# THE BROADBAND MULTICHANNEL UHF TRANSMITTING TV ANTENNA

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## Abstract

The broadband multichannel UHF transmitting TV antenna consisting of shunt dipoles is offered. The antenna works on several frequency channels simultaneously. The detailed numerical and experimental research is carried out and the geometry of the antenna is optimized. The structure of the antenna includes two orthogonal planes of radiators, the power divider and matching device. The industrial sample of the aerial is created.

*Keywords:* transmitting antenna, UHF band, integral equations.

## 1. INTRODUCTION

Last years in connection with intensive development of a decimeter range for needs of TV and FM local broadcasting there was a need in new simple, cheap and reliable transmitting antennas, suitable for use in the state and commercial networks.

In the given work the broadband multichannel UHF transmitting TV antenna consisting of shunt dipoles is offered.

## 2. THEORY AND RESULTS

The radiating structure of the offered antenna represents a multi-storey antenna array. Each cell is the shunt dipole galvanically connected with adjacent ones. All structure is all-metal and self-bearing.

The integral equation method developed for thin wire arbitrary radiators consisting of a set of linear conductors is applied [1]. The method uses piece-wise sinusoidal basic and weight functions, and the algorithm is constructed in such a manner that galvanic contacts in nods of connection of several conductors are automatically considered.

As for transmitting television antennas very rigid demands are made – stand wave ratio should be not worse, than 1.1 on operating frequencies – the following antenna design strategy has been chosen. The radiating structure is projected so that to provide in all decimeter band (470–790 MHz) demanded pattern and stand wave ratio not worse 1.2–1.3. Further for concrete operating channels which can be to 4–5 and settle down they can any way, demanded level of the stand wave ratio is reached by means of adjusted matching devices. The patterns in horizontal plane have the "eight" form that allows to use quadrature feded tourniquet antenna for achieving the uniform azimuthal radiation.

One of variants of the industrial antenna is shown on fig. 1. The antenna is intended for radiation of a television signal on frequency band 470–790 MHz. The antenna consists of eight-story tourniquet radiating structure on the basis of shunt dipoles, the block of power dividing and matching device. The radiators excitation is made by feeders from structure of the block of power dividing. The matching device represents a piece of a rigid coaxial cable with the tuning elements of capacitor type included along length. The antenna is in radio transparent shelter in which superfluous pressure of dry air is created. The height of the antenna is about 4,5 m, weight — 155 kg.

The power divider contains the divider 1:2 and two dividers 1:8 coaxial type with equal power division. The radiators excitation is made by the feeders which lengths are selected in special way.

Research of patterns in horizontal and vertical planes shows, that in a working frequency band the non-uniformity of azimuthal pattern is greater than 0.7, and gain relative to isotropic radiator is greater than 11 dB.

## 3. CONCLUSIONS

Thus, in the given work the broadband multichannel UHF transmitting TV antenna consisting of shunt dipoles is offered. The antenna is all-metal design and is adjusted on demanded working channels with the help matching device.
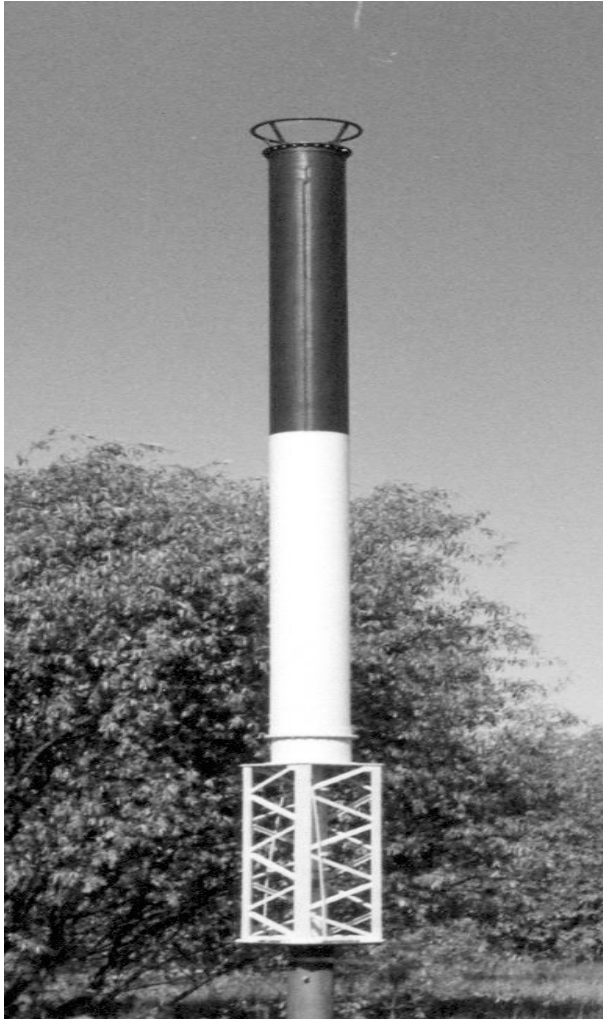
**Fig. 1.** The industrial sample of the eight-story antenna.

**REFERENCES**

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