

**IMPORTANT: This is an Invited Contribution for the Session
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Material Measurements of Absorbers with Magnetic Losses

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Two methods for the simultaneous evaluation of the complex permittivity and the complex permeability are presented in this paper. Both methods are based on transmission/reflection measurements of a material sample placed in a transmission line. The first method directly calculates the material properties using explicit equations. The second is a Gauss-Newton iterative algorithm which fits a weighted combination of the measured scattering data. The position of the sample in the line is calculated from symmetry conditions of the scattering matrix of the sample after the transformation of the measured data from the calibration reference plane to the object surface. These methods are applied to measurements of low-loss and absorber materials. The performance of the methods is examined and compared. Unexpected results for the complex permeability of the absorbers are discussed.