

Ham 66 – VHF: Right Things – Wrong Result

Dr. Marc & Rosemary © 221006

1. One of the newer hams, let's call him Chuck, did the right things to set up his station, but it did not hit the repeater. At 15 miles through trees and terrain, he is on the edge, but my mobile had a viable, if weak, connection from his yard. He could hit my base station simplex. It was a similar distance, but in a different direction. When driving up, I saw a problem: seven broadcast towers permeated the area.
2. His radio is an Icom 2730A. That is as good as it gets. His antenna was a high-gain, high-performance, excellent antenna. He had a short coax to a lightning protector which was grounded, and four ferrite beads on the coax. This was a quality installation.
3. His radio had a noise floor of 6 to 8 bars on receive. With such a level, few signals can get above that noise. What would you do first? We changed out the switch-mode power supply for a battery. No, the power supply was not the major noise culprit.
4. Then, measuring SWR showed 1.2 on low end of VHF decreasing to 1.12, a near perfect reading. SWR is only a start, it does not tell the whole story.
5. I brought 4 antennas to try with various coax and fittings. First was a simple vertical with counterpoise. Not a chance. My go-to is a 7" Compactenna with counterpoise. Bingo, noise floor dropped down to zero or two, but receive signal was not up to expectation. We switched to 9" Compactenna with more signal gain, but less noise rejection. Then we tried a beam, which blocked some, but picked up other.
6. Back to the 7" with minimum noise, but signal less than expected. Change a competitively priced lightning protector for top of line Polyphaser. Dropped two noise bars. Some of the less quality protectors arc-over, creating noise themselves. The protector was at his single-point ground, where he had run a grounding conductor directly to an RF ground rod.
7. Next, we changed out a short 18" RG-8X for a 6-foot RG-213U coax. That was the shortest I had. In the immortal words of a radio pioneer and innovator, W.K. Henderson, 'Hello, world.' We could hear! The RG8X was attenuating the already weak signal. When I checked another 3-foot RG-8X, it cost signal also. Another lesson learned.
8. My co-author was operating our base, through the repeater, for testing. Her signal was rock-solid, crystal-clear. She reported Chuck's signal was still a little scratchy. That is a common problem for radios on the edge of our repeater range. He is soft-spoken and holds the mic away, so we upped the mic gain a little. With time and changing practices, he will likely need to lower that later. He was in awe at the difference in the signal (S) and noise (N).
9. Why did the 7" work, but not other antennas? Recall, the Compactenna is not a conventional, wire-wound inductor. Its design is for Not-Line-Of-Sight. In terrain, obstructions, and interference, the elliptical polarization allows refracted, reflected, and disrupted signals to travel where vertical, line-of-sight cannot penetrate. In addition, antennas with high gain sacrifice radiation in some direction to manipulate the shape to provide gain in another. Think of reshaping a balloon/
10. I contacted Dr. Jack at Compactenna to find why the 7" was effective in eliminating the background radiation from the broadcast antennas. The 7" has less gain, so its angles are different, counteracting the extraneous signals. He affirmed that generally the 9" model is better, but in high RF noise areas of this type, the 7" model can give overall better S/N (signal to noise ratio) performance. With a few pages of physics, it is explainable. The short answer, in the field it works.
11. When the location is good, virtually any vertical stuck in the air will work for VHF. Our area has numerous hills, trees, obstructions, and noise sources. With our conditions and low power repeater, the solution to noise problems and talking through dirt or obstructions invariably has become the Compactenna, sometimes 9", other times 7" depending on conditions.
12. Our ham group of 65 is less than one-year old and most have obtained their license during that time. They do not have many traditional hang-ups and are open to fix the problem. Over one-third of the hams earned General or Extra licenses. Fortunately, we have Elmers on the high end of technical knowledge who push the amateur envelope. After trying various systems, we have found what works here. The result is well over 70% of the active stations now have at least one Compactenna.
13. The experience illustrates a common saying, every installation is unique. Do not assume any part is sacrosanct. It may be good, just not for this installation. Do real research, not opinion forums. Ask an experienced Elmer for help.
14. Life is good. Enjoy!

