

Appendix B

PICTURES OF THE EVALUATION SETUP

PICTURE 1

RIGHT HEAD, CHEEK/TOUCH POSITION



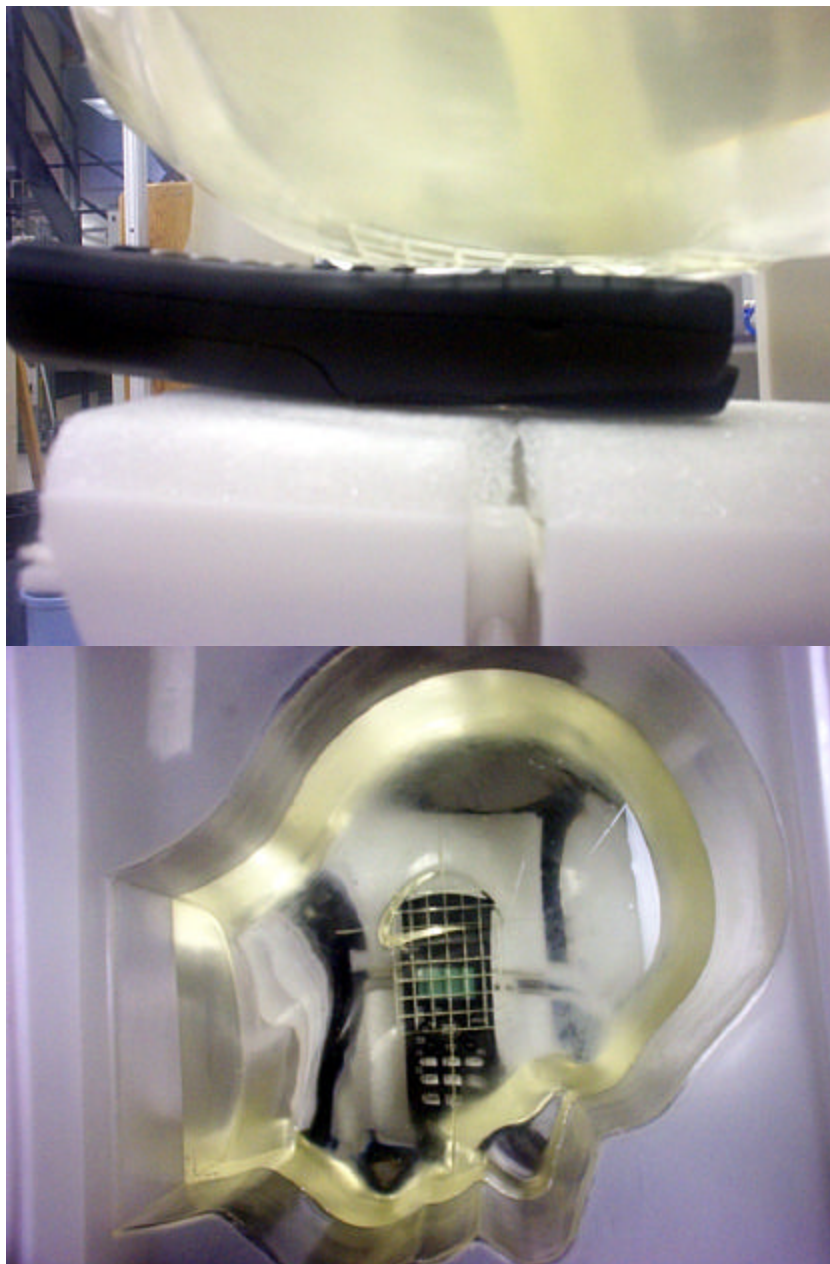
PICTURE 2

RIGHT HEAD, 15° TILT POSITION



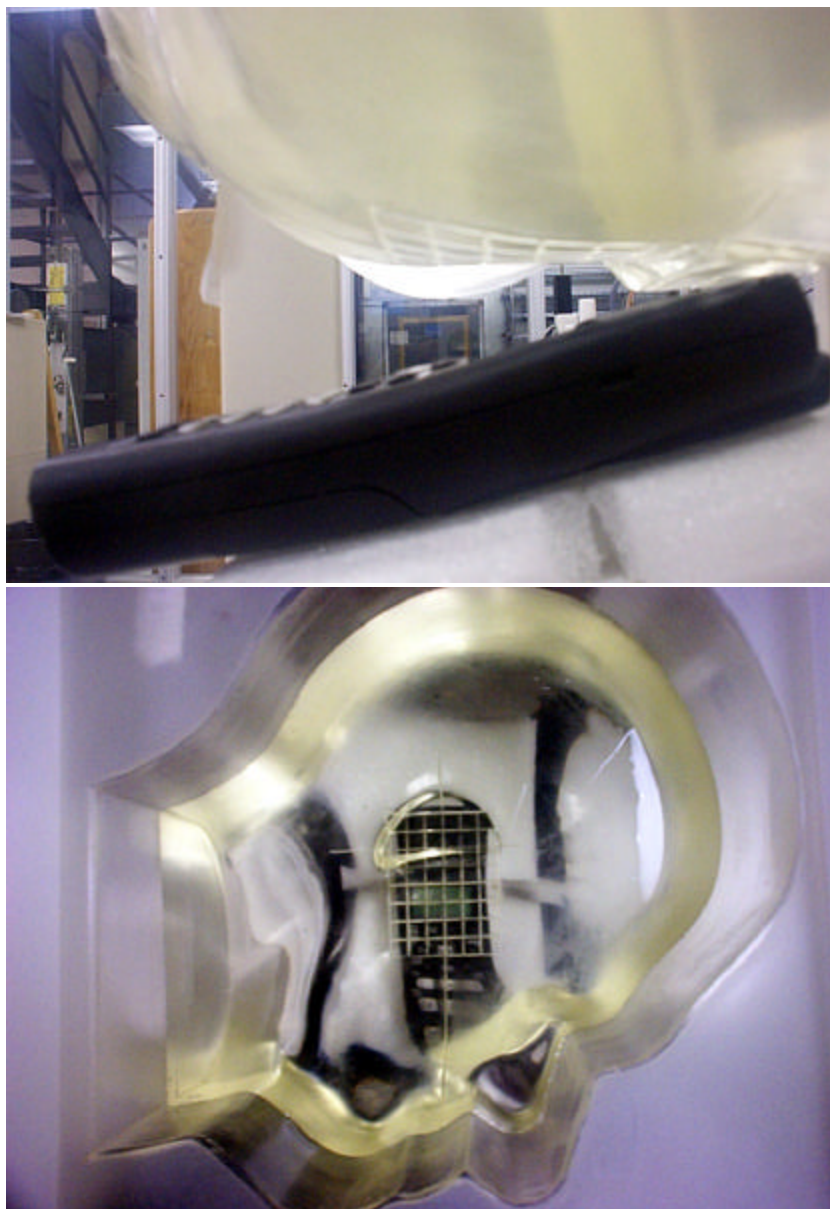
PICTURE 3

LEFT HEAD, CHEEK/TOUCH POSITION



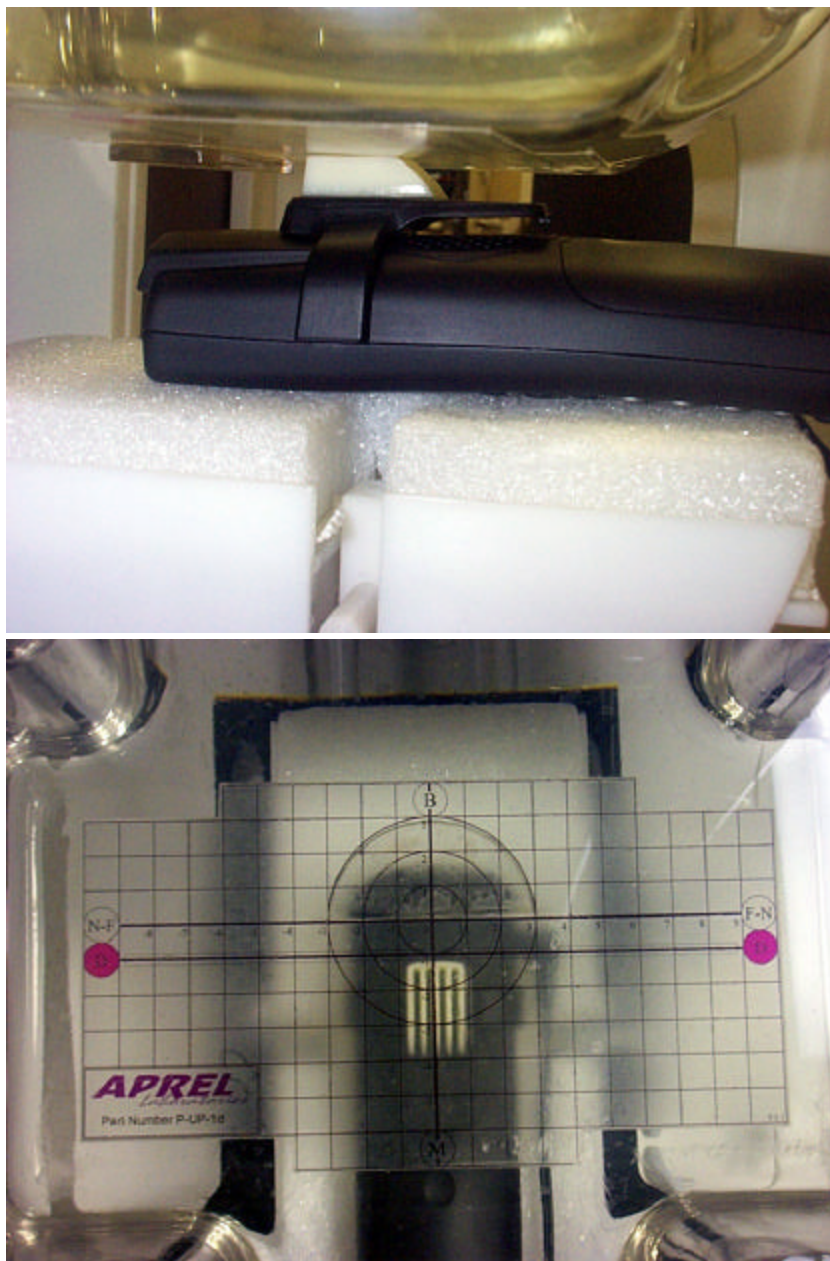
PICTURE 4

RIGHT HEAD, 15° TILT POSITION



PICTURE 5

BODY-WORN POSITION



APPENDIX C: VALIDATION SCAN

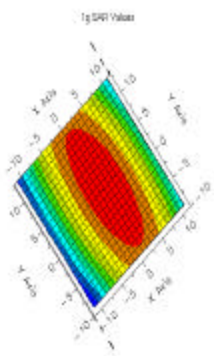


Figure 5. Contour Plot of 1 gram Validation Scan

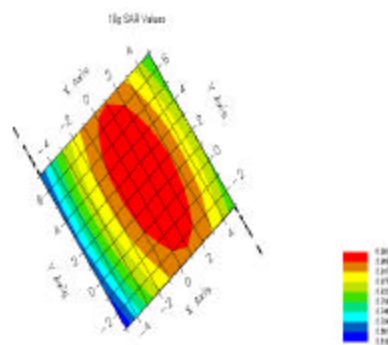


Figure 6. Contour Plot of 10 gram Validation Scan

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 Depth: 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

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%
Permittivity	Setup	2.0%
Probe Calibration	Setup	7.0%
Probe Positioning	Setup	1.0%
Probe Isotropy	Setup	1.5%
Other Setup Uncertainty (Ambient)	Setup	3.0%
18.0%		Expanded Uncertainty K=2

Appendix E: Probe Calibration

NCL CALIBRATION LABORATORIES

Calibration File No.: C-P-0258

CERTIFICATE OF CALIBRATION

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

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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



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: $0.58 \text{ } \mu\text{V}/(\text{V/m})^2$
Channel Y: $0.58 \text{ } \mu\text{V}/(\text{V/m})^2$
Channel Z: $0.58 \text{ } \mu\text{V}/(\text{V/m})^2$

Diode Compression Point: 76 mV

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.

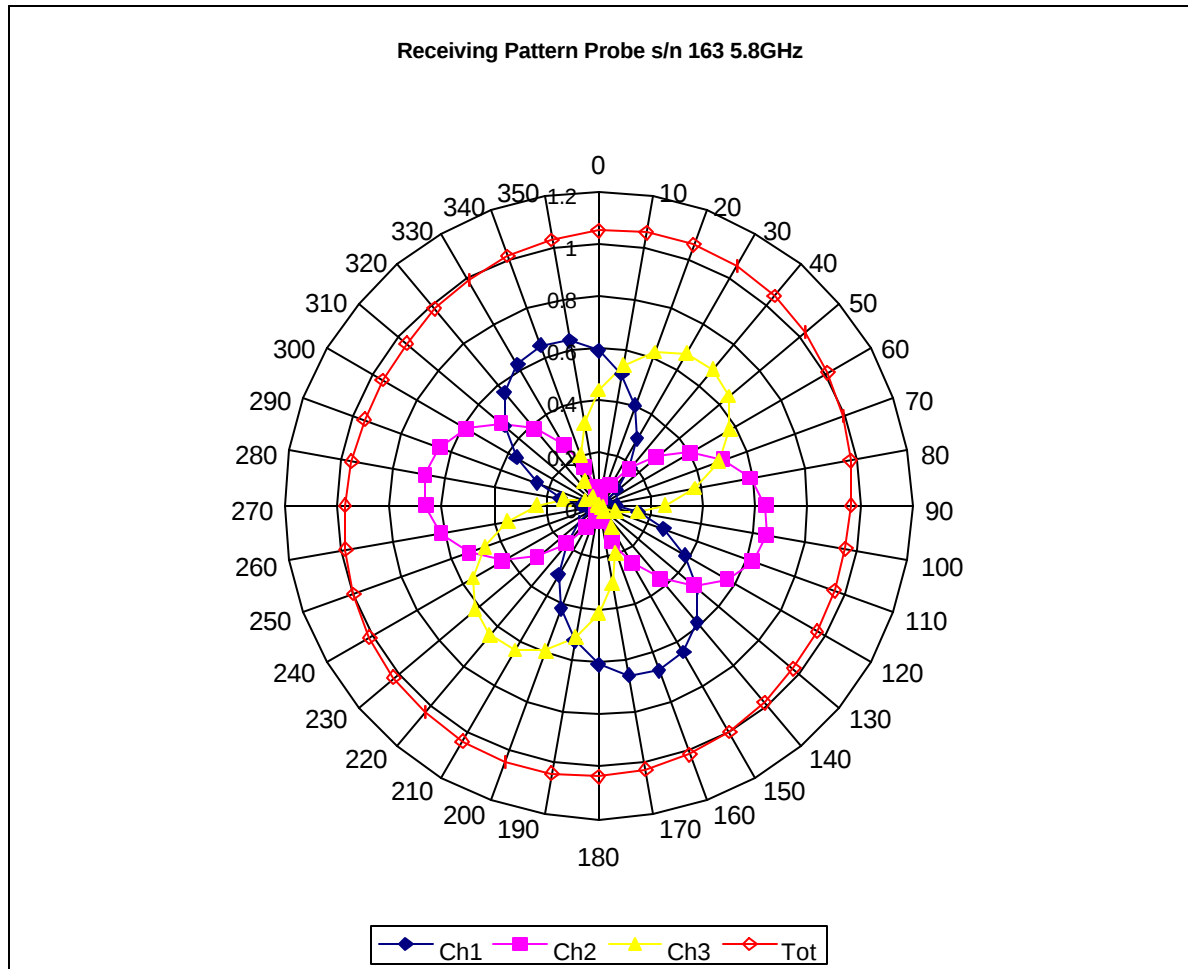
Boundary Effect:

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.

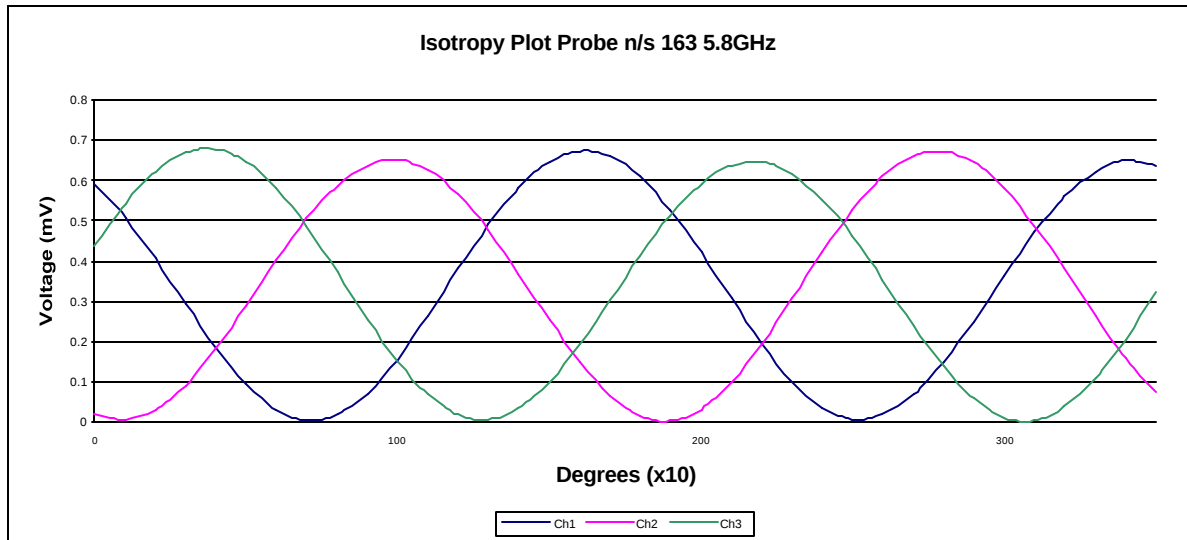
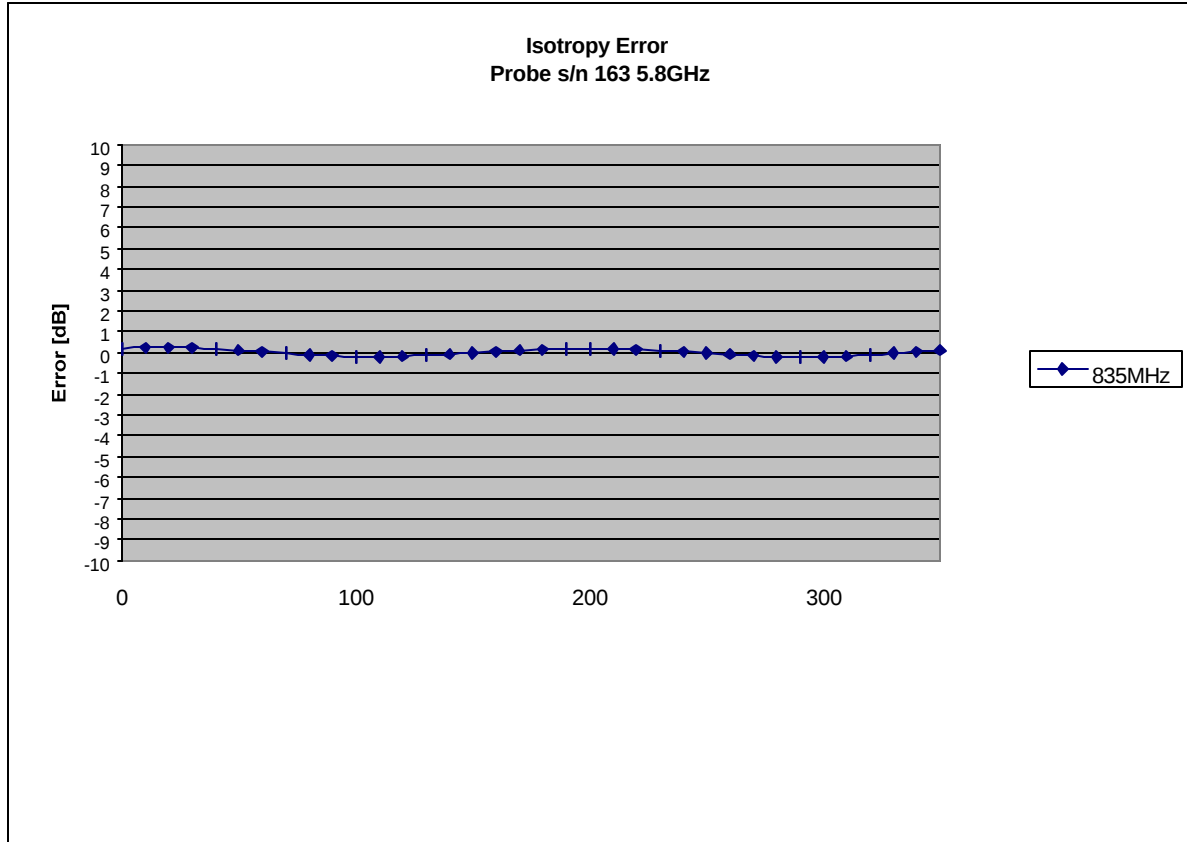
Spatial Resolution:

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.

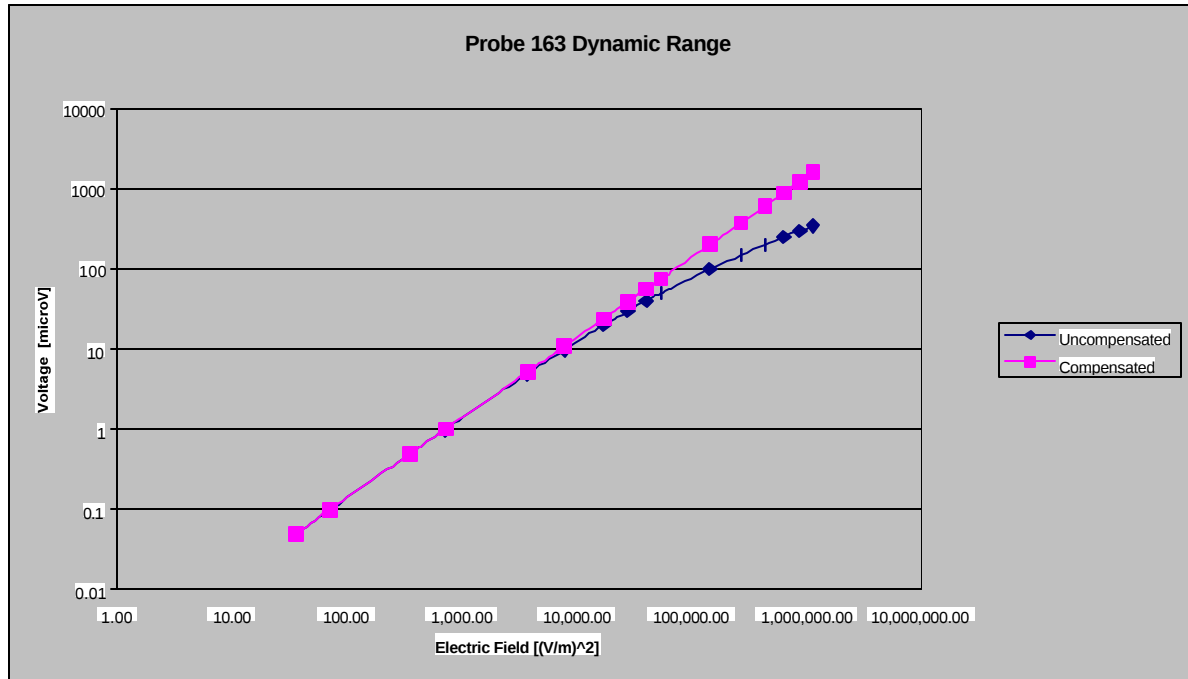
RECEIVING PATTERN 5.8 GHZ (AIR)



ISOTROPY ERROR 5.8 GHZ (AIR)

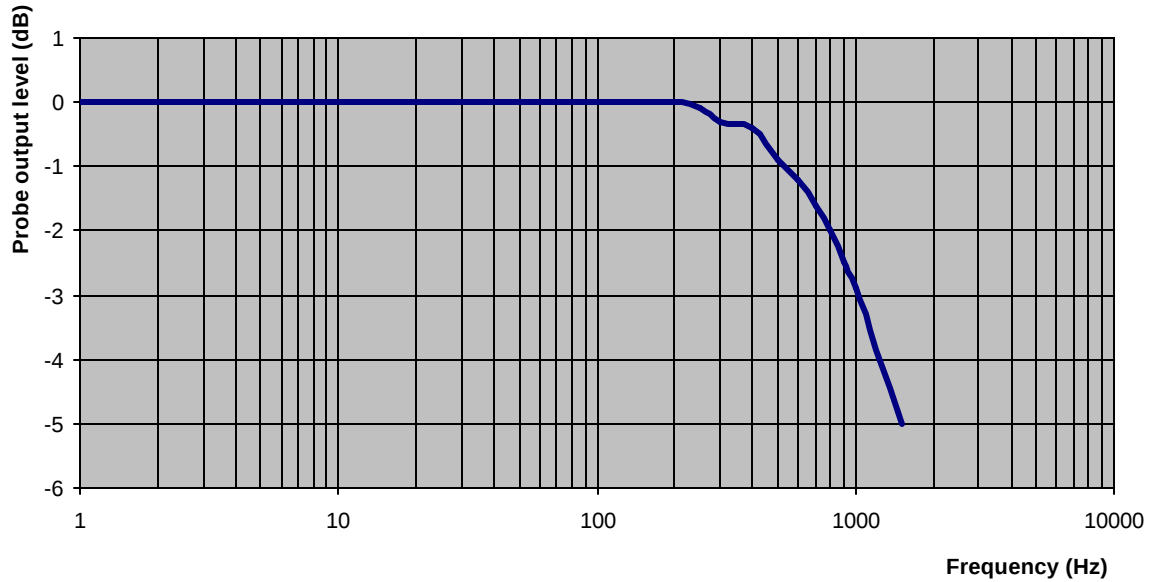


DYNAMIC RANGE



Video Bandwidth

Probe Frequency Characteristics



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

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%.

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