Where Did My Signal Go?

AN ARTICLE
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You spent a considerable fortune on your new transmitter site. The anticipation of turning this gigantic Christmas present on is over whelming and no one can wait for the big day. You lost your lease at the old site so a move was inevitable considering they cancelled it because the tower was sold to some cow hating fool who wants to build some houses.

The mad scramble began nearly a year ago with site selections and opportunities being slim in your allowable circle of where you could re-locate your modified blow torch. Now you have to settle on a site that you are not totally thrilled with but hey,,, it has the right altitude, an owner with a poor attitude, and the price was right for the bosses.

Construction begins and with all of the best efforts as to what the new proposed signal will be, you look forward to what might actually turnout to be an improvement over your old coverage. With all the good wishes in your pocket, and the power of positive thinking at your finger tip, you cautiously approach the "Run" button of the new box and with no filaments to warm up and little lack luster of a whir of fans, the transmitter turns on. Now the proof of the deal. Can anyone hear this? What kind of a question is that? The reality of a new site is exactly this question. Can anybody hear our signal? Did we gain "pops"? Did we lose pops? The sales staff is totally freaked and the clamor about not having a signal to sell begins to murmur.

With no turning back now, the first week of operation is spent with the air staff running coverage contests trying to gather data on who can hear you and who can not. The entire staff is out driving the universe trying to comfort themselves as to whether or not this is going to work. Fear is starting to set in as the information that is coming in is dodgy at best and it is starting to freak out the owner who is now a few hundred thou short from the construction.

Being the resourceful soul that you are, you ask permission to call in a company to perform a drive test of your new signal.

What is supposed to be an omni pattern with reasonable roads to drive on at a comfortable radius to your new tower site, you develop a map for the drive test and agree that one pass should be good. You want the signal testing to be super honest. A dual polarity antenna is selected with a band pass filter to eliminate any possibility of stray or other localized high power interference skewing your data.

The drive test begins and the data is captured. With data samples written to a KML file, each data sample is collected at the agreed upon 500 foot intervals. This interval allows for reasonable evaluation of foliage, terrain, or other objects de interfere'. The antenna is riding around at 11'6" above the pavement on a skinny mast so that minimal reflections or interactions with the test vehicle are avoided. Each data point is assigned a level range of a colored dot and the file is full of strange news.

Point# 2361
GPS Locked
Longitude: -80.873817
Latitude: 28.550650
UTC Date and Time: 10/17/2020 17:06:32
System Date and Time: 10/17/2020 13:05:25

Measurement:
Spectrum Analyzer RSSI(dBm)
-43.5

Setup:
Frequency 599.000 MHz
RBW 30 kHz
VBW 3 kHz
Detection RMS/Avg

Scale:
Excellent > -52.0 dBm
Very Good > -62.0 dBm
Good > -72.0 dBm
Fair > -83.0 dBm
Poor less than -83.0 dBm

Each data point is pretty informative. Other than the frivolous goodies in it, the signal level is the real concern. Some of this data is your friend with a nice high level. Other data points are not so comforting.

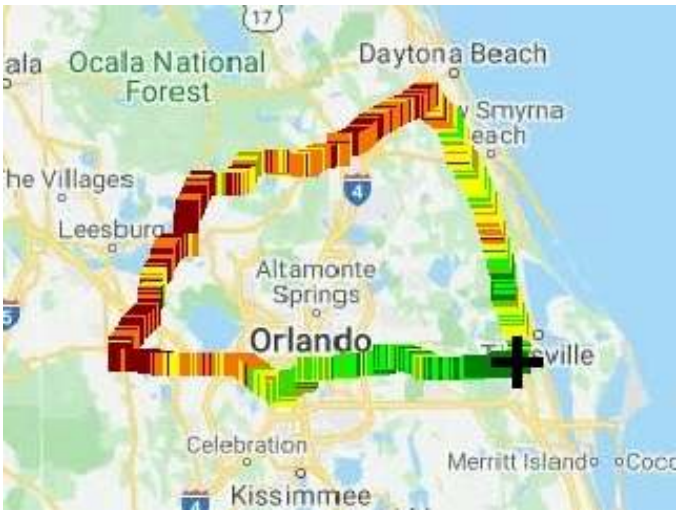
Point# 726
GPS Locked
Longitude: -81.262421
Latitude: 29.063784
UTC Date and Time: 10/17/2020 13:25:31
System Date and Time: 10/17/2020 09:24:23

Measurement:
Spectrum Analyzer RSSI(dBm)
-74.5

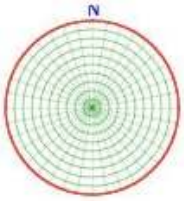
Setup:
Frequency 599.000 MHz
RBW 30 kHz
VBW 3 kHz
Detection RMS/Avg

Scale:
Excellent > -52.0 dBm
Very Good > -62.0 dBm
Good > -72.0 dBm
Fair > -83.0 dBm
Poor less than -83.0 dBm

The expectation was to have a great new signal that all the world can hear. When the report arrives, nothing could be further from the truth. Mr. Mangler, the Owner and your whimpering self get locked in a room and the fur begins to fly. The first question that is way too obvious is didn't you see this coming? Of course they want to hang you in the front yard for the world to see with the results but you defer to the folks that you bought the antenna from. Data was provided about the tower. A complete structural analysis was performed and provided along with the desired coverage area requirements which were well established so how could this have happened. Just because you gave this complete information package to three antenna suppliers, the Owner and Mr. Mangler picked door number three for the low price bid. Surely they modeled the tower,,, didn't they? At some point though your bosses still want your hide on a pike. Even though they should own this one. You did everything else right.



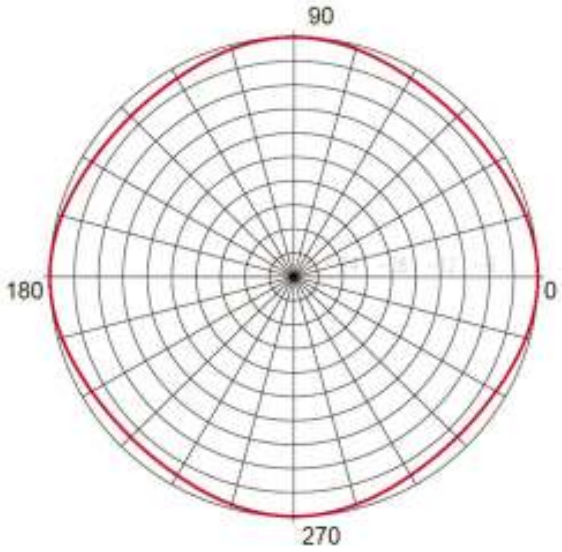
You selected a piece of great line that was hopefully well installed. The system was Line Swept, all systems were tested and verified and you get saddled with a wrinkled coat hanger that is not far off of 50j0 but unfortunately the massive hunk of metal behind your antenna proves to be formidable.



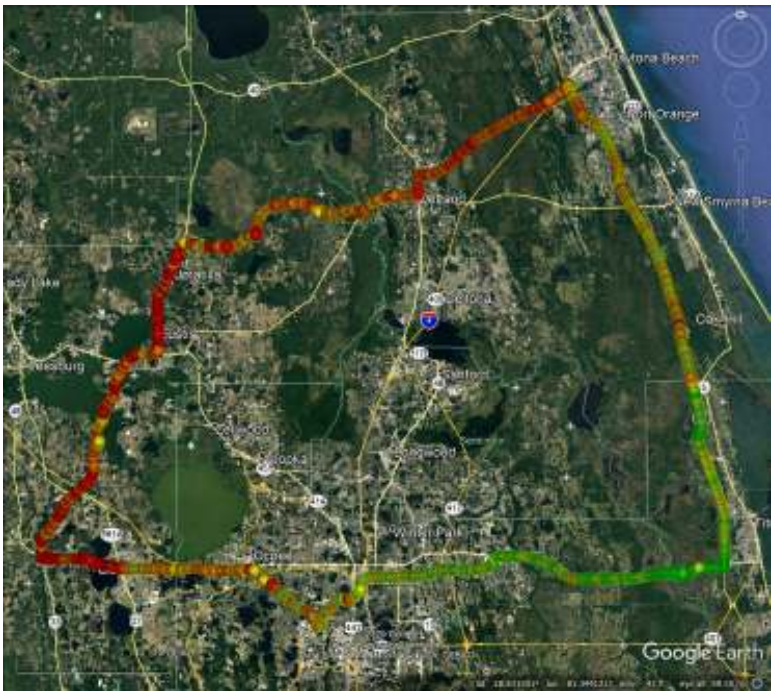
Just because the pattern that was filed looked like something out of the Sears catalog, the result could not have been further from the truth.

Once again the bosses tag team up on you and ask if you received a pattern study from the antenna company. You are relieved to be able to say that you did receive a pattern from them and you shared it with them. You cautiously mention that with a pattern that was suspiciously way too good for this giant hunk of metal. You were concerned, and you did actually mention this IN the Email that included the pattern, but again, your hide on a pike stretched out in the parking lot is their goal.

No matter how many times you try to deflect their tone, you keep dousing them with the irrelevant facts that you did your job correctly and that the blame if any lies with them, not you. Yup, that works.



We arrive at the point where common sense needs to prevail and your dozens of years in this business along with your successful experiences have to kick in and count for something. Yup. You approached this project with the usual calm methodical resolve that you have honed over the years and seemingly this all worked on paper, even though the top brass picked the cheapest antler, the lowest cost transmitter, and the only tower crew with three guys named Melvin.



With all of the data in hand and the evidence of the horrible coverage staring down the barrel, conversations now begin as to what are we going to do with this mess and the choices are just not good.

New sites are always a fright. Even changing out an old friend of an antenna and not moving to a new location can result in severely negative consequences, even when every diligence is applied. There is no substitute for proof, data, testing, first hand observation and trust in your selections of suppliers for quality.

Little comfort is available with the story about lemons and lemonade when your job is on the line and worse yet, your industry reputation.

When decisions involve things in your wheel house like equipment selection, installation techniques and system testing, you have to know where to go for quality work. This is really an open book test. For design and workmanship you have to rely on word of mouth from other colleagues experiences that you can trust. For things that are outside of your domain like antenna range pattern testing from the manufacturer, you have to insist on witnessing the test yourself. Written guarantees are always nice for performance and results. Where field testing is concerned, you have an appropriate meter. You can spend the rest of your days trying to map out your coverage or you can engage a company that offers some form of electronic data and field strength gathering. The equipment is fairly expensive though not terribly hard to operate. This could be true of many fields involved in this craft that you certainly understand but the cost of the equipment always separates the men from the boys. The old saying about the price of the toys is a game changer. It is not enough to know how to push the right buttons, it is important to know what the data means, and that it was gathered in a logical and reputable manner. Your job and your reputation could rely on it.