Appendix B

PICTURES OF THE EVALUATION SETUP

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PICTURE 1

RIGHT HEAD, CHEEK/TOUCH POSITION

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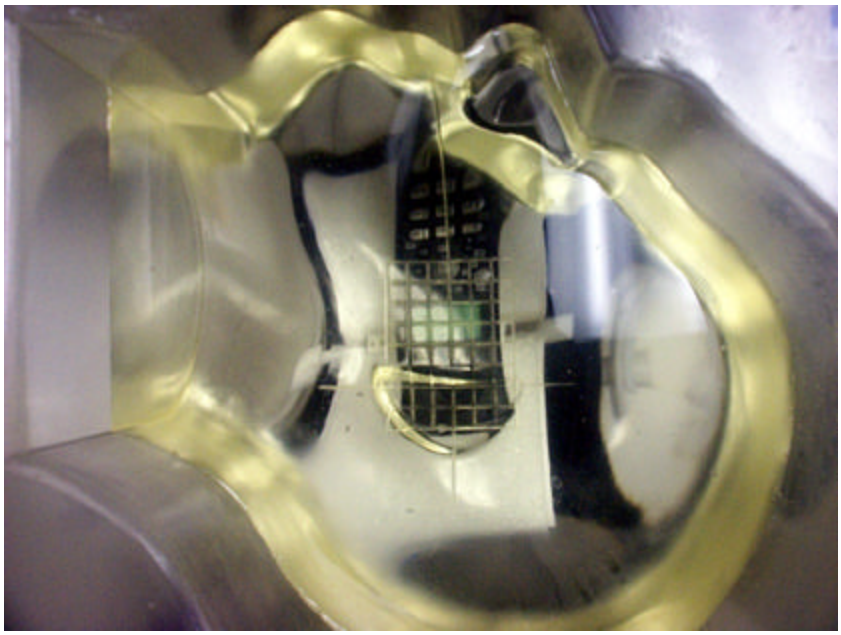
PICTURE 2

RIGHT HEAD, 15° TILT POSITION



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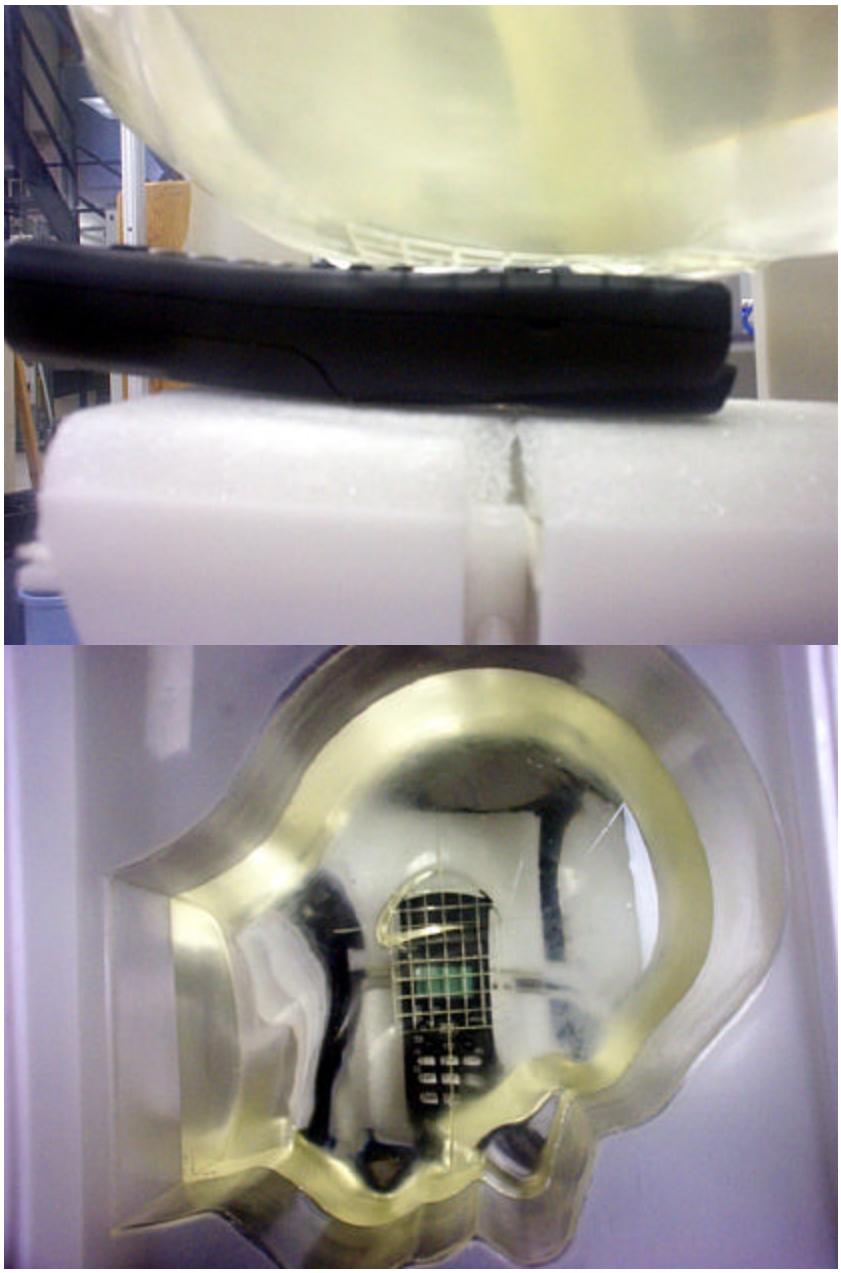
Fax (613) 820 4161

PICTURE 3

LEFT HEAD, CHEEK/TOUCH POSITION



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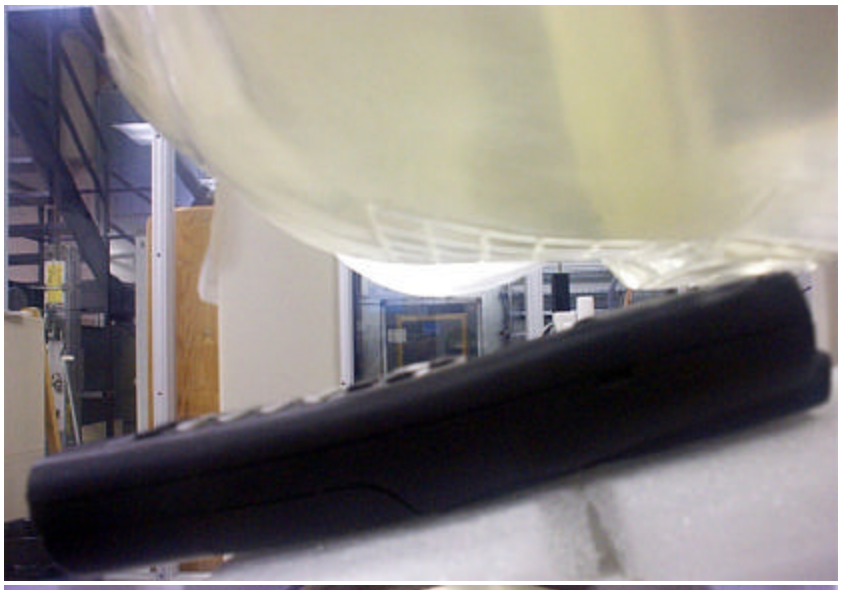
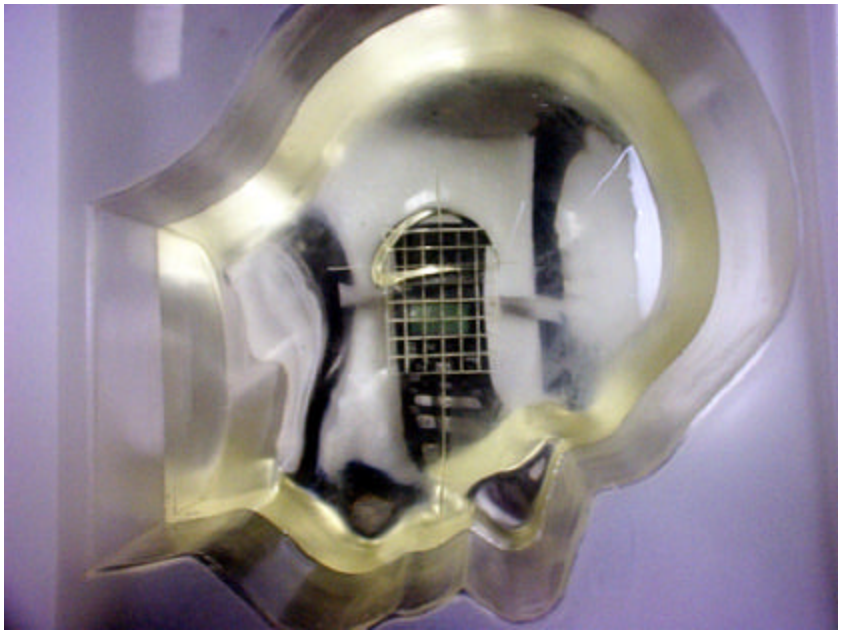
PICTURE 4

RIGHT HEAD, 15° TILT POSITION





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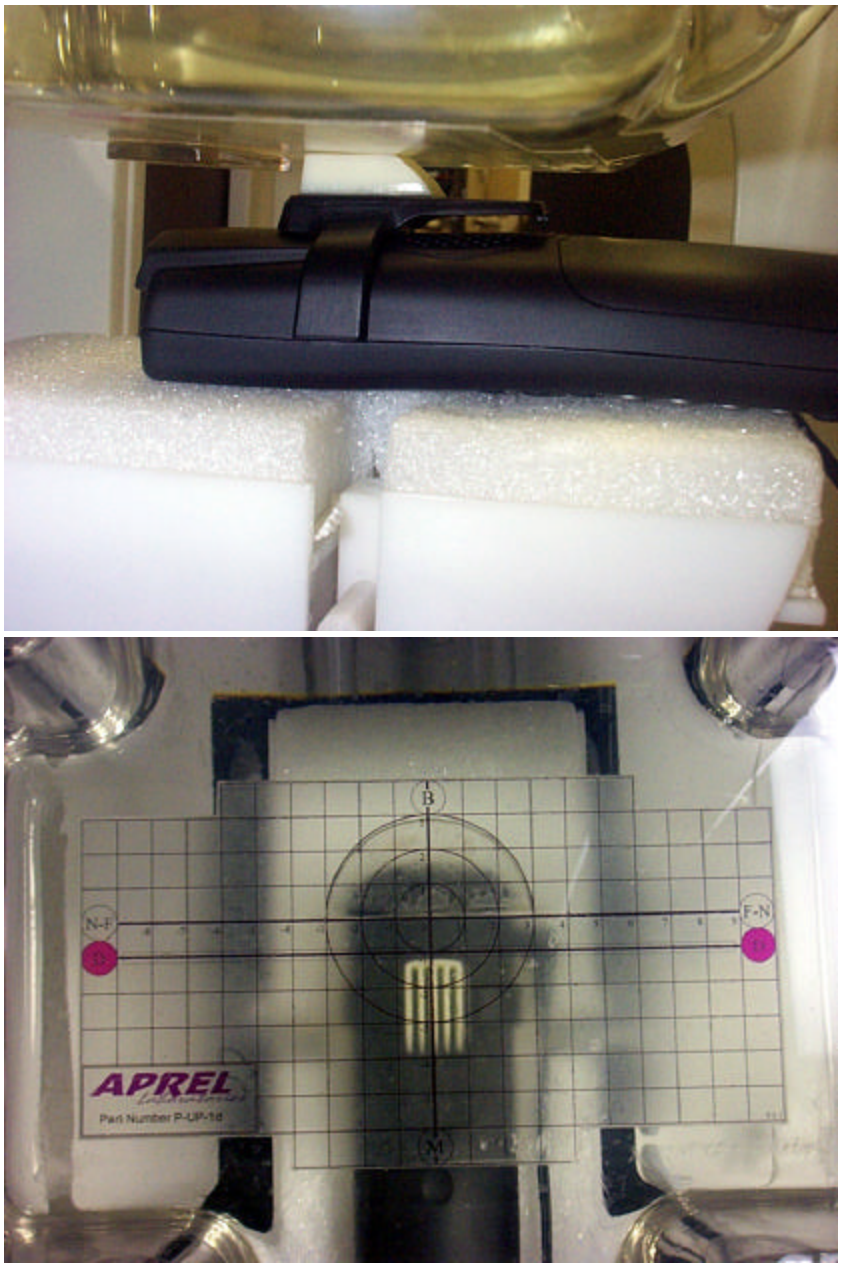
PICTURE 5

BODY-WORN POSITION



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APPENDIX C: VALIDATION SCAN

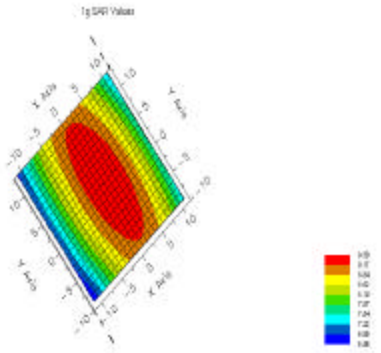

Figure 5. Contour Plot of 1 gram Validation Scan

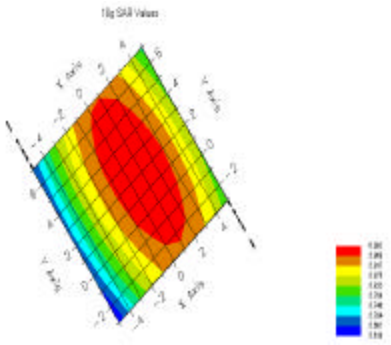

Figure 6. Contour Plot of 10 gram Validation Scan

Frequency: 5800 MHz
Tissue Type: Brain
Conversion Factor: 2.4
Input Power to Dipole: 0.1 W (Normalized to 1W)
Distance from Dipole to Tissue: 10 mm
Tissue Deapth: 15 cm

Measured 1 Gram SAR (W/Kg)	Target 1 Gram SAR (W/Kg)	Delta (%)
136.9	132.3	+3.5

Measured 10 Gram SAR (W/Kg)	Target 10 Gram SAR (W/Kg)	Delta (%)
39.9	38.4	+3.9

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Appendix D: UNCERTAINTY BUDGET

Calculated Uncertainties

Type of Uncertainty	Specific to	Uncertainty
Power variation due to battery condition	DUI	0%
Extrapolation due to depth measurement	Setup	3.8%
Conductivity	Setup	1.0%
Permitivity	Setup	2.0%
Probe Calibration	Setup	7.0%
Probe Positioning	Setup	1.0%
Probe Isotropicity	Setup	1.5%
Other Setup Uncertainty (Ambient)	Setup	3.0%
	18.0%	**Expanded Uncertainty K=2**

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Appendix E: Probe Calibration

NCL CALIBRATION LABORATORIES

Calibration File No.: C-P-0258

C E R T I F I C A T E OF C A L I B R A T I O N

It is certified that the equipment identified below has been calibrated in the **NCL CALIBRATION LABORATORIES** by qualified personnel following recognized procedures and using transfer standards traceable to NRC/NIST.

Equipment: Miniature Isotropic RF Probe 5.8 GHz

Manufacturer: APREL Laboratories
Model No.: E-010
Serial No.: 163

Calibration Procedure: SSI/DRB-TP-D01-032
Project No: Probe Cal Internal

Calibrated: May 8th 2002
Recalibration required: may 7th 2003
Released on: May 8th 2002

Released By: _____

NCL CALIBRATION LABORATORIES

51 SPECTRUM WAY
NEPEAN, ONTARIO
CANADA K2R 1E6

Division of APREL Lab.
TEL: (613) 820-4988
FAX: (613) 820-4161

51 Spectrum Way Tel. (613) 820-2730
Nepean, Ontario, K2R 1E6 Fax (613) 820 4161
e-mail: info@aprel.com

INTRODUCTION

This Calibration Report reproduces the results of the calibration performed in line with the SSI/DRB-TP-D01-032 E-Field Probe Calibration Procedure. The results contained within this report are for APREL E-Field Probe E-010 163.

REFERENCES

SSI/DRB-TP-D01-032 E-Field Probe Calibration Procedure
IEEE P-1528 *DRAFT* "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques"
SSI-TP-014 Tissue Calibration Procedure

Conditions

Probe 163 was a new probe taken from stock prior to calibration.

Ambient Temperature of the Laboratory: 23 °C +/- 0.5 °C
Temperature of the Tissue: 22 °C +/- 0.5 °C

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CALIBRATION RESULTS SUMMARY

Probe Type:	E-Field Probe E-010
Serial Number:	163
Frequency:	5.8 GHz
Sensor Offset:	2.4 mm
Sensor Length:	**2.5 mm**
Tip Enclosure:	**Glass***
Tip Diameter:	**7 mm**
Tip Length:	**40 mm**
Total Length:	**290 mm**

*Resistive to recommended tissue recipes per IEEE-P1528

SENSITIVITY IN AIR

Channel X: 0.58 ìV/(V/m)^2
Channel Y: 0.58 ìV/(V/m)^2
Channel Z: 0.58 ìV/(V/m)^2

Diode Compression Point: 76 mV

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SENSITIVITY IN HEAD TISSUE

Frequency: 5.8 GHz

Epsilon: 35.3(+/-10%) **Sigma:** 5.27 S/m(+/-10%)

ConvF

Channel X: 2.4

Channel Y: 2.4

Channel Z: 2.4

Tissue sensitivity values were calculated using a load impedance of 5 MΩ.

Boundary Effect:

Uncertainty resulting from the boundary effect is less than 2% for the distance between the tip of the probe and the tissue boundary, when less than 2.6mm.

Spatial Resolution:

The measured probe tip diameter is 7 mm (+/- 0.01 mm) and therefore meets the requirements of SSI/DRB-TP-D01-032 for spatial resolution.

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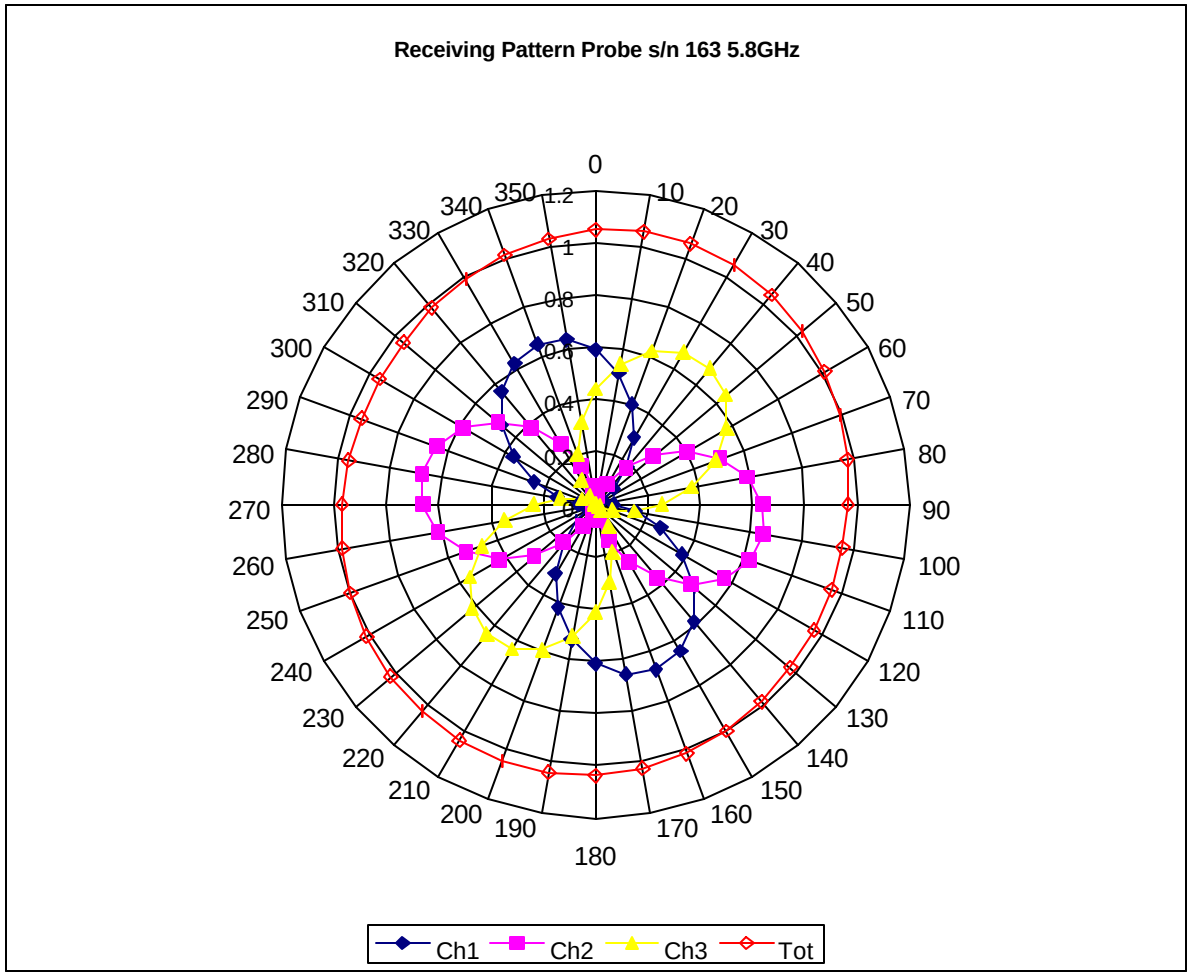
RECEIVING PATTERN 5.8 GHZ (AIR)



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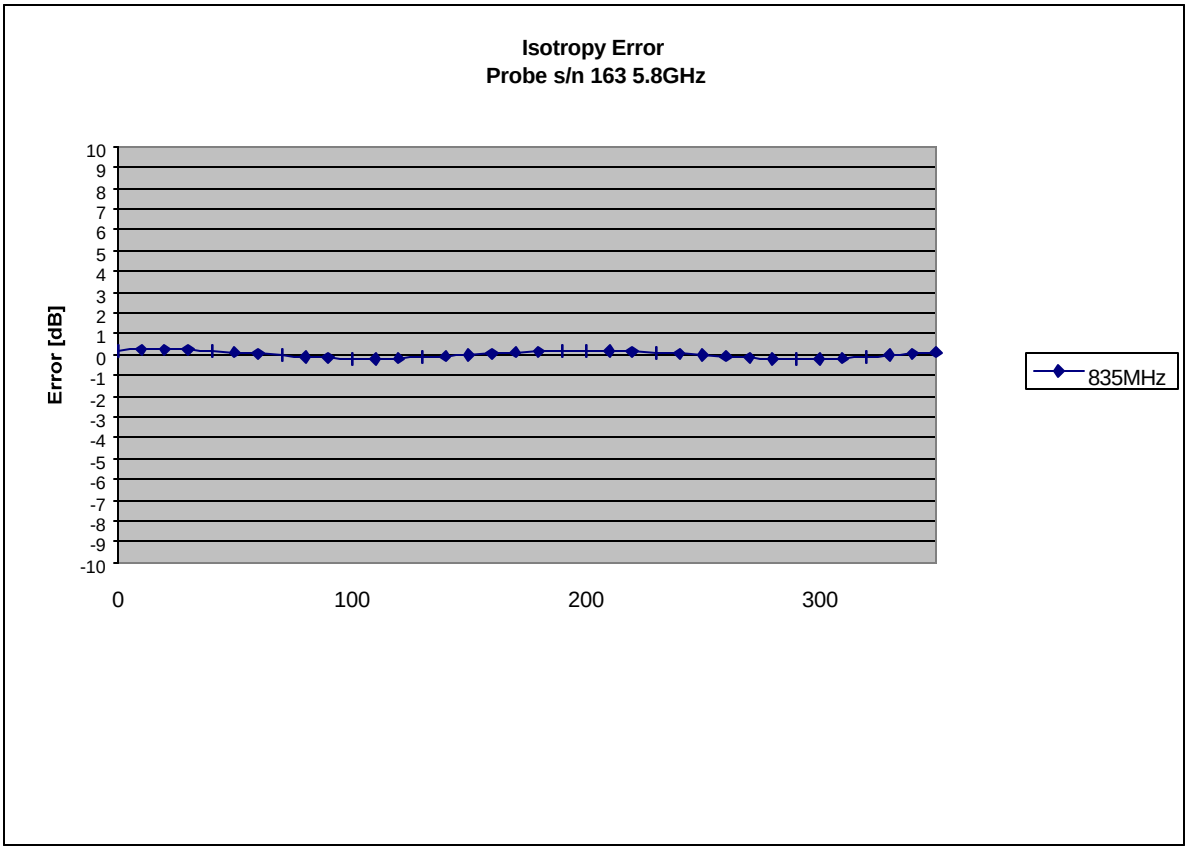
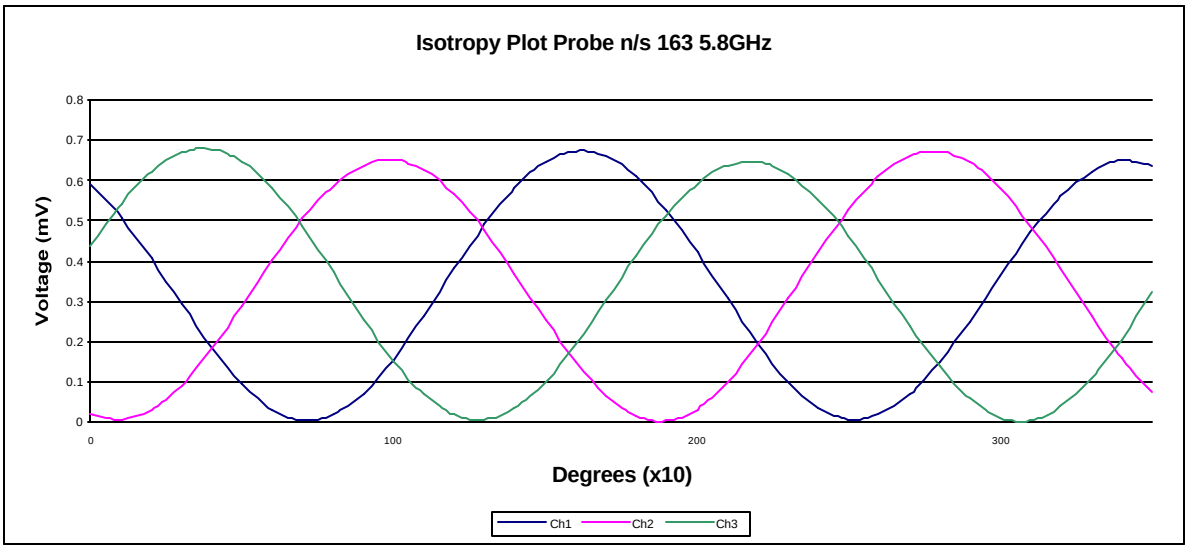
ISOTROPY ERROR 5.8 GHZ (AIR)





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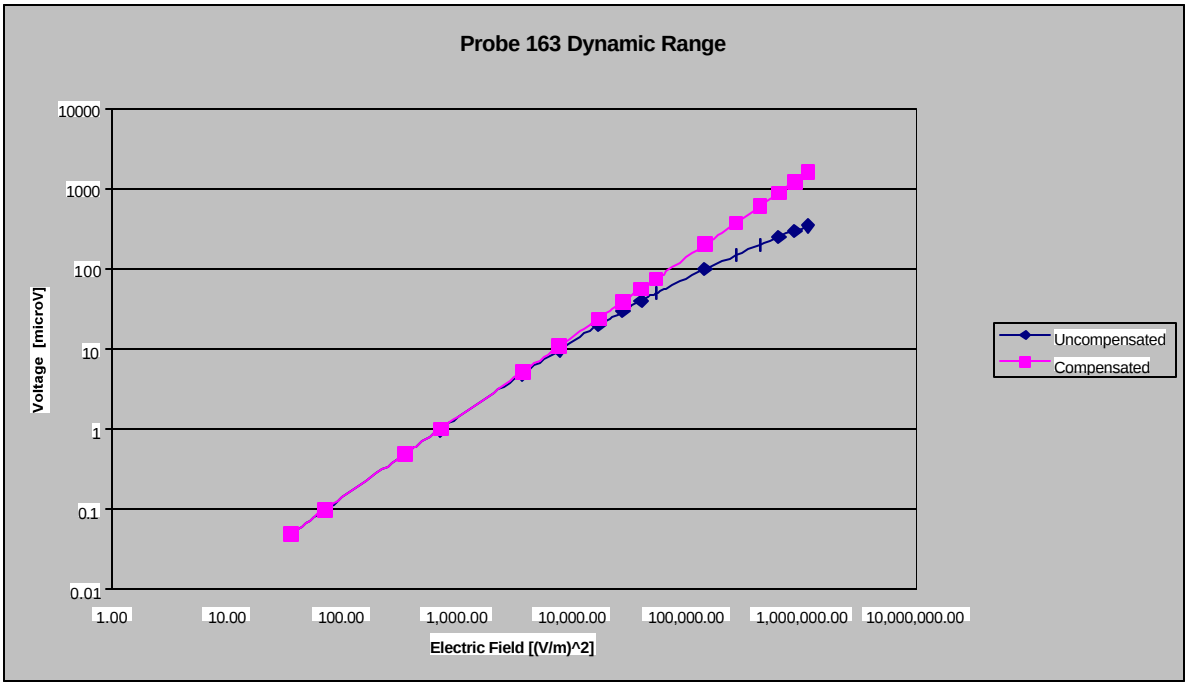
DYNAMIC RANGE



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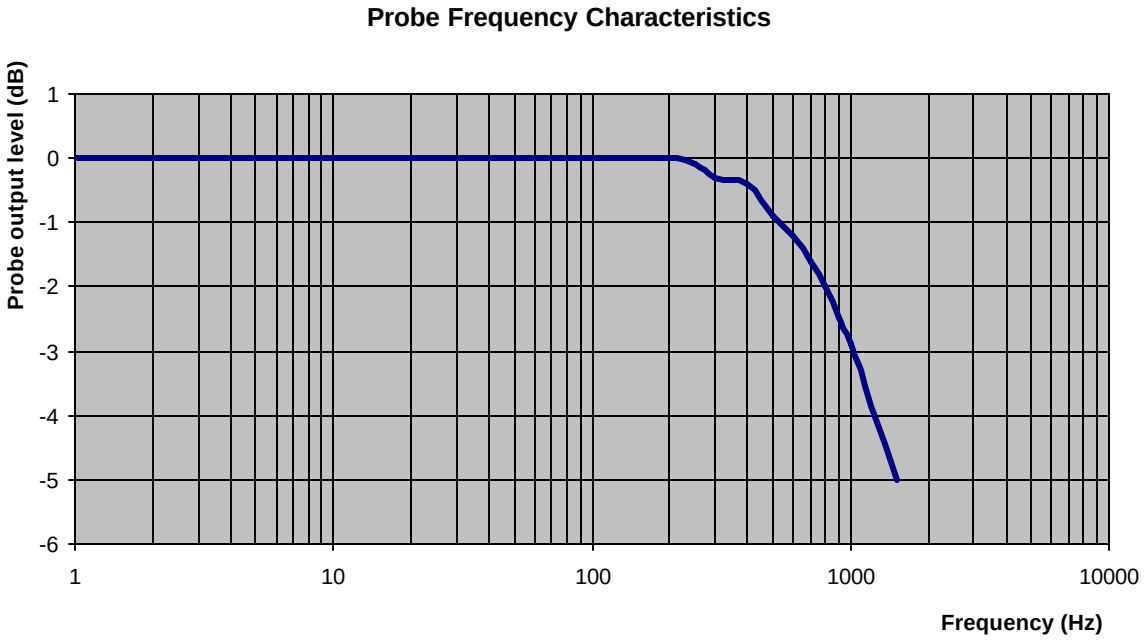
Video Bandwidth



Video Bandwidth at 500 Hz 1 dB
Video Bandwidth at 1.02 KHz: 3 dB

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CONVERSION FACTOR UNCERTAINTY ASSESSMENT

Frequency:		5.8 GHz	
Epsilon:	35.3 (+/-10%)	**Sigma:**	5.27 S/m (+/-10%)
ConvF			
Channel X:	2.4	7%(K=2)	
Channel Y:	2.4	7%(K=2)	
Channel Z:	2.4	7%(K=2)	

To minimize the uncertainty calculation all tissue sensitivity values were calculated using a load impedance of 5 MΩ.

Boundary Effect:

For a distance of 2.6mm the evaluated uncertainty (increase in the probe sensitivity) is less than 2%.

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TEST EQUIPMENT

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed in the following table:

Instrument	Manufacturer	Model Number	Asset Number Serial Number	Calibration Due
UniPhantom	APREL		APL-085	N/A
Universal Frame	APREL		APL-114	N/A
<1GHz TEM Cell			APL-1GHZ-TEM	Jan 2003
>1GHz-2GHz Tem Cell			APL-2GHZ-TEM	Jan 2003
ALIDX-500	APREL/IDX		-	March 2003
RF Amplifier	APREL		301467	October 2003
Signal Generator	HP		301463	November 2002
Power Meter	R&S		301451	September 2002
Power Sensor	R&S		301461	September 2002
Directional Coupler	HP		100251	October 2002
VNA	Anritsu		Z0107643 *TEMP*	August 2002
Slotted Line	HP		100195	N/A
Slotted Line Probe	APREL		APL-SLP-001	December 2002
APREL D-835-S1			301463	March 2003
D-900-S1	APREL		301472	March 2003
D-1900-S1	APREL		301459	March 2003
Measuring Amplifier	B&K		100675	Feb 2003
Signal Generator	B&K		100677	Feb 2003

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