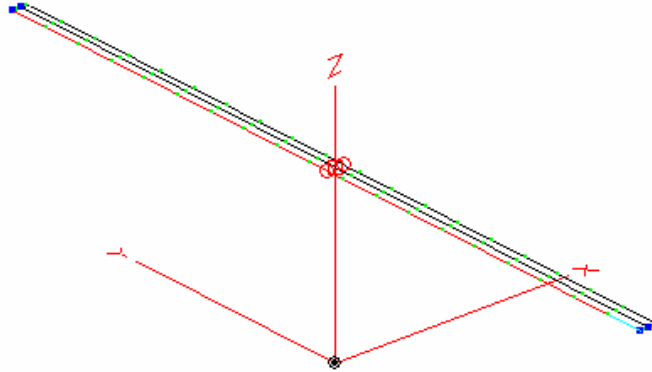


BBA-100E Plots and VSWR Curves

The BBA 100E model was developed in NEC-2 for this document and placed at 40 feet above average high accuracy ground model.

EZNEC+



Elevation gain plots were run to derive the pattern and gain of this antenna at the the four frequencies of interest for ARINC respectively 2.67, 4.05, 6.213, and 8.199 Mhz.

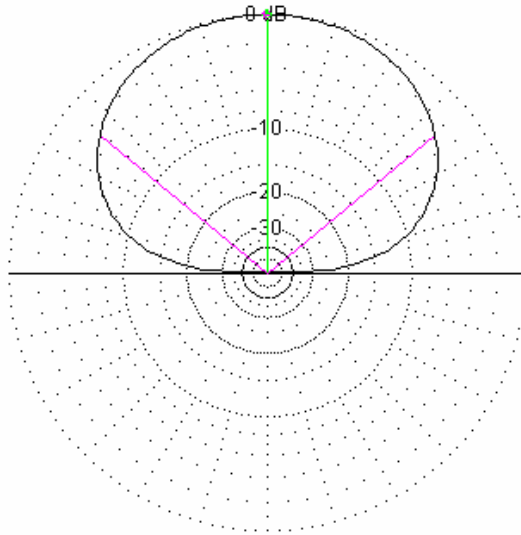
The following plots will include an elevation plot and an AZ plot for each of the frequencies. The AZ plot is taken at the various angles so be careful to notice the angle I ran the plot at.

2.67 MHz Plots

As expected for this frequency this antenna being so close to ground would have a max gain pattern straight up.

*** Total Field**

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2.67 MHz

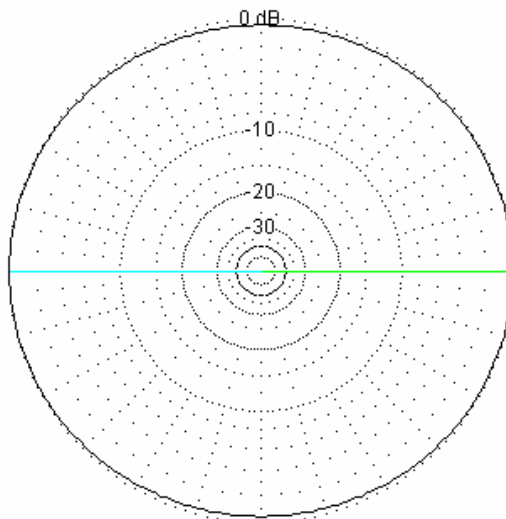
Elevation Plot
Azimuth Angle 0.0 deg.
Outer Ring 1.42 dBi

Cursor Elev 90.0 deg.
Gain 1.43 dBi
0.0 dBmax

Slice Max Gain 1.43 dBi @ Elev Angle = 90.0 deg.
Beamwidth 101.2 deg.; -3dB @ 39.4, 140.6 deg.
Sidelobe Gain < -100 dBi
Front/Sidelobe > 100 dB

*** Total Field**

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2.67 MHz

Azimuth Plot
Elevation Angle 75.0 deg.
Outer Ring 1.22 dBi

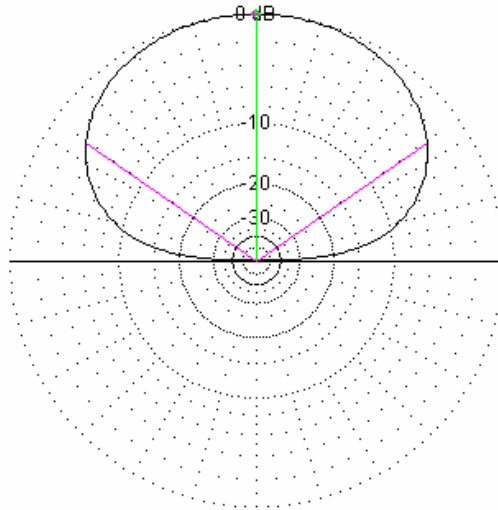
Cursor Az 0.0 deg.
Gain 1.22 dBi
0.0 dBmax

Slice Max Gain 1.22 dBi @ Az Angle = 0.0 deg.
Front/Side 0.44 dB
Beamwidth ?
Sidelobe Gain 1.22 dBi @ Az Angle = 180.0 deg.
Front/Sidelobe 0.0 dB

4.050 Mhz

* Total Field

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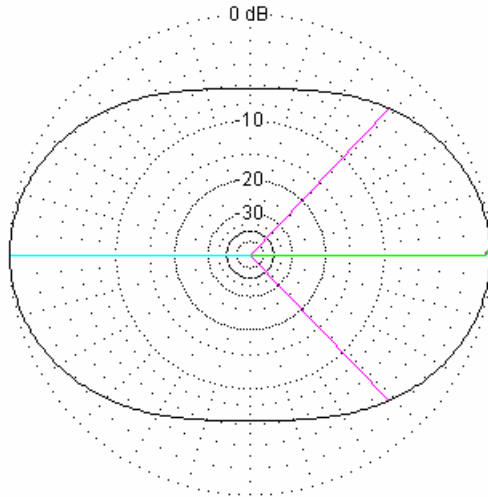
Elevation Plot
Azimuth Angle 0.0 deg.
Outer Ring 3.35 dBi

4.05 MHz
Cursor Elev 90.0 deg.
Gain 3.35 dBi
0.0 dBmax

Slice Max Gain 3.35 dBi @ Elev Angle = 90.0 deg.
Beamwidth 111.2 deg.; -3dB @ 34.4, 145.6 deg.
Sidelobe Gain < -100 dBi
Front/Sidelobe > 100 dB

* Total Field

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Azimuth Plot
Elevation Angle 45.0 deg.
Outer Ring 1.74 dBi

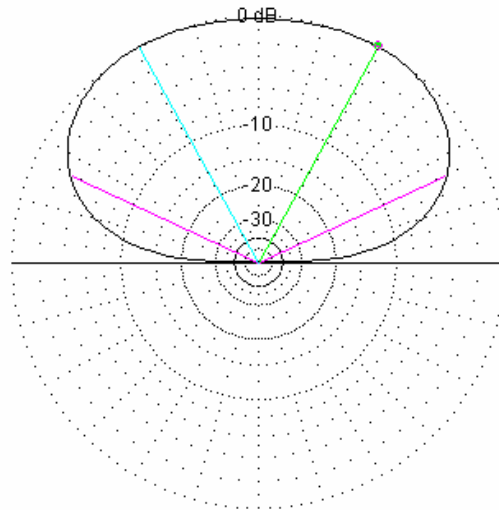
4.05 MHz
Cursor Az 0.0 deg.
Gain 1.74 dBi
0.0 dBmax

Slice Max Gain 1.74 dBi @ Az Angle = 0.0 deg.
Front/Side 6.36 dB
Beamwidth 93.0 deg.; -3dB @ 313.5, 46.5 deg.
Sidelobe Gain 1.74 dBi @ Az Angle = 180.0 deg.
Front/Sidelobe 0.0 dB

6.213 Mhz

* Total Field

EZNEC+



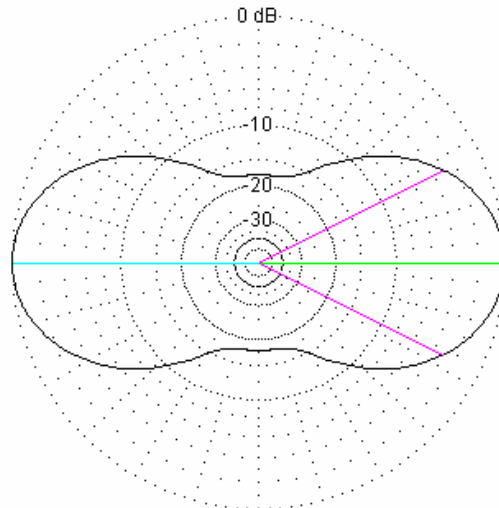
Elevation Plot
Azimuth Angle 0.0 deg.
Outer Ring 3.83 dBi

6.213 MHz
Cursor Elev 61.0 deg.
Gain 3.83 dBi
0.0 dBmax

Slice Max Gain 3.83 dBi @ Elev Angle = 61.0 deg.
Beamwidth 130.6 deg.; -3dB @ 24.7, 155.3 deg.
Sidelobe Gain 3.83 dBi @ Elev Angle = 119.0 deg.
Front/Sidelobe 0.0 dB

* Total Field

EZNEC+



Azimuth Plot
Elevation Angle 45.0 deg.
Outer Ring 3.5 dBi

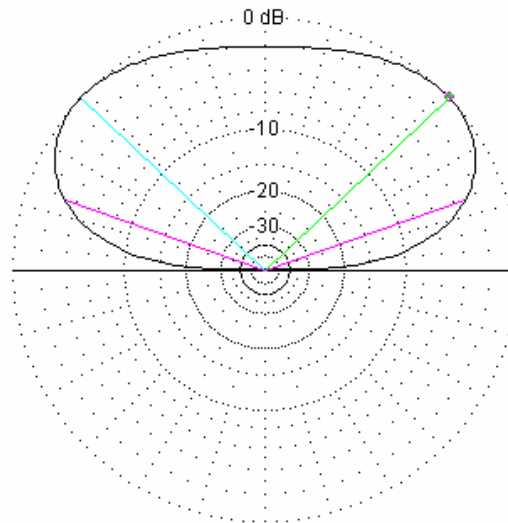
6.213 MHz
Cursor Az 0.0 deg.
Gain 3.5 dBi
0.0 dBmax

Slice Max Gain 3.5 dBi @ Az Angle = 0.0 deg.
Front/Side 17.67 dB
Beamwidth 53.0 deg.; -3dB @ 333.5, 26.5 deg.
Sidelobe Gain 3.5 dBi @ Az Angle = 180.0 deg.
Front/Sidelobe 0.0 dB

8.199 Mhz

* Total Field

EZNEC+



8.199 MHz

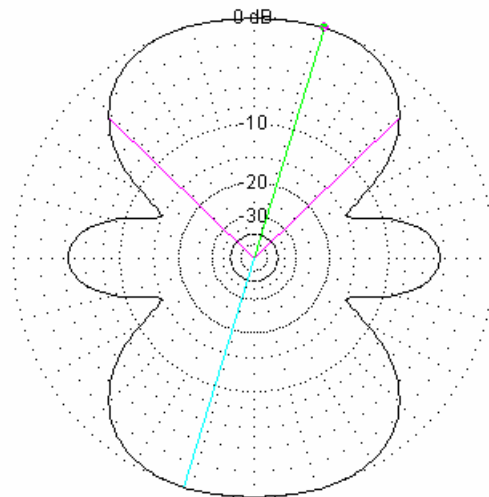
Elevation Plot
Azimuth Angle 0.0 deg.
Outer Ring -0.01 dBi

Cursor Elev 43.0 deg.
Gain -0.01 dBi
0.0 dBmax

Slice Max Gain -0.01 dBi @ Elev Angle = 43.0 deg.
Beamwidth 141.8 deg.; -3dB @ 19.1, 160.9 deg.
Sidelobe Gain -0.01 dBi @ Elev Angle = 137.0 deg.
Front/Sidelobe 0.0 dB

* Total Field

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8.199 MHz

Azimuth Plot
Elevation Angle 45.0 deg.
Outer Ring 4.36 dBi

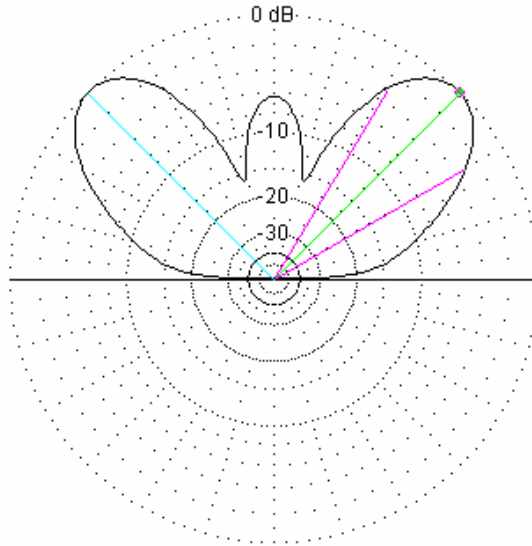
Cursor Az 73.0 deg.
Gain 4.36 dBi
0.0 dBmax

Slice Max Gain 4.36 dBi @ Az Angle = 73.0 deg.
Front/Side 9.97 dB
Beamwidth 92.2 deg.; -3dB @ 43.9, 136.1 deg.
Sidelobe Gain 4.36 dBi @ Az Angle = 253.0 deg.
Front/Sidelobe 0.0 dB

The last plot at 8.199 Mhz shows that the main lobe of the pattern has moved 180 degrees to the y -y axis. Taking the elevation plot at this axis shows the following elevation pattern

*** Total Field**

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8.199 MHz

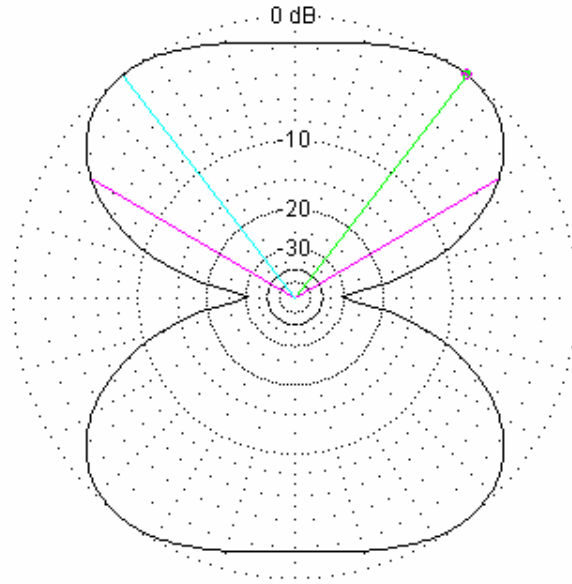
Elevation Plot
Azimuth Angle 90.0 deg.
Outer Ring 4.28 dBi

Cursor Elev 45.0 deg.
Gain 4.28 dBi
0.0 dBmax

Slice Max Gain 4.28 dBi @ Elev Angle = 45.0 deg.
Beamwidth 29.2 deg.; -3dB @ 29.9, 59.1 deg.
Sidelobe Gain 4.28 dBi @ Elev Angle = 135.0 deg.
Front/Sidelobe 0.0 dB

*** Total Field**

EZNEC+



10 MHz

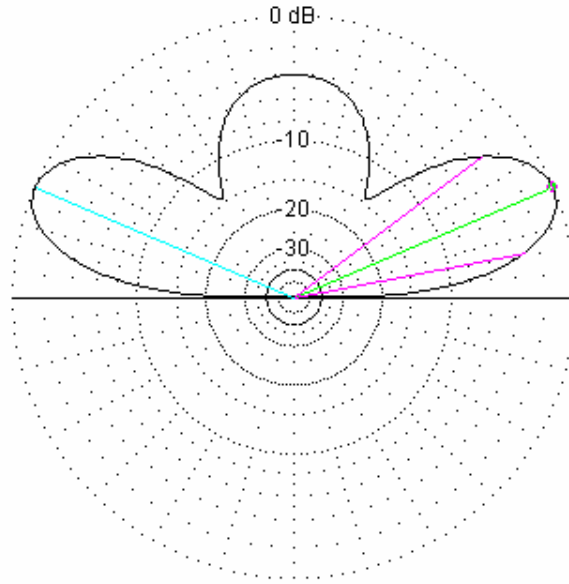
Azimuth Plot
Elevation Angle 45.0 deg.
Outer Ring 4.35 dBi

Cursor Az 52.0 deg.
Gain 4.35 dBi
0.0 dBmax

Slice Max Gain 4.35 dBi @ Az Angle = 52.0 deg.
Front/Side 1.09 dB
Beamwidth 119.6 deg.; -3dB @ 30.2, 149.8 deg.
Sidelobe Gain 4.35 dBi @ Az Angle = 128.0 deg.
Front/Sidelobe 0.0 dB

*** Total Field**

EZNEC+



15 MHz

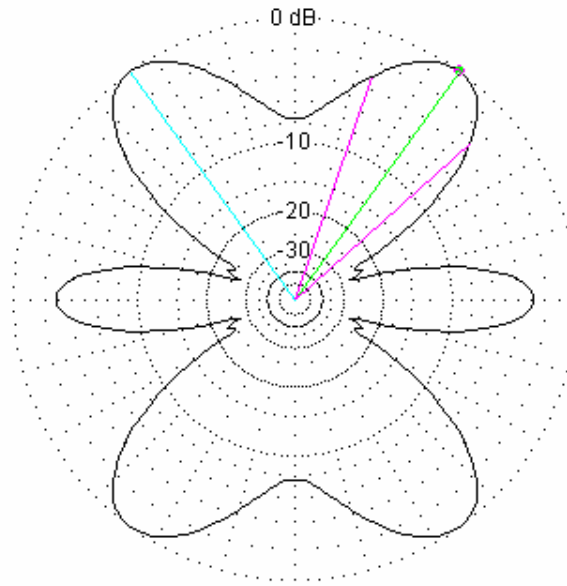
Elevation Plot
Azimuth Angle 0.0 deg.
Outer Ring 4.56 dBi

Cursor Elev 23.0 deg.
Gain 4.56 dBi
0.0 dBmax

Slice Max Gain 4.56 dBi @ Elev Angle = 23.0 deg.
Beamwidth 25.7 deg.; -3dB @ 10.9, 36.6 deg.
Sidelobe Gain 4.56 dBi @ Elev Angle = 157.0 deg.
Front/Sidelobe 0.0 dB

*** Total Field**

EZNEC+



15 MHz

Azimuth Plot
Elevation Angle 23.0 deg.
Outer Ring 7.33 dBi

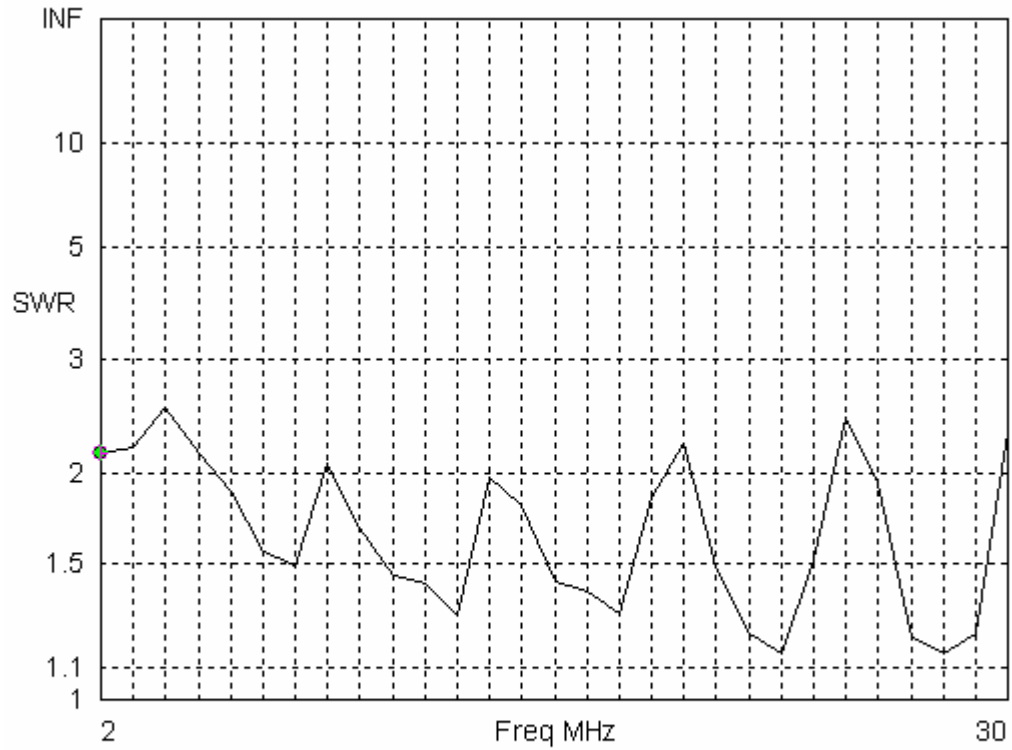
Cursor Az 54.0 deg.
Gain 7.33 dBi
0.0 dBmax

Slice Max Gain 7.33 dBi @ Az Angle = 54.0 deg.
Front/Side 7.76 dB
Beamwidth 29.0 deg.; -3dB @ 41.8, 70.8 deg.
Sidelobe Gain 7.33 dBi @ Az Angle = 126.0 deg.
Front/Sidelobe 0.0 dB

This is still a very good NVIS pattern and should yield good close in communications.

NVIS is probably not a propagation mode higher then 14-15 Mhz.

VSWR over this frequency range is as



Freq 2 MHz
SWR 2.14
Z 555.5 - j 457.4 ohms
Refl Coeff 0.3625 at -99.48 deg.

Source # 1
Z0 800 ohms

follows

I hope this helps describe what this antenna is capable of doing for NVIS networks

Jay Terleski BSEE, WX0B and owner of

