

RA3AAE Antenna for the 10- and 2- meter Band

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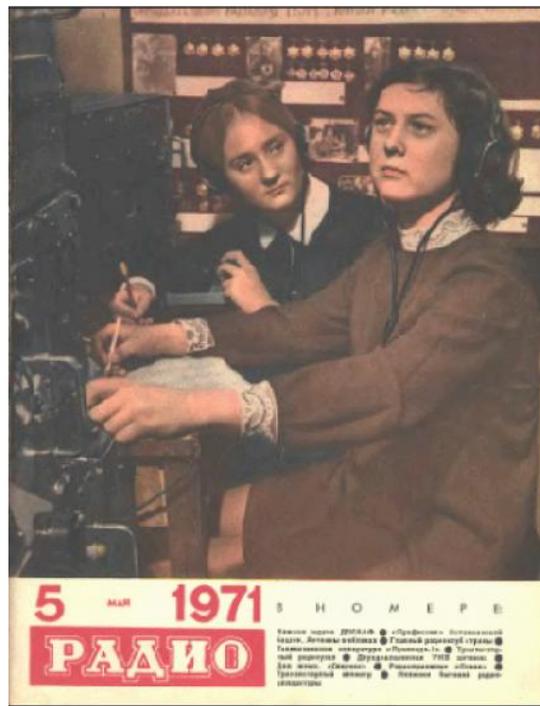
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The antenna works on the 10- and 2- meter Bands. Antenna does not require any switching in ATU when the band is changed. Antenna radiates radio wave with vertical polarisation. Antenna is fed by 75- Ohm coaxial cable. The cable is very chip compare to 50- Ohm coaxial cable. It is possible to buy 30- meters good 75- Ohm cable intended for underground placement for 10... 20 dollars. Practically any transceiver (designed for 50- Ohm antenna) could work with 75- Ohm antenna. **Figure 1** shows design of the antenna.

At the 2- meter Band the radiated part of the antenna is a Vertical Dipole (**item 1**). Physically the dipole is simulated by two tubes (**item 1**). Vertical radiator (that serves at the 10- meter Band) (**item 2**) is going through the upper tube. The vertical is connected with the upper tube at the bottom of the tube. Coaxial cable (**item 4**) is going through the lower tube. Central core of the coaxial cable is connected to the upper tube. Braid of the coaxial cable is connected to the lower tube. Radials (**item 3**) for the 10- meter band antenna are connected to the braid of the coaxial cable a little lower of the lower tube. The tube (**item 1**) is quarter-wave sleeve (serve like an RF choke) for the 2- meter Band. The choke does not allow the leaking of the RF current of the 2- meter Band to the others parts of the antenna.

Hereby the vertical (**item 2**) and coaxial cable (**item 4**) going through the vertical and lower tube (**item 1**) is insulated on RF at the 2- meter Band from the Dipole Vertical antenna (**item 1**). The Dipole Vertical antenna (**item 1**) has input impedance close to 75- Ohm at the 2- meter Band.

At the 10- meter Band the antenna is a Vertical antenna with 3 slope downward radials. All parts of the antenna from the top of the vertical (**item 2**) to the ends of the radials (**item 3**) are radiated.



Radio # 5, 1971. Front Cover

Vertical antenna with 3 slope downward radials (as it is shown on the **Figure 1**) has input impedance near 40... 60- Ohm when the antenna is fed at the terminals "Vertical- Radials." The input impedance is less the 75- Ohm. To match the antenna input impedance with the 75- Ohm coaxial cable the feeding terminals are risen up. It is going to increasing of the antenna input impedance in proportional with:

$$1/\text{Cos} \frac{2\pi h}{\lambda}$$

Двухдиапазонная УКВ антенна

Header of the Article

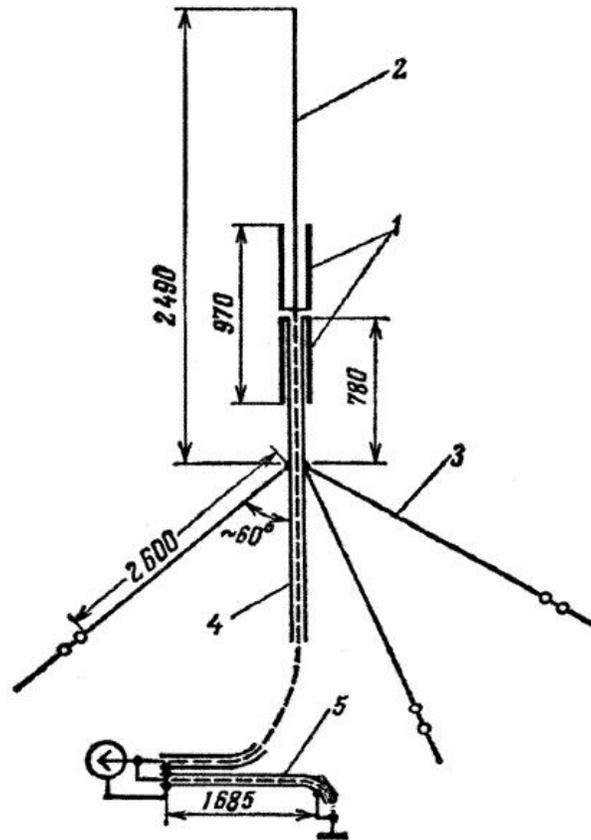


Figure 1 Design of the RA3AAE Antenna for the 10- and 2- meter Band

Where *h* is the height from the radials to the feeding terminals. The resonance frequency of the 10- meter Band antenna does not change at the shift of the feeding terminals. Moreover, at the antenna design the shift of the feeding terminals (for the 10- meter Band) allows to place the vertical antenna for the 2- meter band higher on to the antenna design. It has sense at the limited (on to high) installation of the antenna.

Vertical Dipole Antenna for 2- meter band influences to resonance frequency of the 10- meter Band antenna. The influence is lowered the resonance frequency of the antenna. So it is possible compensate the influence by the shortening of the vertical (item 2). This influence may be calculated theoretically but the simple way is practically find it. For the described here antenna it needs to be shortened the vertical on to 100- mm while the antenna would be tuned to the resonance.

Table 1 shows SWR of the RA3AAE Antenna for the 10- and 2- meter Band.

Vertical of the antenna (item 2) made of aluminum wire in diameter of 8- mm (0- AWG). Vertical Dipole Antenna (item 1) made of duralumin tube in diameter of 30- mm (diameter 1-1/2- inch). Antenna radials (item 3) made of antenna wire in diameter 1...2- mm (12- 18 AWG). Vertical (item 2) is fixed on to wooden mast with help of insulators. Each radial (item 3) has two insulators at the end.

The antenna needs lighting protection. Closed Stub (item 5) does this function. The stub has electrical length 1/4 lambda at 10- meter Band and 5/4 lambda at 2- meter Band. The stub has high impedance at the bands and this one does not affect to the antenna- feeder system.

Table 1 SWR of the RA3AAE Antenna for the 10- and 2- meter Band

F, MHz	28.0	28.5	29.0	29.5	144.0-146.0
SWR	1.5:1.0	1.3:1.0	1.17:1.0	1.4:1.0	1.2:1.0