Abstracts

The Thermal Response of a Human in the Near-Zone of a Resonant Thin-Wire Antenna

R.J. Spiegel. "The Thermal Response of a Human in the Near-Zone of a Resonant Thin-Wire Antenna." 1982 Transactions on Microwave Theory and Techniques 30.2 (Feb. 1982 [T-MTT]): 177-185.

The thermal response of a human in the near-zone of an antenna was determined by numerical procedures. The approach taken was to modify the heat transfer equations for man in air to account for thermal loading due to the energy absorbed from the radiating antenna. The absorbed power density distribution in the human body was determined by considering the body and antenna to be a coupled system in which the resulting system of equations were solved by moment method procedures. This information was then analyzed by a thermal response model consisting of a series of transient conduction equations with internal heat generation due to metabolism, internal convective heat transfer due to blood flow, external interaction by convection and radiation, and cooling of the skin by sweating and evaporation. Internal heating patterns were calculated for two cases: a human in the near-zone of a quarter-wave monopole and a half-wave dipole operating at 45 and 200 MHz, respectively. It was found that negligible heating occurred for antennas with input power levels of less than 50 W.

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