Abstracts

Analysis of the Power Coupling from a Waveguide Hyperthermia Applicator into a Three-Layered Tissue Model

K.S. Nikita and N.K. Uzunoglu. "Analysis of the Power Coupling from a Waveguide Hyperthermia Applicator into a Three-Layered Tissue Model." 1989 Transactions on Microwave Theory and Techniques 37.11 (Nov. 1989 [T-MTT]): 1794-1801.

The power deposition from a rectangular-aperture flanged waveguide into a three-layered stratified tissue medium is analyzed theoretically. The fields inside the tissue layers are expressed in terms of Fourier integrals satisfying the corresponding wave equations while the fields inside the waveguide are expanded in terms of the guided and evanescent normal modes. An integral equation is derived on the aperture plane of the flanged waveguide by applying the continuity of the tangential electric and magnetic fields. This integral equation is solved by expressing the unknown electric field in terms of the waveguide mode fields and by applying a Galerkin procedure. The electromagnetic fields inside the tissue medium are then determined and patterns of the deposited power at frequencies of 432 MHz and 144 MHz for apertures of 5.6 x 2.8 cm^2 and 16.5 x 8.3 cm^2 respectively are computed and presented.

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