

The B&Q Beam

Introduction

This is a small, practical 2m beam that was conceived as a project for the Workington & District Amateur Radio Club as a way of helping members learn about basic antennas and how easy the build of a simple Yagi is. There is minimal theory involved and what theory there is taken from a number of sources and simplified. The main aim is to experiment.

The design

The basic design is shown in the figure below. The maths used is as follows

$$v = f \times \lambda$$

$$v = 299792458 \text{ or } 3 \times 10^8 \text{ m/s}$$

$$\begin{aligned} \text{therefore } \lambda &= \frac{v}{f} \\ &= \frac{299792458 \text{ m/s}}{145500000 \text{ Hz}} \\ &= 2.0604293 \text{ m} \end{aligned}$$

Reflector	=	0.495λ	0.995187	Or 995mm
Driven	=	0.473λ	0.96016	Or 960mm
Director	=	0.43λ	0.879803	Or 880mm

Space between driven and reflector	=	0.21λ	0.43269	Or 435mm
Space between driven and director	=	0.23λ	0.473899	Or 470mm

$$\text{Total boom length} = 905 \text{ mm}$$

The challenge

This just for fun challenge is to build a beam of no more than 3 elements that will perform as well or better than the commercially available models. The antenna is supposed to be simple and also a 'temporary' one. In order to test the beams a 'slightly less than scientific' approach will be taken to make a direct comparison between an existing design using a simplistic scale using a frequency meter at a suitable distance. The simple rules are:

1. The frequency you should design to is 145.500Mhz. Fed from a handheld at 5w.
2. Credit will be given for value for money (in other words a cheap antenna that performs as well as the commercial alternative is better than one that costs more).
3. Inventive designs will be considered as better than copies of others.
4. More elements = less points, less elements = more points. If you can design something that works better than a 3 element beam with just 2 or 1 element then that will be better. Note that 3 elements is probably the best option.

Some hints

1. The design shown at the club is a well designed antenna that is extremely useful.
2. Don't forget it is something that doesn't need to be designed to be on top of a tower in a howling gale. More something simple that could go in a loft or be used portable.
3. Use Google! There are loads of designs on the internet which can be used straight or adapted.
4. If you get stuck ask. Many of the club members have a lot of experience that might be useful.
5. A simplified design is shown below with some figures plucked from the internet. Remember it may not be the best one!
6. Don't forget the feeder.

