
## Welcome to AntennaSelect™ Volume 41 – December 2018

Welcome to Volume 41 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

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## Need More Than 1 Low Band VHF Channel?

MICRONETIXX COMMUNICATIONS

Here's a good question from a translator operator that is being forced to repack onto low band VHF. He has two channels, both are 3 kW Omni-directional. What antenna can he get to cover both channels, in this case channels 4 & 5…And do so without breaking the bank? Plus ability to install the antenna on a 24 inch face tower. OK–panels are out, they are about 12 feet by 12 feet; and you would need 4 of them to make an Omni-Directional pattern. This would not work. Well how about using 4 log periodic antennas? You could make a fairly good Omni Pattern, but there would be some scallops in that pattern. Then there is the mechanical issue again with a small face tower. OK–how about a batwing antenna? …You could install a top mount, but you

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would need to replace the tower, as a 24 inch-face model would not hold even one gigantic batwing bay. Also, a side-mount approach will not work.

Then there is a second problem, combining the two transmitters into a single transmission line...have you seen a low-band combiner? Even one rated at low power is about the size of two side by side refrigerators! So this option does two things; it drains the budget and will probably need a new building extension to house the new combiner. And if you are at a fairly remote site, getting the combiner up the mountain will not be a fun project.

In the last issue of AntennaSelect™, we discussed our new low band VHF antennas; our TLV series. These are circularly-polarized, Omni-directional, single-channel antennas. They are built from rugged stainless steel and present a much reduced weight and wind load profile.

So, how does the TLV antenna solve the problems that this translator has? With the TLV you can stack antennas one on top of another. For the channel 5 antenna, a three or four bay antenna can be mounted further up the tower. Then the channel 4 antenna can be mounted directly below. When spaced properly there is very good electrical isolation between them. Each antenna is fed independently.

In most cases a 7/8” or 1-5/8” transmission line is all that is needed. A Power divider is installed near the center of the antenna array to feed the bays. Another feature of the TLV is that by spacing the bays close to ½ wavelength apart, ground level RFR is reduced.

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The bays are usually half-wave spaced. At channel 4, the bays would be spaced 80.3 inches apart. Therefore, a two-bay antenna would need a vertical space of 18-3/4” feet, (six feet of free space above and below the array). A 4-bay antenna would need about 32.5 feet of free space. The individual bays weigh about 50 pounds.

The most important benefit is the circular polarization that these antennas provide. C/P maximizes the ability of viewers to get the signal, even in areas with a lot of Fresnel zone impairments. Have a low VHF application or one on high band? We have some excellent cost-effective solutions for you.

## Elevation Patterns for Limited Vertical Space

Over the next 6 to 9 months a lot of FM stations will be impacted by the TV Repack. We believe that most stations will want to construct facilities to operate during the time their primary site is under construction. Some of the questions we are getting, include: “If I have **X** feet of vertical space available, what would be the gain of the antenna, and the final ERP be? Another question: “The tower owner will let me put up an antenna as long as it does not exceed **X** pounds, or has a wind load area of **X** square feet or less”.

So let’s run some numbers on a few projects and come up with some solutions for the dreaded “**X**” limits.

Rule 1: Bay-style FM antennas can be spaced anywhere between ½ and full wavelength. There is no magic spacing rule!

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So here is project number one; A station owner needs to move to an alternate location. He has two choices available to move his 98.1 MHz operation to. One tower owner can lease him 35 feet of vertical space, another has 30 feet available. What can be put up there to give the station the most coverage?

At 98.1 MHz, a full wavelength is 120.31 inches. For an FM circularly-polarized antenna, the vertical space needed is the distance between the top and bottom bay center points, plus about 5 feet (the minimum) between the top and bottom bays and another antenna. So let's run a 4-bay antenna model; The space needed from the top bay to bottom bay center is (3 times 120.31 inches) or 30 feet. Sorry – that will not work in either case. If it had, the gain of the antenna would have been about 2.00. With the 10 kW of RF available would have come out to a 20 kW ERP.

We can do two things with the results of the first experiment; One is to drop to a 3-bay antenna, or, evaluate what kind of reduced-spacing for a 4-bay antenna would produce.

So lets try the 3-bay antenna approach next. We will go to full wave spacing. The length is, (2 times 120.31 inches), or 20 feet. Add in the above and below clear space, and the antenna will fit nicely in the 35 foot space; or just barely in the 30 foot space. But the gain reduces to about 1.50. Therefore, our maximum ERP drops to 15 kW.

So we decide to see what we can do with the tower that has the 35 feet of vertical space available. Here, we are working to maximize the ERP obtainable with the 10 kW RF available at the antenna input. So we will first subtract 6 feet above the top bay and 6 feet below the bottom bay. That leaves us 23 feet to wok with. We divide that by three (3 spacings for a 4-bay antenna). This comes out to 92 inches for bay-to-bay spacing. At 98.1 MHz, we are at 120.31 inches for full-wave spacing. We divide the 92 into 120.31 and get 0.764λ.

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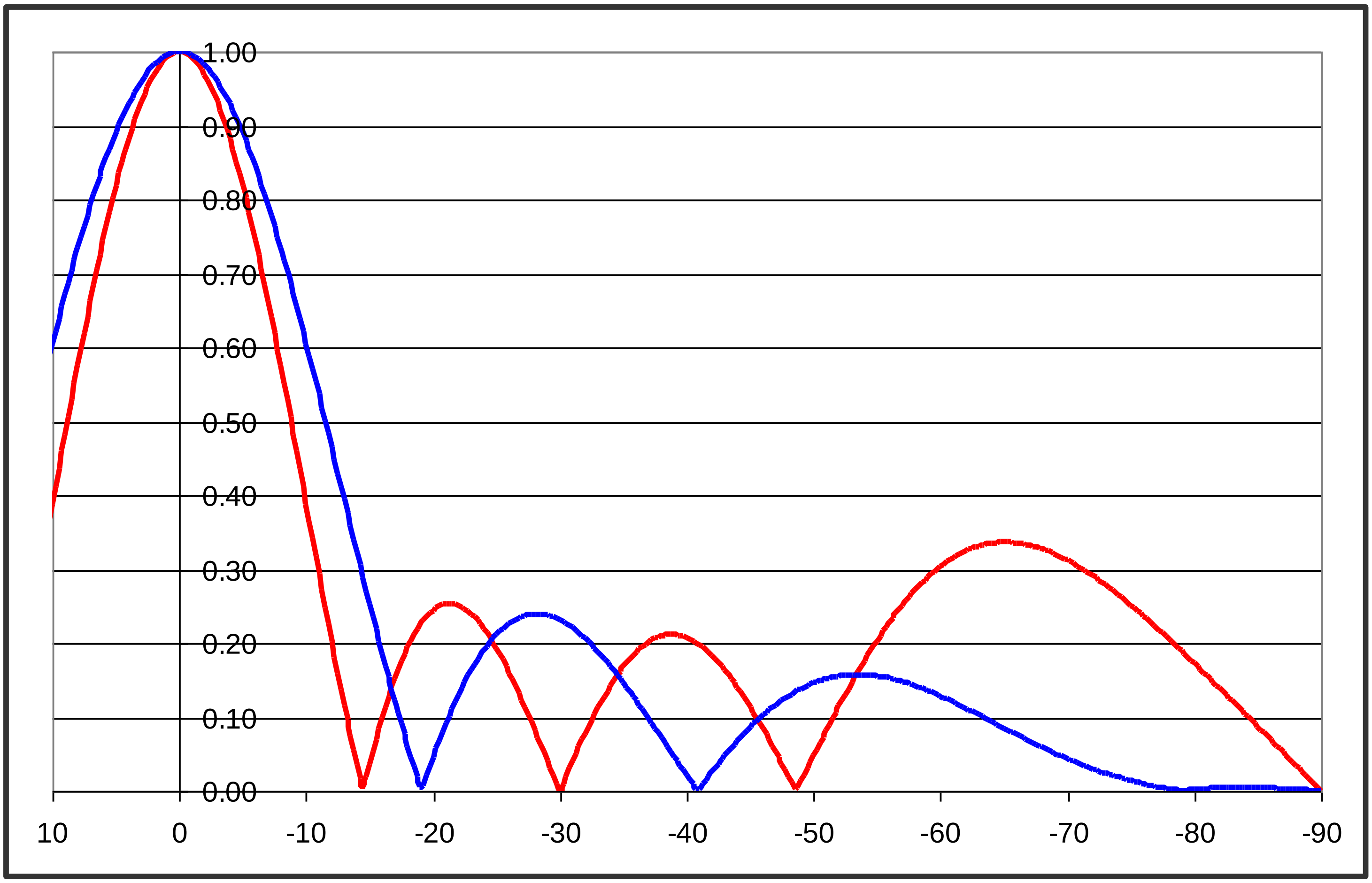
The 0.764 is the spacing in wavelengths from bay to bay. Multiply that by 360 (number of degrees in full wave spacing) and the answer is 275.04 degrees. We plug that value into our elevation pattern software and get a gain of 3.74. Divide this by 2 for a circularly-polarized antenna and the result is 1.87. Multiply this by the 10 kW of RF at the antenna input and we now have an ERP of 18.7 kW.

So what happens to the elevation pattern? The plot below is two four-bay elevation patterns. The **RED** plot is the full-wave spaced antenna, the **BLUE** is the short 275 degree spaced antenna.




The short spaced pattern looks great and will produce excellent coverage. This elevation pattern also has a bonus – much lower RFR at high depression angles. You can place this antenna lower on a tower and stay under radiation limits. When the time comes to plan your FM repack move, give us a call. We can quickly run the numbers and come up with a economical solution that works well.

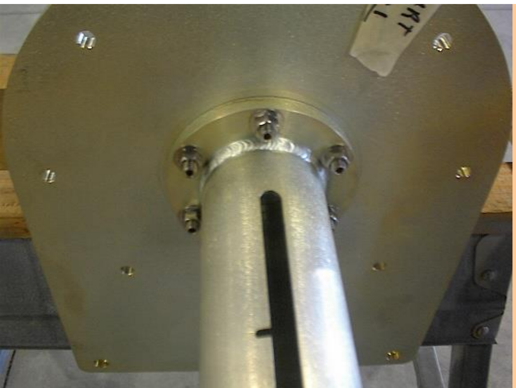
# UHF Side Mount Antennas -Our Stainless Steel Mounts

We have received a number of questions about what cost to fill in on the FCC form 399 for mounting brackets. 95% of the side-mount antennas we sell come with mounting brackets to a tower leg. So in most cases there is no additional cost. Special mounts that are engineered to span tower faces or, special offset mounts are extra, and they are factored into our pricing of the antenna.

All of our mounts are built from AISI Type 304L stainless steel. We use heavy wall square channel and angle stock to build these mounts. With these two components, we can quickly build the mount that is needed for a particular antenna. The components are TIG welded assemblies. After welding, the weld joints are brushed with a stainless steel brush to remove any weld surface impurities.

Using stainless steel allows us to design and 100% build mounts in house. Most of our competitors antennas, are built from standard steel and cold-galvanized. As moisture begins to get under the galvanizing, rust begins to form, and spreads. This can happen in a matter of months. Stainless steel does not rust, and performs well in salty/humid environments for many decades. We build a number of other industrial products from stainless steel for the same reasons. So how long will stainless steel last? At 88 years old, the stainless steel spire of the Chrysler still looks great – your Micronetixx Antenna will too.

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



70 Commercial St. Lewiston ME 04240 U.S.A.
V 207-786-2000 www.micronetixxantennas.com