Portable 160m contesting

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Many of us operate portable, lured by nice views and low - noise environment. We watch nice places and can hear stations not heard at home with beams, only because of very low noise floor. And if we operate with a simple vertical antenna close to salt water, and even better, over, our signals seem competitive with much larger stations. Why? With verticals, radials determine losses in the near field, but low angle radiation is determined by losses in the far field, a few wavelengths away, beyond the reach of radials (ARRL Antenna book). Over salt water, such radiation with a vertical and a single radial can be stronger than from a vertical with many radials, and at low angles, even from a beam. While salt water in the near field boosts all signals, low and high angle, salt water in the far field would boost low angle radiation, useful for DX.

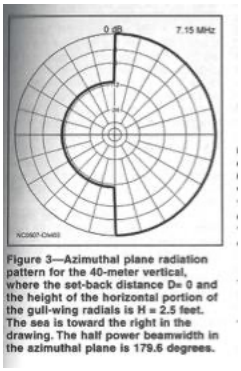


Figure 3—Azimuthal plane radiation pattern for the 40-meter vertical, where the set-back distance D= 0 and the height of the horizontal portion of the gull-wing radials is H = 2.5 feet. The sea is toward the right in the drawing. The half power beamwidth in the azimuthal plane is 179.6 degrees.

Radiation pattern of a vertical on the beach. From NCJ.

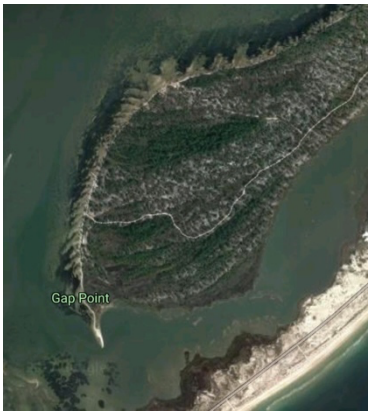
Usually most portable operations are on 40-15m where antennas are small. Low noise and salt water could be a boon to portable work on 160m, boosting performance of too short antennas and magnifying signals of usually very weak DX. However, 160m is generally active during the winter time at night, when it is usually cold if not freezing. Also, the choice of location is important since signals are boosted mostly in direction of salt water.

After Christmas, my family often goes for one-week vacation to St George Island, FL, just south of Tallahassee. The island is about 16 miles long, with a few hundred rental houses on one side and a state park on the other side. The island is just 7 hrs away from my house in GA but it is noticeable warmer, with temperatures reaching 70s, really warm if sunny. There I tried Stew Perry 160m contesting twice, using 40ft Spiderpole as support; the pole weighs only 4 lb, folds to 4 ft, and can be attached to any support without guying. The first time, my antenna was inv L at the edge of a northern beach using one radial and fed directly by TV line. I made about 170 QSOs, with OK performance towards the water but poor inland. Certainly, no matching by the antenna caused large losses. The next year, I set up a vertical inland on a 10 ft high deck, with two 30 ft hat wires and two 30 ft radials. This time the antenna was matched by a large coil and fed via a transformer. My signal seemed stronger though not spectacular,

but due to intensive RFI from nearby power lines and I made only 80 QSOs. No DX stations in either case.

The campground

Last year I found an ideal location at a primitive campsite by the shore in the park. The shore pointed NNE, a perfect direction to nearly all of the US, EU and JA; the nearest power line was a mile away. Two 55-foot trees on the beach separated by 90 ft with a stump in between seemed suitable for



an inv L with a single radial. There were two problems. First, the site was only accessible either by one hr hike, too long for carrying too much weight, or by boat, usually thorough a choppy water. Second, it was a cold spell (for FL), with temperatures dropping to 40 at night.

One challenge for portable 160m operation is antenna matching. My small universal matching unit consisted of a transformer wound on a FT 140-61 ferrite toroid (6 turns of 22 ga twisted pair) and a coil wound with 20 ga wire on a T200-2 iron core (see picture). The transformer isolates the feed with elevated radials (see rational in K2AV article in QST on FCP radial), and the coil cancels the reactive component typical in a short vertical. The toroid was tested at 500W, with wires slightly warm; using gauge 18 wires made the transformer good for 1.5 KW. The iron core was barely warm when tested with 70ft vertical at 500W. Choosing the right materials for coil and the transformer is important. The iron core would have needed many more turns as a transformer, and the ferrite core overloaded at 25W when used as a coil.

Since the exact value of the inductance depends on actual antenna dimensions, I planned to measure the antenna directly with a very accurate yet compact antenna analyzer FA-VA4 (see QST review) and then wind the coil as needed. This analyzer costs < $140 and, after OLS calibration with included test loads, can measure impedances with 1% accuracy. For example, if the impedance is measured as 25 - j350 on 1.83 MHz, I would wind the coil for an impedance of j350. After matching, short verticals have usually SWR < 2:1, which is easily handled by an antenna tuner by the radio, with minimal losses on 160m.

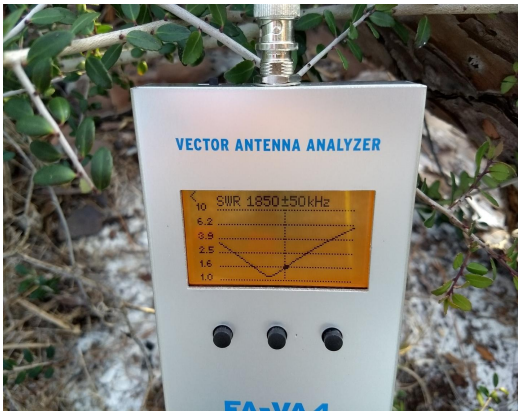
A day before the contest I set up the inverted L using a slingshot and 18 gauge insulated wire. About 55 ft vertical, 90 ft horizontal, and one 70 ft radial elevated 7 ft. To my surprise, SWR was 1.1 at 1.835 without any coil, with a 2:1 bandwidth of about 40 KHz. Talk serendipity. I connected my KX3 via the transformer only. One hr before the sunset and with the sun up high, the first station heard on 160m was fairly strong DL5AXX in a quiet background. I have never heard such a quiet 160m band with such a loud DX before. I tried calling him using 15W with no success, but worked a number of US stations, always receiving 599.

Beachside location. The inv L is hung from the right tree to the left tree, with the radial attached to a stump on the left.

The beach at high tide in the evening

The next day I loaded a boat, sailed through choppy waters, luckily without getting anything wet, and set up a camp. My radio was IC-7000 with LDG Z11Pro tuner plus 30 Ah and 20Ah LiFePO4 batteries. Assuming average power consumption of 4 A/h for S&P and 8 A/h for running, the batteries would be good for only 6 h running but 12 h S&P. My “disposable” laptop (Lenovo 100S) was supposed to last for 7 h but could do longer if used lightly. To extend the operation time, I decide to operate mostly S&P without CAT, using 4 CW memories in IC-7000.

A boat trip.



Nice SWR graph on FA-VA4 antenna analyzer.

The band was in an excellent shape. A good number of stations with no noise. Most stations responded after a first call, and often I was number one when many stations called. Europeans were really loud, some 10-15 db louder than on a receive array at home, just like weaker US stations. No evidence of grey line propagation. Some EU replied right away, and several called when I was running. I was afraid that directions inland would be weak but KP2, KP4 or TI were worked on the first try. My moment of joy came when DL5AXX called; a nearby ham running 1.5KW with a serious antenna later called DL5AXX many times without success, suggesting that my location had over 12 db advantage to EU. In several cases I heard a US station oblivious to a DX just barely weaker calling next it it. Apparently, that DX was not heard by that station but was loud here.

In the tent. IC-7000 with Helinox table (good) and Helinox chair (not good)

Freezing from unusually cold and windy night, I went to sleep at midnight and woke at 6:30 AM, hoping to work KH6 and perhaps JA. The signals were much weaker. A quick look at the beach revealed that, due to a low tide, the beach receded some 200 ft north but half a mile east or west. I worked KH6LC although with many repeats. CA stations were working JA, but no JA copy here. Folding down the site took 2 hrs. Waters were choppy but the luggage made it.

The beach at low tide in the morning.

The total was 228 QSOs, including 13 EU, a few Caribbean's, TI and XE. Why so few QSOs despite excellent conditions? Many reasons. First, there were only so many stations to work S&P. Running was possible as only half the battery was used and 4h left on the laptop. Operating without CAT increased the fatigue. Second, Helinox lightweight chair (2lb) provided no back support next to a low Helinox portable table (2 lb), , causing intense strain and requiring frequent breaks. Third, despite having 5 layers of cloth, it was cold at 40 F with wind blowing through the tent. Operating past midnight until the EU sunset could have brought more high-point QSOs. Fourth, IC-7000 was not the best radio for 160m as it needed 20db of ATT with preamp off to prevent overload by broadcast stations. Finally, the laptop decided to update and locked up a few times.

Comparing to a 160m ARRL contest, it seems that the portable 100W station was as effective as my home station. At home I use inv L 100ft high with 8 elevated radials, 3 el K7TJR vertical array and a legal limit. Modeling in EZNEC (see picture) revealed that at 10 degrees, the difference between poor soil (GA clay) and salt water is about 12 db.

In summary, I experienced an ideal location for 160m contesting. Clean, efficient, DX happy, and not too cold considering that other parts of the country experienced below zero-degree weather. If you decide to have as much funs as I did next year, let me know. I may be there with better clothing, better radio and a generator for a KW. Ready to win. Perhaps with a KX3/ Expert 1.3k-fa combo that I used successfully at CE0Y/NO9E.

Contesting on 160m from a beach next to salt water with a reasonable antenna is magic. Strong US and DX signals and no man-made noise. Perhaps due to weather and locations, such operations are only possible from very few locations where the shore points to the north (majority QSOs) and it is not too cold. St. George Island, FL, is one of such places.