

## **SLIM JIM ANTENNA (ANOTHER ONE)**

### **The 2 Meter 146mhz Slim Jim Antenna Using Aluminum Tubing! By N4UJW Hamuniverse.com**

Further Experimentation With The 2 Meter (146mhz) Slim Jim Antenna Using Aluminium Tubing!  
By N4UJW Hamuniverse.com

Well, here I go again! Not wanting to be out done by myself and after having the temporary J Pole To Slim Jim Conversion project lay down on the ground due to some high winds we had, I decided to get with it on this 81 degree day in January, 2006 (yes, 81 degrees in Texas in January! Won't last long!)... and rebuild the old Slim Jim Antenna Conversion with aluminum tubing using half inch diameter "junk" tubing that I found hiding from me.

### **THE PARTS LIST**

The following instructions may help you if you decide to try the Slim Jim antenna with aluminium tubing. Refer to the Slim Jim Antenna Project for more details if needed.

I used half inch OD "junk" aluminium tubing cut to these final lengths:

NOTE: THE TOTAL LENGTH FROM TOP TO BOTTOM IS 57 1/2 INCHES.

You should end up with with a very, very elongated rectangle with a space (air gap) between the shortest section and the one above it of about 1 inch.

#### **Cut tubing as follows:**

- one section 57 1/2 inches
- one section 37 1/4 inches
- one section 19 1/4 inches

(actually a bit shorter than this) 19.2 inches was used in the original Slim Jim antenna project on the site using copper tubing from the formulas on that page, but I rounded as close as possible.

You will need 2 sections of aluminum stock around 1/8 inch thick and about 1/2 inch wide by about 2 1/2 inches long used as top and bottom spacers "crossovers" to provide 2 inches between elements. I did not have a good method for bending the tubing for "one piece construction" so I used the "crossovers" instead.

You'll need also, assorted screws, nuts, lock washers and bolts.

And, One non-conductive spacer from an old piece of plastic, PVC, etc. This is used for support between short section and longest section about 5 inches down from the air gap. (See pictures below....it is a shade of green/blue in the picture) This spacer and the bottom crossover of the Slim Jim antenna is used to mount the antenna to a 10 foot piece of PVC pipe at final installation by attaching self

tapping screws thru each one....**see pictures.**

Plus one section of non-conductive material between shortest section and the top half. (dark colour in picture) . This came from another antenna "junk" pile. It is used only for support and an insulator, also to keep the bottom and upper sections in line.

### **The Construction**

I drilled holes suitable for the small bolts I had near both ends of the longest section (57 1/2 inches), and one end of the shortest section (19 1/4 inches) and one end of the section above the shortest section. (37 1/4 inches)

Then I attached the "2 1/2 inch "crossover" sections used as spacers and crossovers at bottom and top of Slim Jim using the bolts, lock washers and nuts. Then I attached the air gap insulator/support between the lower and upper sections.

The construction of the Aluminum Slim Jim antenna was now finished except for mounting to the 10 foot PVC pipe, checking and adjusting swr and having some fun with it. Remember...this project was built from just scraps of this and that found laying around my pile of "junk"....(junk is defined by the XYL...it is gold to you and I)!

### **Final Adjustment with a surprise!**

I attached the Slim Jim antenna to the PVC pipe using the bottom crossover section and the green/blue spacer on the shortest section with self tapping screws. You may want to use a different arrangement such as nylon ties along with the screws or put bolts all the way thru the PVC for extra support. The antenna ends up mounted against the upper most part of the PVC pipe with the pipe in the center of both vertical elements.

To attach the coax to the antenna feed points, I used standard adjustable hose clamps that would tighten down on the shield and center conductor of the rg58 coax that I used. I suggest you use stainless steel clamps....again....I did not have any.

The center conductor is attached to the LONGEST side of the antenna under the hose clamp.

The shield is attached to the SHORTEST section under the hose clamp. DO NOT tighten so as to crush the coax. ( My feedpoint connections were just a temporary measure so I could easily slide them up and down for swr tuning. ) They can be attached after tuning with screws, nuts, bolts, etc.

I trimmed off enough of the black outer coax covering exposing the shield about one inch and the center conductor extended so they could be attached to the feedpoints.

I did not measure. Cut coax so the shield and center conductor can be attached underneath the clamps. I connected the coax center conductor first and brought the rest at a 90 degree angle over to the shortest side for it's attachment.

Tighten the clamps at around 4 1/2 inches up from the bottom of the antenna. (This measurement was derived at by my experimentation during tune up). Yours may be different.

The clamps at the feed point connections may have to be adjusted up or down for the best match, hence, the reason for the hose clamps. (The first attempt I made was with the feed at about 3 inches from the bottom.... and the antenna resonant point was way out of the 2 meter band....about 138 mhz with an swr of around 3 to 1).

This told me that the Slim Jim was way too long.....after adjusting the feed point closer to the air gap at 4 1/2 inches from the bottom, **I was in business!**

These are the final swr readings with the antenna up in it's final position....all of 10 feet above the ground beside the house:

- 144MHz 1.2
- 145MHz 1.1
- 146MHz 1.1
- 147MHz 1.1
- 148MHz 1.3

All with a 98 percent match according to the Mfj259b

All lengths of the Slim Jim may be changed slightly either way depending on your construction for better swr. You may not get that perfect 1:1 reading.

### **THE SURPRISE!**

After I stood back and marveled at my "new" Slim Jim, it dawned on me that the bottom of the antenna was only about 8 inches from the metal roof flashing under the shingles!

This was a NO NO according to all of the Slim Jim articles I had researched on the Web.

The "freespace" distance should be no less than about 20 inches (1/4 wave) from ANY metal in ANY direction!

### **THE HORROR!**

I rechecked the swr, resonant points, etc over the entire 2 meter band using the MFJ 259B, in case I had made an error, (not a mistake), but the numbers were the same as before.

Now my curiosity came out showing it's ugly face, so I managed to get the 10 foot piece of PVC pipe up higher so the bottom of the antenna was at least 36 inches from ANY metal.....

Re-checked the readings using the Mfj 259b and to my wonder.....

### **NO CHANGE AT ALL!**

I suspect that the freespace distance of 20 inches or more quoted in previous articles and research on this antenna is used so the pattern will not distort up or down from the "8 degree" angle of radiation from the ground. I have not done further research or testing on the air to confirm this but hope to in the future. If any of you out there wish to "model" this antenna using different distances from

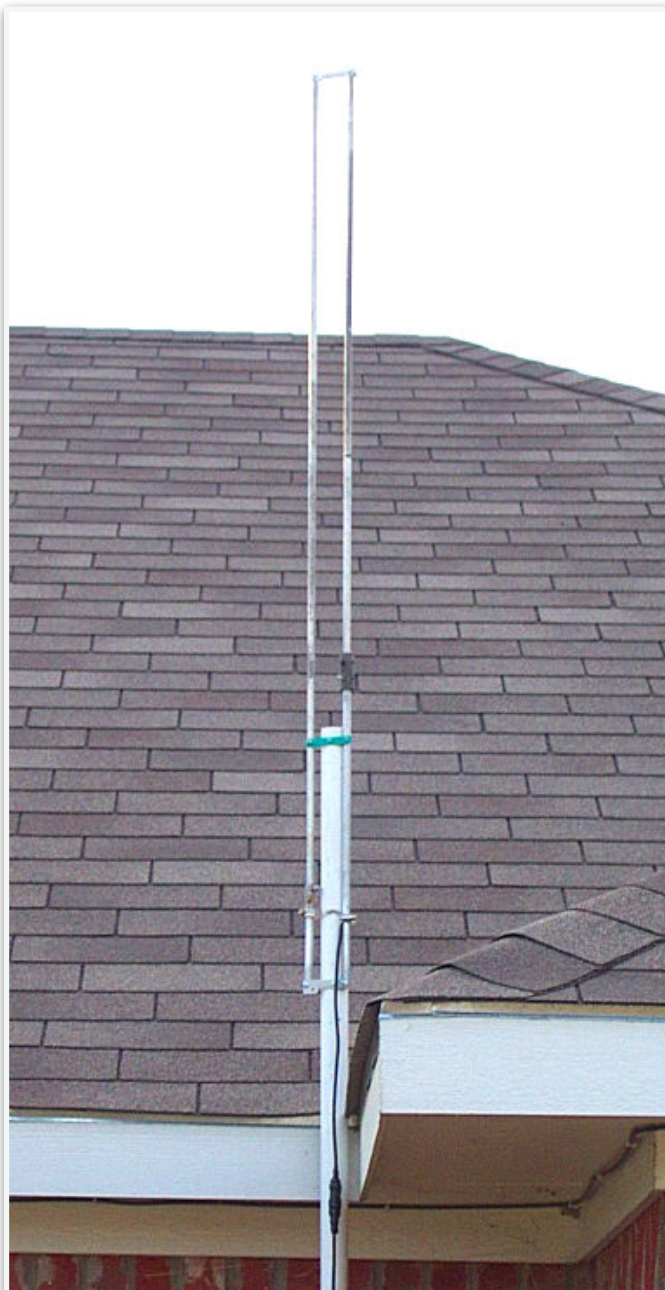
surrounding metal....I am open to your input.

**An air wound choke may be used at the base of the antenna to help prevent rf on the feedline, creating difficulty with SWR readings, and help prevent distorting the low angle pattern..**

For 2 meters, the air choke coil is about 4 turns of coax at 5 inches in diameter. Some builders use it....some don't...I have not added one at this time but plan to in the future to see if there is any effect on the pattern.

One note of further information for you should you decide to build the Slim Jim.

During the period of time between this version and the dismantling of the old Slim Jim, I decided to put it back up as a Slim Jim antenna....take some S meter readings of area repeaters for a reference and then re-convert the same antenna back to the old standard J Pole .....take some readings of the same repeaters and compare them.



I found that the Slim Jim could bring up several repeaters that the J Pole could not!  
No changes were made between the two comparisons except the antennas!

This tells me that the Slim Jim antenna has something going for it.....try one and  
get something going for you.....**HAVE FUN! EXPERIMENT, EXPERIMENT,  
EXPERIMENT...**

**73 N4UJW HAMUNIVERSE.COM**

