

A SUPER - GAIN ANTENNA PROJECT FOR 40 METERS

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Taken from original plans published 1969 in 73 Magazine
by
Ed Dusina, W4NVK, Melbourne, Fl

Editors note: Some of the text description below was taken directly from the original article and has been edited down to save space. The entire article can be found in an old 73 magazine dated October, 1969.

The rest of the article is by K5AXN!

Many thanks to both and all those who helped with some of the research and continued testing of this design.

This project gives enough information to build a 40 meter Super- Gain antenna designed to help hams compete somewhat better with the foreign broadcast stations which practically take over the band in the evening and night time. It is based on the theory of super gain NVIS arrays, which reject QRM from low angles.

The final design....still under testing by many hams....is extremely simple, uncritical and offers large gain and QRM rejection.

The propagation studies and design work was done at Dusina Enterprises in Melbourne, Florida.

The antenna is described as having approximately 9 db forward gain and an average of 15db rejection against low angle QRM. The antenna is useful up to about 200 miles radial distance from the transmitter in the daytime and up to around 1,000 miles at night.

DESCRIPTION

The antenna consists of a single dipole antenna placed very close to the ground and above a reflecting "screen" so as to limit the radiation to 90 degrees + or - 35 degrees approximately.

It is nothing more than a simple folded dipole made from 300 ohm TV type twin lead cut to the length of 63 feet 2 inches plus or minus 1 inch and is fed in the center with RG58 coax or some other 50 ohm coaxial cable.

It is suspended tightly between 3 supports (non-conductive) exactly 7 feet + or - 3 inches. If metallic supports are used, it is suggested that nylon cord, about 3 - 4 feet on each side between ends and supports to reduce the effect of capacitance on the ends of the antenna.

On the ground directly below and parallel to the antenna, lay three reflecting wires of a non-critical length 65 to 80 feet long. One of these is laid directly below the dipole. The other two are spaced 6 feet from the center or dipole portion of the arrangement and again parallel to the dipole.

The reflecting wires can be laid on top of the ground for slightly better efficiency and secured at ground level using nails bent into a U shape or any other method you desire.

Feed with about 100 feet RG58, 50 ohm coax.

Using the exact directions above should yield about 1.05 swr at 7.250mhz and increasing towards band edges. Some tuning may be required as with most any antenna projects for your favorite frequency.

Quote.W4NVK, "Due to the extreme simplicity of this antenna and to its significant improvement in communications of this particular band, plus its small size, I believe that if amateurs erect such an antenna and test it for themselves, they will be quick to see the value of it and by this means more use can be obtained from the 40 meter band in the daytime, since it not only greatly increases the signal strength of the stations communicating, but significantly reduces the QRM leaving the state and rejects any QRM coming in from outside the state."

THE USE OF THE REFLECTING SCREEN IS VERY IMPORTANT FOR THREE REASONS!

1. ANTENNA IMPEDANCE WILL BE 50 OHMS only when elements are cut as described with reflecting elements installed.
 2. LESS THAN 50 PERCENT EFFICIENCY without reflectors.
 3. VERY UNPREDICTABLE PATTERNS, GAIN, REJECTION AND OTHER FACTORS due to variations of ground conductivity at each amateur's location.
- The performance of this antenna depends entirely on the reflectors!

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NOW LET'S BUILD A 40 METER SUPER - GAIN ANTENNA
BY K5AXN

"I used Pvc at the ends and center of the antenna to keep it exactly 7 feet 0 inches. Our tests show 10db gain. W8SYD, had a 10db gain over a G5RV at 50 feet up, (a 160 meter G5RV).

The stations I work are about 200 to 300 miles out.

It is really COOL! I can copy and talk to stations I do not even hear on my G5RV or the 14AVQ vertical antenna. This antenna really knocks out the foreign broadcasts when the skip is long. It was in the Oct, 1969 73 magazine.

My friend, Don, K5ACX, told me about it.

DO NOT CHANGE SPACING.....MUST BE 7 FEET + or - 3 INCHES.

DO NOT TRY TO ADD A DIRECTOR!

YOU WILL LOSE RANGE.....10db IS A LOT ON 40 METERS!

I have a metal roof 12 feet away and power lines parallel about 30 feet away so you may need more length than I did.

Check SWR and tune for your frequency. You can scale this antenna for 160 meters or 75/80 meters but NVIS will not work above 40 meters.

Editors note from N4UJW

"I talked to Jerry, K5AXN while he was using his NVIS antenna with reflectors on 40 meters. I was using only about 10 watts ssb (8 to 10) into a temporary inverted vee only up about 16 feet to the apex. (I guess you could call my "antenna" a field day special and nothing to be proud of!). Jerry was 5 9 plus about 10db into my Alinco DX 70 from San Antonio, Tx to my QTH about 50 miles Southeast of Dallas, Tx. Great signal!

I do not recall his power output for certain, but I believe he said about 100 watts. I did not get a signal report from him, but it was obvious that he heard me at least Q5!
He tried several different type antennas during the QSO and the NVIS WAS THE BEST!"

The drawing below represents Jerry's installation.

(He used a standard dipole instead of the folded dipole in his final installation).

He used 1 inch PVC for the supports and tied off at each end with rope to a tree and a fence with coax laying on the ground.

He used a plastic wire tie in the center to attach the coax to the support. In his hand drawn picture sent to me via snail mail, he shows the coax going straight down the center support and laying on the ground.

Using 29 feet 5 inches on each half of the standard wire dipole, he is tuned for 7.266mhz.

Here is the layout, of the antenna he uses below re-drawn from his letter.

