Abstracts

Characteristics of the SAR Distributions in a Head Exposed to Electromagnetic Fields Radiated by a Hand-Held Portable Radio

S.-I. Watanabe, M. Taki, T. Nojima and O. Fujiwara. "Characteristics of the SAR Distributions in a Head Exposed to Electromagnetic Fields Radiated by a Hand-Held Portable Radio." 1996 Transactions on Microwave Theory and Techniques 44.10 (Oct. 1996, Part II [T-MTT] (Special Issue on Medical Application and Biological Effects of RF/Microwaves)): 1874-1883.

This paper presents characteristics of the specific absorption rate (SAR) distributions calculated by the finite-difference time-domain (FDTD) method using a heterogeneous and realistic head model and a realistic hand-held portable radio model. The difference between the SAR distributions produced by a 1/4-wavelength monopole antenna and those produced by a 1/2-wavelength dipole antenna is investigated. The dependence of the maximum local SAR on the distance d/sub a/ between the auricle of the head and the antenna of the radio is evaluated. It is shown that the maximum local SAR decreases as the antenna length extends from 1/4 to 1/2 of the wavelength. The maximum local SAR's in a head model with auricles are larger than those in one without auricles. The dependence of the SAR on the electrical inhomogeneity of the tissues in the head model is not significant with regard to the surface distribution and the maximum local SAR when the radio is near the head. It is also shown that the maximum local SAR is not strongly dependent on the position of the hand when the hand does not shade the antenna. Furthermore, the SAR's experimentally measured in a homogeneous head phantom are compared with the calculated SAR's.

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