Welcome to AntennaSelect™ Volume 46 –October 2019

Welcome to Volume 46 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 e-mailing us at: info@micronetixx.com

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Updated Lead-Times for New Antennas:

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We have had so many of you placing your faith in Micronetixx for your antennas recently. Our factory lines are humming along at 100% of capacity, even with the recent additions to our manufacturing staff. With that being said, the standard lead time for new antenna orders is 16 week A.A.O. That is double of the 8 to 10 weeks we would normally quote.

Antennas are a precision product, meaning they are custom-built to order. Final tuning and checkout are all done open-site, outdoors. We are located in central Maine and can often lose two or three outdoor days to bad outdoor weather. Wish us some good weather this winter!

Optimal Spacing of FM and VHF Antennas:

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FM and VHF antenna bays, depending on design, are spaced between ½ and 1 wavelength apart. We had an FM customer ask us why we specified a bay-to-bay spacing of 0.7 wavelength, (252 degrees), on the antenna we were proposing. First, this was a broadband FM antenna to work on two frequencies about 8 MHz apart. The station did want the antenna to provide as equal coverage profile as possible for each of the two stations.

For a number of “bay” designs, placing the bays either too far apart or too close to together actually reduces the bandwidth of the antenna array due to mutual element coupling. Antenna bays are generally spaced at a maximum of 1 wavelength apart to a minimum of ½ wavelength apart.

Let’s look at close spaced antenna arrays first. Half-wave spaced patterns look great and have little to no radiation from -80 degrees or so downward. We do this all the time with our UHF and VHF slot-style antenna products. This arrangement works great as the radiation center of each slot is exactly ½ wavelength apart.

Spacing FM or VHF antenna bays, with the center of each bay is at ½ wavelength, the element tips of each bay are much closer together, with some designs nearly touching. This way over couples the array and both bandwidth and low V.S.W.R. performance go out the window. Going the other way to full wave spacing, greatly decreases the beneficial mutual coupling between the bays, reducing the bandwidth of the array. Going above 1 wavelength spacing quickly reduces array gain and also begins to distort the elevation pattern profiles.

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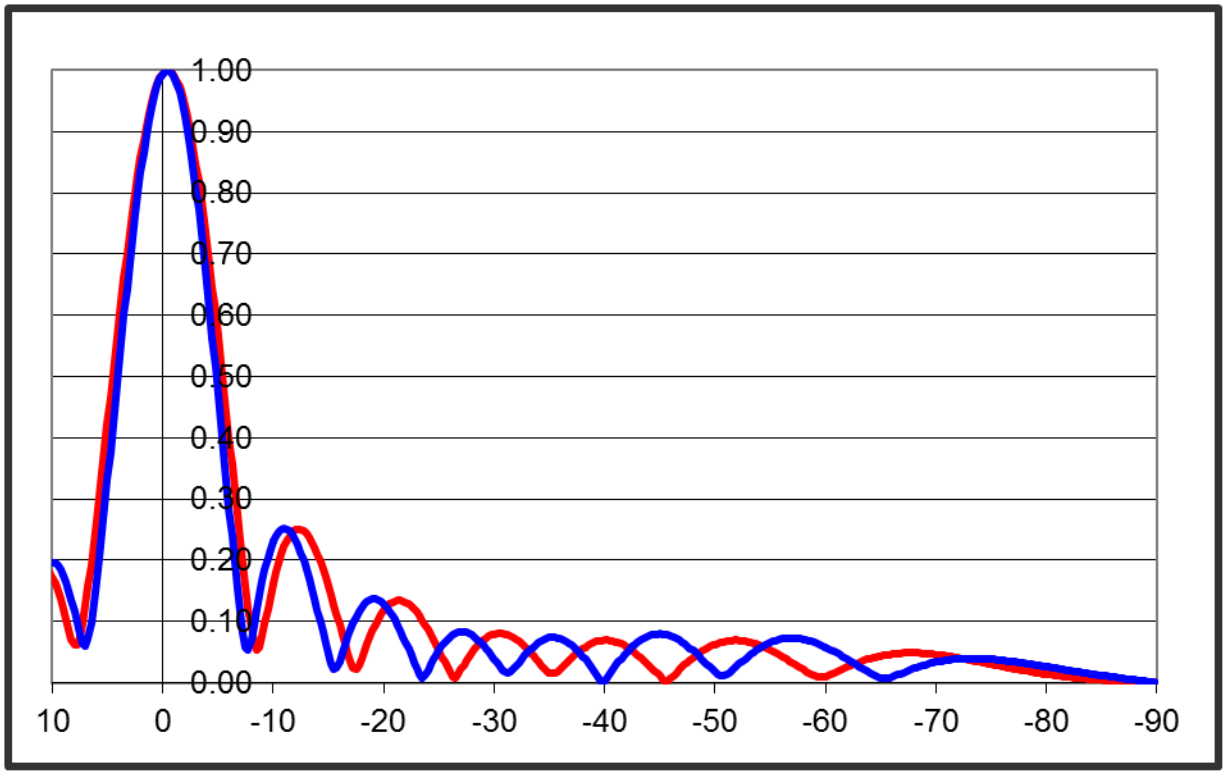
Below is a plot of two elevation patterns for a broadband FM antenna. The operating frequencies are 96 and 104 MHz. To design this array we take the middle frequency between the two channels (in this case 100 MHz. and calculate the spacing of the array based on that frequency. For this example, we are 0.7 wavelength, (252 electrical degrees), at this center frequency. Going down to 96 MHz, the spacing to 242 degrees. For the station on 104 MHz, the spacing increases to 262 degrees. We add a little beam tilt by lead-phasing the top two bays.



Here is the elevation plot of the two stations. 96 MHz is the RED plot, and 104 MHz is the BLUE plot. The radiation from the main beam is very close for both stations. As a bonus the radiation from -50 to -90 degrees is about 10 dB lower than a standard full wavelength-spaced antenna. The vertical space needed to mount the antenna has been reduced compared to a full-wave spaced antenna. The elevation gain however is slightly lower as a function of bay-count for the short spaced antenna.

Replacing Old Bogner Top-Mounted Slot Antennas:

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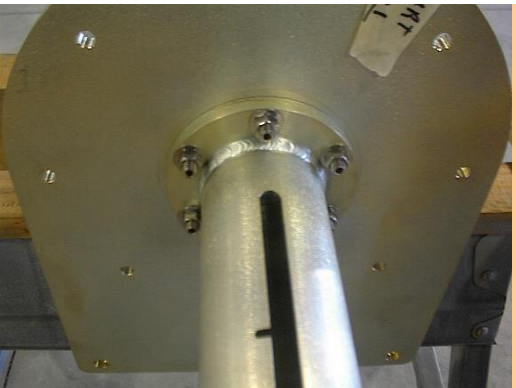
We have had some requests to replace old Bogner UHF top-mounted antennas. We do not offer a direct replacement. Many of these antennas were built with a small mounting pylon and 4-bay cavity clusters that were attached to the monopole with a power divider. Some of these designs are 25 years old or older, and do not meet current structural guidelines. New antennas with the same gain and pattern often weigh 3 to 4 times the weight of the old antennas. Many mounting structures will not hold new antenna.

Is there a solution? Yes! -A smaller-diameter monopole can be used in some cases to hold a side-mounted UHF slot antenna. The monopole would be guyed with non metallic guy wires through the aperture of the antenna. A small face-width tower, (Rohn 25 or 45 for example), can also be used. When properly guyed they can easily hold the weight of a 6 to 12 bay side-mounted UHF slot antenna. Off-the-shelf solutions such as the tower sections can save quite a bit of money and time. In all cases, contact a Professional Licensed Structural Engineer to analyze the proposed change-out. We will gladly work with them to interface the new antenna.

Be on the lookout for the next volume of AntennaSelectTM coming out in December



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