

Remote Sensing of Ground Layers by RF Impedance Method

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The methods of radio-physical control of ground layers are intensive developing now. These methods are characterized in well information, speed and weather independence. For some years the radio-location methods of wideband and ultra-wideband remote sensing in the subsurface ground layers have been developed. Using of ground penetrating radar, some geophysical, engineering, archeological and other problems are solved. In effective using the most of such problems is connected with calculation difficulties of influence of the ground layers electrodynamic parameters to characteristics of transmit and receive antennas. For decrease in such trouble the impedance characteristics of the transmit and receive radar antennas are necessary to take into account.

In the paper give the results of theoretical researches of influence of the subsurface layers electrodynamic parameters to impedance of one or two linear and horizontal antennas, located upon the ground with uniform and non-uniform distributions with complex dielectric permeability and electric conductivity in depth are presented. The particularity behavior of source resistance of single antenna and two antennas are shown with dependence of following factors:

- the electrodynamic parameters with uniform and non-uniform distributions at depth;
- height of antenna location upon the ground with uniform and non-uniform distributions with complex dielectric permeability and electric conductivity of subsurface layers;
- distance between antennas.

The effect of own and non-own resistance in summing result of input receive antenna impedance (for transmit-receive event) with different values of electrodynamic ground parameters in dependence from height and antennas location upon subsurface ground layer are described.