

By Jose Carlos N4IS

New horizontal Waller Flag H_WF

April 28th, 2009



The new horizontal WF is performing very well on 160m 80m 40m and 30m .the HWF is very quiet and does not pick up power line noise, most of the time the horizontal flag is 15db or more quiet then the vertical flag, on 80m the signals are always stronger on the HWF, on 160 some times the signals are stronger on the vertical flag. The two antennas complete each other, if the signal is coming low angle and vertical the BWF (vertical) is better, and if the signal is coming above 15 degree the HWF is better.

My BWF , Big Waller Flag with dual 20ft x 14ft loops is still delivering a solid performance on low bands, I worked during 2007 # 163 and 2008 #155 countries on Top Band from my 1 acre city lot QTH. 2009 is not so strong and propagation is diving due this low solar activity, however I managed to work 119 since Jan 1st on 160m.The big news is about my new Horizontal loop. The HWF performance is just unbelievable, is very quiet and does not pick up any man made noise, power line noise, The city noise in increasing with all new appliance and modern LED, LCD, solar panels, chargers etc. I'm glad I found this new weapon.

End of January I put the HWF on top of my TX antenna at 116ft high. I'm using the 40ft boom as top hat and part of the TX antenna. The antenna worked very well since the first day, but after the first raining day I had problems with the isolation between the loops and the boom, sparking, arching and burned the two resistors. I fixed all those things last week after returning from a 3 weeks trip.

Here what it is important to know.

1 – Choke the feed line at the phasing transformer and at the end of the feed line close to the ground or inside the tower.

2 – For best performance on 160m I recommend 300 sq ft loops, this will work well 160m, 80m 40m and 30m. 200ft is good on 160m and excellent on 80m,. I tested 175 sq ft loops and also works well on all low bands but it is thermo limited on 160m, however if your local noise is high the HWF will be a huge improvement on your RX system.

3- Horizontal RX antenna is not much affected by vertical TX antenna.

4 - Only one external preamp is enough for a 300 sqft loop.

5 - Grounding and chokes to avoid common mode noise is a MUST.

6- Using the boom as part of the TX antenna, the loops must be very well isolated from the boom.

7- I'm using 2 Norton preamps with MRF151a, close to the radio, they are quite and have good IP3, 20 db gain is only what you need, my RX is a IC7800 and the internal PRE1 plus 2 Norton, I get 4 db noise figure on 160m. You can find information on Dallas files about noiseless Norton preamps.

The main reason why this antenna works so well is the rejection to vertical signals, almost 30 db attenuation on the front lobe for vertical signals. The signal noise increase > 15 db in comparison the original BWF vertical. As a result the power line noise does not impact my signal noise any more.

On 80 m I can hear signal from Europe 2 hours before my sun set, Q5 s5 to s6 signal on the HWF and no copy at all on my BWF, vertical.

On 160 m I can hear signals Q5 from PY, ZP VK, ZL when there is no way to even detect a signal on my BWF. During the night when the signal is out of noise, the signal is stronger on the BW vertical.

The propagation plays a lot and if the signal is coming bellow 16 degree and vertical polarized the HWF does not copy it at all, so the solution is to use both antennas one vertical and another horizontal.

I will update my web site by the end of the summer with all tests and photos.

Some friends is getting fantastic results using one single horizontal loop 20 ft above ground, when local power line noise is a problem. PY2DO Daniel few weeks ago was able to copy VK9 and YC0 on 160m with a single loop and no copy on other traditional RX antennas.

This kind of antenna can be easy to built using hardware from 10m yagi, I tested HWF's with 20ft boom, 24 ft and 40 ft, all can perform well but limited by your local noise. Bigger is always better.

My intention is to motivate the low band fellows to test and help to develop this new solution for city lots, imagine how many DX stations can improve RX on 160m, and be active from rare location with a lithe real state. All information is available on my site.

www.n4is.com

George AA7JV is thinking in develop a small RX rotatable antenna for HF, to cover 160 to high bands, easy to turn and use during DX expeditions, so more improvements is possible to come soon.

New papers, tests and new models like a dual delta flag was done by Dr Dallas; you can find a lot of new information on Dallas files

<http://www.kongsfjord.no/dl/dl.htm>

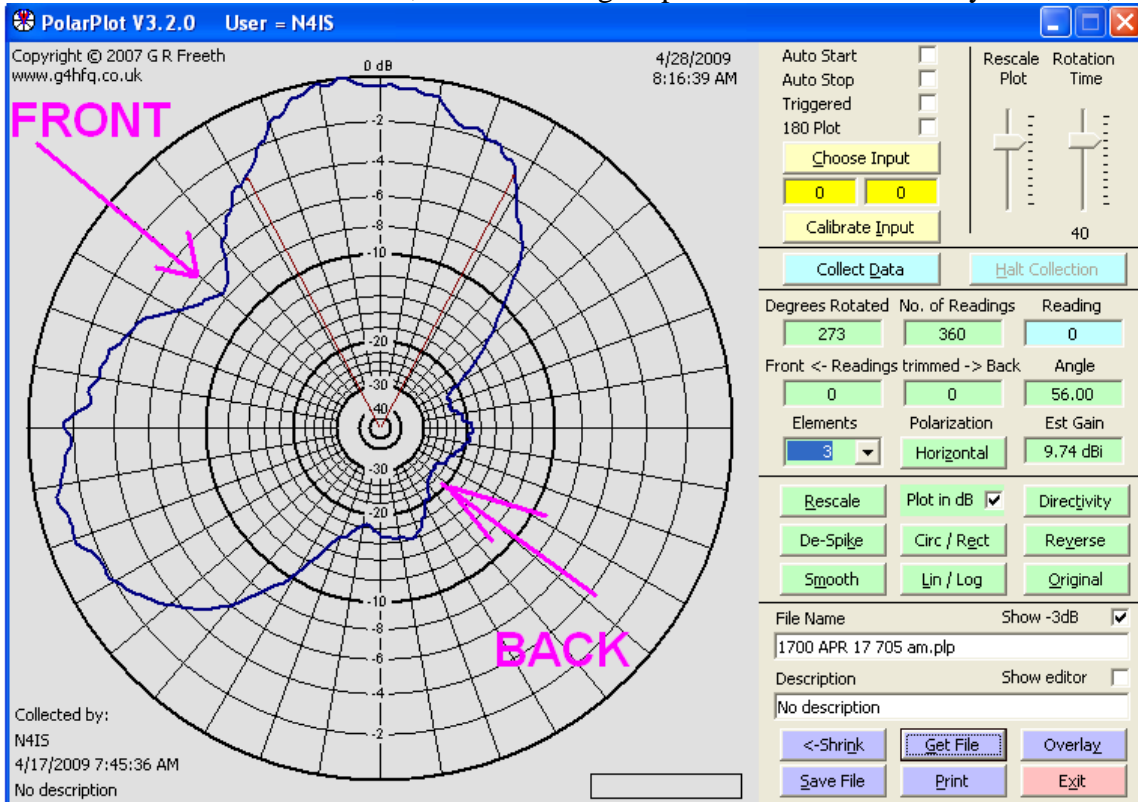
I would like to thank Dr Dallas for his support and important work on developing and testing the Flags, He and Doug NX4D have supporting me and sharing information's and doing tests on Flags, without Doug and Dr Dallas I was not able to reach this level of signal noise on my RX system.

I'm still living in noisy city lot but I can enjoy low band good as never before.

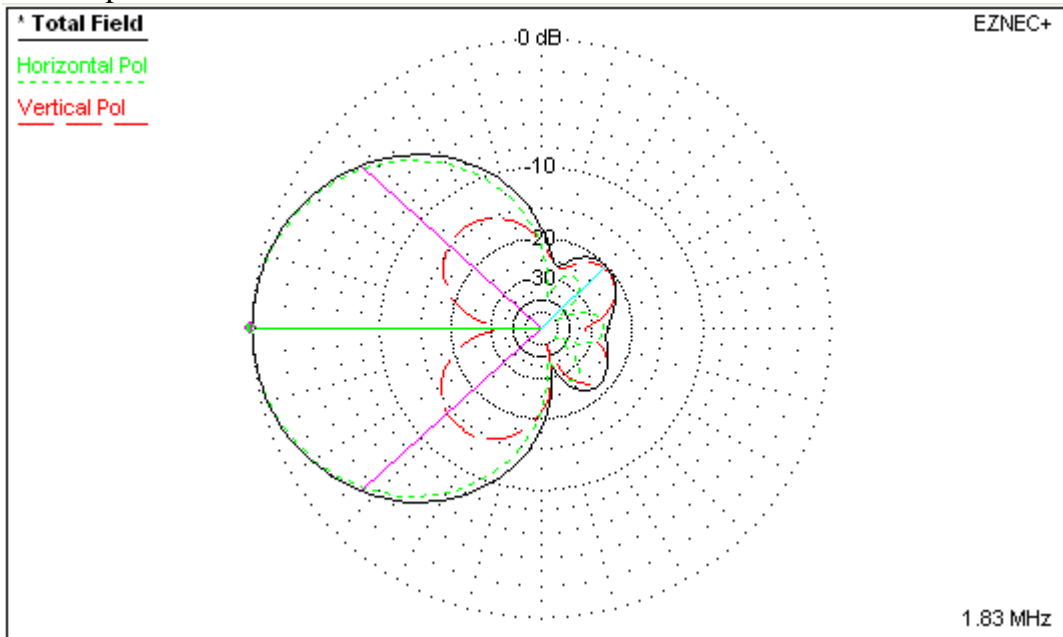
Please try new things, like a big 30ft x 20ft dual loop on 50ft boom at 120 ft high, this monster HWF can performs well as a full size 160m 4 elements yagi. I have no tower to support this size of antenna. Also don't panics for the mechanical problems, a simple wire supported by nylon and a good 2N5901 preamp will get you on low bands with a good RX.

Plots and tests using polar plot and IC7800 with AGC off.

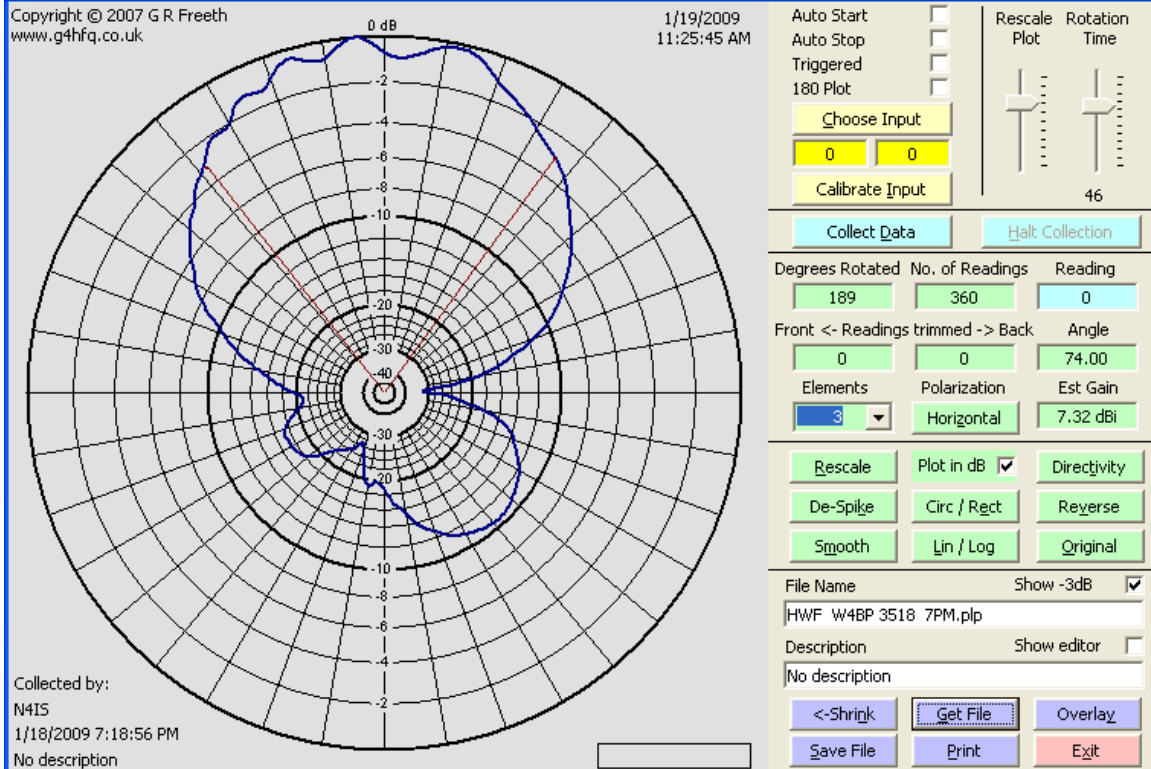
HWF 1700 am BC AM carrier, the vertical signal plot looks like a butterfly on 160m,



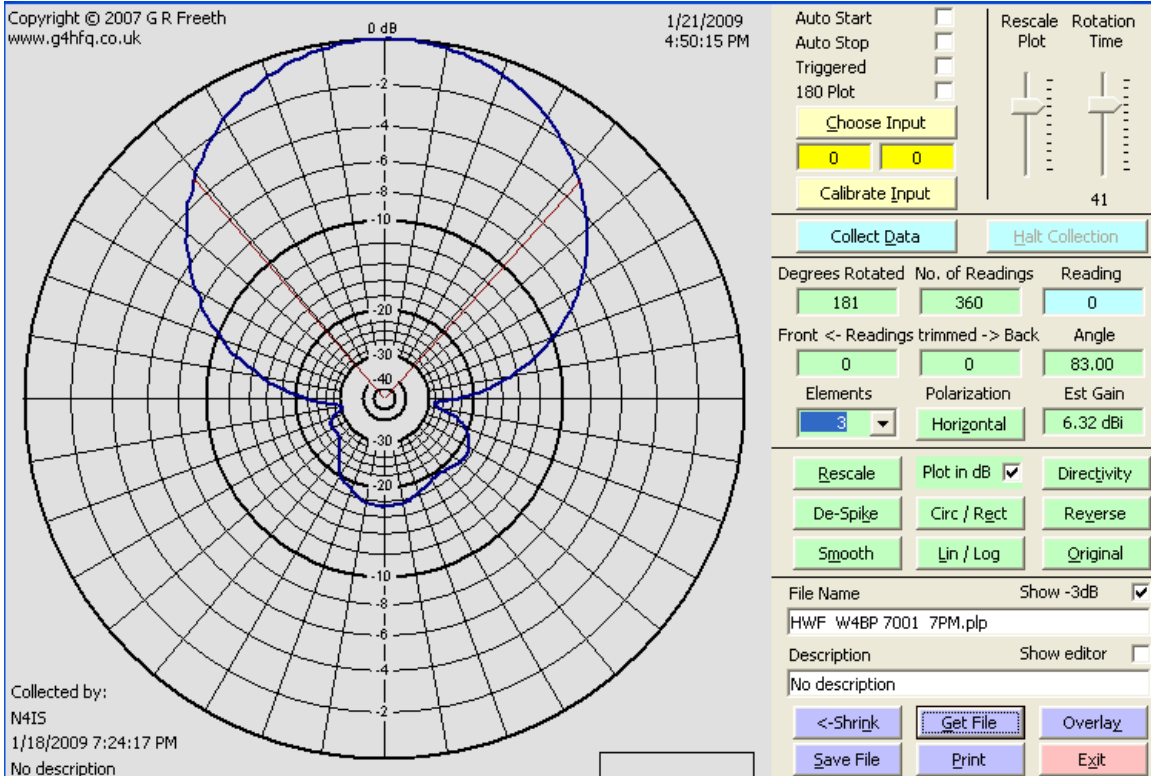
This is very close with EZNEC vertical plot, see the “RED” line representing the vertical polarization field.



Plot from W4BP signal 5 miles north of me on 3518 KHz 80m



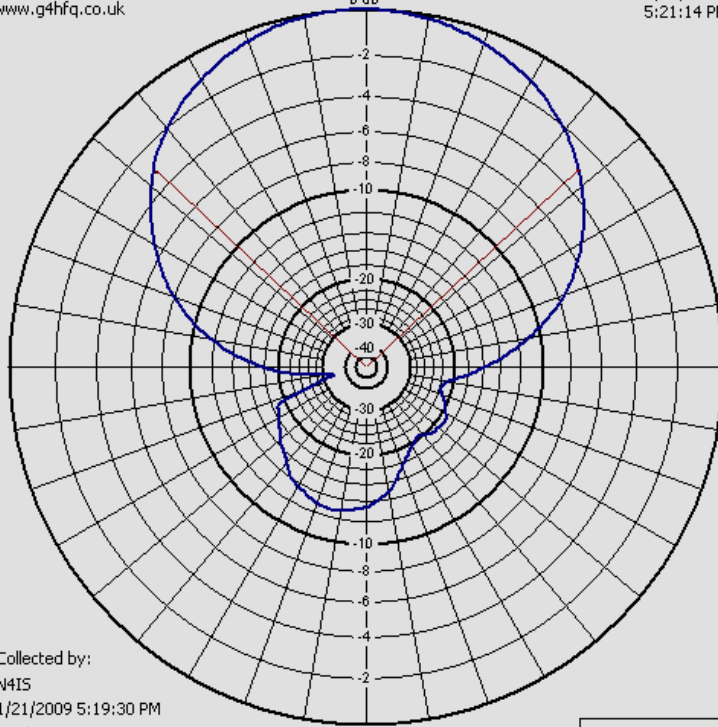
W4BP 7011 40m



W4BP 10103 30m

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1/21/2009
5:21:14 PM



Collected by:
N4IS
1/21/2009 5:19:30 PM
No description

Auto Start
Auto Stop
Triggered
180 Plot
Choose Input
0 0
Calibrate Input

Rescale Plot
Rotation Time 41

Collect Data Halt Collection

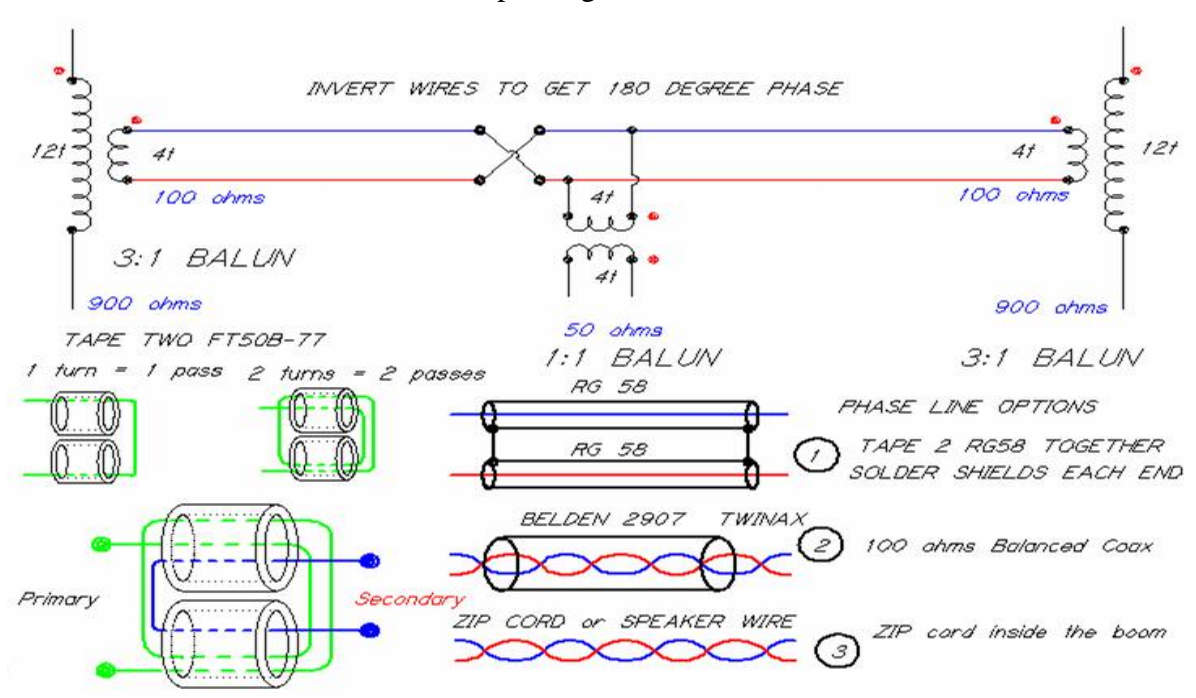
Degrees Rotated	No. of Readings	Reading
249	360	360
Front <- Readings trimmed -> Back	0	0
Angle	0	94.00
Elements	Polarization	Est Gain
3	Horizontal	5.24 dBi

Rescale Plot in dB Directivity
De-Spike Circ / Rect Reverse
Smooth Lin / Log Original

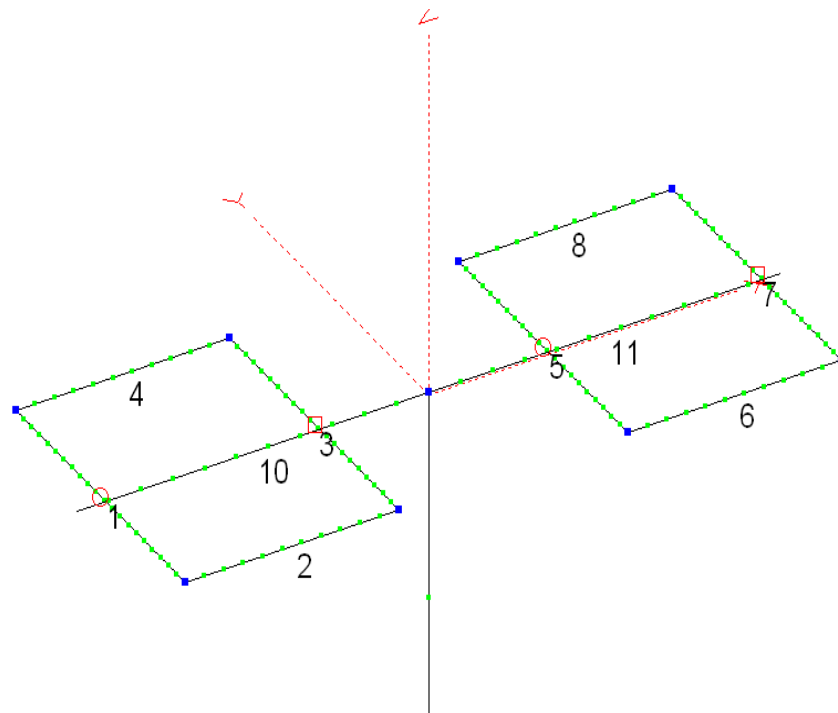
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HWF W4BP 10103 7PM.plp
Description Show editor

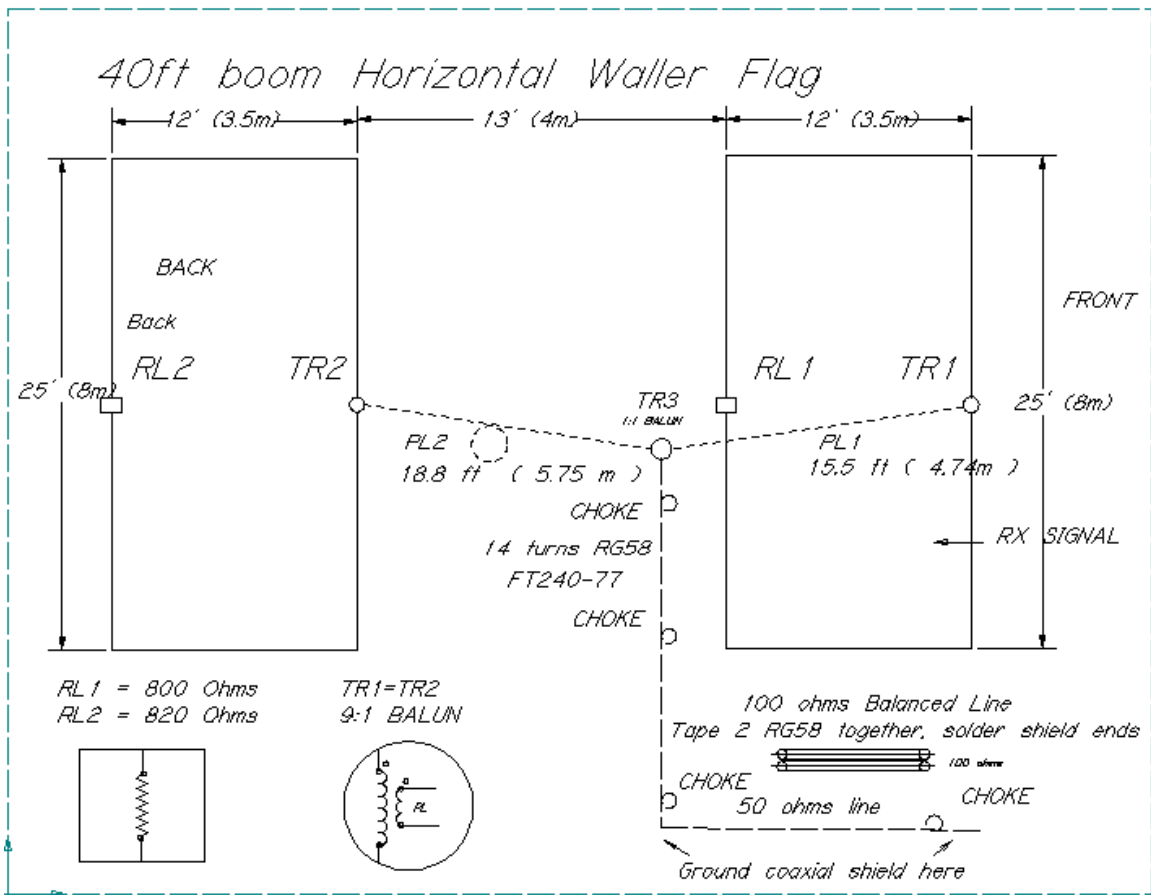
<-Shrink Get File Overlay
Save File Print Exit

These are the construction details and phasing lines.



The dual horizontal dual loop receives from the transformer side (1) and the resistor in the front loop is 800 ohms (3); the back loop transformer (5) is feed with the longer phase line the back resistor is the one with 820 ohms (7)





Balun 1:3 4 turns primary and 12 turns secondary.



Choke 13 turns on FT240-77

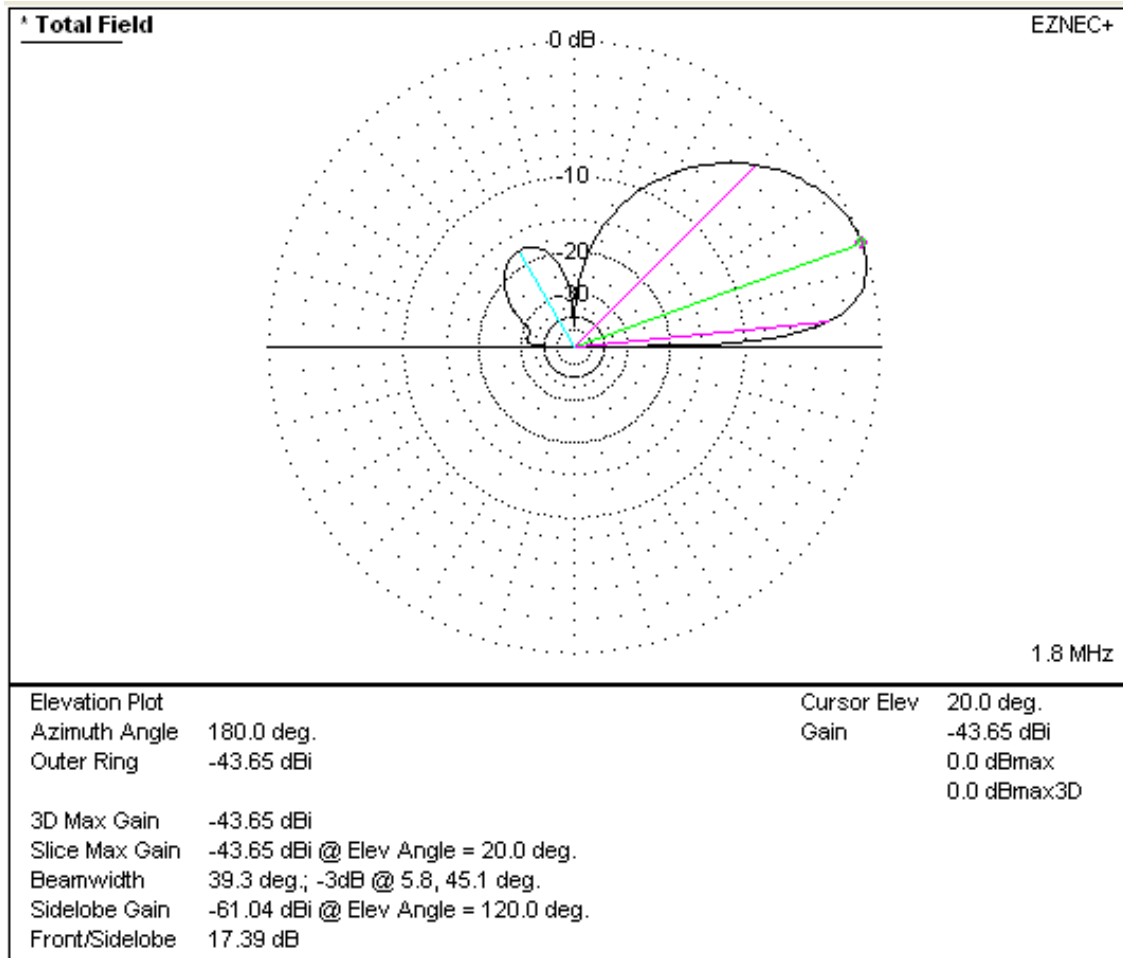


Here some comparison with traditional beveridge antennas using EZENEC

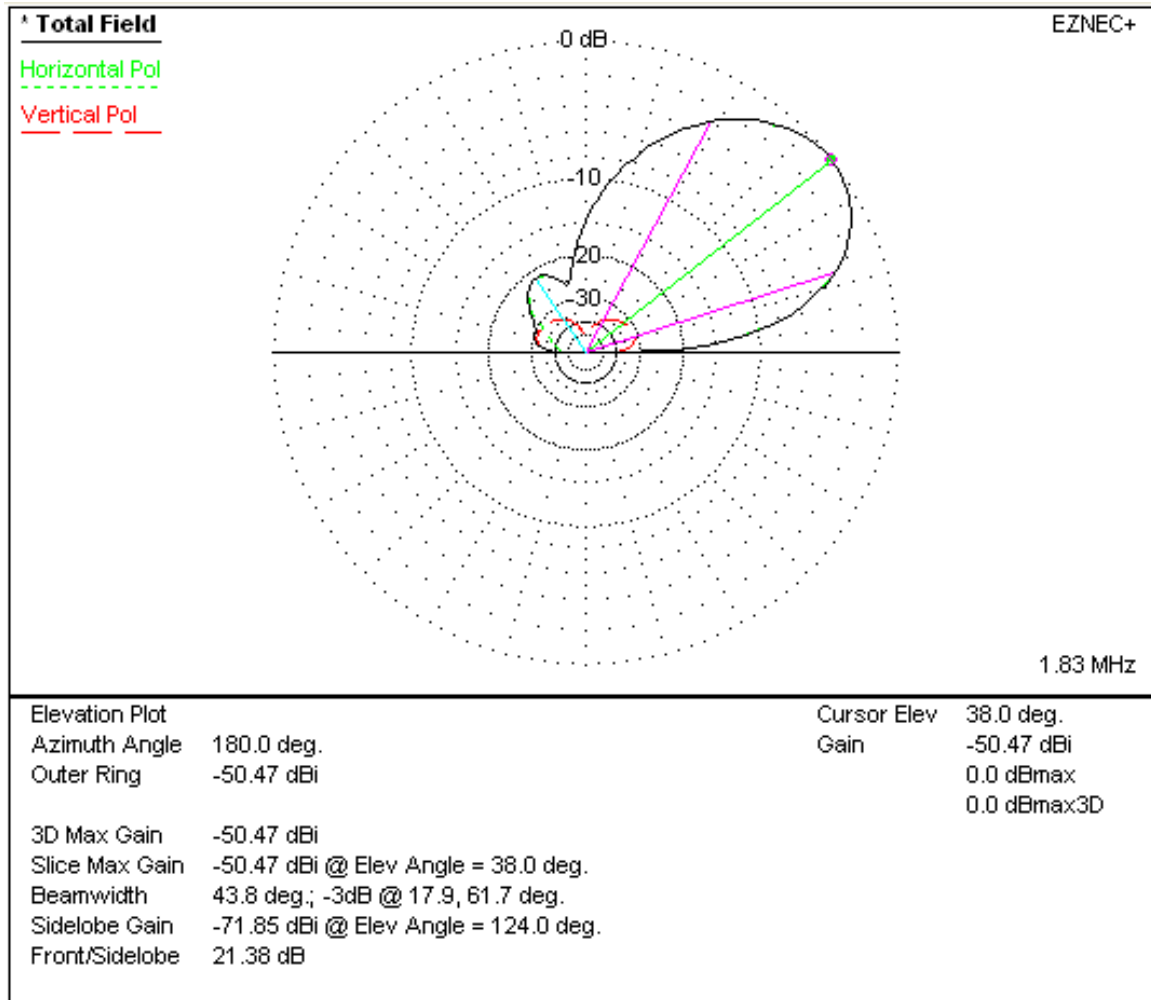
Take-off front lobe.

Antenna	-3db	Peak	+ 3db
Big Waller Flag vertical	5.8	20	45
Horizontal WF	17.9	38	61.7
Beverage 500 ft	9.5	38	65
Beverage 1000ft	8.3	30	52.1
4 Square Receiving	2.9	14	45

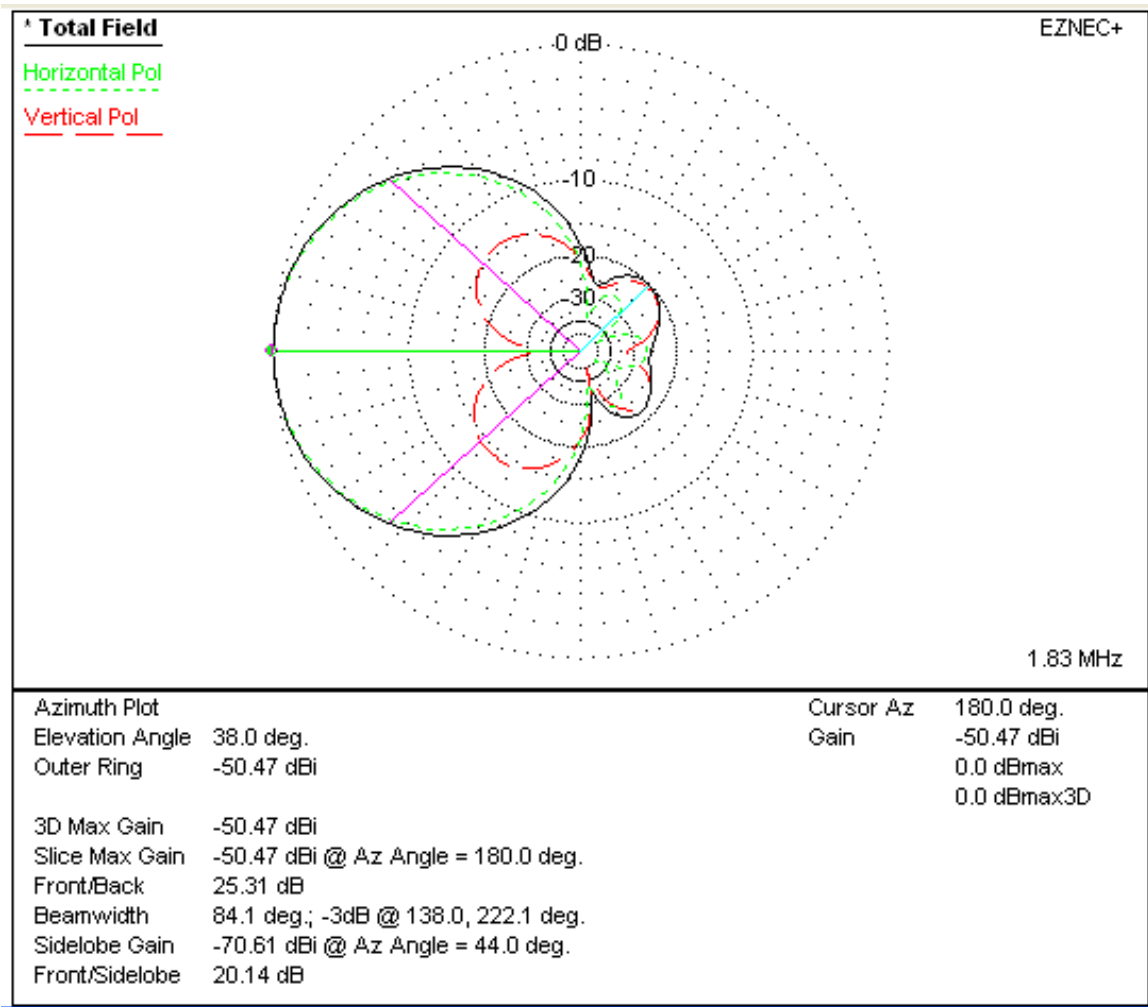
For reference this is a BWF elevation plot



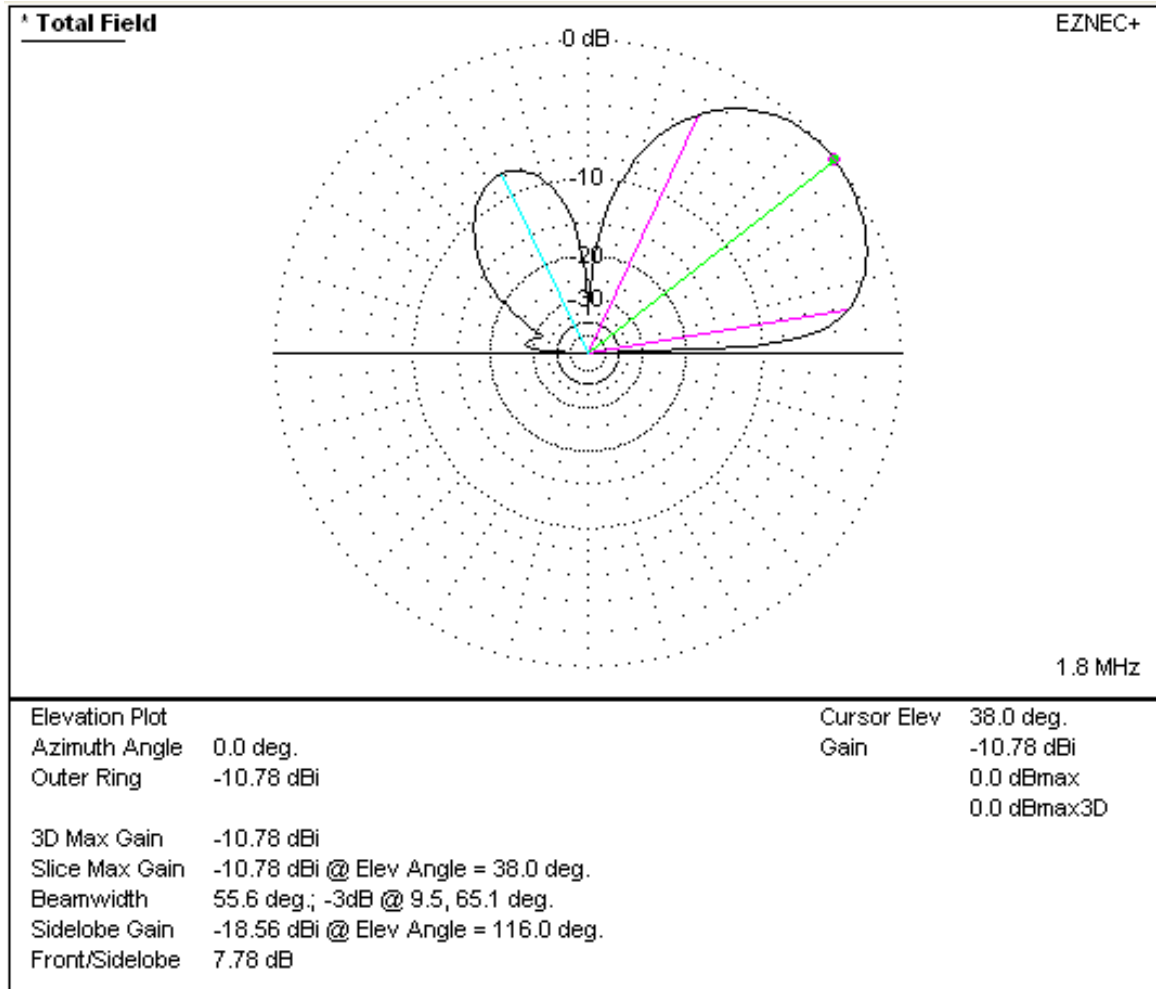
Horizontal Waller Flag elevation field



Horizontal WF vertical and horizontal azimuth.



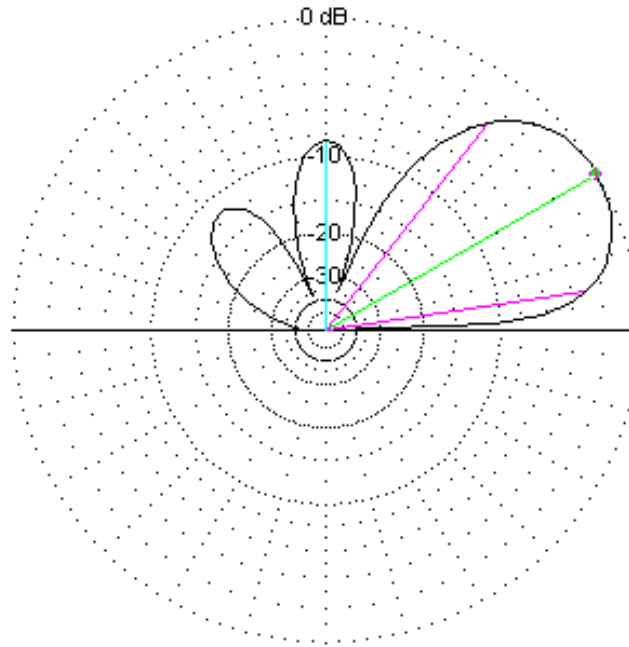
Beverage 500ft long



Beverage 1000 ft long

^ Total Field

EZNEC+



1.8 MHz

Elevation Plot		Cursor Elev	30.0 deg.
Azimuth Angle	0.0 deg.	Gain	-8.05 dBi
Outer Ring	-8.05 dBi		0.0 dBmax
			0.0 dBmax3D
3D Max Gain	-8.05 dBi		
Slice Max Gain	-8.05 dBi @ Elev Angle = 30.0 deg.		
Beamwidth	43.8 deg.; -3dB @ 8.3, 52.1 deg.		
Sidelobe Gain	-16.62 dBi @ Elev Angle = 90.0 deg.		
Front/Sidelobe	8.56 dB		