Abstracts

Precision free-space measurements of complex permittivity of polymers in the W-band

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The complex permittivity of polymers used in millimeter wave systems has been determined by means of a broad-band free-space measurement system operating in the 75 GHz to 95 GHz frequency range. The technique is based on measurements of the complex transmission coefficient through planar samples for different angles of incidence and polarization states. Accurate estimates of the relative permittivity and loss tangent are obtained by employing an optimized measurement set-up and an enhanced processing of the measured data. The uncertainties of relative permittivity and loss tangent are as low as 0.1% and 2/spl times/10/sup -4/, respectively. Results are reported for nonpolar polymers (polypropylene, polyethylene, teflon, rexolite) and for polar polymers (nylon, plexiglas, PVC).

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