UB5UG Horizontal Receiving Antenna

By: Yuri Medinets, UB5UG
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At modern city to use a separate receiving antenna may be only one variant to be on the Air. Interferences from nearest electronics devices could force it. Below here it is described receiving antenna from far 70-s that may solve the hard modern situation.

The antenna works at 80-, 40-, 20-, 15- and 10- meter Bands. Antenna receives mostly radio waves having horizontal polarisation. Industrial electrical interferences as usual has vertical polarisation. Commercial and ham radio- stations as rule have antennas with vertical polarisation. So, the antenna allows decrease at receiving input both as interferences and signals from nearest radio- stations. At right installation the antenna reduces unwanted signals with vertical polarization up to 20- 30- dB. However the antenna would effectively work for receiving DX station because the stations have as vertical as horizontal components.

Antenna has circle diagram directivity in horizontal plane and 8- shape diagram directivity in vertical plane. It is horizontal loop antenna that feed by transmission line in standing wave mode. **Figure 1** shows design of the antenna. Loop antenna made from two length of the same coaxial cable (item P/2). Feeder L made from the same coaxial cable as loop of the antenna. It is possible use any coaxial cable- 50 or 75- Ohm.

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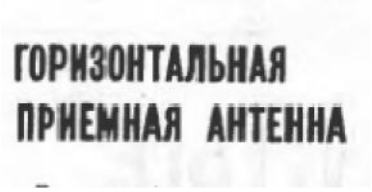
Antenna has electrical length lambda/2 at 80- meter Band, lambda at 40- meter Band, two lambda at 20- meter Band, three lambda at 15- meter band and four lambda at 10- meter Band. Receiving part of the antenna is only loop. When the loop made symmetrically relative to the axis AB the part L cannot participate in receiving. Antenna has input impedance in several Ohms. The antenna may be matched with receiver by some known methods. Antenna has efficiency in several percent at 80- meter Band to several tens at 10- meter band. It is possible to increase the efficiency of the antenna at low bands by increasing of the diameter of the antenna loop.



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However, the antenna lost circular diagram directivity at P more the 0.35 lambda.

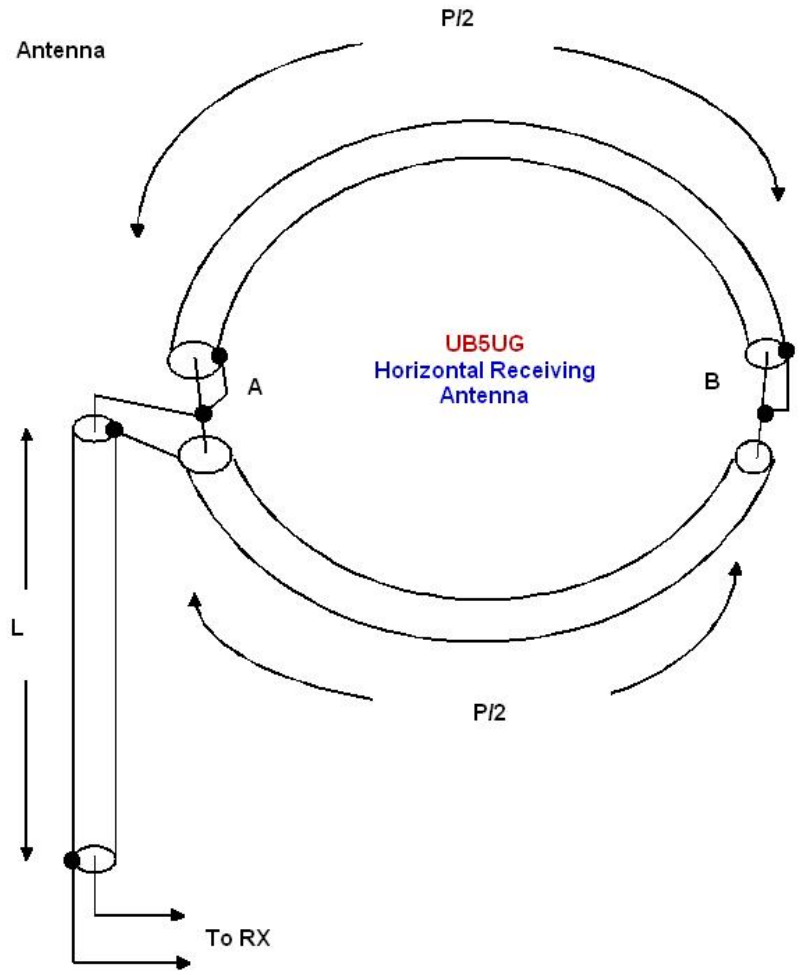

Figure 1 Horizontal Receiving Antenna

Take in attention the limitation (P less the 0.35 lambda), and count desirable quantity of the bands (80, 40, 20, 15 and 10) and take that electrical length of the antenna at lowest band is lambda/2 it is possible to find dimensions for the parts of the antenna according below formula.

$$\frac{P}{2} + \left(\frac{P}{2} + l\right) K_y = \frac{\lambda_{max}}{2}$$

There is at the formula “Ky” that is shortening coefficient for coaxial cable. As usual the shortening coefficient for coaxial cable with polyethylene dielectric is equal to 1.52, and shortening coefficient for coaxial cable with teflon dielectric is equal to 1.44. Formula below helps find Length L.

$$l = \frac{\lambda_{max} - P\,(K_y + 1)}{2K_y}$$

It is going from the formula that optimal sizes for 5-Bands (80, 40, 20, 15, 10- meter Bands) antenna is: P= 4 meter, L= 24.4- meter.

Loop of the antenna should be done symmetrically relative to the axis AB. Loop may have any shape- circular, oval, square or rectangle. Loop may be placed on any form- space out on a wooden crest, lay on the dielectric base and so on. If loop is installed above a conductive surface it should be installed at height 1…- 2- meter above. Feeder should go athwart to the loop. It is very desirable that conductive subjects do not place near the loop on at least 2 meter distance. The subjects may destroy symmetrical of the antenna.