Abstracts

Calibration and verification of the pure-mode vector network analyzer

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In this paper, the calibration of a pure-mode vector network analyzer (PMVNA) is presented in detail. The analyzer is intended for the measurement of mixed-mode scattering parameters (s-parameters) of differential circuits, but is also suitable for measurement of general microwave networks with up to four ports. The theory of calibration of the analyzer is developed in terms of a general n-port analyzer, including the correction of port-to-port crosstalk. The type of the standards used in calibration is examined, and the minimum number of standards are summarized for various levels of crosstalk correction. A new standard for all multiport network analyzer calibrations is introduced. A calibration is performed from 0.25 to 25.25 GHz based on standards with coaxial connectors, and verification standards are measured. The measured data is compared with National Institute of Standards and Technology (NIST) traceable measurements, and errors are found to be generally less than /spl plusmn/1 dB in transmission. In many cases, the error is less than the uncertainty of the NIST traceable measurements.

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