Two Elements YAGI for 145 MHz: Balcony Project

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Well, why I did a Two- Elements YAGI? Why not Three, Four or more Elements YAGI? Or, say, so popular 2-5/8 or 3-5/8 Vertical Collinear Antenna?

Okey, at first, just begin from the beginning. From the theory. As the theory says, multi elements antennas (in the case, YAGI) have a large near field zone. The more elements the antenna contains – the more sized near field zone the antenna has. All subjects that are located inside the near field zone are influenced to the parameters of the antenna.

Conclusion: So- the more elements an antenna is contained - the more free space should be around the antenna.

The conclusion was proved by me. For a while I had to use a commercial (from www.tangenta.ru) made Four and Six Elements YAGI. The antennas are perfect antennas only the antennas have enough large free space around, for example, the antennas are installed on the roof. But I need a balcony antenna. Place at balcony was very limited. I could install only antenna that goes at 1- 1.5- meters outside the balcony. Only the limitation makes me to look for an antenna suitable for such conditions.

Four Elements YAGI works bad at such close to wall (up to 1-meter) installation. There was so called “ladder” effect. The effect means that at one frequency a station is going at 59, step to 25 –kHz the station is going at 58, another step 25-kHz- 59. The more elements have YAGI- the more the “ladder” effect presents. Where a Two Elements YAGI is working at 1 meter from a wall there Four Elements YAGI is required 1.5-meter distance from the wall.

Second question is- why not collinear but YAGI. Collinear works badly at my installation on the balcony. Lots reflected and spurious signals from nearest buildings do the reception too noise and unpredictable.

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Compare to 2-5/8 and 3-5/8 collinear the Two Elements YAGI has more gain. Experience shows that the more distance between radio stations the more Two Elements YAGI beat the collinear. My Two Elements YAGI has room near 100-centimeters x 40 centimeters. Collinear antenna that has close to the Two Elements YAGI gain is 3-5/8 collinear. Such collinear has height near 5 meters. So, what is easy to install at the balcony?

Two Elements YAGI loses 1-dB in gain compare to Three Elements YAGI. However, Two Elements YAGI has boom twice less in length compare to Three Elements YAGI. That is why I have chosen the Two Elements YAGI.

And the last. Why I did configuration “Vibrator- Reflector?” Because the combination has good forward gain thought not good suppression of back lobe. Combination “Vibrator- Director” has good suppression of back lobe but bad forward gain. I need good forward gain.

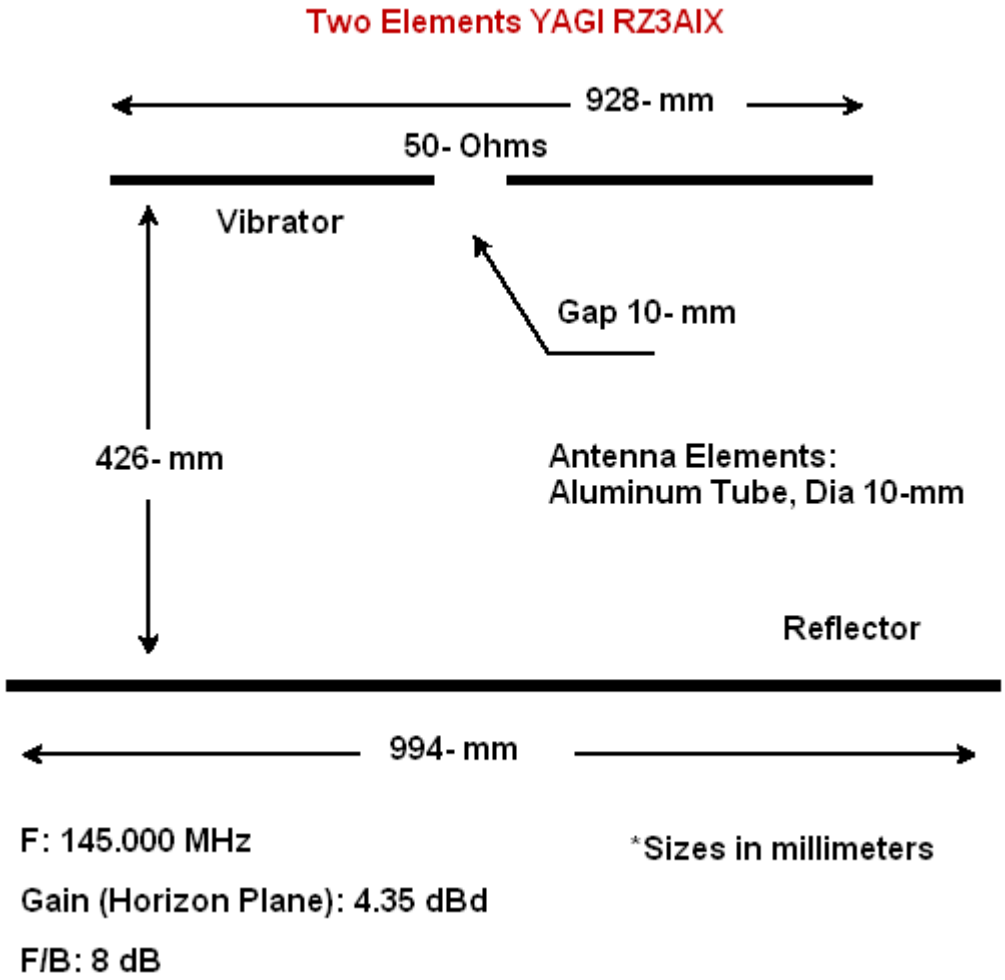

Figure 1 Design of the Two Elements YAGI.

Design.

Figure 1 shows the design of the Two Elements YAGI. Antenna elements are made from aluminum tube in 10-mm diameter. Traverse made of from L- Shape aluminum with sizes 20x20 millimeters. Antenna has input impedance 50-Ohms, so, coaxial cable straight away turns on to the antenna.

Several ferrite rings (that do an RF-Choke) are installed on the coaxial cable near feeding terminal.

Vibrator is insulated from the traverse. Plastic pieces are installed between antenna elements and traverse. The pieces made from a water pipe with OD 20-millimeters (3/4”). Length of 70 millimeters is cut (longitudinal section) on to halves. One piece is going for vibrator another one to reflector. At the vibrator’s piece drill a hole in the centre.

Screw going through the hole fastened the plastic to traverse. Halves of the vibrator fastened to the plastic with help of plastic ties. Reflector electrically connected to the boom through a screw that is going through the reflector and the centre of the plastic insulator. (However, it would be better for antenna performance to isolate the reflector from the traverse.)

Vibrator made of aluminum, so, it needs to install at feeding terminal of the vibrator (with help of screw) solder lugs. Coaxial cable is soldered to the solder lugs. Traverse could be made from any strength stuff- for example ever wood could be used.

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That is all. Antenna is very simple and reliable. I install the antenna at distance 1.5-meter from a wall. There were made lots local and DX-QSO (FM-MODE) at 5-Wtts power. If you will have made the antenna, your comments are welcome to my e-mail.

73!

References:

Igor Lavrushov, UA6HJQ http://www.hamradio.cmw.ru/
Igor Gocharenko, DL2KQ, Antennas HF- VHF, Part- IV

Pictures of my old Four and Six- Elements YAGI.

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