Abstracts

Calculating Input Impedance of Electrically Small Insulated Antennas for Microwave Hyperthermia (Short Papers)

P.S. Debicki and M.A. Astrahan. "Calculating Input Impedance of Electrically Small Insulated Antennas for Microwave Hyperthermia (Short Papers)." 1993 Transactions on Microwave Theory and Techniques 41.2 (Feb. 1993 [T-MTT]): 357-360.

Two analytical methods for approximating the input impedance of insulated monopole or dipole antennas embedded within an electrically dense medium have been reported in the literature. The methods differ by the applied degree of approximation in the solution of the integral equation for the current in the insulated conductor. These methods directly affect the calculation of the wavenumber and the characteristic impedance of an antenna treated as a lossy coaxial line. In the more complex approach the resulting formulas contain an additional term which improves the correlation with measured and numerically modeled results for electrically longer antennas. When applied to electrically small antennas (I.e. < 1/8 wavelength in the medium), this term introduces a significant error into the calculation of the real part of the complex input impedance. Special care must be taken if these formulas are used to design multisectional antennas in order to avoid impedance mismatch. Two methods for correcting this error are presented.

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