

## Nondestructive Measurement of a Dielectric Layer Using Surface Electromagnetic Waves

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W. Ou, C.G. Gardner and S.A. Long. "Nondestructive Measurement of a Dielectric Layer Using Surface Electromagnetic Waves." 1983 *Transactions on Microwave Theory and Techniques* 31.3 (Mar. 1983 [T-MTT]): 255-261.

In this investigation, the possibility of nondestructively measuring the thickness and dielectric constant of a layer of dielectric material on a conducting substrate by surface electromagnetic waves (SEW) has been demonstrated. The theoretical approximate dispersion relations near cutoff were derived for both the TE and TM modes and found to be linear functions of frequency, the thickness and dielectric constant were then calculated as simple algebraic functions of the slope and intercept of the dispersion curve. An experimental apparatus utilizing a prism-coupler was constructed to excite surface electromagnetic waves in a dielectric layer whose characteristics were known. By suitable measurements of the frequency and the coupling angle of the source, the dispersion curve was determined experimentally and the resulting dielectric constant and thickness of the layer calculated.

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