Kiss-SSB Counterpoise Testing

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Conclusion

All results are consistent with RF theory and the measured properties of the Kiss counterpoise with antenna analyzer. As an HF counterpoise, the Kiss-SSB is practically the same as a length of 12g wire about 3 inches longer than the overall length of the Kiss. It provides little or no counterpoise at frequencies 6mhz and less, at higher frequencies it is less effective than conventional counterpoise, and it is less effective at preventing interference with other vessel electronics.

The effect the tuner coax feed line and control cable have on counterpoise performance was not address in this testing as that will be installation dependent. For all tests the coax and control cable had ferrites applied at the tuner to minimize RF conductivity to these conductors. The coax and control cable are internally connected to tuner ground terminal in ICOM tuners and in SGC tuners have DC blocking. In both case the coax and control cable will be a significant part of the counterpoise if not isolated as was done in this testing. It is likely that the coax and control cable will provide some improved performance at low frequencies as they are connected to the transceiver chassis. The chassis has a good reference to transceiver power cables and that will have a good RF connection to vessel's DC wiring. The popularity of this device can only be explained by the subjective nature of determining HF SSB RX and TX performance and by the additional counterpoise provided by tuner feed line and control cable.

Discussion

The manufacturer of the Kiss-SSB claims this device is similar to multiple lengths of wire where each length is tuned for resonance at several HF bands. The Kiss-SSB has all of those lengths of wire folded into a ~5/8" ID tube about 12' long. With radio frequencies, parallel conductors placed in close proximity behave like one conductor due to mutual inductance and capacitance. Testing described here and performed by others using antenna analyzers shows that this device has significant resonance only in one band closely related to its overall length. There is no reason to believe that it has properties not detectable with antenna analyzers.

The only supporting evidence the manufacturer has provided for the claims made are testimonials from users and comments from a professor of communications who did not do any analysis or testing to confirm his assertions. While testimonials should in all cases be viewed skeptically, in this case where the subjective nature of determining HF antenna performance is extreme, one should place little value on those testimonials.

There are many factors involved in the signal levels received by or from distant stations. Transmitted power, radiation angles of TX and RX antennas, efficiency of TX and RX antennas, and propagation are most significant. Evaluating antenna performance using signal reports is confounded by these factors. Some of the signal report testing described here used multiple stations at different angles and different distances over short time duration to help eliminate some of these factors.

The supplier of the Kiss-SSB I tested here was kind enough to loan it to me but did not allow me to disassemble it, so information on how the elements are arranged in the tube is from postings on forums.

Testing

I installed a battery selector switch at tuner ground terminal allowing selection of different counterpoises. The switch has very low resistance, short runs and little capacitance between points. 5 ferrite beads are on the coax and control cables at the tuner to isolate them from being part of the counterpoise.

Test 1

Receive and transmit signal reports. M802 at full power hit tune button after each switch of counterpoise. Test vessel in Apollo Beach, Fl. Saint Jude in NC, Valkyrie in Normans Cay Bahamas, and Kismet in

Miami. The TX reports are as received by distant station. RX reports are as received at test vessel. Distant stations were blind to which counterpoise was being tested. Frequency is 8152khz

Station	Existing TX	Kiss TX	Existing RX	Kiss RX
SaintJude	2 bars	1bar	4 bars	2 bars
Valkyrie	2bars	1bar	2 bars	1 bar
Kismet	7 S units	5 S units	NA	NA

This test shows strong trend indicating Kiss has significantly less antenna gain for RX and TX 2 S units corresponds to 12db change which is a factor of 16x more effective power with existing counterpoise.

Test 2

Replaced existing ground on switch to 12 G wire of similar length and extend in similar pattern to Kiss along starboard side. End of Kiss and end of wire about 4' apart at ends fanning out from switch.

This is an attempt to demonstrate that the KISS is similar to a length of single conductor wire about the same over length of the KISS. The first column of SWR readings at various frequencies were measured with only the KISS attached to the tuner ground post and after a tune operation at each frequency. The second column are with only the wire attached to the tuner ground, but with the tune operation being done while only the KISS was attached. The assumption is that there would be a change in SWR if the counterpoise properties where different between the wire and the KISS. To validate the assumption, I included SWR readings with the existing counterpoise and with no connection to the tuner ground post.

Frequency	Kiss	Wire	Existing	Open
2093	1.16	1.00	18.90	1.35
4003	1.00	1.00	3.90	1.11
6227	1.06	1.06	3.35	1.30
8146	1.00	1.01	10.50	2.70
12359	1.05	1.00	2.73	3.84
22159	1.27	1.00	1.81	1.60

This test indicates that there is no significant difference between the wire and Kiss and at lower frequencies the Kiss and wire are no different than no connection to tuner ground. With the system tuned while connected to the KISS this test shows that there is little difference in SWR readings when the KISS is replaced with the wire. The assumption that there will be a significant change in SWR when the counterpoise properties change significantly is validated by the observed change in SWR when connecting to existing counterpoise or when not connected

Test 3

Used MFJ 259b antenna analyzer as low power beacon to test if Kiss is better at rejecting RF noise generated aboard vessel. I tried placing the noise source in 7 different locations and tried 20, 40 and 80 meter frequencies. I switched between existing and Kiss counterpoise tuning on each switch. In all but one case at 40meter the Kiss signal was higher and in a few cases it was the same. In most cases the existing counterpoise was better at rejecting noise by 2-6 S units even in the case where the beacon was connected directly to the grounding buss bar where DC ground and RF ground are connected.

Test 4

With one of my refrigeration units with Danfoss DC compressor running, I compared RX noise level and found the level was 2 S units higher with Kiss than with existing counterpoise. At each switch of the counterpoise I tuned the tuner and dialed the frequency to maximize the signal level to compensate for frequency drift of signal emitted by the compressor unit. Repeated the test 3 times with same results.

Base line noise level was 9 S units lower than compressor signal.

Moved Kiss-SSB to tuner on base of my vertical on patio roof. Placed 1:1 current balun on coax feed line and control cable at tuner. Existing ground is metal roof and aluminum frame.

Test 5

I performed a test to see if Kiss will radiate. I used a Fluorescent light tube held by one end in my hand with contacts touching my hand and held the other end of the tube near the Kiss. I set radio to 40 meter freq, and power at 150w and tuned then with wireless headset and vox the tube illuminated while transmitting. Another test I did was to switch to existing ground and with same tube but contacts of distant end of tube on tuner ground, the tube did not illuminate when transmitting. Switch back to Kiss and tube does illuminate indicating high potential at tuner ground. Also used an analog 20v dc meter with 1/2 wave rectifier connected between existing ground and tuner ground. With Kiss and power set to 5w it pegged the meter. Yet another test was to touch the tuner ground and it burned. Did not burn when tuner connected to existing ground. Again all predicted by theory.

Test 6

Repeated SWR test as was done in test 2, but this time on tuner at base of vertical on patio roof with similar results.

Test 7

Switched between wire, open, existing ground. Tuner was tuned at each switch. Tested RX signals level (s-units) from 2 stations on 80m, one in FL Keys and other in Ohio

Station	Kiss	Wire	Open	Existing
Ohio	2.5	2.5	2.5	8
Keys	7	7	7	9

This test indicate less signal from both stations. The large difference seen between the 2 stations is most likely due to difference in radiation (rx in this case) pattern. The lack of change between Kiss, wire and open is expected as wire and Kiss provides very little counterpoise and low frequency.

Test 8

Switched between wire, open, existing ground . Tuner in pass through. Tested perceived RX audio quality from WWV at 5m and 10m.

Frequency	Kiss	Wire	Open	Existing
5mhz	poor	poor	poor	good
10mz	good	good	poor	good

This test again indicates the Kiss is ineffective at lower frequencies.

Test 9

I hook up my antenna analyzer and found similar results as Chris noted in posts on http://www.cruisersforum.com/forums/f13/the-kiss-ssb-counterpoise-revealed-with-pics-56551-3.html. I connected the analyzer ground to the existing ground and the Kiss to the center lead. The Kiss has 2 detectable peaks for return loss, one at ~15mhz and the other at ~16mhz. Above and below these frequencies the return loss was less than 0.3 db indicating no resonance above or below these frequencies. Did the same test with wire and saw only one peak at ~16mhz. While it is not exactly the

same as a piece of wire it is practically the same.