

ZOOM-IN ON THE PLOTS!

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THE WELLINGTON RADIO CLUB'S LOW BAND FIELD DAY ANTENNA

ZOOM IN!

THE K4WRC VEE BEAM

Field Day in the USA is a national emergency communications exercise with a competitive nature. The antenna described here was used at the Wellington Emergency Operations Center during FD2004.

One goal was to have low band antennas providing both low and high angles of radiation. A multiband, trapped inverted vee served as the high takeoff angle antenna.

For low to medium RF takeoff angles, the Vee Beam was selected because of its simple design, ease of erection, high gain, low cost and the particular space available. Another goal was NOT to use manual antenna tuners to enable multiband operation. That permits inexperienced operators to use the radios without fear of damaging them!

Using EZNEC modeling software, we designed a V with 302.5 foot legs... 9/2 wavelengths on 40 meters and 5/2 wavelengths on 80m. (A free demo version of EZNEC is at www.ez nec.com). ODD half wave long, centered antennas have low impedance feedpoints. Automatic impedance matching was accomplished with a series matching section.

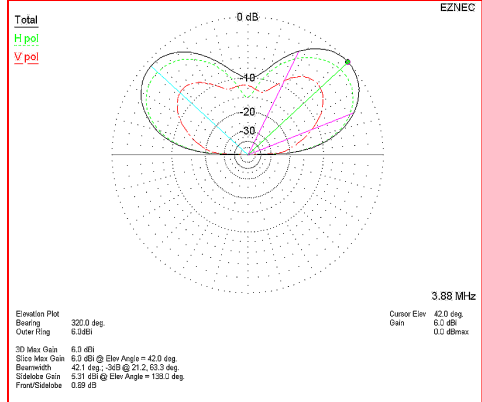
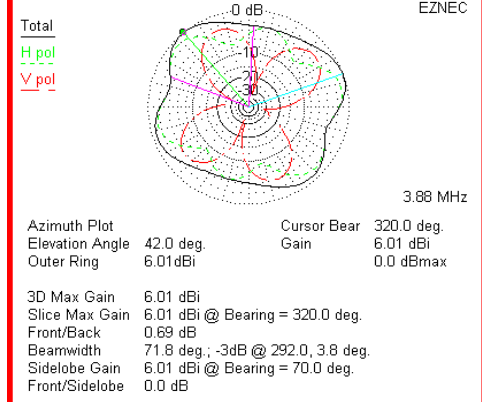
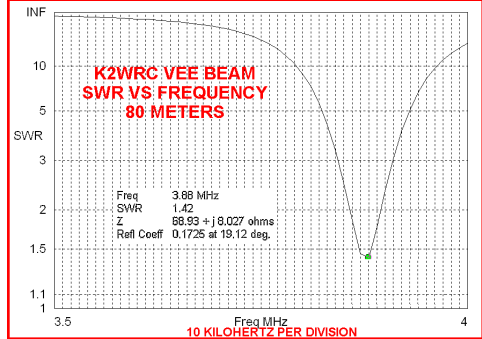
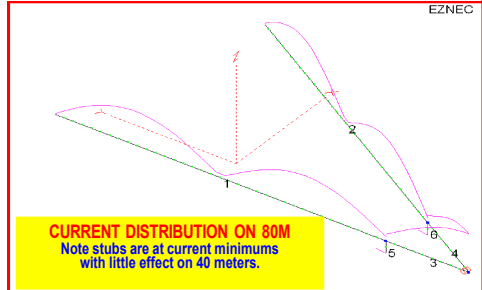
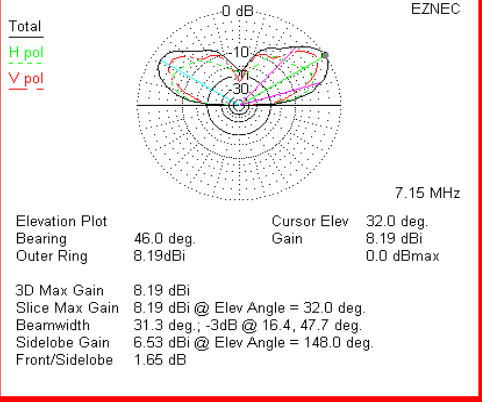
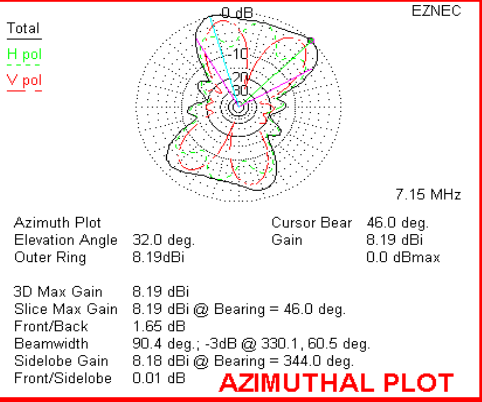
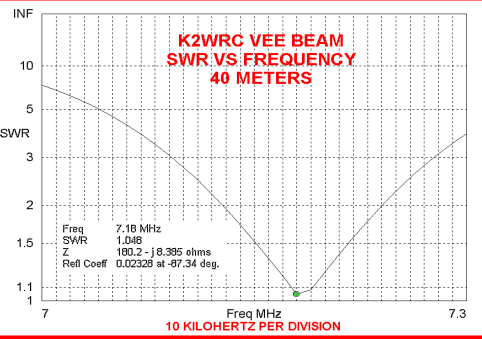
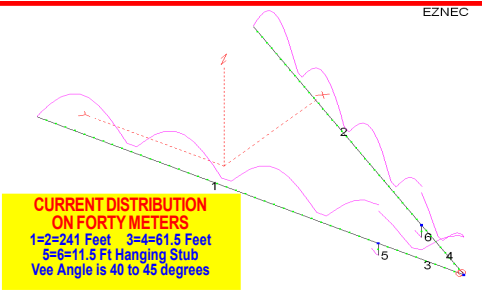
The chart below has the technical information to fabricate matching sections using main feedlines of either 54 or 75 ohm coax and 300 ohm twinlead.

Single wire vertical stubs were used to adjust resonances so they fell near the center of 40m and the top of 80m. When placed at high current points they have little effect on the antenna, but at low current/high voltage points, they act to lengthen the antenna.

Tuning antenna sections 1 and 2 affects both bands while adjusting the stub lengths primarily affects 80m. First adjust the antenna for your desired 40 meter frequency and then the stubs for 80m. On 40M, our antenna tuning changed about 40KHz per foot.

A narrow Vee angle was chosen to avoid a large metal roofed building, but for maximum gain use an angle of 60 to 80 degrees. The dimensions are shown in the top left plot. They will vary depending upon height, soil and nearby objects. Our V was at an average height of about 40 feet.

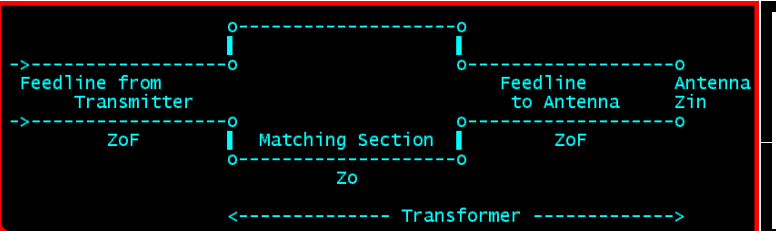
Larry KS4NB would be happy to answer questions about this project. Contact him at Echolink repeater node K4WRC-R, IRLP Node 7830 or email at: larry33414@aol.com



ABOVE LEFT & RIGHT: Plots from EZNEC show expected performance. SWRs and resonances were very close to predicted. They were easily handled by the built in tuners of the IC746 & IC756 radios. Patterns were broad enough to cover most of the USA from Florida.

BELOW: The "Series Matching Section" used to raise the line impedance,

ZoF, to match the antenna feedpoint resistance, Zin, of about 180 ohms on 40M. The values for two matching systems are shown depending on whether 50 or 75 ohm coax lines are used. The transformer resonance is very broadband and the 300 ohm section has little effect on 80m where it is less than 0.02 wavelengths long.



MAIN FEEDLINE FROM RADIO ZoF	300 OHM TWINLEAD vf=0.82 Zo	SAME TYPE AS MAIN FEEDLINE ZoF
RG-58 vf=0.66 54 OHM COAX	4.311 Feet 1.314 Meters	6.93 Feet 2.112 Meters
RG-59 vf=0.66 75 OHM COAX	4.371 Feet 1.332 Meters	7.844 Feet 2.391 Meters