Abstracts

Numerical Simulation of Annular Phased Arrays for Anatomically Based Models Using the FDTD Method

C.-Q. Wang and O.P. Gandhi. "Numerical Simulation of Annular Phased Arrays for Anatomically Based Models Using the FDTD Method." 1989 Transactions on Microwave Theory and Techniques 37.1 (Jan. 1989 [T-MTT]): 118-126.

Annular phased arrays (APA's) of aperture and diopole antennas used for hyperthermia are simulated in three dimensions by using the finite difference time-domain (FDTD) method. A 17 363 cell, 1.31 cm resolution, anatomically based model of the human torso surrounded by a bolus of deionized water is used for calculations of specific absorption rates (SAR's). Test runs on the calculation of fields in the water-filled interaction space and with homogeneous circular- and elliptical-cylinder phantoms correlate well with the experimental data in the literature, lending support to the accuracy of the FDTD method for near-field exposure conditions. Results are given for APA's using different sizes of aperture and dipole antennas and for a subannular array to obtain higher SAR's in the liver. Because of its flexibility, the procedure of this paper may be useful for a variety of realistic radio frequency applicators for hyperthermia and other biomedical applications.

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