
## Welcome to AntennaSelect™ Volume 57– September 2021

Welcome to Volume 57 of our newsletter, AntennaSelect™. Every two months we will be giving you an "under the radome" look at antenna and RF Technology. If there are subjects you would like to see covered, please let us know what you would like to see by emailing us at: info@micronetixx.com

**In this issue:**



### Problems With Higher Azimuth-Gain UHF Antennas.

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UHF antennas are social creatures to a point. They tolerate being close to each other, but really want their own free space. As their azimuth gain or directivity increases they get less tolerant of nearby metallic structures. Why? Let's first look at an Omnioid or Omni-Directional Antenna. These antennas radiate in all Azimuth directions nearly equally. Nearby metallic structures will reflect radiation back to the antenna, causing a change in V.S.W.R. or match. Since there is radiation in all Azimuth directions, reflections at some azimuths may help improve match, while reflections from others may degrade it.

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The net effect in change of antenna match may be improvement or degradation, depending on how all of these reflections add to a resultant from the different Azimuths. Now let's take a cardioid azimuth antenna pattern. This antenna produces nearly 100% field over 150 to 270 degrees in front of the antenna, and 10% to 20% of peak field to the "rear" of the pattern. To the backside of the antenna, the reduced radiation offers much smaller opportunity for reflections at these azimuths to change the antenna match. In the front lobe however, there are enhanced opportunities for a disruptive reflection to occur. If the installed match of the Antenna has dropped from the factory test numbers, moving the mounting angle of the antenna by a degree or two, or changing the distance from the reflecting structure(s) to the antenna may help. Because wavelengths get shorter as the channel number increases, disruptive reflections will be more likely at these higher-field azimuth angles. At UHF it only requires a difference of a few inches to change the installed match profiles of the antenna. As we narrow the azimuth beam width of the antenna, the V.S.W.R.-altering influence of any support structure and/or other antennas increases. Antennas with azimuth gains of 3 or more can be quite sensitive to reflections in the "main beam" from structures nearby. With most of the energy radiated from the transmitting antenna concentrated in a narrowed azimuth beam, reflection de-tuning affects in this region are greatly enhanced. It only takes one reflection to cause detuning. Generally, placing the antenna farther off the tower cures a lot of problems. At 550 MHz or so, inches count. Also, sometimes moving the direction of the transmitting antenna just a few degrees will help. If there are flex transmission lines running close behind the antenna, adding grounding kits to the line through the aperture of the antenna can help make things more stable also. If you notice antenna detuning during periods of ice or rain, grounding can also help out immensely.

We have seen a number of initial installations over the years where the installed V.S.W.R is over a 1.20:1. Making small changes can easily drop the V.S.W.R. substantially.

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Consider in adding a four-probe vector “fine-matcher” to the input of your antenna. This can tremendously reduce the time needed to properly install the antenna and get the best results..

## How Much Is My Real ERP at Any Given Point?

My station has an ERP, (Effective Radiated Power), of 100 kW. Another engineer proclaims that they have a 1000 kW ERP. Is that everywhere or just portions of a stations service area?

So let’s take as the first example a 1000 kW ERP station with a 1000 foot tower. We will assume that the station uses an Omni-directional antenna, has a bay count of 28 bays – a fairly normal size for a full power UHF installation. Most UHF slot antennas use 3 or 4 slots per elevation. If we consider 3 slots per elevation, there will be three azimuths (or maxima) that actually produce full 100% of field. That produces the 1000 kW ERP. This antenna will also have 3 minimas or azimuths that radiate lower signal. Typical minima values are 87% to 90% of full field. So the maximum real ERP there would be .90 squared times the full ERP, or 810 kW.

Now factor in the elevation pattern of the antenna. Most transmitting antennas have a beam tilt of 0.50 to 1.0 degrees. That means the main lobe is tilted downward by that amount. So at the radio horizon, again you have less than full ERP. In this example we will use a radio horizon value of 0.95. To find the real ERP, square 0.95 and multiply it by 810 kW (the result from the calculated value in the minima). That gives you an ERP of 731 kW.

Just for fun let’s look at the ERP at a depression angle of -12 degrees. (That is far below maximum main beam elevation angle.) Taking .12 Field vale at this angle, squaring it and multiplying it by 810 kW, yields a true ERP of only 11.66 kW

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So even with a 1000 kW ERP, your ERP in back of, or at higher depression angles may not be that much. With the introduction of ATSC 3.0, distributed transmission is in our opinion the next big thing. We have new technology coming out this year to make this process even easier. We will keep you informed in future editions of AntennaSelect™.

## We Love DIN Connectors

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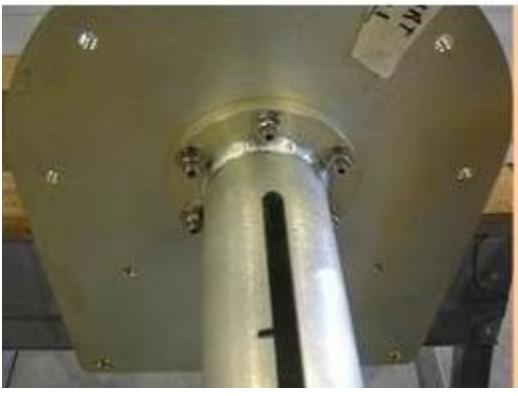
For lower power FM and VHF antennas in the past, we used type N connectors. However, they were limited on the power they could handle, and the types of cable we could use.

The engineering decision was made to go to DIN connectors for ALL lower power products. Yes, the cost did go up a bit. Our Production Engineers and Technicians reported DIN connectors provided a much more rugged far more reliable RF connection. The connector quality and consistency of the DIN connectors was far superior in that application.

Product quality went up. The connectors also seal better against rain and ice ingress. Explore DIN connectors for your RF interconnections. We love DIN connectors, you will too!

**Be on the lookout for the next volume of AntennaSelect coming out in November**



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