

Next Monthly Meeting: Friday December 22 6:30 PM at the MCL Cafeteria in Kettering .
Meeting is always the 4th Friday of the month except for when impacted by holidays

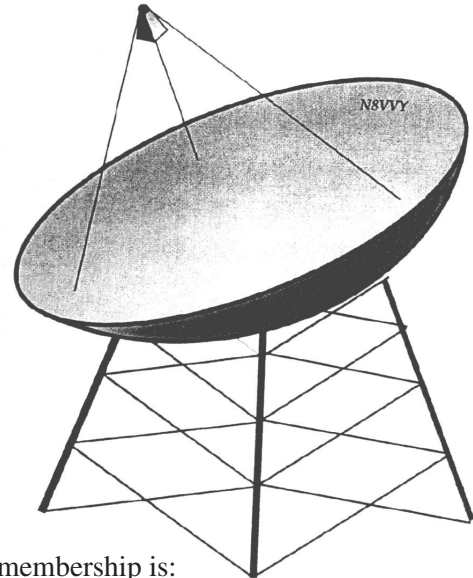
ANOMALOUS PROPAGATION

November - December 2023

Newsletter of the **Midwest VHF/UHF Society**

Editor: Jim Bacher, WB8VSU

For a Word document template for articles, send a request to Jim (j.bacher@ieee.org) or click on this link to get the Word format Template. Thank you!



Annual membership is:

\$12.00 for newsletter by Email

\$16 if newsletter by USPS

\$240 Life Membership by email

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Beacons: 1296.079 W8KSE EM79ur Dayton, OH---- 2W to Big Wheel at 800' AGL.
 MVUS Skimmer -. <http://www.reversebeacon.net/dxsd1/dxsd1.php?f=0&c=w8kse&t=de>

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De N8ZM

In our last episode, I mentioned the painting project at a water tank on the NW side of Dayton. I have not yet checked in with the folks in charge there recently, but I suspect that the painting is completed. W8RKO and I will check on the situation and start planning for re-installing our beacons and repeaters. And maybe add some additional beacon frequencies. If Mike is OK with that, as he really does most of the work.

I know it is still some 6 months or more in the future, but Hamvention planning needs to start soon. At our November meeting I vowed to check with N8ASB about ordering the flea market spaces, that we usually sell from, as well as the extra space we had last year for the MVUS booth. Everyone seemed to agree that having it next to our selling spaces was quite handy. It also allowed N8QHV to take longer, guilt-free, breaks from his duties as primary booth staff person. Not sure if Mike will be available this coming year, so having the booth close by will ease the staffing challenge.

As the end of the year approaches, it is a good time to renew your MVUS membership. It isn't an expensive proposition and you get Anom Prop with the great articles that WB8-VSU digs up, as well as the monthly tirade from me. All-in-all, one of the better deals in ham radio! I almost forgot: There is our August picnic as well, which is always a fun gathering to test gear and chat with other MVUS folks. And food, too!

I hope you all had a happy and calorie-filled Thanksgiving, and wish you all a very merry holiday season filled with friends, good times, and lots of VHF/UHF fun!

de N8ZM

\$98 RF Power Meter Review

Author: Jim Bacher, WB8VSU

This is a review of the \$98 New RF Power Meter purchased off of eBay. There were multiple sellers of the device on eBay. The specifications for the RF Power Meter are at the end of the article.

It's listed as being usable from 100 KHz to 10 GHz. However, on the eBay pages it implies there are different versions to cover the frequencies range listed, however there is no info on how to order specific frequency range versions.

I can only test up to 2 GHz, so once again Tom Holmes, N8ZM had to do the testing above 2 GHz. Like the one I reviewed in June there is no manufacturer identified along with no manual. I wonder if this is a clone of another company's RF Power Meter.

As this one was actually in a case, it was much nicer than the one reviewed in June. Although the ad didn't say anything about a battery, it turns out it has a small Lithium Ion battery (I am assuming a Lithium-Ion battery) in it. So once you charge it, it can go portable. There is PC software to download data off the unit, but it is a bear to get and I have not tried the software. The software seems to be very capable and can run in real time to capture data with graphs.

One of the first issues I hit was how to turn it on. There was no obvious way, so I had to ask the seller how to turn it on. Turns out you push in on the Joystick then push the Joystick towards the bottom of the unit to turn it on. Same method turns it off. The joystick allows you to move between all the items you need to set. You move between settings by going left or right with the joystick. Then move the Joystick up or down to change the value.

As you can see in picture # 1, it has a noise floor of -59.3 dBm. It does allow you to set the value of an attenuator if you happen to be using one. You can also use the "Offset" to adjust for any in accuracy in the unit. You do need to set what frequency is that you are measuring. We also found that it was typically about 1.8 dB off, which is why you see the 1.8 dB in the Offset value in the photo.

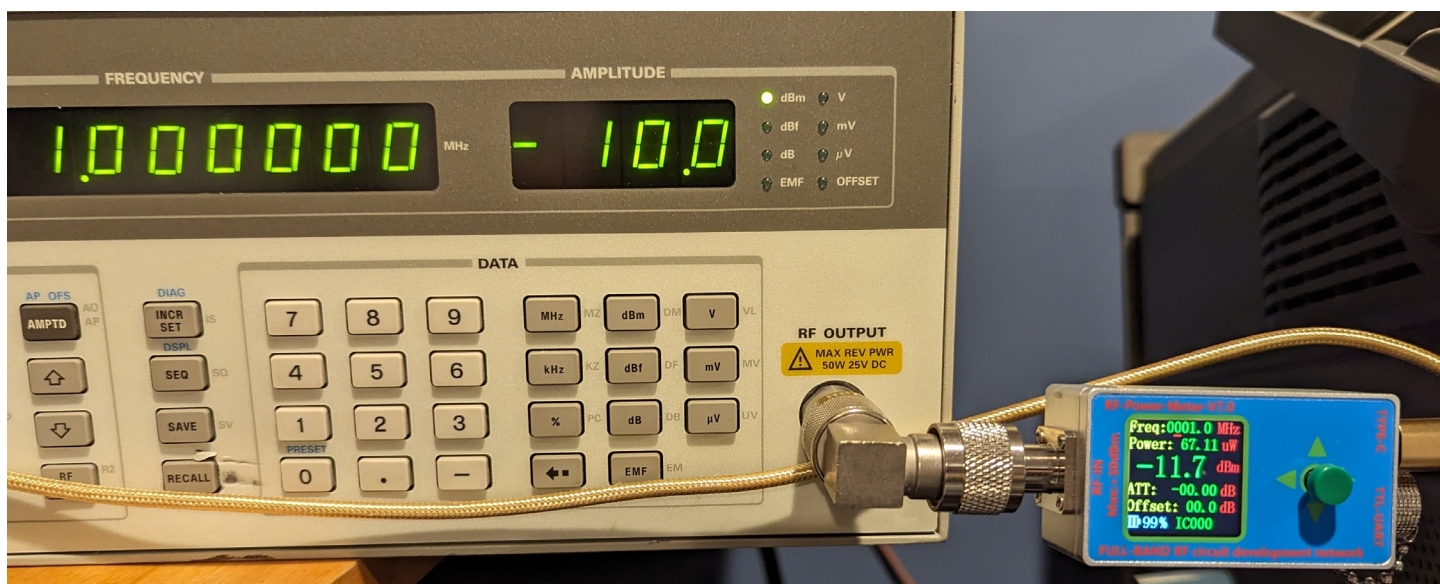
Continued on page 5



Picture # 1

We found that it worked from 100 KHz up to 7.5 GHz. After that it still detected RF but by 10 GHz it was reading about 20 dB low. Below there are charts showing what it measured against HP RF Power Meters. That is enough range for most Hams.

In Picture # 2 you can see the signal generator is set for 1 MHz and -10 dBm. The power meter is measuring the signal at -11.7 dBm.

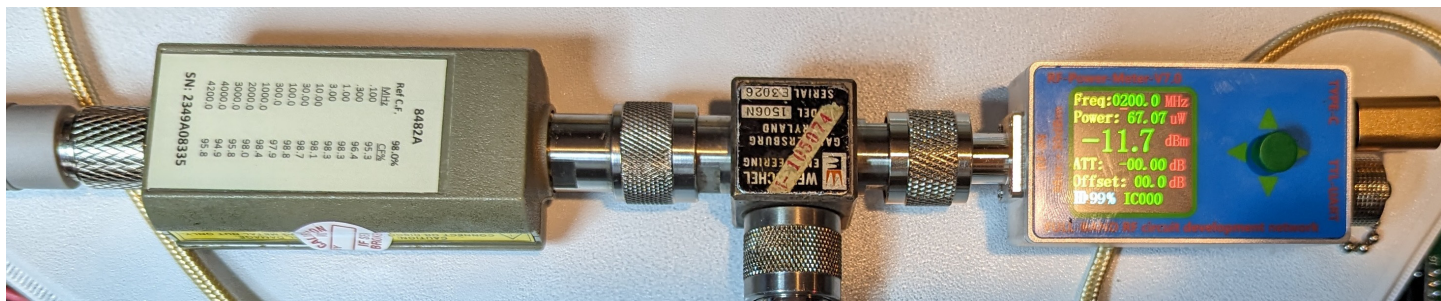


Picture # 2

My test setup (Below 2 GHz) was a power divider attached to the signal generator. Then the HP 437B Power meter with the HP 8482A Power Sensor (recently calibrated) were connected to one port and the \$98 RF Power Meter was connected to the other port. As

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the power divider had a 6 dB loss (+0.2 dB), I set the signal generator at -4 dBm, so that both devices should read the RF level at -10 dBm. In Picture # 3 you can see the test setup.



Picture # 3

In Table # 1 you can see the readings of both the HP RF Power Meter and the \$98 RF Power Meter from 100 KHz up to 2 GHz. In Table # 2 you can see the differences from 3 GHz up to 7.5 GHz.

Freq MHz	437B	\$98 PM	Diff
1	-9.60	-11.60	-2.00
5	-9.60	-11.70	-2.10
10	-9.59	-11.60	-2.01
25	-9.61	-11.80	-2.19
50	-9.37	-12.00	-2.63
100	-9.75	-11.60	-1.85
250	-10.02	-11.80	-1.78
500	-10.68	-11.80	-1.12
750	-10.78	-11.80	-1.02
1000	-10.35	-11.80	-1.45
1250	-10.17	-11.90	-1.73
1500	-10.10	-12.40	-2.30
1750	-10.70	-12.10	-1.40
2000	-10.14	-11.50	-1.36
Calculated Average difference			-1.78

Table # 1

Freq GHz	436	\$98 PM	Diff
3	-10.17	-8.70	1.47
5	-30.37	-30.10	0.27
6	-30.22	-31.30	-1.08
7	-30.43	-32.17	-1.74
7.5	-30.39	-34.70	-4.31
10	-30.36	-50.80	-20.44

Table # 2

Using John Akerman's Boonton Model 2520 Precision RF Source, I tested to see how well it tracked the levels being changed with a precision attenuator. Table 3 shows the results.

Output Level dBm	Measured in dBm
0	-3.00
-10	-11.80
-20	-21.90
-30	-31.80
-40	-41.90
-50	-52.00
-60	-59.40

Table # 3

I liked this particular RF Power Meter much better than the one reviewed in June. This one is very portable and in a well made enclosure. With the ability to enter a correction figure, it is reasonably accurate for ham radio use.

**Picture # 4**

There are a number of companies that sell USB based RF Power Meters. All the way from under \$100 to many thousands of dollars. Mini-Circuits is one of them. I am not going to be buying and testing any of those, but if someone else is willing to try a few, please consider writing an article for this newsletter

\$98 RF Power Meter Ratings

\$98 Power Meter (N-Type RF Power Meter V7 10GHz Type-C High Performance Full-band RF Circuit Development Network Serial Communication)

- Measuring power range: - 60 ~ +30dBm (0 ~ - 40dbm has good linearity)
- Measuring power resolution: ± 0.1 dBm
- Measuring frequency range: 100K~10GHz (the frequency range of different models is different)
- Input impedance: 50ohm
- Dynamic range: 90dB
- Working voltage 5VDC (power supply via TYPE-C line)
- Charging current: 300mA
- 66 x 36 x 24cm (excluding protruding N head, refer to the given mechanical drawing for details); The fuselage is made of aluminum alloy shell processed by CNC, and its weight is less than 100g.

Test Equipment

HP 437B (Calibrated July 3 2023) and 436 Ratings:

Measurement power resolution: 0.1 dBm

Accuracy: ± 0.02 dB

Weichel Electronics Power Divider Model # WA1506A Ratings:

Specification: DC – 18 GHz

DC- 4.0 GHz Tracking between ports is 0.2 dB (was not used above 2 GHz)

HP 8482A (Calibrated July 3 2023):

100 kHz to 4.2 GHz.

Power Levels: -30 dBm to +20 dBm

Uncertainties: Varies between 2.2% and 3.1% over the frequency range used in testing

HP 8484A

10 MHz to 18 GHz

Power Levels from -70 to -20 dBm.

Uncertainties: Varies between 2.7% and 3.6% over the frequency range used in testing.

HP 8657B Signal Generator (not calibrated)

Output +13 to -143.5 dBm ± 1 dB from 100 KHz to 1040 MHz

100 KHz to 2 GHz

Boonton Model 2520

Fixed frequency (30 MHz) source at 50 ohms that provides an accurate level from -70 dBm to +20 dBm in 0.1 dB steps.

Frequency: 30 MHz

-70 to +20 dBm in 0.1 dB steps into 50 Frequency Accuracy: 0.1 %

Output Resolution: 0.1 dB

Aging: 0.002dB/Year Max

Output Accuracy: 0.055dB

MVUS Renewal

Don't forget to renew your MVUS membership.

Annual membership is:

\$12.00 for newsletter by Email

\$16 if newsletter by USPS

Or

\$240 for Life Membership with Newsletter by email

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Memberships are prorated by month. So you can send any amount and Joe will adjust your membership accordingly

If you want to pay by PayPal you can send your renewal to Either Tom Holmes, N8ZM or Jim Bacher, WB8VSU and we will get your renewal to Joe.

Tom's PayPal account is: tholmes@woh.rr.com

Jim's PayPal account is: wb8vsu@arrl.net