

# **Repeatability Study of Commercial Harmonic Phase Standards Measured by a Nonlinear Vector Network Analyzer**

**Jeffrey A. Jargon, Donald C. DeGroot, and Dominic F. Vecchia**

**NVNA User's Group Meeting  
December 3, 2003**



## Summary

- Repeated Calibrations
- Statistical Analysis
- Warm-Up Drift

## Key Findings

- Expanded uncertainties of measured phase angles for a single calibration were  $\leq 0.73^\circ$ .
- Discovered considerable warm-up drift, with an estimated  $1/e$  time-constant of 500 sec.

# Measured Phase Angles – 20 GHz HPS

