Ham 53 – Talking Through Noise & Squelch

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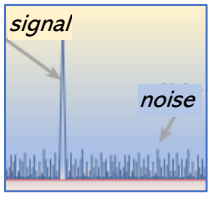
1. This is another article in direct response to a question. In fact the question is so good, we will simply quote it.
2. "I know this isn't scientific but when the air conditioning is on and I'm monitoring our repeater the receive light on my phone (transceiver) is on. With the fan only not as much static. When walking around the house the receive light goes off and on. Seems like some grounds aren't correct. If I go outside away from the house with my rubber duck antenna or in the car it seems to work ok. When I was talking or listening in the car the recieve light was off. Any thoughts? Do you think I should have my electric grounds checked? I'm wondering if it's the reabar, as the closer I hold the phone to the floor the steadier the receive light is."
3. First, that was precisely what scientific research is. The steps of the scientific method are: (1) There is a problem. (2) Define the problem. (3) Gather data. (4) Analyze data. (5) Develop hypothesis (possibility). (6) Test hypothesis against known, available information [me]. (7) Develop final hypothesis, which may change with more data, analyses, and testing.
4. Did he follow those steps? Absolutely. This becomes a teachable moment.
5. First answer the direct question, then explain the alternative. "It may be the grounds, but is more likely other issues." Recall in the last article, "Talking Through Dirt," we repeatedly mentioned handling noise multiple times. Your radio does not know whence comes the radio frequency information it receives.
6. Motors, LED lights, electronics, computers, switches, power supplies, lightning, atmospheric static are all sources we call *noise*, because we do not want it. What we do want is the *signal* we are trying to receive.



7. The most common comparison is *signal*-to-*noise* ratio (S/N). If the signal is low or the noise is high, the radio cannot decipher the desired information.
8. *Received causes:* If the radio antenna is poor, radio ground is ratty, or the radio is low quality, the signal will be weak. *Transmitted causes:* The signal will be weak if the transmitter is too far; its transmitter is weak; or there are barriers like dirt, trees, or buildings. In any case, the noise may be greater, so we do not hear anything.
9. A Baofeng handi-talkie has a lousy antenna, poor ground path, and the electronics are cheap. We call them throw away radios for a reason. We can have fun with them. They are a good intro device, but they are not dependable to talk. Period!
10. Look at the question further. "The green LED comes on," or other indicators on different radios. This indicates the receiver detects a source greater that its receive detection threshhold. Recall the radio does not know signal from noise. If the noise is high, the radio LED triggers.
11. When I worked in the field, I used a cheap AM portable radio to drive along power lines to find loose connections or walking through the plants looking for similar issues. Now IR cameras do the job. Loose connections make radio frequency noise. Similarly, radios get very noisy with thunderstorms approaching. Use the problem for a solution.
12. The *squelch* on a radio can be increased to get rid of noise. What is the problem? The squelch is reducing the receiver sensitivity. So, low level signals will not get through.
13. What is *sensitivity*? As the radio sensitivity increases, the amount of signal required decreases. Many different measures are used, but a simple one to understand is μV (microvolts). A receiver with a 1 μV sensitivity can receive a much weaker signal than a 2 μV radio. Greater sensitity requires more signal processing. More costs more.
14. *What are the fixes to increase signal?* A better radio increases sensitivity. A better antenna (NLOS) increases signal level. A better ground / counterpoise increases the relative performace. Better coax reduces loss of signal.
15. *What are the fixes to decrease noise?* Ferrite cores on coax increase impedance to atmospheric. Ferrite cores on power lines increase impedance to man-made noise. Protectors on coax divert extraneous noise to ground. Protectors on power lines divert surges. Low impedance ground path to earth diverts stray noise. Better power supplies generate less noise. Improved LEDs make less noise.
16. Every component is specifically chosen to increase the signal (antenna), mitigate loss (coax), eliminate noise (ferrite), increase safety (protector), and provide a noise path out (ground).
17. Now you know, which is going to work better? A base or handi-talkie?
    Ask questions, if you do not know the answer. Active hams ask interesting questions.
18. Life is good. Enjoy!