Welcome to AntennaSelect™ Volume 19 – April 2015

Welcome to Volume 19 of our newsletter, AntennaSelect™. Each month 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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- **There are big round antennas at my LPFM site**
- **Watch for new FM products in the June newsletter**

A possible move to high band ? Let's take a look.

Some of our DTV antenna customers are looking ahead at the possibility that they may need to move to high band VHF after a future spectrum repacking. Some have heard horror stories about the loss of coverage when stations went from analog to digital. While the poor coverage of high band VHF seems to be the main story, are there success stories out there ? Let's look at a problem story first.

In the good old days of analog TV many high band stations were given a licensed power of 316 kW or 25 dBk. Many stations used a 12 bay antenna and a transmitter with a 30 to 35 kW rating

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Depending on the station tower height and the type of receive antenna that the viewer had, a viewable range of up to 100 miles was not that uncommon. We then entered the digital era and allocated power levels for high band DTV stations were often lowered by a factor or 10 or more.

Those viewers who were getting just OK reception in analog with an indoor antenna, now faced the blue screen of death with their set top boxes. Getting rid of the old rabbit ears and buying a hyped up UHF only indoor antenna did not solve the problem either. Those antennas could offer up to 10 dB of loss as compared to the rabbit ears.

Moving into a new house in many cases made things worse for those who wanted to get high band TV stations with an indoor antenna. Many new homes have low-E glass windows that use a sputtered metal coating to raise reflection of heat (and DTV signals !) Between these windows and modern insulation that has a thin metal barrier, the signal loss inside the house increased. What was transmitted as a H pol signal might arrive as a vertical signal at the receive antenna. And that polarization might change depending on how many or where people were in the viewing room.

Back in the analog days there were tons of the Radio Shack VU-90 antennas mounted on roof tops. The antennas at high band had about 4 dB of gain and 8 to 10 dB front to back ratio. As people turned to cable and satellite, many of the antennas were removed or fell from storms. Most people today if asked about what the antenna on the roof does, could not give a correct answer.

As broadcasters there is little we can to solve many of the reception problems listed above. In planning a new high band VHF facility, the antenna system can be designed to provide maximum coverage and help overcome some of the viewers reception problems.

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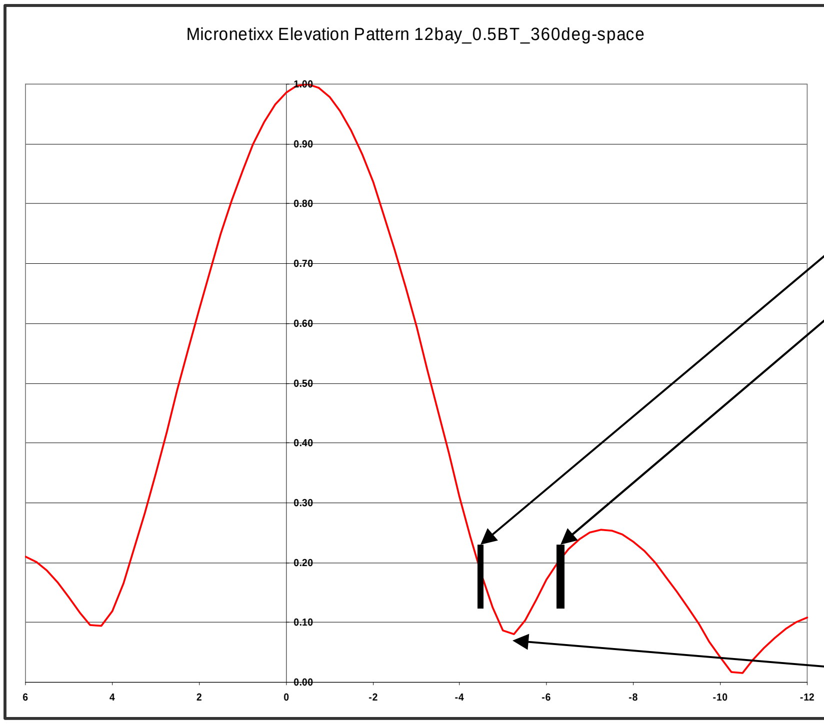
Let's look at one high band DTV station that had significant viewer issues after their conversion. The station was given a post transition ERP of 9 kW, down from their 316 kW analog ERP. The used their existing 12 bay batwing antenna. For many off air viewers it seemed the station had gone off the air. So lets look at what happened. The antenna is on a 1100 foot tower and is about 1400 feet over the core of the city



12 bay antenna elevation pattern +6 to -12 degrees

Core of the city is between these depression angles

First antenna null

The areas that were effected the most were in the core of the city at depression of between -4.5 and -6.25 degrees. The first null of the antenna is at -5.25 degrees and has a field value of only 8%. That translates to an effective ERP at this angle of only 57.6 Watts. Over the area of that lies between -4.5 and -6.25 degrees, the effective ERP is no more than 291 Watts. In the analog days the ERP would have been as high as 10.23 kW – a signal loss of over 15 dB. With the attenuation of building materials in homes and less than unity gain receiving antennas, it is easy to see what the problem is.

In the next issue of AntennaSelect, we will discuss using a new antenna design that will overcome many of the reception issues with the station. We will show how to make high band a success story !

There are big round antennas at my LPFM site

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One of our LPFM clients wanted to know if the big round antennas near where they had planned to put their new LPFM antenna would cause any problems. In this case the next tower over had two parabolic dishes about 6 feet in diameter located at the same elevation. They were able to secure this tower space for free, so it seemed like a win for them. They had planned a single bay FM antenna and had 12 feet of clear vertical space to mount it.

The tower with the dishes was about 40 feet away with one of the dishes being almost broadside to where the LPFM antenna would be located. And that happened to be where they needed the signal the most. A pattern study to determine just how bad the distortion to the pattern would be would cost them about half of what they budgeted for the station.

The tower that had the dishes did have clear space above the dishes and below cell antennas mounted further up the tower. That location did provide a clear path for the station antenna towards where the bulk of the listeners are. To minimize coupling to the dishes and cell antennas above, we recommended a 2 bay half wave spaced antenna. There was more than enough vertical space available. The single bay antenna they were first planning on has a very broad elevation pattern. With the one bay antenna, there is still plenty of energy being radiated in the +/- 70 to 90 degree depression angles. That energy can couple to the antennas above and below it causing the LPFM antenna to detune slightly. Also there is a lot of energy exciting the nearby antennas, raising the possibility of PIM products being generated. One the next page is a overlay of a single bay LPFM elevation pattern, versus a two bay half wave spaced pattern..

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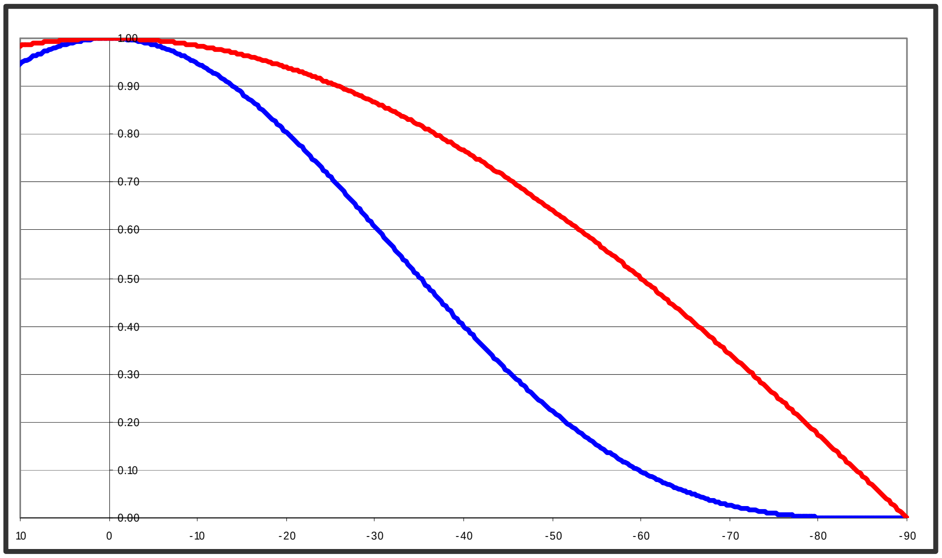

The red trace is the single LPFM antenna bay. The blue trace is the two bay half wave spaced antenna. At +/- 70 degrees, the effective ERP of the station is 23 Watts using the single bay antenna.

Using the two bay half wave spaced antenna, at +/- 70 degrees the effective ERP is only 80 mW – a difference of 24 dB. The reduction in energy reflecting off nearby antennas will also lessen the amount of possible multipath being transmitted from the LPFM antenna due to out of phase signals. Also the possible detuning of the LPFM antenna from nearby antennas will be greatly reduced.

Watch for new FM products in our June newsletter

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Watch for news about our new FM antenna products in the next issue of AntennaSelect™. We will be introducing new antenna designs for the medium and high power FM marketplace.

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

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