

**APPENDIX A: SAR TEST DATA**

SAR Data Report 05032812

Start : 28-Mar-05 02:55:14 pm  
End : 28-Mar-05 03:04:11 pm  
Code Version : 4.08  
Robot Version: 4.08

Product Data:

Type : SAMSUNG  
Model Number : SGH-E620  
Serial Number : 150214  
Frequency : 1850.20 MHz  
Transmit Pwr : 1.000 W  
Antenna Type : Helical  
Antenna Posn. : Internal

Measurement Data:

Phantom Name : SAM-RIGHT  
Phantom Type : Right Ear  
Tissue Type : Brain  
Tissue Dielectric : 41.050  
Tissue Conductivity : 1.410  
Tissue Density : 1.000  
Robot Name : CRS

Probe Data:

Probe Name : PCT005  
Probe Type : E Fld Triangle  
Frequency : 1900 MHz  
Tissue Type : Brain  
Calibrated Dielectric : 39.020  
Calibrated Conductivity : 1.370  
Calibrated Density : 1.000  
Probe Offset : 1.600 mm  
Conversion Factor : 5.400  
Probe Sensitivity : 5.115 4.969 4.453 mV/(mW/cm^2)  
Amplifier Gains : 20.00 20.00 20.00

Sample:

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

Comments:

PCS Mode CH-512  
Cheek  
CF=8; Amb. Temp= 22.2 'C; Liq. Temp=21.1 'C

Power Drop Test:

Reading @ start = 0.037  
Reading @ End = 0.038  
Power at End = 102.7%

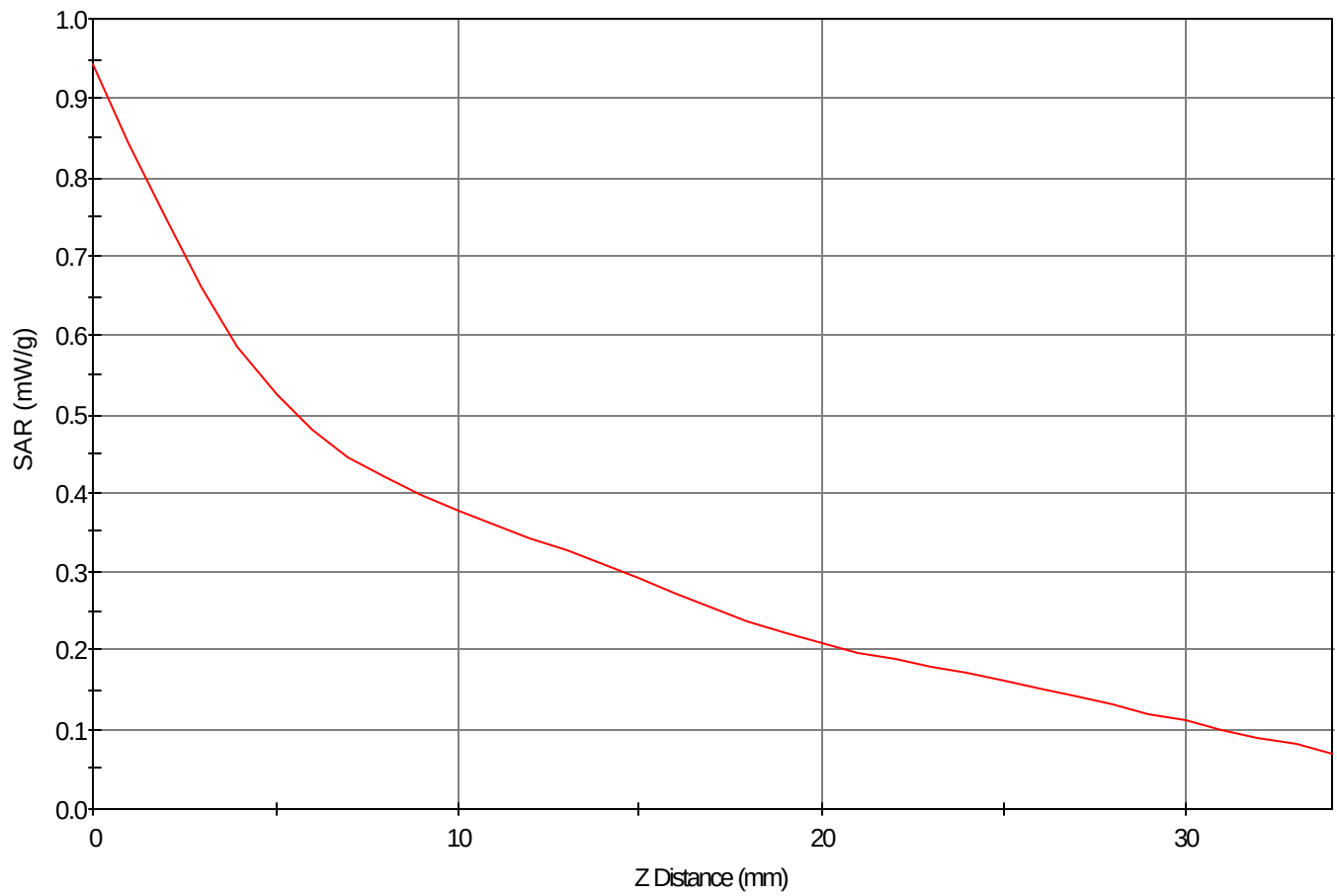
Area Scan - Max Peak SAR Value at x=88.0 y=5.0 = 0.60 W/kg

Zoom Scan - Max Peak SAR Value at x=86.0 y=6.0 z=0.0 = 0.94 W/kg

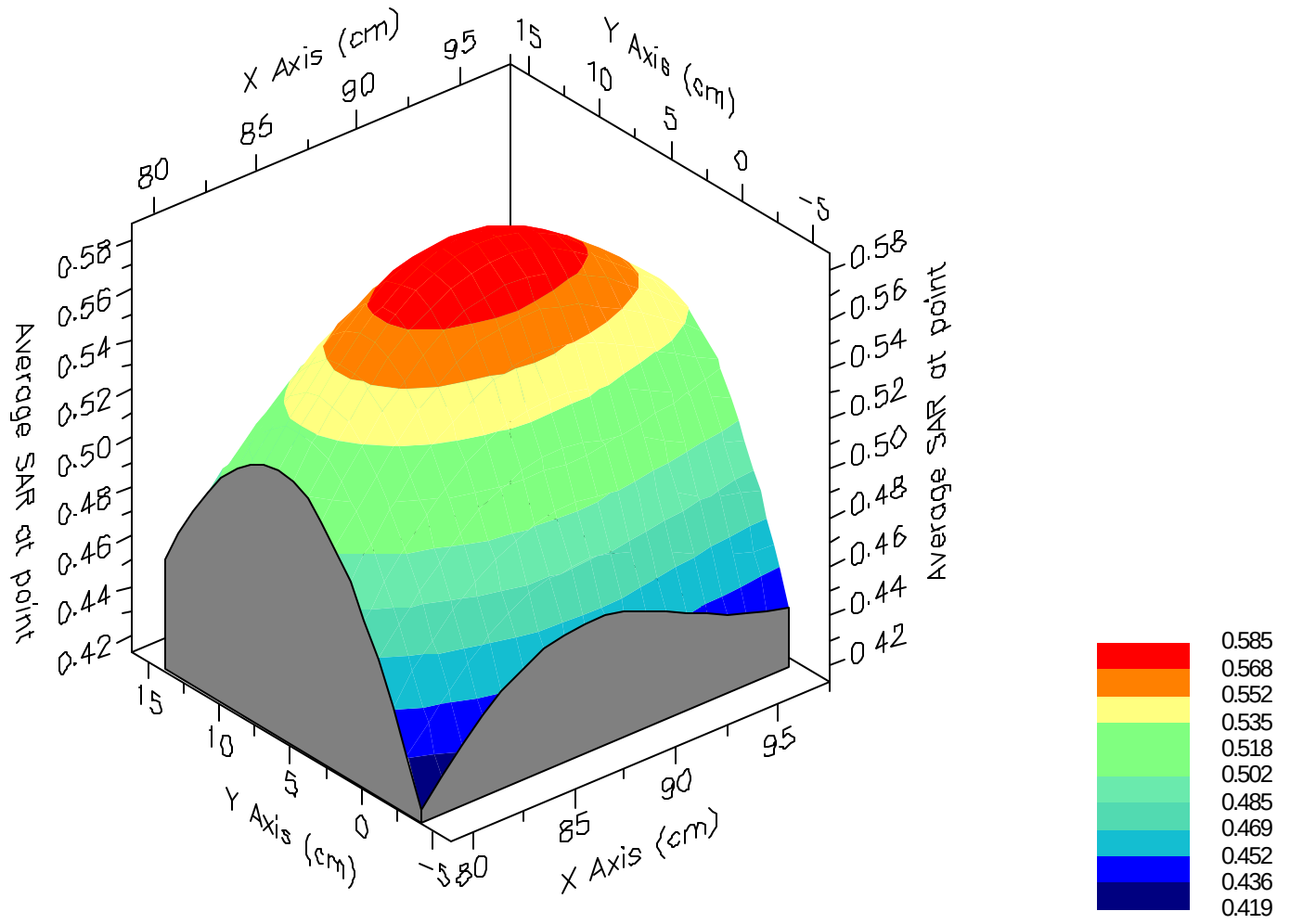
Max 1g SAR at x=88.0 y=5.0 z=0.0 = 0.58 W/kg

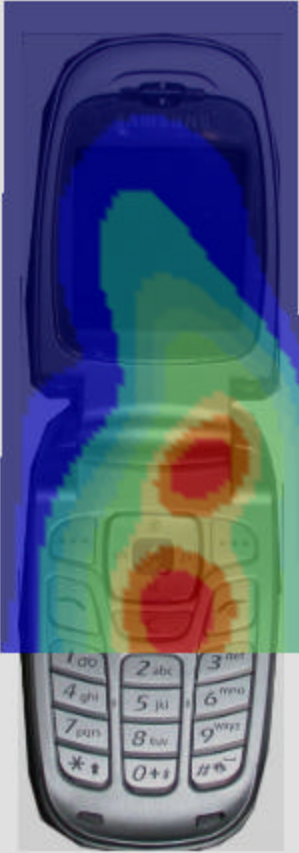
Max 10g SAR at x=91.0 y=6.0 z=0.0 = 0.37 W/kg

SAR - Z Axis  
at Hotspot x:86.0 y:6.0



1g SAR Values





SAR Data Report 05032814

Start : 28-Mar-05 03:19:38 am  
End : 28-Mar-05 03:25:52 am  
Code Version : 4.08  
Robot Version: 4.08

Product Data:

Type : SAMSUNG  
Model Number : SGH-E620  
Serial Number : 150214  
Frequency : 1880.00 MHz  
Transmit Pwr : 1.000 W  
Antenna Type : Helical  
Antenna Posn. : Internal

Measurement Data:

Phantom Name : SAM-RIGHT  
Phantom Type : Right Ear  
Tissue Type : Brain  
Tissue Dielectric : 41.050  
Tissue Conductivity : 1.410  
Tissue Density : 1.000  
Robot Name : CRS

Probe Data:

Probe Name : PCT005  
Probe Type : E Fld Triangle  
Frequency : 1900 MHz  
Tissue Type : Brain  
Calibrated Dielectric : 39.020  
Calibrated Conductivity : 1.370  
Calibrated Density : 1.000  
Probe Offset : 1.600 mm  
Conversion Factor : 5.400  
Probe Sensitivity : 5.115 4.969 4.453 mV/(mW/cm^2)  
Amplifier Gains : 20.00 20.00 20.00

Sample:

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

Comments:

PCS Mode CH-661  
Tilt  
CF=8; Amb. Temp= 22.2 'C; Liq. Temp=21.1 'C

Power Drop Test:

Reading @ start = 0.063  
Reading @ End = 0.061  
Power at End = 96.2%

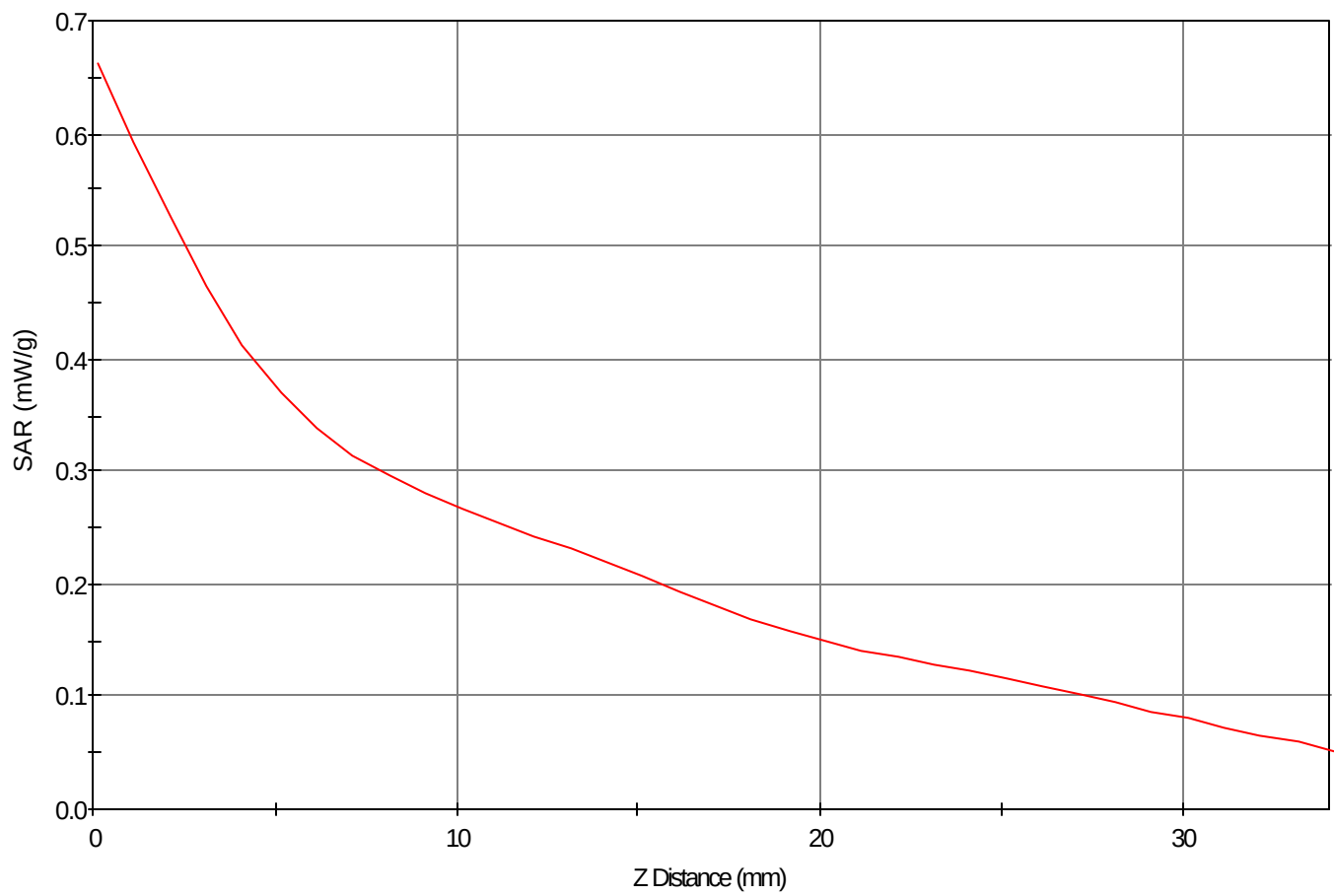
Area Scan - Max Peak SAR Value at x=13.0 y=-2.0 = 0.18 W/kg

Zoom Scan - Max Peak SAR Value at x=13.0 y=-9.0 z=0.0 = 0.67 W/kg

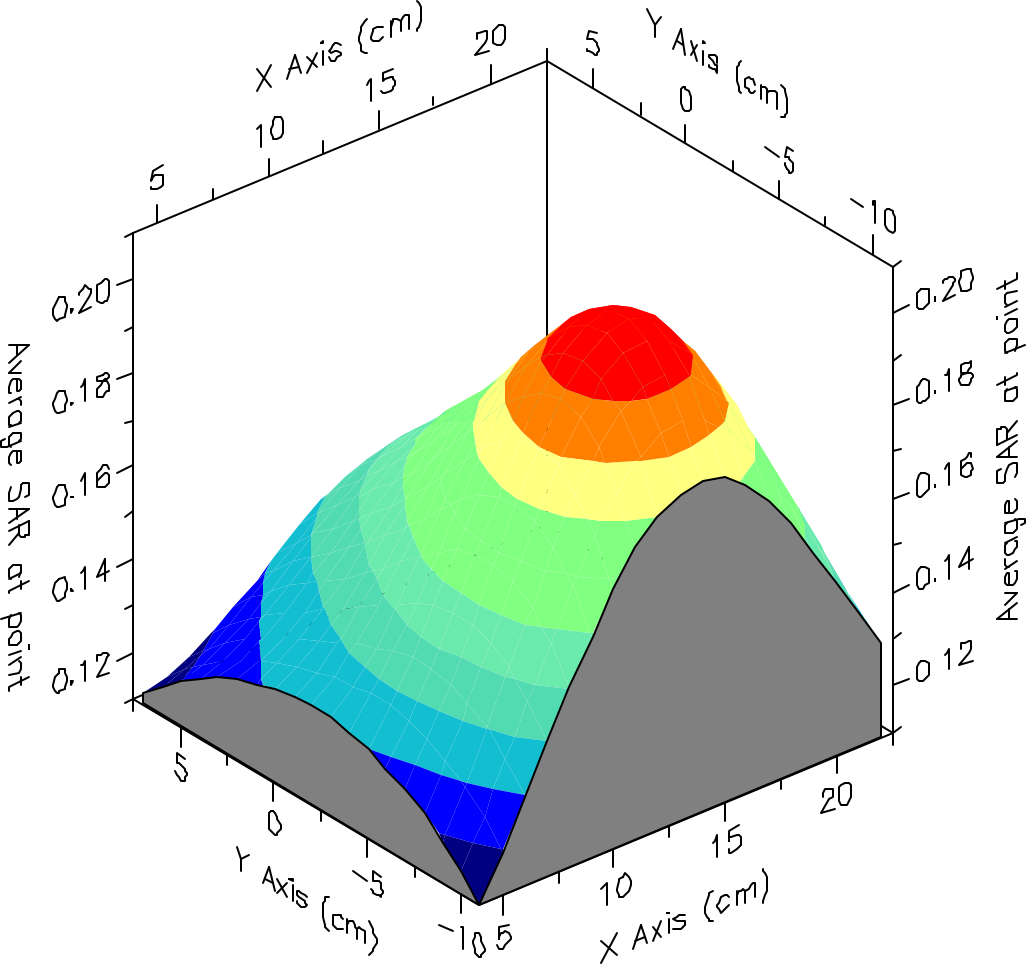
Max 1g SAR at x=14.0 y=-7.0 z=0.0 = 0.21 W/kg

Max 10g SAR at x=16.0 y=-2.0 z=0.0 = 0.10 W/kg

SAR - Z Axis  
at Hotspot x:13.0 y:-9.0



1g SAR Values





SAR Data Report 05032803

Start : 28-Mar-05 01:24:20 pm  
End : 28-Mar-05 01:30:30 pm  
Code Version : 4.08  
Robot Version: 4.08

Product Data:

Type : SAMSUNG  
Model Number : SGH-E620  
Serial Number : 150214  
Frequency : 1850.20 MHz  
Transmit Pwr : 1.000 W  
Antenna Type : Helical  
Antenna Posn. : Internal

Measurement Data:

Phantom Name : SAM-LEFT  
Phantom Type : Left Ear  
Tissue Type : Brain  
Tissue Dielectric : 41.050  
Tissue Conductivity : 1.410  
Tissue Density : 1.000  
Robot Name : CRS

Probe Data:

Probe Name : PCT005  
Probe Type : E Fld Triangle  
Frequency : 1900 MHz  
Tissue Type : Brain  
Calibrated Dielectric : 39.020  
Calibrated Conductivity : 1.370  
Calibrated Density : 1.000  
Probe Offset : 1.600 mm  
Conversion Factor : 5.400  
Probe Sensitivity : 5.115 4.969 4.453 mV/(mW/cm^2)  
Amplifier Gains : 20.00 20.00 20.00

Sample:

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

Comments:

PCS Mode CH-512  
Cheek  
CF=8; Amb. Temp= 22.2 'C; Liq. Temp=21.1 'C

Power Drop Test:

Reading @ start = 0.069  
Reading @ End = 0.070  
Power at End = 101.7%

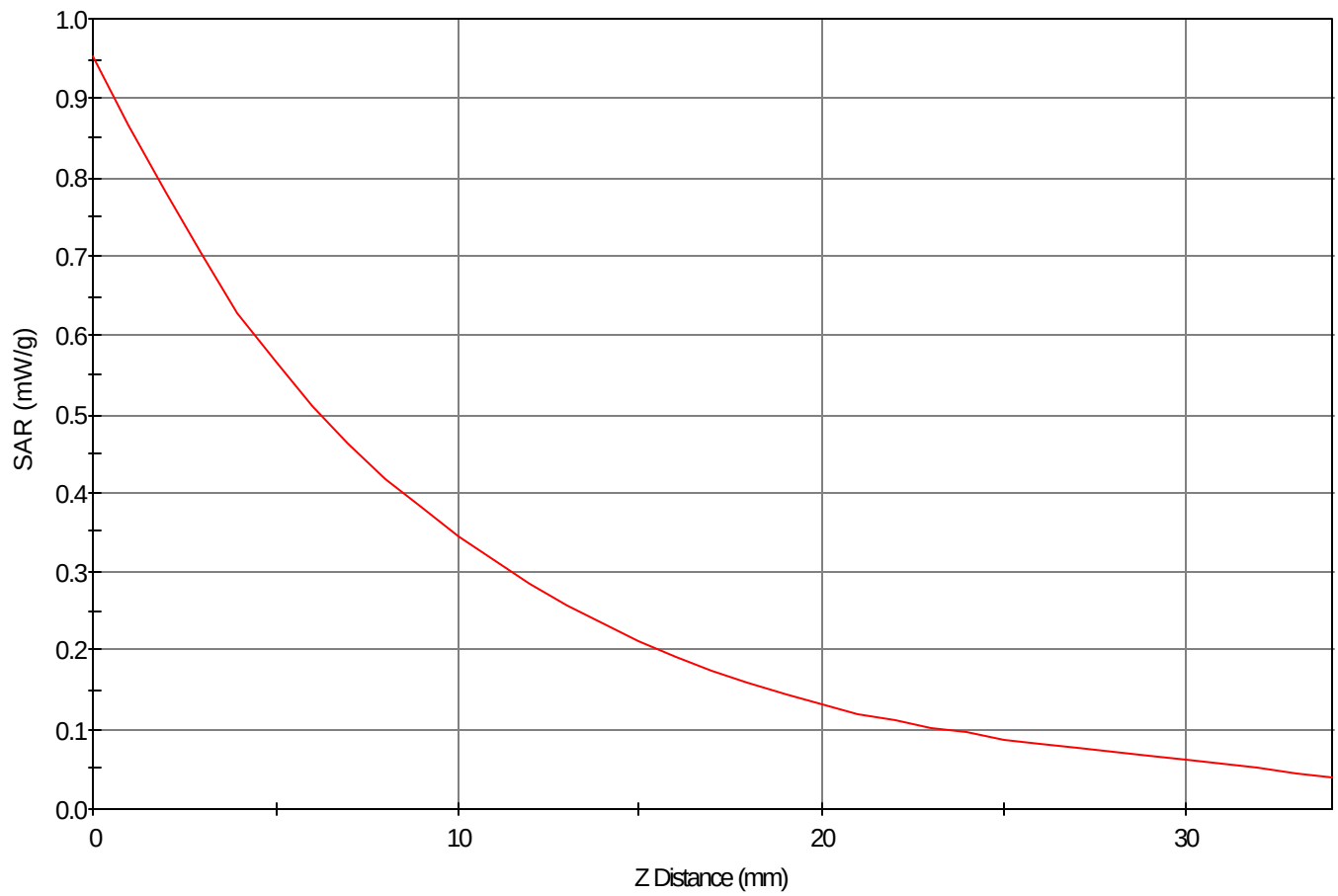
Area Scan - Max Peak SAR Value at x=66.0 y=4.0 = 0.66 W/kg

Zoom Scan - Max Peak SAR Value at x=66.0 y=7.0 z=0.0 = 0.95 W/kg

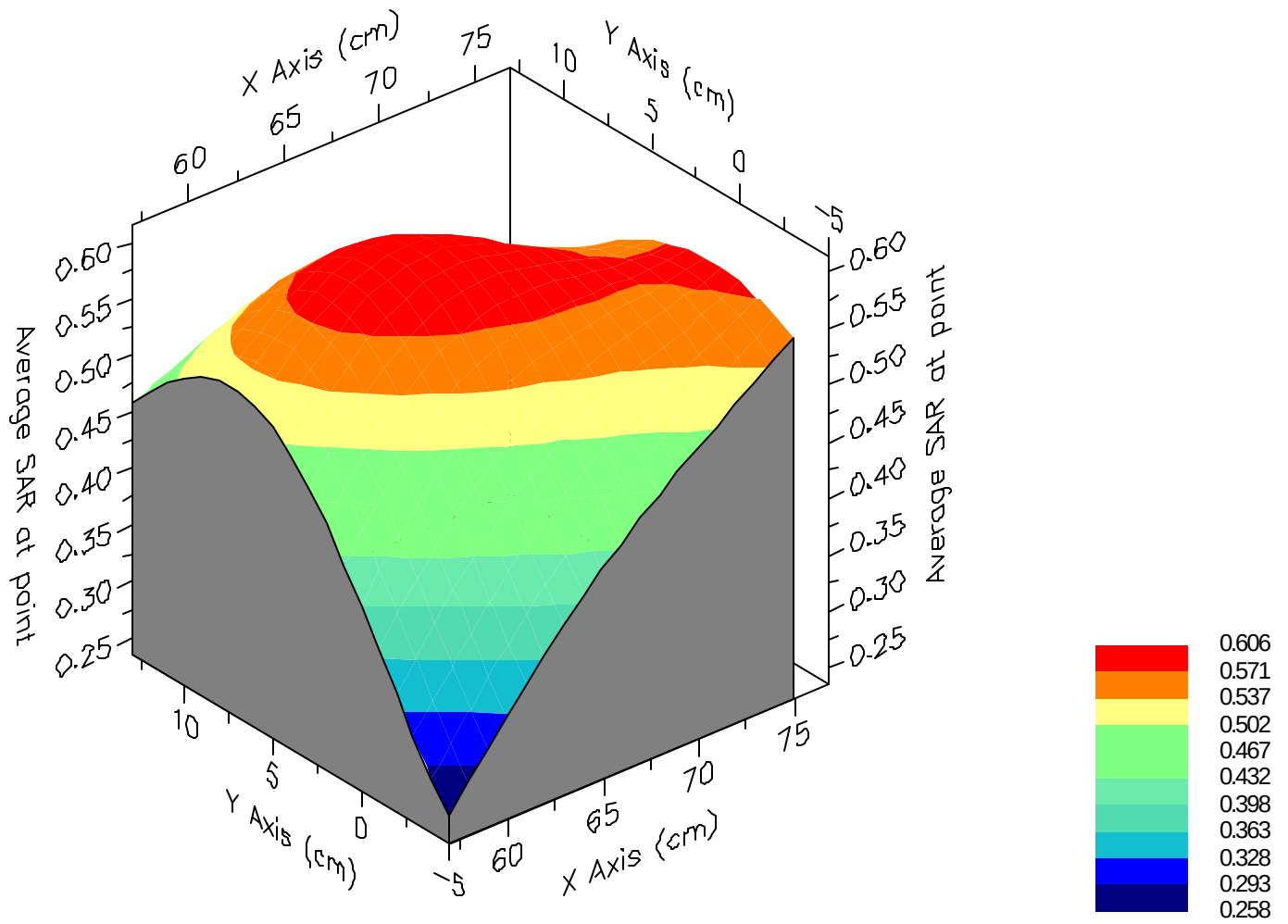
Max 1g SAR at x=65.0 y=6.0 z=0.0 = 0.61 W/kg

Max 10g SAR at x=69.0 y=3.0 z=0.0 = 0.36 W/kg

SAR - Z Axis  
at Hotspot x:66.0 y:7.0



1g SAR Values





SAR Data Report 05032806

Start : 28-Mar-05 01:55:25 pm  
End : 28-Mar-05 02:01:38 pm  
Code Version : 4.08  
Robot Version: 4.08

Product Data:

Type : SAMSUNG  
Model Number : SGH-E620  
Serial Number : 150214  
Frequency : 1850.20 MHz  
Transmit Pwr : 1.000 W  
Antenna Type : Helical  
Antenna Posn. : Internal

Measurement Data:

Phantom Name : SAM-LEFT  
Phantom Type : Left Ear  
Tissue Type : Brain  
Tissue Dielectric : 41.050  
Tissue Conductivity : 1.410  
Tissue Density : 1.000  
Robot Name : CRS

Probe Data:

Probe Name : PCT005  
Probe Type : E Fld Triangle  
Frequency : 1900 MHz  
Tissue Type : Brain  
Calibrated Dielectric : 39.020  
Calibrated Conductivity : 1.370  
Calibrated Density : 1.000  
Probe Offset : 1.600 mm  
Conversion Factor : 5.400  
Probe Sensitivity : 5.115 4.969 4.453 mV/(mW/cm^2)  
Amplifier Gains : 20.00 20.00 20.00

Sample:

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

Comments:

PCS Mode CH-512  
Tilt  
CF=8; Amb. Temp= 22.2 'C; Liq. Temp=21.1 'C

Power Drop Test:

Reading @ start = 0.184  
Reading @ End = 0.181  
Power at End = 98.4%

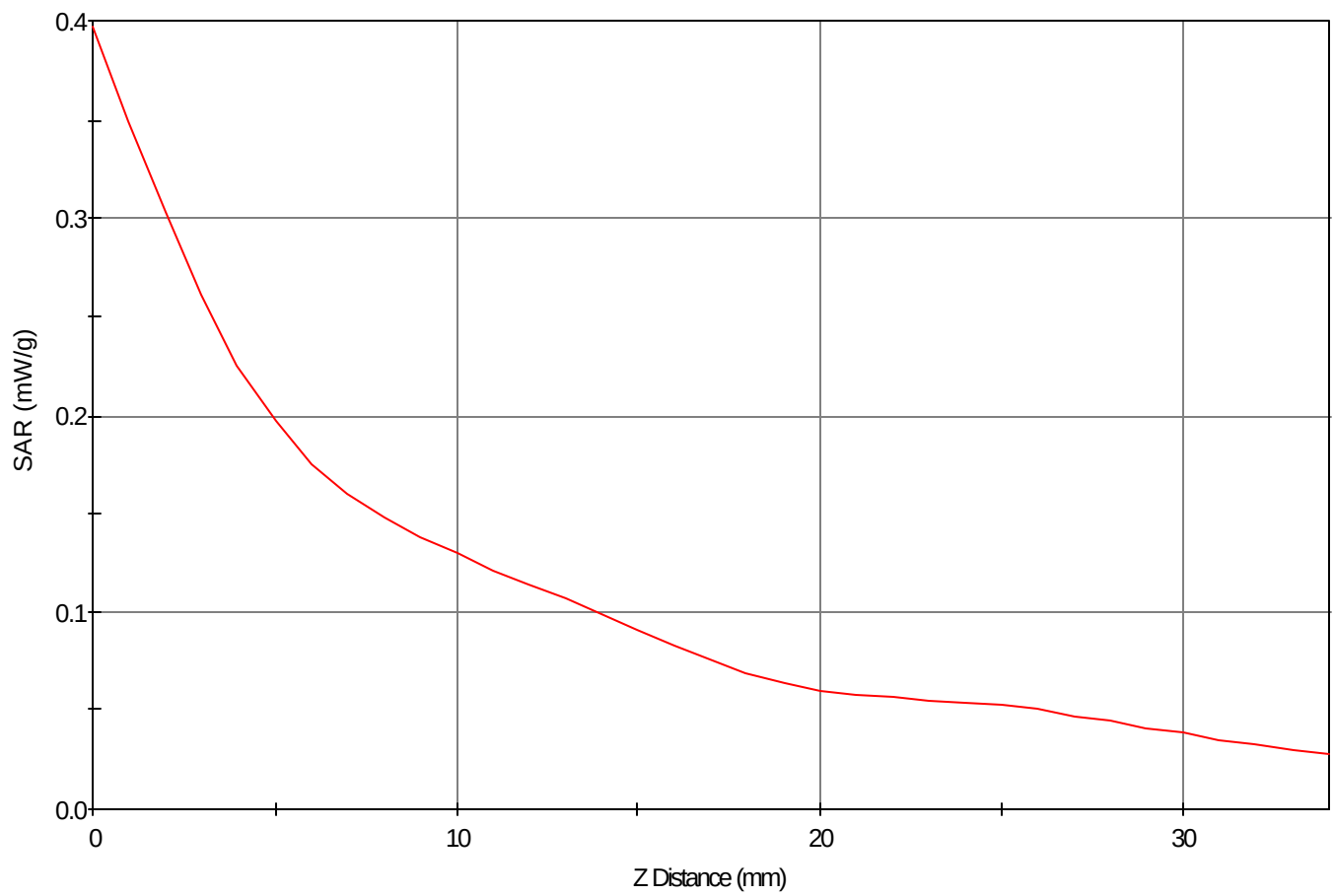
Area Scan - Max Peak SAR Value at x=9.0 y=8.0 = 0.27 W/kg

Zoom Scan - Max Peak SAR Value at x=23.0 y=13.0 z=0.0 = 0.40 W/kg

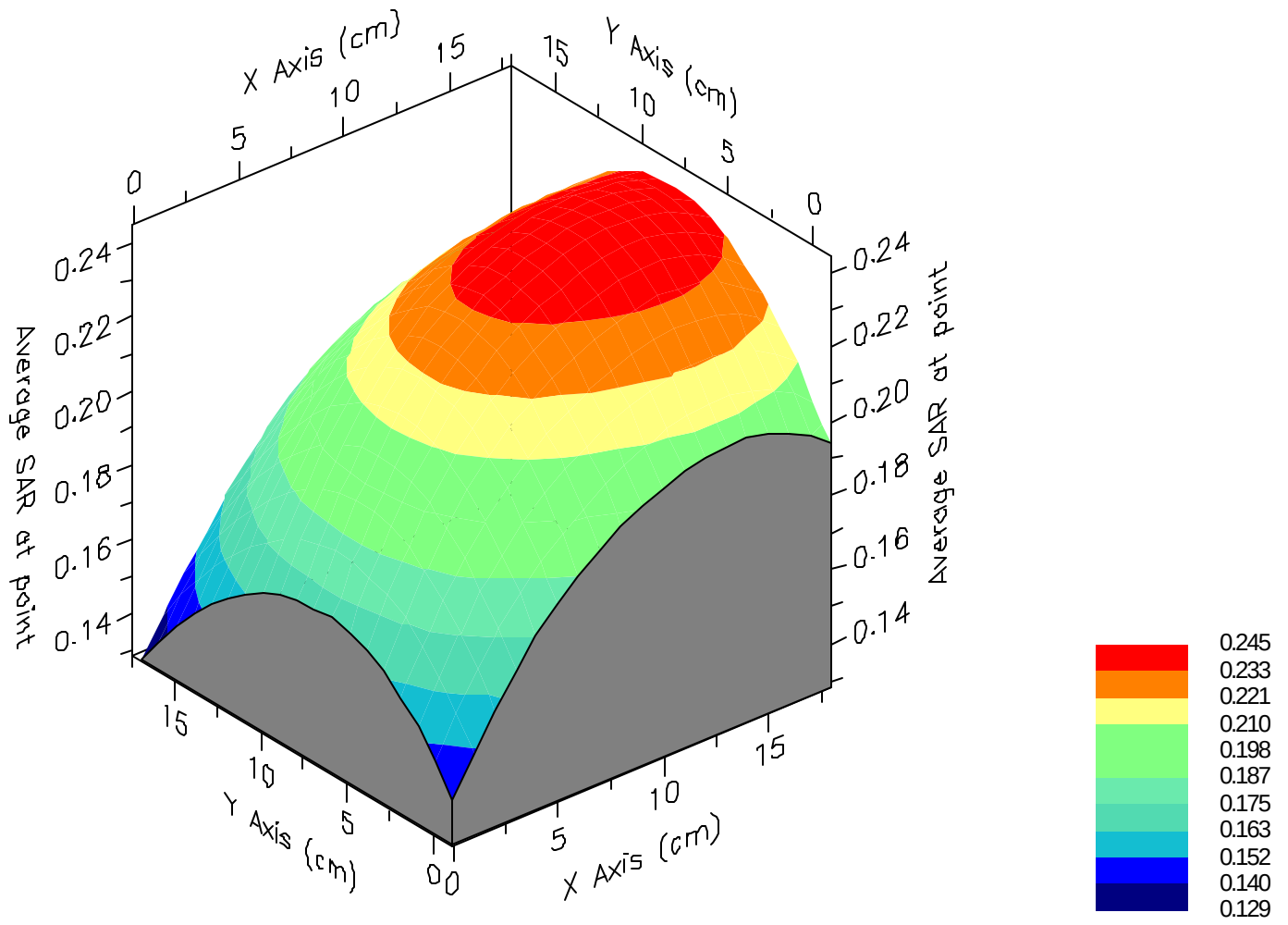
Max 1g SAR at x=14.0 y=7.0 z=0.0 = 0.24 W/kg

Max 10g SAR at x=12.0 y=8.0 z=0.0 = 0.14 W/kg

SAR - Z Axis  
at Hotspot x:23.0 y:13.0



1g SAR Values





SAR Data Report 05032822

Start : 28-Mar-05 7:42:09 pm  
End : 28-Mar-05 7:48:20 pm  
Code Version : 4.08  
Robot Version: 4.08

Product Data:

Type : SAMSUNG  
Model Number : SGH-E620  
Serial Number : 150214  
Frequency : 1880.00 MHz  
Transmit Pwr : 1.000 W  
Antenna Type : Helical  
Antenna Posn. : Internal

Measurement Data:

Phantom Name : SAM FLAT  
Phantom Type : Uniphantom  
Tissue Type : Muscle  
Tissue Dielectric : 53.880  
Tissue Conductivity : 1.510  
Tissue Density : 1.000  
Robot Name : CRS

Probe Data:

Probe Name : PCT005  
Probe Type : E Fld Triangle  
Frequency : 1900 MHz  
Tissue Type : Muscle  
Calibrated Dielectric : 51.810  
Calibrated Conductivity : 1.580  
Calibrated Density : 1.000  
Probe Offset : 1.600 mm  
Conversion Factor : 5.500  
Probe Sensitivity : 5.115 4.969 4.453 mV/(mW/cm^2)  
Amplifier Gains : 20.00 20.00 20.00

Sample:

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

Comments:

GPRS Mode CH-661  
Body  
CF=4; Amb. Temp= 22.2 'C; Liq. Temp=21.1 'C

Power Drop Test:

Reading @ start = 0.189  
Reading @ End = 0.189  
Power at End = 100.0%

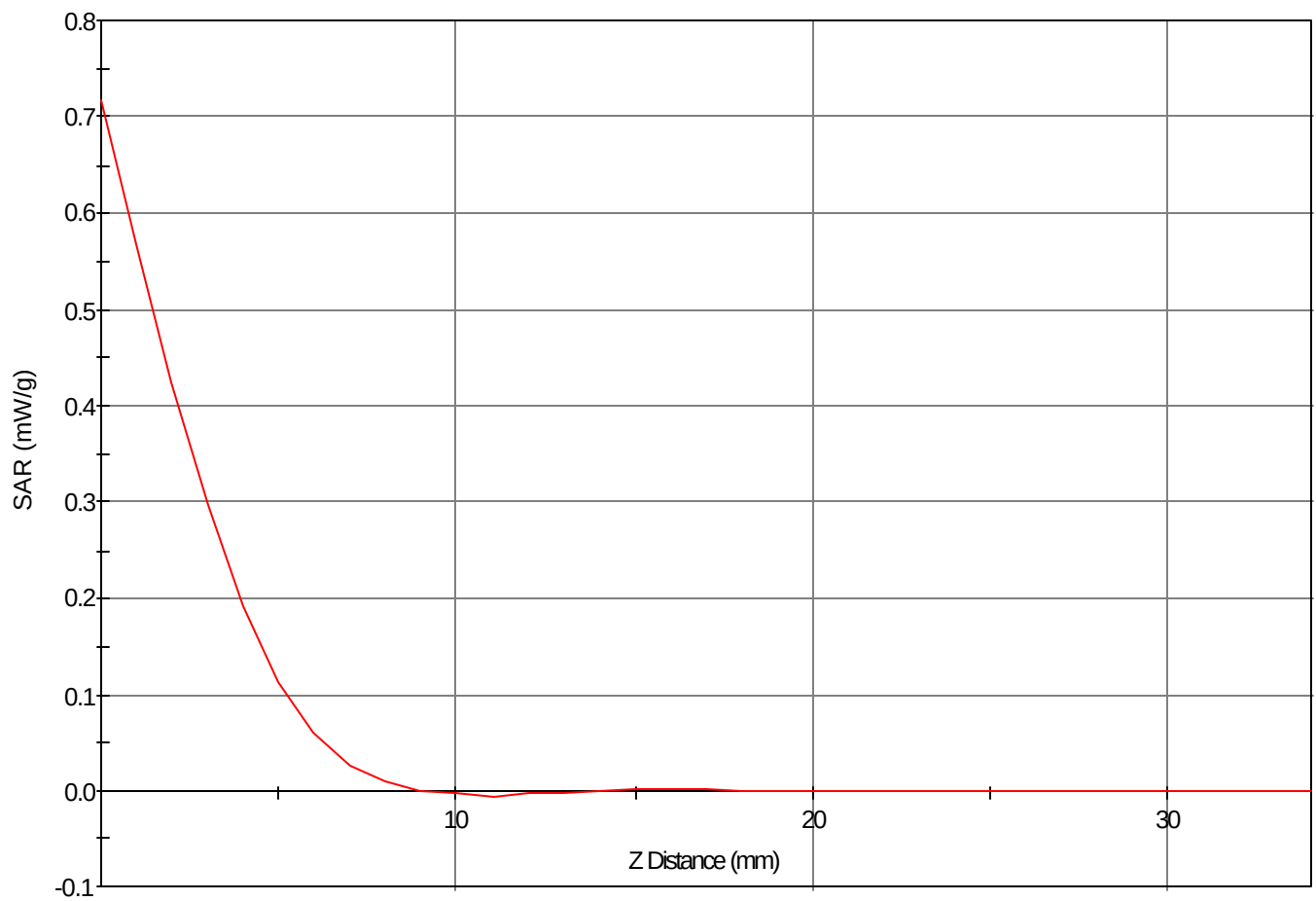
Area Scan - Max Peak SAR Value at x=-2.0 y=15.0 = 0.17 W/kg

Zoom Scan - Max Peak SAR Value at x=-4.0 y=17.0 z=0.0 = 0.72 W/kg

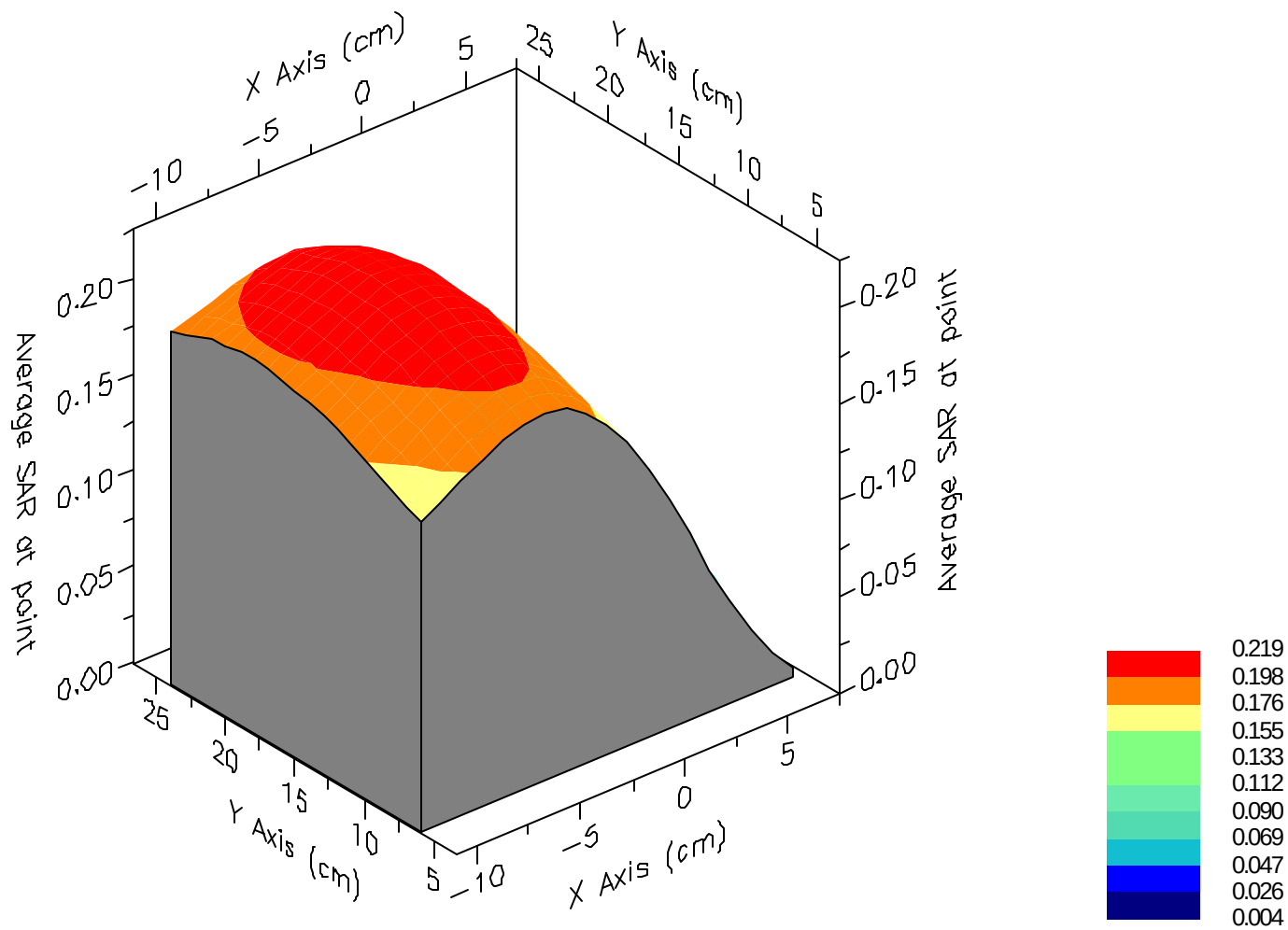
Max 1g SAR at x=-5.0 y=17.0 z=0.0 = 0.22 W/kg

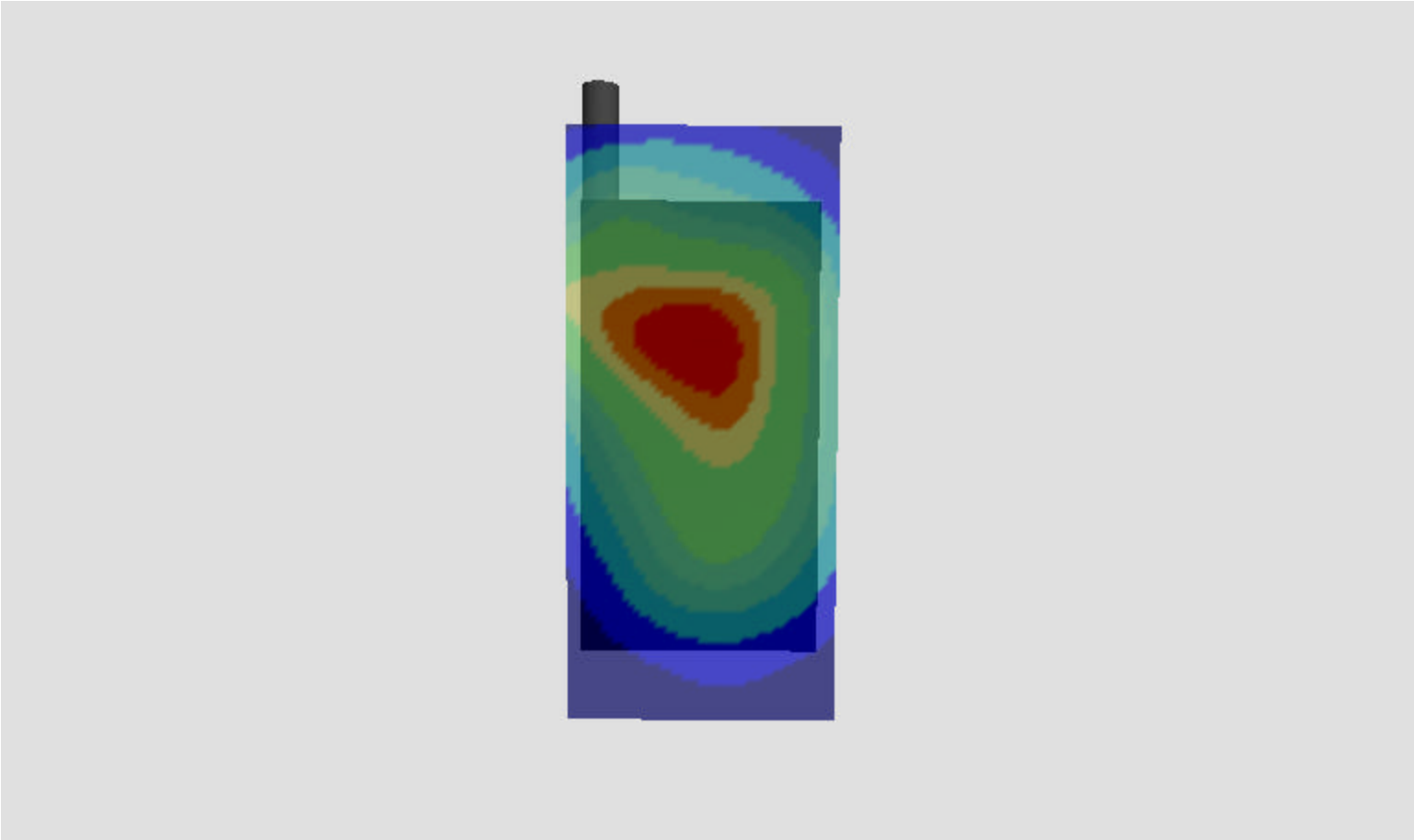
Max 10g SAR at x=-5.0 y=16.0 z=0.0 = 0.07 W/kg

SAR - Z Axis  
at Hotspot x:-4.0 y:17.0



1g SAR Values





## **APPENDIX B: DIPOLE VALIDATION**

SAR Data Report 05032801

Start : 28-Mar-05 09:54:41 am  
End : 28-Mar-05 10:01:35 am  
Code Version : 4.08  
Robot Version: 4.08

Product Data:

Type : Verification  
Model Number : E-020  
Serial Number : PCT003  
Frequency : 1900 MHz  
Transmit Pwr : 0.040 W  
Antenna Type : Dipole  
Antenna Posn. : Verification

Measurement Data:

Phantom Name : SAM-FLAT2  
Phantom Type : Uniphantom  
Tissue Type : Brain  
Tissue Dielectric : 41.050  
Tissue Conductivity : 1.410  
Tissue Density : 1.000  
Robot Name : CRS

Probe Data:

Probe Name : PCT005  
Probe Type : E Fld Triangle  
Frequency : 1900 MHz  
Tissue Type : Brain  
Calibrated Dielectric : 39.020  
Calibrated Conductivity : 1.370  
Calibrated Density : 1.000  
Probe Offset : 1.600 mm  
Conversion Factor : 5.400  
Probe Sensitivity : 5.115 4.969 4.453 mV/(mW/cm^2)  
Amplifier Gains : 20.00 20.00 20.00

Sample:

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

Comments:

1900MHz Verification

CF=1; Amb. Temp= 22.2 'C; Liq. Temp=21.1 'C

Power Drop Test:

Reading @ start = 1.546  
Reading @ End = 1.562  
Power at End = 101.0%

Area Scan - Max Peak SAR Value at x=-3.0 y=-1.0 = 1.76 W/kg

Zoom Scan - Max Peak SAR Value at x=-2.0 y=-1.0 z=0.0 = 3.17 W/kg

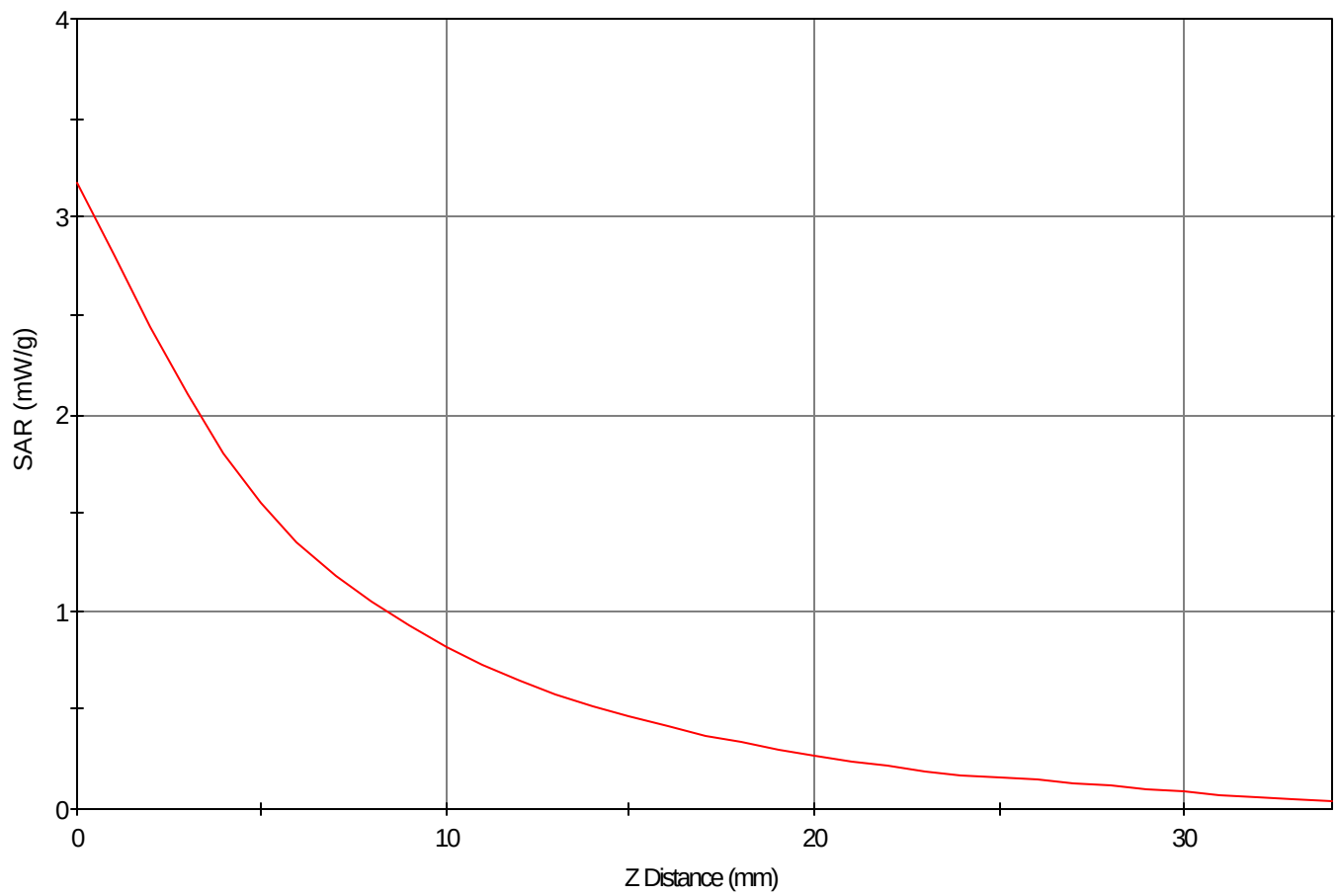
Max 1g SAR at x=-2.0 y=0.0 z=0.0 = 1.70 W/kg

Max 10g SAR at x=-2.0 y=-1.0 z=0.0 = 0.82 W/kg

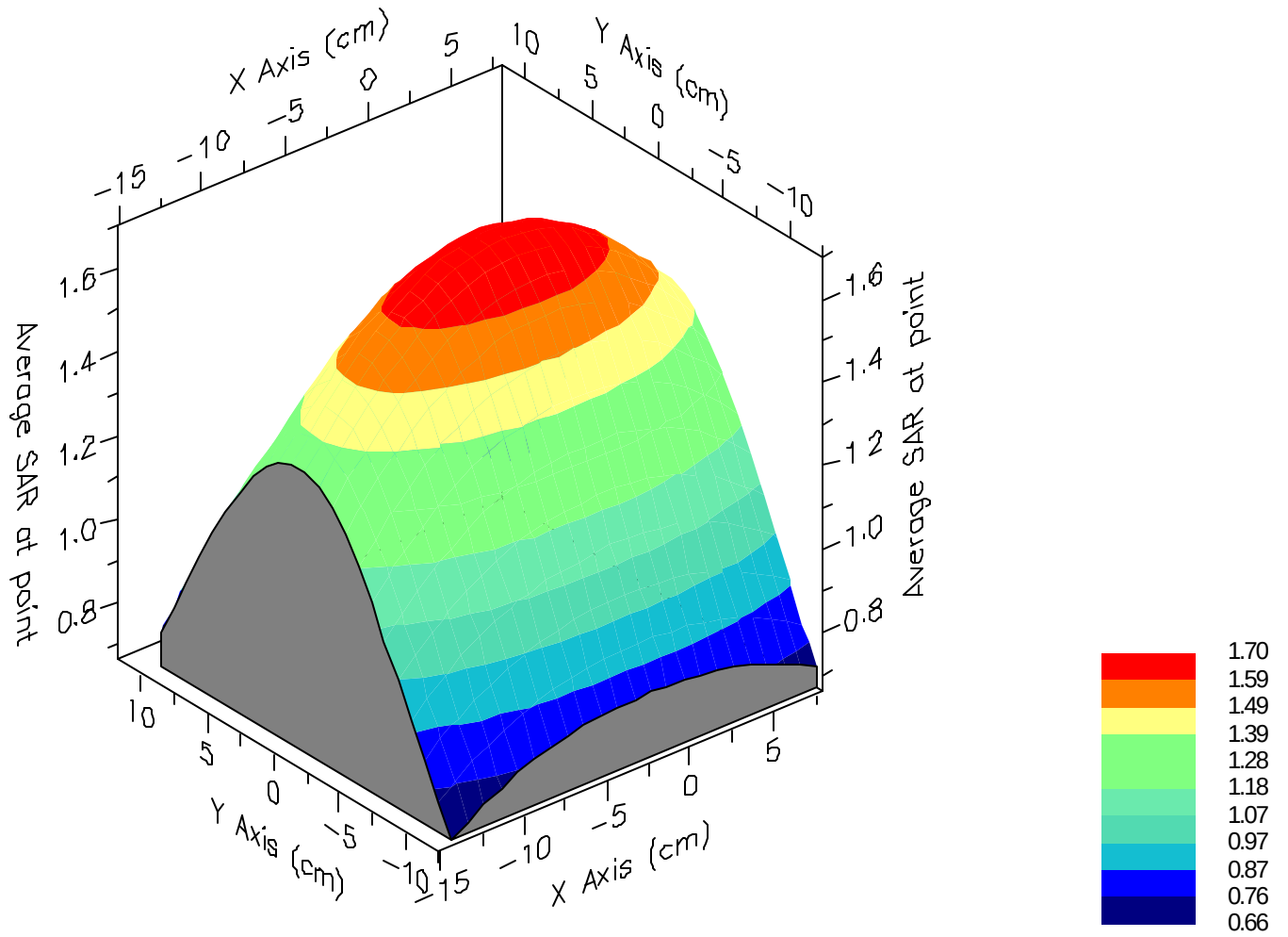
Validation Results at 0.04 W:

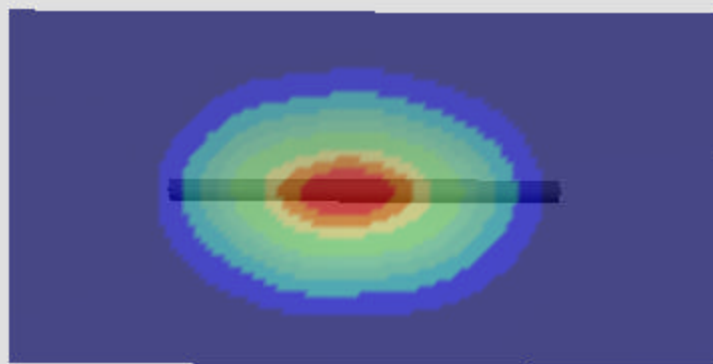
Peak Nominal = 2.9, Error: 9.91 %  
1g Nominal = 1.6, Error: 6.90 %

SAR - Z Axis  
at Hotspot x:-2.0 y:-1.0

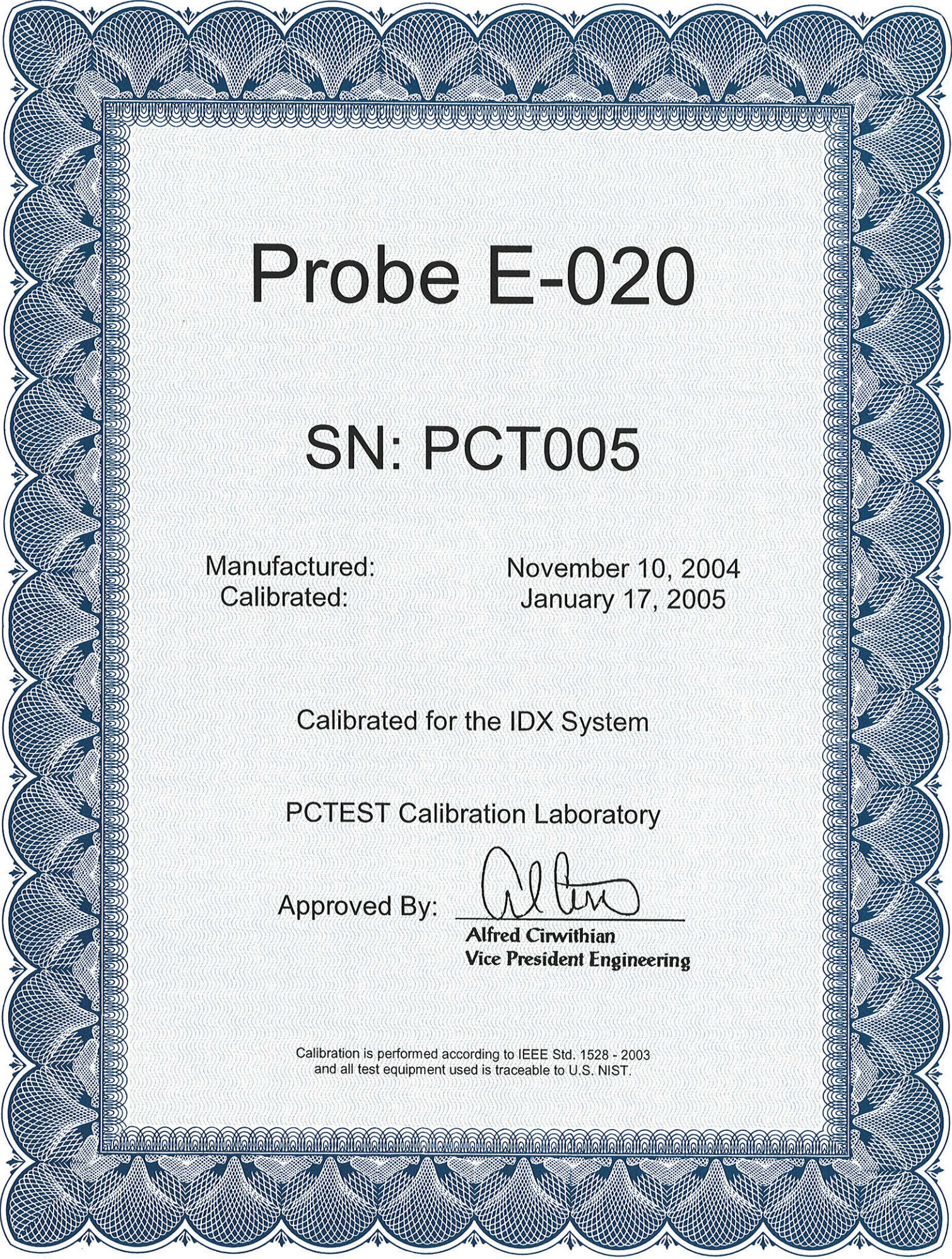


1g SAR Values





## **APPENDIX C: PROBE CALIBRATION**



# Probe E-020

## SN: PCT005

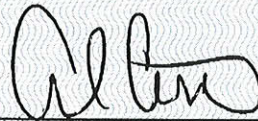
Manufactured:  
Calibrated:

November 10, 2004  
January 17, 2005

Calibrated for the IDX System

PCTEST Calibration Laboratory

Approved By:



**Alfred Cirwithian**  
**Vice President Engineering**

Calibration is performed according to IEEE Std. 1528 - 2003  
and all test equipment used is traceable to U.S. NIST.

## PCTEST Calibration Laboratory

6660-B Dobbin Road  
Columbia, Maryland 21045 USA

### Calibration Summary

Model: E-020

S/N: PCT005

| Tissue Type | Frequency (MHz) | Dielectric Constant<br>$\epsilon_r$ | Conductivity (S/m)<br>$\sigma$ | Conversion Factor<br>$\gamma_x, \gamma_y, \gamma_z$ |
|-------------|-----------------|-------------------------------------|--------------------------------|-----------------------------------------------------|
| Brain       | 450             | 44.41                               | 0.88                           | 8.8                                                 |
| Brain       | 835             | 40.81                               | 0.87                           | 5.5                                                 |
| Brain       | 1900            | 39.02                               | 1.37                           | 5.4                                                 |
| Brain       | 2100            | 41.11                               | 1.39                           | 5.25                                                |
| Muscle      | 450             | 57.70                               | 0.96                           | 9.24                                                |
| Muscle      | 835             | 53.66                               | 0.98                           | 5.85                                                |
| Muscle      | 1900            | 51.81                               | 1.58                           | 5.5                                                 |
| Muscle      | 2100            | 52.23                               | 1.53                           | 5.3                                                 |

| Frequency (MHz) | Isotropy |      |
|-----------------|----------|------|
|                 | %        | dB   |
| 450             | 1.23     | 0.05 |
| 835             | 2.12     | 0.09 |
| 1900            | 6.61     | 0.28 |
| 2100            | 7.61     | 0.32 |

**Boundary Effect** < 2%, 2.5 mm from probe tip to phantom

**Diode Compression Point:** 120 mV

#### Environmental Conditions:

Temperature: 22.6 °C

Relative Humidity: 41%

Barometer: 101.2 kPa

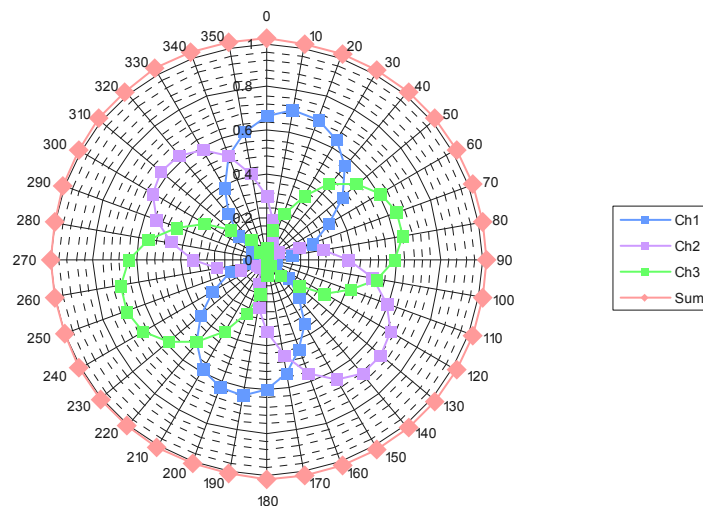
----- .

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.

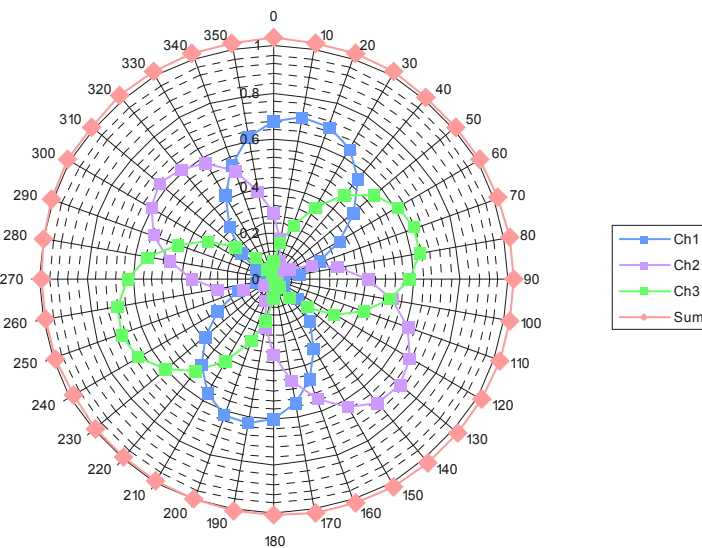
# PCTEST Calibration Laboratory

6660-B Dobbin Road  
Columbia, Maryland 21045 USA

**450 MHz Calibration (PCT005)**



**835 MHz Calibration (PCT005)**

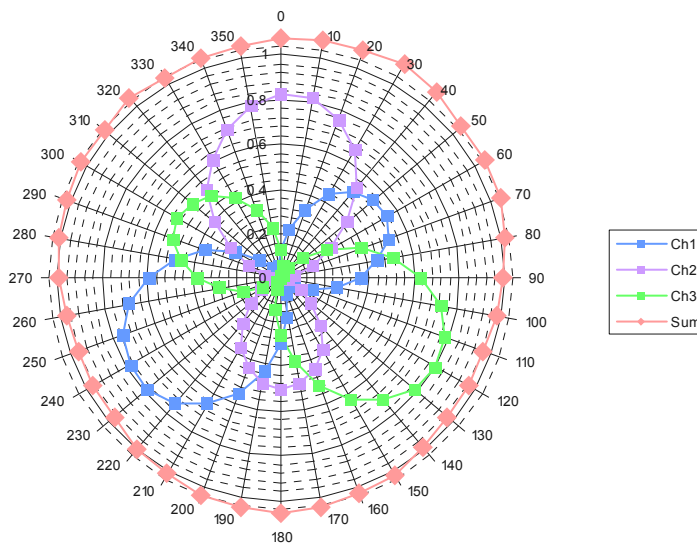


# PCTEST Calibration Laboratory

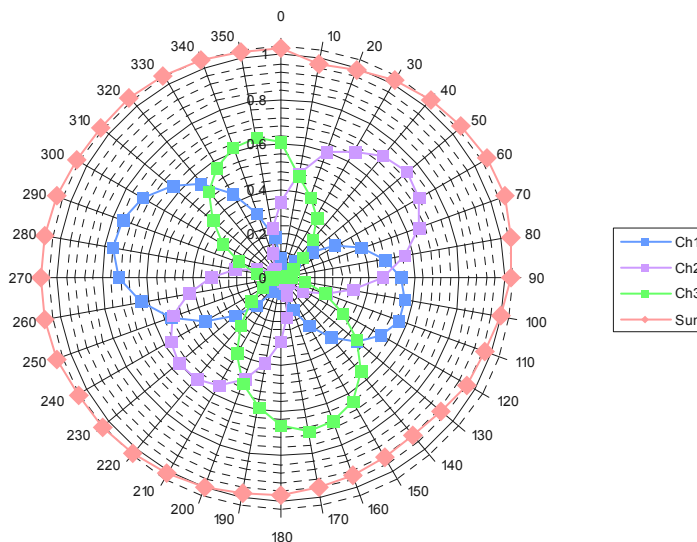
6660-B Dobbin Road

Columbia, Maryland 21045 USA

**1900 MHz Calibration (PCT005)**

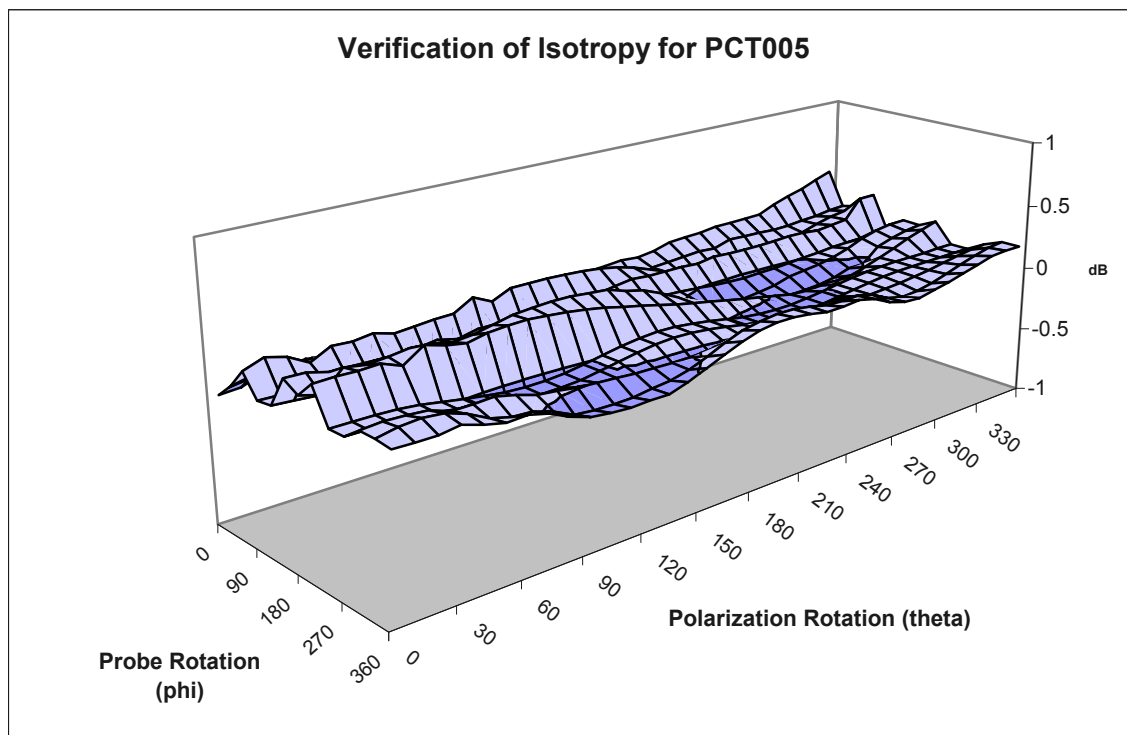


**2100 MHz Calibration (PCT005)**



## PCTEST Calibration Laboratory

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Columbia, Maryland 21045 USA

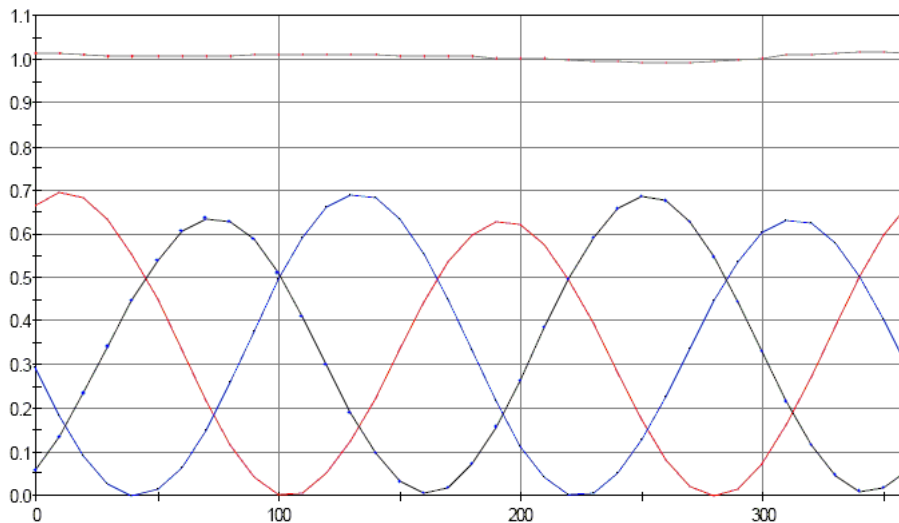


## PCTEST Calibration Laboratory

6660-B Dobbin Road  
Columbia, Maryland 21045 USA

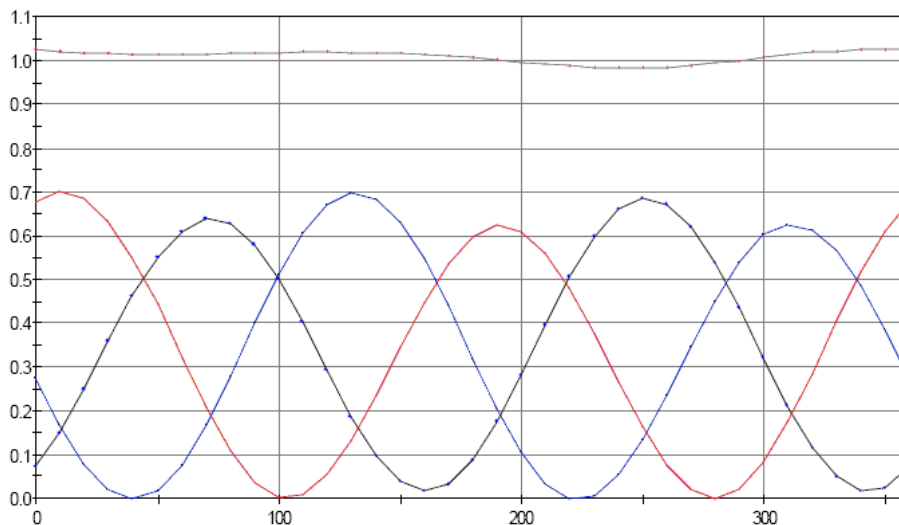
TEM Calibration Plot  
Date: 13-Jan-05 04:03:28 pm  
Probe Name: PCT005  
Frequency: 450

Sensitivity: Ch1: 3.320 Ch2: 3.289 Ch3: 3.267 mV/(mW/cm<sup>2</sup>)  
Isotropy: 1.23% 0.05 db Min=0.993 Max=1.019



TEM Calibration Plot  
Date: 13-Jan-05 03:41:45 pm  
Probe Name: PCT005  
Frequency: 835

Sensitivity: Ch1: 3.807 Ch2: 3.736 Ch3: 3.821 mV/(mW/cm<sup>2</sup>)  
Isotropy: 2.12% 0.09 db Min=0.985 Max=1.028



## PCTEST Calibration Laboratory

6660-B Dobbin Road  
Columbia, Maryland 21045 USA

### TEM Calibration Plot

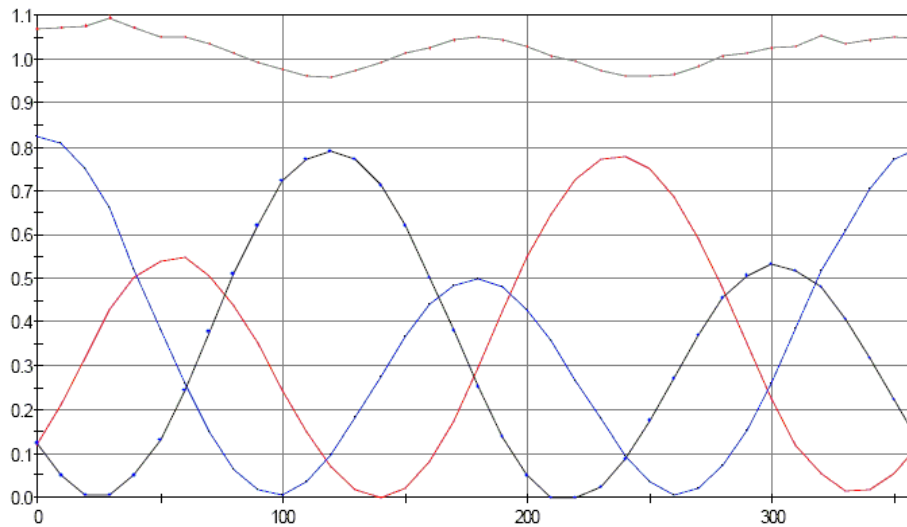
Date: 14-Jan-05 11:08:15 am

Probe Name: PCT005

Frequency: 1900

Sensitivity: Ch1: 5.115 Ch2: 4.969 Ch3: 4.453 mV/(mW/cm<sup>2</sup>)

Isotropy: 6.79% 0.29 db Min=0.961 Max=1.097



### TEM Calibration Plot

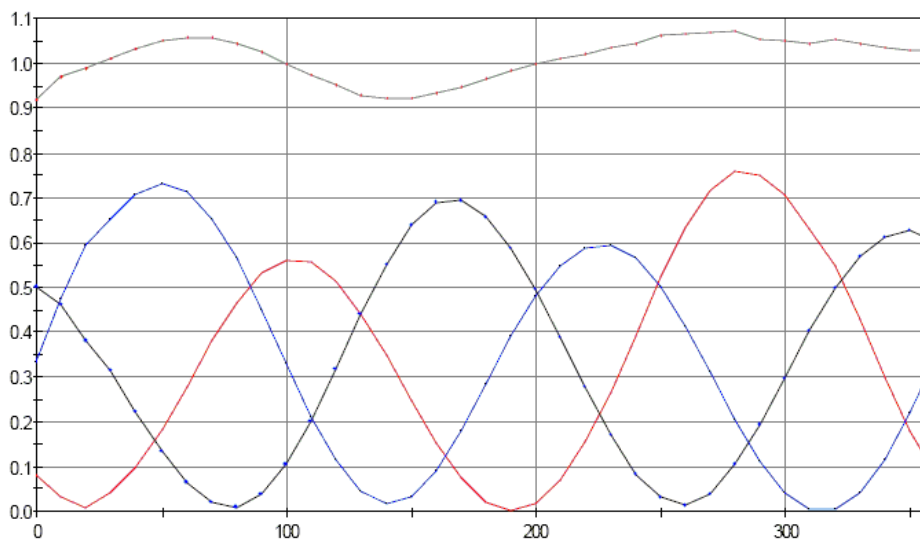
Date: 14-Jan-05 11:38:38 am

Probe Name: PCT005

Frequency: 2100

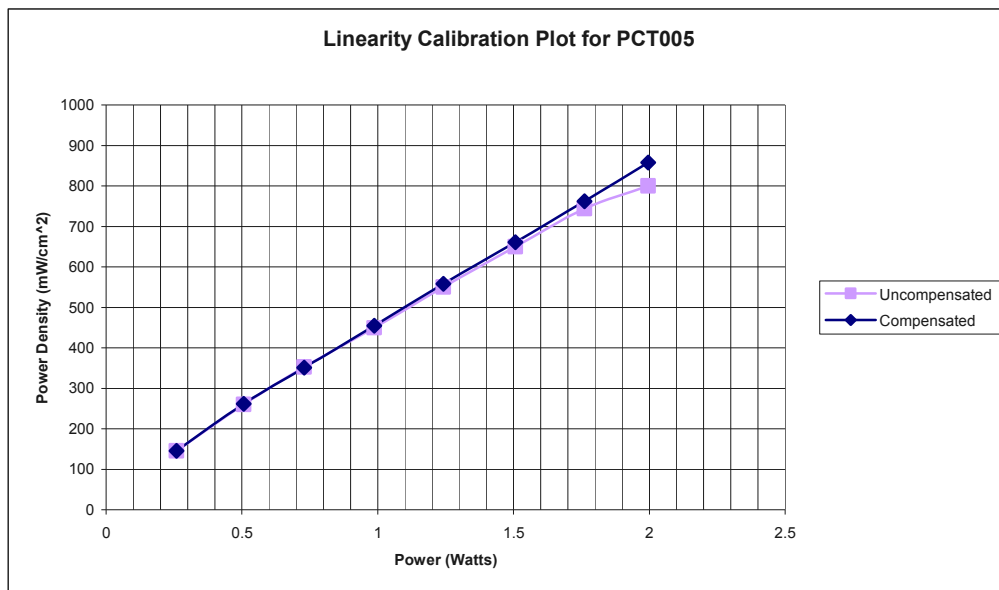
Sensitivity: Ch1: 5.496 Ch2: 4.887 Ch3: 5.267 mV/(mW/cm<sup>2</sup>)

Isotropy: 7.61% 0.32 db Min=0.921 Max=1.074



## PCTEST Calibration Laboratory

6660-B Dobbin Road  
Columbia, Maryland 21045 USA



### Probe Physical Characteristics

Serial Number: PCT005  
Model: E-020

Sensor Offset: 1.56 mm  
Sensor Length: 2.5 mm  
Tip Enclosure: Ertalyte  
Tip Diameter: 5 mm  
Tip Length: 60 mm  
Total Length: 290 mm

## PCTEST Calibration Laboratory

6660-B Dobbin Road  
Columbia, Maryland 21045 USA

### Test Equipment

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

| EQUIPMENT SPECIFICATIONS                          |                 |                                |
|---------------------------------------------------|-----------------|--------------------------------|
| Type                                              | Calibration Due | Asset Number/<br>Serial Number |
| CRS Robot F3                                      | February 2005   | RAF0134133                     |
| CRS C500C Motion Controller                       | February 2005   | RCB0003303                     |
| CRS Teach Pendant (Joystick)                      | February 2005   | STP0132231                     |
| DELL Computer, Pentium 4 1.6 GHz, Windows 2000™   | February 2005   | 4PJZ111                        |
| Flat SAM Phantom (P-SAM-FLAT)                     | February 2005   | 94X-097                        |
| IDX Robot End Effector (EE-103-C)                 | February 2005   | 07111223                       |
| IDX Probe Amplifier                               | February 2005   | 07111113                       |
| Validation Dipole D835V2                          | October 2005    | PCT441                         |
| Validation Dipole D1900V2                         | February 2005   | PCT512                         |
| Validation Dipole D2450V2                         | October 2005    | PCT641                         |
| HP-778D Dual-Directional Coupler (0.1 ~ 2.0 GHz)  | November 2005   | PCT664                         |
| MicroCircuits Directional Coupler (4.0 ~ 8.0 GHz) | November 2005   | PE2204-6                       |
| Amplifier Research 5S1G4 Power Amp                | January 2005    | PCT540                         |
| IFI T184-10 Power Amplifier (4.0 ~ 18.0 GHz)      | December 2005   | 5957                           |
| HP-8241A (250kHz ~ 20 GHz) Signal Generator       | December 2005   | 88934                          |
| HP-8753E (30kHz ~ 6GHz) Network Analyzer          | January 2006    | PCT552                         |
| Rohde & Schwarz Power Meter NRVS 1020.1809.02     | January 2006    | 835360/079                     |
| Rohde & Schwarz Power Sensor NRV-Z53 858.0500.02  | April 2005      | 846076/007                     |
| HP85070B Dielectric Probe Kit                     | January 2005    | PCT501                         |
| IFI CC110EXX TEM Cell (DC to 2000 MHz)            | January 2006    | PCT498                         |
| EMCO 3115 Horn Antenna (2.0 ~ 18.0 GHz)           | August 2005     | PCT496                         |
| Guildline 5150 Precision Dual-Thermometer         | November 2005   | 66145                          |