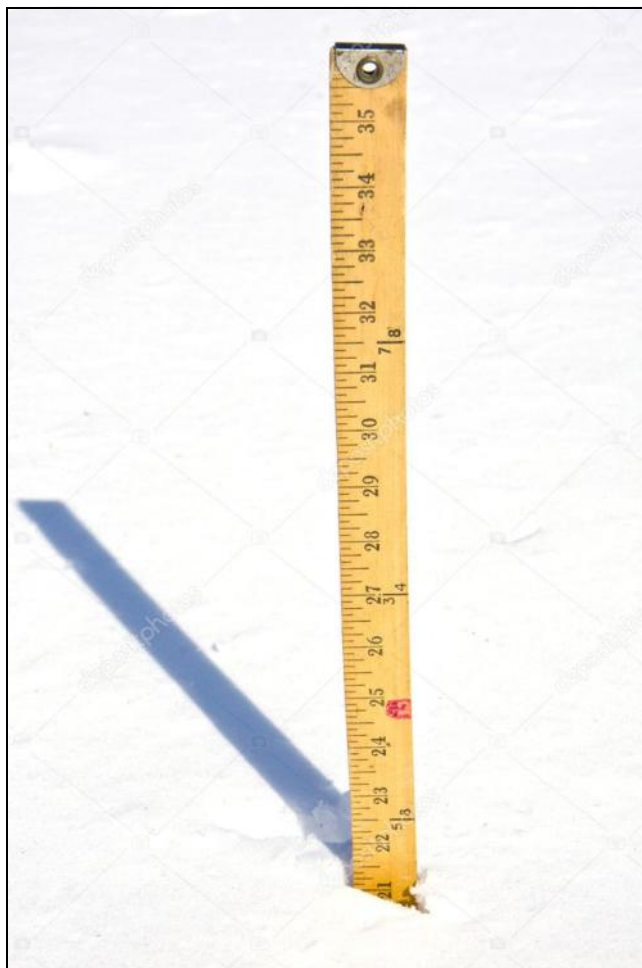




Q5er – The Official Newsletter of the Skyview Radio Society

Skyview Weather Group



The Skyview Weather Group has become very active since Steve - K3FAZ took leadership. Lots of different weather related subjects are being covered at the joint on the Second Tuesday of each month. Steve concentrates on terrain weather, not solar weather. We are all affected by the terrain weather. Stop in and participate in the Weather Group activities.

2023 is Skyview's 63rd Anniversary !!

December 1, 2023

- VE Session Success Stories
- License Advancement Help
- APRS in WPA
- Nomenclature (it hertz)
- GE MASTR II Repeaters
- Frightening Pumpkins
- From the Basement
- And More

SEASONS GREETINGS!

**Sunspot Numbers
are Way Up
There !!!**

**Time to exercise
the 10-12-15-17-20
Meter bands**

Inside this issue:

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The Skyview Radio Society Clubhouse is the “Every Tuesday Place” . . .

Something is going on at ‘the joint’ each and every Tuesday evening, from about 1900 hours to whenever.

See the general schedule of Tuesday events on the Skyview Web Page: <http://www.skyviewradio.net>

For the latest up-to-date plan, check the Groups.io Reflector at : <https://groups.io/g/K3MJW>

Directions are on: <http://www.skyviewradio.net>

Guests are always welcome !!

From the Editor

Lots of good contributions this month.

It is nice to have a variety of educational articles and personal experience articles.

I think it is this variety of reader written articles that makes our newsletter unique.

Merry Christmas.

Jody - K3JZD

Remember: The number of people older than you never increases, it only decreases

Ham Radio is a Contact Sport

From the Treasurer

Membership Renewal Time is here once again. Your Membership Dues “keep the lights on”.

100% of the money received for Membership Dues (and any additional donations sent in with the Dues) goes into our ‘Operations’ account. It is then spent on our reoccurring bills. That includes our reoccurring electric, water, Internet, propane, security system, property taxes, and property insurance expenses.

That also covers the annual donations that we make to the local fire company and ambulance service. And the reoccurring costs for the components that must be periodically refreshed in our AED (defibrillator).

Anything that is left over in our Operations account at the end of the year gets moved onto our Equipment Self Insurance account.

Property, radio, and antenna Improvements, as well as our various activities, are funded from other income.

Jody - K3JZD

Continue Use the Skyview Facilities At Your Own Risk - It is Not Really History Yet.

Follow <https://groups.io/g/K3MJW> for COVID updates.

Skyview Radio Society is recognized by the Internal Revenue Service as a charitable non-profit organization under Section 501(c)(3) of the IRS Code. Donations to Skyview are tax deductible to the extent permitted by law.

Support your club.

We're fools whether we dance or not, so we might as well dance. Japanese proverb

November Business Meeting Minutes

de Don - WA3HGW

Skyview Radio Society

Monthly Business Meeting – November 7, 2023

Call to Order: 7:30 PM by President Paul Krystosek, AC3IE.

Attending – 31 Members and one guest: N3WMC, NM3A, NJ3R, W3IU, NK3P, AG3U, KA3CBA, K4PDF, KC3LHW, W3CDW, K3FAZ, AC3IE, KC3PXQ, WC3O, W3UY, K3HSE, WA3HGW, AG3I, AB3IK, KB3DVD, K3CLT, KC3VNB, N2MA, W3ZVX, K3STL, KC3VCX, K3JZD, AB3GY, AJ3O, AC3KI, N3TIN, and Diane Wilson.

Prior Meeting Minutes: The minutes of the October 3, 2023 meeting were distributed for member review. A motion to accept the minutes as presented was made by N3WMC and seconded by AC3KI. The motion passed without objection.

Treasurer's Report: Treasurer Jody, K3JZD reviewed the Financial Report of 31 October 2023. Jody noted the club finances are in good shape through October, with some surplus projected for the year. There were no facility expenses this month and no expenses for the restroom addition. There was some radio maintenance expense for replacement of the cables on the crank-up tower. Income included the usual VE testing and 50/50 drawing. A motion to accept the Treasurer's Report as presented was made by AG3I and seconded by KC3PXQ. The motion passed without objection.

Membership Report: Tom, AB3GY, advised there are two new membership applications. AB3GY made a motion to open the membership rolls, which was seconded by AJ3O. The applications are:

Amy Cicak, KA3CBA, a Technician from Monroeville, PA. Amy is well known in the area from her embroidery business at local hamfests and supplying Skyview regalia items. A motion to accept the nomination was made by AB3GY and seconded by KC3PXQ. The motion passed without exception.

Tim Mullins, an Extra Class from Pittsburgh, PA. A motion to accept the nomination was made by AB3GY and seconded by AC3KI. The motion passed without exception.

AB3GY made a motion to close the membership rolls, which was seconded by K3CLT. The motion passed without exception. Membership now stands at 165. We just surpassed the record membership of 164 achieved last year. Congratulations to all our members who keep this organization strong.

Radio Officer Report: Bob, WC3O, reported the 2 meter repeater hum was repaired. The problem was traced to the transmit synthesizer card. The card from the back-up repeater was installed to cure the fault. Bob then obtained a replacement card for the back-up repeater. Steve, KE3Z, is working getting two new Arcom 210 repeater controllers set up to replace the existing controllers. This will give us capabilities in addition to Echolink such as weather station interface. Bob, WC3O, and Jack, K3JAS, arranged a swap of the 50 amp radio room DC power supply for Jack's 70 amp supply. This will provide some additional DC power overhead for the radio room 12 volt system. Bob will be adding meters to the 70 amp supply for monitoring its output. Still working on repairing the rotor control boxes RS-232 interfaces, which were damaged by the lightning strike. WC3O also procured a like-new Simpson 260 VOM for the radio room. We already have one, but its full functioning and calibration is somewhat questionable. All in all, a lot of activity by our radio officer this month.

Kitchen Report: Bob, WC3O, noted the kitchen balance is at \$100. Snacks have been replenished.

VE Report: At the October session we had two upgrades, one to General and one to Amateur Extra class. Presently there is one candidate for the next VE session on December 18

Newsletter: The October issue of the *Q5er* is out. Jody has a good number of articles for the December issue, but more are always welcome. Submissions by November 15 for the December issue.

Facilities: N3TIN reported the gas line was moved to a new entrance point. Plumbing in the existing restroom was changed as needed for the new restroom. The studding on the exterior wall of the existing rest-

Q5er – The Official Newsletter of the Skyview Radio Society

room was increased in depth to upgrade the insulation in order to eliminate the occasional water line freezing in winter. A decision needs to be made regarding potential of relocating the furnace from the radio room to the existing restroom area once the new restroom is functional.

Building Committee: AG3I reports the next task for the new restroom is continued plumbing rough-in on the water supply lines. This should be completed this week. Then electrical needs are to be addressed. Both need to be complete before drywall installation can begin.

Calendar of Events:

ARRL EME Contest – November 25-26.

North American SSB Sprint – November 12. (November 11 local time.)

K3LR/DX Engineering visit – November 11.

ARRL Sweepstakes Contest Phone – November 17-19.

Club Pot Luck Diner – December 19.

Holiday Party – January 20.

Winter Field Day – Last weekend in January.

Old Business: Founders Day resulted in about 130 to 160 QSOs. If anyone knows where the Founders Day QSL cards are, let Bob, WC3O, know because QSL requests are starting to come in.

New Business: We have a \$100 DX Engineering gift certificate remaining from the Swap & Shop. The winner donated it back to the club. We need to decide what to do with it before it expires at the end of 2023.

Jack, K3JAS and Paul, AC3IE, are considering restarting some Saturday "Smoke & Solder" sessions. Stay tuned for announcements.

Election of Club Officers:

Incumbent officer positions that were not contested were automatically re-elected. Nominated are:

Vice President: Jerry LaSalle, W3UY

Trustee, 5 Year: Jim Shuey, W3IU

Scott Gliebe, AC3GB

Joe Poli, KC3PXQ

As there were no additional nominations for Vice President, Jerry LaSalle, W3UY was elected.

For Trustee, 5 year, ballots were passed out to the membership present. Elected were Jim Shuey, W3IU and Scott Gliebe AC4GB (with Baxter as auxiliary!)

Weather Night: We now have our weather balloon tracking station up and operational. Thanks to all who helped complete this task.

November – Snow measuring.

December – The 2nd Saturday is Skywarn Recognition Day. Ham radio operation at the clubhouse using the Pit NWS call WX3PIT.

December 12 – Winter Skywarn Training.

Elmer Night: Bob, W3CO, will demonstrate use of climbing harnesses. He can compare his old harness with the newly acquired harness which includes a seat. Also planned for another date is Part 4 of Heathkit HX-11 transmitter repair.

Net Report: Check-in numbers averaged 43.25 in October. K3STL noted Jack, K3JAS as net control, had what might be a record with 52 check-ins on his turn. If you want to volunteer for net control, contact K3STL or WC3O.

50/50 Drawing: The total collected was \$50. The winner of \$25 was Steve, K3FAZ, who donated the proceeds to the club treasury.

Meeting Adjourned: A motion to adjourn was made by KC3PXQ and seconded by AC3KI. The motion passed without objection. The meeting was adjourned at 8:16PM.

Respectfully Submitted,

Don Stewart – WA3HGW

Secretary; Skyview Radio Society, Inc.



Set Your Phasors to Stun

de Charles - KC3TTK

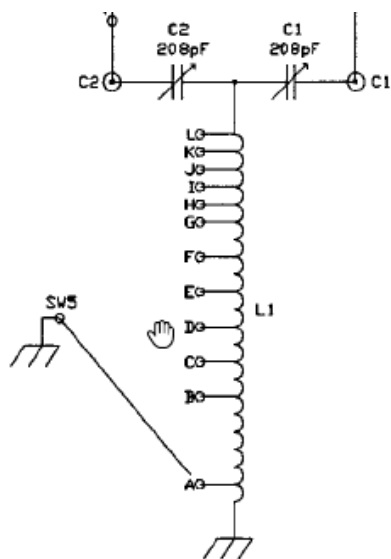
ED : Many of the formulas contained in this article are reduced to fit the newsletter format. They have been inserted as images so that you can enlarge this PDF file to be able to see them clearly.

An intriguing piece of technology is the antenna tuner. A more accurate name would be network impedance matcher. Because, being at the beginning of the feed line, it's not really tuning the antenna.

Since getting my ICOM in May, daily I have fired it up, pressed the "Tune" button and have had many successful QSOs across many bands with various different modes. Considering that I am using a broad band dipole antenna It is no surprise though that on a few of the bands, the auto tuner in the ICOM, just like many of us in high school, cannot seem to find a match.

This got me thinking. What is a tuner and how does it work?

I searched around for a while looking for a reasonably priced manual tuner. I wanted to take it apart, take some measurements and understand what was happening on. Fortunately for me – I got my hands on a MFJ Deluxe Versa Tuner II. Coincidentally this is the exact model I was looking for. The manual for the MFJ was surprisingly well documented. The manual for the tuner includes a schematic, and to my delight I discovered the circuit performing the tuning function was rather simple.



It looked like a High-Pass T network consisting of two capacitors in series with an inductor between them in parallel, and in fact this is exactly what it was. But, how to analyze what is going on in here?

Before the analysis of the system, I had to brush up on a couple of topics.

In DC circuits, resistance is the opposition to current flow. While they take many forms – resistors are a simple device and one of the three devices in the triad of passive components. The other two are capacitors and Inductors. In a DC circuit though the inductor and capacitor do not do very much. In a steady state DC system, the Capacitor behaves as an open circuit the Inductor behaves as a short.

Analysis of a DC circuit is straight forward using Ohm's Law: $V=I \cdot R$

AC Circuits are a bit more complex (no pun intended). Ohms law still applies however the impedance of capacitors and inductors is influenced by the frequency, and the amount of capacitance or inductance changes the phase of current with respect to the voltage.

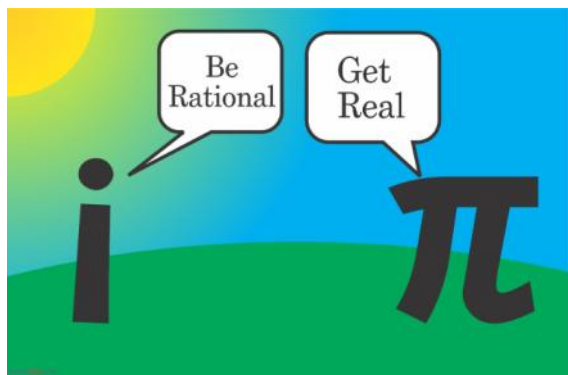
Resistance is the restriction against current flow. This characteristic is present in all conductors and most notably the humble resistor. This is what cooks your toast, so tomorrow while you are buttering your freshly toasted bread take a moment and tip your toast to Georg Ohm, whom the unit for resistance, Ohm, is named after.

Reactance is inertia against the flow of current. Reactance exists where electric or magnetic fields are developed proportionally to the applied voltage or current. This is where the inductor and capacitor are important. When AC current passes through reactive load the voltage drop is 90 degrees out of phase with the current. Either leading or lagging depending on the source of the reactance.

Have you met ELI the ICE man? Eli reminds us that current lags voltage (lagging, or positive j) in an inductive circuit and current leads voltage in a capacitive circuit (leading, or negative j). The unit for reactance is, also the Ohm and its symbol is "X".

You may have noticed I slipped an “j” in there.

“j” stands for imaginary. “j” is the $\sqrt{-1}$ and this is the term we use to denote the reactive part of the load. The **j** is sometimes called the **j** operator. I know what you are thinking how we can take a square root of a negative number. Well, we cannot. So, that is why this is called an imaginary number. The “j” is sometimes an “i”.



Impedance is the comprehensive expression of all the resistance and reactance to current in an AC circuit. Its symbol is “Z”, and its units are.... You guessed it the ohm.

There are a couple of ways to express impedance which when dealing with AC circuits which are called phasors. A phasor is a complex valued number that represents a sinusoidal waveform. A phasor has the magnitude and phase of the sinusoid it represents.

Let’s take the impedance of **67Ω + j19Ω**

This is the rectangular form of a complex number. **A+Bi** where **A** is the real part and **Bi** is the imaginary part.

Another way to express impedance is in Polar form: **R∠θ** where **R** is the square root sum of squares of both the real and imaginary components and **θ** is the inverse tangent of the imaginary portion with respect to the real portion of the impedance.

$$R = \sqrt{67^2 + 19^2} = 69.6$$

$$\theta = \tan^{-1} \frac{19}{67} = 15.8^\circ$$

$$Z = 69.6\Omega \angle 15.8^\circ$$

We have two ways to say the same thing. The angle can be negative or positive depending on the amount of capacitance or inductance in the circuit.

I know that this is enough to make your head explode. But there is a point to this dissertation.



Resistance reactance and impedance are all given in Ohms Ω but the units for a capacitor is are Farads and the units for an inductor are Henrys. How do we get these into Ohms. This is where the frequency the circuit is operating has an impact on the reactance of a capacitor and inductor. The equations below will illustrate this.

$$\text{Capacitive reactance } (\Omega) = -j \frac{1}{2\pi f C}$$

Where **f** is the frequency of the circuit, **C** is the capacitance in Farads and the **j** operator is to denote this is an imaginary number. The negative sign reminds us that the capacitor adds negative reactance to the circuit.

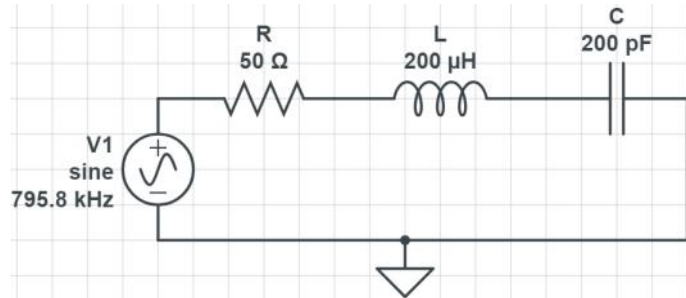
$$\text{Inductive reactance } (\Omega) = j2\pi f L$$

Where **f** is the frequency of the circuit, **L** is the inductance in Farads and the **j** operator is to denote this is an imaginary number. Inductive reactance adds positive reactance to a circuit.

ED : Take a Deep Breath, grab a Cold 807, and then Turn the Page

If the inductive and capacitive reactance are equal and opposite the circuit is at resonance.

Lets look at the example below. We have a resistor, inductor and capacitor in series.



Frequency 795 kHz

Resister: 50 Ω

$$\text{Resistive reactance } (\Omega) = 50\Omega + j0\Omega$$

Capacitor 200 pF

$$\text{Capacitive reactance } (\Omega) = -j \frac{1}{2\pi * 795000 \text{ Hz} * .000000000200 \text{ F}} = 0\Omega - j1000\Omega$$

$$\text{Capacitive Reactance } (\Omega) = 1000\Omega \angle -90^\circ$$

Inductor 200 μH

$$\text{Inductive reactance } (\Omega) = j2\pi * 795000 \text{ Hz} * .0002 \text{ H} = 0\Omega + j1000\Omega$$

$$\text{Inductive Reactance } (\Omega) = 1000\Omega \angle 90^\circ$$

Since this is a series circuit, we add all the values.

$$Z = 50\Omega + (1000\Omega - 1000\Omega) = 50\Omega + j0\Omega$$

$$\begin{aligned} \text{So} \\ Z &= 50\Omega + j0\Omega \\ \text{Or} \\ Z &= 50\Omega \angle 0^\circ \end{aligned}$$

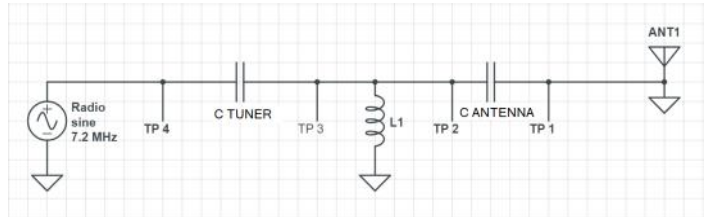
At this frequency, this circuit is resonant. If this were a radio and antenna it would have an SWR of **1:1**

When we talk about a 50-ohm impedance it really means **50 Ω** of resistance with **j0Ω** of reactance.

However, if you change the frequency, the circuit is no longer in resonance. This is why the Tuner needs to be adjusted when you change bands. The capacitors and inductors have a different impedance at 40 meters than they do at 20 or 80 meters.

All these calculations rest on the assumption that we are dealing with ideal components. As I will illustrate in the following example none of the items in any of our transceiver circuits are ideal components. But we get an answer that is closed enough to convince me how the system works.

Looking at the simplified schematic of the system (please excuse the crudity of my model as I have not had time to build it to scale or to paint it)



We can see the radio, antenna a couple capacitors and inductor and some test points.

There are other components in the front end of the tuner, though when doing this experiment, I bypassed the front end of the tuner buy running the input directly to the tuner capacitor. This helped eliminate some of the complexity and variability of the calculations.

First, we will measure the impedance of the antenna and feed line. I did this using a NanoVNA that I bought of Amazon for less than \$50. I have used better ones in the field but for \$50 this gets us close enough to illustrate the point.

I am going to try to tune up on 40 meters. I chose 7.2 MHz as my tuning point because that is where I had the sharpest dip in reactance and the best SWR on the day I did this experiment.



The SWR at this point is 2.28 and our impedance is 34+j31

Then we insert the antenna tuner and adjust the inductor and two capacitors until we have an acceptable SWR.



Making a few adjustments we can get the SWR down to 1.014 and the Impedance to 50+j0.5

Now, to analyze the circuit we created, we need to make a formula. The formula will represent what the radio sees.

Working backwards from the antenna we have a C antenna in series with the antenna.

$$Z_{C-ANT} + Z_{ANT}$$

The next step backwards is the inductor which is in parallel with the antenna and the antenna capacitor.

$$\frac{1}{\frac{1}{Z_{L1}} + \frac{1}{Z_{C-ANT} + Z_{ANT}}}$$

Our final step before we get to the transceiver is another capacitor in series.

$$Z_{SYSTEM} = \left[\frac{1}{\left(\frac{1}{Z_{L-1}} \right) + \left(\frac{1}{(Z_{C-ANT}) + (Z_{ANT})} \right)} \right] + (Z_{C-TUN})$$

We can now measure the values of our components. Here is where reality and theory diverge slightly. The equation assumes ideal components. Our components are not ideal. But the exercise gives us close enough to see the impact that our tuner has on the whole system.

With that in mind, we measure the value of our components and come up with the following values.

Capacitor-Tuner
C_{TUNER} = 160 pF

$$Z_{C-TUNER} (\Omega) = -j \frac{1}{2 * \pi * 7,200,000 \text{ Hz} * 0.000000000160 \text{ F}} = (0 \Omega - j138 \Omega)$$

Capacitor-Antenna
C_{ANTENNA} = 150 pF

$$Z_{C-TUNER} (\Omega) = -j \frac{1}{2 * \pi * 7,200,000 \text{ Hz} * 0.000000000150 \text{ F}} = (0 \Omega - j147 \Omega)$$

Inductor: L-1 = 1.51 μH

$$Z_{L-1} (\Omega) = j2 * \pi * 7,200,000 * .00000151 \text{ H} = (0 \Omega + j69 \Omega)$$

Z_{ANTENNA} = 34Ω + j31Ω

$$Z_{SYSTEM} = \left[\frac{1}{\left(\frac{1}{Z_{L-1}} \right) + \left(\frac{1}{(Z_{C-ANT}) + (Z_{ANT})} \right)} \right] + (Z_{C-TUN})$$

$$Z_{Sys} = \left[\frac{1}{\left(\frac{1}{(0\Omega + j69\Omega)} \right) + \left(\frac{1}{(0\Omega - j147\Omega) + (34\Omega + j31\Omega)} \right)} \right] + (0\Omega - j138\Omega)$$

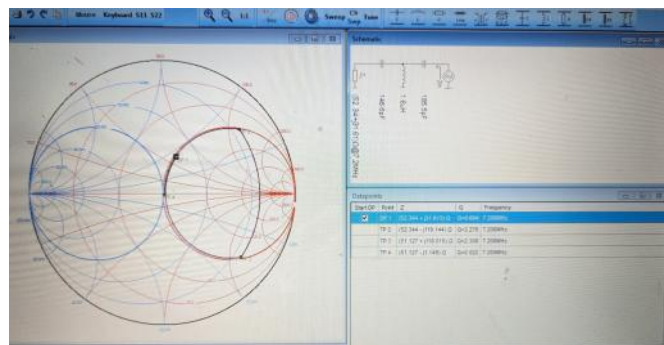
$$= 48.5\Omega - j2.5\Omega$$

Not exactly the 50 Ω + j0Ω that we were looking for. As I mentioned above, we are not dealing with ideal components. But this gives the idea, mathematically what the tuner does to the circuit.

Doing all this math is sort of an exercise in futility. It is basically doing math for the sake of math. We all know these devices work and there are free tools available where you can build this same circuit and the software does the math for you. But maybe you are like me and enjoy taking things apart just to see how they work.

The tool by Fritz Dellsperger (linked below) will do the exact same thing for you.

Set up smith charts, manipulate component values and see the impact on the impedance.



[Fritz Dellsperger - Smith](#)

Here is our final check.

The ICOM IC-7300 SWR Graph on 40 meters with the antenna tuner bypassed :



The ICOM IC-7300 SWR Graph on 40 meters with the antenna tuner in line with the circuit :



While not perfect, our expected results are close enough to our actual results to convince me that it is good.

Thank you for taking the time to read through this, and a big thank you to Jody for getting all of this to format into the newsletter. If you have any questions, find a mistake I made or have an area for me to improve my method please let me know up at the club, on the Big 64 repeater, the reflector or through email.

Charles - KC3TTK

Skyview VE Sessions

Skyview provides VE Testing at the Skyview Clubhouse each month (Details provided later, near the end of this newsletter)

Here are some of the recent success stories

August 2023

Tim Mullins KC3WOQ passed the General exam

September 2023

Dave Brady N3DRB passed the General exam

Samantha Dzielski KC3VPN passed the General exam

Walter Cornwell KC3WCY passed the Extra exam

October 2023

Ted Semetkoskey KC3VCX passed the General exam

Andrew Neil KC3SDJ passed the Extra exam

November 2023

Charles Mance KC3TTK passed the Extra exam

tnx : Tom - AB3GY

Budda-Bing !!

de Bob - WC3O

This is a tale of woe. I forget the date now, but we had a large rash of thunderstorms move through the area. I remember that I was watching the Lightning Maps web site and there were so many lightning strikes that the entire page was completely BLACK! I had never seen anything like it. I remember thinking, that can't be good for anyone. It wasn't.

Well, as luck would have it the storm went right by the Skyview clubhouse. I believe that we took at least two strikes. We have pretty good lightning protection at the clubhouse, but we got hit in the few ways that we were not well protected.

At first I thought the only hit we took was through our COMCAST internet cable line. We lost the internet modem, the router, the CAT5 lightning protector in the radio room that helps protect the CAT5 cable that runs between the repeater shed and the radio room (There's two protectors on that line on either end), and the internet switch in the repeater shed. That was enough. I received huge help from Steve, KE3Z (X-KB3EYY) and Jim, KQ3S. Steve purchased all of the components that we needed, installed and programmed them and got us back up and running. I thought we were good.

We were not...

Also, the lighting took out the TNC for our APRS. Pat, AB3IK donated a new Kantronics TNC and Curt, WU3U programmed it up. It put our APRS back on the air. I thought we were good.

We were not...

Next I noticed that the rotor on the crank-up tower was only working in one direction? After some diagnostics I found that one of the motor windings in the rotor was open. Damn! With the help of Marty, AG3I, we switched out the rotor with a spare. Just to be sure, I tested the spare rotor before we installed it in the tower. It worked great. We replaced the rotor and I thought we were good.

We were not...

The rotor controller for the crank-up tower would turn the rotor 360 degrees, but the display only showed it

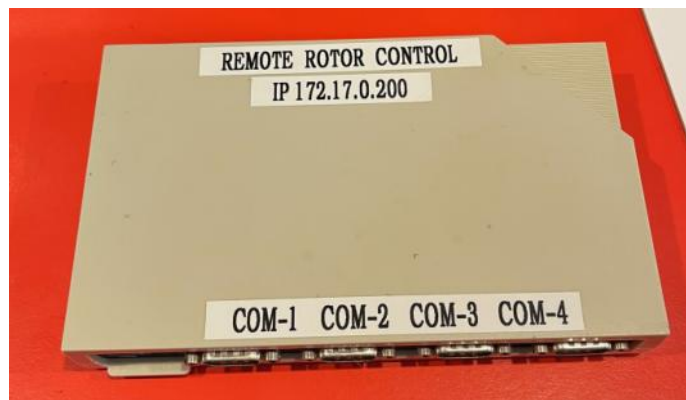
tuning 180? What the hell! After replacing the rotor control box with an old-school CDE control box we found that the issue was in fact that the control box was damaged. The rotor control boxes have an aftermarket circuit board installed called Rotor-EZ to allow automated control of the rotors.



Dan, NM3A replaced the metering resistors in the Rotor-EZ circuit board and once again the controller worked! I thought we were good.

We were not...

This was all in a mad rush to get everything working in time for the CQ World-Wide RTTY contest on September 23/24. I have things set up for N1MM and N1MM ROTOR programs to allow remote rotor operation from each computer. I noticed that this feature was not working?



To make this configuration function I use an Edgeport adaptor that gives me 4 virtual COM ports using one USB connection. Turns out, the Edgeport adaptor is dead... As luck would have it, I had a spare! I installed the new

Edgeport adaptor and sure enough the four virtual COM ports were back! I thought we were good!

We were not...

The new adapter was not seeing any of the three rotors (Quad, the crank-up tower and the 40 meter beam) What the hell! Turns out that the strike that took out the rotor, that took out the rotor control box, that killed the Edgeport adaptor, also took out the MAX232 RS232 communication chips in all three rotors!

As of this writing the three MAX232 chips still need replaced.

Add to that:

A While back one leg of the 80 meter dipole up 90 feet on the repeater tower broke. The rope that we had shot into the tree YEARS ago grew into a tree branch and was no longer usable. We replaced the dipole wire and needed to reshoot a new line up through the tree on our next door neighbor's property. (THANK YOU Diane!) With the help of Chuck, K3CLT, Dan, NM3A, Mike, KC3CBQ and others we got the 80 meter dipole back up and working.

Then we noticed that the DX Engineering NCC1 receive antenna system was not working. We found that the phantom voltage that powers the active receive antennas was not working.



Ron, NJ3R took a look, found the issue and repaired it. I thought we were good!

We were not...

THEN we found that the lightning strike/s took out both active antenna pre-amps, blowing the top of a capacitor and blowing out the FETs. We replaced the active antenna preamps with spares. Ron is looking at the blown pre-amps and hopes to have them returned to service, if possible.

Add to that:

I don't know if this was lightning related or not, I don't think it was, but one of the Elecraft W2 wattmeter sensors crapped out. Ron, NJ3R is looking into that one.

Add to that:

The little NUC computer that operates the Skyview remote HF radio shit the bed. This was not related to the lightning strike, but the computer had been slowly failing for some time. I found a similar NUC on EBAY minus a hard drive for cheap. I ordered it and installed the old hard drive and it worked! I thought we were good!

We were not...

Steve, KE3Z needed to properly set up some things to allow the RemoteHams program to access the outside world. The remote is now back up and running...

BTW Dan, NM3A also replaced a damaged 5 volt regulator chip in the old TNC and got that operational again

During the RTTY contest we noticed an intermittent issue with the amp on the Blue station. That needs to be looked into yet.

Add to that, I'd like to get the 6 meter Moxon that Bill, W3BUW built for us around two years ago installed. It's been a long time and I feel bad that I haven't installed it yet. As of this writing the antenna is installed and the coax feed still needs run.

Also, Steve, K3FAZ wants to install a UHF antenna to add Skyview to the list of stations that tracks weather balloons. Other than the antenna it would just consist of as Raspberry Pi that would live in the repeater shed. Stay tuned.

Also, I want to replace the cabling on the crank-up tower that is getting pretty rusty. As of this writing the cables are ordered.

Other than that, it's been pretty slow in the Radio Officer department. Gotta love that lightning.... Plans are in motion to rectify our weak areas for lightning protection. Stay tuned.

(The quad rotor and the 40 meter beam rotor both already have lightning protectors on them.

The rotor on the crank-up tower was the only one that didn't...)

I can't begin to thank enough all of the great hams that have helped me through this rough patch. MUCH appreciated. Hoping for smooth sailing.

I'll leave you with this Bob Dylan song that pretty well sums up the situation.

<https://www.youtube.com/watch?v=pndhO5DcSI0>

Cooky - WC30

Skyview Radio Officer



APRS in WPA – Not So Good

de Jody - K3JZD

Several years ago, I tried using a small dedicated APRS TNC that was connected to the hand mike interface on my 5 watt 2 Meter FM HT. This little APRS TNC used Bluetooth software to obtain my GPS location from my cell phone and then it sent the periodic APRS Beacon Packets out via the HT's hand mike interface. I carried this cell phone, APRS TNC, and HT combination with me for a week while I took my daily walks around my neighborhood.

The results were very disappointing. I only had one hit on each on two of the days during the week that I carried it – both were from the highest spot that I walked by. Other days, while I was passing the same area, I was not seen. The timing of my APRS Beacons had to coincide with my passing by that high spot.

I called it an interesting experiment and put my small dedicated APRS TNC on the shelf to gather dust. I published my results and my thoughts in some previous issue of the Q5er.

Recently, Curt – WU3U provided an interesting APRS Elmer Night presentation at Skyview. While the technology had not changed, nonetheless that presentation inspired me to try it again, only this time with a mobile radio. <https://www.youtube.com/watch?v=XcD4ufL6w2I>

I bought a small Radioddity DB25-D transceiver which had GPS, TNC, and APRS software built in. I configured the APRS settings in the radio, set it to 144.390 Simplex, set it to Low Power (20 watts), and added an external antenna. I was broadcasting my APRS Beacons every three minutes, as recommended.

After seven days of driving all around I only was seen a few times. During that week of testing, Dan - KB3FCZ in West Mifflin saw me once whenever I was up at the local Trafford Gun Club that we have been going to for our shooting events. And K3MJW saw me once on another day whenever I was at Rolling Fields Golf course, which is just a stones throw from the K3MJW clubhouse.

That week included my going up Rt 28 to do a couple of SOTA summits that were up to the North of I-80, and then coming back home from there via Rt 119, How-

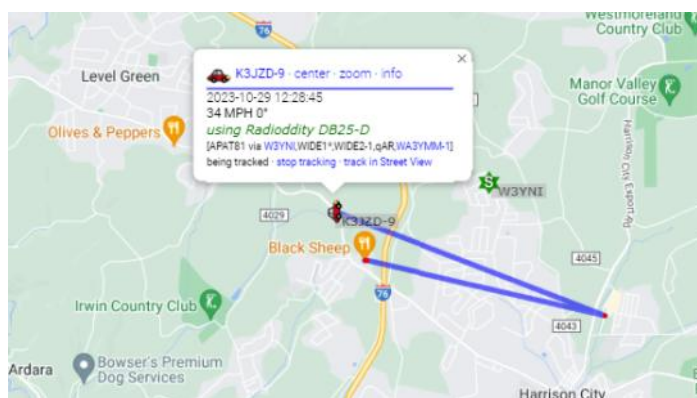
ever, I was never seen during my five hours of driving on that long round trip up to the North and back.

Stations which heard K3JZD-9 directly on radio - [2023-10 ▼]

callsign	pkts	first heard - EDT	last heard	longest	(tx => rx)	longest at - EDT
K3MJW-1	1	2023-10-26 12:03:07	2023-10-26 12:03:07	FN00DM > FN00DM	1.2 miles 37°	2023-10-26 12:03:07
KB3FCZ-2	1	2023-10-23 17:09:16	2023-10-23 17:09:16	FN00DJ > FN00AI	9.5 miles 264°	2023-10-23 17:09:16
W3YNI	6	2023-10-29 11:46:19	2023-10-29 12:28:45	FN00EI > FN00EJ	1.5 miles 319°	2023-10-29 12:22:16

In addition to KB3FCZ and K3MJW seeing me, according to these APRS site statistics, W3YNI saw me six times on one day whenever I went to the Harrison City Giant Eagle, which is practically in Chuck's back yard. But he did not see me while I was driving from Levelgreen on Rt 130 until I was almost to the crest at the I-76 turnpike crossing. Whenever I am just a little ways to the West of that turnpike crossing, there is not really much drop in elevation, but I drop out of his line of sight and am invisible. Both coming and going.

And when W3YNI was tracking me, the APRS map does not show my location every three minutes as I expected to see. It only seems to show me at three distinct locations. It does not show that I went through 'downtown Harrison City' on Rt 130 while both coming and going. So, I have to wonder about those six reported receptions. I had left my radio on while I was in Giant Eagle – maybe my radio does not use Smart Beaconing and kept on sending Beacons while my car was parked.



Levelgreen is not very far from W3YNI. And I am at a respectable elevation. But W3YNI never sees me anywhere near my home. And K3MJW never sees me either. While my 2M magnetic mount mobile antenna is not a high gain antenna, I do not see where my adding a high gain 2M antenna would make any difference.

APRS station **K3JZD-9**  - [show graphs](#)

Comment: using Radioddity DB25-D
Location: 40°22.62' N 79°41.21' W - locator **FN00DJ70NL** - [show map](#)
3.1 miles North bearing 343° from Manor, Westmoreland County, Pennsylvania, United States [?]
3.7 miles North bearing 12° from Irwin, Westmoreland County, Pennsylvania, United States
16.8 miles East bearing 105° from Pittsburgh, Allegheny County, Pennsylvania, United States
70.9 miles Southeast bearing 134° from Youngstown, Mahoning County, Ohio, United States
Last position: 2023-10-29 12:28:45 EDT (3h46m ago)
2023-10-29 12:28:45 EDT local time at Manor, United States [?]
Course: 0°
Speed: 33 MPH
Device: Anytone: AT-D878 (ht)
Last path: K3JZD-9>APAT81 via W3YNI,WIDE1*,WIDE2-1,qAR,WA3YMM-1 **Good path!**
Positions stored: 7
Packet rate: 510 seconds between packets on average during 2548 seconds.
Other SSIDs: **K3JZD** 

Just about all of the APRS monitoring stations are located at home station locations. And probably using modest, and perhaps low level, omni-directional secondary 2M antennas with no gain. That may work well in the parts of the world that are flat and long distance 2M line of sight is not an issue.

Western PA's terrain was not designed for line of sight communications. Perhaps if the APRS monitoring stations were elevated to the status of our 2M FM repeaters, and were placed at high locations with gain antennas and very sensitive receivers, mobiles would be heard much better. But since everything is on 144.390 Simplex, I can quickly see the downside of that.

The alternative is to have hundreds, if not thousands, of additional home based monitoring stations. And that is not likely to happen, since being tracked is not a really a high priority for most people. Paddy's wife might like to know which Pub that Paddy is at right now, but Paddy is not likely to add APRS to his vehicle to tell her that!

I am not always in the land of No-RF whenever I am driving around Pittsburgh's Eastern Suburbs. What is puzzling is that I hear lots and lots of APRS Packets while I'm out driving around. But then whenever I get home and look at the last 24 hours of activity on the APRS Map, I do not see very many vehicle tracks. So, I don't know where all of the APRS Packets I have been hearing are coming from, nor why they are being sent.

Maybe all of the APRS Packets that I am hearing while driving around are home based monitoring stations just reporting over and over again that they are there. Or maybe they are APRS Packets just being forwarded and re-forwarded. As Curt suggested in his presentation, maybe all of those extraneous APRS Packets are interfer-

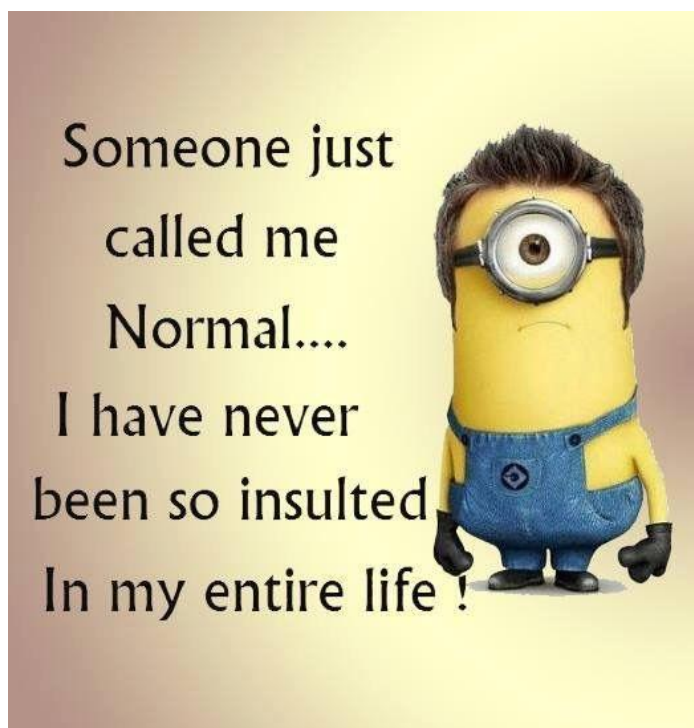
ing with the reception of the mobile Beacon broadcasts. The protocol is strictly one time broadcasting - no acknowledgements and no repeats.

Maybe the APRS system needs a second backbone frequency for the forwarding stuff, leaving the primary frequency open for listening for mobiles. Although APRS has been around for a long time, the APRS technology does not seem to be evolving at all.

I have concluded once again that APRS does not really have a practical future in Western PA. Whenever I want to be tracked (beyond what my cell phone automatically does), I will have to rely solely on my Garmin InReach Satellite Tracker. Not APRS.

I'll be adding some FM and DMR Repeater Channels to my Dual Band Radioddity DB25-D mobile transceiver in order to get some real use out of it.

Jody – K3JZD



Radio Check ?

de Brian - KC3VNB

ED : Like the earlier article by Charles - KC3TTK, this article contains some information that can be read by enlarging this PDF File.

At one time or another, you've no doubt given your call and asked for a radio check over the air. But what exactly are you testing? Well, if you're trying to get into a repeater, you're probably confirming your Tx/Rx frequencies/offset and perhaps your PL tone setting. Or you may be checking to see if you have sufficient power and antenna performance to see if you can reach the intended receiver with sufficient readability.

Those are perfectly fine things to confirm, however this article is going quite a bit deeper to look at how to check your rig or HT for conformance to FCC regulations, the manufacturer's specifications and then some. Not everyone will have the instruments that I used, but I will provide my methodology and alternate approaches where possible, so that most everyone can examine their equipment a bit deeper.

For these tests, I'll be using a radio that has quite a bit of love and hate surrounding it – the ubiquitous Baofeng UV-5R. My sample was purchased in February of '23, and is badged as a UV-5R8W (8W tri-power version).

Now many of you may have seen various YouTube or online reviews of this radio – I've seen plenty, and most are woefully short on their accuracy, explanations, and methodology – that's exactly what this article will work to clarify.

Our Device Under Test:



Manufacturer Specifications:

General Specifications

Specification	Value
Frequency Range (MHz)	144-148(Rx only) 420-450MHz
Memory channels	128 total (0-127)
Frequency stability	2.5ppm
Frequency step (kHz)	2.5K/5.0K/6.25K/10.0K/12.5K/20.0K/25.0K/50.0K
Antenna impedance	50 Ohm
Operating temperature	-20°C to +60°C
Supply voltage	7.4V
	≤75mA (standby)
Consumption	380mA (reception) ≤1.4A(transmission)
Mode of operation	Simplex or semi-duplex
Duty cycle	03/03/54 min. (Rx/Tx/ Standby)
Dimensions(mm)	58X110X32
Weight (g)	214

Transmitter Specifications

Specification	Value
RF power (Watts)	UV-5R/UV-5R+Plus/UV-5R EX/GT-3: 5W/1W UV-5RTP/GT-3TP: 8W/4W/1W
Type of modulation	FM
Emission class	16K#F3E(wide band) 1K#F3E (narrowband)
Maximum deviation(kHz)	±5.0 (wide band) ±2.5 (narrowband)
Spurious emissions (dB)	<-60dB

Receiver Specifications

Specification	Value
Receiver sensitivity	0.2µV (a t 12dB SINAD)
Intermodulation	60dB
Audio Output	1000mW
Adjacent channel selectivity	65/60dB

For our DUT, a VHF/UHF HT with power output below 25W, the relevant FCC regulation is as follows:

97.307 Emission standards. (Only paragraph 'e' shown for clarity)

(e) The mean power of any spurious emission from a station transmitter or external RF power amplifier transmitting on a frequency between 30–225 MHz must be at least 60 dB below the mean power of the fundamental. For a transmitter having a mean power of 25 W or less, the mean power of any spurious emission supplied to the antenna transmission line must not exceed 25 µW and must be at least 40 dB below the mean power of the fundamental emission, but need not be reduced below the power of 10 µW. A transmitter built before April 15, 1977, or first marketed before January 1, 1978, is exempt from this requirement.

That 97.307(e) wording is a bit confusing, and this is where quite a few online pundits go off the rails. Let me unpack this for you in the simplest terms possible. If you work through all of the cases contemplated in the byzantine rule above, you will end up with this: For any device built or marketed in the last 45 years, operating between 25 W and 250 mW, no emission outside of the intended transmission's bandwidth can exceed 25 μW. Since it will come in handy later, please note that 25 μW is the same as -16 dBm, which you can compute from $(10 * \log(25\mu\text{W}/1\text{mW}))$.

Test Results and Methodology

1. Battery:

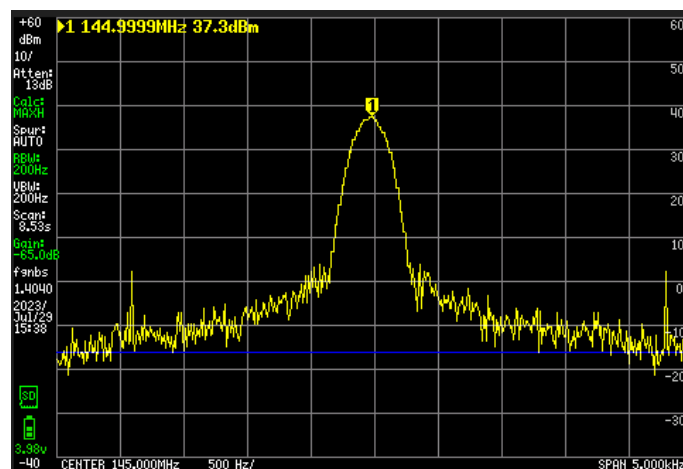
The battery included with this radio has 7.4 V/1800 mAh printed on it. Immediately after charging, the battery voltage was 8.3 V. A DC electronic load was used to drain the battery at a constant 200 mA rate until the voltage was 6.4 V. That end voltage was chosen based on when the radio reports "low voltage", as determined by using a bench supply and lowering the voltage until the warning was heard. One could alternatively run the battery down until the low voltage warning occurs, and then use a meter to measure the voltage. The drain test yielded 1250 mAh – only 70% of the rated value. Not terribly surprising given the overrating stated on many Li-ion batteries. If you don't have an electronic load, you can get a close approximation using resistor in the range of 30 Ω to 40 Ω across the battery, timing until the battery drops to 6.4 V and apply Ohm's law for the current (using an average voltage of 7.4 V will be good enough).

The DC electronic load also provides a way to rapidly change the current drawn from the battery. By doing that and measuring the change in the battery voltage, the internal resistance of the battery can be calculated. For this test, a base draw of 100 mA was used, and then tests where the current was increased by 50 mA, 100 mA, 500 mA and 2 A, while ΔV was measured with an oscilloscope. Alternatively, a resistor could be used to temporarily load the battery while observing the change (ΔV) with a voltmeter. In all cases, the observed ΔV/ΔI came out to roughly 220 mΩ. No spec was given, but this is not an unreasonable value for a 2 cell, low-capacity Li-ion battery. It does give a general sense that

the battery is healthy.

2. Power Output:

For these tests, a TinySA Ultra was used with 65dB of external attenuation. You could of course use an RF power meter and a dummy load. Here is what the test looked like for 145MHz at the "H" power setting (specified as 8W output):



Frequency/Setting	Measured dBm	Measured Output (W)	Specified Output (W)	Supply Current (A)
145 MHz/High	37.3	5.4	8	1.84
145 MHz/Medium	35.3	3.4	4	1.50
145 MHz/Low	29.8	0.96	1	0.85
445 MHz/High	36.0	4.0	8	1.80
445 MHz/Medium	34.9	3.0	4	1.46
445 MHz/Low	30.4	1.1	1	0.99

Note that 37.3dBm is only 5.4W; quite a bit below the specified 8W. High/Medium/Low values for VHF and UHF were as shown in the following table. Overall, this would be reasonable if the radio was specified as a 5W device. The measured supply current during transmit is also shown. The specified ≤1.4 A for transmit was roughly correct for Low and Medium output, but was clearly out of spec for High output.

The average standby current was measured at 38 mA (spec is ≤ 75 mA). The standby current did have a rather odd periodic fluctuation, which was observed with a special lab bench supply possessing statistics and logging functions. Alternatively, a scope with a current probe or shunt resistor could have been used.

3. Frequency Accuracy:

Using a GPSDO (global positioning system disciplined oscillator) referenced counter, a 145 MHz setting on the radio was measured as 144,999,944 Hz. This corresponds to a 0.4 ppm error – well within the 2.5 ppm specified.

4. Sensitivity:

The TinySA ultra can also operate as a reasonably well calibrated signal generator. By using external attenuators, very small signals can be supplied to the radio. The official specification for sensitivity uses SINAD, which is a sum of S/N (signal to noise ratio) and THD (total harmonic distortion). For our purposes here, the signal was increased until the lowest squelch setting was opened, and the signal was enough to overcome most of the background noise. Conversion from dBm to μV is:

Band	Measured Sensitivity (dBm)	Measured Sensitivity (μV)	Specification (μV)
VHF	-123	0.16	0.2
UHF	-121	0.20	0.2

$$\mu\text{V} = 10^6 * \text{sqrt}(50 * 10^{((\text{dBm} - 30)/10)})$$

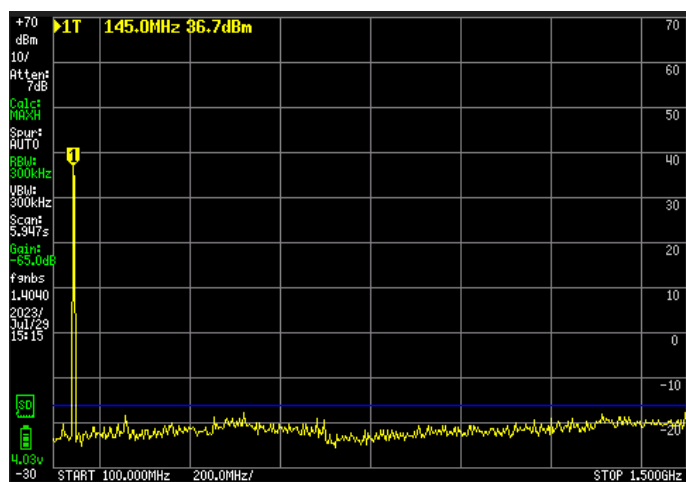
The receiver sensitivity met the spec, and is actually quite decent for an HT.

5. Selectivity:

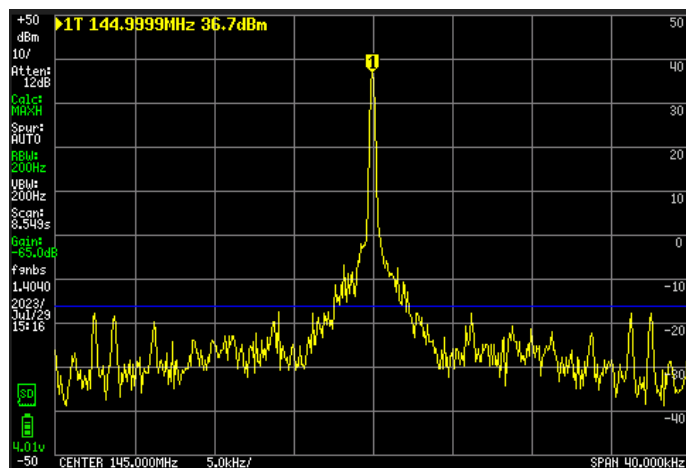
The spec given for selectivity doesn't really say much; just 65/60 dB, the two numbers possibly being for VHF and UHF respectively. However, it doesn't give the channel spacing. So, the approach taken here is to measure the channel spacing that would tolerate a neighboring signal +60 dB over the sensitivity determined previously. Using the TinySA Ultra signal generator once again, the frequency of the +60 dB signal was varied until the first squelch threshold was surpassed. For VHF, a 15 kHz spacing was measured, while for UHF, it was a 13 kHz spacing. Channel spacing in most areas is 20 kHz, so the selectivity spec is easily met. Even in those areas where 12.5 kHz spacing is used, it would most likely do well.

5. Spurious Emissions:

In the online universe, this is the specification most hotly contested. Early models of this radio were measured as having very large 3rd and 5th harmonics; sometimes even 2nd harmonics would exceed the FCC specs. Remember from early in this article that spurious emissions must not exceed -16 dBm. The manufacturer claims an even tighter spec of -60 dB down from the fundamental, which for the 5 W output would correspond to no spurs exceeding -23 dBm. Looking at a very broad swath of spectrum (from 100 MHz to 1.5 GHz) to check out the higher harmonics, here's the result for VHF:



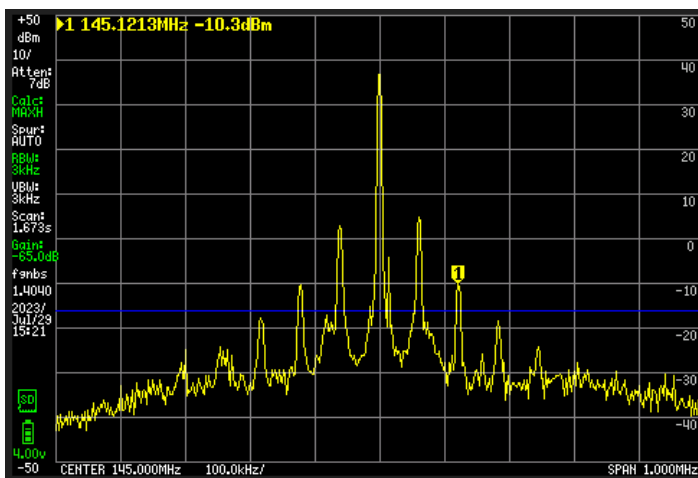
Note that the blue line is at -16 dBm (the applicable FCC limit for spurs). No harmonics out of spec all the way to 1.5 GHz! How does it look zoomed in around the fundamental? Here it is with a 40 kHz span:



Again, no spurs above the blue line. This is the point where most casual YouTube pundits would say that

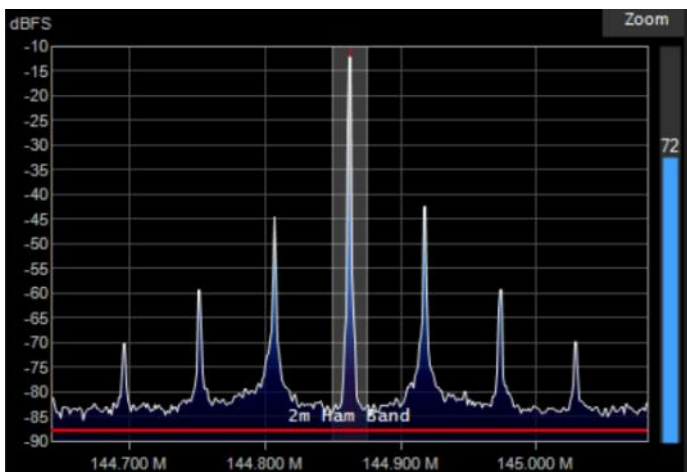
Baofeng has fixed their filtering, and thus declare FCC compliance.

Well, this article is not for casual observers, so let's zoom out a bit to see any emissions the next few neighboring "channels" would see, using a 1 MHz span:

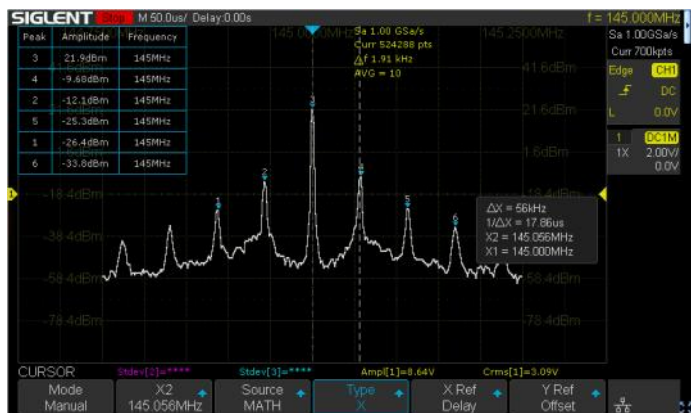


Clearly, a **FAIL** – multiple spurs outside of the bandwidth of the channel, above the blue line. Similar results were seen for the UHF band.

What if you don't happen to have a TinySA Ultra at your disposal? Well, another way to check this is with an SDR receiver and a program such as Airspy. The RTL-SDR dongle is quite inexpensive and when used with external attenuators (similar to the TinySA), and all gain set to zero, you would see nearly the same result as the spectrum analyzer: Unfortunately, you will not see results in dBm directly – but you can still use the relative dB values on the left to see that the spurs are out of spec – down only about 30 dB to 33 dB from the fundamental.



Another alternative is to use the FFT (fast Fourier transform) feature available on most digital oscilloscopes. Again, we see the same out of compliance spurs. Please note that a 15 dB attenuator was used on the scope input, in case you want to convert the amplitudes shown below to actual dBm.



Conclusions

As a receiver, this radio is not bad at all for an HT. It meets the receive specs and most of the other general specs. It falls short in the battery department, which is sadly typical for many manufacturers, but that is not a deal breaker from a compliance standpoint.

Where it completely falls down is in the transmission area, with significantly out of spec and out of compliance spurious emissions. Also, there is an unfortunate failing on transmission power, not unexpected, but disappointing nevertheless.

It looks like I'll be restricting my Baofeng to scanner duty. What about your radio?

Hopefully, this article has given you some new ideas on how to test your equipment, or at least motivated you to do so. Maybe it even helped explain how to use some tools you already have in some new ways to do the testing.

If you have any questions on the equipment or tests done here, please do not hesitate to contact me at kc3vnb@gmail.com. Have fun!

Brian - KC3VNB

SOTA S2S Trans Atlantic Event

de Dan - NM3A

On Saturday, November 4, I activated SOTA (Summits On The Air) Summit “W3/PT-007”, which is on top of Bear Cave Lookout mountain. This is a nearby SOTA Summit that is on Chestnut Ridge, between Derry and Ligonier.

This is a November and April event to encourage intercontinental S2S (Summit to Summit) activity. I used my old, but newly acquired, Elecraft KX2 running 5 watts. There was lots of CW and SSB activity, but I was only active on CW.

My antenna was a vertical, coaxial sleeve dipole cut for 17 meters. The antenna was easily matched by the KX2's internal tuner on 17 - 10 meters. This antenna requires no ground plane and has a fairly low angle of peak radiation; ideal for DX contacts. The vertical dipole was set up on a 6 meter telescoping fiberglass pole which was lashed to a dead sapling. This was beside a downed log that provided a comfortable seat for me.

The weather was great- sunny and about 45 degrees at 9:30 am and got to about 55 degrees by noon. So my fingers were not numb the whole time. The mountain has a large flat top and consequently, a large activation zone. (We can operate in an ‘activation zone’ that is no more than 75 meters (82 feet) below the actual summit elevation.)

There are a number of active antennas on towers there, but they all seem to be on VHF or UHF. I had very low noise levels. There are a few abandoned sites as well, including an old AT&T microwave relay building and a what was a manned fire tower at the actual summit. I set up in the woods near the AT&T building.

I was worried about my low power and minimal antenna, but I needn't have been. European, Rocky Mountain, and west coast stations were pounding in. Many of them were QRP as well and I had little trouble working quite a few of them. Unfortunately,

many of them had big pileups and it took a while to break through the pileups with just 5 watts.

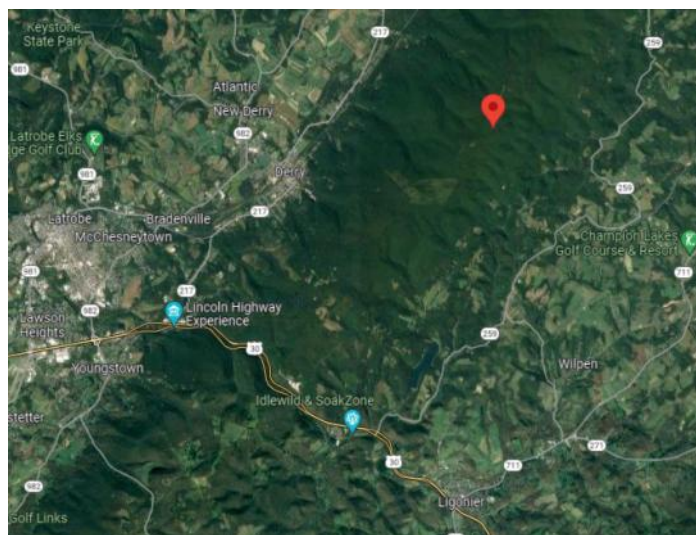
I did work 17 European stations, 9 of which were S2S out of 31 total QSOs. There were an additional 8 USA S2S contacts. I heard many other European SOTA stations, but could not easily break through the pileups. The chasers with high power home stations were just too numerous.

Most contacts were on 10 meters, with quite a few on 12 and 15 meters as well. After seeing what others did and the power and antennas they were running, I felt I had done reasonably well. Most of my time was spent S&P, which was relatively slow going, but garnered all S2S QSOs. A short time calling CQ in the beginning and end gave a much better rate, but few S2S QSOs.

In addition, the XYL and I had a real nice 1 mile hike up to and back from the site and we enjoyed the outing quite well. The good operating conditions were icing on the cake. Ice cream at The Meadows in New Alexandria topped off the day.

Dan - NM3A

For SOTA information—go to sota.org.uk



New/Old Coax for Little Bobby

de Bobby - WC3O

I was a ham for many years before I was hit with the idea that coax leaks signal out through the shield - Likewise, noise from outside of the coax also leaks IN through the shield causing a radio to pick up nearby in-house interference. (Thank you George, KA3GIR) I knew that any given coax has a leakage rating, I just never thought about what that actually means!

My shack at home is down in my basement. It is well grounded. All good equipment and put together fairly well. However, for a long while now, I have been suffering from excessive noise on receive and excessive TVI when I transmit. Whenever I would key my HF radio and talk, it was quickly followed up by loud banging from above. That loud banging would be my wife showing her great displeasure with me killing the TV and causing other issues! For a long time this kept me from trying to operate from home. BANG BANG BANG!

Around two months ago I decided I would try to improve the problem. All of the coax in my shack was all homebrew jumpers that I had put together, maybe 20 to 30 years ago. In that time I've learned A LOT about how NOT to install a PL-259!

Also in recent history, I have decided to steer away from using coax that has a regular braided shield AND an aluminum foil shield such as LMR-400. I get the feeling that the dissimilar metals of the tinned copper and aluminum, over time, causes bad things to happen such as micro arcing within the coax, causing intermod and noise generation. I now use good old RG-213 for longer runs. It's simple and has good resistance to water intrusion, unlike coax with foam type center insulators.

However, on the inside of my shack I decided to use all RG-400 coax. Now don't get confused.

LMR-400 and RG-400 are completely two different types of coax.

RG-400 is the same diameter as RG-58 that is often used with CB applications. But there are some major differences. RG-400 is often used in repeaters, aerospace applications and test equipment. Anywhere that you need flexible cable is minimal leakage.

RG-400 benefits:

- It is double shielded with two silver plated braids, greatly decreasing leakage - out and in.
- The center conductor is also silver plated.
- The silver plating makes soldering a dream!
- It uses a Teflon center insulator that you can heat with a soldering iron until you're blue in the face and it still will not melt. So don't worry about overheating the PL259 while you're soldering and melting the coax.
- It can be wrapped in a tight radius and because of the Teflon insulator, the center conductor will not migrate toward the shield when the coax gets warm like lesser coax does. Most ALL high quality baluns use RG-400 for this reason.
- Despite the small size you can put crazy amounts of power through it! 1500 watts is NO problem.

RG-400 disadvantages:

- It is stiffer than other coax of the same diameter
- The losses are notably higher than it would be with other coax such as RG-8, RG-213, and LMR-400. BUT we are only using it for short runs so the additional losses are largely negligible.
- IT IS EXPENSIVE!

Well, I'm a cheap ham. While I like RG-400, I ain't about to pay the going price for it.

But first, a little backstory:

Picture it. Dayton Hamvention! A threat of rain. Little Bobby is wandering the flea market. He looks down. What does he see? An old cardboard box chalked full of what appears to be RG-400 jumpers! OH MAMA! So here he is sorting through the jumpers and squinting with his sad eyesight trying to be sure that it is in fact RG-400. A stranger approaches. He starts talking to little Bobby. Bobby never looks up but talks to the stranger. The stranger tells Bobby how good RG-400 is. Bobby says he knows and continues to pull jumpers out of the box, never looking once up.

Bobby explains to the stranger that he is working on a multi-op high power station for contesting and that this coax will help greatly with inter-station interference. After sorting out all of the jumpers that he could find, little Bobby looks up at the stranger. Turns out the stranger is none other than contester extraordinaire Frank, W3LPL!

With great embarrassment little Bobby says "Well, I guess I don't have to tell YOU about RG-400!" We laughed, we cried. It is a great Dayton memory that I'll never forget.

Bottom line is that I bought a whole crap-ton of RG-400 for 25 bucks! This is the stuff that I re-coaxed my shack with. Most of the jumpers had BNC connectors on them. SNIP SNIP. Now they have PL-259s.

After installation:

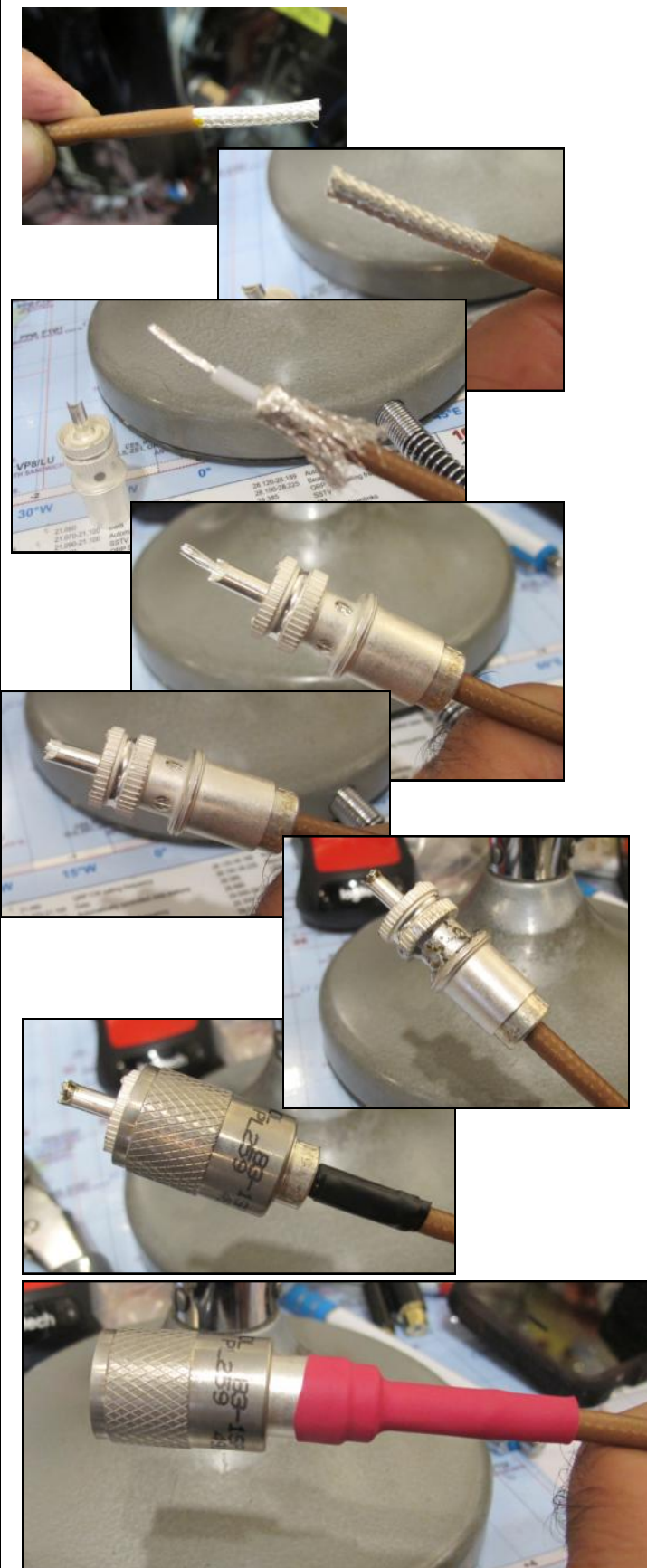
- My noise floor is notably better.
- My wife is getting much less exercise letting me know that I'm killing the TV.
- If I fire up the amp, all bets are off...

Much of the cabling up the joint is this same RG-400. There is also a fair amount of RG-214 donated by Dave, AA3EE. What's RG-214, you ask? It's double shielded, silver plated coax of RG-8 size, 0.404 inches. If you thought RG-400 was expensive? Holy crap! But the addition of double shielded coax up the joint has greatly reduced inter-station interference. Well worth doing. TNX DIT DIT!

So enjoy the coax prep pics. The purpose of the electric tape behind the connector in the one picture is to let the heat shrink get a good grip on the outside jacket so as not to slide off of the PL-259 and down the coax. (My heat shrink doesn't quite shrink small enough to get a good grip on the coax so I fatten it up with some tape)

And kids, don't forget to use only Amphenol "83-1SP" PL-259s. No numbers after the 83-1SP, like 1050 or 15RFX, those are the cheaper non-silver plated body ones. The silver plated ones solder like a dream and are perfect in every way. Take my advice, don't take my advice, it's up to you. Just sayin.

de Bobby - WC3O



On Nomenclature (it hertz)

de Don - WA3HGW

CAUTION:

Musings of a grumpy (sometimes) old man follow 😊

The recent demonstrations at the clubhouse on repair and operation of the Heathkit HX-11 transmitter reminded me of something I think about from time to time. That is; Why take a perfectly good self-explanatory term, such as cycles-per-second, and obfuscate it by assigning it the name Hertz. I think it may have at least something to do with highly educated members of a profession having their own specialized vocabulary to keep it exclusive.



Imagine, if you will, trying to explain our alternating current (AC) power system to a youngster. You describe how the voltage goes up and down over and over again in a continuing cycle 60 times every second or, in other words, 60 Hertz. Their reply might be “What hurts?”. In the old days you would have said that varying of the voltage was 60 cycles-per-second, often shortened to “60 cycles”.

I noted that the Heathkit HX-11 manual shows the frequency ranges for a Novice class license in kc, (kilocycles) or thousands of cycles per second. Obviously, the manual was written before changing over from cycles to Hertz.

The Heathkit manual also specifies the band coverage as 80, 40, 20, 15 and 10 meters. As you may know from

your various FCC exams, frequency and wavelength are interrelated. Wavelength being the distance the wave travels from one peak to the next, normally expressed in meters. This measurement is also self-explanatory. Using the example of frequency above, why not give wavelength a name to honor some other person from radio or electrical history?

How about one Marconi (Mr) being equal to a wavelength of one meter? Maybe one day you will see someone posting on the club email reflector that the 10 Marconi band is wide open.



Wayne's, K3WM, power amplifier for the 23 cMr (centiMarconi) band.

As an aside, I was originally thinking of using Maxwell as the unit of wavelength, but that one is already taken. A Maxwell (Mx) is a unit of magnetic flux equal to 1 gauss cm².

We could expand this nomenclature to other everyday measurements. Highway speed is measured in self-explanatory units. Here in the USA, we use miles-per-hour (MPH) in the IPS (Inch Pound Second) system while Europe and many other countries use the CGS (Centimeter Gram Second) kilometers-per-hour (KPH) system. There is already a named unit for speed in the CGS system. The Benz is equal to one meter per second. How about for the USA we invent the Ford as a unit of speed equal to one mile per hour? On the PA turnpike you could have a speed limit of 70 Ford. In Europe that would be 31.4 Benz.

We could even use such a system at Skyview. How about using the Dipole Dog (DD) as a unit of length for transmission lines. We would need a coax run of at least 150 DD to get to the repeater antenna.

So, there you have it. Now it's time to head on down to the 'ol 75 Marconi band and start calling “CQ, CQ, CQ, No Lids, No Kids, No Space Cadets”....

[Continued - Keep Reading]

P.S. After sending this article to Jody, I was searching for something in the ARRL QST archive.

While perusing the **September 1966 issue of QST** I stumbled across a letter in the Technical Correspondence column from August Huger, WA5BTO, titled "**Hertzese? Why Not?**"

August made the same points as in this Q5er article. So maybe my grumpy musings are not so original!

Ed : Cannot really reprint the referenced QST Reader Letter here -- copyrights and all that stuff -- well, maybe just a little teaser -- you will have to go into the ARRL QST Archive to read the whole thing . .

Sep 1966 QST - Copyright © 2023 American Radio Relay L



HERTZES? WHY NOT?

Technical Editor, *QST*:
Let's see now; we have Mr. Ohm's ohm for resistance, Monsieur Ampere's amperes for current, Mr. Faraday's farads, Mr. Henry's henrys for inductance, and for all I know, Monsieur Voltaire's volts for potential, so I guess it is perfectly logical to have Hertzese.
After all, there is certainly no point in making electronics simple. If we did that, any old citizen could understand it, and then where would the status be in the statement, "I'm in *Electronics*"?

It looks like use of the term Hertz for frequency was coming into vogue around the mid 1960s, although QST was still using Hz, KHz and MHz at the time.

By the way, what I was really looking for was the old exchange that was used in the November Sweepstakes contest. I found it. In 1966 the exchange was: serial number, precedence (always R for routine), your call, check (last two digits of the year you were first licensed), place (your ARRL section), time (in GMT - we didn't call it UTC back then) and finally a date (which was the month and day of your birthday).

The birthday of my friend Chuck, WA3CEJ (SK), would occasionally fall on the phone sweepstakes weekend, and sometimes the other operator would wish him a happy birthday as part of the exchange.

Don - WA3HGW

Frightening

de Charles - KC3TTK

Fall is one of my favorite times of the year. Something I look forward to every year is apple cider from some of my favorite local orchards. Much like wine – there are good years and great years, and even peak time during the years. This year the best cider came in near Halloween.

Now I know what you are thinking what does this article have to do with ham radio, well nothing. It has to do with Halloween. I always enjoy carving pumpkins with my family. But this year I decided to carve the scariest thing I could think of (well the second scariest, the first scariest would require too much explaining to the kids who knocked on my door for treats).

Here it is:



Lets hope none of us see this particular lamp in any of our daily lives.

I had a couple of Trick-or-Treaters ask me why that was so scary. I guess none of them have every had to deal with the consequences of seeing this particular lamp. They do not call it the "Money Light" for nothing.

de Charles - KC3TTK

And furthermore . . .

de Cooky - WC3O

The trend continues... During the PA QSO Party the big AL-1500 amplifier on the Blue Station pooped the bed. It was not quite working right during the recent CQ WW RTTY contest.

Sometimes it worked fine and sometimes it did not. We suspect that there is a contact heating up and losing connection. When things cool down, it worked again. We suspect to see some heat damaged contact/s when we remove the cover. Now, it appears to have lost the high-voltage supply for some reason.

Other than checking the fuse, as of this writing we have not dug any deeper. It's kinda tough because the amp weighs approximately 50 bazillion pounds! (Around 90 pounds) We will give it a good look-see soon. Stay tuned.

AND THEN . . .

Our main 146.640 repeater went down! For a very long time (years) the repeater has had an intermittent, yet persistent hum. Not knowing exactly where the hum was coming from, I would often blame the power supply. It's an older repeater, capacitors get old. The hum was 120 Hz, twice that of the 60 Hz line frequency. Is it a bad rectifier? When I replaced the supply that seemed to have fixed it. Then, the hum would return... What the hell! (The intelligent Radio Officer would have looked at the ripple voltage with a scope on the power supply and seen that the supply was just fine, but I didn't)

The main shelf of the repeater is made up of replaceable modules. IF, power, System, RX synthesizer and TX synthesizer. One day recently I noticed that if I moved the TX synthesizer card that the hum would get louder or quieter or go away completely. Hmmm I tried spraying Deoxit on both sides of the 60-some pin connector to the card/backplane, but no joy. Was the problem in the backplane? Was it the TX Card? Something else?

If you ask someone that knows M3 repeaters they very quickly say "It's the jumpers!" There are short U-shaped coax jumpers with BNC connectors on the front panel to make testing very easy. They are sometimes known to go bad, likely due to careless technicians being too rough with them. I checked. It was not the jumpers... Hell if I know!

I got to pulling the TX synthesizer card for a closer look. Nothing. So I decided to tighten the Torx screws that hold the shielding cover on to the TX card. Guess what? The hum was GONE! I would have NEVER expected that. Never.



I thought we were good!

We were not . . .

After I tightened the screws, the repeater would then simply go offline for no reason, and come back on later. I suspected the VCO (Voltage Controlled Oscillator) in the TX synthesizer card is coming out of lock. MAN!

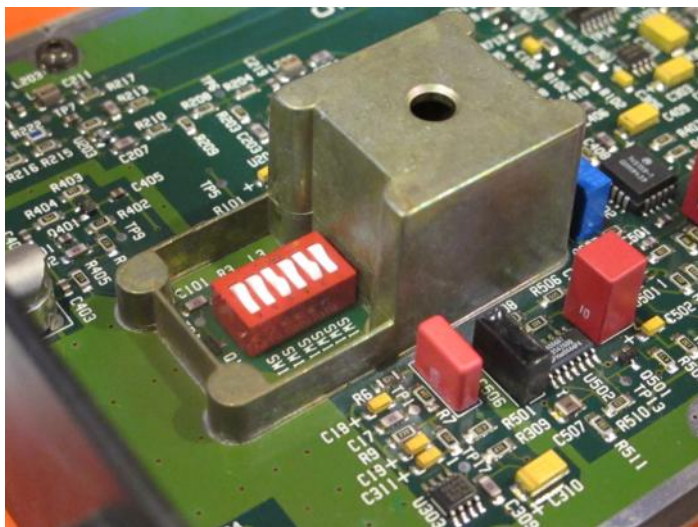
I think all of our issues were caused by that damn TX card all along. I switched it out with the TX synthesizer card from our backup repeater and the main 64 seems to be stable AND hum-free!

During Founder's Day I took a closer look inside the TX card that I had pulled. Everything looked in order, however... After looking at the factory info about this module I found that there is a set of DIP switches that sets the one of four frequency ranges that the VHF version of this repeater can be programmed to.

Table 2 - Frequency Range Switch Settings

FREQUENCY RANGE (MHz)	SW1A (SW#1)	SW1B (SW#2)	SW1C (SW#3)	SW1D (SW#4)
160-174	OPEN	OPEN	OPEN	OPEN
150-162	CLOSED	OPEN	CLOSED	OPEN
142-152	OPEN	CLOSED	OPEN	CLOSED
136	CLOSED	CLOSED	CLOSED	CLOSED

After looking at the info and looking at our module I noted that the switches were set for the 150 - 162 MHz range.



It had been like this for YEARS but we never had a problem with the VCO unlocking. I reset to switches for the 142 - 152 MHz range, re-assembled the module and put it back into service on the main 64 repeater. It works! No hum! So far no mysterious drop outs!

When I wiggle the connections on the card no noises! So far so good. I think it is going to be just fine. I hope... I will still continue to look for a spare TX synthesizer module just to have. I replaced the other card back in the back-up 64 and checked it. It still works.

After writing this I suspect that I will get emails asking if it's time to replace the repeater with something newer. I don't think so, and let me tell you why.

Both the main 64 and the backup 64 repeaters are GE MASTR IIIs. (Yes, that's how MASTR is spelled) The MASTR III repeaters are not built like a tank. They are built like THREE tanks!

Every aspect of these units is HEAVY DUTY to the max. The power supplies. The repeater shelf. The 100 watt amplifier. Everything. They stand up to damn near anything. I'm not sure of the new price, but I think they were between \$20,000 and \$30,000 bucks! These are boxes that only the government can afford.

Today, many of them have been taken out of service. Everyone has gone digital happy. I'm willing to bet that they miss the great sound of analog. Now you can buy MASTR IIIs for a song and a dance.

In terms of popularity, Motorola sold MANY times more repeaters than did GE. So the GE M3s are not nearly as easy to find as Motorola repeaters, but the M3 is about as solid as one can get. Buying a spare used TX synthesizer card likely will be VERY inexpensive, and it will likely work for years to come.

One downside of the MASTR III is that you need an old DOS computer to talk to it. That's bad, but not too bad, figuring you most likely only need to program it once. I'll live with that. That, and it's nice to have smart people by your side that still know how to use DOS. And I do.

Now let's compare our old M3 to our MUCH newer Yaesu DR-1 repeater that we have on 444.525.

We bought the Yaesu repeater new. It has been replaced once already by Yaesu due to a blown power amp. You may not know this but I often need to reboot the 440 repeater because it lost its mind. Also, the WIRES-X software is a constant pain in the ass due to Windows updates. The updates never end! THEN when the computer goes stupid due to some Windows or power reason, the repeater goes stupid too and does not work at all, until the computer comes back up. (The repeater will operate as a stand alone machine without WIRES-X. But if you want the nice features of WIRES-X you need to have the computer be the repeater controller)

Looking inside of the box, the Yaesu repeater, as with most repeaters these days, you'll find not much more than two slightly ruggedized mobile radios side by side. Honestly, I am quite impressed that this little Yaesu repeater has lasted this long considering what it is made out of.

Despite the Yaesu repeater being MUCH newer than the old MASTR III, I'll take the old M3 any day of the week. The M3 is a beast.

Stay tuned for what happened to the AL-1500 amplifier.

But those were just the two latest items to cause grief and aggravation.

This trend of things breaking can stop any time it wants to

Cooky - WC3O

Skyview Radio Officer

License Advancement Help

Local licensing training sessions are few and far between. And they require you to attend at their location and on their schedule.

Here something to consider - while many have done it on their own, with books and other online aids, possibly by memorizing answers without fully understanding the subject, something like this may make it easier for you. And it may also give you a better understanding of why those licensing questions exist.

<https://hamradioprep.com/>

You can use coupon code **SKYVIEW** at checkout for 20% off all of their license courses and bundles.

NOTE: - I have no experience with this. I have obtained the 20% Discount Coupon, which may be used by anyone, not just Skyview Members.

However, this is not Skyview sponsored, nor is this a Skyview recommendation. It is just being published for your awareness.

Try their free sample session, and then use your own good judgment.

Jody - K3JZD

HELLO DARKNESS, MY OLD FRIEND

**MY SHACK JUST
BLEW A FUSE AGAIN!**

Pictures From The Skyview Basement

de Cooky - WC3O

A new series for the Q5er! It called pictures from the Skyview basement. (OK, so we don't have a basement, but you get the idea...) A wise man once said, if you're wondering where you're going, take a look at where you've been. Enjoy the pictures!

Part I

Mike - KA3VNP & Kent - N3KB (2003)

The year was 2003. The scene was a SET drill. If memory serves, the location was the Allegheny Valley Hospital in Natrona Heights. In the picture is Mike, KA3VNP on the left and traffic handler extraordinaire Kent, N3KB.

Mike is George, N3GJ's dad and worked at the hospital. Kent was (as I understand it) a photographer for the Pittsburgh Press. Some of those beautiful black and white old pics of Skyview came from Kent. Kent was the first Novice to officially join Skyview back in the day. At the time, Novice operators were not allowed to join. Kent made a fuss, and they changed the rules!

Also, Kent was passionate about traffic handling and he lived up in Sarver. While Kent is now a silent key, Mike is still going strong!



Part II

The Skyview Pavilion (2003)

The pavilion was the brainchild of Bill Bell, W3RSR/SK, AKA the "Old Timer". Bill was a founding member of Skyview and he is the guy that I credit with saving Skyview from going out of business. It was projects like the pavilion that turned things around at the club.

But first, let's set the scene:

At the time there was NO money in the club treasury. Bill had a buddy up in Tionesta that had a sawmill. Bill donated the wood to build the pavilion, and that is how the project got started. (Unfortunately, that wood was not pressure treated and that led to some very serious structural issues later where Dave, N3TIN and Tom, KB3MDL worked like dogs to replace the supports with pressure treated wood, but that's another story... Just keep in mind that the club had NO money at the time)

The story of the pavilion and the installation of the crank-up tower are closely related. They both went up at around the same time.

The original idea of the pavilion was that it would have a gravel floor. At the same time we were looking to erect the crank-up tower that Skyview received as a donation from Don Mcdaniels, KJ3Q/SK. We needed



Goerge

money for a base, new cabling and lots of cement. We put out a letter to the membership asking for donations. At the time there were only something like 30 or 40 members! It was through a very generous donation from John White, W3VFJ/SK that allowed us to purchase everything we needed, with enough left over to pay for a cement floor for the pavilion! Actually it was Bob, W3GH/SK that donated the money to replace the cabling on the crank-up tower.

Meanwhile, back at the pavilion...



If you ever look up and notice the roof of the pavilion on the inside, it is made up of odd shapes of flake-board. Why? At the time, they were building new homes around my neighborhood and those odd shapes are the window cut-outs. They were FREEEEE!



If you look at the shingles on the back side of the roof you will see that they are different colors. Those were just shingles that Bill, RSR and others could scrounge up! Again, NO money in the bank.



Also, the shed next to the pavilion was Bill's doing. Again, a buddy with a sawmill.

If you look in the pavilion you will see a nice piece of engraved wood with the call sign W3RSR, dedicated to Bill Bell, W3RSR/SK. BTW the sign was made by Bob Siksa, K3OFX/SK. Another VERY missed member of Skyview. If you're new to Skyview I'm afraid you missed some really great guys.



Finished !!

Look for the story of the crank-up tower in the next Q5er!

Cooky - WC3O



Our Well Dressed Tower Climber





“I’ll bet this guy’s signal really gets rolling” - de Curt - WU3U

(Ed : Probably With a Very Flat SWR)

E = I R

**Ohm's Law.
It's not just a suggestion.**

Welcome New Members !!

Welcome the following Skyview Radio Society Members who have joined us since publishing the October 2023 newsletter:

KA3CBA - Amy Cicak - Penn Hills

KK3TM - Tim Mullins - Pittsburgh 15217

Remember that something is going on up at 'the joint' every Tuesday. Sign up for the K3MJW Groups.io Reflector to get the latest news and event announcements by email.

If you are a reader who is interested in becoming a Skyview member, then go to:

<http://www.skyviewradio.net/> for information.

If you are a reader who is not yet a ham, and you are interested in becoming a ham, , then go to:

<http://www.skyviewradio.net/> for information.



Skyview Radio Society Roster as of 30 NOV 23

NM3A	NY9H	KB3NSH	KC3SNZ
N3AFS	WB3HFP	AJ3O	KB3SOU
KB3APD	WA3HGW	WC3O	K3STL
NA0B	KB3HPC	WO3O	KC3STV
W18B	K3HSE	KC3OCA	KB3SVJ
N3BAH	KB3HXP	KC3OCB	KC3TEX
W3BUW	AG3I	KC3OCC	WV8TG
KF3C	AC3IE	N3OEX	N3TIN
KA3CBA	KE3IF	K3OGN	N3TIR
KC3CBQ	KC3IIO	N3OIF	W3TLN
W3CDW	AB3IK	KB3OMB	KK3TM
K2CI	WB3IMB	KB3ORO	N3TTE
K3CLT	W3IU	NK3P	KC3TTK
K3CWE	K3JAS	K3PC	AG3U
K3DCG	N3JLR	K4PDF	NS3U
N3DRB	KA3JOU	KC3PIM	N3UIW
KB3DVD	ND9JR	K2PMD	KC3UNP
K3DWS	K3JZD	KE3PO	W3UY
KC2EGL	WA3KFS	W3PRL	KX3V
KC3EJC	AC3KI	KC3PSQ	KC3VCX
K3ELP	AC0KK	KC3PXQ	KC3VNB
AB3ER	W4KV	AC3Q	K3VRU
WA3ERT	KC3KXZ	NU3Q	N3VXT
N3ERW	WE3L	WQ3Q	KC3VYK
K3ES	WA3LCY	KC3QAA	W3VYK
KB3EYY	KC3LHW	KC3QWF	N3WAV
AC3EZ	WB3LJQ	NJ3R	KC3WBN
WB3FAE	KB3LND	K3RAW	KC3WCJ
K3FAZ	K3LR	KC3RIL	K3WM
KC3FEI	KC3LRT	K3RMB	N3WMC
K3FH	AB3LS	KC3RMN	KA3WVU
K3FKI	KC3LZH	KC3RPE	K3WWP
KC3FWD	N2MA	W3RRK	N3XF
AC3GB	KC3MBM	I2RTF	W3YNI
N2GBR	N3MHZ	KI2RTF	KB3YRU
AC3GE	K3MJ	KD3RVR	W3YS
KC3GPM	W3MLJ	KQ3S	KB3YYC
K3GT	K3MRN	K3SBE	K3ZAU
AB3GY	N3MRU	WA3SCM	W3ZVX
KC3GZW	KS3N	KC3SDJ	
NC3H	G4NFS	KC3SKX	

Notes: Only Call Signs are being published. Refer to QRZ.COM for more information. (Unable to publish those without Call Signs.)

Kul - Links

Jody - K3JZD

There is lots of stuff out on the Internet... Some of it can brighten your day. Some of it can educate you.

I can't really copy and past it all in here. But, I can point you at some of it

Nothing this month

I'll consider any Kul - Links that you find.
Email then to me at: K3JZD AT ARRL DOT NET
They might just end up in the next issue

Previous Issues

Previous Issues of the Q5er are available at

<http://www.nelis.net>

Next Newsletter will be February 1, 2024
Closing Date For Submissions : Jan 15, 2024

K3JZD AT ARRL DOT NET

**Become Well Known
Publish in the Q5er**

**The Q5er goes to other clubs and is
available to all on our web site.**

Submissions to : K3JZD AT ARRL DOT NET

>>>>> WARNING <<<<<<

An Alarm System has been installed up at the joint. Do Not go in there on your own until you learn how to disarm and rearm it.

****** Skyview VE Testing ******

For Testing Dates, See :

<http://www.arrl.org/find-an-amateur-radio-license-exam-session>

Time: Usually 8:15 AM

Location: Skyview Clubhouse Meeting Room
2335 Turkey Ridge Rd
New Kensington PA 15068-1936

Contact: Bill Dillen
(724) 882-9612

Email: bdillen@comcast.net

<http://www.skyviewradio.net/ve-tests/>

Please E-Mail or call to register!!!

While walk-ins are accepted, the exam session may be cancelled if no candidates are scheduled.

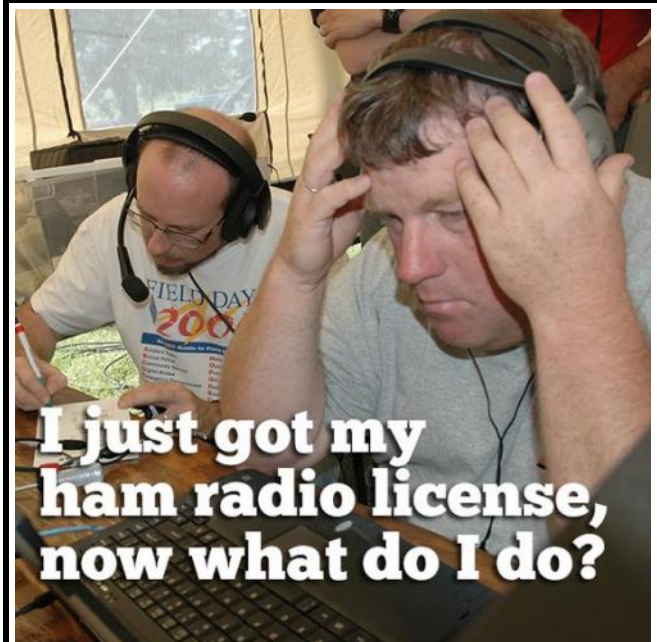


Q5er Editor & Publisher: Jody Nelis - K3JZD

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email your comments and article submissions to: [K3JZD AT ARRL DOT NET](mailto:K3JZD@ARRL.NET)



I just got my ham radio license, now what do I do?

That's Easy

Come up to the Skyview Clubhouse on any Tuesday and ask !!!

And See : <https://tinyurl.com/y79tqsr8>

All General Information about the Skyview Radio Society is at <http://www.skyviewradio.net>

Subscribe to K3MJW [groups.io](https://groups.io/g/K3MJW) reflector for All Current News & Activities : <https://groups.io/g/K3MJW>
If you want to keep up with what is going on NOW, that is the place - have it forward msgs to your email



Is this how your dining room looks ??

Send in pictures of your Ham Shack