Abstracts

A Passive Electrodeless Method for Determining the Interior Field of Biological Materials

M.E. Brodwin, A. Taflove and J.E. Matz. "A Passive Electrodeless Method for Determining the Interior Field of Biological Materials." 1976 Transactions on Microwave Theory and Techniques 24.8 (Aug. 1976 [T-MTT]): 514-521.

A passive remote-sensing method is proposed for the measurement of the electric-field distribution within a biological sample. The instrument analyzes the intermodulation spectrum reradiated by a diode imbedded within the sample exposed to a dual-frequency illumination. Experimental results in a waveguide system indicate that the relative intensities of the intermodulation products are a unique function of the field intensity at the diode. These results are also used to determine the basic scattering properties of the diode. A low-power free-space apparatus is described which exposes the principal problem associated with this method: the inadvertent generation of intermodulation frequencies. Isolation techniques are described which eliminate this problem. Finally, an analysis of a complete system shows that at 910 MHz fields can be measured in 4.0 cm of soft tissue, tan delta = 0.5, without exceeding an incident power density of 10 mW/cm^2.

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