Investigation of backscattering of resonant dielectric magnetic dipoles at different angles of incidence of a plane electromagnetic wave in the microwave range

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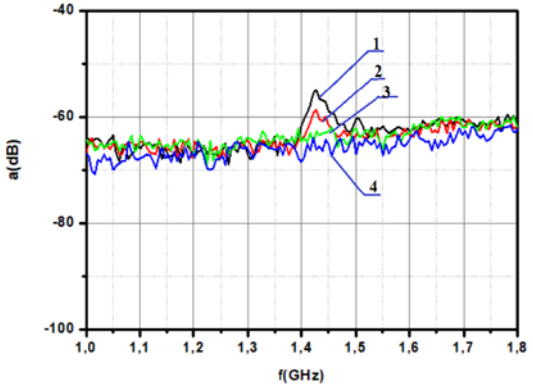

Fig. 1. Resonant spectra of the magnetic field at different angles of incidence of the electromagnetic wave relative to the ellipse plane: 1- 0^0, 2 - 40^0, 3 - 90^0, 4 –without ellipse. The dielectric ellipse with dimensions of large and small axes of 51 and 11 mm, respectively, with rectangle cross-section of 5×7 mm, $\varepsilon \approx 110$.

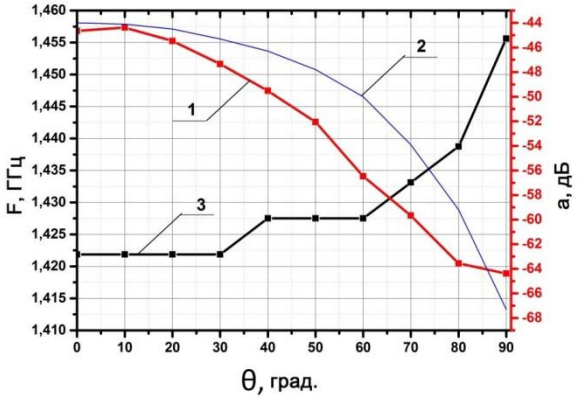

Fig. 2. Changes in the magnetic field (1) and the frequency of the main magnetic resonance (3) from the angle of incidence of a plane wave on the plane of the ellipse. (2) is the normalized component of the magnetic field H(0) cos θ. H(0) is the magnetic field at the angle of incidence of the wave equal to 0 degrees.

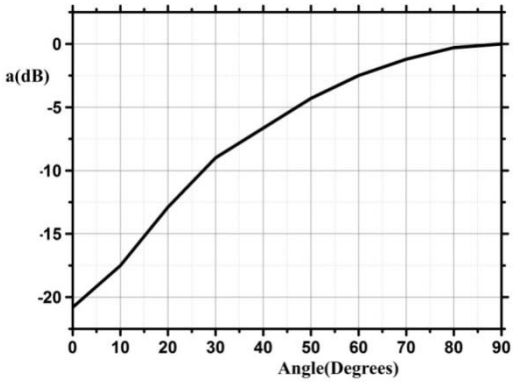

Fig. 3. Changes in the magnetic field of the main magnetic resonance from the angle between the ring plane and the magnetic field vector H. The dielectric ring with dimensions of 16×10×3 mm, $\varepsilon \approx 160$.

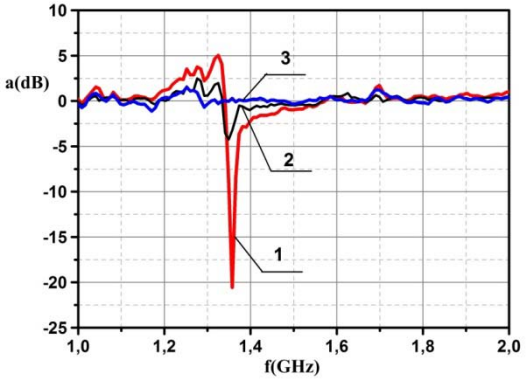

Fig. 4. Resonant spectra of the magnetic field at different angles of incidence of the electromagnetic wave relative to the ring plane: 1- 0^0, 2 - 50^0, 3 - 90^0.

The change in the amplitude of the main resonant frequency of the scattering magnetic field as a function of the angle between the magnetic field vector of the incident plane wave and the normal to the plane of the dielectric ellipse and ring obeys the cosine law, which fully corresponds to the theoretical model of excitation of a magnetic dielectric dipole.

The frequency value practically does not change when the angle of incidence of the electromagnetic wave changes.