Abstracts

A novel W-band spectrometer for dielectric measurements (Dec. 2000 [T-MTT])

M.N. Afsar, I.I. Tkachov and K.N. Kocharyan. "A novel W-band spectrometer for dielectric measurements (Dec. 2000 [T-MTT])." 2000 Transactions on Microwave Theory and Techniques 48.12 (Dec. 2000 [T-MTT] (Special Issue on 2000 International Microwave Symposium)): 2637-2643.

A new spectrometer for the precision measurement of dielectric permittivity and loss tangent is presented. The new instrument is capable of providing high-resolution data for the first time over an extended W-band (68-118 GHz) frequency for specimens with a large range of absorption values, including highly absorbing specimens that otherwise would not be possible. A novel technique based on the unbalanced bridge is developed for the measurement of the phase of the wave passed through the specimen in free space (quasi-optical) with reference provided by a waveguide arm. Specially constructed precision waveguide and quasi-optical components allowed reliable broadband operation. A number of common dielectrics are measured, and results are compared with previously reported data.

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