

Dealing with Radio Frequency Interference (RFI) for Dummies.

We are blessed (in Nova Scotia, at least) by having a power company that takes a genuine interest in solving the types of interference problems generated by their power distribution system, however they cannot work miracles. The chances of having these types of problems solved increase by an order of magnitude **if the radio amateur operator does the initial localization of the noise source**. The process of narrowing down such noise sources does not necessarily involve exotic electronics or complicated procedures. It does, though, require a scientific approach and plenty of common sense.

The following simple instructions are based on real-world experience in locating electrical power distribution system noise sources. While the instructions below are aimed at locating that specific type of problem, the techniques are applicable to noises generated by sources other than those from your local power company (e.g., the electric fence operated by the writer's neighbour's farm).

Caveat: Electrical noises do not necessarily *radiate* from the source. Sometimes the noise will be generated in one location but propagate along power feeders and begin the actual emission into the aether at some other place such as, say, a guy cable on a power pole that is acting as an antenna. Good luck finding those sources.

Step 1. Keep a journal. In order to characterize intermittent noise, record the details of the noise every time it is encountered. Take those notes for as long as is necessary to be able to predict the conditions under which the will noise occur. That could take a month or more in some instances. Record day of the week, time of day at which the noise starts and goes away, season of the year, bands involved, description of noise (pulsing; continuous, etc), the relative noise strength as read off a receiver's S-Meter, weather conditions (temperature and precipitation or lack thereof) and any other factors which might seem to be relevant. An amazing number of conclusions regarding the noise source can be drawn from this information alone. If nothing else it may help in determining if the noise source really is the power company or, rather, it is from your neighbour's new plasma television.

Here is a simple example: One residential noise source tended to occur daily after 4:00 PM during the week, quit in the late evening, and be continuous all day long on the weekend. It was significantly more pronounced on very hot days. Conclusion: break down of an electrical insulator when people came home after school and after work and started turning on

appliances, especially air conditioning units. The additional electrical load on the power distribution system was the trigger.

Step 2. Use your antennas – all of them – to try to determine the direction from which the noise is radiating. Rotating antennas and reversible Beverages and K9AY loops are invaluable in assessing the compass heading to the noise source.

Step 3. When you are experiencing the noise in the station, go to your car, turn the radio on to the broadcast band (AM), and start driving in ever-expanding circles around your station. You will hear some pretty loud and disturbingly strong noises from lots of places but when you come to the noise source you are looking for, there will be little mistaking it. It will stand out from the crowd. This will narrow down the general location of the noise source.

Step 4. Once you have the general area, walk around with a battery-powered HF (short wave) receiver with a whip antenna to try to narrow down, even more, the area located in Step 3. Tune the radio to the worst band as identified in your station.

Step 5. Once the general area of the noise source is known, then take a hand-held Radio capable of operating in the VHF AM air-traffic control band, say at about 135 MHz, and walk the area. No self-respecting noise source will escape the attention of this device. That technique can prove accurate to the point where one can identify the pole or other component from which the noise is actually radiating. Record the location and pole number.

Step 6. It may be assumed that that an arcing noise source will produce audible noise as well as electrical noise. There are inexpensive ultrasonic noise detectors on the market place that can hear that noise. Even the cheap ones will be accurate enough to point to the actual component from which acoustic noise is coming. Find one of those ultrasonic receivers and when you are not listening for “bats”, repeat Step 5 with it as a means of even more accurate localization or at least corroboration of what has been surmised up to this point.

When and only when these steps have been carried out, document all of those findings in a simple report and contact the Engineering department of your local power company and forward them the report. Industry Canada provides a list of contact numbers for power companies across Canada – <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10641.html>. The person assigned the RFI sniffing task will then want to meet with you and visit the source that you have tentatively identified. They have much better test equipment than most hams and will be able to verify or reject your conclusions. If you are lucky, you will have found the exact source, the power company engineer will agree with it, and he or she will then raise a work order to have the noise corrected. That can take a while (two or three weeks).

If it is determined that the RF noise is not being generated by the power company, then you are faced with attempting to fix the noise problem through dealings with the private or business owner from whence the noise is coming. The proper means of dealing with interferences under those conditions are well documented by organizations such as Radio Amateurs of Canada (RAC). Stated in simple terms, it may be the other guy's fault but resolution is quite likely to be up to your own initiative. Patience and a level temperament will prove critical.

Summary: Identifying noises sources is a process of deductive Sherlock Holmes work followed by localization using tools readily available to most hams. Resolution is significantly more likely if you can do the preliminary work to identify the source and location of the noise. NSP will love you for it.

Gary Bartlett - VE1RGB

June 2013