High Gain VHF/UHF Collinear J Pole with Phasing SHORT Spaced Coils 146 MHZ

By WB3AYW and KK1CW

A collinear (or co-linear) antenna array is an array of dipole antennas mounted in such a manner that the corresponding elements of each antenna are parallel and collinear, that is they are located along a common line or axis.

A collinear array is usually mounted vertically, in order to increase overall gain and directivity in the horizontal direction. Theoretically, when stacking idealised lossless dipole antennas in such a fashion, doubling their number will, with proper phasing, produce double the gain, with an increase of 3.01 dB. In practice, the gain realised will be below this due to losses. (From Wikipedia)

This antenna project will allow you to design a collinear antenna for either the 2 meter or the 70cm (440) ham band that will give you lots of gain using the calculator in the download.

Quick Specs and description

Antenna pattern is OMNI Directional
Very high gain and low to horizon radiation angle

Lengths and dBd gain

2 meters length and dBd gain	440 band length
3 element = 12 feet long 7.2 DBD's gain	5 ft.
5 element = 19 feet long 9.7 DBD's gain	8 ft.
10 element = 36 feet long 13.0 DBD's gain	14 ft.
15 element = 55 feet long = 14.45 DBD's gain	17 ft

More than 15 elements not recommended as the radiation pattern gets too tight for normal use.

Gain on a 15 element is 14.45 dBd

Could be built as a dual band but I, myself do not recommend it as a dual band design.

This antenna design does NOT use radials, it uses the J POLE bottom feed system, so it will match any feed line. Antenna gets very long (tall) when more than 5 elements on 2 meters but much shorter on the 440 band!

Below "graphics" were taken from the original xls file document. The xls document contains a working calculator to design for your particular frequency on the 2 meter or 440 ham band and are not working on this web page. The xls document contains 3 pages.

You must download the xls document and open it in a program that will read an xls document such as Open Office Org or similar program. Then the calculator will work!
See bottom of this article for downloading instructions. Drawings are much more clear in the xls document download than on this web page.

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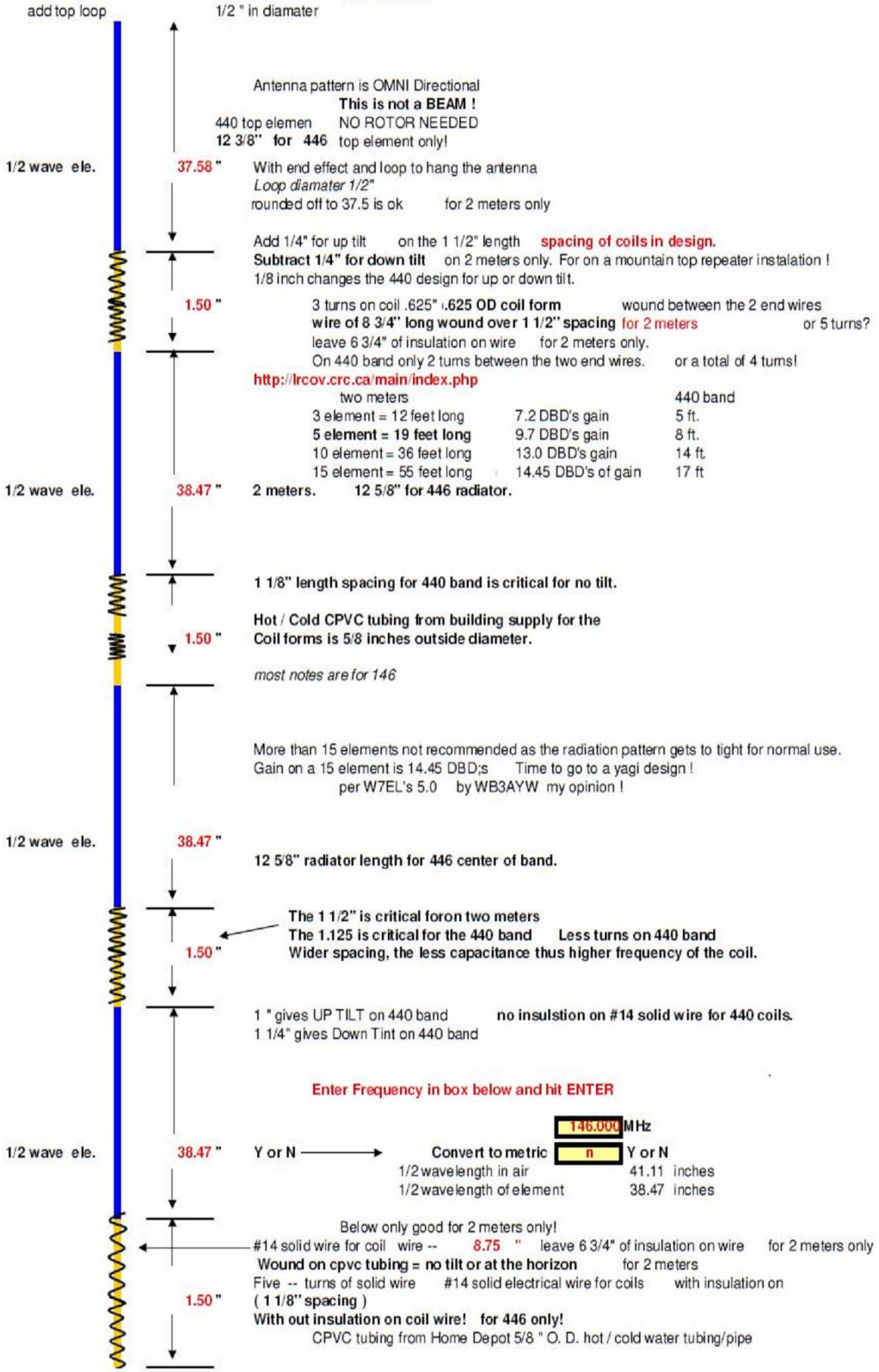
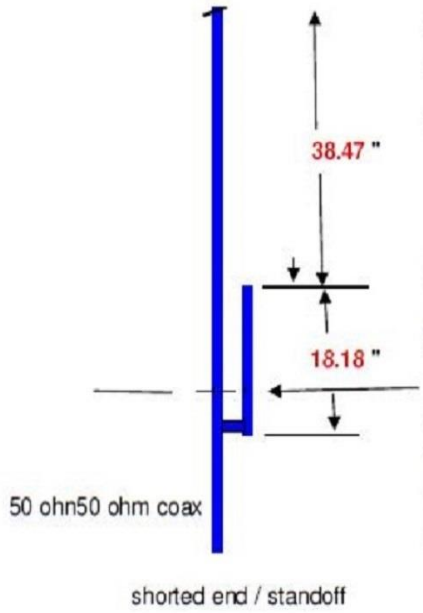


Drawing below continued from above



Pull wire tight on form or tilt will happen !!!!!!!!!!!!!!!!!! all coils.

Leave insulation on 2 meter coils. No insulation on 440 coils.

Rounded off to 38.5 " is ok for 2 meters and 12 5/8" for 446 MHZ

most notes are for 2 meters

6 " long, for 440 J Feed at 1 1/4" from ground

For matching network inside CPVC tubing
1 1/4" feed point for 440 band is 446 starting point only.
Feed point 3.75 " up from the shorted end, this is only a starting point for matching the antenna to the feed-line on 2 meters only

This antenna design does NOT use radials, it uses the J POLE bottom feed system, so it will match any feed line.

updated 040914

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Note that the antenna is one continious length from top to bottom and not as shown above in the drawings.
After you download the program below, set the program files to 146 and the measurements should work as a dual band antenna using the 2 meter design.
In the 440 design the gain will be higher and pattern will be like the 2 meter design.