DDRR Dipole for VHF

—experiment!

Seeking selectivity.

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Selectivity in an antenna is becoming increasingly important as the bands compress under the load of more and more stations. Reception is where this is most desirable. Front-end overload, we have learned, will cause big problems to a communications circuit when off-channel signals are strong. Directional-type antennas, of course, are the answer unless we need to cover everything around us. The DDRR, or directly driven ring radiator, developed by its inventor, J.M. Boyer (with patents assigned to Northrop), has high selectivity. Because of this, it also is a low-noise device. This makes two good reasons for its superior performance. (*73 Magazine* for August and September, 1976, goes into detail of its design and advantage. There have been many other articles written about it over the years.) Two drawbacks are noted when the chips are down. One is the size of the ground plane for the monopole design; the other is the cost of the conductor material for low-frequency use. Tuning can be another problem where its use for high-power transmission is contemplated. Very high voltage and current are the prices of the trade-off for high selectivity.

What Is It?

Boyer suggests the DDRR dipole in his September (part two) article. This version does without the big ground plane, as would any dipole. So here we have a quarter-wave open transmission line formed into a shape which "leaks" and radiates rf. I first built one of these for ten meters and made it so it operated on its highest frequency (no added capacitance) and at a fixed frequency. A/B checks with the spaced rings mounted vertically compared very well with those of a horizontal folded dipole at the same height and with the same orientation. Pretty good for an antenna on ten meters which is 30 cm "long" and 84 cm in diameter (see *73*, April, 1965, "Double Hula," Peter Lovelock).

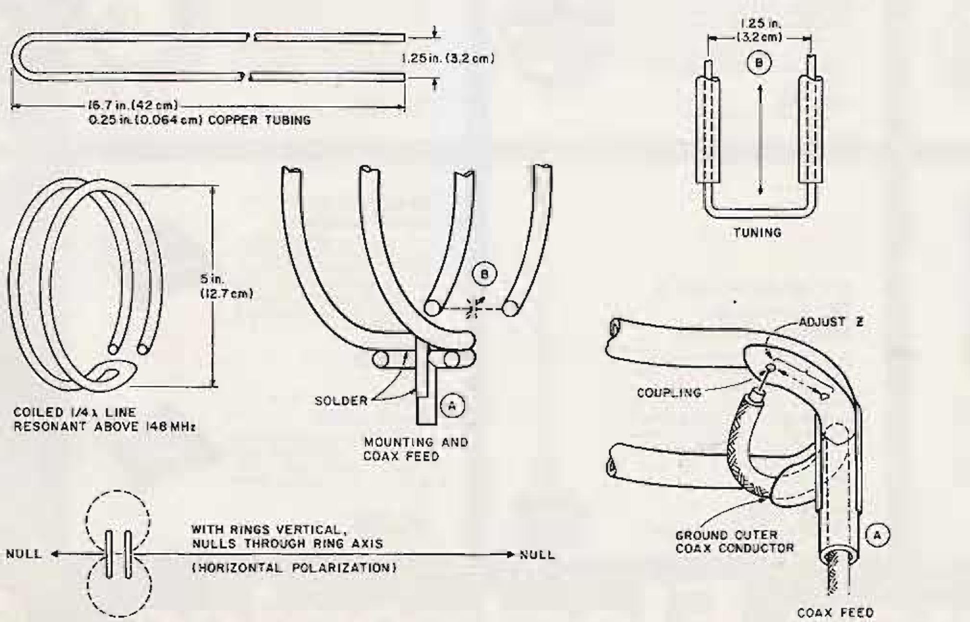

Fig. 1. Two meter DDRR dipole.

The Two Meter DDRR Dipole

To make the two meter model, I dug out an old ¼-inch tubing coil from a long-forgotten final and annealed it in the fireplace, then cleaned and polished the surface after stretching it between a car bumper and a stout post. 33 inches comes to a half wave. This is then folded on a one-inch-diameter rod or mandrel at exact center. The quarter-wave line is formed on a can to make a circular double ring or transmission line of about 5 inches diameter. This will resonate above the 148 MHz end of the band. I made a simple tuning arrangement of a 4-inch piece of #20 (0.8 mm) Teflon™-covered flexible wire. This is formed into a U to slide into the open ends of the line. When pushed in, the frequency should more than cover the 2 meter band. See detail B in Fig. 1.

A length of small-diameter coax may be coupled tightly to the closed end of the open line. Mine was fed through a separate matching U-shape of the same tubing soldered to the closed end of the line. A good match was obtained by varying the size of the link (see drawing). A 50-Ohm match comes at an area of less than that formed by the 180 degree half turn at the closed end of the line. The ¼-inch line thus formed needs no insulators for support.

Mounting of the completed antenna may be done in several ways. Mine was to make a pedestal a few inches long and to feed the coax through. This was mounted breadboard fashion on a piece of hardwood. A BNC coax connector was fastened to this piece. A tuning arrangement was made to slide the Teflon tuning U in or out to cover the band of interest. The selectivity curve was measured using a signal generator, a counter, and an FM receiver. The antenna frequency was left fixed and the receiver and generator were moved together across the antenna frequency.

While vertical polarization is the way most of our present two meter signals leave the antenna, things happen that make the polarization somewhat different at the receiving end. By orienting the receiving antenna, it is often possible to null out an interfering signal. By going a step further, I made the mounting adjustable in azimuth and elevation. This also can be done in various ways—mine is a breadboard way to test the idea. Aiming it works well and can reduce multipath *and* QRM.

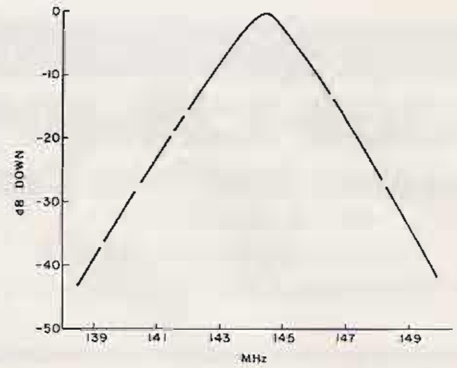

Fig. 2. Two meter DDRR dipole antenna selectivity.

Conclusions

While the amount of selectivity afforded by the DDRR will not come up to that of a multipole filter, it is worthwhile in that it is ahead of the front end—aiding in the signal-to-noise problem. An undesired signal off to one side is noise, too.

Do not try transmitting with the device with the tuning method described except with very low power. It will not pass the smoke test.

Broadband antennas are very convenient (discones, rhombics, and tribanders), but who needs all these unwanted signals going up and down the feedline? Phased DDRR elements could improve selectivity as well as gain.

A selective antenna should make a big difference to you. ■

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