SAR Evaluation Report

in accordance with the requirements of
FCC Report and Order: ET Docket 93-62, and OET Bulletin 65 Supplement C

For

D-Link Corporation

2.4GHz Wireless PC Card Adapter

Model: DWL-650 v.P / WPM-B13

FCC ID: KA22003070026-1

Trade Name: D-Link

Prepared for

D-Link Corporation
No. 20, Park Ave. II, Secience-based Industrial Park,
Hsinchu, Taiwan, R.O.C.

Prepared by

Compliance Certification Services Inc.
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1. TEST RESULT CERTIFICATION

Applicant:	D-Link Corporation No.20, Park Ave. II, Secience-based Industrial Park, Hsinch, Taiwan, R.O.C.
Equipment Under Test:	2.4GHz Wireless PC Card Adapter
Trade Name:	D-Link
Model:	DWL-650 v.P / WPM-B13
FCC ID	KA22003070026-1
Device Category:	PORTABLE DEVICES
Exposure Category:	GENERAL POPULATION/UNCONTROLLED EXPOSURE
Report Number:	B30808201-SAR-FCC
Date of Test:	Aug 12, 2003

Test Sample is a:	2.4GHz Wireless PC Card Adapter
Modulation Type:	Direct Sequence Spread Spectrum
Operating Mode:	Maximum continuous output
Tx Frequency:	2412 ~ 2462 MHz
Max. O/P Power: (Conducted)	19.31dBm (2462 MHz)
Max. SAR (1g):	0.515mW/g (2437MHz)
Application Type:	Certification
FCC Rule part(s):	§ 15.247

Host Type	Laptop PC
Brand Name	IBM R32
P/N	2695-HT2
S/N	AK-VNCW6

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE Std. C95.1-1999 and had been tested in accordance with the measurement procedures specified in FCC OET 65 Supplement C (released on 6/29/2001 - see Test Report).

I attest to accuracy of the data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for completeness of these measurements and vouch for the qualifications of all persons taking them.

Approved by:

Jonson Lee / Director
Compliance Certification Services Inc.

Reviewed by:

Miro Chueh / Section Manager
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Applicant:	D-Link Corporation No.20, Park Ave. II, Secience-based Industrial Park, Hsinch, Taiwan,R.O.C.
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Host	Laptop PC
Brand Name	IBM R32
P/N	2695-HT2
S/N	AK-VNCW6

Notes:

1. *Specific Absorption Rate (SAR) is a measure of the rate of energy absorption due to exposure to an RF transmitting source (wireless portable device).*
2. *EEE/ANSI Std. C95.1-1999 limits are used to determine compliance with FCC ET Docket 93-62*

3. REQUIREMENTS FOR COMPLIANCE TESTING DEFINED BY THE FCC

The US Federal Communications Commission has released the report and order “Guidelines for Evaluating the Environmental Effects of RF Radiation", ET Docket No. 93-62 in August 1996 [1]. The order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 1.6 mW/g for an uncontrolled environment and 8.0 mW/g for an occupational/controlled environment as recommended by the ANSI/IEEE standard C95.1-1999 [6]. According to the Supplement C of OET Bulletin 65 “Evaluating Compliance with FCC Guide-lines for Human Exposure to Radio frequency Electromagnetic Fields," released on Jun 29, 2001 by FCC, the device should be evaluated at maximum output power (radiated from the antenna) under “worst-case” conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling.

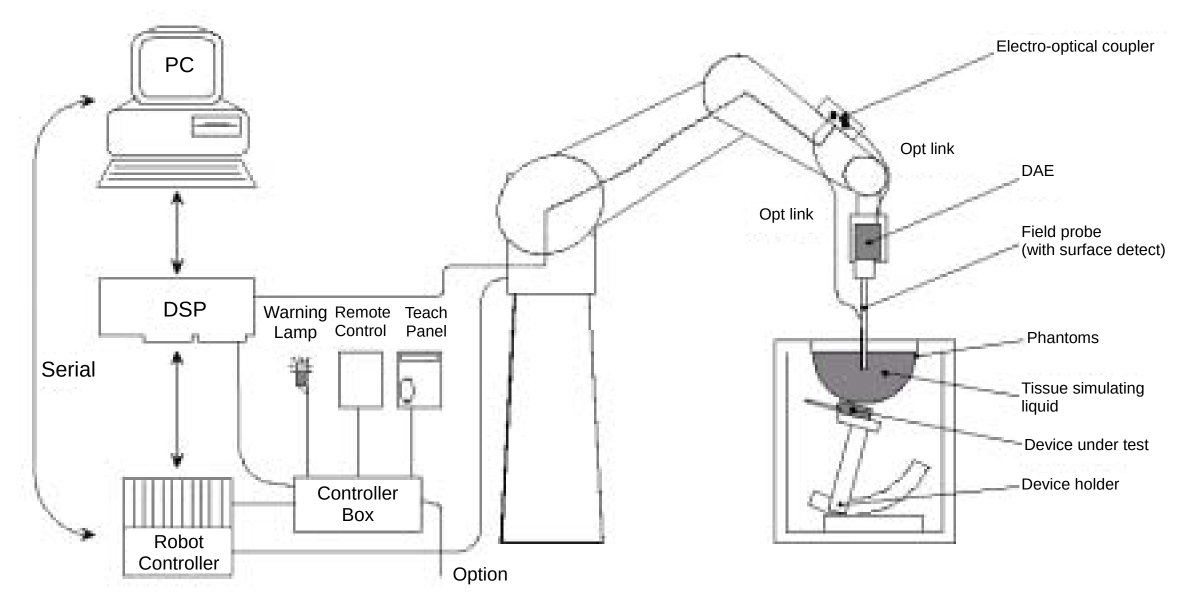
4. DOSIMETRIC ASSESSMENT SYSTEM

These measurements were performed with the automated near-field scanning system DASY4 from Schmid & Partner Engineering AG (SPEAG). The system is based on a high precision robot (working range greater than 0.9 m) which positions the probes with a positional repeatability of better than ± 0.02 mm. Special E- and H-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines to the data acquisition unit. The SAR measurements were conducted with the dosimetric probe ET3DV6 SN: 1762 (manufactured by SPEAG), designed in the classical triangular configuration [3] and optimized for dosimetric evaluation. The probe has been calibrated according to the procedure described in [7] with accuracy of better than ±10%. The spherical isotropy was evaluated with the procedure described in [8] and found to be better than ±0.25 dB. The phantom used was the SAM Twin Phantom as described in FCC supplement C, IEEE P1528 and EN50361.

The Tissue simulation liquid used for each test is in accordance with FCC OET65 supplement C as listed below.

Ingredients (%, by weight)	Frequency (MHz)									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

4.1 MEASUREMENT SYSTEM DIAGRAM



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

1. A standard high precision 6-axis robot (Stäubli RX family) with controller and software.
2. An arm extension for accommodating the data acquisition electronics (DAE).
3. 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.
4. A data acquisition electronic (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.
5. A unit to operate the optical surface detector, which is connected to the EOC.
6. The Electro-optical coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the PC plug-in card.
7. The functions of the PC plug-in card based on a DSP is to perform the time critical task such as signal filtering, surveillance of the robot operation fast movement interrupts.
8. A computer operating Windows 95 or larger
9. DASY4 software
10. Remote control with teaches pendant and additional circuitry for robot safety such as warning lamps, etc.
11. The SAM phantom enabling testing left-hand and right-hand usage.
12. The device holder for handheld EUT.
13. Tissue simulating liquid mixed according to the given recipes (see Application Note).
14. System validation dipoles to validate the proper functioning of the system.

4.2 SYSTEM COMPONENTS

ET3DV5 Probe Specification

Construction Symmetrical design with triangular core

Built-in optical fiber for surface detection System

Built-in shielding against static charges

Calibration in air from 10 MHz to 2.5 GHz

In brain and muscle simulating tissue at frequencies of 450 MHz, 900 MHz and 1.8 GHz (accuracy of ± 8%)

Frequency 10 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)

Directivity ± 0.2 dB in brain tissue (rotation around probe axis)

± 0.4 dB in brain tissue (rotation normal probe axis)

Dynamic 5 mW/g to > 100 mW/g;

Range Linearity: ± 0.2 dB

Surface ± 0.2 mm repeatability in air and clear liquids

Detection 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 dosimetric up to 3 GHz

Compliance tests of mobile phones

Fast automatic scanning in arbitrary phantoms

Photograph of the Probe

The SAR measurements were conducted with the dosimetric probe ET3DV6 designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique, with printed resistive lines on ceramic substrates. The probe is equipped with an optical multi-fiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY4 software reads the reflection during a software approach and looks for the maximum using a 2nd order fitting. The approach is stopped when reaching the maximum.

Inside View of ET3DV6 E-field Probe

E-Field Probe Calibration Process

Each probe is calibrated according to a dosimetric assessment procedure described in [6] with accuracy better than +/- 10%. The spherical isotropy was evaluated with the procedure described in [7] and found to be better than +/-0.25dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz, and in a waveguide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

SAM Phantom

The SAM Phantom V4.0 is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is in compliance with the specification set in IEEE P1528 and CENELEC EN50361. The phantom 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 the 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 in the robot.

SAM Phantom

Shell Thickness: 2 ± 0.2 mm

Filling Volume: Approx. 25 liters

Dimensions (H x L x W): 810 x 1000 x 500 mm

Device Holder for Transmitters

In combination with the Generic Twin Phantom V3.0, the Mounting Device enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately, and repeatedly positioned according to the FCC and CENELEC specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

Device Holder

Note: *A simulating human hand is not used due to the complex anatomical and geometrical structure of the hand that may produced infinite number of configurations [10]. To produce the worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.*

5. EVALUATION PROCEDURE

5.1 DATA EVALUATION

The DASY4 software automatically executes the following procedure to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	- Sensitivity	$Norm_i$, a_{i10}, a_{i11}, a_{i12}
	- Conversion factor	ConvFi
	- Diode compression point	Dcpi
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can either be found in the component documents or be imported into the software from the configuration files issued for the DASY4 components. In the direct measuring mode of the multi-meter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

Where V_i = *Compensated signal of channel i (i = x, y, z)*
U_i = *Input signal of channel i (i = x, y, z)*
cf = *Crest factor of exciting field (DASY parameter)*
dcp_i = *Diode compression point(DASY parameter)*

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes: $$E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

H-field probes: $$H_i = \sqrt{Vi} \cdot \frac{a_{i10} + a_{i11} f + a_{i12} f^2}{f}$$

Where V_i = *Compensated signal of channel i (i = x, y, z)*
$Norm_i$ = *Sensor sensitivity of channel i (i = x, y, z)*
μV/(V/m)2 for E0field Probes
ConvF = *Sensitivity enhancement in solution*
a_{ij} = *Sensor sensitivity factors for H-field probes*
f = *Carrier frequency (GHz)*
E_i = *Electric field strength of channel i in V/m*
H_i = *Magnetic field strength of channel i in A/m*

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The primary field data are used to calculate the derived field units.

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1000}$$

where *SAR* = *local specific absorption rate in mW/g*
E_{tot} = *total field strength in V/m*
σ = *conductivity in [mho/m] or [siemens/m]*
ρ = *equivalent tissue density in g/cm3*

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid.

The power flow density is calculated assuming the excitation field as a free space field.

$$P_{pwe} = \frac{E_{tot}^2}{3770} \quad or \quad P_{pwe} = H_{tot}^2 \cdot 37.7$$

where P_{pwe} = *Equivalent power density of a plane wave in mW/cm2*
E_{tot} = *total electric field strength in V/m*
H_{tot} = *total magnetic field strength in A/m*

5.2 SAR EVALUATION PROCEDURE

The evaluation was performed with the following procedure:

Step 1: Measurement of the SAR value at a fixed location above the central position was used as a reference value for assessing the power drop.

Step 2: The SAR distribution at the exposed side of the body was measured at a distance of 4 mm from the inner surface of the shell. The area covered the entire dimension of the EUT and the horizontal grid spacing was 10 mm x 10 mm. Based on the data, the area of the maximum absorption was determined by spline interpolation.

Step 3: Around this point, a volume of 32 mm x 32 mm x 34 mm was assessed by measuring 7 x 7 x 7 points. On the basis of this data set, the spatial peak SAR value was evaluated under the following procedure:

1. The data at the surface were extrapolated, since the center of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation was based on a least square algorithm [11]. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.
2. The maximum interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed by the 3D-Spline interpolation algorithm. The 3D-Spline is composed of three one-dimensional splines with the “Not a knot"-condition (in x, y and z-directions) [11], [12]. The volume was integrated with the trapezoidal-algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.
3. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

Step 4: Re-measurement of the SAR value at the same location as in Step 1. If the value changed by more than 5%, the evaluation was repeated.

6. MEASUREMENT UNCERTAINTY

Error Description	**Uncertainty Value ±%**	**Probablility distribution**	**Divisor**	C_1 1g	**Standard unc.(1g) ±%**	V_1 or V_{eff}
Measurement System						
Probe calibration	±4.8	normal	1	1	±4.8	∞
Axial isotropy of probe	±4.6	rectangular	√3	$(1-C_p)^{1/2}$	±1.9	∞
Sph. Isotropy of probe	±9.7	rectangular	√3	$(C_p)^{1/2}$	±3.9	∞
Probe linearity	±4.5	rectangular	√3	1	±2.7	∞
Detection Limit	±0.9	rectangular	√3	1	±0.6	∞
Boundary effects	±8.5	rectangular	√3	1	±4.8	∞
Readoutelectronics	±1.0	normal	1	1	±1.0	∞
Response time	±0.9	rectangular	√3	1	±0.5	∞
Integration time	±1.2	rectangular	√3	1	±0.8	∞
Mech Constrains of robot	±0.5	rectangular	√3	1	±0.2	∞
Probe positioning	±2.7	rectangular	√3	1	±1.7	∞
Extrap. And integration	±4.0	rectangular	√3	1	±2.3	∞
RF ambient conditiona	±0.54	rectangular	√3	1	±0.43	∞
Test Sample Related						
Device positioning	±2.2	normal	1	1	±2.23	11
Device holder uncertainty	±5	normal	1	1	±5.0	7
Power drift	±5	rectangular	√3	1	±2.9	∞
Phantom and Setup						
Phantom uncertainty	±4	rectangular	√3	1	±2.3	∞
Liquid cinductivity	±5	rectangular	√3	0.6	±1.7	∞
Liquid cinductivity	±5	rectangular	√3	0.6	±3.5/1.7	∞
Liquid permittivity	±5	rectangular	√3	0.6	±1.7	∞
Liquid permittivity	±5	rectangular	√3	0.6	±1.7	∞
Combined Standard Uncertainty					±12.14/11.76	
Coverage Factor for 95%		kp=2				
Expaned Standard Uncertainty					±24.29/23.51	

7. EXPOSURE LIMIT

(A). Limits for Occupational/Controlled Exposure (mW/g)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

(B). Limits for General Population/Uncontrolled Exposure (mW/g)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

***Note: Whole-Body SAR** is averaged over the entire body, **partial-body SAR** is averaged over any 1 gram of tissue defined as a tissue volume in the shape of a cube. **SAR for hands, wrists, feet and ankles** is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.*

Population/Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

Occupational/Controlled Environments are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

NOTE

GENERAL POPULATION/UNCONTROLLED EXPOSURE
PARTIAL BODY LIMIT

1.6 mW/g

8. MEASUREMENT RESULTS

8.1 SYSTEM VALIDATION

Prior to the assessment, the system validation kit was used to test whether the system was operating within its specifications of ±10%. The validation results are tabulated below. And also the corresponding SAR plot is attached as well in the SAR plots files.

IEEE P1528 Recommended Reference Value

Frequency (MHz)	1g SAR	10g SAR	Local SAR at Surface (Above Feed Point)	Local SAR at Surface (y = 2cm offset from feed point)
900	10.3	6.57	16.4	5.4
1800	39.2	20.3	69.5	6.8
2450	54.8	24.2	104.2	7.7

System Validation Results

Ambient conduction: Temperature: 25.8 °C; Relative humidity: 59%

System Validation Dipole: D2450V2 SN:726 **Date**: Aug 12, 2003

Medium			Parameters	Target	Measured	Deviation[%]	Limited[%]
Type	Temp. [°C]	Dipth [cm]					
Head 2450 MHz	25.40	15.00	Permitivity:	39	38	-2.56	± 5
			Conductivity:	1.84	1.8489	0.48	± 5
			1g SAR:	54.8	54.4	-0.73	± 5

8.2 TEST LIQUID CONFIRMATION

Simulated Tissue Liquid Parameter confirmation

The dielectric parameters were checked prior to assessment using the HP85070C dielectric probe kit. The dielectric parameters measured are reported in each correspondent section.

IEEE SCC-34/SC-2 P1528 recommended Tissue Dielectric Parameters

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations and extrapolated according to the head parameters specified in P1528

Target Frequency	Head		Body	
(MHz)	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800-2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	45.3	5.27	48.2	6.00

Note: *ε_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3*

Liquid Confirmation Results

Ambient conduction – Temperature: 25.8 °C; Relative humidity: 59% **Date**: Aug 12, 2003

Medium			Parameters	Target	Measured	Deviation[%]	Limited[%]
Type	Temp. [°C]	Dipth (cm)					
Muscle	25.30	15.00	Permitivity:	52.7	50.64	-3.91	± 5
2450 Mhz			Conductivity:	1.95	2	2.56	± 5

EUT TUNE-UP PROCEDURE

The following procedure had been used to prepare the EUT for the SAR test.

- The client supplied a special driver to program the EUT, allowing it to continually transmit the specified maximum power and change the channel frequency.
- The conducted power was measured at the high, middle and low channel frequency before and after the SAR measurement.
- The output power(dBm) we measured before SAR test in different transition rate and channel

CH \ Rate	1M	2M	5.5M	11M
1	18.16	18.42	18.81	18.96
6	18.24	18.55	18.99	19.30
11	18.30	18.60	19.07	**19.31**

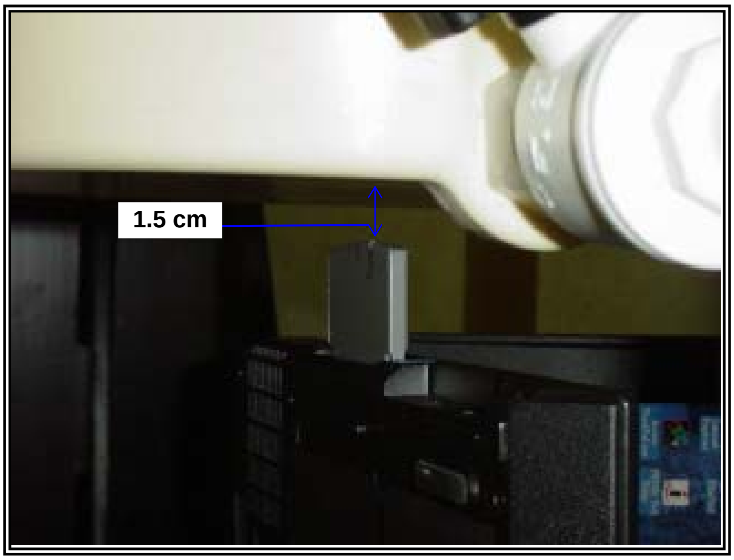
8.3 EUT SETUP PHOTOS

EUT Setup Configuration 1

1. Installation conditions between host device and phantom - Botton face in parallel with flat phantom.
2. Spacing between host device and phantom - In contact (0 cm).
3. Spacing between EUT and phantom – 7.5 mm.

EUT Setup Configuration 2

4. Installation conditions between host device and phantom - Host device perpendicular to flat phantom
5. Spacing between EUT and phantom - 1.5 cm



8.4 SAR MEASUREMENT RESULT

Date of Measurement: Aug, 12 2003

EUT Set-up Configuration 1 - **Body/Flat**								Date: Aug 12, 2003
EUT Set-up conditions		Frequency		Conducted power [dBm] (**Peak**)		Liquid Temp [°C]	**SAR** (mW/g)	Limit (mW/g)
Sep. [cm]	Rate	Channel	MHz	Before	After			
0	1	6	2437	18.24	18.23	25.3	0.413	1.6
	2	6	2437	18.55	18.54	25.3	0.476	
	5.5	6	2437	18.99	18.97	25.3	0.503	

EUT Set-up Configuration 1 - **Body/Flat**								
EUT Set-up conditions		Frequency		Conducted power [dBm] (**Peak**)		Liquid Temp [°C]	**SAR** (mW/g)	Limit (mW/g)
Sep. [cm]	Rate	Channel	MHz	Before	After			
0	11	1	2412	18.96	18.95	25.3	0.490	1.6
		6	2437	19.30	19.28	25.3	**0.515**	
		11	2462	19.30	19.28	25.3	0.446	
Note (s): Please refer to attachment for the result presentation in plot format.								

EUT Set-up Configuration 2 - **Body/Flat**								
EUT Set-up conditions		Frequency		Conducted power [dBm] (**Peak**)		Liquid Temp [°C]	**SAR** (mW/g)	Limit (mW/g)
Sep. [cm]	Rate	Channel	MHz	Before	After			
1.5	11	1	2412	18.96	18.94	25.3	0.0841	1.6
		6	2437	19.30	19.28	25.3	0.0853	
		11	2462	**19.31**	19.28	25.3	0.0847	
Note (s): Please refer to attachment for the result presentation in plot format.								

9. EUT PHOTOS

10. EQUIPMENT LIST & CALIBRATION

Name of Equipment	Manufacturer	Type/Model	Serial Number	Calibration Due
S-Parameter Network Analyzer	Agilent	E8358A	US40280243	03/24/04
Electronic Probe kit	Hewlett Packard	85070A	N/A	N/A
3.5mm electronic Calibration Kit	Agilent	85093C	US01400208	01/22/04
Power Meter	Boonton	4531	13061	01/10/04
Power Sensor	Boonton	56218	2240	01/10/04
Power Meter	Agilent	E4416A	GB41291611	03/15/04
Power Sensor	Agilent	E9327A	US40441097	03/15/04
Thermometer	Amarell	4046	23641	12/12/04
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	1100.0008.02	N/A
Signal Generator	Agilent	83630B	3844A01022	01/15/04
Amplifier	Mini-Circuit	ZHL-1724HLN	N/A	N/A
DC Power generator	ABM	8301HD		N/A
Data Acquisition Electronics (DAE)	SPEAG	DAE3	558	03/07/04
Dosimetric E-Field Probe	SPEAG	ET3DV6	1762	03/31/04
900 MHz System Validation Dipole	SPEAG	D900V2	179	03/31/04
1800 MHz System Validation Dipole	SPEAG	D1800V2	2d026	04/01/04
2450 MHz System Validation Dipole	SPEAG	D2450V2	728	03/05/04
Probe Alignment Unit	SPEAG	LB (V2)	348	N/A
Robot	Staubli	RX90B L	F02/5T69A1/A/01	N/A
SAM Twin Phantom V4.0	SPEAG	N/A	N/A	N/A
Devices Holder	SPEAG	N/A	N/A	N/A
Head 835 MHz	CCS	H835A	N/A	N/A
Muscle 835 MHz	CCS	M835A	N/A	N/A
Head 900 MHz	CCS	H900A	N/A	N/A
Muscle 900 MHz	CCS	M900A	N/A	N/A
Head 1800 MHz	CCS	H1800A	N/A	N/A
Muscle 1800 MHz	CCS	M1800A	N/A	N/A
Head 1900 MHz	CCS	H1900A	N/A	N/A
Muscle 1900 MHz	CCS	M1900A	N/A	N/A
Head 2450 MHz	CCS	H2450A	N/A	N/A
Muscle 2450 MHz	CCS	M2450A	N/A	N/A

11. REFERENCES

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[2] David L. Means Kwok Chan, Robert F. Cleveland, \Evaluating compliance with FCC guidelines for human exposure to radio frequency electromagnetic fields", Tech. Rep., Federal Communication Commission, Office of Engineering & Technology, Washington, DC, 1997.

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[6] ANSI, ANSI/IEEE C95.1-1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz, The Institute of Electrical and Electronics Engineers, Inc., New York, NY 10017, 1992.

[7] Katja Pokovic, Thomas Schmid, and Niels Kuster, \Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies", in ICECOM _ 97, Dubrovnik, October 15{17, 1997, pp. 120{124.

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[10] Klaus Meier, Ralf Kastle, Volker Hombach, Roger Tay, and Niels Kuster, \The dependence of EM energy absorption upon human head modeling at 1800 MHz", IEEE Transactions on Microwave Theory and Techniques, Oct. 1997, in press.

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[13] NIS81 NAMAS, \The treatment of uncertainty in EMC measurement", Tech. Rep., NAMAS Executive, National Physical Laboratory, Teddington, Middlesex, England, 1994.

[14] Barry N. Taylor and Christ E. Kuyatt, \Guidelines for evaluating and expressing the uncertainty of NIST measurement results", Tech. Rep., National Institute of Standards and Technology, 1994. Dosimetric Evaluation of Sample device, month 1998 10

12. ATTACHMENT

Exhibit	Content
1	Data Acquisition Electronics (DAE)-DAE3, S/N: 558
2	Dosimetric E-Field Probe - ET3DV6, S/N: 1762
3	SAM Twin Phantom V4.0 – S/N: TP-1150 and higher
4	Validation Dipole - D2450V2, S/N: 728
5	System Performance Check Plots
6	SAR Test Plots

End of Report

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

Client

CALIBRATION CERTIFICATE

Object(s)	DAE3 - SN:558
Calibration procedure(s)	QA CAL-06.v2 Calibration procedure for the data acquisition unit (DAE)
Calibration date:	March 07, 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
Fluke Process Calibrator Type 702	SN: 6295803	3-Sep-01	Sep-03

	Name	Function	Signature
Calibrated by:	Eric Hainfeld	Technician	
Approved by:	Fin Bomholt	R&D Director	F. Bomholt

Date Issued: March 07, 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.

1. DC Voltage Measurement

DA - Converter Values from DAE

High Range:	1LSB =	6.1µV ,	full range =	400 mV
Low Range:	1LSB =	61nV ,	full range =	4 mV

Software Set-up: Calibration time: 3 sec   Measuring time: 3 sec

Setup	X	Y	Z
High Range	405.010098	404.9037428	405.0817835
Low Range	3.972	3.95185	3.96828
Connector Position	86 °		

High Range	Input	Reading in µV	% Error
Channel X + Input	200mV	200000	0.00
	20mV	20003.4	0.02
Channel X - Input	20mV	-19993	-0.04
Channel Y + Input	200mV	200001	0.00
	20mV	20002.7	0.01
Channel Y - Input	20mV	-19993	-0.04
Channel Z + Input	200mV	200000	0.00
	20mV	20000.8	0.00
Channel Z - Input	20mV	-19997.7	-0.01

Low Range	Input	Reading in µV	% Error
Channel X + Input	2mV	2000.2	0.01
	0.2mV	200.04	0.02
Channel X - Input	0.2mV	-200.81	0.41
Channel Y + Input	2mV	2000.1	0.00
	0.2mV	199.47	-0.27
Channel Y - Input	0.2mV	-201.01	0.50
Channel Z + Input	2mV	1999.9	0.00
	0.2mV	198.68	-0.66
Channel Z - Input	0.2mV	-201.1	0.55

2. Common mode sensitivity

Software Set-up
Calibration time: 3 sec, Measuring time: 3 sec
High/Low Range

in µV	Common mode Input Voltage	High Range Reading	Low Range Reading
Channel X	200mV	-1.0284	-1.5716
	- 200mV	3.9204	1.3725
Channel Y	200mV	6.7686	5.874
	- 200mV	-6.8145	-8.0898
Channel Z	200mV	2.1943	2.766
	- 200mV	-2.52	-4.6218

3. Channel separation

Software Set-up
Calibration time: 3 sec, Measuring time: 3 sec
High Range

in µV	Input Voltage	Channel X	Channel Y	Channel Z
Channel X	200mV	-	0.88082	0.19177
Channel Y	200mV	0.049124	-	0.25676
Channel Z	200mV	-2.1226	-0.89508	-

4. AD-Converter Values with inputs shorted

in LSB	Low Range	High Range
Channel X	16492	16236
Channel Y	16307	15690
Channel Z	16461	16033

5. Input Offset Measurement

Measured after 15 min warm-up time of the Data Acquisition Electronic.
Every Measurement is preceded by a calibration cycle.

Software set-up:
- Calibration time: 3 sec
- Measuring time: 3 sec
- Number of measurements: 100, Low Range

Input 10MΩ

in µV	Average	min. Offset	max. Offset	Std. Deviation
Channel X	-0.52	-1.64	0.60	0.43
Channel Y	-2.05	-3.65	0.06	0.51
Channel Z	-0.34	-2.05	0.43	0.37

Input shorted

in µV	Average	min. Offset	max. Offset	Std. Deviation
Channel X	0.04	-0.84	1.09	0.41
Channel Y	-0.77	-2.08	0.17	0.40
Channel Z	-1.01	-1.68	-0.38	0.24

6. Input Offset Current

in fA	Input Offset Current
Channel X	< 25
Channel Y	< 25
Channel Z	< 25

7. Input Resistance

	Calibrating	Measuring
Channel X	200 kΩ	200 MΩ
Channel Y	200 kΩ	200 MΩ
Channel Z	200 kΩ	200 MΩ

8. Low Battery Alarm Voltage

in V	Alarm Level
Supply (+ Vcc)	7.66 V
Supply (- Vcc)	-7.53 V

9. Power Consumption

in mA	Switched off	Stand by	Transmitting
Supply (+ Vcc)	0.000	5.83	14.1
Supply (- Vcc)	-0.011	-7.86	-9.13

10. Functional test

Touch async pulse 1	ok
Touch async pulse 2	ok
Touch status bit 1	ok
Touch status bit 2	ok
Remote power off	ok
Remote analog Power control	ok
Modification Status	B – C

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

Client C&C (Auden)

CALIBRATION CERTIFICATE

Object(s)	ET3DV6 - SN:1762
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	March 31, 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	Mar-02	Mar-03
Power sensor HP 8481A	MY41092180	18-Sep-02	Sep-03
Power meter EPM E4419B	GB41293874	13-Sep-02	Sep-03
Network Analyzer HP 8753E	US38432426	3-May-00	In house check: May 03
Fluke Process Calibrator Type 702	SN: 6295803	3-Sep-01	Sep-03

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Technician	
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: April 2, 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 9779
info@speag.com, http://www.speag.com

Probe ET3DV6

SN:1762

Manufactured: January 20, 2003
Last calibration: March 31, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1762

Sensitivity in Free Space

NormX	**1.90**	$\mu V/(V/m)^2$
NormY	**1.78**	$\mu V/(V/m)^2$
NormZ	**1.82**	$\mu V/(V/m)^2$

Diode Compression

DCP X	**96**	mV
DCP Y	**96**	mV
DCP Z	**96**	mV

Sensitivity in Tissue Simulating Liquid

Head 900 MHz ε_r **= 41.5 ± 5%** σ **= 0.97 ± 5% mho/m**
Head 835 MHz ε_r **= 41.5 ± 5%** σ **= 0.90 ± 5% mho/m**

ConvF X	**6.7** ± 9.5% (k=2)		Boundary effect:	
ConvF Y	**6.7** ± 9.5% (k=2)		Alpha	**0.67**
ConvF Z	**6.7** ± 9.5% (k=2)		Depth	**1.74**

Head 1800 MHz ε_r **= 40.0 ± 5%** σ **= 1.40 ± 5% mho/m**
Head 1900 MHz ε_r **= 40.0 ± 5%** σ **= 1.40 ± 5% mho/m**

ConvF X	**5.4** ± 9.5% (k=2)		Boundary effect:	
ConvF Y	**5.4** ± 9.5% (k=2)		Alpha	**0.50**
ConvF Z	**5.4** ± 9.5% (k=2)		Depth	**2.63**

Boundary Effect

Head 900 MHz Typical SAR gradient: 5 % per mm

Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	8.8	4.5
SAR_{be} [%]	With Correction Algorithm	0.1	0.2

Head 1800 MHz Typical SAR gradient: 10 % per mm

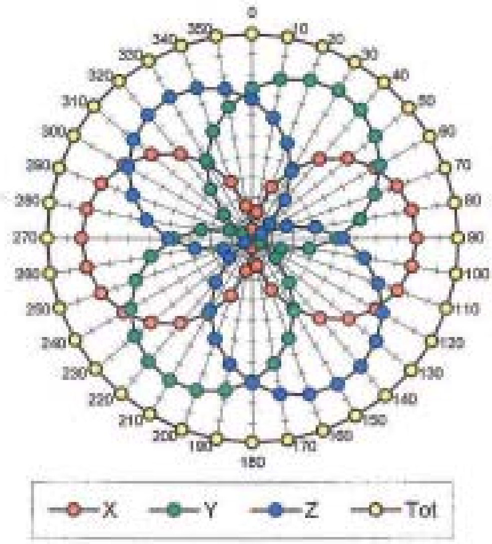
Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	13.8	9.3
SAR_{be} [%]	With Correction Algorithm	0.2	0.1

Sensor Offset

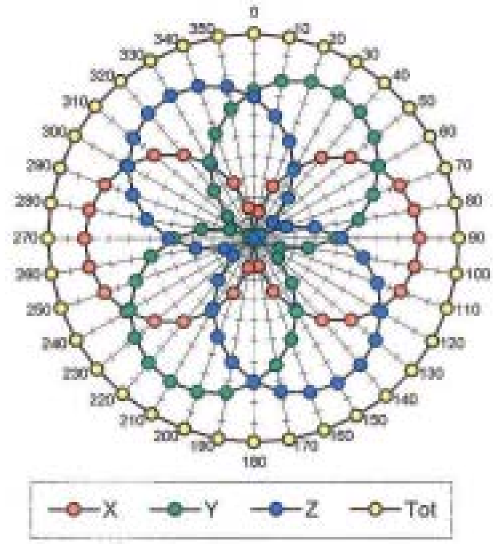
Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**1.4 ± 0.2**	mm

Receiving Pattern (ϕ), $\theta = 0°$

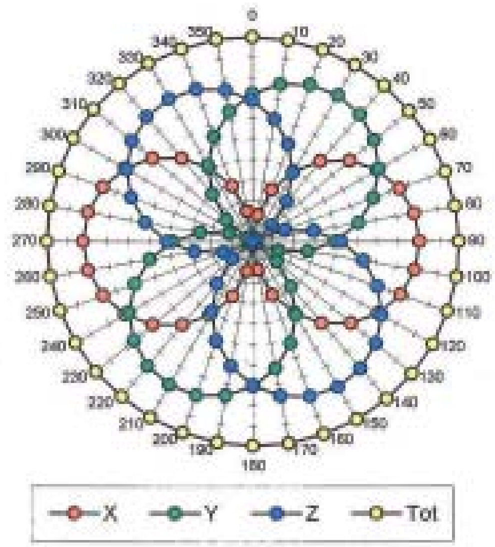
f = 30 MHz, TEM cell ifi110



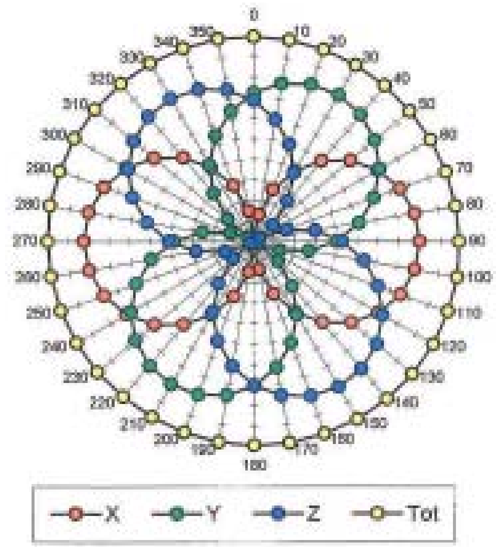
f = 100 MHz, TEM cell ifi110

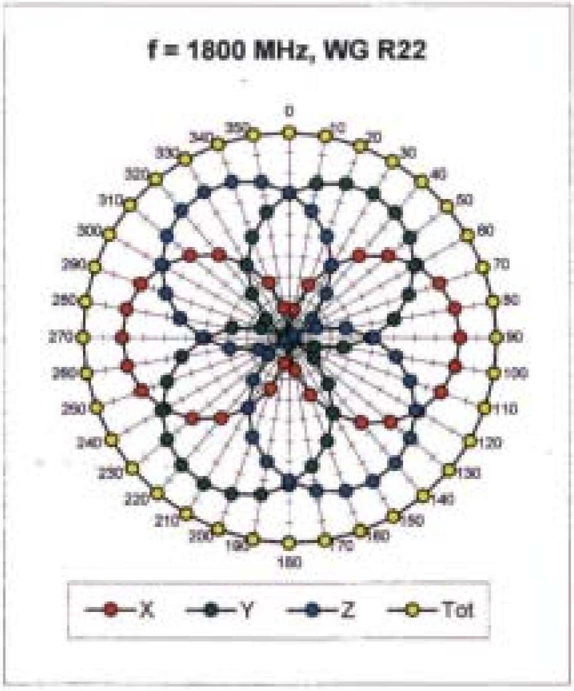


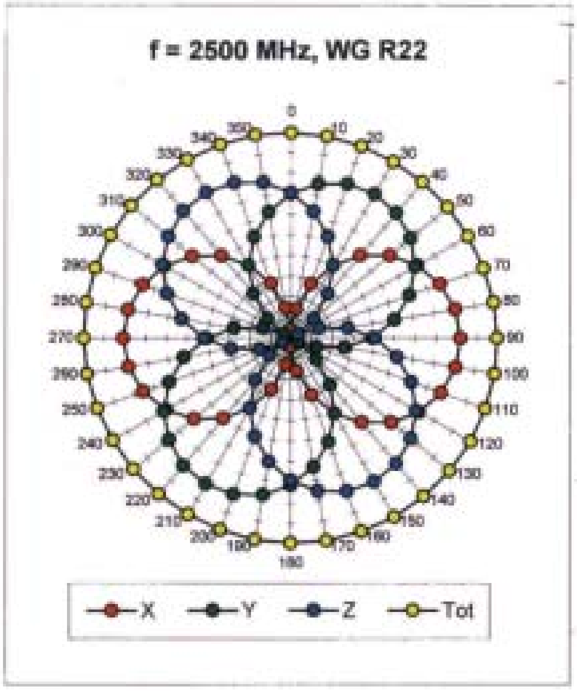
f = 300 MHz, TEM cell ifi110



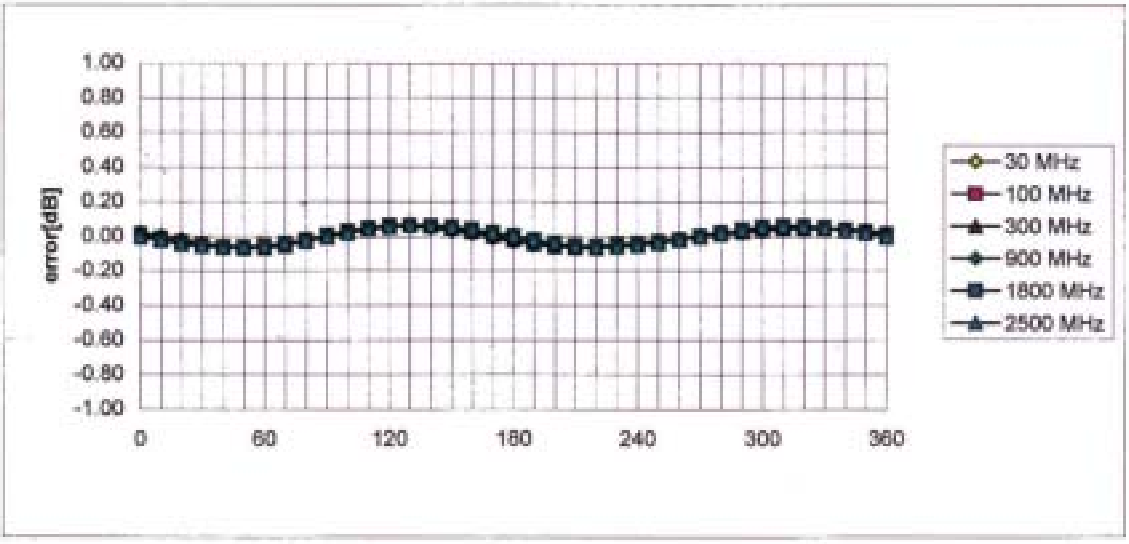
f = 900 MHz, TEM cell ifi110





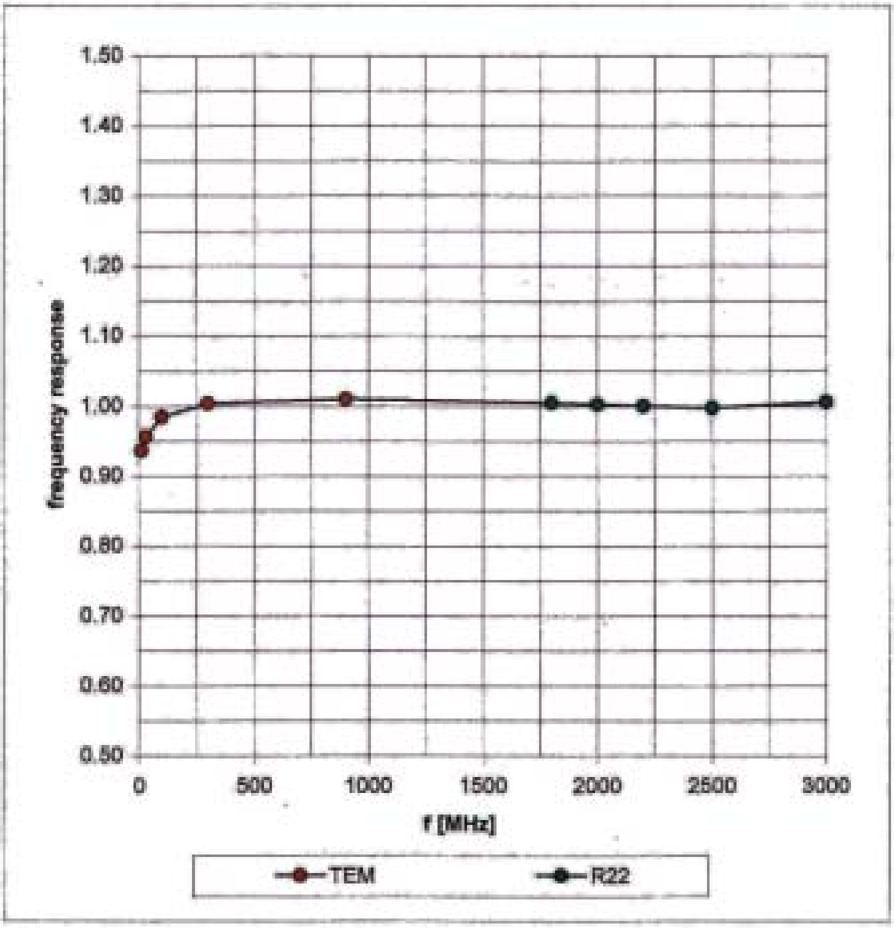


Isotropy Error (ϕ), θ = 0°



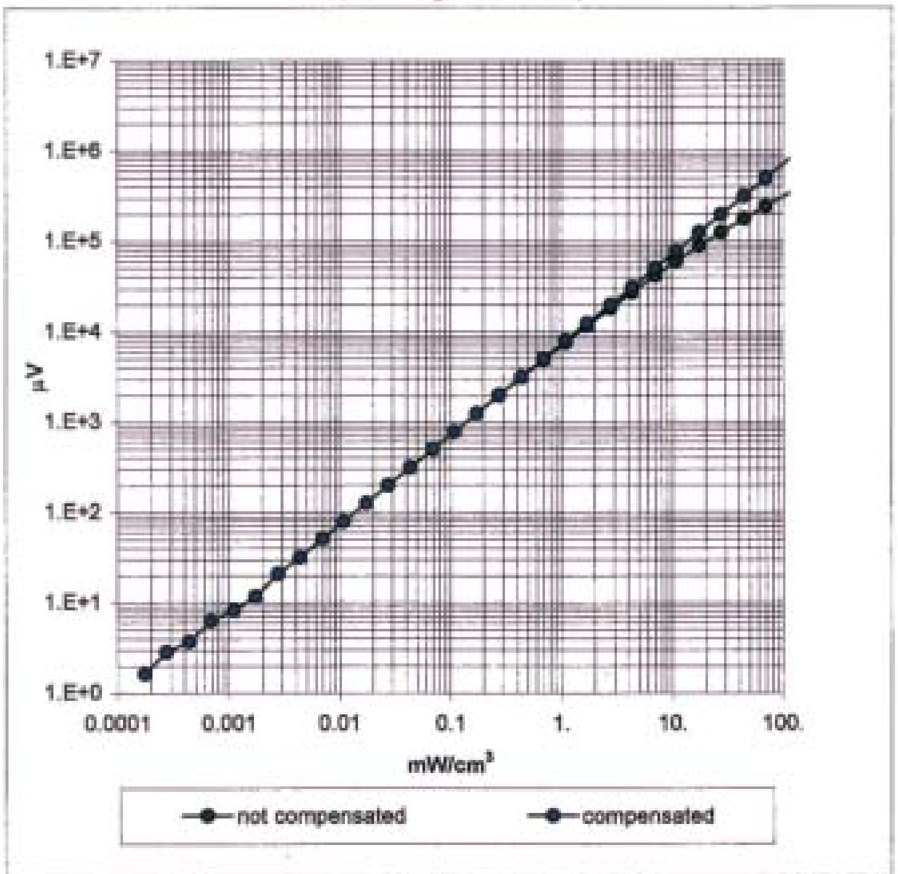
Frequency Response of E-Field

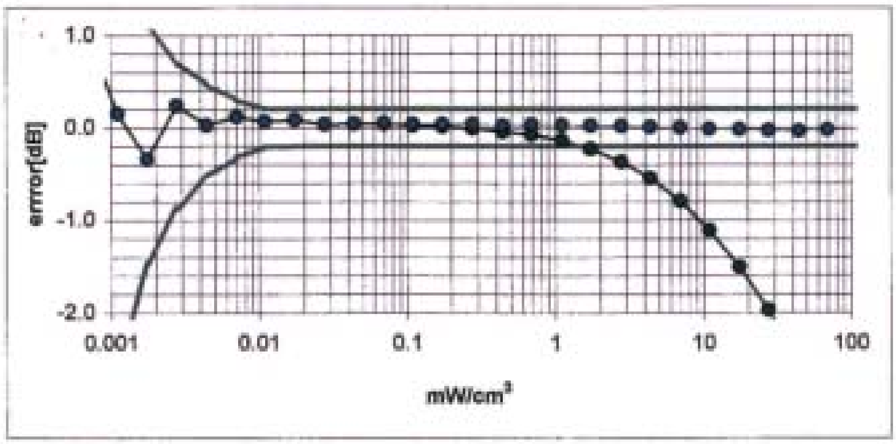
(TEM-Cell:ifi110, Waveguide R22)



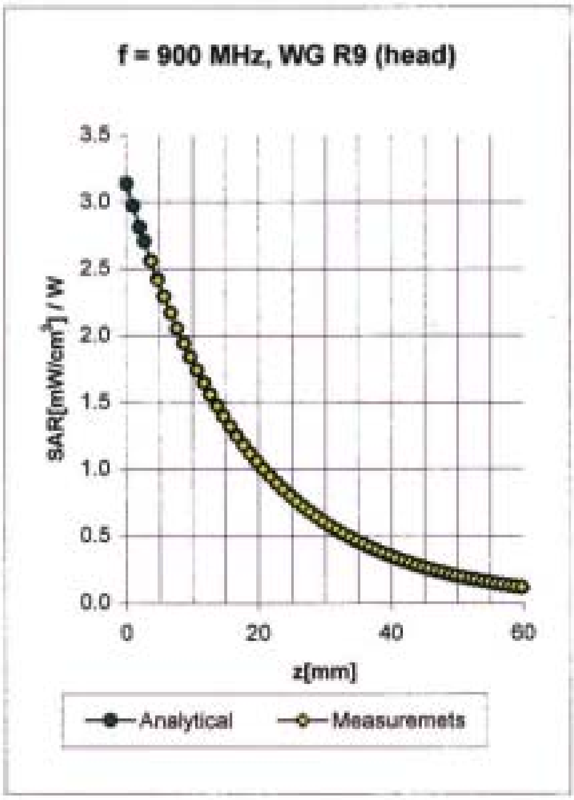
Dynamic Range f(SAR_{brain})

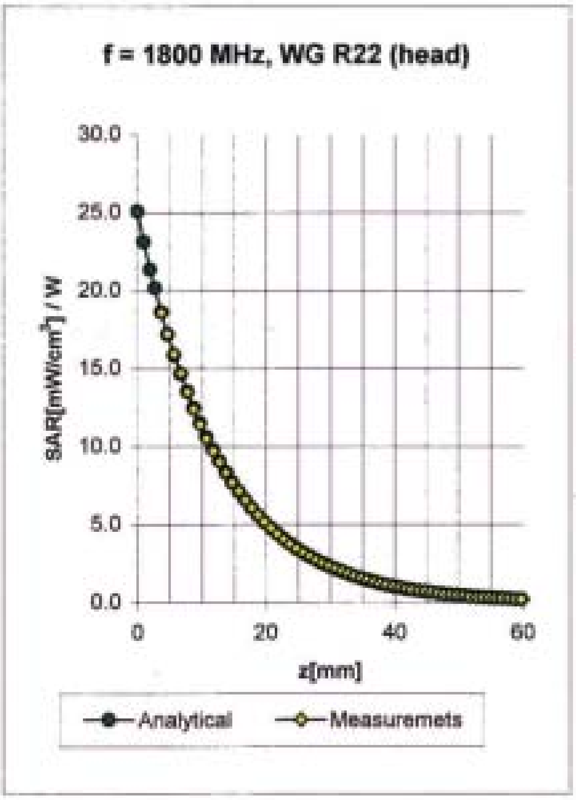
(Waveguide R22)





Conversion Factor Assessment

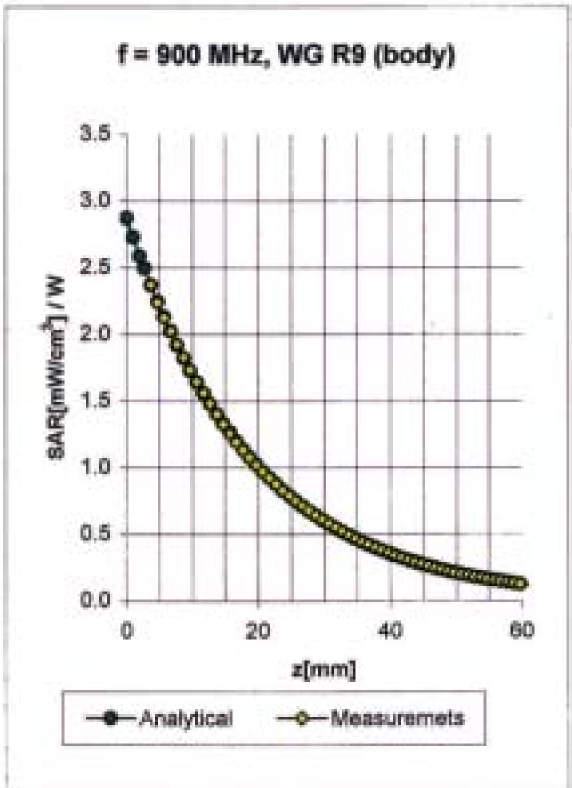


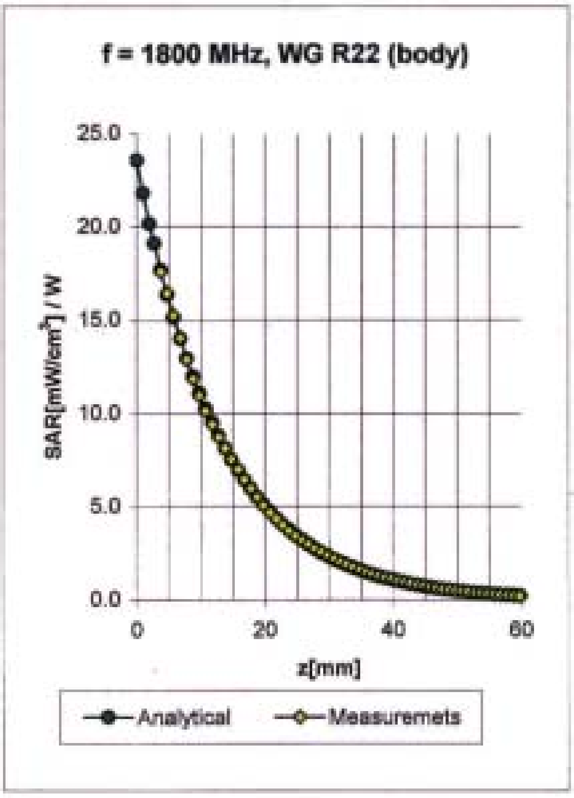


Head	**900 MHz**		**ε_r = 41.5 ± 5%**	**σ = 0.97 ± 5% mho/m**	
Head	**835 MHz**		**ε_r = 41.5 ± 5%**	**σ = 0.90 ± 5% mho/m**	
	ConvF X	**6.7**	± 9.5% (k=2)	Boundary effect:	
	ConvF Y	**6.7**	± 9.5% (k=2)	Alpha	**0.67**
	ConvF Z	**6.7**	± 9.5% (k=2)	Depth	**1.74**

Head	**1800 MHz**		**ε_r = 40.0 ± 5%**	**σ = 1.40 ± 5% mho/m**	
Head	**1900 MHz**		**ε_r = 40.0 ± 5%**	**σ = 1.40 ± 5% mho/m**	
	ConvF X	**5.4**	± 9.5% (k=2)	Boundary effect:	
	ConvF Y	**5.4**	± 9.5% (k=2)	Alpha	**0.50**
	ConvF Z	**5.4**	± 9.5% (k=2)	Depth	**2.63**

Conversion Factor Assessment

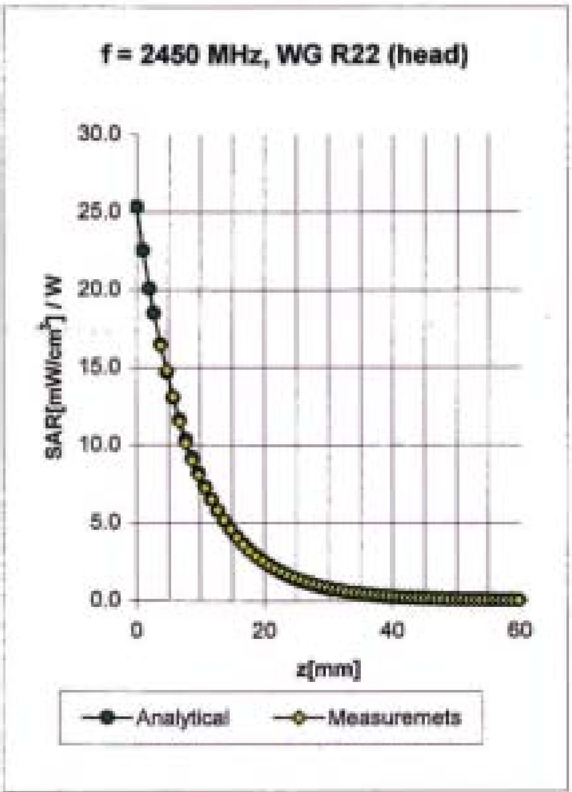


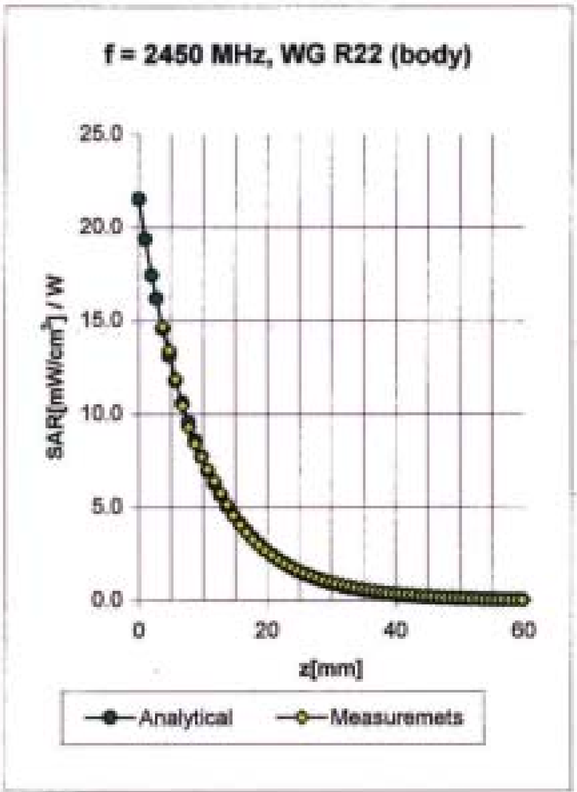


Body	900 MHz	ε_r = 55.0 ± 5%	σ = 1.05 ± 5% mho/m	
Body	835 MHz	ε_r = 55.2 ± 5%	σ = 0.97 ± 5% mho/m	
	ConvF X	**6.5** ± 9.5% (k=2)	Boundary effect:	
	ConvF Y	**6.5** ± 9.5% (k=2)	Alpha	**0.43**
	ConvF Z	**6.5** ± 9.5% (k=2)	Depth	**2.34**

Body	1800 MHz	ε_r = 53.3 ± 5%	σ = 1.52 ± 5% mho/m	
Body	1900 MHz	ε_r = 53.3 ± 5%	σ = 1.52 ± 5% mho/m	
	ConvF X	**5.0** ± 9.5% (k=2)	Boundary effect:	
	ConvF Y	**5.0** ± 9.5% (k=2)	Alpha	**0.57**
	ConvF Z	**5.0** ± 9.5% (k=2)	Depth	**2.65**

Conversion Factor Assessment





Head	**2450**	**MHz**	ε_r **= 39.2 ± 5%**	σ **= 1.80 ± 5% mho/m**

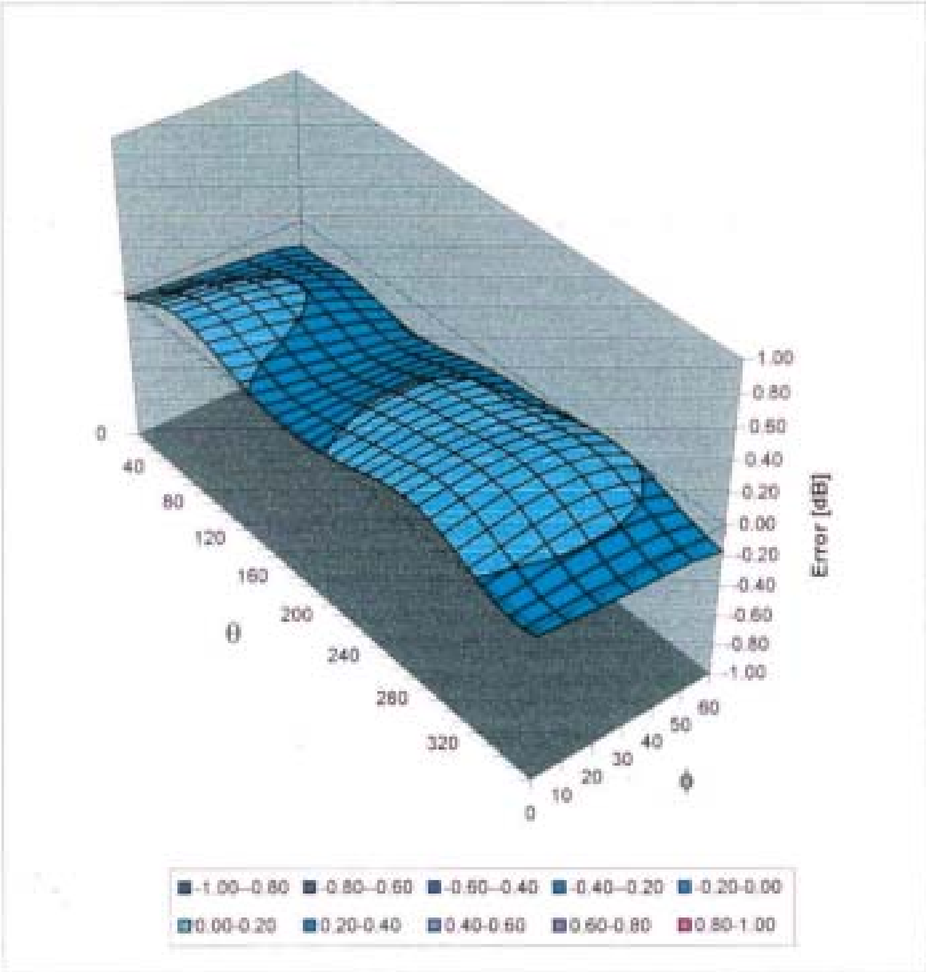
ConvF X	**5.1**	± 8.9% (k=2)	Boundary effect:	
ConvF Y	**5.1**	± 8.9% (k=2)	Alpha	**1.32**
ConvF Z	**5.1**	± 8.9% (k=2)	Depth	**1.61**

Body	**2450**	**MHz**	ε_r **= 52.7 ± 5%**	σ **= 1.95 ± 5% mho/m**

ConvF X	**4.6**	± 8.9% (k=2)	Boundary effect:	
ConvF Y	**4.6**	± 8.9% (k=2)	Alpha	**1.39**
ConvF Z	**4.6**	± 8.9% (k=2)	Depth	**1.60**

Deviation from Isotropy in HSL

Error (θ,ϕ), f = 900 MHz



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.	IT'IS 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 IT'IS 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

F. Bomholt

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USAGE OF ORGANIC SOLVENTS

Diethylene Gycol Monobuthy Ether (used as basis for HSL1800 and M1800 liquids), as many other orginic solvents, is a very effective softener for synthetic materials. These solvents can cause irreparable damage to certain SPEAG products except those which are explicitly declared as compliant with organic solvents.

Compatible Probes:
- ET3DV6
- ES3DV2
- ER3DV6
- H3DV6

The probes shall not be exposed to solvents longer than necessary for the measurements and shall daily after use be cleaned with water and stored dry.

Compatible Phantom:
- SAM V4.0

The phantom shall not be exposed longer than necessary to solvents. After such use, it shall be cleaned with water and dried.

Note: If you intend to use these probes and phantom in acids or solvents other than specified in -- the standards/guidelines for compliance testing, please contact SPEAG before hand.

Phantoms with Restricted Compatibility:
The solvents will also act as a softener for the fiberglass of phantoms V2 & V3, i.e., V2.0, V3.0, V3.5, V3.6. However, it will not damage the phantom, provided the following precaution is considered: Do not keep the liquid in the phantom overnight, i.e., empty and dry the phantom every evening.

Other Products:
For all other SPEAG products we are forced to waive the warranty if used with organic solvents without the written consent from SPEAG.

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

Client C&C (Auden)

CALIBRATION CERTIFICATE

Object(s)	D2450V2 - SN:728
Calibration procedure(s)	QA CAL-05.v2 Calibration procedure for dipole validation kits
Calibration date:	March 5, 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 R&S SML-03	100698	27-Mar-2002	In house check: Mar-05
Power sensor HP 8481A	MY41092317	18-Oct-02	Oct-04
Power sensor HP 8481A	US37292783	30-Oct-02	Oct-03
Power meter EPM E442	GB37480704	30-Oct-02	Oct-03
Network Analyzer HP 8753E	US38432426	3-May-00	In house check: May 03

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Technician	D. Vetterli
Approved by:	Katja Pokovic	Laboratory Director	Katja Pokovic

Date issued: April 2, 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 9779
info@speag.com, http://www.speag.com

DASY

Dipole Validation Kit

Type: D2450V2

Serial: 728

Manufactured: January 9, 2003
Calibrated: March 5, 2003

1. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with head simulating solution of the following electrical parameters at 2450 MHz:

Relative Dielectricity	**37.4**	± 5%
Conductivity	**1.88 mho/m**	± 5%

The DASY4 System with a dosimetric E-field probe ES3DV2 (SN:3013, Conversion factor 4.8 at 2450 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10mm from dipole center to the solution surface. The included distance holder was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 7x7x7 fine cube was chosen for cube integration.
The dipole input power (forward power) was 250mW ± 3 %. The results are normalized to 1W input power.

2. SAR Measurement with DASY4 System

Standard SAR-measurements were performed according to the measurement conditions described in section 1. The results (see figure supplied) have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values measured with the dosimetric probe ES3DV2 SN:3013 and applying the advanced extrapolation are:

averaged over 1 cm^3 (1 g) of tissue:	**54.8 mW/g** ± 16.8 % (k=2)[1]
averaged over 10 cm^3 (10 g) of tissue:	**24.2 mW/g** ± 16.2 % (k=2)[1]

[1] validation uncertainty

3. Dipole Impedance and Return Loss

The impedance was measured at the SMA-connector with a network analyzer and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	**1.153 ns**	(one direction)
Transmission factor:	**0.997**	(voltage transmission, one direction)

The dipole was positioned at the flat phantom sections according to section 1 and the distance holder was in place during impedance measurements.

Feedpoint impedance at 2450 MHz:	Re{Z} = **53.7 Ω**
	Im {Z} = **3.8 Ω**
Return Loss at 2450 MHz	**-25.9 dB**

4. Handling

Do not apply excessive force to the dipole arms, because they might bend. Bending of the dipole arms stresses the soldered connections near the feedpoint leading to a damage of the dipole.

5. Design

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

Small end caps have been added to the dipole arms in order to improve matching when loaded according to the position as explained in Section 1. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

6. Power Test

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

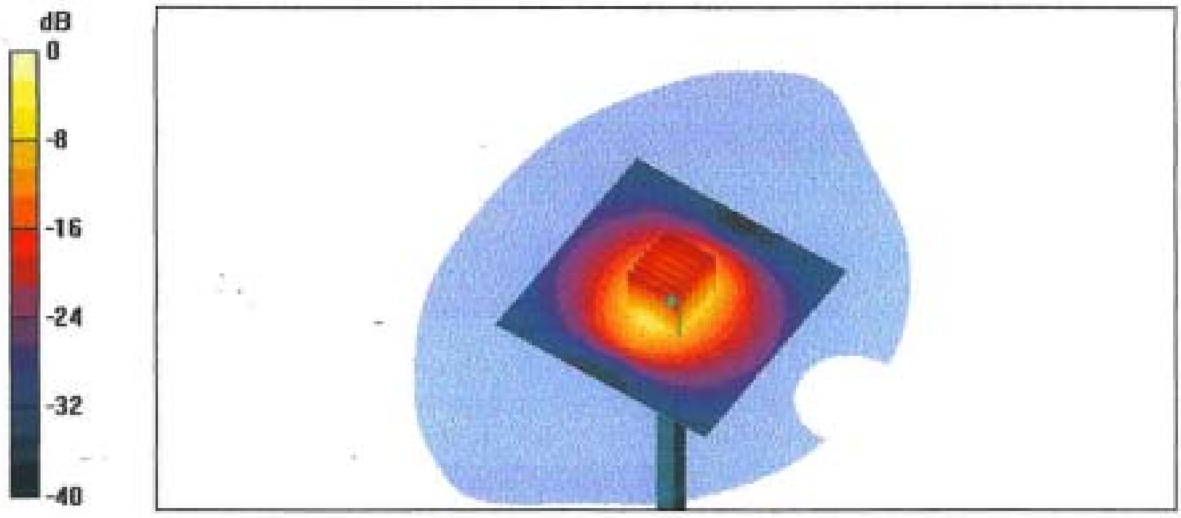
Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN728_SN3013_HSL2450_050303.da4

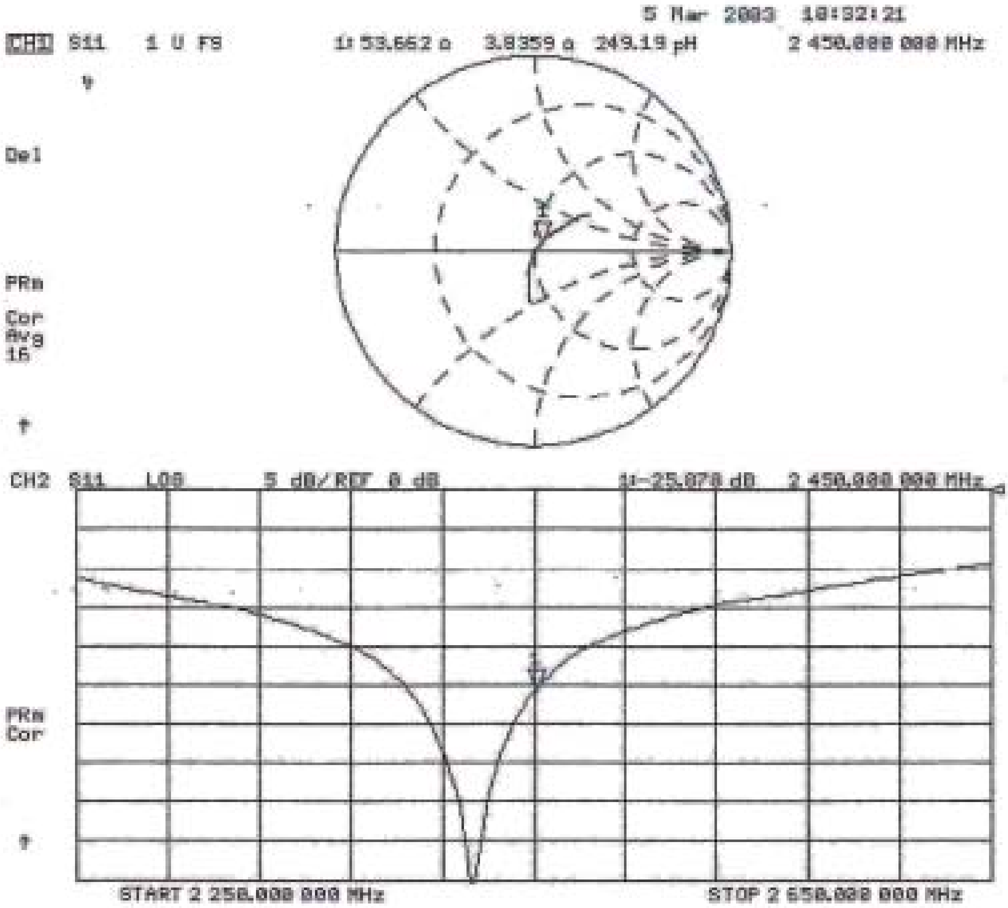
DUT: Dipole 2450 MHz; Serial: D2450V2 - SN728
Program: Dipole Calibration

Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL 2450 MHz; (σ = 1.88 mho/m, ε_r = 37.4, ρ = 1000 kg/m^3)
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3013; ConvF(4.8, 4.8, 4.8); 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 = 91.6 V/m
Peak SAR = 30.6 W/kg
SAR(1 g) = 13.7 mW/g; SAR(10 g) = 6.04 mW/g
Power Drift = 0.02 dB





5 Mar 2003 10:32:21
CH1 S11 1 U FS 1: 53.662 Ω 3.8359 Ω 249.19 pH 2 450.000 000 MHz
Del
PRm
Cor
Avg
16
CH2 S11 LOG 5 dB/ REF 0 dB 1:-25.070 dB 2 450.000 000 MHz
PRm
Cor
START 2 250.000 000 MHz
STOP 2 650.000 000 MHz

728
Head

Test Laboratory: C&C Labratory CO., Ltd
File Name: 2450-Dipole-1.da4

2450-Dipole-1

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:728
Program: System Performance Check at 2450MHz

Communication System: CW2450; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: HSL2450 (σ = 1.8489 mho/m, ε_r = 38, ρ = 1000 kg/m^3)
Air Temperature 25.8 deg C ; Liquid Temperature 25.4 deg C
Phantom section: Flat Section

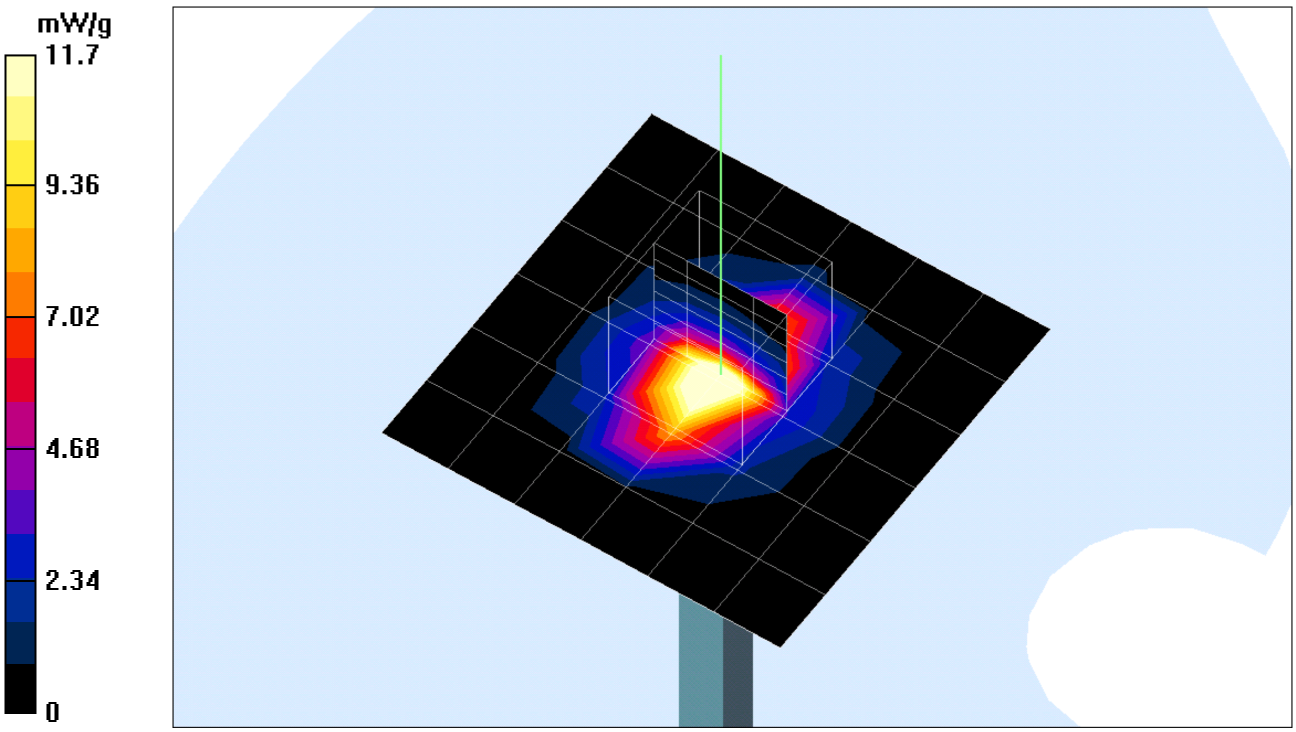
DASY4 Configuration:

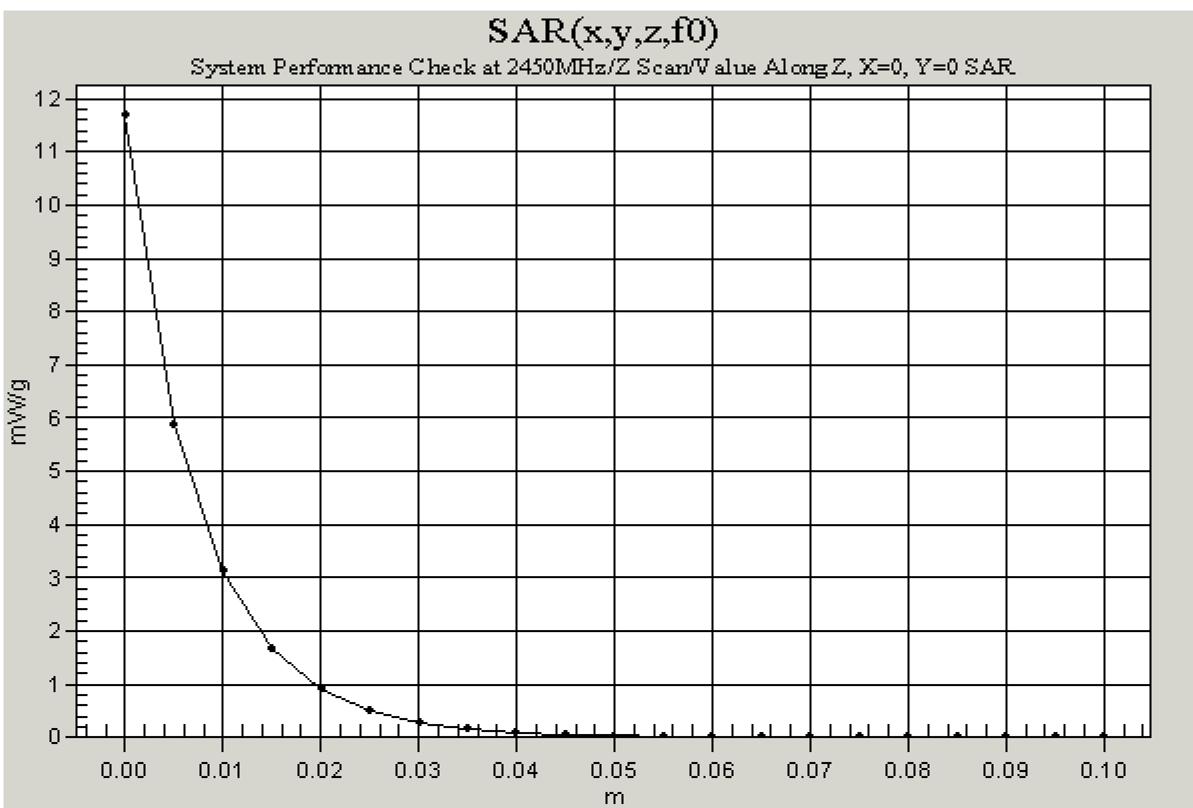
- Probe: ET3DV6 - SN1762; ConvF(5.1, 5.1, 5.1); Calibrated: 3/31/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
  Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE3 Sn558; Calibrated: 3/7/2003
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1271
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Pin=250mW,d=10mm/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 95.6 V/m
Power Drift = 0.05 dB
Maximum value of SAR = 15.1 mW/g

Pin=250mW,d=10mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Peak SAR (extrapolated) = 27.7 W/kg
SAR(1 g) = 13.6 mW/g; SAR(10 g) = 6.35 mW/g
Reference Value = 95.6 V/m
Power Drift = 0.05 dB
Maximum value of SAR = 15.3 mW/g

Pin=250mW,d=10mm/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Reference Value = 95.6 V/m
Power Drift = 0.06 dB
Maximum value of SAR = 11.7 mW/g

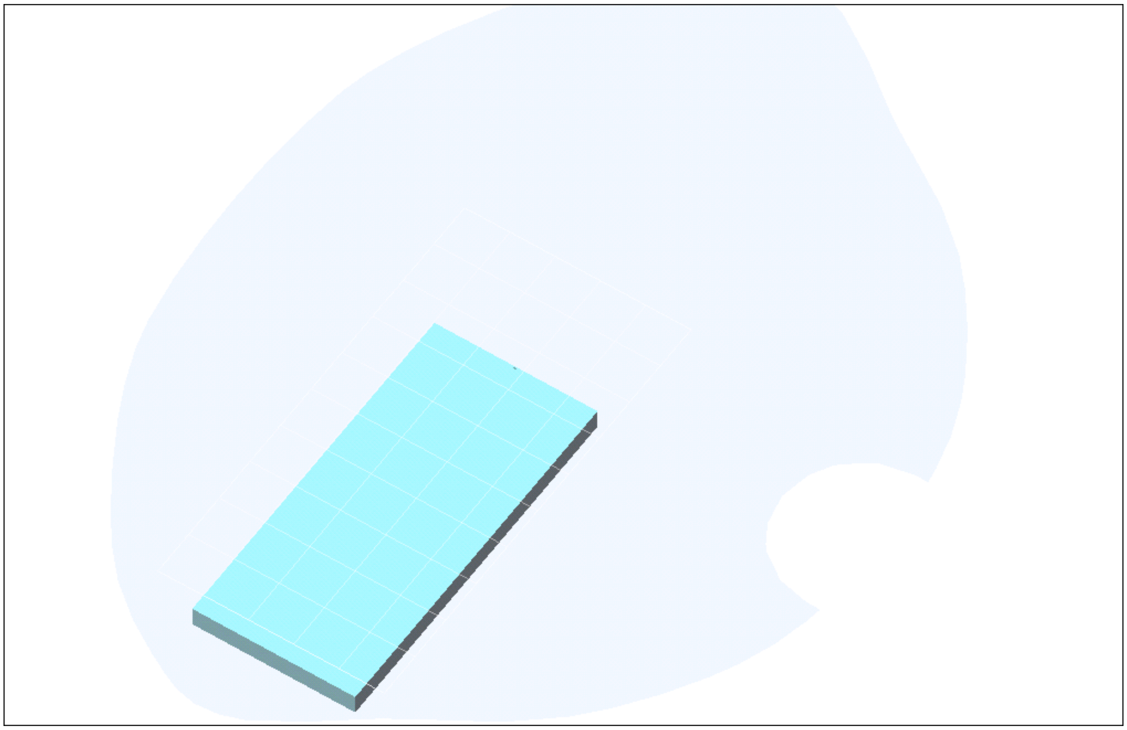

mW/g
11.7
9.36
7.02
4.68
2.34
0


SAR(x,y,z,f0)
System Performance Check at 2450MHz/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
m

Date/Time: 08/12/03 13:35:08

Test Laboratory: C&C Labratory CO., Ltd

EUT SETUP CONFIGURATION1



Date/Time: 08/12/03 11:15:11

Test Laboratory: C&C Labratory CO., Ltd
File Name: pcmcia.da4

pcmcia CH6 Rate: 1mb

DUT: 2.4GHz wireless PCI Card Adapter; Type: DWL-650; Serial: FCC ID:
Program: touch

Communication System: 802.11b WLAN pci card; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: BSL2450 (σ = 2 mho/m, ε_r = 50.64, ρ = 1000 kg/m^3)
Air Temperature 25.8 deg C ; Liquid Temperature 25.3 deg C
Phantom section: Flat Section

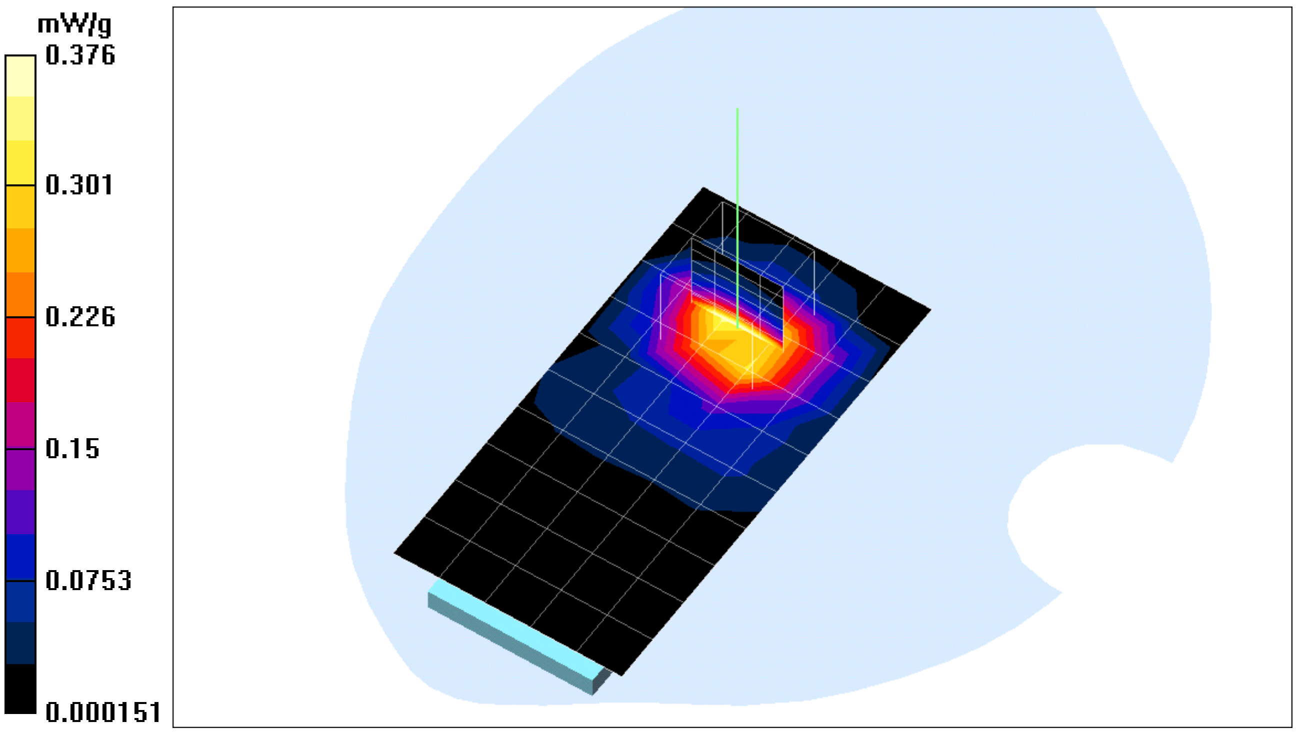
DASY4 Configuration:

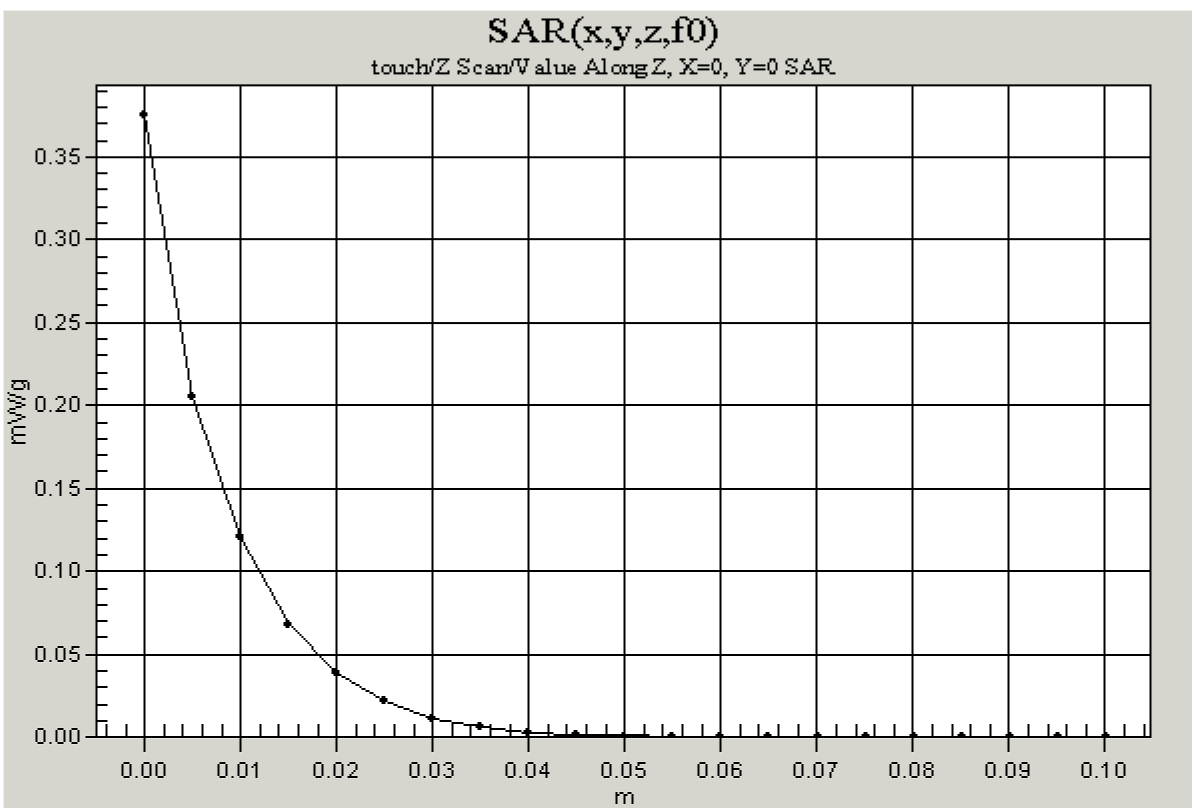
- Probe: ET3DV6 - SN1762; ConvF(4.6, 4.6, 4.6); Calibrated: 3/31/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
  Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE3 Sn558; Calibrated: 3/7/2003
- Phantom: SAM 34; Type: SAM V4.0; Serial: TP-1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

1 mb/Area Scan (6x11x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 11.8 V/m
Power Drift = -0.1 dB
Maximum value of SAR = 0.367 mW/g

1 mb/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Peak SAR (extrapolated) = 0.809 W/kg
SAR(1 g) = 0.413 mW/g; SAR(10 g) = 0.212 mW/g
Reference Value = 11.8 V/m
Power Drift = -0.1 dB
Maximum value of SAR = 0.434 mW/g

1 mb/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Reference Value = 11.8 V/m
Power Drift = -0.1 dB
Maximum value of SAR = 0.376 mW/g


mW/g
0.376
0.301
0.226
0.15
0.0753
0.000151


SAR(x,y,z,f0)
touch/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 08/12/03 11:48:37

Test Laboratory: C&C Labratory CO., Ltd
File Name: pcmcia.da4

pcmcia ch 6 Rate : 2mb

DUT: 2.4GHz wireless PCI Card Adapter; Type: DWL-650; Serial: FCC ID:
Program: touch

Communication System: 802.11b WLAN pci card; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: BSL2450 (σ = 2 mho/m, ε_r = 50.64, ρ = 1000 kg/m^3)
Air Temperature 25.8 deg C ; Liquid Temperature 25.3 deg C
Phantom section: Flat Section

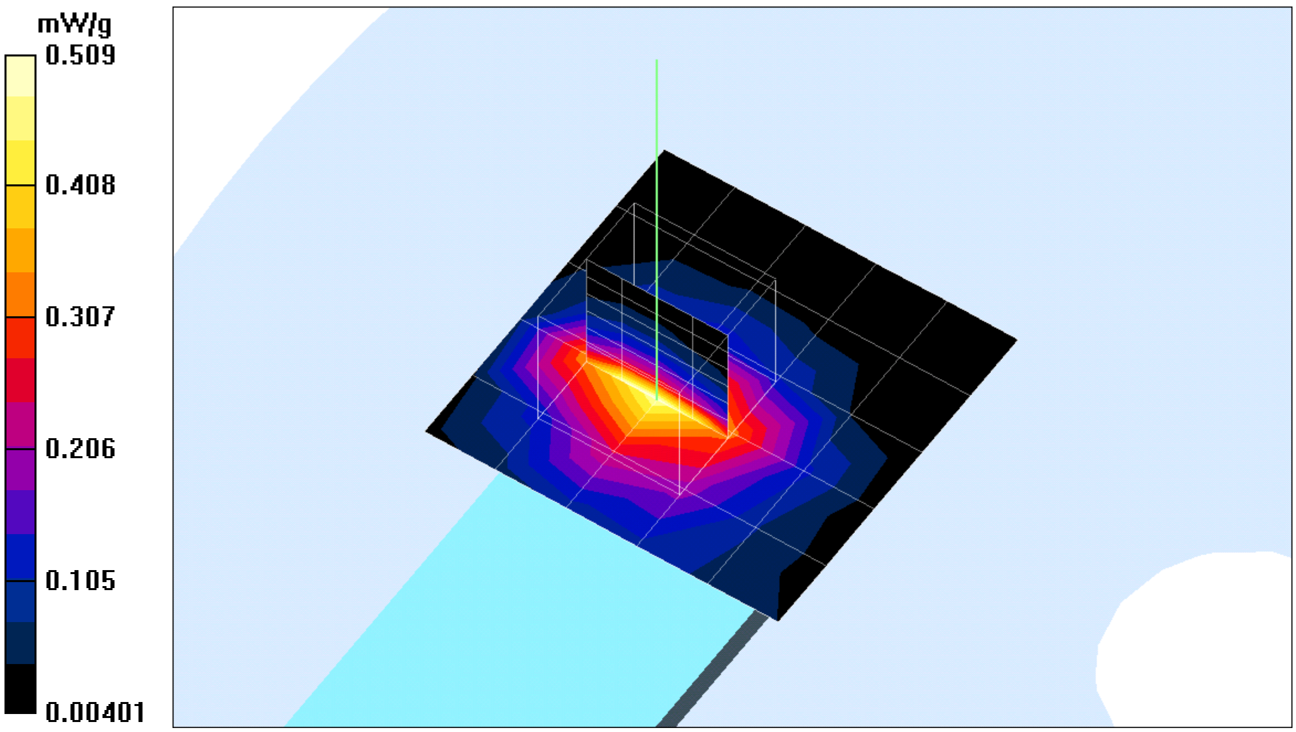
DASY4 Configuration:

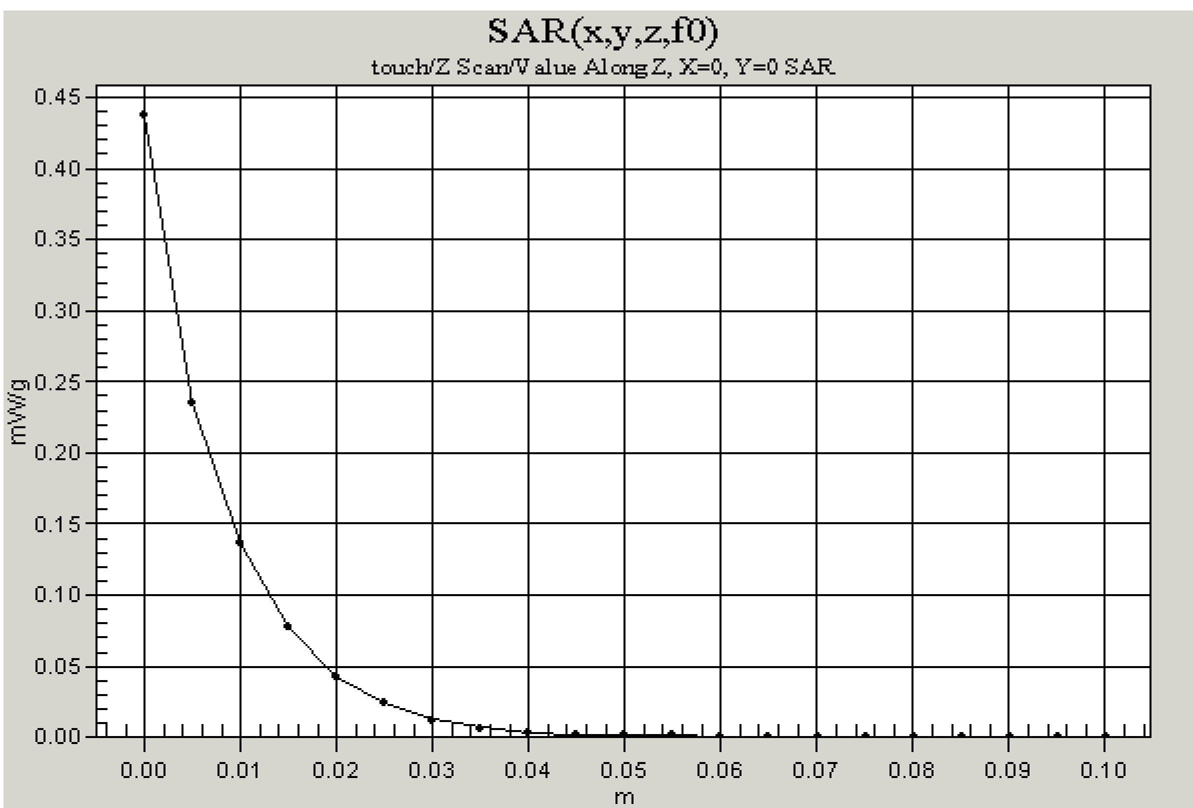
- Probe: ET3DV6 - SN1762; ConvF(4.6, 4.6, 4.6); Calibrated: 3/31/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
  Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE3 Sn558; Calibrated: 3/7/2003
- Phantom: SAM 34; Type: SAM V4.0; Serial: TP-1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

2 mb/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 10 V/m
Power Drift = -0.03 dB
Maximum value of SAR = 0.492 mW/g

2 mb/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Reference Value = 10 V/m
Power Drift = -0.009 dB
Maximum value of SAR = 0.438 mW/g

2 mb/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Peak SAR (extrapolated) = 0.951 W/kg
SAR(1 g) = 0.476 mW/g; SAR(10 g) = 0.242 mW/g
Reference Value = 10 V/m
Power Drift = -0.03 dB
Maximum value of SAR = 0.509 mW/g


mW/g
0.509
0.408
0.307
0.206
0.105
0.00401


SAR(x,y,z,f0)
touch/Z Scan/Value Along Z, X=0, Y=0 SAR
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
mW/g
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 08/12/03 13:00:12

Test Laboratory: C&C Labratory CO., Ltd
File Name: pcmcia.da4

pcmcia ch6 Rate : 5.5mb

DUT: 2.4GHz wireless PCI Card Adapter; Type: DWL-650; Serial: FCC ID:
Program: touch

Communication System: 802.11b WLAN pci card; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: BSL2450 (σ = 2 mho/m, ε_r = 50.64, ρ = 1000 kg/m^3)
Air Temperature 25.8 deg C ; Liquid Temperature 25.3 deg C

Phantom section: Flat Section

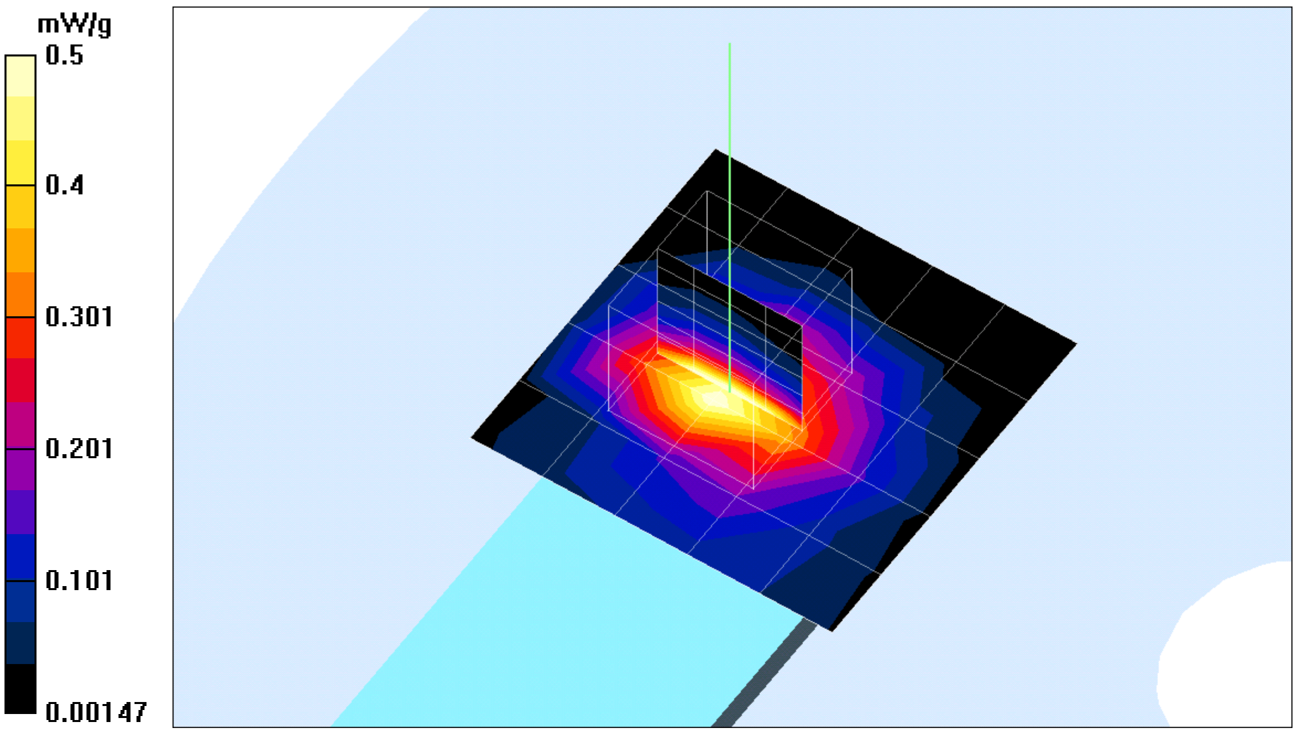
DASY4 Configuration:

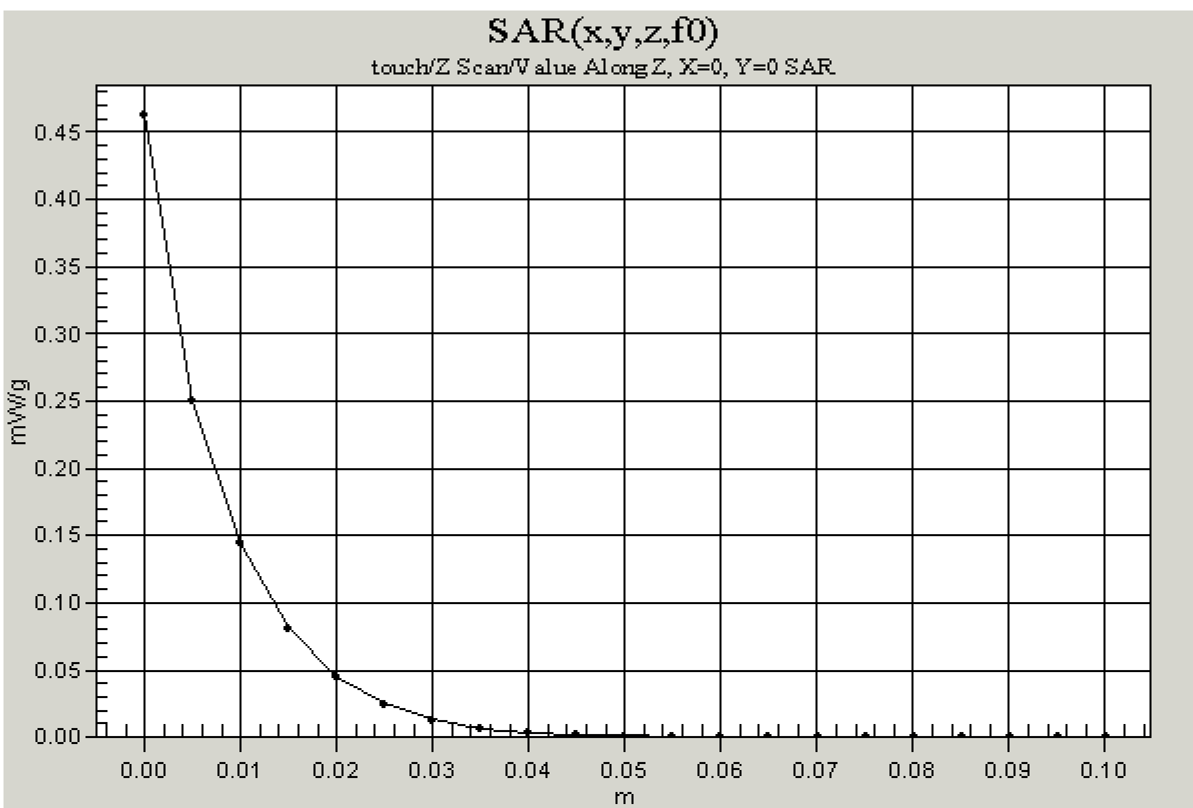
- Probe: ET3DV6 - SN1762; ConvF(4.6, 4.6, 4.6); Calibrated: 3/31/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
  Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE3 Sn558; Calibrated: 3/7/2003
- Phantom: SAM 34; Type: SAM V4.0; Serial: TP-1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

5.5 mb/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 13.5 V/m
Power Drift = -0.05 dB
Maximum value of SAR = 0.5 mW/g

5.5 mb/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Reference Value = 13.5 V/m
Power Drift = -0.06 dB
Maximum value of SAR = 0.463 mW/g

5.5 mb/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Peak SAR (extrapolated) = 0.999 W/kg
SAR(1 g) = 0.503 mW/g; SAR(10 g) = 0.256 mW/g
Reference Value = 13.5 V/m
Power Drift = -0.05 dB
Maximum value of SAR = 0.533 mW/g


mW/g
0.5
0.4
0.301
0.201
0.101
0.00147


SAR(x,y,z,f0)
touch/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 08/12/03 13:56:09

Test Laboratory: C&C Labratory CO., Ltd
File Name: 11mb touch.da4

Rate:11mb touch ch1

DUT: 2.4GHz wireless PCI Card Adapter; Type: DWL-650; Serial: FCC ID:
Program: PCMCIA

Communication System: 802.11b WLAN pci card; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: BSL2450 (σ = 2 mho/m, ε_r = 50.64, ρ = 1000 kg/m^3)
Air Temperature 25.8 deg C ;Liquid Temperature 25.3 deg C
Phantom section: Flat Section

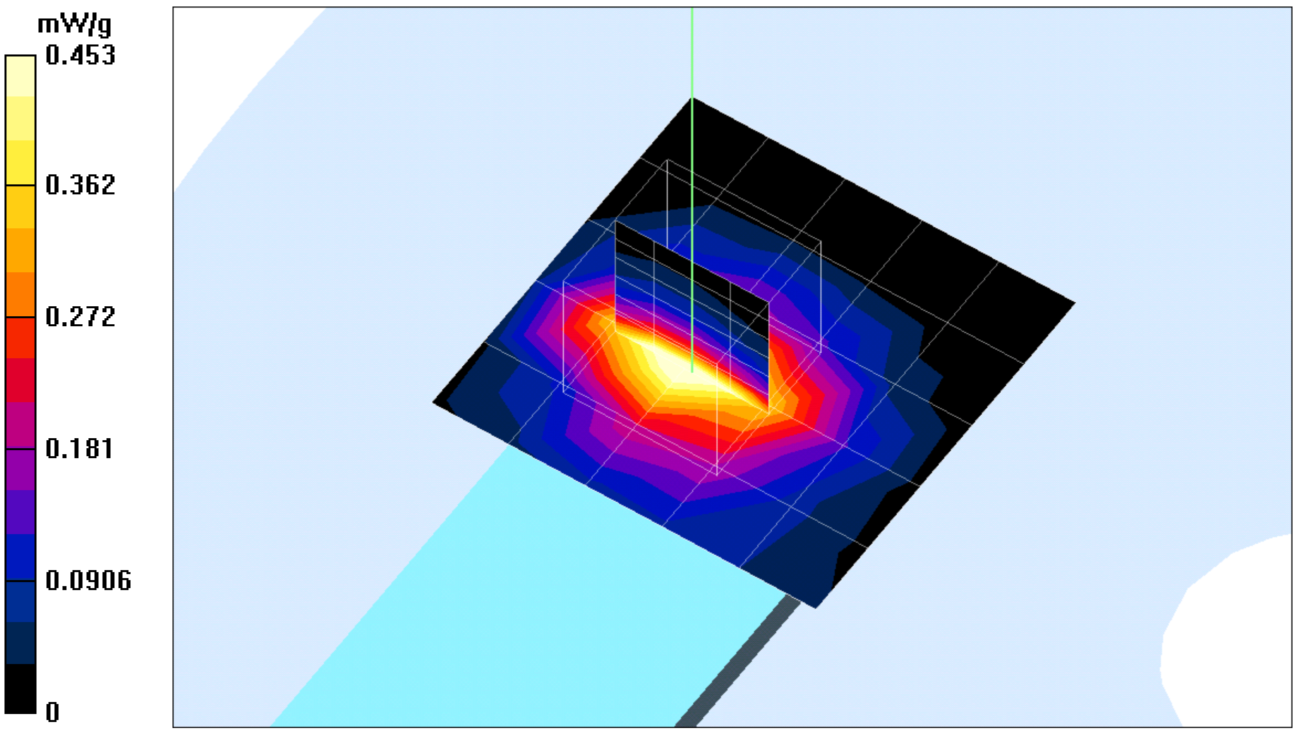
DASY4 Configuration:

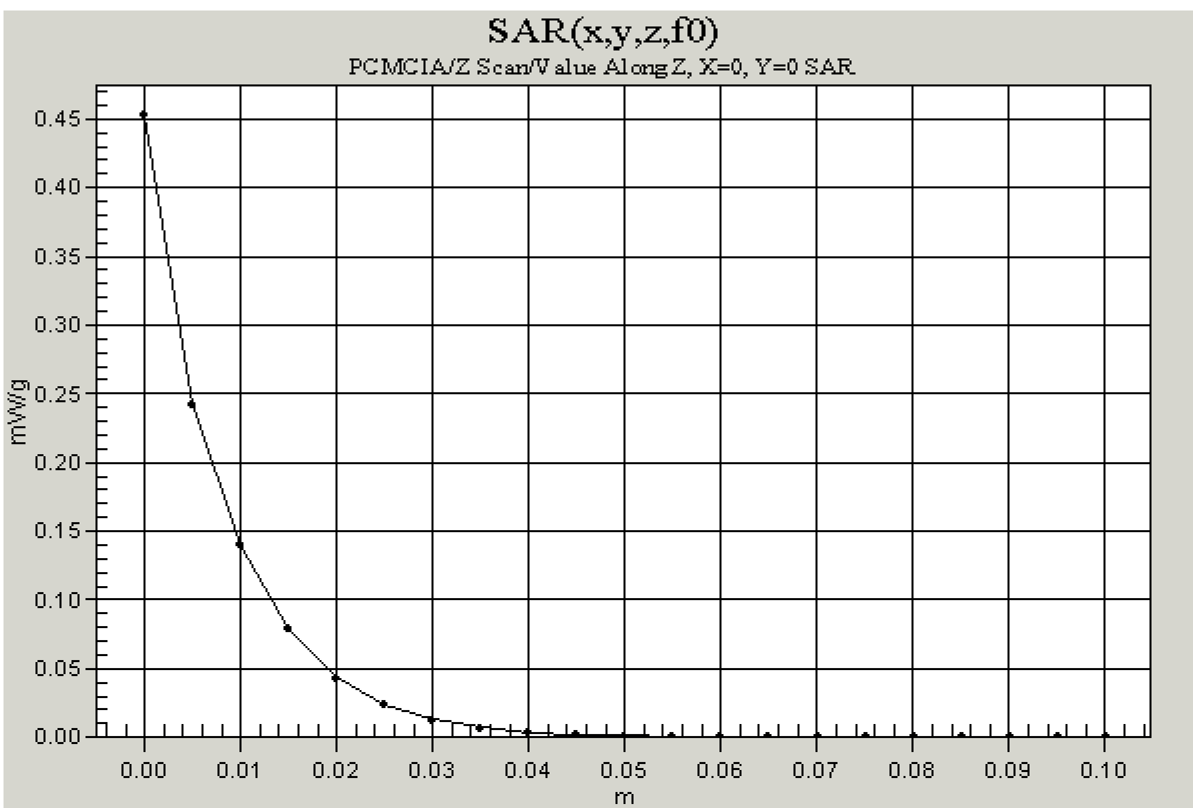
- Probe: ET3DV6 - SN1762; ConvF(4.6, 4.6, 4.6); Calibrated: 3/31/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
  Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE3 Sn558; Calibrated: 3/7/2003
- Phantom: SAM 34; Type: SAM V4.0; Serial: TP-1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

touch ch1/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 11.1 V/m
Power Drift = 0.03 dB
Maximum value of SAR = 0.521 mW/g

touch ch1/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Reference Value = 11.1 V/m
Power Drift = 0.03 dB
Maximum value of SAR = 0.453 mW/g

touch ch1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Peak SAR (extrapolated) = 0.972 W/kg
SAR(1 g) = 0.49 mW/g; SAR(10 g) = 0.25 mW/g
Reference Value = 11.1 V/m
Power Drift = 0.03 dB
Maximum value of SAR = 0.521 mW/g


mW/g
0.453
0.362
0.272
0.181
0.0906
0


SAR(x,y,z,f0)
PCMCIA/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 08/12/03 13:35:08

Test Laboratory: C&C Labratory CO., Ltd
File Name: pcmcia.da4

pcmcia ch 6 Rate:11 mb

DUT: 2.4GHz wireless PCI Card Adapter; Type: DWL-650; Serial: FCC ID:
Program: touch

Communication System: 802.11b WLAN pci card; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: BSL2450 (σ = 2 mho/m, ε_r = 50.64, ρ = 1000 kg/m^3)
Air Temperature 25.8 deg C ; Liquid Temperature 25.3 deg C
Phantom section: Flat Section

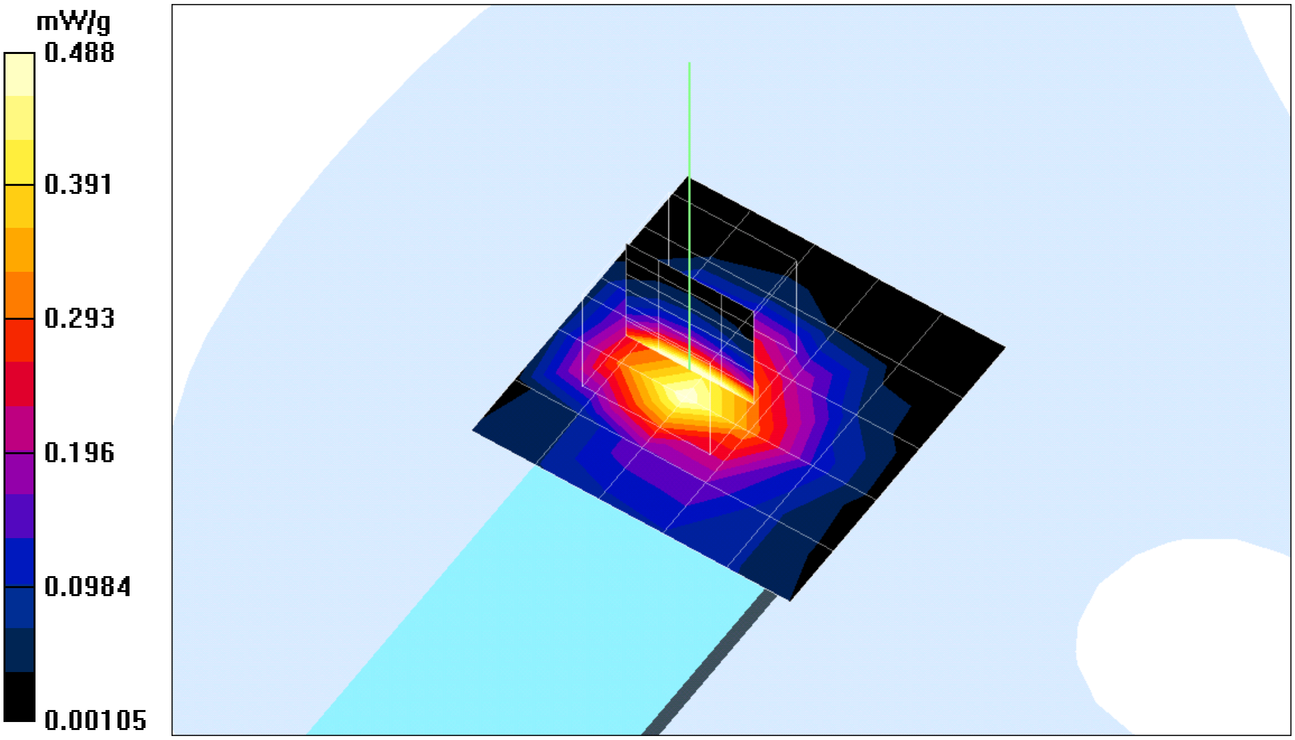
DASY4 Configuration:

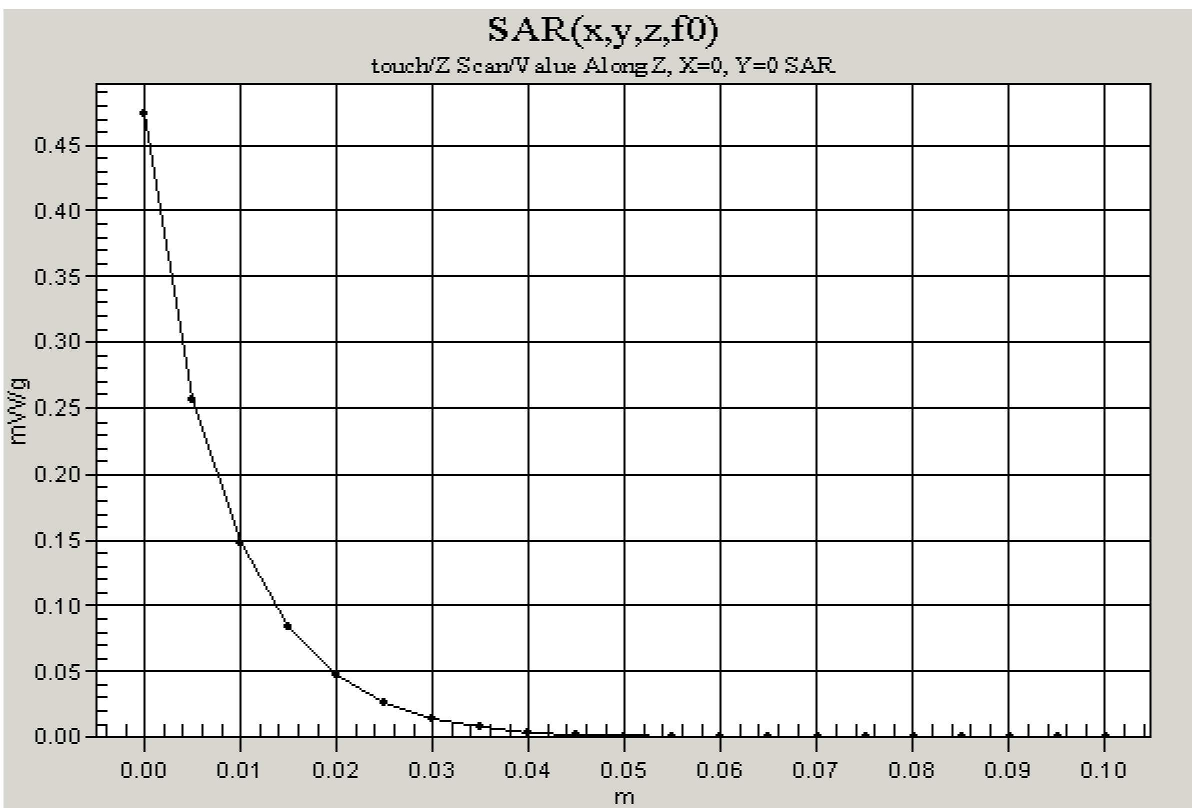
- Probe: ET3DV6 - SN1762; ConvF(4.6, 4.6, 4.6); Calibrated: 3/31/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
  Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE3 Sn558; Calibrated: 3/7/2003
- Phantom: SAM 34; Type: SAM V4.0; Serial: TP-1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

11 mb/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 13.1 V/m
Power Drift = 0.01 dB
Maximum value of SAR = 0.488 mW/g

11 mb/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Peak SAR (extrapolated) = 1.02 W/kg
SAR(1 g) = 0.515 mW/g; SAR(10 g) = 0.261 mW/g
Reference Value = 13.1 V/m
Power Drift = 0.01 dB
Maximum value of SAR = 0.557 mW/g

11 mb/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Reference Value = 13.1 V/m
Power Drift = 0.02 dB
Maximum value of SAR = 0.474 mW/g


mW/g
0.488
0.391
0.293
0.196
0.0984
0.00105


SAR(x,y,z,f0)
touch/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Test Laboratory: C&C Labratory CO., Ltd
File Name: 11mb touch.da4

Rate:11mb touch ch 11

DUT: 2.4GHz wireless PCI Card Adapter; Type: DWL-650; Serial: FCC ID:
Program: PCMCIA

Communication System: 802.11b WLAN pci card; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: BSL2450 (σ = 2 mho/m, ε_r = 50.64, ρ = 1000 kg/m^3)
Air Temperature 25.8 deg C ; Liquid Temperature 25.3 deg C
Phantom section: Flat Section

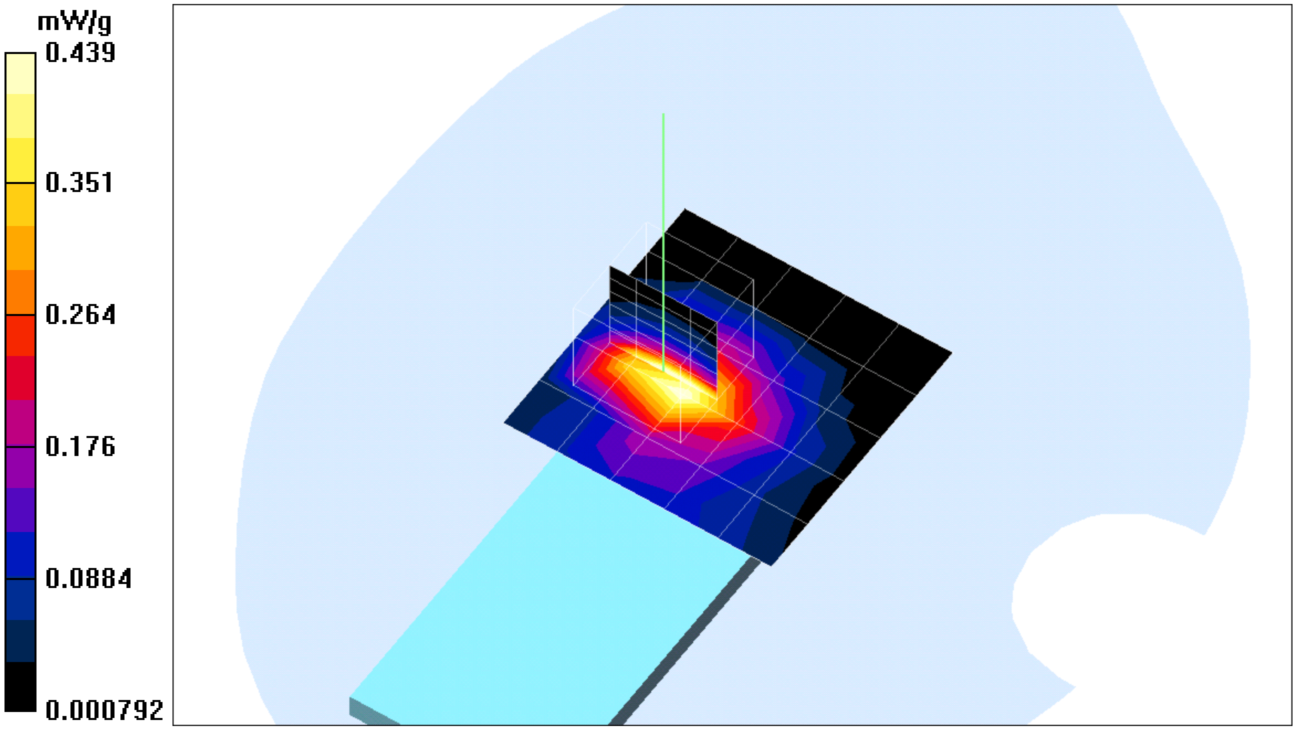
DASY4 Configuration:

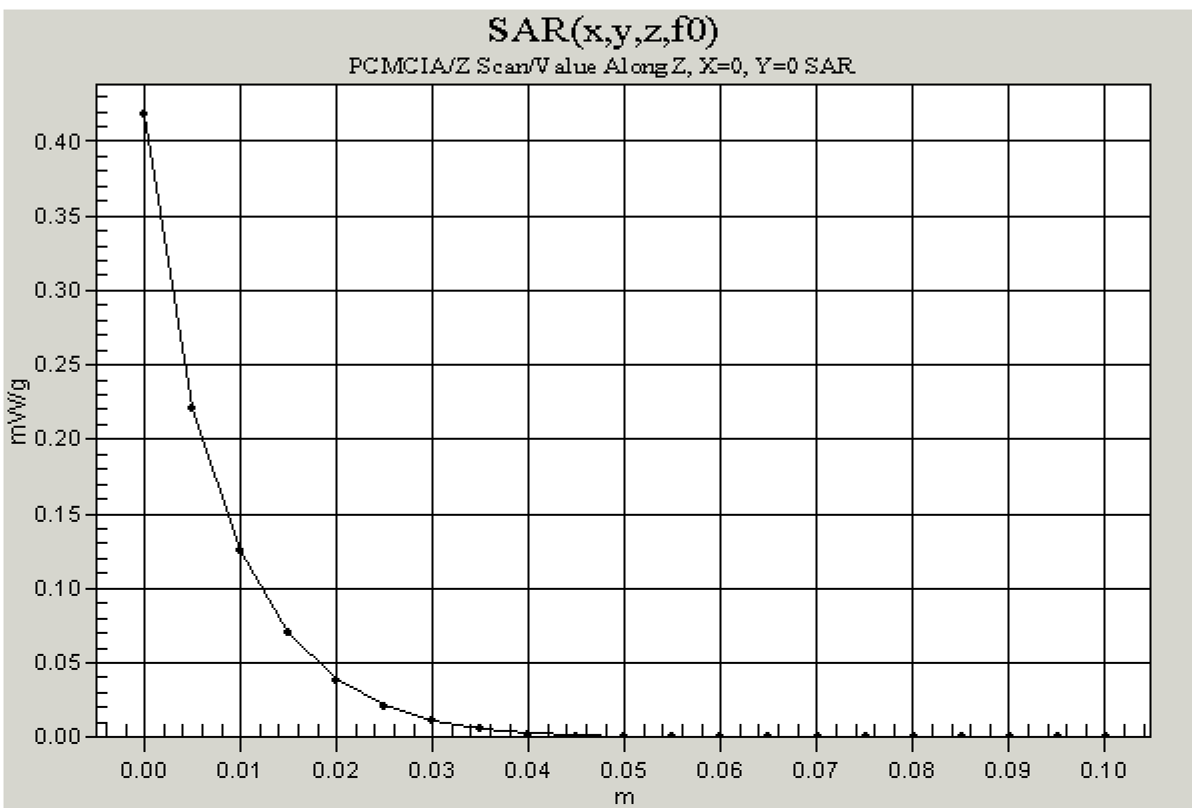
- Probe: ET3DV6 - SN1762; ConvF(4.6, 4.6, 4.6); Calibrated: 3/31/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
  Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE3 Sn558; Calibrated: 3/7/2003
- Phantom: SAM 34; Type: SAM V4.0; Serial: TP-1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

touch ch 11/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 10.9 V/m
Power Drift = 0.06 dB
Maximum value of SAR = 0.439 mW/g

touch ch 11/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Reference Value = 10.9 V/m
Power Drift = 0.04 dB
Maximum value of SAR = 0.419 mW/g

touch ch 11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Peak SAR (extrapolated) = 0.908 W/kg
SAR(1 g) = 0.446 mW/g; SAR(10 g) = 0.224 mW/g
Reference Value = 10.9 V/m
Power Drift = 0.06 dB
Maximum value of SAR = 0.482 mW/g

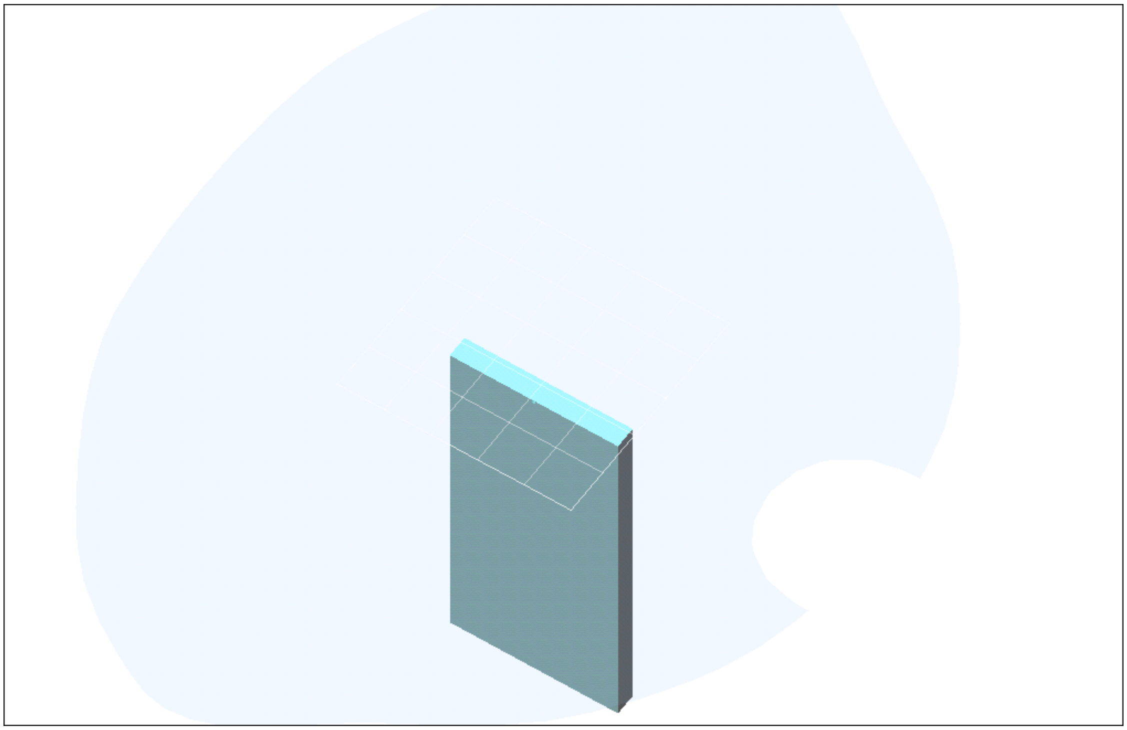

mW/g
0.439
0.351
0.264
0.176
0.0884
0.000792


SAR(x,y,z,f0)
PCMCIA/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 08/12/03 15:32:07

Test Laboratory: C&C Labratory CO., Ltd

EUT SETUP CONFIGURATION 2



Date/Time: 08/12/03 15:32:07

Test Laboratory: C&C Labratory CO., Ltd
File Name: 11mb touch.da4

11mb 15mm ch1

DUT: 2.4GHz wireless PCI Card Adapter; Type: DWL-650; Serial: FCC ID:
Program: PCMCIA

Communication System: 802.11b WLAN pci card; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: BSL2450 (σ = 2 mho/m, ε_r = 50.64, ρ = 1000 kg/m^3)
Air Temperature 25.8 deg C ; Liquid Temperature 25.3 deg C

Phantom section: Flat Section

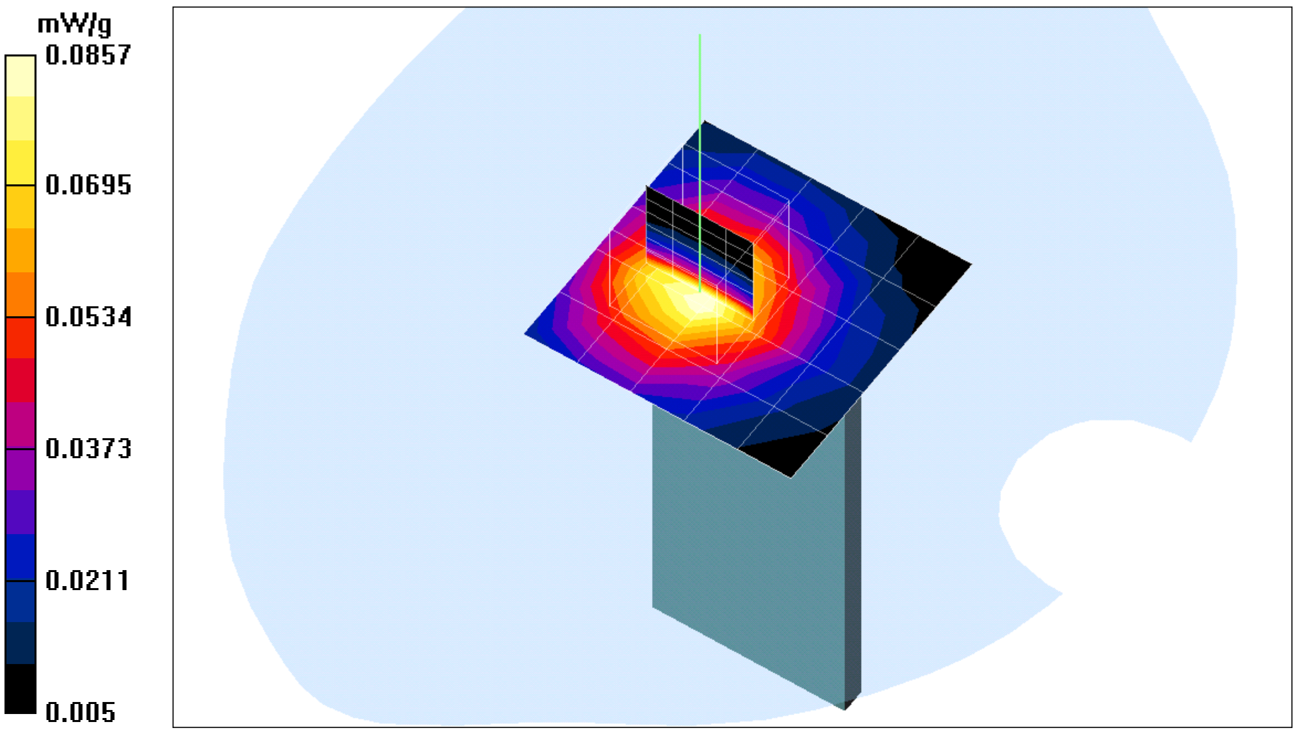
DASY4 Configuration:

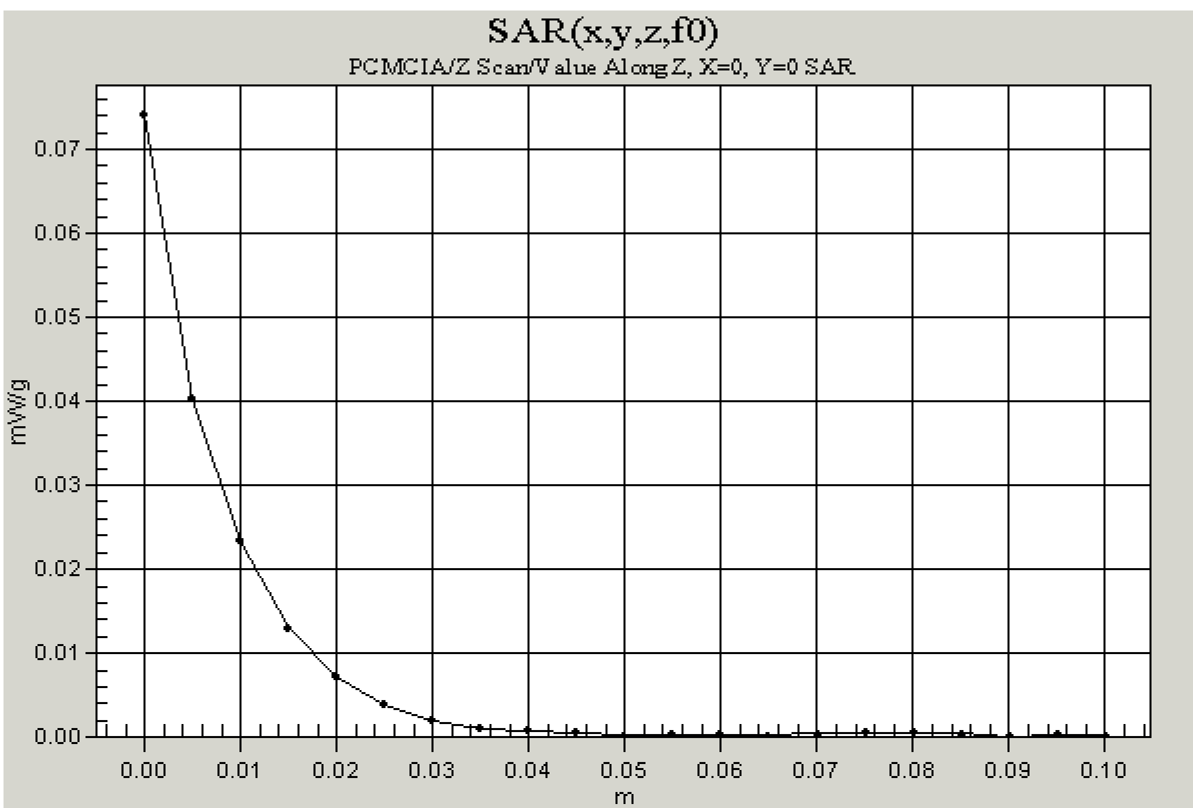
- Probe: ET3DV6 - SN1762; ConvF(4.6, 4.6, 4.6); Calibrated: 3/31/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
  Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE3 Sn558; Calibrated: 3/7/2003
- Phantom: SAM 34; Type: SAM V4.0; Serial: TP-1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

15mm ch1/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 6.43 V/m
Power Drift = -0.005 dB
Maximum value of SAR = 0.0857 mW/g

15mm ch1/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Reference Value = 6.43 V/m
Power Drift = 0.02 dB
Maximum value of SAR = 0.0741 mW/g

15mm ch1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Peak SAR (extrapolated) = 0.162 W/kg
SAR(1 g) = 0.0841 mW/g; SAR(10 g) = 0.0475 mW/g
Reference Value = 6.43 V/m
Power Drift = -0.005 dB
Maximum value of SAR = 0.0874 mW/g


mW/g
0.0857
0.0695
0.0534
0.0373
0.0211
0.005


SAR(x,y,z,f0)
PCMCIA/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 08/12/03 15:14:54

Test Laboratory: C&C Labratory CO., Ltd
File Name: 11mb touch.da4

11mb 15mm ch6

DUT: 2.4GHz wireless PCI Card Adapter; Type: DWL-650; Serial: FCC ID:
Program: PCMCIA

Communication System: 802.11b WLAN pci card; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: BSL2450 (σ = 2 mho/m, ε_r = 50.64, ρ = 1000 kg/m^3)
Air Temperature 25.8 deg C ; Liquid Temperature 25.3 deg C

Phantom section: Flat Section

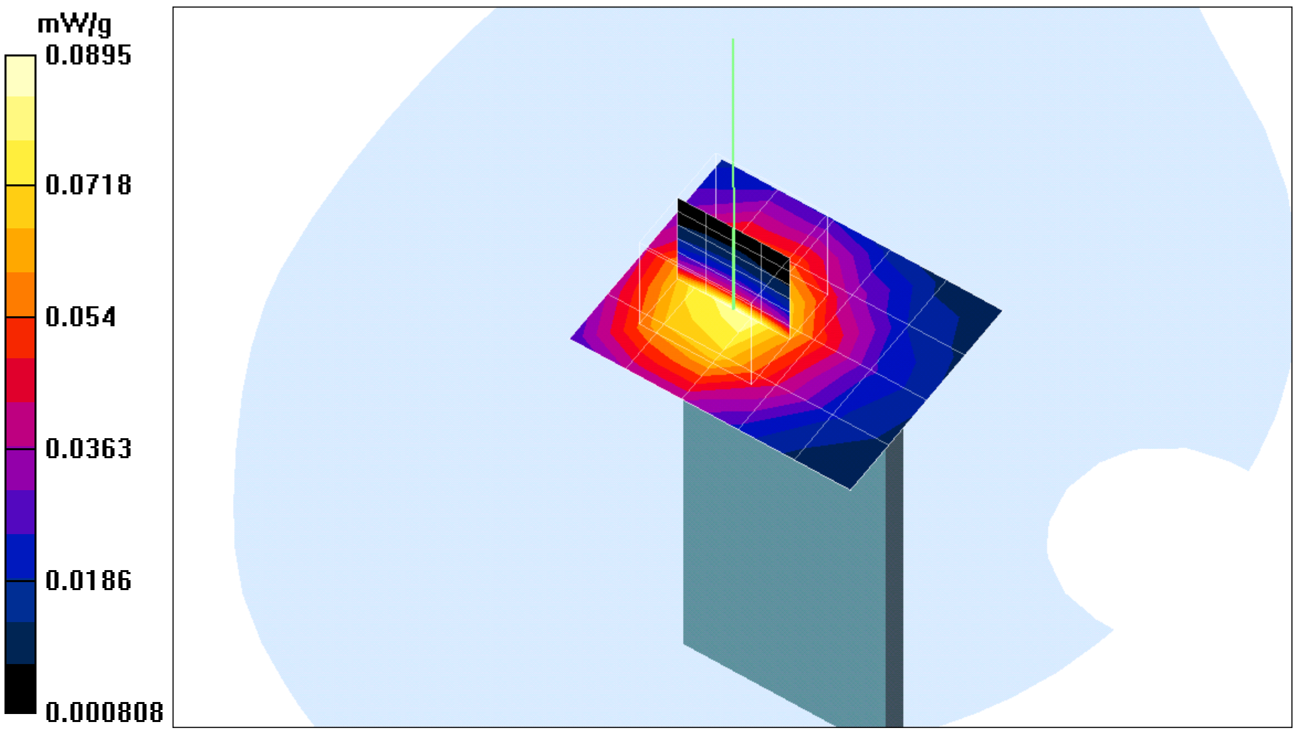
DASY4 Configuration:

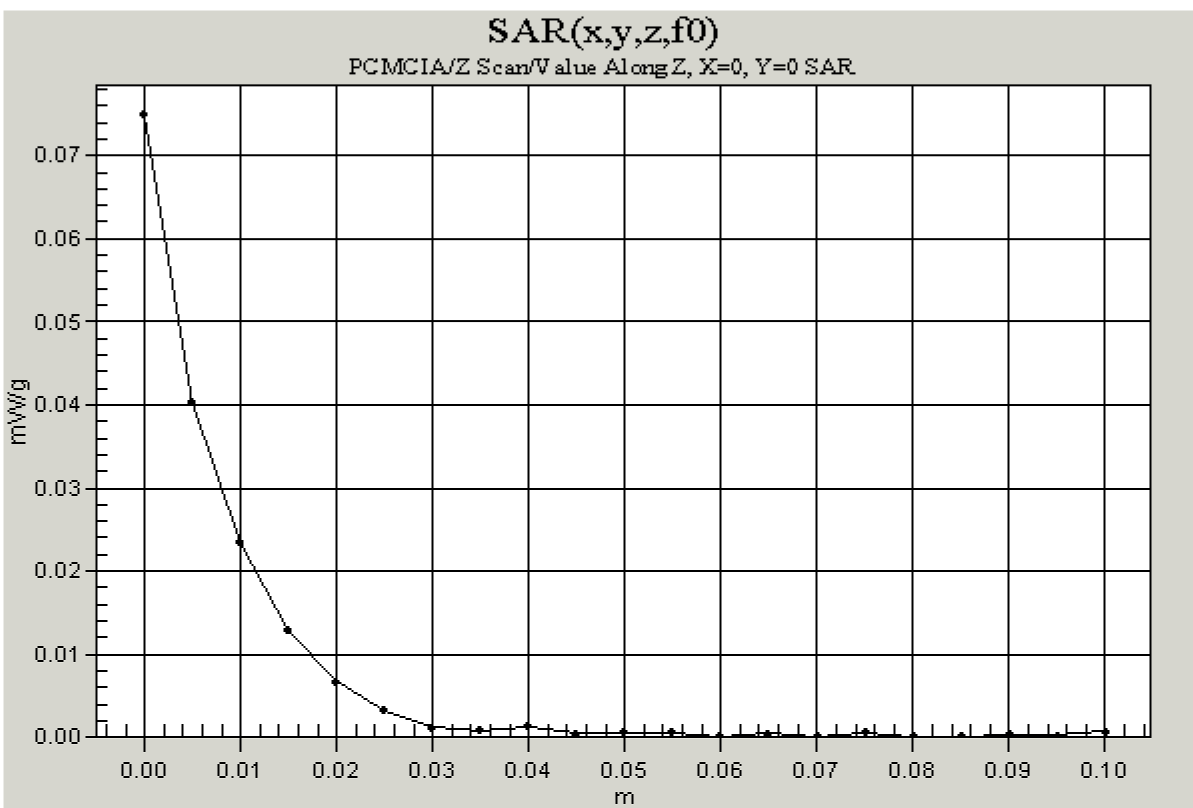
- Probe: ET3DV6 - SN1762; ConvF(4.6, 4.6, 4.6); Calibrated: 3/31/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
  Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE3 Sn558; Calibrated: 3/7/2003
- Phantom: SAM 34; Type: SAM V4.0; Serial: TP-1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

15mm ch6/Area Scan (6x5x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 6.34 V/m
Power Drift = 0.02 dB
Maximum value of SAR = 0.0855 mW/g

15mm ch6/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Reference Value = 6.34 V/m
Power Drift = 0.02 dB
Maximum value of SAR = 0.075 mW/g

15mm ch6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Peak SAR (extrapolated) = 0.165 W/kg
SAR(1 g) = 0.0853 mW/g; SAR(10 g) = 0.0478 mW/g
Reference Value = 6.34 V/m
Power Drift = 0.02 dB
Maximum value of SAR = 0.0895 mW/g


mW/g
0.0895
0.0718
0.054
0.0363
0.0186
0.000808


SAR(x,y,z,f0)
PCMCIA/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 08/12/03 14:56:20

Test Laboratory: C&C Labratory CO., Ltd
File Name: 11mb touch.da4

11mb 15mm ch11

DUT: 2.4GHz wireless PCI Card Adapter; Type: DWL-650; Serial: FCC ID:
Program: PCMCIA

Communication System: 802.11b WLAN pci card; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: BSL2450 (σ = 2 mho/m, ε_r = 50.64, ρ = 1000 kg/m^3)
Air Temperature 25.8 deg C ; Liquid Temperature 25.3 deg C
Phantom section: Flat Section

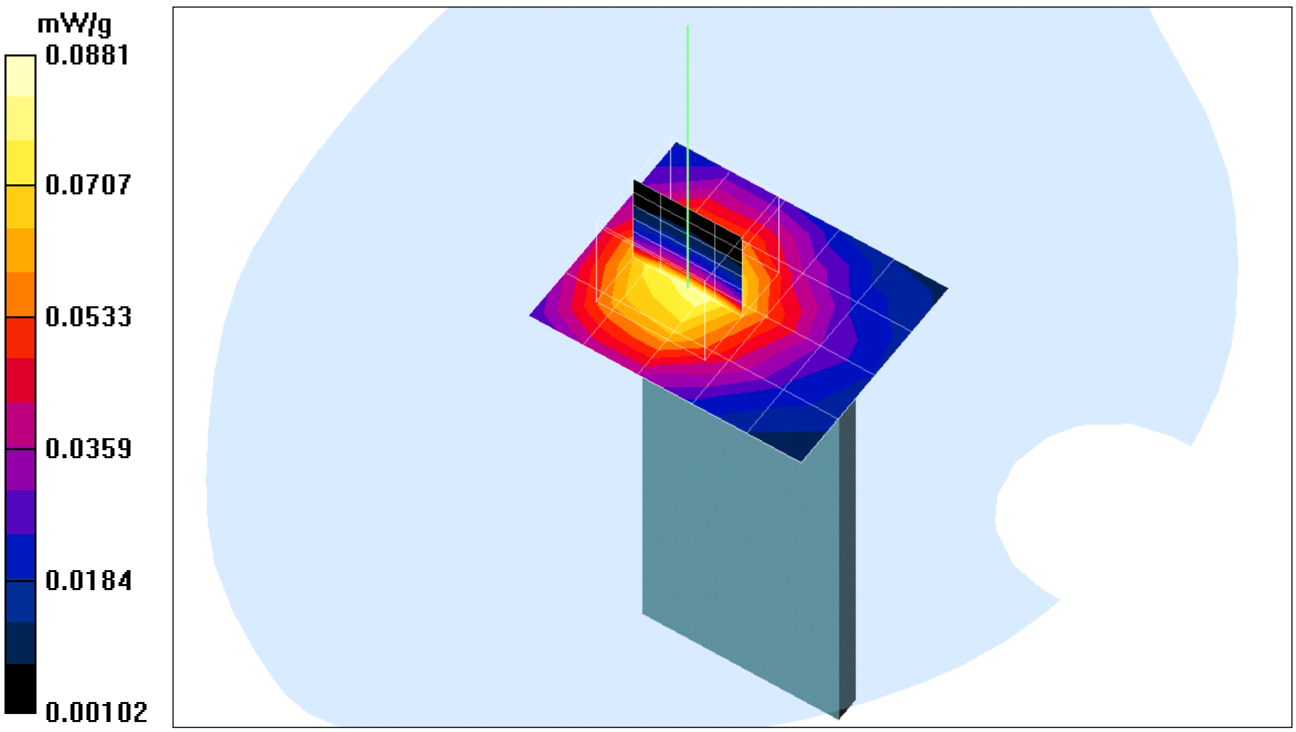
DASY4 Configuration:

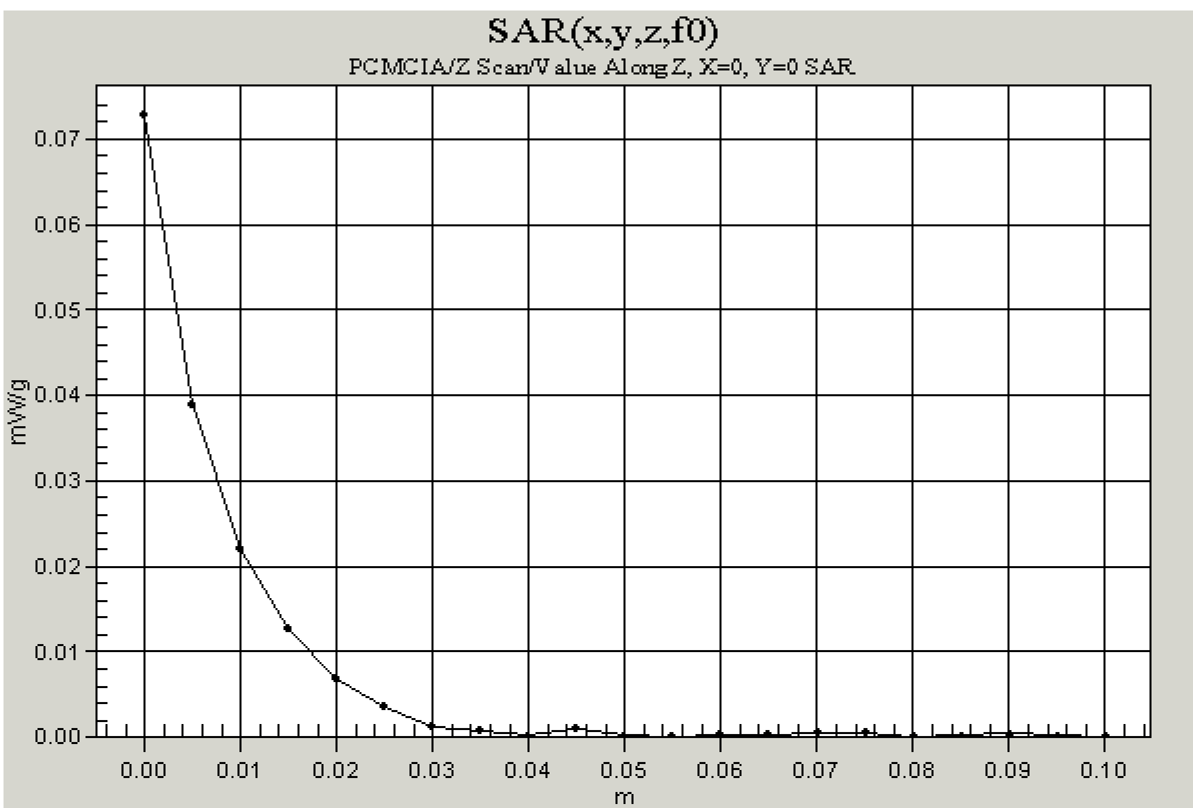
- Probe: ET3DV6 - SN1762; ConvF(4.6, 4.6, 4.6); Calibrated: 3/31/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
  Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE3 Sn558; Calibrated: 3/7/2003
- Phantom: SAM 34; Type: SAM V4.0; Serial: TP-1150
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

15mm ch11/Area Scan (6x5x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 3.25 V/m
Power Drift = -0.2 dB
Maximum value of SAR = 0.0841 mW/g

15mm ch11/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Reference Value = 3.25 V/m
Power Drift = -0.004 dB
Maximum value of SAR = 0.0729 mW/g

15mm ch11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Peak SAR (extrapolated) = 0.167 W/kg
SAR(1 g) = 0.0847 mW/g; SAR(10 g) = 0.0472 mW/g
Reference Value = 3.25 V/m
Power Drift = -0.2 dB
Maximum value of SAR = 0.0881 mW/g


mW/g
0.0881
0.0707
0.0533
0.0359
0.0184
0.00102


SAR(x,y,z,f0)
PCMCIA/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m