Experimental investigation of polarization plane rotation of U.H.F. waves scattered by metal helix

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In the last years the attention of scientists was attracted to studying of media which can transform polarization of electromagnetic waves of U.H.F. range [1-4]. This is connected with the discovery of new technologies, allowing to manufacture corresponding materials [5], appropriate for the use in millimeter and submillimeter waves ranges, and possibly useful in the U.H.F. techniques. Such media can be created, for example, on the basis of metal helix elements.

For optimization of parameters of such media it is necessary previously to study interaction of electromagnetic fields of a microwave range with a separate metal helix in a free space. The investigation of influence of parameters of separate spiral on polarization of scattered waves is the main aim of our paper.

The investigation carried out in an anechoing chamber with the sizes (12m, 8m, 3m) in a frequency range 2.5 - 4 GHz. The metal helixes are explored, which lengths satisfy to the following relation

$$L_n = n\frac{\lambda}{2}, \tag{1}$$

where n=1,2,3, and λ=10 cm is wave length.

The frequency dependence of the angle of polarization plane rotation of scattered wave for various helixes in the specified frequency band was experimentally determined.

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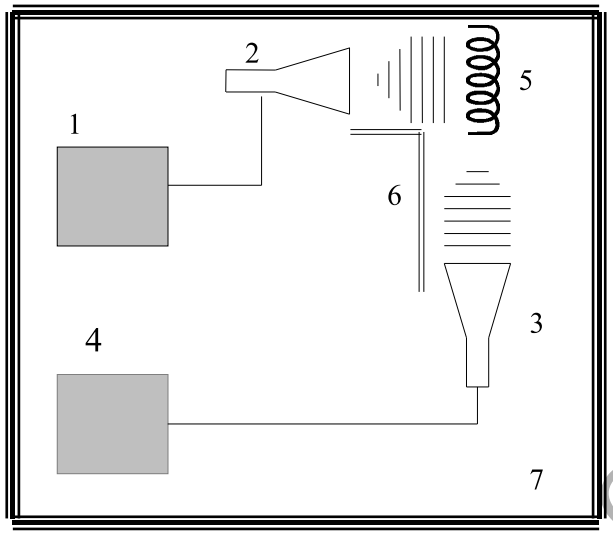

Figure 1. Scheme of the experiment. 1 is generator GCH-80 (2.6-4.0 GHz), 2 and 3 are antennas P6-28, 4 is receiver P5-5B (2.35-4.0 GHz), 5 is the helix, 6 is absorbing screen, 7 is anechoing chamber (12m,8m,3m)

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