Asymmetrical Trap Dipole Antenna

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Credit Line: http://cqham.ru/ant78_71.htm

Ham knows and widely used to Symmetrical Trap Dipole Antennas. Classical example of such antenna is W3DZZ antenna. At my opinion such antennas has just one benefit- patterns of the antennas are almost the same at the different bands. However, the antennas have lots deficiency. There are heavy weight, complexity in design, large enough windage and narrow bandwidth at the lower bands, high SWR at some bands.
Asymmetrical Dipole Antennas (that are used by hams) are free from some of lacks of the Symmetrical Trap Dipole Antennas. However the main lack of the Asymmetrical Dipole Antennas is the main lobe of the diagram directivity at lower bands is toward to main lobes at the other upper bands.

An interesting antenna was design by me by combination of these two types of antennas- Symmetrical Dipole Antennas and Asymmetrical Dipole Antennas. I called it “Asymmetrical Trap Dipole Antenna.” The antenna has pattern almost similar to pattern of Symmetrical Trap Dipole Antennas. However the antenna needs twice less traps compare to Symmetrical Trap Dipole Antennas. So, Asymmetrical Trap Dipole Antenna is more easy to tune up and has less windage (compare to Symmetrical Trap Dipole Antennas). **Figure 1** shows the design of the Asymmetrical Trap Dipole Antenna. Dimensions of the antenna are given for height 15 meter over the ground (there are in the brackets dimension for height 15 meter over the ground)

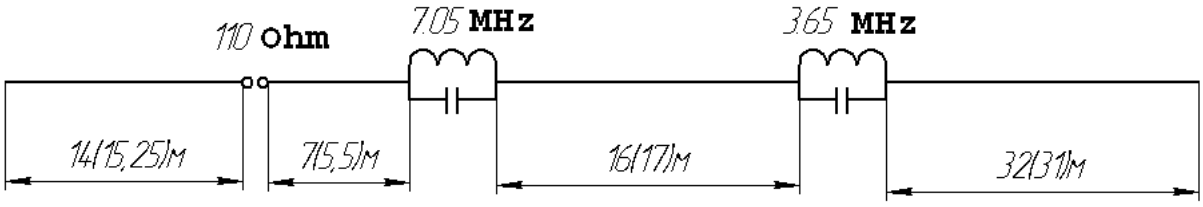

Figure 1 Asymmetrical Trap Dipole Antenna for the 40, 80 and 160- meter Bands

How the antenna works: At the 40- meter Band there are left wire and wire up to trap on 7- MHz take part in the antenna radiation. So it is asymmetrical dipole with the ratio of the sides 1:2. At the 80- meter Band there are left wire and wire up to trap on 3.5- MHz take part in the antenna radiation. So it is asymmetrical dipole with the ratio of the sides 1:2, however, the left wire of the dipole is the less wire of the antenna. At the 160- meter band all right part of the antenna works. It is not classical asymmetrical dipole with ratio 1:2. However because of the inductors in the right wire and low height above the ground the antenna may be matched with 110- Ohm with SWR 1.25:1 .

The antenna has input impedance close to 110- Ohm at its working Bands. Antenna may be match with 50- Ohm coaxial cable by binocular transformer 1:2.56. **References 1, 2** are described such transformers. Do not use autotransformers. As a rule autotransformer does not provide cut-off RF current from the outer braid of the coaxial cable.

So the cable would be radiated and very possible RFI and TVI around of the antenna. It would be useful to install RF choke on the coaxial cable before the entering the cable in to the room.

To prevent breakdown of the transformer by static electricity it should be installed resistor on 100- kOhm (or more) in bridge with antenna wire (any of them, or, that is better, between the middle point of the transformer) and the braid of the coaxial cable. The braid should be grounded in the shack. I made traps for the antenna accordingly to **Reference 3**.

Picture of the similar traps are at **Reference 4**. **Figure 2** shows pattern of the antenna installed at height 30 meter above the ground.

Adjusting of the antenna is usual for such kind of the antennas. At the 40 meters antenna is tuned to the resonance by proportional changing of the length of two wires before trap for the 7- MHz.

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At the 80- meter the antenna is tuned in to resonance by wire between trap for 7- MHz and 3.5- MHz. At the 160- meter the antenna is tuned to resonance by the length of the wire after trap to the 3.5- MHz. (See **Figure 1**).

Similar to the antenna from the **Figure 1** it is possible to make two band antennas. **Figure 3** shows Asymmetrical Trap Dipole Antenna for the 80 and 160- meter Bands.

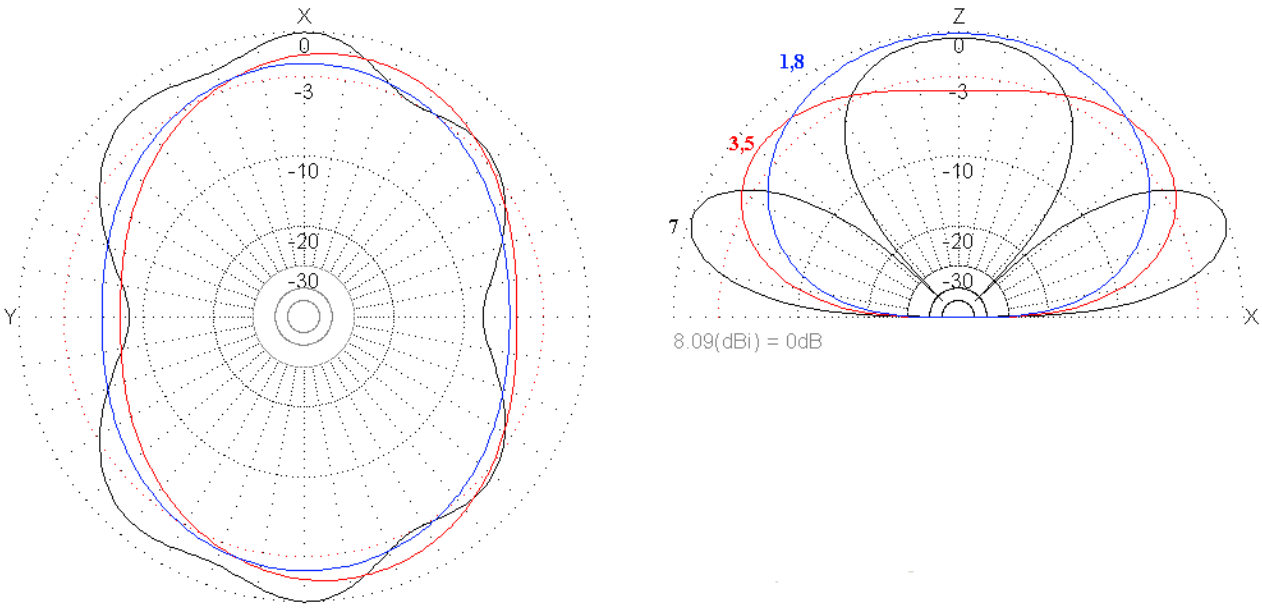

Figure 2 Pattern of the Asymmetrical Trap Dipole Antenna installed at height 30 meter above the ground

Dimensions are for the height of 15- meter above the ground. The antenna may be fed directly by coaxial cable 50 or 75 Ohm. RF choke installed near the feeding terminal of the antenna would be very useful. The choke may be made as several turns of the coax above any ferrite ring.

The MMANA models of the antennas may be loaded: http: // www.antentop.org/015/ra9qce_015.htm

The models should be checked in the utility NEC2 for MMANA. The utility may be loaded from the link at **Reference 5**.

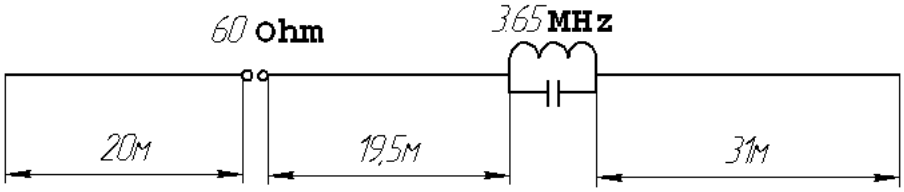

Figure 3 Asymmetrical Trap Dipole Antenna for the 80 and 160- meter Bands for 80 and 160-meter Bands.

References:

1. http://forum.qrz.ru/showthread.php?t=12762

2. http://forum.cqham.ru/viewtopic.php?t=17233

3. http://dl2kq.de/soft/6-6.htm - Trap-rus

4. http://cqham.ru/trx84_11.htm

5. http://dl2kq.de/mmana/4-8.htm - NEC2 for MMANA

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