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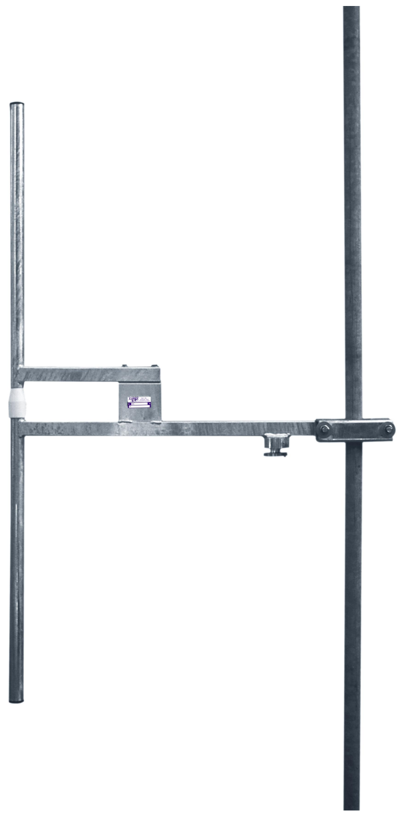
AKG/1 - AKF/1 - AKS/1 - AKH/1

Vertical Polarization Omnidirectional Antenna



MOUNTING INSTRUCTIONS

These wide band FM antennas, made of galvanized steel or alluminium alodyne, are particularly recommended for low / medium / high Output Power Transmitters.

AKG/1

BAYS	DB	POWER	ANTENNA	WEIGHT	WIND VEL.	WIND LOAD
n°	GAIN	GAIN	Vert. dimensions	Kg.	Km/h	Kg.
1	2	1.6	1,5 mt.s	7	190	18
2	5	3.20	4,1 mt.s	14		
4	8	6.3	9,3 mt.s	28		
6	9.5	8.9	14,5 mt.s	42		
8	11	12.6	19,7 mt.s	56		

SUGGESTED GUYED MAST SECTION

Is suggested install this Dipole Antenna over the guyed mast, because the section higher than 110mm can be increase the SWR value and modify the radiation pattern.

DISTANCE ESTIMATION BETWEEN FM ANTENNA BAYS

Wave Lenght = l = 300 : f(MHz)

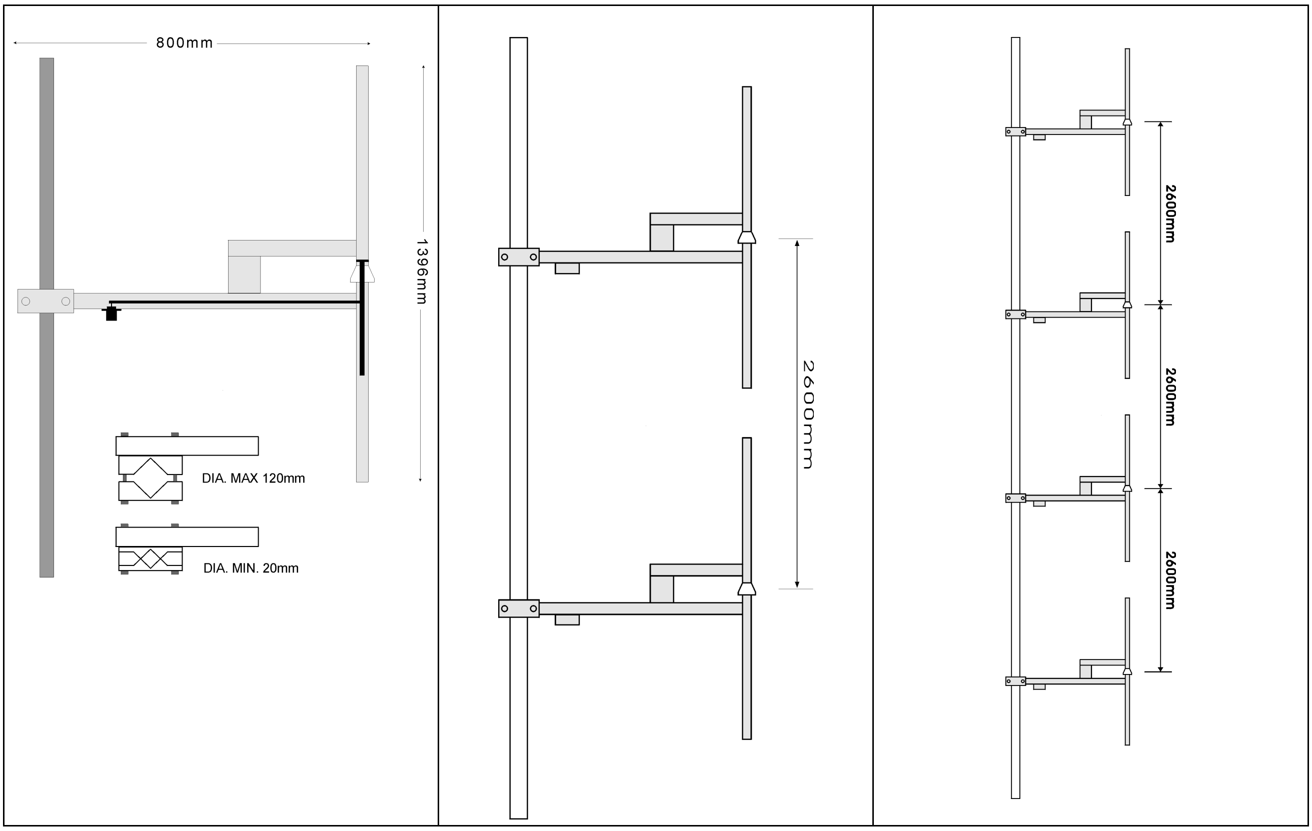
Distance between antenna bays (all antenna types) = **d**

d (suggested) = l x 0.85

examples

88MHz	⌡	l = 300 : 88 = 3.41 mt	⌡	d = 3.41 x 0.85 = 2.9 mt
98MHz	⌡	l = 300 : 98 = 3.06 mt	⌡	d = 3.06 x 0.85 = 2.6 mt
108MHz	⌡	l = 300 : 108 = 2.78 mt	⌡	d = 2.78 x 0.85 = 2.36 mt

<u>Distance **d** suggested 2.6mt, even if working frequency is 88MHz or 108MHz</u>



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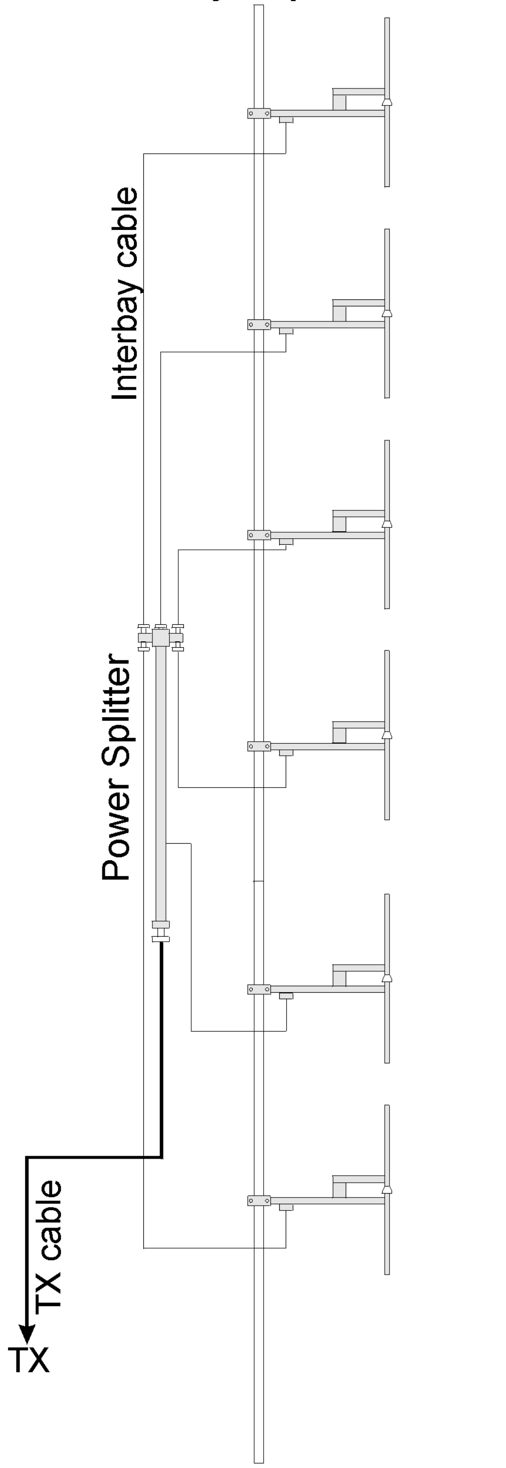
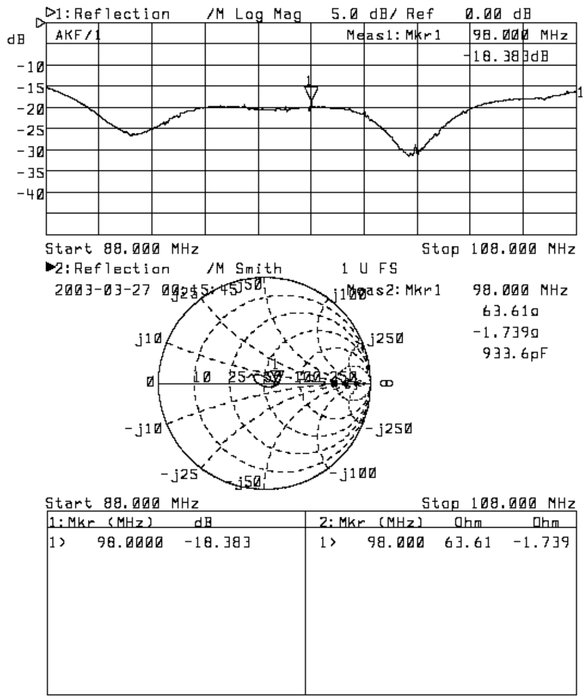
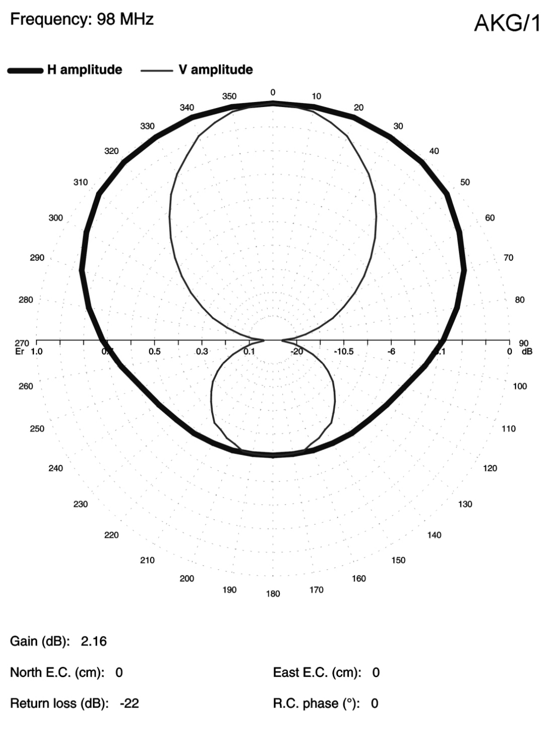
Example
6 bays dipole antenna







Some criteria for evaluating antennas

Complaints about High Reflected Power, High VSWR, or Poor Match all mean the same thing. The antenna does not appear to be absorbing as much power from the transmitter as it should. It must be determined whether the installation or the product is the cause. Answers to the following technical questions can help determine if the product qualifies as defective per the manufacturer's warranty. We presume all connections are clean, dry, and tight. We also assume all test equipment to be in good, calibrated condition.:

What is the VSWR you have measured?
Most of our antennas have a match of 1.3:1 or 1.4:1 across a specified bandwidth. Performance at a Voltage Standing Wave Ratio greater than 1.5:1 may be unsatisfactory. Some technicians will refer to match as "Return Loss" in which case rates of 20 dB or 18 dB apply. Performance at a R.L. of less than -15 dB may be unsatisfactory.

What test equipment did you use?
Check to see that it has been properly calibrated and that any connector adaptors are of good quality. A poorly matched adaptor will invalidate the results.

Wattmeter/Power Meter?
(These devices are inexpensive and therefore more common but can be inaccurate, particularly if more than one RF carrier is present. Technicians who use them will eagerly tell you how many Watts of power is reflected back to the transmitter but often do not know the actual mismatch. The forward power measurement is required to calculate the VSWR or Return Loss number. This can be tricky because some transmitters have an output stage protection circuit which reduces power under highly reflection conditions.)

Network Analyzer/Spectrum Analyzer with Tracking Generator?
(These devices do not rely upon the site's transmitter as a signal source. They can produce more accurate and meaningful results but do not subject the antenna to full power where arcing or flashover would occur.)

Did you perform the measurement directly at the antenna's connector?
The technician may have chosen not to perform this test because it requires climbing the tower. This procedure should be done to eliminate jumper cable or downlead cable factors. These cables could be either defective and cause the problem or be fine and absorbing the reflection which masks the problem.

What is your operational frequency?
Check to see if the antenna was ordered for the correct frequency. The manufacturer may have mismarked the antenna or carton. Several methods can be used to determine an antenna's frequency. If the technician has swept the response of the antenna he will know the frequency of best match. That should be its designed frequency. The technician may also measure the physical length so that we may compare it to a cut chart. This is a crude method. If the antenna is of relatively new and the model number is known, the factory may still have the production test data sheet which will identify its frequency by Serial Number.

Did you measure the antenna erect, free and clear of metal objects?
Side mounting too close to the tower can detune an antenna. The required spacing distance between the antenna and any other metal object decreases as the operational frequency increases. Some good numbers per our factory test procedure for omnidirectional antennas are from 8/10mt at 30 Mhz to 1mt at 900 Mhz.

What is the DC continuity measurement using an ohmmeter?
Some antennas have direct ground lightning protection. These normally measure as a DC short between the connector's inner and outer conductor but will be the proper 50 Ohm impedance at RF. See lightning notes in the catalog specs to determine if this antenna model should measure as an open or a short.

Did you have the opportunity to substitute an identical antenna?
If the second antenna measures OK under the same mounting conditions, the technician's first antenna is probably defective. If the second one yields the same bad result, the problem is unlikely to be the antenna. Perhaps the transmitter is not operating on the expected frequency. Substitution of a dummy load is an option if a second antenna is not available but the test is less meaningful because it is actually testing only the cable.

When was the antenna installed?
It could either be new and defective or had performed nominally for some time before failing. It is a good practice for technicians to test products on receipt before transporting them to the job site. Manufacturer's warranties cover only manufacturing defects, not damage from an improper installation. An example would be mounting a standard antenna upside-down. This would put the drain hole at the top where it could collect water and cause the product to fail over time. Factory options given to an inverted antenna include reconfiguring both the drain hole location and any electrical beam tilt.

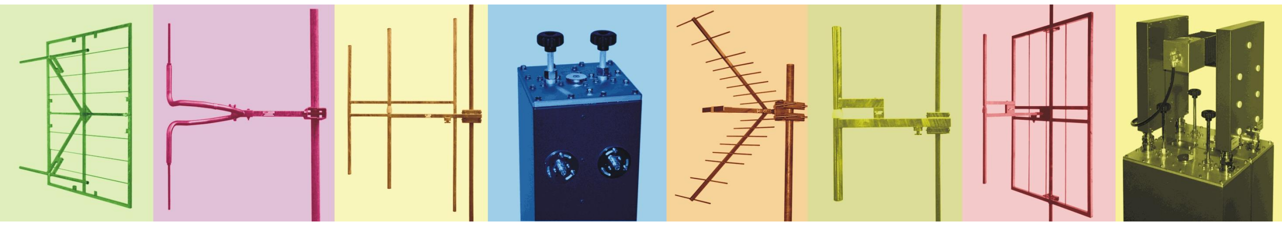
Are the antenna drain holes open?
They are placed at the bottom of the antenna for draining internal moisture. Periodic inspection of these openings is the responsibility of the owner. They must remain clear of debris to preclude corrosion from internal condensation. Such damage can drastically affect performance and is not covered by warranty.

Is the antenna intermittent?
It is a good idea to shake the antenna during the above tests to ensure there are no mechanical intermittents. Poor connections may lead to RF intermodulation products. Water entering the antenna may lead to electrical intermittents which subside when the antenna dries out.

Notes
Match is only one indicator of antenna quality. VSWR tells us how well the product’s impedance matches to (absorbs) a transmitters signal, and is easy to measure in the field. Unfortunately, VSWR does not reveal an antenna’s efficiency (how well it radiates the signal). This measurement (an antenna’s radiation pattern) is more difficult to perform in the field. We may presume that match bandwidth and pattern bandwidth are equal, but this may not always be true. For example, operating an end-fed antenna below its design frequency will result in an electrically downtilted vertical pattern. Usually, substitution with an identical unit of known quality is the method of choice when a defective product is suspected.

The typical VSWR for a good antenna is 1.2:1. Although some site engineers can declare the need for an even lower value. For example at 1.5:1 ratio, 4.0% of the power is reflected back, creating a 0.18 dB loss.
At a1.3:1 ratio, 1.7% is reflected resulting in 0.07 dB loss. The performance improvement is only 0.11 dB.

It is a good idea to document performance upon installation. This is usually done by choosing a remote site and measuring the signal level received from the transmitter. Periodic measurements at that same location will reveal the amount of any degradation so corrective action may be taken.



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