

## **Non-destructive dielectric measurements and calibration for thin materials using waveguide-coaxial adaptors**

### **ABSTRACT**

This paper focuses on the calibration of apertures for rectangular waveguides using open-short-load (OSL) standards and transmission-line (TL) approaches. The reflection coefficients that were measured using both calibration techniques were compared with the coefficients acquired using the thru-reflect-line (TRL) method. In this study, analogous relationships between the results of OSL calibration and TL calibration were identified. In the OSL calibration method, the theoretical, open-standard values are calculated from quasi-static integral models. The proposed TL calibration procedure is a simple, rapid, broadband approach, and its results were validated by using the OSL calibration method and by comparing the results with the calculated integral admittance. The quasi-static integral models were used to convert the measured reflection coefficients to relative permittivities for the infinite samples and the thin, finite samples.

**Keyword:** Relative permittivity; Thin materials; Rectangular waveguide; Reflection coefficient; One-port calibration; Admittance aperture