



January 2023 Newsletter

Seaway Valley Amateur Radio Club

The **Seaway Valley Amateur Radio Club** is a 'not for profit' organization incorporated in the Province of Ontario that promotes Amateur Radio and provides Auxiliary communication Services in Cornwall and surrounding area. The Club's mailing address is 4672 O'Keefe Road, St. Andrews West, ON. K0C 2A0.

The **Seaway Valley Amateur Radio Club** operates several repeaters in Cornwall and surrounding area. For a detailed list of repeaters operated by the club please visit our website at SVARC.ca.

- **President:** Earle DePass (VE3IMP)
- **Vice-President:** Joe Scott (VE3ADB)
- **Secretary:** Roger Bélanger (VA3GBV)
- **Treasurer:** Chris Lauzon (VA3CRR)
- **Technical Director:** Doug Pearson (VE3HTR)
- **Net Manager:** Joe Scott (VE3ADB)
- **ACS Coordinator:** Earle DePass (VE3IMP)
- **Newsletter:** Roger Bélanger (VA3GBV)

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President's Message December 2022

SVARC Presidents Message January 2023

Here's hoping that each of you had a wonderful, healthy and holy Christmas 2022 season!? Please accept my very best wishes for a better 2023.

As this New Year dawns, I am so optimistic about us building on the great year we had in 2022.

While Field Day 2022 didn't happen, I am looking forward to Field Day 2023. I hope you will mark the date (June 27, 2023) and participate this year.

I continue to remain positive that the numbers of HAMS attending Fox Hunts will grow this year. While we had three Fox Hunts last year, I hope our numbers of hunts will at least double!

In case you haven't heard, recently we have two new Amateur Radio Operators join the fold! Earnest Vinson and Carlo D'Empaire (grandson of Patricia – VA3PUR) were both successful recently on their HAM examinations. Congratulations to both of them!

To those who continue to join us on Mondays, I thank you for your continued participation in our Monday night nets. For those going South for the rest of the winter, "safe travels".

We are hoping to conduct an exercise soon utilizing the new repeater VA3FHA in concert with the Glengarry Fire Department. We also hope to continue to restore our relations with the City of Cornwall.

Our next meeting will feature a virtual Guest Speaker - the RAC Community Services Officer - Jason Tremblay (VE3JXT). It promises to be most interesting.

We are saddened to learn that Art (VE3AIH) has become a Silent Key just before Christmas. Art will be missed! Fortunately we presented Art with his 60-year commemorative plaque.

Our Coffee Klatches at Spinners Restaurant continue to be a lot of fun. Please come out and enjoy!

Sincerely,
Earle (VE3IMP), President SVARC



Roger
VA3GBV

Note from the Editor

Here comes 2023!

1. Happy New Year

First let me wish to all members a very Happy New Year and mostly Peace Happiness and Health.

2022 ended with a heavy snowstorm and 2023 started with a snowstorm then rain and freezing rain, what a ride. Can't wait to see the rest of the winter.

2. 2023 Greetings from the IARU

As Radio Amateurs, we share a common interest in radio communications not bounded by cultural, religious, or other designations, creating friendships across oceans, national boundaries, and other barriers. This is unique and special in a world where we often focus on the things that separate us. At this holiday time, the Executive Committee of IARU R2 offers our warmest best wishes for the coming year.

George Gorsline VE3YV, IARU R2 Secretary.

3. Here comes the sun...

Our little G-type star is in full swing with multiple solar flares this month resulting in the upper bands of the HF spectrum opening wide. During daytime the 12 and 10 meter band are buzzing with activity. And the nice part is that most of the US is in the Skip dead zone which reduces greatly the QRM from US operators chasing these DX. In a matter of minutes I managed to work England, Italy, Poland and France having 57 to 59 signals reports in both directions. This with my antique barefoot TS 140 into an inverted V Off-center fed dipole. Did I mention that you do not need traps with

off center fed Dipoles? Check the May 2021 newsletter for more details on this type of antenna.

4. 2023 Club dues

A note from the secretary: Don't forget to renew your membership for 2023. You can renew electronically by Interac transfer to:

treas.svarc@gmail.com

P.S.: If you want to buy a Barbie Doll for your granddaughter:

The Barbie Doll

One day a father, on his way home from work, suddenly remembers that it's his daughter's birthday. He stops at a toy store and goes in and asks the salesperson, 'How much for one of those Barbies in the display window?'

The salesperson answers, 'Which one do you mean, Sir? We have: Work Out Barbie for \$19.95, Shopping Barbie for \$19.95, Beach Barbie for \$19.95, Disco Barbie for \$19.95, Astronaut Barbie for \$19.95, Skater Barbie for \$19.95, and Divorced Barbie for \$265.95'.

The amazed father asks: 'It's what? Why is the Divorced Barbie \$265.95 and the others only \$19.95?'

The slightly miffed salesgirl rolls her eyes, sighs, and answers: 'Sir, Divorced Barbie comes with: Ken's Truck, Ken's House, Ken's Fishing Boat, Ken's Furniture, Ken's Dog, Ken's Computer, and one of Ken's Friends.'

The mystery of VE3VSW feedback behavior

Initial installation

When we first installed VE3VSW, a Motorola R-1225, in Bonville a new frequency had to be selected.

The reason for this is that because the Sinclair C-3037 Expandable Multi-couplers Eric VE3EI (SK) donated, have a minimum frequency spacing of 1 MHz from each other, 443.000 could not be reused in Bonville, being too close to VE3PGC on 443.650. So, a new frequency of 442.225 (+) was selected.

VE3VSW was then installed in Bonville with this frequency.

The problem

It turned out that the repeater exhibited very strong feedback with a modulation delay of about 100 to 200 ms. Which is, more or less, the processing delay of the repeater.

It was then suspected that the repeater was defective, maybe causing by some leakage of the audio from the controller output to the input.

The repeater was brought back to Doug's QTH for investigation.

Doug reset several parameters through the programming S/W, tuned a duplexer to 442.225 MHz (+)

and connected it to a UHF antenna at his QTH.

The repeater behaved properly for several days without any feedback issue.

Thinking the problem was solved, the repeater was reinstalled in Bonville on Friday November 25.

The problem persists

Upon turning-on the repeater, the same feedback behavior was observed.

To isolate the problem, we retune the PGC repeater, a Yeasu DR-2X, to 442.225 MHz and connected it to the VE3VSW multi-coupler and the same feedback behavior was observed.

That, together with the fact that the Motorola repeater worked fine at Doug's QTH, exonerated the Motorola repeater itself.

We must conclude that the feedback issue is caused by something between the repeater O/P ports and the antenna in Bonville, but what?

The cause could be some Inter-Modulation Product resulting from the 442,225 MHz mixing with some frequency at the site.

Frequency change

We retuned the Motorola repeater to 442.400 MHz, which is close enough to be within the multi-coupler pass band. This solved the problem but the VSWR of the transmit path was too high. We retuned the repeater to 442.200 MHz and this was also successful in solving the feedback problem and the VSWR was very good at <1.1:1

After a quick search in the Repeater book, we decided to keep this frequency for VE3VSW normal operation.

The only other repeaters on this frequency within a 200 KM of Bonville are:

VE2APO, St-Constant, Off the air

VE2APC, Mt Sutton, Off the air

VE2RRJ, Maskinongé, On the air, 190 KM, Digital only, no CTCSS tone.

VE2RXG, Granby, On the air, 170 KM, CTCSS 94.8 Hz

VE3MGK, Chatham, On the air, 700KM

VE3SED, Kitchener, On the air, 490 KM

VE3REX, Rideau Ferry, On the air, 110KM, No CTCSS tone reported.

Problem solved but...

Now the question is what IM product could result in a 447,225 MHz feeding back to the receiver input. We know the 447.225 MHz is one of the frequencies in the IM mix since changing the frequency eliminates the problem.

We tried all combinations of $N*F_o - M*F_x$ and $N*F_x - M*F_o = 447.225$ MHz, with $F_o = 442.225$.

We checked all IM's for N and M from 1 to 11th harmonics, nothing was found that corresponds to any frequencies present at the site.

We have checked for $F_o + F_1 - F_2$ and $F_1 + F_2 - F_o = 447.225$ MHz. Again, nothing was found that corresponds to any Tx frequencies present at the site.

We have not checked for IM resulting from various harmonics of the 3 frequency cases as the number gets too large.

Preliminary conclusion:

1. The Motorola repeater hardware is not causing the problem
 - a. The Yeasu repeater in Bonville exhibited the same behavior.
 - b. The Motorola repeater had no issue in VE3HTR QTH.
2. The 442.225 MHz Tx signal from the repeater is interacting with some other component in the Bonville site but the exact IM mix was not identified.
3. A 25 KHz change was sufficient to eliminate the problem.
4. Could something else be the cause? While we checked all frequencies present in the equipment room in combination with the VSW carrier, all these frequencies are only activated on a very low duty cycle. On the other hand, the repeater goes into feedback any time that it is activated. So, the TX must be mixing with some frequency that is always present. For instance, a LO leak in one of the repeaters.

Further investigations

Doug (VE3HTR) and I (VA3GBV) decided to do a site survey using an HP Spectrum Analyser (model 8595E).

The input to the SA was a VHF/UHF rubber duckie used on a dual band Baofeng HT.

Indeed after scanning several bands, we found a strong spurious floating in the equipment room at 442.268 MHz. See figure 1.

When we keyed the repeater, the repeater transmit frequency also appears floating in the equipment room at 442.203 MHz. See figure 2

It should be noted here that the spectrum analyser calibration is likely off by 3 KHz. Indeed, the repeater uses a digitally temperature compensated Reference Oscillator. Which would typically have a 10^{-7} frequency accuracy or +/- 50Hz.

This means that the spurious detected is 442.265 MHz and the repeater O/P frequency is 442.200 MHz.

It is also worth noting that the spurious is only 21 dB below the repeater carrier. Knowing that the transmit power is 50 W for the Motorola R-1225, and assuming a loss of 3dB in the duplexer, multi-coupler and heliax run to the antenna, the power to the antenna is about 25 watts or 44 dBm.

The spurious is then equivalent to 23 dBm at the antenna or 200mW.

Then the question becomes: How does this spurious cause the feedback problem we experienced when the repeater is tune to 442.225 MHz.

We have not found an answer to this question yet and the readers are invited to submit their comments on this subject or suggest further lines of investigations.

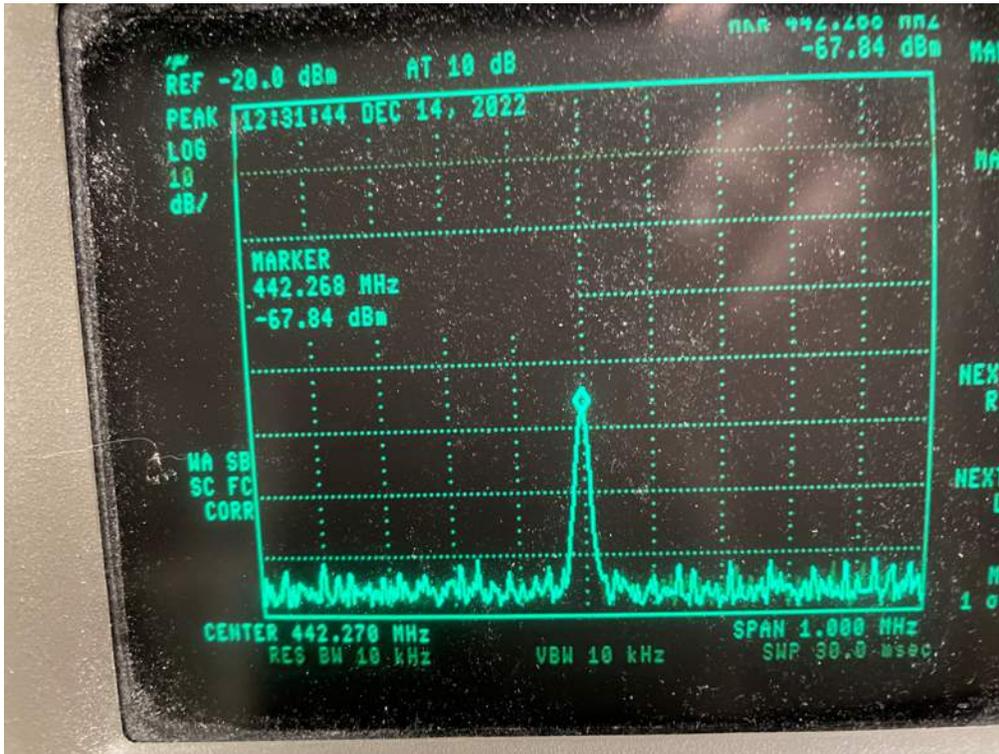


Figure 1: Spurious detected at 442.268 MHz

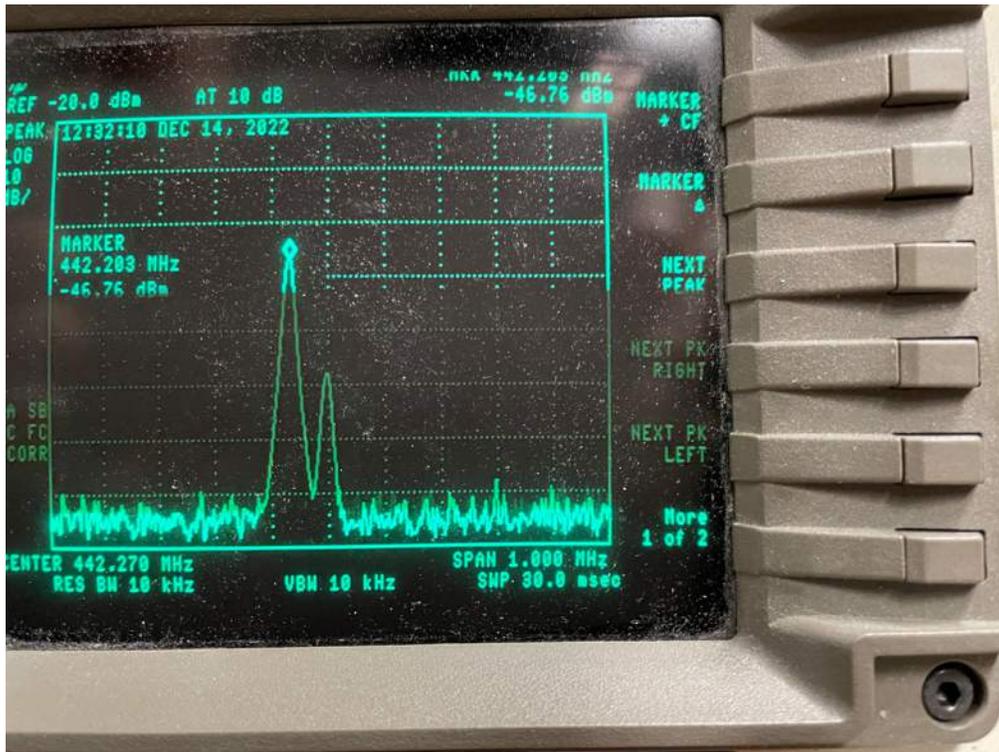


Figure 2 : Repeater TX frequency at 442. 203 MHz with Spurious at 442.268 MHz



Graphics by René (VA3RIA)

Farewell my friend

The year ended on a sad note with the passing of Art.
Farewell my friend, it is always with a smile that we will remember you.



Show and Tell

Coffee klatches



December 10

Rick (VA3EV), Doug (VE3HTR), Joe (VE3ADB), Don (VA3NC), Hal (VE3HWG) and yours truly (VA3GBV) behind the camera.



January 14, 2023

Roger B. (VA3GBV), John G. (VE2EQL), Earnest V. (TBA), Terry L. (TBA), Rick P. (VA3EV) Doug P. (VE3HTR).

Editor's note: Had it not be for the 25 cm of snows falling on Thursday and Friday preceding we would have had 2 more tables...