MOUNTAIN SPARK GAPS

NPARC—The Radio Club for the Watchung Mountain Area

Website: http://www.nparc.org
Club Calls: N2XJ, W2FMI
Facebook: New Providence Amateur Radio Club ((NPARC)

VOLUME 52 NO. 7 July 2018

UPCOMING EVENTS

Holiday Luncheon
12/2
Chimney Rock Inn, Gillette, NJ

Kids Day?
1/7/2018 2:00—5:00 PM
DeCorso Community Center

Regular Meetings

8/14 & 8/28
Monday 7:30
DeCorso Community Center

Meeting Schedule

Regular Meeting: 7:30—9:00 PM
2nd Monday of each month at the
NP Senior & Adult Center
15 East Forth Street
New Providence

Informal Meeting: 7:30—9:00 PM
4th Monday of each month
Same location
Everyone is Welcome
If a normal meeting night is a holiday, we usually meet the following night.
Call one of the contacts below or check the web site

Club Officers for 2016

President: W2PTP Paul Wolfmeyer
201-406-6914
Vice President:K2GLS Bob Willis
973-543-2454
Secretary: K2AL: Al Hanzl
908-872-5021
Treasurer: K2YG Dave Barr
908-277-4283

Activities: Open

On the Air Activities

Club Operating Frequency
145.750 MHz FM Simplex

Sunday Night Phone Net
Murray Hill Repeater (W2LI) at 9:00 PM
Transmit on 147.855 MHz
With PL tone of 141.3 Hz
Receive on 147.255 MHz
Net Control K2AL

Digital Net
First & Third Mondays 9 PM
28,084 — 28,086
Will be using PSK and RTTY

Club Internet Address

Website:http://www.nparc.org
Webmaster KC2WUF david Bean
Reflector: nparc@mailman.qth.net
Contact K2UI, Jim

MOUNTAIN SPARK GAPS

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Contributing Editors:
WB2QOQ Rick Anderson
W2PTP Paul Wolfmeyer
K2UI Jim Stekas

Climatological Data for New Providence for June 2017

The following information is provided by Rick, WB2QOQ, who has been recording daily weather events at his station for the past 35 years.

TEMPERATURE -
Maximum temperature this June, 95 deg. F (June 13)
Last June(2016) maximum was 91 deg. F.
Average Maximum temperature this June, 81.2 deg. F
Minimum temperature this June, 49 deg. F (June 4,9)
Last June(2016) minimum was 50 deg. F.
Average Minimum temperature this June, 60.6 deg. F
Minimum diurnal temperature range, 9 deg. (61-52 deg.) 6/6;(74-65)6/17
Maximum diurnal temperature range, 33 deg. (82-49 deg.)6/9

Average temperature this June, 70.9 deg. F
Average temperature last June, 70.9 deg. F

5 days this June had maximum temperatures of 90 degs. or higher.
2 days last June of 90 degs. or higher temps.

PRECIPITATION -
Total precipitation this June - 3.25" rain
Total precipitation last June - 2.80" rain

Maximum one day precip.event this June - June 24, 1.24" rain
Measurable rain fell on 13 days this June, 7 days last June.

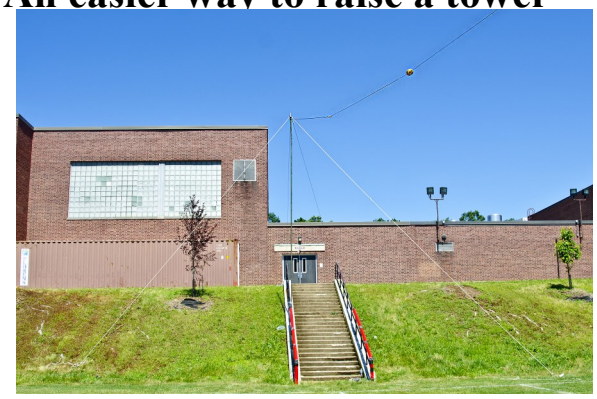
YTD Precipitation - 25.08" (includes rain + melted snow; 22.25" snow as of 3/31/17)

==========
Rick Anderson
7/20/17
243 Mountain Ave.
New Providence, NJ
(908)464-8911
rick243@comcast.net
Lat = 40 degrees, 41.7 minutes North
Long = 74 degrees, 23.4 minutes West
Elevation: 380 ft.
CoCoRaHS Network Station #NJ-UN-10

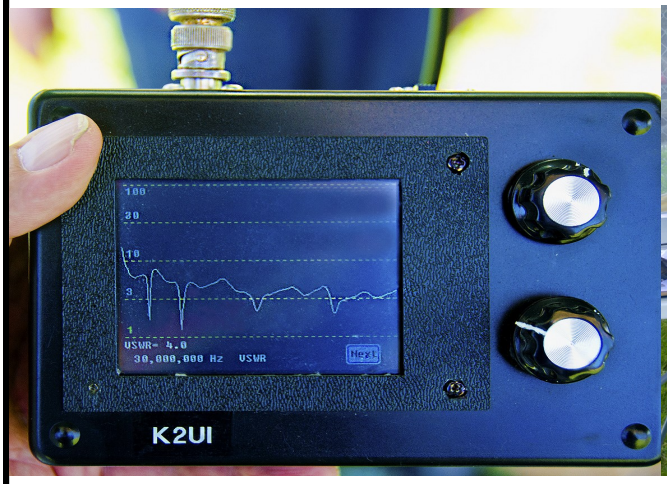
Welcome table

An easier way to raise a tower

Anchoring the tower

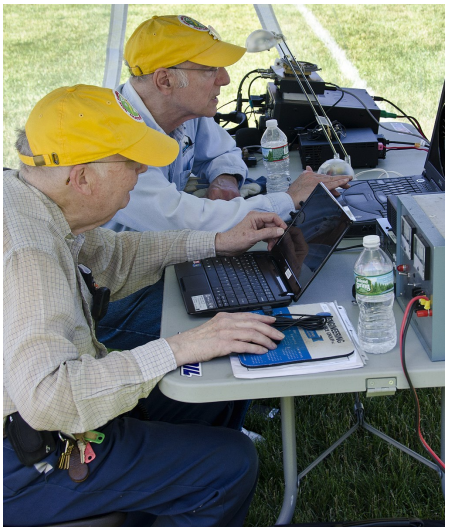


Tree replacement?



Where does it resonate?

HF Station 1



HF Station 2

VHF Station

GOTA Station

Supper time?

Alternate use for K2JV's cane

President's Column July 2017

First this month is a big Thank You to Al Hanzl K2AL for putting together our club donation to the Senior Center in gratitude for the use of the facilities for our meetings. It is a very nice planter, complete with flowers, at the start of the sidewalk entrance to the Center, replacing the barrel which was in disrepair.

Second is a SAVE the DATE notification for Saturday afternoon October 21. We are attempting to set up a visit to the Bell Labs Technical Showcase complete with a narrative/lecture on the history of the Labs.

While you are saving dates, put down the first Saturday of December for the Holiday Luncheon at Chimney Rock—it has been reserved, thanks to James KB2FCV.

It's been quite a while since we've done a club project—we decided at the July 24 meeting to build the DIY mega 328 Transistor Tester, Capacitance, Inductance ESR Meter brought to the club by Jon Pawlik AE2JP. Since the kits are imported, it may take a few weeks to receive them. Individuals should order his/her own on ebay, according to the info posted by Jon on the reflector July 25—I've got mine on order—cost is under $17 with free shipping. We hope to tackle assembly in late September/early October.

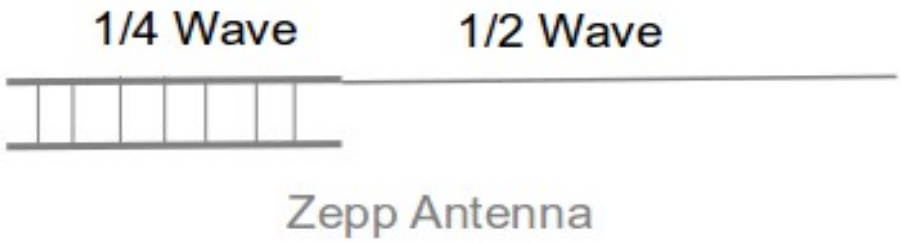
And, quickly, the HF Digital" net continues...for help, I'd suggest Dave K2YG, David KC2WUF, Al K2AL, or Bob K2GLS as possible mentors—talk to them or to me.
Finally—our first pack of "pooled QSLs" is submitted to ARRL—thanks Sam!

73 for now
Wolf
W2PTP
201-404-6914 or W2PTP@arrl.net

End Fed Half Wave (EFHW) Antennas

Jim Stekas - K2UI

One hundred years ago German Zeppelins crossed the English Channel and bombed London. For radio communications the Zeppelins trailed a linear antenna that came to be called a "Zepp". The Zepp consisted of a half wave dipole whose end was attached to one side of a ¼ wavelength of ladder line. The end fed half wave (EFWH) dipole has a very high impedance (~2500 ohms) which is transformed to about 80 ohms by a ¼ wavelength of 450 ohm ladder line. At least that's the "theory". Actually, the Zepp is a ¾ wave dipole due to the contribution of common mode currents on the ladder line.



Today, the term "Zepp" is often used to refer to any linear wire antenna fed with ladder line.

In recent years, the EFHW antenna has become very popular, particularly for portable operation. The modern implementation of an EFHW is essentially a Zepp with the ¼ wavelength of ladder line replaced by a toroidal transformer matching network. EFHWs are sold by many manufacturers, including MyAntennas, W1SER, LNR, MFJ and others.

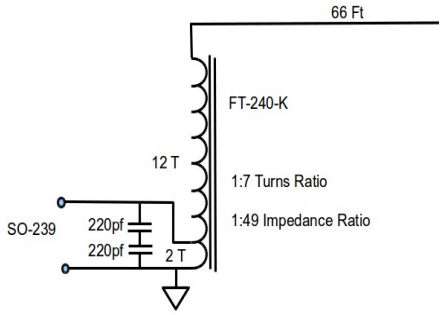
I was highly suspicious of these antennas because they defy modeling. The reason for this is that conservation of charge requires that whatever current enters the EFWH wire must eventually find a path back to the transmitter ground. No provision is made for a return path, so in practice, the return path is formed by unquantified stray coupling within the matching network and between the feed line and antenna that create common mode currents in the feed system to close the current loop. Taking 2500 ohms as a typical EFHW impedance, at a frequency of 7MHz only 50pf of stray capacitance would have a reactance of 2500 ohms. So stray coupling will surely make an important contribution to input impedance and therefore SWR.

My theoretical skepticism is counterbalanced by rave reviews from hams worldwide. MyAntennas EFHW-8010 got a very good review in QST (Hallas W1ZR, March 2016) and has a 5.0 rating on Eham.net. EFHW antennas are in wide use and people seem to be happy with them. What experiments have demonstrated, theory must accept.

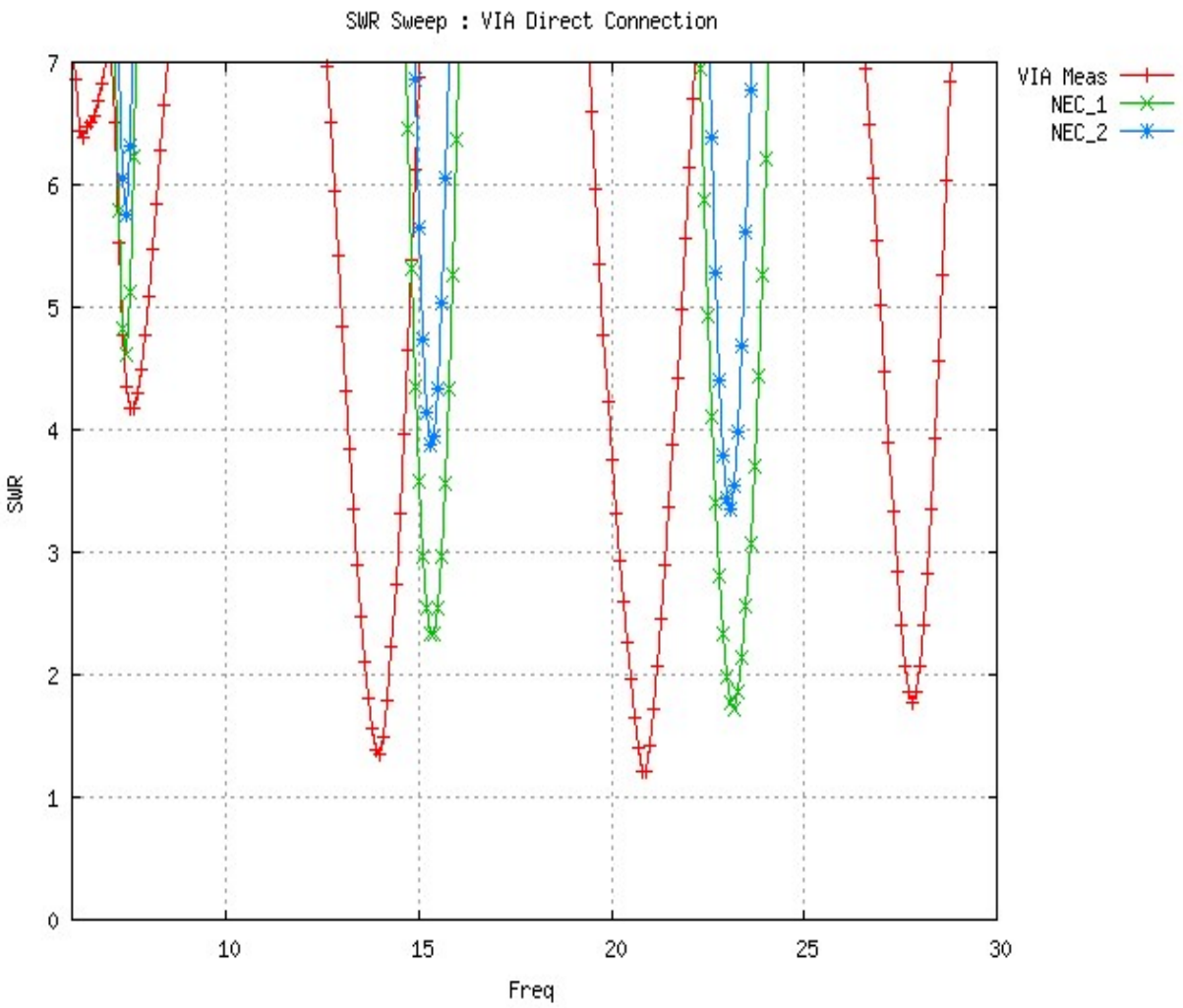
Taking the Plunge

To understand how these antennas worked I decided I had to buy one and test it. My choice was the recently released MFJ-1984MP, a 40-10 EFHW antenna rated at 300W. The key specs that swung my decision were the price ($66 shipped) and length (66ft.) When then antenna arrived the first thing I did was to take it apart.

Inside the box is a 1:7 auto-transformer wound on an FT-240 ferrite core. Measurement of the inductance showed that the material is type-K (a Jerry Sevick favorite.) The shunt capacitance at the input is typical of the EFHW "matching network". Many designs use a variable capacitor at the input to allow the match to be tweaked on each band. In any case, the value of the input capacitance is typically determined empirically.

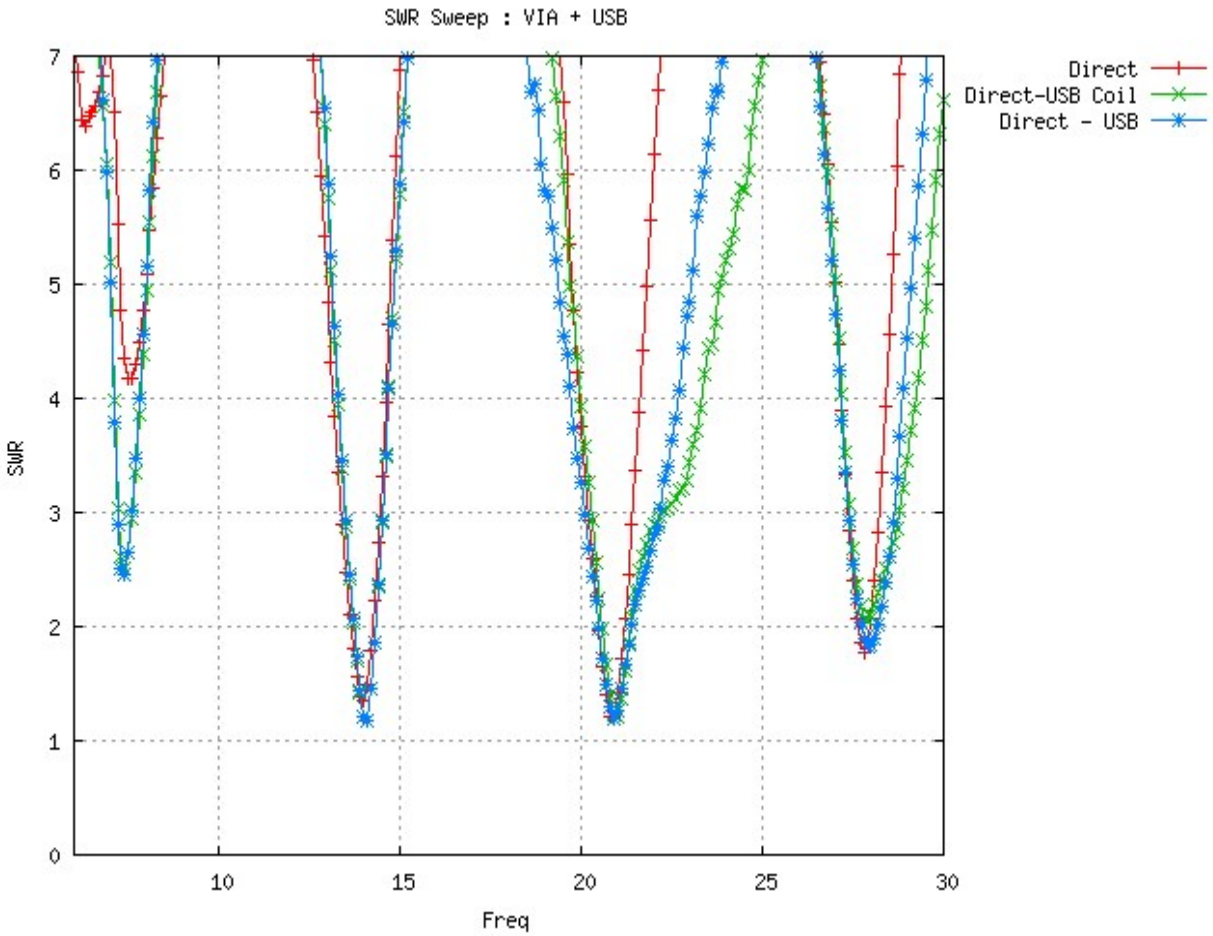


Below is an SWR sweep made with my VIA directly connected to the antenna matching network. Since the VIA is battery powered, there are no extraneous wires to provide paths for current leakage. Note that the match on 40m is marginal, but 20m, 15m, and 10m the match is very good. (This is typical of what I see with OCF antennas.)

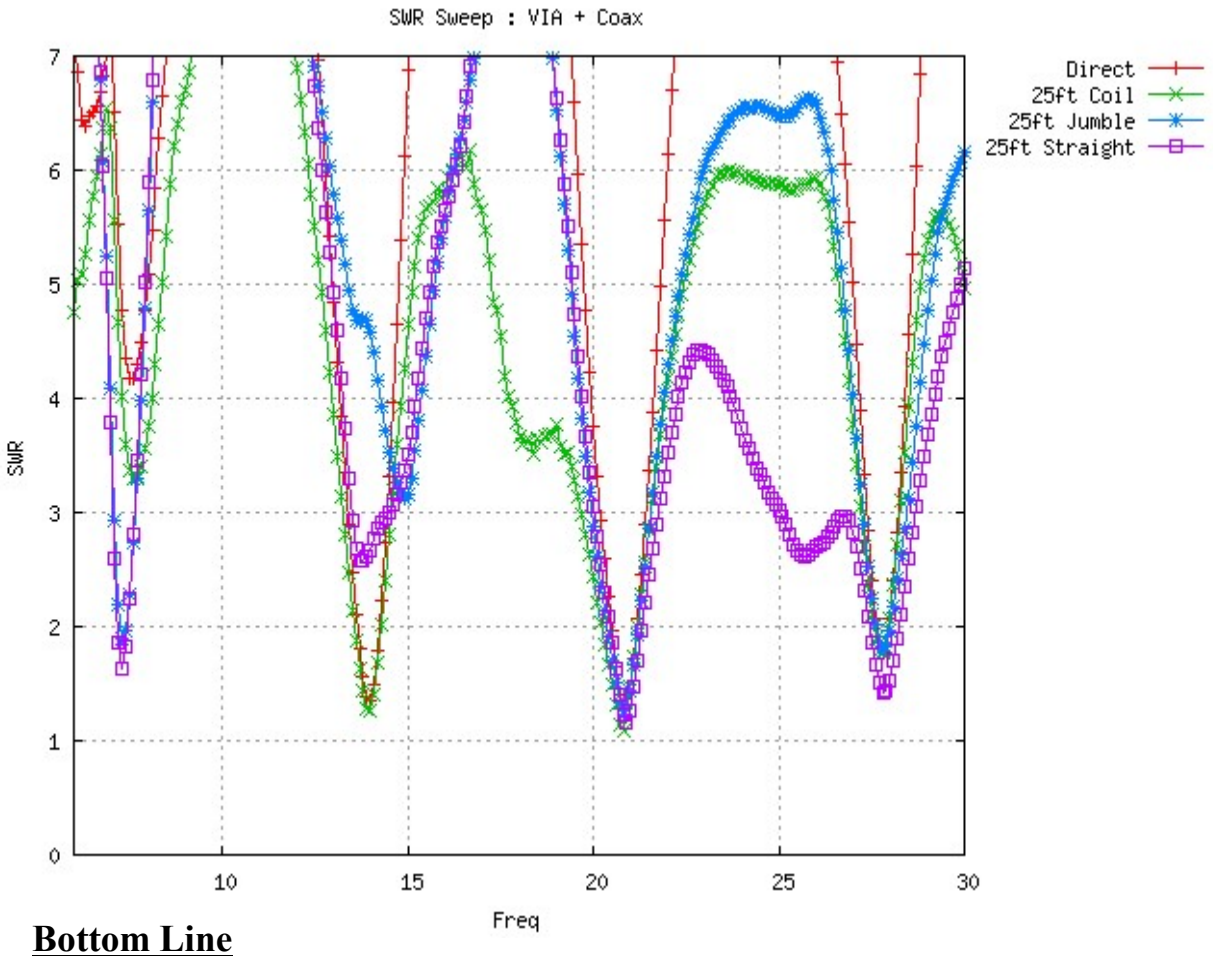


Also shown are the results of NEC2 models of an OCF (off-center fed) 40m dipole with a feed point about 2ft from the end, an almost-EFHW. The first model (green) includes the 1:49 transformer, and the second model (blue) adds the shunt capacitor as well. The models show the minimum SWR of second and third harmonics shifted up in frequency. This is because the SWR minima occur at frequencies where the antenna is non-resonant (i.e. the reactance is not zero.) In any case, the EFHW cannot be modeled simply as a very off-center fed dipole.

Next I added a USB cable to the VIA to capture measurement data (below). Measurements were made with the USB coiled compactly and uncoiled as it would typically be used. The USB and PC add some stray coupling that changes the SWR profile in a favorable way on 40m. Many EFHW users advocate using and 18 inch “counterpoise” to the matching network ground which is essentially the equivalent of adding the USB cable!



Finally, I took an SWR sweep with a 25ft. coax feed. Three cases were considered: the coax in a 1ft diameter coil, the coax in a random jumble on the floor and the coax pulled to is full length roughly parallel to the antenna. Note that the match on 40m and 20m is sensitive to how the coax is routed. Notice too that configurations that improve the match on 40m tend to degrade the match on 20m, and vice versa.



Bottom Line

The EFHW antenna works quite well as a multiband antenna. Operation on several bands is usually possible without any tuner and a basic auto-tuner will handle the rest. New installations will likely require a bit of experimentation to optimize multiband performance owing to the sensitivity of the input impedance to stray coupling.

An EFHW is a good choice for FD and portable operations because it can be operated as a sloper with only a single elevated support. That's what makes the EFHW antenna a favorite of SOTA operators.

A weakness of the EFHW is its limited power handling capability. The toroid in the matching network is operated as a voltage transformer and is susceptible to high flux densities in the core. This results in losses, but more importantly core heating. The MFJ manual warns of sudden spikes in SWR indicating that the core was heated beyond the Curie temperature. (Above the Curie point ferrite loses its magnetic properties and the core functions as if it were made of wood.) If this happens, MFJ recommends going QRT for 30min to allow the core to cool. Not something you want to have happen in the middle of a contest. Be especially careful if you intend to operate with higher average power levels such as RTTY, CW, or SSB with voice processing.

Another concern is that the end of the antenna is the point of highest RF voltage so the matching network will be "hot" with respect to RF. Be sure to provide a decent ground to prevent RF from stinging the radio operator, especially if the station is running 50w or more.

References & Comment

www.aa5tb.com/efha.html - A good overview with practical advice, experimental results, and speculative theory.
www.w8ji.com/end-fed_1_2_wave_matching_system_end%20feed.htm - Good analysis of EFHW antennas with debunking of some misconceptions about how the work.
www.sotabeams.co.uk/efhw - Nice overview of EFHW antennas from the SOTA perspective with practical setup advice.
www.qsl.net/k5bcq/Kits/Kits.html - The VIA used to make the SWR sweeps is a ~$100 kit. Portable, accurate, great user interface. I couldn't be more positive about this gadget if they paid me, which they didn't!

EFHW antenna reviews are generally very good, but the best reviews tend to correlate with highest price. I think my MFJ antenna is pretty good, but if I had paid $166 instead of $66 I would probably find a way to like it even more.