

TEST REPORT

Equipment Under Test	: 802.11b Cardbus Interface WLAN Card
Model No.	: CBWLRP
FCC ID	: NLF-CBWLRP
Applicant	: Billionton Systems Inc.
Address of Applicant	: No.21, Sui-Lih Rd,. Hsin-Chu, 300, Taiwan.
Date of Receipt	: 2003.11.03
Date of Test(s)	: 2003.11.03-2003.11.04
Date of Issue	: 2003.11.04

Standards:

**FCC OET Bulletin 65 supplement C,
ANSI / IEEE C95.1 , C95.3**

In the configuration tested, the EUT complied with the standards specified above.

Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS Taiwan E&E Services or testing done by SGS Taiwan E&E Services in connection with distribution or use of the product described in this report must be approved by SGS Taiwan E&E Services in writing.

Tested by : Dikin Yang **Date** : 2003.11.07

Approved by : Robert Chang **Date** : 2003.11.07

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1. General Information

1.1 Testing Laboratory

SGS Taiwan Ltd. (FCC Registration number: 573967)
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Taipei county , Taiwan , R.O.C.
Telephone : +886-2-2299-3279
Fax : +886-2-2298-2698
Internet : <http://www.sgs.com.tw>

1.2 Details of Applicant

Applicant : Billionton Systems Inc.
Address : No.21, Sui-Lih Rd., Hsin-Chu, 300, Taiwan.
Product Name : 802.11b Cardbus Interface WLAN Card
Model Name : CBWLRP

Applicant : DSG Retail Ltd.
Address : Dixons House, 200 The Campus, Maylands
Avenue, Hemel Hempstead, Hertfordshire,
HP2 71G, United Kingdom.
Product Name : CardBus Wireless LAN
Model Name : CBWLRP-N-DX

Applicant : Cables Direct Limited
Address : Unit C, Heage Road Industrial Estate, Heage
Road, Ripley, Derbyshire, DE5 3GH, United
Kingdom.
Product Name : CardBus Wireless LAN
Model Name : CBWLRP-N-CDL

1.3 Description of EUT(s)

Equipment Type	802.11b Cardbus Interface WLAN Card
Test Procedure	FCC OET Bulletin 65, Supplement C
TX Frequency range	2412-2462 MHz
FCC ID	NLF-CBWLRP
Model(s)	CBWLRT
RF Conducted Output Power	802.11b Mode
	18.92 dBm (2412MHz)
	18.08 dBm (2437MHz)
	17.78 dBm (2462MHz)
Max. SAR Measured	0.107 W/kg (Body-worn)
Antenna Type	Retractable
Battery Type(s)	From PCMCIA slot 3.3V/5V
Host Laptop PC(s) Tested	IBM ThinkPad T30 (S/N: 99AMZM5)

1.4 Test Environment

Ambient temperature : 22.6° C

Tissue Simulating Liquid : 22° C

Relative Humidity : 62 %

1.5 Operation Configuration

EUT's Antenna is retractable(Fig.18 & Fig.19) , and it also can be rotated by 360 ° ,so we use six normal case to measurement SAR.

Configuration 1: "End-on" placement; Bottom of the Pc is paralleled and at a distance of 0.0 cm from the base of the phantom, but 1.2 cm Spacing between EUT & Planar Phantom, and Antenna isn't extended. (Fig.4 & Fig.5)

Configuration 2: "End-on" placement; Bottom of the Pc is paralleled and at a distance of 0.0 cm from the base of the phantom, but 1.2 cm Spacing between EUT & Planar Phantom, and the antenna is in horizontal direction. (Fig.6 & Fig.7)

Configuration 3: "End-on" placement; Bottom of the Pc is paralleled and at a distance of 0.0 cm from the base of the phantom, but 1.2 cm Spacing between

EUT & Planar Phantom, and the antenna tip is downward. (Fig.8& Fig.9)

Configuration 4: " Edge-on" placement; edge of the PC at 90° and at a distance of 1.5 cm from the base of the phantom (Fig.11 & Fig.12)

Configuration 5: " Edge-on" placement; edge of the PC at 90° and at a distance of 1.5 cm from the base of the phantom, and the antenna tip is upward. (Fig.13 & Fig.14)

Configuration 6: " Edge-on" placement; edge of the PC at 90° and at a distance of 1.5 cm from the base of the phantom, and the antenna is in horizontal direction. (Fig.15 & Fig.16)

1.6 The SAR Measurement System

A photograph of the SAR measurement System is given in Fig. a. This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (Speag Dasy 4 professional system). A Model ET3DV6 1759 E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation $SAR = \sigma (|E_i|^2) / \rho$ where σ and ρ are the conductivity and mass density of the tissue-simulant.

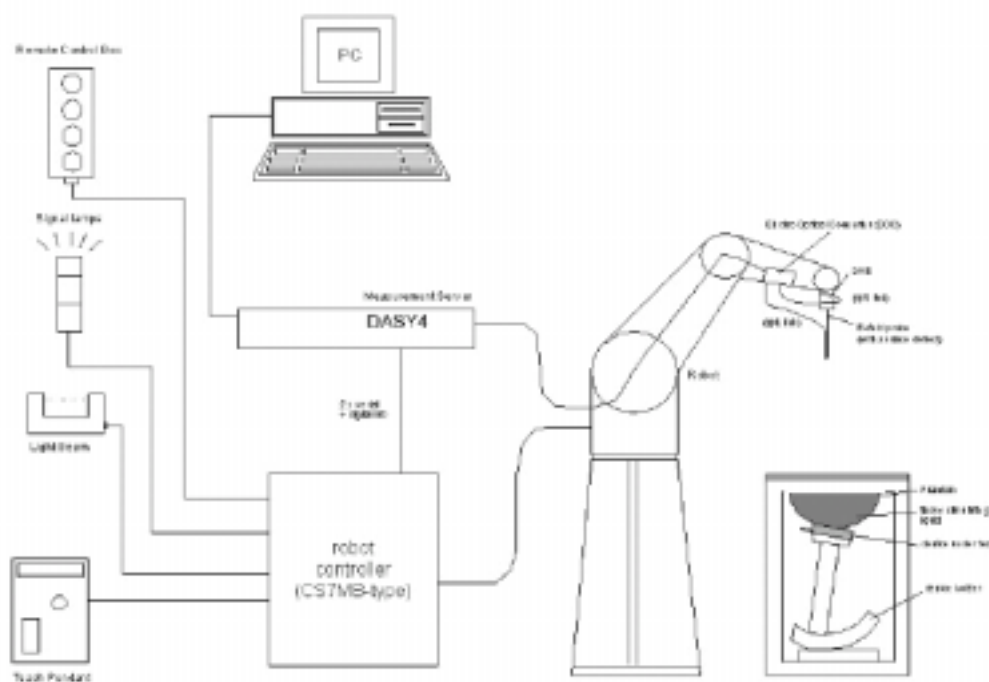


Fig. a The microwave circuit arrangement used for SAR system verification

The DASY4 system for performing compliance tests consists of the following items:

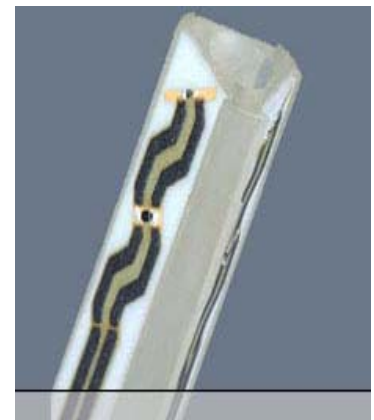
- A standard high precision 6-axis robot (Staubli RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).

- A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 2000 or Windows XP.
- DASY4 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validate the proper functioning of the system.

1.7 System Components

ET3DV6 E-Field Probe

Construction:	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g. glycol)
Calibration:	In air from 10 MHz to 2.5 GHz In brain simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy $\pm 8\%$)
Frequency:	10 MHz to >6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)



ET3DV6 E-Field Probe

Directivity: ± 0.2 dB in brain tissue (rotation around probe axis)
 ± 0.4 dB in brain tissue (rotation normal to probe axis)

Dynamic Range: 5 μ W/g to >100 mW/g; Linearity: ± 0.2 dB

Surface Detect: ± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces

Dimensions: Overall length: 330 mm
Tip length: 16 mm
Body diameter: 12 mm
Tip diameter: 6.8 mm
Distance from probe tip to dipole centers: 2.7 mm

Application: General dosimetry up to 3 GHz
Compliance tests of mobile phone

SAM PHANTOM V4.0C

Construction: The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-200X, CENELEC 50361 and IEC 62209. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points with the robot.

Shell Thickness: 2 ± 0.2 mm

Filling Volume: Approx. 25 liters

Dimensions: Height: 810 mm;
Length: 1000 mm;
Width: 500 mm



PHANTOM v4.0C

DEVICE HOLDER

Construction

In combination with the Twin SAM Phantom V4.0/V4.0C or Twin SAM, the Mounting Device (made from POM) enables the rotation of the mounted transmitter in spherical coordinates, whereby the rotation point is the ear opening. The devices can be easily and accurately positioned according to IEC, IEEE, CENELEC, FCC or other specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).



Device Holder

1.8 SAR System Verification

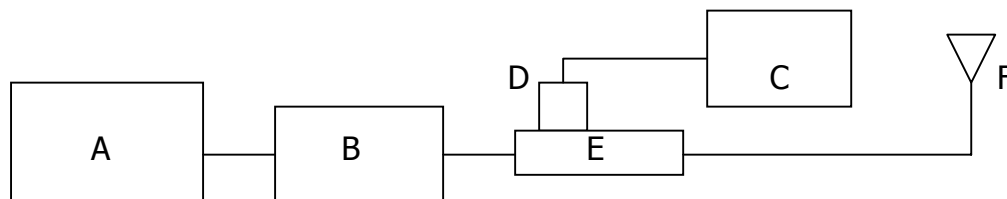


Fig. b The microwave circuit arrangement used for SAR system verification

- A. Agilent Model 8648D Signal Generator
- B. Mini circuits Model ZHL-42 Amplifier
- C. Agilent Model E4416A Power Meter
- D. Agilent Model 8482H Power Sensor
- E. Agilent Model 777D Dual directional coupling
- F. Reference dipole antenna



Photograph of the 2450MHz System Check

Validation Kit	Frequency	Target SAR 1g (250mW)	Target SAR 10g (250mW)	Measured SAR 1g	Measured SAR 10g	Measured date
DT3DV6 S/N :1759	2450 MHz	13.7 m W/g	6.02 m W/g	13.5 m W/g	5.97 m W/g	2003-11-03

Table 1. Results system validation

The microwave circuit arrangement for system verification is sketched in Fig. b. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within $\pm 10\%$ from the target SAR values. These tests were done at 1900MHz. The tests were conducted on the same days as the measurement of the DUT. The obtained results from the system accuracy verification are displayed in the table 1 (SAR values are normalized to 1W forward power delivered to the dipole). During the tests, the ambient temperature of the laboratory was in the range 22.3 °C, the relative humidity was in the range 54% and the liquid depth above the ear reference points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

1.9 Tissue Simulant Fluid for the Frequency Band 2.4 to 2.5 GHz

The dielectric properties for this body-simulant fluid were measured by using the HP Model 85070D Dielectric Probe (rates frequency band 200 MHz to 20 GHz) in conjunction with HP 8714ET Network Analyzer(300 KHz-3000 MHz) by using a procedure detailed in Section V.

F (Mhz)	Tissue type	Limits/ Measured	Dielectric Parameters		
			Permittivity	Conductivity	Simulated Tissue Temp(° C)
2450	Body	Measured, 03-Nov-03	51.78	1.916	21.5
		Measured, 03-Nov-03	51.52	1.89	21.5
		Recommended Limits	50.1-55.3	1.85-2.05	20-24

All dielectric parameters of tissue simulates were measured within 24 hours of SAR measurements. The depth of the tissue simulant in the ear reference point of the phantom was $15\text{cm} \pm 5\text{mm}$ during all tests. (Fig .2)

The composition of the brain tissue simulating liquid for 2450 MHz is:

Ingredient	2450Mhz (Head)	2450Mhz (Body)
DGMBE	550.0 g	301.7 ml
Water	450.0 g	698.3 ml
Total amount	1 L (1.0kg)	1 L (1.0kg)

1.10 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate ("SAR") in Section 4.2 of "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," ANSI/IEEE C95.1–1992, Copyright 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in "Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and shall apply for portable devices transmitting in the frequency range from 100 kHz to 6 GHz. Portable devices that transmit at frequencies above 6 GHz are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter. Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

(1) Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over an 10 grams of tissue (defined as a tissue volume in the shape of a cube). Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.

(2) Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). General Population/Uncontrolled limits apply when the general public may be

exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure. Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section.(Table .4)

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR (Brain)	1.60 m W/g	8.00 m W/g
Spatial Average SAR (Whole Body)	0.08 m W/g	0.40 m W/g
Spatial Peak SAR (Hands/Feet/Ankle/Wrist)	4.00 m W/g	20.00 m W/g

Table .4 RF exposure limits

Notes:

1. Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.
2. Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.

2. Instruments List

Manufacturer	Device	Type	Serial number	Date of last calibration
Schmid & Partner Engineering AG	Dosimetric E-Fiel Probe	ET3DV6	1759	Mar.07.2003
Schmid & Partner Engineering AG	2450 MHz System Validation Dipole	D2450V2	727	Mar.05. 2003
Schmid & Partner Engineering AG	Data acquisition Electronics	DAE3	547	Jan.30.2003
Schmid & Partner Engineering AG	Software	DASY 4 V4.1c Build 47	---	Calibration isn't necessary
Schmid & Partner Engineering AG	Phantom	SAM	---	Calibration isn't necessary
Agilent	Network Analyser	8714ET	US41442815	Jan.16.2003
Agilent	Dielectric Probe Kit	85070D	US01440168	Jan.20.2003
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	102189	Aug.11.2003

3.Summary of Results

EUT Configuration 1

EUT Set-up conditions		Frequency		Conducted Power [dBm] (Peak)	Liquid Temp[°C]	SAR (W/kg)	Limit (W/kg)
Sep. [cm]	Antenna	Channel	MHz				
1.5		1	2412	18.92 dBm (2412MHz)	22.1	0.005	1.6
		6	2437	18.08 dBm (2437MHz)	22.2	0.006	
		11	2462	17.78 dBm (2462MHz)	22	0.007	

EUT Configuration 2

EUT Set-up conditions		Frequency		Conducted Power [dBm] (Peak)	Liquid Temp[°C]	SAR (W/kg)	Limit (W/kg)
Sep. [cm]	Antenna	Channel	MHz				
1.5		1	2412	18.92 dBm (2412MHz)	22.1	0.107	1.6
		6	2437	18.08 dBm (2437MHz)	22	0.0914	
		11	2462	17.78 dBm (2462MHz)	22	0.0926	

EUT Configuration 3

EUT Set-up conditions		Frequency		Conducted Power [dBm] (Peak)	Liquid Temp[°C]	SAR (W/kg)	Limit (W/kg)
Sep. [cm]	Antenna	Channel	MHz				
1.5		1	2412	18.92 dBm (2412MHz)	22.1	0.00911	1.6
		6	2437	18.08 dBm (2437MHz)	22	0.01	
		11	2462	17.78 dBm (2462MHz)	22	0.0112	

EUT Configuration 4

EUT Set-up conditions		Frequency		Conducted Power [dBm] (Peak)	Liquid Temp[°C]	SAR (W/kg)	Limit (W/kg)
Sep. [cm]	Antenna	Channel	MHz				
0.0		1	2412	18.92 dBm (2412MHz)	22.1	0.0094	1.6
		6	2437	18.08 dBm (2437MHz)	22.1	0.0084	
		11	2462	17.78 dBm (2462MHz)	22	0.0093	

EUT Configuration 5

EUT Set-up conditions		Frequency		Conducted Power [dBm] (Peak)	Liquid Temp[°C]	SAR (W/kg)	Limit (W/kg)
Sep. [cm]	Antenna	Channel	MHz				
0.0		1	2412	18.92 dBm (2412MHz)	22.1	0.0106	1.6
		6	2437	18.08 dBm (2437MHz)	22.2	0.00948	
		11	2462	17.78 dBm (2462MHz)	22	0.00779	

EUT Configuration 6

EUT Set-up conditions		Frequency		Conducted Power [dBm] (Peak)	Liquid Temp[°C]	SAR (W/kg)	Limit (W/kg)
Sep. [cm]	Antenna	Channel	MHz				
0.0		1	2412	18.92 dBm (2412MHz)	22.1	0.106	1.6
		6	2437	18.08 dBm (2437MHz)	21.9	0.0985	
		11	2462	17.78 dBm (2462MHz)	22	0.096	

Crest factor : 1 (Duty cycle: 100%)

Laptop PC : IBM ThinkPad T30 , S/N: 99AMZM5

Depth of Liquid : 15.0 cm

Measured Mixture Type	Body	Relative Humidity	62%
Ambient Temperature	22.6°C	Fluid Temperature	22°C

4. Measurements

End-on position, lowest channel

Date/Time: 11/04/03 09:30:33

Configuration 1

DUT: 802.11b Wireless PCMCIA Card ; Type: CBWLRT;

Program: 802.11b Wireless PCMCIA Card

Communication System: Wireless LAN; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: M2450 ($\sigma = 1.91174$ mho/m, $\epsilon_r = 52.4599$, $\rho = 1000$ kg/m³)

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Horizontal 0.0cm/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 1.33 V/m

Power Drift = -0.5 dB

Maximum value of SAR = 0.00729 mW/g

Horizontal 0.0cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 0.0145 W/kg

SAR(1 g) = 0.00564 mW/g; SAR(10 g) = 0.0024 mW/g

Reference Value = 1.33 V/m

Power Drift = -0.5 dB

Maximum value of SAR = 0.00619 mW/g



0 dB = 0.00619mW/g

End-on position, middle channel
Configuration 1

Date/Time: 11/04/03 09:56:20

DUT: 802.11b Wireless PCMCIA Card ; Type: CBWLRT;
Program: 802.11b Wireless PCMCIA Card

Communication System: Wireless LAN; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: M2450 ($\sigma = 1.88499$ mho/m, $\epsilon_r = 51.8552$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Horizontal 0.0cm/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 1.29 V/m

Power Drift = 0.6 dB

Maximum value of SAR = 0.0077 mW/g

Horizontal 0.0cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 0.016 W/kg

SAR(1 g) = 0.00638 mW/g; SAR(10 g) = 0.00275 mW/g

Reference Value = 1.29 V/m

Power Drift = 0.6 dB

Maximum value of SAR = 0.00678 mW/g



0 dB = 0.00678mW/g

End-on position, highest channel Configuration 1

Date/Time: 11/04/03 10:20:25

DUT: 802.11b Wireless PCMCIA Card ; Type: CBWLRT;
Program: 802.11b Wireless PCMCIA Card

Communication System: Wireless LAN; Frequency: 2462 MHz; Duty Cycle: 1:1
Medium: M2450 ($\sigma = 1.91369$ mho/m, $\epsilon_r = 51.3206$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Horizontal 0.0cm/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 1.37 V/m

Power Drift = -0.4 dB

Maximum value of SAR = 0.00862 mW/g

Horizontal 0.0cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 0.0193 W/kg

SAR(1 g) = 0.00761 mW/g; SAR(10 g) = 0.00325 mW/g

Reference Value = 1.37 V/m

Power Drift = -0.4 dB

Maximum value of SAR = 0.00817 mW/g



0 dB = 0.00817mW/g

End-on position, lowest channel Configuration 2

Date/Time: 11/05/03 11:16:43

DUT: 802.11b Wireless PCMCIA Card ; Type: CBWLRT;
Program: 802.11b Wireless PCMCIA Card

Communication System: Wireless LAN; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: M2450 ($\sigma = 1.91174$ mho/m, $\epsilon_r = 52.4599$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Horizontal 0.0cm/Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 3 V/m

Power Drift = -0.3 dB

Maximum value of SAR = 0.121 mW/g

Horizontal 0.0cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

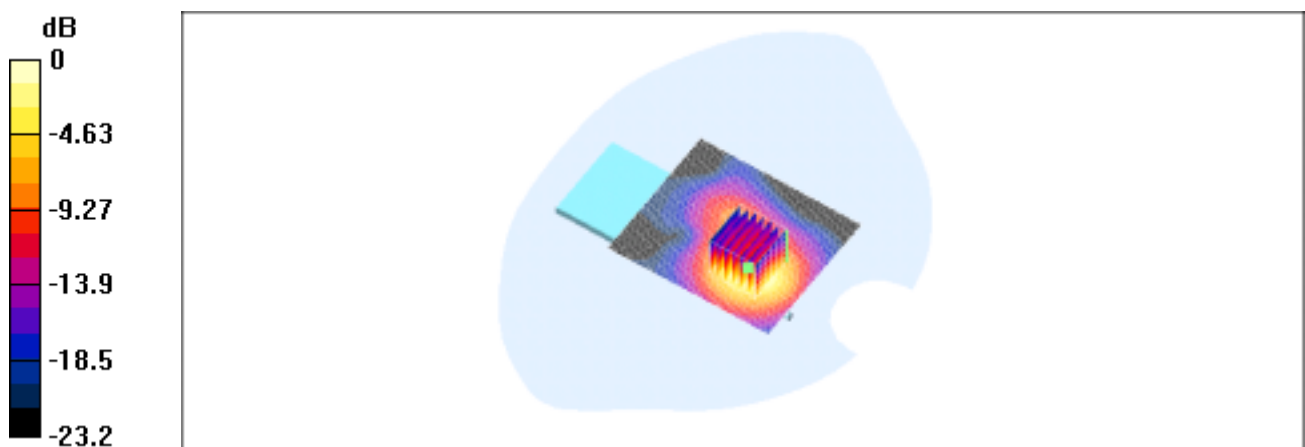
Peak SAR (extrapolated) = 0.219 W/kg

SAR(1 g) = 0.107 mW/g; SAR(10 g) = 0.0528 mW/g

Reference Value = 3 V/m

Power Drift = -0.3 dB

Maximum value of SAR = 0.113 mW/g



0 dB = 0.113mW/g

End-on position, middle channel
Configuration 2

Date/Time: 09/17/03 15:14:45

DUT: 802.11b Wireless PCMCIA Card ; Type: CBWLRT;
Program: 802.11b Wireless PCMCIA Card

Communication System: Wireless LAN; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: M2450 ($\sigma = 1.88499$ mho/m, $\epsilon_r = 51.8552$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Horizontal 0.0cm/Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 3.11 V/m

Power Drift = -0.05 dB

Maximum value of SAR = 0.108 mW/g

Horizontal 0.0cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

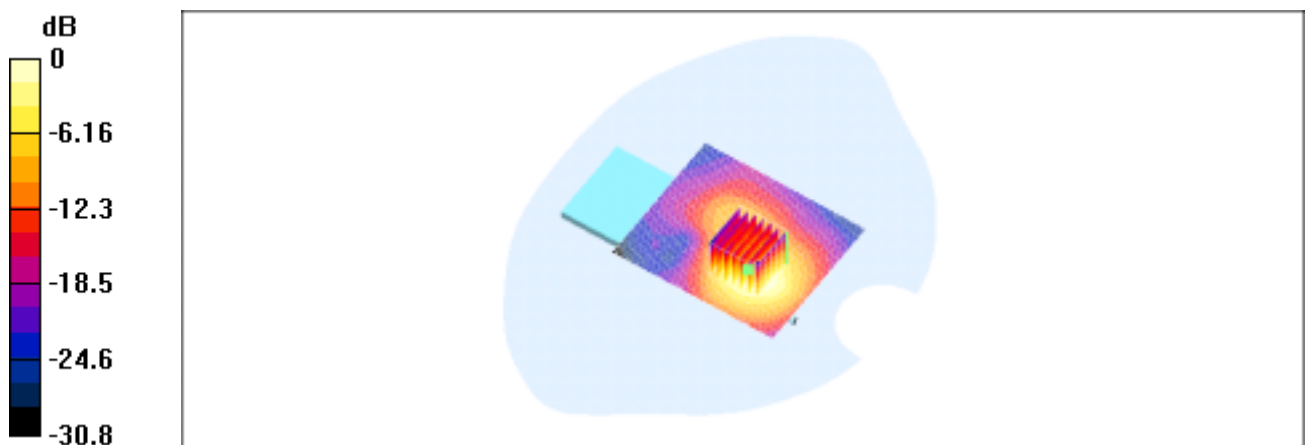
Peak SAR (extrapolated) = 0.188 W/kg

SAR(1 g) = 0.0914 mW/g; SAR(10 g) = 0.0458 mW/g

Reference Value = 3.11 V/m

Power Drift = -0.05 dB

Maximum value of SAR = 0.0965 mW/g



0 dB = 0.0965mW/g

End-on position, highest channel Configuration 2

Date/Time: 11/05/03 12:38:24

DUT: 802.11b Wireless PCMCIA Card ; Type: CBWLRT;
Program: 802.11b Wireless PCMCIA Card

Communication System: Wireless LAN; Frequency: 2462 MHz; Duty Cycle: 1:1
Medium: M2450 ($\sigma = 1.91369$ mho/m, $\epsilon_r = 51.3206$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Horizontal 0.0cm/Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 2.97 V/m

Power Drift = -0.04 dB

Maximum value of SAR = 0.0926 mW/g

Horizontal 0.0cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

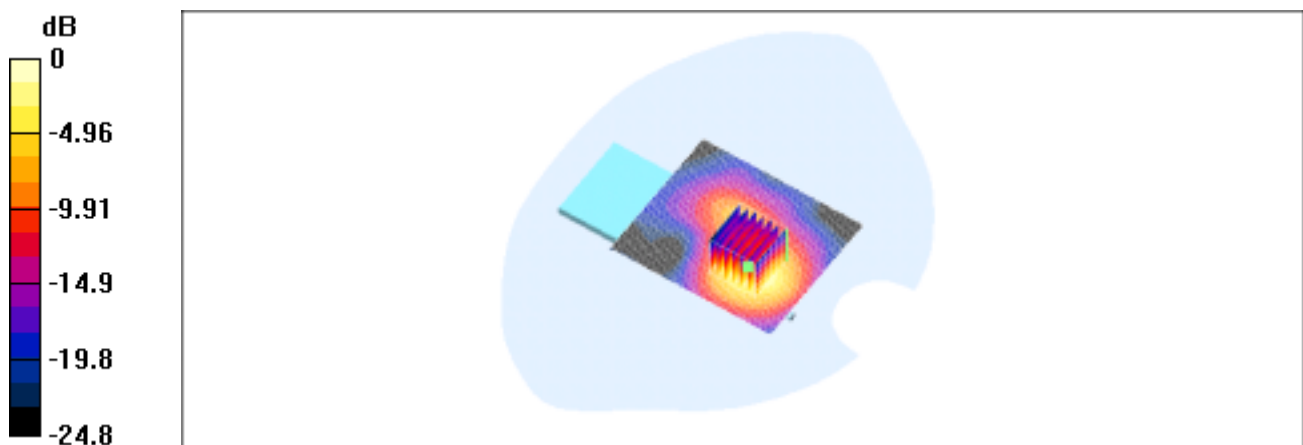
Peak SAR (extrapolated) = 0.195 W/kg

SAR(1 g) = 0.0926 mW/g; SAR(10 g) = 0.0452 mW/g

Reference Value = 2.97 V/m

Power Drift = -0.04 dB

Maximum value of SAR = 0.0993 mW/g



End-on position, lowest channel
Configuration 3

Date/Time: 11/05/03 14:47:38

DUT: 802.11b Wireless PCMCIA Card ; Type: CBWLRT;
Program: 802.11b Wireless PCMCIA Card

Communication System: Wireless LAN; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: M2450 ($\sigma = 1.91174$ mho/m, $\epsilon_r = 52.4599$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Horizontal 0.0cm/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 1.21 V/m

Power Drift = -0.5 dB

Maximum value of SAR = 0.00973 mW/g

Horizontal 0.0cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 0.0428 W/kg

SAR(1 g) = 0.00911 mW/g; SAR(10 g) = 0.00388 mW/g

Reference Value = 1.21 V/m

Power Drift = -0.5 dB

Maximum value of SAR = 0.00953 mW/g



End-on position, middle channel
Configuration 3

Date/Time: 11/05/03 15:13:37

DUT: 802.11b Wireless PCMCIA Card ; Type: CBWLRT;
Program: 802.11b Wireless PCMCIA Card

Communication System: Wireless LAN; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: M2450 ($\sigma = 1.88499$ mho/m, $\epsilon_r = 51.8552$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Horizontal 0.0cm/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 0.998 V/m

Power Drift = 0.7 dB

Maximum value of SAR = 0.00979 mW/g

Horizontal 0.0cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 0.0274 W/kg

SAR(1 g) = 0.01 mW/g; SAR(10 g) = 0.00413 mW/g

Reference Value = 0.998 V/m

Power Drift = 0.7 dB

Maximum value of SAR = 0.0109 mW/g



0 dB = 0.0109mW/g

End-on position, highest channel
Configuration 3

Date/Time: 11/05/03 15:35:25

DUT: 802.11b Wireless PCMCIA Card ; Type: CBWLRT;
Program: 802.11b Wireless PCMCIA Card

Communication System: Wireless LAN; Frequency: 2462 MHz; Duty Cycle: 1:1
Medium: M2450 ($\sigma = 1.91369$ mho/m, $\epsilon_r = 51.3206$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Horizontal 0.0cm/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 0.866 V/m

Power Drift = 2 dB

Maximum value of SAR = 0.0098 mW/g

Horizontal 0.0cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

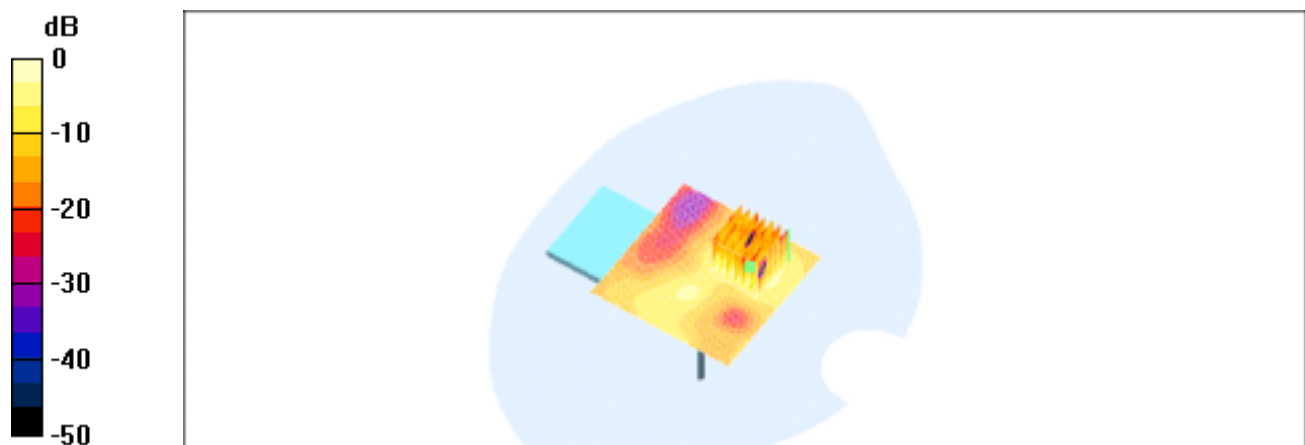
Peak SAR (extrapolated) = 0.0372 W/kg

SAR(1 g) = 0.0112 mW/g; SAR(10 g) = 0.0047 mW/g

Reference Value = 0.866 V/m

Power Drift = 2 dB

Maximum value of SAR = 0.0121 mW/g



0 dB = 0.0121mW/g

Edge-on position, lowest channel
Configuration 4

Date/Time: 11/04/03 16:17:45

DUT: 802.11b Wireless PCMCIA Card ; Type: CBWLRT;
Program: 802.11b Wireless PCMCIA Card

Communication System: Wireless LAN; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: M2450 ($\sigma = 1.91174$ mho/m, $\epsilon_r = 52.4599$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Vertical 1.5cm/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 2.22 V/m

Power Drift = -0.1 dB

Maximum value of SAR = 0.0112 mW/g

Vertical 1.5cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 0.0221 W/kg

SAR(1 g) = 0.00937 mW/g; SAR(10 g) = 0.00409 mW/g

Reference Value = 2.22 V/m

Power Drift = -0.1 dB

Maximum value of SAR = 0.0103 mW/g



0 dB = 0.0103mW/g

Edge-on position, middle channel Configuration 4

Date/Time: 11/04/03 15:55:02

DUT: 802.11b Wireless PCMCIA Card ; Type: CBWLRT;
Program: 802.11b Wireless PCMCIA Card

Communication System: Wireless LAN; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: M2450 ($\sigma = 1.88499$ mho/m, $\epsilon_r = 51.8552$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Vertical 1.5cm/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 2.16 V/m

Power Drift = -0.4 dB

Maximum value of SAR = 0.0102 mW/g

Vertical 1.5cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 0.019 W/kg

SAR(1 g) = 0.00837 mW/g; SAR(10 g) = 0.00367 mW/g

Reference Value = 2.16 V/m

Power Drift = -0.4 dB

Maximum value of SAR = 0.00911 mW/g



0 dB = 0.00911mW/g

Edge-on position, highest channel Configuration 4

Date/Time: 11/04/03 15:24:59

DUT: 802.11b Wireless PCMCIA Card ; Type: CBWLRT;
Program: 802.11b Wireless PCMCIA Card

Communication System: Wireless LAN; Frequency: 2462 MHz; Duty Cycle: 1:1
Medium: M2450 ($\sigma = 1.91369$ mho/m, $\epsilon_r = 51.3206$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Vertical 1.5cm/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 2.16 V/m

Power Drift = 0.05 dB

Maximum value of SAR = 0.0105 mW/g

Vertical 1.5cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 0.0223 W/kg

SAR(1 g) = 0.00934 mW/g; SAR(10 g) = 0.00402 mW/g

Reference Value = 2.16 V/m

Power Drift = 0.05 dB

Maximum value of SAR = 0.01 mW/g



0 dB = 0.01mW/g

Edge-on position, lowest channel Configuration 5

Date/Time: 11/05/03 18:24:58

DUT: 802.11b Wireless PCMCIA Card ; Type: CBWLRT;
Program: 802.11b Wireless PCMCIA Card

Communication System: Wireless LAN; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: M2450 ($\sigma = 1.91174$ mho/m, $\epsilon_r = 52.4599$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Vertical 1.5cm/Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 0.942 V/m

Power Drift = 2 dB

Maximum value of SAR = 0.0094 mW/g

Vertical 1.5cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

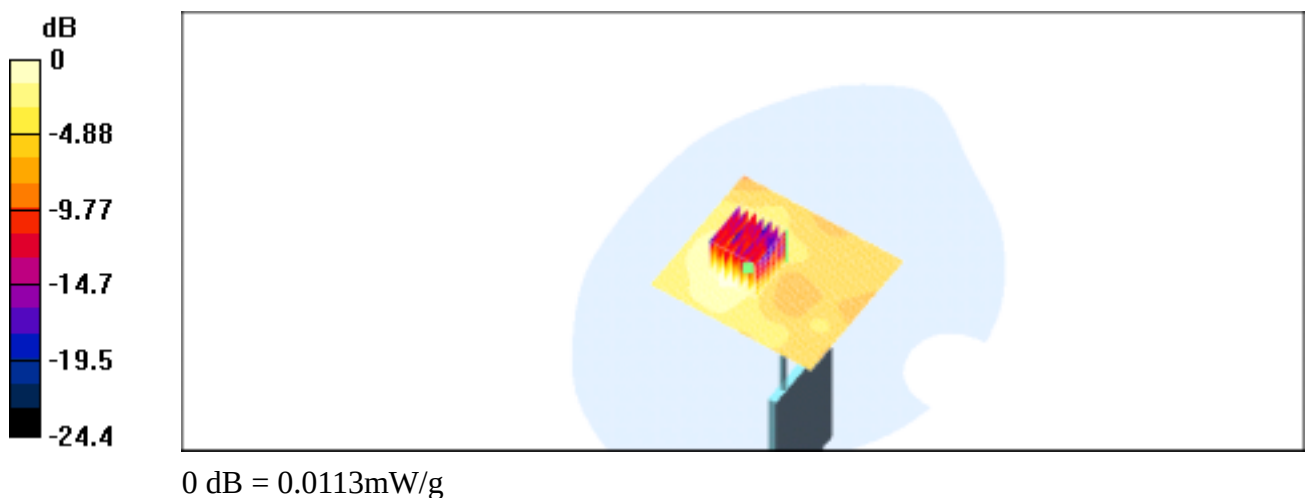
Peak SAR (extrapolated) = 0.0234 W/kg

SAR(1 g) = 0.0106 mW/g; SAR(10 g) = 0.00595 mW/g

Reference Value = 0.942 V/m

Power Drift = 2 dB

Maximum value of SAR = 0.0113 mW/g



Edge-on position, middle channel Configuration 5

Date/Time: 11/05/03 18:00:38

DUT: 802.11b Wireless PCMCIA Card ; Type: CBWLRT;
Program: 802.11b Wireless PCMCIA Card

Communication System: Wireless LAN; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: M2450 ($\sigma = 1.88499$ mho/m, $\epsilon_r = 51.8552$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Vertical 1.5cm/Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 1.01 V/m

Power Drift = 0.5 dB

Maximum value of SAR = 0.00922 mW/g

Vertical 1.5cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 0.0203 W/kg

SAR(1 g) = 0.00948 mW/g; SAR(10 g) = 0.00515 mW/g

Reference Value = 1.01 V/m

Power Drift = 0.5 dB

Maximum value of SAR = 0.0101 mW/g



0 dB = 0.0101mW/g

Edge-on position, highest channel Configuration 5

Date/Time: 11/05/03 18:49:01

DUT: 802.11b Wireless PCMCIA Card ; Type: CBWLRT;
Program: 802.11b Wireless PCMCIA Card

Communication System: Wireless LAN; Frequency: 2462 MHz; Duty Cycle: 1:1
Medium: M2450 ($\sigma = 1.91369$ mho/m, $\epsilon_r = 51.3206$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Vertical 1.5cm/Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 1.08 V/m

Power Drift = 0.1 dB

Maximum value of SAR = 0.00878 mW/g

Vertical 1.5cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 0.0176 W/kg

SAR(1 g) = 0.00779 mW/g; SAR(10 g) = 0.00429 mW/g

Reference Value = 1.08 V/m

Power Drift = 0.1 dB

Maximum value of SAR = 0.0082 mW/g



Edge-on position, lowest channel
Configuration 6

Date/Time: 11/05/03 16:58:47

DUT: 802.11b Wireless PCMCIA Card ; Type: CBWLRT;
Program: 802.11b Wireless PCMCIA Card

Communication System: Wireless LAN; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: M2450 ($\sigma = 1.91174$ mho/m, $\epsilon_r = 52.4599$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Vertical 1.5cm/Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 2.58 V/m

Power Drift = -0.3 dB

Maximum value of SAR = 0.132 mW/g

Vertical 1.5cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

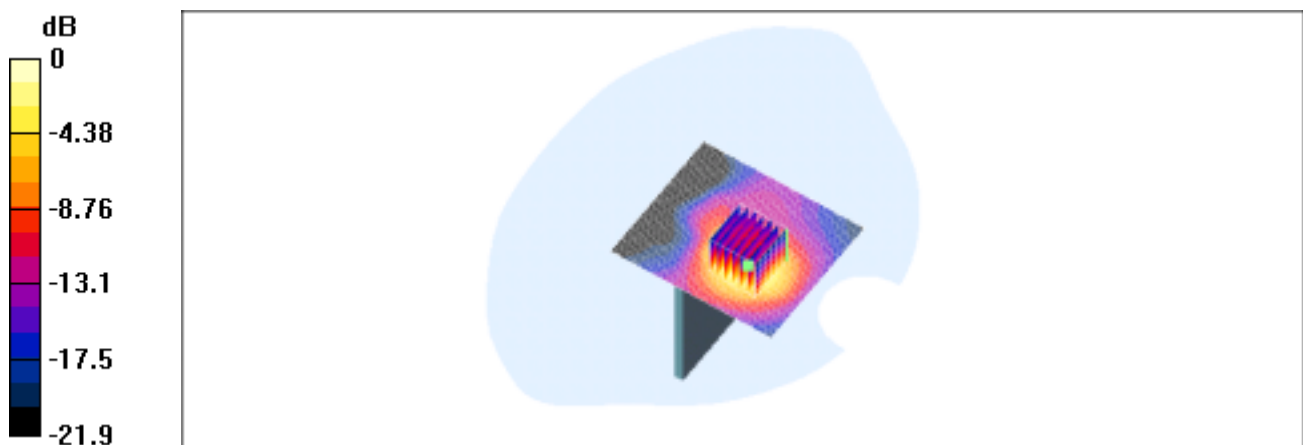
Peak SAR (extrapolated) = 0.22 W/kg

SAR(1 g) = 0.106 mW/g; SAR(10 g) = 0.0518 mW/g

Reference Value = 2.58 V/m

Power Drift = -0.3 dB

Maximum value of SAR = 0.115 mW/g



0 dB = 0.115mW/g

Edge-on position, middle channel Configuration 6

Date/Time: 11/05/03 16:36:07

DUT: 802.11b Wireless PCMCIA Card ; Type: CBWLRT;
Program: 802.11b Wireless PCMCIA Card

Communication System: Wireless LAN; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: M2450 ($\sigma = 1.88499$ mho/m, $\epsilon_r = 51.8552$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Vertical 1.5cm/Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 2.52 V/m

Power Drift = 0.2 dB

Maximum value of SAR = 0.121 mW/g

Vertical 1.5cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

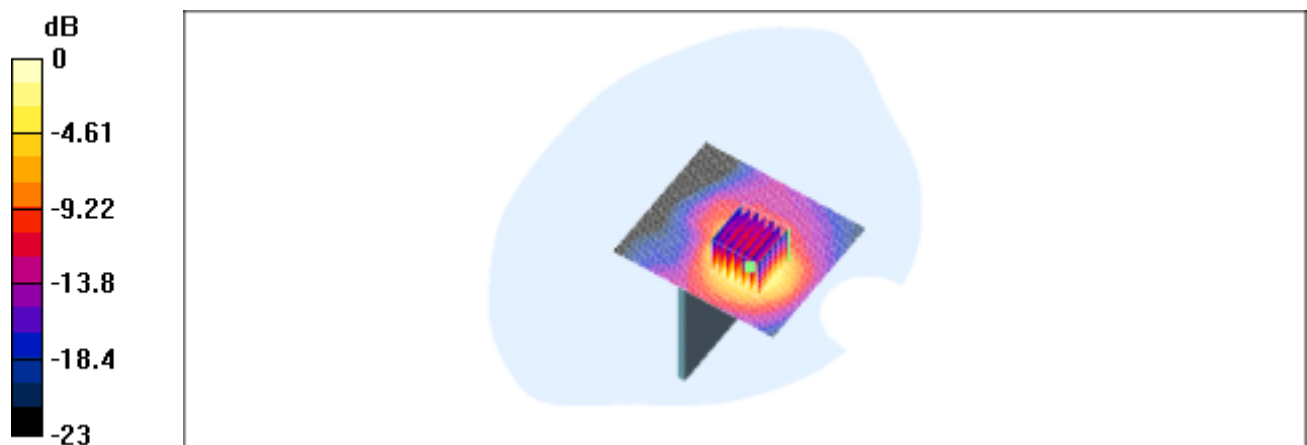
Peak SAR (extrapolated) = 0.203 W/kg

SAR(1 g) = 0.0985 mW/g; SAR(10 g) = 0.0482 mW/g

Reference Value = 2.52 V/m

Power Drift = 0.2 dB

Maximum value of SAR = 0.106 mW/g



0 dB = 0.106mW/g

Edge-on position, highest channel**Configuration 6****DUT: 802.11b Wireless PCMCIA Card ; Type: CBWLRT;****Program: 802.11b Wireless PCMCIA Card**

Communication System: Wireless LAN; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: M2450 ($\sigma = 1.91369$ mho/m, $\epsilon_r = 51.3206$, $\rho = 1000$ kg/m³)

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Vertical 1.5cm/Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 2.42 V/m

Power Drift = 0.7 dB

Maximum value of SAR = 0.115 mW/g

Vertical 1.5cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

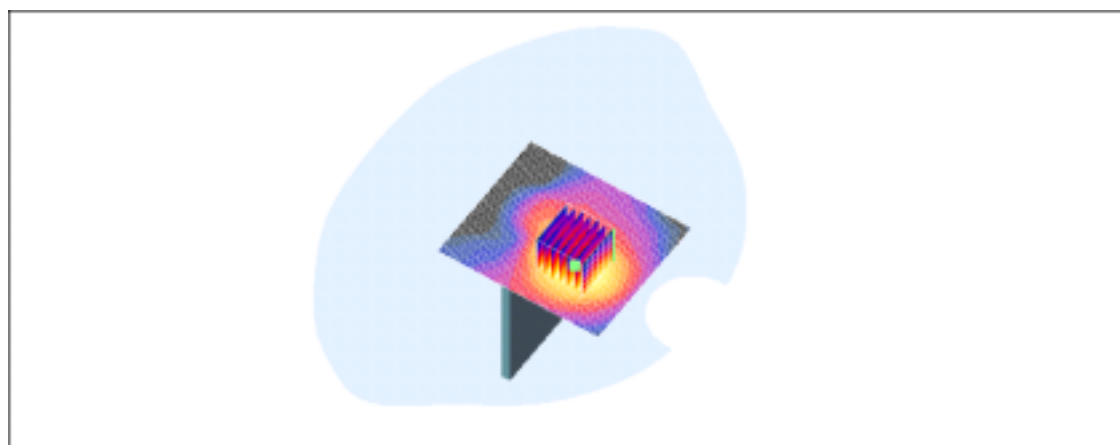
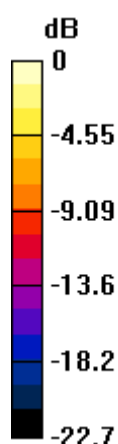
Peak SAR (extrapolated) = 0.201 W/kg

SAR(1 g) = 0.096 mW/g; SAR(10 g) = 0.0472 mW/g

Reference Value = 2.42 V/m

Power Drift = 0.7 dB

Maximum value of SAR = 0.102 mW/g



0 dB = 0.102mW/g

SAR System Performance Verification

Date/Time: 11/03/03 12:42:52

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:727
Program: 2003-11-03

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: M2450 ($\sigma = 1.89046$ mho/m, $\epsilon_r = 51.515$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1759; ConvF(4.5, 4.5, 4.5); Calibrated: 2003/3/7
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn547; Calibrated: 2003/1/30
- Phantom: SAM 12; Type: SAM 4.0; Serial: TP:1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

System Test/Area Scan (101x101x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 93.6 V/m

Power Drift = -0.02 dB

Maximum value of SAR = 15.1 mW/g

System Test/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

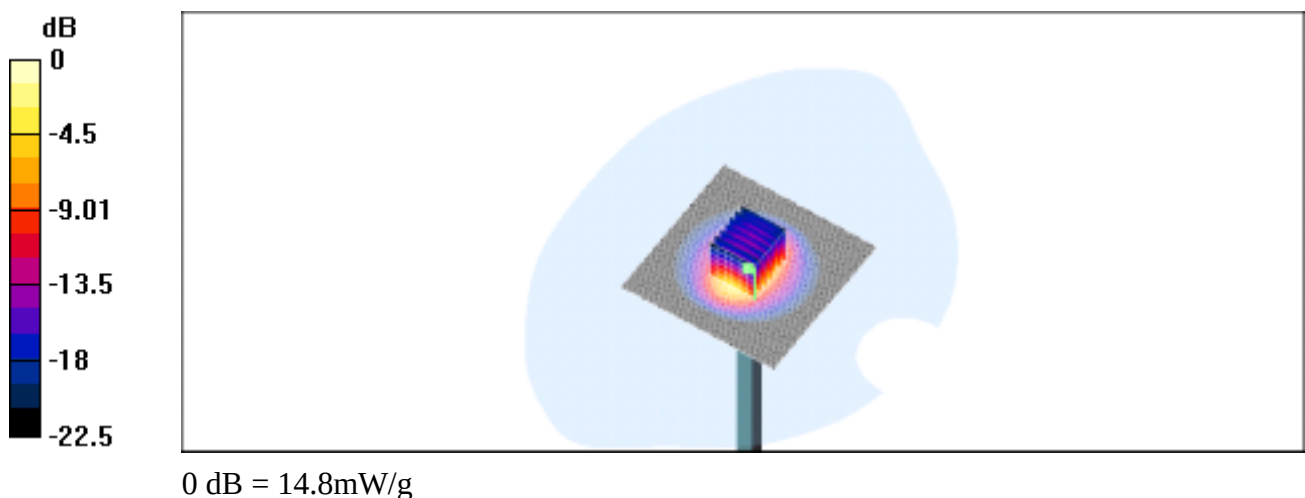
Peak SAR (extrapolated) = 30.3 W/kg

SAR(1 g) = 13.5 mW/g; SAR(10 g) = 5.97 mW/g

Reference Value = 93.6 V/m

Power Drift = -0.02 dB

Maximum value of SAR = 14.8 mW/g



Appendix

Photographs of Test Setup



Fig.1 Photograph of the SAR measurement System

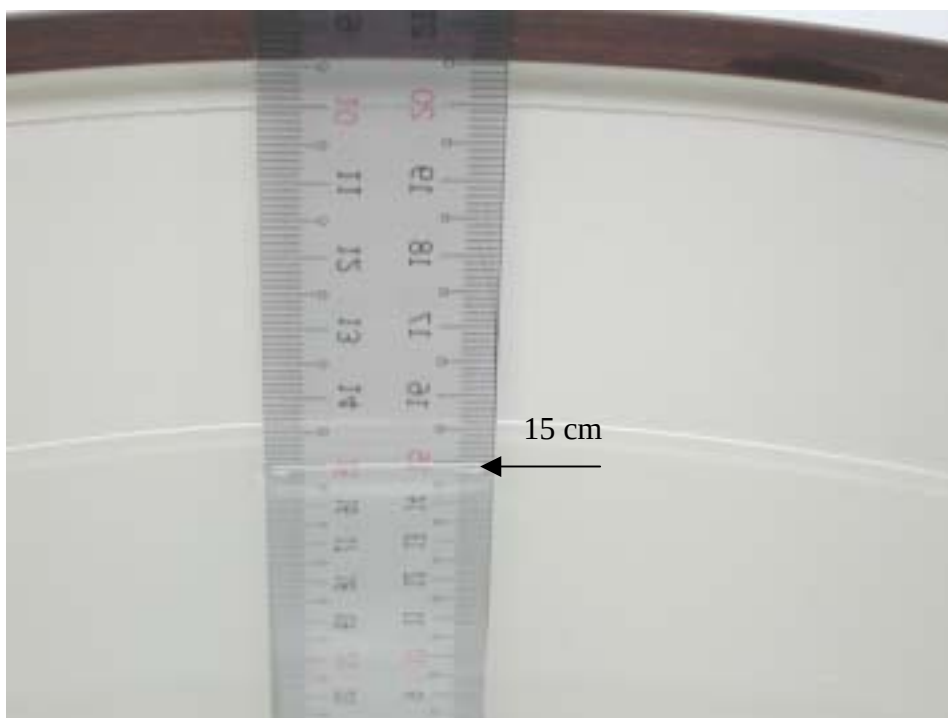


Fig.2 Photograph of the Tissue Simulant Fluid liquid depth 15cm

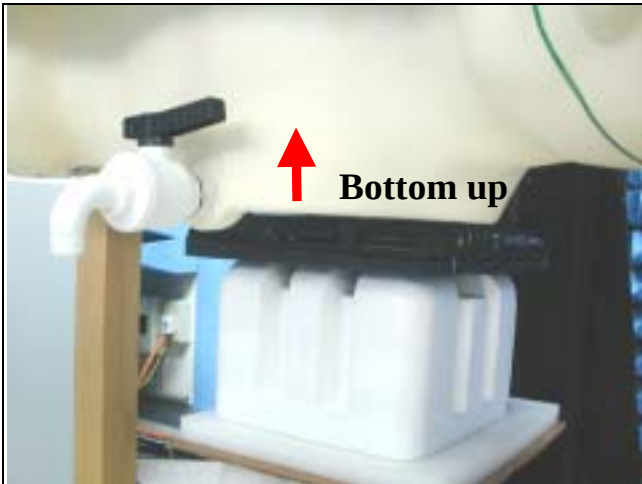


Fig.3

Fig.3 Photograph of the Bottom of the Pc is paralleled and at a distance of 0.0 cm from the base of the phantom.

Fig.(4 & 5) Photograph of the 1.2 cm Spacing between EUT & Planar Phantom and Antenna isn't extended.

Fig. (6 & 7) Photograph of the 1.2 cm Spacing between EUT & Planar Phantom and antenna is in horizontal direction.

Fig. (8 & 9) Photograph of the 1.2 cm Spacing between EUT & Planar Phantom the antenna tip is downward

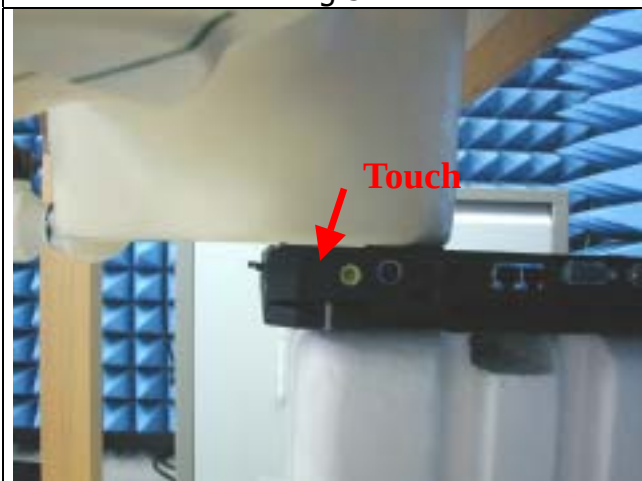


Fig.4

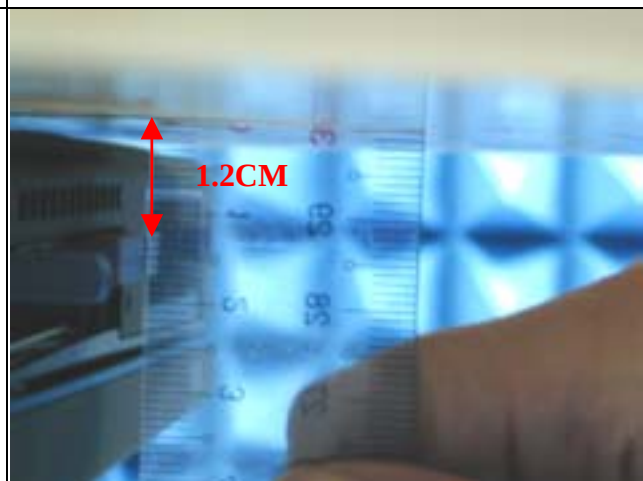


Fig.5



Fig.6

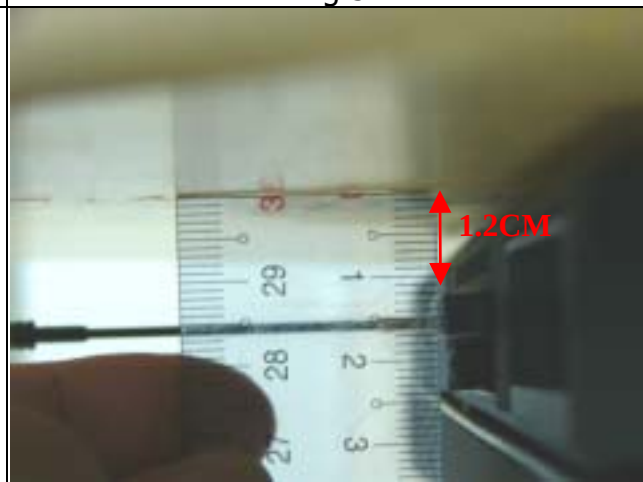


Fig.7



Fig.8

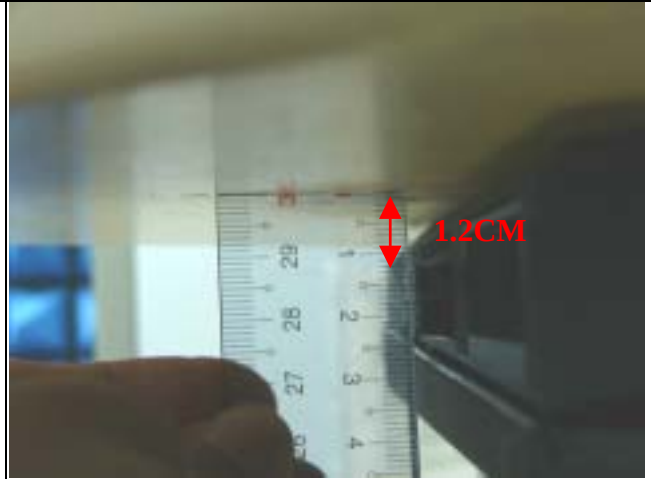


Fig.9



Fig.10

Fig. 10 edge of the PC at 90° and at a distance of 1.5 cm from the base of the phantom.

Fig. (11 & 12) Photograph of the Antenna isn't extended and at a distance of 1.5 cm from the base of the phantom.

Fig. (13 & 14) Photograph of the antenna tip is upward and at a distance of 1.5 cm from the base of the phantom.

Fig. (15 & 16) Photograph of the antenna is in horizontal direction. and at a distance of 1.5 cm from the base of the phantom.

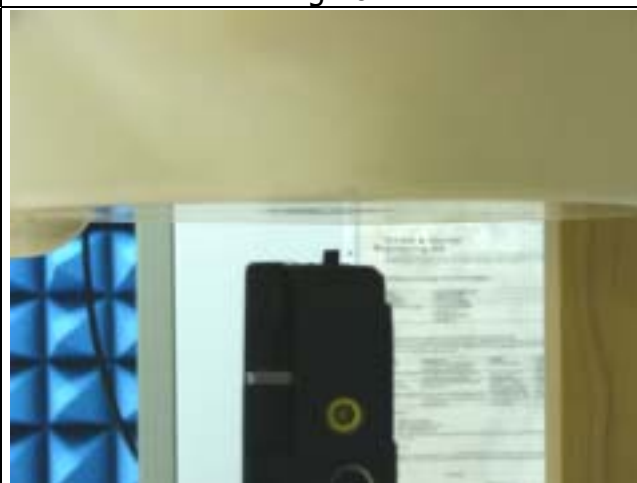


Fig.11



Fig.12



Fig.13

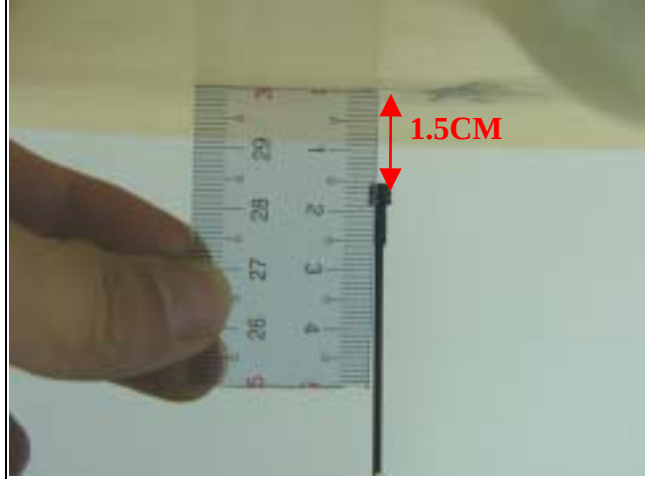


Fig.14

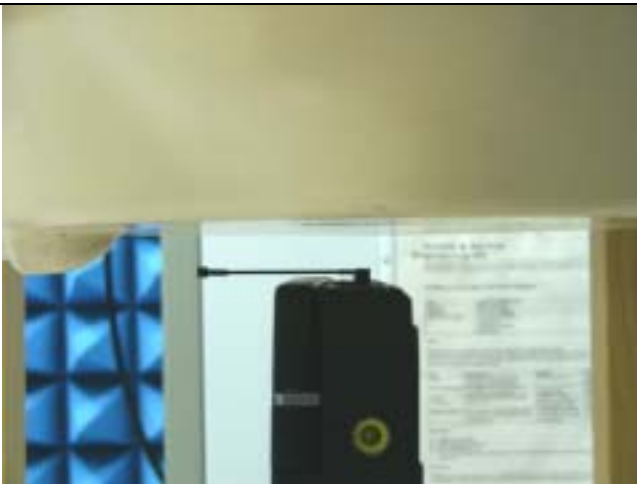


Fig.15

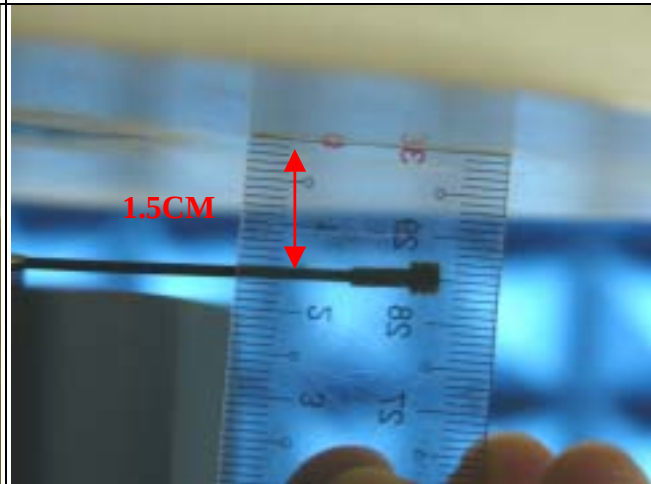


Fig.16

瑞軒科技股份有限公司
 Epson Sensio Corp.
 工廠編號: S1010066
 零件編號: S1010066
 產品型號: S1010066
 零件數: 3
 產品名稱: S1010066 S1010066
 規格: S1010066 S1010066

[illegible]

A photograph of a mobile phone with a large, rectangular, silver-colored external display attached to its back. The display shows a list of contacts or messages. A ruler is placed below the phone for scale.

Fig.20 Aantenna tip is upward



Fig.21 with IBM ThinkPad T30 PC PCMCIA slot



Fig.22 Antenna isn't extended



Fig.23 the antenna is in horizontal direction



Fig.24 the antenna tip is upward

Probe Calibration certificate

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

Client **SGS (Auden)**

CALIBRATION CERTIFICATE

Object(s) **ET3DV6 - SN:1759**

Calibration procedure(s) **QA CAL-01.v2
Calibration procedure for dosimetric E-field probes**

Calibration date: **March 7, 2003**

Condition of the calibrated item **In Tolerance (according to the specific calibration document)**

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

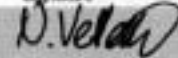
All calibrations have been conducted in the closed laboratory facility: environment temperature 22 ± 2 degrees Celsius and humidity $< 75\%$.

Calibration Equipment used (M&TE critical for calibration)

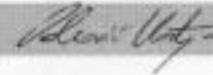
Model Type	ID #	Cal Date	Scheduled Calibration
RF generator HP 8684C	US3642U01700	4-Aug-99 (in house check Aug-02)	in house check: Aug-05
Power sensor E4412A	MY41495277	8-Mar-02	Mar-03
Power sensor HP 8481A	MY41092160	18-Sep-02	Sep-03
Power meter EPM E4419B	GB41293874	13-Sep-02	Sep-03
Network Analyzer HP 8753E	US36432426	3-May-00	in house check: May 03
Fuke Process Calibrator Type 702	SN: 6295803	3-Sep-01	Sep-03

Calibrated by: **Nico Vertert** **Technician**

Signature



Approved by: **Katja Pokovic** **Laboratory Director**



Date issued: March 7, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

Schmid & Partner Engineering AG

s p e a g

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9778
info@speag.com, <http://www.speag.com>

Probe ET3DV6

SN:1759

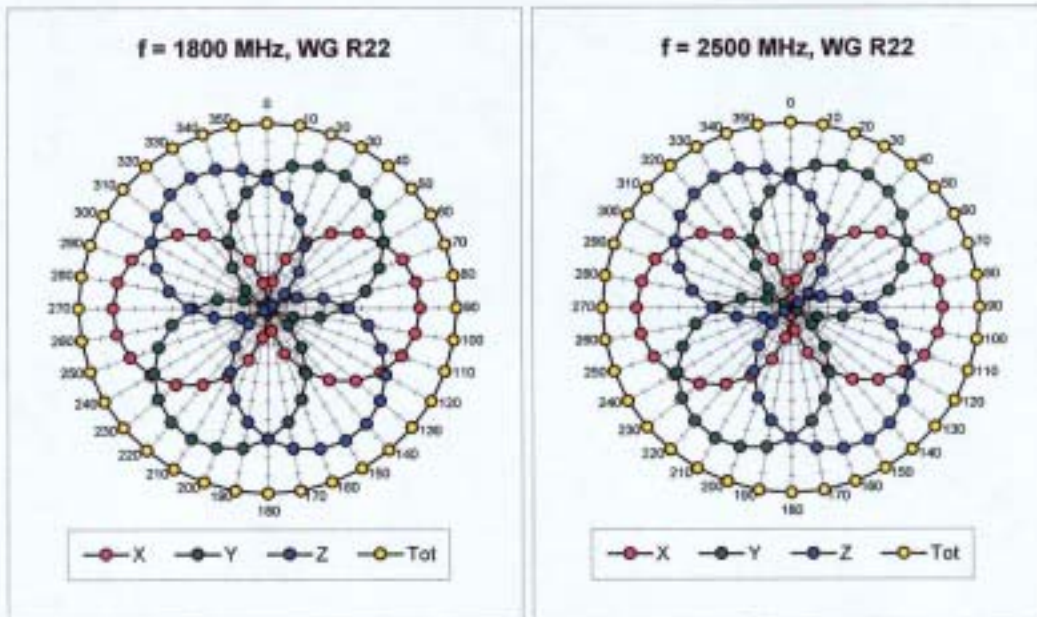
Manufactured:	November 12, 2002
Last calibration:	March 7, 2003

Calibrated for DASY Systems

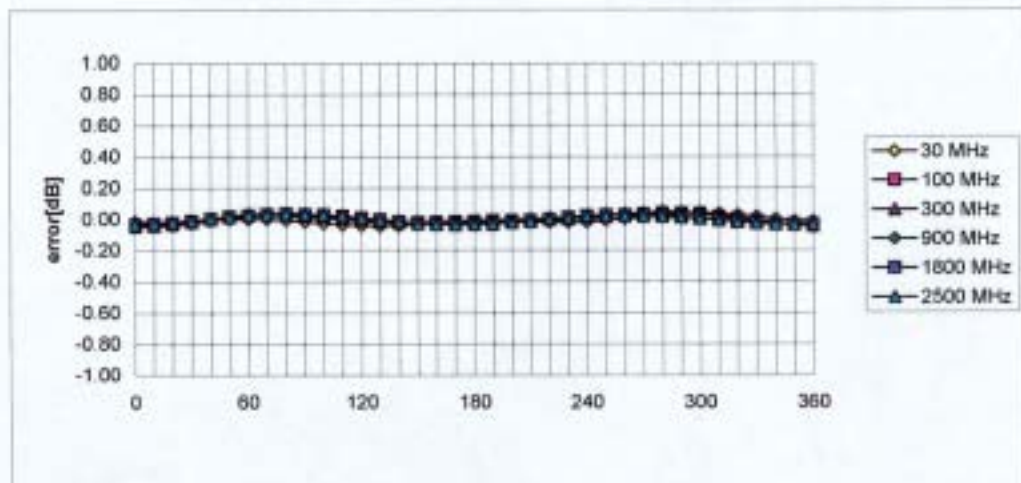
(Note: non-compatible with DASY2 system!)

ET3DV6 SN:1759

March 7, 2003



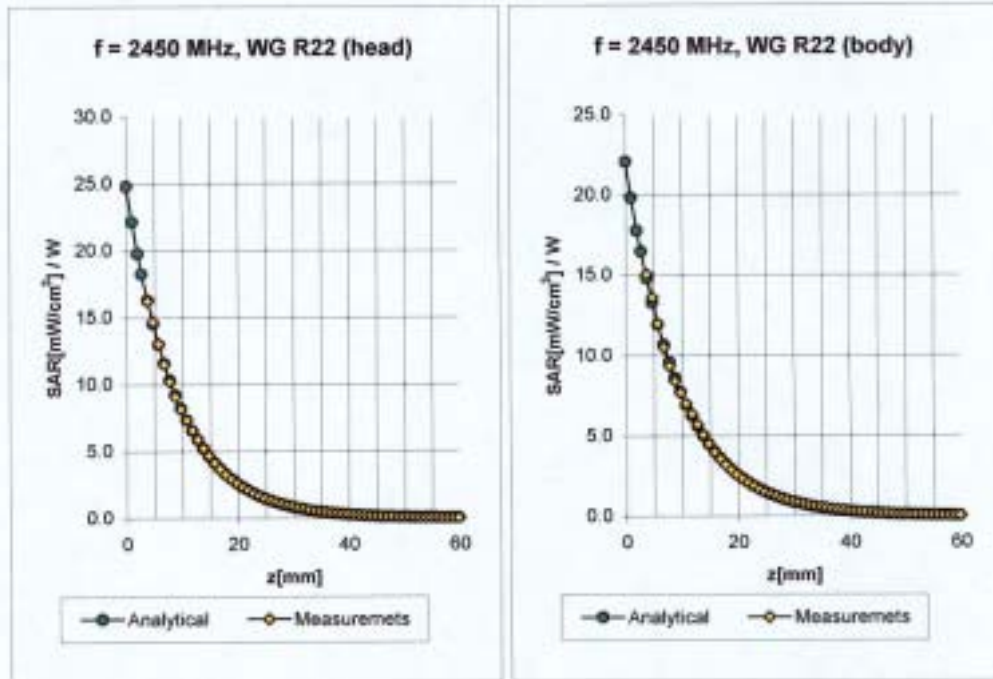
Isotropy Error (ϕ), $\theta = 0^\circ$



ET3DV6 SN:1759

March 7, 2003

Conversion Factor Assessment



2450	Head	MHz	$\epsilon_r = 39.2 \pm 5\%$	$\sigma = 1.80 \pm 5\% \text{ mho/m}$
	ConvF X	$5.0 \pm 8.9\% (k=2)$	Boundary effect:	
	ConvF Y	$5.0 \pm 8.9\% (k=2)$	Alpha	0.98
	ConvF Z	$5.0 \pm 8.9\% (k=2)$	Depth	1.95
2450	Body	MHz	$\epsilon_r = 52.7 \pm 5\%$	$\sigma = 1.95 \pm 5\% \text{ mho/m}$
	ConvF X	$4.5 \pm 8.9\% (k=2)$	Boundary effect:	
	ConvF Y	$4.5 \pm 8.9\% (k=2)$	Alpha	1.01
	ConvF Z	$4.5 \pm 8.9\% (k=2)$	Depth	1.80

Uncertainty Analysis

DASY4 Uncertainty Budget								
<i>According to IEEE P1528</i>								
Error Description	Uncertainty Value	Prob. Dist.	Div.	(Ci) 1g	(Ci) 10g	Std.Unc. (1g)	Std. Unc. (10g)	(Vi) Veff
Measurement System								
Probe Calibration	± 4.8%	N	1	1	1	± 4.8%	± 4.8%	∞
Axial Isotropy	± 4.7%	R	√ 3	0.7	0.7	± 1.9%	± 1.9%	∞
Hemispherical Isotropy	± 9.6%	R	√ 3	0.7	0.7	± 3.9%	± 3.9%	∞
Boundary Effects	± 1.0%	R	√ 3	1	1	± 0.6%	± 0.6%	∞
Linearity	± 4.7%	R	√ 3	1	1	± 2.7%	± 2.7%	∞
System Detection Limits	± 1.0%	R	√ 3	1	1	± 0.6%	± 0.6%	∞
Readout Electronics	± 1.0%	N	1	1	1	± 1.0%	± 1.0%	∞
Response Time	± 0.8%	R	√ 3	1	1	± 0.5%	± 0.5%	∞
Integration Time	± 2.6%	R	√ 3	1	1	± 1.5%	± 1.5%	∞
RF Ambient Conditions	± 3.0%	R	√ 3	1	1	± 1.7%	± 1.7%	∞
Probe Positioner	± 0.4%	R	√ 3	1	1	± 0.2%	± 0.2%	∞
Probe Positioning	± 2.9%	R	√ 3	1	1	± 1.7%	± 1.7%	∞
Max. SAR Eval	± 1.0%	R	√ 3	1	1	± 0.6%	± 0.6%	∞
Test Sample Related								
Device Positioning	± 2.9%	N	1	1	1	± 2.9%	± 2.9%	875
Device Holder	± 3.6%	N	1	1	1	± 3.6%	± 3.6%	5
Power Drift	± 5.0%	R	√ 3	1	1	± 2.9%	± 2.9%	∞
Phantom and Setup								
Phantom Uncertainty	± 4.0%	R	√ 3	1	1	± 2.3%	± 2.3%	∞
Liquid Conductivity (target)	± 5.0%	R	√ 3	0.64	0.43	± 1.8%	± 1.2%	∞
Liquid Conductivity (meas.)	± 2.5%	N	1	0.64	0.43	± 1.6%	± 1.1%	∞
Liquid Permittivity (target)	± 5.0%	R	√ 3	0.6	0.49	± 1.7%	± 1.4%	∞
Liquid Permittivity (meas)	± 2.5%	N	1	0.6	0.49	± 1.5%	± 1.2%	∞
Combined Std. Uncertainty						± 10.3%	± 10.0%	331
Expanded STD Uncertainty						± 20.6%	± 20.1%	∞

Phantom description

Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

Certificate of conformity / First Article Inspection

Item	SAM Twin Phantom V4.0
Type No	QD 000 P40 CA
Series No	TP-1150 and higher
Manufacturer / Origin	Untersee Composites Hauptstr. 69 CH-8559 Fruthwilen Switzerland

Tests

The series production process used allows the limitation to test of first articles. Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series units (called samples).

Test	Requirement	Details	Units tested
Shape	Compliance with the geometry according to the CAD model.	IT1S CAD File (*)	First article, Samples
Material thickness	Compliant with the requirements according to the standards	2mm +/- 0.2mm in specific areas	First article, Samples
Material parameters	Dielectric parameters for required frequencies	200 MHz - 3 GHz Relative permittivity < 5 Loss tangent < 0.05.	Material sample TP 104-5
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards	Liquid type HSL 1800 and others according to the standard.	Pre-series, First article

Standards

- [1] CENELEC EN 50361
- [2] IEEE P1528-200x draft 6.5
- [3] IEC PT 62209 draft 0.9
- (*) The IT1S CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

Conformity

Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standard [1] and draft standards [2] and [3].

Date

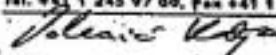
28.02.2002

Signature / Stamp



**Schmid & Partner
Engineering AG**

Zeughausstrasse 43, CH-8004 Zurich
Tel. +41 1 245 97 00, Fax +41 1 245 97 79



System Validation from Original equipment supplier SPEAG Schmid & Partner

Date/Time: 03/05/03 16:17:40

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN727_SN3013_M2450_050303.da4

DUT: Dipole 2450 MHz; Serial: D2450V2 - SN727
Program: Dipole Calibration

Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: Muscle 2450 MHz; ($\sigma = 2.05$ mho/m, $\epsilon_r = 51.05$, $\rho = 1000$ kg/m³)
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV2 - SN3013; ConvF(4.2, 4.2, 4.2); Calibrated: 1/19/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASY4, V4.1 Build 25; Postprocessing SW: SEMCAD, V1.6 Build 105

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.7 V/m

Peak SAR = 27.6 W/kg

SAR(1 g) = 13.7 mW/g; SAR(10 g) = 6.16 mW/g

Power Drift = 0.007 dB

