Abstracts

Surface integral equation modeling approach to the handset antenna and human body interaction

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Numerical analysis of the handset antenna and human body interaction in the 900 MHz and 1900 MHz frequency bands based on a surface integral equation (SIE) technique in frequency domain is presented. Simplified models of a head and a hand are used, that can provide satisfactorily accurate results for many applications. All the boundary surfaces are modeled by bilinear quadrilateral surface elements, and the equivalent electric and magnetic surface current density vectors over the elements are approximated by high-order polynomial basis functions in local parametric coordinates. The unknown current-distribution coefficients are determined by a Galerkin-type method of moments. The SIE modeling theoretical results, obtained on a modest PC in very reasonable amounts of time, are compared to both the experimental results and the theoretical results obtained by a finite-difference time-domain (FDTD) technique from the literature, and a good agreement is observed. The principal aim of this paper, that appears to offer the first SIE-based numerical modeling of an antenna-user interaction, is to promote the SIE method of moments as a general approach to the electromagnetic analysis of a class of biological systems and a useful alternative to the FDTD method in some biological applications.

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