MyAntennas End-Fed Half-Wave Antenna for 80 – 10 Meters

Reviewed by Joel R. Hallas, W1ZR
QST *Contributing Editor*
w1zr@arrl.org

A long-standing desire of many hams is to be able to operate all the HF amateur bands using a single antenna. The MyAntennas EFHW-8010-1K promises to allow just that.

The antenna consists of approximately 130 feet of #18 AWG black insulated wire and a sealed matching unit (about 6 × 5 × 2 inches) with stainless hardware and a silver-plated, Teflon-insulated UHF socket. Included in the box was a folded instruction sheet that had sufficient information for someone to install and use the antenna.

The instructions indicate that it will provide a good match on the 80, 40, 30, 20, 17, 15, 12, and 10 meter bands whether at a height of 10 feet or 50 feet. Note that 60 meters is not included on the list. In addition to the connections to the antenna wire and coax, the instructions suggest that a ground wire as short as possible be connected to the GROUND terminal on the matching unit.

Hanging It Up

I hung the matching unit about 6 feet above ground (see Figure 2) and about 8 feet from my cable entrance facility. The unit was grounded to the entrance facility, which has multiple rods and radials and an underground connection to my service entrance ground about 20 feet away. While intended more as a lightning protection ground than a counterpoise, it is probably typical of many amateur station grounds.

The antenna wire was sloped upward to a surplus halyard that brought it to about 25 feet about ¾ of the way along its length. The remainder of the wire came down to about 8 feet above ground with the end insulator secured to a handy tree. The coax to the entrance facility passed through a lightning arrestor and then via about 50 feet of low-loss RG-8 sized coax to my station. While this is certainly not an ideal installation, it may be typical of what others will do, and it is within the guidelines of the manufacturer's instructions.

First Impressions

First I looked at the impedance characteristics to see if the antenna really could be fed directly on all the bands indicated above. It was surprisingly close. The instructions

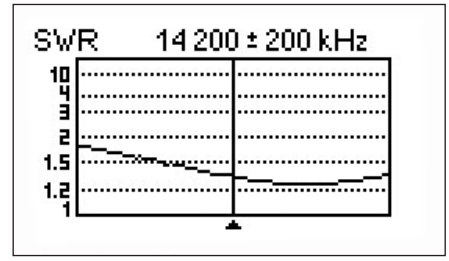

Figure 3 — Measured SWR of the EFHW-8010-1K in the reviewer's station across 20 meters. This is fairly typical of what we observed.

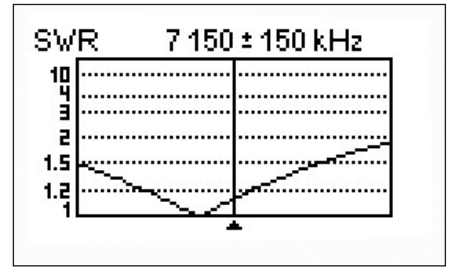

Figure 4 — Measured SWR of the EFHW-8010 in the reviewer's station across 40 meters. Note that the full band is covered at less than a 2:1 SWR.

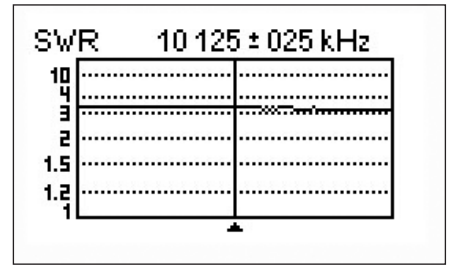

Figure 5 — Measured SWR of the EFHW-8010 in the reviewer's station across 30 meters. This was the band with the worst SWR, and still likely within the range of "trimming" type antenna tuners.

Figure 2 — The EFHW-8010-1K matching unit hanging from the wall above my feed line entrance facility. Because I was unsure of the connectivity within the unit, I tied the ground terminal to the outside of the coax outer conductor using a PL-258 adapter with the wire fastened between two nuts.

Bottom Line

The EFHW-8010-1K provides an easy-to-deploy antenna that can be operated on all HF bands, except 60 meters, with a low enough SWR to be used without an antenna tuner on most bands. Being able to feed the antenna from an end may make it a good solution for many support configurations.

Table 2
EFHW-8010-1K SWR Measurements

Frequency (MHz)	Manufacturer's "Typical SWR"	SWR Measured At Entrance Panel	SWR Measured At Station
3.60	1.5:1	2.0:1	2.0:1
7.05	1.2:1	1.3:1	1.3:1
10.1	1.5:1	4.0:1	3.3:1
14.2	1.1:1	1.4:1	1.4:1
18.1	1.5:1	2.0:1	1.8:1
21.2	1.3:1	1.2:1	1.1:1
24.9	1.2:1	1.1:1	1.1:1
28.5	1.4:1	2.3:1	2.0:1

provide "typical VSWR reading across the bands," which are shown in Table 2 along with my measurements on the same frequencies. Table 2 shows measurements at my ground-level entrance panel, along with another set made in my upstairs station at the end of 50 feet of coaxial cable. The instructions note that the SWR will vary with height and surrounding objects.

These results seem fairly remarkable to me. The antenna can be driven by most transceivers without an antenna tuner on most bands and with a typical built-in "trimming tuner" on others. While the specifications indicate that operation at power levels up to 1 kW is possible, I was able to put out only 500 W and had no indications of problems at that level.

Some may be suspicious of low SWR as indicative of losses, or that these frequencies are "cherry picked" at a magic frequency. The results of swept analysis on representative bands, shown in Figures 3 through 6, are notable in two respects. First, the response is nicely wide across most bands. Second, the SWR goes high outside the bands, indicative of low losses. Higher-loss antenna systems tend to have flatter SWR curves.

The response on 80 meters (see Figure 6) was at least as wide as that from a center-fed wire dipole, and could be shifted up in frequency by shortening the wire. I didn't try that, because I was concerned about the impact on the response of the higher frequency bands due to the change. Again, as provided, it was perfect for the CW op, and within range of the typical tuner on the high end. Figure 7 shows the 80 meter SWR curve with the antenna analyzer centered on the low SWR point. This is indicative of what you might be able to achieve with some tweaking of the antenna length.

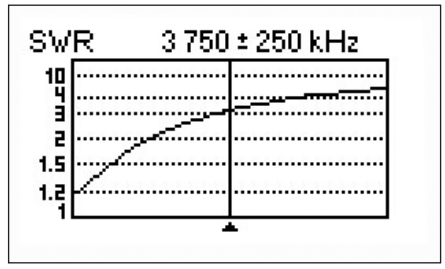

Figure 6 — Measured SWR of the EFHW-8010 in the reviewer's station across 80 meters. Note the very low SWR at the bottom of the band. The manufacturer suggests trimming for best SWR. Based on a dipole model, removing about 8 feet of wire should bring it right in.

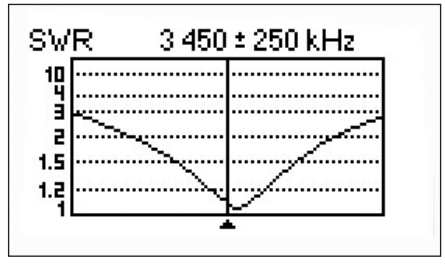

Figure 7 — Measured SWR of the EFHW-8010 in the reviewer's station with the antenna analyzer centered below the bottom of 80 meters. This is indicative of how the antenna would operate over 80 meters if it were shortened to move its resonance to mid band.

I was also surprised at how well this antenna worked during on-air testing, especially considering my less-than-optimum installation. I compared it in an A/B fashion with my 80 meter center-fed half wave, up considerably higher, and in a similar, but not identical, orientation. On most bands the EFHW played better with mid-range signals than longer distance ones, often down about an S unit or two at the longer ranges. Even so, I was able to make contacts and, in some cases, the EFHW outperformed my higher dipole, likely because of the different pattern on the higher bands with nulls at different azimuths. Still, it was possible to work and get reasonable signal reports from most stations I could hear.

That Sealed Box

An e-mail exchange with the antenna's designer, Danny Horvat, E73M, yielded the following response: "…it is simple 1:7 ratio (1:49 [impedance] transformation) on ferrite material producing minimum possible loss from 3 – 30 MHz." Danny goes on to say that he has spent considerable effort experimenting with different ferrite mixes and configurations to obtain the minimum loss.

Because I had no way to independently determine the loss at W1ZR, other than through dc measurements between coupling unit terminals — all of which indicated copper connections — I took the coupling unit to the ARRL Lab. Working with Senior ARRL Lab Test Engineer Bob Allison, WB1GCM, we adapted the Lab's usual antenna tuner test routine to test the coupling unit. We used the highest impedance test load — 800 Ω — and measured the power delivered to the load compared to the net power delivered to the coupling unit on multiple bands. The output power was equal to the input power, within the readability of the less than ideal test setup, indicating minimal loss.

MyAntennas offers other antenna configurations including an end fed 40 –10 meter antenna (EFHW-4010) as well as a number of off-center fed dipoles.

Manufacturer: EuroXpress Corporation d/b/a MyAntennas.com, 40415 Chancey Rd, Suite 105, Zephyrhills, FL 33542; tel 813-298-5358; **myantennas.com**. Price: $150.