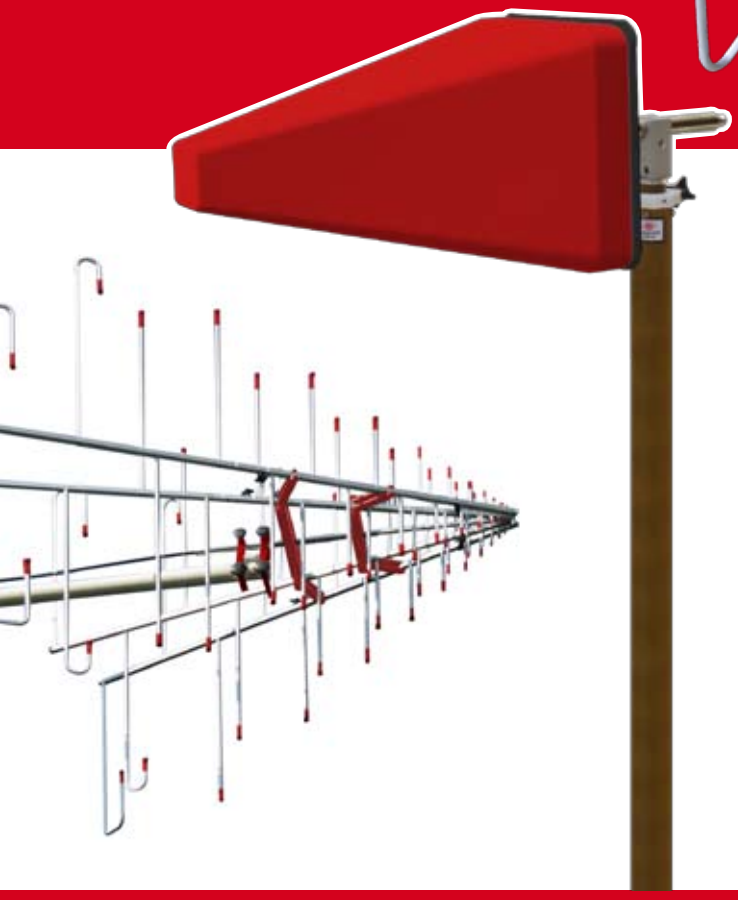
ANTENNAS
ANTENNA MASTS
PRE-AMPLIFIER



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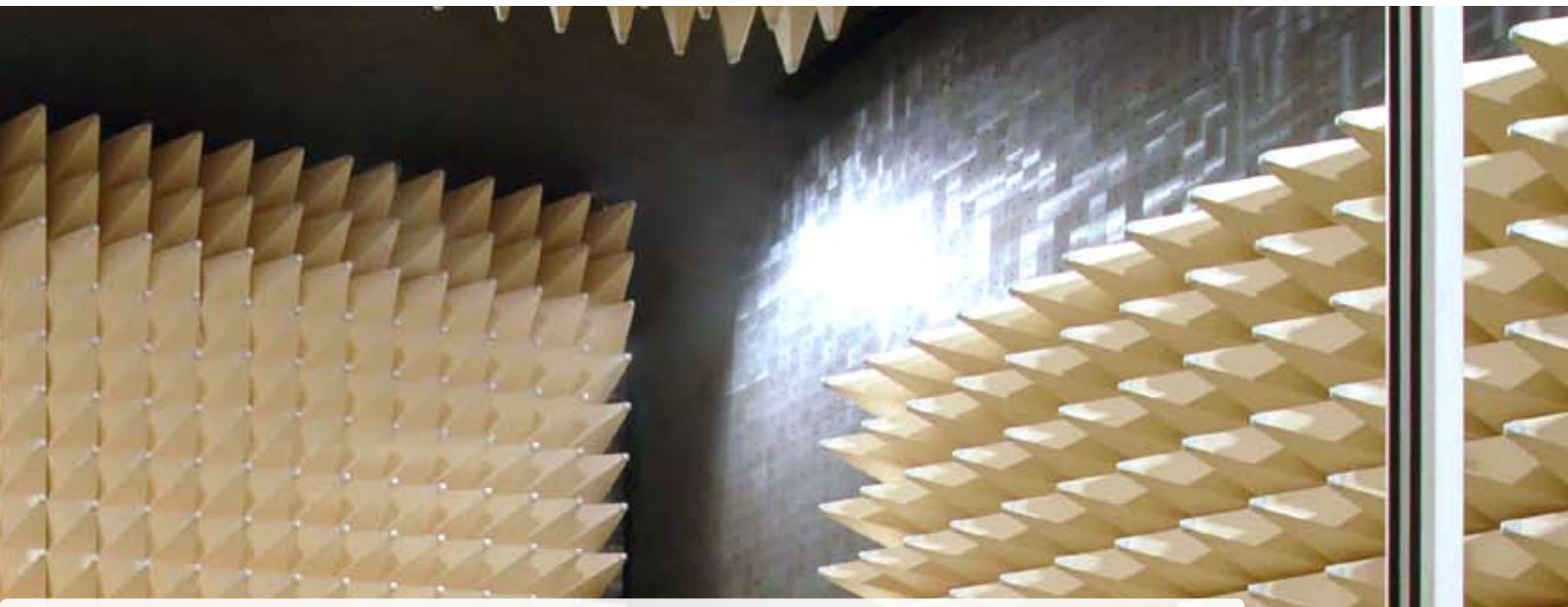
Content / Index



Antennas:

ALX-4000 / -E, ALX-8000E	Broadband antenna	25 MHz – 8 GHz 3-4
AXL-80	Double-stacked log.-per. antenna	80 MHz – 4 GHz 5
AXL-80S	Double-stacked log.-per. antenna with folded elements	80 MHz – 4 GHz 6
AXL-200	Double-stacked log.-per. antenna	200 MHz – 2.5 GHz 7
MAX-9	Double-stacked log.-per. antenna	700 MHz – 10.5 GHz 8
MAX-18	Double-stacked log.-per. antenna	700 MHz – 18 GHz 9
HAX-6	Broadband horn antenna	500 MHz – 6 GHz..... 10
HAX-18	Broadband horn antenna	800 MHz – 18 GHz 11
HAX-40	Broadband horn antenna	14 GHz – 40 GHz 12
SAX-10	Active rod-antenna for E-field measurements	9 kHz – 30 MHz 13
LAX-10	Active loop antenna for H-field measurements	9 kHz – 30 MHz 14
SAM-6	Biconical antenna for micro-wave frequencies for field strength radiation under free-space conditions	1 GHz – 6 GHz 15
SAM-18	Biconical antenna for micro-wave frequencies for field strength radiation under free-space conditions	3 GHz – 18 GHz 16

Pre-Amplifier:

FPA-2 / -6	Broadband pre-amplifier	9 kHz – 6 GHz..... 17
FPA-18	Broadband pre-amplifier	1 GHz – 18 GHz..... 18
FPA-26	Broadband pre-amplifier	18 GHz - 26.5GHz..... 19

Antenna Masts:

FSM-EP1	Electrical polarization switch	 20
PPS	Pneumatical polarization switch	 20
FSM 1.6 / 2.0 / 4.0	Manual antenna masts	 21
FAM	Fully automatic antenna mast	 22

Broadband Antenna ALX-4000 / ALX-4000E / ALX-8000E

for emission measurements and immunity tests

Description

The ALX-4000 is an ultra-broadband antenna for emission measurements and immunity tests according to nearly all relevant international standards in the frequency range from 25 MHz up to 4 GHz. With regard to its mechanical structure it is a linear polarized logarithmic periodic broadband antenna for the higher frequency range, combined with a 4:1 broadband dipole (aluminum) for the low frequency range. This kind of ultra-broadband antenna allows performance of EMC test in one run, without time consuming antenna changes.

The ALX-4000E is an especially optimized version for emission measurements. It offers lower antenna factors and improved VSWR. Additionally it can be used for immunity tests which require an input power of less than 100 W cw (200 W intermitt.).

The ALX-8000E has an extended frequency range up to 8 GHz.

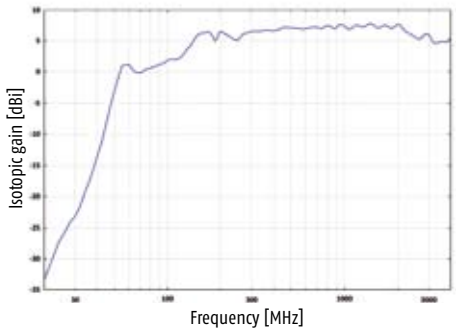
All antennas are supplied with antenna factors for 3.0 m and 10.0 m measuring distance (1.0 m on request).

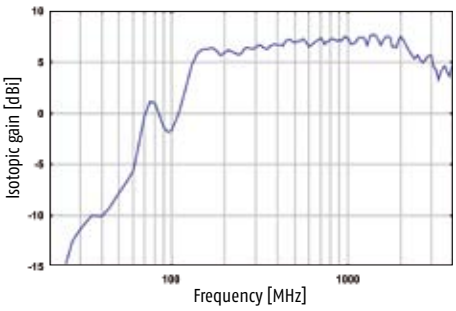
Technical specifications	ALX-4000	ALX-4000E	ALX-8000E
Frequency range	25 MHz to 4 GHz		25 MHz to 8 GHz
Max. input power	100 MHz - 900 W 500 MHz - 300 W 1000 MHz - 210 W 2000 MHz - 140 W 3000 MHz - 100 W	200 W (intermitt.) 100 W (cont.)	
Nominal impedance	50 Ω		
Connector	type N female		
Isotropic gain (LP-Section)	6.4 ± 1.2 dBi		
Antenna factor	4 ... 37 dB/m	7 ... 34 dB/m	7 ... 43 dB/m
Standing wave ratio SWR typ.	< 1.5		
Front to back ratio	20 dB (f > 150 MHz)		
Cross polarization	>20 dB (30 MHz...1 GHz)		
3 dB beamwidth typ. (E-Plane)	45°-65° (f > 150 MHz) ≈ 78° (f < 150 MHz)		
3 dB beamwidth typ. (H-Plane)	90°-120° (f > 150 MHz)		
Dimensions (W x L x D)	1500 x 930 (1218) x 620 mm	1500 x 910 (1218) x 620 mm	1500 x 920 (1253) x 620 mm
Weight	3.1 kg		
Fixation (indexing ring)	22 mm tube		
Use	Emission measurements Radiated immunity tests		

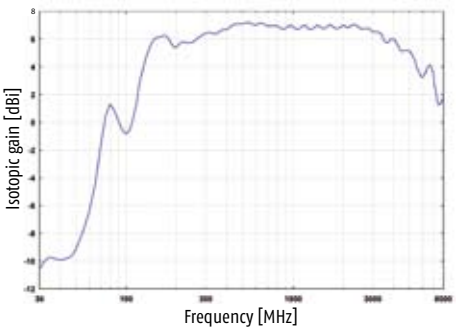
Broadband Antenna ALX-4000 / ALX-4000E / ALX-8000E

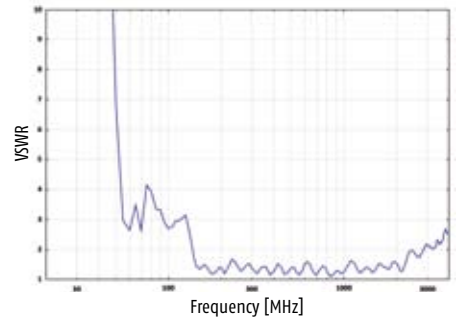
for emission measurements and immunity tests

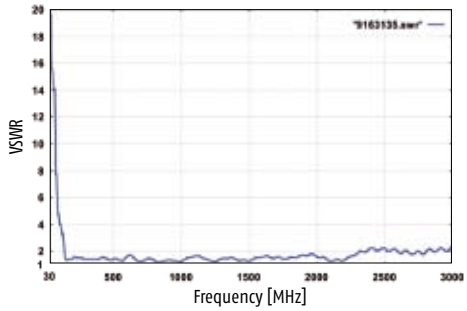
Measurements of ALX-4000	Measurements of ALX-4000E	Measurements of ALX-8000E

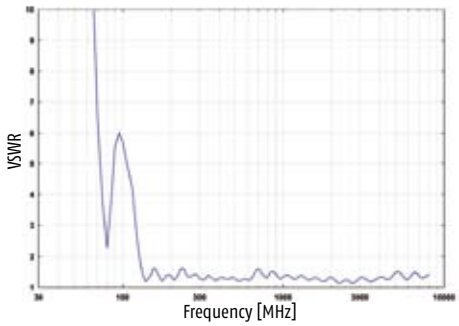


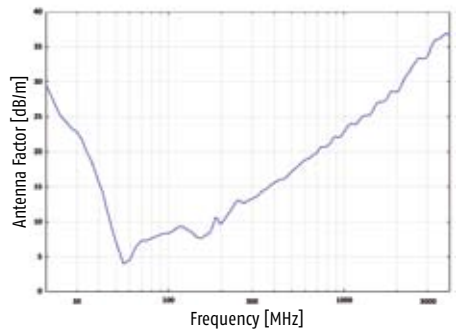


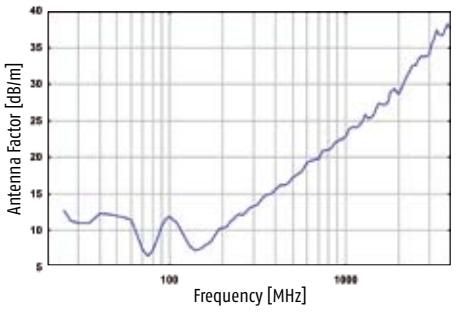


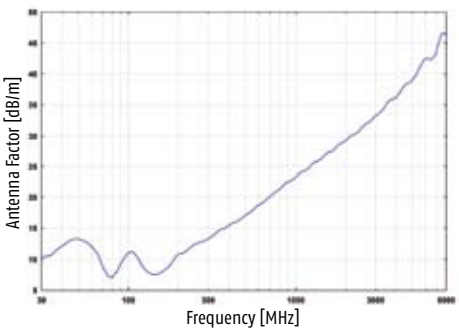


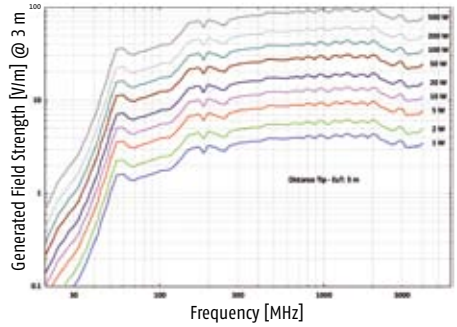


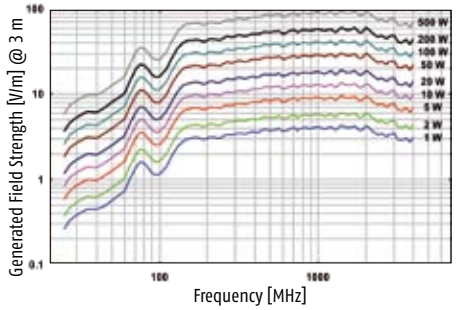


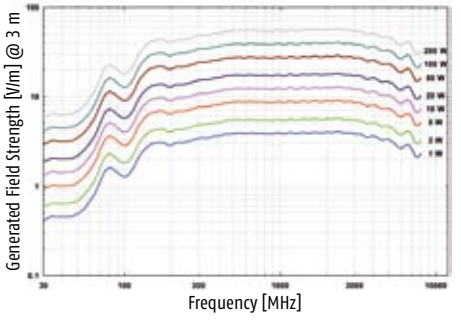












Double Stacked Log.-Periodic Antenna - AXL-80, 80 MHz - 4 GHz

for immunity tests and emission measurements

Description

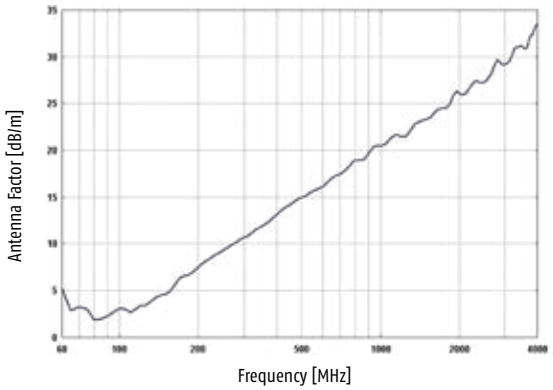
Double-stacked log.-periodic antennas have mainly been developed in order to reach the highest field strength levels acc. to automotive-, avionics- and military standards with as less as possible input power. **Antenna gain saves amplifier power!**

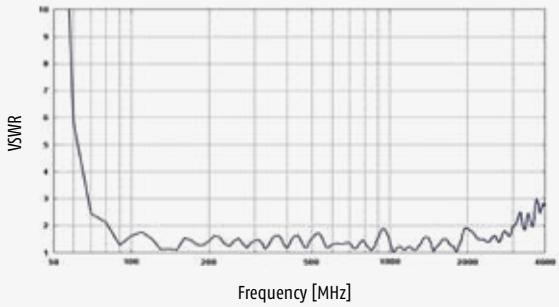
The stacked design helps to focus the directional pattern of the H-plane somewhat, resulting in a typical gain improvement of 2.5dB compared to an ordinary LP antenna. This is especially important for immunity testing, where a maximum field strength and a good field uniformity is required. The beam-width in the E-plane and the H-plane are nearly identical, providing an opti-mized illumination of the EUT with minimized ground reflection influence.

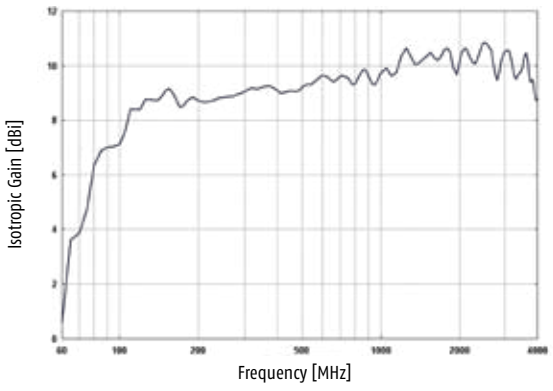
Further the cross polar rejection of the AXL-80 is excellent and the high and flat gain of about 9dBi over a broad frequency range is the main advantage of the AXL-80. Because of its physical dimensions the main application of the AXL-80 is in bigger anechoic chambers / test sites for radiated immunity tests and emission measurements. From its technical / mechanical design it is a double- stacked log.-periodic antenna, consisting of two excellent ordinary log.-periodic structures. For easy transport and storage it is possible to remove the rear elements of the antenna, which are fixed by fast links.

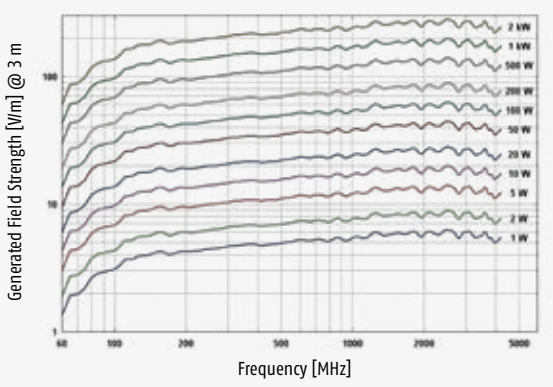
Technical specifications	
Type:	AXL-80
Frequency range:	80 MHz to 4 GHz
Max. input power	1.5 kW (intermitt.)
(N-connector):	1 kW (cont.)
Max. input power	3 kW (intermitt.)
(7 / 16-connector):	2 kW (cont.)
Nominal impedance:	50 Ohm
Isotropic gain:	9 +/- 2 dBi
Antenna factor:	2 ... 30 dB/m
Standing wave ratio SWR typ.:	1.5 (f < 3GHz)
Front to back ratio:	8 - 22 dB
Cross polarization:	> 30 dB
3 dB beamwidth typ. (E-Plane):	60° - 75°
3 dB beamwidth typ. (H-Plane):	50° - 65°
Dimensions (W x L x D) in mm:	1850 x 1460 x 1955
Weight:	11 kg
Fixation:	ø 22 mm mounting tube
Use:	Emission measurements
	Radiated immunity tests

Measurements



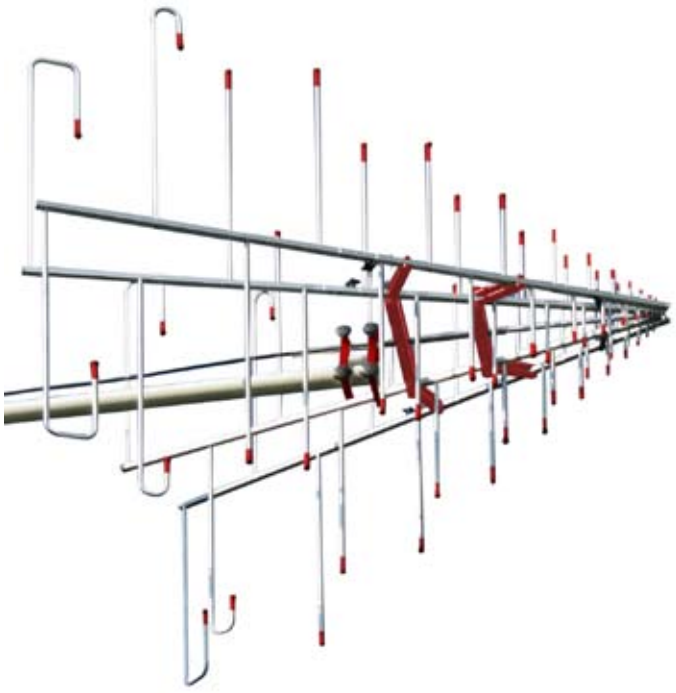






Double Stacked Log.-Periodic Antenna – AXL-80S, 80 MHz – 4 GHz

with folded elements for immunity tests and emission measurements with limited space

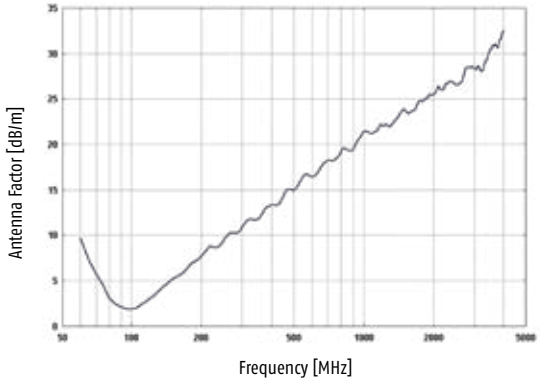


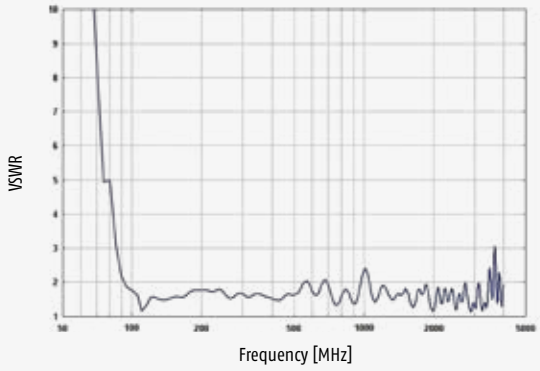
Description

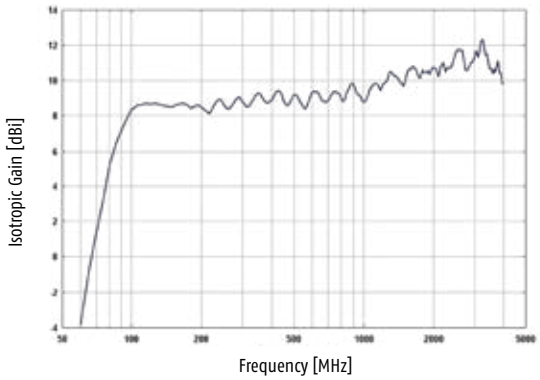
The AXL-80S has the same antenna design as the AXL-80 (see page 4), but with folded rear elements. The folded rear elements reduce the width of the AXL-80S to 1,480 mm. That is important for some standards, in order to keep the minimum distance of 25cm to the floor when testing in vertical polarization. But also for applications in smaller anechoic chambers the reduced dimensions might be an advantage.

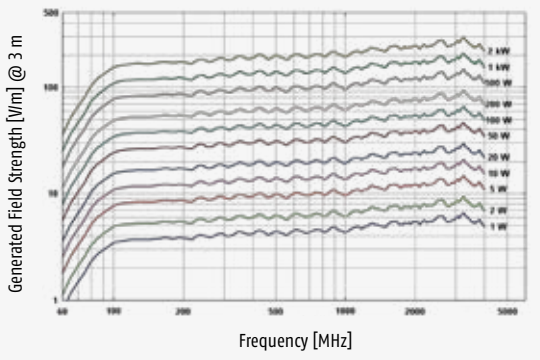
Technical specifications	
Type:	ALX-80S
Frequency range:	80 MHz to 4 GHz
Max. input power	1.5 kW (intermitt.)
(N-connector):	1 kW (cont.)
Max. input power	3 kW (intermitt.)
(7 / 16-connector):	2 kW (cont.)
Nominal impedance:	50 Ohm
Isotropic gain:	9 +/- 3 dBi
Antenna factor:	2 ... 32 dB/m
Standing wave ratio SWR typ.:	1.6 (f < 3 GHz)
Front to back ratio:	8 - 22 dB
Cross polarization:	> 30 dB
3 dB beamwidth typ. (E-Plane):	60° - 75°
3 dB beamwidth typ. (H-Plane):	50° - 65°
Dimensions (W x L x D) in mm:	1480 x 1330 x 1480
Weight:	9 kg
Fixation:	ø 22 mm tube
Use:	Emission measurements Radiated immunity tests

Measurements



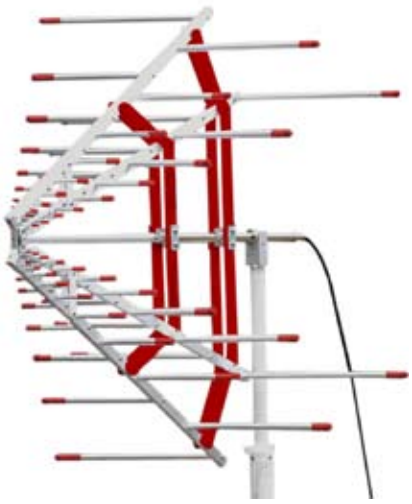






Double Stacked Log.-Periodic Antenna – AXL-200, 200 MHz – 2.5 GHz

for immunity tests acc. to automotive standards



Description

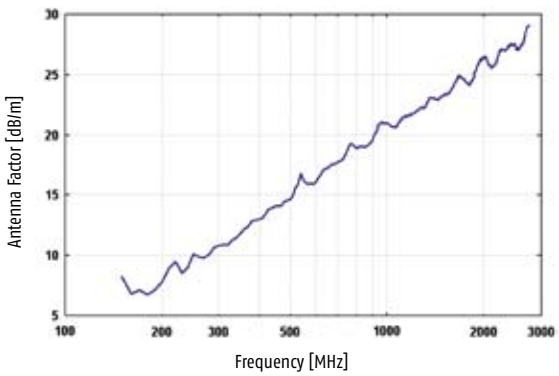
The AXL-200 has especially been designed for the generation of high field strength levels acc. to automotive immunity standards. The small dimensions of the antenna does also allow to keep the min. required distance of 25cm to the floor, when testing in vertical polarization.

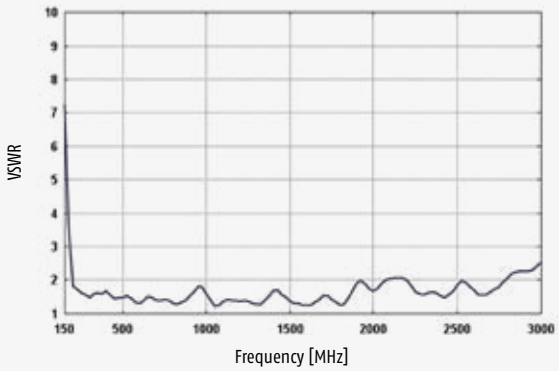
From the mechanical design it´s a double-stacked logarithmic periodic antenna, consisting of two excellent ordinary log.-periodic structures. This design guarantees a high and flat gain of 9-10dBi over a large bandwidth and a low SWR.

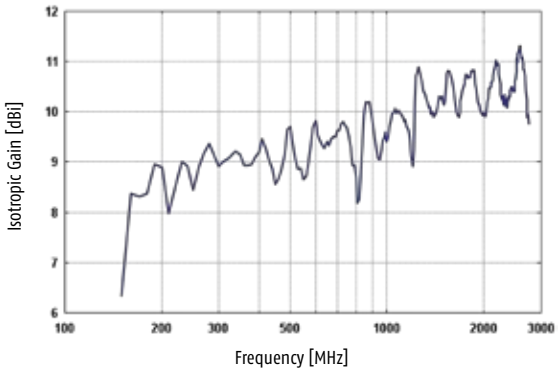
The stacked design helps to focus the directional pattern of the H-plane somewhat, resulting in a typical gain improvement of ca. 2 dB compared to an ordinary LP antenna. This is especially important for immunity testing, where a maximum field strength and a good field uniformity is required. The beamwidth in the E-plane and the H-plane are nearly identical, providing an optimized illumination of the EUT with minimized ground reflection influence. Further the AXL-200 has an excellent cross-polar rejection.

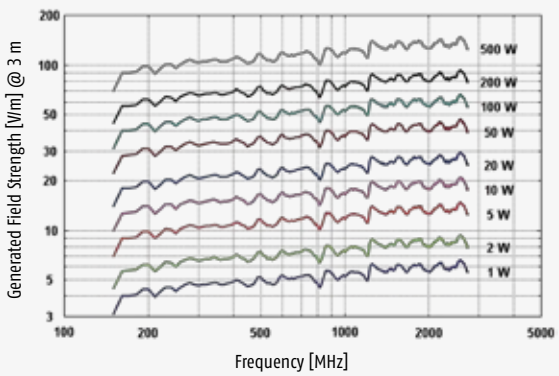
Technical specifications	
Type:	AXL-200
Frequency range:	200 MHz to 2.5 GHz
Max. input power	2 kW (intermitt.)
(N-connector):	1 kW (cont.)
Max. input power	3 kW (intermitt.)
(7 / 16-connector):	2 kW (cont.)
Nominal impedance:	50 Ohm
Isotropic gain:	9 ... 10 +/- 1 dBi
Antenna factor:	8 ... 24 dB/m
Standing wave ratio SWR typ.:	< 1.5
Front to back ratio:	> 16 dB
Cross polarization:	> 30 dB (200 MHz ... 1 GHz)
3 dB beamwidth typ. (E-Plane):	64° - 53°
3 dB beamwidth typ. (H-Plane):	63° - 44°
Dimensions (W x L x D) in mm:	930 x 890 x 940
Weight:	4.6 kg
Fixation:	ø 22 mm tube
Use:	Radiated immunity tests and Emission measurements acc. to automotive standards

Measurements









Double Stacked Log.-Periodic Antenna – MAX-9, 700 MHz – 10.5 GHz

for immunity tests and emission measurements

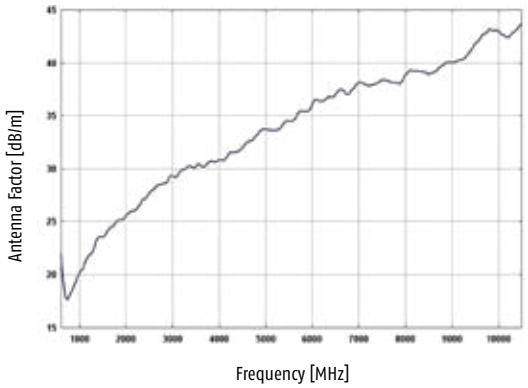
Description

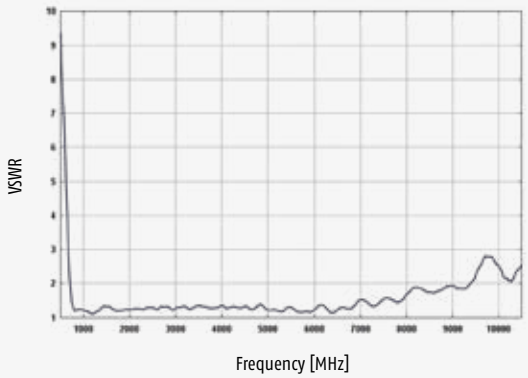
Stacked logarithmic-periodic broadband antenna for radiated immunity tests and emission measurements in the microwave frequency range. The antenna structure is made of laser-cut brass.

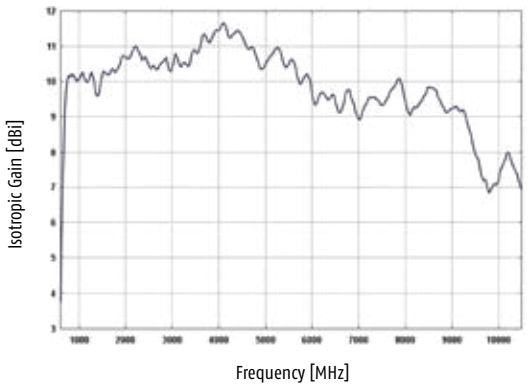
For protection of the fine antenna structure against damage the antenna is equipped with a low loss plastic protection cover. The MAX-9 is especially suitable for immunity testing acc. to IEC 61000-4-3 because of its good field uniformity. Further outstanding characteristics of the MAX-9 are the wide bandwidth, the nearly constant high gain, very good impedance matching as well as equal beamwidth in E- and H-plane.

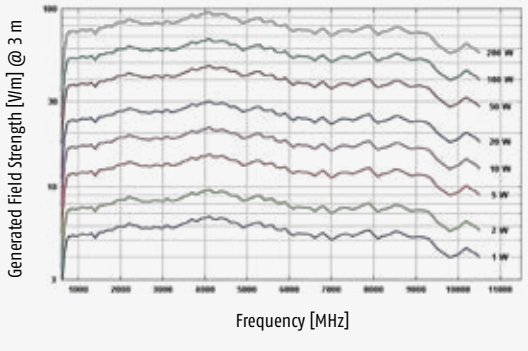
Technical specifications	
Type:	MAX-9
Frequency range:	700 MHz to 10.5 GHz
Max. input power:	300 W (f = 1 GHz)
	150 W (f = 6 GHz)
Nominal impedance:	50 Ohm
Connection:	type N feamle
Isotropic gain:	typ. 10.3 dBi +/- 1.5 dB
Antenna factor:	18 ... 41 dB/m
SWR typical:	< 1.5 (f < 7 GHz)
Front to back ratio:	> 25 dB typ.
Cross polarization rejection:	> 30 dB typ.
Half-power beamwidth (E-plane):	46° +/- 10°
Half-power beamwidth (H-plane):	48° +/- 10°
Dimensions (L x W x H) in mm:	460 (+215) x 270 x 270
Weight:	3.7 kg
Fixation:	ø 22 mm tube
Use:	Radiated immunity tests Emission measurements

Measurements









Double Stacked Log.-Periodic Antenna – MAX-18, 700 MHz – 18 GHz

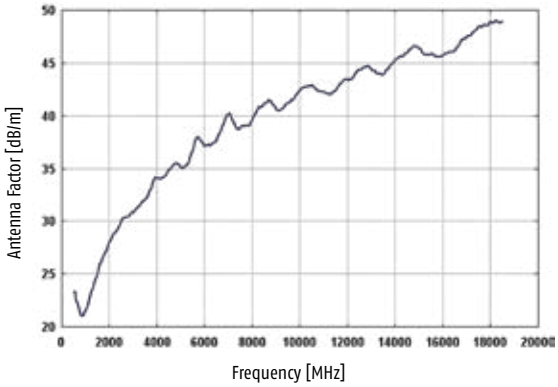
for immunity tests and emission measurements

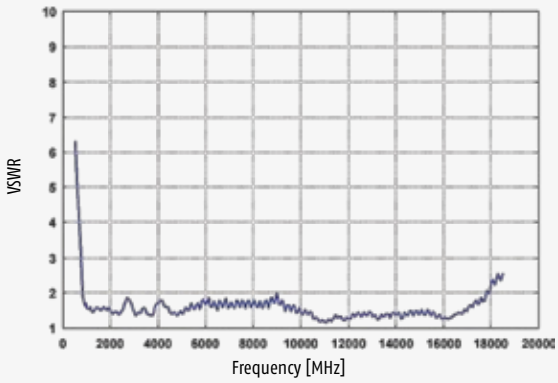
Description

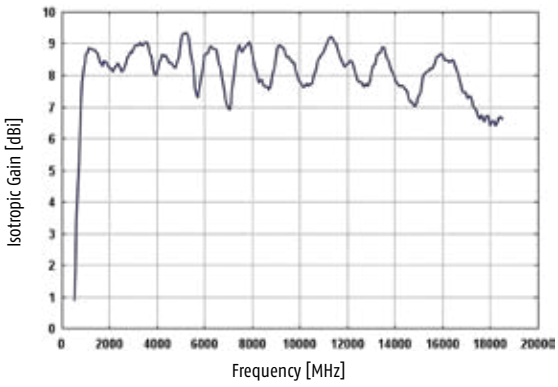
Stacked logarithmic-periodic broadband antenna for radiated immunity tests and emission measurements in the microwave frequency range. The antenna structure is made of laser-cut brass. For protection of the fine antenna structure against damage the antenna is equipped with a low loss plastic protection cover. The MAX-18 is especially suitable for immunity testing acc. to IEC 61000-4-3 because of its good field uniformity. Further outstanding characteristics of the MAX-18 are the wide bandwidth, the nearly constant high gain, very good impedance matching as well as equal beamwidth in E- and H-plane.

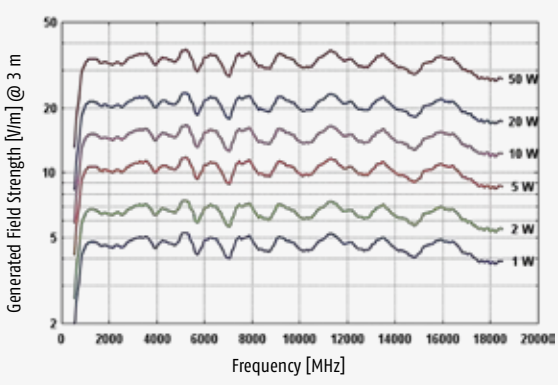
Technical specifications	
Type:	MAX-18
Frequency range:	0.7 to 18 GHz
Max. input power	50 W
Nominal impedance:	50 Ohm
Connection:	type N female
Isotropic gain:	typ. 8.6 dBi +/- 1 dB
Antenna factor:	20 ... 49 dB/m
SWR typical:	< 2
Front to back ratio:	> 25 dB
Cross polarization rejection:	> 28 dB
Half-power beamwidth (E-plane):	58°
Half-power beamwidth (H-plane):	60°
Dimensions (L x W x H) in mm:	(308 + 182) x 270 x 270
Weight:	1.2 kg
Fixation:	ø 22 mm tube
Use:	Radiated immunity tests Emission measurements

Measurements









Broadband Horn Antenna - HAX-6, 500 MHz – 6 GHz

for immunity tests and emission measurements

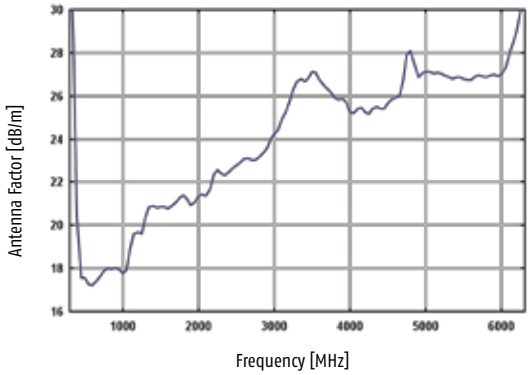
Description

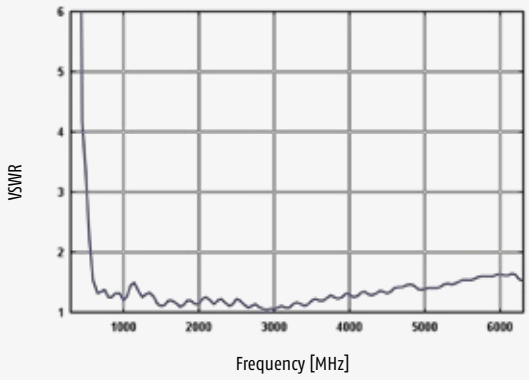
The horn antennas HAX offer a very low SWR in their nominal frequency range and a very broad bandwidth. The gain increases with frequency up to approx. 18 dBi. The increasing gain with frequency helps to compensate cable losses.

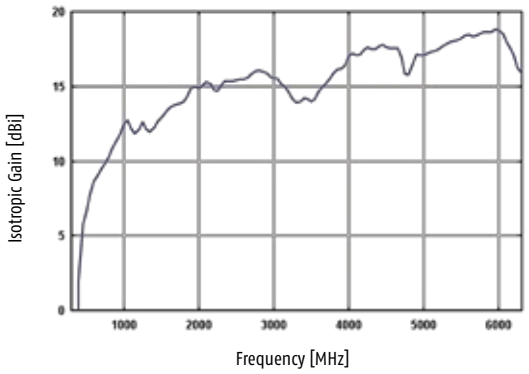
The HAX series is suitable for both, transmission and receiving applications. The maximum allowed input power is only limited by the female N-connector. The detailed manual of the calibrated test antennas includes gain, antenna factor, SWR and directional patterns. The antenna is mounted with the 22 mm tube, equipped with a index ring for quick changes of polarization without using tools.

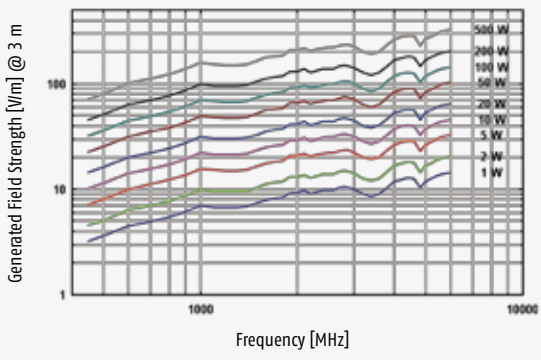
Technical specifications	
Type:	HAX-6
Frequency range:	500 MHz to 6 GHz
Max. input power:	limited only by N-connector
Connector:	N-female
Gain:	6 ... 18 dBi
Antenna factor:	19 ... 29 dB/m
Standing wave ratio SWR typ.:	< 2
Dimensions (L x W x H) in mm:	820 x 424 x 314
Weight:	4.1 kg
Fixation:	ø 22 mm tube
Material:	aluminium
Use:	Radiated immunity tests Emission measurements

Measurements









Broadband Horn Antenna – HAX-18, 800 MHz – 18 GHz

for immunity tests and emission measurements

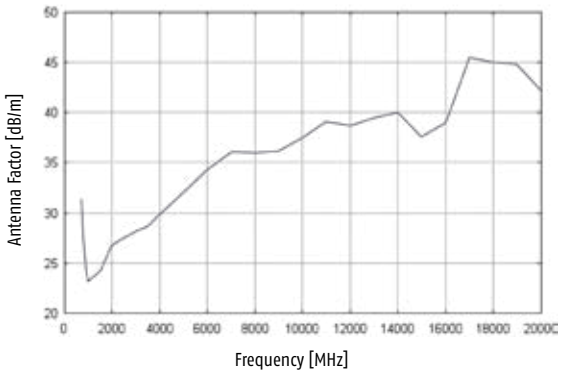
Description

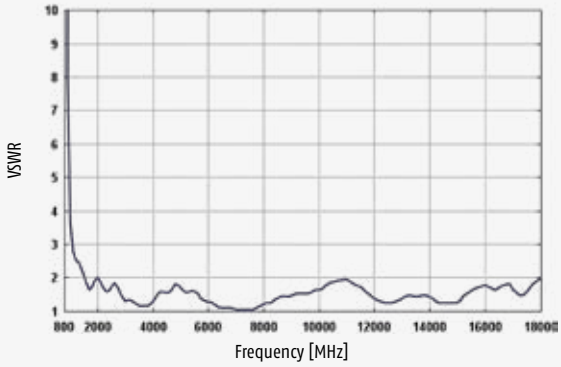
The horn antennas HAX offer a very low SWR in their nominal frequency range and a very broad bandwidth. The gain increases with frequency up to approx. 16 dBi. The increasing gain with frequency helps to compensate cable losses.

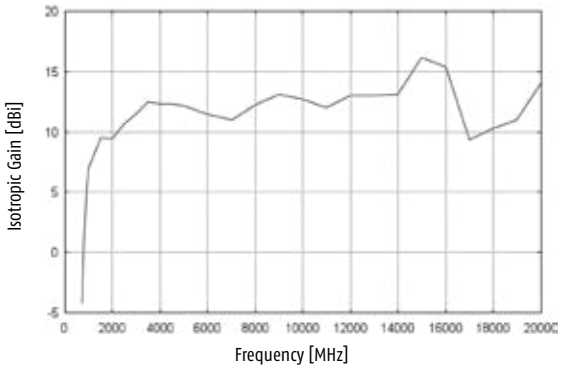
The HAX series is suitable for both, transmission and receiving applications. The maximum allowed input power is only limited by the female N-connector. The detailed manual of the calibrated test antennas includes gain, antenna factor, SWR and directional patterns. The antenna is mounted with the 22 mm tube, equipped with a index ring for quick changes of polarization without using tools.

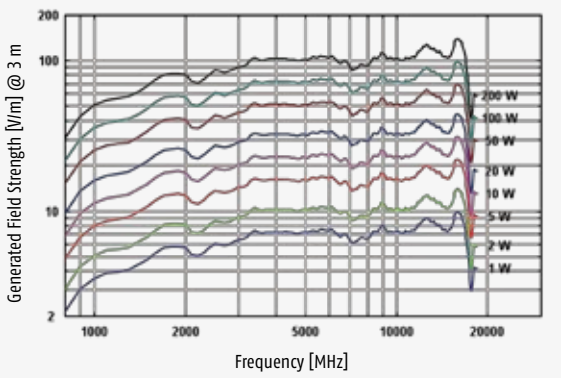
Technical specifications	
Type:	HAX-18
Frequency range:	800 MHz to 18 GHz
Max. input power	limited only by N-connector
Connection:	N-female
Isotropic gain:	6 ... 16 dBi
Antenna factor:	24 ... 50 dB/m
Nominal impedance:	50 Ohm
SWR typical:	≈ 1.5
Front to back ratio:	> 25 dB (f > 1.3 GHz)
Cross polarization rejection:	> 25 dB (1 GHz ... 18 GHz)
3dB Beamwidth typ. (E-plane):	90° - 10°
3dB Beamwidth typ. (H-plane):	60° - 10°
Dimensions (L x W x H) in mm:	408 x 245 x 142
Weight:	1.3 kg
Fixation:	ø 22 mm tube
Use:	Radiated immunity tests Emission measurements

Measurements



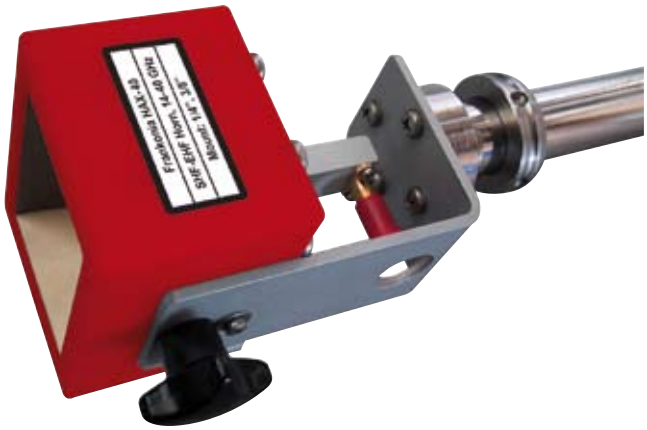






Broadband Horn Antenna - HAX-40, 14 GHz – 40 GHz

for immunity tests and emission measurements



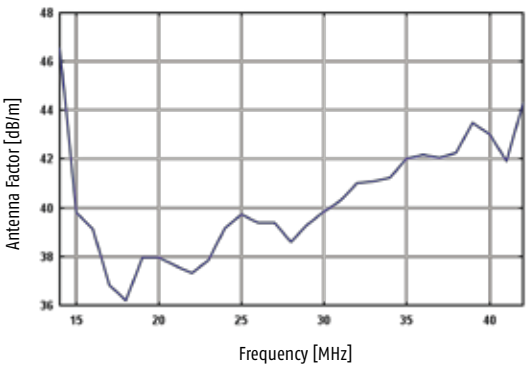
Description

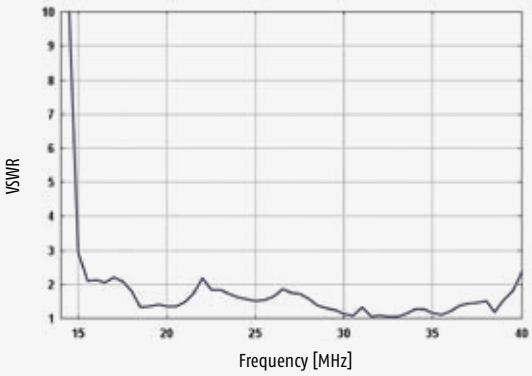
The horn antennas HAX offer a very low SWR in their nominal frequency range and a very broad bandwidth. The gain increases with frequency up to approx. 20 dBi. The increasing gain with frequency helps to compensate cable losses.

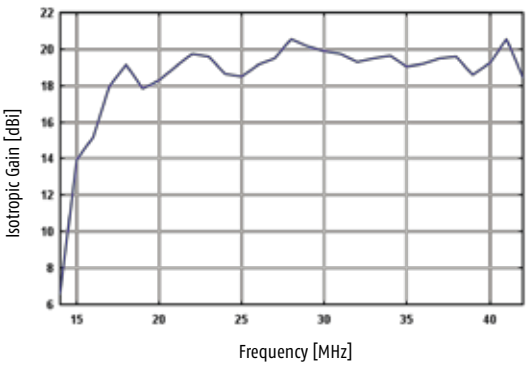
The HAX series is suitable for both, transmission and receiving applications. The maximum allowed input power is only limited by the female N-connector. The detailed manual of the calibrated test antennas includes gain, antenna factor, SWR and directional patterns. The antenna is mounted with the 22 mm tube, equipped with a index ring for quick changes of polarization without using tools.

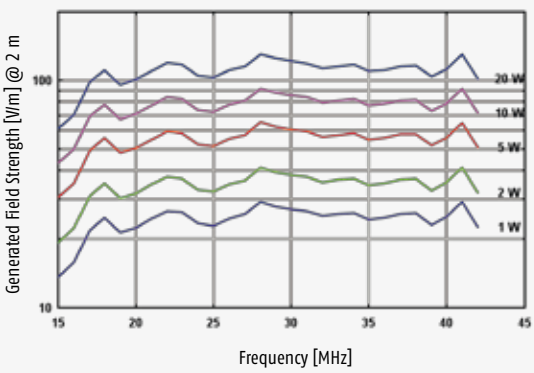
Technical specifications	
Type:	HAX-40
Frequency range:	14 GHz to 40 GHz
Max. input power	10 W (cont.)
	25 W (peak)
Nominal impedance:	50 Ohm
Connection:	SMA-compatible / female
Isotropic gain:	15 ... 20 dBi
Antenna factor:	38 ... 45 dB/m
SWR typical:	≈ 2
Front to back ratio:	> 30 dB
Cross polarization:	> 25 dB
3dB Beamwidth typ. (E-plane):	13° - 21°
3dB Beamwidth typ. (H-plane):	14° - 23°
Dimensions (L x W x H) in mm:	86 x 75 x 60
Weight:	0.3 kg
Fixation:	3/8", 1/4"
Use:	Radiated immunity tests Emission measurements

Measurements



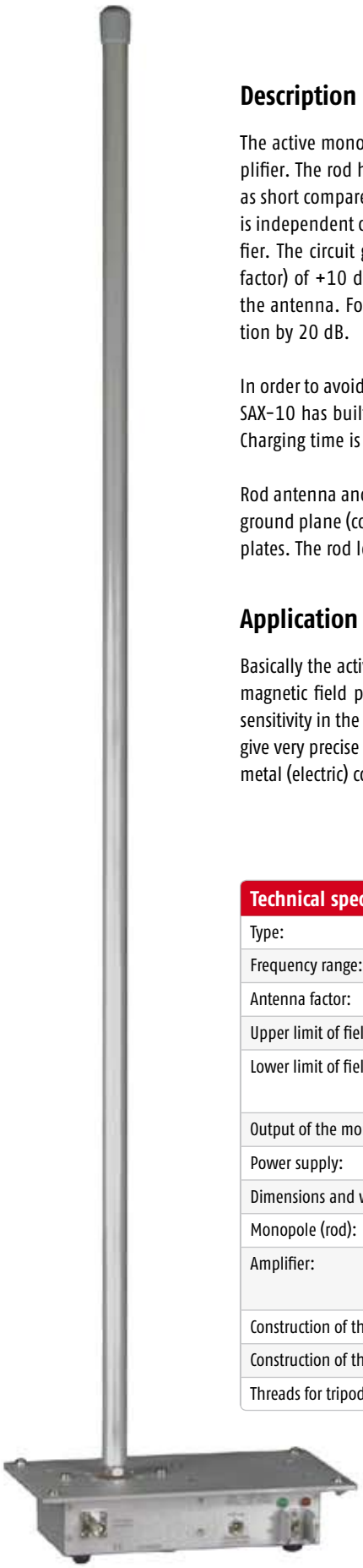






Active Rod Antenna - SAX-10, 9 kHz – 30 MHz

for E-field measurements



Description

The active monopole antenna SAX-10 consists of a vertical rod and an impedance matching amplifier. The rod has a standard length of 1m (other rod length on request) and can be considered as short compared to the wave length in the frequency range 9 kHz-30MHz. The conversion factor is independent of the frequency because of the extremely high impedance of the matching amplifier. The circuit gives best results of noise and intermodulation for a conversion factor (antenna factor) of +10 dB and sensitive measuring receivers are able to use the whole dynamic range of the antenna. For very high field strength, an optional plug-in attenuator reduces the amplification by 20 dB.

In order to avoid absolutely any influence by the mains, power supply, voltage regulator a. o., the SAX-10 has built-in NiMH rechargeable batteries. The typical operation time is at least 50 hours. Charging time is 2-4 hours using the quick charger.

Rod antenna and amplifier cabinet are made of aluminium. The top plate can be fixed to the metal ground plane (counterpoise) with 4 screws. The connectors and controls are situated below the two plates. The rod length begins exactly at the top plate.

Application

Basically the active monopole antenna is an electric field strength adapter. In combination with our magnetic field probes, electric and magnetic field strength can be measured separately with high sensitivity in the frequency range from 9 kHz - 30MHz. Standards, especially in the automotive field, give very precise specification for the measuring site. Usually the monopole antenna is mounted on a metal (electric) counterpoise. Measurement is made in a shielded room.

Technical specifications	
Type:	SAX-10
Frequency range:	9 kHz - 30 MHz
Antenna factor:	+10 dB/m +/- 1.5 dB
Upper limit of field strength measurement:	1 V/m (F=1 MHz, 1 dB compression) Input attenuator for higher field strength optional
Lower limit of field strength measurement:	Limitation by internal noise: Typ. -3 dBµV/m / 10 MHz, CISPR-Quasipeak, 9 kHz bandwidth Typ. -8 dBµV/m / 10 MHz, average detector, 9 kHz bandwidth
Output of the monopole amplifier:	BNC-connector, fem., 50 Ohm nom.
Power supply:	9.6 V / 1100 mAh NiMH
Dimensions and weight:	
Monopole (rod):	Length including thread connection 1 m, weight approx.: 0.2 kg
Amplifier:	180 x 80 x 40 mm (WxHxD) without BNC-connector (female) and controls. Top plate 220 x 120 mm, weight approx.: 0.7 kg
Construction of the monopole (rod):	Aluminium rod 16 mm diameter with thread-hole M8
Construction of the amplifier:	Cabinet made of aluminium profiles. Top plate 3mm aluminium material
Threads for tripods:	1/4", 3/8"

Active Loop Antenna - LAX-10, 9 kHz – 30 MHz

for H-Field measurements

Description

Active, shielded loop antenna with nearly constant antenna factor over the entire frequency range, battery driven to minimize disturbance influence from power line. Combined with a CISPR-16 EMI-receiver a convenient field strength measuring system with low noise and pulse measuring capabilities is composed. The LAX-10 can also be used with a spectrum analyzer. The shielded aluminum housing is equipped with rubber feet for desktop operation or can be mounted to a tripod using the female camera thread (3/8") at the bottom. A protection circuit against deep discharge provides a long battery lifecycle. The battery must be recharged after an automatic switch off.

A full battery charging period using the recommended charger takes around 5 hours. The PWR-switch must be set to OFF during the recharging period, otherwise no charging takes place. The charging connector is disabled while the PWR switch is set to ON (normal measuring operation), this avoids disturbances generated by the charger having an unwanted influence on the measurement.

Application

The active loop antenna LAX-10 can be used for the frequency selective measurement of magnetic fields in the long wave, mid wave and short wave frequency ranges. It can be used for testing according to CISPR, MIL, FCC, EN, ISO, ANSI, ETSI and many other standards.

Technical specifications	
Type:	LAX-10
Nominal frequency range:	9 kHz - 30 MHz
Connector, female:	50 Ohm, BNC
Antenna factor for fict. E-field strength:	20 dB / m
Antenna factor for H-field strength:	-31.5 dB / Ωm
Loop diameter:	0.5 m
Fieldstrength measuring range QP-Detector / 9 kHz IF-Bandwidth:	30 - 130 dBµV/m
Fieldstrength measuring range AV-Detector / 200 Hz IF-Bandwidth:	8 - 130 dBµV/m
Broadband impulsive field strength:	
20 ns, 100 kHz pulse rep. freq.	90 dBµV/m
20 ns, 20 kHz pulse rep. freq.	76 dBµV/m
20 ns, 10 kHz pulse rep. freq.	70 dBµV/m
Frequency response:	< +/- 1 dB
Operation time with full battery capacity:	> 20 h / typ. 24 h
Battery capacity:	12 V Pb 2.4 Ah
Recommended charger:	ALCS 2-24A
Operation indicator: Green LED	> 10.2 V
Batt. reserve indicator: LED red and green	9.8 V - 10.2 V
Automatic switch off LED red (terminating):	< 9.8 V
Mounting thread:	3/8"
Dimensions:	520 x 615 x 160 mm
Weight:	4.0 kg

Biconical antenna for micro-wave frequencies – SAM-6, 1 – 6 GHz

for field strength radiation under free-space conditions, for example Site-VSWR measurements acc. to CISPR 16-1-4

Description

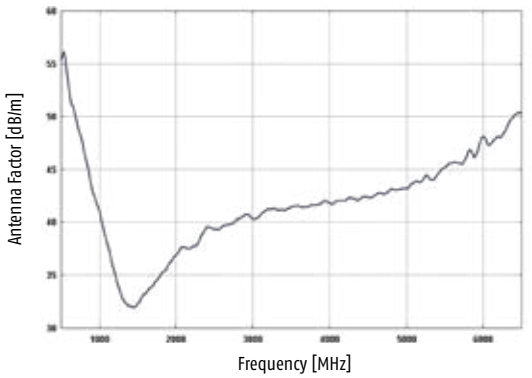
The SAM-6 has two main applications: A passive field probe for frequency selective measurements of the generated field according to EN 61000-4-3, including the measurement of the uniform area. A further application is the validation of fully anechoic rooms for measurements above 1 GHz according the Site-VSWR method, described in CISPR 16-1-4. In conjunction with the SAM-18 a frequency range from 1 to 18 GHz can be covered with excellent antenna performance. Accepting some limitations (i.e. antenna factor and VSWR increase, symmetry reduction) the SAM-6 can be used from 0.5 GHz on. The validation of test sites with commonly used microwave antennas (e.g. log.-per. or horn antennas) leads to insufficient results, since these directive gain antennas with concentrated directional pattern do not take the test site characteristics into account.

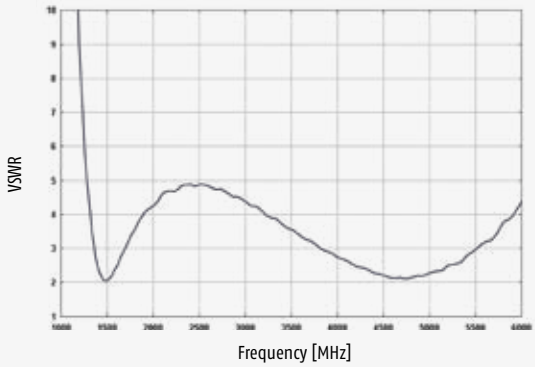
Application

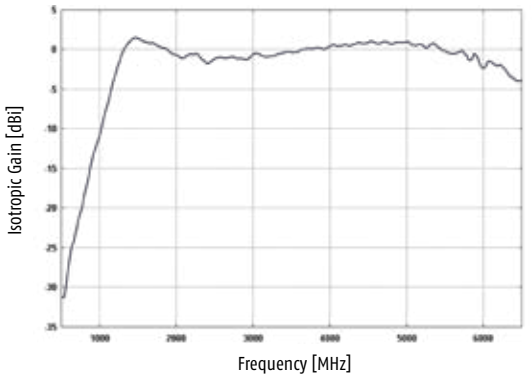
The typical applications of the microwave biconical antenna are the evaluation of test sites, the (frequency selective) field strength measurement and the generation of defined field strength (e.g. ERP or EIRP). Thanks to the wide bandwidth there is no need for a time consuming change of the antenna elements as required when operating with tuned half-wave dipoles. The biconical elements allow a continuous sweep over the complete frequency range. Because of the dipole-like directional pattern, the fixed phase center and the high power handling capability the SAM-6 may replace tuned half-wave dipoles in many applications. The SAM-6 is not intended for emission testing with very low limits, horn and log.-per. antennas are better matched for this purpose because of their better antenna factor. A typical application of the SAM-6 is the use as a (highly linear) broadband near field probe thanks to its small dimensions.

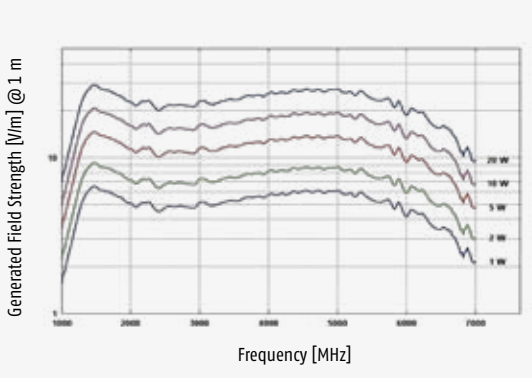
Technical specifications	
Type:	SAM-6
Frequency range:	1 GHz to 6 GHz
Max. input power:	20 W
N-connector, female:	50 Ohm
Isotropic gain (1 - 6 GHz):	typ. -10 ... +2 dBi
Antenna factor:	32 ... 48 dB/m
SWR typical (1.3 - 6 GHz):	1.5 - 5
Balun (low loss):	1:1
Inversion symmetry (1 - 6 GHz):	typ. < 0.5 dB
Cross polarization rejection:	< - 20 dB
Half-power beamwidth (E-plane):	84° - 45°
Mounting tube:	L_H = 560mm, d = 22mm
Index ring:	L_R = 190mm
Element length total:	L_E = 50mm
Element diameter:	D = 28mm
Weight:	400 g

Measurements









Biconical antenna for micro-wave frequencies – SAM-18, 3 – 18 GHz

for field strength radiation under free-space conditions, for example Site-VSWR measurements acc. to CISPR 16-1-4

Description

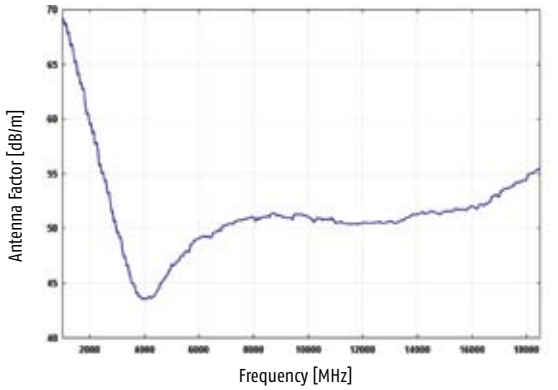
The SAM-18 was designed because of the worldwide unavailability of omnidirectional or dipole-like broadband antennas operating above 3 GHz. Accepting some limitations (i.e. antenna factor and VSWR increase, symmetry reduction) the SAM-18 can be used from 1 GHz on. The validation of test sites with commonly used microwave antennas (e.g. Log.-per. or horn antennas) leads to insufficient results, since these directive gain antennas with concentrated directional pattern do not take the test site characteristics into account.

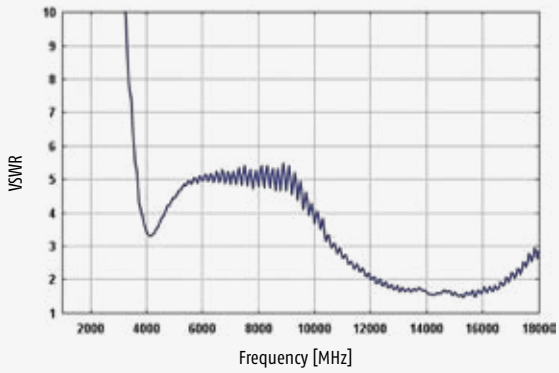
Application

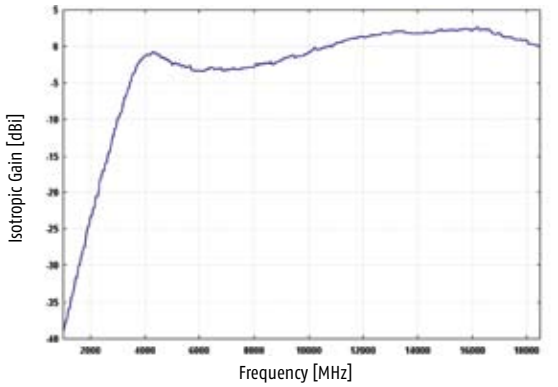
The typical applications of the microwave biconical antenna are the evaluation of test sites, the (frequency selective) field strength measurement and the generation of defined field strength (e.g. ERP or EIRP). Thanks to the wide bandwidth there is no need for a time consuming change of the antenna elements as required when operating with tuned half-wave dipoles. The biconical elements allow a continuous sweep over the complete frequency range. Because of the dipole-like directional pattern, the fixed phase center and the high power handling capability the SAM-18 may replace tuned half-wave dipoles in many applications. The SAM-18 is not intended for emission testing with very low limits, horn and log.-per. antennas are better matched for this purpose because of their better antenna factor. A typical application of the SAM-18 is the use as a (highly linear) broadband nearfield probe thanks to its small dimensions.

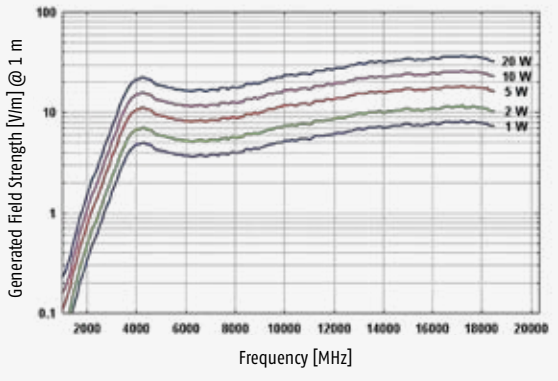
Technical specifications	
Type:	SAM-18
Frequency range:	3 GHz to 18 GHz
Max. input power:	10 W
N-connector, female:	50 Ohm
Isotropic gain (3.5 - 18 GHz):	typ. -4 ... +3 dBi
Antenna factor:	43 ... 53 dB/m
Balun (low loss):	1:1
Inversion symmetry (3 - 18 GHz):	typ. < 0.5 dB
Cross polarization rejection:	< - 20 dB
Half-power beamwidth (E-plane):	84° - 45°
Mounting tube:	L_H = 560 mm, d = 22 mm
Index ring:	L_R = 190 mm
Element length total:	L_E = 20 mm
Element diameter:	D = 9 mm
Weight:	420 g

Measurements









Broadband Pre-Amplifier – FPA-2, 9 kHz – 2 GHz
FPA-6A, 10 MHz – 6 GHz
FPA-6B, 9 kHz – 6 GHz

Description

The FPA-x is a general purpose broadband pre-amplifier with high gain and low internal noise. The wide frequency range up to 2/6 GHz allows measurements acc. CISPR 22. Due to the high gain and the low noise figure the system noise is nearly independent of the other components including cable and receiver. These features make the FPA-x very useful for the measurement of very low limits, as required for CISPR 25. In this case it will be connected directly to the antenna. The amplifiers FPA-2 and FPA-6A are ESD protected to prevent defects by unintentional electrostatic discharge. The FPA offers a frequency range from 9 kHz to 6 GHz. For technical reasons it cannot be ESD-protected and special care is necessary. Nevertheless pre-amplifiers are generally ESD-sensitive devices, therefore it is very important to discharge coaxial cables before being connected. This is an essential precaution to protect the extremely small semiconductor structures operating in the microwave frequency range.

It must be noted that the use of pre-amplifier is generally not recommended for the measurement of impulsive signals. Such broadband noise is typical for many EMC measurements. This means that any broadband pre-amplifier is not suitable for EMC measurement of a broadband pulse spectrum. The FPA-x has an aluminum enclosure and uses N-Type flange connectors. A standard wall plug supply with +12 VDC output can be used. A suitable power supply for 230 V with Schuko socket is included in the delivery. The use of switching power supplies is not recommendable as they may cause higher levels of interference. An internal protection circuit slows down the rising and falling edge of the power supply voltage to prevent internal components and the receiver from being damaged by voltage spikes. 12 V auxiliary supplies from receivers and analysers or batteries are also suitable if they can provide a continuous current of 0.14 A.

Technical specifications	FPA-2	FPA-6A	FPA-6B
Frequency range	9 kHz - 2 GHz	10 MHz - 6 GHz	9 kHz - 6 GHz
Noise figure	2.5 dB (1.0 GHz)	2.5 dB (1.0 GHz)	2.5 dB (1.0 GHz)
Gain	+ 28 dB	+ 28 dB	+ 28 dB
Amplitude flatness	< ± 3 dB	< ± 3 dB	< ± 3 dB
1 dB compression point at input	> 100 dBµV	> 100 dBµV	> 100 dBµV
Impedance	50 Ω	50 Ω	50 Ω
VSWR input / output	< 2:1	< 2:1	< 2:1
ESD protection	yes	yes	no
Power supply	+ 12 V (± 2 V)	+ 12 V (± 2 V)	+ 12 V (± 2 V)
Current consumption	< 140 mA	< 140 mA	< 140 mA
Dimensions	88 x 41 x 27 mm	88 x 41 x 27 mm	88 x 41 x 27 mm
Weight	160 g	160 g	160 g

Broadband Pre-amplifier - FPA-18, 1 GHz – 18 GHz

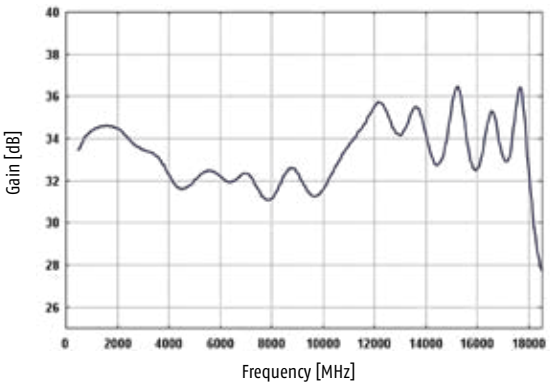
Description

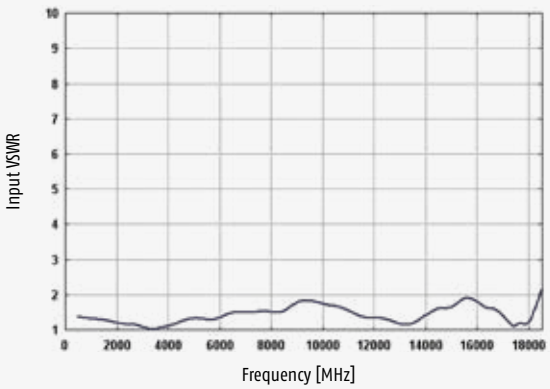
Low noise low power wideband amplifier for increasing sensitivity at field strength measurements and for general attenuation measurements up to 18 GHz. A power supply with 12 V / 300 mA DC (e.g. optional AC/DC adaptor, laboratory power supply, rechargeable battery) is required for operation. In- and output of the broadband amplifier are sensitive to electrostatic discharge. Therefore some precaution (discharging coaxial cables and persons) is required before touching the amplifier. The amplifier input comes with an SMA- female connector. A coaxial microwave cable of 0.5 m length is supplied to connect the antenna with the amplifier. The cable is equipped with N-male and SMA-male connectors.

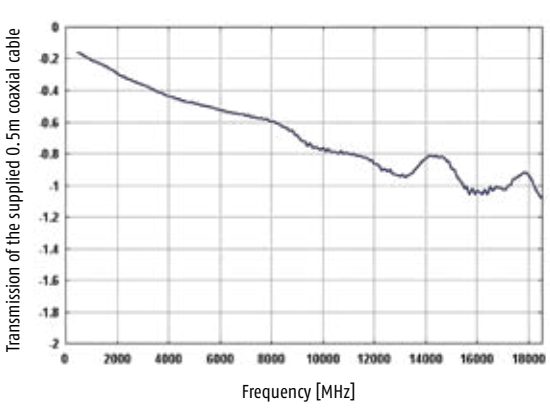
Usually the amplifier should be installed very close to the antenna. The amplifier housing is equipped with rubber pads for placement on horizontal surfaces. Further there are 22 mm holes in the housing to accept the mounting tube of Frankonia antennas. The antenna mounting tube is usually oriented horizontally with the N-female output of the amplifier facing to ground. This avoids undesired bending of the coaxial cable.

Technical specifications	
Type:	FPA-18
Nominal frequency range:	1 - 18 GHz
Useable frequency range:	0.5 - 20 GHz
Connectors:	50 Ohm N / SMA
Fixation:	ø 22 mm tube
Gain:	typ. 33 dB +/- 2.5 dB
Gain min.:	30.0 dB
Max. input power:	-30 dBm (77 dBµV)
1 dB compression (at output):	> +3 dBm (110 dBµV)
SWR typ.:	< 2
Noise figure:	3.5 dB
Supply voltage:	12V - 15V/DC
Current consumption:	250 - 300 mA
Power supply via female banana sockets:	4mm
Weight:	0.6 kg
Dimensions:	142 x 90 x 48 mm

Measurements





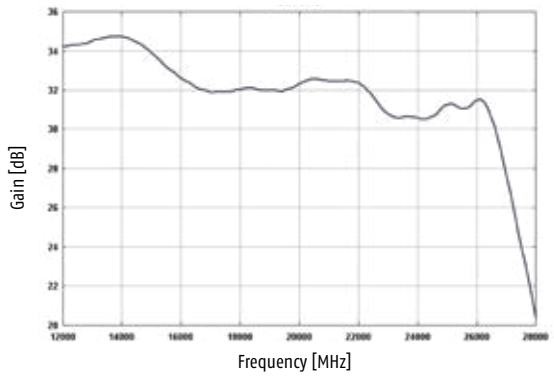


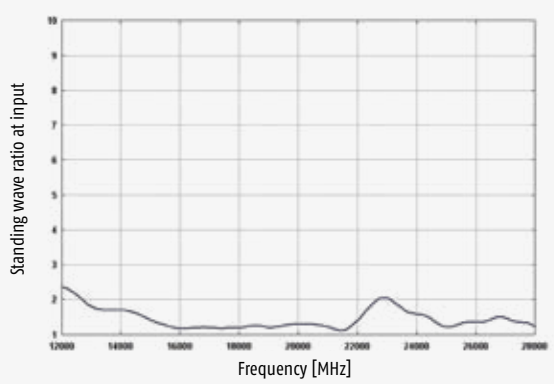
Broadband Pre-amplifier - FPA-26, 18 GHz – 26.5 GHz

Technical specifications

Type:	FPA-26
Nominal frequency range:	18 - 26.5 GHz
Useable frequency range:	12 - 28 GHz
Connectors:	50 Ohm SMA
Mounting thread:	3/8"
Gain:	typ. 33 dB +/- 2 dB
Gain min.:	30 dB
Max. input power:	-20 dBm (87 dBµV)
1 dB compression (at output):	> +17 dBm (124 dBµV)
SWR typ.:	< 2
Noise figure:	3.5 dB
Supply voltage:	12V - 15V/DC
Current consumption:	250 - 300 mA
Power supply via female banana sockets:	4mm
Weight:	400 g
Dimensions:	210 x 100 x60 mm

Measurements





Description

Low noise low power wideband amplifier for increasing sensitivity at field strength measurements and for general attenuation measurements up to 26.5 GHz. A power supply with 12 V / 300 mA DC (e.g. optional AC/DC adaptor, laboratory power supply, rechargeable battery) is required for operation. In- and output of the broadband amplifier are sensitive to electrostatic discharge.

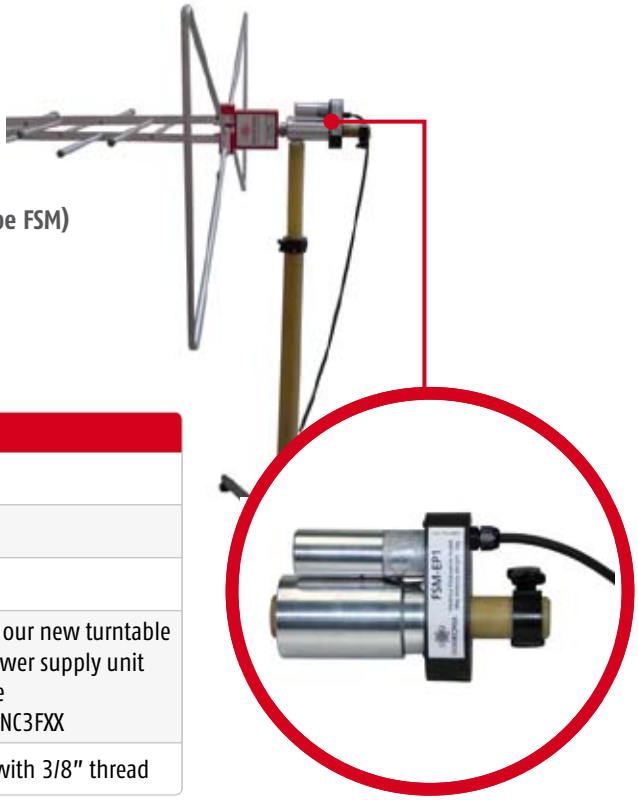
Therefore some precaution (discharging coaxial cables and persons) is required before touching the amplifier. The amplifier input comes with SMA- female connectors. A coaxial microwave cable of 0.5 m length is supplied to connect the antenna with the amplifier. The cable is equipped with SMA-male connectors. The amplifier is equipped with a female 3/8" camera thread to be connected to a mast, e.g. to FSM-1.6. The antenna itself is mounted with another 3/8" screw at the amplifier base. The polarization swivel can easily be achieved within seconds by a further screw in 45° steps using fixing bolts for indexing.

It is very important to avoid bending and torsion of the microwave cable, otherwise persistent damage may be a result. Therefore we recommend to mount the antenna in a way that the antenna connector points into the opposite direction as the RF-input of the amplifier. This allows a smooth routing the microwave cable with a wide bending radius.

Electrical Polarization Switch – FSM-EP1
Pneumatical Polarisation Switch – PPS

Main characteristics FSM-EP1

- Electrical polarization swivel adapter for remote controlled change of antenna polarization
- Compatible with all antenna masts with 3/8" thread (i. e. our type FSM)
- Power supply is provided by new series of Frankonia turntables, e.g. FTF-0.6-0.3 or by optional available power supply unit



Technical specifications	FSM-EP1
Antenna tube fixture	22 mm
Max. antenna weight	5 kg
Mast mount	3/8" female
Power supply	12 VDC ± 25%, 150mA provided by our new turntable series or by optional available power supply unit 5m shielded cable Neutrik cable connector NC3FXX
Recommended accessory	FSM-1.6, FSM-2.0 or any tripod with 3/8" thread

Description PPS

The pneumatic polarization swivel adapter PPS is used to change the polarization of antennas with 22 mm tube remote controlled. A compressed air terminal with a recommended pressure of 5 to 6 bar is required. Higher air pressure should be reduced with a pressure regulator. The control of the 2 way pneumatic cylinder is made using a 5/2-way valve, which is available as manually operated version or electrically switched version. In order to achieve a smooth antenna rotation flow control valves are used. 50 m of flexible pneumatic pipe, flow control valves and a 5/2-way valve with a 12V DC operated solenoid (also available: 24V DC, 24V AC, 110V AC, or 220V AC) are included by default. The power consumption of the solenoid is 2.4 W.

Technical specifications	PPS
Antenna tube fixture	22 mm
Max. antenna size	2 m
Max. antenna weight	15 kg
Mast mount	3/8" female
Included in the delivery	Cylinder with flow control valves, turning gear, holder with fixture screw 3/8" female thread, air tube 50 m, streering unit with air tube connectors and mounted solenoid
Recommended pressure	5 - 6 bar
Pipe diameter (outer / inner)	6 mm / 4 mm
Dimensions	205 x 395 x 120 mm
Weight	2.7 kg
Recommended accessories	FSM-1.6 / FSM-2.0

Application

Initially the PPS should be attached to the antenna mast without mounting the antenna itself. Then the pipes are connected to the pneumatic cylinder via the flow control valves and the 5/2 way valve (steering unit). The flow control valves should be adjusted to obtain a slow and smooth rotation of the polarization swivel adapter. Typical times for a 90°-rotation are 2 s (small antennas) to 5 s (large antennas). After the correct rotation speed adjustment the antenna may be placed with its 22 mm tube into the fixture of the PPS. Prior fastening the fixture it must be checked carefully that the antenna elements do not crash with the mast when changing the polarization. Shifting the antenna somewhat along the 22 mm tube in axial direction will help to find a correct location. It is also important to check that the antenna polarization and the actual setting of the PPS are corresponding. If both conditions are fulfilled, the fixture of PPS can be tightened with appropriate torque. Please note: prior to remote control operation the operator must take care that neither persons nor things are in the swivel area of the antenna. In order to obtain a smooth rotation the antennas' center of gravity should be as close as possible to the rotational axis.

Manual Antenna Masts FSM 1.6 / 2.0 / 4.0

Description FSM-1.6 / FSM-2.0:

The height level of the double telescopic antenna masts FSM-1.6 and FSM-2.0 can be manually adjusted from 0.9 / 1.2 m to 1.6 / 2.0 m (depending on the model). The continuous height setting is made within a few seconds. In order to avoid unwanted reflexions the mast rods are made of fibre glass. A collapsible tripod provides a secure stand and easy adaption to uneven ground. The perpendicular mast-adjustment is simplified with a spirit level mounted at the tripod. A rotatable spider fixes the tripod-legs for easy movement within seconds by one person only. Antennas can be mounted directly on the 3/8" male thread or using adapters for double stacked antennas.

Technical specifications		
Type:	FSM-1.6	FSM-2.0
Height range:	0.9 - 1.6 m	1.2 - 2.0 m
Antenna or adpater mount:	3/8" male	
Material mast:	fibre glass	
Recommended adapters:	MAS / MAD	
Weight:	6 kg	7 kg
Dimensions for transport:	1.0 x 0.3 x 0.3 m	1.2 x 0.3 x 0.3 m

Description FSM-4.0:

The main application of FSM-4.0 are emission measurements, where frequent height scans are required. Level adjustment from 0.4 m to 4.15 m can easily be done by using the manual winch. The mast can be setup and disassembled without any tools within 2 min. The FSM-4.0 tripod is suitable for both stationary and mobile applications. Thanks to its small transport dimensions it can be stored without problems even in small cars. The antennas are mounted with their 22 mm tube directly to the support, the polarization is fixed with an indexing ring for both, vertical and horizontal polarization without tools. There is no additional adapter needed to accept antennas with 22 mm tubes. Each of the three spider legs can be adjusted individually for a coarse level adjustment on uneven or inclined mounting .

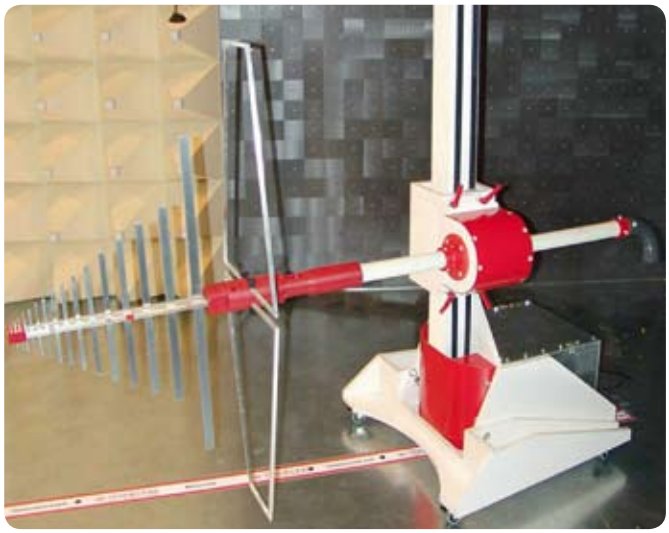
Technical specifications	
Type:	FSM-4.0
Height scan:	with manual winch
Height scanning range:	0.4 ... 4.15 m
Required time for complete height scan:	< 8 s
Required time for mast assembly:	< 2 min
Antenna mount:	22 mm with index ring
Mast material:	fibre glass
Tripod material:	zinc-plated steel
Costed option:	fibre glass
Maximum antenna weight:	5 kg
Total weight:	13 kg
Tripod leg circuit diameter:	2.06 m
Dimensions for the transport:	1.17 x 0.3 x 0.3 m

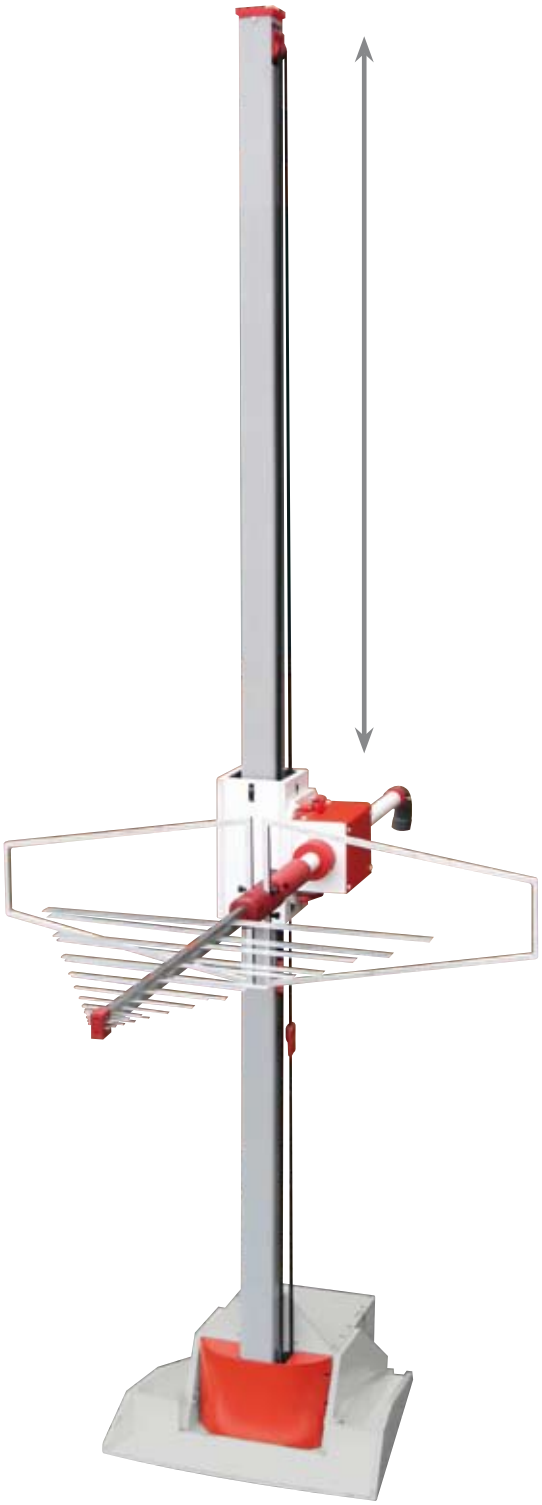
FAM – Fully automatic antenna mast

FAM – FULLY AUTOMATIC ANTENNA MAST

FRANKONIA's innovative range of positioning devices is entirely compatible with the EMC chamber environment.

Using a new optical communication bus, the system provides the possibility to control up to 15 devices along a single duplex fiber optic.





MAIN CHARACTERISTICS:

- Vertical accuracy 5 mm
- Resolution 1 mm
- Polarization accuracy 0.2°
- 30 step adjustable vertical speed from 0.01 m/s to 0.50 m/s
- Fully automatic calculation of acceleration and deceleration ramps according to the weight of the antenna
- Manual tilting + / – 5°
- Mast positioning from 1.00 m to 4.00 m / 6.00 m
- Low noise, completely shielded hardware
- FRANKONIA optic communication bus
- Remote-controlled by controller type FC-02

FAM – Technical specifications	
Antenna height	1.0 m to 4.00 m (6.0 m)
Max. antenna weight	12 kg at cross beam section of the mast
Dimensions	760 mm x 800 mm x 4,200 mm (L x W x H)
Weight	95 kg
Power supply	230V, 50/60 Hz, 4A

Available Sizes	
FAM 4	Frankonia Antenna Mast for 4.0m height scan
FAM 6	Frankonia Antenna Mast for 6.0m height scan

Notes

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