



SAR TEST REPORT

Test Report No. : 28BE0083-HO-E

Applicant : **Panasonic Communications Co., Ltd.**

Type of Equipment : **Cordless Telephone (Handset)**

Model No. : **KX-TGA431**

FCC ID : **ACJ96NKX-TG4321**

Test standard : **FCC47CFR 2.1093**
FCC OET Bulletin 65, Supplement C

Test Result : **Complied**

Max. SAR Value : **Head 0.429W/kg (5838.185MHz)**
: **Body 0.809W/kg (5798.053MHz)**

1. This test report shall not be reproduced except full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested 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:

October 4 to 9, 2007

Tested by:

Hisayoshi Sato
EMC Services

Approved by :

Hironobu Shimoji
Assistant Manager of EMC Services



NVLAP LAB CODE: 200572-0

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MF060b (18.06.07)

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SECTION 1: Client information

Company Name	Panasonic Communications Co., Ltd.
Brand name	Panasonic
Address	1-62, 4-chome, Minoshima, Hakata-ku, Fukuoka, 812-8531 Japan
Telephone Number	+81-92-477-1405
Facsimile Number	+81-92-477-1487
Contact Person	Kunihiko Nawata

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

2.1 Identification of E.U.T.

Type of Equipment		Cordless Telephone (Handset)
Model No.		KX-TGA431
Serial No.		SAR TEST No.1
Rating		DC 2.4V (Ni-MH Battery AAA x2)
Battery	Model Name	HHR-65AAABU
	Type	Ni-MH Battery AAA
	Rating	DC 1.2V/630mAh
	Manufacture	Panasonic
Option Battery		N/A
Country of Manufacture		China
Condition of EUT		Engineering prototype (Not for sale: This sample is equivalent to mass-produced items.)
Accessories		BeltClip (Bundled item) Typical headset (No bundled item)
Size		W48mm×H156mm×L33mm
Receipt Date of Sample		October 1, 2007
Modification of EUT		No modification by the test lab.
Category Identified		Portable device

2.2 Product Description

Equipment Type	Transceiver
Frequency band	Lower Channel : 5759.700MHz Upper Channel : 5838.185MHz
Bandwidth & Channel spacing	Bandwidth: 79MHz Channel spacing: 892kHz
Type of Modulation	FHSS
Antenna Type	5/8 lambda Pattern-Antenna
Antenna Gain	3dBi (Typ.)
Power Supply (RF Part)	DC3.1V
Method of Frequency Generation	Synthesizer
Operation Clock	Main clock:13.824 MHz
Maximum Output Power (FCC 15.247)	17.32 dBm (53.95mW)

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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**

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3.3 Result of Maximum. SAR value

Maximum. SAR value : Head 0.429W/kg (5838.185MHz)
: Body 0.809W/kg (5798.053MHz)

3.4 Test Location

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SECTION 4 : Operation of E.U.T. during testing

4.1 Confirmation before SAR testing

EMC power was measured for EMC test sample(S/N: RF TEST No.1).
EMC sample was measured antenna terminal power with a power meter connected to the antenna port,
and it was measured radiated power with a spectrum analyzer.

SAR power was measured for SAR test sample(S/N: SAR TEST No.1).
SAR sample was measured radiated power with a spectrum analyzer.

4.2 Correlation between EMC power and SAR power

It was checked that the EIRP was correlated within 0~+5% (FCC requirements)

The test was performed to see the differences in the average power at the two tests.

<EMC power (Sample S/N: RF TEST No.1)>

As for the antenna terminal power and radiated power, the data of EMC test (Test date :October 1)
is shown
as a reference data.

< SAR power (Sample S/N: SAR TEST No.1)>

The test was performed before SAR test. (Test date : October 4, 2007)

The result is shown in section 7.1.

4.3 Confirmation after SAR testing

It was checked that the powerdrift is within $\pm 5\%$ in the evaluation procedure of SAR testing.
The result is shown in APPENDIX 2.

4.4 Operating modes for SAR testing

4.4.1 Setting of EUT

Transmitting

Operating frequency : 5759.700MHz – 5838.185MHz

Channel : Low ch (5759.700MHz), Mid ch (5798.053MHz), High ch (5838.185MHz)

Modulation : FHSS

Crest factor : 5.2

Duty Cycle is 19.22% (On time: 1.922ms (0.961ms x 2slots) / 1cycle:10.0ms)

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4.5 Measurement procedure

Radiated power is always monitored by Spectrum analyzer.

4.5.1 Head SAR 5.8GHz

Step1. The searching for the worst position

Step2. The test for the Low and High channels

This test was performed at the worst conditions of Step1 .

4.5.2 Body SAR 5.8GHz

Step3. The searching for the worst position

Step4. The test for the Low and High channels

This test was performed at the worst conditions of Step3.

Step5. Change distance between EUT and SAM Twin Phantom

The measurement was performed with the distance, 5mm,10mm and 15mm to check if the shortest distance may not have the worst value at the conditions of the highest SAR value.

* Refer to Section 7.2

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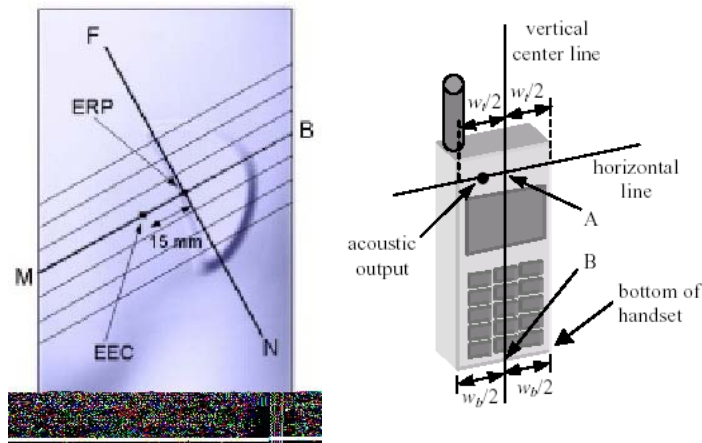
4.6 Description of the head test setup

According to the OET 65, IEEE1528, and IEC62209-1 this EUT was tested on the “Cheek/Touch” and “Ear/Tilt” positions at the left head and right head section of the SAM phantom.

4.6.1 Initial ear position

A handset should be initially positioned with the earpiece region pressed against the ear spacer of a head phantom.

The device should be positioned parallel to the “N-F” line defined along the base of the ear spacer that contains the “ear reference point”. The “test device reference point” is aligned to the “ear reference point” on the head phantom and the “vertical centerline” is aligned to the “phantom reference plane”.

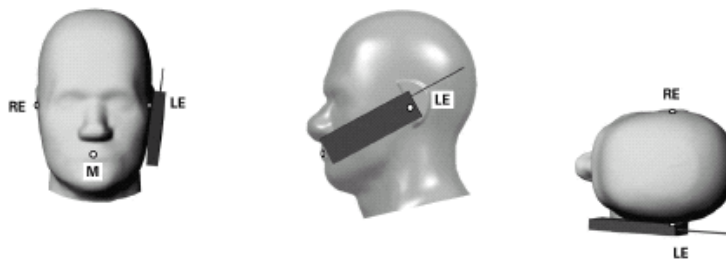


4.6.2 Cheek position

The device is brought toward the mouth of the head phantom by pivoting against the “ear reference point” or along the “N-F” line.

This test position is established:

- When any point on the display, keypad or mouthpiece portions of the handset is in contact with the phantom.
- (or) When any portion of a foldout, sliding or similar keypad cover opened to its intended self-adjusting normal use position is in contact with the cheek or mouth of the phantom.



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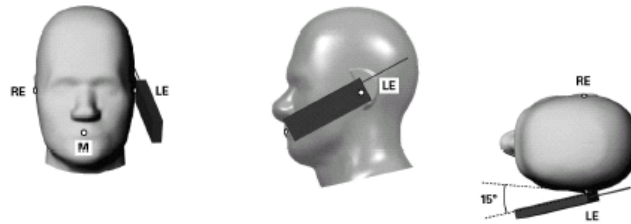
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4.6.3 Tilt position

If the earpiece of the handset is not in full contact with the phantom's ear spacer and the peak SAR location for the "Cheek/Touch" position is located at the ear spacer region or corresponds to the earpiece region of the handset, the device should be returned to the "initial ear position" by rotating it away from the mouth until the earpiece is in full contact with the ear spacer. Otherwise the handset should be moved away from the cheek perpendicular to the line passes through both "ear reference points" for approximate 2-3 cm. While it is in this position, the handset is tilted away from the mouth with respect to the "test device reference point" by 15°. After the tilt, it is then moved back toward the head perpendicular to the line passes through both "ear reference points" until the device touches the phantom or the ear spacer. If the antenna touches the head first, the positioning process should be repeated with a tilt angle less than 15° so that the device and its antenna would touch the phantom simultaneously.



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4.7 Test setup of EUT

When users operate 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) Left cheek:

The test was performed in touch with left cheek position surface to the ear reference point of left head of the SAM twin phantom.

(2) Left tilt:

The test was performed in touch with left tilt position surface to the ear reference point of left head of the SAM twin phantom.

(3) Right cheek:

The test was performed in touch with right cheek position surface to the ear reference point of right head of the SAM twin phantom.

(4) Right tilt:

The test was performed in touch with right tilt position surface to the ear reference point of right head of the SAM twin phantom.

(5) Rear:

The test was performed in touch with rear surface to the SAM twin phantom.

(6) Front:

The test was performed in touch with front surface to the SAM twin phantom.

(7) Left side:

The test was performed in touch with left side surface to the SAM twin phantom.

(8) Right side:

The test was performed in touch with right side surface to the SAM twin phantom.

(9) Top:

The test was performed in touch with top surface to the SAM twin phantom.

(10) Body-worn test setup / Rear (with belt clip)

The tests were performed with the EUT with the belt clip and headset.

The test was performed in touch with belt clip surface to the SAM twin phantom.

(11) Left side (separation 5mm) :

The measurement opened 5mm distance between the EUT and the SAM twin phantom.

(12) Left side (separation 10mm) :

The measurement opened 10mm distance between the EUT and the SAM twin phantom.

(13) Left side (separation 15mm) :

The measurement opened 15mm distance between the EUT and the SAM twin phantom.

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SECTION 5 : Test surrounding

5.1 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 $\pm$ %	Probability distribution	divisor	(ci) 1g	Standard Uncertainty (1g)	vi or v _{eff}
Measurement System						
Probe calibration	± 6.8	Normal	1	1	± 6.8	∞
Axial isotropy of the probe	± 4.7	Rectangular	$\sqrt{3}$	$(1-cp)^{1/2}$	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	$\sqrt{3}$	$(cp)^{1/2}$	± 3.9	∞
Boundary effects	± 2.0	Rectangular	$\sqrt{3}$	1	± 1.2	∞
Probe linearity	± 4.7	Rectangular	$\sqrt{3}$	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	$\sqrt{3}$	1	± 0.6	∞
Readout electronics	± 0.3	Normal	1	1	± 0.3	∞
Response time	± 0.8	Rectangular	$\sqrt{3}$	1	± 0.5	∞
Integration time	± 2.6	Rectangular	$\sqrt{3}$	1	± 1.5	∞
RF ambient Noise	± 3.0	Rectangular	$\sqrt{3}$	1	± 1.7	∞
RF ambient Reflections	± 3.0	Rectangular	$\sqrt{3}$	1	± 1.7	∞
Probe Positioner	± 0.8	Rectangular	$\sqrt{3}$	1	± 0.5	∞
Probe positioning	± 9.9	Rectangular	$\sqrt{3}$	1	± 5.7	∞
Max.SAR Eval.	± 4.0	Rectangular	$\sqrt{3}$	1	± 2.3	∞
Test Sample Related						
Device positioning	± 2.9	Normal	1	1	± 2.9	30
Device holder uncertainty	± 3.6	Normal	1	1	± 3.6	12
Power drift	± 5.0	Rectangular	$\sqrt{3}$	1	± 5.8	∞
Phantom and Setup						
Phantom uncertainty	± 4.0	Rectangular	$\sqrt{3}$	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	$\sqrt{3}$	0.64	± 1.8	∞
Liquid conductivity (meas.)	± 5.0	Rectangular	1	0.64	± 3.2	∞
Liquid permittivity (target)	± 10.0	Rectangular	$\sqrt{3}$	0.6	± 3.5	∞
Liquid permittivity (meas.)	± 10.0	Rectangular	1	0.6	± 6.0	∞
Combined Standard Uncertainty					± 14.787	
Expanded Uncertainty (k=2)					± 29.57	

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SECTION 6 : Confirmation before SAR testing

6.1 EMC power

This data is reference data of EMC test. (Refer to EMC report (28BE0083-HO-A))

FCC15.247 Maximum Output Peak Power

Test date: October 1, 2007

Ant 1

Ch	Freq.	P/M (PK) Reading	Atten.+ Cable	Result	
	[MHz]	[dBm]	[dB]	[dBm]	[mW]
Low	5759.700	-2.56	19.68	17.12	51.52
Mid	5798.053	-2.52	19.68	17.16	52.00
High	5838.185	-2.52	19.68	17.16	52.00

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

* In the above table, factor 0.0dB represents no use of Atten. and/or Filter.

Ant 2

Ch	Freq.	P/M (PK) Reading	Atten.+ Cable	Result	
	[MHz]	[dBm]	[dB]	[dBm]	[mW]
Low	5759.700	-2.71	19.68	16.97	49.77
Mid	5798.053	-2.51	19.68	17.17	52.12
High	5838.185	-2.36	19.68	17.32	53.95

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

* In the above table, factor 0.0dB represents no use of Atten. and/or Filter.

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6.2 Correlation of EMC power and SAR power

6.2.1 EIRP measurement

1) Measurement method

EUT was placed on a platform of nominal size, 0.5m by 1.0m, raised 1.5m above the conducting ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The Radiated Electric Field Strength intensity has been measured in semi anechoic chamber with absorbent materials lined (Type VHP 12) on a ground plane and at a distance of 3m.

The measuring antenna height was varied between 1 to 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for both vertical and horizontal antenna polarization.

2) Spectrum analyzer setting

Function of spectrum analyzer	: None
Center frequency	: equal to the signal source
Resolution BW	: 1MHz
Video BW	: 1MHz
Detector mode	: Peak
Trace	: Max hold

3) Calculation of result

E-field [dBμV/m] = Reading (S/A) + Factor (Measurement equipment)

E-field [dBμV/m] was converted into E[V/m]

EIRP[dBm] = $10\log\left(\frac{E^2}{30G}\right) + 10^3$; d= 3[m], G =1

6.2.2 Result of EIRP measurement on EMC test (Refer to EMC report (28BE0083-HO-A))

Test date: October 3, 2007

Antenna gain : 3.00dBi

Max.EIRP power of antenna port : 20.32dBm

Max.EIRP power of radiation : 20.37dBm

Testing method	Power [dBm] Measurement	Antenna Gain	EIRP [dBm]
Antenna port (S/N: RF TEST No.1) *	17.32	3.00	20.32
Radiation (S/N: Air 001)	-	-	20.37

6.2.3 Result of EIRP measurement on SAR test

Test date: October 4, 2007

Antenna gain : 3.00dBi

Max.EIRP power of antenna port : 20.32dBm

Max.EIRP power of radiation : 20.47dBm

Testing method	Power [dBm] Measurement	Antenna Gain	EIRP [dBm]
Antenna port (S/N: RF TEST No.1) *	17.32	3.00	20.32
Radiation (S/N: SAR TEST No.1)	-	-	20.47

* FCC15.247 Maximum Output Peak Power

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6.3 SAR power

Ant.1

Testing method	EIRP [dBm]
Lch (5759.700MHz)	20.17
Mch (5798.053MHz)	20.27
Hch (5838.185MHz)	20.27

Ant.2

Testing method	EIRP [dBm]
Lch (5759.700MHz)	20.07
Mch (5798.053MHz)	20.37
Hch (5838.185MHz)	20.47

SECTION 7 : Measurement results

7.1 Head SAR 5.8GHz

Date : October 4, 2007 Measured By : Hisayoshi Sato
Liquid Depth (cm) : 15.0 Model : KX-TGA431
Parameters : $\epsilon_r = 33.2$, $\sigma = 5.32$ Serial No. : SAR Test No.1
Ambient temperature (deg.c.) : 24.5 Modulation : FHSS
Relative Humidity (%) : 58 Crest factor : 5.2

Ant. 1

Annex 1

Head SAR MEASUREMENT RESULTS										
Frequency			Modulation	Phantom Section	EUT Set-up Conditions			Liquid Temp.[deg.c]		SAR(1g) [W/kg]
Mode	Channel	[MHz]			Antenna	Position	Separation [mm]	Before	After	Maximum value of multi-peak
Transmitting	Step 1. The searching for the worst modulation									
	44	5798.053	FHSS	Left	Ant. 1	Left cheek	0	24.1	24.1	0.199
	44	5798.053	FHSS	Left	Ant. 1	Left tilt	0	24.1	24.1	0.287
	44	5798.053	FHSS	Right	Ant. 1	Right cheek	0	24.1	24.1	0.221
	44	5798.053	FHSS	Right	Ant. 1	Right tilt	0	24.0	24.0	0.28
	Step 4. The changing to the Low and High channels									
	1	5759.700	FHSS	Left	Ant. 1	Left tilt	0	24.0	24.0	0.297
	89	5838.185	FHSS	Left	Ant. 1	Left tilt	0	24.0	24.0	0.296

Ant. 2

Ann. 2

Head SAR MEASUREMENT RESULTS										
Frequency			Modulation	Phantom Section	EUT Set-up Conditions			Liquid Temp.[deg.c]		SAR(1g) [W/kg]
Mode	Channel	[MHz]			Antenna	Position	Separation [mm]	Before	After	Maximum value of multi-peak
Transmitting	Step 1. The searching for the worst modulation									
	44	5798.053	FHSS	Left	Ant. 2	Left cheek	0	24.0	24.0	0.297
	44	5798.053	FHSS	Left	Ant. 2	Left tilt	0	24.0	24.0	0.230
	44	5798.053	FHSS	Right	Ant. 2	Right cheek	0	23.8	23.8	0.219
	44	5798.053	FHSS	Right	Ant. 2	Right tilt	0	23.8	23.8	0.153
	Step 4. The changing to the Low and High channels									
	1	5759.700	FHSS	Left	Ant. 2	Left cheek	0	23.8	23.8	0.330
	89	5838.185	FHSS	Left	Ant. 2	Left cheek	0	23.8	23.8	0.429

7.2 Body SAR 5.8GHz

Date : October 5, 2007 Measured By : Hisayoshi Sato
Liquid Depth (cm) : 15.0 Model : KX-TGA431
Parameters : $\epsilon_r = 43.5$, $\sigma = 6.07$ Serial No. : SAR Test No.1
Ambient temperature (deg.c.) : 24.5 Modulation : FHSS
Relative Humidity (%) : 57 Crest factor : 5.2

Ant. 1

BODY SAR MEASUREMENT RESULTS										
Frequency			Modulation	Phantom Section	EUT Set-up Conditions			Liquid Temp.[deg.c]		SAR(1g) [W/kg]
Mode	Channel	[MHz]			Antenna	Position	Separation [mm]	Before	After	Maximum value of multi-peak
Transmitting	Step 1. The searching for the worst position									
	44	5798.053	FHSS	Flat	Ant. 1	Rear	0	24.0	24.0	0.610
	44	5798.053	FHSS	Flat	Ant. 1	Front	0	23.9	23.9	0.227
	44	5798.053	FHSS	Flat	Ant. 1	Left side	0	23.9	23.9	0.062
	44	5798.053	FHSS	Flat	Ant. 1	Right side	0	24.0	24.0	0.122
	44	5798.053	FHSS	Flat	Ant. 1	Top	0	24.0	24.0	0.525
	44	5798.053	FHSS	Flat	Ant. 1	Rear (with belt	0	24.0	24.0	0.425
	Step 4. The test for the Low and High channels									
	1	5759.700	FHSS	Flat	Ant. 1	Rear	0	24.0	24.0	0.664
	89	5838.185	FHSS	Flat	Ant. 1	Rear	0	24.0	24.0	0.733

Date : October 9, 2007 Measured By : Hisayoshi Sato
Liquid Depth (cm) : 15.0 Model : KX-TGA431
Parameters : $\epsilon_r = 43.5$, $\sigma = 6.05$ Serial No. : SAR Test No.1
Ambient temperature (deg.c.) : 24.5 Modulation : FHSS
Relative Humidity (%) : 57 Crest factor : 5.2

Ant. 2

BODY SAR MEASUREMENT RESULTS										
Frequency			Modulation	Phantom Section	EUT Set-up Conditions			Liquid Temp.[deg.c]		SAR(1g) [W/kg]
Mode	Channel	[MHz]			Antenna	Position	Separation [mm]	Before	After	Maximum value of multi-peak
Transmitting	Step 1. The searching for the worst position									
	44	5798.053	FHSS	Flat	Ant. 2	Rear	0	24.0	24.0	0.306
	44	5798.053	FHSS	Flat	Ant. 2	Front	0	24.0	24.0	0.327
	44	5798.053	FHSS	Flat	Ant. 2	Left side	0	24.1	24.1	0.809
	44	5798.053	FHSS	Flat	Ant. 2	Right side	0	24.0	24.0	0.041
	44	5798.053	FHSS	Flat	Ant. 2	Top	0	24.0	24.0	0.073
	44	5798.053	FHSS	Flat	Ant. 2	Rear (with belt	0	24.0	24.0	0.173
	Step 2. The test for the Low and High channels									
	1	5759.700	FHSS	Flat	Ant. 2	Left side	0	24.0	24.0	0.794
	89	5838.185	FHSS	Flat	Ant. 2	Left side	0	24.0	24.0	0.787
	Step 3. Separation change									
	44	5798.053	FHSS	Flat	Ant. 2	Left side	5	24.0	24.0	0.42
	44	5798.053	FHSS	Flat	Ant. 2	Left side	10	24.0	24.0	0.374
	44	5798.053	FHSS	Flat	Ant. 2	Left side	15	24.0	24.0	0.176

APPENDIX 1 : Photographs of test setup

1. Photograph of EUT

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2. Antenna position

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3. EUT with accessories (Body-worn setup)

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4. Photograph of set up

(1) Left cheek

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(2) Left tilt

This page has been submitted in a separate sheet.

(3)Right cheek

This page has been submitted in a separate sheet.

(4) Right tilt

This page has been submitted in a separate sheet.

(5) Rear

This page has been submitted in a separate sheet.

(6) Front

This page has been submitted in a separate sheet.

(7) Left side

This page has been submitted in a separate sheet.

(8) Right side

This page has been submitted in a separate sheet.

(9) Top

This page has been submitted in a separate sheet.

(10) Body-worn set up / Rear (with belt clip)

This page has been submitted in a separate sheet.

(11) Left side / Separation 5mm

This page has been submitted in a separate sheet.

(11) Left side / Separation 10mm

This page has been submitted in a separate sheet.

(11) Left side / Separation 15mm

This page has been submitted in a separate sheet.

APPENDIX 2 : 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 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 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 15 mm x 15 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 25mm was assessed by measuring 8 x 8 x 10 points. And for any secondary peaks found in the Step2 which are within 2dB of maximum peak (level more than ambient noise (≥ 0.012 W/kg)) 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 (Head SAR 5.8GHz)

KX-TGA431/ Head/ Left cheek/ Ant.1/ 5798.053MHz

Crest factor: 5.2

Medium: HSL 5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 5.32$ mho/m; $\epsilon_r = 34.2$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.8, 4.8, 4.8); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x61x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.354 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 4.66 V/m; Power Drift = 0.101 dB

Peak SAR (extrapolated) = 0.705 W/kg

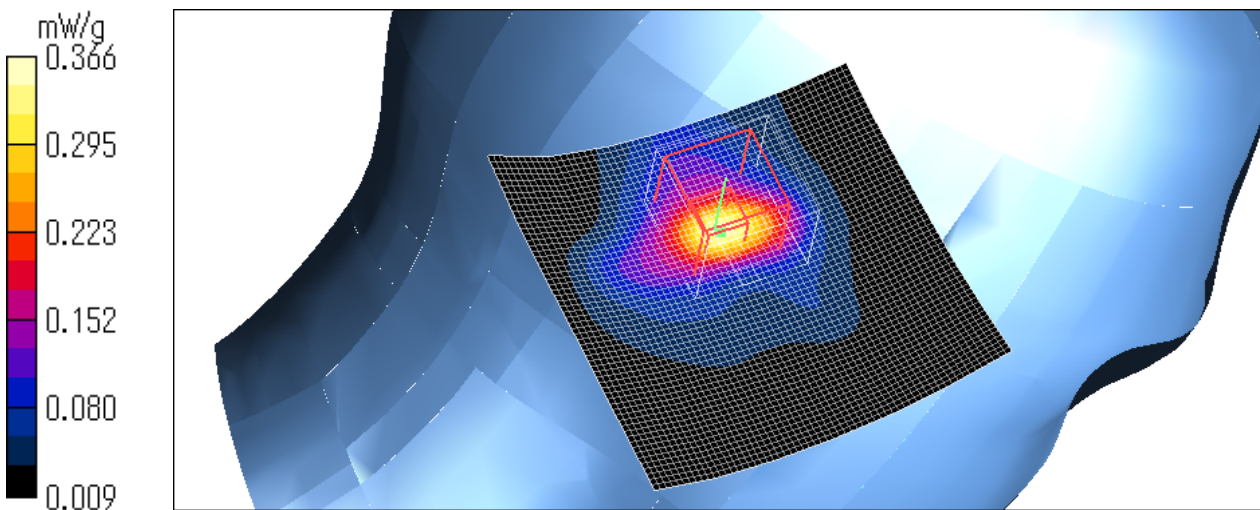
SAR(1 g) = 0.199 mW/g; SAR(10 g) = 0.083 mW/g

Maximum value of SAR (measured) = 0.366 mW/g

Test Date = 10/04/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.1 degree.C , After 24.1 degree.C



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KX-TGA431/ Head/ Left tilt/ Ant.1/ 5798.053MHz

Crest factor: 5.2

Medium: HSL 5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 5.32$ mho/m; $\epsilon_r = 34.2$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.8, 4.8, 4.8); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x61x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.521 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 6.77 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 1.01 W/kg

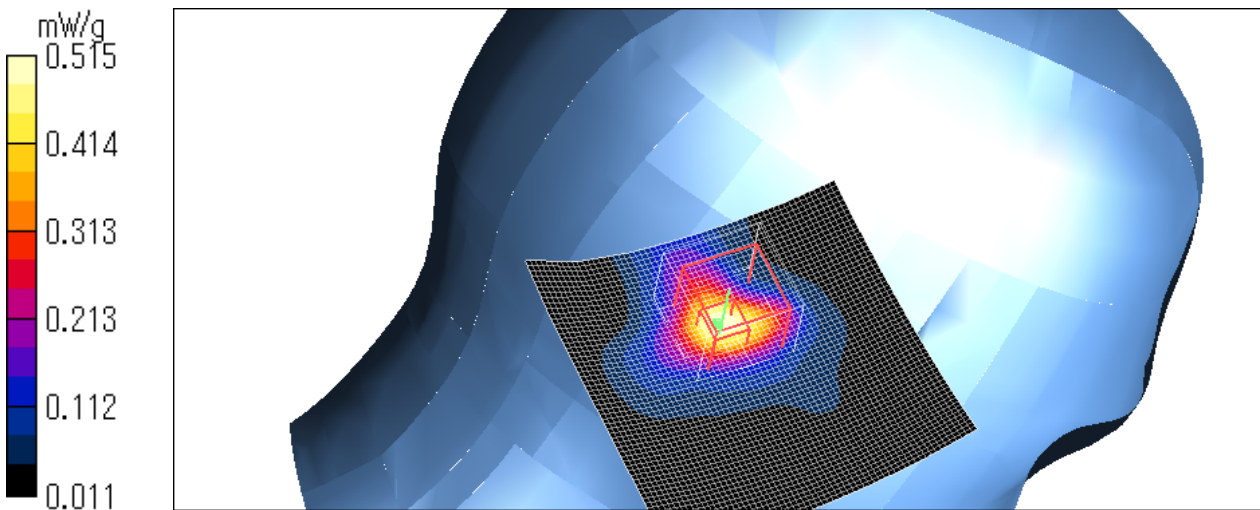
SAR(1 g) = 0.287 mW/g; SAR(10 g) = 0.109 mW/g

Maximum value of SAR (measured) = 0.515 mW/g

Test Date = 10/04/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.1 degree.C , After 24.1 degree.C



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KX-TGA431/ Head/ Right cheek/ Ant.1/ 5798.053MHz

Crest factor: 5.2

Medium: HSL 5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 5.32$ mho/m; $\epsilon_r = 34.2$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.8, 4.8, 4.8); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x61x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.357 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 5.92 V/m; Power Drift = 0.070 dB

Peak SAR (extrapolated) = 0.768 W/kg

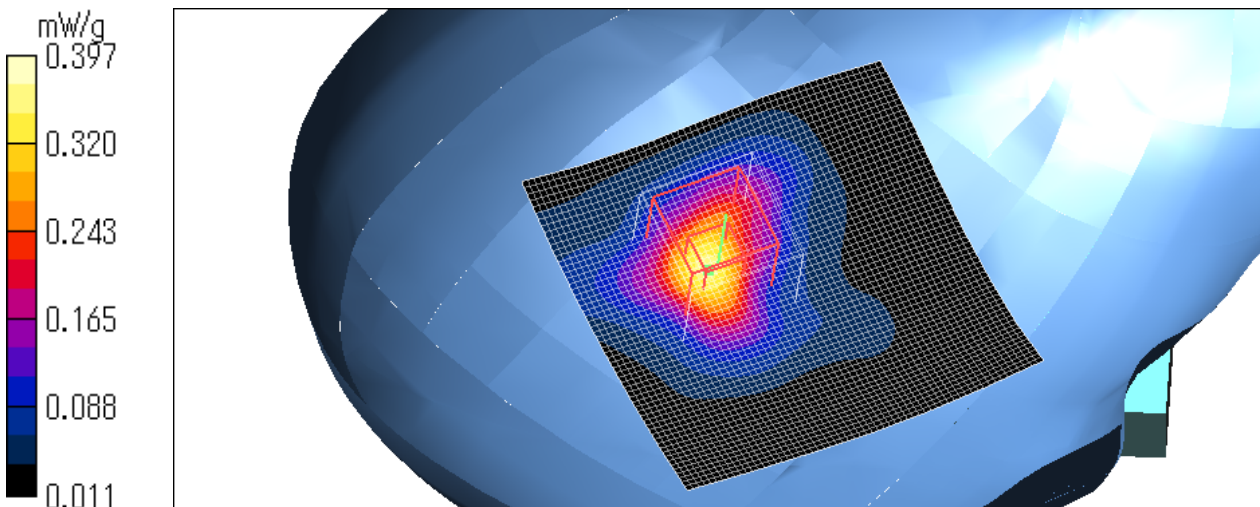
SAR(1 g) = 0.221 mW/g; SAR(10 g) = 0.090 mW/g

Maximum value of SAR (measured) = 0.397 mW/g

Test Date = 10/04/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.1 degree.C , After 24.1 degree.C



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KX-TGA431/ Head/ Right tilt/ Ant.1/ 5798.053MHz

Crest factor: 5.2

Medium: HSL 5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 5.32$ mho/m; $\epsilon_r = 34.2$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.8, 4.8, 4.8); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x61x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.472 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 6.45 V/m; Power Drift = -0.140 dB

Peak SAR (extrapolated) = 0.944 W/kg

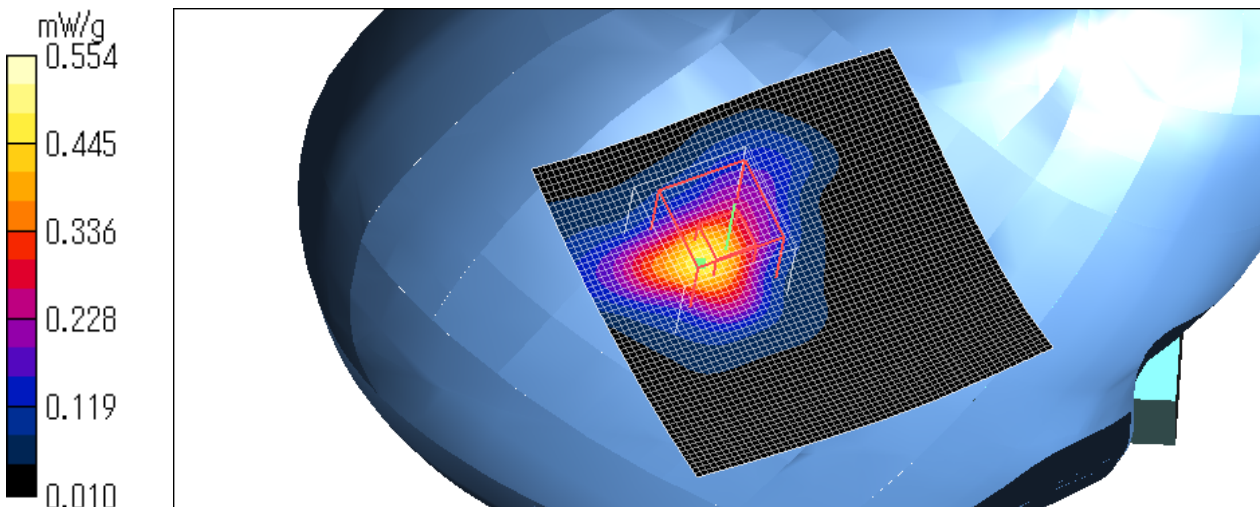
SAR(1 g) = 0.280 mW/g; SAR(10 g) = 0.110 mW/g

Maximum value of SAR (measured) = 0.554 mW/g

Test Date = 10/04/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Head/ Left tilt/ Ant.1/ 5759.700MHz

Crest factor: 5.2

Medium: HSL 5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 5.32$ mho/m; $\epsilon_r = 34.2$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.8, 4.8, 4.8); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x61x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.575 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 8.28 V/m; Power Drift = -0.060 dB

Peak SAR (extrapolated) = 1.05 W/kg

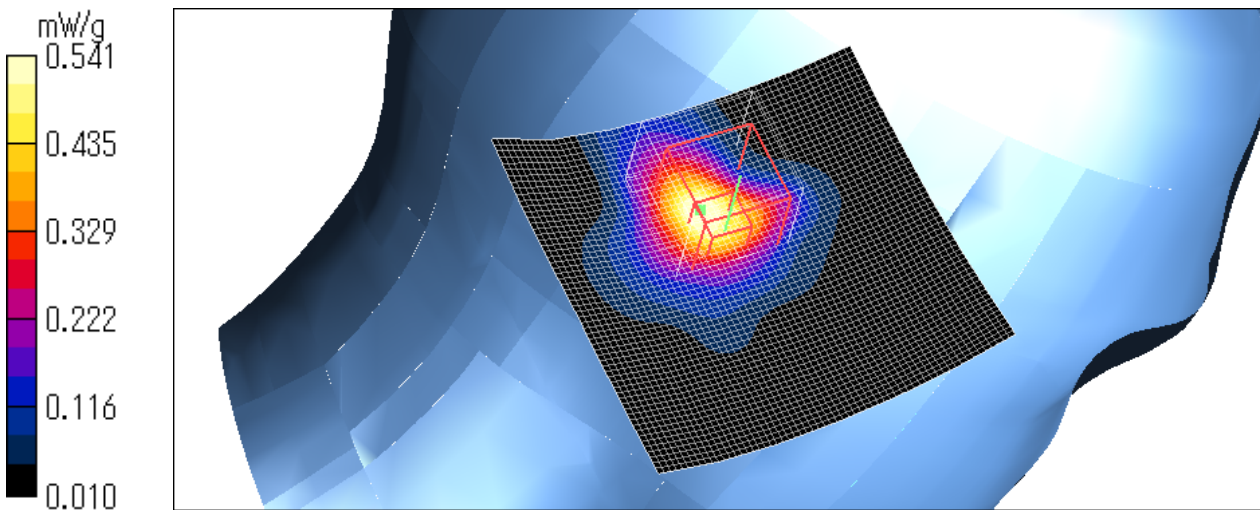
SAR(1 g) = 0.297 mW/g; SAR(10 g) = 0.119 mW/g

Maximum value of SAR (measured) = 0.541 mW/g

Test Date = 10/04/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Head/ Left tilt/ Ant.1/ 5838.185MHz

Crest factor: 5.2

Medium: HSL 5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 5.32$ mho/m; $\epsilon_r = 34.2$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.8, 4.8, 4.8); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x61x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.615 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 7.48 V/m; Power Drift = -0.057 dB

Peak SAR (extrapolated) = 1.05 W/kg

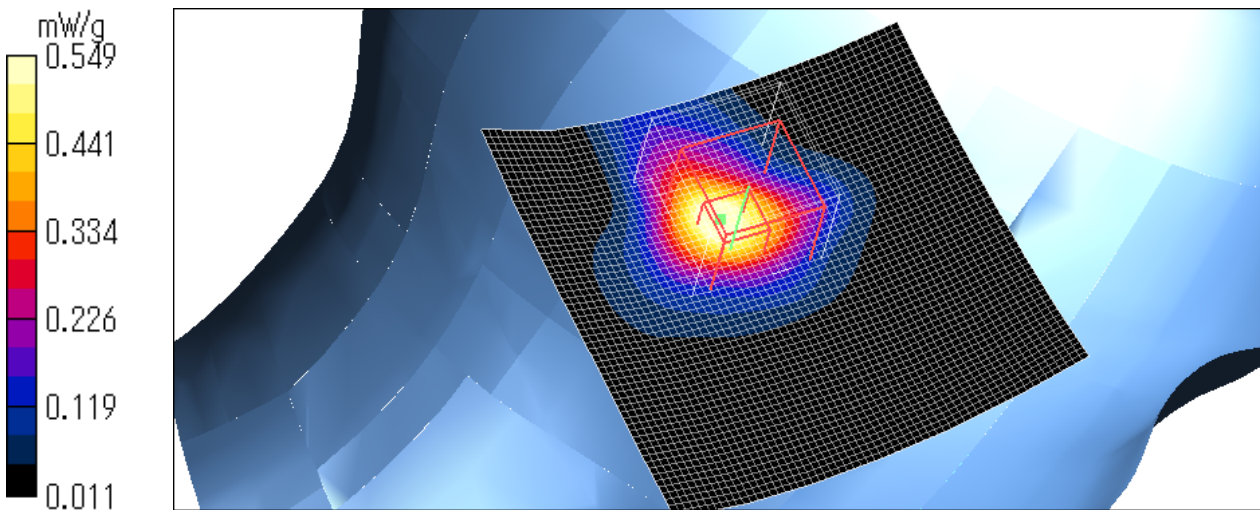
SAR(1 g) = 0.296 mW/g; SAR(10 g) = 0.115 mW/g

Maximum value of SAR (measured) = 0.549 mW/g

Test Date = 10/04/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Head/ Left cheek/ Ant.2/ 5798.053MHz

Crest factor: 5.2

Medium: HSL 5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 5.32$ mho/m; $\epsilon_r = 34.2$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.8, 4.8, 4.8); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x61x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.494 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 2.43 V/m; Power Drift = -0.173 dB

Peak SAR (extrapolated) = 1.13 W/kg

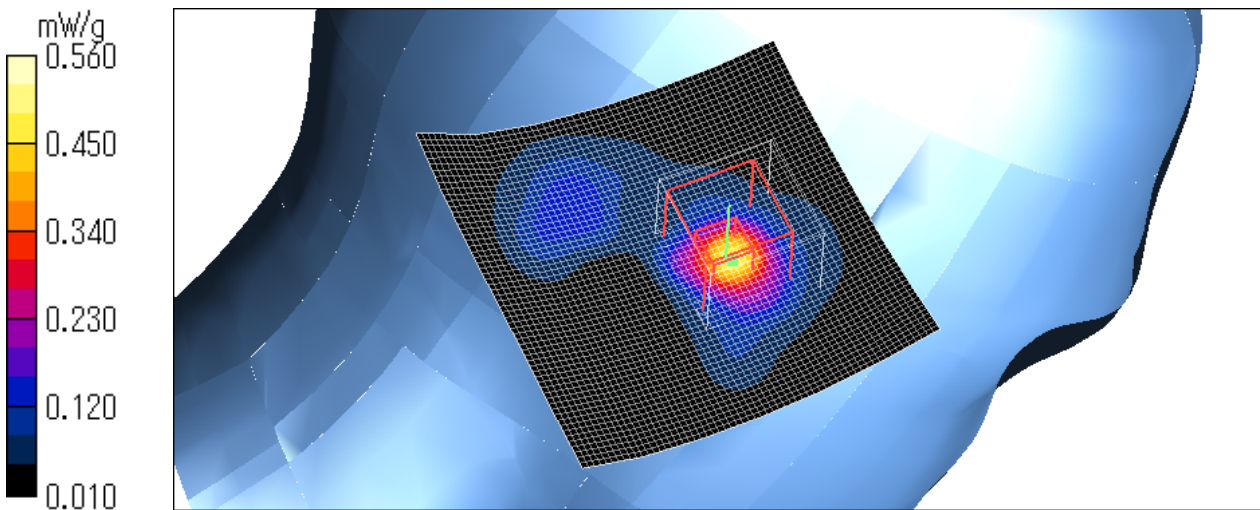
SAR(1 g) = 0.297 mW/g; SAR(10 g) = 0.104 mW/g

Maximum value of SAR (measured) = 0.560 mW/g

Test Date = 10/04/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Head/ Left tilt/ Ant.2/ 5798.053MHz

Crest factor: 5.2

Medium: HSL 5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 5.32$ mho/m; $\epsilon_r = 34.2$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.8, 4.8, 4.8); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x61x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.375 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 2.15 V/m; Power Drift = 0.003 dB

Peak SAR (extrapolated) = 0.874 W/kg

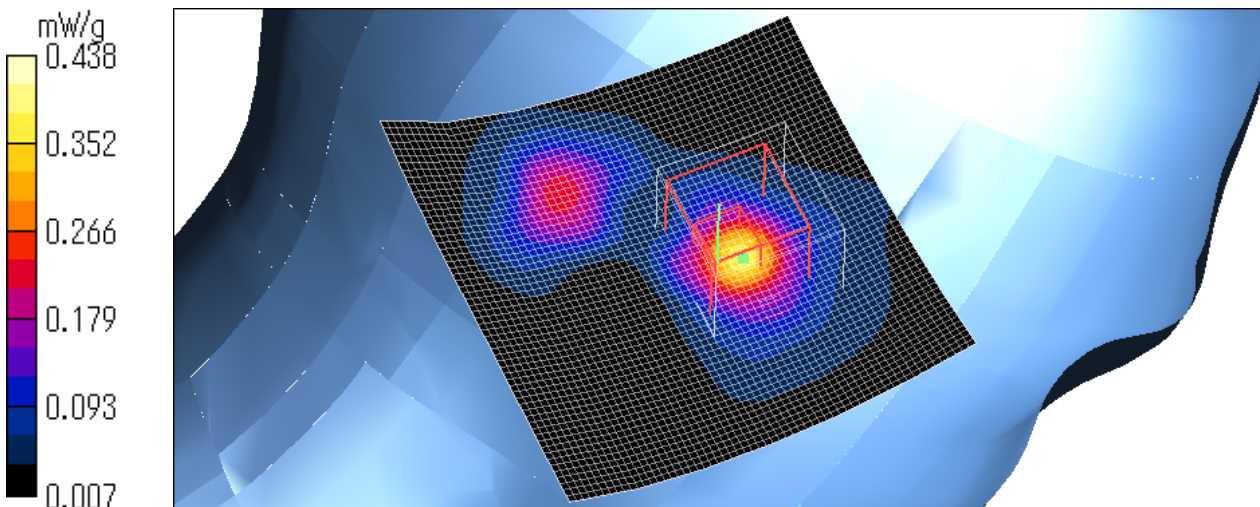
SAR(1 g) = 0.230 mW/g; SAR(10 g) = 0.086 mW/g

Maximum value of SAR (measured) = 0.438 mW/g

Test Date = 10/04/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Head/ Right cheek/ Ant.2/ 5798.053MHz

Crest factor: 5.2

Medium: HSL 5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 5.32$ mho/m; $\epsilon_r = 34.2$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.8, 4.8, 4.8); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x61x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.570 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 2.50 V/m; Power Drift = -0.164 dB

Peak SAR (extrapolated) = 0.771 W/kg

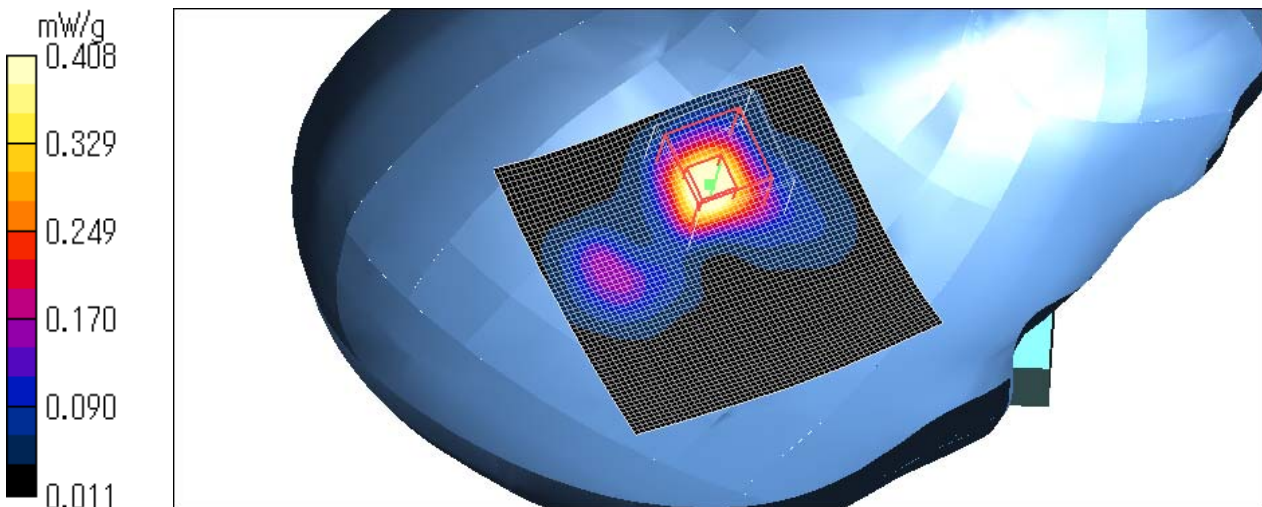
SAR(1 g) = 0.219 mW/g; SAR(10 g) = 0.090 mW/g

Maximum value of SAR (measured) = 0.408 mW/g

Test Date = 10/04/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 23.8 degree.C , After 23.8 degree.C



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KX-TGA431/ Head/ Right tilt/ Ant.2/ 5798.053MHz

Crest factor: 5.2

Medium: HSL 5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 5.32$ mho/m; $\epsilon_r = 34.2$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.8, 4.8, 4.8); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x61x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.287 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 2.59 V/m; Power Drift = -0.177 dB

Peak SAR (extrapolated) = 0.574 W/kg

SAR(1 g) = 0.153 mW/g; SAR(10 g) = 0.067 mW/g

Maximum value of SAR (measured) = 0.281 mW/g

Zoom Scan (8x8x10)/Cube 1: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 2.59 V/m; Power Drift = -0.177 dB

Peak SAR (extrapolated) = 0.086 W/kg

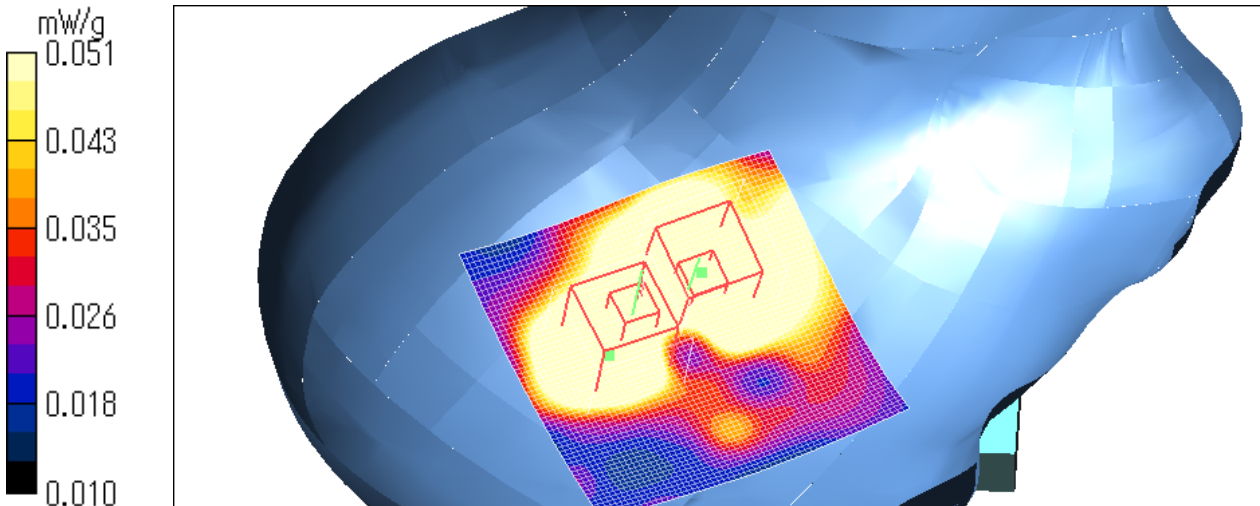
SAR(1 g) = 0.020 mW/g; SAR(10 g) = 0.015 mW/g

Maximum value of SAR (measured) = 0.051 mW/g

Test Date = 10/04/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 23.8 degree.C , After 23.8 degree.C



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KX-TGA431/ Head/ Left cheek/ Ant.2/ 5759.700MHz

Crest factor: 5.2

Medium: HSL 5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 5.32$ mho/m; $\epsilon_r = 34.2$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.8, 4.8, 4.8); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x61x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.520 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 3.78 V/m; Power Drift = -0.182 dB

Peak SAR (extrapolated) = 1.29 W/kg

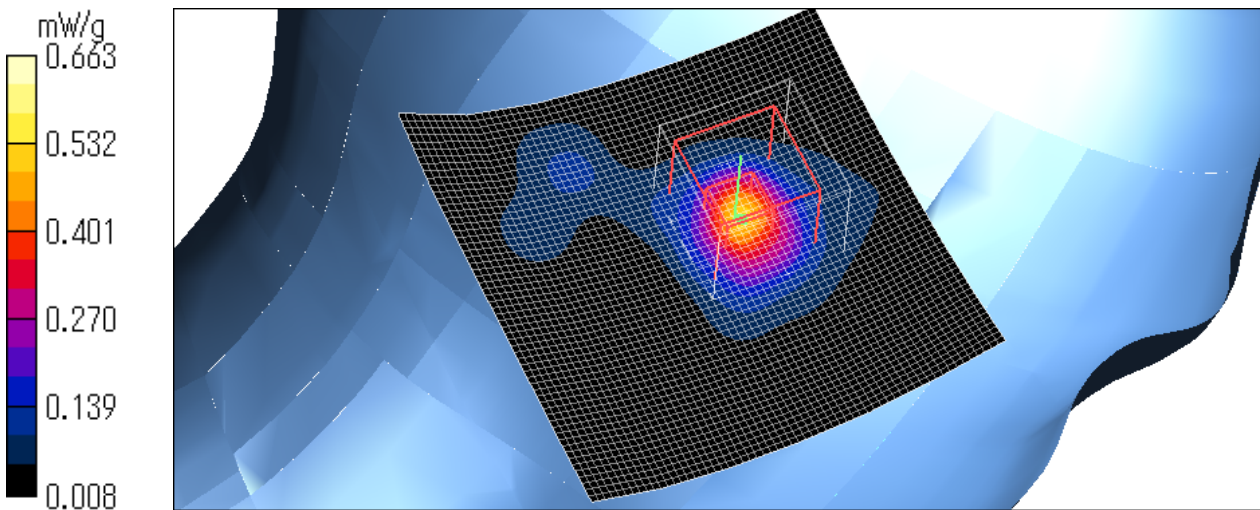
SAR(1 g) = 0.330 mW/g; SAR(10 g) = 0.109 mW/g

Maximum value of SAR (measured) = 0.663 mW/g

Test Date = 10/04/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 23.8 degree.C , After 23.8 degree.C



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KX-TGA431/ Head/ Left cheek/ Ant.2/ 5838.185MHz

Crest factor: 5.2

Medium: HSL 5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 5.32$ mho/m; $\epsilon_r = 34.2$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.8, 4.8, 4.8); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x61x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.783 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 5.66 V/m; Power Drift = -0.112 dB

Peak SAR (extrapolated) = 1.68 W/kg

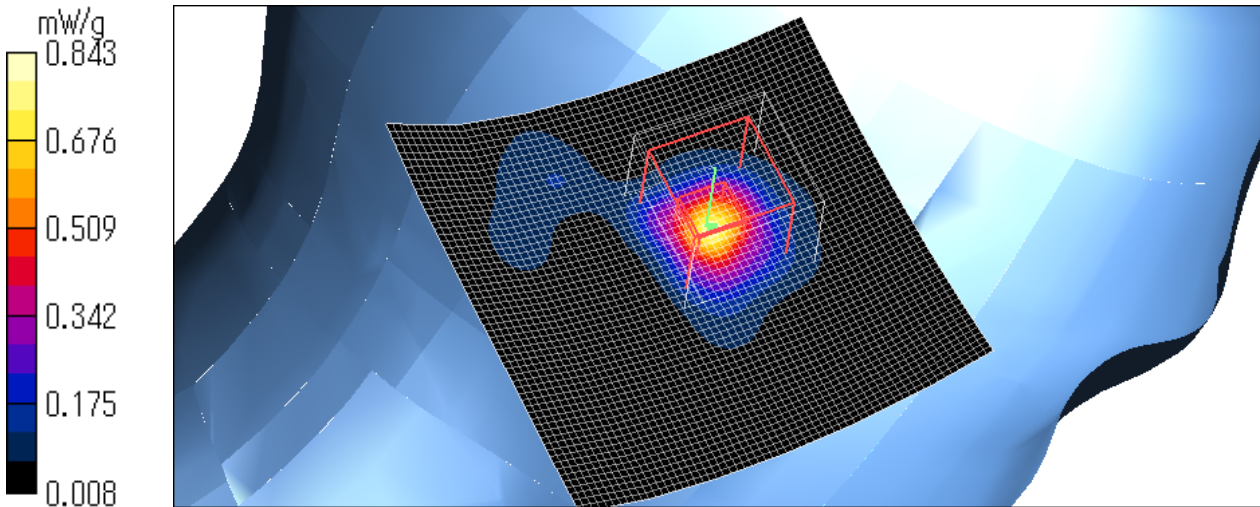
SAR(1 g) = 0.429 mW/g; SAR(10 g) = 0.140 mW/g

Maximum value of SAR (measured) = 0.843 mW/g

Test Date = 10/04/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 23.8 degree.C , After 23.8 degree.C



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Z-axis scan at max SAR location

KX-TGA431/ Head/ Left cheek/ Ant.2/ 5838.185MHz

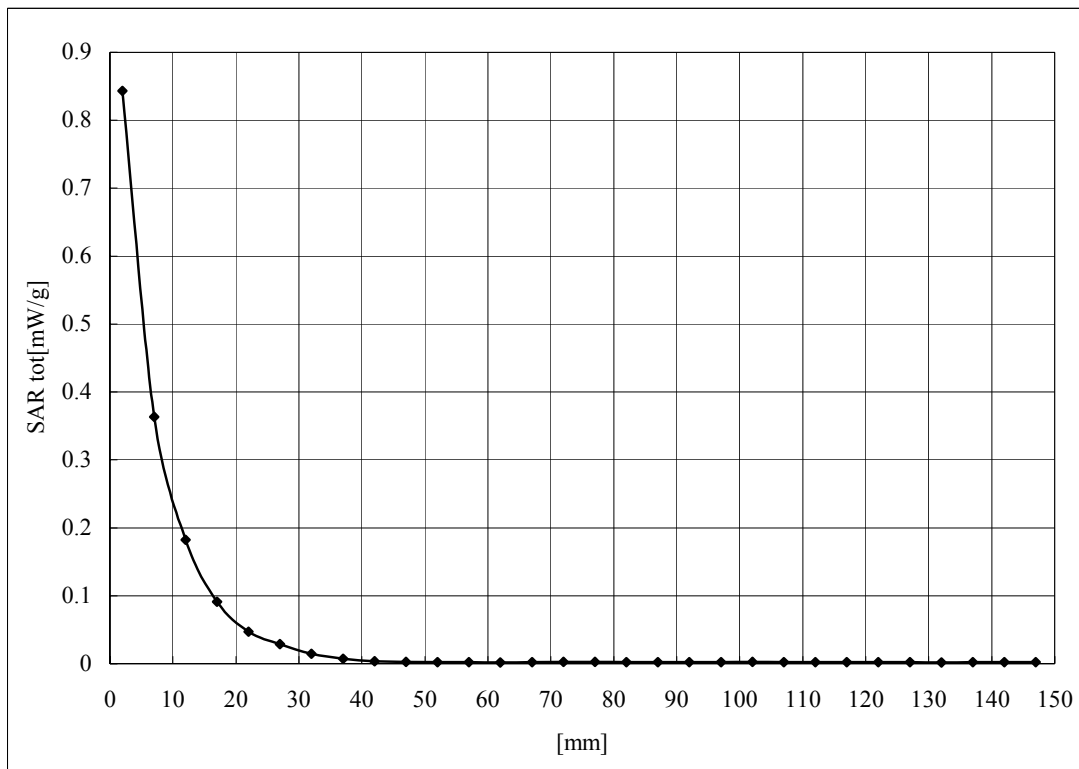
Crest factor: 5.2

Medium: HSL 5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 5.32$ mho/m; $\epsilon_r = 34.2$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.8, 4.8, 4.8); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160



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3. Measurement data (Body SAR 5.8GHz)

KX-TGA431/ Body/ Rear/ Ant.1/ 5798.053MHz

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.07$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15

- Sensor-Surface: 2mm (Mechanical Surface Detection)

- Phantom: SAM 1196

- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x81x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 1.45 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 13.4 V/m; Power Drift = -0.185 dB

Peak SAR (extrapolated) = 2.45 W/kg

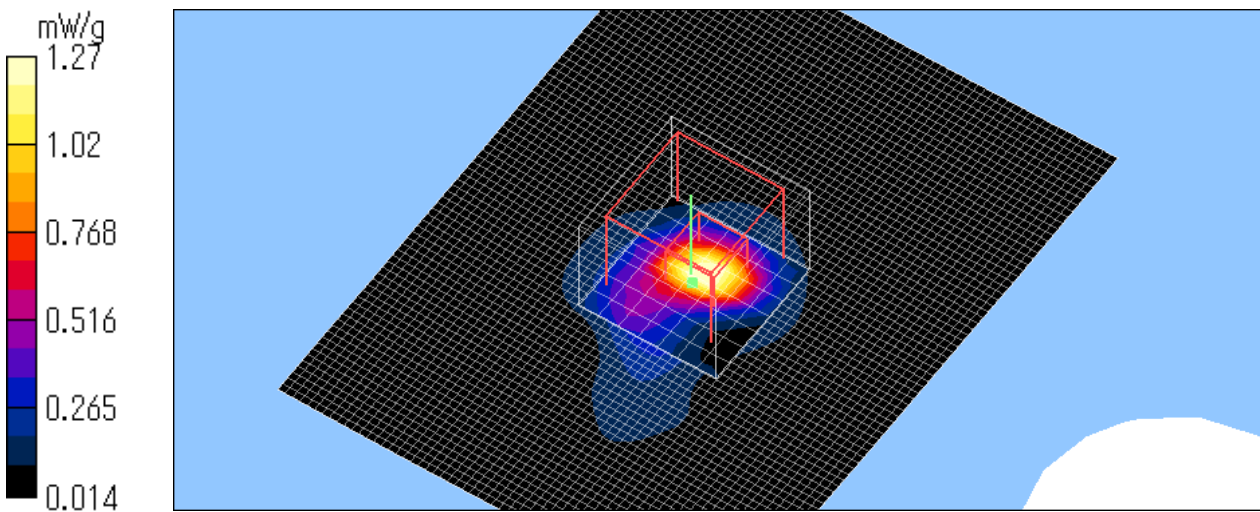
SAR(1 g) = 0.610 mW/g; SAR(10 g) = 0.170 mW/g

Maximum value of SAR (measured) = 1.27 mW/g

Test Date = 10/05/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Body/ Front/ Ant.1/ 5798.053MHz

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.07$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x81x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.594 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 7.26 V/m; Power Drift = 0.089 dB

Peak SAR (extrapolated) = 0.951 W/kg

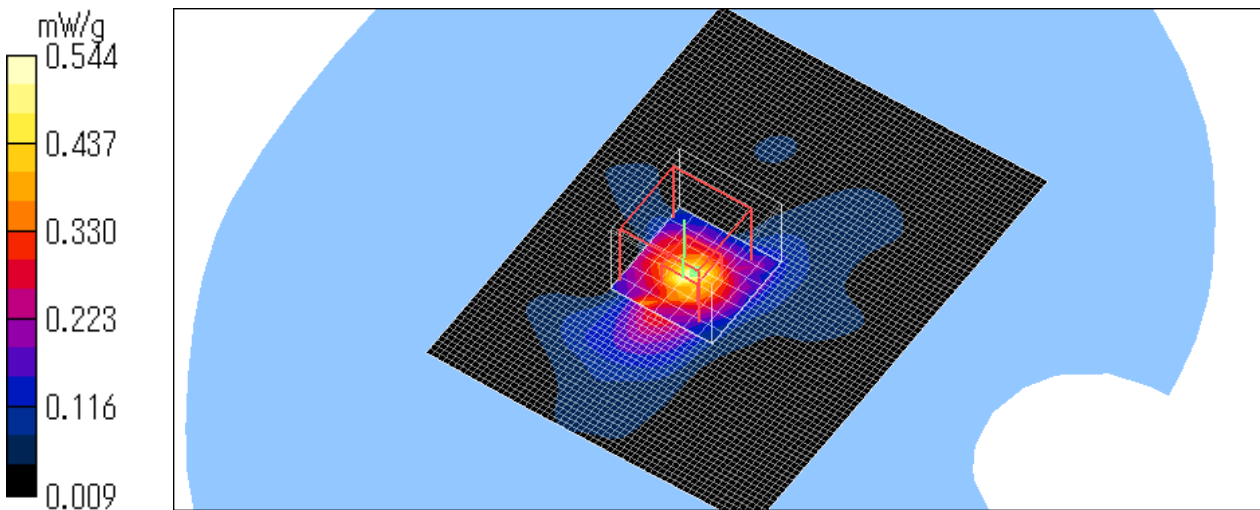
SAR(1 g) = 0.227 mW/g; SAR(10 g) = 0.083 mW/g

Maximum value of SAR (measured) = 0.544 mW/g

Test Date = 10/05/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 23.9 degree.C , After 23.9 degree.C



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KX-TGA431/ Body/ Rear/ Ant.1/ 5798.053MHz

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.07$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.147 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 4.82 V/m; Power Drift = -0.201 dB

Peak SAR (extrapolated) = 0.495 W/kg

SAR(1 g) = 0.062 mW/g; SAR(10 g) = 0.030 mW/g

Maximum value of SAR (measured) = 0.204 mW/g

Zoom Scan (8x8x10)/Cube 1: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 4.82 V/m; Power Drift = -0.201 dB

Peak SAR (extrapolated) = 0.418 W/kg

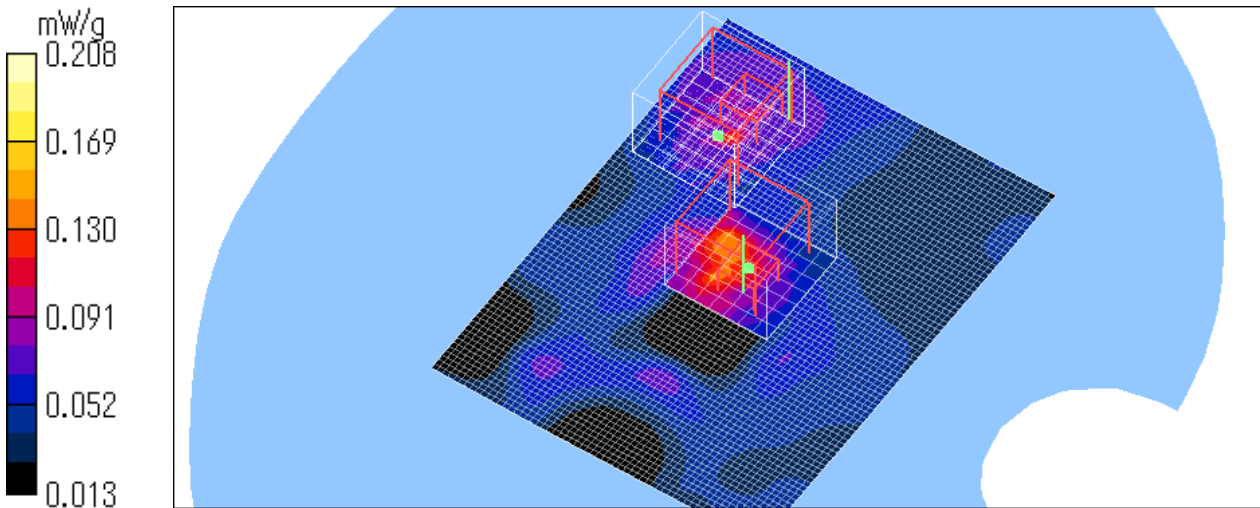
SAR(1 g) = 0.056 mW/g; SAR(10 g) = 0.029 mW/g

Maximum value of SAR (measured) = 0.208 mW/g

Test Date = 10/05/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 23.9 degree.C , After 23.9 degree.C



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KX-TGA431/ Body/ Right/ Ant.1/ 5798.053MHz

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.07$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x81x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.304 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 3.68 V/m; Power Drift = -0.110 dB

Peak SAR (extrapolated) = 0.849 W/kg

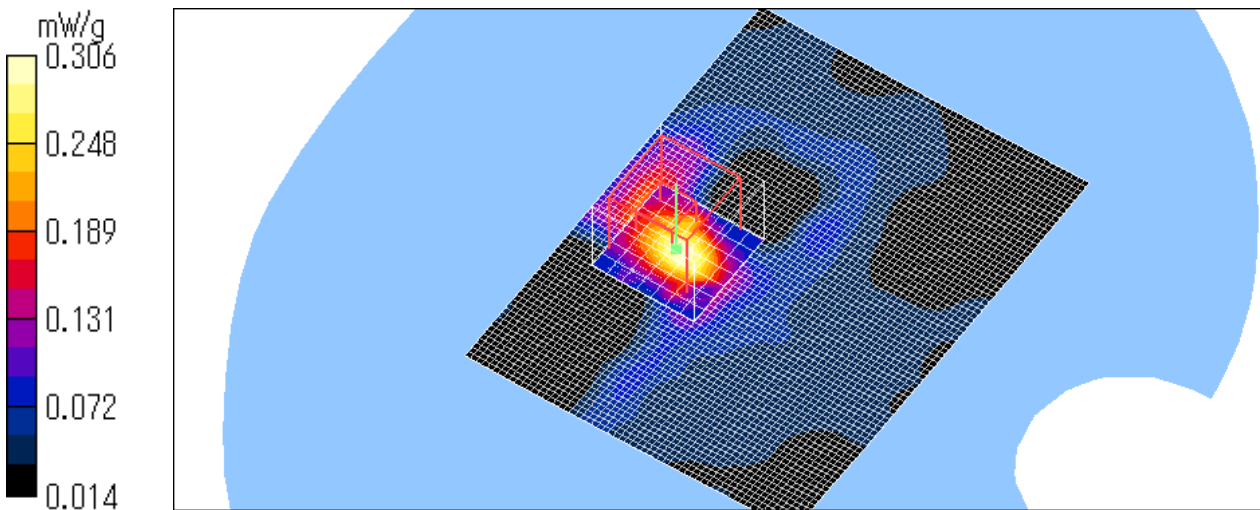
SAR(1 g) = 0.122 mW/g; SAR(10 g) = 0.039 mW/g

Maximum value of SAR (measured) = 0.306 mW/g

Test Date = 10/05/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Body/ Top/ Ant.1/ 5798.053MHz

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.07$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.21 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 2.52 V/m; Power Drift = -0.122 dB

Peak SAR (extrapolated) = 2.19 W/kg

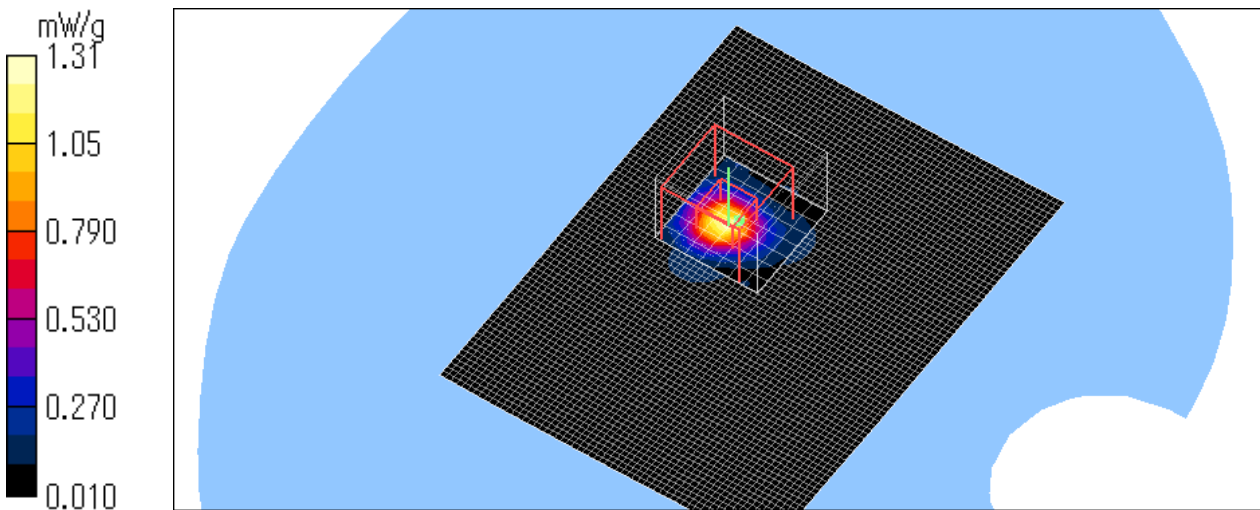
SAR(1 g) = 0.525 mW/g; SAR(10 g) = 0.127 mW/g

Maximum value of SAR (measured) = 1.31 mW/g

Test Date = 10/05/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Body/ Rear (with belt clip)/ Ant.1/ 5798.053MHz

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.07$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x81x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.185 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 3.91 V/m; Power Drift = 0.181 dB

Peak SAR (extrapolated) = 0.377 W/kg

SAR(1 g) = 0.108 mW/g; SAR(10 g) = 0.051 mW/g

Maximum value of SAR (measured) = 0.190 mW/g

Zoom Scan (8x8x10)/Cube 1: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 3.91 V/m; Power Drift = 0.181 dB

Peak SAR (extrapolated) = 51.8 W/kg

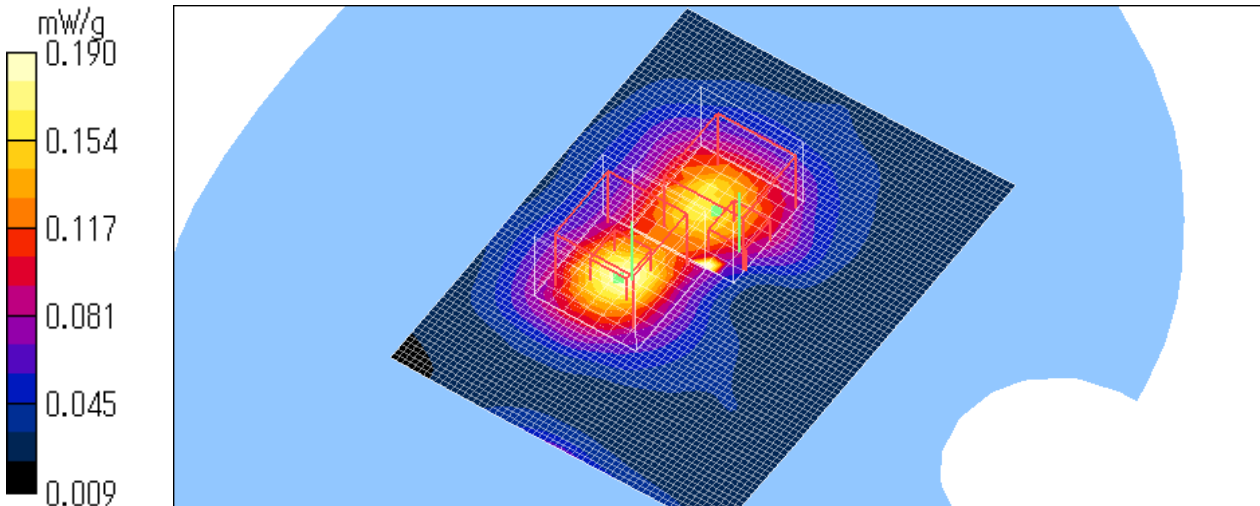
SAR(1 g) = 0.425 mW/g; SAR(10 g) = 0.082 mW/g

Maximum value of SAR (measured) = 51.8 mW/g

Test Date = 10/05/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Body/ Rear/ Ant.1/ 5759.700MHz

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.07$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x81x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 1.25 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 12.2 V/m; Power Drift = -0.123 dB

Peak SAR (extrapolated) = 3.45 W/kg

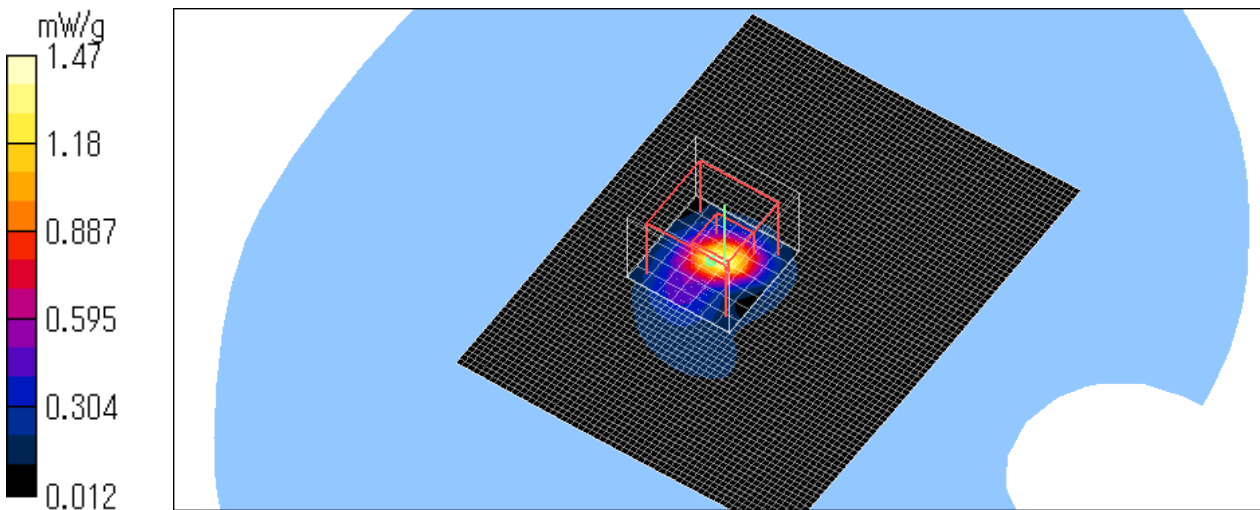
SAR(1 g) = 0.664 mW/g; SAR(10 g) = 0.176 mW/g

Maximum value of SAR (measured) = 1.47 mW/g

Test Date = 10/05/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Body/ Rear/ Ant.1/ 5838.185 MHz

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.07$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x61x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 1.65 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 12.3 V/m; Power Drift = -0.128 dB

Peak SAR (extrapolated) = 3.82 W/kg

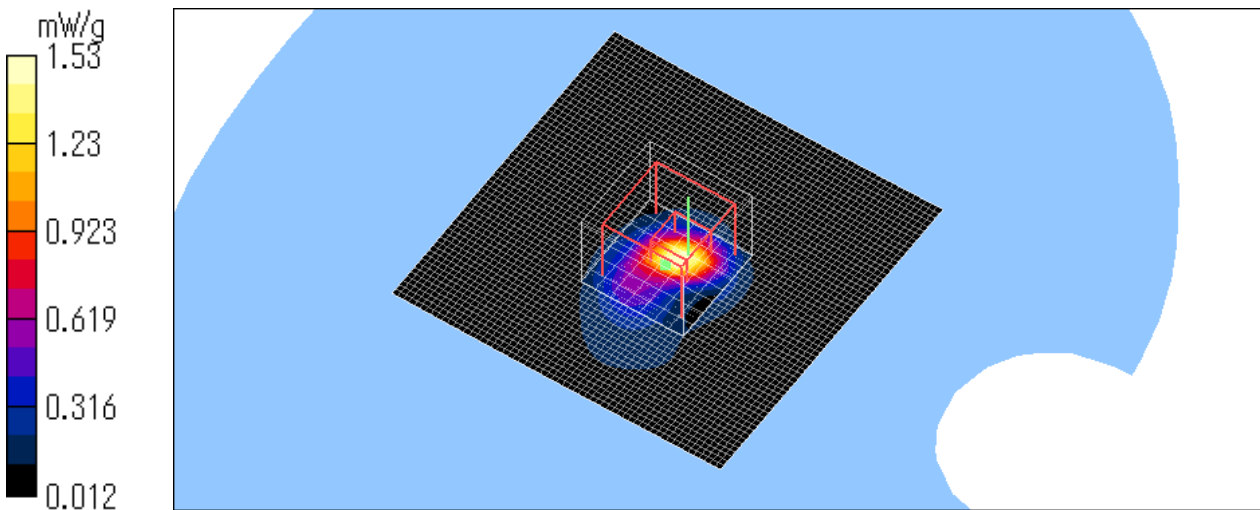
SAR(1 g) = 0.733 mW/g; SAR(10 g) = 0.207 mW/g

Maximum value of SAR (measured) = 1.53 mW/g

Test Date = 10/05/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Body/ Rear/ Ant.2/ 5798.053MHz

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.05$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x51x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.533 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 6.26 V/m; Power Drift = -0.116 dB

Peak SAR (extrapolated) = 2.19 W/kg

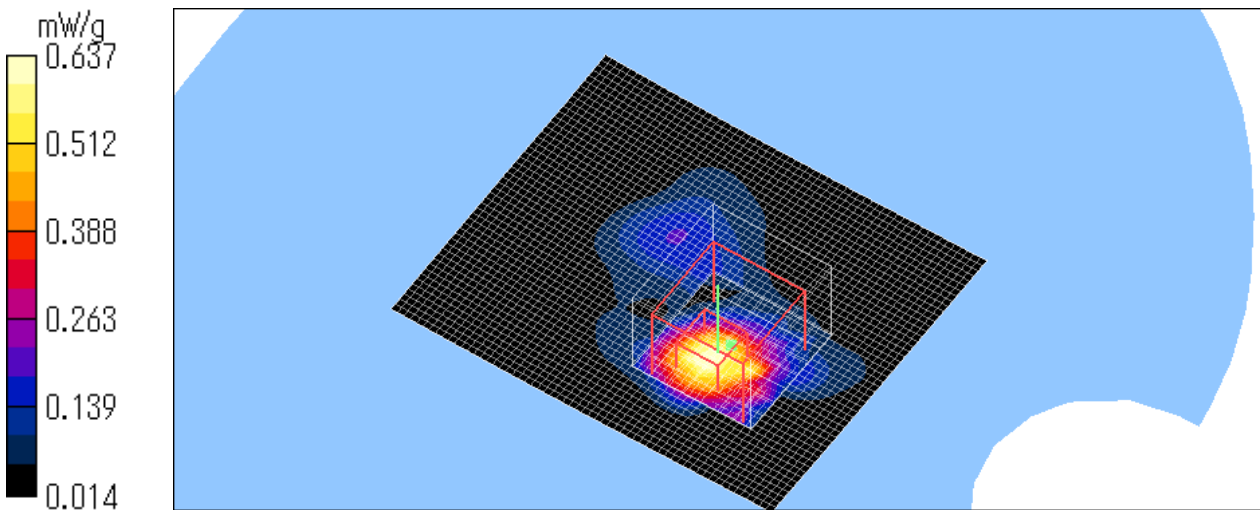
SAR(1 g) = 0.306 mW/g; SAR(10 g) = 0.090 mW/g

Maximum value of SAR (measured) = 0.637 mW/g

Test Date = 10/09/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Body/ Front/ Ant.2/ 5798.053MHz

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.05$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x61x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.559 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 10.8 V/m; Power Drift = -0.135 dB

Peak SAR (extrapolated) = 1.38 W/kg

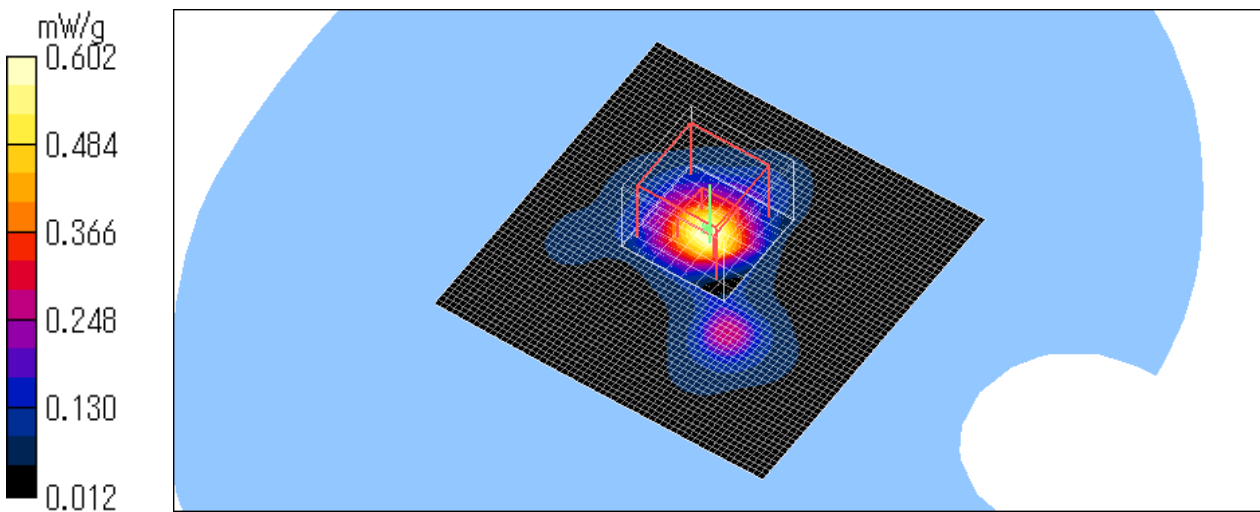
SAR(1 g) = 0.327 mW/g; SAR(10 g) = 0.120 mW/g

Maximum value of SAR (measured) = 0.602 mW/g

Test Date = 10/09/07

Ambient Temperature = 24.5 degree.C

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Body/ Left side/ Ant.1/ 5798.053MHz

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.05$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x81x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.940 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 12.6 V/m; Power Drift = -0.052 dB

Peak SAR (extrapolated) = 3.94 W/kg

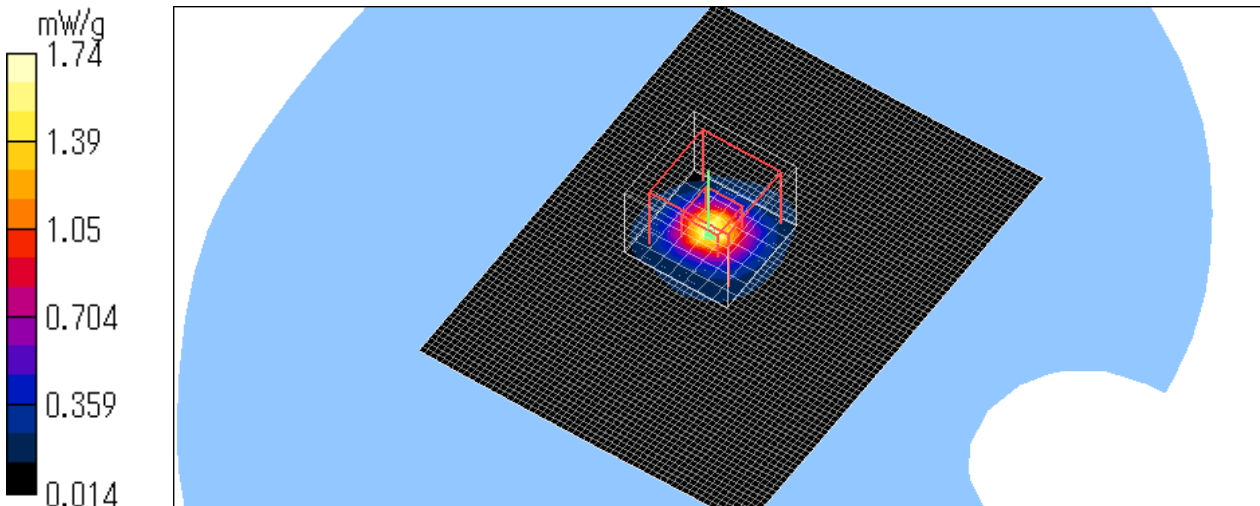
SAR(1 g) = 0.809 mW/g; SAR(10 g) = 0.229 mW/g

Maximum value of SAR (measured) = 1.74 mW/g

Test Date = 10/09/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.1 degree.C , After 24.1 degree.C



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Z-axis scan at max SAR location

KX-TGA431/ Body/ Left side/ Ant.1/ 5798.053MHz

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.05$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

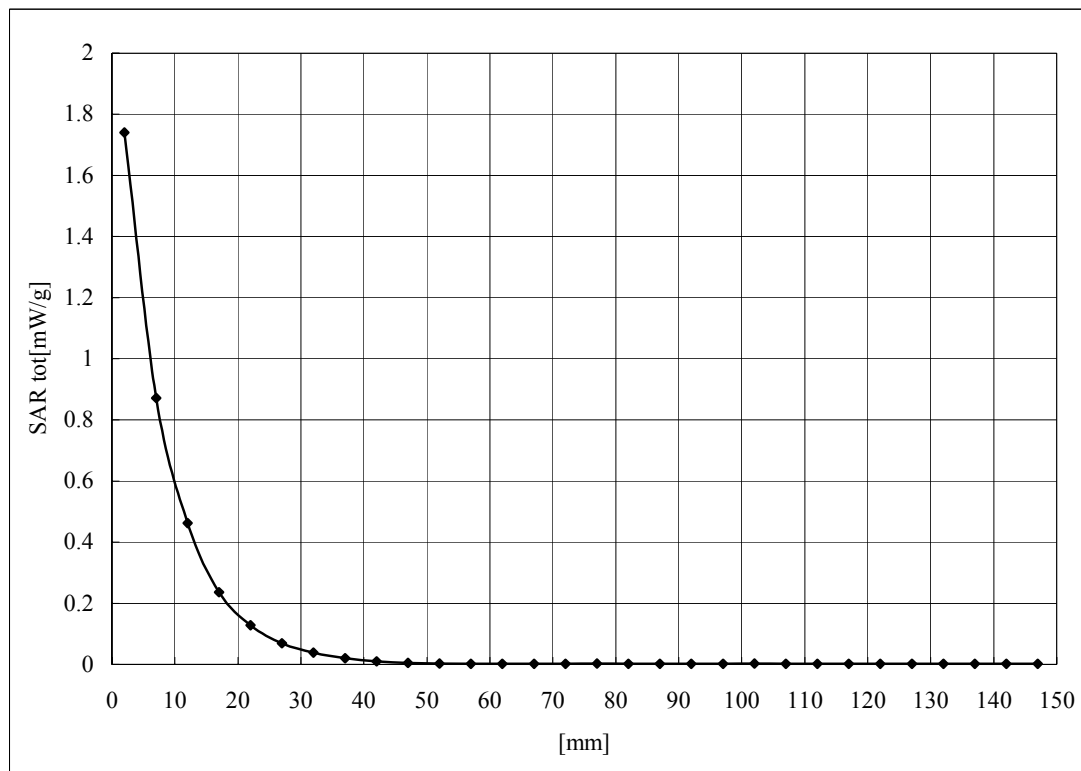
DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15

- Sensor-Surface: 2mm (Mechanical Surface Detection)

- Phantom: SAM 1196

- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160



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KX-TGA431/ Body/ Right side/ Ant.2/ 5798.053MHz

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.05$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x81x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.089 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 2.03 V/m; Power Drift = 0.136 dB

Peak SAR (extrapolated) = 0.247 W/kg

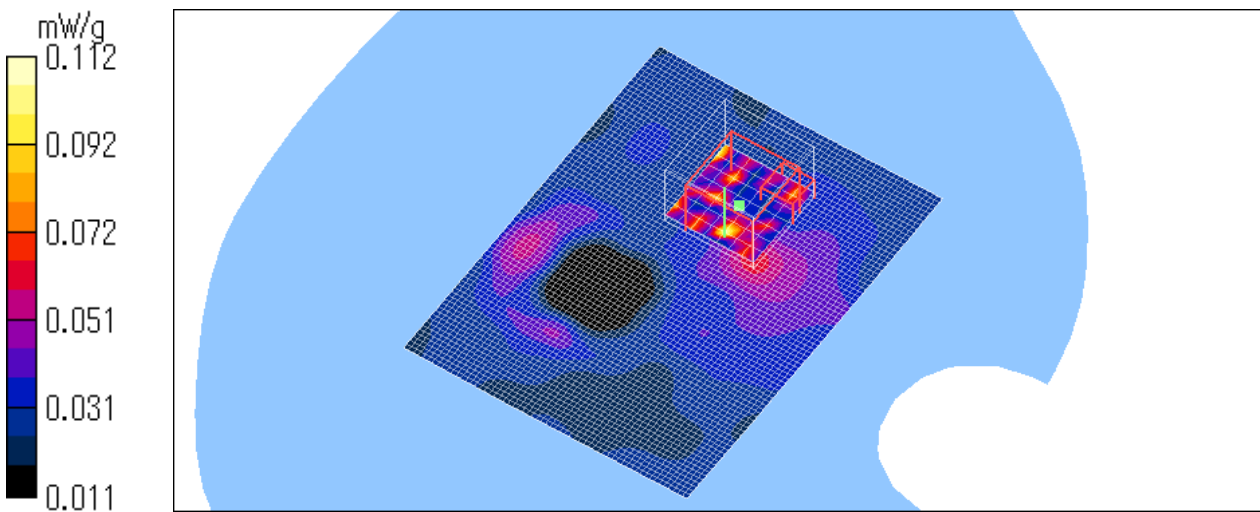
SAR(1 g) = 0.041 mW/g; SAR(10 g) = 0.025 mW/g

Maximum value of SAR (measured) = 0.112 mW/g

Test Date = 10/09/07

Ambient Temperature = 24.5 degree.C

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Body/ Top/ Ant.2/ 5798.053MHz

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.05$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.106 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 2.98 V/m; Power Drift = -0.161 dB

Peak SAR (extrapolated) = 1.76 W/kg

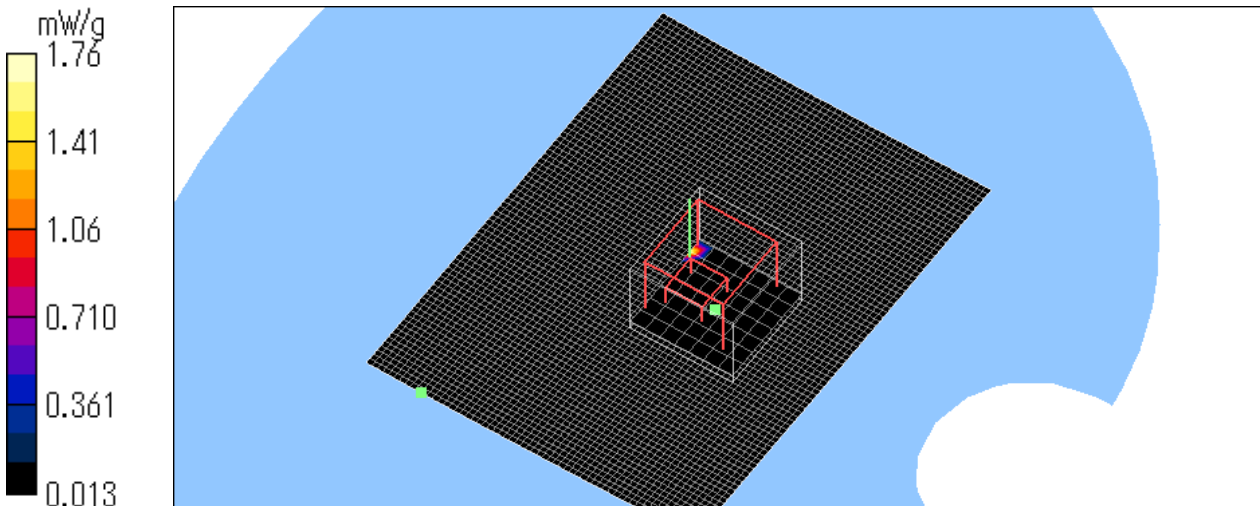
SAR(1 g) = 0.073 mW/g; SAR(10 g) = 0.032 mW/g

Maximum value of SAR (measured) = 1.76 mW/g

Test Date = 10/09/07

Ambient Temperature = 24.5 degree.C

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Body/ Rear (with belt clip) / Ant.2/ 5798.053MHz

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.05$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x81x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.417 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 3.03 V/m; Power Drift = -0.107 dB

Peak SAR (extrapolated) = 0.992 W/kg

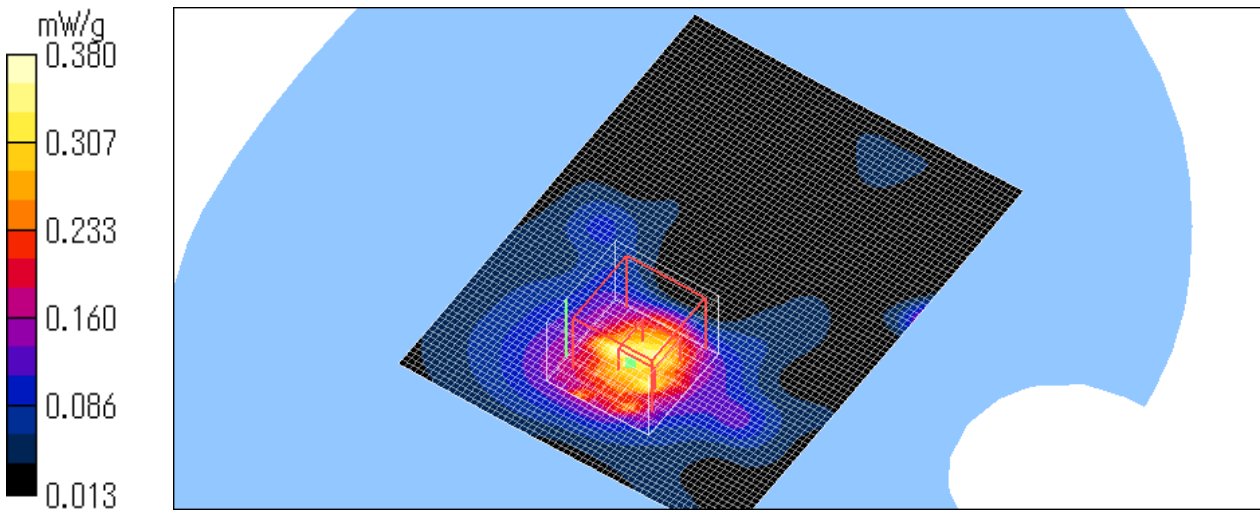
SAR(1 g) = 0.173 mW/g; SAR(10 g) = 0.064 mW/g

Maximum value of SAR (measured) = 0.380 mW/g

Test Date = 10/09/07

Ambient Temperature = 24.5 degree.C

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Body/ Rear/ Ant.2/ 5759.7MHz

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.05$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x81x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 1.66 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 2.81 V/m; Power Drift = 0.132 dB

Peak SAR (extrapolated) = 3.31 W/kg

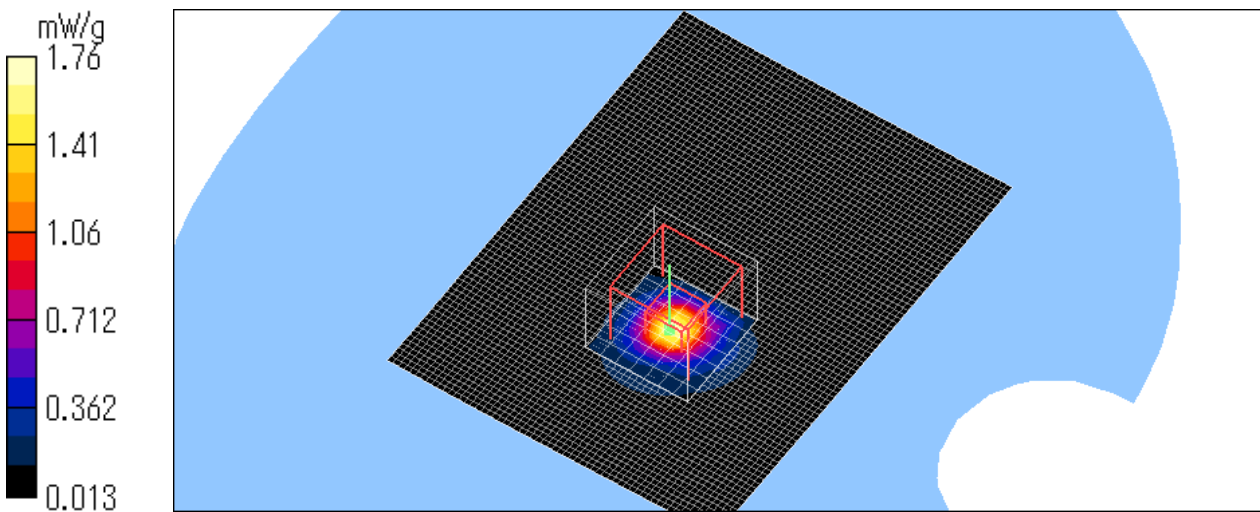
SAR(1 g) = 0.794 mW/g; SAR(10 g) = 0.209 mW/g

Maximum value of SAR (measured) = 1.76 mW/g

Test Date = 10/09/07

Ambient Temperature = 24.5 degree.C

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Body/ Rear/ Ant.2/ 5838.185MHz/

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.05$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x81x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 1.28 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 5.26 V/m; Power Drift = -0.150 dB

Peak SAR (extrapolated) = 3.85 W/kg

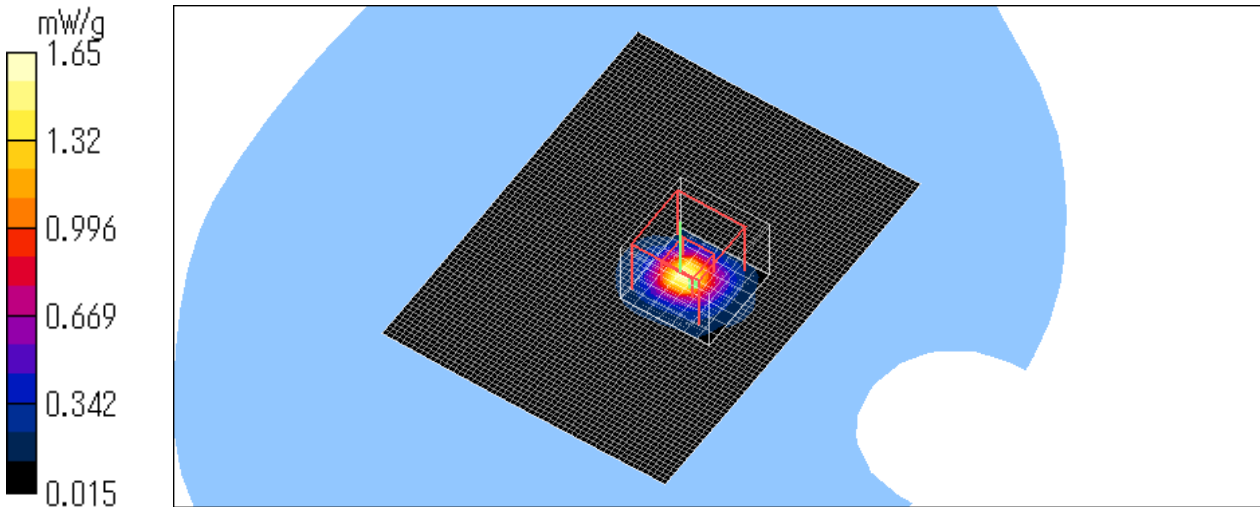
SAR(1 g) = 0.787 mW/g; SAR(10 g) = 0.216 mW/g

Maximum value of SAR (measured) = 1.65 mW/g

Test Date = 10/09/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Body/ Rear/ Ant.2/ 5798.053MHz/ Separation 5mm

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.05$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x81x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.783 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 3.57 V/m; Power Drift = -0.167 dB

Peak SAR (extrapolated) = 1.64 W/kg

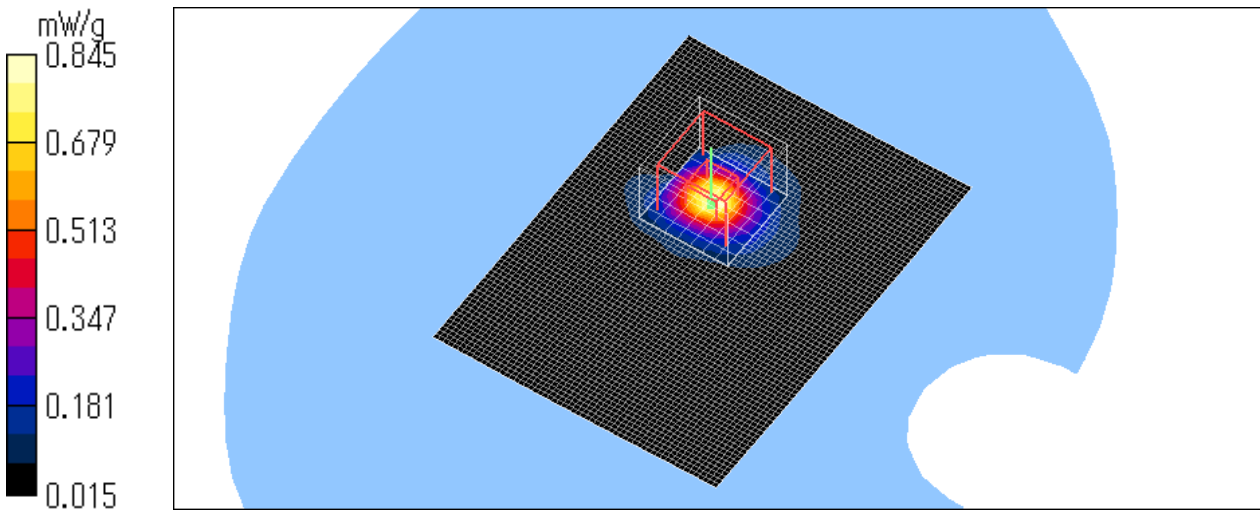
SAR(1 g) = 0.420 mW/g; SAR(10 g) = 0.140 mW/g

Maximum value of SAR (measured) = 0.845 mW/g

Test Date = 10/09/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Body/ Rear/ Ant.2/ 5798.053MHz/ Separation 10mm

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.05$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x81x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.404 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 2.34 V/m; Power Drift = -0.198 dB

Peak SAR (extrapolated) = 1.29 W/kg

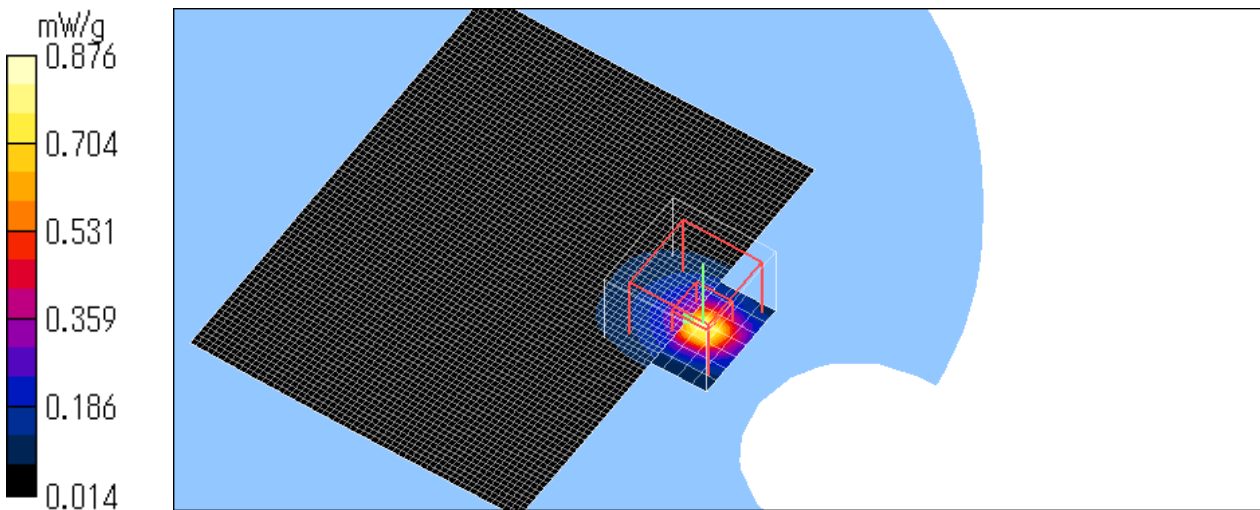
SAR(1 g) = 0.374 mW/g; SAR(10 g) = 0.099 mW/g

Maximum value of SAR (measured) = 0.876 mW/g

Test Date = 10/09/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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KX-TGA431/ Body/ Rear/ Ant.2/ 5798.053MHz/ Separation 15mm

Crest factor: 5.2

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.05$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: SAM 1196
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (61x81x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.349 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 5.63 V/m; Power Drift = -0.103 dB

Peak SAR (extrapolated) = 1.24 W/kg

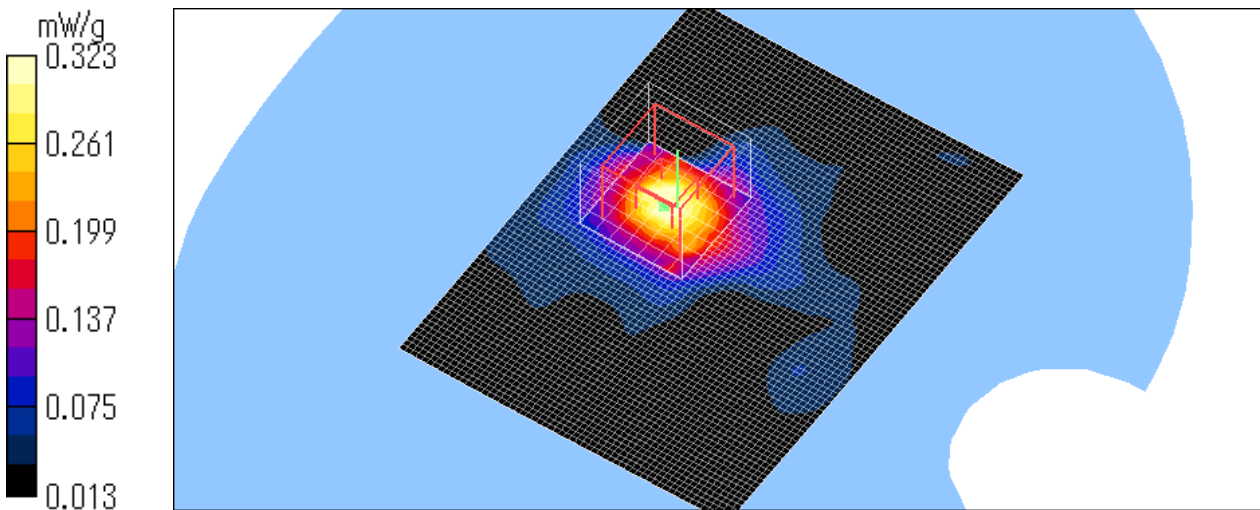
SAR(1 g) = 0.176 mW/g; SAR(10 g) = 0.076 mW/g

Maximum value of SAR (measured) = 0.323 mW/g

Test Date = 10/09/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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APPENDIX 3 : Test instruments

1. Equipment used

Control No.	Name of Equipment	Manufacture	Model number	Serial number	Calibration	
					Last Cal	Due date
MPM-01	Power Meter	Agilent	E4417A	3008A01671	2007/01/10	2008/01/31
MPSE-01	Power sensor	Agilent	E9300B	US40010300	2006/12/20	2007/12/31
MPSE-03	Power sensor	Agilent	E9327A	US40440576	2007/01/10	2008/01/31
MAEC-04	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	DA-10005	2007/03/03	2008/03/31
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	2007/08/16	2008/08/31
MCC-57	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	246769(1m) + 250654(5m)	2007/03/30	2008/03/31
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	2007/03/12	2008/03/31
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	2007/06/01	2008/06/31
MSTW-14	EMI measurement program	TSJ	TEPTO-DV	-	-	-
MOS-14	Thermo-Hygrometer	Custom	CTH-180	-	2006/01/19	2008/01/31
MSG-05	Signal Genelator	Agilent	E4438C	MY45090353	2007/06/20	2008/06/30
MRFA-08	Pre Amplifier	TSJ	TCBP0206	-	2007/03/02	2008/03/31
MHDC-12	Dual Directional Coupler	Hewlett Packard	772D	2839A0016	-	-
MNA-01	Network Analyzer	Agilent	E8358A	US41080381	2006/02/10	2009/02/28
MPB-03	Dosimetric E-Field Probe	Schmid&Partner Engineering AG	EX3DV3	3507	2007/06/15	2008/06/30
MDAE-01	Data Acquisition Electronics	Schmid&Partner Engineering AG	DAE3 V1	509	2007/06/13	2008/06/30
MSTW-16	SAR measurement System	Schmid&Partner Engineering AG	DASY4	1021834	-	-
MDA-08	5.8GHz System Validation Dipole	Schmid&Partner Engineering AG	D5GHzV2	1020	2007/08/14	2009/08/31
MPS-01	SAM Phantom	Schmid&Partner Engineering AG	SAM Twin Phantom V4.0	1196	-	-
MDPK-01	Dielectric probe kit	Agilent	85070D	-	-	-
MOS-05	Thermo-Hygrometer	Custom	CTH-190	810201	2006/04/25	2008/04/30
MOS-10	Digital thermometer	HANNA	Checktemp-2	MOS-10	2007/03/23	2009/03/31
	Body 5.8GHz	-	-	-	Daily check Target value $\pm$ 5%	
	Head 5.8GHz	-	-	-	Daily check Target value $\pm$ 5%	
	SAR room	-	-	-	Daily check Ambient Noise<0.012W/kg	

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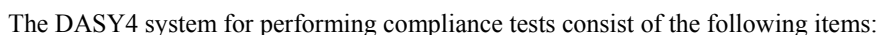
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2. Dosimetry assessment setup

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 EX3DV4, SN: 3540 (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 $\pm 10\%$. 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.



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4. System components

4-a 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(S/N 3507):

Basic Broad Band Calibration in air : 10-3000 MHz
Conversion Factors(Head and Body): 450MHz,900 MHz,1810MHz,2450MHz,
5.2GHz,5.5GHz,5.8GHz

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

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4-b 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

SAM Twin Phantom

Dimensions:

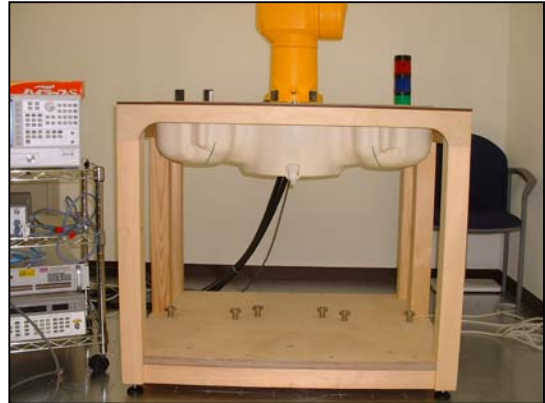
(H x L x W): 810 x 1000 x 500 mm

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

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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 μ V to > 200 mV (16 bit resolution and two range settings: 4mV, 400mV)
Input Offset voltage	:	< 1 μ V (with auto zero)
Input Resistance	:	200 M Ω
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.	:	4.6
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

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Phantom

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

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6. Simulated Tissues Composition

6-a 5GHz

Ingredient	Mixture(%)
	Muscle 5GHz
Water	64-78
Mineral Oil	11-18
Emulsifiers	9-15
Additives and salt	2-3

7. 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-a Head 5GHz

Type of liquid : Head 5GHz
Ambient temperature (deg.c.) : 24.5(4-Oct)
Relative Humidity (%) : 58(4-Oct)
Liquid depth (cm) : 15.0

DIELECTRIC PARAMETERS MEASUREMENT RESULTS								
Date	Frequency	Liquid Temp [deg.c]		Parameters	Target Value	Measured	Deviation [%]	Limit [%]
		Before	After					
4-Oct	5800	24.1	24.1	Relative Permittivity ϵ_r	35.3 *1	33.2	-5.9	+/-10
				Coductivity σ [mho/m]	5.27 *1	5.32	0.9	+/-5
4-Oct	5800	24.1	24.1	Relative Permittivity ϵ_r	34.6 *2	33.2	-4.0	+/-10
				Coductivity σ [mho/m]	5.15 *2	5.32	3.3	+/-5

*1 The target values is a parameter defined in FCC OET 65.

*2 The target value is the calibrated dipole TSL parameters. (D5GHz V2, S/N: 1020)

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7-b Muscle 5GHz

Type of liquid : Muscle 5GHz
Ambient temperature (deg.c.) : 24.5(5-Oct), 24.3(9-Oct)
Relative Humidity (%) : 57(5-Oct), 53(9-Oct)
Liquid depth (cm) : 15.0

DIELECTRIC PARAMETERS MEASUREMENT RESULTS								
Date	Frequency	Liquid Temp [deg.c]		Parameters	Target Value	Measured	Deviation [%]	Limit [%]
		Before	After					
5-Oct	5800	24.0	24.0	Relative Permittivity ϵ_r	48.2 *1	43.5	-9.8	+/-10
				Coductivity σ [mho/m]	6.00 *1	6.07	1.2	+/-5
5-Oct	5800	24.0	24.0	Relative Permittivity ϵ_r	46.5 *2	43.5	-6.5	+/-10
				Coductivity σ [mho/m]	6.20 *2	6.07	-2.1	+/-5
9-Oct	5800	24.1	24.1	Relative Permittivity ϵ_r	48.2 *1	43.5	-9.8	+/-10
				Coductivity σ [mho/m]	6.00 *1	6.05	0.8	+/-5
9-Oct	5800	24.1	24.1	Relative Permittivity ϵ_r	46.5 *2	43.5	-6.5	+/-10
				Coductivity σ [mho/m]	6.20 *2	6.05	-2.4	+/-5

*1 The target values is a parameter defined in FCC OET 65.

*2 The target value is the calibrated dipole TSL parameters. (D5GHz V2, S/N: 1020)

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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 “10. Validation measurement data”.

We performed the system validation based on FCC requirement, [The 1-g or 10-g SAR values measured using the required tissue dielectric parameters should be within 10% of manufacturer calibrated dipole SAR values. However these manufacturer calibrated dipole target SAR values should be substantially similar to those defined in IEEE Standard 1528.] and FCC permits [SAR system verification with the actual liquid used for DUT SAR measurement should be the default operating procedures.]

We confirmed the this dipole manufacture's validation date for head is within 5% against IEEE Standard 1528. so we can only use Body liquid validation data for our system verification.

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8-a System validation of 5GHz

Type of liquid : **Head 5GHz**
Ambient temperature (deg.c.) : **24.5(4-Oct)**
Relative Humidity (%) : **58(4-Oct)**
Dipole : **D5GHz V2, S/N: 1020**
Power : **250mW**

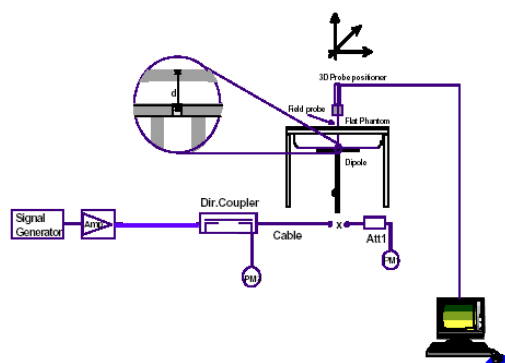
SYSTEM PERFORMANCE CHECK										
Date	Liquid (Head 5GHz)						measured			
	Liquid Temp [deg.c.]		Relative Permittivity ϵ_r		Conductivity σ [mho/m]		SAR 1g [W/kg]		Deviation [%]	Limit [%]
	Before	After	Target	Measured	Target	Measured	Target	Measured		
4-Oct	24.0	24.0	34.6	33.2	5.15	5.32	19.00 *	20.30	6.8	+/-10

Type of liquid : **Muscle 5GHz**
Ambient temperature (deg.c.) : **24.5(5-Oct), 24.3(9-Oct)**
Relative Humidity (%) : **57(5-Oct), 53(9-Oct)**
Dipole : **D5GHz V2, S/N: 1020**
Power : **250mW**

SYSTEM PERFORMANCE CHECK										
Date	Liquid (Muscle 5GHz)						measured			
	Liquid Temp [deg.c.]		Relative Permittivity ϵ_r		Conductivity σ [mho/m]		SAR 1g [W/kg]		Deviation [%]	Limit [%]
	Before	After	Target	Measured	Target	Measured	Target	Measured		
5-Oct	24.0	24.0	46.5	43.5	6.20	6.07	17.30 *	18.60	7.5	+/-10
9-Oct	24.0	24.0	46.5	43.5	6.20	6.05	17.30 *	19.00	9.8	+/-10

* The target value is a manufacturer calibrated dipole 1g SAR value.

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



Test system for the system performance check setup diagram



5100-5800MHz
System performance check setup

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 $\pm$ %	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	$\sqrt{3}$	1	± 2.7	∞
Spherical isotropy of the probe	± 9.6	Rectangular	$\sqrt{3}$	0	0	∞
Boundary effects	± 2.0	Rectangular	$\sqrt{3}$	1	± 1.2	∞
Probe linearity	± 4.7	Rectangular	$\sqrt{3}$	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	$\sqrt{3}$	1	± 0.6	∞
Readout electronics	± 1.0	Normal	1	1	± 1.0	∞
Response time	0	Rectangular	$\sqrt{3}$	1	0	∞
Integration time	0	Rectangular	$\sqrt{3}$	1	0	∞
RF ambient Noise	± 3.0	Rectangular	$\sqrt{3}$	1	± 1.7	∞
RF ambient Reflections	± 3.0	Rectangular	$\sqrt{3}$	1	± 1.7	∞
Mech. constraints of robot	± 0.8	Rectangular	$\sqrt{3}$	1	± 0.5	∞
Probe positioning	± 9.9	Rectangular	$\sqrt{3}$	1	± 5.7	∞
Extrap. and integration	± 4.0	Rectangular	$\sqrt{3}$	1	± 2.3	∞
Dipole						
Dipole Axis to Liquid Distance	± 2.0	Rectangular	$\sqrt{3}$	1	± 1.2	∞
Input power and SAR drift meas.	± 4.7	Rectangular	$\sqrt{3}$	1	± 2.7	∞
Phantom and Setup						
Phantom uncertainty	± 4.0	Rectangular	$\sqrt{3}$	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	$\sqrt{3}$	0.64	± 1.8	∞
Liquid conductivity (meas.)	± 5.0	Normal	1	0.64	± 3.2	∞
Liquid permittivity (target)	± 10.0	Rectangular	$\sqrt{3}$	0.6	± 3.5	∞
Liquid permittivity (meas.)	± 10.0	Normal	1	0.6	± 6.0	∞
Combined Standard Uncertainty					± 13.552	
Expanded Uncertainty (k=2)					± 27.10	

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10. Validation measurement data

5800MHz System Validation / Dipole5GHz / Forward Conducted Power : 250mW

Dipole 5GHz; Type: D5GHzV2; Serial: 1020

Crest factor: 1

Medium: HSL5800 Medium parameters used: $f = 5800 \text{ MHz}$; $\sigma = 5.32 \text{ mho/m}$; $\epsilon_r = 33.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.8, 4.8, 4.8); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: Flat Phantom 4.3
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (81x81x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 42.1 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 99.9 V/m; Power Drift = -0.014 dB

Peak SAR (extrapolated) = 79.9 W/kg

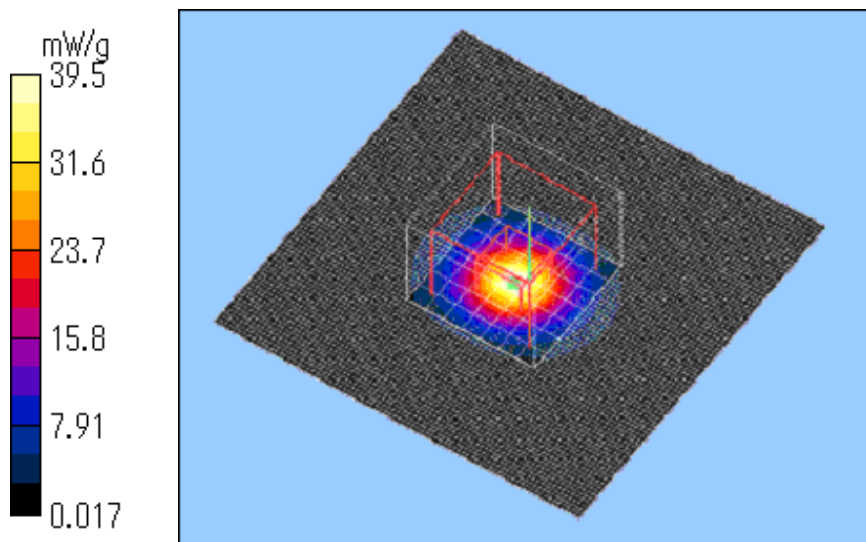
SAR(1 g) = 20.3 mW/g; SAR(10 g) = 5.73 mW/g

Maximum value of SAR (measured) = 39.5 mW/g

Test Date = 10/04/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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5800MHz System Validation / Dipole5GHz / Forward Conducted Power : 250mW

Dipole 5GHz; Type: D5GHzV2; Serial: 1020

Crest factor: 1

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.07$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: Flat Phantom 4.3
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (81x81x1): Measurement grid: $dx=10$ mm, $dy=10$ mm

Maximum value of SAR (interpolated) = 41.6 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 96.1 V/m; Power Drift = -0.056 dB

Peak SAR (extrapolated) = 79.4 W/kg

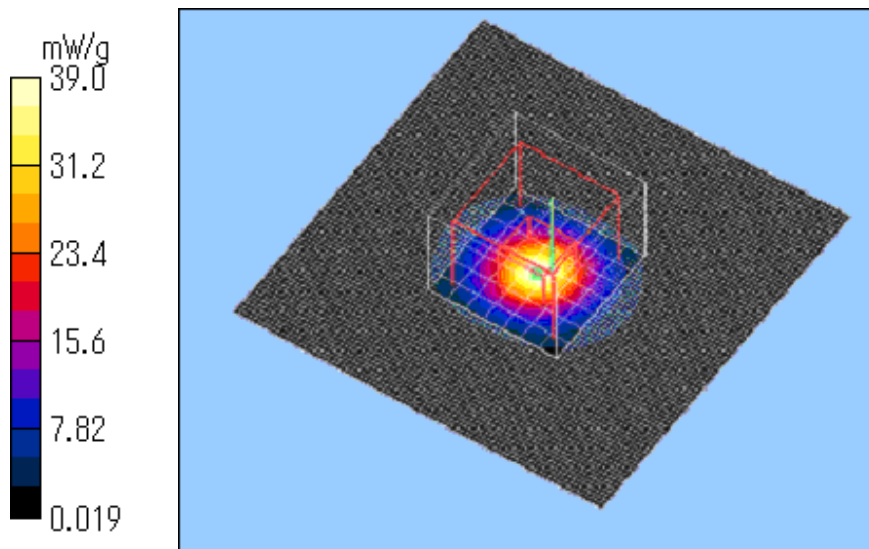
SAR(1 g) = 18.6 mW/g; SAR(10 g) = 4.95 mW/g

Maximum value of SAR (measured) = 39.0 mW/g

Test Date = 10/05/07

Ambient Temperature = 24.5 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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5800MHz System Validation / Dipole5GHz / Forward Conducted Power : 250mW

Dipole 5GHz; Type: D5GHzV2; Serial: 1020

Crest factor: 1

Medium: M5800 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.05$ mho/m; $\epsilon_r = 43.5$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV3 - SN3507; ConvF(4.55, 4.55, 4.55); Calibrated: 2007/06/15
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: Flat Phantom 4.3
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (81x81x1): Measurement grid: $dx=10$ mm, $dy=10$ mm

Maximum value of SAR (interpolated) = 45.7 mW/g

Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2.5$ mm

Reference Value = 100.9 V/m; Power Drift = 0.004 dB

Peak SAR (extrapolated) = 92.0 W/kg

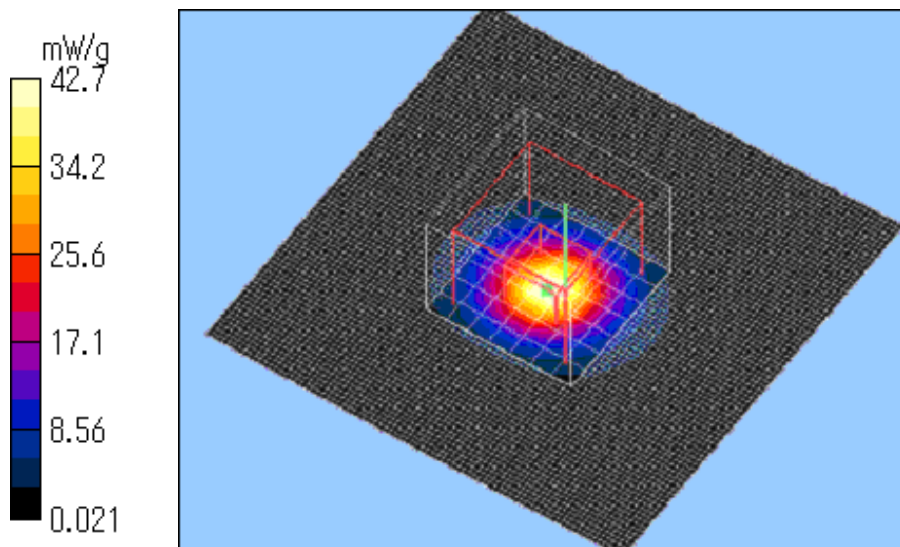
SAR(1 g) = 19.0 mW/g; SAR(10 g) = 5.52 mW/g

Maximum value of SAR (measured) = 42.7 mW/g

Test Date = 10/09/07

Ambient Temperature = 24.3 degree.c

Liquid Temperature = Before 24.0 degree.C , After 24.0 degree.C



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