# Abstracts

## Noninvasive Electrical Characterization of Materials at Microwave Frequencies Using an Open-Ended Coaxial Line: Test of an Improved Calibration Technique

*D. Misra, M. Chabbra, B.R. Epstein, M. Mirotznik and K.R. Foster. "Noninvasive Electrical Characterization of Materials at Microwave Frequencies Using an Open-Ended Coaxial Line: Test of an Improved Calibration Technique." 1990 Transactions on Microwave Theory and Techniques 38.1 (Jan. 1990 [T-MTT]): 8-14.*

We consider dielectric measurements using a probe consisting of coaxial transmission line with an open-circuit end placed against the sample. For the 2.99 or 3.6 mm (OD) probes considered in this study, a simple lumped parameter model shows errors above 1 GHz that increase greatly with frequency. We evaluate an approximate model due originally to Marcuvitz, on the basis of measured probe impedances from 1 to 18 GHz with samples consisting of water, methanol, and dioxane-water mixtures. This model is more accurate than the lumped-parameter model, and is better suited for calibration of the automated network analyzer. Finally, we consider the errors introduced in dielectric measurements by the use of approximate models for the probe. The technique succeeds because of partial cancellation of errors in modeling the probe in ANA-based measurements.

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