# How many elevated radials do you really need

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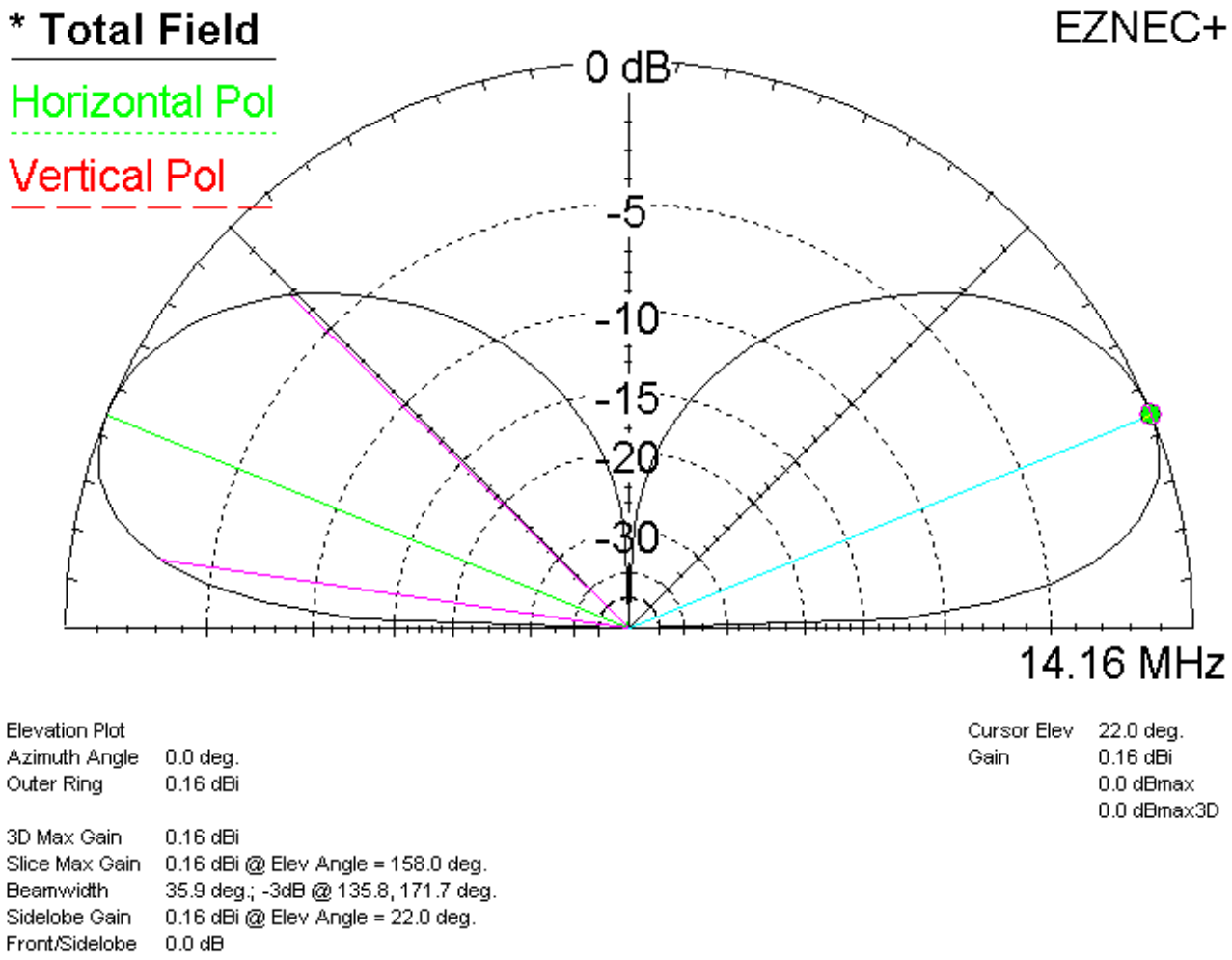
September 2007  mark 41 years of amateur radio for me. As far back as I can remember radio operators have been telling other operators that the more radials you have the better off you are, but I have discovered that the only time this is an accurate statement, is when they are either buried in the ground or laying on the ground. The minute you elevate the feed point of the vertical antenna to a height above ground of 10ft. and the radials to a minimum sloping height of 2ft. this statement no longer applies. Let me demonstrate what I am talking about I have modeled the Buddipole vertical on 20m. The first model has four elevated radials each one is 1/4 wavelength long. The VersaTee/ Antenna feed point is located 10 feet above ground. Each radial slopes back down to a point 2 feet above ground. All of the models have the same set up except for the amount of radials.

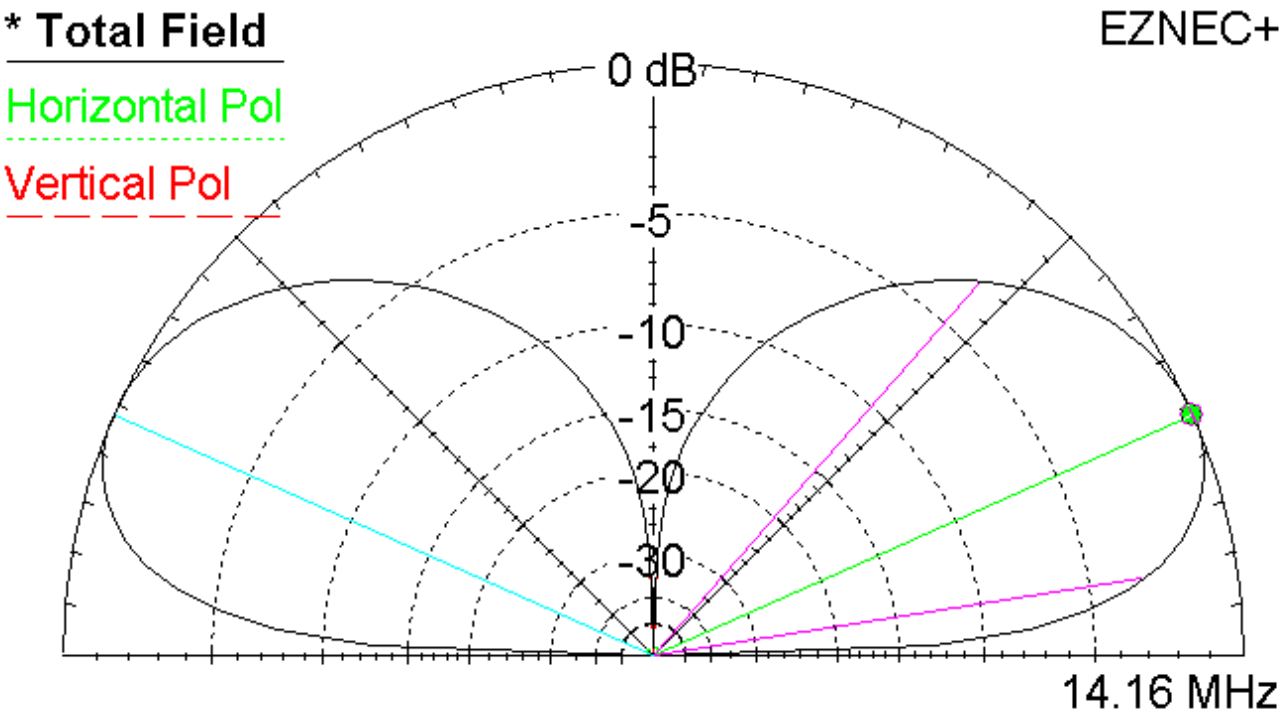
Gain=0.16dBi
This model is using four

Note that these are positive gain figures, compared to a classic ground mounted vertical with buried radials that typically have a negative gain figure.



Gain=0.23dBi
This model is using two radials

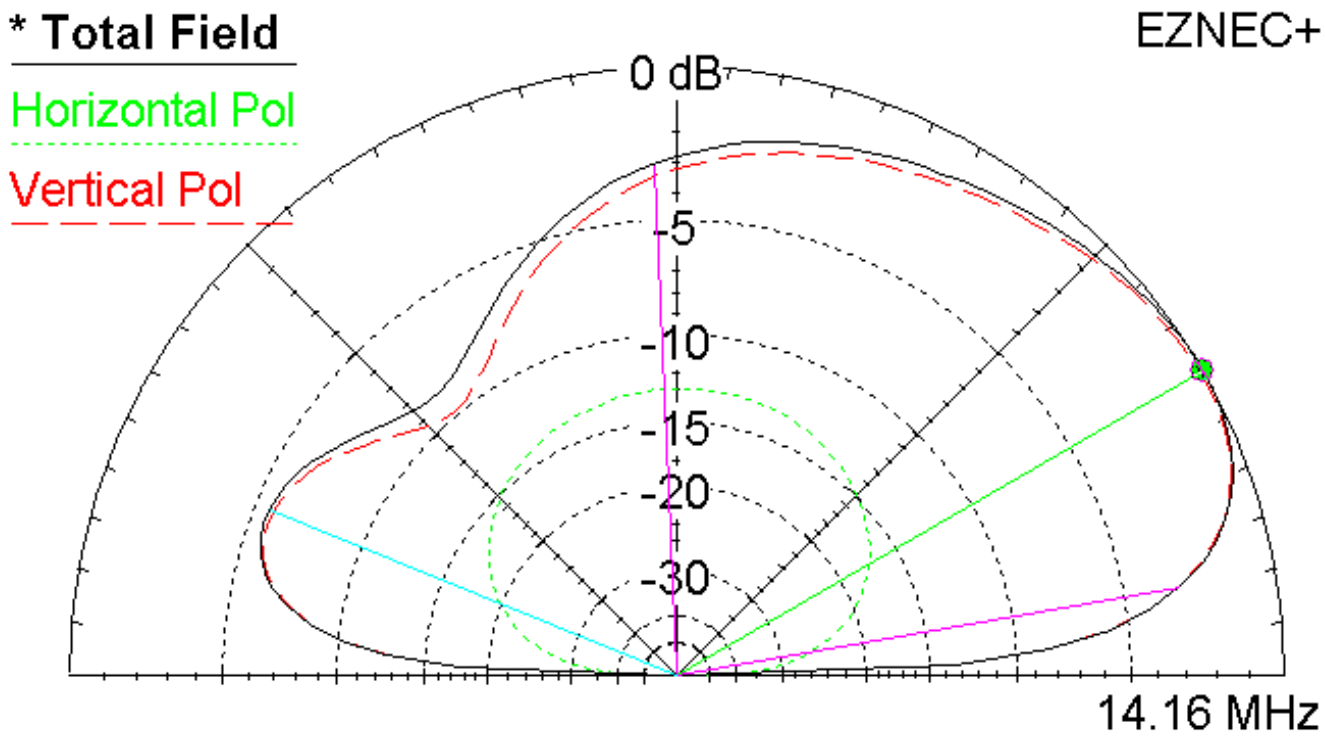
As you can see compared to the four radial model above the gain in this model is about double.




| | |
|---|---|
| Elevation Plot | |
| Azimuth Angle | 0.0 deg. |
| Outer Ring | 0.23 dBi |
| | |
| 3D Max Gain | 0.23 dBi |
| Slice Max Gain | 0.23 dBi @ Elev Angle = 24.0 deg. |
| Beamwidth | 39.8 deg.; -3dB @ 8.9, 48.7 deg. |
| Sidelobe Gain | 0.23 dBi @ Elev Angle = 156.0 deg. |
| Front/Sidelobe | 0.0 dB |

| | |
|---|---|
| Cursor Elev | 24.0 deg. |
| Gain | 0.23 dBi |
| | 0.0 dBmax |
| | 0.0 dBmax3D |

Gain=0.75dBi
This model is using one radial




| | |
|---|---|
| Elevation Plot | |
| Azimuth Angle | 72.0 deg. |
| Outer Ring | 0.75 dBi |
| | |
| 3D Max Gain | 0.75 dBi |
| Slice Max Gain | 0.75 dBi @ Elev Angle = 30.0 deg. |
| Beamwidth | 82.7 deg.; -3dB @ 9.9, 92.6 deg. |
| Sidelobe Gain | -4.8 dBi @ Elev Angle = 158.0 deg. |
| Front/Sidelobe | 5.55 dB |

| | |
|---|---|
| Cursor Elev | 30.0 deg. |
| Gain | 0.75 dBi |
| | 0.0 dBmax |
| | 0.0 dBmax3D |

As you can see compared to the two radial model above, this model using a single elevated radial has the highest gain. About 1/2db higher than the two radial model above. The reason why this happens is when you have two or more radials, the radiation coming off of each one cancels the radiation coming off the other ones. This leaves only the vertical element to produce radiation. So the next time someone ask you how many radials do I need you should say it all depends.