

APPENDIX A: SAR TEST DATA

SAR Data Report 03031716

Start : 17-Mar-03 05:06:58 pm
End : 17-Mar-03 05:15:32 pm
Code Version : 4.08
Robot Version: 4.08

Product Data:

Type : ZEBRA
Model Number : CC16232-2
Frequency : 2437 MHz
Transmit Pwr : 0.097 W
Antenna Type : Dipole
Antenna Posn. : Fixed

Measurement Data:

Phantom Name : SAM FLAT
Phantom Type : Uniphantom
Tissue Type : Muscle
Tissue Dielectric : 51.000
Tissue Conductivity : 1.980
Tissue Density : 1.000
Robot Name : CRS

Probe Data:

Probe Name : PCT003
Probe Type : E Fld Triangle
Frequency : 2440 MHz
Tissue Type : Muscle
Calibrated Dielectric : 52.300
Calibrated Conductivity : 1.990
Calibrated Density : 1.000
Probe Offset : 2.400 mm
Conversion Factor : 9.900
Probe Sensitivity : 2.075 2.820 2.456 mV/(mW/cm^2)
Amplifier Gains : 20.00 20.00 20.00

Sample:

Rate: 6000 Samples/Sec
Count: 1000 Samples
NIDAQ Gain: 5

Comments:

DSS Mode CH-6
BODY
CF=1; Amb. Temp= 22.3 'C; Liq. Temp=21.1 'C

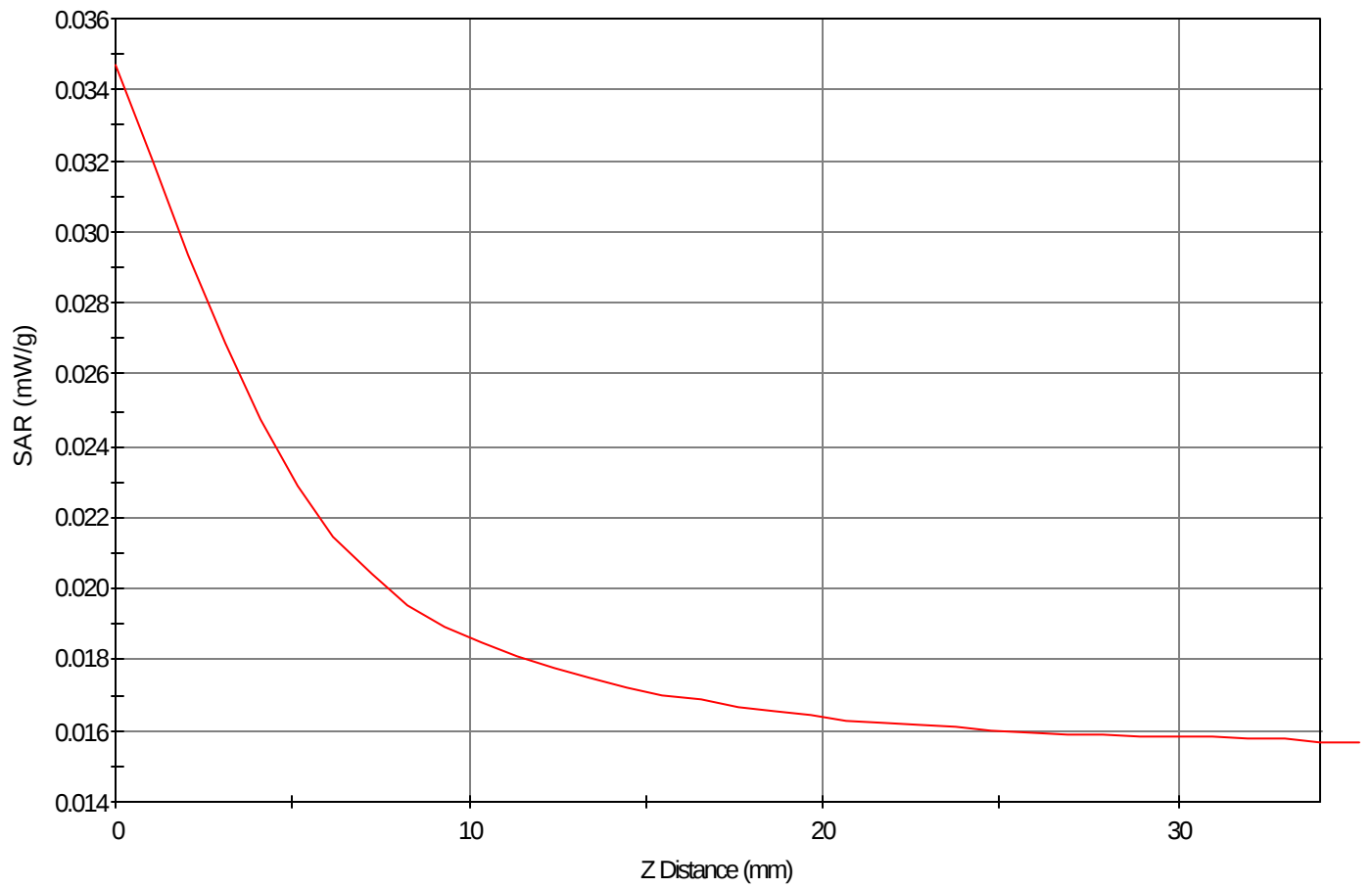
Area Scan - Max Peak SAR Value at x=-21.0 y=27.0 = 0.10 W/kg

Zoom Scan - Max Peak SAR Value at x=-37.0 y=25.0 z=0.0 = 0.03 W/kg

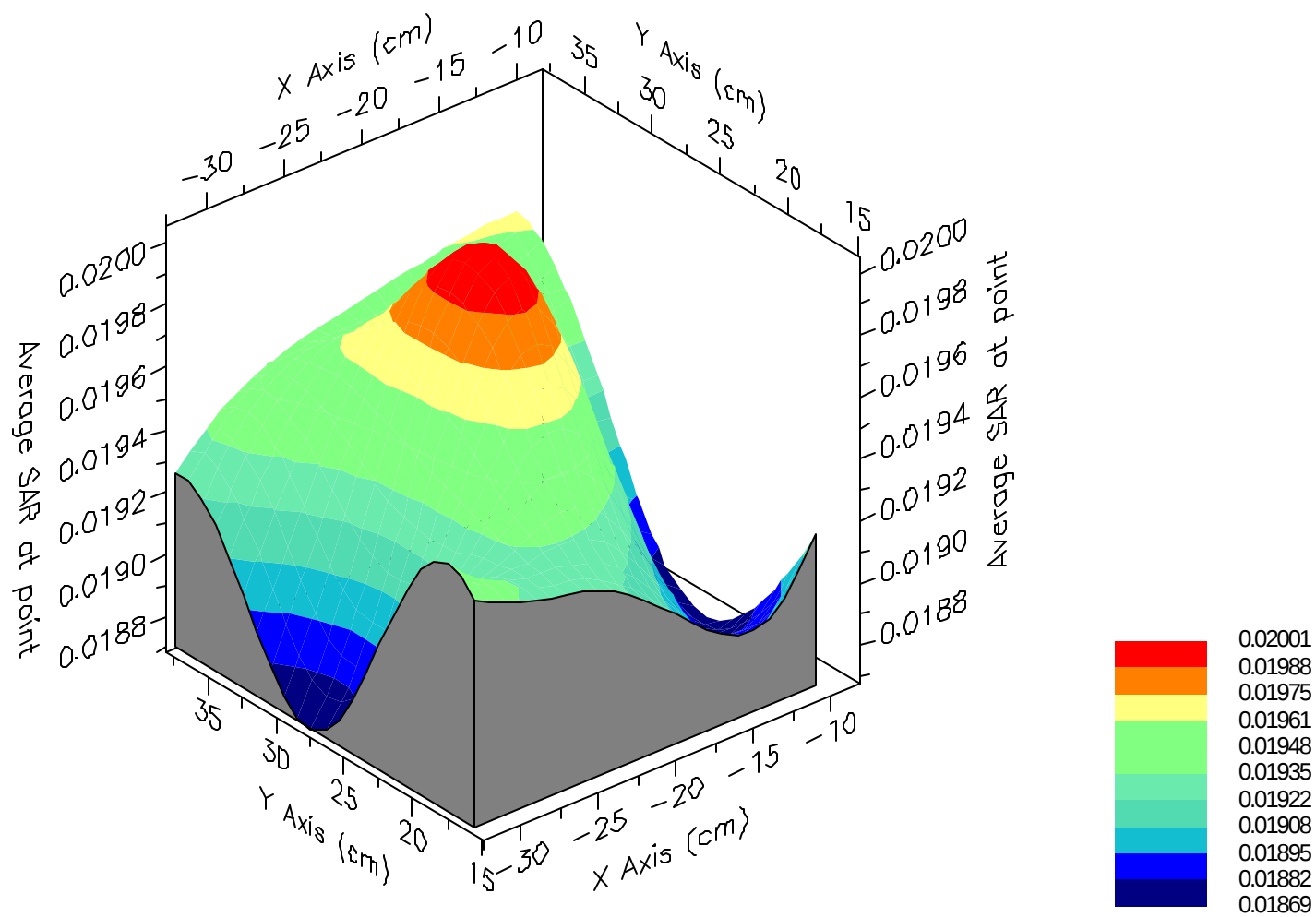
Max 1g SAR at x=-22.0 y=28.0 z=22.0 = 0.02 W/kg

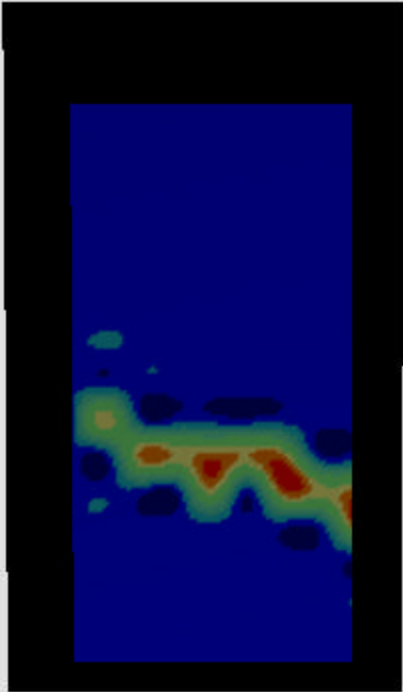
Max 10g SAR at x=-16.0 y=32.0 z=10.0 = 0.02 W/kg

SAR - Z Axis
at Hotspot x:-37.0 y:25.0



1g SAR Values





SAR Data Report 03031712

Start : 17-Mar-03 04:33:13 pm
End : 17-Mar-03 04:39:14 pm
Code Version : 4.08
Robot Version: 4.08

Product Data:

Type : ZEBRA
Model Number : CC16232-2
Frequency : 2462 MHz
Transmit Pwr : 0.093 W
Antenna Type : Dipole
Antenna Posn. : Fixed

Measurement Data:

Phantom Name : SAM FLAT
Phantom Type : Uniphantom
Tissue Type : Muscle
Tissue Dielectric : 51.000
Tissue Conductivity : 1.980
Tissue Density : 1.000
Robot Name : CRS

Probe Data:

Probe Name : PCT003
Probe Type : E Fld Triangle
Frequency : 2440 MHz
Tissue Type : Muscle
Calibrated Dielectric : 52.300
Calibrated Conductivity : 1.990
Calibrated Density : 1.000
Probe Offset : 2.400 mm
Conversion Factor : 9.900
Probe Sensitivity : 2.075 2.820 2.456 mV/(mW/cm^2)
Amplifier Gains : 20.00 20.00 20.00

Sample:

Rate: 6000 Samples/Sec
Count: 1000 Samples
NIDAQ Gain: 5

Comments:

DSS Mode CH-11
BODY
CF=1; Amb. Temp= 22.3 'C; Liq. Temp=21.1 'C

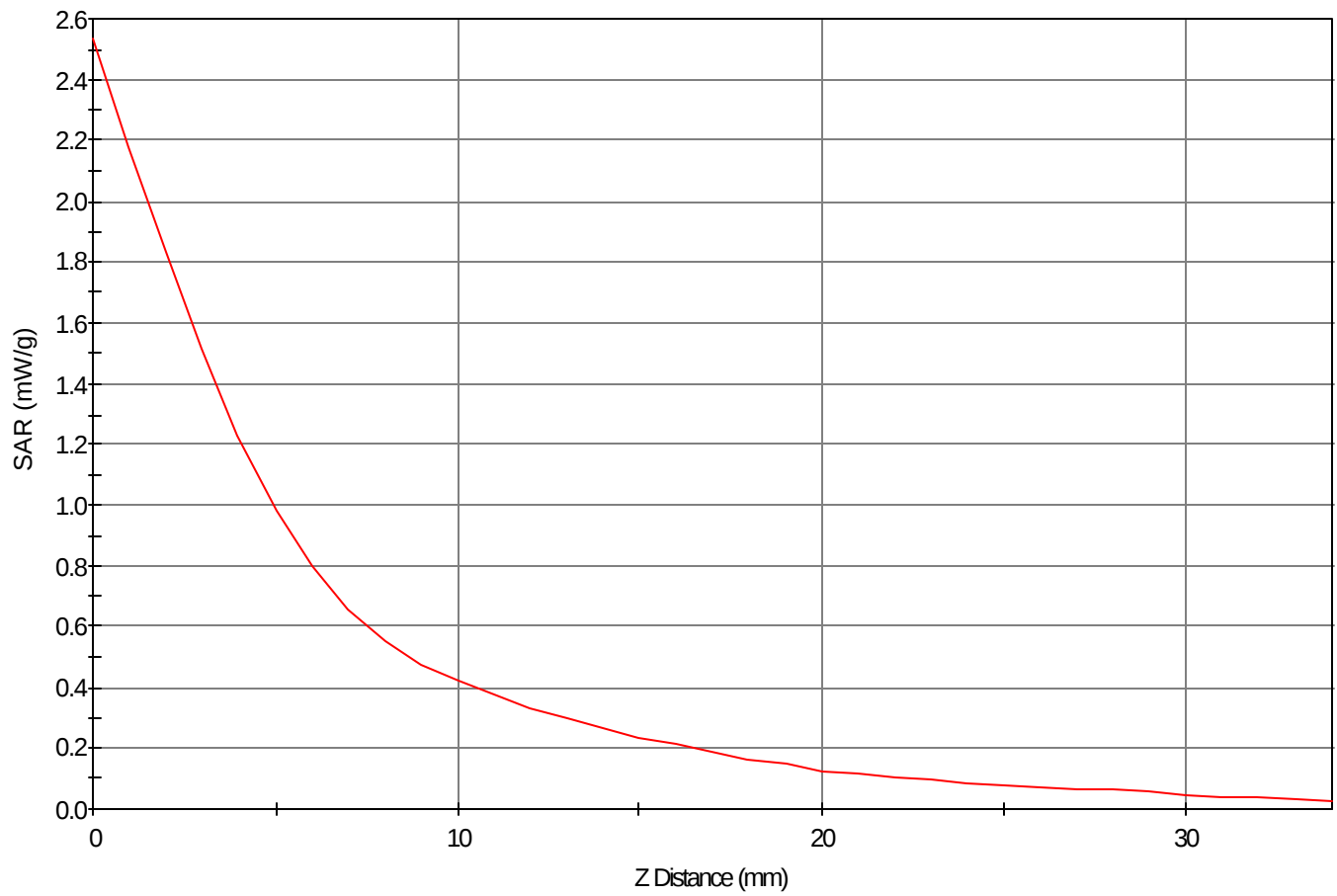
Area Scan - Max Peak SAR Value at x=0.0 y=0.0 = 1.01 W/kg

Zoom Scan - Max Peak SAR Value at x=0.0 y=-1.0 z=0.0 = 2.54 W/kg

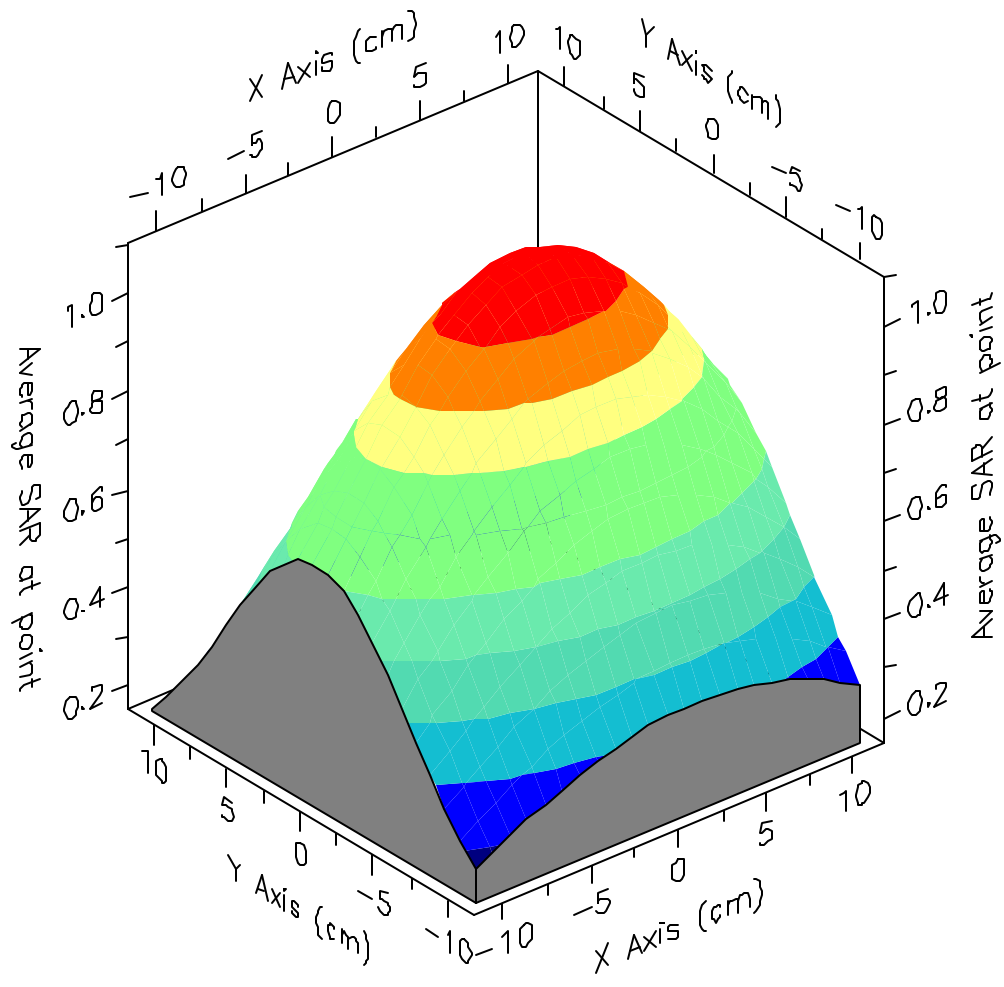
Max 1g SAR at x=1.0 y=0.0 z=0.0 = 1.10 W/kg

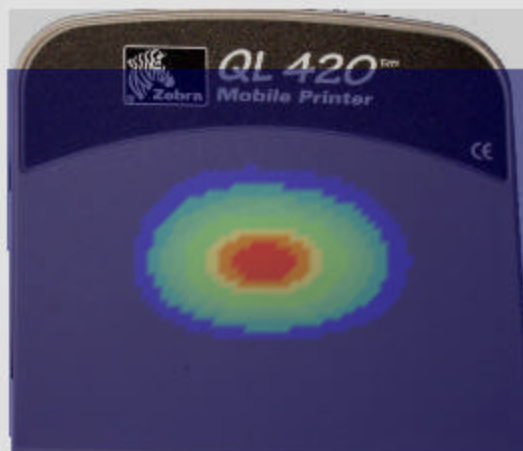
Max 10g SAR at x=1.0 y=-1.0 z=0.0 = 0.41 W/kg

SAR - Z Axis
at Hotspot x:0.0 y:-1.0



1g SAR Values





APPENDIX B: DIPOLE VALIDATION

SAR Data Report 03031702

Start : 17-Mar-03 10:32:25 am
End : 17-Mar-03 10:36:44 am
Code Version : 4.08
Robot Version: 4.08

Product Data:

Type : Verification
Model Number : E-010
Serial Number : PCT003
Frequency : 2440 MHz
Transmit Pwr : 0.100 W
Antenna Type : Dipole
Antenna Posn. : Validation

Measurement Data:

Phantom Name : SAM-FLAT-B
Phantom Type : Uniphantom
Tissue Type : Brain
Tissue Dielectric : 40.030
Tissue Conductivity : 1.880
Tissue Density : 1.000
Robot Name : CRS

Probe Data:

Probe Name : PCT003
Probe Type : E Fld Triangle
Frequency : 2440 MHz
Tissue Type : Brain
Calibrated Dielectric : 39.340
Calibrated Conductivity : 1.770
Calibrated Density : 1.300
Probe Offset : 2.400 mm
Conversion Factor : 8.800
Probe Sensitivity : 2.075 2.820 2.456 mV/(mW/cm^2)
Amplifier Gains : 20.00 20.00 20.00

Sample:

Rate: 6000 Samples/Sec
Count: 1000 Samples
NIDAQ Gain: 5

Comments:

Verification

CF=1; Amb. Temp= 22.3 'C; Liq. Temp=21.1 'C

Area Scan - Max Peak SAR Value at x=-4.0 y=-1.0 = 4.71 W/kg

Zoom Scan - Max Peak SAR Value at x=-4.0 y=-2.0 z=0.0 = 10.76 W/kg

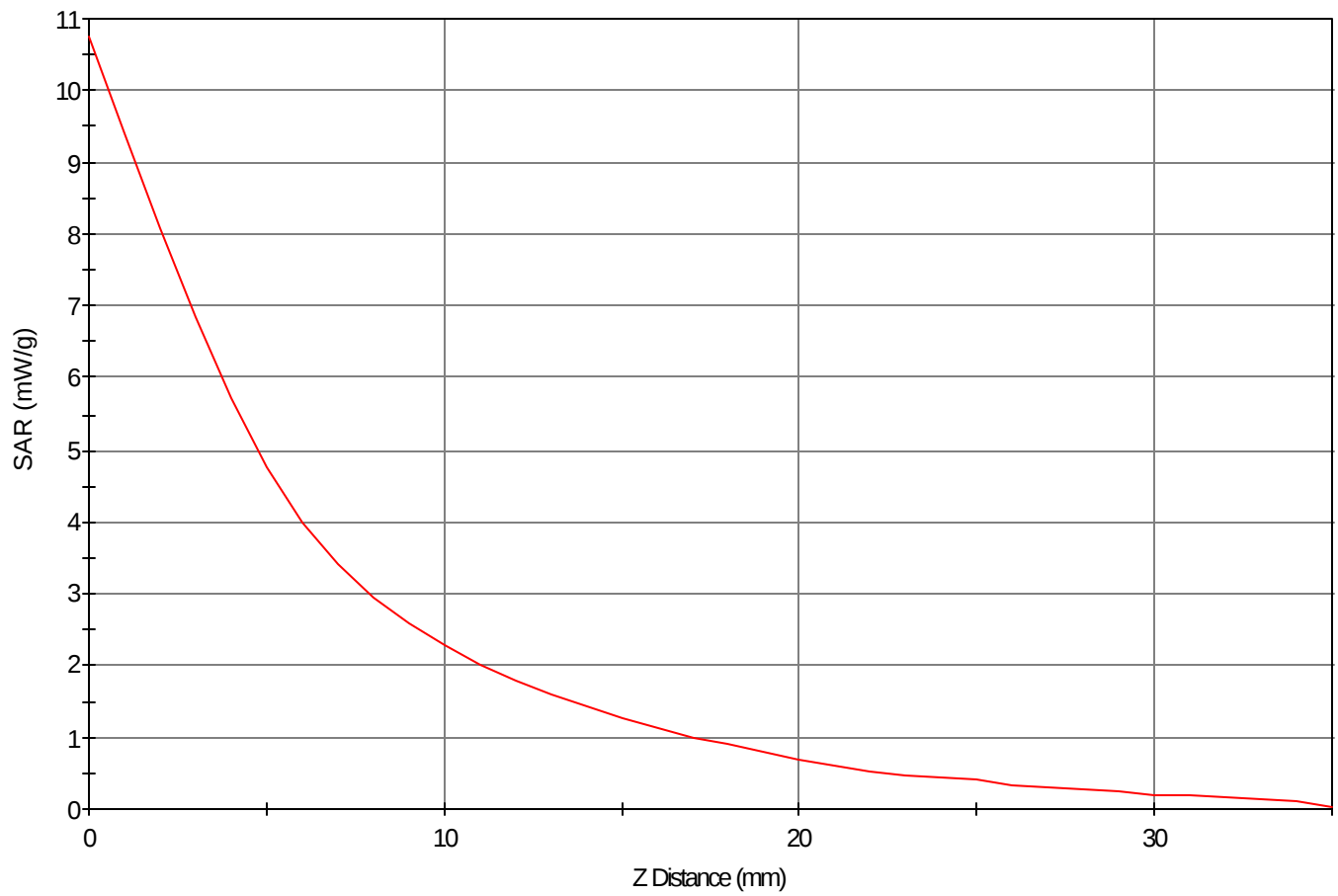
Max 1g SAR at x=-4.0 y=-2.0 z=0.0 = 5.34 W/kg

Max 10g SAR at x=-4.0 y=-2.0 z=0.0 = 2.36 W/kg

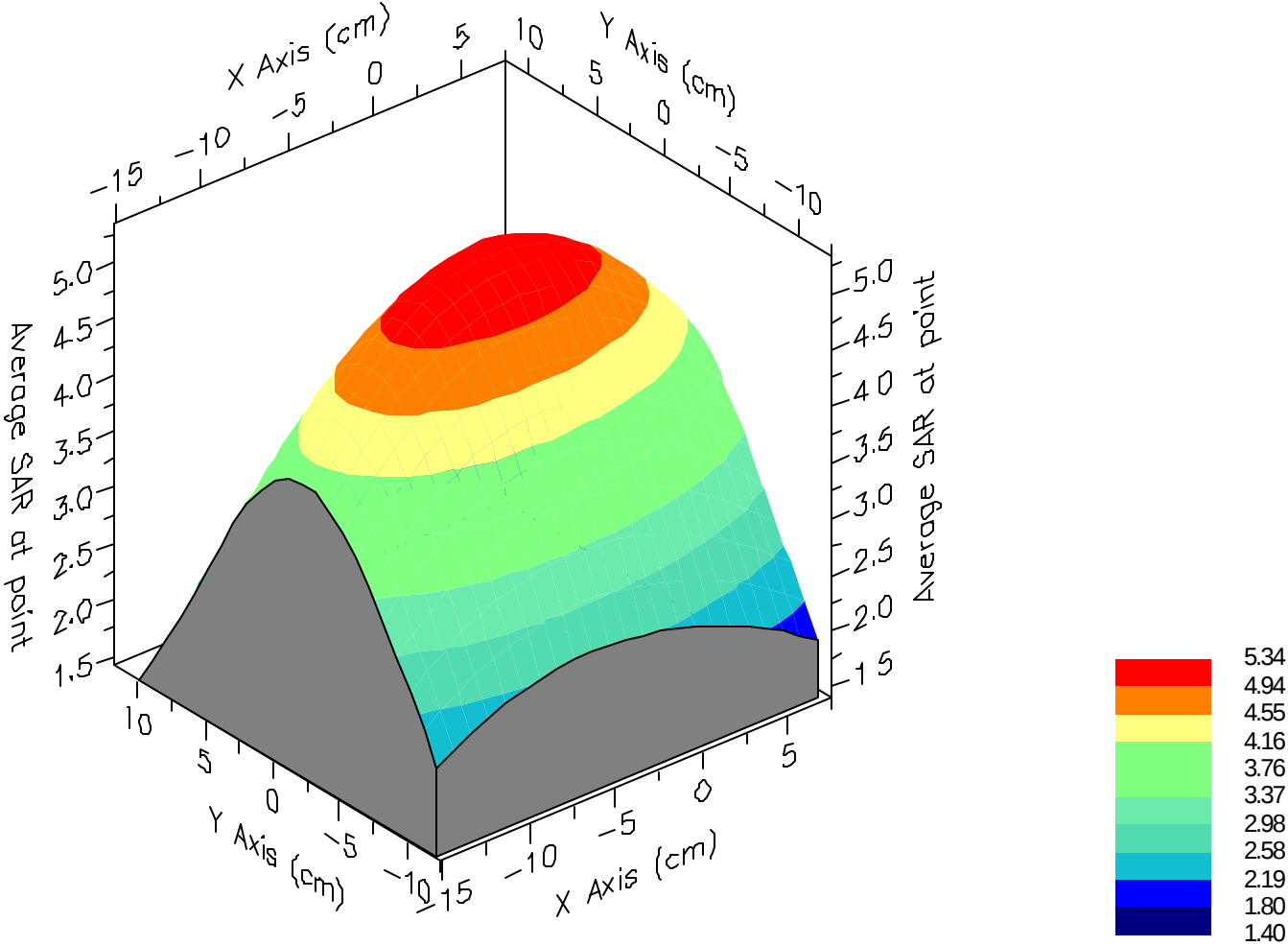
Validation Results at 0.10 W:

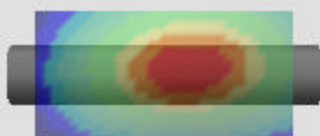
Peak Nominal = 10.4, Error: 3.25 %
1g Nominal = 5.2, Error: 1.87 %
10g Nominal = 2.4, Error: -1.61 %

SAR - Z Axis
at Hotspot x:-4.0 y:-2.0



1g SAR Values





APPENDIX C: PROBE CALIBRATION

Probe E-010

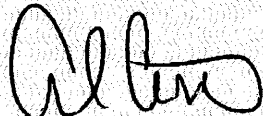
SN: PCT003

Manufactured:
Calibrated:

November 4, 2002
January 3, 2003

Calibrated for the IDX System

PCTEST Calibration Laboratory

Approved By: 
Alfred Cirwithian
Vice President Engineering

Calibration is performed according to IEEE Std. P1528-200X, Sec. 7 Draft 6.5 (2001)
and all test equipment used are traceable to U.S. NIST.



Calibration Laboratory

6660-B Dobbin Road
Columbia, Maryland 21045 USA

Calibration Summary

Model: E-010

S/N: PCT003

OFFSET (cm)	ANGLE (deg)
0.24	54.73

Tissue Type	Frequency (MHz)	Dielectric Constant ϵ_r	Conductivity (S/m) σ	Conversion Factor g_x, g_y, g_z
Brain	835	40.00	0.91	7.20
Brain	1880	40.20	1.41	4.05
Brain	2440	39.34	1.77	8.80
Brain	5300	37.10	4.84	3.20
Brain	5800	36.00	5.28	2.30
Muscle	835	55.70	0.98	7.70
Muscle	1900	53.90	1.48	4.40
Muscle	2440	52.30	1.99	9.90
Muscle	5300	48.80	5.43	3.45
Muscle	5800	48.50	6.05	2.50

Frequency (MHz)	Isotropy	
	%	dB
835	3.49	0.15
1880	5.35	0.23
2440	4.02	0.17
5300	4.85	0.21
5800	4.93	0.21

Boundary Effect < 2%, 2.6 mm from probe tip to phantom

Diode Compression Point: 76 mV

Environmental Conditions:

Temperature: 23.34 °C

Relative Humidity: 34%

Barometer: 100.1 kPa

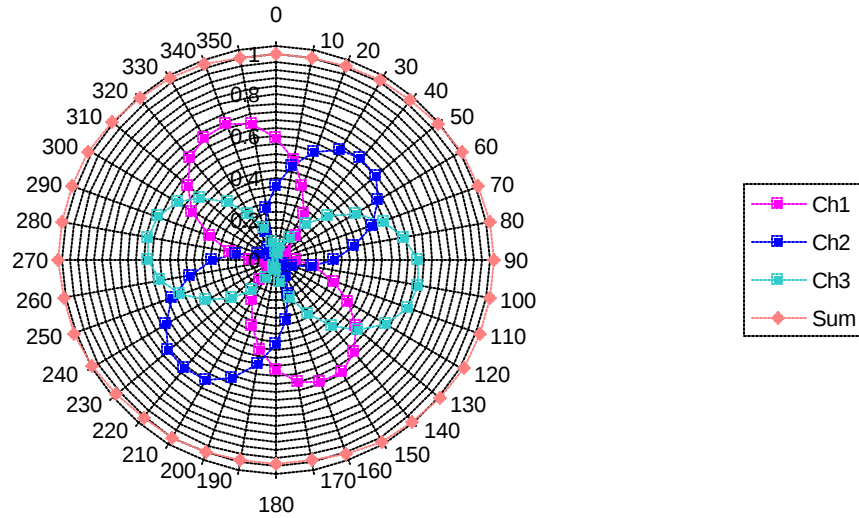
This probe was calibrated under the IEEE Std 1309-1966, *IEEE Standard for Calibration of Electromagnetic Field Sensors and Probes, Excluding Antennas*, from 9 kHz to 40 GHz.

CALIBRATED BY: DATE: 01/15/03

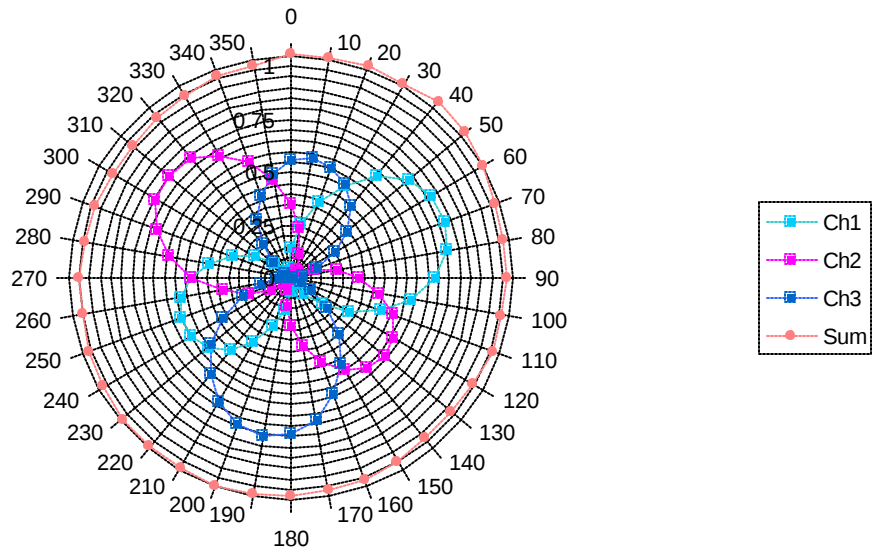
Calibration Laboratory

6660-B Dobbin Road
 Columbia, Maryland 21045 USA

835 MHz Calibration (PCT003)



1880 MHz Calibration (PCT003)

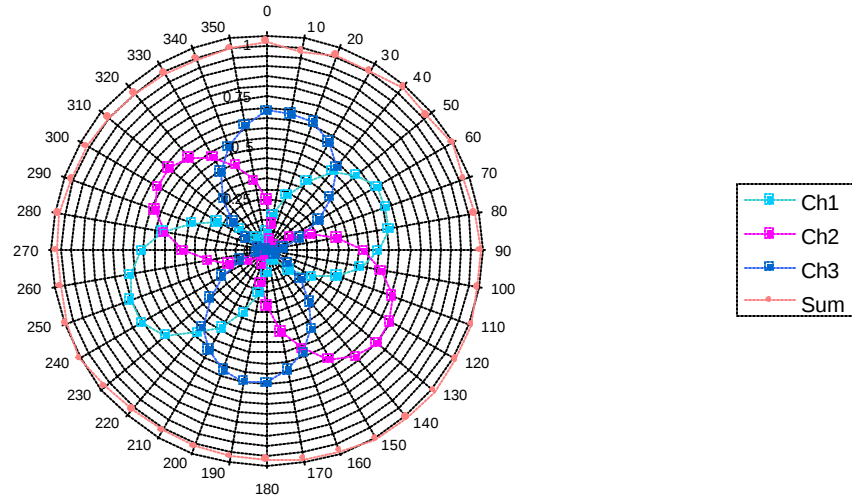


CALIBRATED BY: DATE: 01/15/03

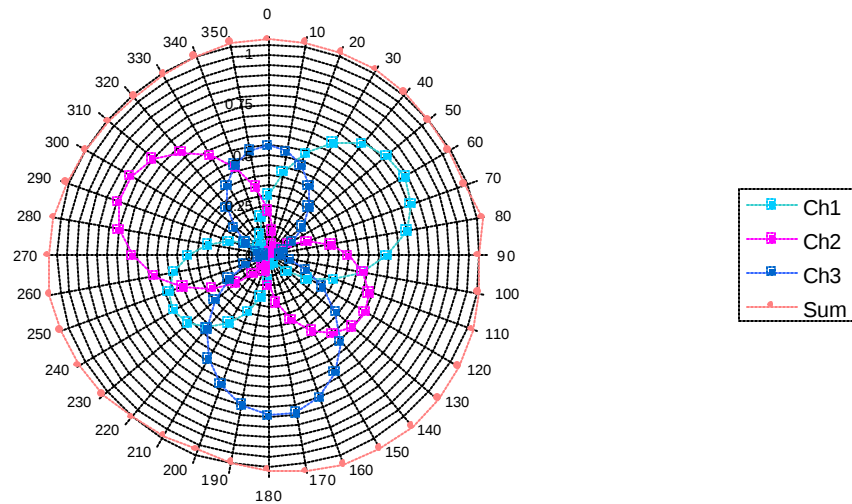
Calibration Laboratory

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 Columbia, Maryland 21045 USA

2440 MHz Calibration (PCT003)



5300 MHz Calibration (PCT003)

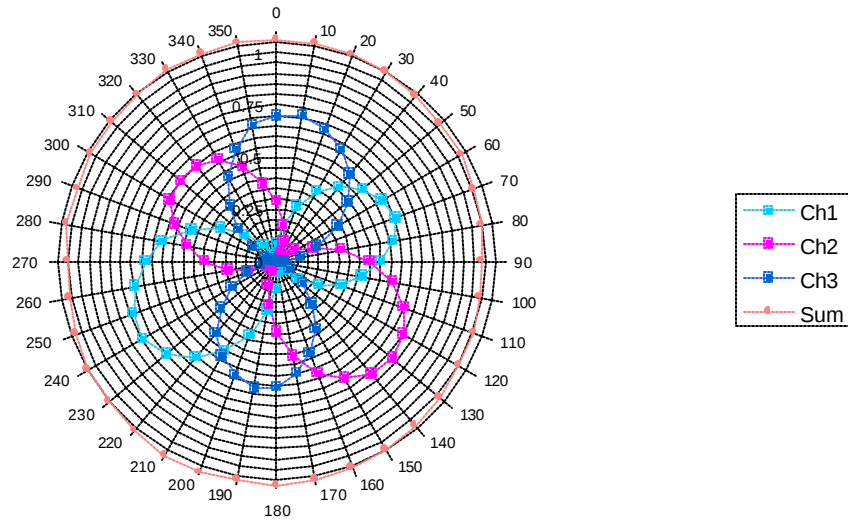


CALIBRATED BY: DATE: 01/15/03

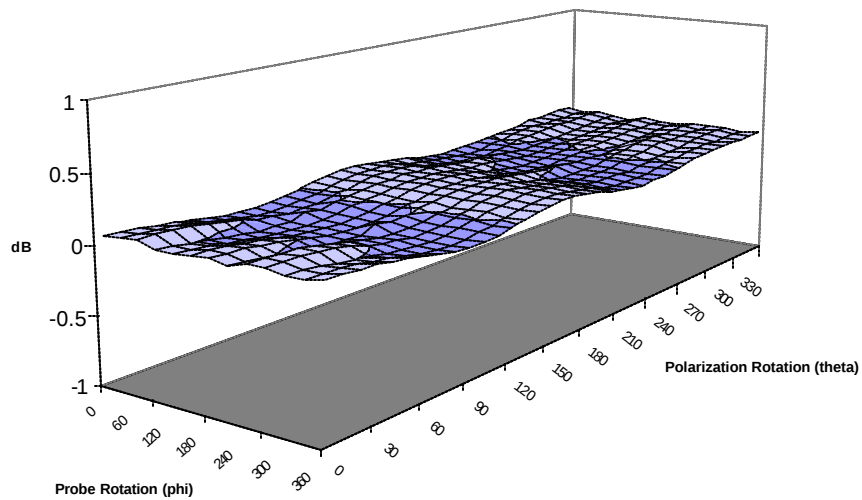
Calibration Laboratory

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 Columbia, Maryland 21045 USA

5800 MHz Calibration (PCT003)



Verification of Isotropy for PCT003



CALIBRATED BY: DATE: 01/15/03



Calibration Laboratory

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Columbia, Maryland 21045 USA

Test Equipment

The test equipment used during the probe calibration are listed as follows:

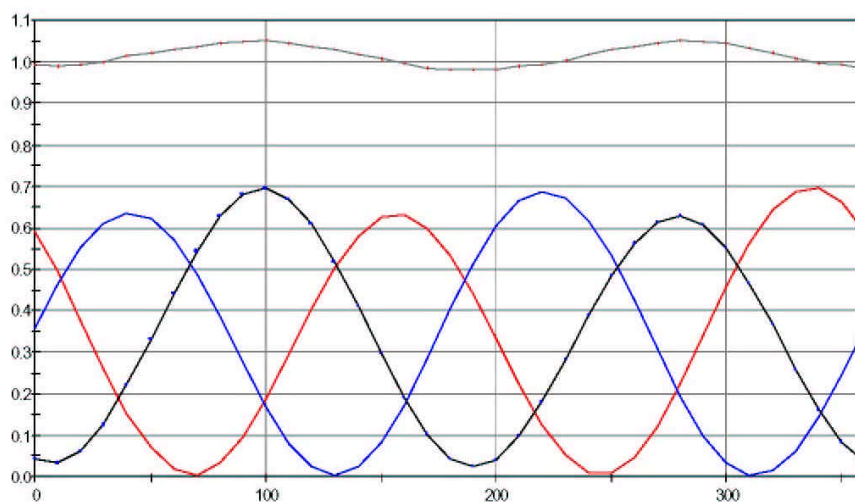
EQUIPMENT SPECIFICATIONS		
Type	Calibration Date	Asset Number/ Serial Number
CRS Robot F3	February 2002	RAF0134133
CRS C500C Motion Controller	February 2002	RCB0003303
CRS Teach Pendant (Joystick)	February 2002	STP0132231
DELL Computer, Pentium 4 1.6 GHz, Windows 2000™	February 2002	4PJZ111
E-Field Probe E-010	January 2003	PCT003
Flat SAM Phantom (P-SAM-FLAT)	February 2002	94X-097
IDX Robot End Effector (EE-103-C)	February 2002	07111223
IDX Probe Amplifier	February 2002	07111113
Validation Dipole D-835S	October 2002	PCT441
Validation Dipole D-1900S	October 2002	PCT541
Validation Dipole D-2450S	October 2002	PCT641
Validation Dipole D-5000S	November 2002	PCT741
HP-778D Dual-Directional Coupler (0.1 ~ 2.0 GHz)	November 2002	PCT664
MicroCircuits Directional Coupler (4.0 ~ 8.0 GHz)	November 2002	PE2204-6
Amplifier Research 5S1G4 Power Amp	January 2003	PCT540
IFI T184-10 Power Amplifier (4.0 ~ 18.0 GHz)	December 2002	5957
Agilent E8241A (250kHz ~ 20GHz) Signal Generator	November 2002	US42110432
HP-8648D (9kHz ~ 4 GHz) Signal Generator	January 2003	PCT526
HP-8753E (30kHz ~ 6GHz) Network Analyzer	January 2003	PCT552
HP85070B Dielectric Probe Kit	January 2003	PCT501
IFI CC110EXX TEM Cell (DC to 2000 MHz)	January 2003	PCT498
EMCO 3115 Horn Antenna (2.0 ~ 18.0 GHz)	August 2002	PCT496
Guidline 5150 Precision Dual-Thermometer	November 2002	66145

CALIBRATED BY: DATE: 01/15/03

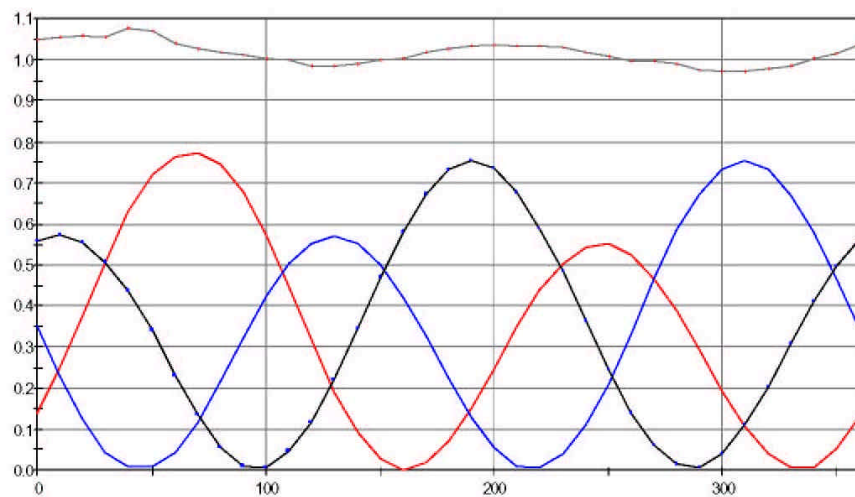
Calibration Laboratory

6660-B Dobbin Road
Columbia, Maryland 21045 USA

TEM Calibration Plot
Date: 3-Jan-03 05:19:17 pm
Probe Name: PCT003
Frequency: 835
Sensitivity: Ch1: 2.439 Ch2: 2.706 Ch3: 2.822 mV/(mW/cm²)
Isotropy: 3.49% 0.15 db Min=0.981 Max=1.051



TEM Calibration Plot
Date: 3-Jan-03 05:52:39 pm
Probe Name: PCT003
Frequency: 1880
Sensitivity: Ch1: 4.794 Ch2: 5.895 Ch3: 5.327 mV/(mW/cm²)
Isotropy: 5.35% 0.23 db Min=0.971 Max=1.078



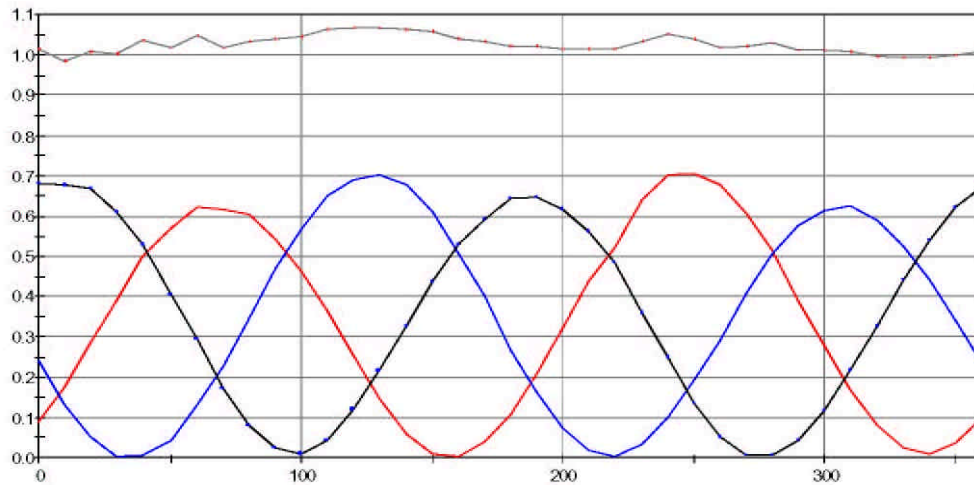
CALIBRATED BY: DATE: 01/15/03



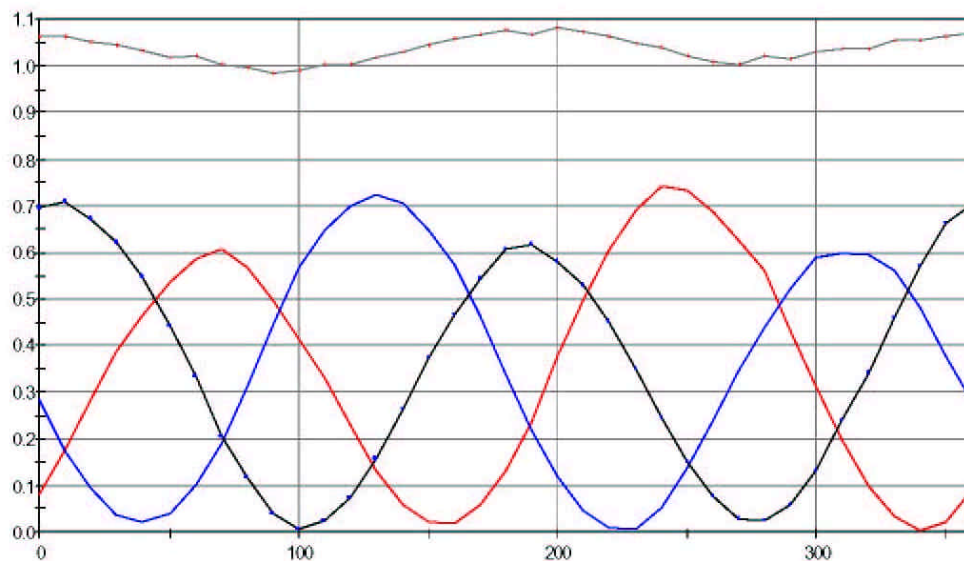
Calibration Laboratory

6660-B Dobbin Road
Columbia, Maryland 21045 USA

TEM Calibration Plot
Date: 3-Jan-03 10:10:11 am
Probe Name: PCT003
Frequency: 2440
Sensitivity: Ch1: 2.075 Ch2: 2.820 Ch3: 2.456 mV/(mW/cm²)
Isotropy: 4.02% 0.17 db Min=0.985 Max=1.066



TEM Calibration Plot
Date: 3-Jan-03 10:31:24 am
Probe Name: PCT003
Frequency: 5300
Sensitivity: Ch1: 1.939 Ch2: 2.177 Ch3: 2.062 mV/(mW/cm²)
Isotropy: 4.85% 0.21 db Min=0.984 Max=1.081



CALIBRATED BY: DATE: 01/15/03

