Resolving HF Power Line Noise Issues

The process to effectively locate & resolve power line noise.

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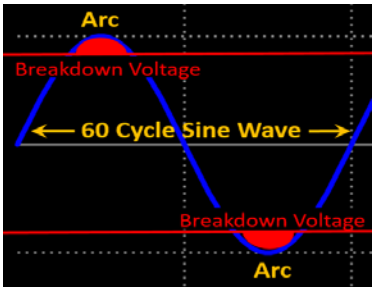
While the problem has been around since the dawn of radio communications, ***power line noise is on the rise***. Almost every amateur radio operator has, at some point, been confronted with the all-too-familiar raspy buzz that can disrupt radio communications, particularly on HF.

Note: Always exercise appropriate safety measures while engaged in locating and resolving power line noise issues to avoid accident or injury. Should you decide to proceed with this activity do so at your own risk.

Fortunately, many amateur radio operators already have the equipment which can be used to locate & identify the noise source. Sometimes an AM radio combined with an HT able to tune AM on Aircraft Band (VHF), 2M, or 70cm may be all that is needed.

A portable short wave radio and Yagi for your HT are **very** helpful.

Virtually all power line noise originating from utility company equipment is caused by arcing across loose or defective hardware. A spark-gap transmitter is, in effect, created with the high voltage discharge generating RF across the resonant spectrum of the conductors.



The resulting noise bursts repeat at 120 Hz, since the voltage breakdowns occur twice during each 60 Hz power cycle. The resulting radio frequency interference (RFI) may span the AM broadcast band to 30 MHz or beyond at various levels. In some cases the interference may only be detectable across portions of the HF spectrum.

Loose hardware is a very common cause of power line noise along with faulty insulators, lightning arresters, or other hardware defects. Transformers are less likely the issue.

FCC Rules Apply

FCC Part 15 protects licensed radio services including amateur radio from harmful interference, and, **that includes power line noise**. The FCC generally allows 60 days for a utility to resolve interference issues after notification. But, the noise source must first be identified to determine who is at fault. *That's where up front work by the amateur radio operator can pay off.*

Important First Step

Safely turn off the main breaker to your residence while listening to the noise on your HF radio operating on battery backup, or, while using a portable radio. ***If the noise stops, then the source is within your residence*** and it is up to you to resolve it.

It would be helpful if the same check could safely be performed at the closest neighbors to eliminate those locations as potential noise sources. *Use caution along with your best judgement if you decide to pursue this avenue as there may be risk involved.*

The ARRL can write a letter to a neighbor on your behalf, if a noncompliant device is causing harmful radio interference as defined under FCC Parts 15 or 18. *The operator of the faulty device is responsible for resolving the issue.*

The Noise Signature

After confirming residential noise is not involved, an off-site search can be initiated using your available equipment to locate the problematic noise source. ***But first, it helps to identify the noise signature***. At your QTH:

1) Use your HF radio to identify the range of frequencies where the broad-band noise is most prevalent. And, if you have a directional antenna try to get a bearing on the noise source.

2) If you have VHF/70cm capability perform the same check. If the noise is present, ***it is a sign that you may be in close proximity to the noise source***, since power lines are usually inefficient radiators at those frequencies.

Tracking the Noise

It is strongly suggested that the tracking process involve **at least two people** with one monitoring the noise signal and the other insuring the effort is proceeding safely. This will help to avoid accidents or injuries. **Follow all appropriate safety measures**, and, always wear safety vests and other appropriate safety gear and be observant when working in areas of vehicular traffic or other hazards.

3) Begin by listening to the highest frequency on which you can hear the noise signature. Use your portable shortwave receiver if possible. ***Very importantly, have an HT tuned to Aircraft Band or 2M (AM mode)*** turned on with squelch open. It will indicate when you arrive at the noise source.

4) Then safely follow the route of the power lines while carefully observing traffic, pedestrians, or hazards. The noise may alternately increase and decrease but it should generally increase as you head towards the source.

5) As the noise becomes stronger and it is safe to do so while navigating, switch to higher frequencies as you are getting closer to the source.

6) Eventually you should hear the noise on your HT indicating you are arriving at the source.

Confirmation

7) Once you locate the likely source it could be confirmed **if it is safe to do so**. If you decide to proceed with this step use utmost caution regarding traffic or any other hazards that might exist at the location. ***Maintain a safe distance from power utility equipment do not tamper with it.***

While on site and observing all appropriate safety measures, use your HT to identify the power pole where the noise is the strongest. A portable Yagi would be **very** helpful to pinpoint the source, using 70 cm AM if it is available. *A recording of the noise observation made at the source would be helpful. Maintain good records at this point as they will serve to support your report to the utility company.*

Notification

At this point you should have adequate information to draft a letter of notification to the responsible power utility. Describe the work you have performed to locate and identify the likely noise source, *present your findings,* and politely ask the utility to resolve the issue. Offer to assist, if needed, in the resolution process.

Conclusion

Power line noise can impair your ability to effectively operate your amateur radio station. When excessive, the noise can make it difficult or impossible to converse with other stations. Fortunately, there are measures (including the ones described herein) that can be taken to resolve the issue. And, *it is the law*, so the odds of resolution are in your favor, particularly if the noise source has been located and well documented.

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References:

* ARRL: The Issue of Power-Line Noise
* ARRL: Locating RF Interference at HF
* ARRL: Power Line Noise FAQ
* ARRL: Identifying Power Line Noise (Video)
* ARRL: Locating Power Line Noise with Mike Gruber (Video)
* Helping Art Bell find Power Line Noise
* Hunting Power Line Noise (N0RQ) (Video)