

ALSAS-10U VER 2.3.2 APREL Laboratories

SAR Test Report -5.2GHz Band: 802.11n HT8 (40MHz)

Report Date : 11-Apr-2007
Measurement Date : 11-Apr-2007

Product Data

Device Name : ASUS
Type : Other
Model : F9S, F9E, F9D
Frequency : 5200.00 MHz
Drift Time : 0 min(s)
Length : 305 mm
Width : 245 mm
Depth : 9.4 mm
Antenna Type : Internal

Phantom Data

Type : Uni-Phantom
Size (mm) : 280 x 280 x 200
Location : Center

Tissue Data

Type : BODY
Serial No. : 326-B
Frequency : 5200.00 MHz
Last Calib. Date : 11-Apr-2007
Temperature : 21.50 °C
Ambient Temp. : 22.40 °C
Humidity : 56.00 RH%
Epsilon : 50.62 F/m
Sigma : 5.254 S/m
Density : 1000.00 kg/cu. m

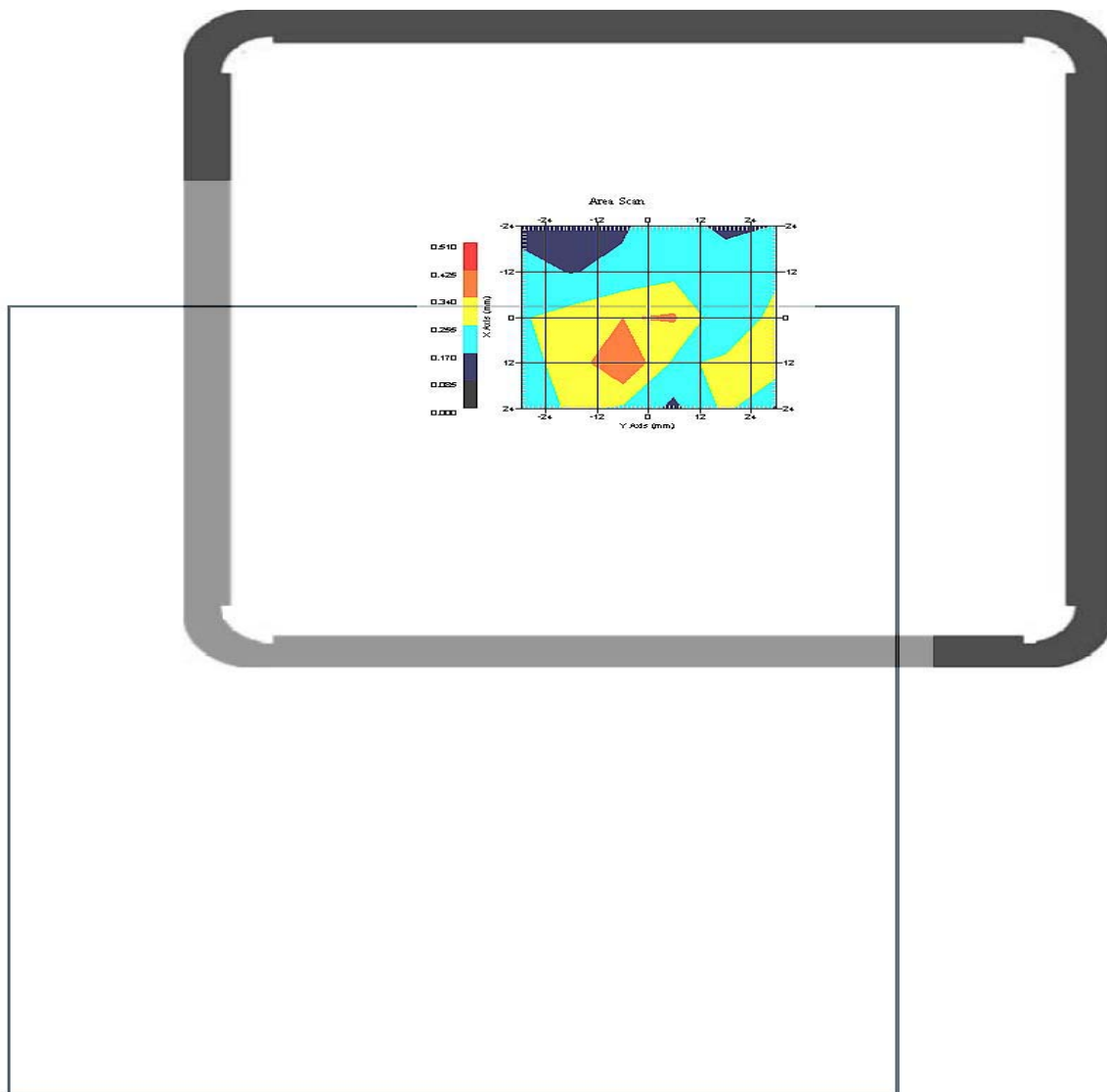
Probe Data

Name : Probe 264
Model : E020
Type : E-Field Triangle
Serial No. : 264
Last Calib. Date : 21-Mar-2006
Frequency : 5200.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 4.5
Probe Sensitivity: 0.61 0.61 0.61 $\mu\text{V}/(\text{V}/\text{m})^2$
Compression Point: 95.00 mV
Offset : 1.56 mm

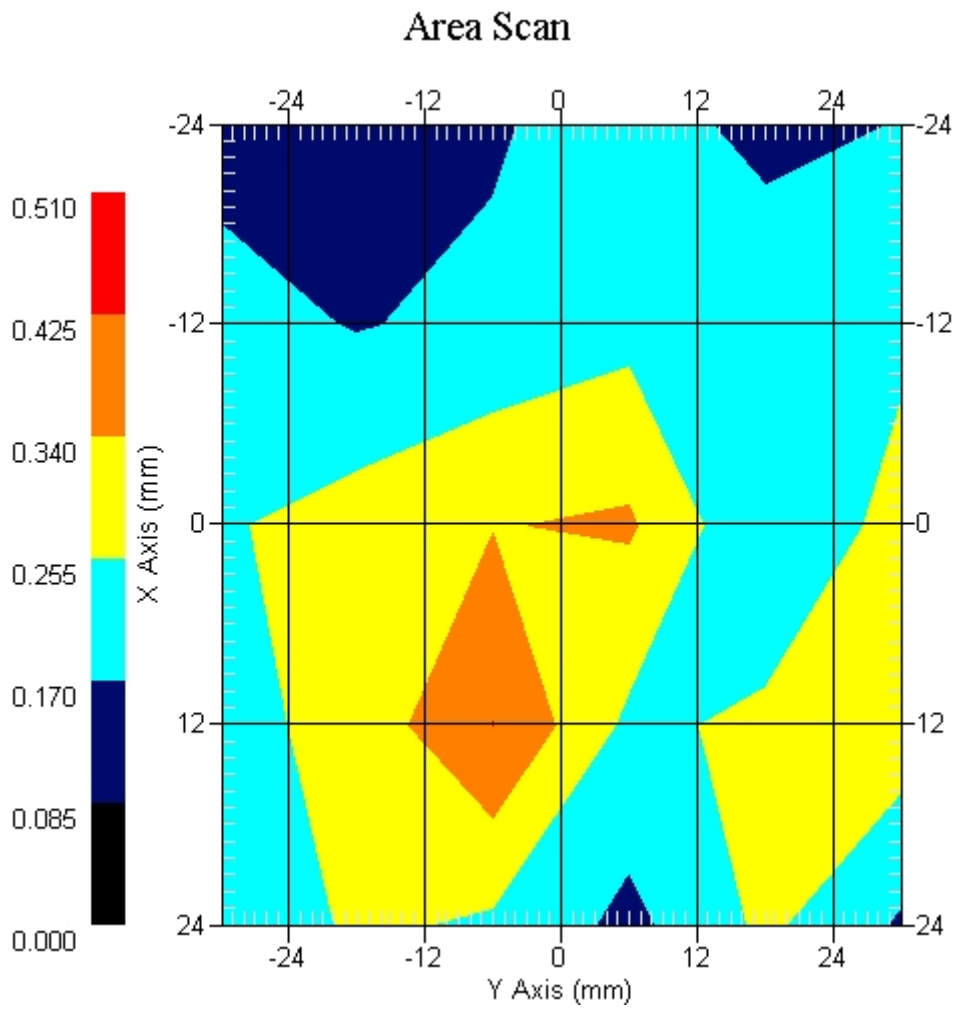
Measurement Data

Crest Factor : 1
 Tissue Temp. : 21.50 °C
 Ambient Temp. : 22.40 °C
 Area Scan : 5x6x1 : Measurement x=12mm, y=12mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.351 W/kg
 Power Drift-Finish: 0.338 W/kg
 Power Drift (%) : -3.709

DUT Position : Touch EUT Back
 Channel : 38



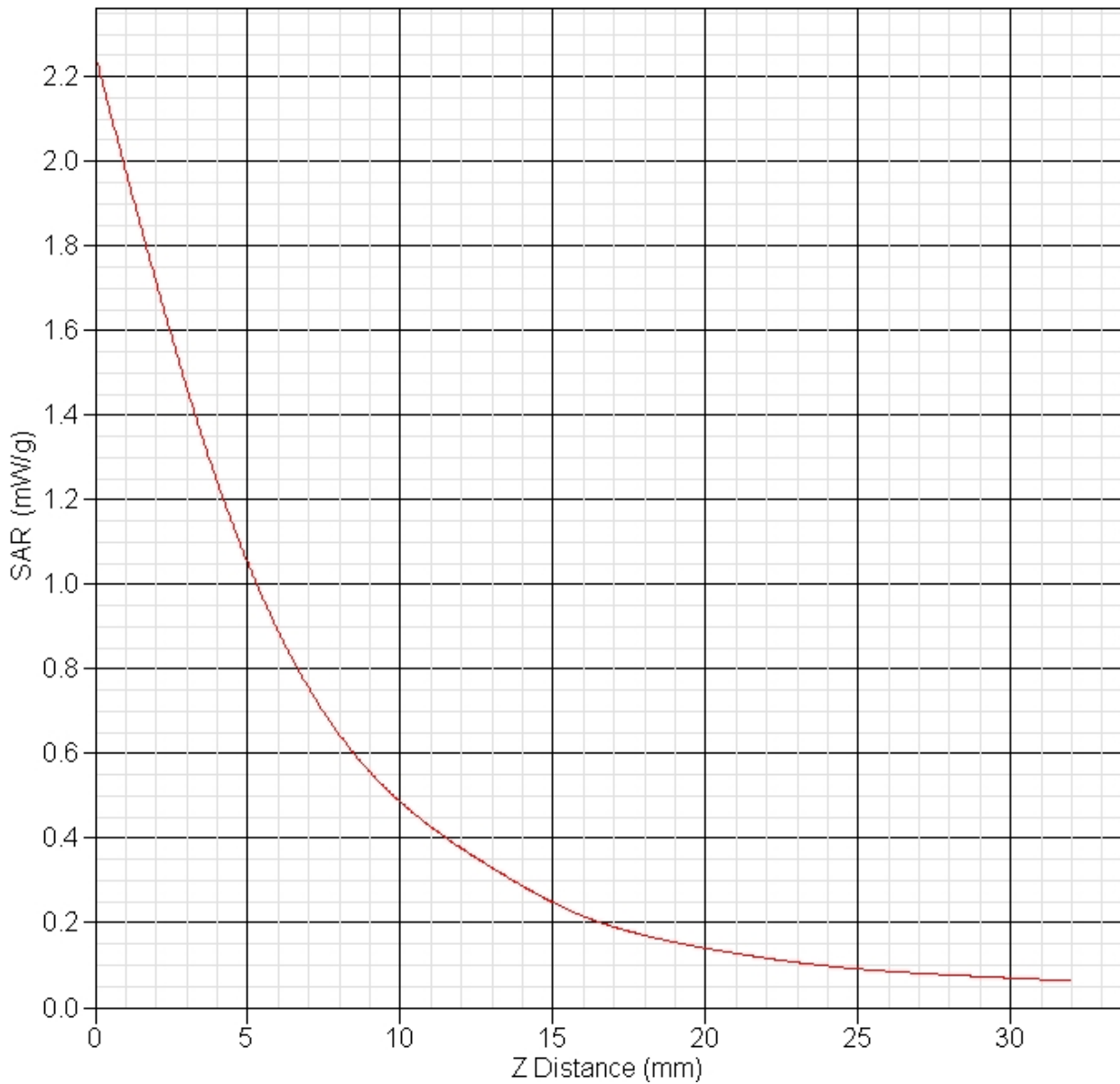
1 gram SAR value : 0.457 W/kg
 10 gram SAR value : 0.259 W/kg
 Area Scan Peak SAR : 0.426 W/kg
 Zoom Scan Peak SAR : 0.924 W/kg



5.2 GHz Band Z-Axis plot

802.11a (6Mbps)-Antenna A (Tyco) channel: 44

SAR-Z Axis
at Hotspot x:14.12 y:-6.01



ALSAS-10U VER 2.3.2 APREL Laboratories

SAR Test Report -5.8GHz Band: 802.11a (6Mbps)-Antenna A (Tyco)

Report Date : 11-Apr-2007
Measurement Date : 11-Apr-2007

Product Data

Device Name : ASUS
Type : Other
Model : F9S, F9E, F9D
Frequency : 5800.00 MHz
Drift Time : 0 min(s)
Length : 305 mm
Width : 245 mm
Depth : 9.4 mm
Antenna Type : Internal

Phantom Data

Type : Uni-Phantom
Size (mm) : 280 x 280 x 200
Location : Center

Tissue Data

Type : BODY
Serial No. : 327-B
Frequency : 5800.00 MHz
Last Calib. Date : 11-Apr-2007
Temperature : 21.50 °C
Ambient Temp. : 22.40 °C
Humidity : 56.00 RH%
Epsilon : 49.41 F/m
Sigma : 6.234 S/m
Density : 1000.00 kg/cu. m

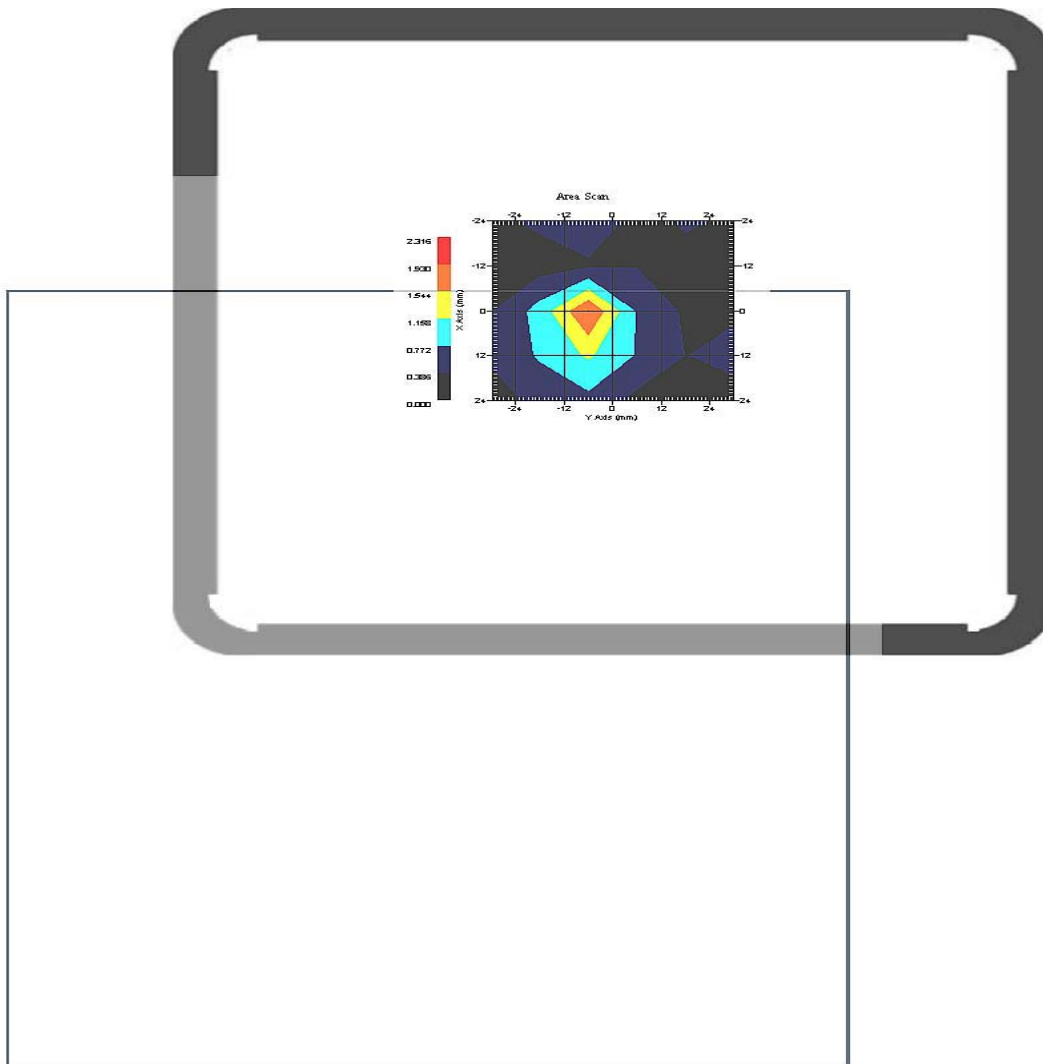
Probe Data

Name : Probe 264
Model : E020
Type : E-Field Triangle
Serial No. : 264
Last Calib. Date : 21-Mar-2006
Frequency : 5800.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 4.3
Probe Sensitivity: 0.61 0.61 0.61 $\mu\text{V}/(\text{V}/\text{m})^2$
Compression Point: 95.00 mV
Offset : 1.56 mm

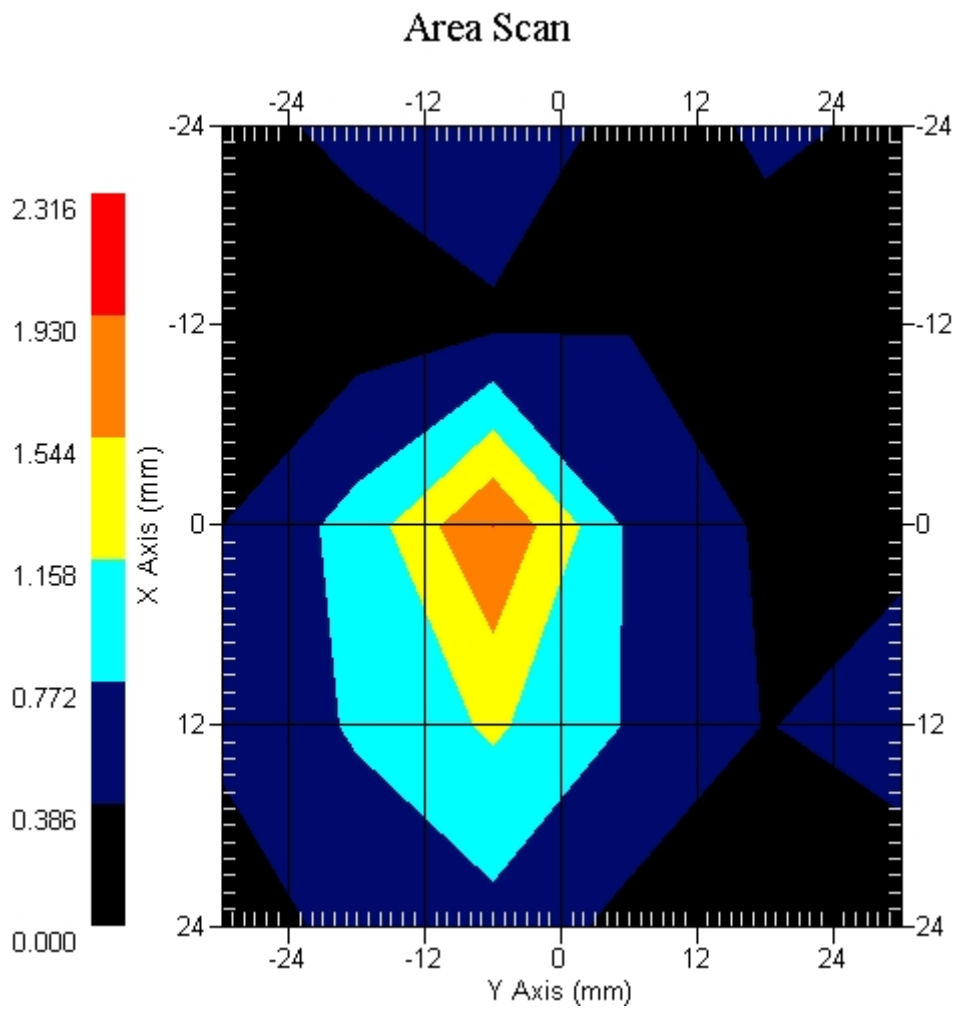
Measurement Data

Crest Factor : 1
Tissue Temp. : 21.50 °C
Ambient Temp. : 22.40 °C
Area Scan : 5x6x1 : Measurement x=12mm, y=12mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 1.292 W/kg
Power Drift-Finish: 1.299 W/kg
Power Drift (%) : 0.596

DUT Position : Touch EUT Back
Channel : 149



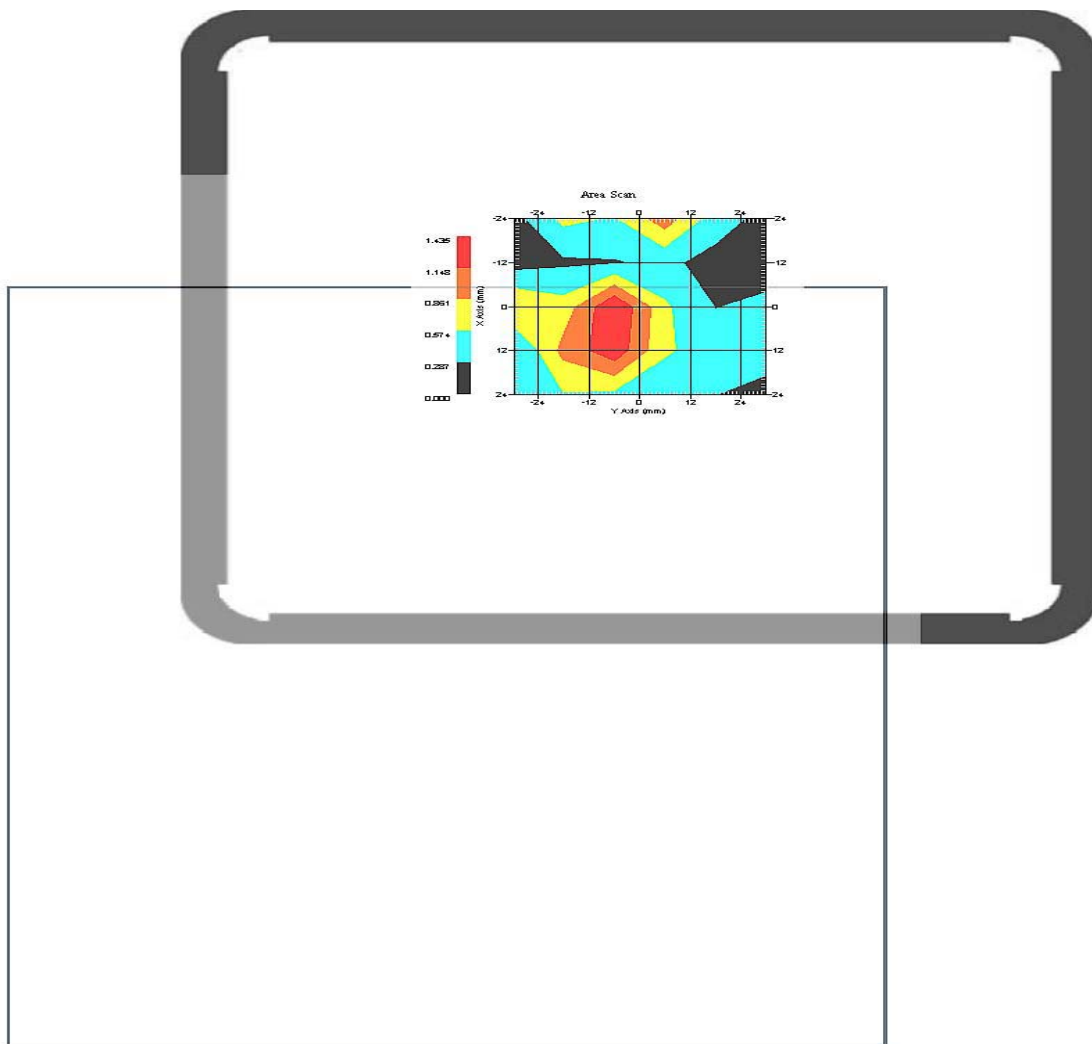
1 gram SAR value : 1.477 W/kg
10 gram SAR value : 0.715 W/kg
Area Scan Peak SAR : 1.931 W/kg
Zoom Scan Peak SAR : 4.093 W/kg



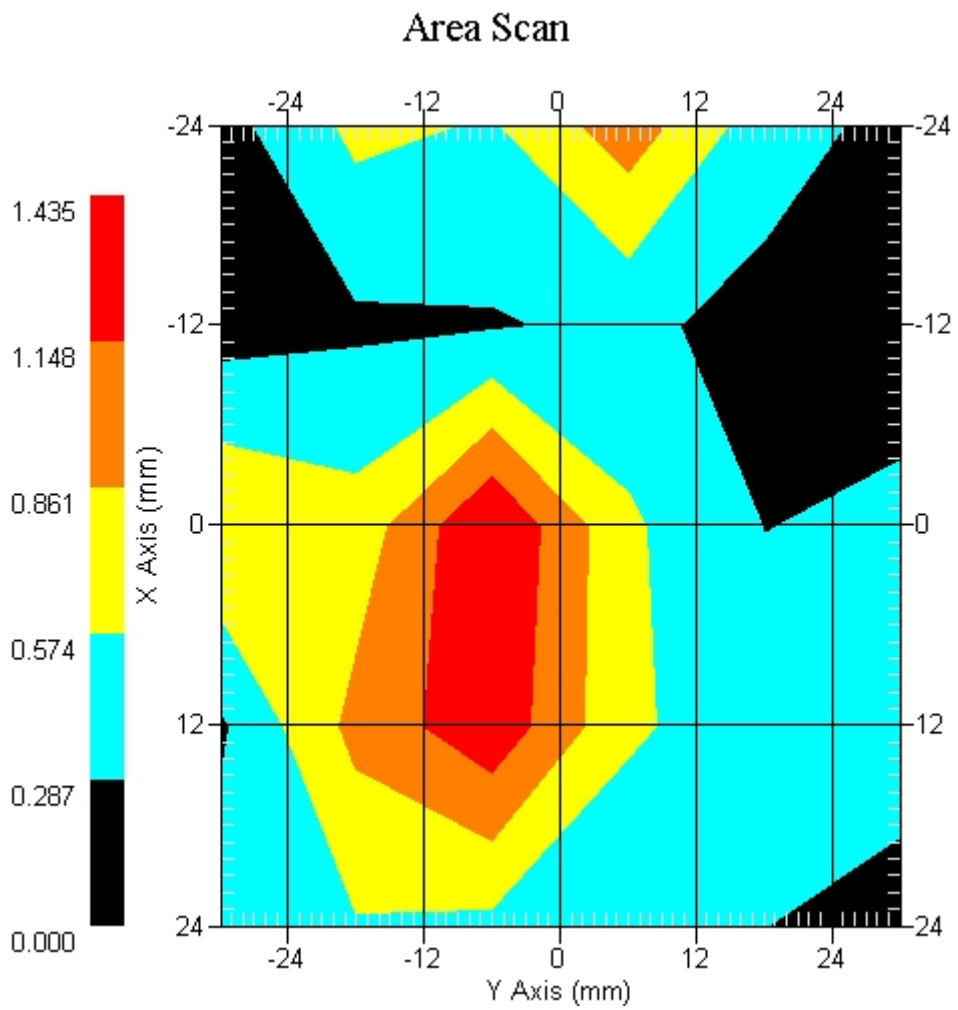
Measurement Data

Crest Factor : 1
 Tissue Temp. : 21.50 °C
 Ambient Temp. : 22.40 °C
 Area Scan : 5x6x1 : Measurement x=12mm, y=12mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 1.024 W/kg
 Power Drift-Finish: 1.061 W/kg
 Power Drift (%) : 3.605

DUT Position : Touch EUT Back
 Channel : 157



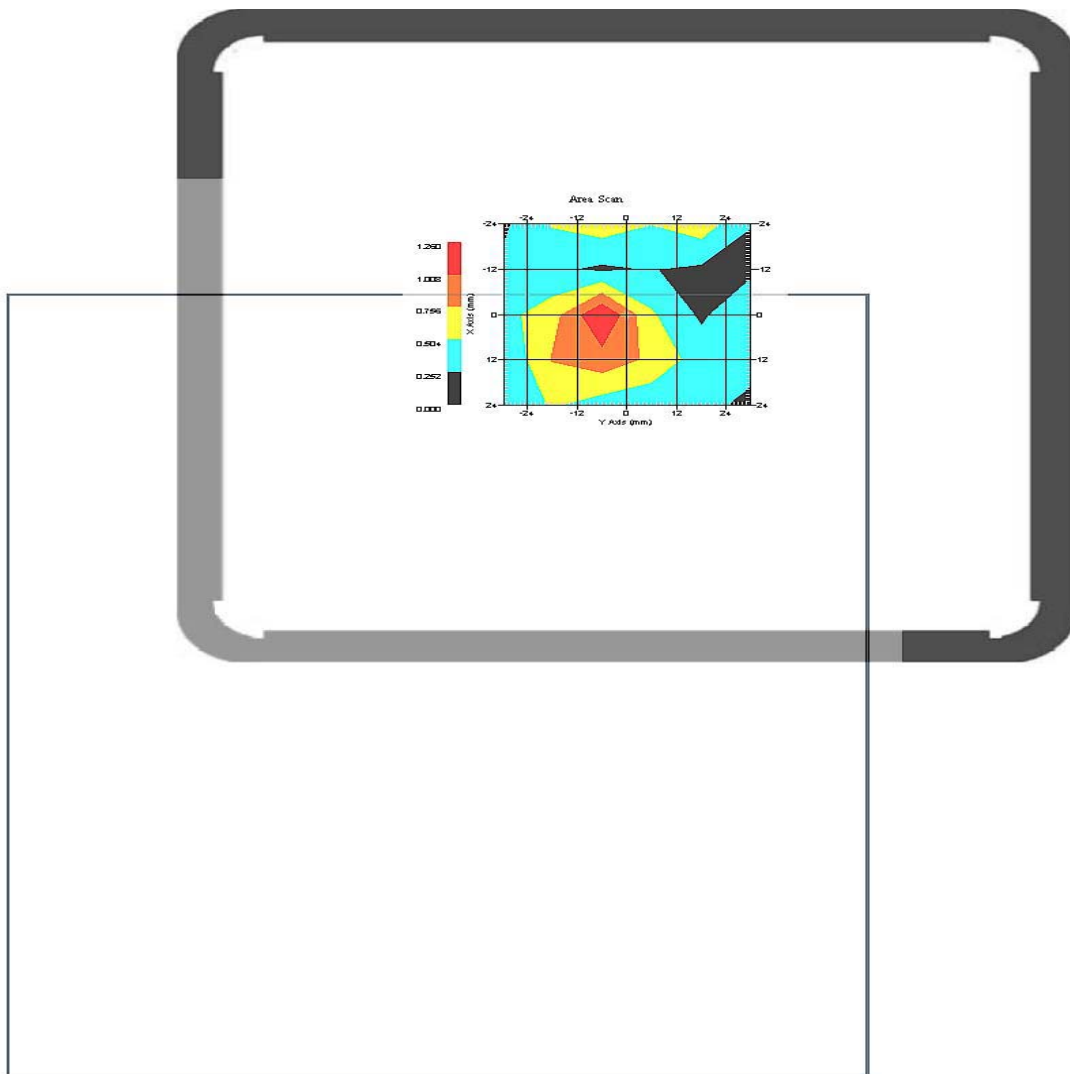
1 gram SAR value : 1.257 W/kg
 10 gram SAR value : 0.683 W/kg
 Area Scan Peak SAR : 1.433 W/kg
 Zoom Scan Peak SAR : 3.613 W/kg



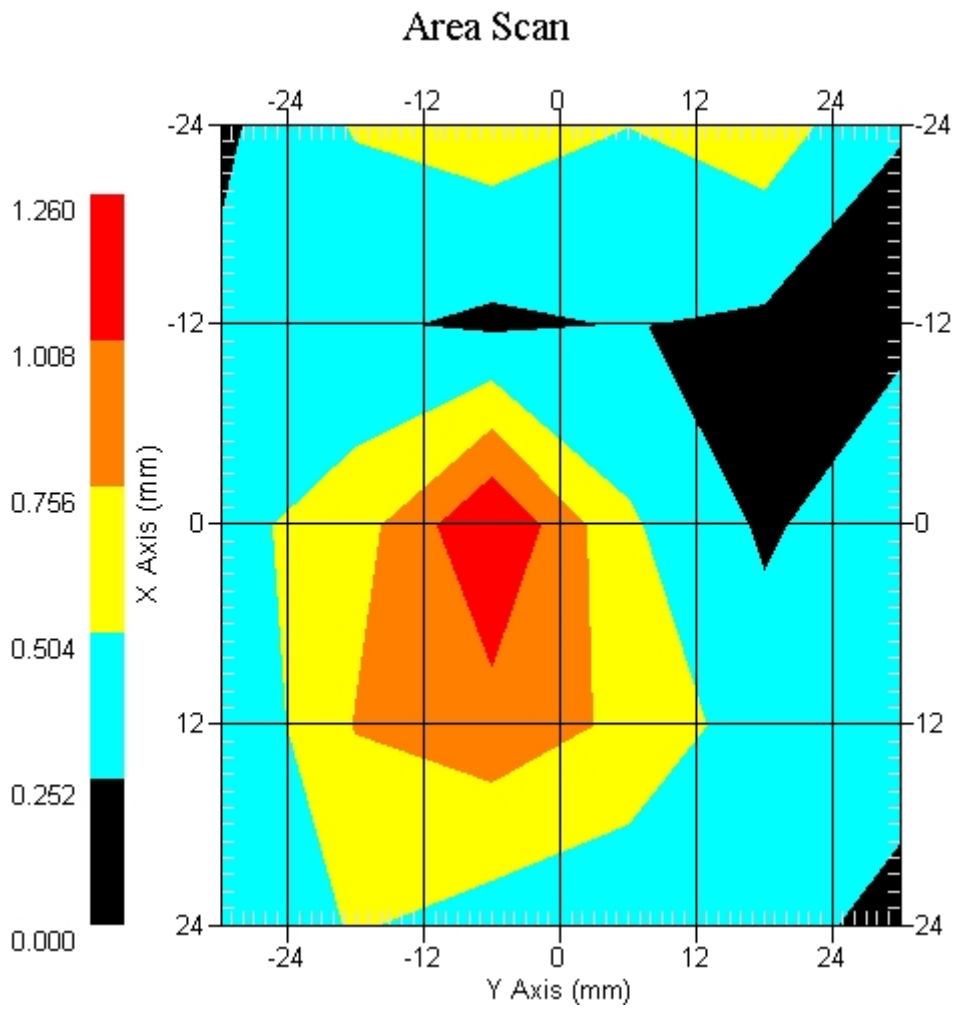
Measurement Data

Crest Factor : 1
 Tissue Temp. : 21.50 °C
 Ambient Temp. : 22.40 °C
 Area Scan : 5x6x1 : Measurement x=12mm, y=12mm, z=4mm
 Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm
 Power Drift-Start : 0.830 W/kg
 Power Drift-Finish: 0.856 W/kg
 Power Drift (%) : 3.145

DUT Position : Touch EUT Back
 Channel : 165



1 gram SAR value : 1.371 W/kg
 10 gram SAR value : 0.665 W/kg
 Area Scan Peak SAR : 1.258 W/kg
 Zoom Scan Peak SAR : 3.492 W/kg



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SAR Test Report -5.8GHz Band: 802.11a (6Mbps)-Antenna B (Tyco)

Report Date : 11-Apr-2007
Measurement Date : 11-Apr-2007

Product Data

Device Name : ASUS
Type : Other
Model : F9S, F9E, F9D
Frequency : 5800.00 MHz
Drift Time : 0 min(s)
Length : 305 mm
Width : 245 mm
Depth : 9.4 mm
Antenna Type : Internal

Phantom Data

Type : Uni-Phantom
Size (mm) : 280 x 280 x 200
Location : Center

Tissue Data

Type : BODY
Serial No. : 327-B
Frequency : 5800.00 MHz
Last Calib. Date : 11-Apr-2007
Temperature : 21.50 °C
Ambient Temp. : 22.40 °C
Humidity : 56.00 RH%
Epsilon : 49.41 F/m
Sigma : 6.234 S/m
Density : 1000.00 kg/cu. m

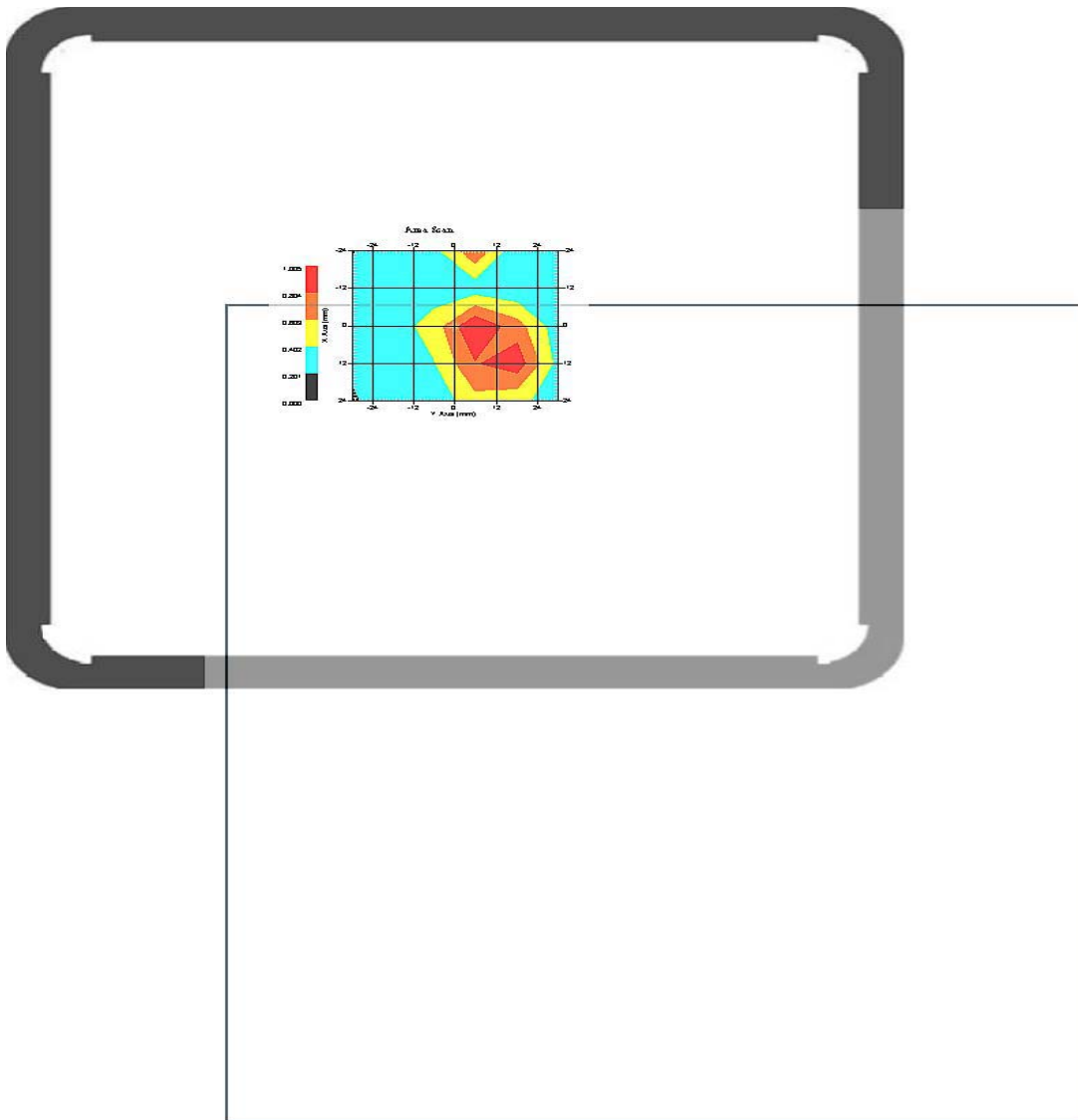
Probe Data

Name : Probe 264
Model : E020
Type : E-Field Triangle
Serial No. : 264
Last Calib. Date : 21-Mar-2006
Frequency : 5800.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 4.3
Probe Sensitivity: 0.61 0.61 0.61 $\mu\text{V}/(\text{V}/\text{m})^2$
Compression Point: 95.00 mV
Offset : 1.56 mm

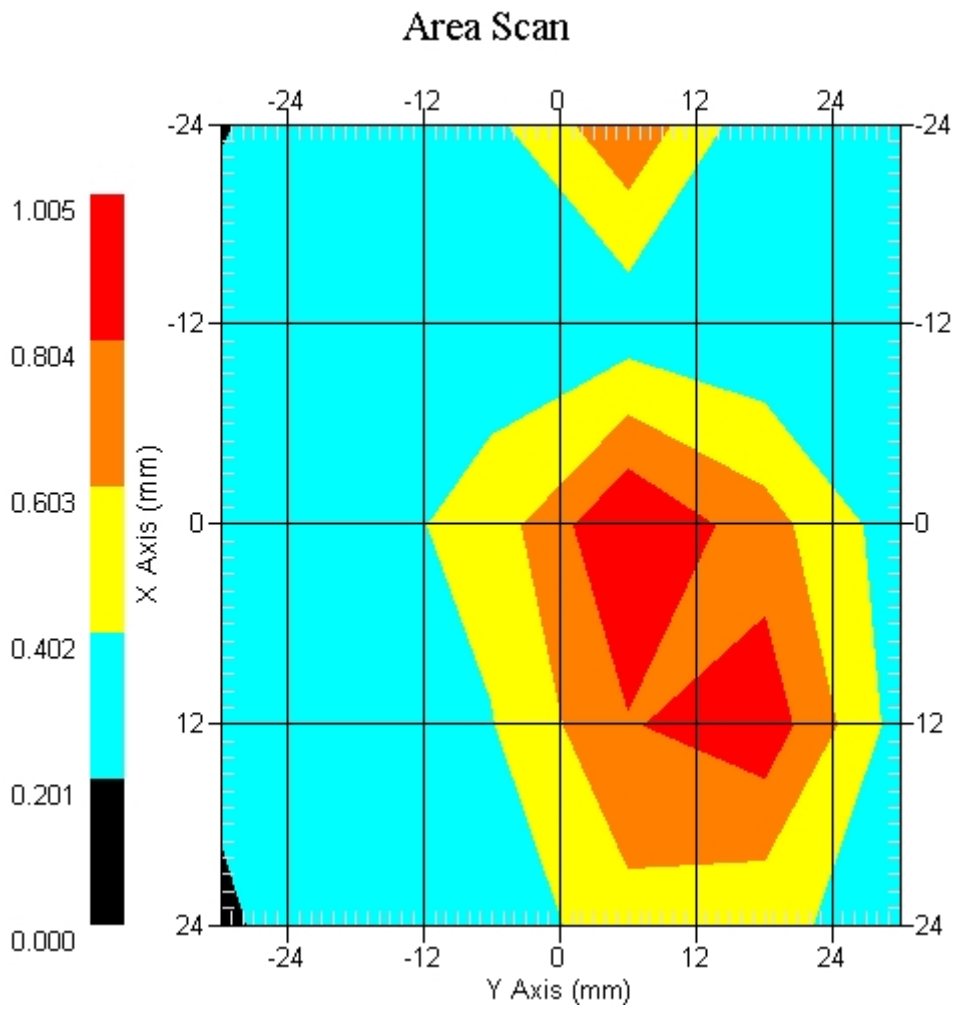
Measurement Data

Crest Factor : 1
Tissue Temp. : 21.50 °C
Ambient Temp. : 22.40 °C
Area Scan : 5x6x1 : Measurement x=12mm, y=12mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.820 W/kg
Power Drift-Finish: 0.836 W/kg
Power Drift (%) : 1.961

DUT Position : Touch EUT Back
Channel : 157



1 gram SAR value : 0.890 W/kg
10 gram SAR value : 0.527 W/kg
Area Scan Peak SAR : 1.004 W/kg
Zoom Scan Peak SAR : 2.362 W/kg



ALSAS-10U VER 2.3.2 APREL Laboratories

SAR Test Report -5.8GHz Band: 802.11n HT0 (20MHz)

Report Date : 11-Apr-2007
Measurement Date : 11-Apr-2007

Product Data

Device Name : ASUS
Type : Other
Model : F9S, F9E, F9D
Frequency : 5800.00 MHz
Drift Time : 0 min(s)
Length : 305 mm
Width : 245 mm
Depth : 9.4 mm
Antenna Type : Internal

Phantom Data

Type : Uni-Phantom
Size (mm) : 280 x 280 x 200
Location : Center

Tissue Data

Type : BODY
Serial No. : 327-B
Frequency : 5800.00 MHz
Last Calib. Date : 11-Apr-2007
Temperature : 21.50 °C
Ambient Temp. : 22.40 °C
Humidity : 56.00 RH%
Epsilon : 49.41 F/m
Sigma : 6.234 S/m
Density : 1000.00 kg/cu. m

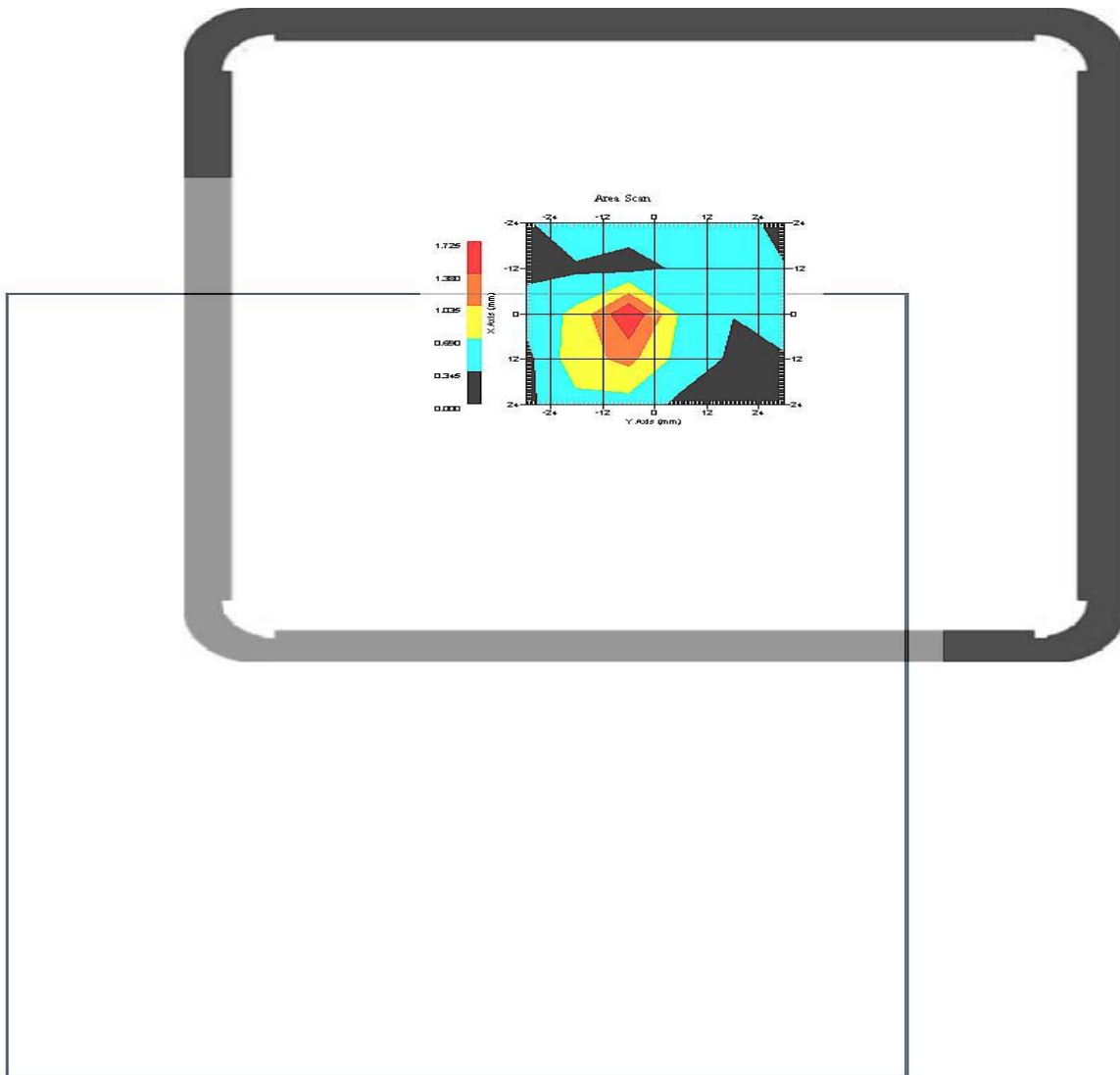
Probe Data

Name : Probe 264
Model : E020
Type : E-Field Triangle
Serial No. : 264
Last Calib. Date : 21-Mar-2006
Frequency : 5800.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 4.3
Probe Sensitivity: 0.61 0.61 0.61 $\mu\text{V}/(\text{V}/\text{m})^2$
Compression Point: 95.00 mV
Offset : 1.56 mm

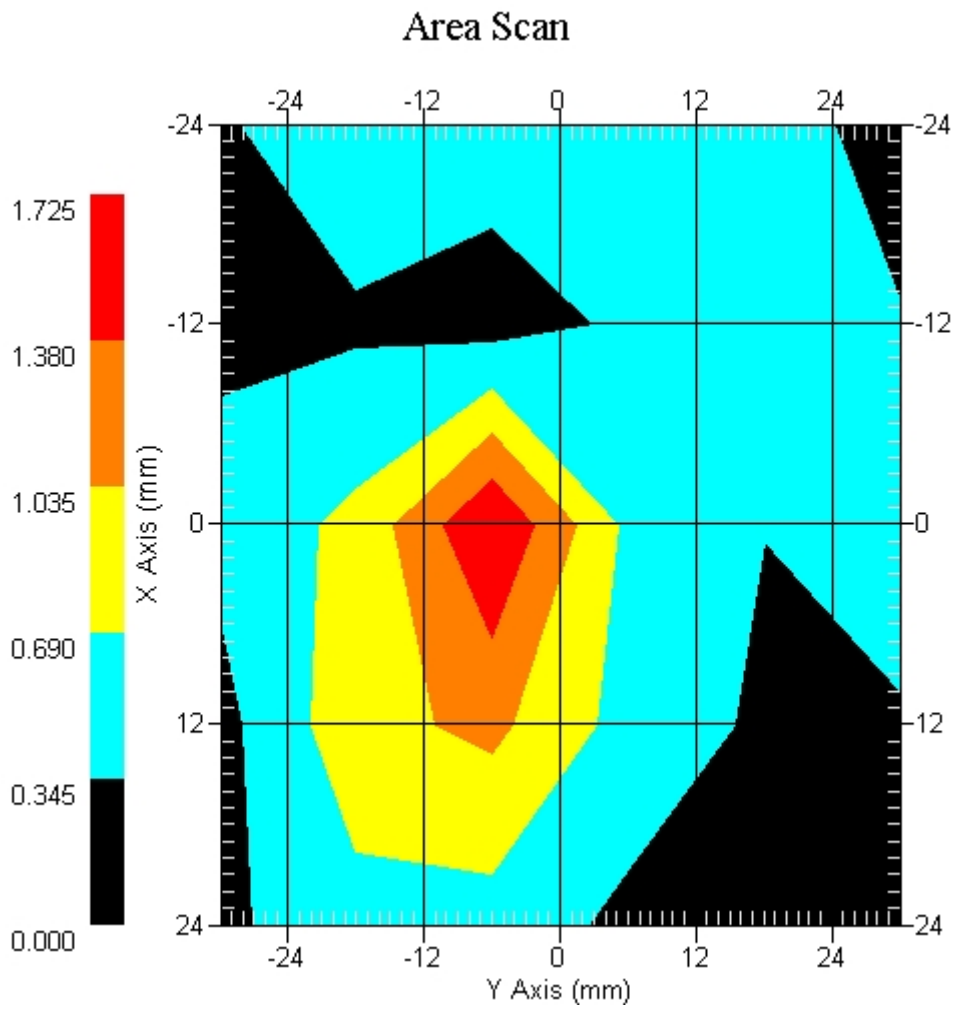
Measurement Data

Crest Factor : 1
 Tissue Temp. : 21.50 °C
 Ambient Temp. : 22.40 °C
 Area Scan : 5x6x1 : Measurement x=12mm, y=12mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 1.085 W/kg
 Power Drift-Finish: 1.030 W/kg
 Power Drift (%) : -3.413

DUT Position : Touch EUT Back
 Channel : 149



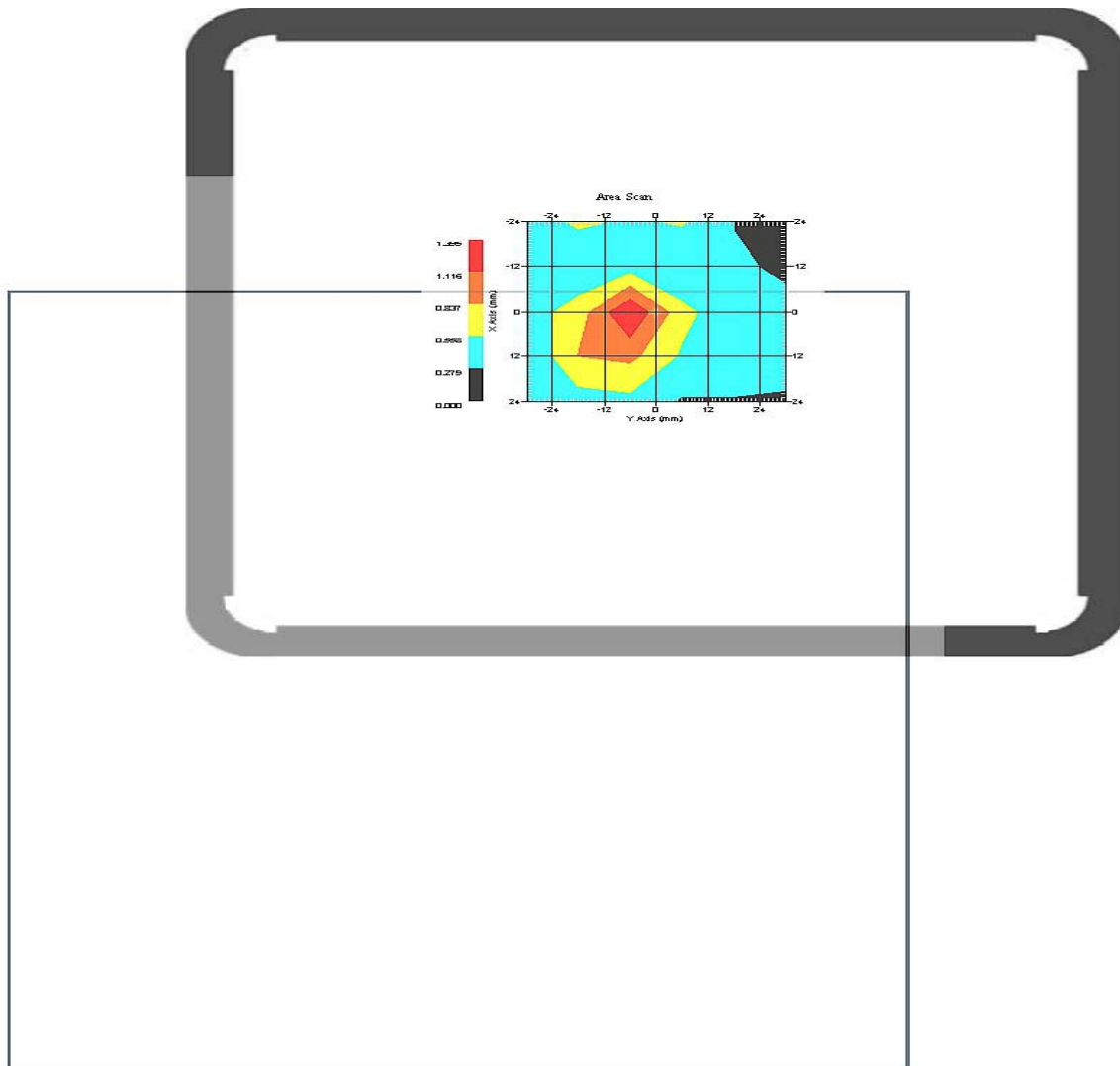
1 gram SAR value : 1.462 W/kg
 10 gram SAR value : 0.685 W/kg
 Area Scan Peak SAR : 1.724 W/kg
 Zoom Scan Peak SAR : 4.003 W/kg



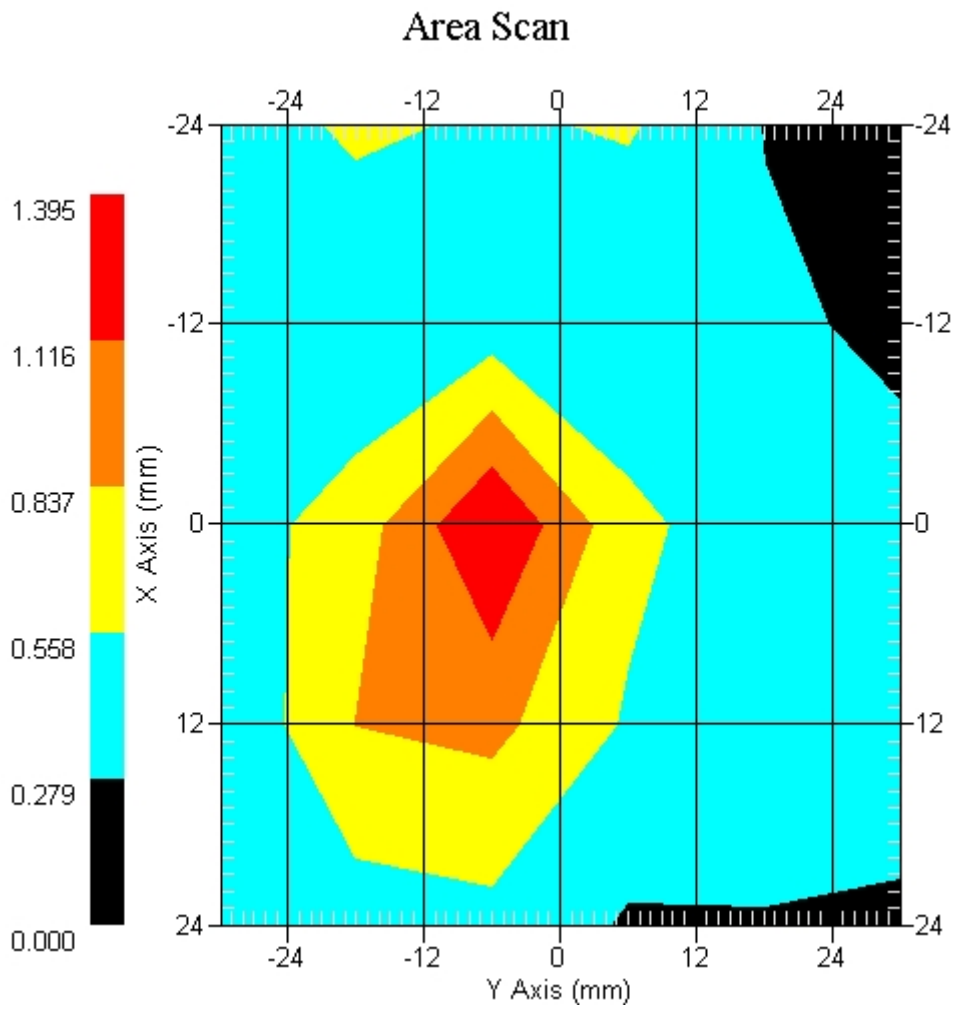
Measurement Data

Crest Factor : 1
 Tissue Temp. : 21.50 °C
 Ambient Temp. : 22.40 °C
 Area Scan : 5x6x1 : Measurement x=12mm, y=12mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 1.032 W/kg
 Power Drift-Finish: 1.009 W/kg
 Power Drift (%) : -2.229

DUT Position : Touch EUT Back
 Channel : 157



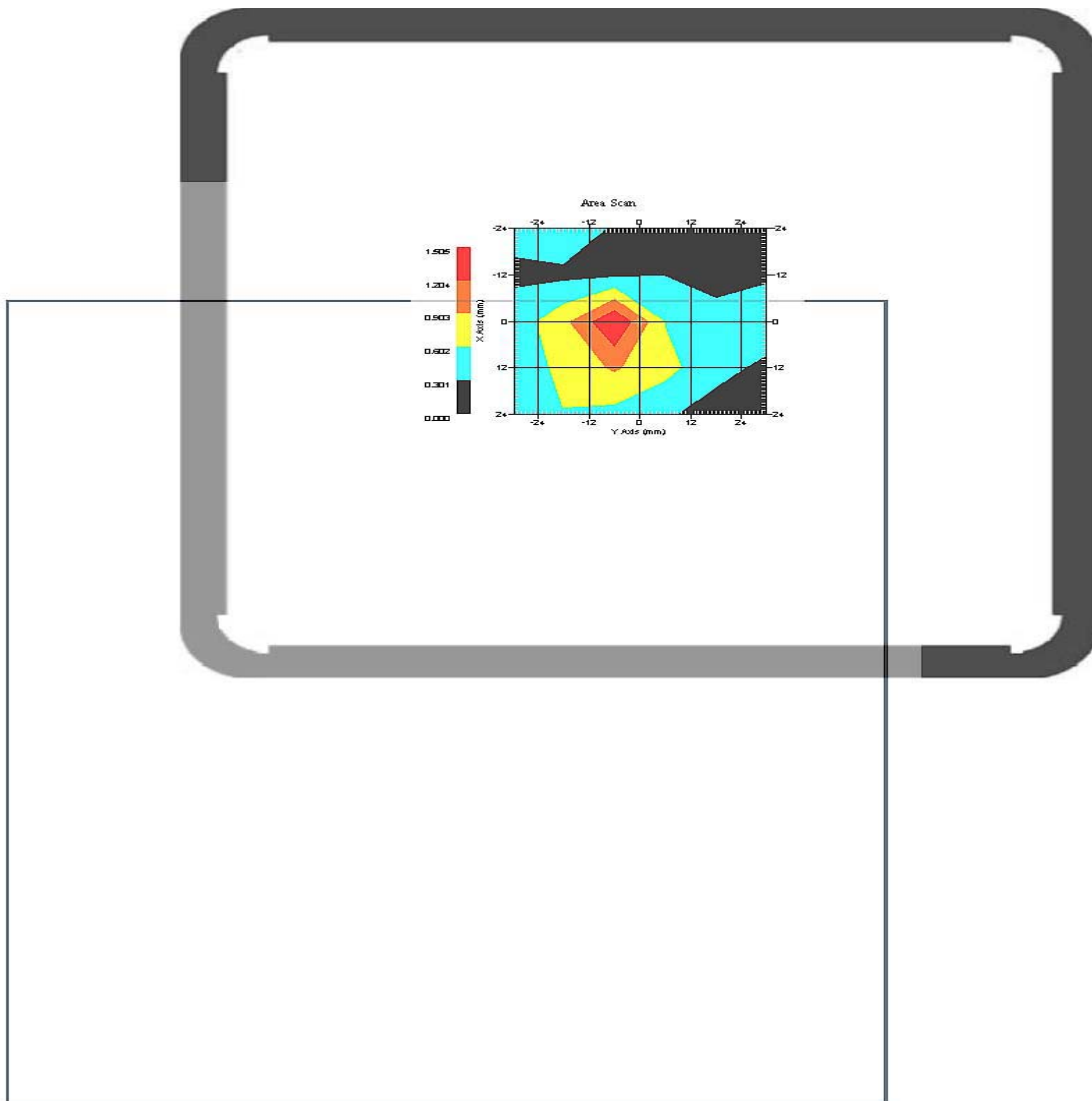
1 gram SAR value : 1.220 W/kg
 10 gram SAR value : 0.599 W/kg
 Area Scan Peak SAR : 1.394 W/kg
 Zoom Scan Peak SAR : 2.832 W/kg



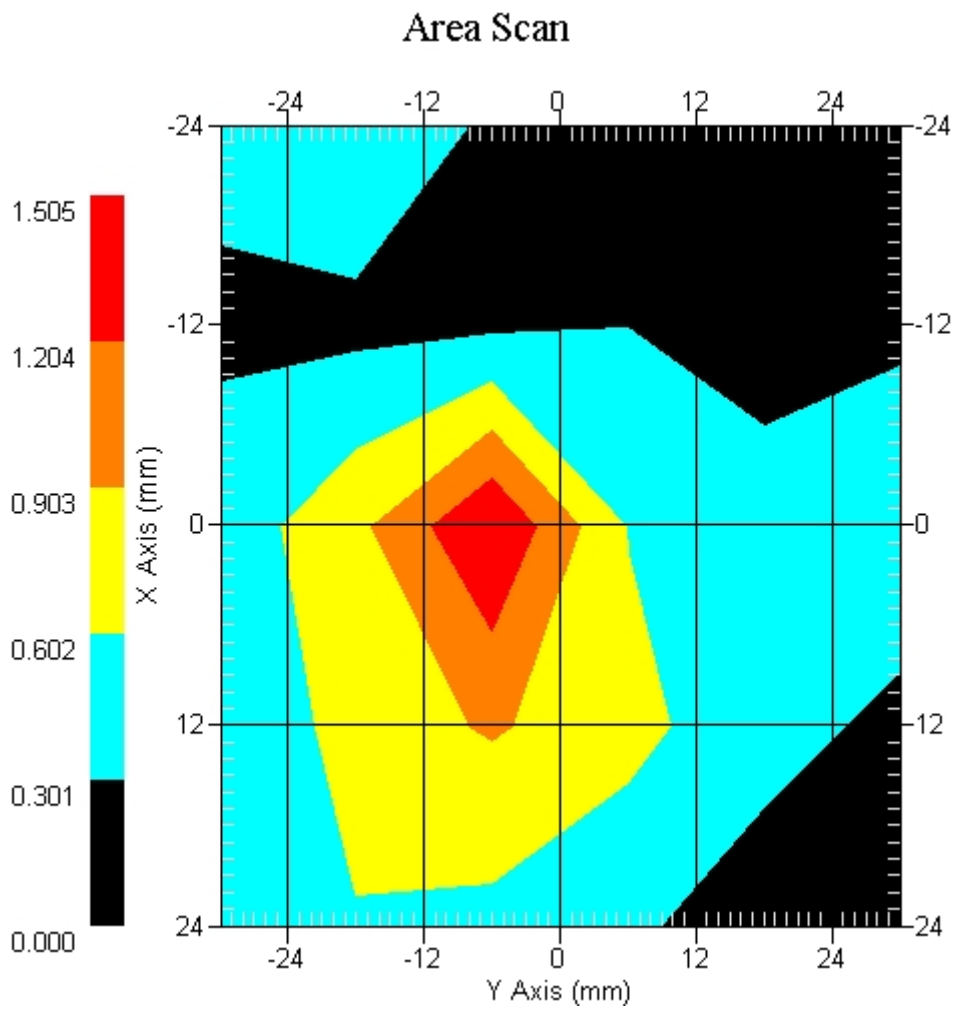
Measurement Data

Crest Factor : 1
Tissue Temp. : 21.50 °C
Ambient Temp. : 22.40 °C
Area Scan : 5x6x1 : Measurement x=12mm, y=12mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 1.060 W/kg
Power Drift-Finish: 1.023 W/kg
Power Drift (%) : -3.542

DUT Position : Touch EUT Back
Channel : 165



1 gram SAR value : 1.303 W/kg
10 gram SAR value : 0.630 W/kg
Area Scan Peak SAR : 1.503 W/kg
Zoom Scan Peak SAR : 3.162 W/kg



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SAR Test Report -5.8GHz Band: 802.11n HT0 (40MHz)

Report Date : 11-Apr-2007
Measurement Date : 11-Apr-2007

Product Data

Device Name : ASUS
Type : Other
Model : F9S, F9E, F9D
Frequency : 5800.00 MHz
Drift Time : 0 min(s)
Length : 305 mm
Width : 245 mm
Depth : 9.4 mm
Antenna Type : Internal

Phantom Data

Type : Uni-Phantom
Size (mm) : 280 x 280 x 200
Location : Center

Tissue Data

Type : BODY
Serial No. : 327-B
Frequency : 5800.00 MHz
Last Calib. Date : 11-Apr-2007
Temperature : 21.50 °C
Ambient Temp. : 22.40 °C
Humidity : 56.00 RH%
Epsilon : 49.41 F/m
Sigma : 6.234 S/m
Density : 1000.00 kg/cu. m

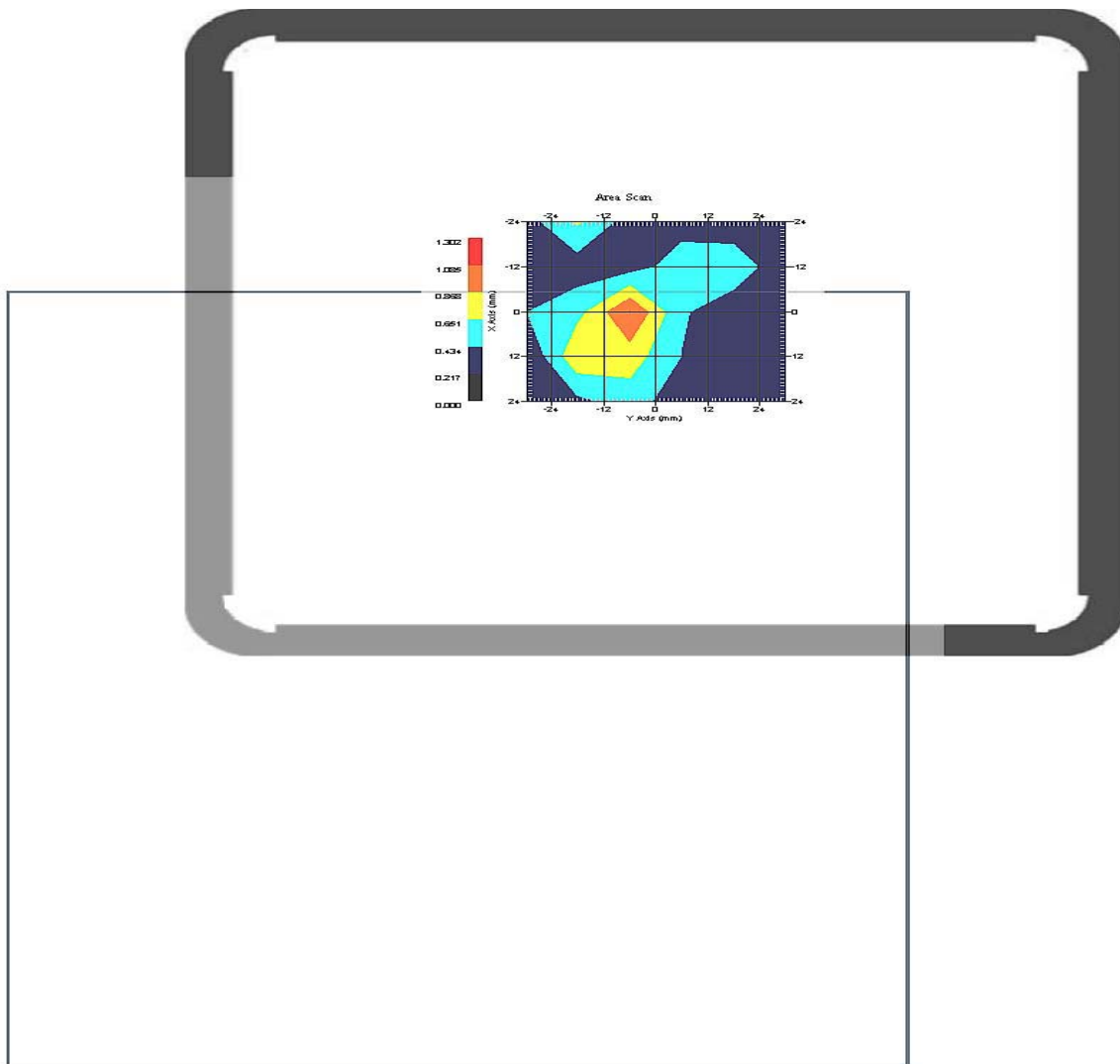
Probe Data

Name : Probe 264
Model : E020
Type : E-Field Triangle
Serial No. : 264
Last Calib. Date : 21-Mar-2006
Frequency : 5800.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 4.3
Probe Sensitivity: 0.61 0.61 0.61 $\mu\text{V}/(\text{V}/\text{m})^2$
Compression Point: 95.00 mV
Offset : 1.56 mm

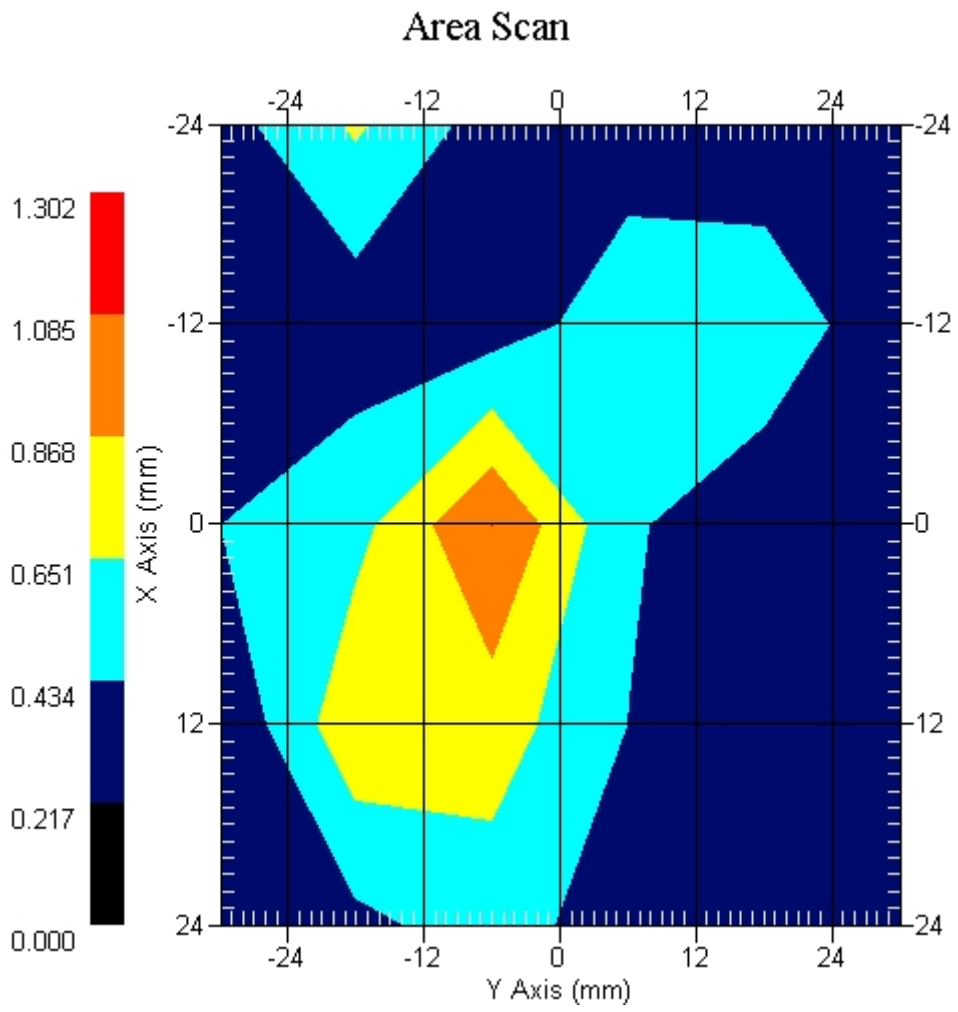
Measurement Data

Crest Factor : 1
Tissue Temp. : 21.50 °C
Ambient Temp. : 22.40 °C
Area Scan : 5x6x1 : Measurement x=12mm, y=12mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.861 W/kg
Power Drift-Finish: 0.855 W/kg
Power Drift (%) : -0.692

DUT Position : Touch EUT Back
Channel : 151



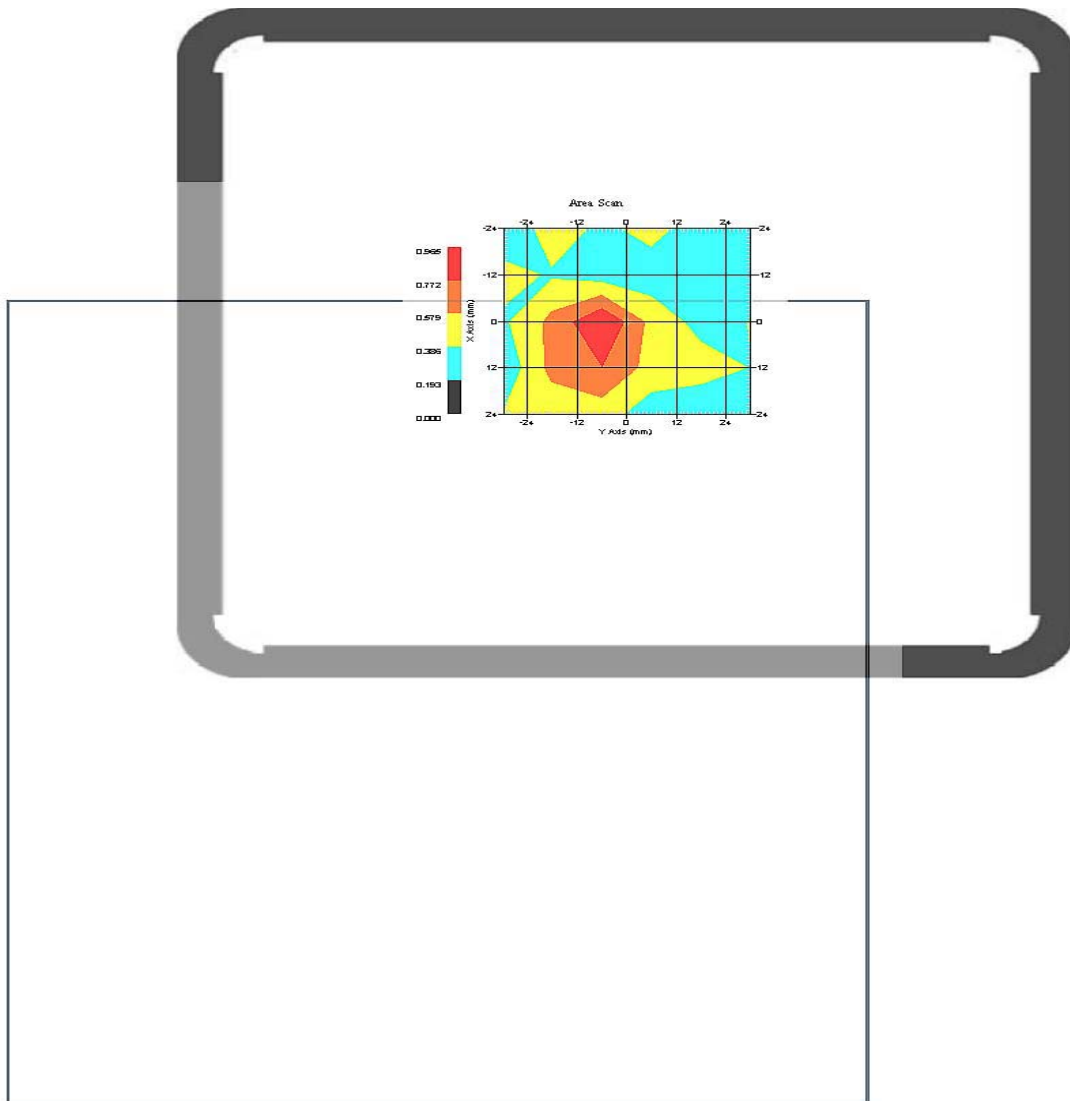
1 gram SAR value : 1.020 W/kg
10 gram SAR value : 0.551 W/kg
Area Scan Peak SAR : 1.086 W/kg
Zoom Scan Peak SAR : 2.582 W/kg



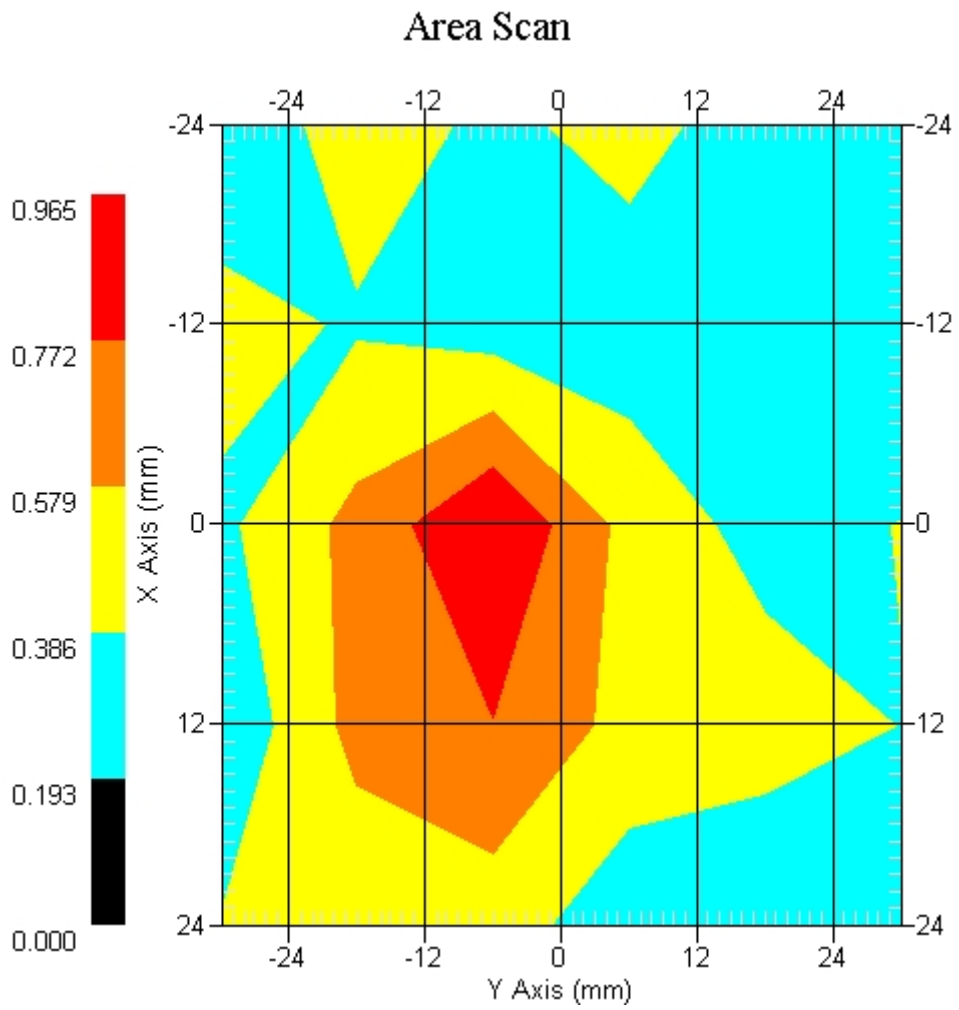
Measurement Data

Crest Factor : 1
Tissue Temp. : 21.50 °C
Ambient Temp. : 22.40 °C
Area Scan : 5x6x1 : Measurement x=12mm, y=12mm, z=4mm
Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm
Power Drift-Start : 0.706 W/kg
Power Drift-Finish: 0.717 W/kg
Power Drift (%) : 1.551

DUT Position : Touch EUT Back
Channel : 159



1 gram SAR value : 1.031 W/kg
10 gram SAR value : 0.561 W/kg
Area Scan Peak SAR : 0.965 W/kg
Zoom Scan Peak SAR : 2.311 W/kg



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SAR Test Report -5.8GHz Band: 802.11n HT8 (20MHz)

Report Date : 11-Apr-2007
Measurement Date : 11-Apr-2007

Product Data

Device Name : ASUS
Type : Other
Model : F9S, F9E, F9D
Frequency : 5800.00 MHz
Drift Time : 0 min(s)
Length : 305 mm
Width : 245 mm
Depth : 9.4 mm
Antenna Type : Internal

Phantom Data

Type : Uni-Phantom
Size (mm) : 280 x 280 x 200
Location : Center

Tissue Data

Type : BODY
Serial No. : 327-B
Frequency : 5800.00 MHz
Last Calib. Date : 11-Apr-2007
Temperature : 21.50 °C
Ambient Temp. : 22.40 °C
Humidity : 56.00 RH%
Epsilon : 49.41 F/m
Sigma : 6.234 S/m
Density : 1000.00 kg/cu. m

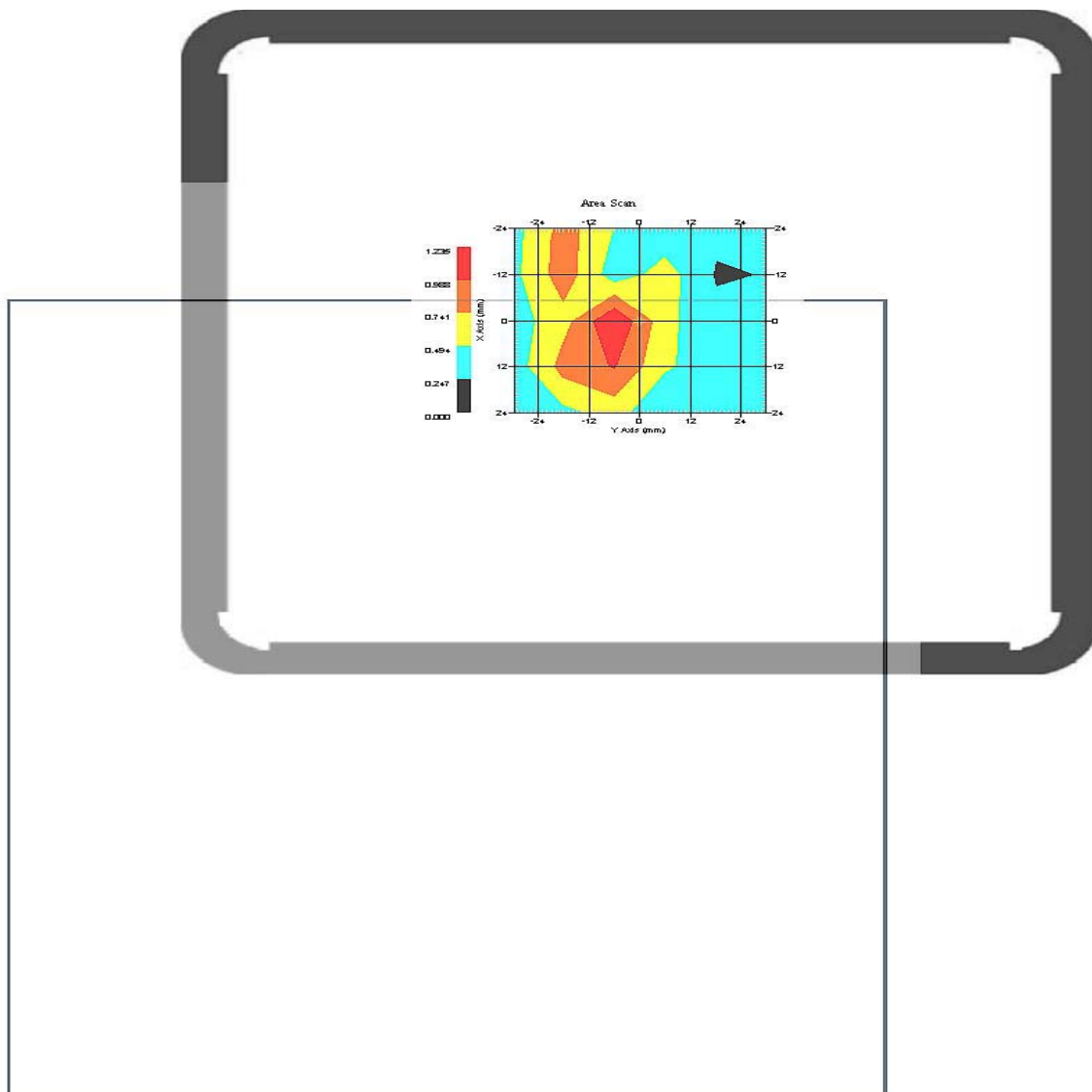
Probe Data

Name : Probe 264
Model : E020
Type : E-Field Triangle
Serial No. : 264
Last Calib. Date : 21-Mar-2006
Frequency : 5800.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 4.3
Probe Sensitivity: 0.61 0.61 0.61 $\mu\text{V}/(\text{V}/\text{m})^2$
Compression Point: 95.00 mV
Offset : 1.56 mm

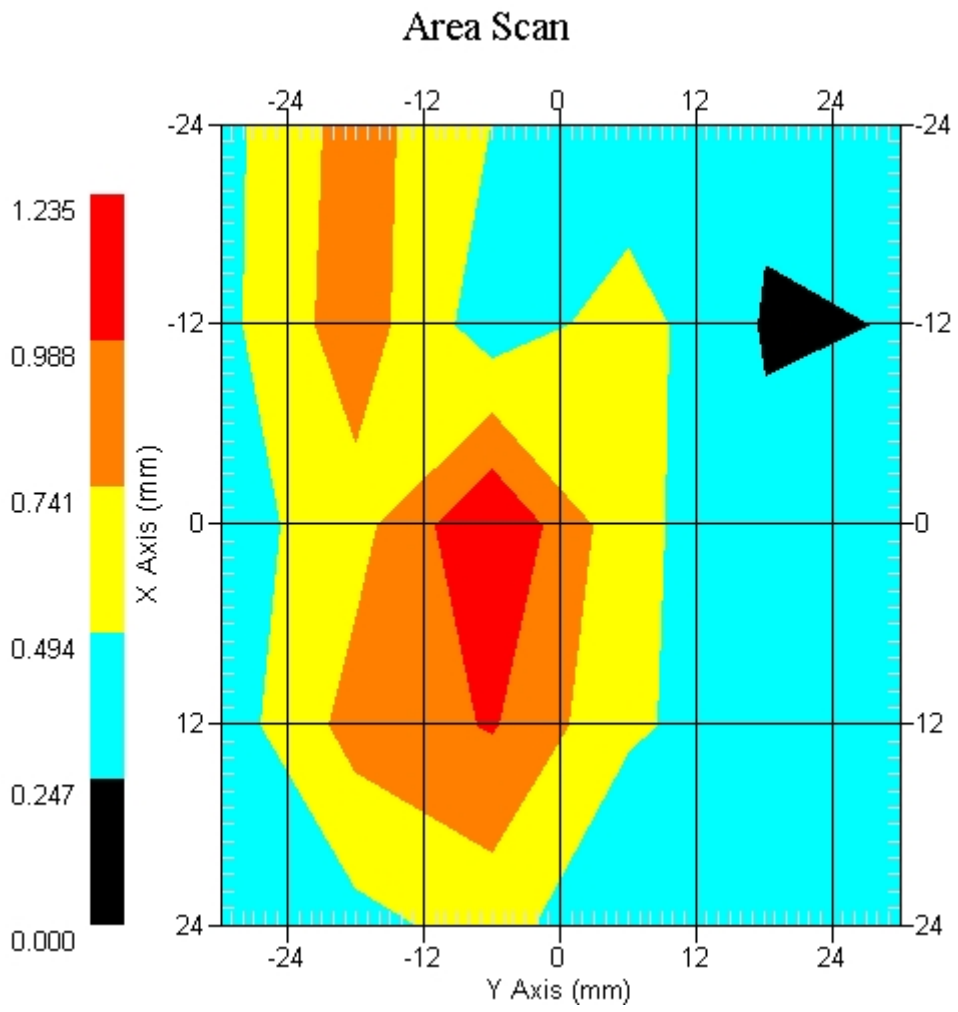
Measurement Data

Crest Factor : 1
 Tissue Temp. : 21.50 °C
 Ambient Temp. : 22.40 °C
 Area Scan : 5x6x1 : Measurement x=12mm, y=12mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 1.096 W/kg
 Power Drift-Finish: 1.079 W/kg
 Power Drift (%) : -1.814

DUT Position : Touch EUT Back
 Channel : 149



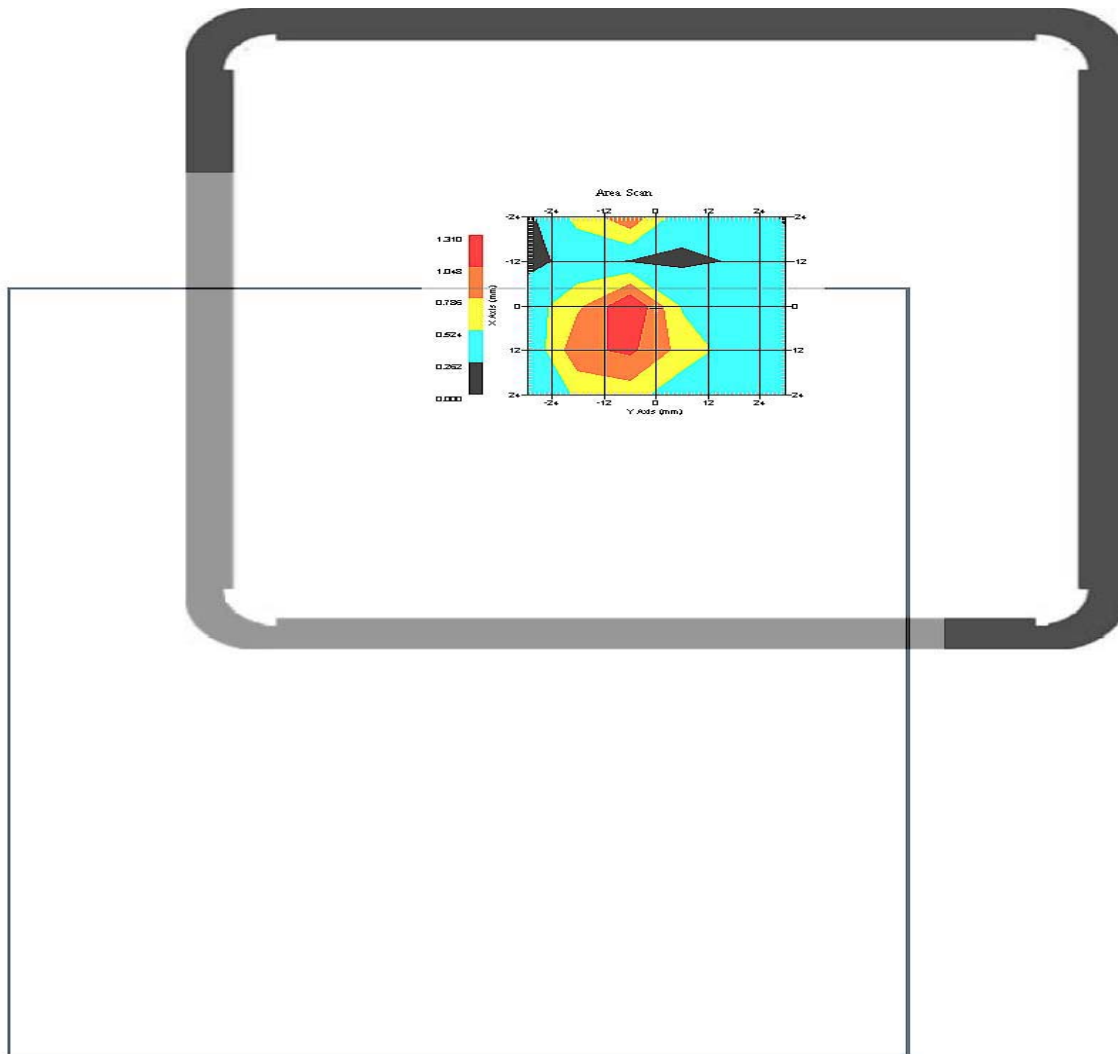
1 gram SAR value : 1.448 W/kg
 10 gram SAR value : 0.675 W/kg
 Area Scan Peak SAR : 1.234 W/kg
 Zoom Scan Peak SAR : 3.603 W/kg



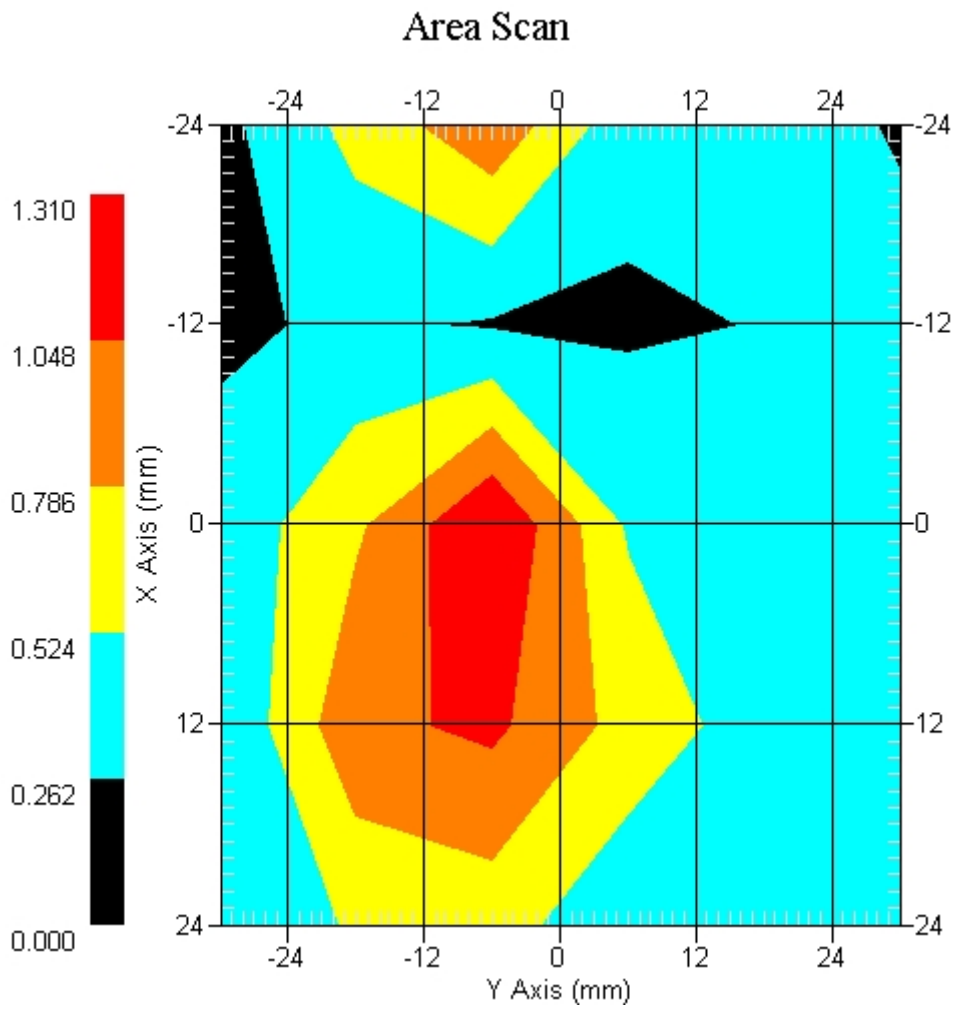
Measurement Data

Crest Factor : 1
 Tissue Temp. : 21.50 °C
 Ambient Temp. : 22.40 °C
 Area Scan : 5x6x1 : Measurement x=12mm, y=12mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.851 W/kg
 Power Drift-Finish: 0.873 W/kg
 Power Drift (%) : 2.583

DUT Position : Touch EUT Back
 Channel : 157



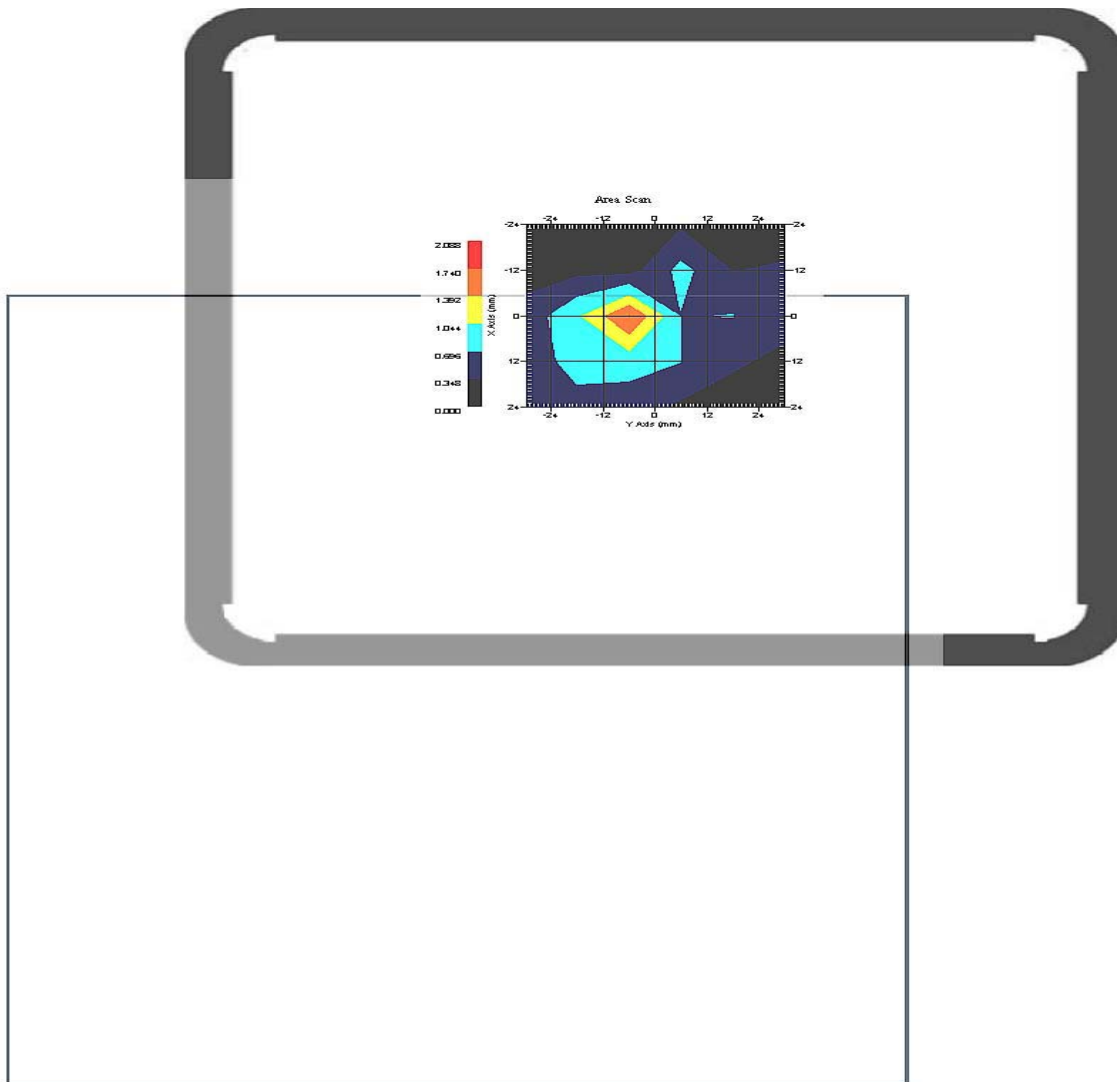
1 gram SAR value : 1.452 W/kg
 10 gram SAR value : 0.672 W/kg
 Area Scan Peak SAR : 1.309 W/kg
 Zoom Scan Peak SAR : 3.963 W/kg



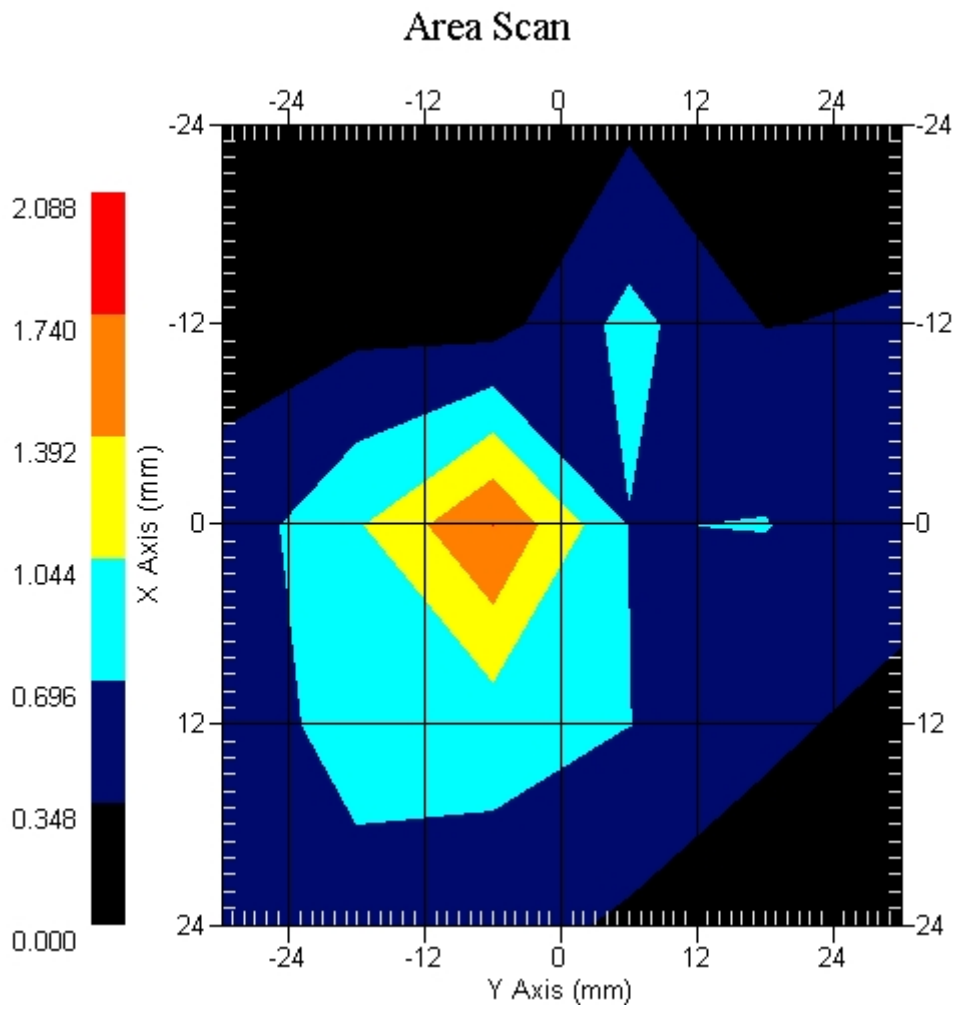
Measurement Data

Crest Factor : 1
Tissue Temp. : 21.50 °C
Ambient Temp. : 22.40 °C
Area Scan : 5x6x1 : Measurement x=12mm, y=12mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 1.053 W/kg
Power Drift-Finish: 1.072 W/kg
Power Drift (%) : 1.807

DUT Position : Touch EUT Back
Channel : 165



1 gram SAR value : 1.204 W/kg
10 gram SAR value : 0.595 W/kg
Area Scan Peak SAR : 1.741 W/kg
Zoom Scan Peak SAR : 3.142 W/kg



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Humidity : 56.00 RH%
Epsilon : 49.41 F/m
Sigma : 6.234 S/m
Density : 1000.00 kg/cu. m

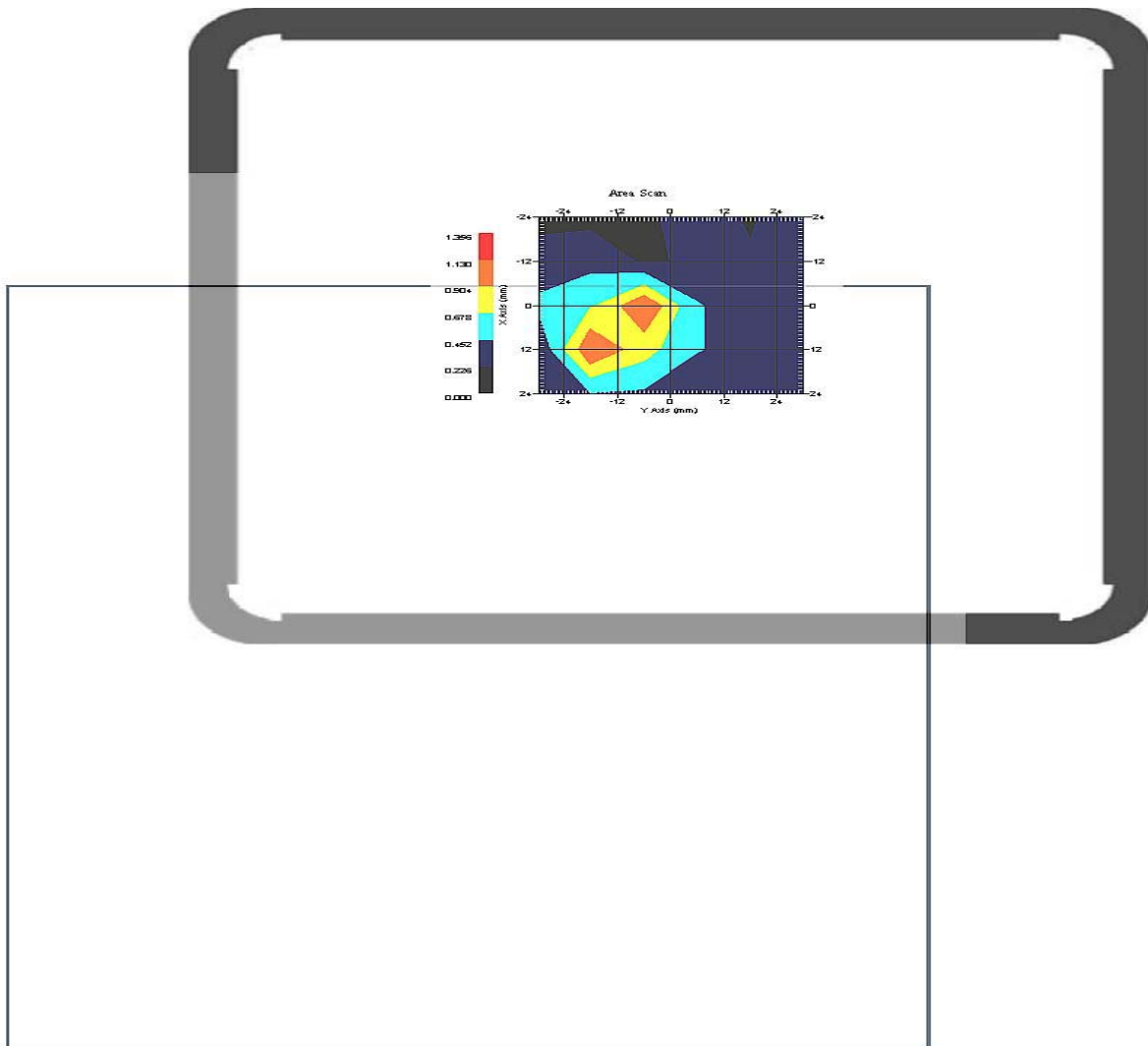
Probe Data

Name : Probe 264
Model : E020
Type : E-Field Triangle
Serial No. : 264
Last Calib. Date : 21-Mar-2006
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Duty Cycle Factor: 1
Conversion Factor: 4.3
Probe Sensitivity: 0.61 0.61 0.61 $\mu\text{V}/(\text{V}/\text{m})^2$
Compression Point: 95.00 mV
Offset : 1.56 mm

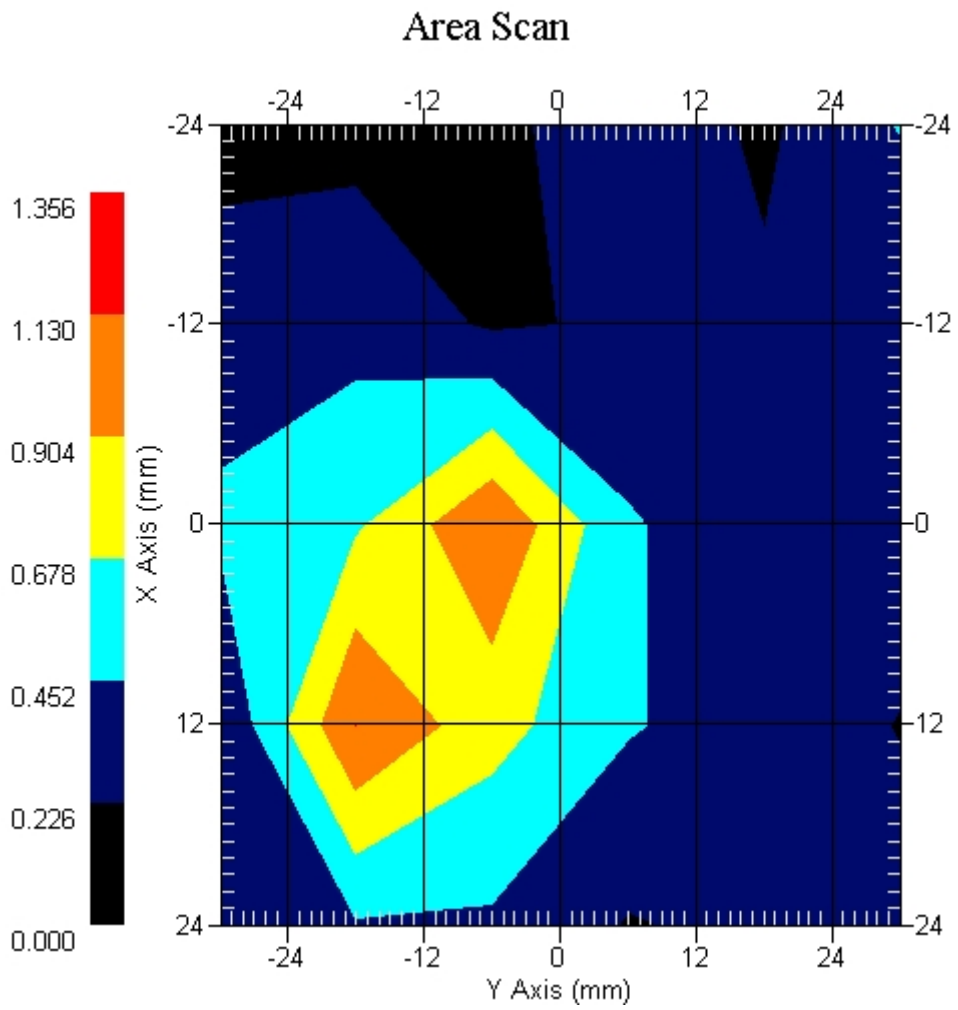
Measurement Data

Crest Factor : 1
 Tissue Temp. : 21.50 °C
 Ambient Temp. : 22.40 °C
 Area Scan : 5x6x1 : Measurement x=12mm, y=12mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.939 W/kg
 Power Drift-Finish: 0.961 W/kg
 Power Drift (%) : 2.359

DUT Position : Touch EUT Back
 Channel : 151



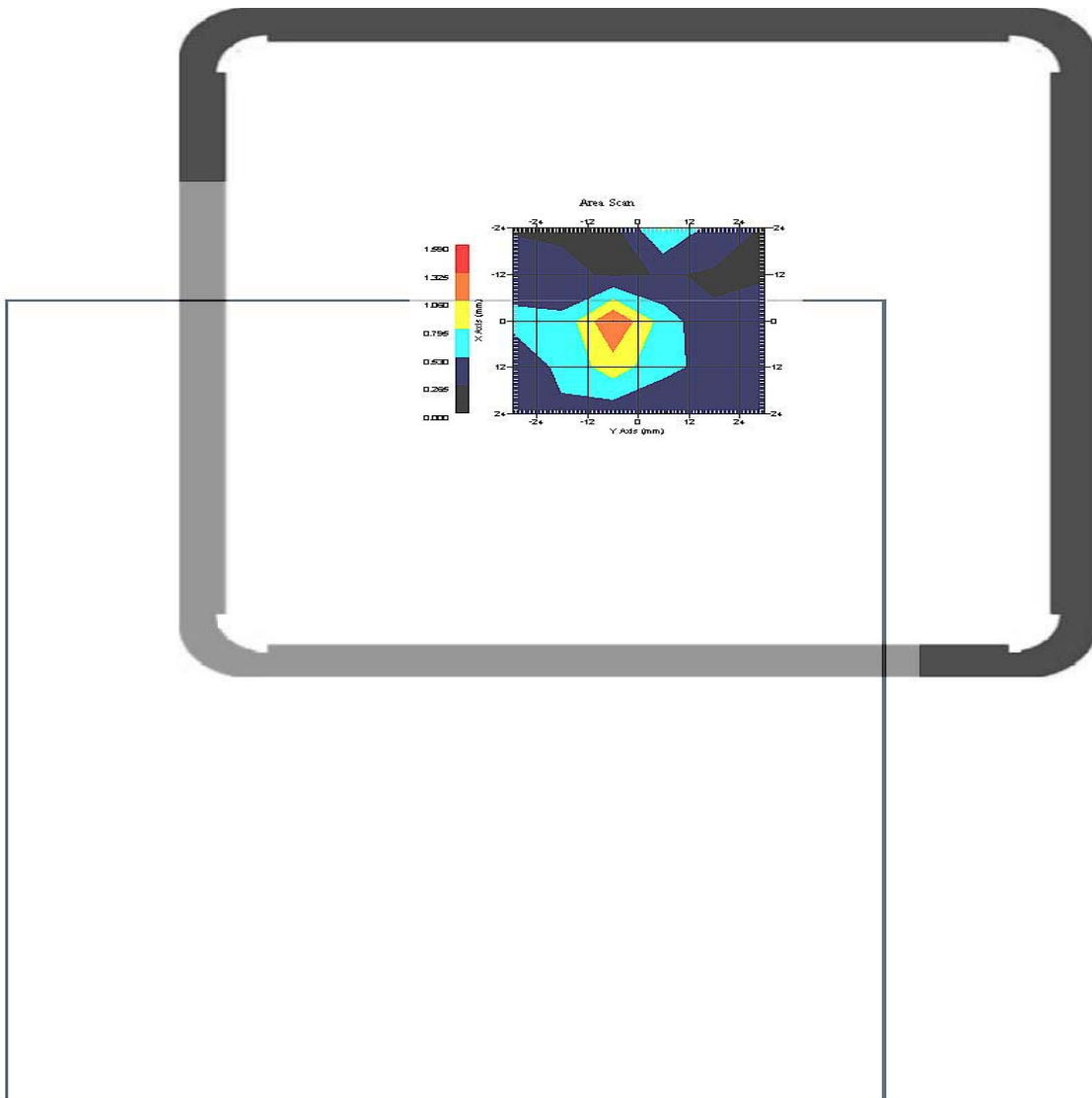
1 gram SAR value : 1.236 W/kg
 10 gram SAR value : 0.696 W/kg
 Area Scan Peak SAR : 1.131 W/kg
 Zoom Scan Peak SAR : 3.142 W/kg



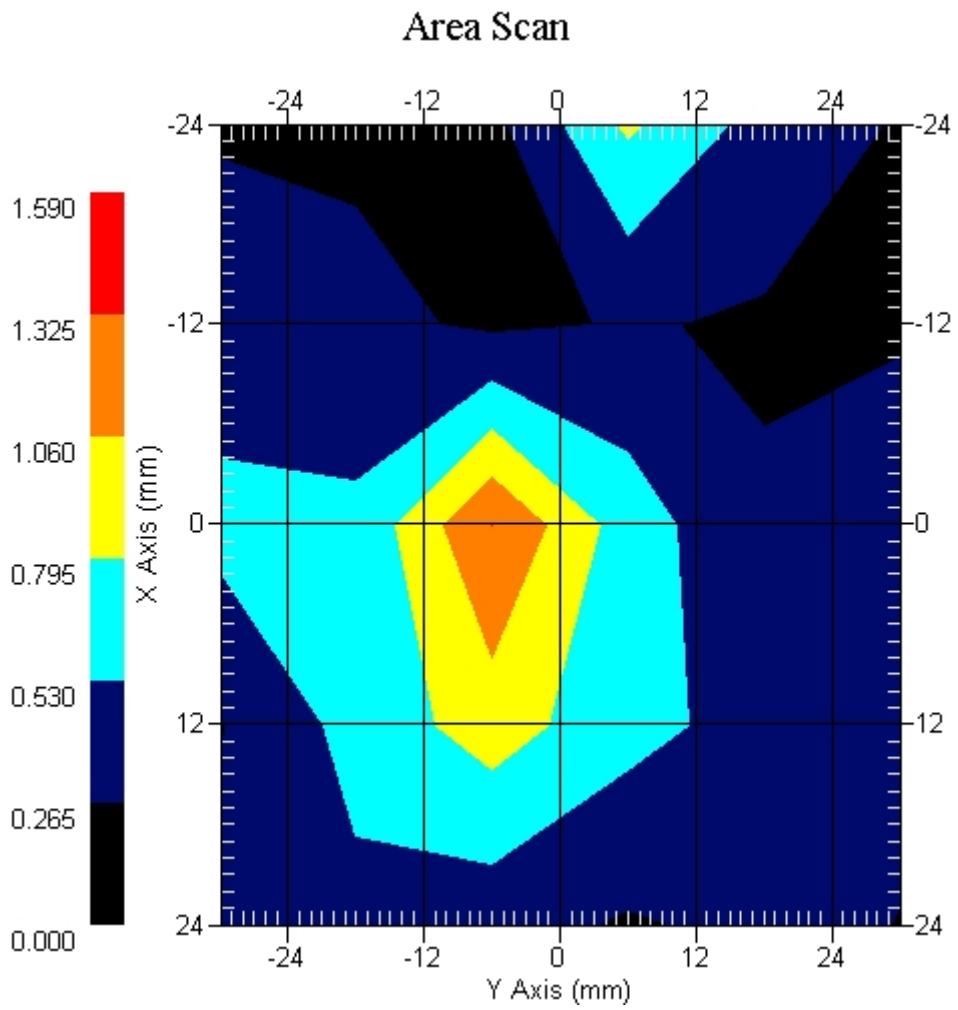
Measurement Data

Crest Factor : 1
Tissue Temp. : 21.50 °C
Ambient Temp. : 22.40 °C
Area Scan : 5x6x1 : Measurement x=12mm, y=12mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.861 W/kg
Power Drift-Finish: 0.848 W/kg
Power Drift (%) : -1.502

DUT Position : Touch EUT Back
Channel : 159



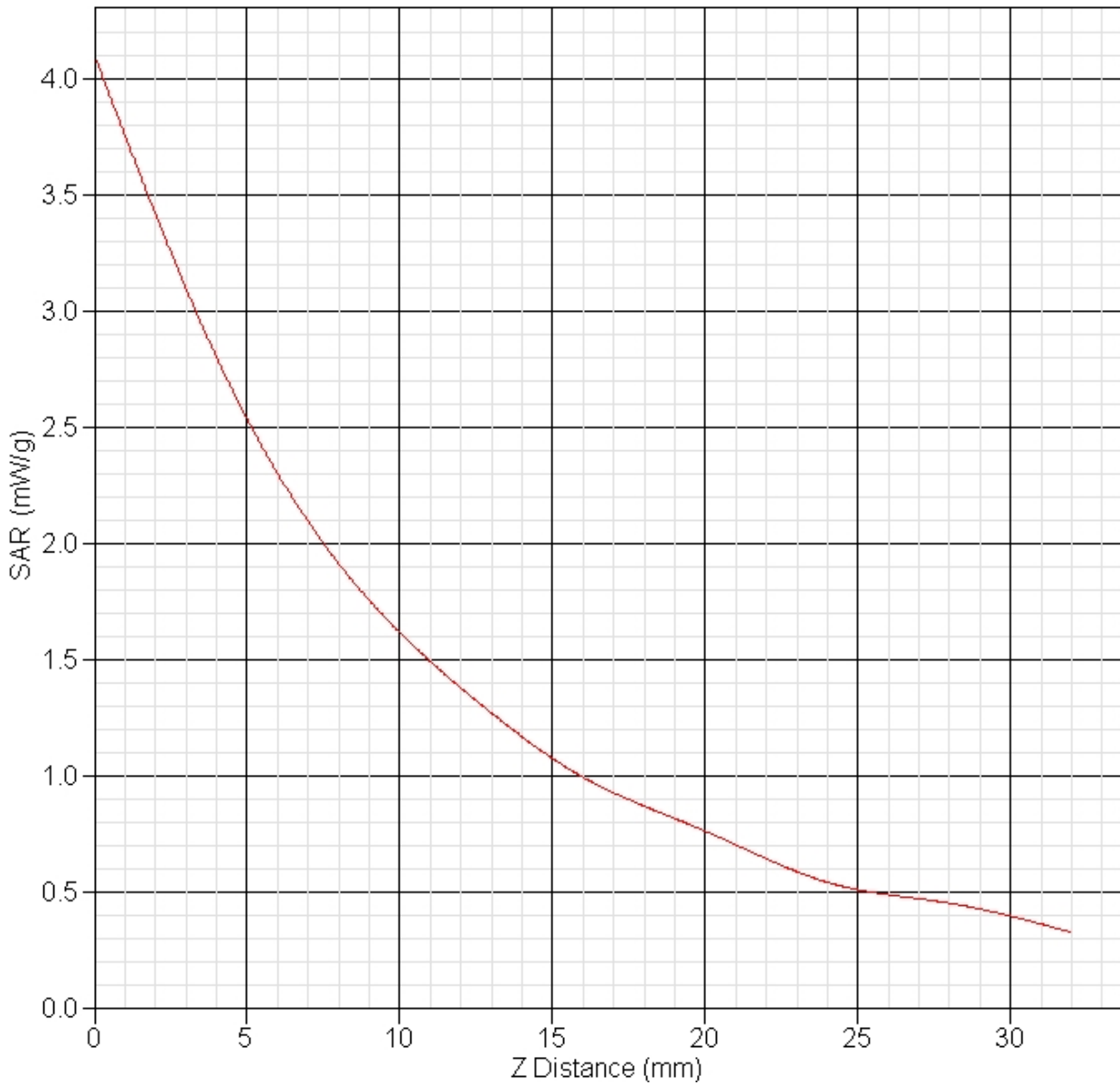
1 gram SAR value : 1.256 W/kg
10 gram SAR value : 0.660 W/kg
Area Scan Peak SAR : 1.326 W/kg
Zoom Scan Peak SAR : 3.432 W/kg



5.8 GHz Band Z-Axis plot

802.11a (6Mbps)-Antenna A (Tyco) channel: 149

SAR-Z Axis
at Hotspot x:0.05 y:-0.01



Test Setup Photographs**EUT Back**

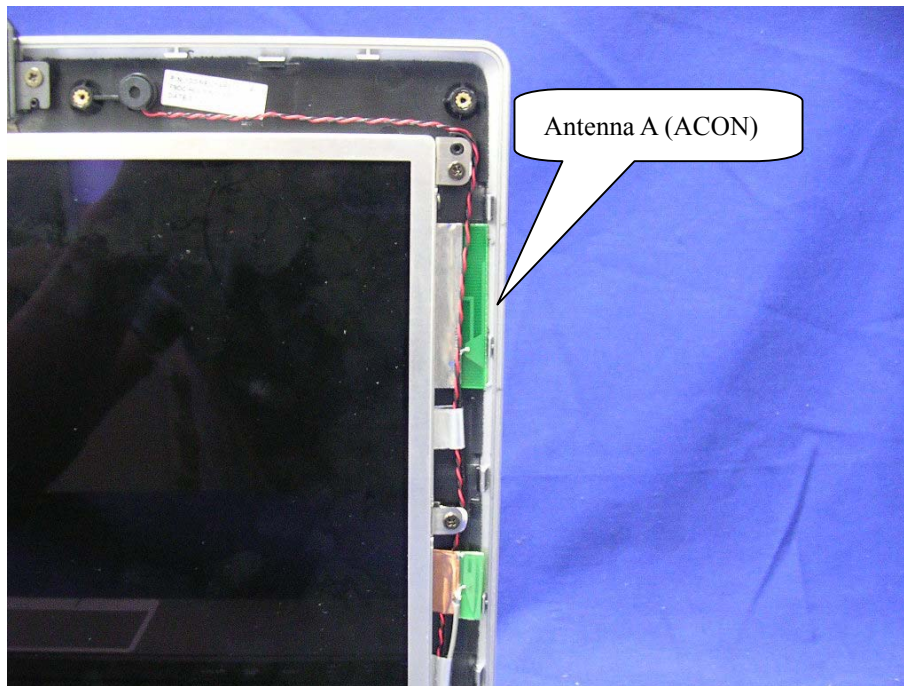
Note: The positions used in the measurements were according to IEEE 1528-2003.

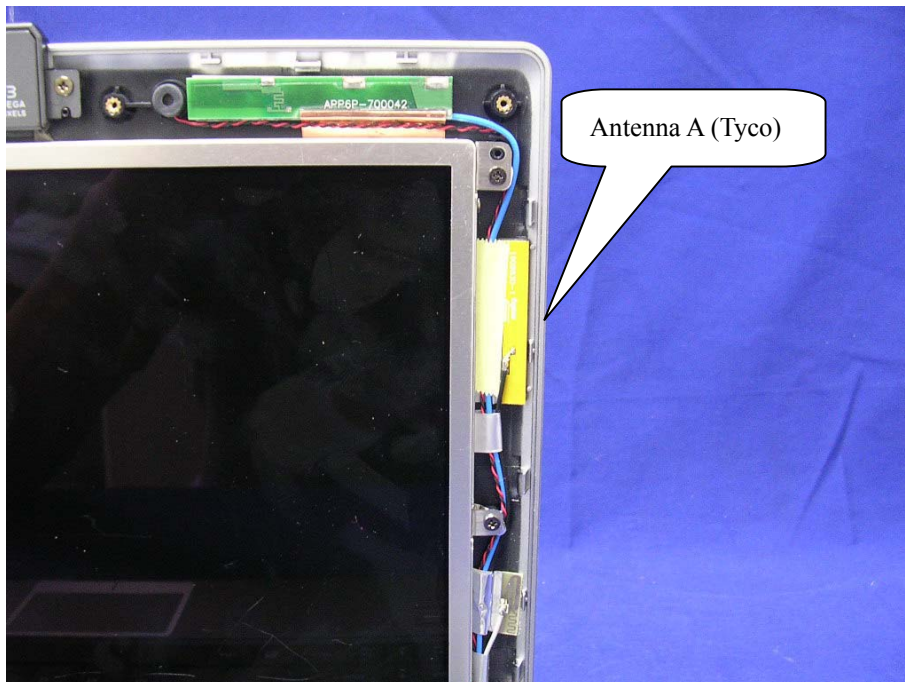
Test EUT Photographs

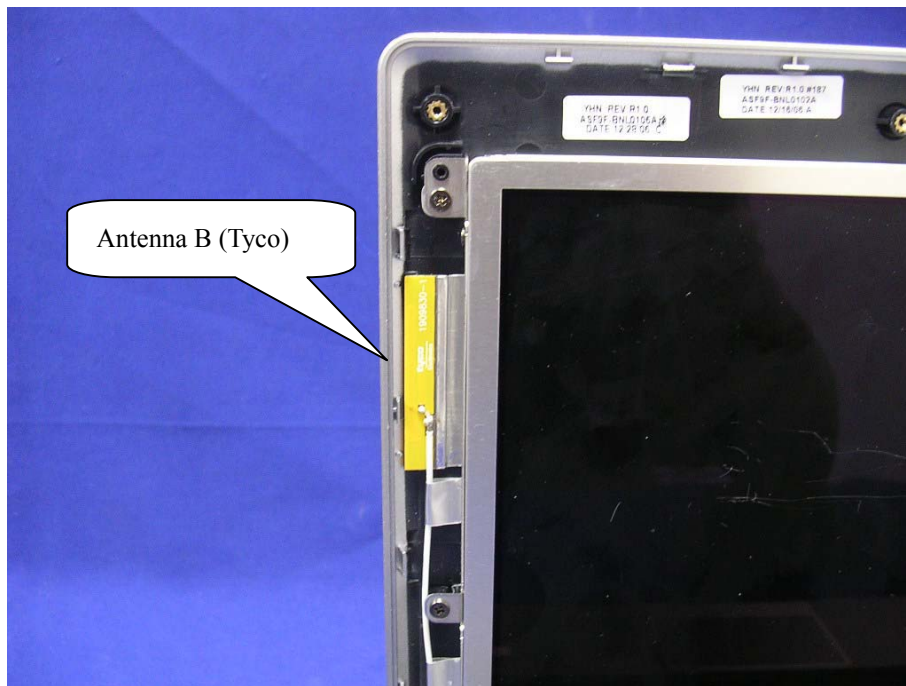














Appendix - Probe Calibration

Miniature Isotropic RF Probe

M/N: ALS-E-020

S/N: 264

2450MHz Head Calibration page 2~11

2450MHz Body Calibration page 12~21

5200MHz Head Calibration page 22~31

5200MHz Body Calibration page 32~41

5800MHz Head Calibration page 42~51

5800MHz Body Calibration page 52~61

NCL CALIBRATION LABORATORIES

Calibration File No.: CP-634

Client: QUIETEK

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 2450 MHz

Manufacturer: APREL Laboratories

Model No.: ALS-E-020

Serial No.: 264

HEAD Calibration


Calibration Procedure: SS/DRB-TP-D01-032-E020-V2

Project No: QUIB-Probe-Cal-5210

Calibrated: 21st March 2006

Released on: 21st March 2006

This Calibration Certificate is incomplete unless accompanied with the Calibration Results Summary

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

Temperature of the Tissue: 21 °C +/- 0.5 °C

We the undersigned attest that to the best of our knowledge the calibration of this probe has been accurately conducted and that all information contained

NCL Calibration Laboratories

Division of APREL Laboratories.

Introduction

This Calibration Report reproduces the results of the calibration performed in line with the SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure. The results contained within this report are for APREL E-Field Probe E-020 264.

References

SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure
IEEE 1528 "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-011 Tissue Calibration Procedure

Conditions

Probe 264 was a new probe taken from stock prior to calibration.

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

Temperature of the Tissue: 21 °C +/- 0.5°C

We the undersigned attest that to the best of our knowledge the calibration of this probe has been accurately conducted and that all information contained within this report has been reviewed for accuracy.



Stuart Nicol



Yi Pan

Page 2 of 10

This page has been reviewed for content and attested to on Page 2 of this document.

NCL Calibration Laboratories

Division of APREL Laboratories.

Calibration Results Summary

Probe Type:	E-Field Probe E-020
Serial Number:	264
Frequency:	2450 MHz
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

*Resistive to recommended tissue recipes per IEEE-1528

Sensitivity in Air

Channel X:	1.2 $\mu\text{V}/(\text{V}/\text{m})^2$
Channel Y:	1.2 $\mu\text{V}/(\text{V}/\text{m})^2$
Channel Z:	1.2 $\mu\text{V}/(\text{V}/\text{m})^2$
Diode Compression Point:	95 mV

NCL Calibration Laboratories

Division of APREL Laboratories.

Sensitivity in Head Tissue

Frequency: 2450 MHz

Epsilon: 39.2 (+/-5%)

Sigma: 1.80 S/m (+/-5%)

ConvF

Channel X: 5.0

Channel Y: 5.0

Channel Z: 5.0

Tissue sensitivity values were calculated using the load impedance of the APREL Laboratories Daq-Paq.

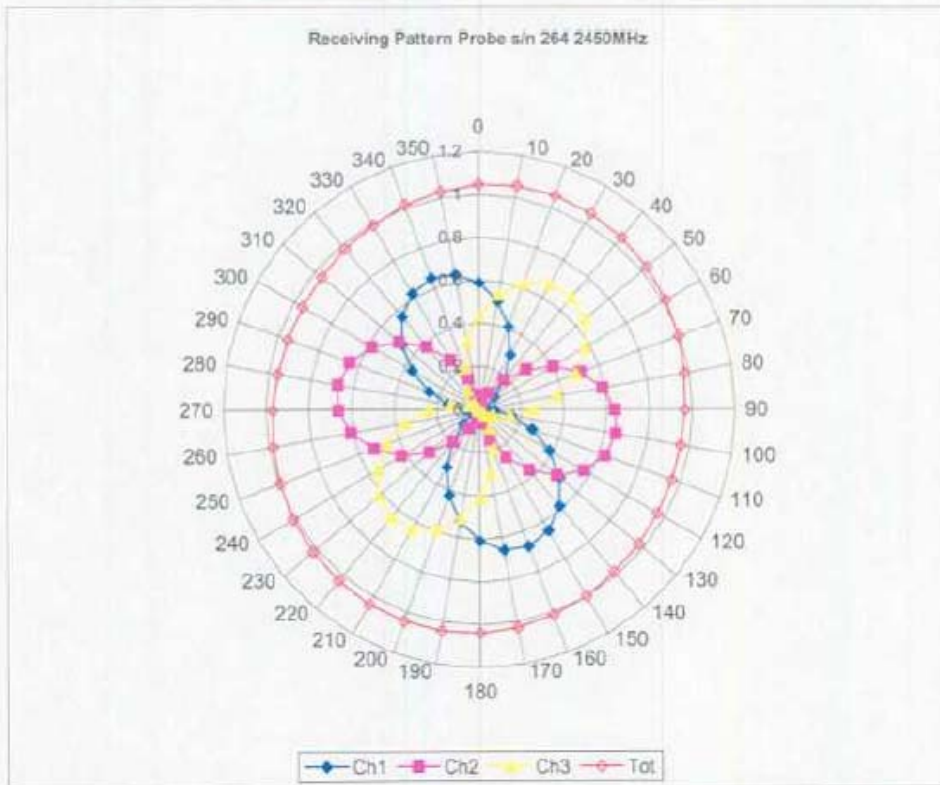
Boundary Effect:

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 2.44mm.

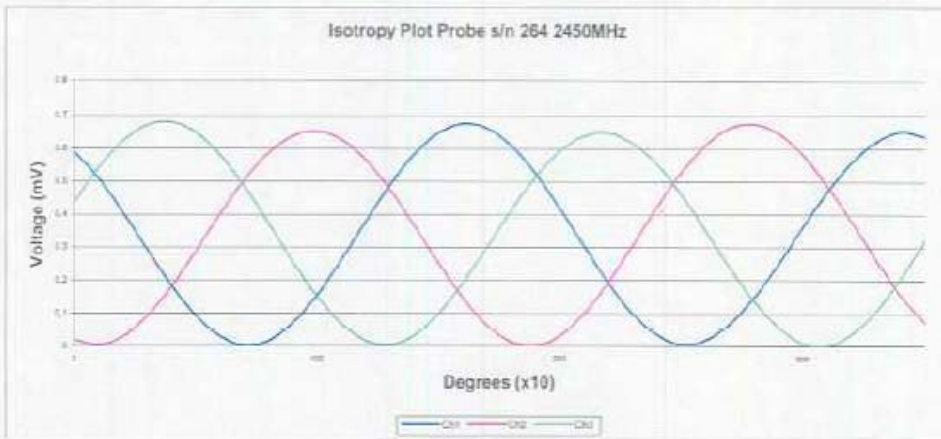
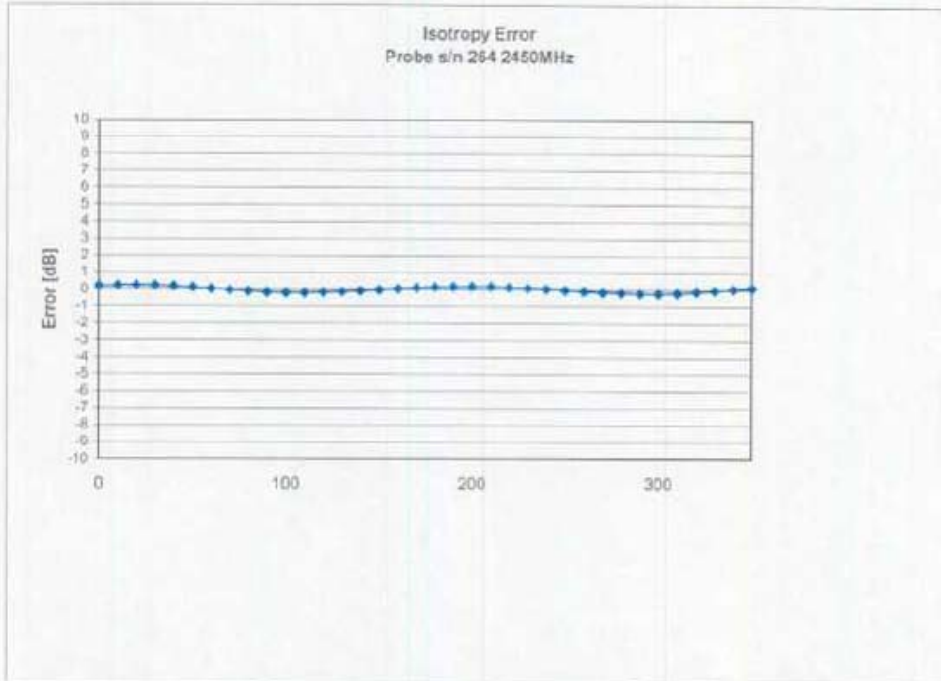
Spatial Resolution:

The measured probe tip diameter is 5 mm (+/- 0.01 mm) and therefore meets the requirements of SSI/DRB-TP-D01-032 for spatial resolution.

Receiving Pattern 2450 MHz (Air)



Isotropy Error 2450 MHz (Air)



Isotropicity in Tissue:

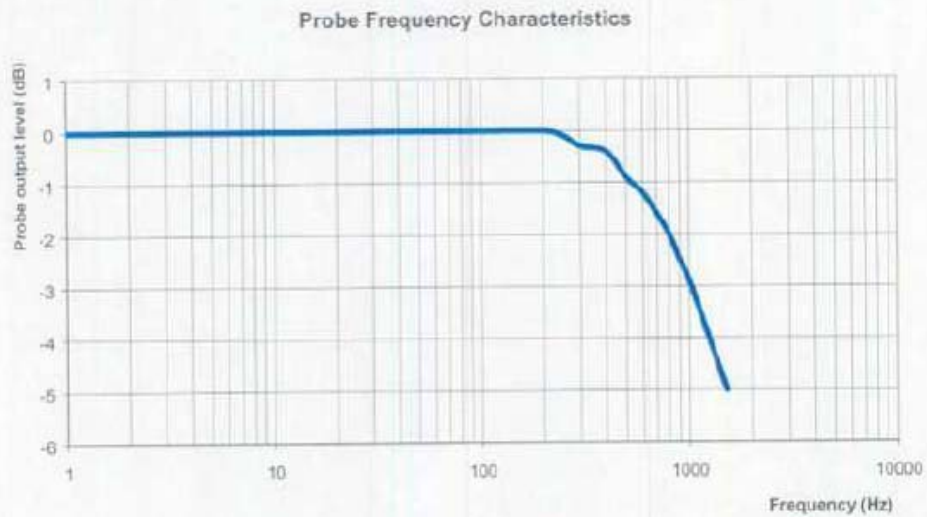
0.10 dB

Dynamic Range



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Video Bandwidth



Video Bandwidth at 500 Hz	1 dB
Video Bandwidth at 1000 Hz	3 dB

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Division of APREL Laboratories.

Conversion Factor Uncertainty Assessment

Frequency: 2450MHz

Epsilon: 39.2 (+/-5%)

Sigma: 1.80 S/m (+/-5%)

ConvF

Channel X: 5.0 7%(K=2)

Channel Y: 5.0 7%(K=2)

Channel Z: 5.0 7%(K=2)

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

Boundary Effect:

For a distance of 2.4mm the evaluated uncertainty (increase in the probe sensitivity) is less than 2%.

NCL Calibration Laboratories

Division of APREL Laboratories.

Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List.

Page 10 of 10

This page has been reviewed for content and attested to on Page 2 of this document.

NCL CALIBRATION LABORATORIES

Calibration File No.: CP-641

Client: QUIETEK

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 2450 MHz

Manufacturer: APREL Laboratories

Model No.: ALS-E-020

Serial No.: 264

BODY Calibration

Calibration Procedure: SS/DRB-TP-D01-032-E020-V2

Project No: QUIB-Probe-Cal-5210

Calibrated: 21st March 2006

Released on: 21st March 2006

This Calibration Certificate is incomplete unless accompanied with the Calibration Results Summary

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

NCL Calibration Laboratories

Division of APREL Laboratories.

Introduction

This Calibration Report reproduces the results of the calibration performed in line with the SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure. The results contained within this report are for APREL E-Field Probe E-020 264.

References

SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure
IEEE 1528 "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-011 Tissue Calibration Procedure

Conditions

Probe 264 was a new probe taken from stock prior to calibration.

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

Temperature of the Tissue: 21 °C +/- 0.5°C

We the undersigned attest that to the best of our knowledge the calibration of this probe has been accurately conducted and that all information contained within this report has been reviewed for accuracy.



Stuart Nicol



Yi Pan

Page 2 of 10

This page has been reviewed for content and attested to on Page 2 of this document.

NCL Calibration Laboratories

Division of APREL Laboratories.

Calibration Results Summary

Probe Type:	E-Field Probe E-020
Serial Number:	264
Frequency:	2450 MHz
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

*Resistive to recommended tissue recipes per IEEE-1528

Sensitivity in Air

Channel X:	$1.2 \mu\text{V}/(\text{V}/\text{m})^2$
Channel Y:	$1.2 \mu\text{V}/(\text{V}/\text{m})^2$
Channel Z:	$1.2 \mu\text{V}/(\text{V}/\text{m})^2$
Diode Compression Point:	95 mV

NCL Calibration Laboratories

Division of APREL Laboratories.

Sensitivity in Body Tissue

Frequency: 2450 MHz

Epsilon: 52.7 (+/-5%)

Sigma: 1.95 S/m (+/-5%)

ConvF

Channel X: 5.2

Channel Y: 5.2

Channel Z: 5.2

Tissue sensitivity values were calculated using the load impedance of the APREL Laboratories Daq-Paq.

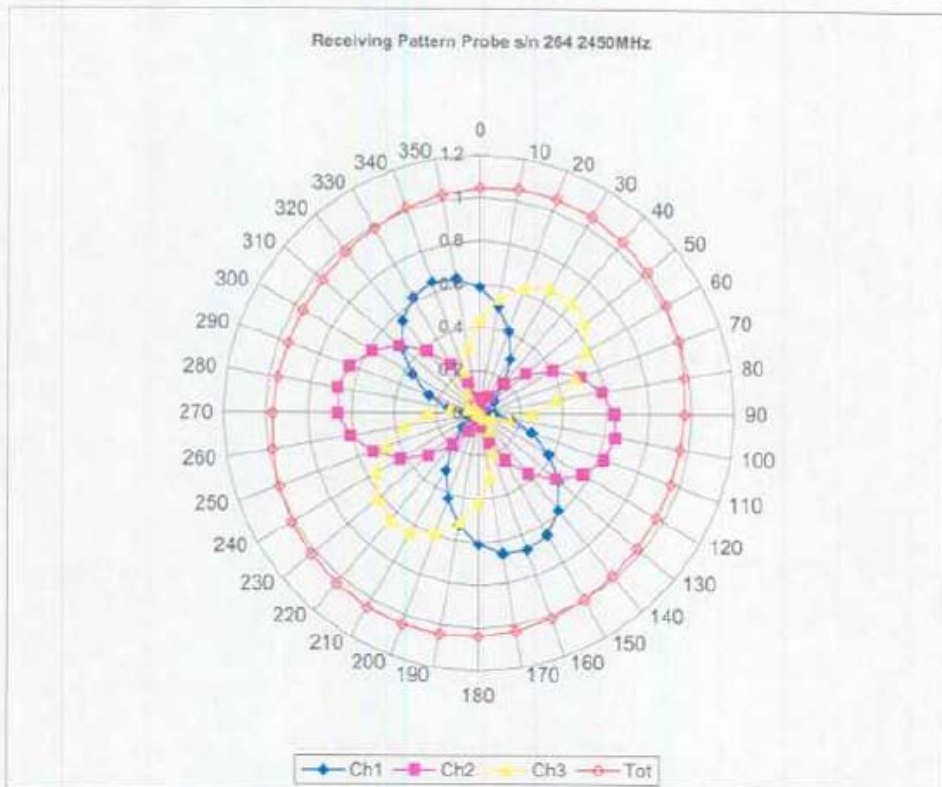
Boundary Effect:

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 2.44mm.

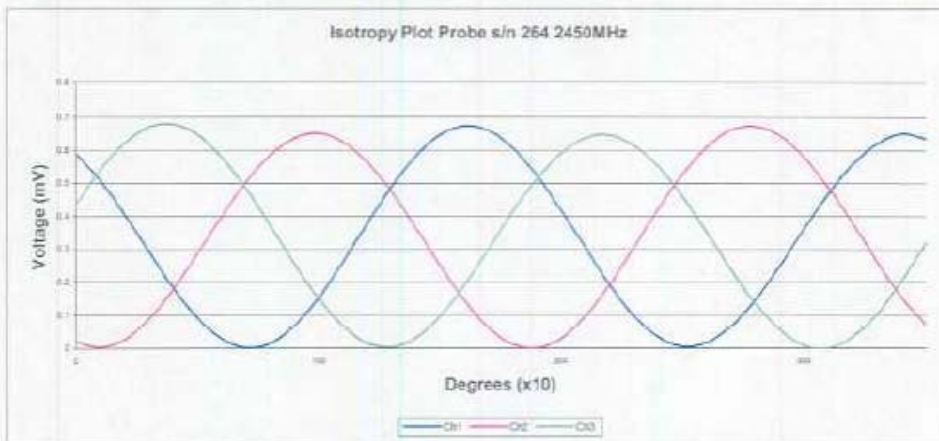
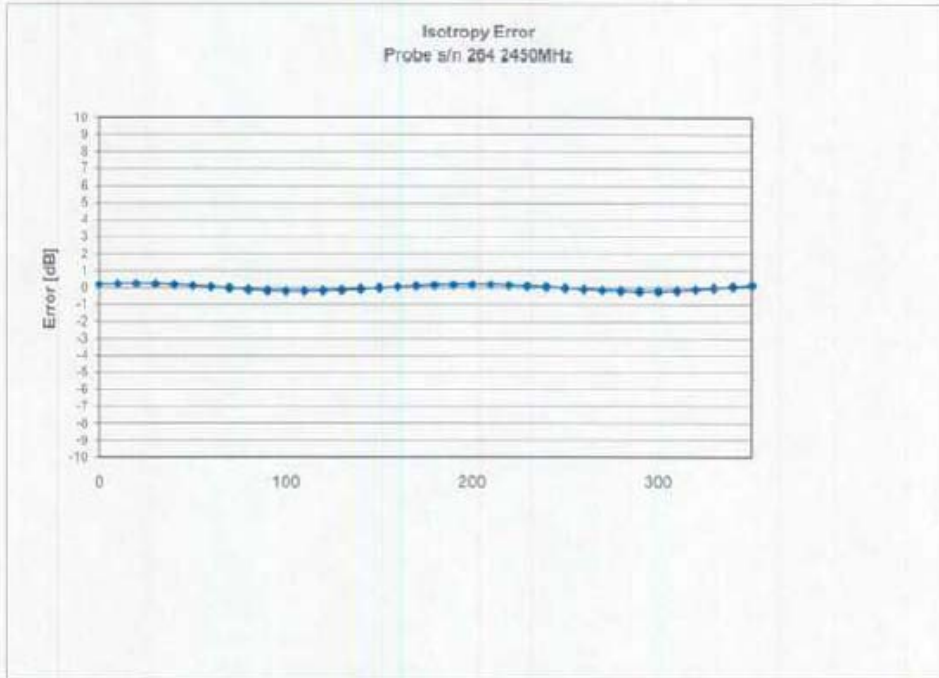
Spatial Resolution:

The measured probe tip diameter is 5 mm (+/- 0.01 mm) and therefore meets the requirements of SSI/DRB-TP-D01-032 for spatial resolution.

Receiving Pattern 2450 MHz (Air)



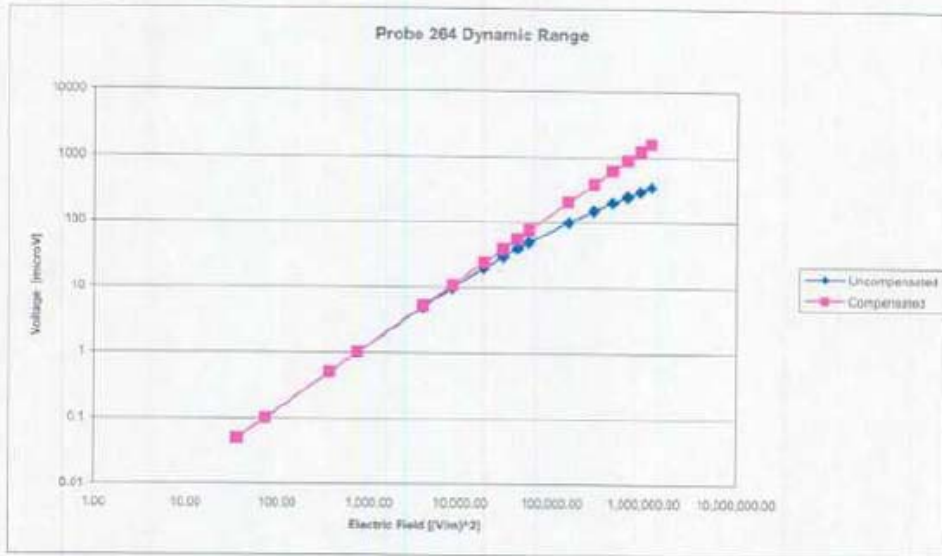
Isotropy Error 2450 MHz (Air)



Isotropy in Tissue:

0.10 dB

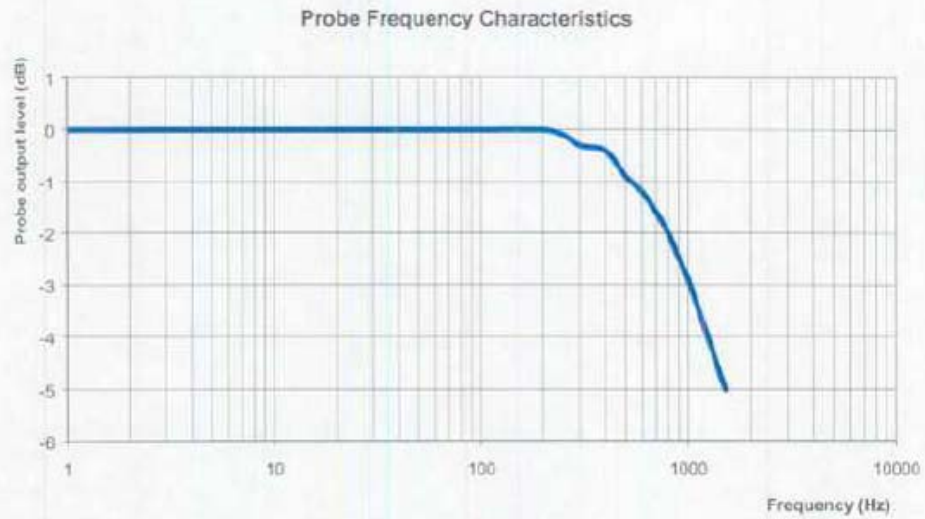
Dynamic Range



NCL Calibration Laboratories

Division of APREL Laboratories.

Video Bandwidth



Video Bandwidth at 500 Hz 1 dB
Video Bandwidth at 1000 Hz 3 dB

NCL Calibration Laboratories

Division of APREL Laboratories

Conversion Factor Uncertainty Assessment

Frequency:		2450MHz	
Epsilon:	52.7 (+/-5%)	Sigma:	1.95 S/m (+/-5%)
ConvF			
Channel X:	5.2		7%(K=2)
Channel Y:	5.2		7%(K=2)
Channel Z:	5.2		7%(K=2)

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

Boundary Effect:

For a distance of 2.4mm the evaluated uncertainty (increase in the probe sensitivity) is less than 2%.