Abstracts

A Study of the Handset Antenna and Human Body Interaction

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The antenna radiation pattern and other characteristics are significantly altered by the presence of the human body. This interaction as well as the resultant deposition of microwave power in the body (specific absorption rate--SAR) are of particular interest for cellular telephones and similar communication devices. This paper builds on and extends the previous analyses of parameters that influence the antenna-user interaction. Computer tomography (CT) and magnetic resonance imaging (MRI)-derived, high-resolution models of the human bead are used. The numerical analysis is performed with the finite-difference time-domain (FDTD) method. The specific findings are: 1) a box model of a human head provides grossly distorted and unreliable results for the antenna radiation pattern; 2) a spherical model of the human head provides results that are relatively close to those obtained with a relatively simple, but more realistic, head model; 3) the SAR values obtained with spherical or simplified head models, that do not include the ear, are greater than those for a realistic head model that includes the ear; and 4) a hand holding the handset absorbs significant amount of antenna output power, which can be considerably decreased by modifying the geometry of the handset metal box.

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