Abstracts

Time-domain measurement of the electromagnetic properties of materials

C.C. Courtney. "Time-domain measurement of the electromagnetic properties of materials." 1998 Transactions on Microwave Theory and Techniques 46.5 (May 1998, Part I [T-MTT]): 517-522.

A time-domain measurement and data-reduction technique is presented that can yield the broad-band frequency-dependent values of a sample material's electrical properties (complex permittivity and permeability). The method uses the material's response to the spectral content of a fast rise-time pulse to determine the frequency dependence of the complex relative permittivity (/spl epsi//sub /spl tau//) and permeability (/spl mu//sub r/). The measurement procedure and data-reduction scheme are described, and the derived material values for a sample material are given. The advantages of this method include a potentially lower equipment cost and the avoidance of awkward calibration procedures that are inherent in frequency-domain methods. Though the material examined was nonmagnetic, the procedure is general and rigorous (for low-loss materials, low dispersion over the bandwidth) for the determination of both electrical and magnetic properties.

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