SHUNT VERTICAL UNIVERSAL HF ANTENNA

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*Field universal antenna RV3DA (**see pp.:24- 35 of ANTENTOP- 02- 2004**) works well even at a bad grounding. To hammer into the ground a metal rod in 1 meter length is enough for the grounding. Installation of the antenna takes a little time, it is another its advantage.However, if there is an opportunity to provide a good ground, and there is some free time to spend of for installation of an antenna, it is possible to use a **Shunt Vertical Universal HF Antenna** .*

Figure 1 shows the schematic of the Shunt Vertical Universal HF Antenna. A detailed description of the theory of a Shunt Vertical Universal is given at reference **[1]**.

Apparently, the circuit of the antenna only a bit differs from field universal antenna RV3DA. The differences are: the loop is isolated from the ground, its terminals are shortened, shunts go down from two tops of the triangle loop to the ground. To ground shunts is possible as to universal antenna RV3DA it is done, i.e., a metal rod in 1 meter length is enough for the grounding. Of course, several counterpoises (three and more) in length 0f 5 meters (and more) help to improve the antenna operation. Counterpoises can lay on a surface of the ground.

Shunt Vertical Universal HF Antenna radiates mainly vertical radiation. It is required to use the antenna at woodless surrounding or big losses of high-frequency energy will be. Please, take attention Shunt Vertical Universal HF Antenna has a gain less then universal antenna RV3DA. It is possible to do a design of the Shunt Vertical Universal HF Antenna so, that this one can be easy turned to the field universal antenna RV3DA.

Below given diagram directivity for the antenna obtained with help of free antenna program MMANA (MININEC based). Left diagram is a section of the volumetric diagram directivity of plane X-Y at a zenith corner of the maximum radiation. The right diagram is section of the volumetric diagram directivity of plane X-Z. Also at the right down corner of the pictures is a table with antenna impedance. Please, take attention to the data, you can do decision how you ATU does match of the

Reference:

1. Aizenberg G. Z. Antennas of Short Waves.: Moscow, '
Svyaz", 1985.

73!
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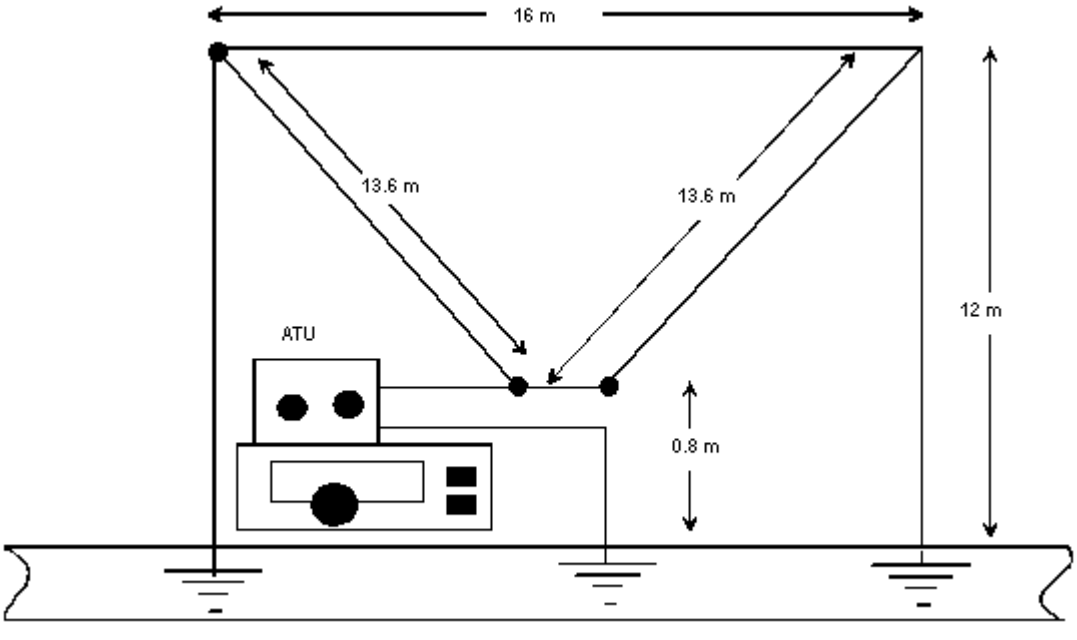
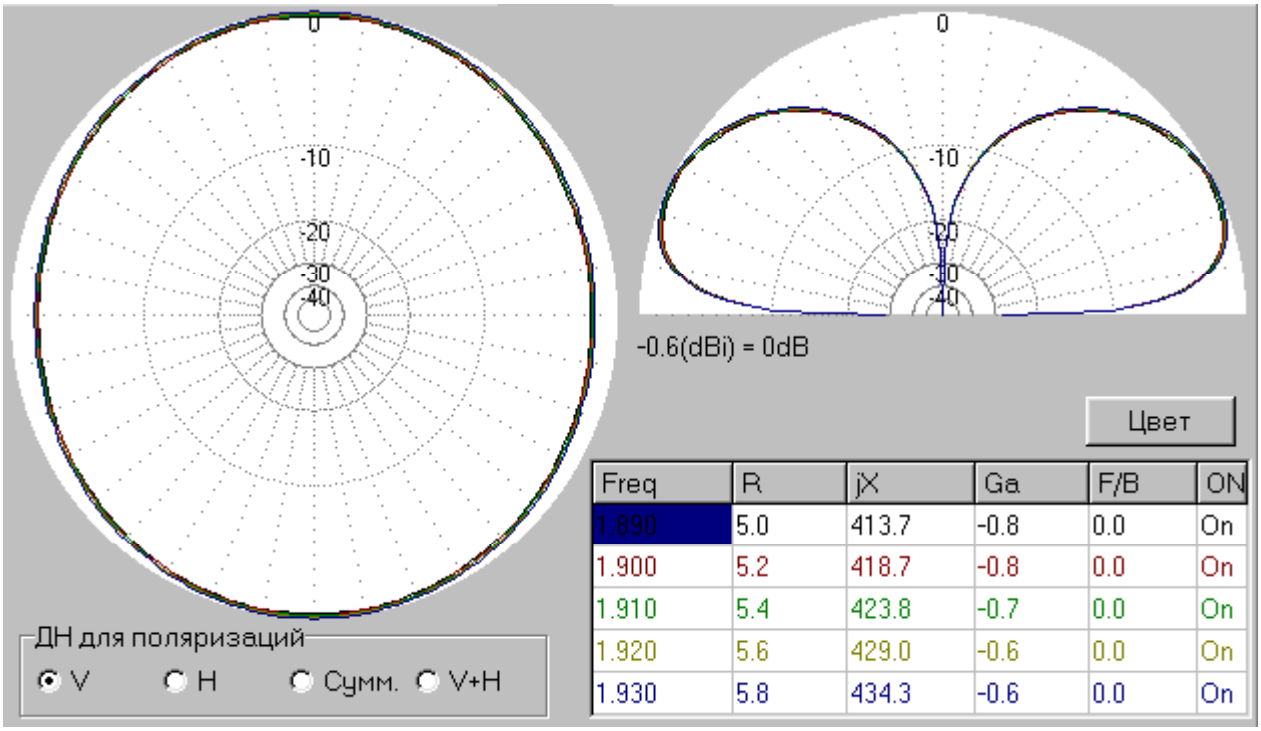


Figure 1

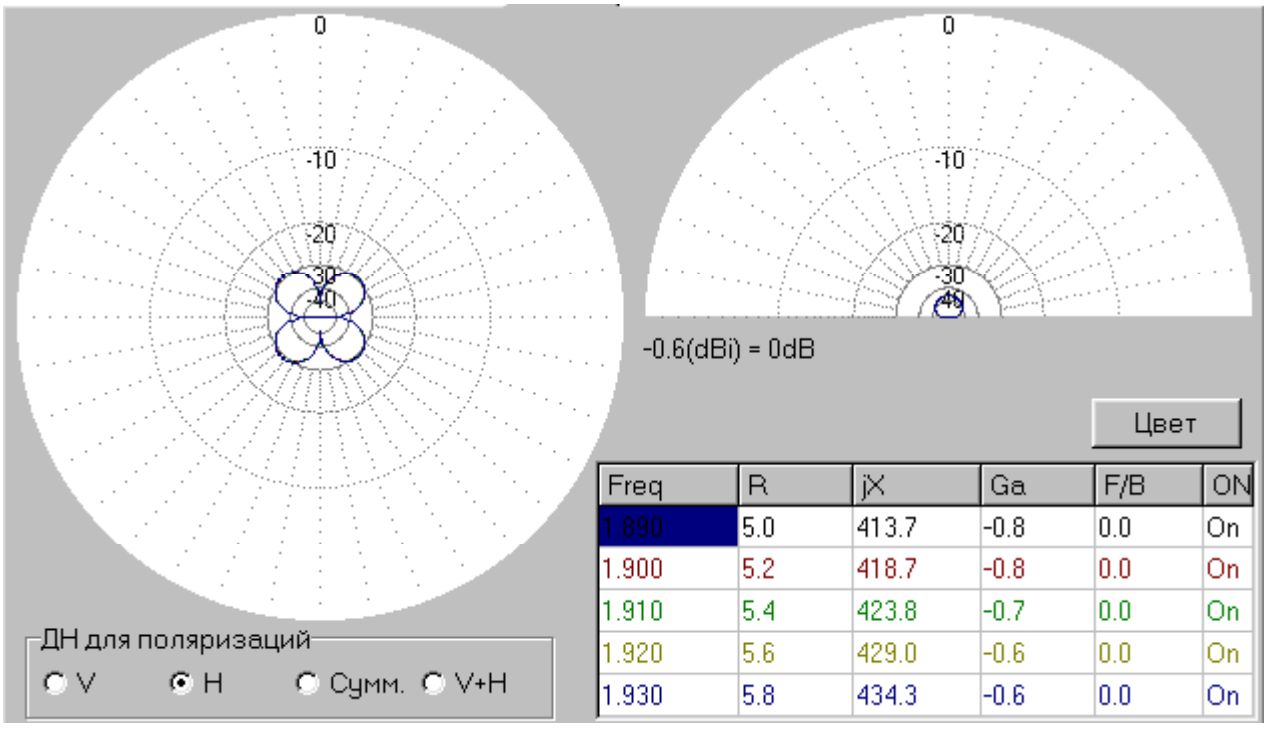
Shunt Vertical Universal HF Antenna at 160-m

Vertical Radiation Pattern



Freq	R	jX	Ga	F/B	ON
1.890	5.0	413.7	-0.8	0.0	On
1.900	5.2	418.7	-0.8	0.0	On
1.910	5.4	423.8	-0.7	0.0	On
1.920	5.6	429.0	-0.6	0.0	On
1.930	5.8	434.3	-0.6	0.0	On

Horizon Radiation Pattern

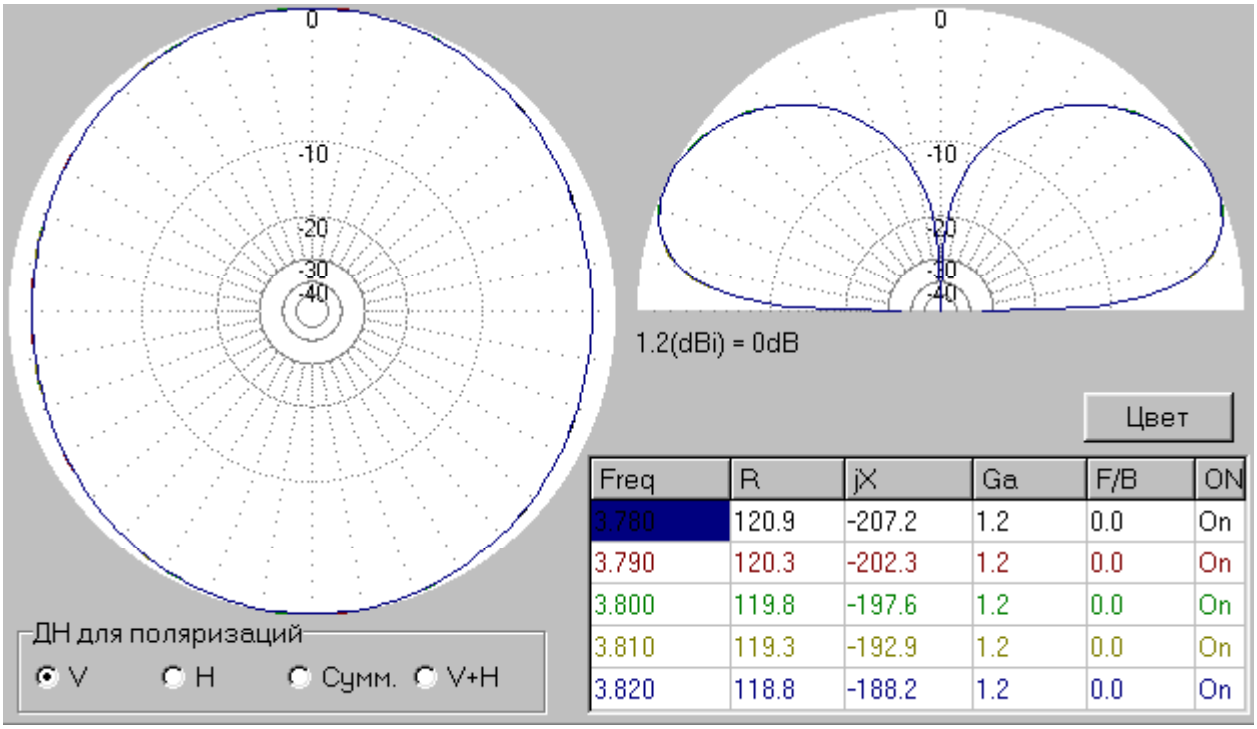


Freq	R	jX	Ga	F/B	ON
1.890	5.0	413.7	-0.8	0.0	On
1.900	5.2	418.7	-0.8	0.0	On
1.910	5.4	423.8	-0.7	0.0	On
1.920	5.6	429.0	-0.6	0.0	On
1.930	5.8	434.3	-0.6	0.0	On

Comments: Antenna radiates radio waves with vertical polarization. A very good pattern with low lobes in the vertical plane. Circular pattern in horizontal plane. It is fine for DX- QSO. But antenna has Z= 5.4+ j423-Ohms at 1910-kHz. Not all ATUs do good matching for such load.

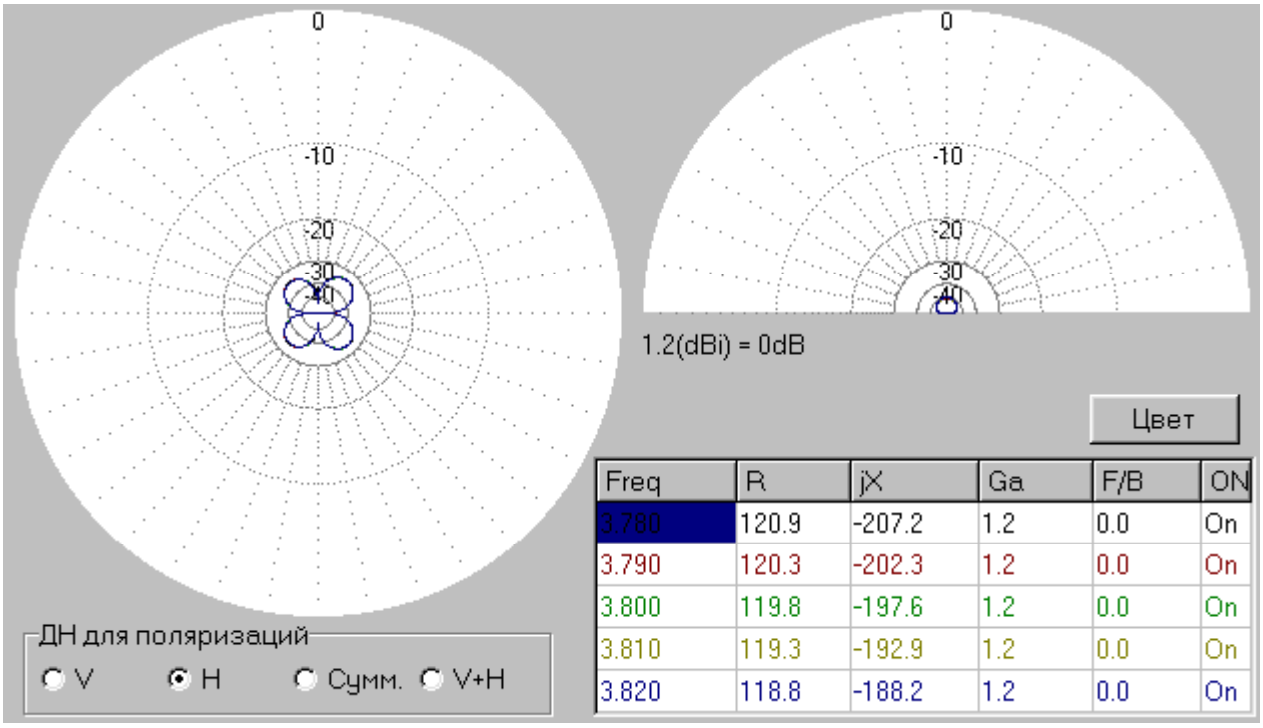
Shunt Vertical Universal HF Antenna at 80-m

Vertical Radiation Pattern



Freq	R	jX	Ga	F/B	ON
3.780	120.9	-207.2	1.2	0.0	On
3.790	120.3	-202.3	1.2	0.0	On
3.800	119.8	-197.6	1.2	0.0	On
3.810	119.3	-192.9	1.2	0.0	On
3.820	118.8	-188.2	1.2	0.0	On

Horizon Radiation Pattern

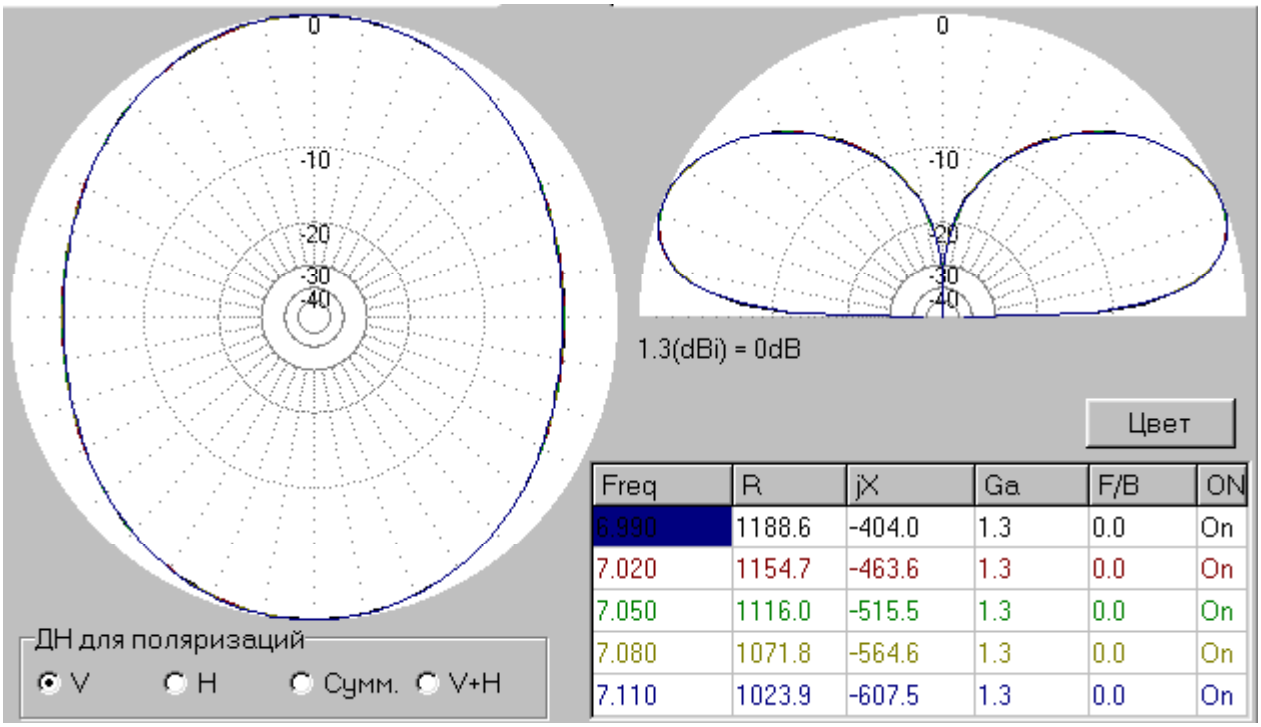


Freq	R	jX	Ga	F/B	ON
3.780	120.9	-207.2	1.2	0.0	On
3.790	120.3	-202.3	1.2	0.0	On
3.800	119.8	-197.6	1.2	0.0	On
3.810	119.3	-192.9	1.2	0.0	On
3.820	118.8	-188.2	1.2	0.0	On

Comments: Antenna radiates radio waves with vertical polarization. A very good pattern with low lobes in the vertical plane. Circular pattern in horizontal plane. It is fine for DX- QSO. Antenna has Z= 119-j197-Ohms at 3800-kHz. Almost any ATU does good matching for such load.

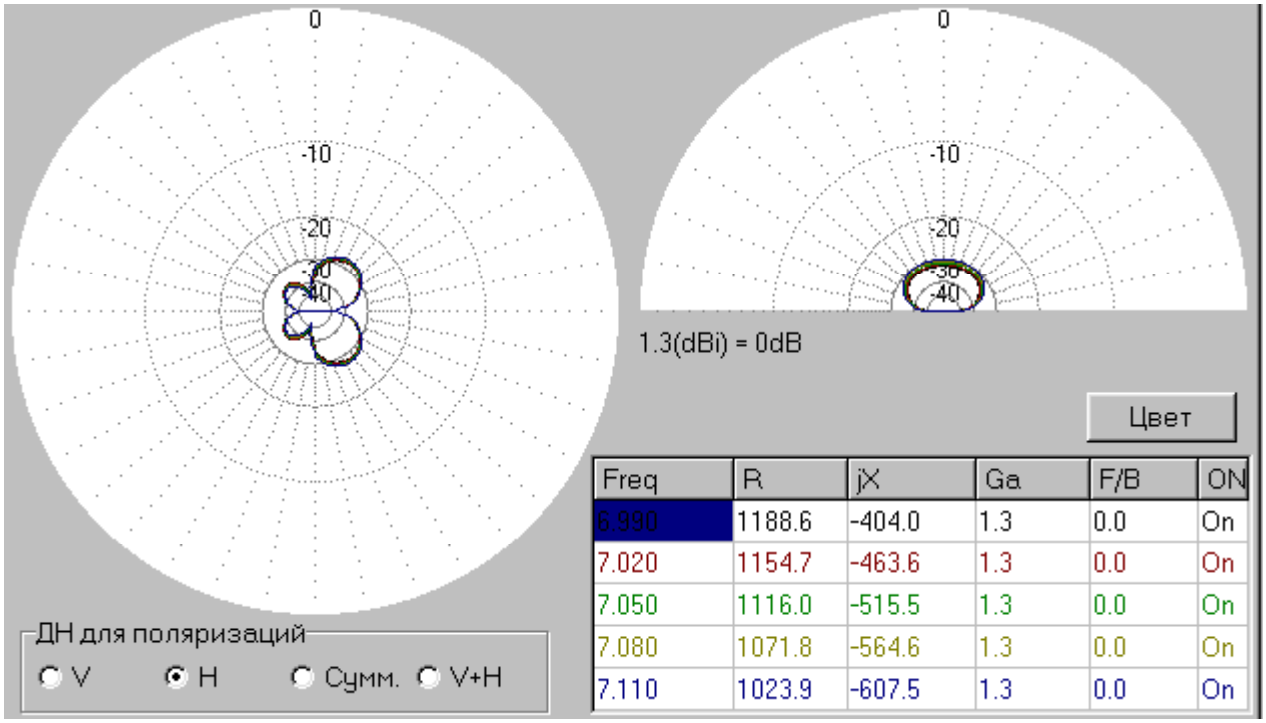
Shunt Vertical Universal HF Antenna at 40-m

Vertical Radiation Pattern



Freq	R	jX	Ga	F/B	ON
6.990	1188.6	-404.0	1.3	0.0	On
7.020	1154.7	-463.6	1.3	0.0	On
7.050	1116.0	-515.5	1.3	0.0	On
7.080	1071.8	-564.6	1.3	0.0	On
7.110	1023.9	-607.5	1.3	0.0	On

Horizon Radiation Pattern

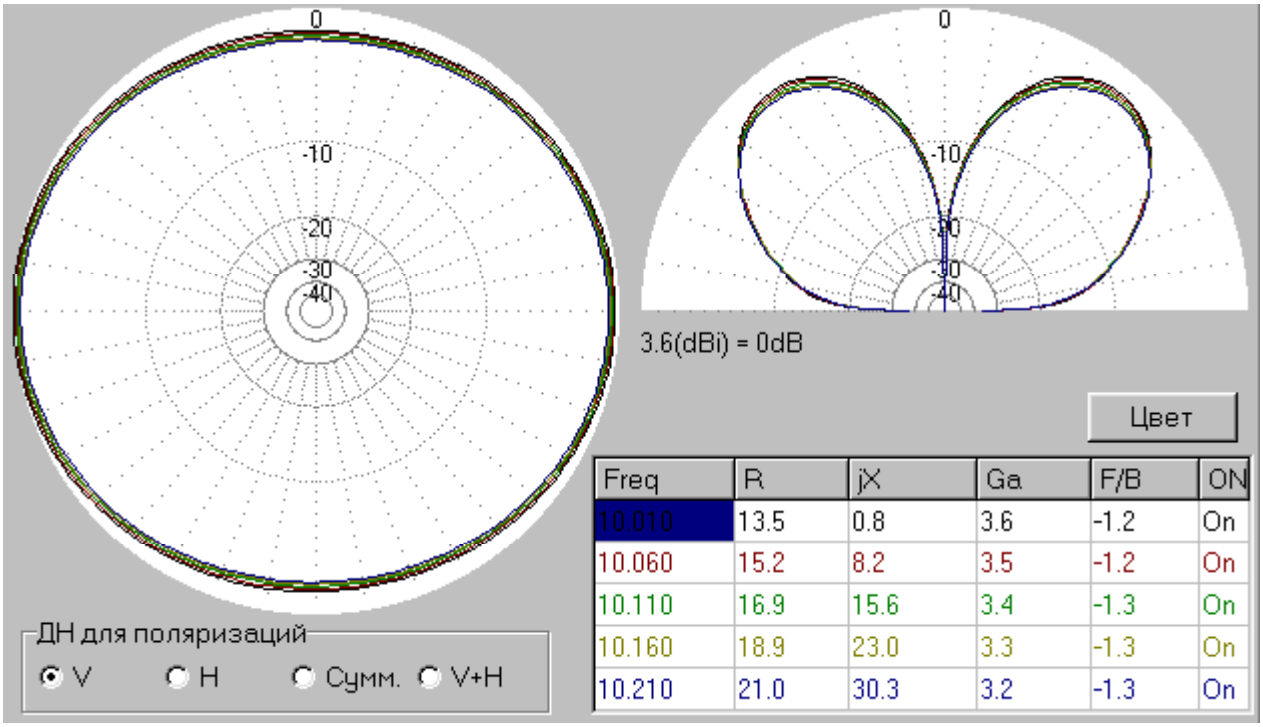


Freq	R	jX	Ga	F/B	ON
6.990	1188.6	-404.0	1.3	0.0	On
7.020	1154.7	-463.6	1.3	0.0	On
7.050	1116.0	-515.5	1.3	0.0	On
7.080	1071.8	-564.6	1.3	0.0	On
7.110	1023.9	-607.5	1.3	0.0	On

Comments: Antenna radiates radio waves with vertical polarization. A very good pattern with low lobes in the vertical plane. Almost a circular pattern in horizontal plane. It is fine for DX- QSO. Antenna has Z=1116- j515-Ohms at 7050-kHz. Not all ATUs do good matching for such load.

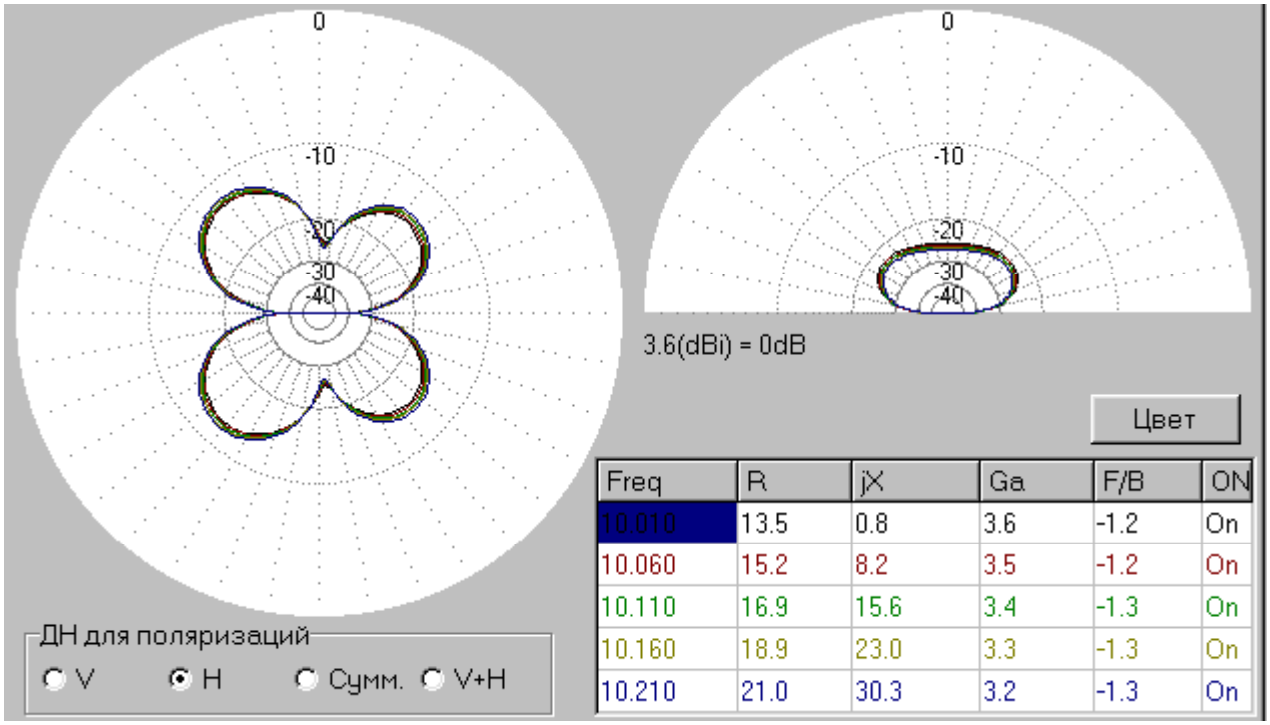
Shunt Vertical Universal HF Antenna at 30-m

Vertical Radiation Pattern



Freq	R	jX	Ga	F/B	ON
10.010	13.5	0.8	3.6	-1.2	On
10.060	15.2	8.2	3.5	-1.2	On
10.110	16.9	15.6	3.4	-1.3	On
10.160	18.9	23.0	3.3	-1.3	On
10.210	21.0	30.3	3.2	-1.3	On

Horizon Radiation Pattern

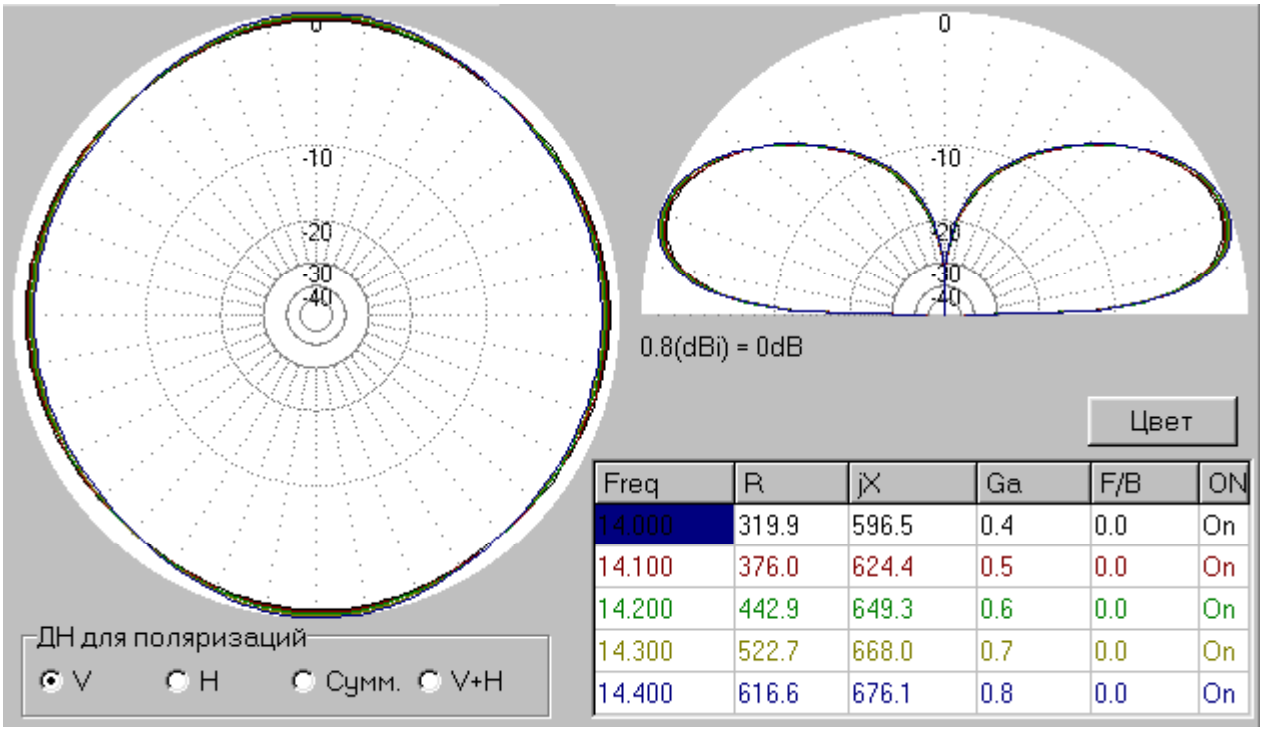


Freq	R	jX	Ga	F/B	ON
10.010	13.5	0.8	3.6	-1.2	On
10.060	15.2	8.2	3.5	-1.2	On
10.110	16.9	15.6	3.4	-1.3	On
10.160	18.9	23.0	3.3	-1.3	On
10.210	21.0	30.3	3.2	-1.3	On

Comments: Antenna has strong vertical radiation. A good pattern in the vertical plane. Antenna has strong radiation at high corners that allows to do local QSOs. Antenna has almost circular pattern in horizontal plane. Antenna provides DX and local QSOs. Antenna has Z= 16.9+ j15.6-Ohms at 10110-kHz. Any ATU does good matching for such load.

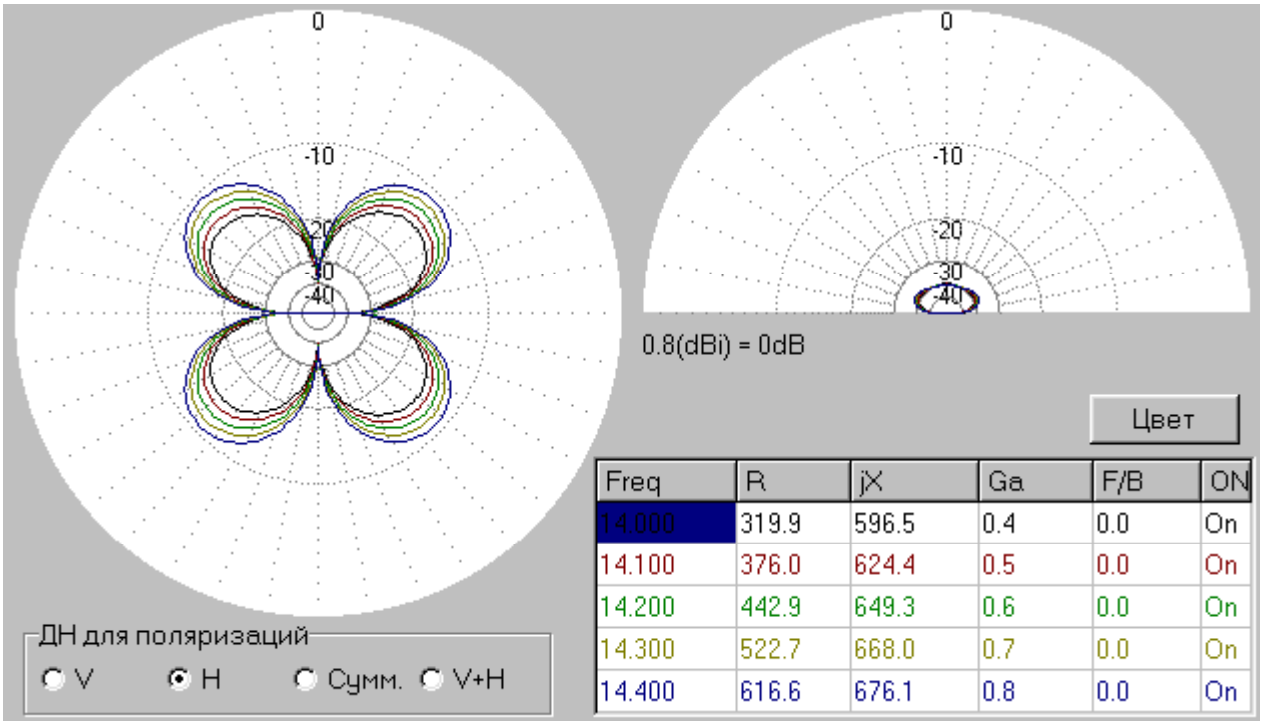
Shunt Vertical Universal HF Antenna at 20-m

Vertical Radiation Pattern



Freq	R	jX	Ga	F/B	ON
14.000	319.9	596.5	0.4	0.0	On
14.100	376.0	624.4	0.5	0.0	On
14.200	442.9	649.3	0.6	0.0	On
14.300	522.7	668.0	0.7	0.0	On
14.400	616.6	676.1	0.8	0.0	On

Horizon Radiation Pattern

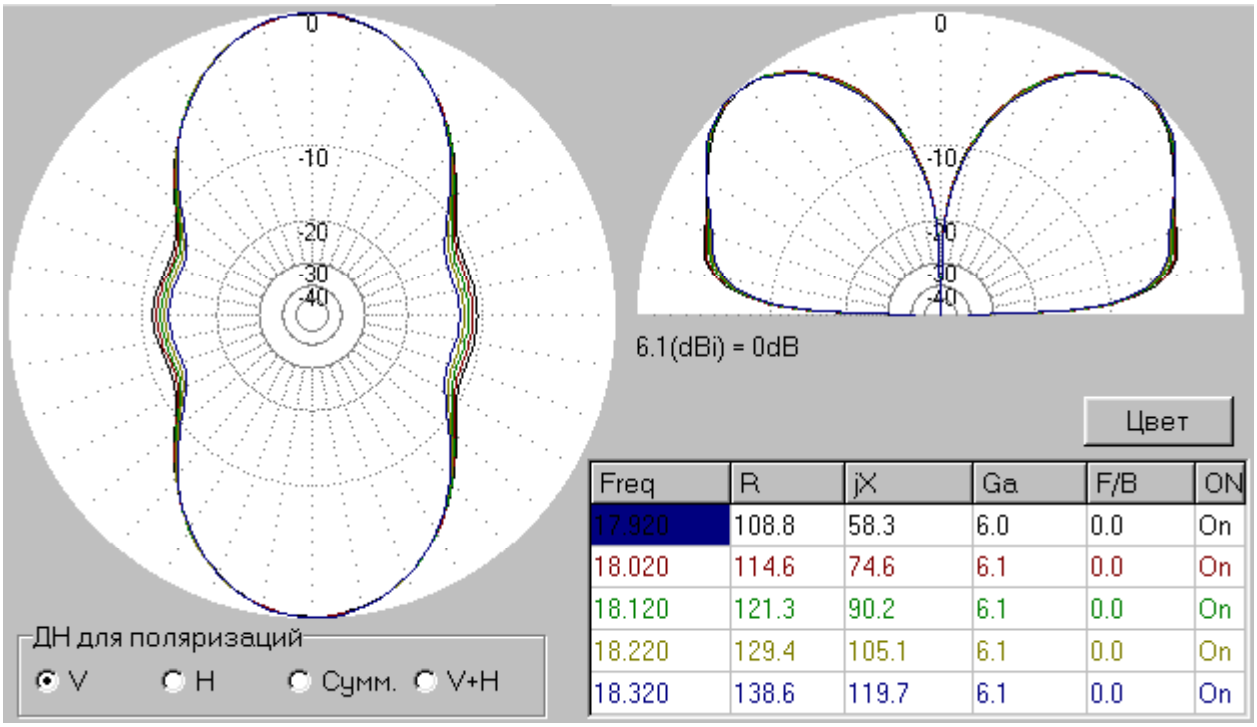


Freq	R	jX	Ga	F/B	ON
14.000	319.9	596.5	0.4	0.0	On
14.100	376.0	624.4	0.5	0.0	On
14.200	442.9	649.3	0.6	0.0	On
14.300	522.7	668.0	0.7	0.0	On
14.400	616.6	676.1	0.8	0.0	On

Comments: Antenna has strong vertical radiation. A very good pattern in the vertical plane. Antenna has almost circular pattern in horizontal plane. Antenna provides DX QSOs. Antenna has Z= 442+ j649-Ohms at 14200-kHz. Not all ATUs do good matching for such load.

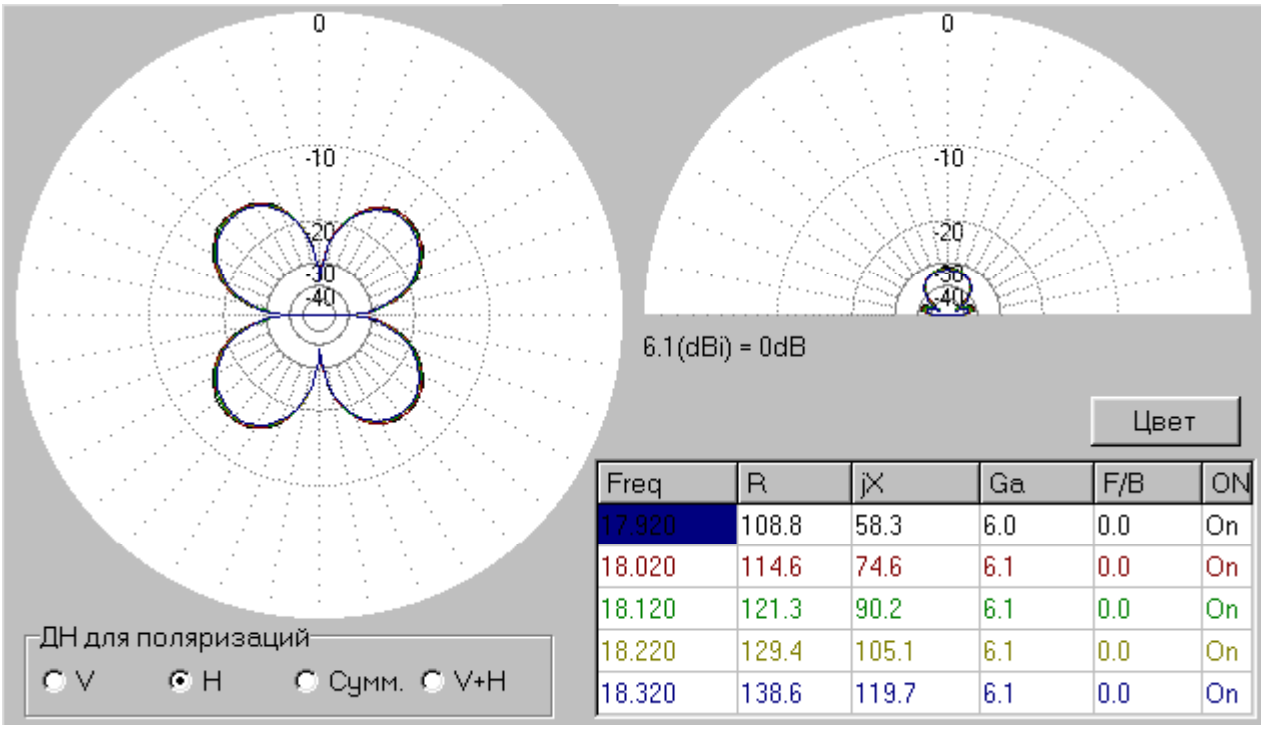
Shunt Vertical Universal HF Antenna at 17-m

Vertical Radiation Pattern



Freq	R	jX	Ga	F/B	ON
17.920	108.8	58.3	6.0	0.0	On
18.020	114.6	74.6	6.1	0.0	On
18.120	121.3	90.2	6.1	0.0	On
18.220	129.4	105.1	6.1	0.0	On
18.320	138.6	119.7	6.1	0.0	On

Horizon Radiation Pattern

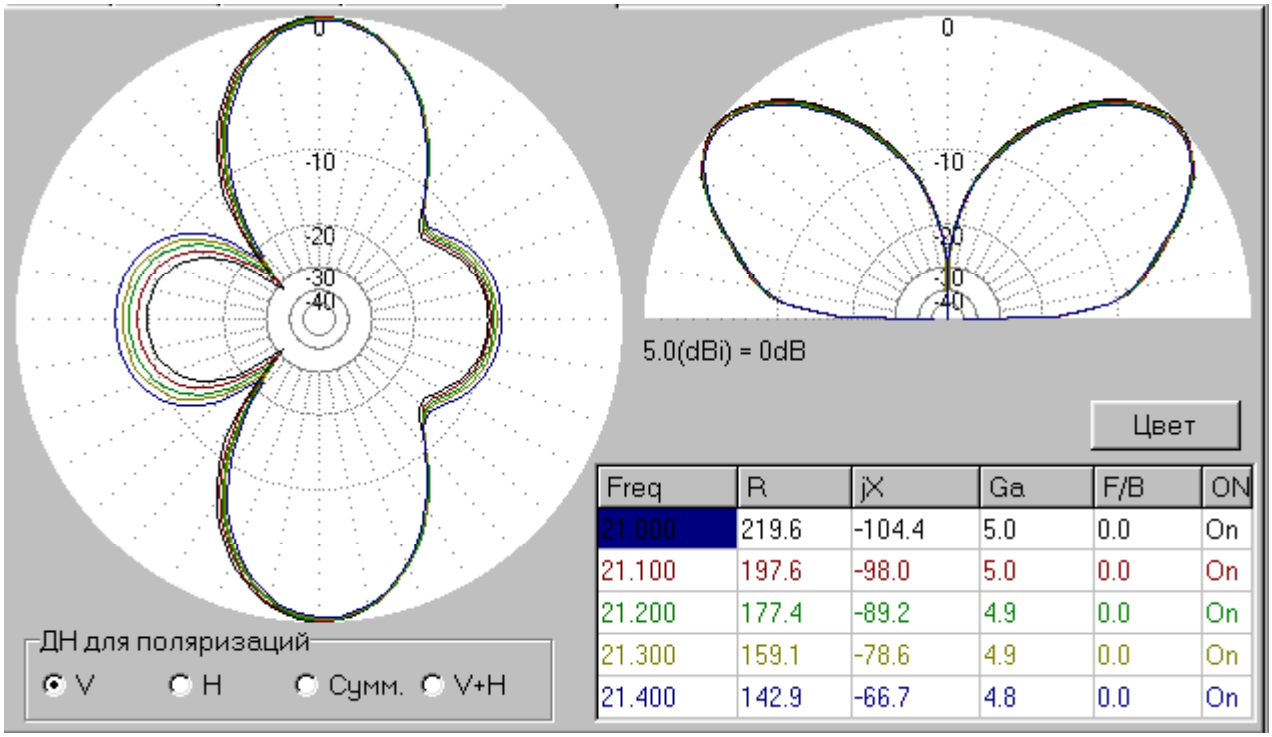


Freq	R	jX	Ga	F/B	ON
17.920	108.8	58.3	6.0	0.0	On
18.020	114.6	74.6	6.1	0.0	On
18.120	121.3	90.2	6.1	0.0	On
18.220	129.4	105.1	6.1	0.0	On
18.320	138.6	119.7	6.1	0.0	On

Comments: Antenna has strong vertical radiation. A good pattern in the vertical plane. Antenna has egg shape pattern in horizontal plane, so, it demands to choose a proper direction before an installation of the antenna. Antenna provides DX QSOs. Antenna has Z= 121+ j90-Ohms at 18120-kHz. Any ATU does good matching for such load.

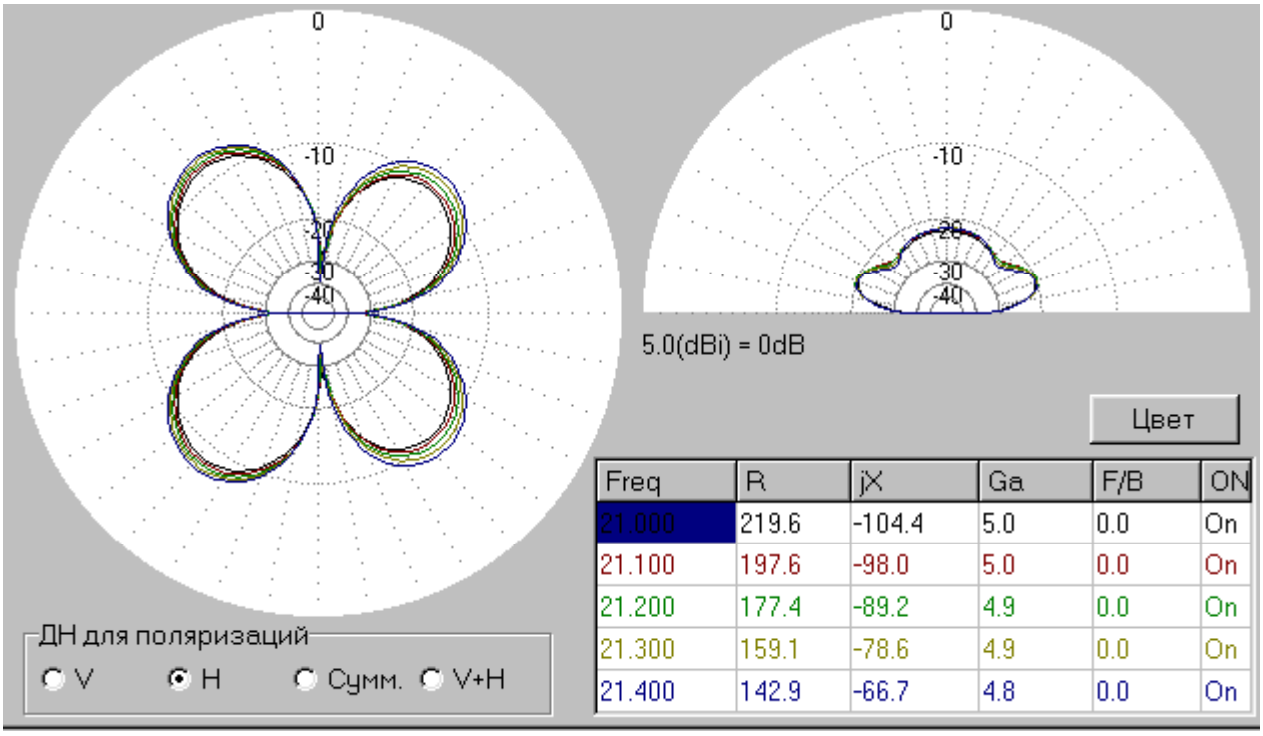
Shunt Vertical Universal HF Antenna at 15-m

Vertical Radiation Pattern



Freq	R	jX	Ga	F/B	ON
21.000	219.6	-104.4	5.0	0.0	On
21.100	197.6	-98.0	5.0	0.0	On
21.200	177.4	-89.2	4.9	0.0	On
21.300	159.1	-78.6	4.9	0.0	On
21.400	142.9	-66.7	4.8	0.0	On

Horizon Radiation Pattern

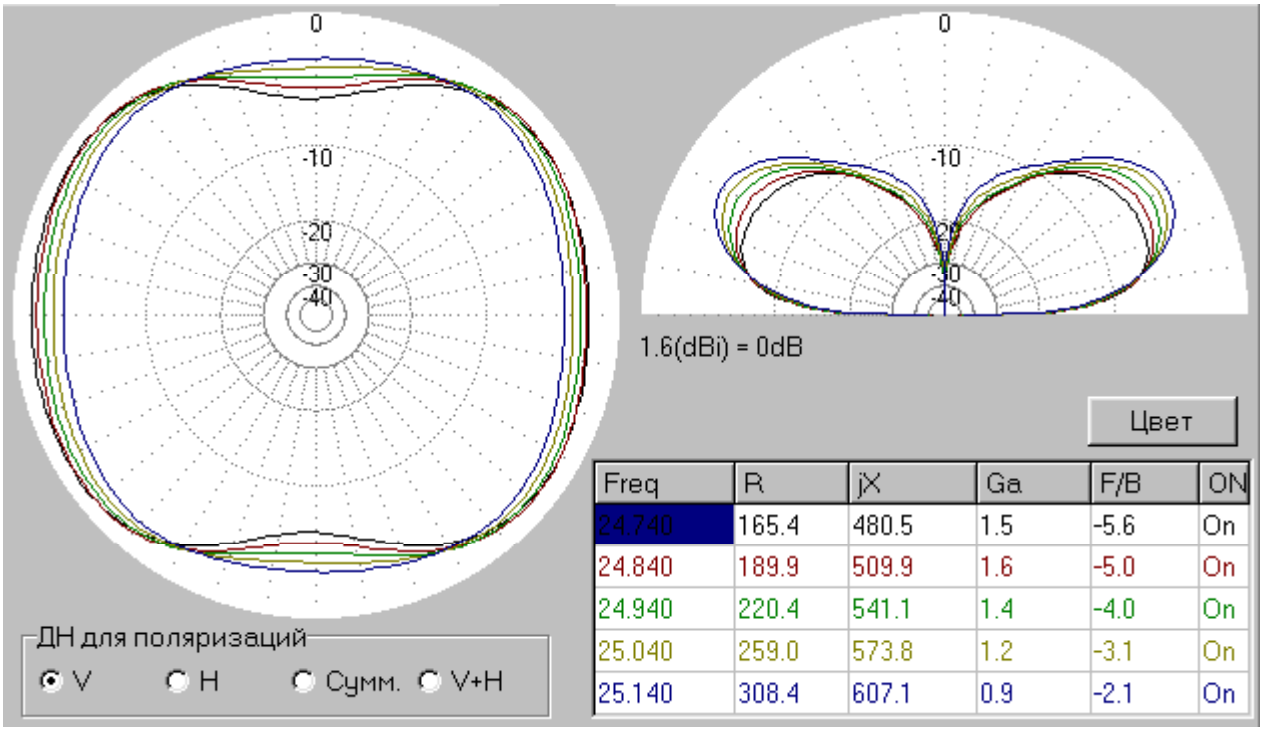


Freq	R	jX	Ga	F/B	ON
21.000	219.6	-104.4	5.0	0.0	On
21.100	197.6	-98.0	5.0	0.0	On
21.200	177.4	-89.2	4.9	0.0	On
21.300	159.1	-78.6	4.9	0.0	On
21.400	142.9	-66.7	4.8	0.0	On

Comments: Antenna has strong vertical radiation. A good pattern in the vertical plane. Antenna has almost egg shape pattern dropped to four lobes in horizontal plane, so, it demands to choose a proper direction before an installation of the antenna. Antenna provides DX QSOs. Antenna has Z= 177- j89-Ohms at 21200-kHz. Any ATU does good matching for such load.

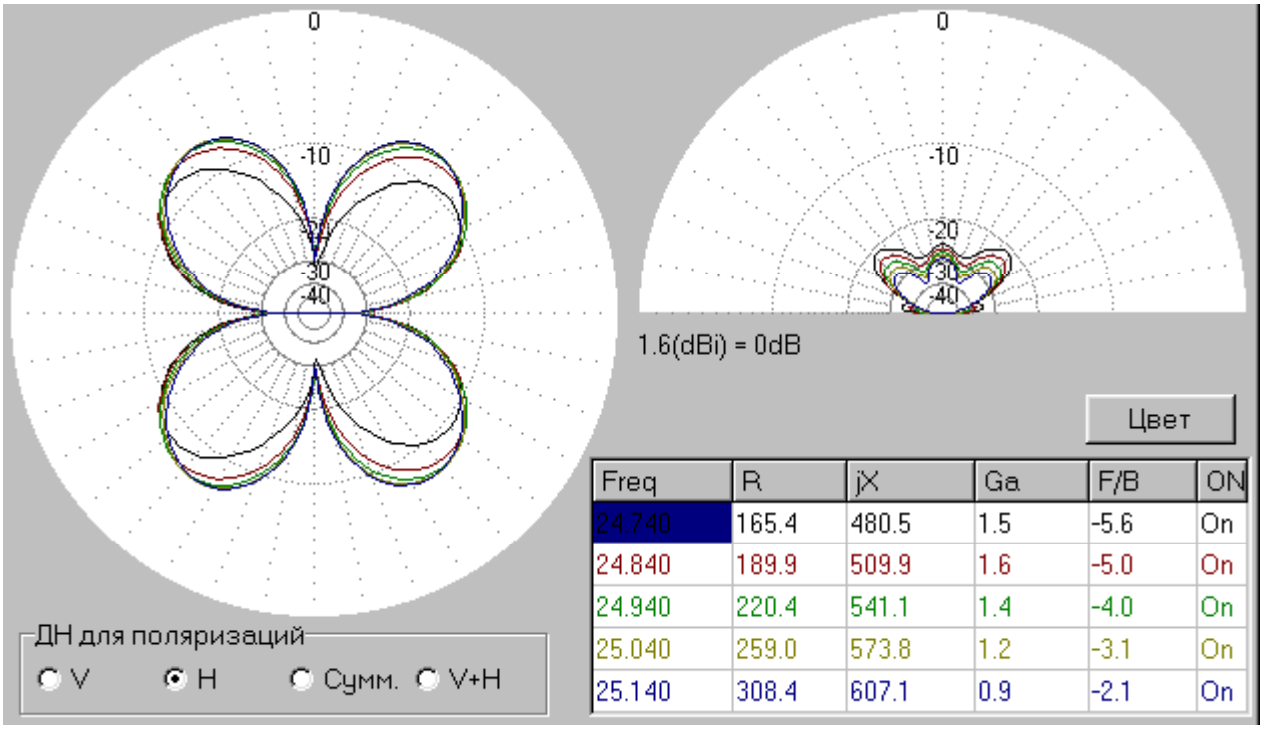
Shunt Vertical Universal HF Antenna at 12-m

Vertical Radiation Pattern



Freq	R	jX	Ga	F/B	ON
24.740	165.4	480.5	1.5	-5.6	On
24.840	189.9	509.9	1.6	-5.0	On
24.940	220.4	541.1	1.4	-4.0	On
25.040	259.0	573.8	1.2	-3.1	On
25.140	308.4	607.1	0.9	-2.1	On

Horizon Radiation Pattern

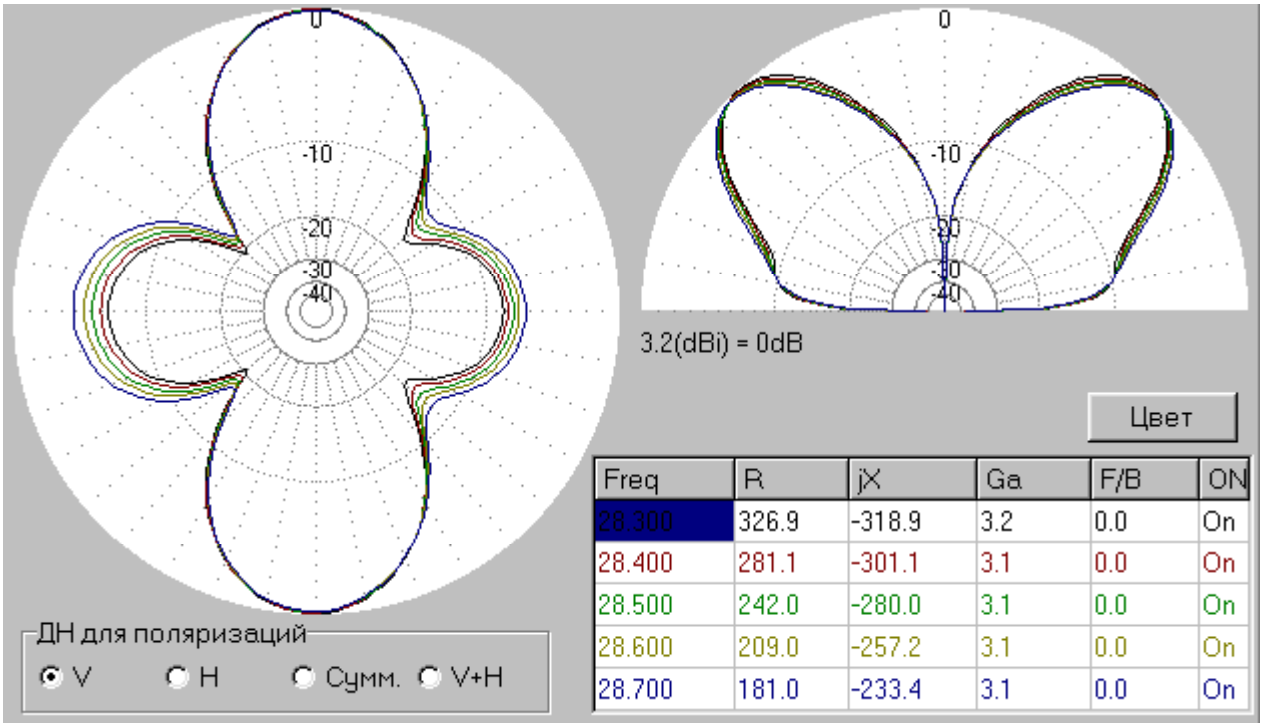


Freq	R	jX	Ga	F/B	ON
24.740	165.4	480.5	1.5	-5.6	On
24.840	189.9	509.9	1.6	-5.0	On
24.940	220.4	541.1	1.4	-4.0	On
25.040	259.0	573.8	1.2	-3.1	On
25.140	308.4	607.1	0.9	-2.1	On

Comments: Antenna has strong vertical radiation. A good pattern in the vertical plane. Antenna has almost circular pattern in horizontal plane. Antenna provides DX QSOs. Antenna has Z= 259- j573-Ohms at 25040-kHz. Not all ATUs do good matching for such load.

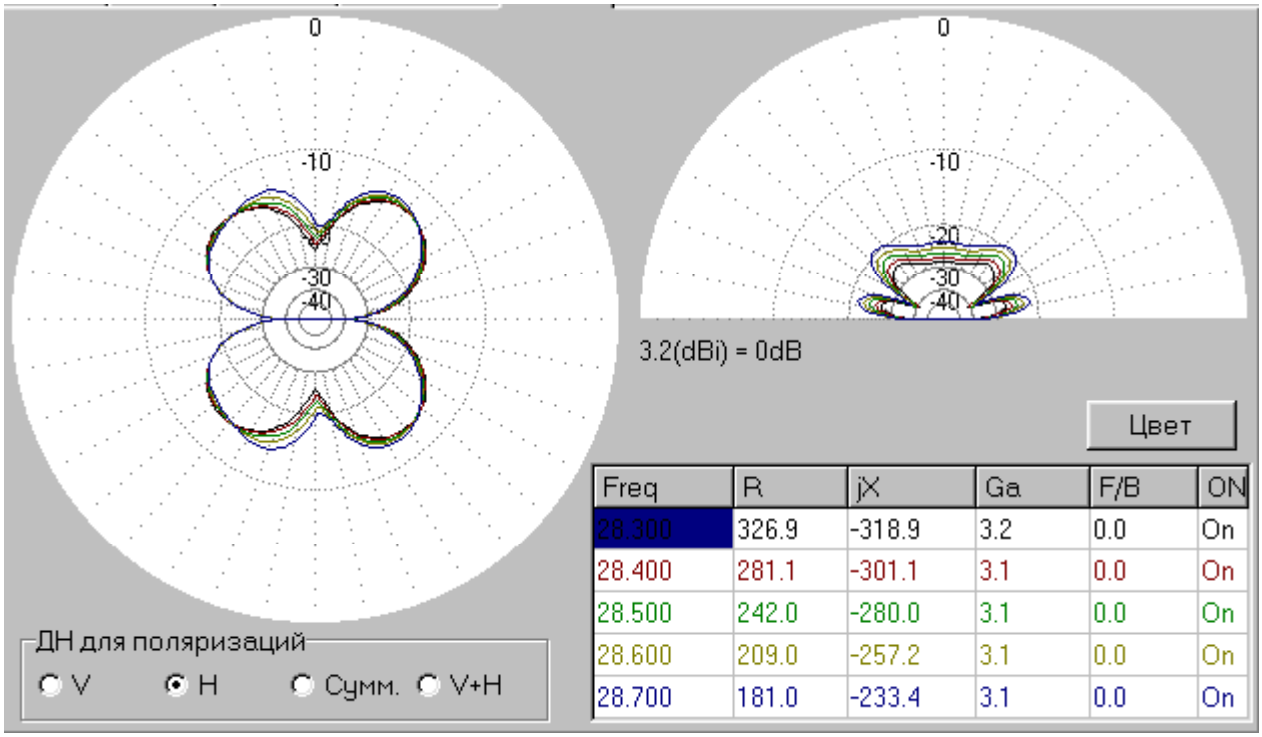
Shunt Vertical Universal HF Antenna at 10-m

Vertical Radiation Pattern



Freq	R	jX	Ga	F/B	ON
28.300	326.9	-318.9	3.2	0.0	On
28.400	281.1	-301.1	3.1	0.0	On
28.500	242.0	-280.0	3.1	0.0	On
28.600	209.0	-257.2	3.1	0.0	On
28.700	181.0	-233.4	3.1	0.0	On

Horizon Radiation Pattern

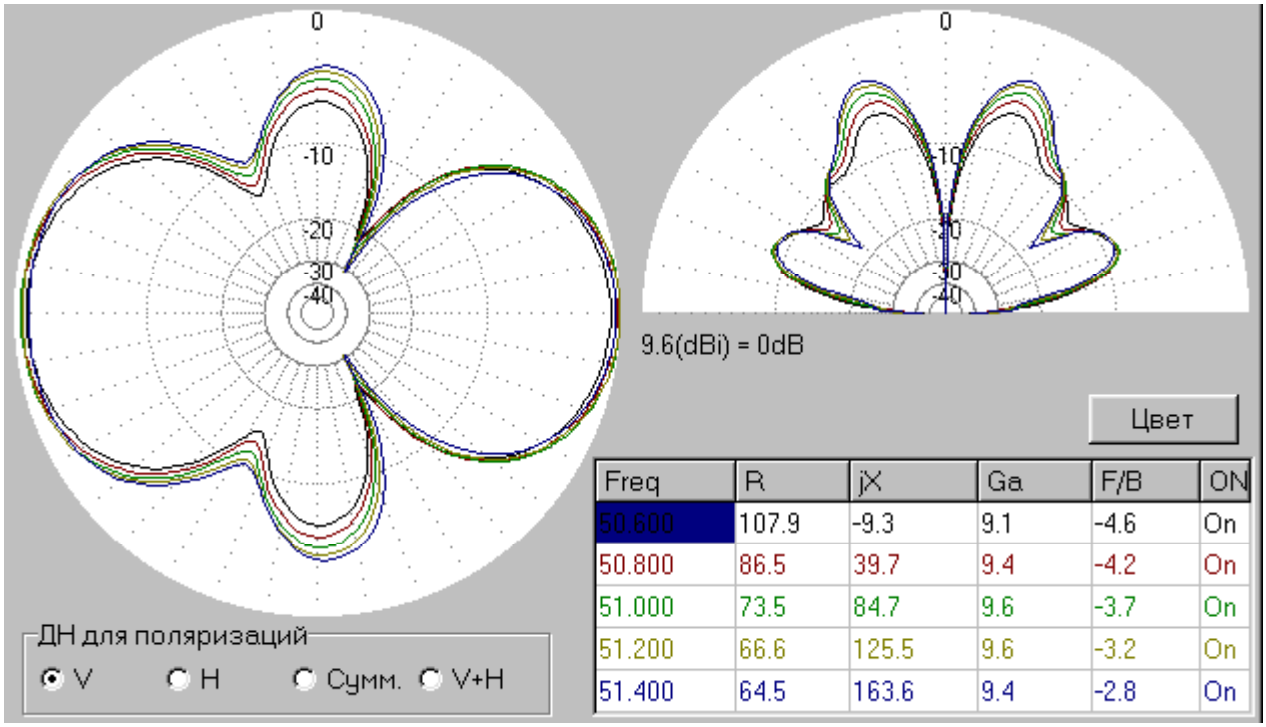


Freq	R	jX	Ga	F/B	ON
28.300	326.9	-318.9	3.2	0.0	On
28.400	281.1	-301.1	3.1	0.0	On
28.500	242.0	-280.0	3.1	0.0	On
28.600	209.0	-257.2	3.1	0.0	On
28.700	181.0	-233.4	3.1	0.0	On

Comments: Antenna has strong vertical radiation. A not bad pattern in the vertical plane. Antenna has a four- shaped lobes pattern in horizontal plane, so, it demands to choose a proper direction before an installation of the antenna.. Antenna can provide DX QSOs. Antenna has Z= 242- j280-Ohms at 28500-kHz. Any ATU does good matching for such load.

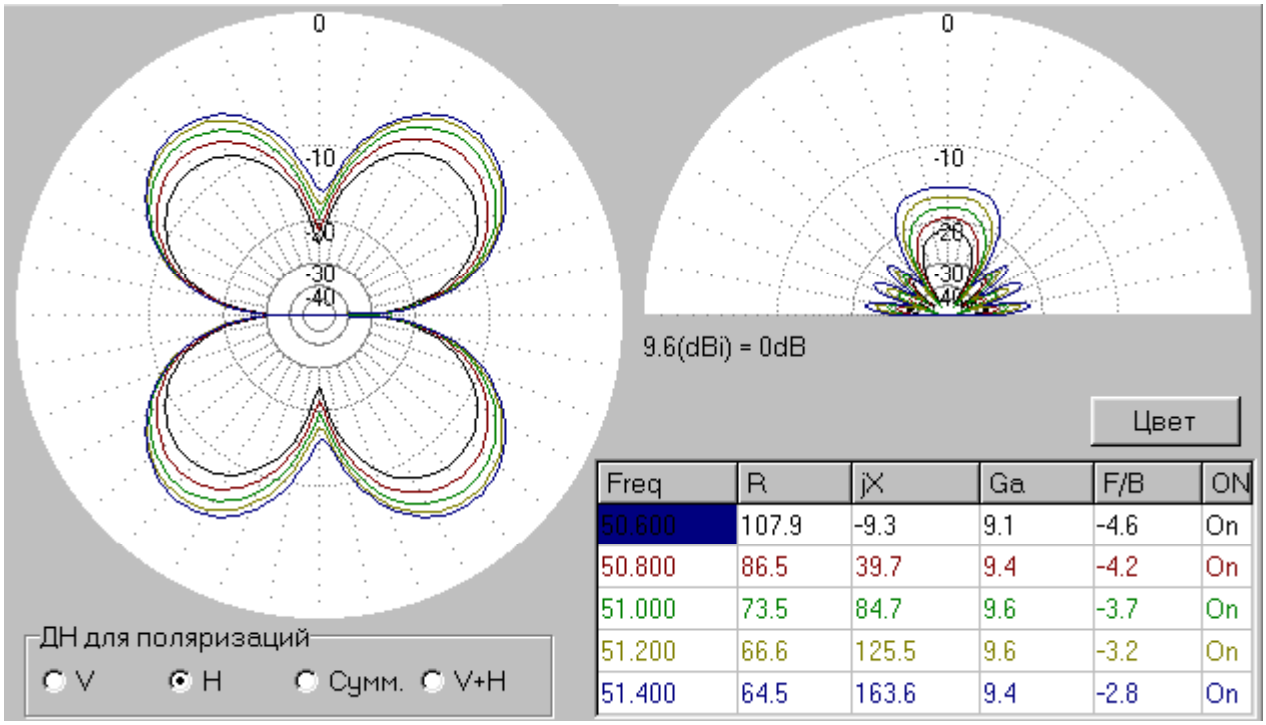
Shunt Vertical Universal HF Antenna at 6-m

Vertical Radiation Pattern



Freq	R	jX	Ga	F/B	ON
50.600	107.9	-9.3	9.1	-4.6	On
50.800	86.5	39.7	9.4	-4.2	On
51.000	73.5	84.7	9.6	-3.7	On
51.200	66.6	125.5	9.6	-3.2	On
51.400	64.5	163.6	9.4	-2.8	On

Horizon Radiation Pattern



Freq	R	jX	Ga	F/B	ON
50.600	107.9	-9.3	9.1	-4.6	On
50.800	86.5	39.7	9.4	-4.2	On
51.000	73.5	84.7	9.6	-3.7	On
51.200	66.6	125.5	9.6	-3.2	On
51.400	64.5	163.6	9.4	-2.8	On

Comments: Antenna has strong vertical radiation. A not bad pattern in the vertical plane. Antenna has an “eight- shape” pattern in horizontal plane, so, it demands to choose a proper direction before an installation of the antenna.. Antenna can provide DX QSOs. Antenna has Z= 86+ j40-Ohms at 50800-kHz. The resonance is at the 6- meters band. Any ATU does good matching for such load.