Abstracts

Microwave Heating of Simulated Human Limbs by Aperture Sources

H.S. Ho, A.W. Guy, R.A. Sigelmann and J.F. Lehmann. "Microwave Heating of Simulated Human Limbs by Aperture Sources." 1971 Transactions on Microwave Theory and Techniques 19.2 (Feb. 1971 [T-MTT] (Special Issue on Biological Effects of Microwaves)): 224-231.

Microwave heating of phantom models of human limbs by aperture sources is investigated theoretically and experimentally. These phantom models consist of triple-layered circular lossy dielectric cylinders. The three layers of dielectric materials simulate human tissues of fat, muscle, and bone. In the theoretical investigation, apertures operating in the frequency range of 433 to 2450 MHz are used as microwave sources for heating the dielectric materials. The theoretical investigation makes use of the technique of summation of cylindrical waves. A high-speed computer is used to calculate the numerical results. For the experimental investigation, an aperture is designed and built to operate at the frequency of 918 MHz. The resulting temperature patterns in the phantom models are detected by the use of a thermograph camera. The theoretical results are shown to be in agreement with the experimental results. The technique and results of this investigation may be applied towards the design of applicators for therapeutic heating of human tissues.

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