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SureCAL™ TECHNICAL NOTES

Technical Note TN 14

Sliding Load Techniques Utilized in the SureCAL RF Components Package

Overview:

This Technical Note describes sliding load techniques implemented within the RF Components Package. Also covered is a test case example of the S11of a standard thermistor mount.

Sliding Load Implementation:

For measurements requiring a system directivity of greater than 30dB at frequencies greater 2 GHz, sliding load techniques are utilized for the calibration processes within the RF Components Package. To support a maximum number of possible calibration kits and their sliding loads, a fixed number of five unequally spaced slide positions are used. Five represents the minimum number of sliding load positions to adequately sample the required 360 degree change in phase caused by the moving load element while still supporting the largest number of calibration kits.

Calibration Sequence for a Sliding Load:

As stated above, a minimum of five sliding load positions are required to adequately sample the required 360 degree change in phase. Since the most commonly used calibration kit sliding load has six detents or notches, this type was chosen for the graphics presented to the user. To successfully perform the required sliding load position sequence the operator will need to be attentive to how the unequal steps are implemented.

Simply put, the sliding load sequence consists of “two short and three long” positions.

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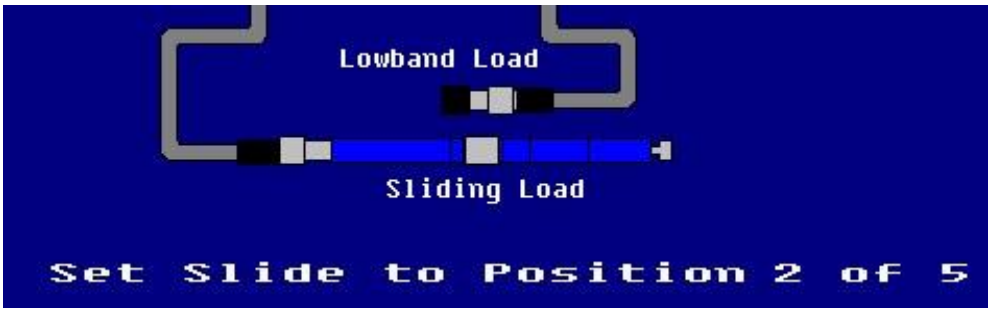
Sliding Load Position 1:
The sliding load graphic depicts the slide at its shortest position.

Sliding Load Position 2:
Proceeding from left to right the slide is advanced one detent.



Sliding Load Position 3:
Note: Due to the similar spacing between detent two and three the slide is advanced to the fourth detent.

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Sliding Load Position 4:
The slide is advanced to the next detent.

Sliding Load Position 5:
The slide is advanced to the next and final detent position.

For slides with greater than the six position depicted, select the detents that will create a similar “two short and three long” pattern paying attention that all of the selected increment sizes are unequal in spacing.

The demonstrate the validity of this technique the following test case example compares results obtained using a five position slide technique to the NIST calibration test data provided on a TEGAM M1110 Standard Thermistor mount. The uncertainties presented in the graphs are those provided by the NIST test report.

In both magnitude and phase the five position slide technique duplicates the NIST test data.

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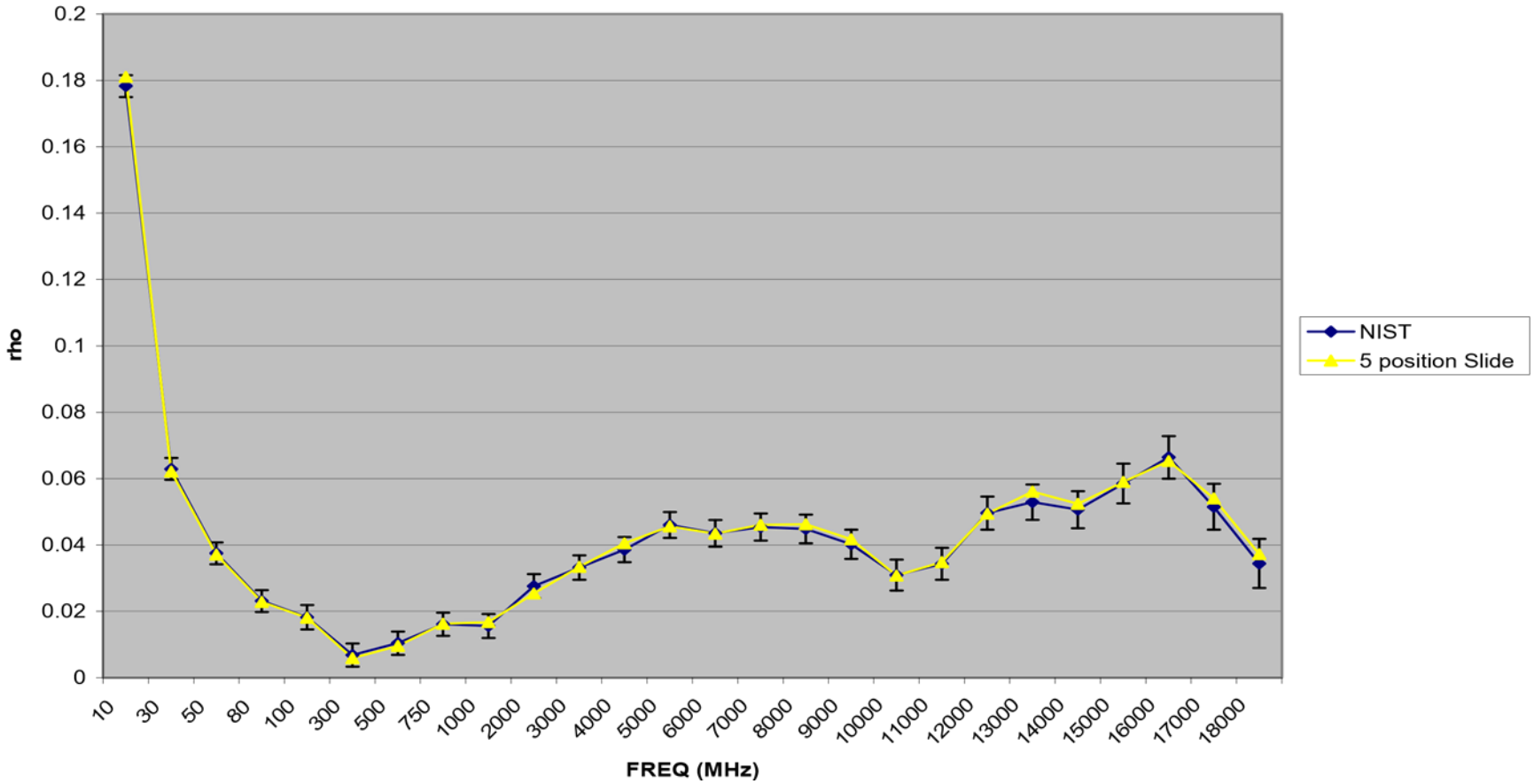
S_{11} Linear Magnitude



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S_{11} Phase