

The "Dual" company has been producing antennas for more than 30 years.

Our focus is on:

- wide bandwidth,
- designs that work equally well in all weather conditions,
- very low SWR and superior G/T, F/B and F/S ratios across the entire frequency band,
- excellent mechanical properties, and
- uncompromised durability.

We do not use amateurish programs like **EZNEC Pro/4, 4NEC2, EZNEC, MMANA AO or YO**. We perform the design work using **the latest professional full-3D electromagnetic modelling software**. This enables us to accurately include the influence of the boom, insulators, baluns, feed point, connections, etc

Our designs are optimised using the Particle Swarm algorithm, which is considered one of the best global optimization algorithms. We also use the classic Nelder-Mead Simplex algorithm for fine-tuning. Our optimization runs frequently exceed 1 million evaluations.

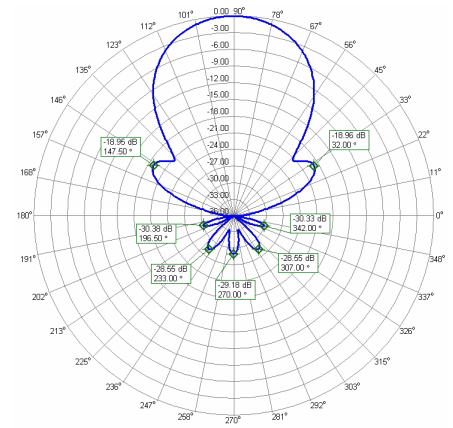
We rely on solid physics, not on "clever" tinkering with antenna elements or spacings. By paying the greatest attention to all of the important details, we are able to consistently produce top performance designs.

Our antennas are precision physical instruments, they are real **"Precision Antennas" (PA)**.

PA144-432-21-3B

Electrical Specifications 2 m

Frequency Range:	144 - 146 MHz
Free Space Forward Gain:	12.8 dBi
Front to Back Ratio:	29 dB
3 dB Horizontal Beamwidth:	40°
Polarization:	Horizontal
Nominal Input Impedance:	50 Ohms
SWR Across Entire Band:	< 1.2
Maximum Power Input:	1000W
Matching Method:	Voltage Balun
Connector:	"N" (Common connector for both bands)



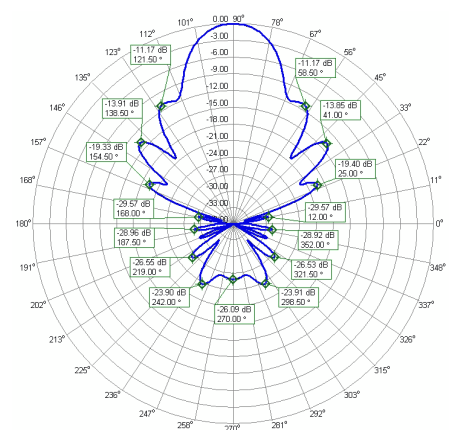
145 MHz Azimuth Radiation Pattern

Mechanical Specifications 2 m

Number of elements:	7
Element Diameter:	8 mm Aluminum tube
Dipole Diameter:	8 mm Hard Copper tube
Longest element:	1030 mm
Element Mounting Position:	Below the Boom
Balun and Connectors:	Included

Electrical Specifications 70 cm

Frequency Range:	430 - 440 MHz
Free Space Forward Gain:	15.4 dBi
Front to Back Ratio:	25 dB
3 dB Horizontal Beamwidth:	22°
Polarization:	Horizontal
Nominal Input Impedance:	50 Ohms
SWR Across Entire Band:	< 1.2
Maximum Power Input:	750W
Matching Method:	Voltage Balun
Connector:	"N" (Common connector for both bands)



435 MHz Azimuth Radiation Pattern

Mechanical Specifications 70 cm

Number of elements:	14
Element Diameter:	4 mm Aluminum rod
Dipole Diameter:	8 mm (Common dipole for both bands)
Longest element:	350 mm
Element Mounting Position:	Below the Boom
Balun and Connector:	Included

Common Mechanical Specifications

Boom Length:	2.92 m
Boom Size:	30 x 30 mm
Number of Boom Pieces:	2
Guy rope support:	Not necessary. Strong boom.
Mounting Mast Diameter:	43 - 70 mm 1-1/4" - 2-3/4"
Survival Wind Speed:	160 km/h
Net Weight:	3.5 kg
Gross Weight:	5.7 kg
Transportation Length:	1.49 m



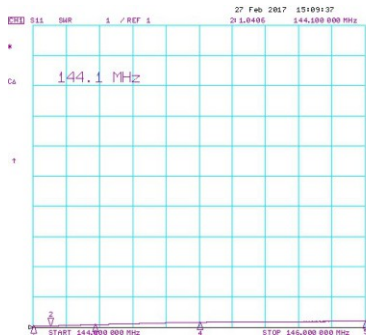
PA144-432-21-3B

Vertical Stacking Distance for two antennas 2200 mm:

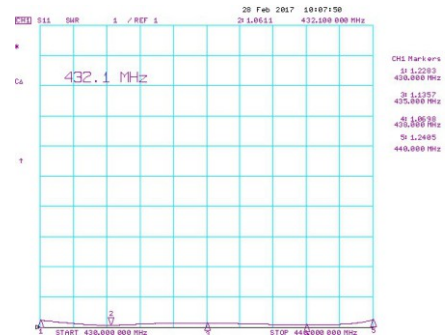
Gain 144 MHz 15.3 dBi

Gain 432 MHz 17.7 dBi

PA144-432-17-2 Measured characteristics with calibrated HP8753ES Network Analyzer.



Measured SWR 144 - 146 MHz
at Finished Antenna.



Measured SWR 430 - 440 MHz
at Finished Antenna.

Assembly instruction:

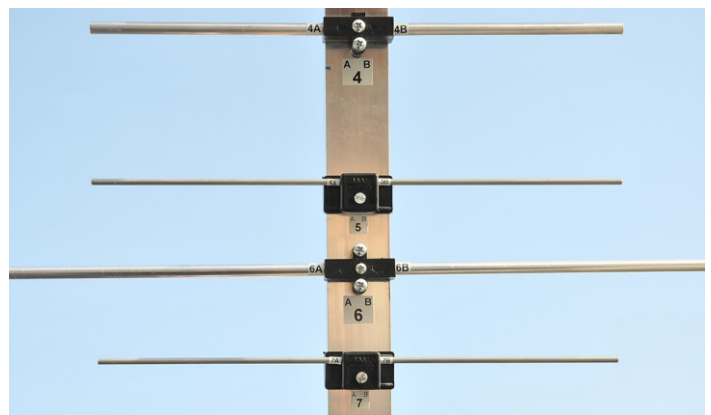
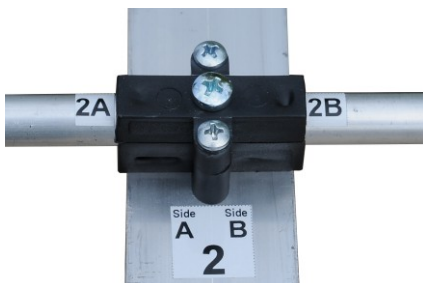
Join the boom.



Before tightening all screws, apply thread lock like Loctite 243 or Permatex Threadlocker BLUE.


Attach the elements (number to number).

Starting with 1, paying special attention on orientation.



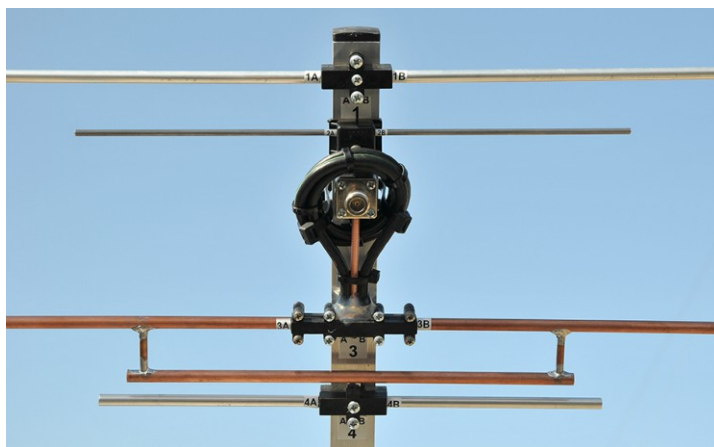
Required torque 2.2 Nm for 8 mm elements and 1.4 Nm for 4 mm elements.
If needed align elements and screw tightly. Elements must stand in one plane.



Company Dual. The largest antenna and ham radio equipment manufacturer in Serbia.
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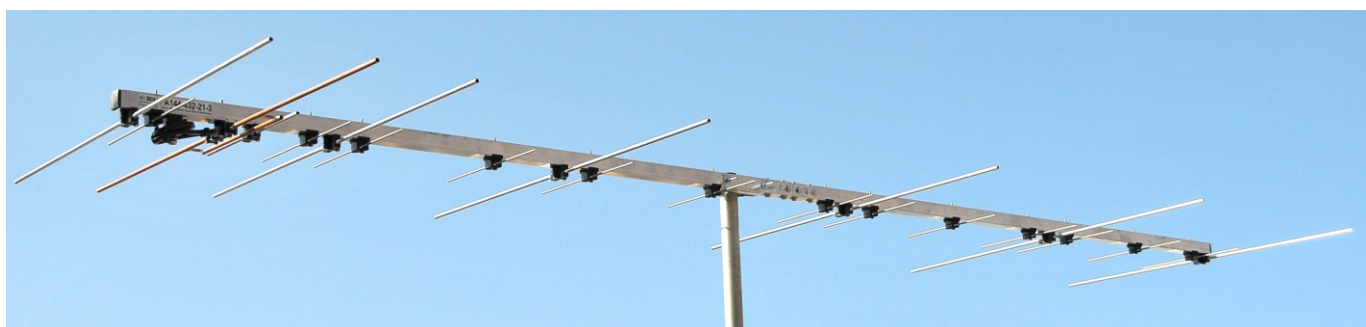
PA144-432-21-3B

Attach the dipole.




Screw connector to connector holder.

Attach antenna mounting bracket.



Raise the antenna. Measure SWR. It must be as predicted or very close on all frequencies. Low SWR is a sign that you assembled everything correctly. Best DX.



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