The only dielectric probe and software package designed to be used with Anritsu or Agilent economy vector network analyzers.

Dielectric Probe Kit
ALS-PR-DIEL

Product Information
December 2009

Features

- Runs on a PC, using GPIB card.
- Guided calibration and measurement.
- Measure permittivity over a broad frequency range (200 MHz to 20 GHz).
- View measurement results in ε_r' and Cole-Cole.
- Compatible with a variety of Anritsu and Agilent network analyzers.
- Report format provides data for use in Specific Absorption Rate analysis.
- Unique calibration short limits damage to probe tip.
- Resistant to SAR tissue especially glycol/DGBE.
- Designed to support tissue validation based on IEEE-1528 and IEC-62209.

Developed for SAR testing.

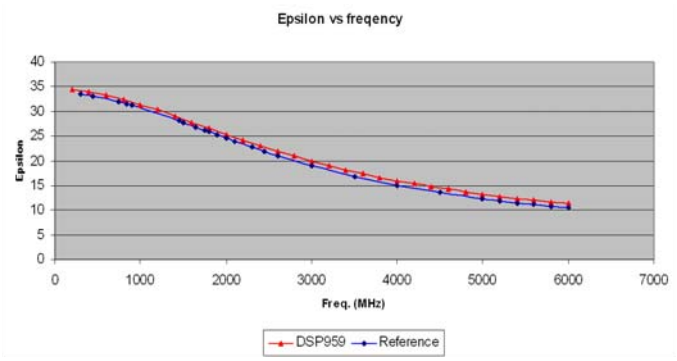
17 Bentley Avenue
Ottawa ON Canada K2E 6T7
www.aprel.com
info@aprel.com
Phone (613) 820-2730
Fax (613) 820-4161
© 2009 APREL Laboratories

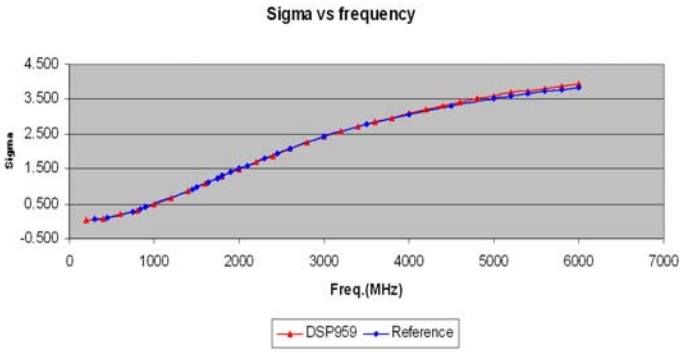
Dielectric measurements

The ALS-PRE-DIEL is a dielectric probe that is used to measure the intrinsic electrical properties of materials in the RF and microwave frequency bands. The ALS-PRE-DIEL software allows you to measure the complex dielectric constant of tissues as described in IEEE-1528 and IEC-62209. To obtain data at hundreds of frequencies in seconds, simply immerse the probe into liquids and the epsilon and sigma vales are reported which can be exported via .txt format through Windows.

The ALS-PRE-DIEL must be used in conjunction with a network analyzer. The network analyzer provides the high frequency stimulus, and measures the reflected response.

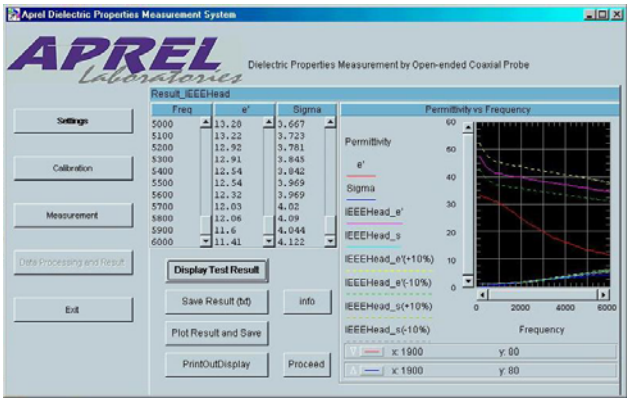
The probe transmits a signal into the material under test (MUT). The measured reflected response from the material is then related to its dielectric properties. A computer controls the system, and runs software that guides the user through a measurement sequence (computer not included).

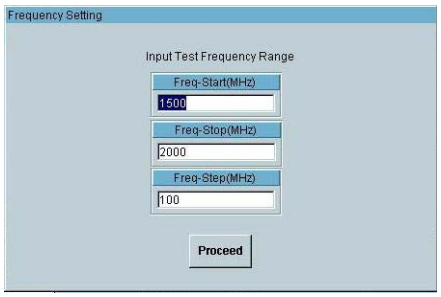




ALS-PRE-DIEL measurement attributes

- Rugged design withstands temperatures from –40 °C to +65°C.
- Resists corrosive chemicals per IEEE-1528 and IEC-62209.
- Accessories (cable, short circuit, mounting bracket) improve measurement repeatability.



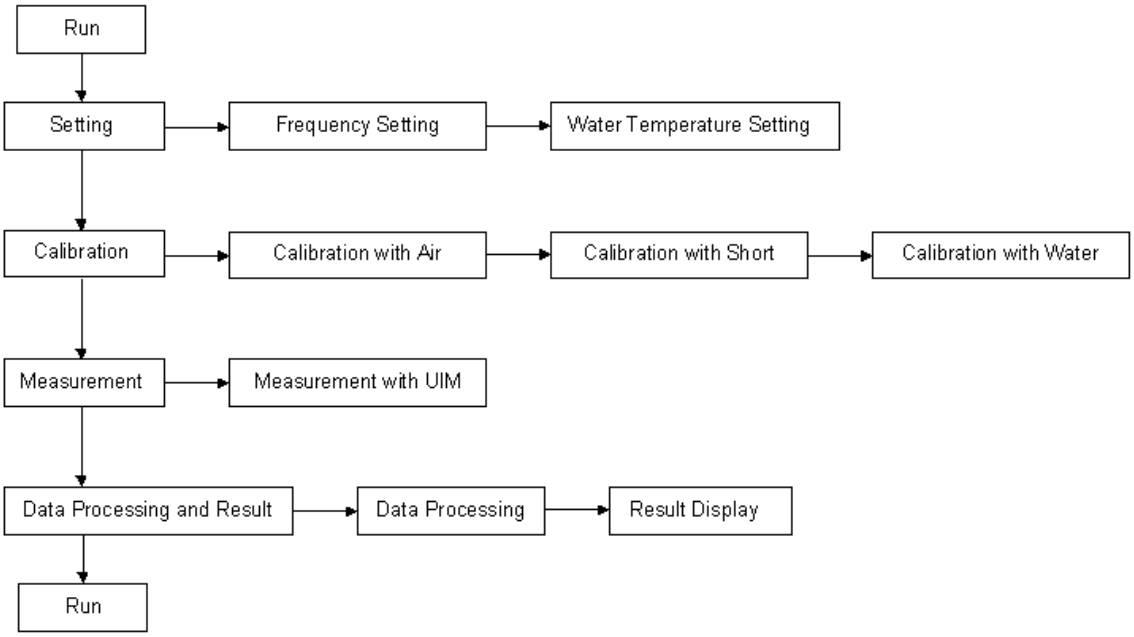


17 Bentley Avenue
Ottawa ON Canada K2E 6T7
www.aprel.com
info@aprel.com
Phone (613) 820-2730
Fax (613) 820-4161

© 2009 APREL Laboratories

Contents of ALS-PRE-DIEL dielectric probe kit

Dielectric probe	3.5 mm (m) connector type
Dielectric probe software	Windows® 95, 98, 2000, Me or Windows NT® 4.0 compatible
Flexible cable	Connects probe to network analyzer test port; 1 meter long with SMA (f) to SMA (f) connectors.
Adapters	Adapts network analyzer test port to flexible cable, when necessary; includes one 3.5 mm through
Shorting block and clamp	Fits over probe face for a repeatable short circuit
Mounting bracket	Keeps probe in a fixed position to minimize cable movement for more repeatable
Probe stand	Probe stand consists of a 24-inch high, 1/2-inch diameter metal support rod with a 13 x 7-inch porcelain base.



17 Bentley Avenue
Ottawa ON Canada K2E 6T7
www.aprel.com
info@aprel.com
Phone (613) 820-2730
Fax (613) 820-4161
© 2009 APREL Laboratories

Performance characteristics

Specifications describe the warranted performance over the temperature range 18 to 25 °C.

Frequency range

Probe: 30 MHz to 6 GHz (nominal)

Temperature

Range: −40 °C to +65 °C
Rate: < 10° C per minute

Accuracy (typical)

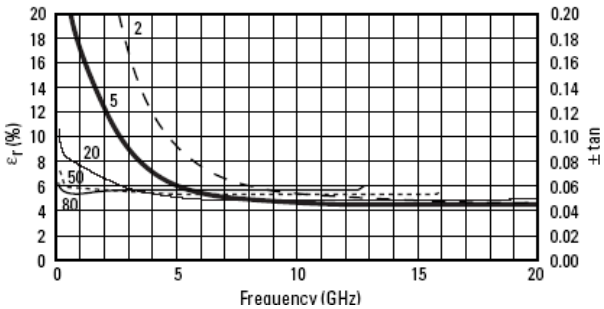
Dielectric constant, ε_r',: ±5% per 1.0 °C
Sigma, ∂: ±0.05 per 1.0 °C

Repeatability and resolution (typical)

Within ±2% over 5 tests.

Material under test uncertainties

Deviation from measurements is based on recognized methanol standard and calibrated to within ±5% for both epsilon ε_r/∂ at 21°C throughout for 30MHz to 6GHz frequency span.
Measurement uncertainty based on IEEE-1528 and IEC-62209 is ∂ = 2% and ε_r = 1.7%



Typical accuracy[1] vs. frequency for ε_r* = 2, 5, 20, 50, 80

17 Bentley Avenue
Ottawa ON Canada K2E 6T7
www.aprel.com
info@aprel.com
Phone (613) 820-2730
Fax (613) 820-4161
© 2009 APREL Laboratories