Abstracts

Irradiation of Prolate Spheroidal Models of Humans in the Near Field of a Short Electric Dipole

M.F. Iskander, P.W. Barber, C.H. Durney and H. Massoudi. "Irradiation of Prolate Spheroidal Models of Humans in the Near Field of a Short Electric Dipole." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 801-807.

Analysis of the near-field irradiation of prolate spheroidal models of humans and animals by a short electrical dipole is described. The method of solution involves an integral equation formulation of the problem in terms of the transverse dyadic Green's function and expanding the fields irradiated by a short dipole in terms of the vector spherical harmonics. The extended boundary condition method (EBCM) is employed to solve the integral equations. The power distribution and the average specific absorption rate (SAR) are calculated and plotted as a function of the separation distance. It is shown that for a dipole placed along the major axis of the spheroidal (k-polarization), and for a very short separation distance, d= 0.15 lambda, the relative power values at both ends of the spheroid are about 40 compared with the ratio of 15 in the planewave exposure case. Furthermore, the calculated average SAR values as a function of the separation distance were found to oscillate around the constant value obtained from the planewave irradiation case. Differences between the near-and far-field exposure cases occurred only at separation distances shorter than 0.5 lambda where the magnitudes of the electric and magnetic energy densities are higher than the time-average radiation power density.

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