

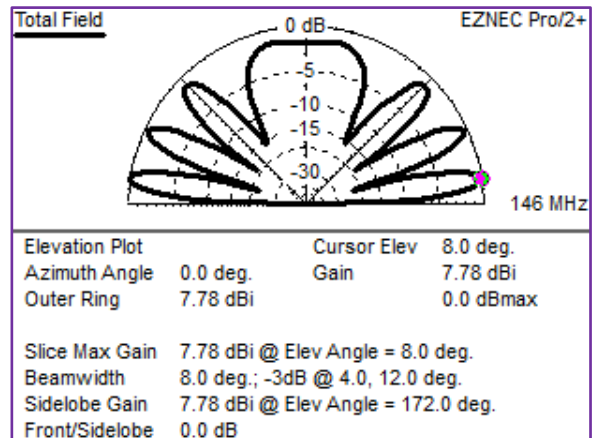
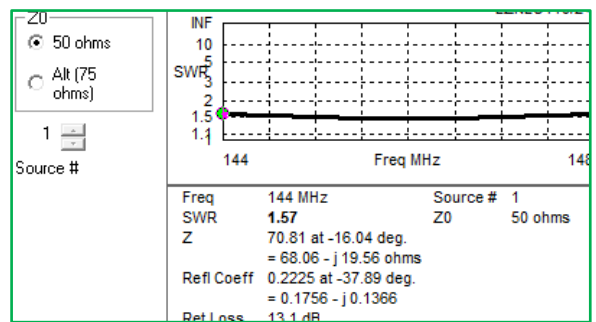
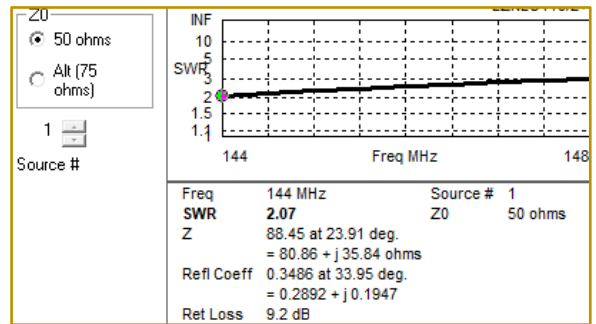
Ham 121 – Antenna Modeling EzNEC

Dr. Marc & Rosemary © 230710

- The first thing most hams build is an antenna. Is it as good as commercial? It certainly can be even better.
- Where do you start? EzNEC Pro2+ v7.0 is professional grade software, now free to the public.
 - Roy Lewallen, W7EL, developed the interface for the Lawrence Livermore Numerical Electromagnetics Code (NEC). With that lineage, it is not necessary to know the physics.
 - The software is at a couple of sites.
- Start the app to see the main screen. Open a file.
 - The last one used was saved in LAST.EZ. Save your own copy.
 - Click Open to see demo files. Cebik (SK) has many samples.
 - Set the antenna frequency. It returns wavelength.
 - Change the Units lower on the screen.
- Click Wires for an entry box. An antenna is a grouping of wires.
 - Antenna segments start from End 1 coordinates X-Y-Z.
 - That wire finishes at End 2 coordinates X-Y-Z.
 - Give diameter in #, inches, or metric.
 - Use as many wires as necessary.
 - A dipole can be one wire, but I prefer two for ease of variations.
 - A ground wire is any wire that has one end at 0 elevation.
- Let's build a model of a two-wire dipole.
 - For 2-m, 146 MHz, $\lambda = 80.84''$, mount in attic 12' above earth.
 - Quarter wave = 20.21". Use as starting point.
- Click Wires to enter data.
 - Segments are a number to break-up each wire. Start with 10/inch. A dialog box informs if segment is too short or long.
 - The table will show which ends connect.
 - Click View Ant to see a sketch.
- Click Sources to add a coax connection.
 - For most, I place source 1, on wire 1 at 0% from end 1.
 - By being consistent, you know where it is on every model.
- Click Ground Type. Real is realistic. Free Space gives results without Ground-Effect from being lower than 2λ .
- Click SWR. In Dialog set start and stop frequency bandwidth.
 - 2-m is 144 to 148 MHz.
 - Steps typically are 0.1 unless doing wide band, when .2, .5, or 1.0 is faster. Widen frequency to see harmonics that resonate.
 - A chart pops-up with SWR, impedance, and a curve.
 - You don't like it. You want the low point at 146 Mhz.
 - Low now is to left, a lower frequency.
 - To raise frequency, shorten the radiator and return. Guess at 19.2". Change Wires length and run SWR again.
 - What a good choice. SWR = 1.57, with low near 146 MHz..
- Click Fast Fourier (FF) Plot for angles and gain of 7.7 dB.
 - More lobes come from multiple wavelengths in elevation.
- Click Wires to move, scale, make radials, catenary.
- Click Alt SWR Z0 for a matching impedance such as 9:1 transformer. $9 * 50 = 450\Omega$ as alt. Then try it on SWR screen.
- Does the result make sense? EzNEC outputs whatever you input.
- Life is good. Enjoy! Web: evergreenca.org Social: gab.com/groups/62710

EzNEC Pro/2+ v. 7.0 - (2)

File	Edit	Options	Outputs	Setups	View	Utilities	Help
2-m dipole							
File							LAST.EZ
> Frequency							146 MHz
Wavelength							80.8415 in
> Wires							2 Wires, 398 segments
> Sources							1 Source
> Loads							0 Loads
> Trans Lines							0 Transmission Lines
> Transformers							0 Transformers
> L Networks							0 L Networks
> Y Param Networks							0 Y Param Networks
> Ground Type							Real/High Accuracy
> Ground Descrip							1 Medium (0.0303, 20)
> Wire Loss							Zero
> Units							Inches
> Plot Type							Elevation
> Azimuth Angle							0 Deg.
> Step Size							1 Deg.
> Ref Level							0 dBi
> Alt SWR Z0							75 ohms
> Desc Options							
> Gnd Wave Dist							OFF



WIRES										
No.	End1			Conn	End 2			Conn	Dia	Segs
	X (in)	Y (in)	Z (in)		X (in)	Y (in)	Z(in)		(in)	
1	0	0	144	W2E2	0	19.2	144		#14	199
2	0	-19.2	144		0	0	144	W1E1	#14	199

