

# **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 54 NO. October 2021**

## **Regular Meetings**

**Second & Fourth Mondays  
“ZOOM” until we can all  
get together again**

## **Upcoming Events**

**Digital Net Mondays at 9:00 PM  
PSK on 80 or 10 meters  
CW training Net, Thursday at 9:00 PM  
Watch for Email announcements.**

## Meeting Schedule

**Regular Meeting: 7:30—9:00 PM**  
**2nd & 4th Monday**  
**of each month**

ZOOM until further notice

### 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 2021

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: KC2OSR: Sam Sealy  
973-462-2014

## —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  
Mondays 9 PM  
28,084 — 28,086  
Will be using PSK and RTTY  
Net control K2YG

## Club Internet Address

Website: <http://www.nparc.org>  
Webmaster KC2WUF David Bean  
Reflector: [nparc@mailman.qth.net](mailto:nparc@mailman.qth.net)  
Contact K2JV, Barry

## MOUNTAIN SPARK GAPS

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Contributing Editors:  
WB2QOO Rick Anderson  
W2PTP Paul Wolfmeyer  
K2UI Jim Stekas

## Climatological Data for New Providence for September 2021

The following information is provided by  
Rick, WB2QOO, who has been recording daily  
weather events at his station for the past  
40 years.

### TEMPERATURE -

Maximum temperature this September, 82 deg.  
F (September 15)  
Last September (2020) maximum was 82 deg.  
F.  
Average Maximum temperature this September,  
73.9 deg. F  
Minimum temperature this September, 51 deg.  
F (September 29)  
Last September (2020) minimum was 40 deg. F.  
Average Minimum temperature this September,  
60.6 deg. F  
Minimum diurnal temperature range, 6 deg.  
(75 - 69 deg.) 9/17  
Maximum diurnal temperature range, 19 deg.  
(74 - 55 deg.) 9/11

Average temperature this September, 67.3  
deg. F  
Average temperature last September, 66.3  
deg. F

### PRECIPITATION -

Total precipitation this September- 9.57"  
rain.  
Total precipitation last September- 3.64"  
rain.  
Maximum one day precip. event this September  
-  
September 1, 7.38" rain. (Trop. Storm Ida.)  
Measurable rain fell on 9 days this Septem-  
ber, 8 days last September.  
YTD Precipitation - 45.72"

=====  
Rick Anderson  
10/30/2021  
243 Mountain Ave.  
New Providence, NJ  
(908) 464-8911  
[rick243@comcast.net](mailto: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

## President's Column October 2021

We had our monthly business meeting on October 11. The Dissolution bylaw was approved. The updated Bylaws are posted on the club website under the Club Information menu item; thanks David KC2WUF.

It has been nice to have some new hams and potential members join us on our ZOOM meetings: Ron Redling KD2WVB and Laura Black KD2TEN. Welcome!!

We intend to hold our required annual meeting November 8. Hopefully we will have election of officers for 2022 at that time. Bob K2GLS as vice-president and I, as president, do not intend to run again. **I would encourage you to think about who you would like to see in those positions and make your suggestions to Tim Farrell KD2EKN, our nominations chair. Leadership and direction of the club are at stake here, so take the time to think seriously and suggest names.**

We have plans for a holiday luncheon on December 4 at Chimney Rock. We plan greater spacing for attendees than in the past, probably minimum three feet. Attendees at our ZOOM meetings favored a luncheon; Individuals will need to make a personal choice of risk versus seeing each other. The cost per meal will likely increase to the \$36 range, as prices of many items have increased and restaurants were particularly hard hit by the pandemic.

Relative to meeting space--New Providence has not yet made space available. Our most recent inquiry yielded a response about the Senior Center being unsuitable for meetings at this time due to damage from Ida. We are looking at alternatives in the New Providence vicinity.

Our second meeting of the month featured Jim Stekas K2UI with an informative program on NanoVNAs. I believe there is more info later in this issue.

Dates to mark down: November 8 (annual meeting with elections), November 22 (program meeting), December 4 (holiday luncheon), December 13 (only December meeting). All, except the luncheon, will be ZOOM.

Don't forget the nets!!  
[W2ptp@arrl.net](mailto:W2ptp@arrl.net)

73,

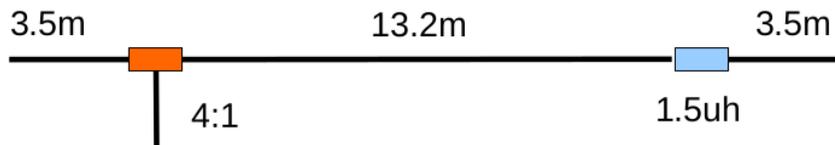
Wolf W2PTP, 201-404-6914,

## Antenna Models vs. Measurements

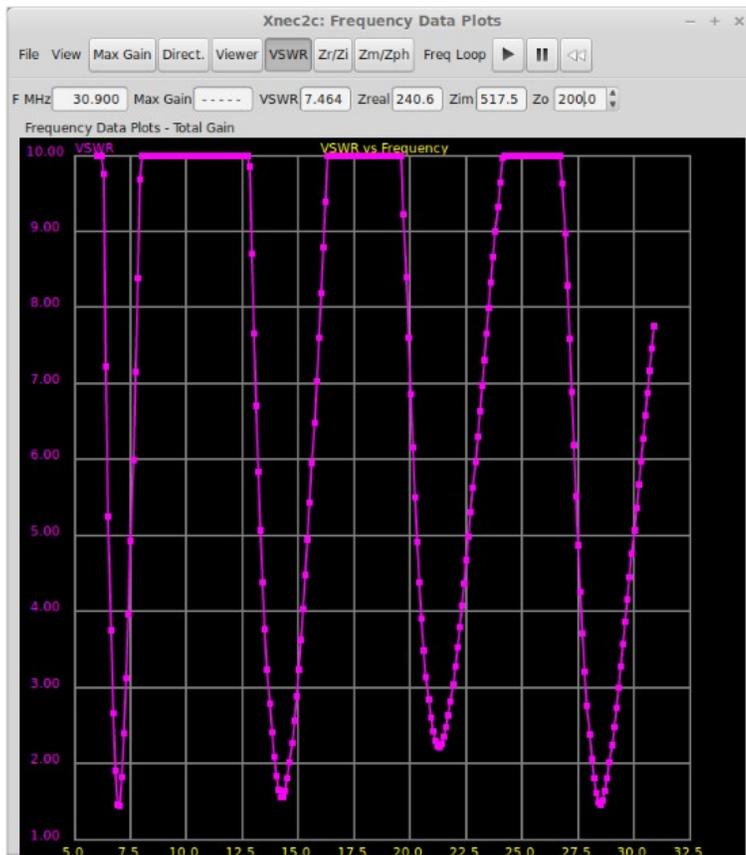
Jim Stekas - K2UI

The easiest (and cheapest!) way to experiment with different antenna designs is using computer modeling. But an antenna that looks good on the computer might end up performing poorly in practice. Being able to compare antenna measurement against the computer model is essential for refining an antenna design. That means having the ability to download the measurements from your antenna analyzer to your computer and manipulating the data.

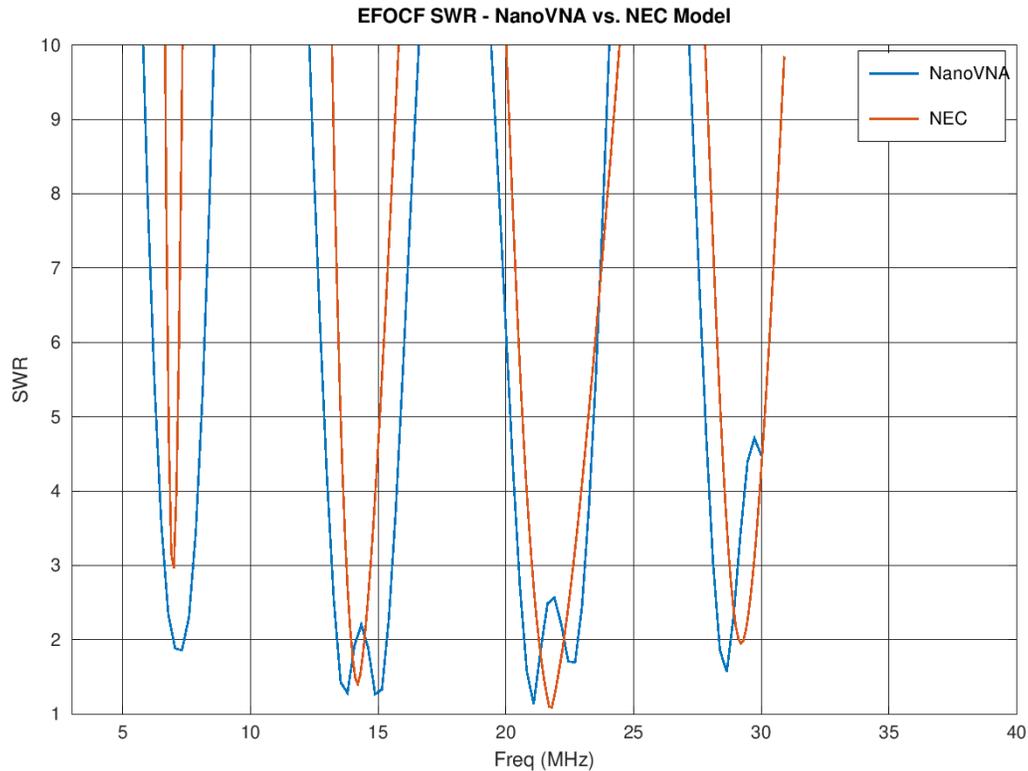
My main antenna is an off-center fed dipole (OCF) where the short leg is the outer surface of the coax feed. The antenna as modeled is shown below, where the outer surface of the coax is treated as a “third wire.”



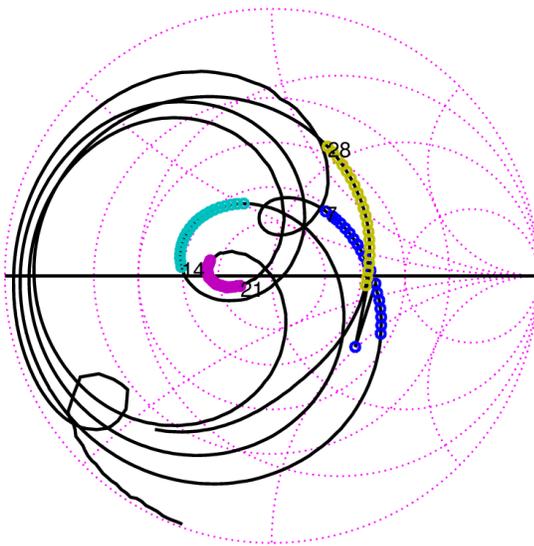
The antenna design evolved over time from some hand sketches, to a spreadsheet, and finally to modeling with NEC (XNec2c, below). The feedpoint was moved around to get the best SWR on 40/40/15/10m and a “magic coil”<sup>1</sup> was added to lower the resonant frequency on 15 & 10m harmonics. The model results showed a good match on all four bands (below).



The antenna looked great on the computer, but the real thing didn't work too well. In fact it was so horrible I referred to it as "My Bogus Antenna"<sup>2</sup>. A sweep of the antenna with my VIA (from the Austin QRP club) bore no resemblance to what came out of the computer model. The measurements indicated an open circuit in the feedline which turned out to be a bad BNC connector. Once that got fixed the real antenna began working as it expected. Here is a comparison of an SWR sweep with the NanoVNA<sup>3</sup> and the NEC model prediction.



Agreement isn't too bad. The major difference is that the SWR bandwidth of the actual antenna is wider than the model, which may be due to losses (or not). The multiple dips in SWR at 14 and 21 MHz correspond to "wiggles" in the reactance seen at the feedpoint and are from unknown causes.



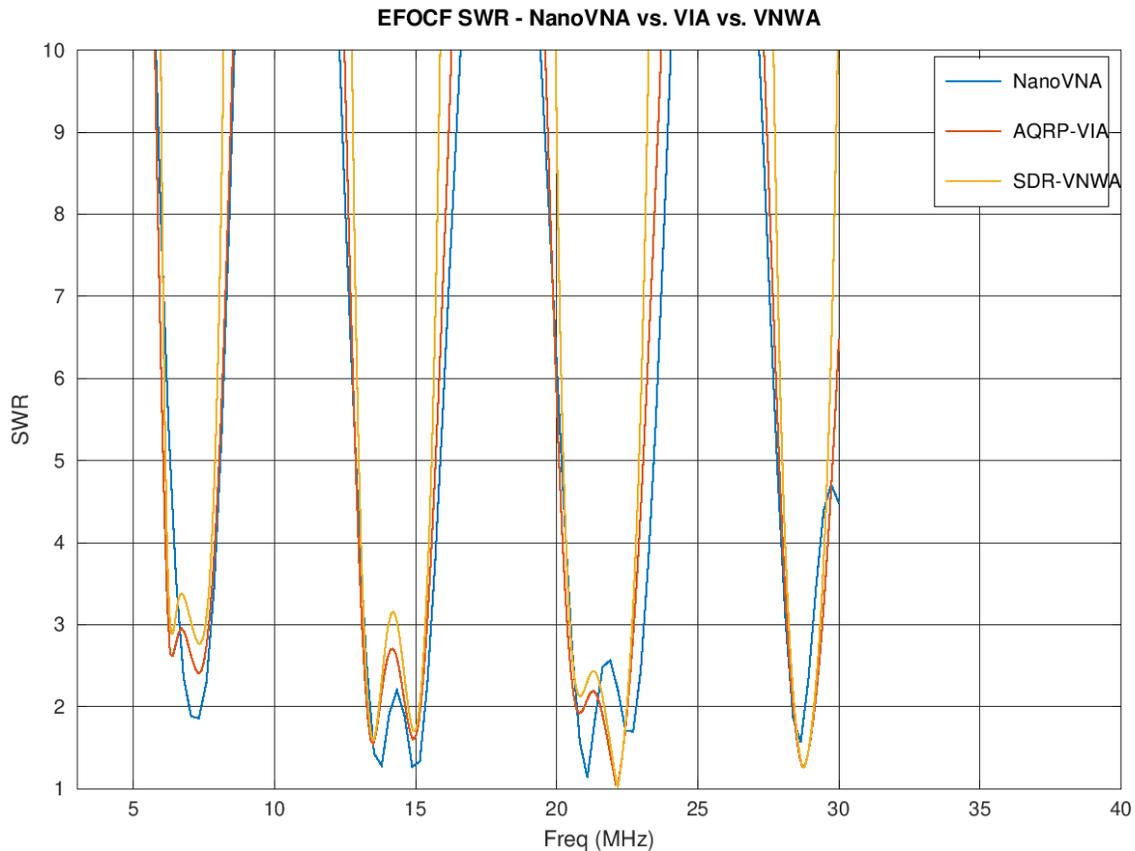
On the Smith chart, these wiggles appear as tight loops. These loops can work in our favor by keeping the trace near the center where SWR is low.

(Incidentally, the Smith chart is a great way to quickly evaluate the effects of tweaking your antenna design.)

<sup>2</sup> Spark Gaps, Aug 2018.

<sup>3</sup> The data were downloaded to the PC using NanoVNA-Server.

Besides the NanoVNA, I also have the AQRV VIA (~\$100, but no longer available) and the VNWA from SDR-Kits (~\$500). The figure below compares antenna a recent NanoVNA sweep with 4 year old sweeps from the VIA and VNWA. What surprises me most is how stable the antenna has been over the last four years. Running periodic sweeps to validate the health of our antennas is probably a good idea.



Of the three instruments, the AQRV VIA is my favorite because it is battery powered and can take a stand-alone sweep. Later, a USB connection to a PC can be established to download the data.

The VNWA is the most accurate of the three analyzers but it has no display or controls and requires a PC connection to operate. That makes it the least convenient for making antenna measurements in the field and is why it rarely sees action.

The NanoVNA can take stand-alone measurements, but it reboots when connected to a PC. So a PC connection to the NanoVNA is required *when you sweep* if you want to capture the data. However, most of the time data capture is not required and the NanoVNA is the one I reach for.

For SWR=1,  $R_L=R_S$  and  $P_{TOT}=2P_{MAX}$ . When SWR=10,  $|\Gamma|=\frac{9}{11}$ , and power to the load is  $P_L=0.33P_{max}$ . There are two possibilities for  $R_L$  that give SWR=10:

- $R_L=10R_S$  in which case  $P_{TOT}=\frac{4}{11}P_{MAX}=0.36P_{MAX}$
- $R_L=0.1R_S$  for which  $P_{TOT}=\frac{4}{1.1}P_{Max}=3.6P_{MAX}$

For both cases of SWR=10 the total power delivered by the transceiver is less than for the SWR=1 case even though they reflect 80% of the forward power back to the rig. In fact, for any SWR>1 the transmitter will deliver less total power than for SWR=1.