Welcome to AntennaSelect™ Volume 56– July 2021

Welcome to Volume 56 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:

LPFM 250 – How Does That Affect Your Antenna?

There is a possibility that some LPFM stations can go from a current ERP of 100 Watts to 250 Watts. How does that affect the antenna? Here are a few examples of things to look at:

If you are running a single-bay antenna and have an ERP of 100 Watts with circular polarization, the antenna input power is about 204 Watts. Most likely you are running a 250 to a 300 Watt transmitter. So going up in power to 250 Watts with a single-bay antenna would need an input power to of just over 500 Watts. OK…looks like a new transmitter is needed.

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So how about combining a second antenna bay to the existing antenna? There is a 99% chance this will not work. A single-bay antenna is tuned to 50 Ohms at the frequency of interest. You can add a second bay if you can find the correct impedance to tune for and then hook it up to a phase-matched two way feeder cable. With any luck the antenna would work, (all bets against), and you would still need over 300 Watts (depending on the relative spacing of the bays) to make your 250 Watt ERP. A new transmitter is still needed. There is no easy answer but to start from scratch.

If you are going to go to LPFM250, the best thing you can do is to go to circular polarization. It is going to take more transmitter power, however your coverage will be up to 20 dB higher in places when compared to the coverage from a horizontal dipole or vertical whip

DTV Over-The-Air Reception; Part 9 – What Did the Author Do?

What's on my roof? I live in Phoenix on the east end of South Mountain. This is where most of the DTV transmissions come from. I am 5 miles from the transmitter cluster, and about 1600 feet lower than most stations' center of radiation. There is no line-of-site and I would need about a 250 foot-high tower in my back yard to get line of sight to the transmitting antennas. Add this in to being under the south flight path of the airport and the signals get dicey, losing lock frequently.

So what went up on my roof? I have test equipment (man cave stuff) and technical knowledge. I took an off the shelf UHF antenna from Winegard (PR-9032), which is a corner reflector Yagi. I took the antenna up to my sister's horse farm, which also works well as an antenna range.

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Setting up the antenna with the help of one of the horses, I spun the antenna to look at directivity. It fairly good overall. The front to back ratio at higher frequencies fell off due to the wide spacing of the reflector elements. Gain was measured and was higher than 12 dB up to channel 51.

For the heck of it I ran return loss measurements on it. As expected at the low end of the band, return loss numbers up to about channel 20 were about 20 dB. As we got up above channel 40, return loss varied up and down quickly.

Now it was time to add modifications and retune the antenna if needed. I added an 8 foot boom extension to the antenna and populated it with more director elements. Several reflector elements were added, and to help improve the match of the antenna at the high end of the band, I added a small compensation element near the folded dipole. The net result of this was an average gain increase of about 2 dB across the band; about 6 to 8 dB better front to back ration and a return loss of over 14 dB across the band. The result: Greatly improved reception and less fades from aircraft flying overhead.

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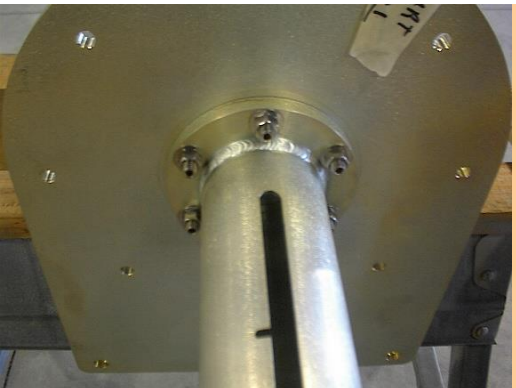
We Have Low-Band VHF Antennas

Lately, there's been an up-tick of interest in antennas for low-band VHF. We make a rugged line of circularly-polarized – Omni-directional antennas. With a 3 kW maximum ERP, properly designed stations really do get out well.

These antennas have a bay-to-bay spacing of 0.75 wavelength, which helps them achieve an excellent frequency response over a single channel. For a 3 kW ERP station the best value is to go with a 4-bay antenna. With transmission line loss, this would take about 1.8 kW of TPO, allowing the uses of several 2 to 2.4 kW transmitters. The total free space needed on the tower is about 40 feet.

Each bay with mounting brackets is less than 50 lbs and carries a load area of under 5 square feet. Are these antennas broadband enough to support an adjacent channel? In reality no. Another problem is at low-band a dual-channel combiner is physically very large (think several industrial refrigerators big.) So if there is an application for an adjacent channel, using two single-channel antennas works much better and is much more cost effective.

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



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