SAR TEST REPORT

Test Report No. : 26HE0182-HO-C-5

Applicant	:	**Sony Computer Entertainment Inc.**
Type of Equipment	:	**PSP**
Model No.	:	**PSP-1001**
FCC ID	:	**AK8PSP1001B2**
Test standard	:	**FCC47CFR 2.1093** **FCC OET Bulletin 65, Supplement C**
Test Result	:	**Complied**
Max. SAR Measured	:	**0.103W/kg (Body, 2437MHz)**

1. This test report shall not be reproduced except full or partial, without the written approval of UL Apex Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with the above standard. We hereby certify that the data contain a true representation of the SAR profile.
4. The test results in this test report are traceable to the national or international standards.

Date of test : April 10, 2006

Tested by : H. Sato

Hisayoshi Sato
EMC Services

Approved by : H. Shimoji

Hironobu Shimoji
Group Leader of EMC Services

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SECTION 1 : Client information

Company Name	Sony Computer Entertainment Inc.
Brand name	Sony
Address	2-6-21 Minami-Aoyama,Minato-ku,Tokyo,107-0062, Japan
Telephone Number	+81-3-6483-8625
Facsimile Number	+81-3-6483-8607
Contact Person	Tatsuya Suzuki

SECTION 2 : Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment		PSP
Model No.		PSP-1001
Serial No.		20005508-PSP1001 has Antenna, model: HFS11-SO01, manufactured by Hitachi. 20005478-PSP1001 has Antenna, model: UBA-CUW1000, manufactured by Sony.
Country of Manufacture		China
AC Adapter*1)	Model Name :	Model: PSP-100 (Mitsumi, ADP-553SR)
	Rating (output) :	DC5V
Battery*2)	Type :	Li-ion Battery
	Model Name :	PSP-110
	Rating :	DC3.6V/1800mAh
	Manufacturer	Sony
Accessories		Earphone, USB cable
Condition of EUT		Production prototype (Not for sale: This sample is equivalent to mass-produced items.)
Operation Clock		22MHz, 27MHz, 37MHz, 22 or 24MHz (switching), 48MHz, 111MHz
Receipt Date of Sample		March 20, 2006
Category Identified		Portable device

2.2 Identification of Wireless LAN Module

2.2.1 Product Description

Radio Specification
Wireless LAN Module (IEEE802.11b)

Equipment Type	Transceiver
Frequency of Operation	2412-2462 MHz
Max. Output Power	14.16dBm (26.06mW)
Type of Modulation	DSSS
Mode of Operation	Simplex
Method of frequency generation	Crystal
Power Supply	DC3.2V

Antenna

Antenna model *3)	UBA-CUW1000	HFS11-SO01
Antenna type	Monopole antenna	Monopole antenna
Antenna Gain	2.0 dBi (Max.)	5.0 dBi (Max)
Antenna location	Refer to Appendix 1	

*3) Antenna : Either UBA-CUW1000 or HFS11-SO01 will be installed in PSP-1001.

SECTION 3 : Test standard information

3.1 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. 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 C95.1-1992. 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 the 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.

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 IEEE/ANSI Std. C95.1-1992 limits are used to determine compliance with FCC ET Docket 93-62.

3.2 Exposure limit

(A) Limits for Occupational/Controlled Exposure (W/kg)

Spatial Average (averaged over the whole body)	Spatial Peak (averaged over any 1g of tissue)	Spatial Peak (hands/wrists/feet/ankles averaged over 10g)
0.4	8.0	20.0

(B) Limits for General population/Uncontrolled Exposure (W/kg)

Spatial Average (averaged over the whole body	Spatial Peak (averaged over any 1g of tissue)	Spatial Peak (hands/wrists/feet/ankles averaged over 10g)
0.08	1.6	4.0

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).

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

NOTE:GENERAL POPULATION/UNCONTROLLED EXPOSURE
SPATIAL PEAK(averaged over any 1g of tissue) LIMIT
1.6 W/kg

SECTION 4 : Test result

4.1 Result of Max. SAR value

Max. SAR Measured (IEEE 802.11b) : 0.103 W/kg (Body, 2437MHz)

4.2 Test Location

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SECTION 5 : Operation of E.U.T. during testing

5.1 Operating modes

Operating mode	The frequency band and the modulation used in this test are shown as a following. 1. IEEE 802.11b mode Frequency band : 2412-2462MHz Channel : 1ch(2412MHz), 6ch(2437MHz), 11ch(2462MHz) Modulation : DSSS (DBPSK,DQPSK,CCK) Crest factor : 1

5.2 Measurement procedure

This EUT is composed two kinds of antennas, we were measured in each of different EUT.
20005478-PSP1001 has Antenna, model: UBA-CUW1000, manufactured by Sony.
20005508-PSP1001 has Antenna, model: HFS11-SO01, manufactured by Hitachi.

1. ANT. UBA-CUW1000 (EUT S/N: 20005478-PSP1001)

The 11b (DSSS) test was performed in the CCK(11Mbps) modulation because it was the highest peak power and data rate.

Step1. Decision of SAR Measurement position
The purpose of this examination is to decide the position of the sample in the SAR measurement.

Step2. Conformation of the Low and High channels
The purpose of this examination is to measure SAR value of Low (2412MHz) and High (2462MHz) channels. This test was performed at the worst condition of Step1.

2. ANT. HFS11-SO01 (EUT S/N: 20005508-PSP1001)

The 11b (DSSS) test was performed in the CCK(11Mbps) modulation because it was the highest peak power and data rate.

Step3. Decision of SAR Measurement position
The purpose of this examination is to decide the position of the sample in the SAR measurement.

Step4. Conformation of the Low and High channels
The purpose of this examination is to measure SAR value of Low (2412MHz) and High (2462MHz) channels. This test was performed at the worst condition of Step3.

3. Change distance between EUT and SAM Twin Phantom

Step5. The measurement was performed with the distance,5mm,10mm and 15mm to check if the shortest distance (0mm) may not have the worst value at the conditions of the highest SAR value.As a result, the shortest distance (0mm) had the worst value.

5.3 Test setup of EUT

When users operate or carry the EUT, it could be considered to touch or get close to their bodies. In order to assume this situation, we performed the test at the following positions. Please refer to "APPENDIX 1" for more details.

(1) Front:
The test was performed in touch with Front surface of the EUT to the flat section of SAM Twin phantom.

(2) Back :
The test was performed in touch with Back of the EUT to the flat section of SAM Twin phantom.

(3) Top :
The test was performed in touch with Top surface of the EUT to the flat section of SAM Twin phantom.

(4) Bottom :
The test was performed in touch with Bottom surface of the EUT to the flat section of SAM Twin phantom.

(5) Left Side :
The test was performed in touch with Left Side surface of the EUT to the flat section of SAM Twin phantom.

(6) Front (5mm) :
The measurement opened 5mm distance between EUT and SAM Twin Phantom.

(7) Front (10mm) :
The measurement opened 10mm distance between EUT and SAM Twin Phantom.

(8) Front (15mm) :
The measurement opened 15mm distance between EUT and SAM Twin Phantom.

*The test setup photograph is put on appendix 1.

SECTION 6 : Test surrounding

6.1 Measurement uncertainty

The uncertainty budget has been determined for the DASY4 measurement system according to the SPEAG documents [6][7] and is given in the following Table.

Error Description	Uncertainty value ± %	Probability distribution	divisor	(ci) 1g	Standard Uncertainty (1g)	vi or veff
Measurement System						
Probe calibration	±6.8	Normal	1	1	±6.8	∞
Axial isotropy of the probe	±4.7	Rectangular	√3	0.7	±1.9	∞
Spherical isotropy of the probe	±9.6	Rectangular	√3	0.7	±3.9	∞
Boundary effects	±2.0	Rectangular	√3	1	±1.2	∞
Probe linearity	±4.7	Rectangular	√3	1	±2.7	∞
Detection limit	±1.0	Rectangular	√3	1	±0.6	∞
Readout electronics	±1.0	Normal	1	1	±1.0	∞
Response time	±0.8	Rectangular	√3	1	±0.5	∞
Integration time	±2.6	Rectangular	√3	1	±1.5	∞
RF ambient Noize	±3.0	Rectangular	√3	1	±1.7	∞
RF ambient Reflections	±3.0	Rectangular	√3	1	±1.7	∞
Mech. constraints of robot	±0.8	Rectangular	√3	1	±0.5	∞
Probe positioning	±9.9	Rectangular	√3	1	±5.7	∞
Extrap. and integration	±4.0	Rectangular	√3	1	±2.3	∞
Test Sample Related						
Device positioning	±2.9	Normal	1	1	±2.9	16
Device holder uncertainty	±3.6	Normal	1	1	±3.6	12
Power drift	±5.0	Rectangular	√3	1	±2.9	∞
Phantom and Setup						
Phantom uncertainty	±4.0	Rectangular	√3	1	±2.3	∞
Liquid conductivity (target)	±5.0	Rectangular	√3	0.64	±1.8	∞
Liquid conductivity (meas.)	±5.0	Normal	1	0.64	±3.2	∞
Liquid permittivity (target)	±5.0	Rectangular	√3	0.6	±1.7	∞
Liquid permittivity (meas.)	±5.0	Normal	1	0.6	±3.0	∞
Combined Standard Uncertainty					**±13.515**	
Expanded Uncertainty (k=2)					**±27.0**	

The test result shows that the power drift exceeded ±5%. Therefore, the uncertainty of power drift expanded to ±10%. However, the extended uncertainty (k= 2) of a test is less than 30%.

SECTION 7 : Confirmation before testing

7.1 Conducted power

[11b /11Mbps] EUT S/N: 20005478-PSP1001 (Ant UBA-CUW1000)						
Ch	Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Converted [mW]
Low	2412.0	-7.04	0.91	19.87	13.74	23.66
Mid	2437.0	-7.25	0.92	19.88	13.55	22.65
High	2462.0	-7.38	0.96	19.88	13.46	22.18

[11b / 11Mbps] EUT S/N: 20005508-PSP1001 (ANT.HFS11-SO01)						
Ch	Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Converted [mW]
Low	2412.0	-6.62	0.91	19.87	14.16	26.06
Mid	2437.0	-6.70	0.92	19.88	14.10	25.70
High	2462.0	-7.10	0.96	19.88	13.74	23.66

[11b /Check of data rate] EUT S/N: 20005478-PSP1001 (Ant UBA-CUW1000)						
Rate [Mbps]	Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Converted [mW]
11.0	2437.0	-7.25	0.92	19.88	13.55	22.65
5.5	2437.0	-8.71	0.92	19.88	12.09	16.18
2.0	2437.0	-9.92	0.92	19.88	10.88	12.25
1.0	2437.0	-10.45	0.92	19.88	10.35	10.84

[11b /Check of data rate] EUT S/N: 20005508-PSP1001 (ANT.HFS11-SO01)						
Rate [Mbps]	Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Converted [mW]
11.0	2437.0	-6.70	0.92	19.88	14.10	25.70
5.5	2437.0	-7.91	0.92	19.88	12.89	19.45
2.0	2437.0	-9.21	0.92	19.88	11.59	14.42
1.0	2437.0	-9.70	0.92	19.88	11.10	12.88

Sample Calculation:

Result = Reading + Cable Loss (supplied by customer)+ Attenuator

SECTION 8 : Measurement results

8.1 ANT. UBA-CUW1000

8.1.1 Body 2450MHz SAR

Liquid Depth (cm)	:	**15.0**	Model	:	**PSP-1001**
Parameters	:	ε_r =**50.2**, σ =**1.95**	Serial No.	:	**20005478-PSP1001**
Ambient temperature (deg.c.)	:	**24.8**	Modulation	:	**DSSS**
Relative Humidity (%)	:	**44**	Crest factor	:	**1**
Date	:	**April 10, 2006**	Measured By	:	**Hisayoshi Sato**

BODY SAR MEASUREMENT RESULTS (ANT. UBA-CUW1000)										
Frequency			Modulation (Data rate[bps])	Phantom Section	EUT Set-up Conditions			Liquid Temp.[deg.c		SAR(1g) [W/kg]
Mode	Channel	[MHz]			Battery	Position	Separation [mm]	Before	After	Maximum value of multi-peak
11b	**Step1. Position search**									
	6	2437	CCK(11Mbps)	Flat	PSP-110(sony)	Front	0	23.7	23.7	**0.071**
	6	2437	CCK(11Mbps)	Flat	PSP-110(sony)	Back	0	23.7	23.7	**0.037**
	6	2437	CCK(11Mbps)	Flat	PSP-110(sony)	Top	0	23.8	23.8	**0.030**
	6	2437	CCK(11Mbps)	Flat	PSP-110(sony)	Bottom	0	23.8	23.8	**0.019**
	6	2437	CCK(11Mbps)	Flat	PSP-110(sony)	Left Side	0	24.1	24.1	**0.071**
	Step2. Frequency Change									
	1	2412	CCK(11Mbps)	Flat	PSP-110(sony)	Front	0	23.8	23.8	**0.066**
	11	2462	CCK(11Mbps)	Flat	PSP-110(sony)	Front	0	24.0	24.0	**0.069**
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population								**Body SAR: 1.6 W/kg (averaged over 1 gram)**		

***** The measurement data is put on appendix 3.

8.2 ANT. HFS11-SO01

8.2.1 Body 2450MHz SAR

Liquid Depth (cm)	:	**15.0**	Model	:	**PSP-1001**
Parameters	:	ε_r =**50.2**, σ =**1.95**	Serial No.	:	**20005508-PSP1001**
Ambient temperature (deg.c.)	:	**24.8**	Modulation	:	**DSSS**
Relative Humidity (%)	:	**44**	Crest factor	:	**1**
Date	:	**April 10, 2006**	Measured By	:	**Hisayoshi Sato**

BODY SAR MEASUREMENT RESULTS (Ant.HFS11-SO01)										
Frequency			Modulation (Data rate[bps])	Phantom Section	EUT Set-up Conditions			Liquid Temp.[deg.c]		SAR(1g) [W/kg]
Mode	Channel	[MHz]			Battery	Position	Separation [mm]	Before	After	Maximum value of multi-peak
11b	**Step4. Position search**									
	6	2437	CCK(11Mbps)	Flat	PSP-110(Sony)	Front	0	24.1	24.1	**0.103**
	6	2437	CCK(11Mbps)	Flat	PSP-110(Sony)	Back	0	24.0	24.0	**0.040**
	6	2437	CCK(11Mbps)	Flat	PSP-110(Sony)	Top	0	24.0	24.0	**0.064**
	6	2437	CCK(11Mbps)	Flat	PSP-110(Sony)	Bottom	0	23.9	23.9	**0.0042**
	6	2437	CCK(11Mbps)	Flat	PSP-110(Sony)	Left Side	0	24.2	24.2	**0.070**
	Step5. Frequency Change									
	1	2412	CCK(11Mbps)	Flat	PSP-110(Sony)	Front	0	24.1	24.1	**0.081**
	11	2462	CCK(11Mbps)	Flat	PSP-110(Sony)	Front	0	24.0	24.0	**0.067**
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population								**Body SAR: 1.6 W/kg (averaged over 1 gram)**		

BODY SAR MEASUREMENT RESULTS (Ant.HFS11-SO01)										
Frequency			Modulation (Data rate[bps])	Phantom Section	EUT Set-up Conditions			Liquid Temp.[deg.c]		SAR(1g) [W/kg]
Mode	Channel	[MHz]			Battery	Position	Separation [mm]	Before	After	Maximum value of multi-peak
Change distance between EUT and SAM phantom										
11b	6	2462	CCK(11Mbps)	Flat	PSP-110(Sony)	Front	5	24.0	24.0	**0.032**
	6	2462	CCK(11Mbps)	Flat	PSP-110(Sony)	Front	10	23.9	23.9	**0.013**
	6	2462	CCK(11Mbps)	Flat	PSP-110(Sony)	Front	15	23.8	23.8	**0.010**
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population								**Body SAR: 1.6 W/kg (averaged over 1 gram)**		

***** The measurement data is put on appendix 3.

APPENDIX 1 : Photographs of test setup

Photograph EUT

Top

Antenna

Right Side

Front

Left Side

Bottom

Back

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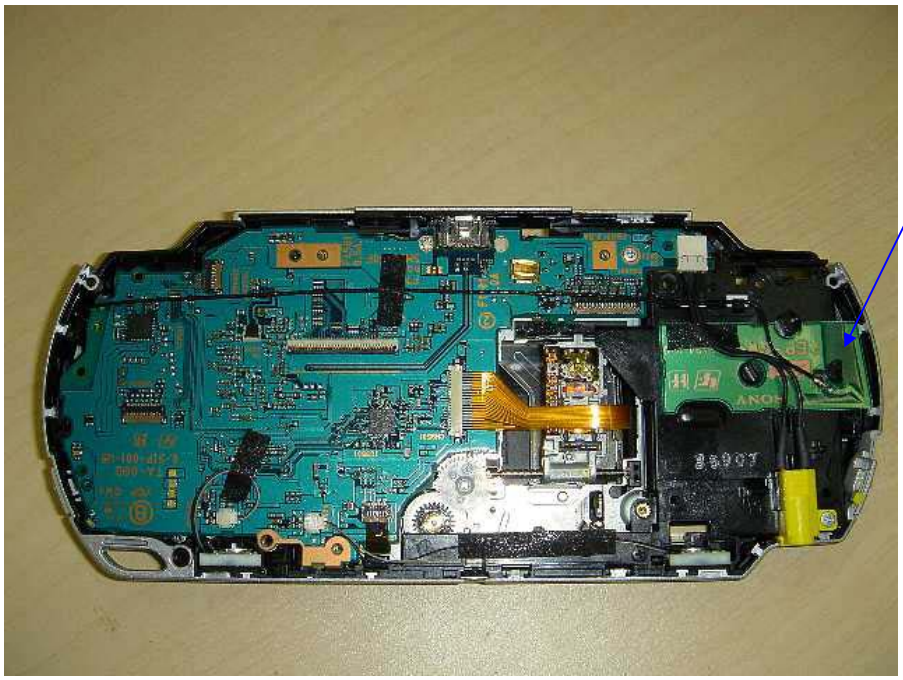
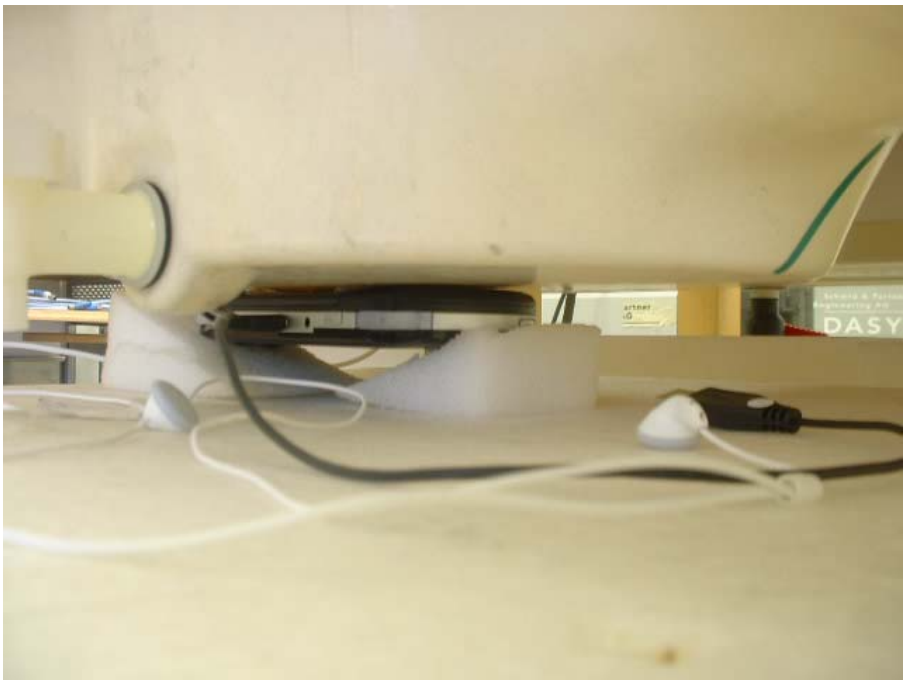
Photograph Antenna location



Photograph EUT with Accessary

(1) Front

(2) Back



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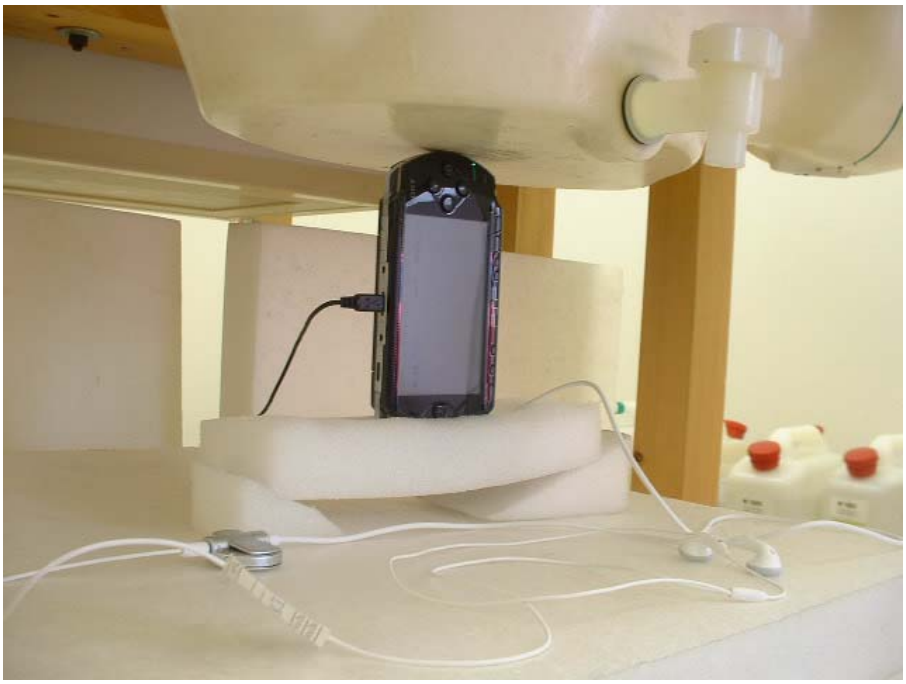
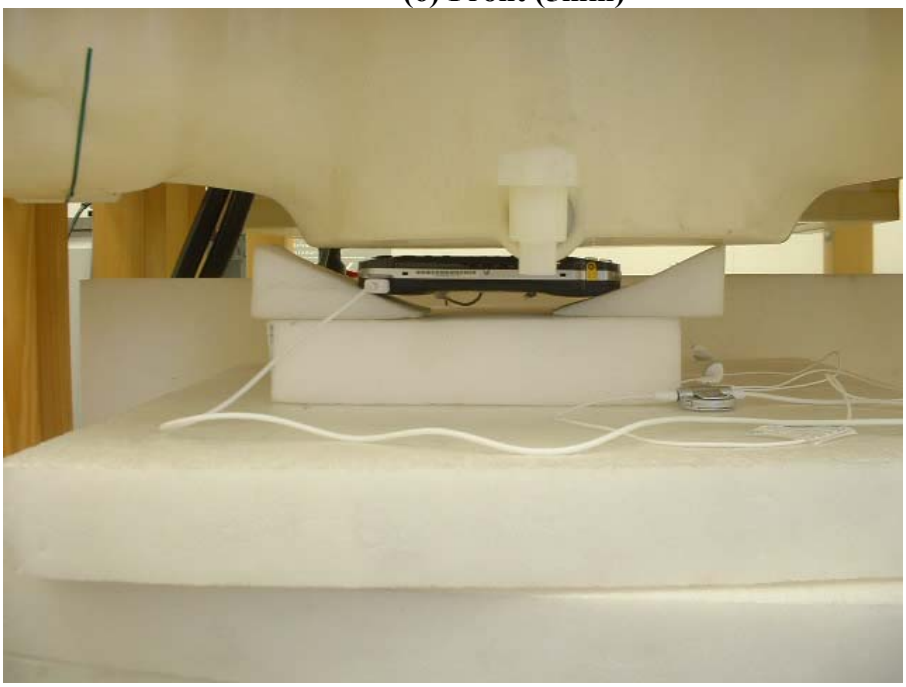
(3) Top

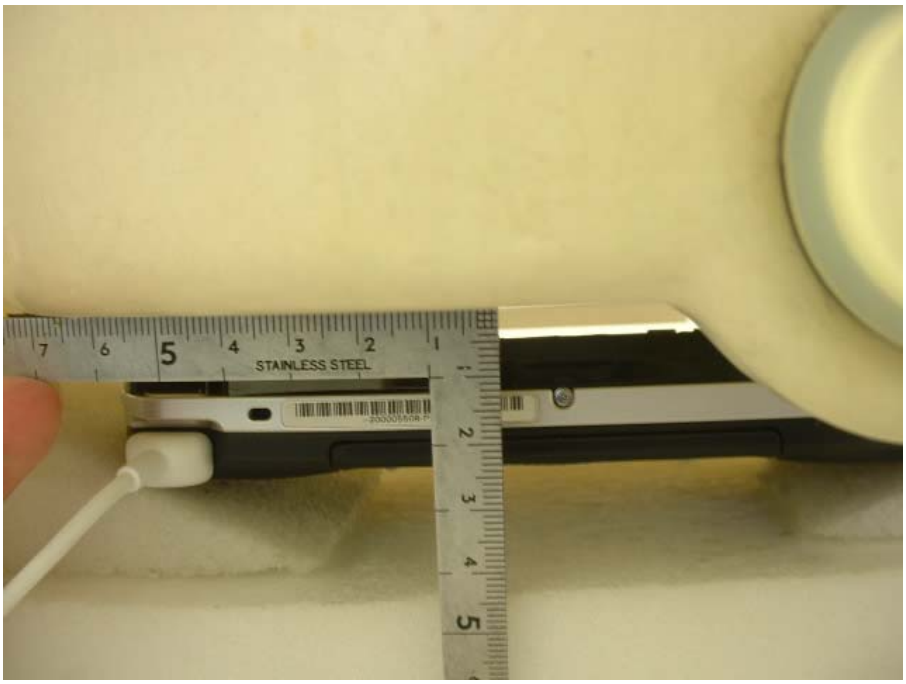
(4) Bottom

(5) Left Side

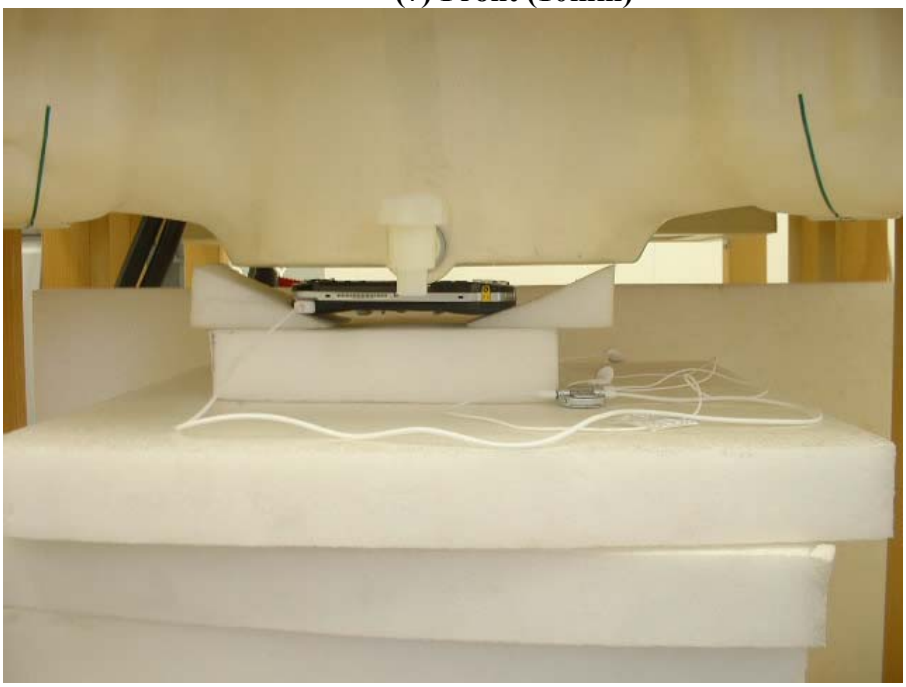


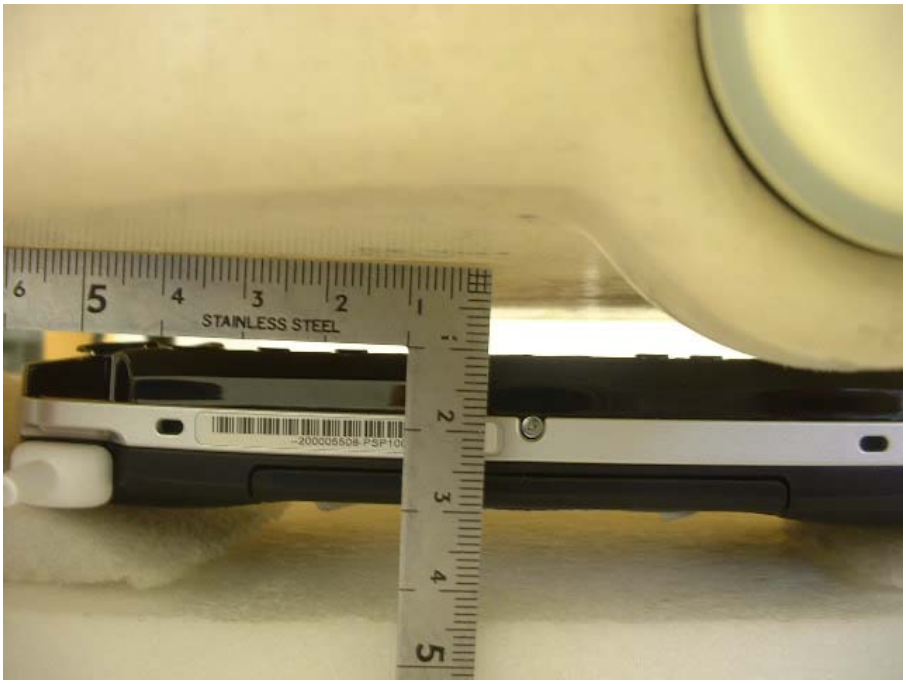
(6) Front (5mm)

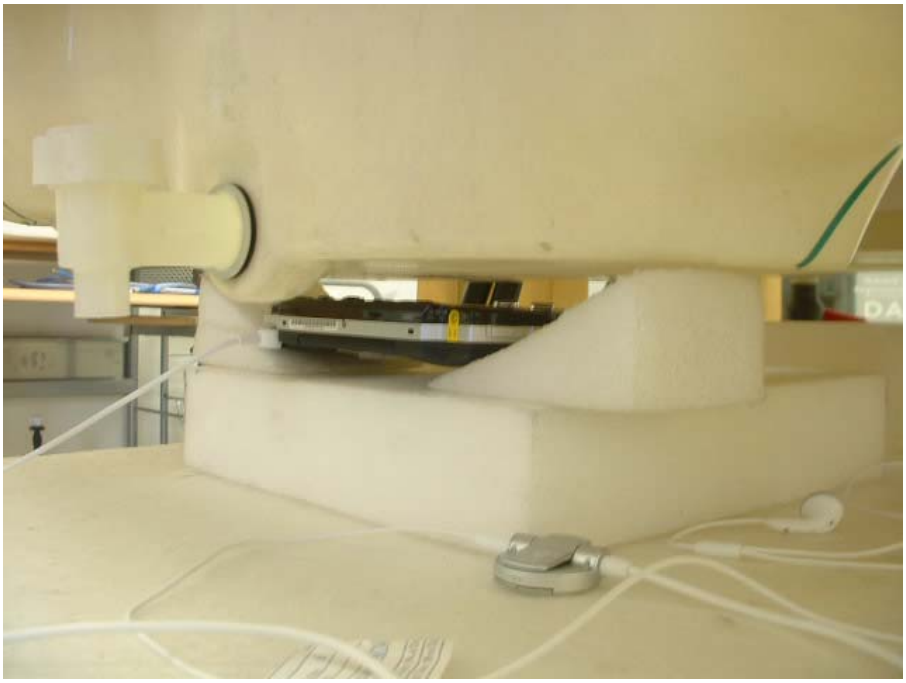




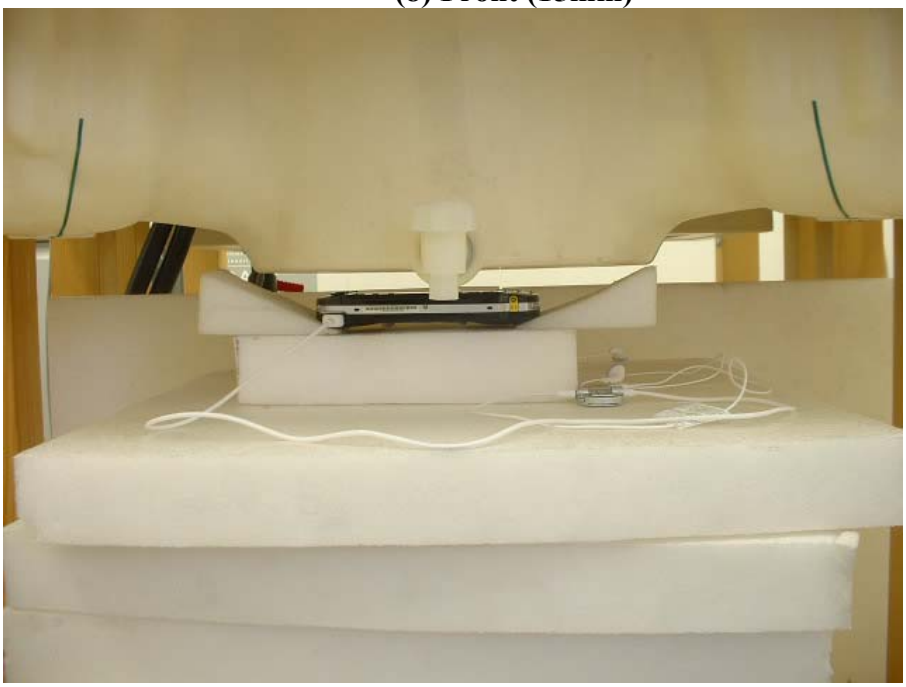
(7) Front (10mm)

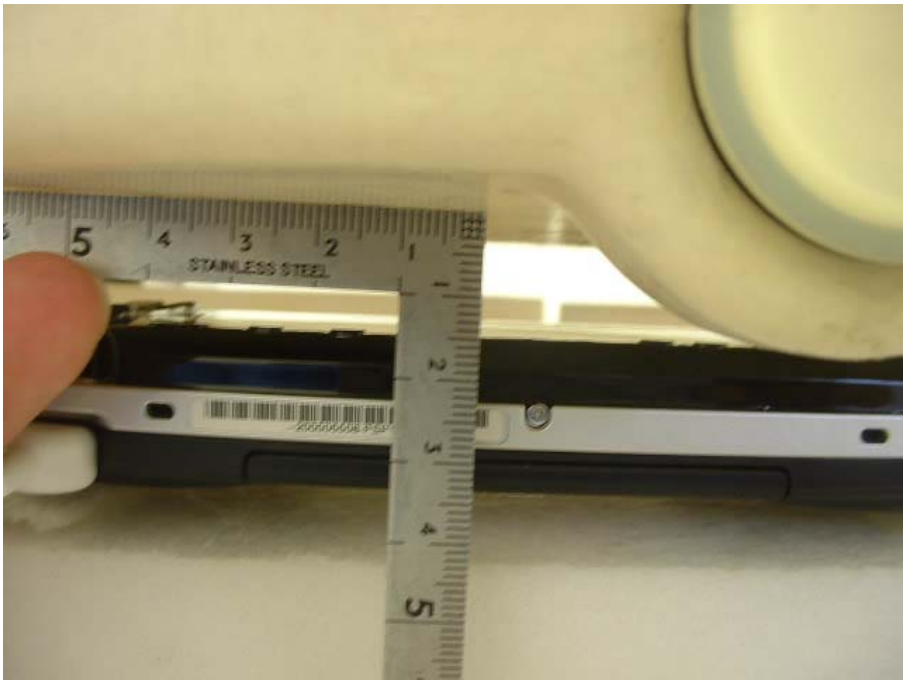






(8) Front (15mm)





APPENDIX 2 : Test instruments

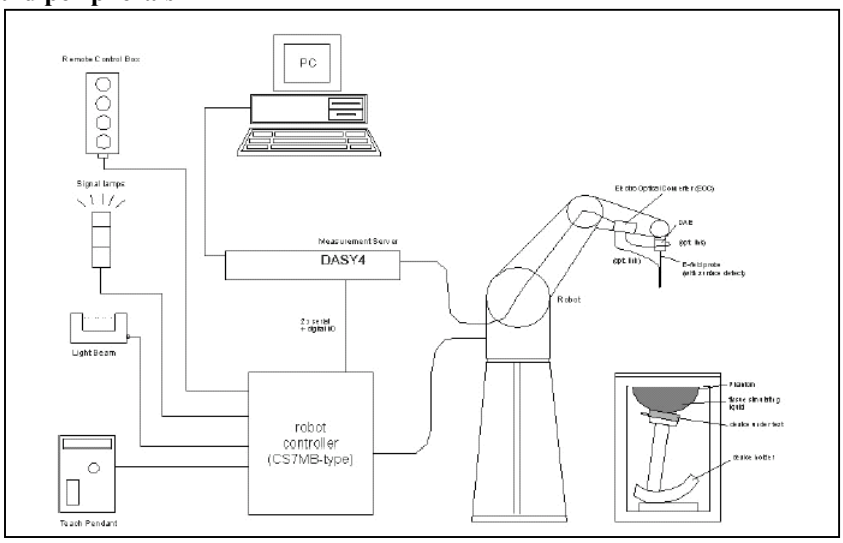
Equipment & calibration information
1. Equipment used

Name of Equipment	Manufacture	Model number	Serial number	Calibration	
				Last Cal	due date
Power Meter	Agilent	E4417A	GB41290639	2005/11/09	2006/11/08
Power Sensor	Agilent	E9300B	US40010300	2005/11/28	2006/11/27
Power Sensor	Agilent	E9327A	US40440545	2005/11/23	2006/11/22
Spectrum Analyzer	Agilent	E4448A	MY44020357	2005/09/16	2006/09/15
S-Parameter Network Analyzer	Agilent	8753ES	US39174808	2003/10/23	2006/10/22
Signal Generator	Rohde&Schwarz	SML40	100023	2005/01/05	2006/01/04
RF Amplifier	OPHIR	5056F	1005	2005/05/20	2006/05/19
Dosimetric E-Field Probe	Schmid&Partner Engineering AG	EX3DV3	3507	2005/04/12	2006/04/11
Data Acquisition Electronics	Schmid&Partner Engineering AG	DAE3	509	2005/05/26	2006/05/25
Robot,SAM Phantom	Schmid&Partner Engineering AG	DASY4	I021834	N/A	N/A
Attenuator	Agilent	US40010300	08498-60012	2005/12/16	2006/12/15
Attenuator	Agilent	8493C	71389	2005/06/03	2006/06/02
Microwave Cable	Hirose Electric	U.FL-2LP-066-A-(200)	-	2005/09/06	2006/09/05
2450MHz System Validation Dipole	Schmid&Partner Engineering AG	D2450V2	713	2005/09/02	2007/09/01
Dual Directional Coupler	N/A	Narda	03702	N/A	N/A
Thermo-Hygrometer	Custom	CTH-190	MOS-10	2005/03/07	2007/03/06
Digtal thermometer	HANNA	Checktemp-2	03702	N/A	N/A
Body 2.4GHz	N/A	N/A	N/A	Daily check Target value ± 5%	
Head 2.4GHz	N/A	N/A	N/A	Daily check Target value ± 5%	
SAR room	-	-	-	Daily check Ambient Noise <0.012W/kg	

2. Dosimetry assessment setup

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 dosimetry probe ET3DV6, SN: 1684 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe has been calibrated according to the procedure described in [2] with accuracy of better than +/-10%. The spherical isotropy was evaluated with the procedure described in [3] 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 CENELEC EN50361.

3. Configuration and peripherals



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.
   An arm extension for accommodating the data acquisition electronics (DAE).
2. 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.
3. 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.
4. 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.
5. 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.
6. A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
7. A computer operating Windows 2000.
8. DASY4 software.
9. Remote control with teaches pendant and additional circuitry for robot safety such as warning lamps, etc.
10. The SAM twin phantom enabling testing left-hand and right-hand usage.
11. The device holder for handheld mobile phones.
12. Tissue simulating liquid mixed according to the given recipes.
13. Validation dipole kits allowing to validate the proper functioning of the system.

4. System components

4.2.1 EX3DV3 Probe Specification

Construction:
Symmetrical design with triangular core
Built-in shielding against static charges
PEEK enclosure material (resistant to organic solvents, e.g., glycol ether)
Calibration:
Basic Broad Band calibration in air : 10-3000 MHz
Frequencies of 900 MHz, 1.8 GHz ,2.45GHz,5.2GHz and 5.8GHz(Head and Body)

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

Directivity:
+/-0.3 dB in HSL (rotation around probe axis)
+/-0.5 dB in tissue material (rotation normal probe axis)

Dynamic Range:
10uW/g to > 100 mW/g;Linearity: +/-0.2 dB(noise: typically < 1uW/g)

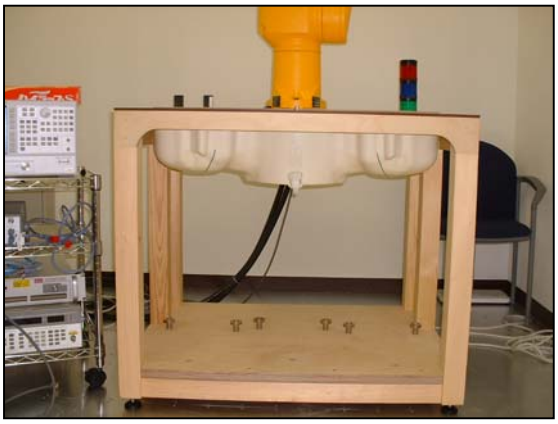
Dimensions:
Overall length: 330 mm (Tip: 20 mm)
Tip diameter: 2.5mm (Body: 12 mm)
Typical distance from probe tip to dipole centers: 1 mm

Application:
Highprecision dosimetric measurement in any exposure scenario
(e.g., very strong gradient fields).Only probe which enables compliance
testing for frequencies up to 6GHz with precision of better 30%.

EX3DV3 E-field Probe

SAM Twin Phantom

Construction:
The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-200X, CENELEC EN 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:
(H x L x W): 810 x 1000 x 500 mm



SAM Twin Phantom

Device Holder for Transmitters

In combination with the SAM Twin Phantom V4.0, 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).
* 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.
To produce the worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.

Device holder couldn't be used at this SAR measurement.

Device Holder

5. Test system specifications

Robot RX60L

Number of Axes	:	6
Payload	:	1.6 kg
Reach	:	800mm
Repeatability	:	+/-0.025mm
Control Unit	:	CS7M
Programming Language	:	V+
Manuafacture	:	Stäubli Unimation Corp. Robot Model: RX60

DASY4 Measurement server

Features	:	166MHz low power Pentium MMX 32MB chipdisk and 64MB RAM Serial link to DAE (with watchdog supervision) 16 Bit A/D converter for surface detection system Two serial links to robot (one for real-time communication which is supervised by watchdog) Ethernet link to PC (with watchdog supervision) Emergency stop relay for robot safety chainTwo expansion slots for future applications
Manufacture	:	Schimid & Partner Engineering AG

Data Acquisition Electronic (DAE)

Features	:	Signal amplifier, multiplexer, A/D converter and control logic Serial optical link for communication with DASY4 embedded system (fully remote controlled) 2 step probe touch detector for mechanical surface detection and emergency robot stop (not in -R version)
Measurement Range	:	1 µV to > 200 mV (16 bit resolution and two range settings: 4mV, 400mV)
Input Offset voltage	:	< 1 µV (with auto zero)
Input Resistance	:	200 MΩ
Battery Power	:	> 10 h of operation (with two 9 V battery)
Dimension	:	60 x 60 x 68 mm
Manufacture	:	Schimid & Partner Engineering AG

Software

Item	:	Dosimetric Assesment System DASY4
Type No.	:	SD 000 401A, SD 000 402A
Software version No.	:	4.5
Manufacture / Origin	:	Schimid & Partner Engineering AG

E-Field Probe

Model	:	EX3DV3
Serial No.	:	3507
Construction	:	Symmetrical design with triangular core
Frequency	:	10 MHz to 6 GHz
Linearity	:	+/-0.2 dB (30 MHz to 3 GHz)
Manufacture	:	Schimid & Partner Engineering AG

Phantom

Type	:	SAM Twin Phantom V4.0
Shell Material	:	Fiberglass
Thickness	:	2.0 +/-0.2 mm
Volume	:	Approx. 25 liters
Manufacture	:	Schimid & Partner Engineering AG

6. Simulated Tissues Composition of 2450MHz

Ingredient	MIXTURE(%)	
	Head 2450MHz	Muscle 2450MHz
Water	45.0	69.83
DGMBE	55.0	30.2

Note:DGMBE(Diethylenglycol-monobuthyl ether)

7. Validation Measurement

Simulated tissue liquid parameter

7-a Simulated Tissue Liquid Parameter confirmation

The dielectric parameters were checked prior to assessment using the HP85070D dielectric probe kit.
The dielectric parameters measurement are reported in each correspondent section.

7-b Head 2450 MHz

Type of liquid : **Head 2450 MHz**
Ambient temperature (deg.c.) : **24.8**
Relative Humidity (%) : **44**
Liquid depth (cm) : **15.0**

DIELECTRIC PARAMETERS MEASUREMENT RESULTS								
Date	Frequency	Liquid Temp [deg.c]		Parameters	Target Value	Measured	Deviation [%]	Limit [%]
		Before	After					
10-Apr	2450	24.2	24.2	Relative Permittivity εr	39.2	37.6	-4.1	+/-10
				Coductivity σ [mho/m]	1.80	1.82	1.1	+/-5

7-c Muscle 2450 MHz

Type of liquid : **Muscle 2450 MHz**
Ambient temperature (deg.c.) : **24.8**
Relative Humidity (%) : **44**
Liquid depth (cm) : **15.0**

DIELECTRIC PARAMETERS MEASUREMENT RESULTS								
Date	Frequency	Liquid Temp [deg.c]		Parameters	Target Value	Measured	Deviation [%]	Limit [%]
		Before	After					
10-Apr	2450	24.2	24.2	Relative Permittivity εr	52.7	50.2	-4.7	+/-5
				Coductivity σ [mho/m]	1.95	1.95	0.0	+/-5

8. System validation data

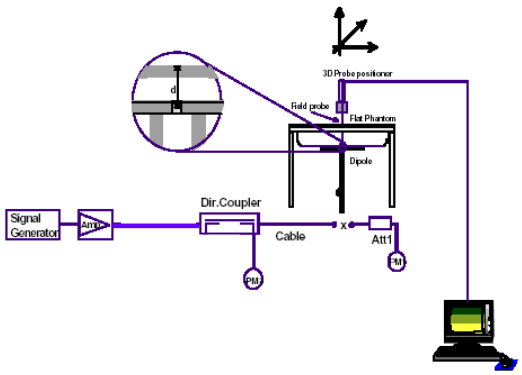
Prior to the assessment, the system validation kit was used to test whether the system was operating within its specifications of +/-10%. The validation results are in the table below. Please refer to APPENDIX3.

System validation of 2450MHz

Type of liquid	:	**HEAD 2450MHz**
Frequenc	:	**2450MHz**
Ambient temperature (deg.c.)	:	**24.8**
Relative Humidity (%)	:	**44**
Dipole	:	**D2450V2 SN:713**
Power	:	**250mW**

SYSTEM PERFORMANCE CHECK										
Date	Liquid (HEAD 2450MHz)						System dipole validation target & measured			
	Liquid Temp [deg.c.]		Relative Permittivity εr		Conductivity σ [mho/m]		SAR 1g [W/kg]		Deviation [%]	Limit [%]
	Before	After	Target	Measured	Target	Measured	Target	Measured		
10-Apr	24.2	24.2	39.2	37.6	1.80	1.82	13.1	13.3	1.5	+/-10

Note: Please refer to Attachment for the result representation in plot format



2450MHz System performance check setup

Test system for the system performance check setup diagram

9. Validation uncertainty

The uncertainty budget has been determined for the DASY4 measurement system according to the SPEAG documents[6][7] and is given in the following Table.

Error Description	Uncertainty value ± %	Probability distribution	divisor	(ci) 1g	Standard Uncertainty (1g)	vi or veff
Measurement System						
Probe calibration	±6.8	Normal	1	1	±6.8	∞
Axial isotropy of the probe	±4.7	Rectangular	√3	1	±2.7	∞
Spherical isotropy of the probe	±9.6	Rectangular	√3	0	0	∞
Boundary effects	±2.0	Rectangular	√3	1	±1.2	∞
Probe linearity	±4.7	Rectangular	√3	1	±2.7	∞
Detection limit	±1.0	Rectangular	√3	1	±0.6	∞
Readout electronics	±1.0	Normal	1	1	±1.0	∞
Response time	0	Rectangular	√3	1	0	∞
Integration time	0	Rectangular	√3	1	0	∞
RF ambient Noize	±3.0	Rectangular	√3	1	±1.7	∞
RF ambient Reflections	±3.0	Rectangular	√3	1	±1.7	∞
Mech. constraints of robot	±0.8	Rectangular	√3	1	±0.5	∞
Probe positioning	±9.9	Rectangular	√3	1	±5.7	∞
Extrap. and integration	±4.0	Rectangular	√3	1	±2.3	∞
Dipole						
Dipole Axis to Liquid Distance	±2.0	Rectangular	√3	1	±1.2	∞
Input power and SAR drift meas.	±4.7	Rectangular	√3	1	±2.7	∞
Phantom and Setup						
Phantom uncertainty	±4.0	Rectangular	√3	1	±2.3	∞
Liquid conductivity (target)	±5.0	Rectangular	√3	0.64	±1.8	∞
Liquid conductivity (meas.)	±5.0	Normal	1	0.64	±3.2	∞
Liquid permittivity (target)	±5.0	Rectangular	√3	0.6	±1.7	∞
Liquid permittivity (meas.)	±5.0	Normal	1	0.6	±3.0	∞
Combined Standard Uncertainty					**±12.151**	
Expanded Uncertainty (k=2)					**±24.3**	

10. Validation Measurement data

System Validation / Dipole 2450 MHz / Forward Conducted Power : 250mW

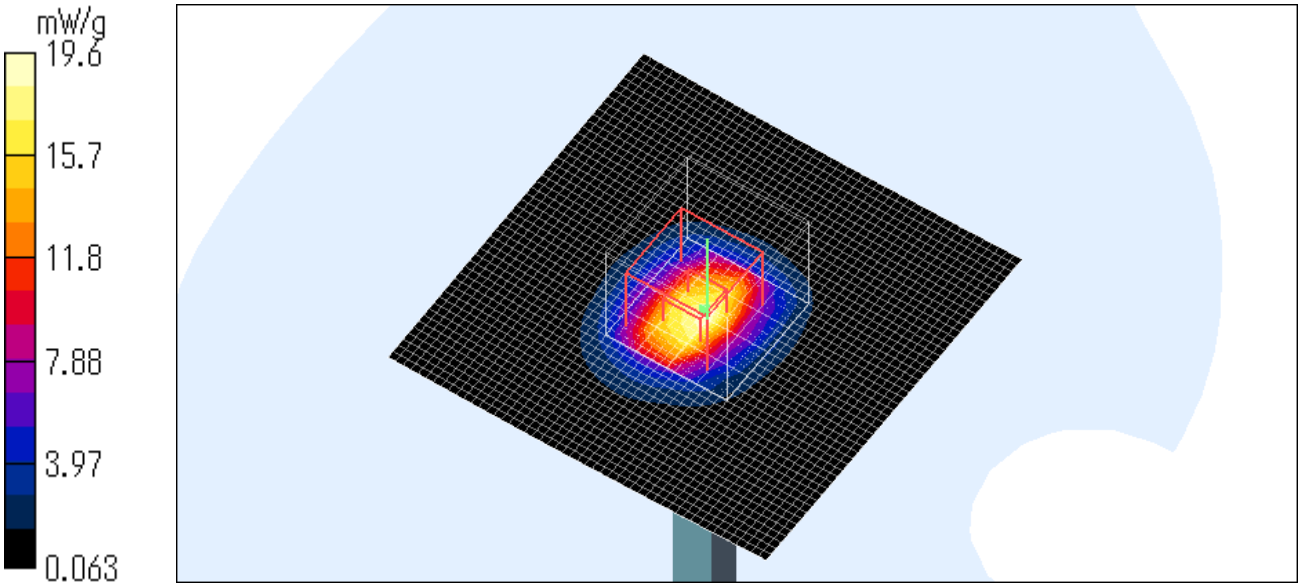
Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.82 mho/m; ε_r = 37.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(8.25, 8.25, 8.25); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 23.4 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 89.7 V/m; Power Drift = 0.099 dB
Peak SAR (extrapolated) = 28.5 W/kg

SAR(1 g) = 13.3 mW/g; SAR(10 g) = 5.96 mW/g
Maximum value of SAR (measured) = 19.6 mW/g

Test Date = 04/10/06
Ambient Temperature = 24.8 degree C.
Liquid Temperature = Before 24.2 degree C. , After 24.2 degree C.



11. System Validation Dipole (D2450V2,S/N: 713)

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **UL A-pex (MTT)**

Certificate No: **D2450V2-713_Sep05**

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 713
Calibration procedure(s)	QA CAL-05.v6 Calibration procedure for dipole validation kits
Calibration date:	September 2, 2005
Condition of the calibrated item	In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E442	GB37480704	12-Oct-04 (METAS, No. 251-00412)	Oct-05
Power sensor HP 8481A	US37292783	12-Oct-04 (METAS, No. 251-00412)	Oct-05
Reference 20 dB Attenuator	SN: 5086 (20g)	11-Aug-05 (METAS, No 251-00498)	Aug-06
Reference 10 dB Attenuator	SN: 5047.2 (10r)	11-Aug-05 (METAS, No 251-00498)	Aug-06
Reference Probe ES3DV2	SN 3025	29-Oct-04 (SPEAG, No. ES3-3025_Oct04)	Oct-05
DAE4	SN 601	07-Jan-05 (SPEAG, No. DAE4-601_Jan05)	Jan-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-03)	In house check: Oct-05
RF generator R&S SML-03	100698	27-Mar-02 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov-05

	Name	Function	Signature
Calibrated by:	Mike Meili	Laboratory Technician	M. Meili
Approved by:	Katja Pokovic	Technical Manager	Katja

Issued: September 2, 2005

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D2450V2-713_Sep05 Page 1 of 9

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY4	V4.6
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Area Scan resolution	dx, dy = 15 mm	
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.5 ± 6 %	1.73 mho/m ± 6 %
Head TSL temperature during test	(21.6 ± 0.2) °C	38.4 ± 6 %	1.75 mho/m ± 6 %

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	condition	
SAR measured	250 mW input power	13.2 mW / g
SAR normalized	normalized to 1W	52.8 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**53.2 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.19 mW / g
SAR normalized	normalized to 1W	24.8 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**24.9 mW / g ± 16.5 % (k=2)**

[1] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

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Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.5 ± 6 %	2.03 mho/m ± 6 %
Body TSL temperature during test	(21.8 ± 0.2) °C	52.5 ± 6 %	2.04 mho/m ± 6 %

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	condition	
SAR measured	250 mW input power	13.5 mW / g
SAR normalized	normalized to 1W	54.0 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**52.8 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.25 mW / g
SAR normalized	normalized to 1W	25.0 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**24.4 mW / g ± 16.5 % (k=2)**

[2] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.7 Ω + 3.7 jΩ
Return Loss	-28.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.6 Ω + 4.8 jΩ
Return Loss	- 25.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.161 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 5, 2002

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DASY4 Validation Report for Head TSL

Date/Time: 02.09.2005 10:54:01

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN713

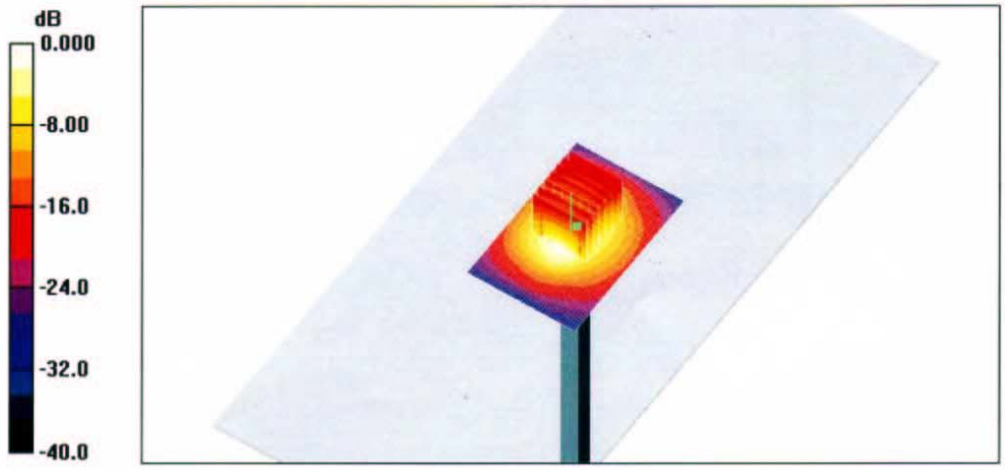
Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL U10 BB;
Medium parameters used: f = 2450 MHz; σ = 1.75 mho/m; ε_r = 38.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(4.4, 4.4, 4.4); Calibrated: 29.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 22.07.2004
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA
- Measurement SW: DASY4, V4.6 Build 13; Postprocessing SW: SEMCAD, V1.8 Build 156

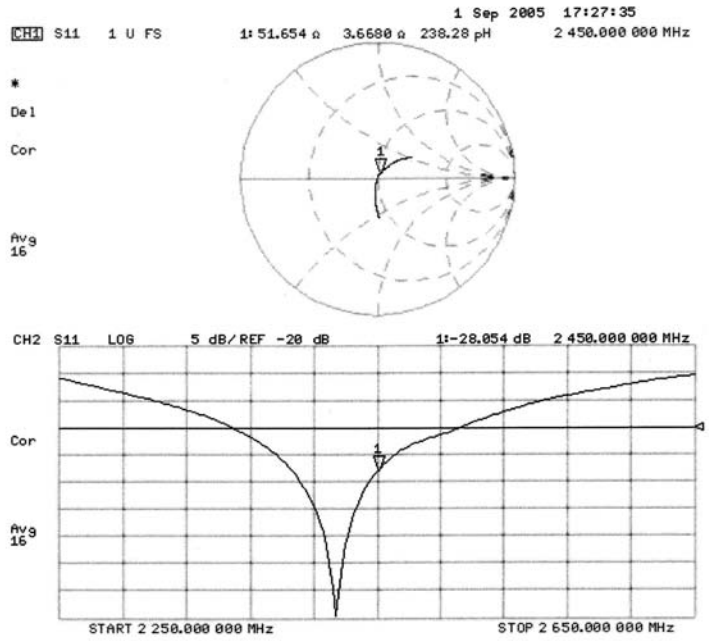
Pin = 250 mW; d = 10 mm/Area Scan (41x61x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 16.7 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.8 V/m; Power Drift = 0.035 dB
Peak SAR (extrapolated) = 27.1 W/kg
SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.19 mW/g
Maximum value of SAR (measured) = 15.0 mW/g



0 dB = 15.0mW/g

Impedance Measurement Plot for Head TSL



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DASY4 Validation Report for Body TSL

Date/Time: 02.09.2005 12:04:42

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN713

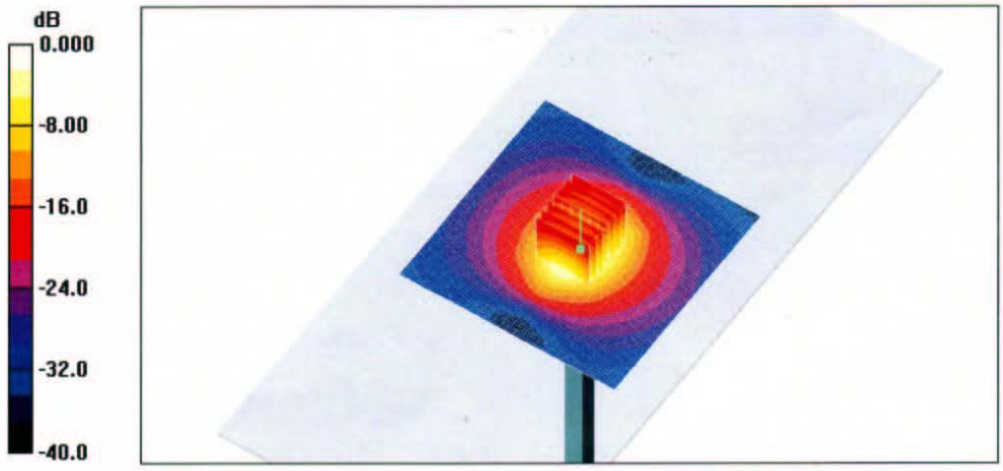
Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: MSL 2450;
Medium parameters used: f = 2450 MHz; σ = 2.04 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(4.13, 4.13, 4.13); Calibrated: 29.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 22.07.2004
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA
- Measurement SW: DASY4, V4.6 Build 13; Postprocessing SW: SEMCAD, V1.8 Build 156

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 15.3 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.3 V/m; Power Drift = -0.062 dB
Peak SAR (extrapolated) = 27.6 W/kg
SAR(1 g) = 13.5 mW/g; SAR(10 g) = 6.25 mW/g
Maximum value of SAR (measured) = 15.3 mW/g



0 dB = 15.3mW/g

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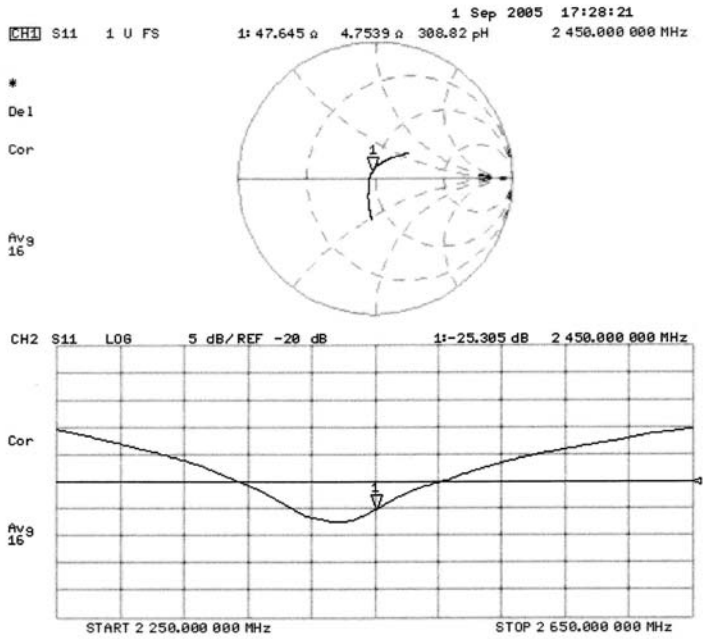
Impedance Measurement Plot for Body TSL



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12. Dosimetric E-Field Probe Calibration (EX3DV3,S/N: 3507)

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client UL-Apex (MTT) Certificate No: EX3-3507_Apr05

CALIBRATION CERTIFICATE

Object EX3DV3 - SN:3507

Calibration procedure(s) QA CAL-01.v5 and QA CAL-14.v2
Calibration procedure for dosimetric E-field probes

Calibration date: April 12, 2005

Condition of the calibrated item In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-May-04 (METAS, No. 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No. 251-00388)	May-05
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-04 (METAS, No. 251-00403)	Aug-05
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-04 (METAS, No. 251-00389)	May-05
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-04 (METAS, No. 251-00404)	Aug-05
Reference Probe ES3DV2	SN: 3013	7-Jan-05 (SPEAG, No. ES3-3013_Jan05)	Jan-06
DAE4	SN: 617	19-Jan-05 (SPEAG, No. DAE4-617_Jan05)	Jan-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec 05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov 05

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

Issued: April 12, 2005

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe EX3DV3

SN:3507

Manufactured:	December 15, 2003
Last calibrated:	February 20, 2004
Recalibrated:	April 12, 2005

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

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EX3DV3 SN:3507 **April 12, 2005**

DASY - Parameters of Probe: EX3DV3 SN:3507

Sensitivity in Free Space[A] Diode Compression[B]

NormX	**0.71** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**96** mV
NormY	**0.74** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**96** mV
NormZ	**0.73** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**96** mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL **900 MHz** **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		**2.0 mm**	**3.0 mm**
SAR_{be} [%]	Without Correction Algorithm	3.4	1.2
SAR_{be} [%]	With Correction Algorithm	0.2	0.4

TSL **1810 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**2.0 mm**	**3.0 mm**
SAR_{be} [%]	Without Correction Algorithm	3.3	1.8
SAR_{be} [%]	With Correction Algorithm	0.6	0.7

Sensor Offset

Probe Tip to Sensor Center	**1.0** mm

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).
[B] Numerical linearization parameter: uncertainty not required.

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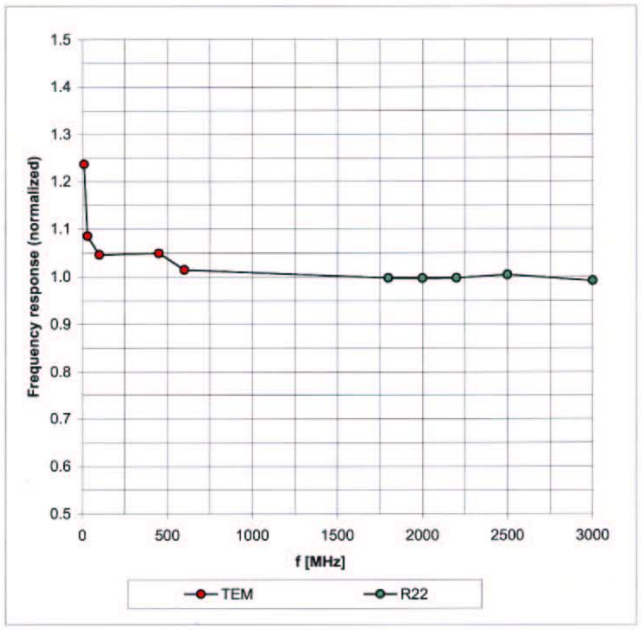
EX3DV3 SN:3507 April 12, 2005

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

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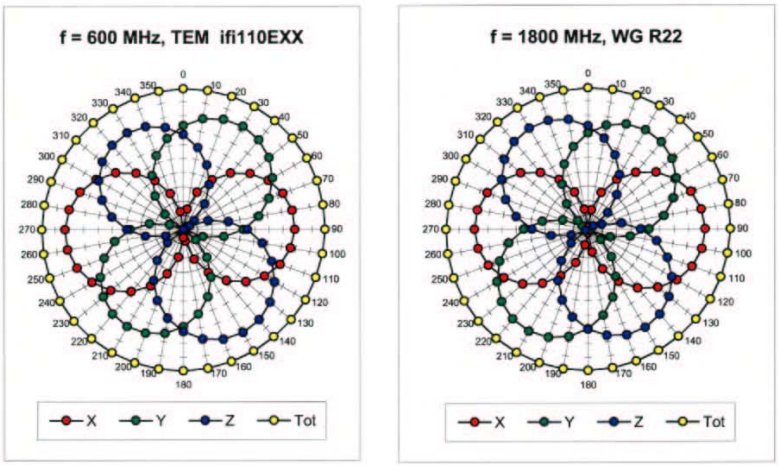
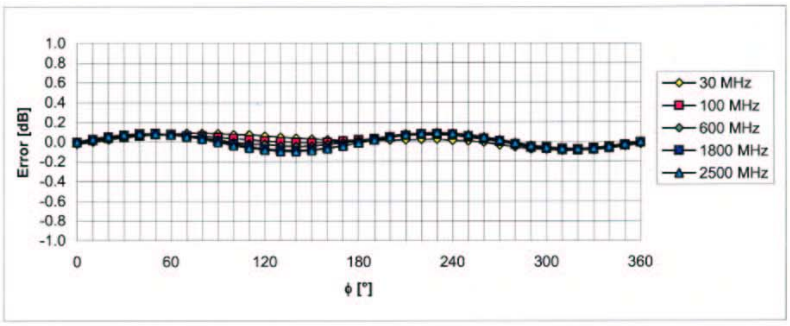
Receiving Pattern (ϕ), ϑ = 0°





Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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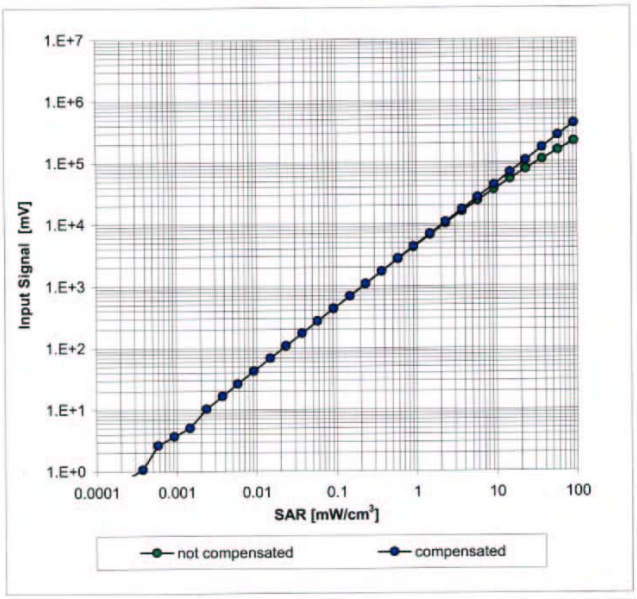
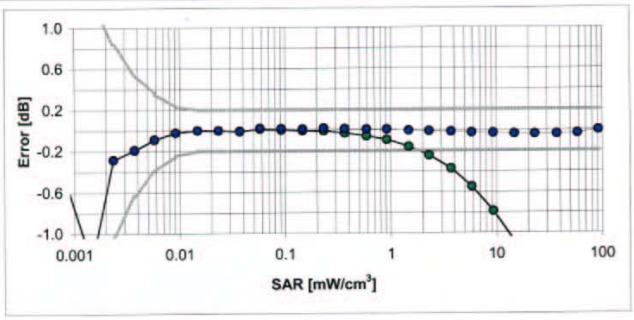
EX3DV3 SN:3507 April 12, 2005

Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)





Uncertainty of Linearity Assessment: ± 0.6% (k=2)

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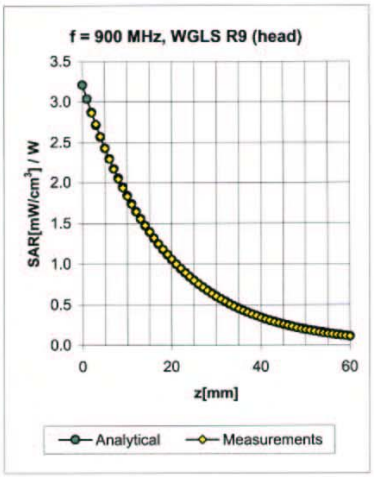
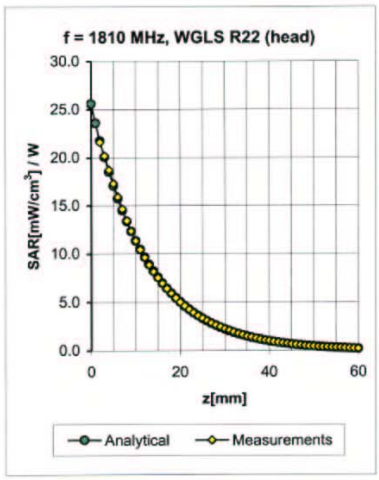
Conversion Factor Assessment





f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.74	0.66	10.48 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.51	0.77	9.10 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.46	0.81	8.25 ± 11.8% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.79	0.62	10.42 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.30	1.78	8.70 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.33	1.59	7.72 ± 11.8% (k=2)

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

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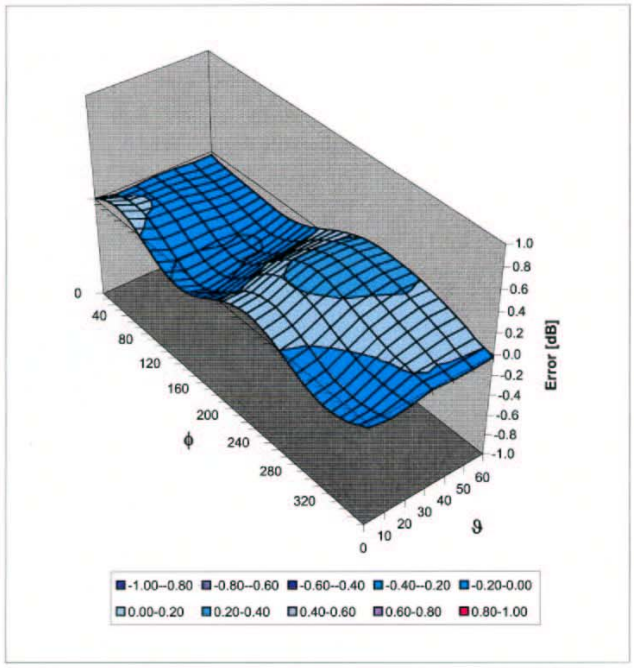
EX3DV3 SN:3507 April 12, 2005

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

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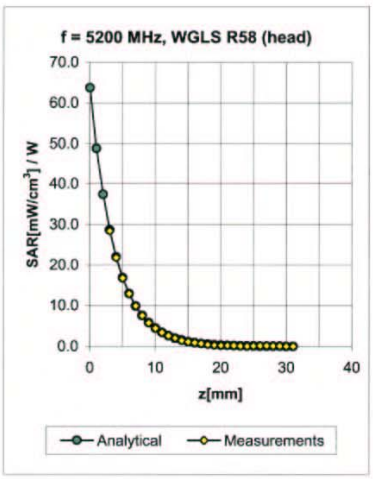
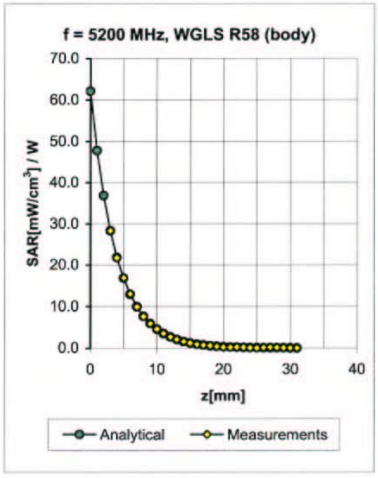
EX3DV3 SN:3507 April 12, 2005

Appendix[D]





f [MHz][D]	Validity [MHz]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
5200	± 50	Head	36.0 ± 5%	4.76 ± 5%	0.41	1.80	5.37 ± 13.6% (k=2)
5800	± 50	Head	35.3 ± 5%	5.27 ± 5%	0.45	1.80	4.67 ± 13.6% (k=2)
5200	± 50	Body	49.0 ± 5%	5.30 ± 5%	0.45	1.90	4.86 ± 13.6% (k=2)
5800	± 50	Body	48.2 ± 5%	6.00 ± 5%	0.45	1.90	4.32 ± 13.6% (k=2)

[D] Accreditation for ConvF assessment above 3000 MHz is currently applied for. Accreditation is expected in spring 2005.

Certificate No: EX3-3507_Apr05 Page 10 of 10

13. References

[1]ANSI, ANSI/IEEE C95.1-1992: 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.
[2] 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.
[3] Katja Pokovic, Thomas Schmid, and Niels Kuster, “E-_field probe with improved isotropy in brain simulating liquids”, in Proceedings of the ELMAR, Zadar, Croatia, 23-25 June, 1996, pp.172-175.
[4] W. Gander, Computermathematik, Birkhaeuser, Basel, 1992.
[5] W. H. Press, S. A. Teukolsky,W. T. Vetterling, and B. P. Flannery, Numerical Recepies in C, The Art of Scientific Computing, Second Edition, Cambridge University Press, 1992.
[6]SPEAG uncertainty document for DASY 4 System from SPEAG (Shimid & Partner Engineering AG).
[7]SPEAG uncertainty document for "the 5-6GHz Extension" from SPEAG (Shimid & Partner Engineering AG).

APPENDIX 3 : SAR Measurement data

1. Evaluation procedure

The evaluation was performed with the following procedure:

Step 1: Measurement of the E-field at a fixed location above the ear point or central position of flat phantom was used as a reference value for assessing the power drop.

Step 2: The SAR distribution at the exposed side of head or body position was measured at a distance of each device from the inner surface of the shell. The area covered the entire dimension of the antenna of EUT and the horizontal grid spacing was 20 mm x 20 mm . Based on these data, the area of the maximum absorption was determined by spline interpolation.

Step 3: Around this point found in the Step 2 (area scan) , a volume of 32mm x 32mm x 30mm was assessed by measuring 5 x 5 x 7 points. And for any secondary peaks found in the Step2 which are within 2dB of maximum peak and not with this Step3 (Zoom scan) is repeated. 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 1mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.3 mm. The extrapolation was based on a least square algorithm [4]. 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) [4], [5]. 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 E-field at the same location as in Step 1.

2. Measurement data (ANT. : UBA-CUW1000)

PSP-1001 (Ant : UBA-CUW1000 : PSP-110(Sony))/ Body / Front / 2437MHz / 11b(11Mbps)

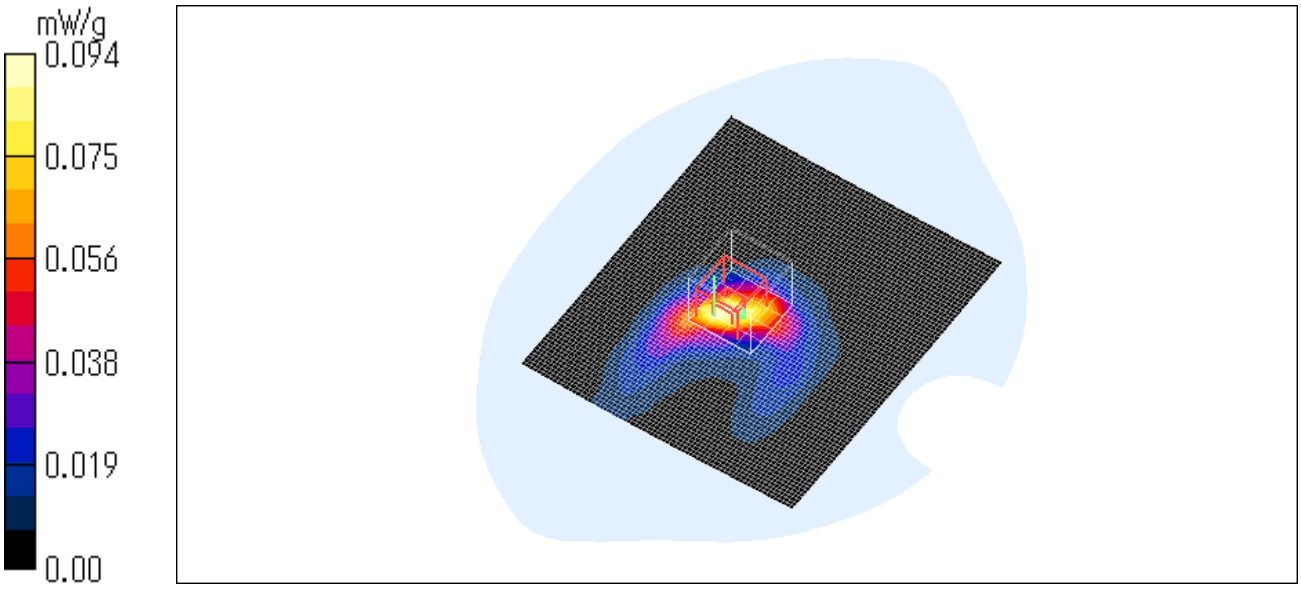
Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(7.72, 7.72, 7.72); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Area Scan (71x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.087 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.88 V/m; Power Drift = -0.216 dB
Peak SAR (extrapolated) = 0.127 W/kg

SAR(1 g) = 0.071 mW/g; SAR(10 g) = 0.036 mW/g
Maximum value of SAR (measured) = 0.094 mW/g

Test Date = 04/10/06
Ambient Temperature = 24.8 degree C.
Liquid Temperature = Before 23.7 degree C. , After 23.7 degree C.



PSP-1001 (Ant : UBA-CUW1000, Battery : PSP-110(Sony))/ Body / Back / 2437MHz / 11b(11Mbps)

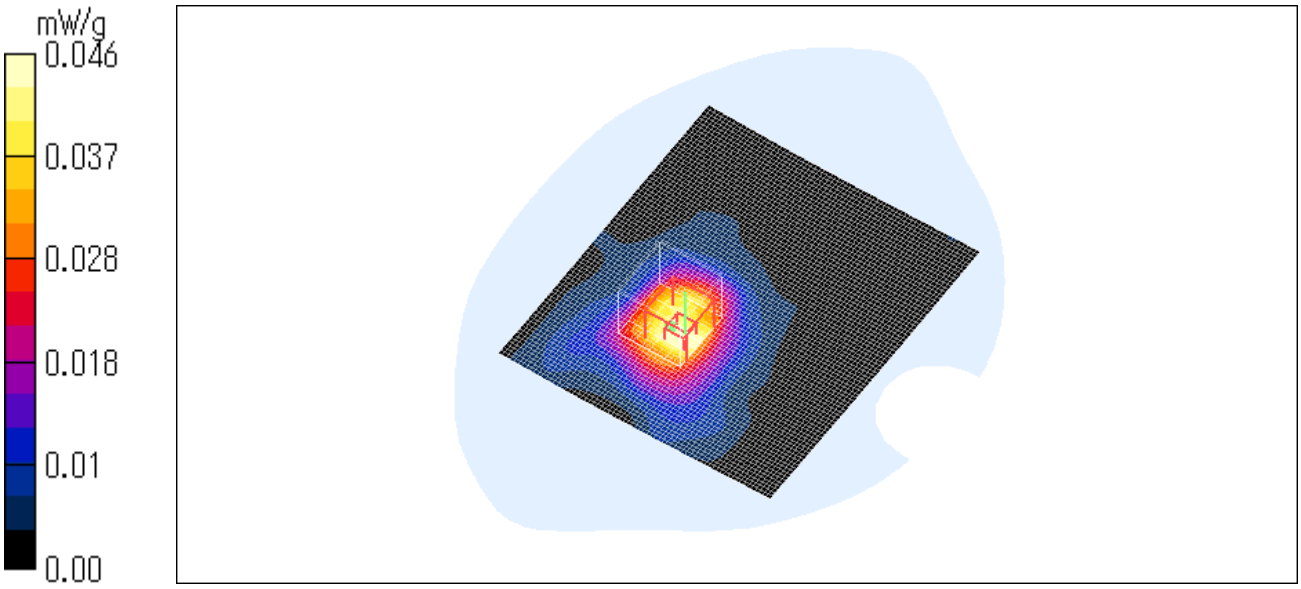
Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(7.72, 7.72, 7.72); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Area Scan (71x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.047 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.80 V/m; Power Drift = -0.190 dB
Peak SAR (extrapolated) = 0.055 W/kg

SAR(1 g) = 0.037 mW/g; SAR(10 g) = 0.022 mW/g
Maximum value of SAR (measured) = 0.046 mW/g

Test Date = 04/10/06
Ambient Temperature = 24.8 degree C.
Liquid Temperature = Before 23.7 degree C. , After 23.7 degree C.



PSP-1001 (Ant : UBA-CUW1000, Battery : PSP-110(Sony))/ Body / Top / 2437MHz / 11b(11Mbps)

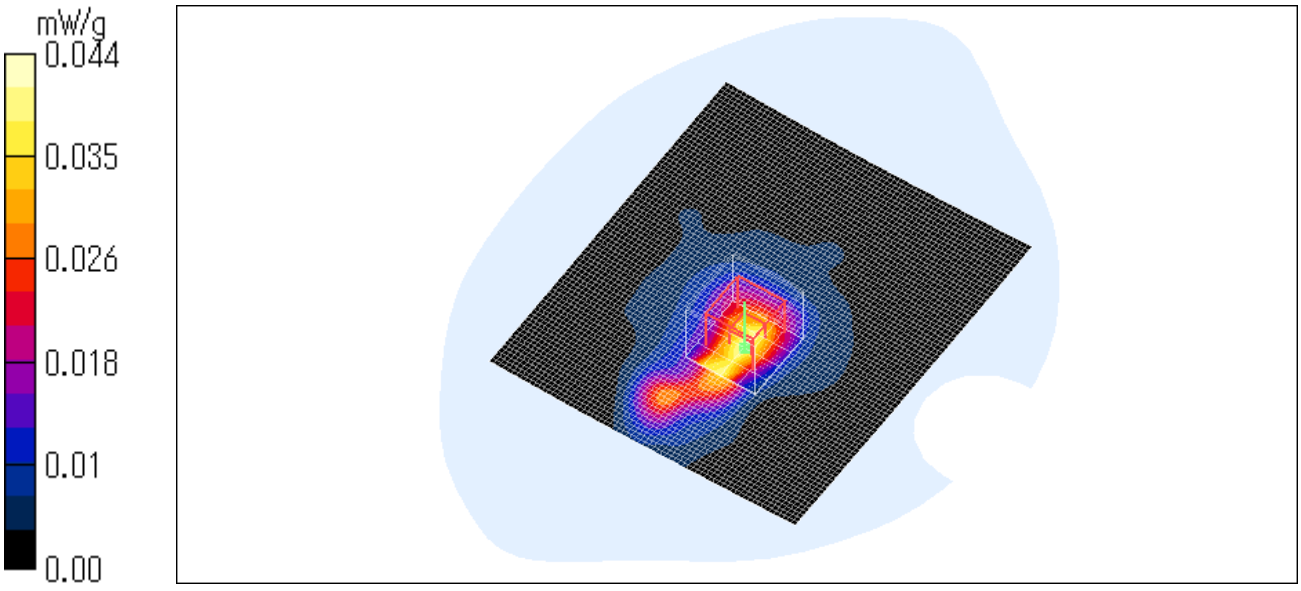
Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(7.72, 7.72, 7.72); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Area Scan (71x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.042 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.83 V/m; Power Drift = -0.205 dB
Peak SAR (extrapolated) = 0.056 W/kg

SAR(1 g) = 0.030 mW/g; SAR(10 g) = 0.015 mW/g
Maximum value of SAR (measured) = 0.044 mW/g

Test Date = 04/10/06
Ambient Temperature = 24.8 degree C.
Liquid Temperature = Before 23.8 degree C. , After 23.8 degree C.



PSP-1001 (Ant : UBA-CUW1000, Battery : PSP-110(Sony))/ Body / Bottom / 2437MHz / 11b(11Mbps)

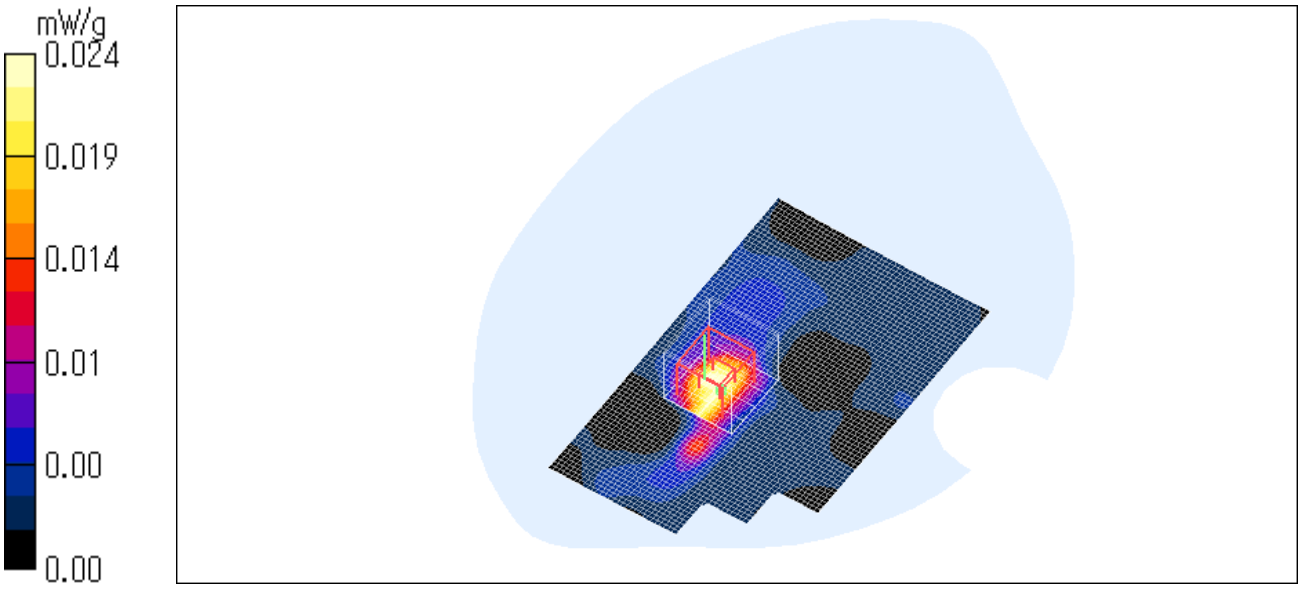
Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(7.72, 7.72, 7.72); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.022 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.68 V/m; Power Drift = -0.223 dB
Peak SAR (extrapolated) = 0.034 W/kg

SAR(1 g) = 0.019 mW/g; SAR(10 g) = 0.00903 mW/g
Maximum value of SAR (measured) = 0.024 mW/g

Test Date = 04/10/06
Ambient Temperature = 24.8 degree C.
Liquid Temperature = Before 23.8 degree C. , After 23.8 degree C.



PSP-1001 (Ant : UBA-CUW1000, Battery : PSP-110(Sony))/ Body / Left side / 2437MHz / 11b(11Mbps)

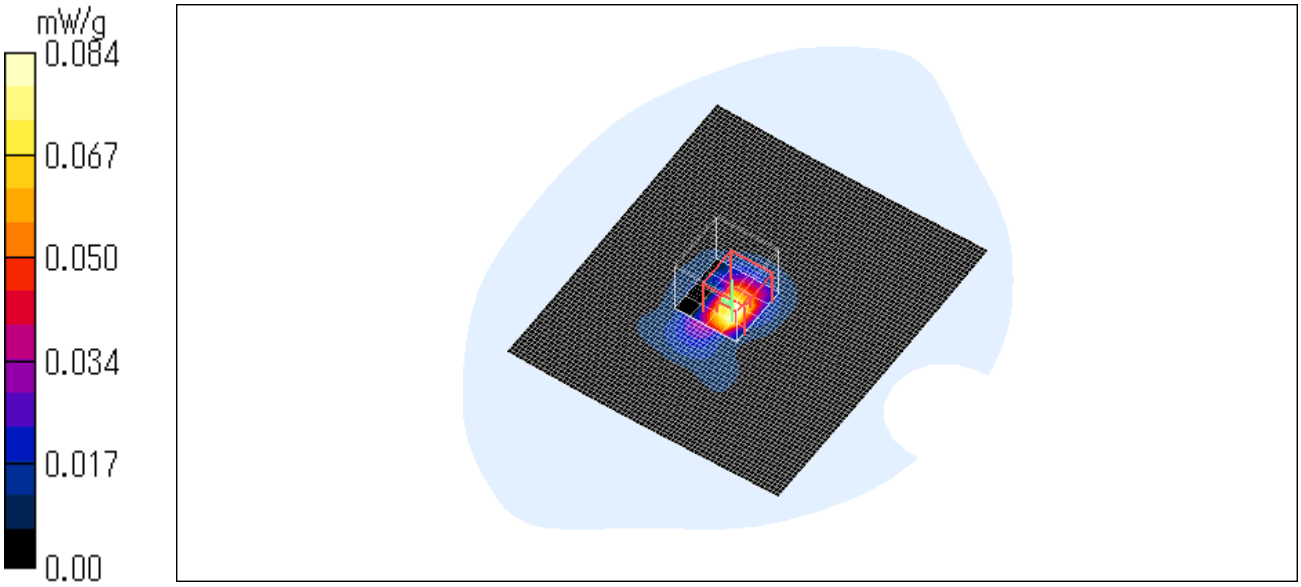
Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(7.72, 7.72, 7.72); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Area Scan (71x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.064 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.22 V/m; Power Drift = -0.211 dB
Peak SAR (extrapolated) = 0.181 W/kg

SAR(1 g) = 0.071 mW/g; SAR(10 g) = 0.025 mW/g
Maximum value of SAR (measured) = 0.084 mW/g

Test Date = 04/10/06
Ambient Temperature = 24.8 degree C.
Liquid Temperature = Before 24.1 degree C. , After 24.1 degree C.



PSP-1001 (Ant : UBA-CUW1000, Battery : PSP-110(Sony))/ Body / Front / 2412MHz / 11b(11Mbps)

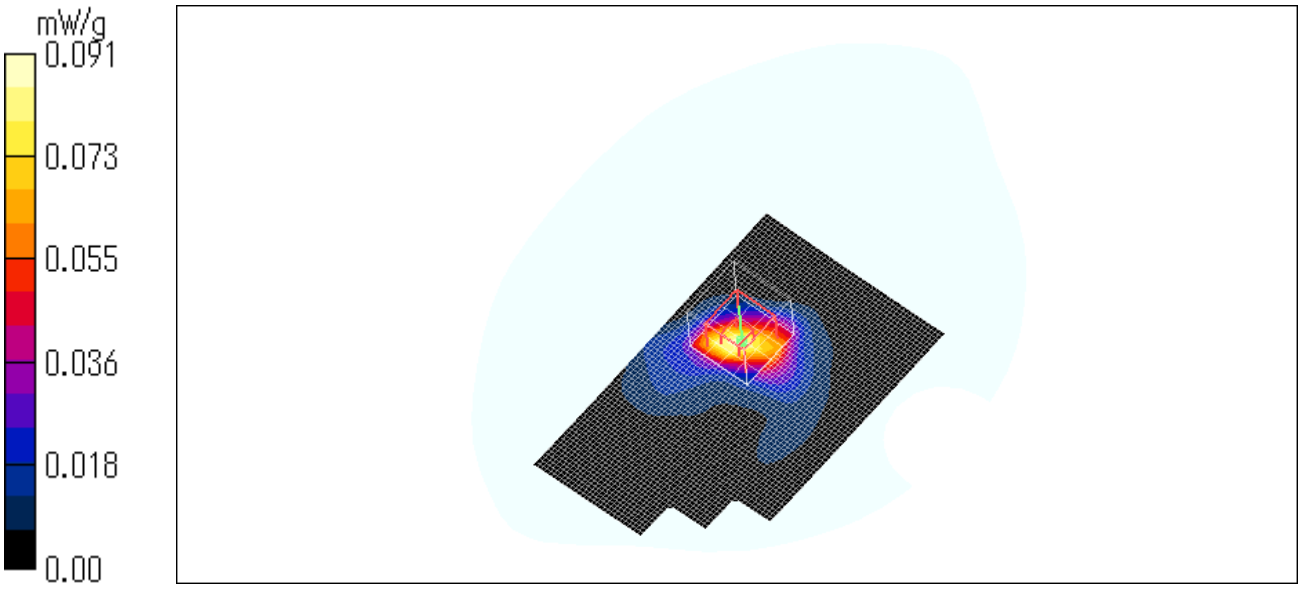
Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(7.72, 7.72, 7.72); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.093 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.96 V/m; Power Drift = -0.191 dB
Peak SAR (extrapolated) = 0.120 W/kg

SAR(1 g) = 0.066 mW/g; SAR(10 g) = 0.033 mW/g
Maximum value of SAR (measured) = 0.091 mW/g

Test Date = 04/10/06
Ambient Temperature = 24.8 degree C.
Liquid Temperature = Before 23.8 degree C. , After 23.8 degree C.



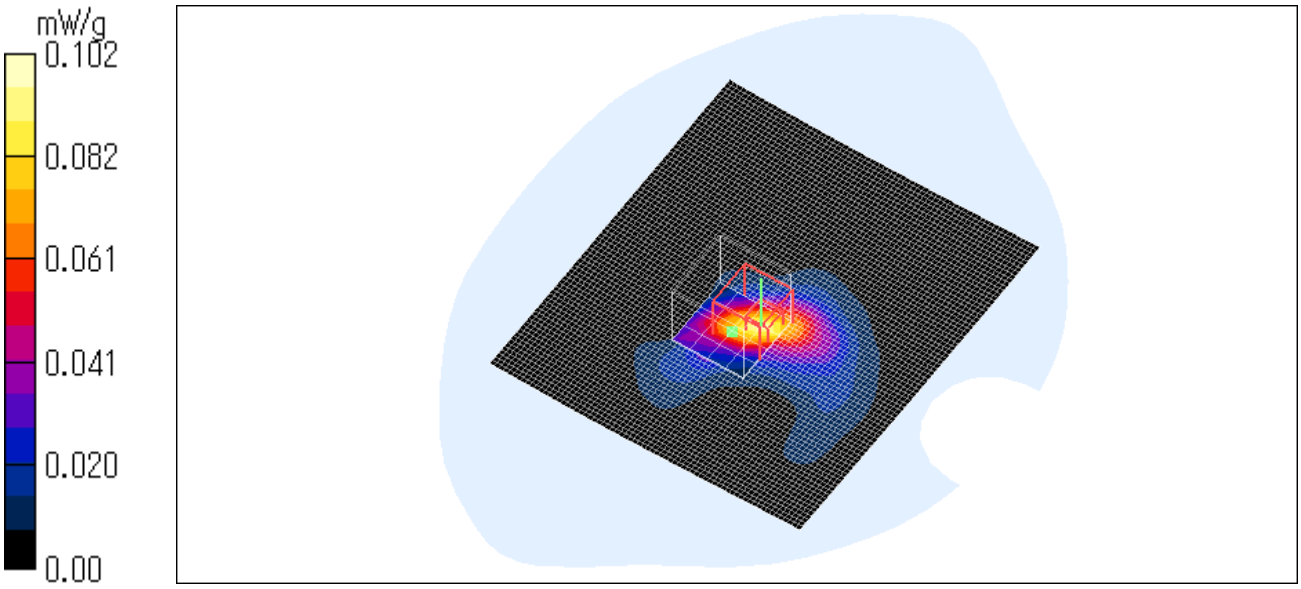
PSP-1001 (Ant : UBA-CUW1000, Battery : PSP-110(Sony))/ Body / Front / 2462MHz / 11b(11Mbps)

Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(7.72, 7.72, 7.72); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Area Scan (71x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.077 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.56 V/m; Power Drift = -0.201 dB
Peak SAR (extrapolated) = 0.129 W/kg
SAR(1 g) = 0.069 mW/g; SAR(10 g) = 0.033 mW/g
Maximum value of SAR (measured) = 0.102 mW/g

Test Date = 04/10/06
Ambient Temperature = 24.8 degree C.
Liquid Temperature = Before 24.0 degree C. , After 24.0 degree C.



3. Measurement data (ANT. : HFS11-SO01)

PSP-1001 (Ant : HFS11-SO01, Battery : PSP-110(Sony)) / Body / Front / 2437MHz / 11b(11Mbps)

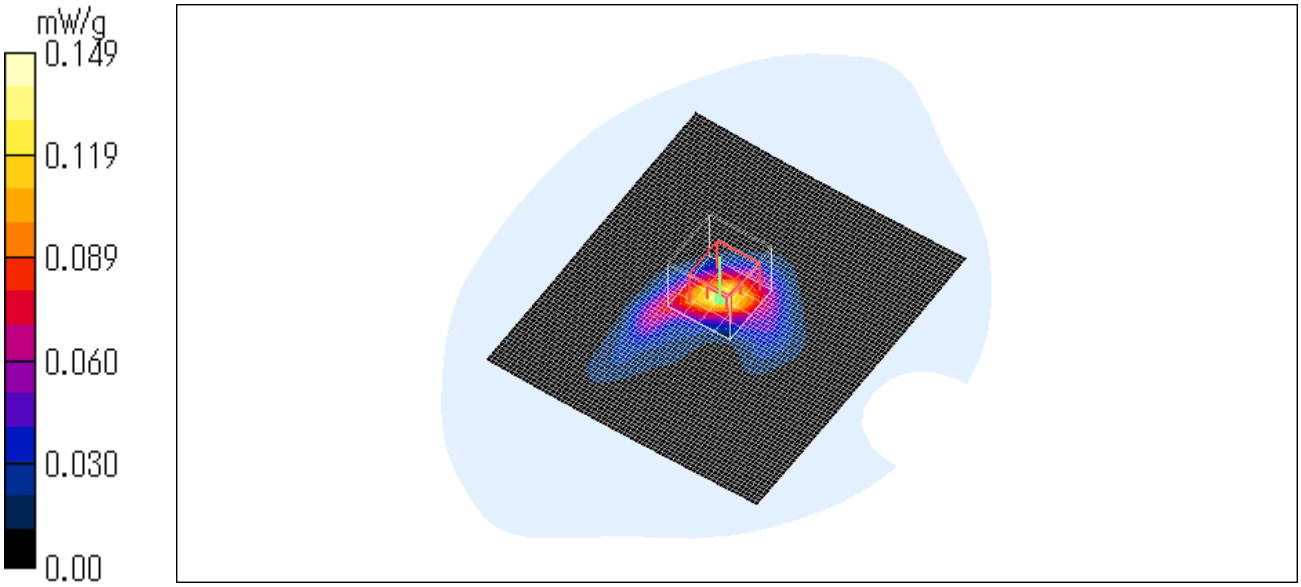
Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(7.72, 7.72, 7.72); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Area Scan (71x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.143 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.69 V/m; Power Drift = -0.064 dB
Peak SAR (extrapolated) = 0.182 W/kg

SAR(1 g) = 0.103 mW/g; SAR(10 g) = 0.051 mW/g
Maximum value of SAR (measured) = 0.149 mW/g

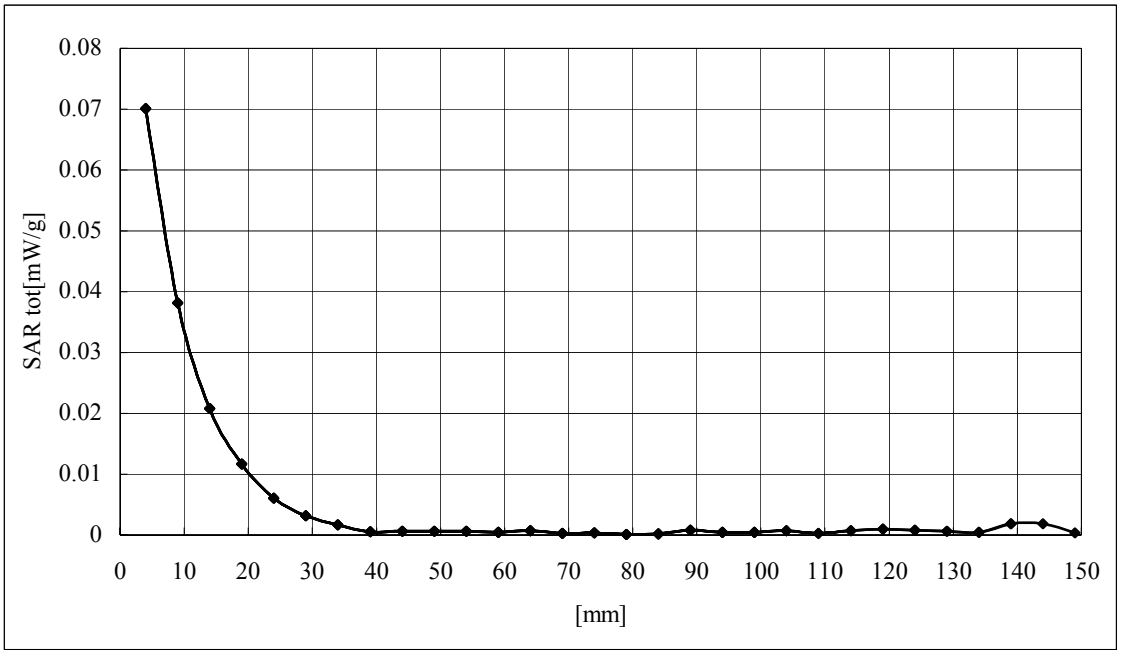
Test Date = 04/10/06
Ambient Temperature = 24.8 degree C.
Liquid Temperature = Before 24.1 degree C. , After 24.1 degree C.



Z-axis scan at max SAR location

PSP-1001 (Ant : HFS11-SO01, Battery : PSP-110(Sony)) / Body / Front / 2437MHz / 11b(11Mbps)

Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(7.72, 7.72, 7.72); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145



PSP-1001 (Ant : HFS11-SO01, Battery : PSP-110(Sony)) / Body / Back / 2437MHz / 11b(11Mbps)

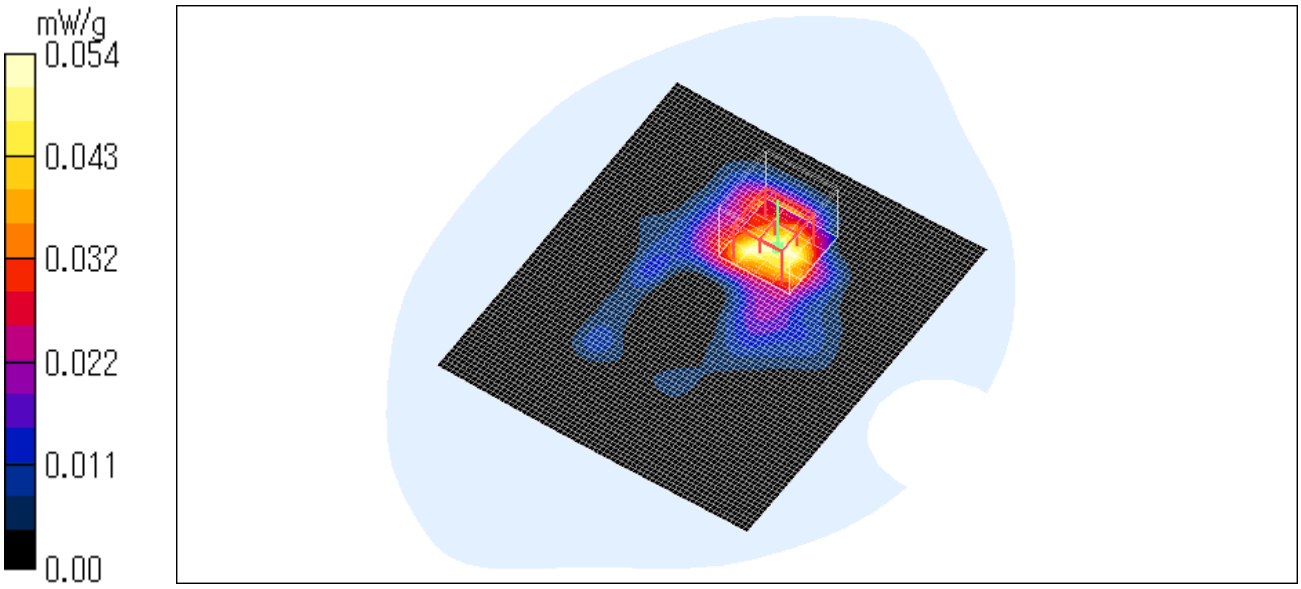
Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(7.72, 7.72, 7.72); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Area Scan (71x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.068 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.53 V/m; Power Drift = 0.051 dB
Peak SAR (extrapolated) = 0.066 W/kg

SAR(1 g) = 0.040 mW/g; SAR(10 g) = 0.023 mW/g
Maximum value of SAR (measured) = 0.054 mW/g

Test Date = 04/10/06
Ambient Temperature = 24.8 degree C.
Liquid Temperature = Before 24.0 degree C. , After 24.0 degree C.



PSP-1001 (Ant : HFS11-SO01, Battery : PSP-110(Sony)) / Body / Top / 2437MHz / 11b(11Mbps)
Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(7.72, 7.72, 7.72); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145
Area Scan (71x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.075 mW/g

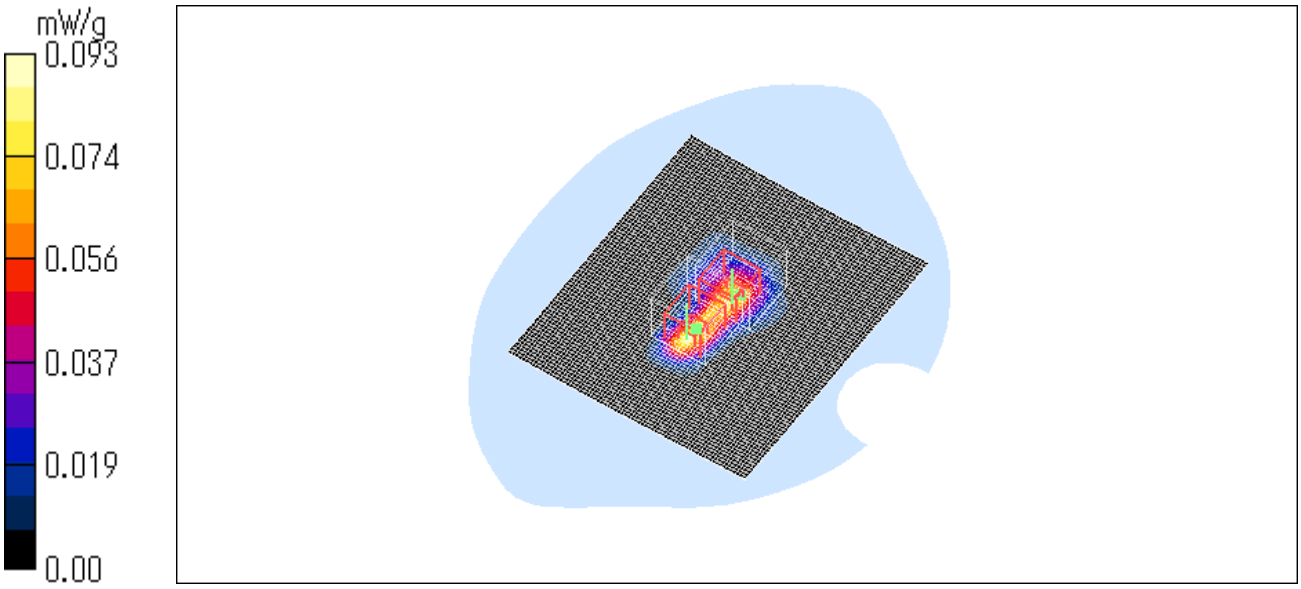
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.54 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.126 W/kg

SAR(1 g) = 0.064 mW/g; SAR(10 g) = 0.029 mW/g
Maximum value of SAR (measured) = 0.093 mW/g

Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.54 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.107 W/kg

SAR(1 g) = 0.057 mW/g; SAR(10 g) = 0.028 mW/g
Maximum value of SAR (measured) = 0.081 mW/g

Test Date = 04/10/06
Ambient Temperature = 24.8 degree C.
Liquid Temperature = Before 24.0 degree C. , After 24.0 degree C.



PSP-1001 (Ant : HFS11-SO01, Battery : PSP-110(Sony))/ Body / Bottom / 2437MHz / 11b(11Mbps)

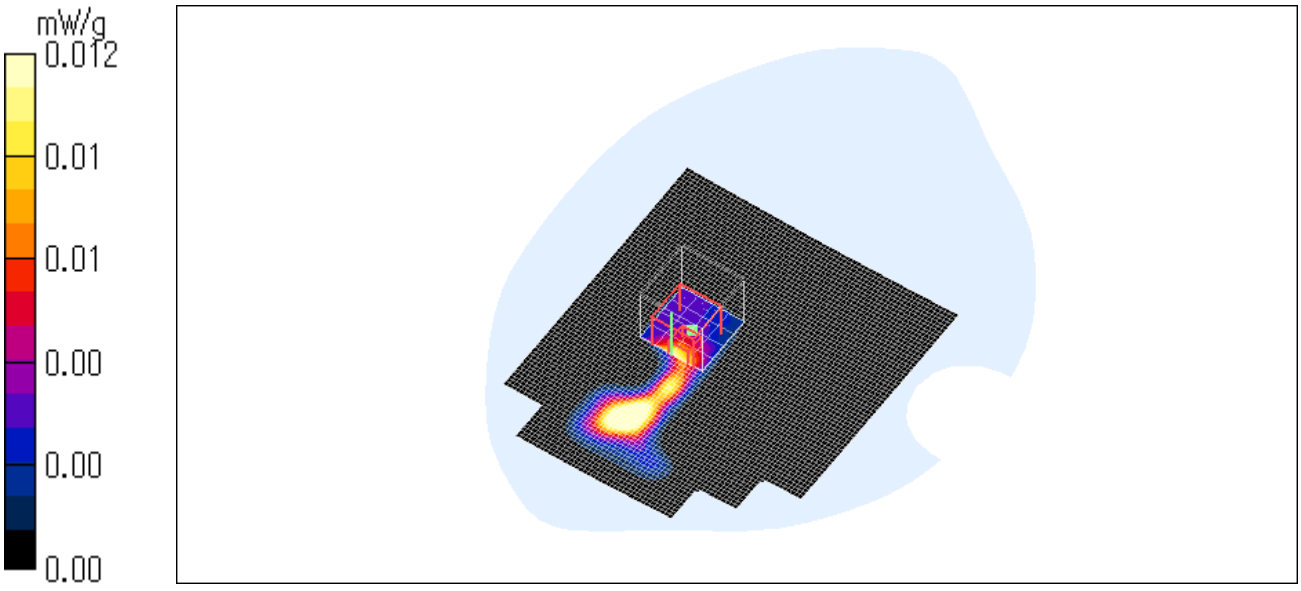
Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(7.72, 7.72, 7.72); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Area Scan (71x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.019 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.945 V/m; Power Drift = -0.199 dB
Peak SAR (extrapolated) = 0.021 W/kg

SAR(1 g) = 0.00426 mW/g; SAR(10 g) = 0.00171 mW/g
Maximum value of SAR (measured) = 0.012 mW/g

Test Date = 04/10/06
Ambient Temperature = 24.8 degree C.
Liquid Temperature = Before 23.9 degree C. , After 23.9 degree C.



PSP-1001 (Ant : HFS11-SO01, Battery : PSP-110(Sony))/ Body / Left Side / 2437MHz / 11b(11Mbps)

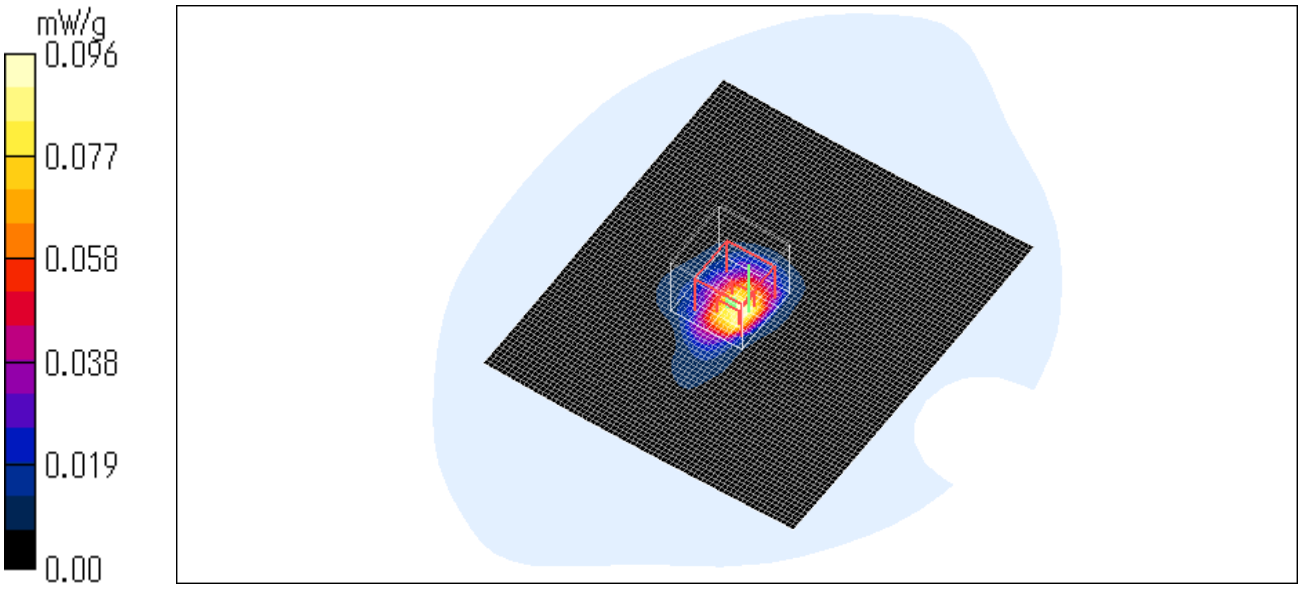
Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(7.72, 7.72, 7.72); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Area Scan (71x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.086 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.34 V/m; Power Drift = -0.206 dB
Peak SAR (extrapolated) = 0.156 W/kg

SAR(1 g) = 0.070 mW/g; SAR(10 g) = 0.030 mW/g
Maximum value of SAR (measured) = 0.096 mW/g

Test Date = 04/10/06
Ambient Temperature = 24.8 degree C.
Liquid Temperature = Before 24.2 degree C. , After 24.2 degree C.



PSP-1001 (Ant : HFS11-SO01, Battery : PSP-110(Sony))/ Body / Front / 2412MHz / 11b(11Mbps)

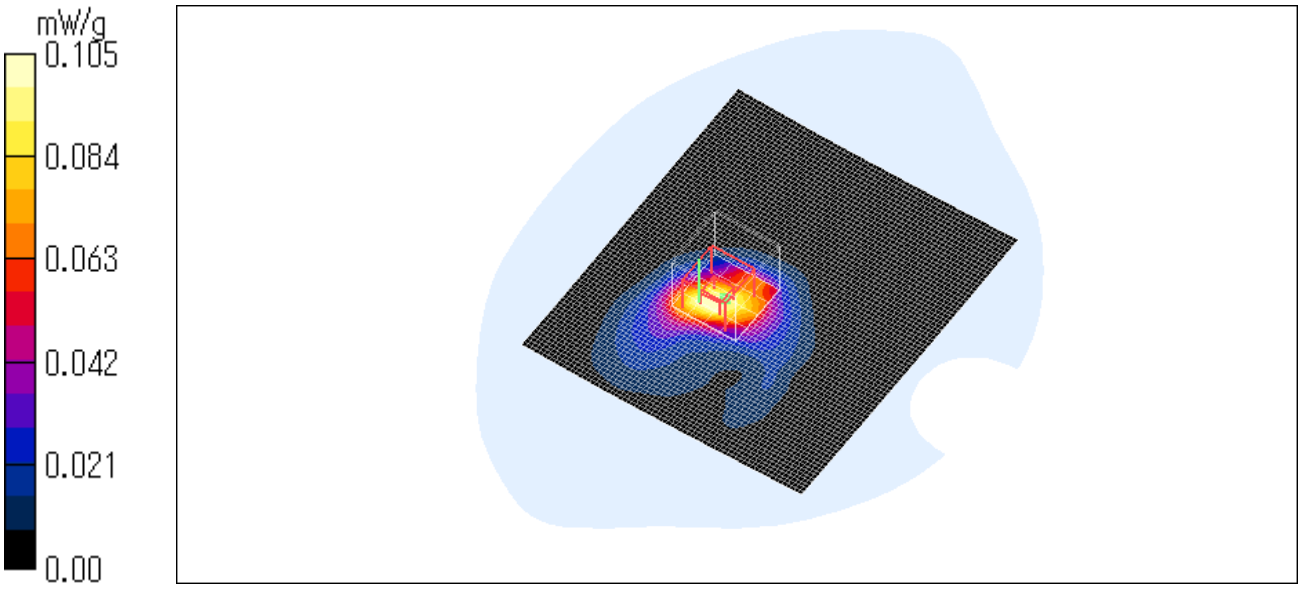
Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(7.72, 7.72, 7.72); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Area Scan (71x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.110 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.90 V/m; Power Drift = -0.158 dB
Peak SAR (extrapolated) = 0.138 W/kg

SAR(1 g) = 0.081 mW/g; SAR(10 g) = 0.042 mW/g
Maximum value of SAR (measured) = 0.105 mW/g

Test Date = 04/10/06
Ambient Temperature = 24.8 degree C.
Liquid Temperature = Before 24.1 degree C. , After 24.1 degree C.



PSP-1001 (Ant : HFS11-SO01, Battery : PSP-110(Sony))/ Body / Front / 2462MHz / 11b(11Mbps)

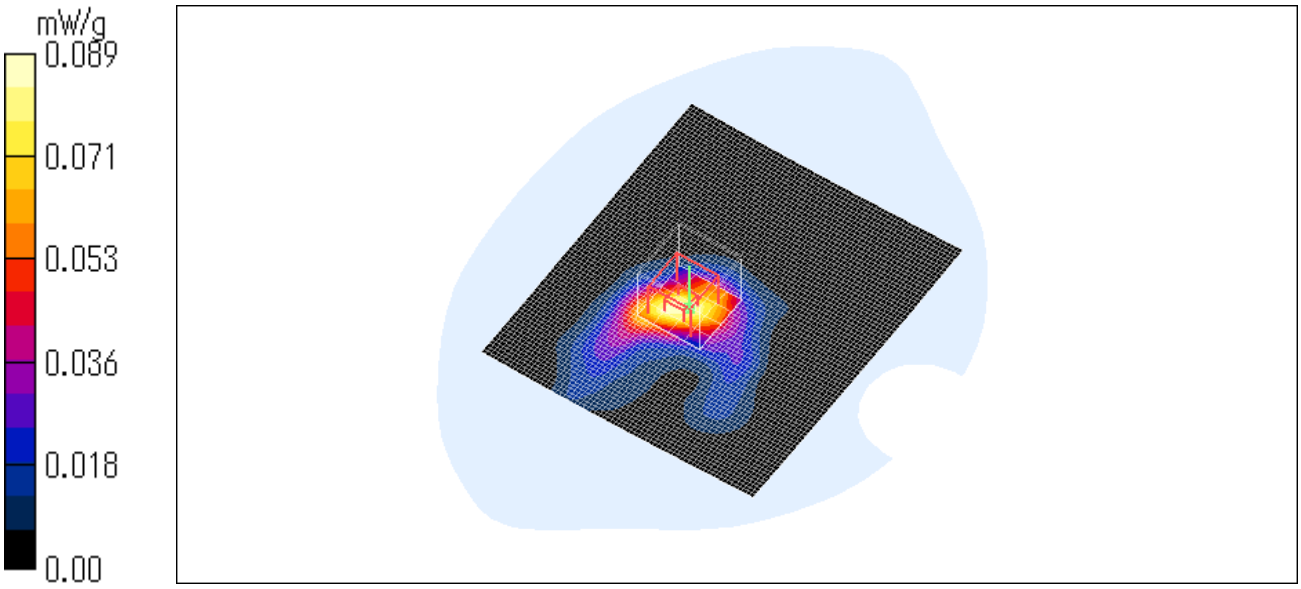
Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(7.72, 7.72, 7.72); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Area Scan (71x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.082 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.06 V/m; Power Drift = -0.169 dB
Peak SAR (extrapolated) = 0.116 W/kg

SAR(1 g) = 0.067 mW/g; SAR(10 g) = 0.035 mW/g
Maximum value of SAR (measured) = 0.089 mW/g

Test Date = 04/10/06
Ambient Temperature = 24.8 degree C.
Liquid Temperature = Before 24.0 degree C. , After 24.0 degree C.



PSP-1001 (Ant : HFS11-SO01, Battery : PSP-110(Sony))/ Body / Front / 2437MHz / 11b(11Mbps) / Separated 5mm

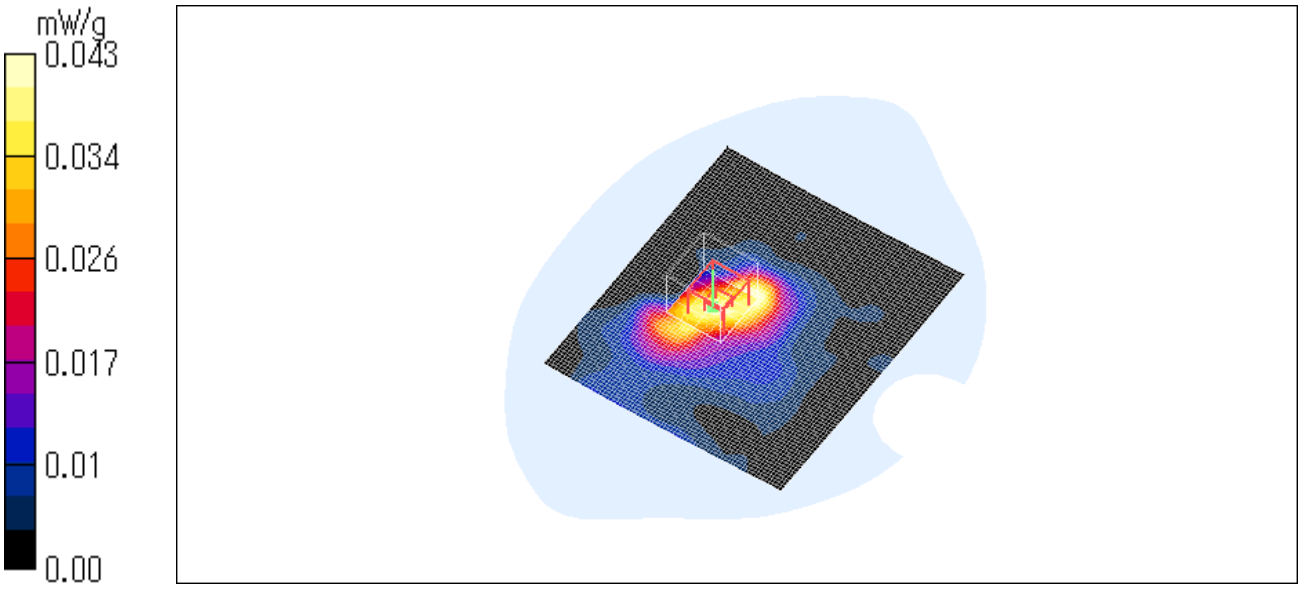
Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(7.72, 7.72, 7.72); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Area Scan (71x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.049 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.43 V/m; Power Drift = -0.158 dB
Peak SAR (extrapolated) = 0.053 W/kg

SAR(1 g) = 0.032 mW/g; SAR(10 g) = 0.018 mW/g
Maximum value of SAR (measured) = 0.043 mW/g

Test Date = 04/10/06
Ambient Temperature = 24.8 degree C.
Liquid Temperature = Before 24.0 degree C. , After 24.0 degree C.



PSP-1001 (Ant : HFS11-SO01, Battery : PSP-110(Sony))/ Body / Front / 2437MHz / 11b(11Mbps) / Separated 10mm

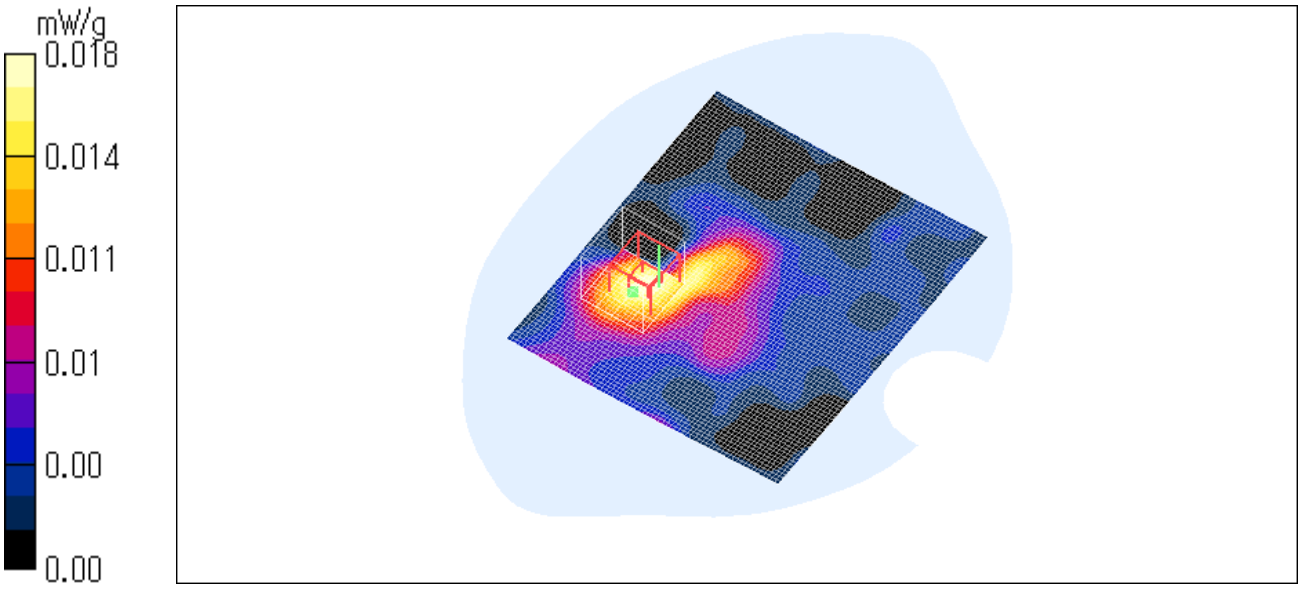
Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(7.72, 7.72, 7.72); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Area Scan (71x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.023 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.21 V/m; Power Drift = -0.201 dB
Peak SAR (extrapolated) = 0.023 W/kg

SAR(1 g) = 0.013 mW/g; SAR(10 g) = 0.0077 mW/g
Maximum value of SAR (measured) = 0.018 mW/g

Test Date = 04/10/06
Ambient Temperature = 24.8 degree C.
Liquid Temperature = Before 23.9 degree C. , After 23.9 degree C.



PSP-1001 (Ant : HFS11-SO01, Battery : PSP-110(Sony))/ Body / Front / 2437MHz / 11b(11Mbps) / Separated 15mm

Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:
Probe: EX3DV3 - SN3507; ConvF(7.72, 7.72, 7.72); Calibrated: 2005/04/12
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn509; Calibrated: 2005/05/26
Phantom: SAM 1196
Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Area Scan (71x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.015 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.01 V/m; Power Drift = -0.212 dB
Peak SAR (extrapolated) = 0.016 W/kg

SAR(1 g) = 0.010 mW/g; SAR(10 g) = 0.00505 mW/g
Maximum value of SAR (measured) = 0.013 mW/g

Test Date = 04/10/06
Ambient Temperature = 24.8 degree C.
Liquid Temperature = Before 23.8 degree C. , After 23.8 degree C.