

# Elizabeth Amateur Radio Club

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## Antenna Testing Field Day

Posted by **kgooley** on Sunday 9th April 2006. Last Updated Tuesday 7th September 2010.

*The primary reason for the field day was to test the new VK5ROC repeater antenna constructed by Dennis (VK5FDEN) and Keith (VK5OQ).*

## Equipment

<b>Signal Source:</b>	Icom IC706mk2G transceiver
<b>Ref Antenna:</b>	Dipole constructed from 1" dia tubing
<b>Receive Antenna:</b>	Rohde & Schwarz Active Broadband Directional Antenna model HE200
<b>Field Strength Meter:</b>	Home-brew broadband RF power meter based on an Analog Devices AD8307 Log-detector IC

## Method

The Icom transceiver was used to provide 9 watts at approx 437MHz.

The antenna under test was replaced by our reference antenna and the field strength was measured. This provided our basis for quoting the 'gain' of the antennas.

The antenna under test was installed and the field strength noted on the Field Strength Meter. The receive antenna was moved up and down by about one wavelength to check that ground reflection was not influencing the measurement significantly. The test antenna was also rotated to measure directional characteristics.

As the field strength meter indicates in dBm the two readings could be simply subtracted to give a gain directly in dB.

## Antenna Descriptions

<b>Reference antenna:</b>	a half wave dipole on 70cm made from 25mm aluminium tube with broad bandwidth in mind.
<b>VK5ROC Antenna:</b>	a vertical array of 4 aluminium folded dipoles fed in phase.
<b>Club J-Pole:</b>	a dual band 2m/70cm aluminium antenna built by Dennis VK5FDEN
<b>5 Element Yagi:</b>	a small 70cm yagi used for field days.
<b>Copper J-Pole:</b>	2m J-pole made of copper pipe and soldered fittings.
<b>3 Element Yagi:</b>	2m yagi antenna

## Results

70cm

<b>Noise Floor:</b>	-48 dBm
<b>Reference Antenna:</b>	-9 dBm

<b>ROC Antenna</b>	0	-1 dBm	Effective gain 8 dB
	90	-2 dBm	
	180	-9 dBm	
<b>Club J-Pole:</b>		-5 dBm	Effective gain 4 dB
<b>5 Element Yagi</b>	0	+2 dBm	Effective gain 11 dB
	90	-6 dBm	
	180	-33 dBm	

2m

<b>Noise Floor:</b>		-34.5 dBm
<b>Reference Antenna:</b>		none available
<b>Club J-Pole:</b>		0 dBm
<b>Copper J-Pole (vk5zkg):</b>		-6 dBm
<b>3 Element Yagi</b>	0	+4 dBm
	90	-9 dBm
	180	-6 dBm

## Discussion

The main result that the repeater antenna had a gain of 8 dB over the dipole reference was pleasing and indicates that the antenna will perform well in service. The Club 2m/70cm aluminium J-pole also performed well as did the 5 element yagi with a gain of 11 dB. The surprise was the copper J-pole which was 6 dB down on the aluminium J-pole. This is an unexpected result as the two should have roughly the same gain. As 3 of these copper antennas were made at the same time the poor performance requires investigation. The SWR of the copper J-pole is good at better than 1.5.

The results indicate the value of quantitative testing of antennas.