Antennas.

For All Your Testing Needs



Frequency & Power-Matched
to AR Amplifiers
1 to 15,000 Watts.
10 kHz to 50 GHz.

- *Log-Periodic*
- *High Gain RF Horns*
- *Microwave Horns*
- *E-field Generators*
- *Tripods and Stands*

rf/microwave instrumentation

High Power Antennas

The Power, Performance & Precision For The Competitive Edge You Need.

The premiere provider of EMC test amplifiers is also the most dependable, reliable source for antennas and accessories. AR has a wide range of rugged, high-power antennas and a full line of accessories - exactly what you need for virtually any testing procedures. All with the exceptional quality and the technological innovations you've come to expect from AR. Our patented designs, like our Radiant Arrow bent element antennas, are setting new standards for performance and efficiency.

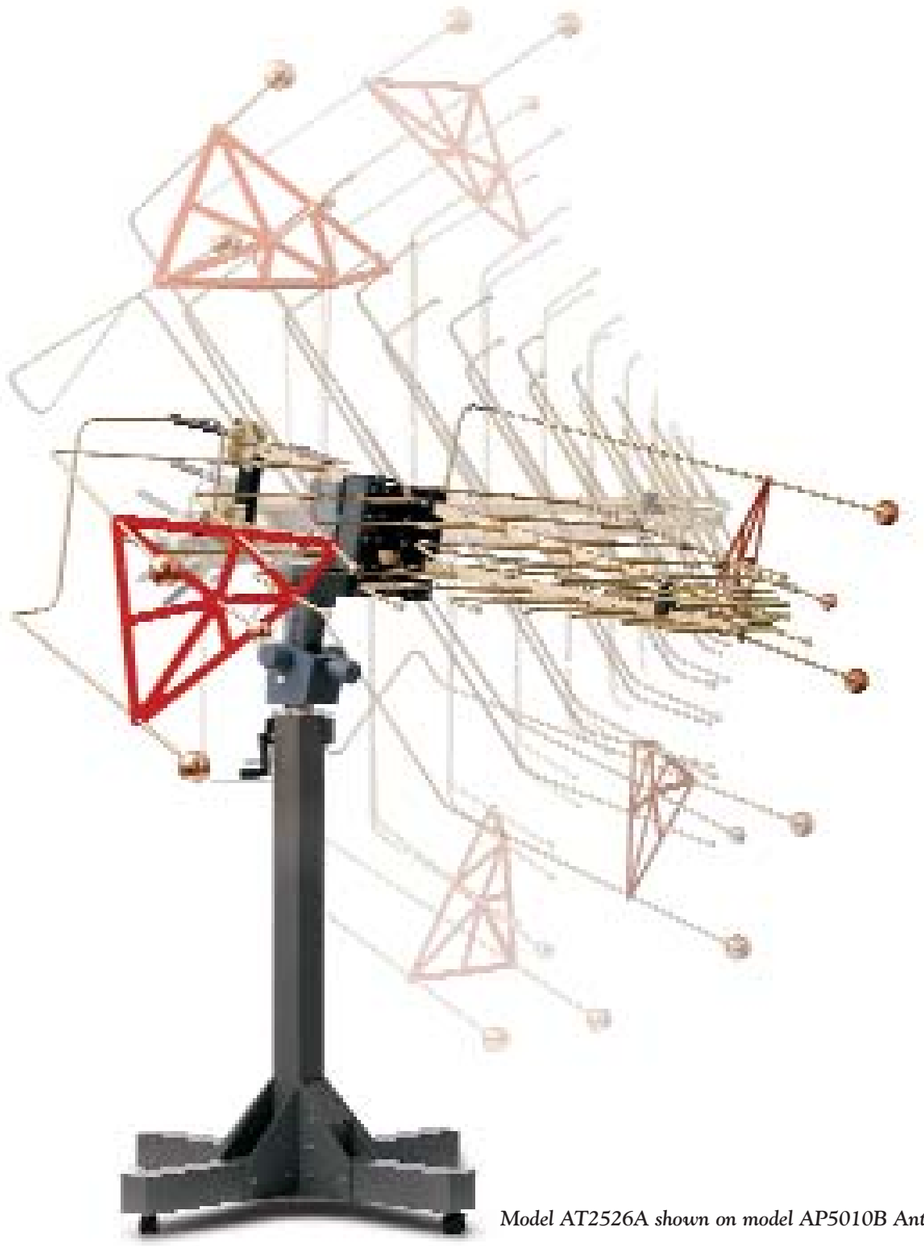
All our antennas are frequency and power-matched to AR amplifiers, so it's easy to select the right unit.

An AR applications engineer is available to help make the whole process even easier.

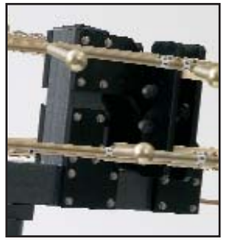
Antennas are available up to 50 GHz and 15,000 watts of input power. All AR antennas develop high fields, suitable for EMC testing; and many models can be calibrated for emissions testing.

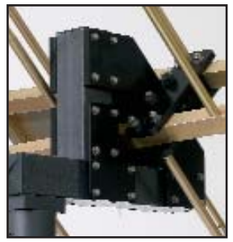
All our antennas are backed by AR's unlimited support network and protected by our exclusive 3-year "Competitive Edge" warranty. AR is here for you to help solve problems and answer questions. Today, tomorrow, and always.

Radiant Arrow Antennas That Take Technology To New Heights.



Model AT2526A shown on model AP5010B Antenna Positioner





Remove a pin and easily rotate the antenna to the desired position.

AR has advanced the science of log-periodic antennas with the unique, patented design of our Radiant Arrow bent element antennas - for fields from 26 MHz to 6,000 MHz.

This exceptional family of antennas includes the AT6080 (80 MHz - 6,000 MHz, 5,000 watts input power), the AT6026A (26 MHz - 6,000 MHz, 5,000 watts input power), and the AT2526A (26 MHz - 250 MHz, 15K watts input power).

The Radiant Arrows utilize a "bent-element" approach that provides a size reduction of approximately 60% without sacrificing key electrical performance such as gain or bandwidth. The size reduction minimizes field loss resulting from "room loading" - which is especially troublesome when conventional log-periodic are used in small enclosures. The AT6026A and AT2526A include vertical to horizontal pivot to allow bore sight rotation without removing an element from the antenna or removing the antenna from the AR positioner.

The Most Advanced Antennas For Radiated EMC Testing.

a: AT6080 - 80 to 6,000 MHz

b: AT6026A - 26 to 6,000 MHz

c: AT2526A - 26 to 250 MHz

Our Radiant Arrows offer up to 6dBi gain and produce high fields even in the toughest applications. They can also be calibrated for emissions testing. These efficient, compact, portable antennas represent the innovative thinking and exceptional products that have earned AR the Number One position in the industry.

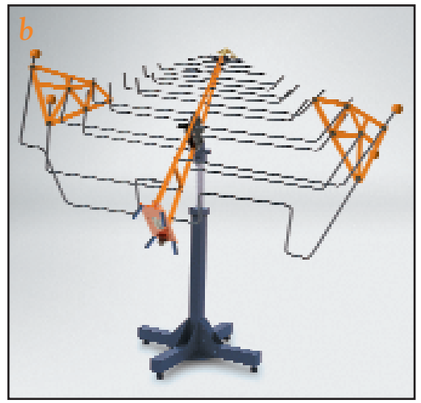
SPECIFICATIONS

	AT6026A	AT6080	AT2526A
Frequency range	26 - 6,000 MHz	80 - 6,000 MHz	26 - 250 MHz
Power input (max.)*	3,000 watts	3,000 watts	15,000 watts
Power gain (over isotropic)	-3 to +6 dBi (26 - 80 MHz.) 6 dBi (80 MHz - 6,000 MHz.)	6 dBi	6 dBi (80 - 250 MHz) -3 to +6 dBi (26 - 80 MHz)
Gain flatness	±1.5 dBi (80 - 6,000 MHz) ±3.75 dBi (26 - 80 MHz)	±1.5 dBi	±1.5 dBi (80 - 250 MHz) ±3.75 dBi (26 - 80 MHz)
Impedance	50 ohms nominal	50 ohms nominal	50 ohms nominal
VSWR (max.)	3:1 (80 - 6,000 MHz) 10:1 (26 - 80 MHz)	3:1 typical 2:1	3:1 (80 - 250 MHz) 10:1 (26 - 80 MHz)
Beamwidth (avg.)	Typical curves available on request	Typical curves available on request	Typical curves available on request
Connector	Type N (F) quick change connector	Type N (F) quick change connector	1 5/8 EIA
Size (W X H X D)	279.4 x 53.6 x 202.4 cm (110 x 21.1 x 79.7 in)	132.1 x 20.32 x 97.8 cm (52 x 8 x 38.5 in)	279.4 x 53.6 x 202.4 cm (110 x 21.1 x 79.7 in)
Weight (max.)	22.7 kg (50 lb)	7.94 kg (17.5 lb)	31.8 kg (70 lb)
Mounting	Wall bracket included. May be mounted in two perpendicular planes using an optional antenna positioner (AP5010B). Two non-metallic masts (4 and 6 foot) are included for vertical mounting	Wall bracket included. May also be tripod mounted in two perpendicular planes using optional tripod. Also includes one non-metallic mast for vertical mounting.	Wall bracket included. May be mounted in two perpendicular planes using an optional antenna positioner (AP5010B). One non-metallic mast (4 foot) is included for vertical mounting

*Connector and frequency dependent. Contact factory for details.

Typical gain charts and antenna patterns are available for most antennas. Contact factory for more information.

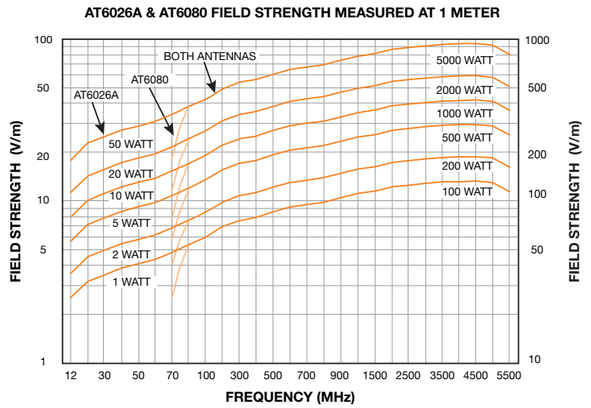
Shown on model TP1000B

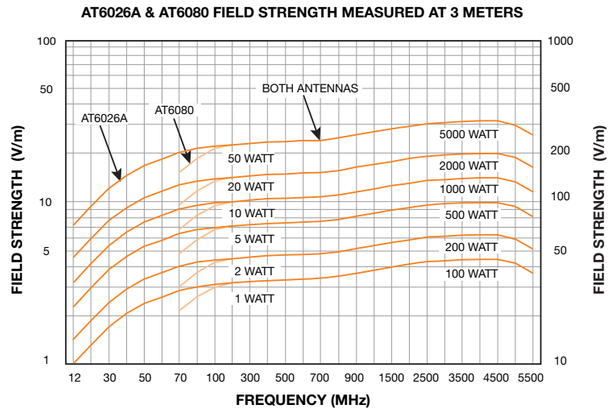


Shown on model AP5010B

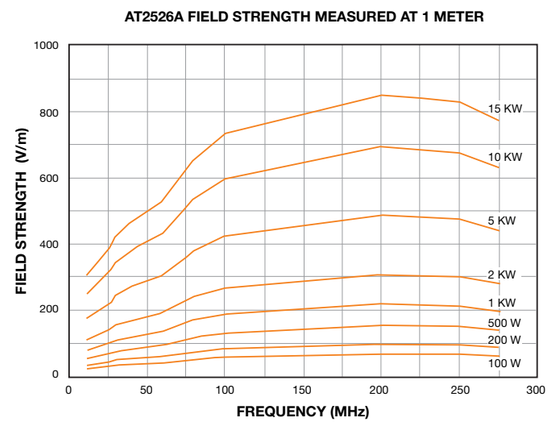
Shown on model AP5010B

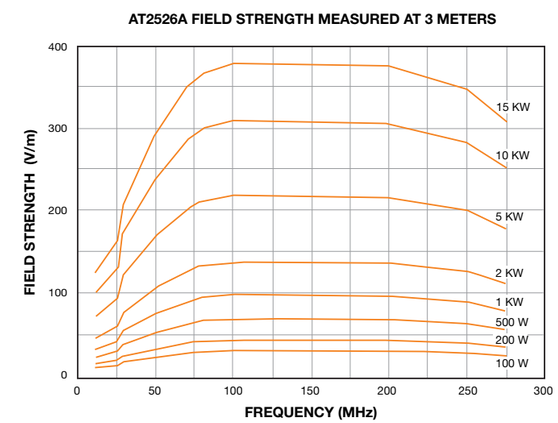
AT6080/AT6026A





AT2526A





Field strengths have been measured in free-space conditions. Individual shielded rooms, amplifiers and test systems conditions will influence performance. Field strength also varies with frequency and position of the antenna and EUT in non-anechoic testing environments.

Broadband Log-periodic. High Gain. Wide Band. Excellent Performance.

a: AT1000B

b: AT1080B

80 to 1,000 MHz • To 800 V/m

You can count on AR's high gain log-periodic to deliver the constant high intensity fields you need for RFI and EMI testing, in and out of a shielded room. You'll also get frequency response and field intensity that goes beyond the norm.

Their lightweight modular design makes assembly and relocation easy. And these antennas are built tough to stand up to the outdoors.

These antennas have been designed to allow polarization change without removing the antenna from a tripod. Both models can be calibrated for emissions testing.

SPECIFICATIONS

	AT1000B	AT1080B
Frequency range	150 - 1,000 MHz	80 - 1,000 MHz
Power input (max.)	2,000 watts	2,000 watts
Power gain (over isotropic)	6.5 dBi min., 7.5 dBi avg.	6.5 dBi min., 7.5 dBi avg.
Gain flatness	±1.0 dBi	±1.0 dBi
Impedance	50 ohms nominal	50 ohms nominal
VSWR	max. 1.8:1, avg. 1.5:1	max. 1.8:1, avg. 1.5:1
Beamwidth (avg.)	E plane 60°, H plane 105°	E plane 60°, H plane 105°
Front to back ratio (min.)	15 dBi	15 dBi
Connector	Type N (F) quick change connector; Type C (F) supplied	Type N (F) quick change connector; Type C (F) supplied
Size (W X H X D)	102 x 13 x 91 cm (40 x 5.1 x 36 in)	193 x 13 x 160 cm (76 x 5.1 x 63 in)
Weight (max.)	7 kg (15 lb)	7.7 kg (17 lb)
Mounting	Wall bracket included. May also be mounted using the optional TP1000B tripod.	Wall bracket included. May also be mounted using the optional TP1000B tripod.

a

Shown on model TP1000B

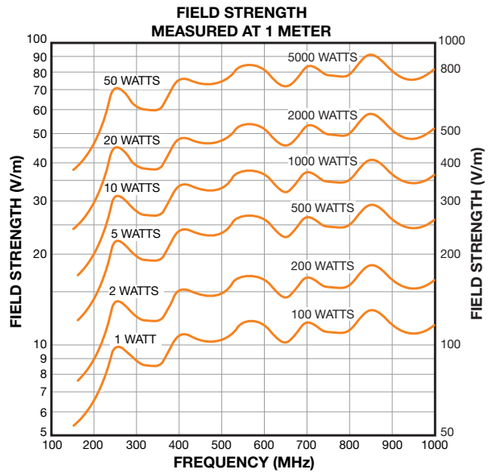
b

Shown on model TP1000B

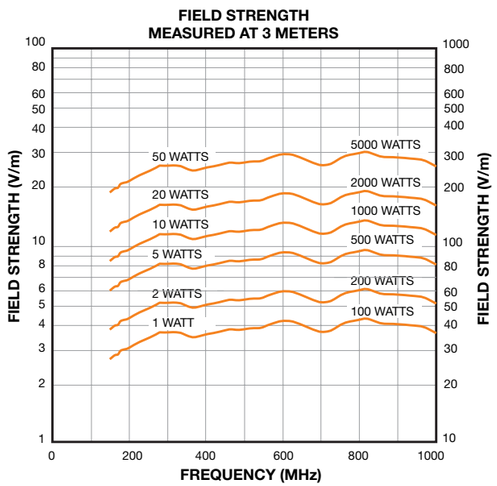
Quick Change Connectors

Most antennas come with quick change connectors so you can easily change the power.

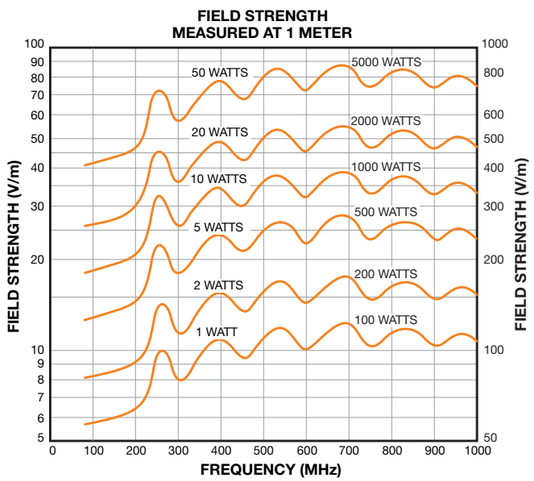
AT1000B



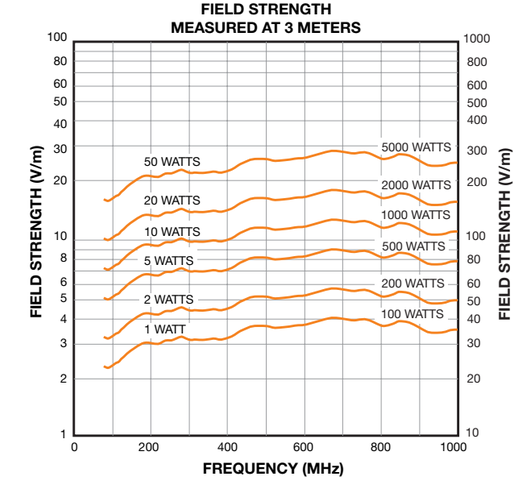
Note: Curves above 1000 and 2000 watts do not apply past power-frequency limits of the antenna.



AT1080B



Note: Curves above 1000 and 2000 watts do not apply past power-frequency limits of the antenna.



Field strengths have been measured in free-space conditions. Individual shielded rooms, amplifiers, and test-system conditions will influence performance. Field strength also varies with frequency and position of antenna and EUT in non-anechoic testing environments.

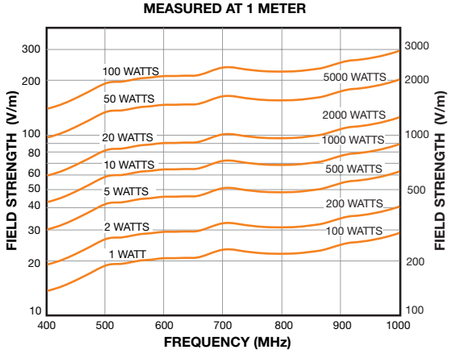
RF Horns. High Gain Over A Broad Spectrum.

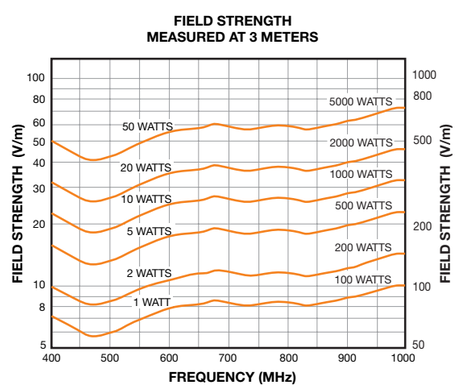
a: AT4001A
b: AT4000A
c: AT4501

200 To 1,000 MHz • To 800 V/m

Our RF horn antennas exhibit increasing gain with frequency up to 18 dBi at 1,000 MHz, helping to compensate for losses that occur elsewhere in an RF test system. The AT4000A handles up to 5,000 watts input power and can be used with AR's high power amplifiers. Use these antennas in shielded rooms or free space testing.

AT4001A



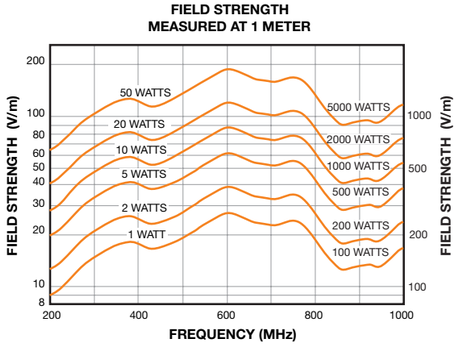


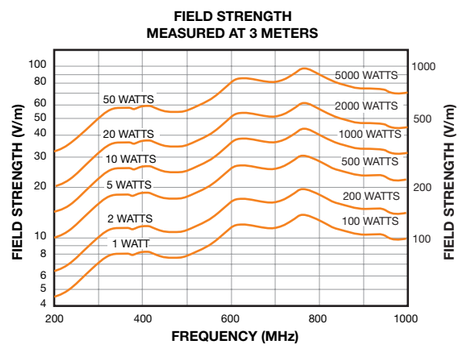
SPECIFICATIONS

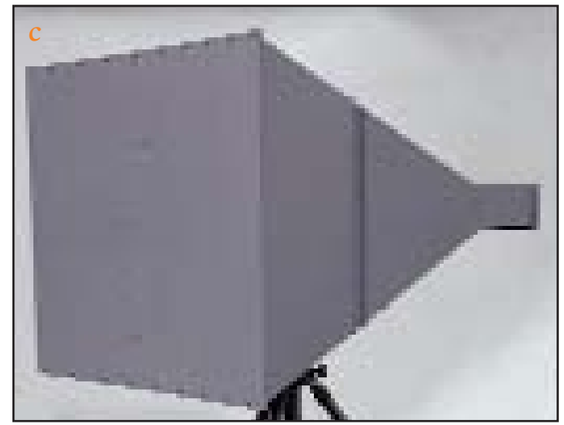
	AT4000A	AT4001A	AT4501
Frequency range	200 - 1,000 MHz	400 - 1,000 MHz	200 - 1,000 MHz
Power input (max.)	5,000 watts	3,000 watts	10,000 watts
Power gain (over isotropic)	10 dBi min., typically increasing to 18 dBi at 1,000 MHz	10 dBi min., typically increasing to 15 dBi at 1,000 MHz	10 dBi min., typically increasing to 18 dBi at 1,000 MHz
Impedance	50 ohms nominal	50 ohms nominal	50 ohms nominal
VSWR	2.5:1 max., 1.5:1 avg.	2.5:1 max., 1.5:1 avg.	2.5:1 max., 1.5:1 avg.
Beamwidth (front to back)	Typical curves available on request	Typical curves available on request	Typical curves available on request
Connector	Type 1 5/8" E/A Flange, Quick Change Connector	Type 1 5/8" E/A Flange, Quick Change Connector	Type 1 5/8" E/A Flange
Mounting	Heavy-duty tripod included. Pads with 3/8-16 thread for stand mounting vertically or horizontally.	Rear flange for wall mount. Pads with 1/4-20 thread for tripod mount.	Heavy-duty tripod included. Pads with 3/8-16 thread for stand mounting vertically or horizontally.
Weight	46 kg (100 lb)	9.1 kg (20 lb)	46 kg (100 lb)
Size (W X H X D)	109.2 x 145.8 x 175.3 cm (43 x 57 x 69 in)	56.4 x 79.3 x 73.7 cm (22.2 x 31.2 x 29 in)	109.2 x 145.8 x 175.3 cm (43 x 57 x 69 in)

Field strengths have been measured in free-space conditions. Individual shielded rooms, amplifiers, and test-system conditions will influence performance. Field strength also varies with frequency and position of antenna and EUT in non-anechoic testing environments.

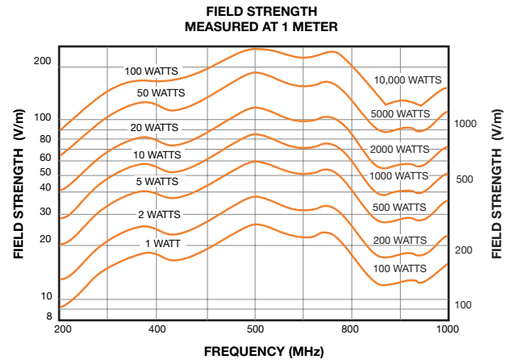
AT4000A

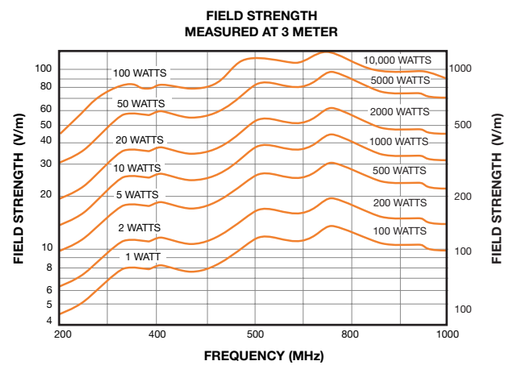






AT4501





Suite of Antennas for DO 160 HIRF Testing

Shown on model TP1000B

a: AT4444 - 2 to 4 GHz

b: AT4446 - 2 to 6 GHz

c: AT4448 - 6 to 8 GHz

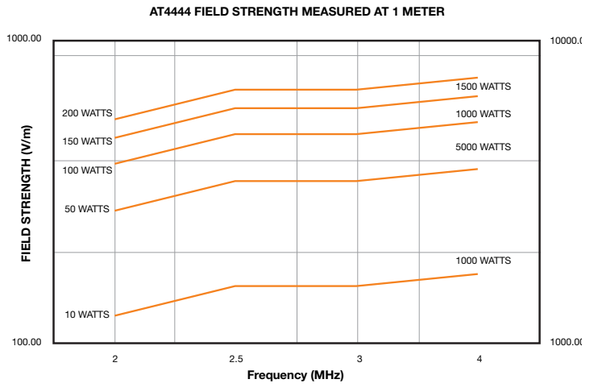
A Special Family of Antennas for High Intensity Radiated Frequency (HIRF) Testing

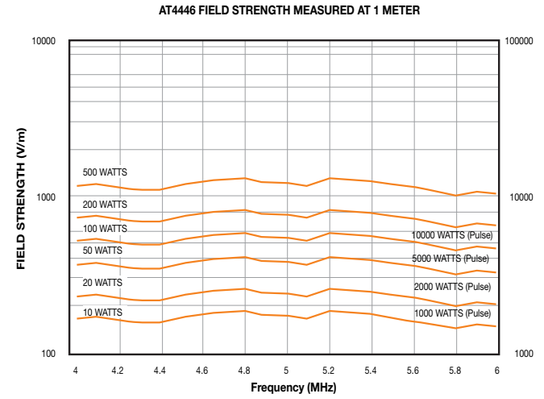
High fields - whether from radar or other electronic devices, or generated by enemy/terrorist forces - can cause electronic equipment to malfunction, stop working, or worse. Our amplifiers and antennas are critical components in generating high intensity fields for testing electronic equipment To keep up with the demands of HIRF testing, AR has developed a new family of antennas with the power and bandwidth needed for high field testing.

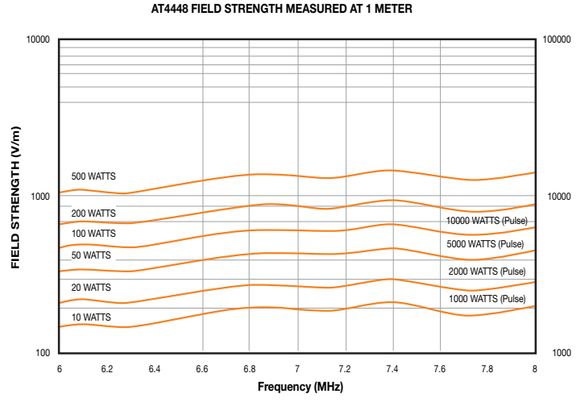
These are all high-gain, high-power microwave horn antennas that provide typical 20 dBi over isotropic. They supply high intensity fields for DO 160 HIRF testing. They are extremely compact and lightweight for easy mobility. Yet they're built tough to withstand the demands of outdoor use. All three antennas are designed to mount easily on a tripod or to a mounting plate; and can be used with AR's power-pulsed traveling wave tube amplifiers.

SPECIFICATIONS

	AT4444	AT4446	AT4448
Frequency range	2 - 4 GHz	4 - 6 GHz	6 - 8 GHz
Power input (max.)	1,000 watts	800 watts	700 watts CW 6 – 7.5 GHz 600 watts CW 7.5 – 8 GHz
Peak Pulse less than 20%	17 kW Peak	15 kW Peak Pulse	10 kW Peak Pulse
Power gain (over isotropic)	17 dBi min.	18 dBi typ.	18 dBi typ.
VSWR			
Maximum	1.5:1	1.5:1	1.5:1
Average	1.3:1	1.3:1	1.3:1
Beamwidth (avg.) at 3dBi down from peak			
E Plane	16°	18°	19°
H Plane	15°	18°	19°
Connector	7/16" DIN connector	7/16" DIN connector	7/16" DIN connector
Weight	11.36 kg (25 lb)	1.59 kg (3.5 lb)	91 kg (2 lb)
Size (WxDxH)	46.55 x 29.4 x 98.50 cm (19 x 12 x 40.2 in)	23.11 x 17.01 x 46.99 cm (9.1 x 6.7 x 18.5 in)	16.25 x 12.06 x 39.37 cm (6.4 x 4.75 x 15.5 in)







Field strengths have been measured in free-space conditions. Individual shielded rooms, amplifiers, and test-system conditions will influence performance. Field strength also varies with frequency and position of antenna and EUT in non-anechoic testing environments.

Compact, Lightweight Microwave Horns To 50 GHz.

Field strengths have been measured in free-space conditions. Individual shielded rooms, amplifiers, and test-system conditions will influence performance. Field strength also varies with frequency and position of antenna and EUT in non-anechoic testing environments.

Even our microwave horns provide exceptional performance. Along with our broadband RF antennas, our microwave horns are specially designed to compensate for the losses that typically occur in test systems as frequency increases.

These innovative microwave horn antennas are compact and lightweight for easy mobility, yet they're tough enough for the extra demands of outdoor use, and they easily mount on a tripod. Several of our microwave horns have removable gain enhancers that improve the field strength to perform 3-meter testing.

Model AT4418

AR introduces two lightweight antennas for RFI/EMI testing. These new models are designed to supply constant high intensity field necessary for test within and beyond the confines of a shielded room. They can also be used to perform emissions measurements, as called out in many standards.

SPECIFICATIONS

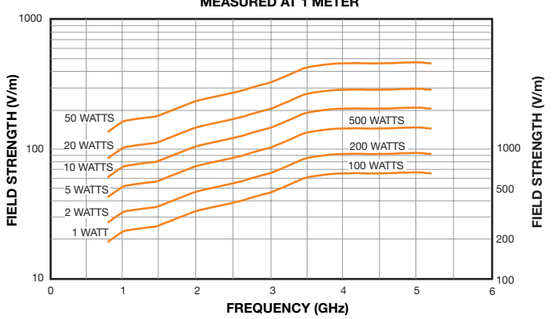
	AT4403	AT4418
Frequency range	200 MHz - 2 GHz	1-18 GHz
Power input (max.)	1,000 watts	300 watts up to 7 GHz; above 7 GHz, derate linearly to 175 watts at 18 GHz
Power gain (over isotropic)	6 dBi typ.	6 dBi min.
Impedance	50 ohms nominal	50 ohms nominal
VSWR (typ.)	2:1	2:1
Beamwidth (avg.)		
E Plane	(beamwidth graph	(beamwidth graph
H Plane	available on request)	available on request)
Front To Back Ratio (Min.)	20 dBi	20 dBi
Connector	N (F) Precision	N (F) Precision
Weight	10.21 kg (22.5 lb)	1.57 kg (3.45 lb)
Size (WxDxH)	72.9 x 97.8 x 93.2 cm (28.7 x 38.5 x 36.7 in)	24.1 x 16 x 20.4 cm (9.48 x 6.29 x 8.03 in)

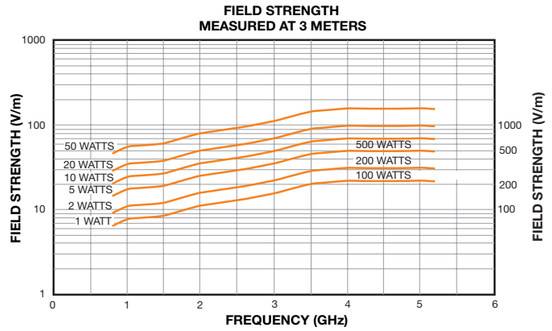
SPECIFICATIONS

	AT4002A	AT4003A	AT4004	AT4010	AT4510	AT4520	AT4540	AT4550	AT4560	AT4640	AT4650	AT4710
Frequency range	0.8 - 5 GHz	4 - 8 GHz	7.5 - 18 GHz	2 - 10 GHz	1 - 4.2 GHz	2.5 - 7.5 GHz	18.0 - 26.5 GHz	26.5 - 40 GHz	18 - 40 GHz	18 - 26.5 GHz	26.5 - 40 GHz	33 - 50 GHz
Power input (max.)	500 watts	500 watts	2,800 watts	700 watts	1,500 watts 15 kW peak pulse	2,800 watts	350 watts	240 watts	450 watts 2,000 watts peak pulse	350 watts	240 watts	240 watts 2,000 watts peak
Power gain (over isotropic)	11 dBi min, increasing to 21 dBi at 5 GHz	11.5 dBi min., increasing to 15.9 dBi at 8 GHz 17.8 dBi min., increasing to 21.2 dBi at 8 GHz with gain enhancer	11.3 dBi min., increasing to 14 dBi at 18 GHz 17.4 dBi min., increasing to 20.2 dBi at 18 GHz with gain enhancer	12.5 dBi min., increasing to 23 dBi at 10 GHz	13 dBi min. increasing to 18 dBi at 4.2 GHz	9.5 dBi min, increasing to 18 dBi at 7.5 GHz.	18.7 dBi min, increasing to 21.6 dBi at 26.5 GHz.	18.9 dBi min, increasing to 21.8 dBi at 40 GHz.	15.5 dBi min, increasing to 21.2 dBi at 40 GHz.	8.8 dBi min, increasing to 12 dBi at 26.5 GHz.	8.6 dBi min, increasing to 12.1 dBi at 40 GHz.	20 ± 2dBi
Impedance	50 ohms nominal	50 ohms nominal	50 ohms nominal	50 ohms nominal	50 ohms nominal	50 ohms nominal	50 ohms nominal	50 ohms nominal	50 ohms nominal	50 ohms nominal	50 ohms nominal	50 ohms nominal
VSWR												
Maximum	2.5:1	1.6:1	1.2:1	2:1	2.0:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	
Average	1.6:1	1.3:1	1.1:1	1.5:1	1.5:1	1.3:1	1.3:1	1.3:1	1.3:1	1.3:1	1.3:1	1.2:1
Beamwidth (avg.) at 3dBi down from peak												
E Plane	27.5°	18° with gain enhancer	17° with gain enhancer	25°	25°	30°	15°	15°	21°	55°	57.5°	9.85°
H Plane	25°	18° with gain enhancer	17° with gain enhancer	27°	26°	30°	15°	15°	19°	56°	56.5°	11.9°
Connector	N (F) Quick change connector	N (F) Quick change connector	WRD-750 waveguide	N(F)	7-16 DIN (F), Type N(F) Quick change connector	WRD-250-D30	WR-42 waveguide	WR-28 waveguide	WR-180 C24 waveguide	WR-42 waveguide	WR-28 waveguide	WR-22 waveguide
Weight	7.26 kg (16 lb)	2.27 kg (5 lb)	0.6 kg (1.25 lb)	1.59 kg (3.5 lb)	7.26 kg (16 lb)	0.6 kg (1.3 lb)	56.7 g (2 oz)	56.7 g (2 oz)	56.7 g (2 oz)	57 g (2 oz)	57 g (2 oz)	0.15 kg (0.33 lb)
Size (WxDxH)	46.3 x 46.3 x 69.2 cm (18.25 x 18.25 x 27.25 in)	without gain enhancer 7.62 x 10.3 x 15.14 cm 3.00 x 4.06 x 5.96 in with gain enhancer: 21.6 x 21.6 x 30.5 cm (8.5 x 8.5 x 12 in)	without gain enhancer 4.6 x 6.1 x 6.4 cm (1.8 x 2.4 x 2.5 in) with gain enhancer: 8.9 x 11.4 x 13.3 cm (3.5 x 4.5 x 5.25 in)	22.9 x 17.8 x 31.75 cm (9 x 7 x 12.5 in)	46.3 x 46.3 x 69.2 cm (18.25 x 18.25 x 27.25 in)	14.0 x 10.4 x 13.2 cm (5.5 x 4.1 x 5.2 in)	5.74 x 4.09 x 11.4 cm (2.26 x 1.61 x 4.49 in)	4.06 x 3.07 x 7.67 cm (1.6 x 1.21. x 3.02 in)	3.73 x 2.69 x 6.27 cm (1.47 x 1.06 x 2.47 in)	1.63 x 1.32 x 2.92 cm (0.64 x 0.52 x 1.15 in)	1.09 x 0.89 x 1.27 cm (0.43 x 0.35 x 0.5 in)	4 x 3 x 9 cm (1.57 x 1.18 x 3.54 in)

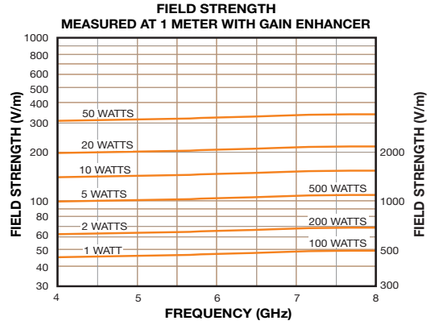
Microwave Horns. Now To 50 GHz.

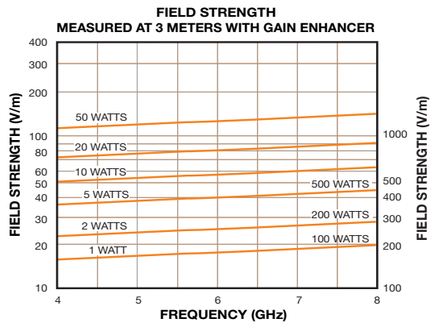
AT4002A





AT4003A





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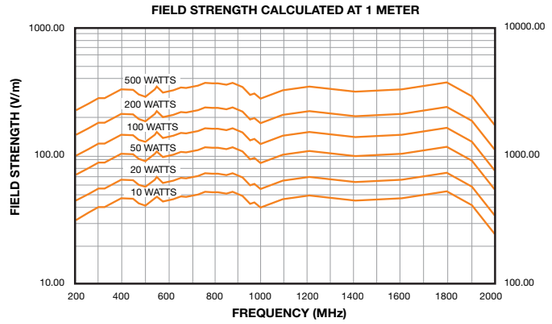

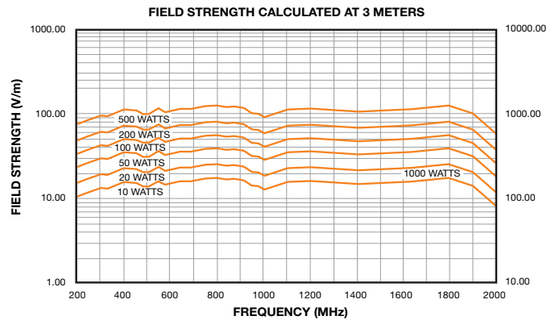

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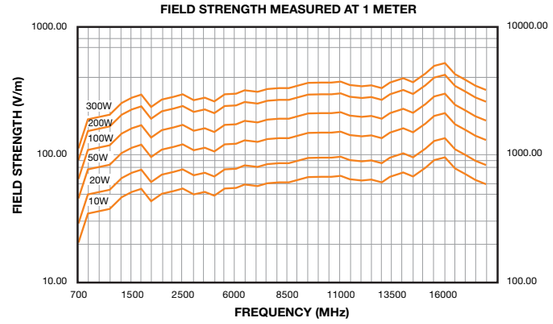

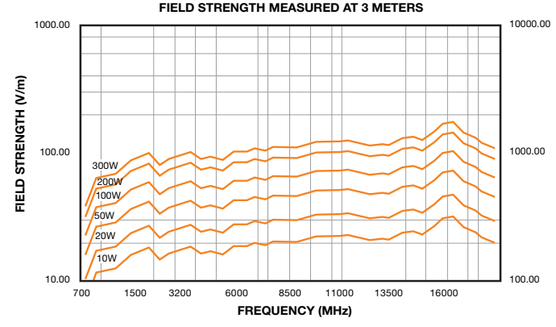

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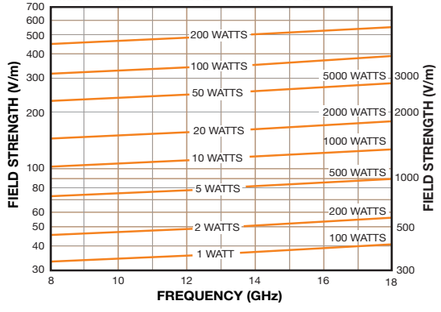

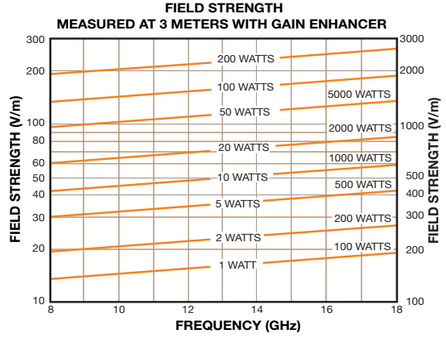

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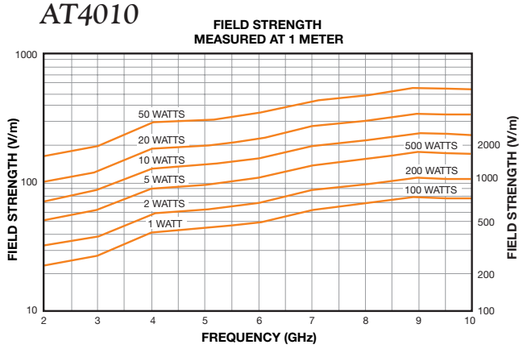

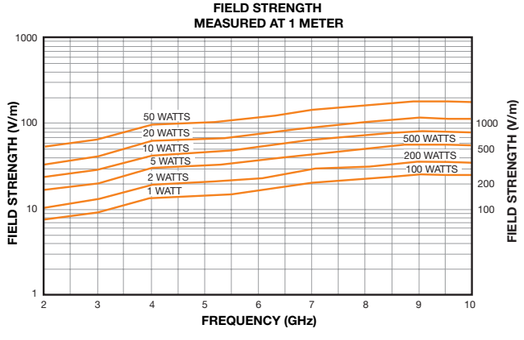

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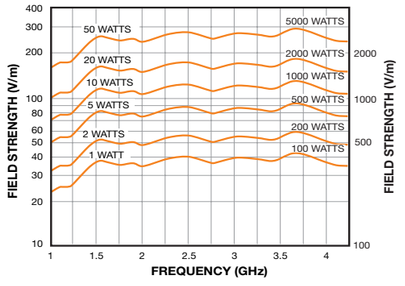
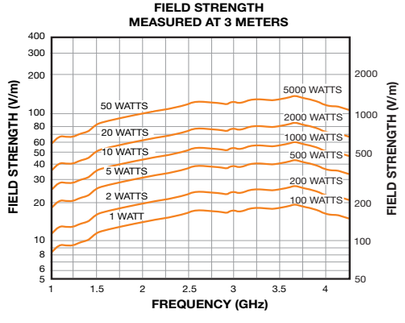
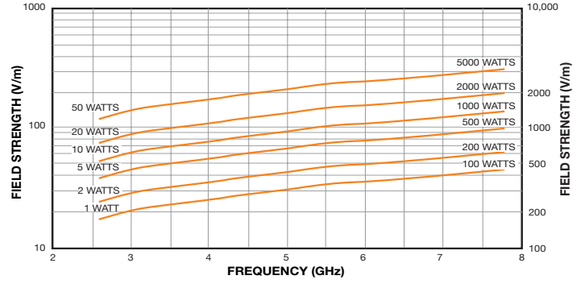
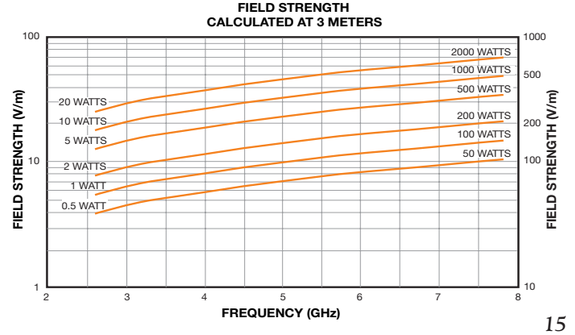




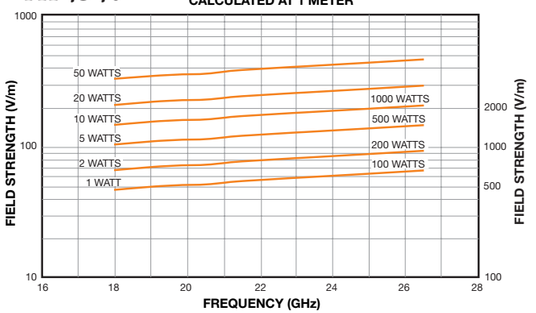
AT4520

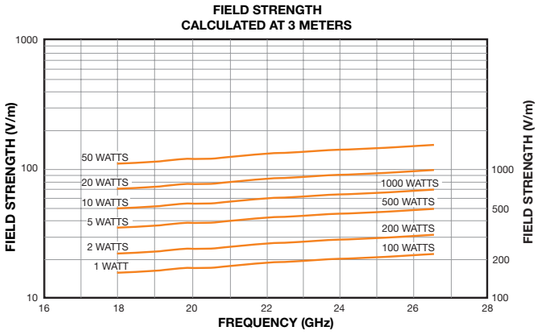




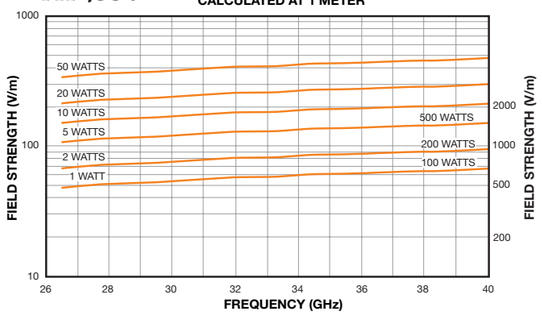
Microwave Horns. Now To 50 GHz.

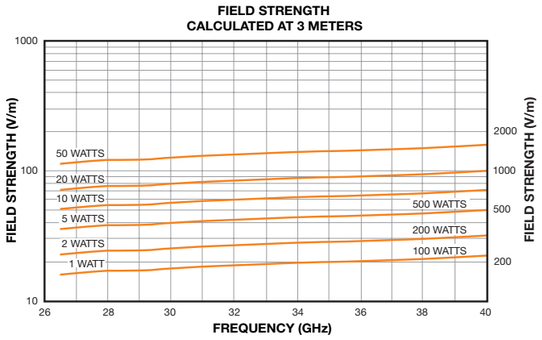
AT4540





AT4550





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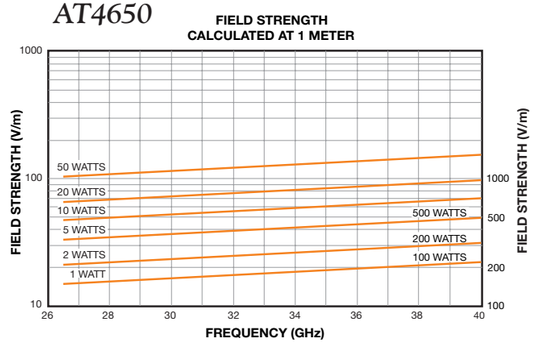

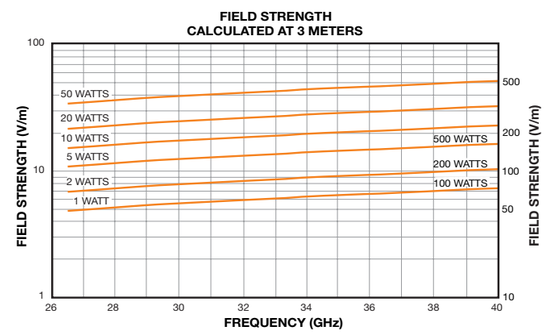

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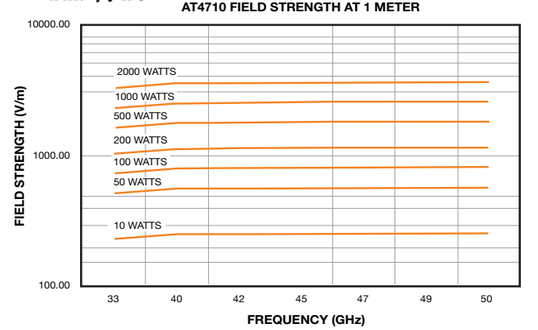

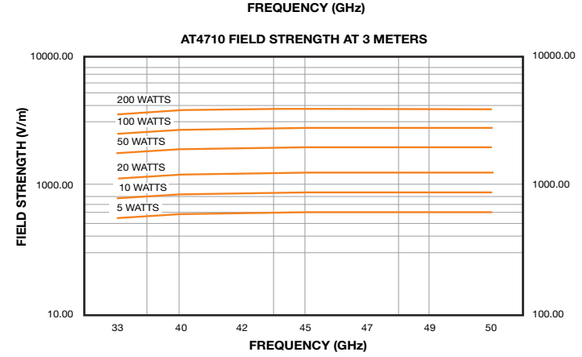

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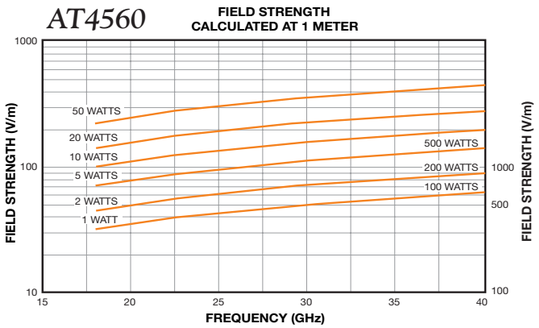

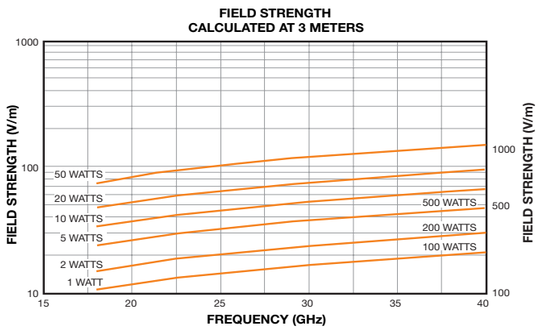

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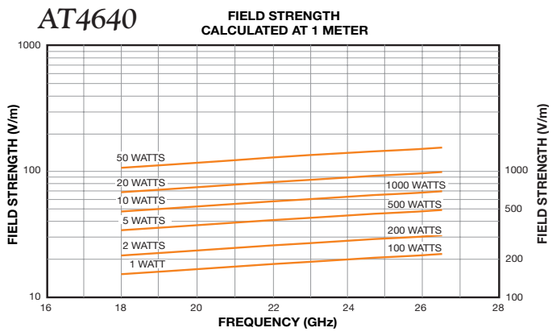
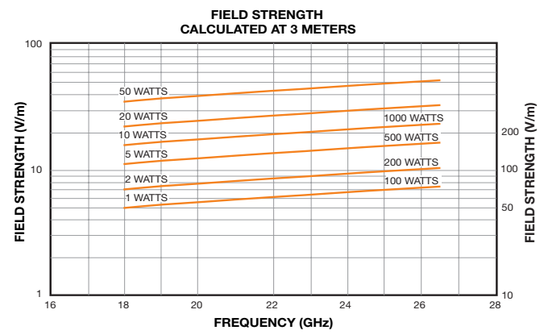


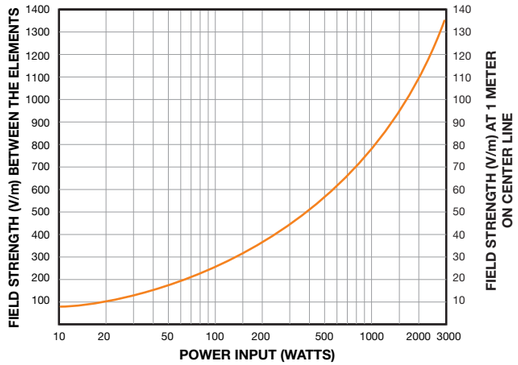


E-Field Generators. For Uniformity Between The Elements.

AT3000 Our Original Wideband.

10 kHz to 30 MHz • 1,000 V/m Between the Elements

The AT3000 radiator uses low inductance, high-power internal load resistors to terminate RF power, and offers well-matched input VSWR. An internal broadband transformer helps increase output voltage. With optional forced-air cooling, the AT3000 can handle power levels up to 3,000 watts. It is small enough to easily handle in shielded rooms and suitable for susceptibility testing at high field levels.



Field strength is shown using AR broadband power amplifiers. Field strengths are typical and do not include cable losses. Individual shielded rooms, reflections, amplifiers, and test-system characteristics will influence performance.

SPECIFICATIONS

OPERATING RANGE (max.)				
	Without forced-air cooling		With forced-air cooling	
POWER (watts)	DUTY CYCLE (percent)	ON TIME (minutes)	DUTY CYCLE (percent)	ON TIME (minutes)
1000	100	continuous	100	continuous
1600	50	7	100	continuous
2000	25	3	100	continuous
3000	Do not use		50	5

Frequency range . . . . . 10 kHz - 30 MHz
Impedance . . . . . 50 ohms
VSWR . . . . . 2.5:1 max.
Electric field intensity . . . . . Up to 1000 volts/meter, see graph
Connector . . . . . Type C (F) Quick change connector (other connectors available - contact factory)
Size (W X H X D) . . . . . 188 x 72 x 7 cm (74 x 28.3 x 2.8 in)
Weight (max.) . . . . . 16 kg (35 lbs)
Mounting . . . . . Optional tripod available

AT3100 Evolved Design.

10 kHz to 100 MHz • To 300 V/m Between the Elements

Our engineers improved upon the folded dipole design with this patented extended bandwidth E-field generator. It offers excellent spatial and spectral field uniformity within the defined test zone.

Two sets of elements accommodate a range of EUT sizes. They can be changed quickly and easily, thanks to the specially designed quick-disconnect clamps.

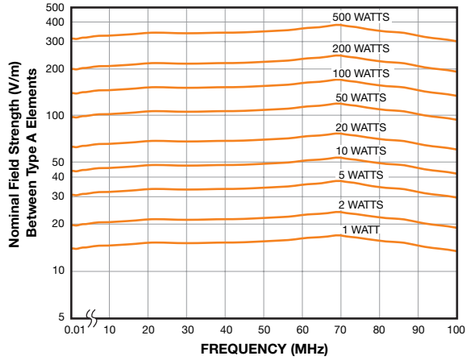
Type A elements provide the highest field intensities and can test objects up to 36 x 46 x 36 cm. The larger elements, Type B, are suitable for testing objects up to 48 x 46 x 36 cm.

SPECIFICATIONS

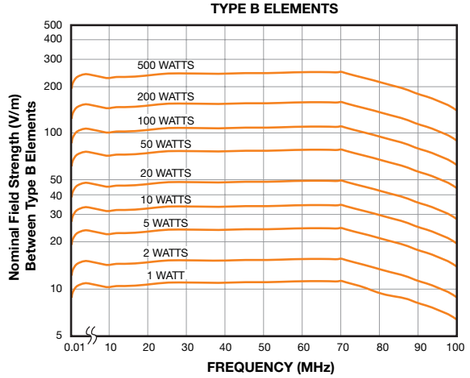
Frequency range . . . . . 10 kHz - 100 MHz
Impedance . . . . . 50 ohms nominal
Input VSWR . . . . . 2.5:1 max., 1.4:1 typical
Power input . . . . . 500 watts max.
Electric field intensity . . . . . see graphs
Field Intensity
between Type A elements
nominally 350 V/m with 500 W input
between Type B elements
nominally 200 V/m with 500 W input
Maximum Test Object Volume
between Type A elements . . . . . 36 x 46 x 36 cm (14 x 18 x 14 in)
between Type B elements . . . . . 48 x 46 x 36 cm (19 x 18 x 14 in)
Connector* . . . . . Type N (F)
Size
with Type A elements . . . . . 74 x 41 x 102 cm (29 x 16 x 40 in)
with Type B elements . . . . . 104 x 41 x 102 cm (41 x 16 x 40 in)
Weight (max.) . . . . . 13 kg (28 lb)
Mounting . . . . . Accepts tripod threaded 1/4 x 20 stud on three faces (optional tripod available)

*Adapter C (M)/ N(F) included.

FIELD STRENGTH MEASURED BETWEEN TYPE A ELEMENTS



FIELD STREGTH MEASURED BETWEEN TYPE B ELEMENTS



Field strength is shown using AR broadband power amplifiers. Field strengths are typical and do not include cable losses. Individual shielded rooms, reflections, amplifiers, and test-system characteristics will influence performance.

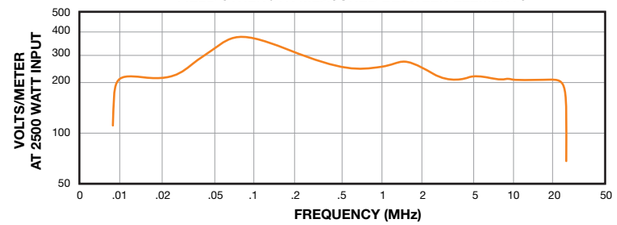
AT3001 For The BIG Jobs

10 kHz to 25 MHz • To 200 V/m Between the Elements

Practically no job is too big for the AT3001 E-field generator. It wraps around cars, small trucks, and other large EUTs. Unbolt the bottom elements from the field generator base to use the AT3001 above a ground plane.

Its high input power and low VSWR capability means the AT3001 generates high E-field strengths for the large span between the elements.

FIELD STRENGTH MEASURED BETWEEN ELEMENTS



Field strength is shown using AR broadband power amplifiers. Field strengths are typical and do not include cable losses. Individual shielded rooms, reflections, amplifiers, and test-system characteristics will influence performance.

SPECIFICATIONS

Power input (max) . . . . . 3,000 watts CW
Frequency range . . . . . 10 kHz - 25 MHz
Impedance . . . . . 50 ohms, VSWR 2.5:1 max., 1.5:1 avg.
Electric field intensity (at 2,500 watt input) . . . . . 200 volts/meter minimum between elements
Connector* . . . . . Type C (F)
Cooling . . . . . Natural convection to 40°C ambient
Weight (Approx.) . . . . . 113 kg (250 lb)
Size (W x H x D) . . . . . 102 x 222 x 304 cm (40.2 x 87.4 x 119.7 in)

*Adapter C (M)/ N(F) included.

Free Space Fields From A Broadband Transmission Line.

AT5000M3

AT5000M3

10 kHz to 100 MHz • To 500 V/m

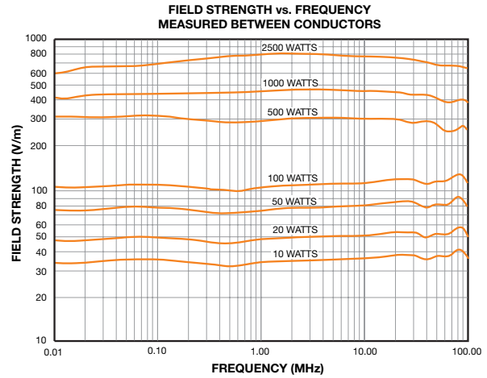
360° Rotation Accommodates Any Test Object.

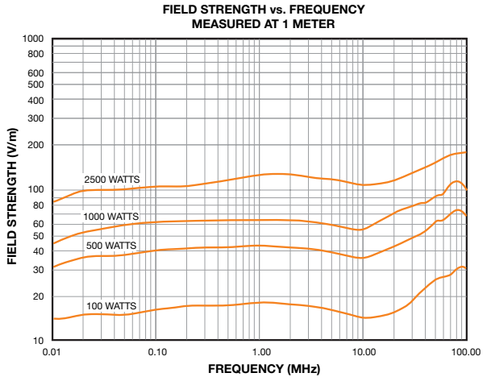
The AT5000M3 adds new possibilities to shielded room and anechoic chamber testing with its ability to match free space impedance resulting in efficient production of RF fields.

The parallel transmission line of the AT5000M3 offers a 377-ohm wave impedance of free space. Matching transformer and load resistors are built in and provide excellent VSWR characteristics over a frequency range of 10 kHz to 100 MHz.

The open area between conductors accommodates entire assemblies within the maximum field volume. Test items too large for insertion between the elements can be brought near the parallel conductors and radiated. The AT5000M3 easily rotates to any horizontal, vertical or diagonal position, and is equipped with height adjustment. Rotation accommodates large EUTs that can't fit between conductors.

AT5000: includes a stand with casters for easy mobility



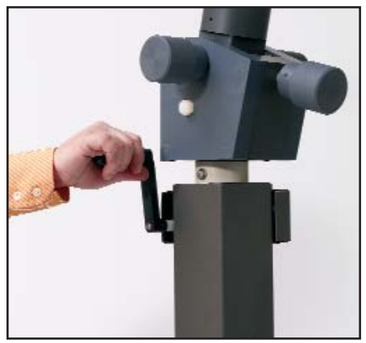


Field strength is shown using AR broadband power amplifiers. Field strengths are typical and do not include cable losses. Individual shielded rooms, reflections, amplifiers, and test-system characteristics will influence performance.

SPECIFICATIONS

Power input (max)	3,000 watts CW
Frequency range	10 kHz - 100 MHz
Input impedance	50 ohms
VSWR	2.0:1 max. 10 kHz - 100 MHz
	6:1 max. 10 - 20 kHz above 1kW input power
Electric field intensity	See charts above
Connector	Type C(F), Quick change connector
Cooling	Natural convection to 40°C ambient temperature
Weight	159 kg (350 lb)
Size (W x H x D)	261.1 x 215.4 x 141.7 cm (102.8 x 84.8 x 55.8 in)

Antenna Positioner & Tripods

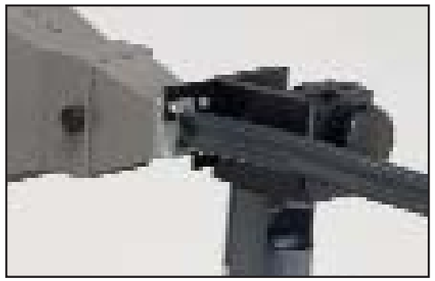


The AP5010B Antenna Positioner.

Heavy-duty non-conductive support and positioner for models AT6026A or AT2526A. Built-in casters for easy movement in a shielded room or open site testing. The design also allows the test engineer to position the antenna for either vertical or horizontal polarization; as well as permitting the antenna to be tilted 30 degrees height adjustment is from 1.91m (72.25 in) to 3.16m (124.50 in). The AP5010B is equipped with base leg adjustment is from 1.53m (60.19 in) overall to 2.04m (80.19 in).

The TP1000B tripod.

Our lightweight, nonconductive tripod supports many antennas. Angle, level and height are easily adjustable. The adjustable mount makes it simple to change antenna polarization. The TP1000BMI comes with locking casters and an additional swivel adapter head. AR offers other tripods including models TP2000, TP2010 and TP4000. For more information on these models, visit our website.



The TM Series Antenna Adapters.

AR also provides antenna adapters that allow bore sight rotation of microwave horn antennas. The TM series is compatible with AR Model TP1000B tripod.

AP4000

The AP4000 Antenna positioner is a heavy-duty positioner for AR's AT4000A, 200 to 1,000 MHz high-gain horn antenna. The height is easily adjustable and it rotates to change polarization. The AP4000 is built on wheels for easy movement in a shielded room or at free space testing. Also available is a 3-meter height positioner for the AT4000A antenna.

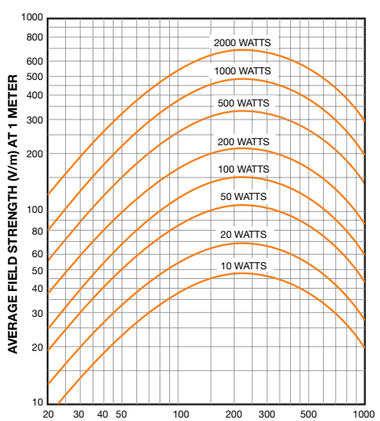
Shielded Room Antenna

The CAVITENNA (AT2000)

25 MHz to 1,000 MHz • To 700 V/m

This is the first RF antenna to make the shielded room an integral part of the radiator. A top-loaded monopole, the Cavitenna, model AT2000, uses the shielded room as a reverberating antenna, and the wall as the antenna's ground plane. As a result, it accommodates extremely high power and corresponding field intensities, comparable to those of log-periodic antennas four times the size of the Cavitenna.

The Cavitenna is often used in fully automated test configurations. Magnetic clamp mounting simplifies installation in the shielded room.



SPECIFICATIONS

Frequency range	25 - 1,000 MHz
Input power (max.)	
25 - 250 MHz	3,500 watts
250 - 500 MHz	2,000 watts
500 - 1000 MHz	1,250 watts
Impedance	50 ohms nominal
Connector	Type C (F)
Electric field intensity	See curves above
Size (W x H x D)	117 x 61 x 51 cm (46 x 24 x 20 in)
Weight (max.)	14 kg (30 lb)
Mounting provisions	Magnetic clamps included

Average field strengths using AR broadband power amplifiers are shown. Field strengths will vary with individual shielded room geometry and placement of the Cavitenna and test item within the room. Consult AR applications engineering or request our Cavitenna Test Report for more information.

Get Smart. Read The Glossary.

Antenna Factor: Antenna factor is the ratio of the magnitude of the E field incident upon a receive antenna divided by the voltage developed at the antenna's coaxial connector (assumed here to be 50 ohms). Antenna factor is derived from gain but is a more convenient parameter for some emissions calculations. Antenna factor may be calculated from gain as follows:

$$A.F. = \frac{9.734}{\lambda\sqrt{G}}\ (m^{-1})$$

where A.F. is the Antenna Factor as a voltage ratio, l is the wavelength in meters, and G is the numeric antenna gain as a power ratio.

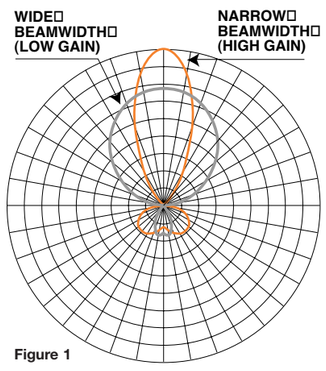
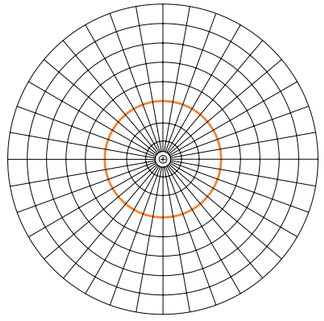


Figure 1

Beamwidth: The angular width of the main beam of a directional antenna is an important parameter for determining field volume. Beamwidth is expressed in degrees and is measured between the –3 dBi, or half-power, points on either side of beam peak. Other levels, such as –1 dBi and –10 dBi, are sometimes used. Beamwidth is inversely related to gain; higher-gain antennas have narrower beamwidths. The beamwidth of an antenna is usually different in the E plane and the H plane, depending upon the antenna.

Directional and Non-directional antennas: Non-directional antennas, such as AR E field generators and balanced transmission line antennas, generate intense fields between the conductors. The compromise of this type of field generator is that the field strength drops off rapidly as the EUT is moved away from the conductors. TEM cells also produce very high field levels within a limited area. Directional antennas, such as log-periodic and horn antennas display a more focused RF field, enabling them to be used at 1 meter and 3 meter distances from the EUT, and still produce with an RF field level high enough to radiate large test objects.



ISOTROPIC RADIATION

Figure 2

Phase center movement plays a significant role in field generation, when the active region moves as a function of frequency, and the effective distance from the EUT to the antenna changes. All AR field strength charts are "measured" from the tip of the antenna in accordance with EMC standards. Rest assured you will get the desired field strength, regardless of the antenna's active region.

Field regions: At distances (R) that are far from a radiating antenna, the E field intensity is inversely proportional to R, and the angular distribution of the radiated energy is independent of R. This is known as the far-field region. At distances close to the antenna, the near field is much more complicated. The E field intensity has inverse square and inverse cube dependencies, and the angular distribution of the radiated energy changes with R. There is no well-defined transition between the near field and the far field; however, two commonly used criteria for the boundary are:

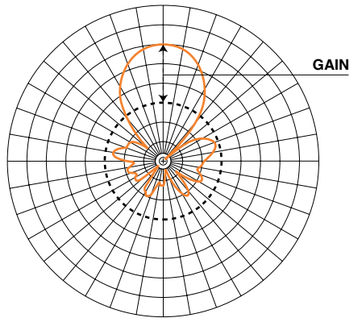
$$R = \frac{2D^2}{\lambda}$$

(for horns) or

$$R = \frac{\lambda}{2\pi}$$

(for log-periodic)

where D is the largest dimension of the antenna's radiating aperture (transverse to the direction of propagation) and λ is wavelength. The first expression is applicable to aperture antennas, such as horns, while the second expression is more appropriate for "wire" antennas such as half-wave dipoles or log-periodics.



DIRECTIONAL RADIATION (GAIN OVER ISOTROPIC)

Figure 3

Front-to-back ratio and side-lobe level: Antennas have, in addition to the main beam, minor beams or lobes in other directions. These lobes represent "lost" power. Horn antennas have side-lobe pairs located symmetrically about the main beam (see Figure 1), while log-periodics have a single predominant minor lobe opposite the main beam. The front-to-back ratio and side-lobe level are the difference in dBi between the main beam and the back lobe or side lobes, respectively.

Gain: An antenna, being a passive device, emits only the power it receives from the amplifier. Directive antennas concentrate their radiation in one direction (like the beam of a flashlight) and are said to have gain. Antenna gain is expressed in dBi, the power density radiated in an antenna's main beam direction relative to the power density that would be radiated by a hypothetical isotropic source (with the same input power). Gain is a far-field parameter and, as such, is independent of distance. If the gain of an antenna is known, the field intensity in the far-field region can easily be calculated:

$$E = \frac{\sqrt{30PG}}{R}$$

where E is the field intensity in V/m, P is the power in watts, G is the numeric antenna gain as a power ratio (not dBi), and R is the distance from the transmit antenna to the EUT in meters.

In the near-field region, however, there is no practical method of predicting field intensity, and one must rely upon measured field strength charts at specific distances, such as the charts in this brochure.

Phase center or active region: The phase center of an antenna is the point, usually located within the volume of the antenna and lying along its centerline in the direction of propagation, that is the apparent source of radiation. In log-periodic antennas, this is also called the active region. The phase center location varies with frequency and may be different in the E plane and the H plane. The phase center of a horn can occur anywhere from the aperture to about 2/3 of the way into the horn, depending upon the design and the frequency. The active region of log-periodic varies nearly the full length of the antenna from the small end at high frequencies to the large end at low frequencies.

The significance of the phase center for susceptibility measurements is that this is the point from which R should be measured in calculating field strength. For most far-field measurements, R is large compared with the size of the antenna, so the exact location of the phase center is unimportant, and R can simply be measured to the aperture or to the mounting point without significant error. The location of the phase center may become important in near-field measurements, and this is another argument for using measured field strength charts rather than attempting to calculate field-strength levels in the near field. Measured field-strength charts are usually based on the distance to the front surface or tip of the antenna.

Polarization: The polarization of an antenna may be linear, circular, or elliptical, although linear polarization is used almost exclusively in the world of RF susceptibility testing, and all of the antennas described in this booklet are linearly polarized. When dealing with linear polarization, the terms E plane and H plane will be encountered. The E plane of a radiated wave is the plane lying in the direction of propagation and containing the electric (E field) vector. Similarly, the H plane lies in the direction of propagation and contains the magnetic (H field) vector. The E plane and the H plane are perpendicular to each other.

Power Input: There are several ways of discussing RF power as it is used to excite antennas for the generation of electromagnetic fields. The equation below is provided to understand the definition as used in this catalog. Usually this value cannot be directly measured, but it is computed from the direct measurement of forward and reflected power by taking the difference:

P net (W) = P forward (W) – P reflected (W).

Radiating and non-radiating antennas: Electric fields generated between the elements of a capacitor-type field generator (such as our E field generators) or between the conductors of a balanced transmission-line field generator (such as our Model AT5000) are concentrated intensely between the conductors and tend to cancel out as one moves away. A field of 200 V/m measured between conductors may degrade to 20 V/m just one meter away. TEM fields generated in a TEM cell are entirely contained within the cell walls. These are all non-radiating field generators, which can provide very high field intensities within a limited volume.

Directional antennas, such as our log-periodic are truly radiating antennas. Their propagating fields allow positioning of large EUTs at suitable distance in accordance with the beam width of the antennas.

Note: When using non-radiating field generators, the EUT should be placed within or as close as possible to the concentrated-field area; the 1-meter and 3-meter separations used in radiated susceptibility measurements are not recommended for non-radiating field generators.

VSWR: The measure of the degree to which source and the load impedances are matched. A VSWR of 1.0 is considered ideal. The greater the VSWR, the more power is reflected back from the antenna resulting in an undesirable mismatch.

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***ISO9001-2000 certification applies to AR RF/Microwave Instrumentation, not to AR Modular RF & AR Receiver Systems.**