

The Cheap and Ugly Dual Band Whip

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Old analog cellular (850 MHz) magnetic mount 3db gain antennas can now be obtained very cheaply from various sources in the Barrie and Toronto area. Try one of the cellular dealers who do in-car installations of cellular phones such as the Bell World store and the Rogers Wireless store (both located in the Cedar Point area in Barrie). Other places in Barrie to watch for these antennas (as well as other goodies) is Barrie Metals and Princess Auto.

The cellular antennas I obtained were made by “The Antenna Company” and did not work on any ham bands before modification. By using a pair of vise-grips and slowly working my way around each loop by repeatedly snapping them on, starting from the bottom of the coil; I was able to straighten the heavy steel wire and thus lengthen the antenna so that it was resonant on the 2M band.

Note that a $\frac{1}{4}$ wavelength antenna for 2M will also work on the 440 MHz ham band as well – making this a dual band antenna!

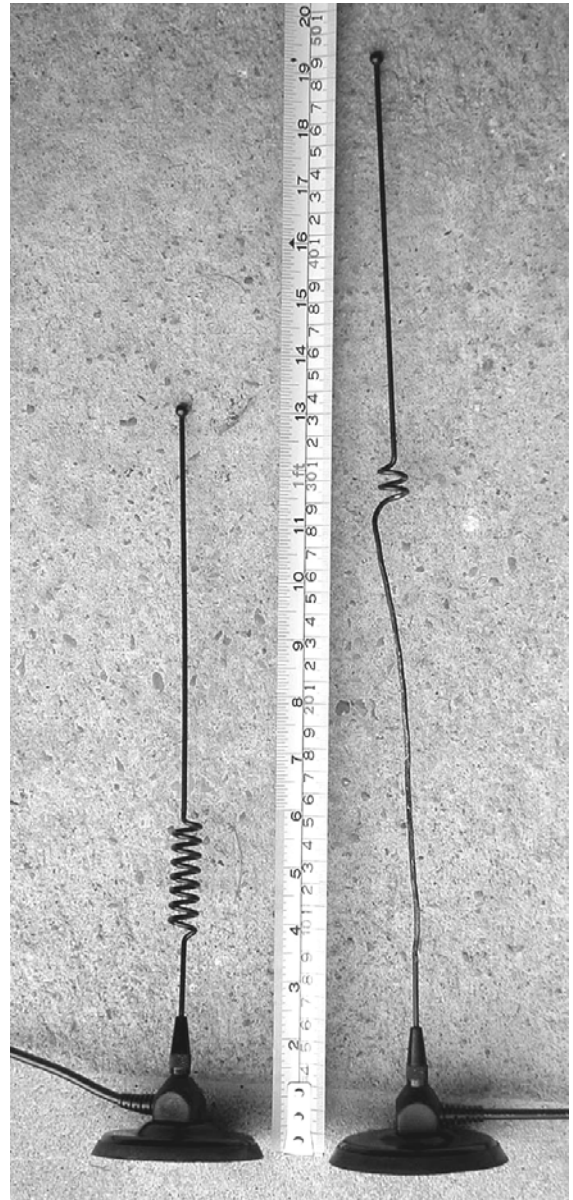
See the VSWR plots on the next page – this antenna covers a really wide frequency range.

As shown on the VSWR plots, the entire 2M band from 144 MHz to 148 MHz is covered with a better than 1.5:1 VSWR.

On the UHF side, the 1.5:1 VSWR frequency range is from 429 to 453 MHz which covers most repeater frequencies (usually in the 438 to 450 MHz range).

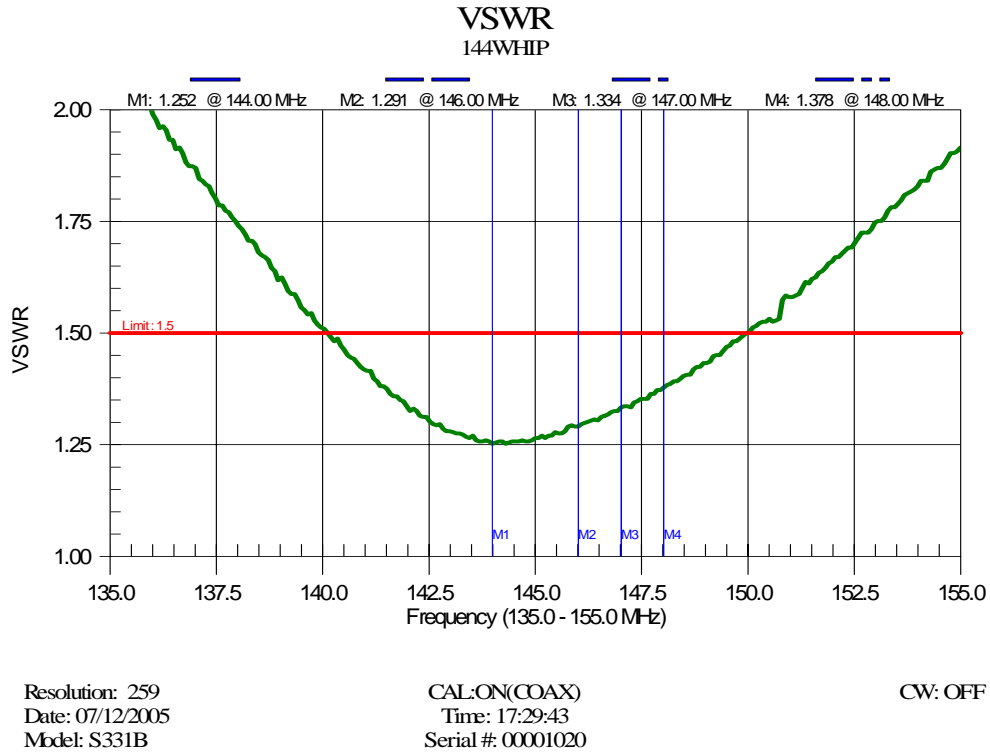
You will require some means of measuring the VSWR as you straighten out the coil loops. Although a professional analyzer, like the one I used, makes it easy; a VSWR meter or power meter that covers the 2M and 440 ham bands can also be used. Place the antenna on the roof of your car each time you want to check your progress and measure the reflected power when you key the transmitter. Probably the 440 MHz band is best to measure this way. After getting a low reflected power reading from at least 438 to 450 MHz, check the 2M band to make sure it looks good from at least 144 to 148 MHz.

In the picture you can see that this antenna isn't exactly commercial quality in appearance!! Some of the final kinks were removed with a hammer. Also, it needs a touch-up paint job as some of the black enamel was chipped off during the “straightening process”. But appearance isn't everything and it works very well (for a $\frac{1}{4}$ wave antenna). The magnet is very strong and has been tested to 140+ Km/hr. The coax is a low-loss foam RG-58 type cable which will usually have a TNC connector on it. Cut off the old connector and replace with a PL-259 or BNC as required. Adapters can be used to convert from a BNC to a SMA or Mini-UHF handheld connector for example.



On the left is the original unmodified cellular antenna
On the right is the 2M/440 Cheap and Ugly Dual Band Whip.

VSWR plots for the Cheap and Ugly Dual Band Whip



Above is the VSWR plot for the 2 meter band with the 4 blue marker lines at 144, 146, 147 and 148 MHz. Below is the plot for the 440 band with the 4 blue marker lines at 420, 430, 440 and 450 MHz. Most repeater input/output frequencies fall between 438 and 450 MHz. VSWR plots were generated with an Anritsu model S331B “Sitemaster” Handheld Antenna Analyzer.

