Abstracts

Numerical computation of fat layer effects on microwave near-field radiation to the abdomen of a full-scale human body model

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Numerical computation results of fat layer effects on the microwave near field radiation to the abdomen of a three-dimensional (3-D) full-scale human body model are presented. The human body is modeled as a 3-D homogeneous muscle phantom with a fat layer covering the abdomen part. The dipole wire-antenna located proximate to the abdomen is used as the microwave radiation source at 915 MHz. This is to study the effects on hyperthermia heating by using the microwave applicator (at 915 MHz) or the near-field exposure from the proximate handset antenna to the human body at ISM band wireless communication band (902-928 MHz). Coupled integral equations (CIE) and the method of moments (MoM) are employed to numerically compute electromagnetic (EM) energy deposition specific absorption rate (SAR) from the radio frequency (RF) antenna applicator into the proximate fat layer covered abdomen. The antenna input impedance (proximate to the body), return loss (RL), and the resonant antenna length (proximate to the body) will also be numerically determined to increase the microwave power delivered into the body. The study of fat layer effects is important for microwave hyperthermia applications. It is also important for the investigation of the potential health hazard from the near-field radiation of a wireless communication antenna.

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