Welcome to AntennaSelect™ Volume 24 – February 2016

Welcome to Volume 24 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:

AntennaSelect – On-Line Antenna Engineering Program

Micronetiixx has a powerful and unique Antenna Design & Planning Program that is available on-line. It is called AntennaSelect. (This Newsletter was named after this powerful Engineering Tool!) This program allows you to design a Broadcast Transmitting Antenna from our Engineering Database. You can compare two elevation or azimuth patterns at the same time, then quickly export them to a spreadsheet.

We decided to do an online application, versus distribute the program via CD, or make users update a static program. This lets us push new data online as it becomes available. There are a number of powerful tools in AntennaSelect to help you quickly design an antenna. Please go to: www.antennaselect.com to get started!

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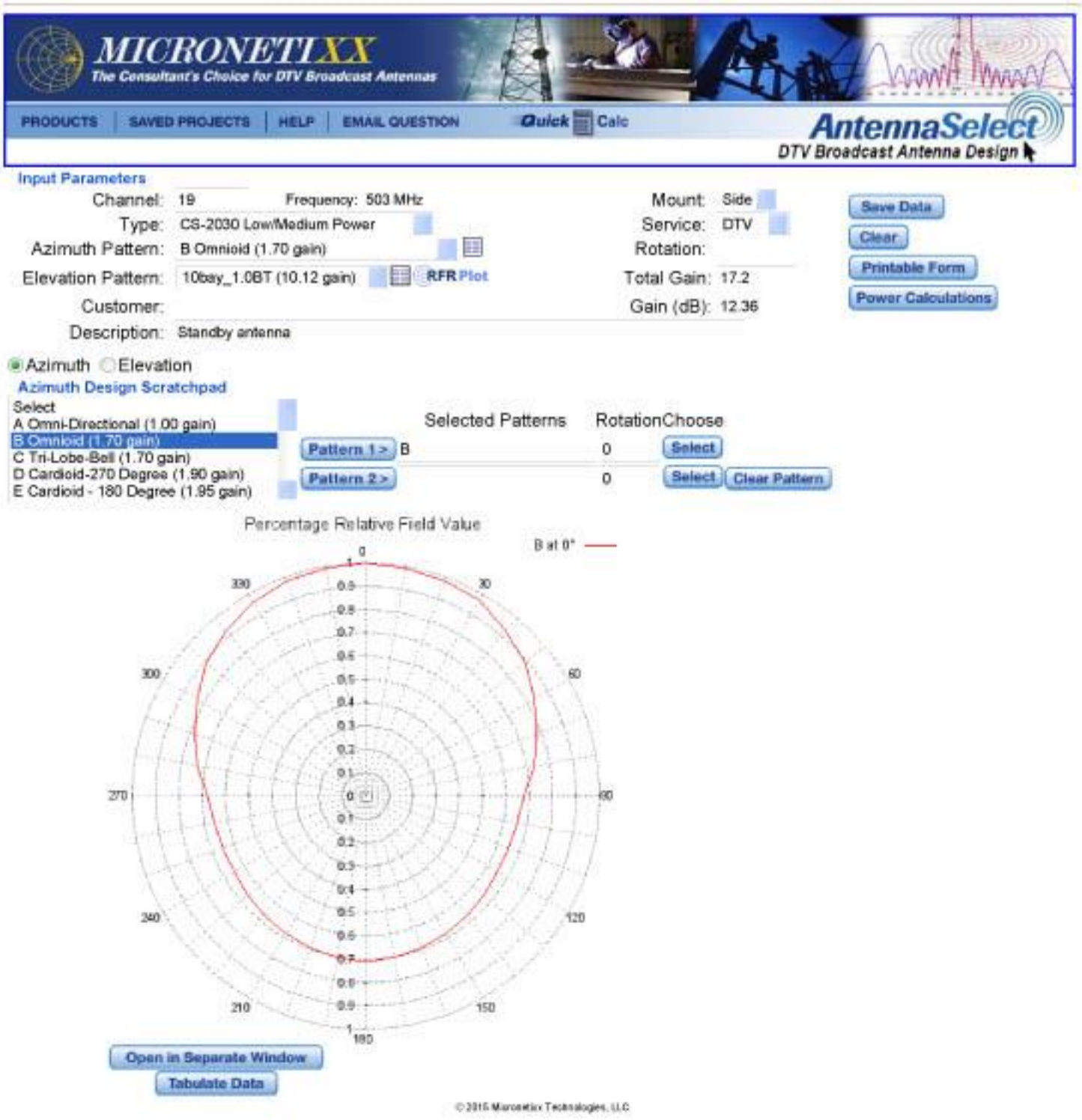

This is a screen shot of the main page of AntennaSelect. You start by entering your channel number, and antenna family you want to work with. You can select elevation and azimuth patterns from either a drop down menu or use the design scratchpad on the left side of the page. Using the scratchpad function , you can overlay two patterns for easy comparison.

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MICRONETIXX
The Consultant's Choice for DTV Broadcast Antennas

AntennaSelect
DTV Broadcast Antenna Design

Radio Frequency Radiation Worksheet

Please fill in the Service, ERP, and Height data then use the button to generate RFR or MPE Chart.

Channel: 19 Elevation Pattern: 10bay_1.0BT (10.12 gain)

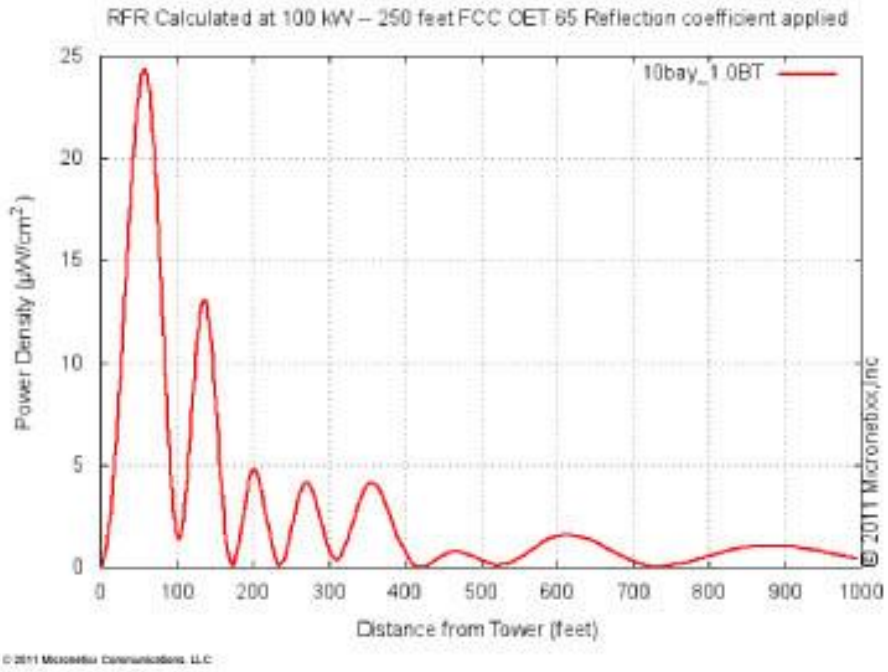
Service: (•) DTV ( ) NTSC [ ] % Aural

Reflection: ( ) None (•) FCC OET 65 (1.6) ( ) Other Reflection (1.0 - 4.0)

ERP (kW): 100

Height: 250 ( ) M (•) F

[RFR Graph] [Zoom] [Exposure%] [Zoom]



Among the many features found in AntennaSelect, the RFR calculator makes it easy to see if an antenna will be within power density rules for a given application. You select the antenna model or models from the main page. Enter your ERP, height above ground and reflection coefficient. You can change the plot by selecting either either the power density or percentage of MPE. The plot can easily be exported by PDF.

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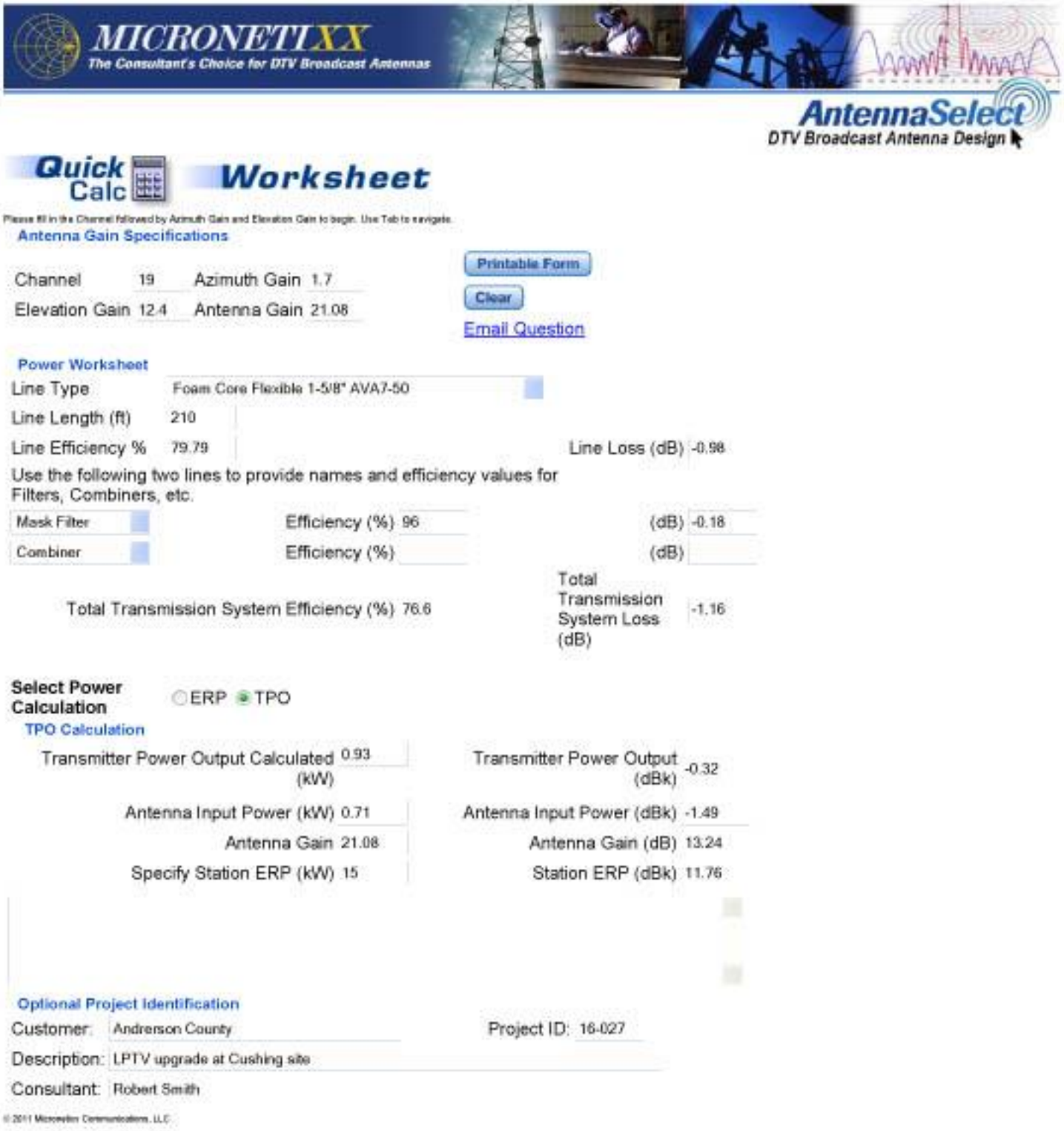

Here is our “what if” calculator. You can use QuickCalc as a scratchpad to design an RF system. Enter the channel, elevation gain, azimuth gain, type of transmission line and any additional losses. You can try new gains and transmission line losses. The form can be printed out. You can even email the form to us is there are questions.

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AntennaSelect has even more antenna engineering applications. If you would like to try it out, go to: antennaselect.com. It takes seconds to set up an account, and it is free. AntennaSelect will be adding on some additional features such as elliptical and circular power calculations. New azimuth and elevation patterns will be added as well. For our FM customers, we will be adding calculation tools for our FM antennas too.

SFN Series – Very Low RFR Slot Antennas

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Micronetixx has a very low RFR series of antennas, called our **SFN** series. These slot antennas have up to 25 dB less RF at high depression angles, as compared to similar sized standard antennas. The **SFN** family of antennas are available for UHF (Band IV). The same technology is also available in our **TPV-SFN** VHF (Band III) slot antennas.

During the repacking, finding an optimal space for your antenna may be problematic. The space available may be too close on a roof or not that far off of ground to allow full power operation. Our **SFN** and **TPV-SFN** antennas may be your answer.

The **SFN** antenna family is a half wave spaced slotted design. Using a special dual mode low Q coupler at each slot, we can precisely control the elevation pattern. With half wave spacing the grazing lobes that are at higher depression angles are greatly reduced, even in small bay count antennas. The **SFN** technology also works when an elliptical or circular elevation pattern is desired. Each bay of the **SFN** antenna produces a true quadrature right hand polarized signal. There is very little differential group delay between polarizations.

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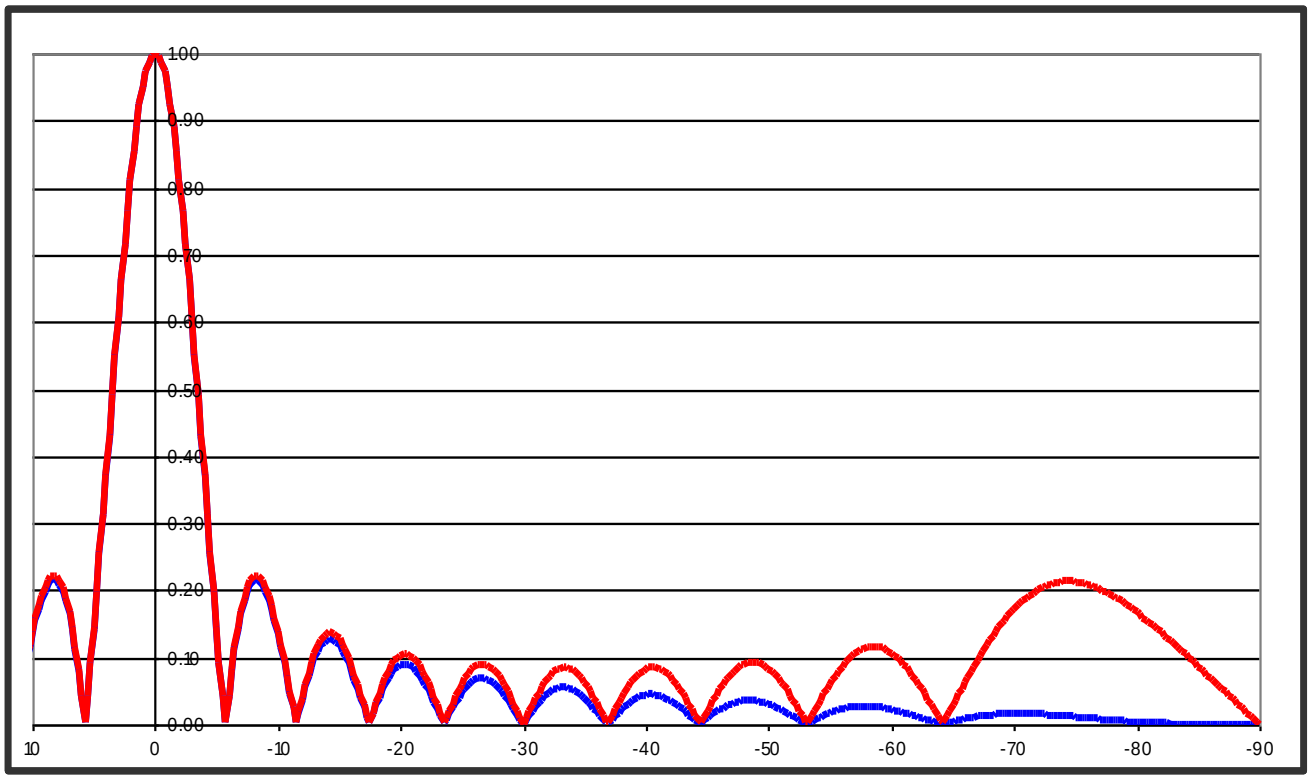

The plot above is a comparison of 10 bay standard UHF slot antenna (RED) plot, versus a 10 bay **SFN** antenna (BLUE) plot. From about -50 to -90 degrees there is very little RF energy being emitted. At -75 degrees, the field value of the full wave antenna is 0.212, while the **SFN** produces only 0.011 of full field. If a station were running an ERP of 200 kW, at -75 degrees there would be and effective ERP of 8.98 kW with the standard antenna. With the **SFN** antenna the effective ERP would be 24.2 Watts – 25 dB lower than the standard antenna.

Another bonus with the **SFN** antennas is the higher unit elevation gain. Since the far right grazing lobe has been cancelled out in the **SFN** antenna, the elevation gain of the antenna increases 10 to 15 percent over a standard antenna. With the **SFN** antenna, it may be possible to drop the bay count, and still have the gain of the larger standard antenna. The smaller bay count antenna will offer a broader main lobe, and the decreased size will help to drop tower loads.

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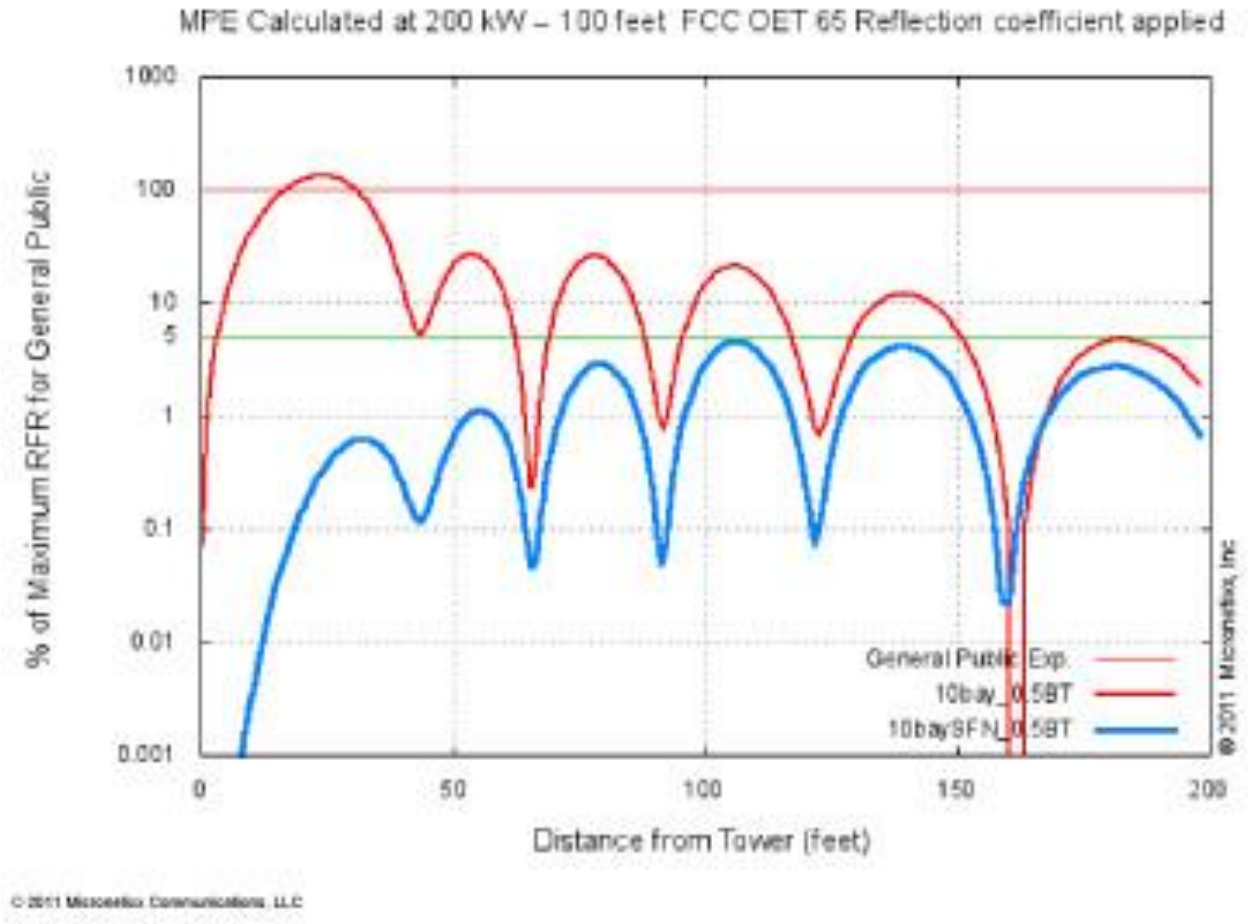
So let's say we apply the two 10 bay patterns and see how much RFR they produce. Using the RFR analysis function found in our AntennaSelect engineering program, here are the results. We set the height above ground at 100 feet and kept the 200 kW ERP. The FCC reflection coefficient of 1.6 was applied.



Close to the tower the standard antenna produces over 100% of MPE, while the **SFN** antenna is less than 1% of MPE at the same place. Even going away from the tower, the MPE generated by the **SFN** antenna is less than 5%.

The **SFN** technology is available on all power levels of antennas in both the VHF and UHF antenna series. If RFR at your site is problematic, the **SFN** antennas will work when no other antenna will. The **SFN** antennas have saved our customers a lot of money when they built out their sites. Have a tough RFR problem coming up ? We will be glad to give you some fresh and flexible solutions.

LPFM and Translators – lowering rooftop RF levels

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Many LPFM stations will be on the roofs of buildings – and not that high off the roof. In some cases Translators will face the same problems and they have up to 2.5 times the maximum ERP that the LPFM's have. We are getting more questions about, what is the best antenna solution for keeping hot spots down and in some cases clearing a second adjacent interference problem.

Half wave spaced antenna bays have the lowest RFR footprint of all the elevation patterns normally used in broadcasting. To get the pattern to perform properly, two things need to happen when working with multibay antennas.

First, the installed antenna should have the proper spacing for its frequency of operation. Installing a "broadband" antenna with instructions for 98.1 MHz will not work when you are at 91.1 MHz.

Secondly, the feed system for the antenna needs to be precisely cut to frequency, taking in the velocity factor of the cable used for the feed harness. Buying an off the shelf "broadband" feed system does not ensure your antenna is producing the proper elevation pattern. This is important with two bay antennas, and even more important with higher bay count antennas. If the spacing or phasing is wrong the elevation pattern can quickly become distorted, causing higher grazing lobes and increasing RFR levels.

Also make sure the feeders, if marked are in the proper location. Beam tilt is added to a multi bay antenna by shortening one feeder cable. Installing that feeder cable in the wrong location will also affect the elevation pattern and may lower its gain.

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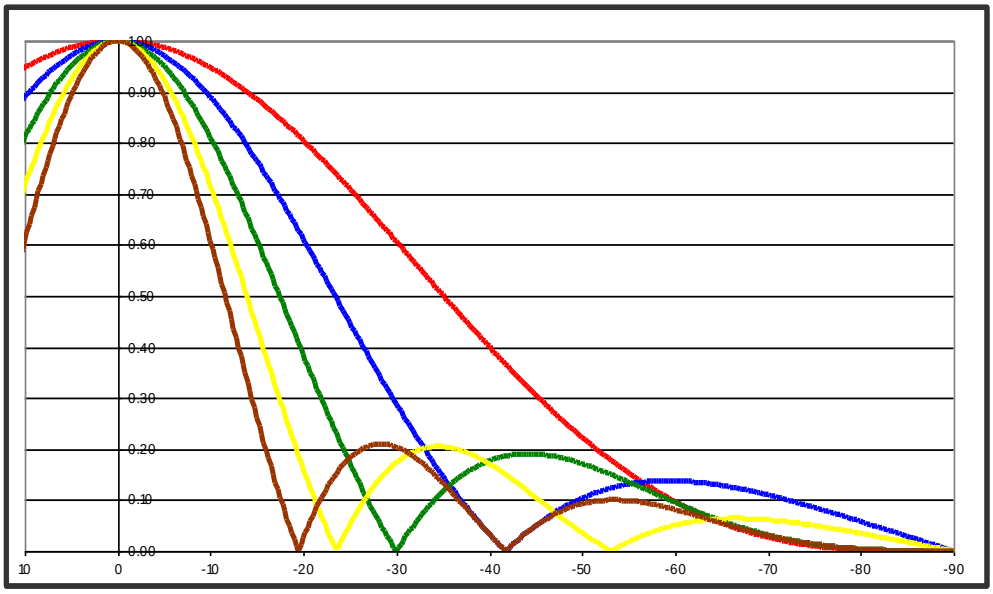
Two Bay – RED
Three Bay – BLUE
Four Bay – GREEN
Five Bay – YELLOW
Six Bay - BROWN



Above is a comparison plot of two through six bay half wave spaced FM antennas. If you are looking to control radiation directly below the antenna, the two, four, and six bay patterns have the same elevation patterns from -62 to -90 degrees down. Going to a larger bay count antenna will not improve RFR levels. The odd bay count antennas do have a slight higher lobe, due to not being a symmetrical array. To lower RFR over a wider range of depression angles, the larger bay count antennas reduce RF due to the main lobe of the antenna getting narrower. At lesser depression angles, the odd and even bay antennas perform nearly the same (all under 20% of peak field), before forming the main lobe.

If you have an RFR problem, let us take a look at it. We can run the numbers for you and present a solution that will work very well.

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

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