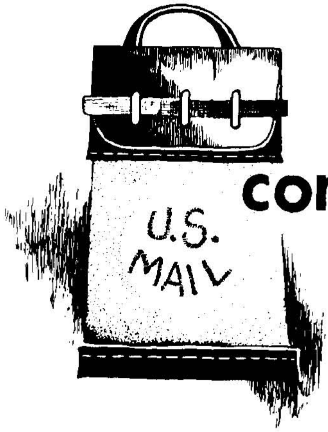

comments

5/8-wavelength antennas

Dear HR:

Having built and used both quarter- and 5/8-wavelength ground-plane and mobile antennas on two meters, I was surprised at the article in the May, 1974, issue of *ham radio*. I have had very good results using the 5/8-wavelength antenna, and KØDOK's article spurred me to do some of my own testing to see the difference for myself.

I decided that my Heathkit HW202 with a step attenuator between the antenna and transceiver would make a good rf micro-voltmeter with which to make the measurements. The antenna is a portable ground plane consisting of three 5-foot sections of telescoping TV masting, guyed and set on a pin so the antenna could be lowered to change the driven elements and be put back in exactly the same position (I used nylon guy ropes which had enough stretch so it was unnecessary to change the guy ropes between antenna changes). The ground radials are mounted to a steel angle bracket with wing nuts for portability. The antenna is attached to a bracket with a PL-259 plug which connects to a SO-239 jack on the mounting plate.

The 5/8-wavelength element consists of a series matching inductor to the 5/8-wavelength radiator with a vswr of 1.7:1. The quarter-wavelength radiator has a vswr of 1.2:1. Both antennas were mounted on the same 15-foot mast.

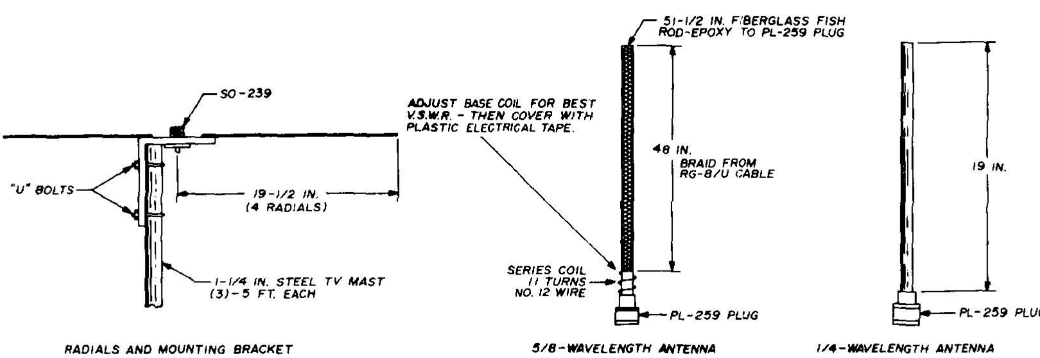

fig. 1. Details of the antennas, ground radials and mounting bracket used in gain comparisons.

The measurement plan was to use received signals, attenuate the signal to a mark on the S-meter in the transceiver, note the attenuation, take the antenna down, change the driven element, put the antenna back in place and again attenuate the signal to the same meter mark, record the reading and note the results. The step attenuator used has a range of zero to 101 dB in 1-dB steps. The results are shown in **table 1**.

Stations of different distances were used to take into account the different angle of radiations between the two antennas. Every effort was made to replace the antenna in exactly the same spot as before so that the tests were all based on a very minimum of variables.

In conclusion, the data in **table 1** shows that the 5/8-wavelength antenna has 3-dB gain over the ¼-wavelength antenna. The antennas used for making these tests are shown in **fig. 1**.

John H. Pearson, K2GVP
Baldwinsville, New York

table 1. Gain comparison of 5/8- and 1/4-wavelength two-meter groundplane antennas with three different stations. Measurement technique is discussed in letter.

	distance	1/4-wave antenna	5/8-wave antenna	gain
Station 1, Base Station	11 miles	18 dB	21 dB	+3 dB
Station 2, Repeater	21 miles	31 dB	34 dB	+3 dB
Station 3, Repeater	41 miles	4 dB	7 dB	+3 dB

I can find no obvious fault with Mr. Pearson's measurement technique although he has used a crude method at best. However, the averaging of a number of results of this type of measurement should yield a meaningful result. That is in effect what Mr. Pearson has done although his measurement resolution of one dB and the small number of samples (three) makes it hard to find the true average. I would conclude from the data however, that Mr. Pearson did indeed achieve gain from the 5/8-wavelength radiator.

As I pointed out in my article, obtaining this performance from a monopole depends upon creating an image element, hopefully from a reflection in the ground plane. I suspect that what Mr. Pearson has actually managed to do is to excite sufficient currents along his 15-foot support mast to, in effect, create an image radiating element. There is at least one commercial antenna (the Ringo*) which appears to depend on this as it does not even include ground-plane rods. From a designer's point of view this is a dangerous approach because the designer has no control over the antenna mounting structure and very few amateur installations will probably wind up having the antenna atop a long straight conducting pole. More likely the antenna will be set just above a 20-meter beam or even side-bracketed to a tower.*

It would, of course, be very interesting if we could see a vertical plane radiation pattern of each of Mr. Pearson's antennas to see if a correspondence exists to **fig. 8** *and* **9** *of my article. Even given a well equipped antenna test range, that measurement would be a tricky one to make. On several occasions I have attempted range measurements at 150 MHz and have always been plagued by ground reflections, especially when tipping the antenna on its side so that it could be rotated for a pattern in the plane of the monopole. That is why the model work reported in my article was conducted at 1000 MHz where reflections are far easier to control.*

Paul E. Meyer, KØDOK