Lab 09

RF Transmission/Reception

Sierra College MECH-1
Jim Weir 530.272.2203
jweir43@gmail.com
www.rstengineering.com/sierra

With the advent of the internet, we can "listen" on a remote receiver to most any frequency we wish. For example, www.globaltuners.com is an England based service with remote receivers all over the world. Want to listen to what somebody in the Philippines is hearing on the radio today? There is a receiver there. The closest one to us is down in San Bernardino and is quite active.

Please log in to globaltuners and create your own account.

1. What do "HF" and "VHF" mean?

2. What is one of the main differences between HF and VHF radio waves (besides their frequencies)?

3. QRZ (tell me)?? What are "Q-signals" and why were they invented?

4. QTH? QRM? QRT? SK?

5. Tune either globaltuners or the classroom radio (outside) to 5, 10, and 15 MHz. Can you hear anything on these frequencies? What do you suppose that they are?

6. See if you can find any information on "WWV" and relate it to what you expect to hear.

7. Where are WWV and WWVH located?

8. Why can't we use the classroom radio INSIDE the classroom or anywhere on the bottom floor of the V building? Take the classroom radio to the outside of the V building and see if there is any reception at all on these frequencies.

9. What is GMT? What is our GMT right now? What is the difference between GMT and UTC?

10. What are the current new Amateur Radio class licenses?

11. What are the Morse Code requirements for these licenses?

12. Do you think putting an amateur radio license as one of the qualifications on a job application might be valuable?

13. How much does the license itself (not the test) cost?

14. Go to www.ncarc.org and look at "for prospective hams".

15. Who are WX6RST, N6HTV, K6YIN and W5LFL? Use www.qrz.com to find these answers. You can log in using KB6QBV and the password *cjw12FEB* .

16. What class of license do each of them hold?

17. Why is one of them a "5" and the rest of them a "6" call? (http://www.radioing.com/hamradio/callareas.html)

18. Go to www.airnav.com and look up either Nevada County Airpark (KGOO) or Sacramento Metropolitan Airport (KSMF).

19. Is it legal for you to "snoop" (i.e “listen in”) on these frequencies?

20. Is it legal for you to push the "transmit" button on the radio on these frequencies?

21. What is an "ATIS/AWOS/ASOS"?

22. Can you access the Nevada County Airpark or Sacramento International AWOS without a radio?

23. Download the first "IAP" (Instrument Approach Procedures) for each of these airports. Can you make heads or tails out of what you see?

24. What does the "K" in front of a three-letter airport identifier mean?

25. Look up KORD, KSTL, and KIAD on Airnav.

26. If you were to tune the classroom VHF radio to frequencies for these airports, would you be able to listen to them from Grass Valley or Rocklin?

27. For whom were each of these airports named?

28. What does www.liveatc.net allow you to do?

29. What is the difference between "magnetic" and "true" compass headings? What is the difference (in degrees) at Grass Valley or Rocklin? (Look up www.skyvector.com and look about twenty miles north of Grass Valley airport or Sac Metro airport

CONSTRUCTING A CHEAP AND DIRTY VHF ANTENNA FOR ANY FREQUENCY YOU WISH

1. Calculate a quarter wave for the frequency you are going to use. For example, the Grass Valley repeater is on frequency 147.285 MHz. and the Mt. Vaca Vacaville) repeater is on 147.195 MHz. Whichever. You only have to remember one thing, and that is the speed of light in miles per second. 186,000 miles per second. Or in Metric 3e8 meters/second.

   Example (Mt. Vaca) 186,000 / 147.195 E6 = 1.26e-3 miles, or .00126 miles. Times 5280 feet in a mile gives 6.67 feet. Times 12 inches in a foot gives 80.06 inches. Divide by four for a quarter wave gives 20 inches. Now the magic – to take care of what we call "end effect" we need to shorten the antenna by 5%. 20 inches * 0.95 = 19.0 inches.

2. So the FIRST trial for the wire elements are 19 inches each. Subtract the wire (in this case the alligator clips) length from the end of the coax cable to the wire ends (about an inch) and cut the wire elements 18 inches long each.

3. Tin one end of the wire elements back about an inch for both elements.

4. Fabricate some sort of insulator to keep the wire straight when we put the elements onto it. PVC pipe works well. Wooden dowels work well. Cardboard works well. Junk 2x4s work OK, but are a bit heavy.

5. Cut these insulators about 3" longer than twice the quarter wave value. Drill four holes in the insulator. Two of them a half-inch either side of the exact center of the insulator. Two of them about 5" or so from each end of the insulator.

6. Pass the tinned end of one element through the center hole. Bend it up "around" the insulator so that we can put an alligator clip on it. Pass the same wire through the hole at the same end of the insulator where you put the tinned end through. Flatten it out to the extent possible.

7. Duplicate the element on the other end. Connect the radio to the antenna with alligator clips and you are on the air.