

TEST REPORT

Equipment Under Test:	GSM Mobile phone
Model No.:	BZ2008S1
FCC ID	M9HBZ08S1
Hardware Version:	V0x
Software Version:	E N,TC
Applicant:	Sagem Mobiles
Address of Applicant:	2,rue du Petit Albi BP 28250 95801 CERGY PONTOISE Cedex
Date of Receipt:	2008.07.17
Date of Test:	2008.07.23 ~2008.07.27
Date of Issue:	2008.08.08



Tested by :

Wu Ni

Date : 2008.08.08

Approved by :

Zhang Yuen

Date : 2008.08.08

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Change History

Version	Change contents	Author	Date
V1.0	First edition	Will Ni	2008-8-8

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Standards:

The Equipment under Test (EUT) has been tested at SGS's (own or subcontracted) laboratories. The following table summarizes the specific reference documents such as harmonized standards or test specifications which were used for testing as SGS's (own or subcontracted) laboratories.

Identity	Document Title	Version
FCC OET Bulletin 65 supplement C	Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields	
IEEE1528	IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques	2003

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

Remarks:

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

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

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1. General Information

1.1 Test Laboratory

GSM Laboratory

SGS-CSTC Standards Technical Services Co., Ltd Shanghai Branch
9F, the 3rd Building, No.889, Yishan Rd, Xuhui District, Shanghai, China

Zip code: 200233

Telephone:

+86 (0) 21 6495 1616

Fax:

+86 (0) 21 5450 0149

Internet:

<http://www.cn.sgs.com>

1.2 Details of Applicant

Name:

Sagem Mobiles

2, rue du Petit Albi
BP 28250

Address:

95801 CERGY PONTOISE Cedex

Contact Person:

Mr. Jean MARQUET

1.3 Description of EUT(s)

Brand name	SAGEM	
Model No.	BZ2008S1	
Status of Product	Production	
Hardware Version	V0x	
Software Version	E N,TC	
Serial No.	IMEI: 35362502000280-1	
Battery Type	BD-L4B Lishen 287144366	
	Mono Headset 189515489	
	Stereo Headset 189660148	
	Bluetooth headset BTH8 189791810	
Modulation Mode	GMSK	
Frequency range	PCS1900	Tx: 1850~1910 MHz
		Rx: 1930~1990 MHz

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**Nominal Maximum RF
Conducted Power**

PCS1900: GMSK/30.0dBm

1.4 Test Environment

Ambient temperature: 22.0° C

Tissue Simulating Liquid: 22.0° C

Relative Humidity: 45%~55%

1.5 Operation Configuration

Configuration 1: GSM 1900, LeftHandSide Cheek & 15° Tilt Position

Configuration 2: GSM 1900, RightHandSide Cheek & 15° Tilt Position

Configuration 3: GSM 1900, BodyWorn (1.5cm between EUT and phantom)

Configuration 4: GSM 1900 Additional tests due to antenna approaching mouth
(0.5cm between EUT Top and Flat phantom)

1.6 SAM Twin Phantom



The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region where shell thickness increases to 6mm). It has three measurement areas:

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- Left hand
- Right hand
- Flat phantom

A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. Free space scans of devices on the cover are possible.

On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

Phantom specification:

Construction:	The shell corresponds to the specifications of Specific Anthropomorphic Mannequin(SAM) Phantom defined in IEEE 1528-2003,EN 50361:2001 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.
Shell Thickness	2±0.2mm
Filling Volume	Approx.25 liters
Dimensions	Height: 850mm Length: 1000mm Width: 500mm

1.7 Device Holder for Transmitters



The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source in 5mm distance, a positioning uncertainty of ±0.5mm would produce a SAR uncertainty of ±20%. An accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions, in which the devices must be measured, are defined by the standards.

The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation centers for both scales are the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon_r=3$ and loss tangent $\tan \delta=0.02$. The amount of dielectric material has

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been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

1.8 Description of Test Position

1.8.1 SAM Phantom Shape



Figure 1—front, back, and side views of SAM (model for the phantom shell). Full-head model is for illustration purposes only—procedures in this recommended practice are intended primarily for the phantom setup of Figure 2. Note: The center strip including the nose region has a different thickness tolerance.

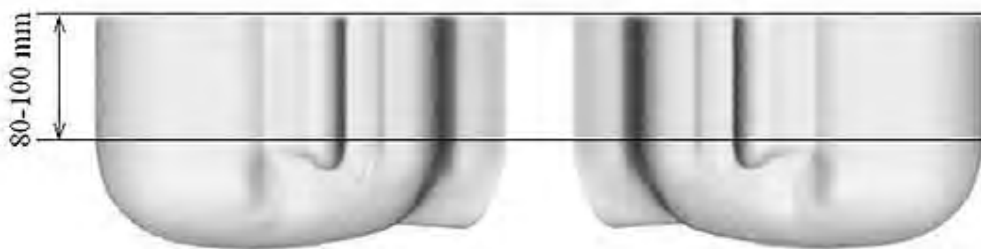


Figure 2—Sagittally bisected phantom with extended perimeter (shown placed on its side as used for SAR measurements)

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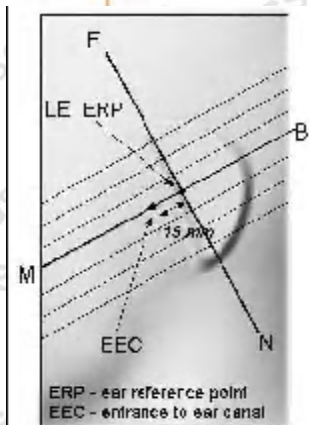


Figure 3—Close-up side view of phantom ear region, N-F and B-M lines, seven cross-sectional plane locations

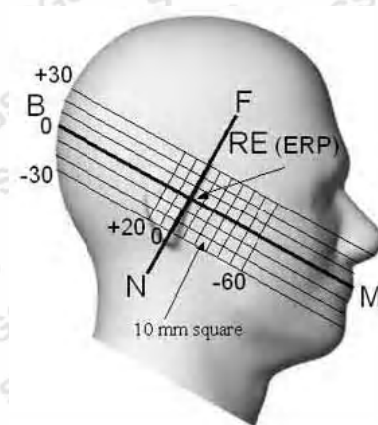


Figure 4—Side view of the phantom showing relevant markings and seven cross-sectional plane locations showing the and

1.8.2 The following pictures present the different DUT constructions.

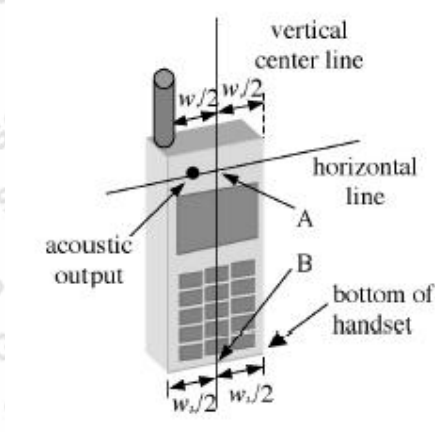


Figure 5a—Handset vertical and horizontal reference lines—"fixed case"

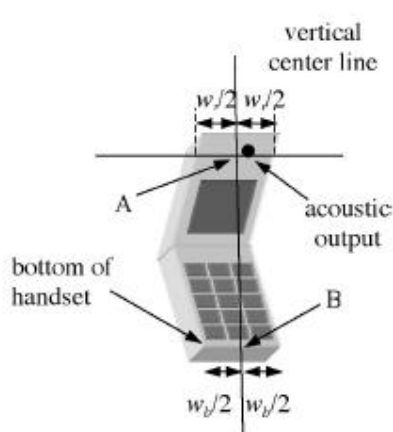


Figure 5b—Handset vertical and horizontal reference lines—"clam-shell case"

1.8.3 Definition of the "cheek" position:

- Position the device with the vertical centre line of the body of the device and the horizontal line crossing the centre of the ear piece in a plane parallel to the sagittal plane of the phantom ("initial position" see Figure 6). While maintaining the device in this plane, align the vertical centre line with the reference plane containing the three ear and mouth reference points (M, RE and LE) and align the centre of the ear piece

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with the line RE-LE;

- b) Translate the mobile phone box towards the phantom with the ear piece aligned with the line LE-RE until the phone touches the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the box until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost.

1.8.4 Definition of the "tilted" position:

- a) Position the device in the "cheek" position described above;
- b) While maintaining the device in the reference plane described above and pivoting against the ear, move it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost.

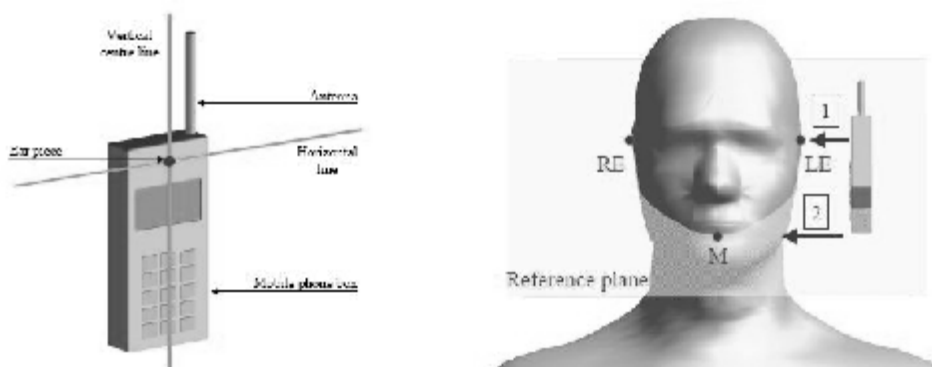


Figure 6 - Definition of the reference lines and points, on the phone and on the phantom and initial position

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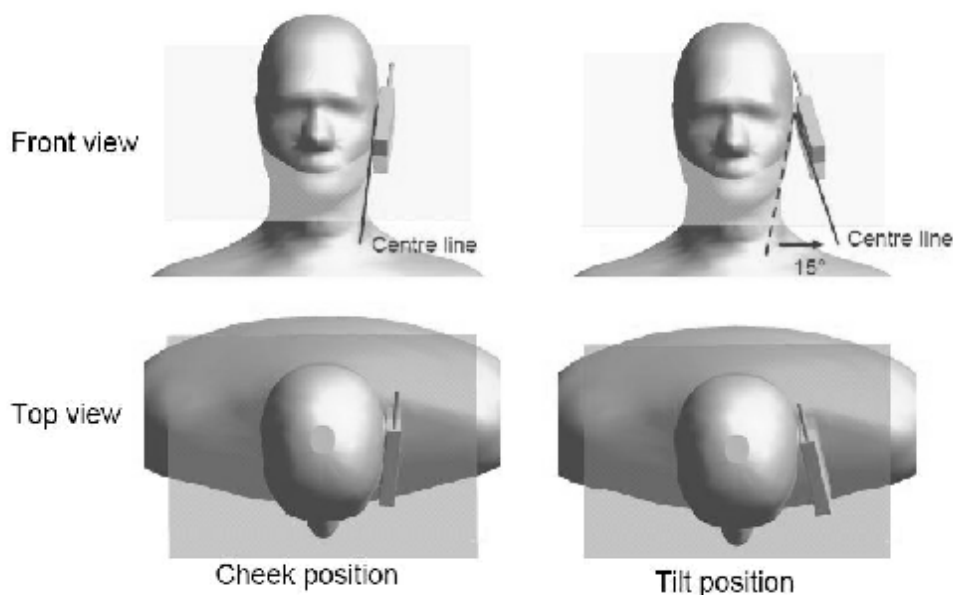


Figure 7 -“Cheek” and “tilt” positions of the mobile phone on the left side

1.9 Recipes for Tissue Simulating Liquid

The following tables give the recipes for tissue simulating liquids to be used in different frequency bands.

Ingredient	835MHz	1900MHz
Water	40.29%	55.24%
Sugar	57.90%	-
Salt (NaCl)	1.38%	0.31%
DGBE	-	44.45%
Preventol	0.18%	-
HEC	0.24%	-
Relative Permittivity	41.5	40.0
Conductivity (S/m)	0.90	1.40

Table 1: Composition of the Brain Tissue Equivalent Matter

Ingredient	835MHz	1900MHz
Water	50.75%	70.17%
Sugar	48.21%	-
Salt (NaCl)	0.94%	0.39%
DGBE	-	29.44%
Preventol	0.10%	-

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HEC	0.00	-
Relative Permittivity	55.2	53.3
Conductivity (S/m)	0.97	1.52

Table 2: Composition of the Body Tissue Equivalent Matter

1.10 Measurement procedure

Step 1: Power reference measurement

The SAR measurement was taken at a selected spatial reference point to monitor power variations during testing. This fixed location point was measured and used as a reference value.

Step 2: Area scan

The SAR distribution at the exposed side of the head was measured at a distance of 3.9mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 20mm*20mm. Based on the area scan data, the area of the maximum absorption was determined by spline interpolation.

Step 3: Zoom scan

Around this point, a volume of 30mm*30mm*34mm (fine resolution volume scan, zoom scan) was assessed by measuring 7*7*7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

The data at the surface was extrapolated, since the center of the dipoles is 2.1mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2mm. (This can be variable. Refer to the probe specification) The extrapolation was based on a least square algorithm. 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. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The volume was integrated with the trapezoidal algorithm. One thousand points (10*10*10) were interpolated to calculate the average. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

Step 4: Power reference measurement (drift)

The SAR value at the same location as in step 1 was again measured. (If the value changed by more than 5%, the evaluation is repeated.)

1.11 The SAR Measurement System

A photograph of the SAR measurement System is given in Fig. a.

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This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (Speag Dasy 4 professional system). A Model ES3DV3 3088 E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation $SAR = \sigma (|E_i|^2) / \rho$ where σ and ρ are the conductivity and mass density of the tissue-simulant.

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

- Y A standard high precision 6-axis robot (Stabile RX family) with controller, teach pendant and software. An arm extension for accommodation the data acquisition electronics (DAE).
- Y 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.
- Y A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- Y The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.

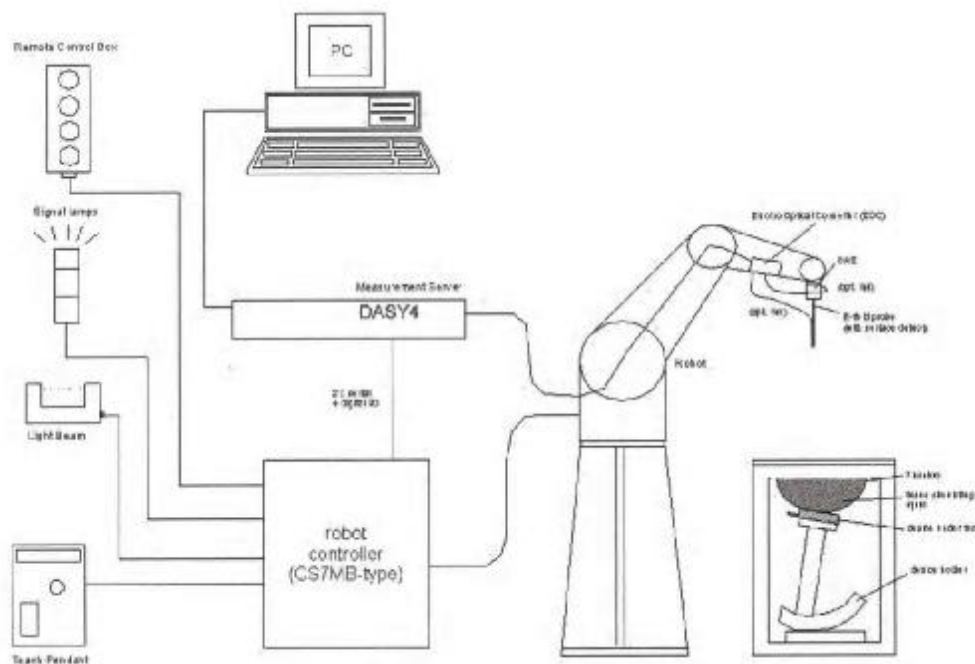


Fig. a SAR System Configuration

- Y The function of the measurement server is to perform the time critical tasks such as signal

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filtering, control of the robot operation and fast movement interrupts.

- Y A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- Y A computer operating Windows 2000.
- Y DASY4 software.
- Y Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- Y The SAM twin phantom enabling testing left-hand, right-hand and body-worn usage.
- Y The device holder for handheld mobile phones.
- Y Tissue simulating liquid mixed according to the given recipes.
- Y Validation dipole kits allowing to validating the proper functioning of the system.

1.12 SAR System Verification

The microwave circuit arrangement for system verification is sketched in Fig. b. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within $\pm 10\%$ from the target SAR values. These tests were done at 1900MHz. The tests were conducted on the same days as the measurement of the DUT. The obtained results from the system accuracy verification are displayed in the table 1 (SAR values are normalized to 1W forward power delivered to the dipole). During the tests, the ambient temperature of the laboratory was in the range 22°C, the relative humidity was in the range 60% and the liquid depth above the ear reference points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

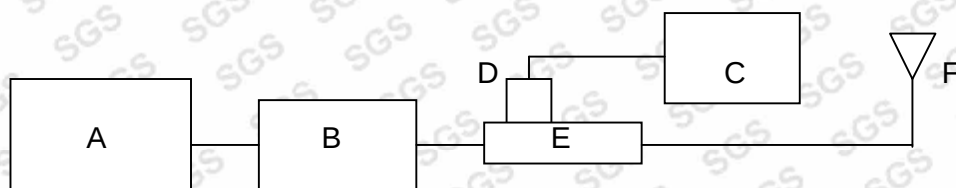


Fig. b the microwave circuit arrangement used for SAR system verification

A. Agilent Model E4438C Signal Generator

B. Mini-Circuit Model ZHL-42 Preamplifier

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- C. Agilent Model E4416A Power Meter
- D. Agilent Model 8481H Power Sensor
- E. HT CP6100 20N Dual directional coupler
- F. Reference dipole antenna

Validation Kit	Frequency MHz	Target SAR 1g (250mW)	Target SAR 10g (250mW)	Measured SAR 1g	Measured SAR 10g	Measured Date
D1900V2 5d028	1900 Body	9.34	4.97	9.23	4.79	2008-07-23
	1900 Head	9.82	5.14	9.62	4.93	2008-07-24
				9.77	4.98	2008-07-27

Table 1. Result System Validation

1.13 Tissue Simulant Fluid for the Frequency Band 1900MHZ

The dielectric properties for this body-simulant fluid were measured by using the HP Model 85070D Dielectric Probe (rates frequency band 200 MHz to 20 GHz) in conjunction with Agilent E5071B Network Analyzer (300 KHz-8500 MHz). The Conductivity (σ) and Permittivity (ρ) are listed in Table 1. For the SAR measurement given in this report. The temperature variation of the Tissue Simulant Fluid was 22°C.

Frequency (MHz)	Tissue Type	Limit/Measured	Permittivity (ρ)	Conductivity (σ)	Simulated Tissue Temp (°C)
1900	Body	Recommended Limit	53.3±5%	1.52±5%	20-24
		Measured, 2008-07-23	51.62	1.566	22.2
	Head	Recommended Limit	40.0±5%	1.40±5%	20-24
		Measured, 2008-07-24	41.18	1.374	22.2
		Measured, 2008-07-27	41.31	1.363	22.5

Table 2. Dielectric parameters for the Frequency Band 1900MHZ

1.14 Test Standards and Limits

Standards:

According to FCC 47 CFR §2.1093(d) the limits to be used for evaluation are based generally on

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criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in Section 4.2 of "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3KHz to 300GHz," ANSI/IEEE C95.1-1992, Copyright 1992 by the Institute of Electrical & Electronics Engineers, Inc., New York, New York 10071.

Human Exposure	Uncontrolled Environment General Population
Spatial Peak SAR (Brain)	1.60 mW/g (averaged over a mass of 1g)

Table 3. RF Exposure Limits

Notes:

1. Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.

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2. Summary of Results

PCS	Test Configuration		SAR, Averaged over 1g/ 10g(W/kg)			Temperature (°C)	Verdict
	Channel/Power(dBm)		Low/30.4	Middle/30.1	High/29.5		
Left	Slide off	Cheek	0.742/0.416	0.606/0.345	0.560/0.308	22	Passed
		Tilt	--	0.175/0.103	--	22	Passed
	Slide on	Cheek	--	0.355/0.209	--	22	Passed
		Tilt	--	0.088/0.053	--	22	Passed
	Worst Case With BT		0.734/0.412	--	--	22	Passed
Right	Slide off	Cheek	0.648/0.346	0.572/0.303	0.686/0.356	22	Passed
		Tilt	--	0.169/0.101	--	22	Passed
	Slide on	Cheek	--	0.222/0.136	--	22	Passed
		Tilt	--	0.175/0.105	--	22	Passed
	Worst Case With BT		--	--	0.582/0.300	22	Passed
Additional	Slide off	0.5cm	--	0.650/0.351	---	22	Passed
	Slide on	0.5cm	--	0.683/0.388	--	22	Passed

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PCS	Channel/Power(dBm)		Low/29.0	Middle/28.6	High/28.0	Temperature (°C)	Verdict
Body GPRS (1.5cm)	Slide off	Headset 189515489	0.506/0.300	--	--	22	Passed
	Slide on	Headset 189515489	0.673/0.404	0.636/0.378	0.534/0.316	22	Passed
	Worst Case With Headset 189660148		0.594/0.354	--	--	22	Passed
	Worst Case With BT		0.501/0.297	--	--	22	Passed

Maximum values

Frequency Band (MHz)	EUT position	Conducted Output Power (dBm)	1g Average (W/kg)	Power Drift(dB)	Amb. Temp (°C)	Verdict
1900	Left/Cheek/Low/Slide off	30.4	0.742	-0.037	22	PASS
	Right/Cheek/High/Slide off	29.5	0.686	-0.163	22	PASS
	Body/GPRS/Low/Slide on/1.5cm with headset 189515489	29.0	0.673	-0.081	22	PASS
	Addition/CS/Mid/Slide on/0.5cm	30.1	0.683	-0.060	22	PASS

Note:

1. In PCS1900 band, the low, middle and high channels are CH512/1805.2MHz, CH661/1880.0MHz and CH810/1909.8MHz separately.
2. Additional tests are performed to verify and eliminate the effect due to antenna approaching mouth.
3. The Max power drift is -0.278db under the configuration: PCS1900-Rightside-cheek-middle channel.

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3. Instruments List

Instrument	Model	Serial number	NO.	Date of last Calibration
Desktop PC	COMPAQ EVO	N/A	GSM-SAR-025	N/A
Dasy 4 software	V 4.7 build 44	N/A	GSM-SAR-001	N/A
Probe	ES3DV3	3088	GSM-SAR-034	2008.1.18
DAE	DAE3	569	GSM-SAR-023	2007.11.19
1900MHz system validation dipole	D1900V2	5d028	GSM-SAR-020	2007.12.21
Phantom	SAM 12	TP-1283	GSM-SAR-005	N/A
Robot	RX90L	F03/5V32A1/A01	GSM-SAR-006	N/A
Dielectric probe kit	85070D	US01440168	GSM-SAR-016	2007.12.18
Agilent network analyzer	E5071B	MY42100549	GSM-SAR-007	2007.12.18
Agilent signal generator	E4438	14438CATO-19719	GSM-SAR-008	2007.12.18
Mini-Circuits preamplifier	ZHL-42	D041905	GSM-SAR-033	2007.12.18
Agilent power meter	E4416A	GB41292095	GSM-SAR-010	2007.12.18
Agilent power sensor	8481H	MY41091234	GSM-SAR-011	2007.12.18
HT CP6100 20N Coupling	6100	SCP301480120	GSM-SAR-012	2007.12.18
R&S Universal radio communication tester	CMU200	103633	GSM-AUD-002	2007.12.18

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4. Measurements

4.1 PCS1900-Leftside- Cheek-Mid-SlideOff

Date/Time: 2008-7-27 14:13:01

Test Laboratory: SGS-GSM

GSM1900--LeftHandSide-Cheek-Mid-Slide Off

DUT: KS005AW02; Type: Body; Serial: 20080721

Communication System: PCS1900-GSM Mode; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium: 1900-Head Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.37 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.84, 4.84, 4.84); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

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Cheek position - Middle/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.661 mW/g

Cheek position - Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

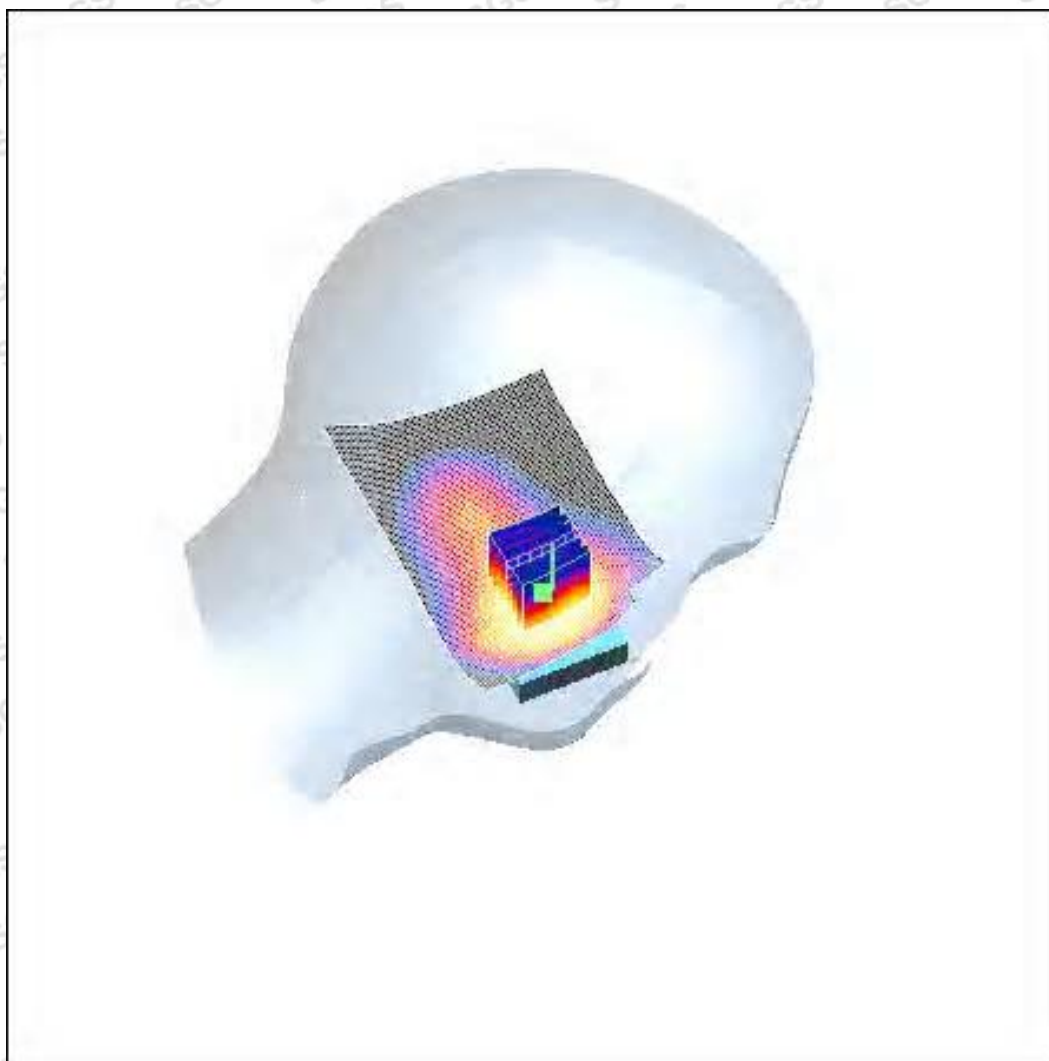
Reference Value = 9.70 V/m; Power Drift = -0.111 dB

Peak SAR (extrapolated) = 1.03 W/kg

SAR(1 g) = 0.606 mW/g; SAR(10 g) = 0.345 mW/g

Maximum value of SAR (measured) = 0.686 mW/g

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0 dB = 0.686mW/g

4.2 PCS1900-Leftside- Tilt-Mid-SlideOff

Date/Time: 2008-7-27 14:36:27

Test Laboratory: SGS-GSM

GSM1900--LeftHandSide-Tilt-Mid-Slide Off

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DUT: KS005AW02; Type: Body; Serial: 20080721

Communication System: PCS1900-GSM Mode; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900-Head Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.37 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.84, 4.84, 4.84); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Tilt position - Middle/Area Scan (61x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Tilt position - Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

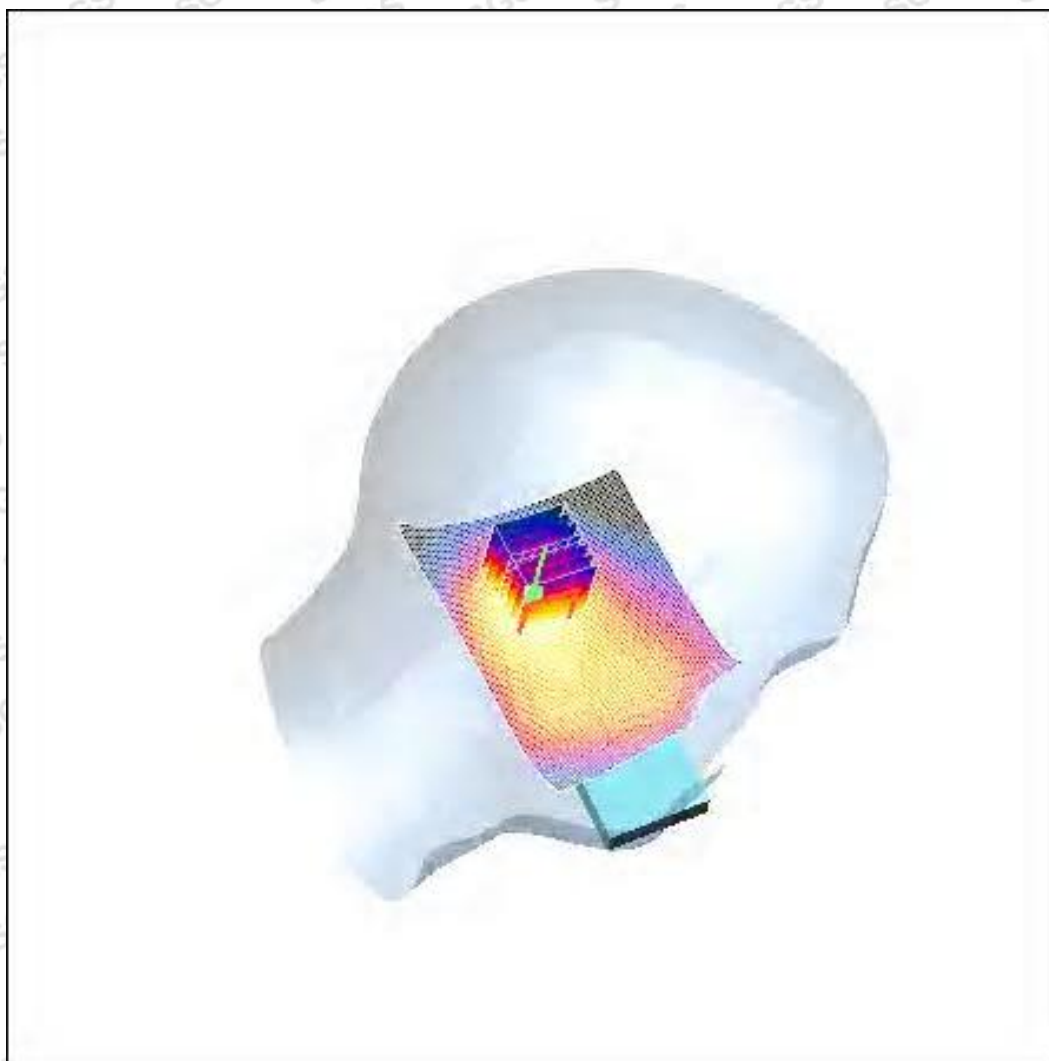
Reference Value = 10.2 V/m ; Power Drift = -0.100 dB

Peak SAR (extrapolated) = 0.278 W/kg

SAR(1 g) = 0.175 mW/g ; SAR(10 g) = 0.103 mW/g

Maximum value of SAR (measured) = 0.192 mW/g

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0 dB = 0.192mW/g

4.3 PCS1900-Leftside- Cheek-Mid-SlideOn

Date/Time: 2008-7-27 15:20:27

Test Laboratory: SGS-GSM

GSM1900--LeftHandSide-Cheek-Mid-Slide On

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SHGSM

DUT: KS005AW02; Type: Body; Serial: 20080721

Communication System: PCS1900-GSM Mode; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900-Head Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.37 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.84, 4.84, 4.84); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Cheek position - Middle open/Area Scan (61x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.384 mW/g

Cheek position - Middle open/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

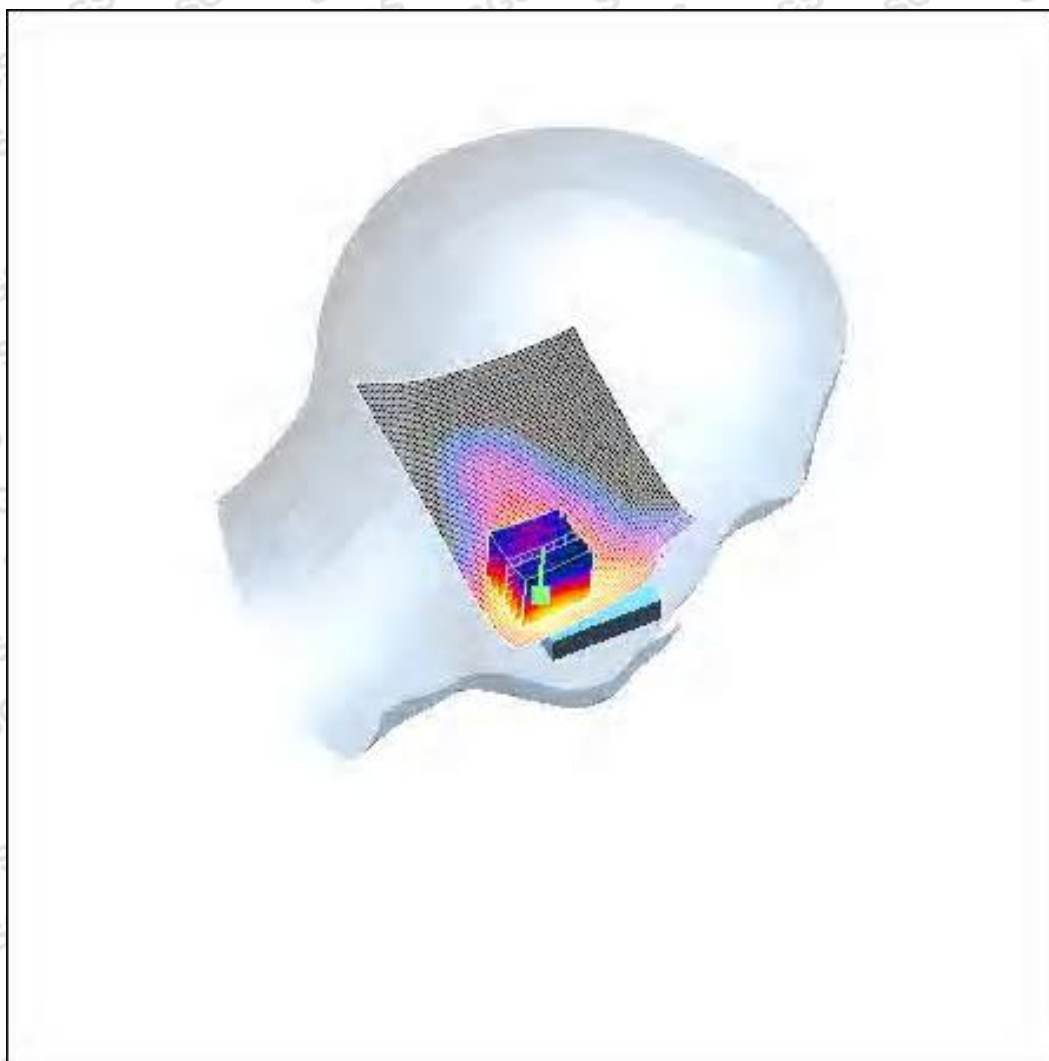
Reference Value = 4.80 V/m; Power Drift = -0.012 dB

Peak SAR (extrapolated) = 0.554 W/kg

SAR(1 g) = 0.355 mW/g; SAR(10 g) = 0.209 mW/g

Maximum value of SAR (measured) = 0.395 mW/g

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0 dB = 0.395mW/g

4.4 PCS1900-Leftside- Cheek-Tilt-SlideOn

Date/Time: 2008-7-27 14:58:15

Test Laboratory: SGS-GSM

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GSM1900--LeftHandSide-Cheek-Tilt-Slide On

DUT: KS005AW02; Type: Body; Serial: 20080721

Communication System: PCS1900-GSM Mode; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900-Head Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.37 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.84, 4.84, 4.84); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Tilt position - Middle open/Area Scan (61x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.104 mW/g

Tilt position - Middle open/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

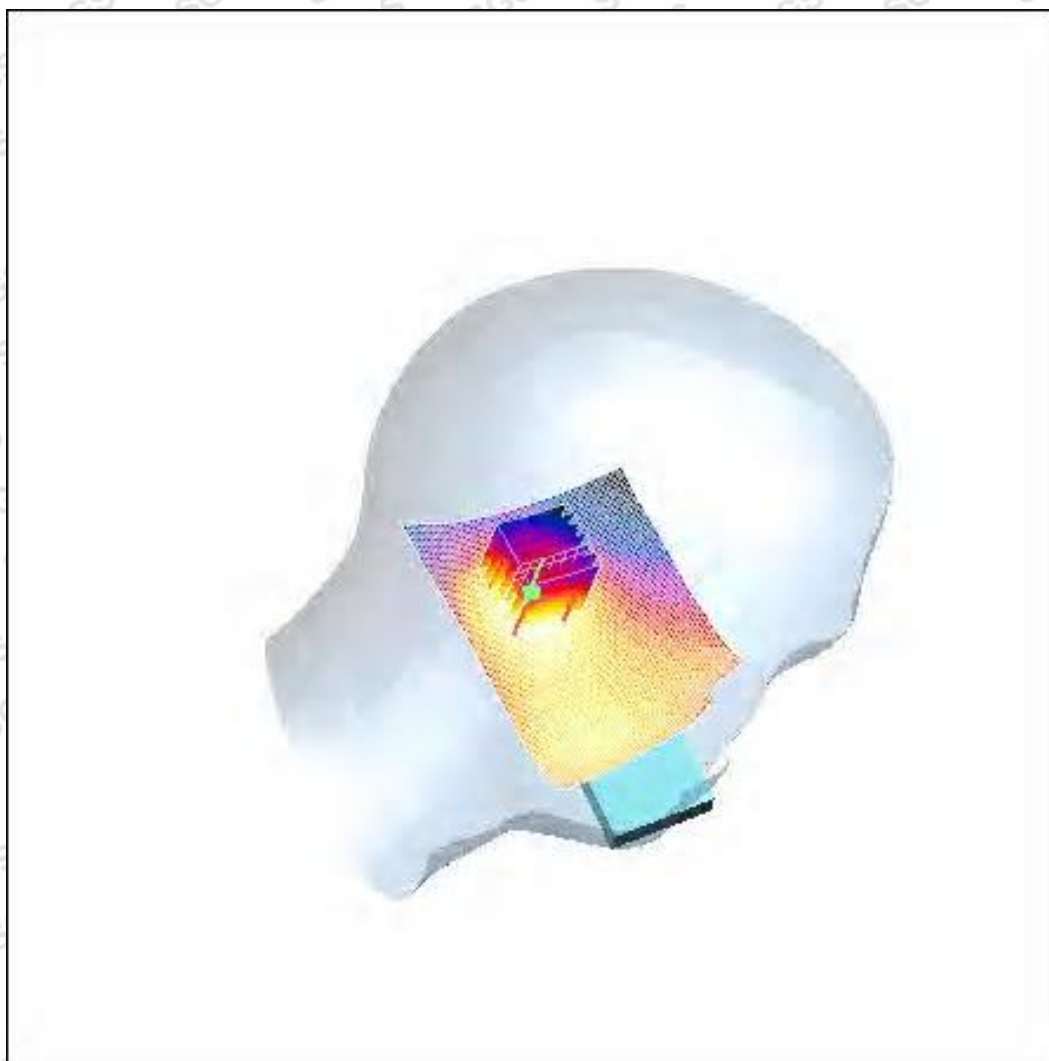
Reference Value = 6.60 V/m; Power Drift = -0.139 dB

Peak SAR (extrapolated) = 0.136 W/kg

SAR(1 g) = 0.088 mW/g; SAR(10 g) = 0.053 mW/g

Maximum value of SAR (measured) = 0.096 mW/g

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0 dB = 0.096mW/g

4.5 PCS1900-Leftside- Cheek-WorstCase-Low

Date/Time: 2008-7-27 16:04:52

Test Laboratory: SGS-GSM

GSM1900--LeftHandSide-Cheek-Low-Slide Off

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DUT: KS005AW02; Type: Body; Serial: 20080721

Communication System: PCS1900-GSM Mode; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Medium: 1900-Head Medium parameters used: $f = 1850.2 \text{ MHz}$; $\sigma = 1.34 \text{ mho/m}$; $\epsilon_r = 41.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.84, 4.84, 4.84); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Cheek position - Low/Area Scan (61x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.817 mW/g

Cheek position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 9.91 V/m; Power Drift = -0.037 dB

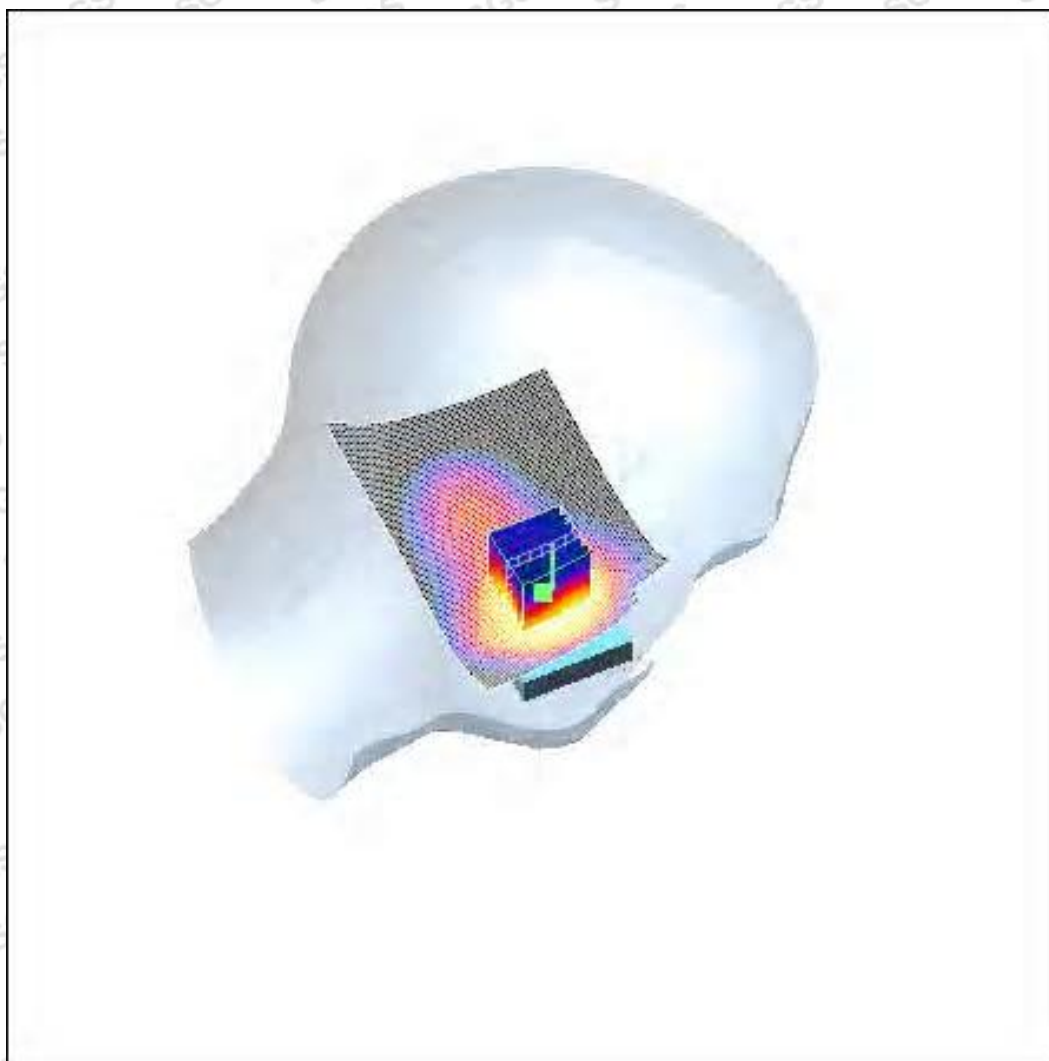
Peak SAR (extrapolated) = 1.24 W/kg

SAR(1 g) = 0.742 mW/g; SAR(10 g) = 0.416 mW/g

Maximum value of SAR (measured) = 0.830 mW/g

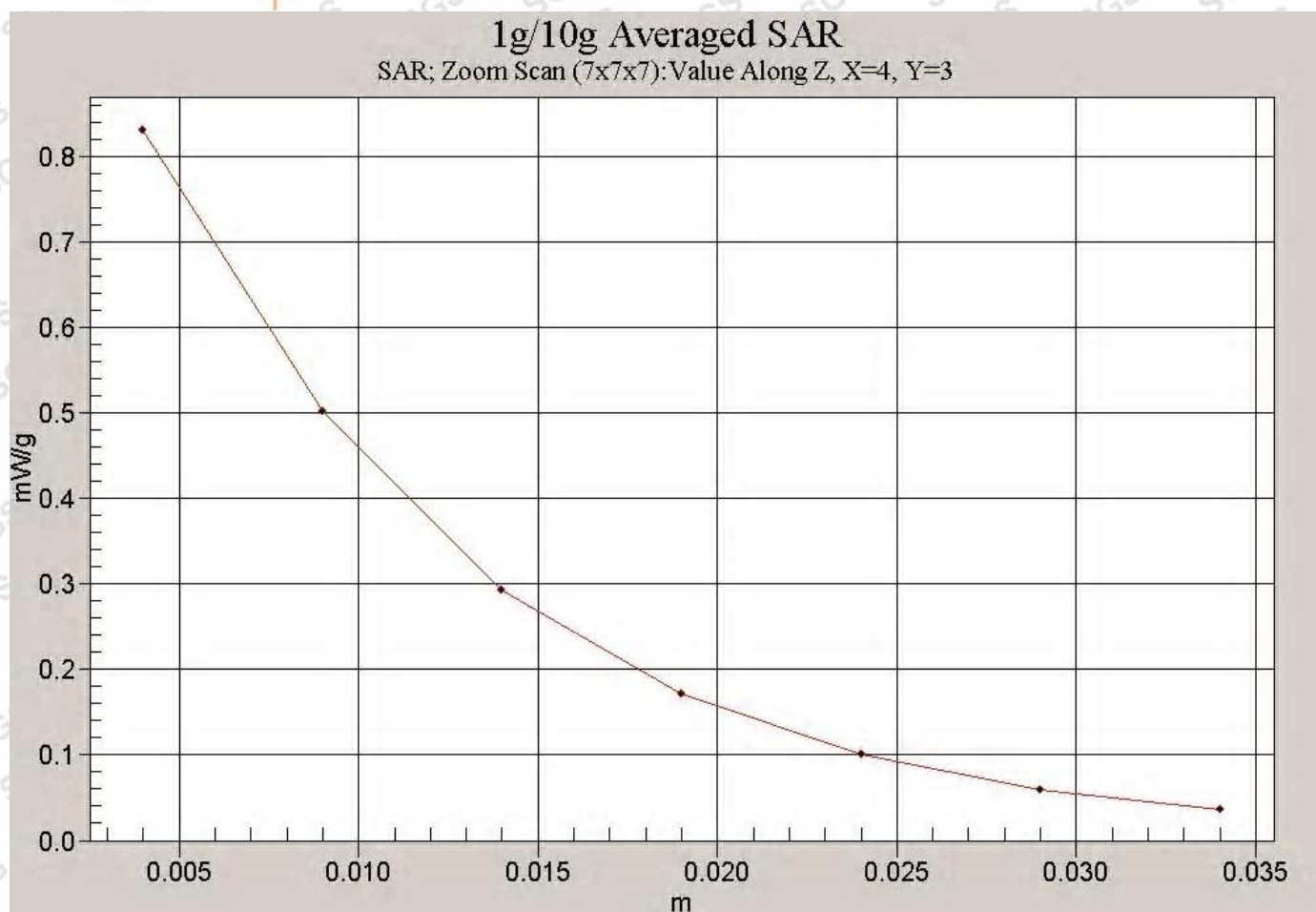
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0 dB = 0.830mW/g

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4.6 PCS1900-Leftside- Cheek- WorstCase-High

Date/Time: 2008-7-27 15:43:00

Test Laboratory: SGS-GSM

GSM1900--LeftHandSide-Cheek-High-Slide Off

DUT: KS005AW02; Type: Body; Serial: 20080721

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Communication System: PCS1900-GSM Mode; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

Medium: 1900-Head Medium parameters used: $f = 1909.8 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 41.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.84, 4.84, 4.84); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Cheek position - High/Area Scan (61x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.620 mW/g

Cheek position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

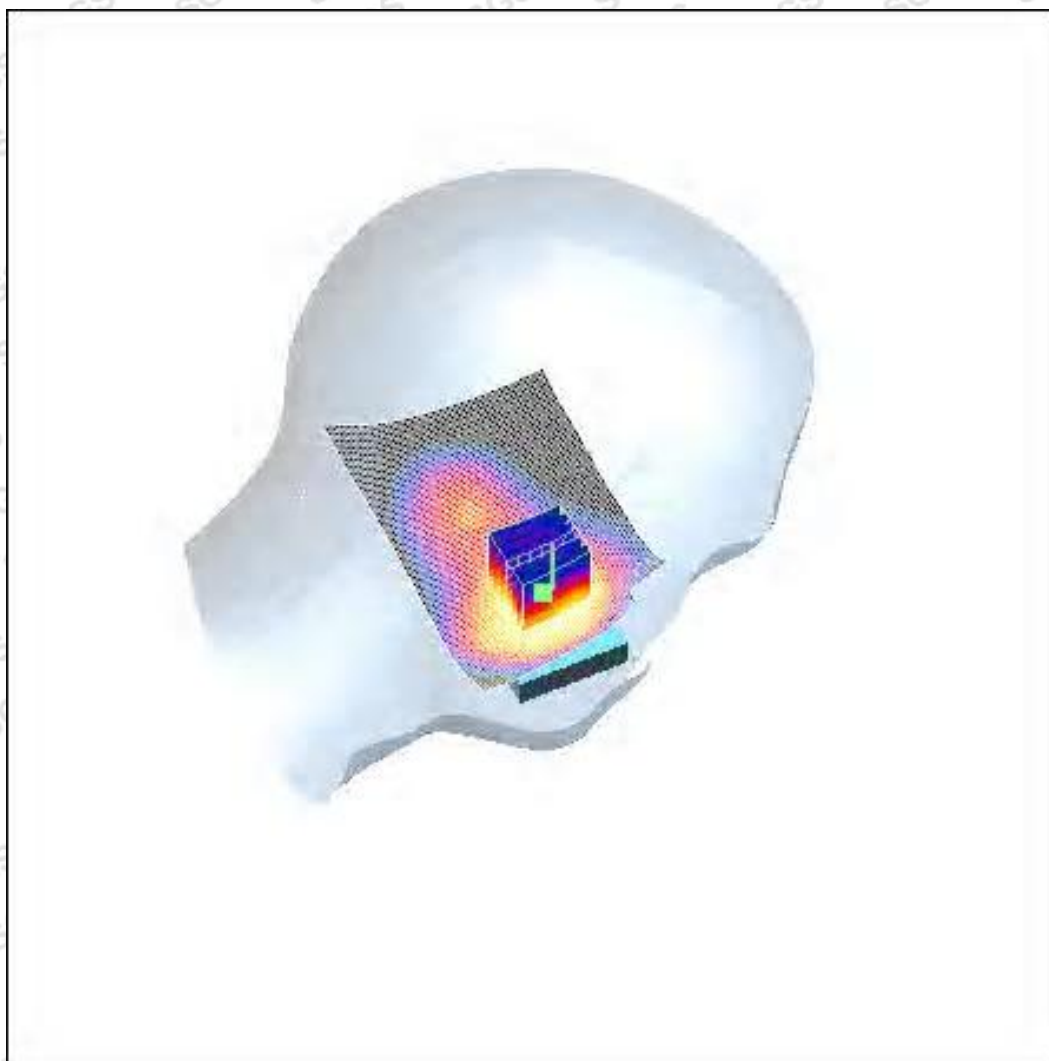
Reference Value = 8.99 V/m; Power Drift = -0.081 dB

Peak SAR (extrapolated) = 0.961 W/kg

SAR(1 g) = 0.560 mW/g; SAR(10 g) = 0.308 mW/g

Maximum value of SAR (measured) = 0.646 mW/g

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0 dB = 0.646mW/g

4.7 PCS1900-Leftside- Cheek- WorstCase+BT

Date/Time: 2008-7-27 16:28:03

Test Laboratory: SGS-GSM

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GSM1900--LeftHandSide-Cheek-Low-Slide Off +BT

DUT: KS005AW02; Type: Body; Serial: 20080721

Communication System: PCS1900-GSM Mode; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3

Medium: 1900-Head Medium parameters used: $f = 1850.2 \text{ MHz}$; $\sigma = 1.34 \text{ mho/m}$; $\epsilon_r = 41.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.84, 4.84, 4.84); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Cheek position - Low BT/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.808 mW/g

Cheek position - Low BT/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.87 V/m; Power Drift = -0.080 dB

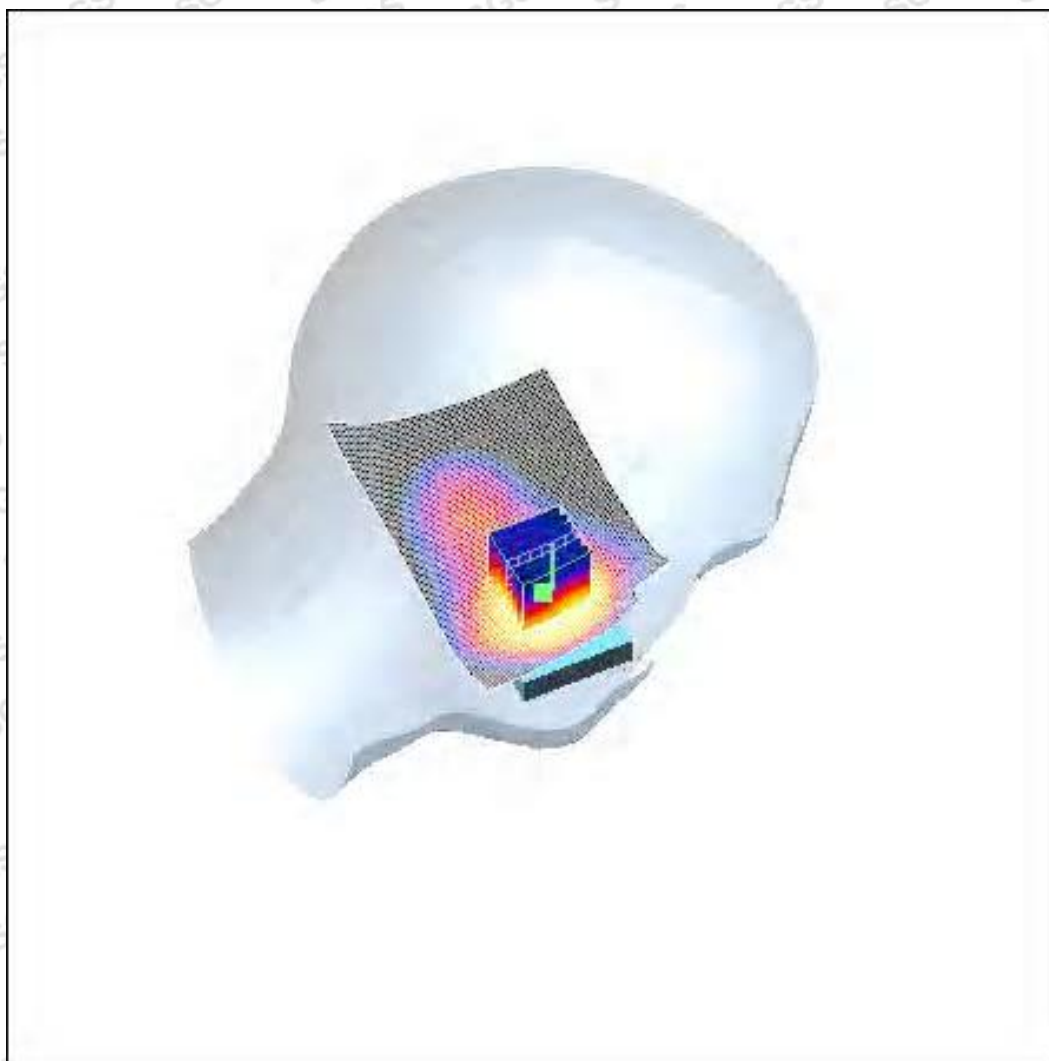
Peak SAR (extrapolated) = 1.23 W/kg

SAR(1 g) = 0.734 mW/g; SAR(10 g) = 0.412 mW/g

Maximum value of SAR (measured) = 0.819 mW/g

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0 dB = 0.819mW/g

4.8 PCS1900-Rightside- Cheek-Mid-SlideOff

Date/Time: 2008-7-24 10:05:19

Test Laboratory: SGS-GSM

GSM1900-RightHandSide-Cheek-Mid-Slide Off

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DUT: KS005AW02; Type: Body; Serial: 20080721

Communication System: PCS1900-GSM Mode; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900-Head Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.37 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.84, 4.84, 4.84); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Cheek position - Middle/Area Scan (61x91x1); Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.657 mW/g

Cheek position - Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

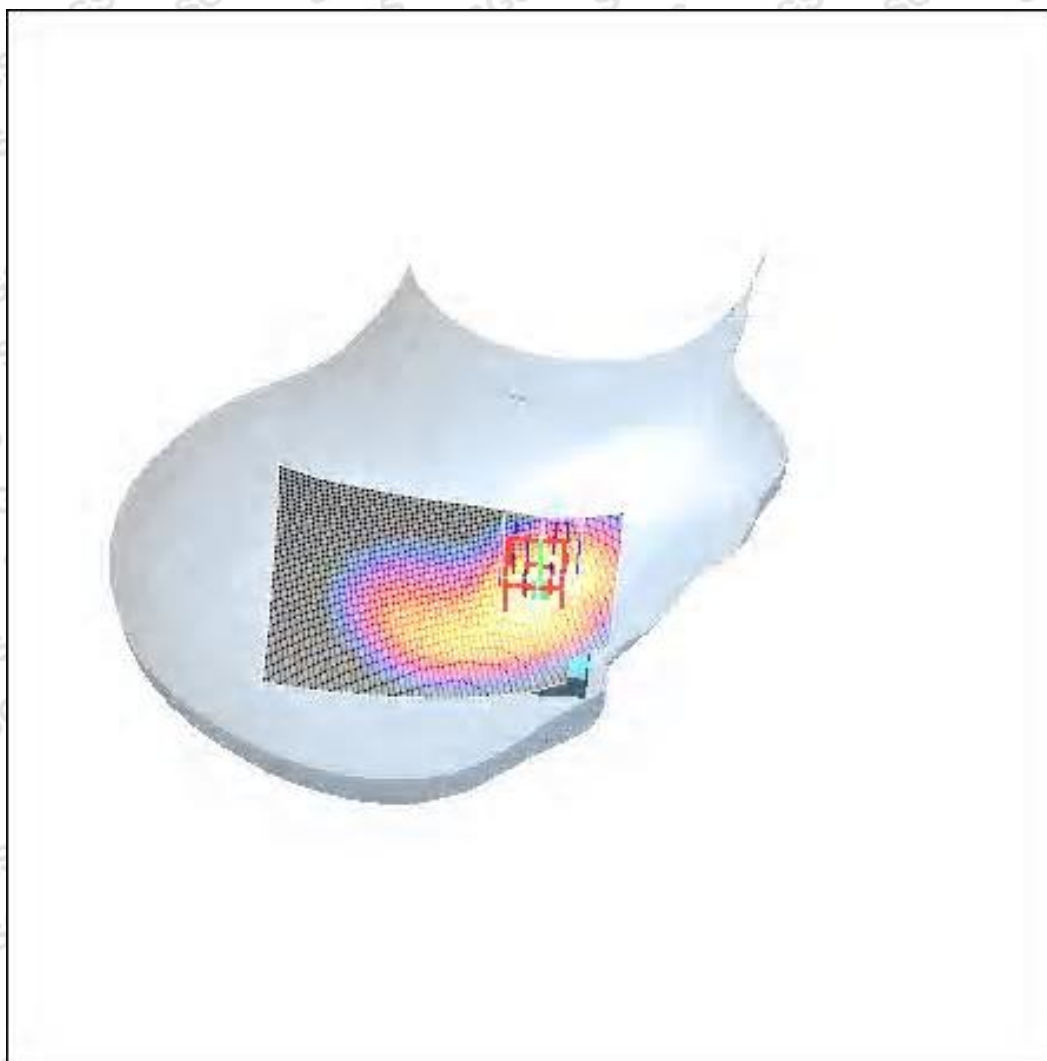
Reference Value = 9.75 V/m; Power Drift = -0.278 dB

Peak SAR (extrapolated) = 1.02 W/kg

SAR(1 g) = 0.572 mW/g; SAR(10 g) = 0.303 mW/g

Maximum value of SAR (measured) = 0.648 mW/g

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0 dB = 0.648mW/g

4.9 PCS1900-Rightside- Tilt-Mid-SlideOff

Date/Time: 2008-7-24 10:32:26

Test Laboratory: SGS-GSM

GSM1900-RightHandSide-Tilt-Mid-Slide Off

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DUT: KS005AW02; Type: Body; Serial: 20080721

Communication System: PCS1900-GSM Mode; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900-Head Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.37 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.84, 4.84, 4.84); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Tilt position - Middle/Area Scan (61x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.206 mW/g

Tilt position - Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 11.5 V/m ; Power Drift = -0.124 dB

Peak SAR (extrapolated) = 0.261 W/kg

SAR(1 g) = 0.169 mW/g ; SAR(10 g) = 0.101 mW/g

Maximum value of SAR (measured) = 0.182 mW/g

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0 dB = 0.182mW/g

4.10 PCS1900-Rightside- Cheek-Mid-SlideOn

Date/Time: 2008-7-24 11:49:14

Test Laboratory: SGS-GSM

GSM1900-RightHandSide-Cheek-Mid-Slide On

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DUT: KS005AW02; Type: Body; Serial: 20080721

Communication System: PCS1900-GSM Mode; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900-Head Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.37 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.84, 4.84, 4.84); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Cheek position - Middle Open/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.250 mW/g

Cheek position - Middle Open/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 6.84 V/m; Power Drift = -0.272 dB

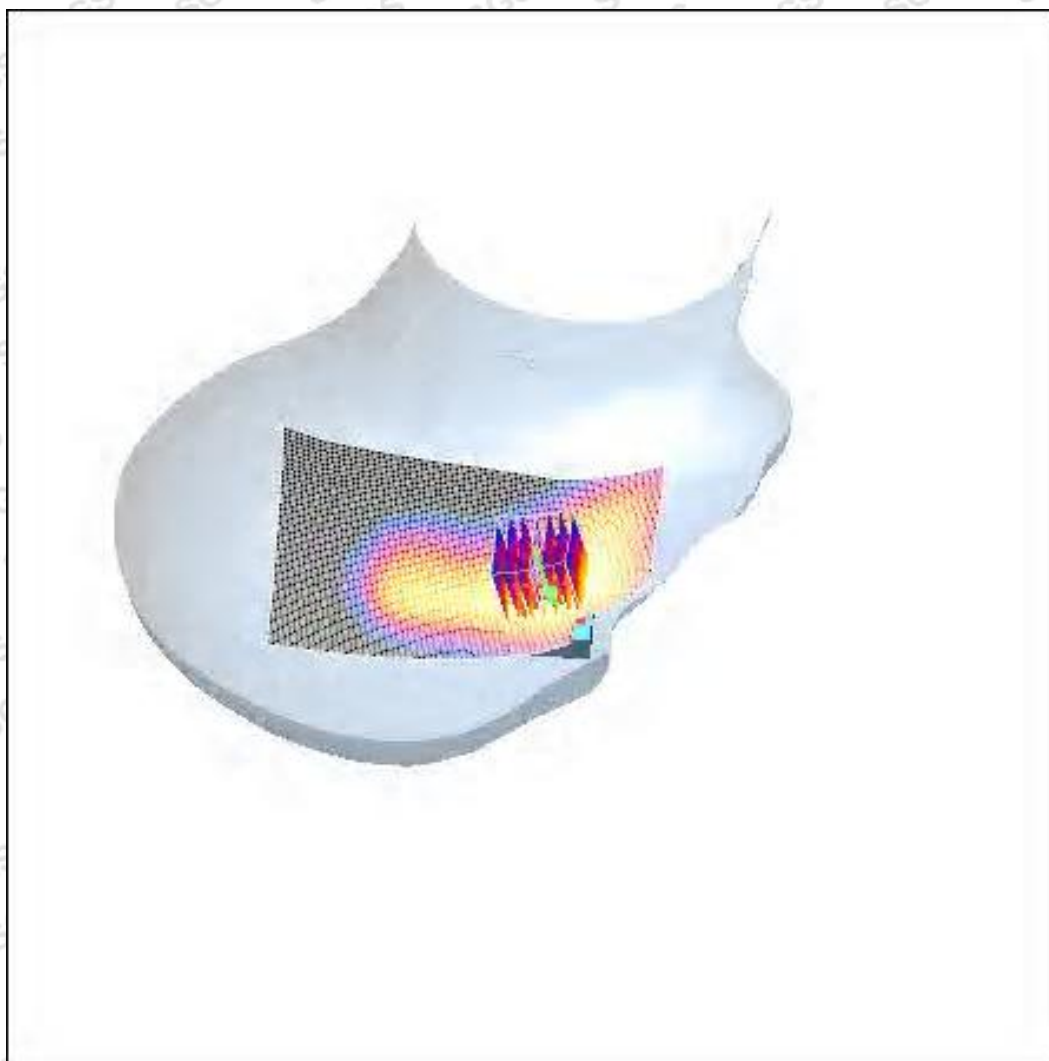
Peak SAR (extrapolated) = 0.344 W/kg

SAR(1 g) = 0.222 mW/g; SAR(10 g) = 0.136 mW/g

Maximum value of SAR (measured) = 0.241 mW/g

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0 dB = 0.241mW/g

4.11 PCS1900-Rightside- Cheek-Tilt-SlideOn

Date/Time: 2008-7-24 12:24:07

Test Laboratory: SGS-GSM

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GSM1900-RightHandSide-Tilt-Mid-Slide On

DUT: KS005AW02; Type: Body; Serial: 20080721

Communication System: PCS1900-GSM Mode; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900-Head Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.37 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.84, 4.84, 4.84); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Tilt position -Mid Open/Area Scan (61x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.197 mW/g

Tilt position -Mid Open/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

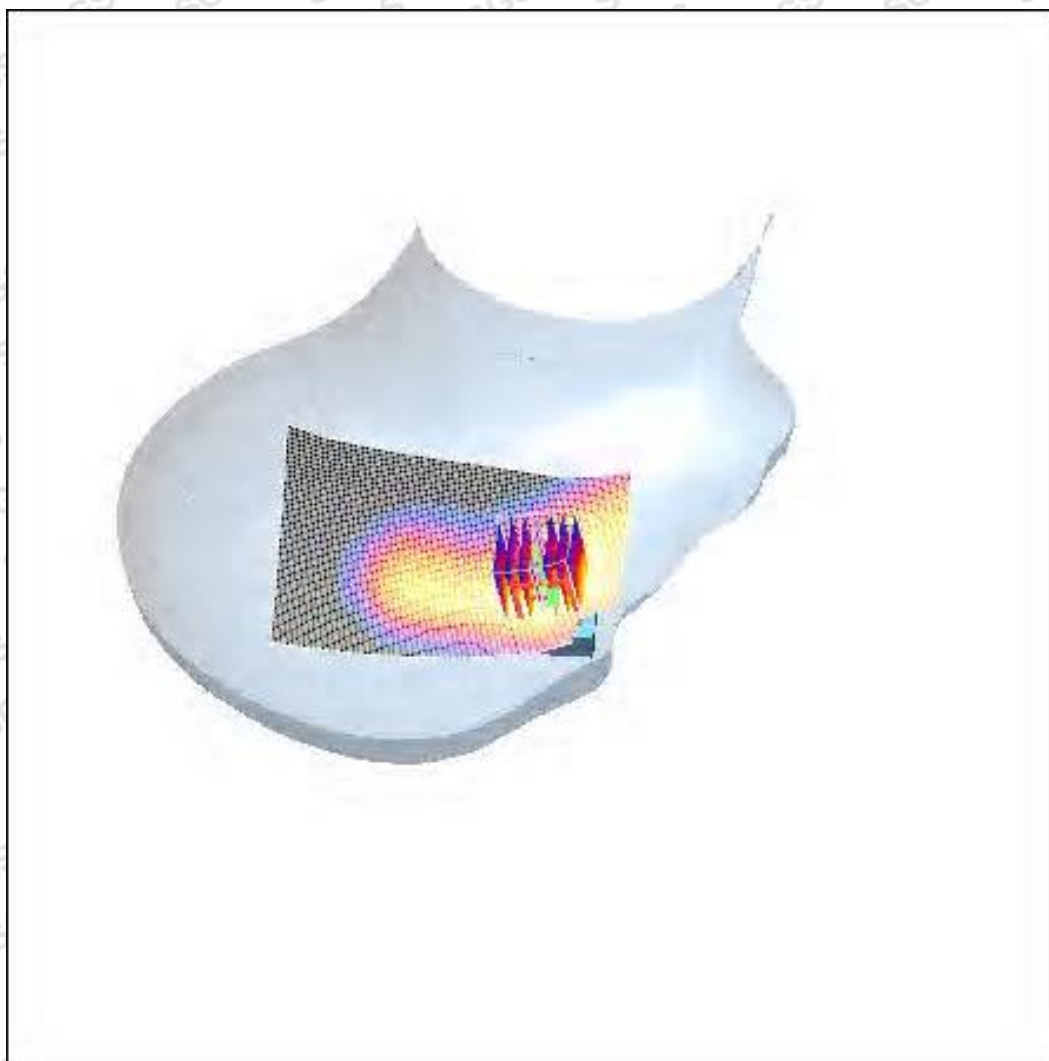
Reference Value = 6.26 V/m; Power Drift = -0.097 dB

Peak SAR (extrapolated) = 0.285 W/kg

SAR(1 g) = 0.175 mW/g; SAR(10 g) = 0.105 mW/g

Maximum value of SAR (measured) = 0.192 mW/g

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0 dB = 0.192mW/g

4.12 PCS1900-Rightside- Cheek-WorstCase-Low

Date/Time: 2008-7-24 10:57:02

Test Laboratory: SGS-GSM

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GSM1900-RightHandSide-Cheek-Low-Slide Off

DUT: KS005AW02; Type: Body; Serial: 20080721

Communication System: PCS1900-GSM Mode; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Medium: 1900-Head Medium parameters used: $f = 1850.2 \text{ MHz}$; $\sigma = 1.34 \text{ mho/m}$; $\epsilon_r = 41.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.84, 4.84, 4.84); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Cheek position - Low/Area Scan (61x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.731 mW/g

Cheek position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

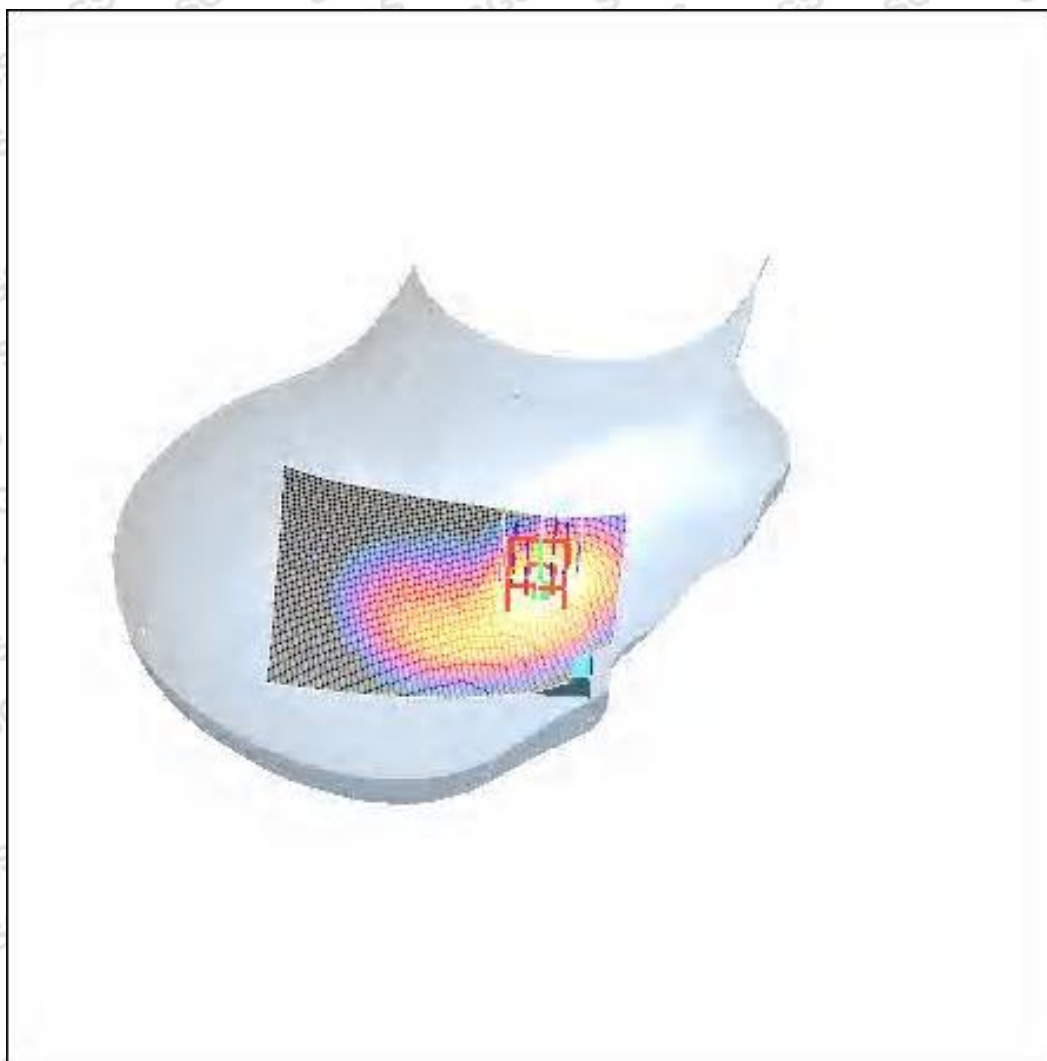
Reference Value = 10.3 V/m; Power Drift = -0.026 dB

Peak SAR (extrapolated) = 1.13 W/kg

SAR(1 g) = 0.648 mW/g; SAR(10 g) = 0.346 mW/g

Maximum value of SAR (measured) = 0.723 mW/g

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0 dB = 0.723mW/g

4.13 PCS1900-Rightside- Cheek- WorstCase-High

Date/Time: 2008-7-24 11:24:37

Test Laboratory: SGS-GSM

GSM1900-RightHandSide-Cheek-High-Slide Off

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DUT: KS005AW02; Type: Body; Serial: 20080721

Communication System: PCS1900-GSM Mode; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

Medium: 1900-Head Medium parameters used: $f = 1909.8 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 41.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.84, 4.84, 4.84); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Cheek position - High/Area Scan (61x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Cheek position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

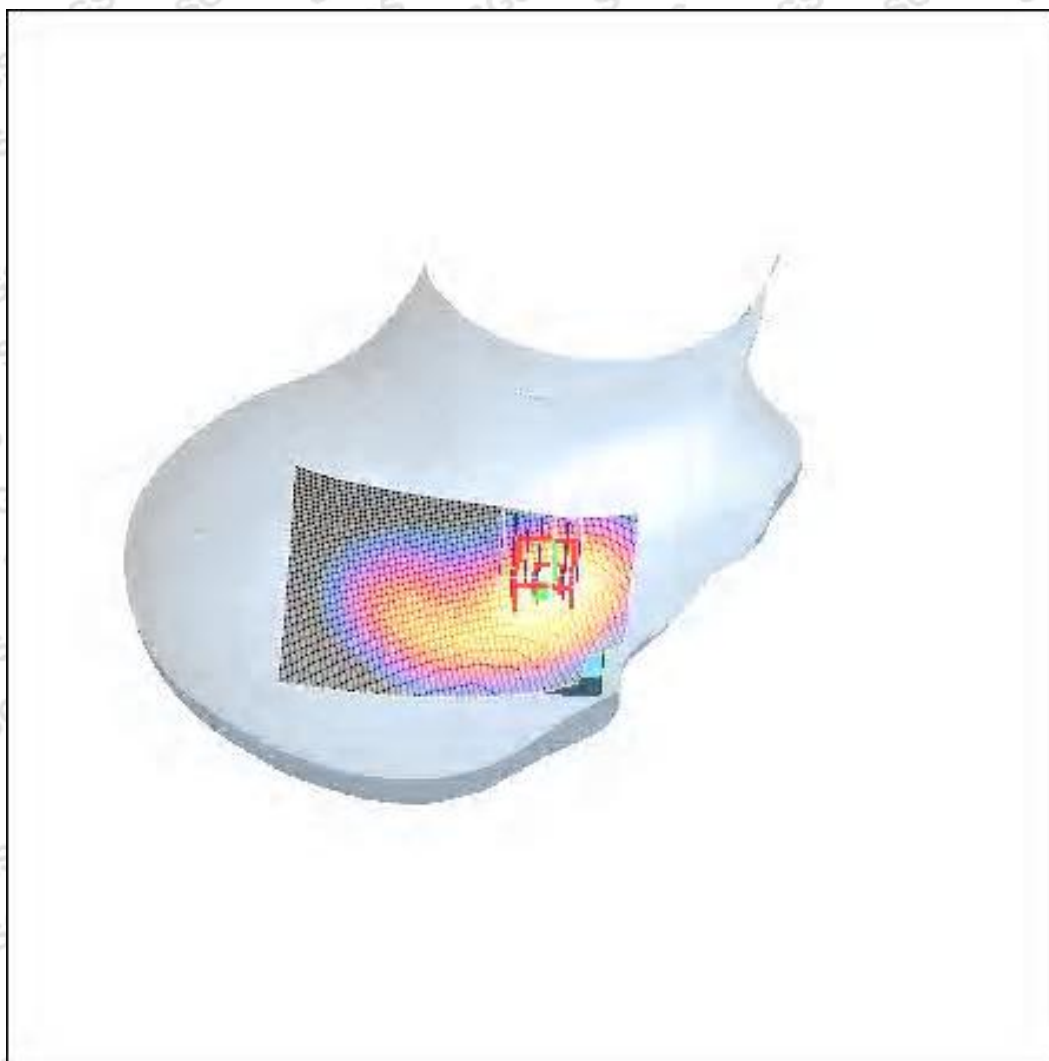
Reference Value = 10.1 V/m; Power Drift = -0.163 dB

Peak SAR (extrapolated) = 1.26 W/kg

SAR(1 g) = 0.686 mW/g; SAR(10 g) = 0.356 mW/g

Maximum value of SAR (measured) = 0.761 mW/g

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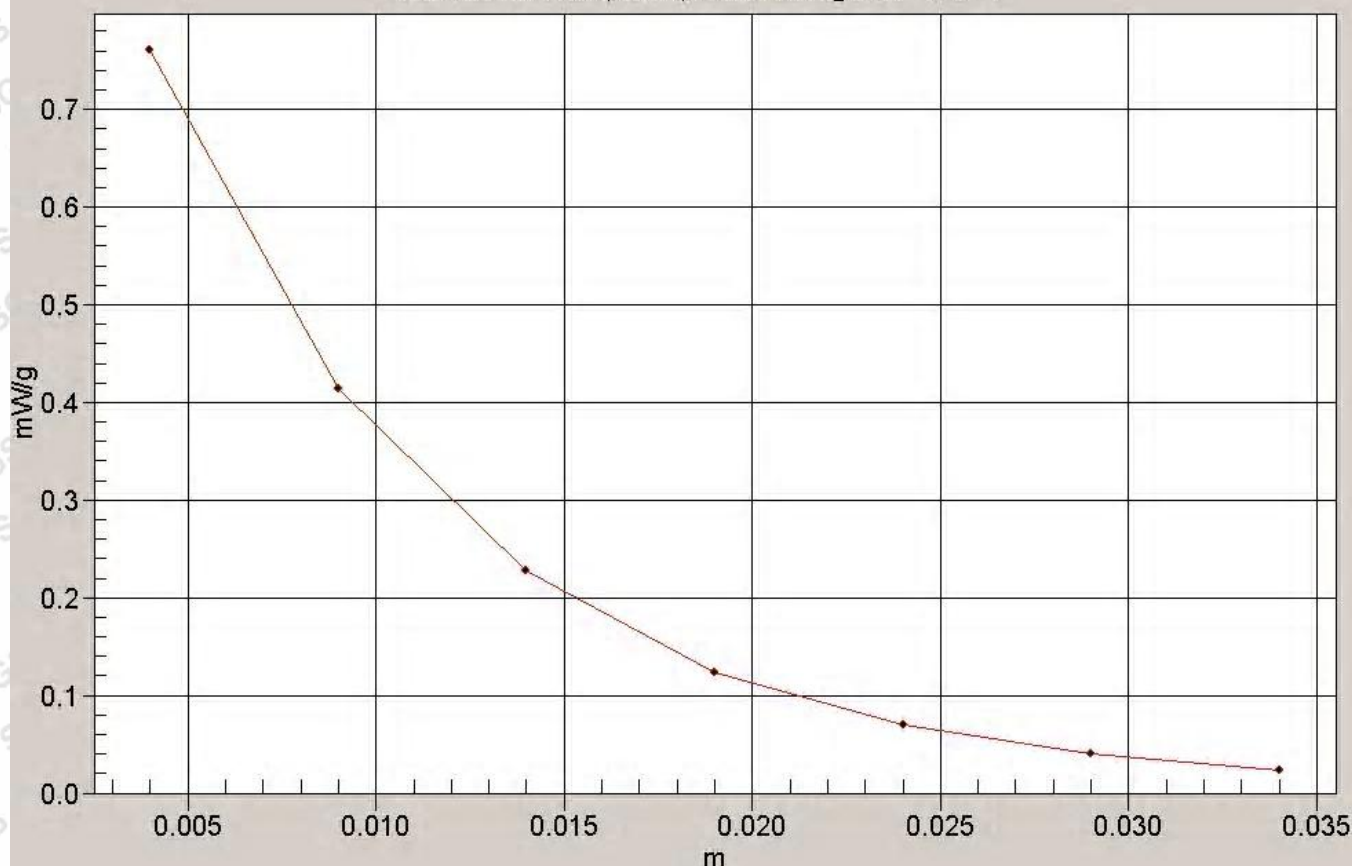


0 dB = 0.761mW/g

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1g/10g Averaged SAR

SAR; Zoom Scan (7x7x7): Value Along Z, X=4, Y=4



4.14 PCS1900-Rightside- Cheek- WorstCase+BT

Date/Time: 2008-7-24 13:44:54

Test Laboratory: SGS-GSM

PCS1900-RightHandSide-Check-High+BT

DUT: KS005AW02; Type: Body; Serial: 20080721

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Communication System: PCS1900-GSM Mode; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

Medium: 1900-Head Medium parameters used: $f = 1909.8 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 41.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.84, 4.84, 4.84); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Cheek position - High +bt/Area Scan (61x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.642 mW/g

Cheek position - High +bt/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$,
 $dz=5\text{mm}$

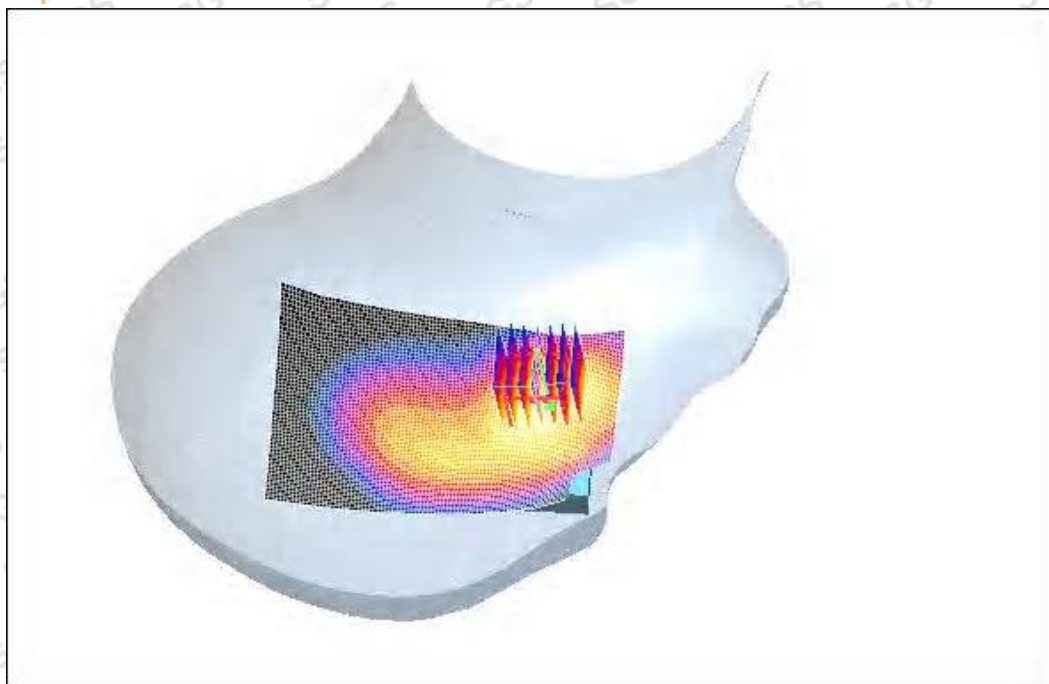
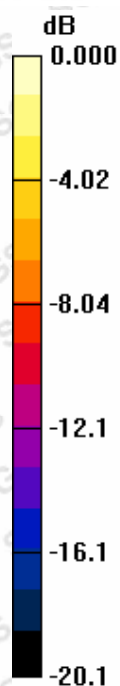
Reference Value = 9.75 V/m; Power Drift = -0.143 dB

Peak SAR (extrapolated) = 1.04 W/kg

SAR(1 g) = 0.582 mW/g; SAR(10 g) = 0.300 mW/g

Maximum value of SAR (measured) = 0.639 mW/g

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0 dB = 0.639mW/g

4.15 PCS1900-Bodyworn- GPRS-Low-Slideon-Headset189515489

Date/Time: 2008-7-23 23:56:44

Test Laboratory: SGS-GSM

GSM1900-Body-Worn-GPRS-Low-1.5cm-489-Slide On

DUT: KS005AW02; Type: Body; Serial: 20080721

Communication System: PCS1900-GPRS Mode; Frequency: 1850.2 MHz; Duty Cycle: 1:4

Medium: HSL1900-Body Medium parameters used: $f = 1850.2 \text{ MHz}$; $\sigma = 1.53 \text{ mho/m}$; $\epsilon_r = 52.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.6, 4.6, 4.6); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body Worn -Low 489 Open/Area Scan (81x131x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.750 mW/g

Body Worn -Low 489 Open/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

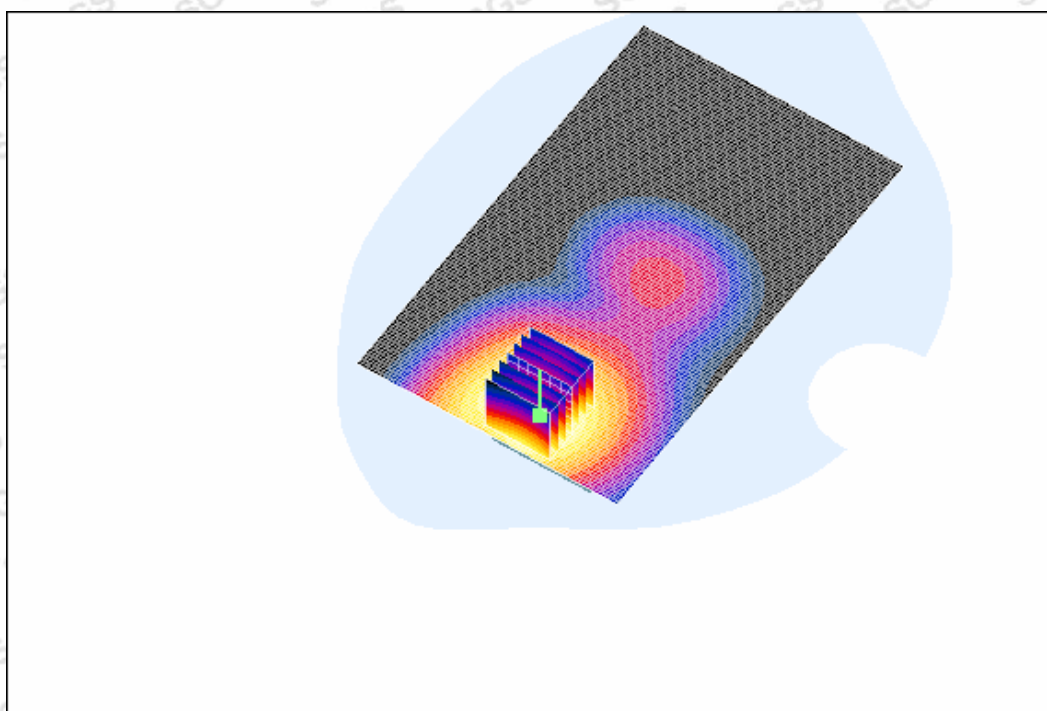
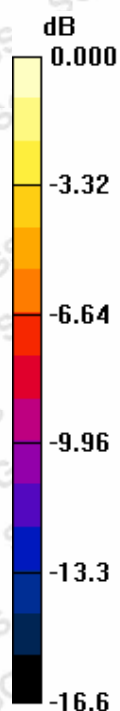
Reference Value = 8.60 V/m; Power Drift = -0.081 dB

Peak SAR (extrapolated) = 1.10 W/kg

SAR(1 g) = 0.673 mW/g; SAR(10 g) = 0.404 mW/g

Maximum value of SAR (measured) = 0.731 mW/g

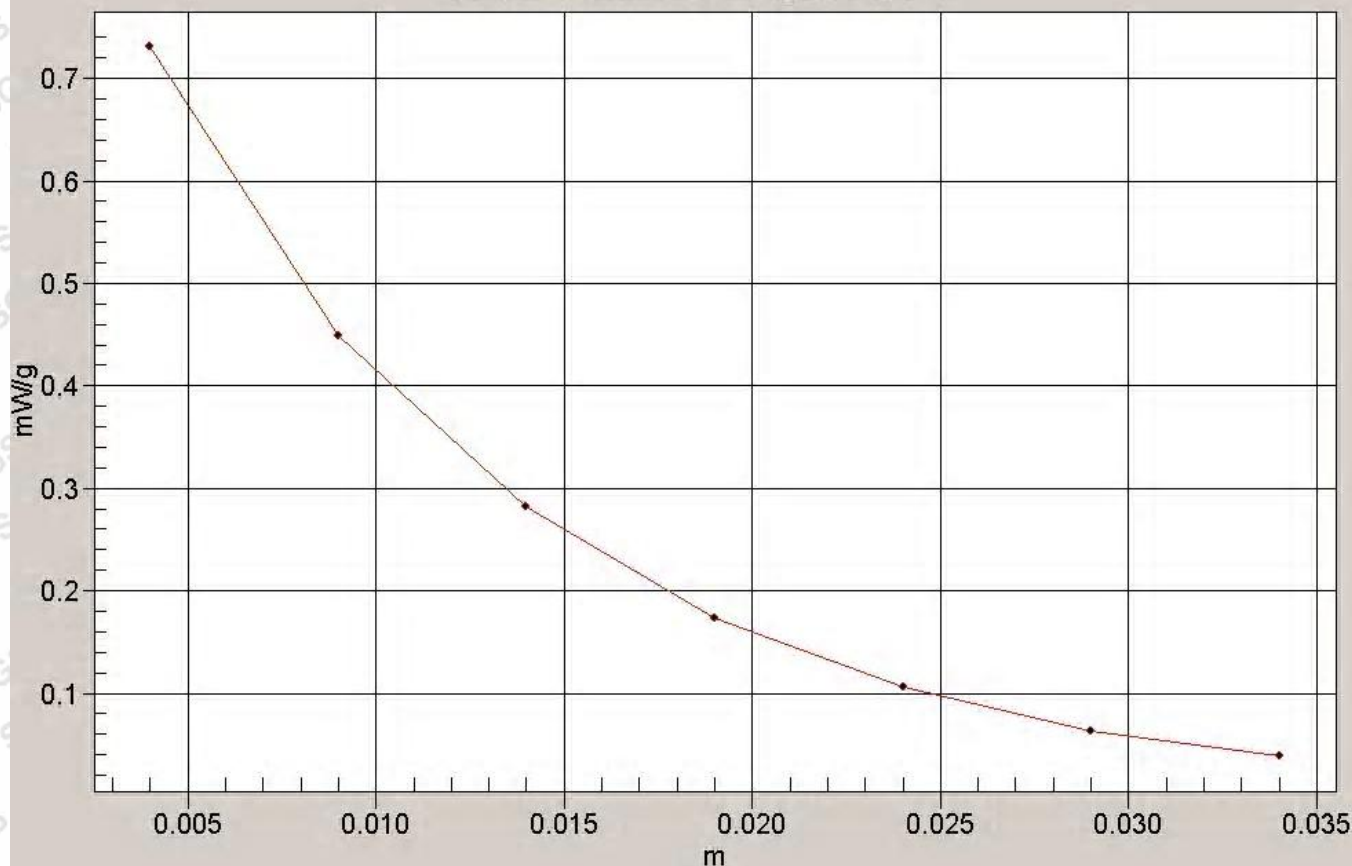
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0 dB = 0.731mW/g

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1g/10g Averaged SAR
SAR; Zoom Scan: Value Along Z, X=3, Y=3



4.16 PCS1900-Bodyworn- GPRS-Mid- Slideon-Headset189515489

Date/Time: 2008-7-23 22:28:54

Test Laboratory: SGS-GSM

GSM1900-Body-Worn-GPRS-Mid-1.5cm-489-Slide On

DUT: KS005AW02; Type: Body; Serial: 20080721

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Communication System: PCS1900-GPRS Mode; Frequency: 1880 MHz; Duty Cycle: 1:4

Medium: HSL1900-Body Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.56 \text{ mho/m}$; $\epsilon_r = 52.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.6, 4.6, 4.6); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body Worn - Middle 489 Open/Area Scan (81x131x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.706 mW/g

Body Worn - Middle 489 Open/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

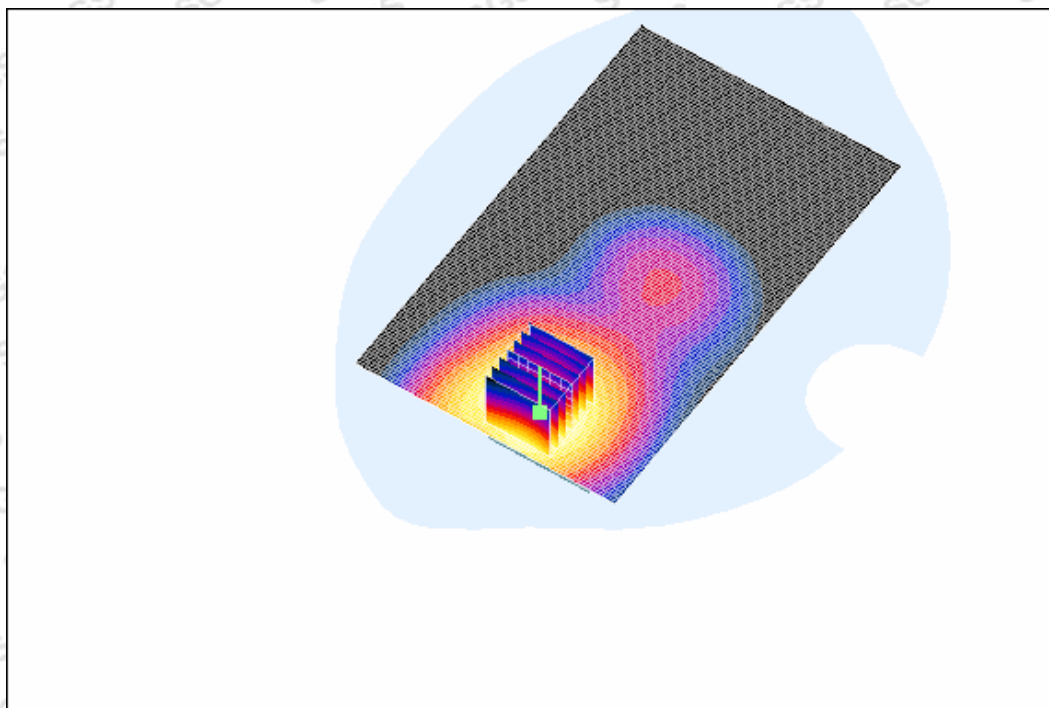
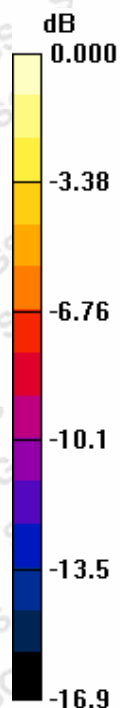
Reference Value = 7.68 V/m; Power Drift = -0.101 dB

Peak SAR (extrapolated) = 1.05 W/kg

SAR(1 g) = 0.636 mW/g; SAR(10 g) = 0.378 mW/g

Maximum value of SAR (measured) = 0.689 mW/g

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0 dB = 0.689mW/g

4.17 PCS1900-Bodyworn- GPRS-High- Slideon-Headset189515489

Date/Time: 2008-7-23 23:30:11

Test Laboratory: SGS-GSM

GSM1900-Body-Worn-GPRS-High-1.5cm-489-Slide On

DUT: KS005AW02; Type: Body; Serial: 20080721

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Communication System: PCS1900-GPRS Mode; Frequency: 1880 MHz; Duty Cycle: 1:4

Medium: HSL1900-Body Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.56 \text{ mho/m}$; $\epsilon_r = 52.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.6, 4.6, 4.6); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body Worn - High 489 Open/Area Scan (81x131x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.597 mW/g

Body Worn - High 489 Open/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 6.96 V/m ; Power Drift = -0.021 dB

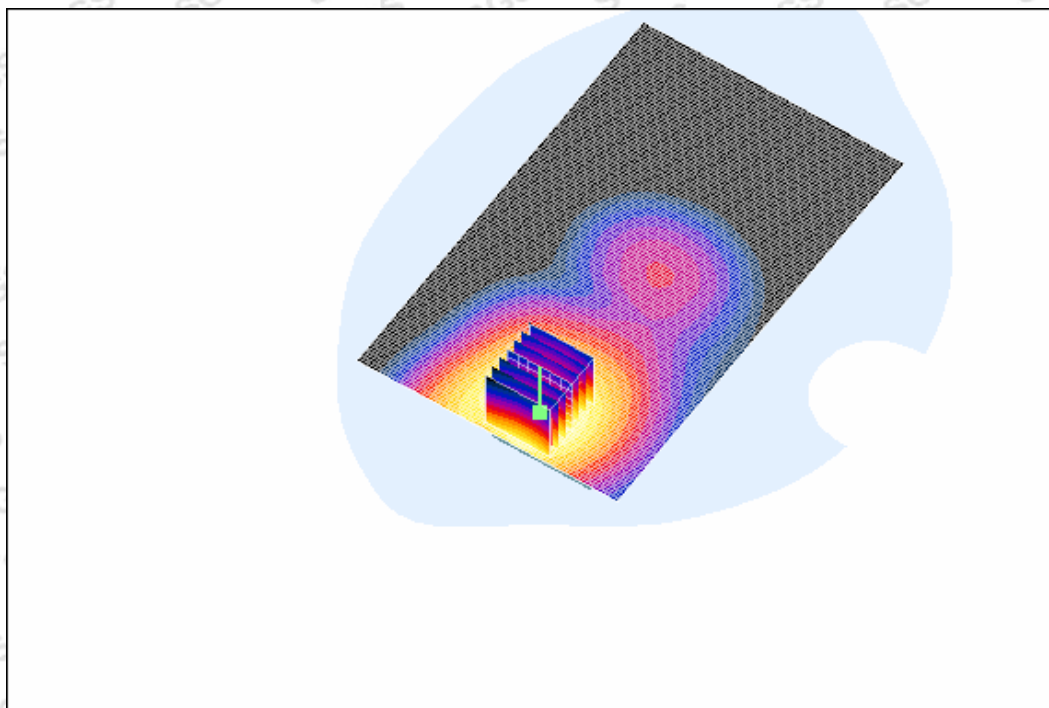
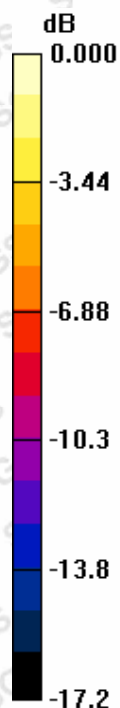
Peak SAR (extrapolated) = 0.880 W/kg

$\text{SAR}(1 \text{ g}) = 0.534 \text{ mW/g}$; $\text{SAR}(10 \text{ g}) = 0.316 \text{ mW/g}$

Maximum value of SAR (measured) = 0.581 mW/g

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SHGSM



0 dB = 0.581mW/g

4.18 PCS1900-Bodyworn- GPRS-Low-Slideon- Headset189515489

Date/Time: 2008-7-23 21:35:19

Test Laboratory: SGS-GSM

GSM1900-Body-Worn-GPRS-Low-1.5cm-489-Slide Off

DUT: KS005AW02; Type: Body; Serial: 20080721

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Communication System: PCS1900-GPRS Mode; Frequency: 1850.2 MHz; Duty Cycle: 1:4

Medium: HSL1900-Body Medium parameters used: $f = 1850.2 \text{ MHz}$; $\sigma = 1.53 \text{ mho/m}$; $\epsilon_r = 52.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.6, 4.6, 4.6); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body Worn - Low 489/Area Scan (81x131x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.561 mW/g

Body Worn - Low 489/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 6.45 V/m; Power Drift = 0.099 dB

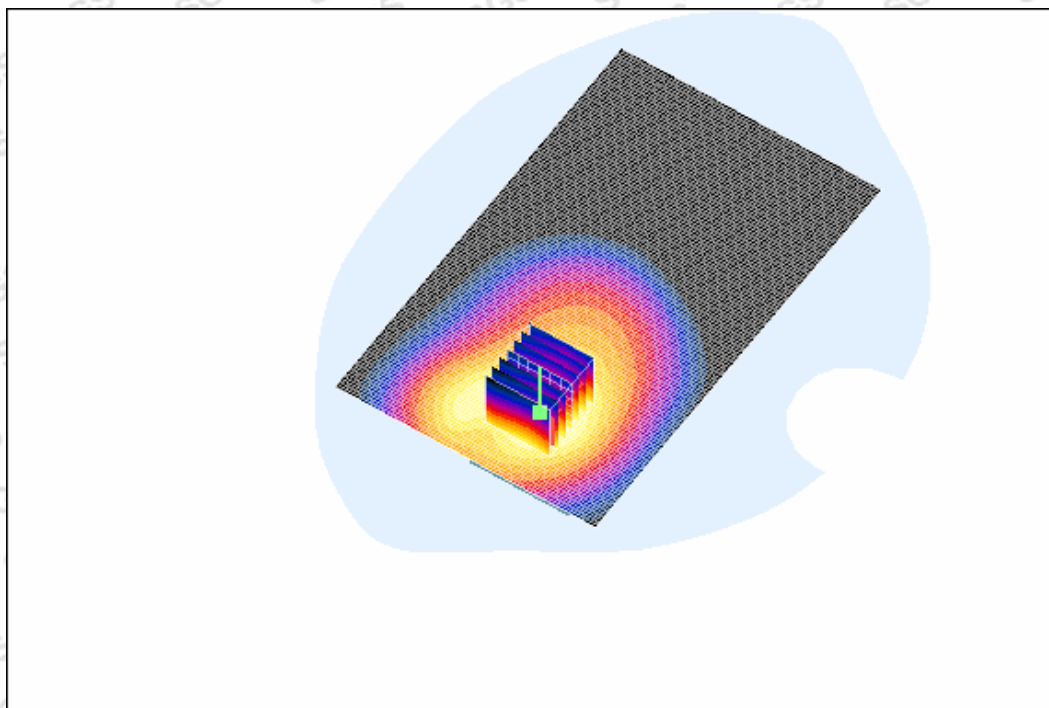
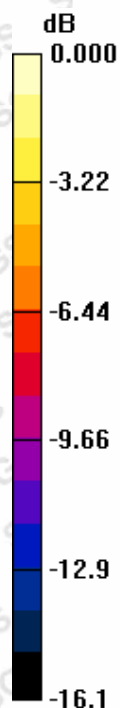
Peak SAR (extrapolated) = 0.840 W/kg

SAR(1 g) = 0.506 mW/g; SAR(10 g) = 0.300 mW/g

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

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SHGSM



0 dB = 0.549mW/g

4.19 PCS1900-Bodyworn- GPRS-worstcase-Headset189660148

Date/Time: 2008-7-23 22:59:17

Test Laboratory: SGS-GSM

GSM1900-Body-Worn-GPRS-Low-1.5cm-148-Slide On

DUT: KS005AW02; Type: Body; Serial: 20080721

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Communication System: PCS1900-GPRS Mode; Frequency: 1850.2 MHz; Duty Cycle: 1:4

Medium: HSL1900-Body Medium parameters used: $f = 1850.2 \text{ MHz}$; $\sigma = 1.53 \text{ mho/m}$; $\epsilon_r = 52.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.6, 4.6, 4.6); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body Worn - Low 148 Open/Area Scan (81x131x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.667 mW/g

Body Worn - Low 148 Open/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

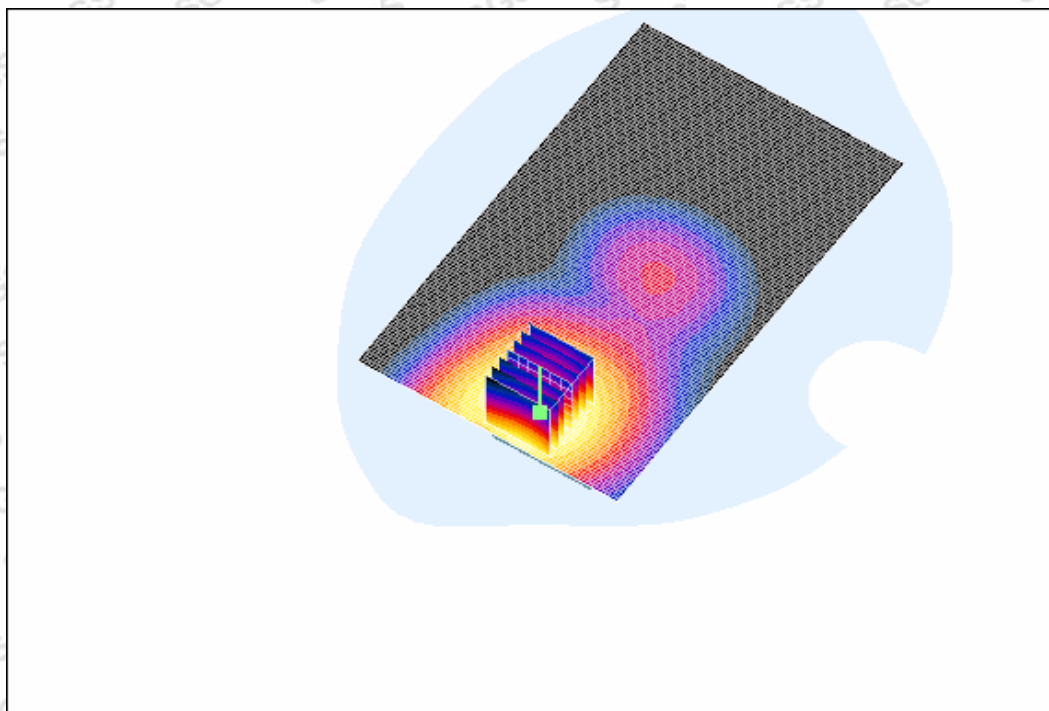
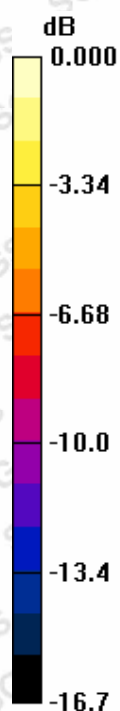
Reference Value = 7.68 V/m ; Power Drift = -0.033 dB

Peak SAR (extrapolated) = 0.967 W/kg

SAR(1 g) = 0.594 mW/g ; SAR(10 g) = 0.354 mW/g

Maximum value of SAR (measured) = 0.645 mW/g

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0 dB = 0.645mW/g

4.20 PCS1900-Bodyworn- GPRS-worstcase-BT

Date/Time: 2008-7-23 22:03:14

Test Laboratory: SGS-GSM

GSM1900-Body-Worn-GPRS-Low-1.5cm-BT-Slide On

DUT: KS005AW02; Type: Body; Serial: 20080721

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Communication System: PCS1900-GPRS Mode; Frequency: 1850.2 MHz; Duty Cycle: 1:4

Medium: HSL1900-Body Medium parameters used: $f = 1850.2 \text{ MHz}$; $\sigma = 1.53 \text{ mho/m}$; $\epsilon_r = 52.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.6, 4.6, 4.6); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body Worn - Low bt/Area Scan (81x131x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.555 mW/g

Body Worn - Low bt/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

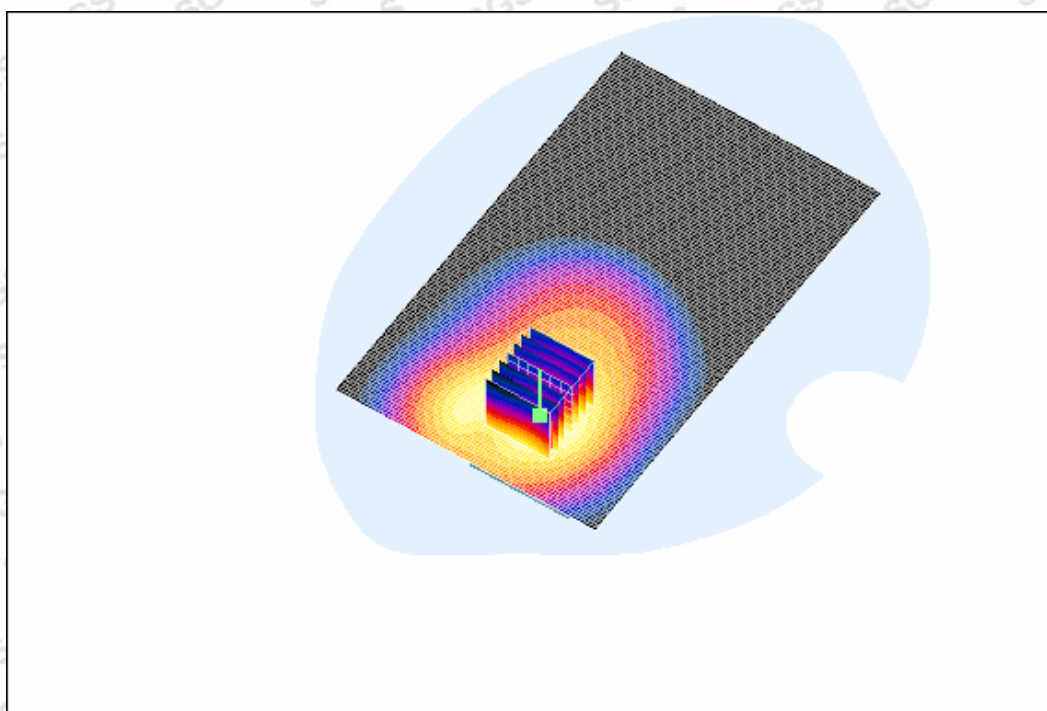
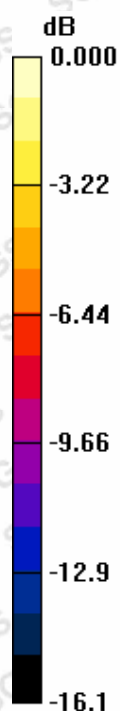
Reference Value = 6.49 V/m; Power Drift = 0.020 dB

Peak SAR (extrapolated) = 0.827 W/kg

SAR(1 g) = 0.501 mW/g; SAR(10 g) = 0.297 mW/g

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

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0 dB = 0.544mW/g

4.21 PCS1900-FlatPhantom-CS-Mid-0.5cm-Slideoff

Date/Time: 2008-7-27 17:04:43

Test Laboratory: SGS-GSM

GSM1900-Head-Worn-Mid-0.5cm-Slide Off

DUT: KS005AW02; Type: Body; Serial: 20080721

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Communication System: PCS1900-GSM Mode; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900-Head Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.37 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.84, 4.84, 4.84); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body Worn - Middle/Area Scan (81x131x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.751 mW/g

Body Worn - Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

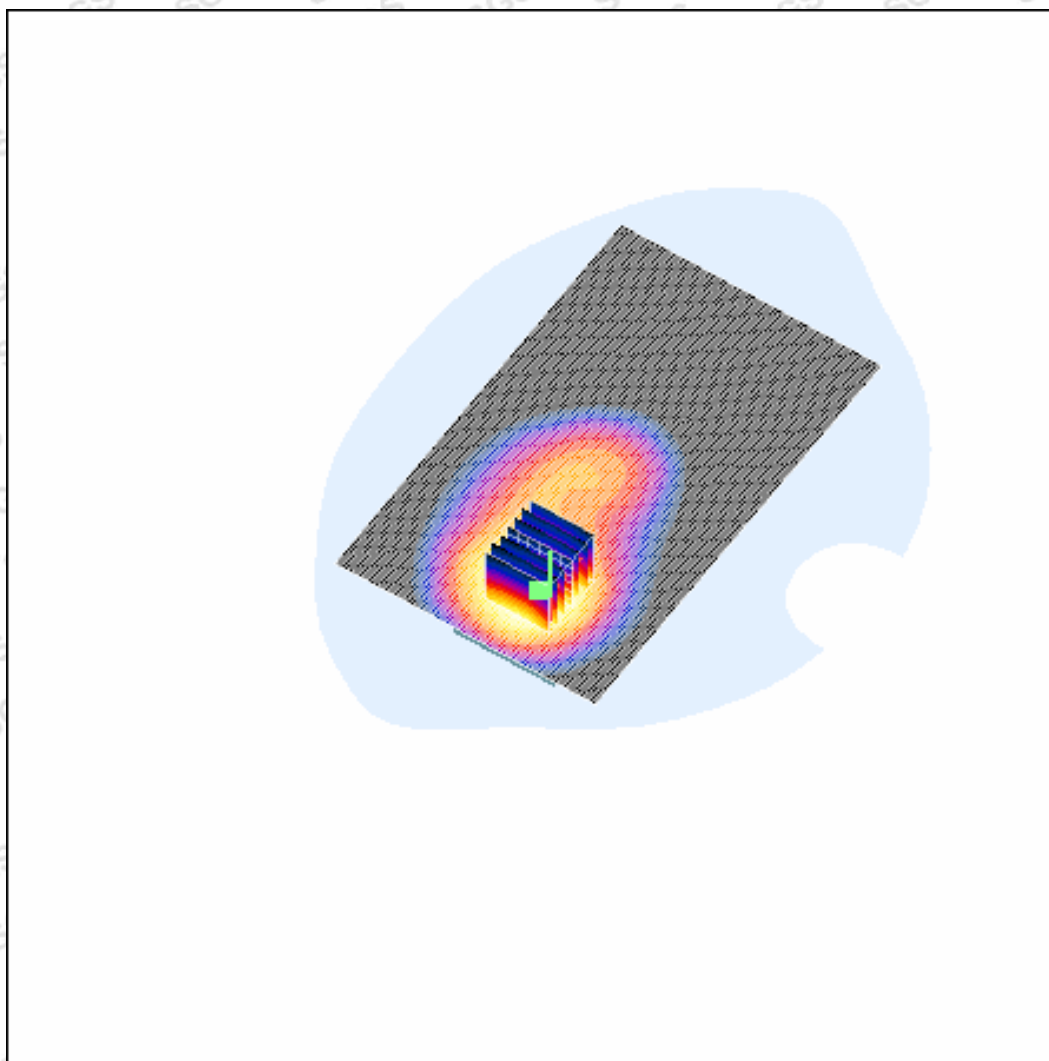
Reference Value = 9.88 V/m; Power Drift = -0.265 dB

Peak SAR (extrapolated) = 1.25 W/kg

SAR(1 g) = 0.650 mW/g; SAR(10 g) = 0.351 mW/g

Maximum value of SAR (measured) = 0.718 mW/g

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0 dB = 0.718mW/g

4.22 PCS1900-FlatPhantom-CS-Mid-0.5cm-Slideon

Date/Time: 2008-7-27 17:32:21

Test Laboratory: SGS-GSM

GSM1900-Head-Worn-Mid-0.5cm-Slide On

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DUT: KS005AW02; Type: Body; Serial: 20080721

Communication System: PCS1900-GSM Mode; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900-Head Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.37 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.84, 4.84, 4.84); Calibrated: 2008-1-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2007-11-19
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body Worn - MiddleOpen/Area Scan (81x131x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.718 mW/g

Body Worn - MiddleOpen/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.39 V/m; Power Drift = -0.060 dB

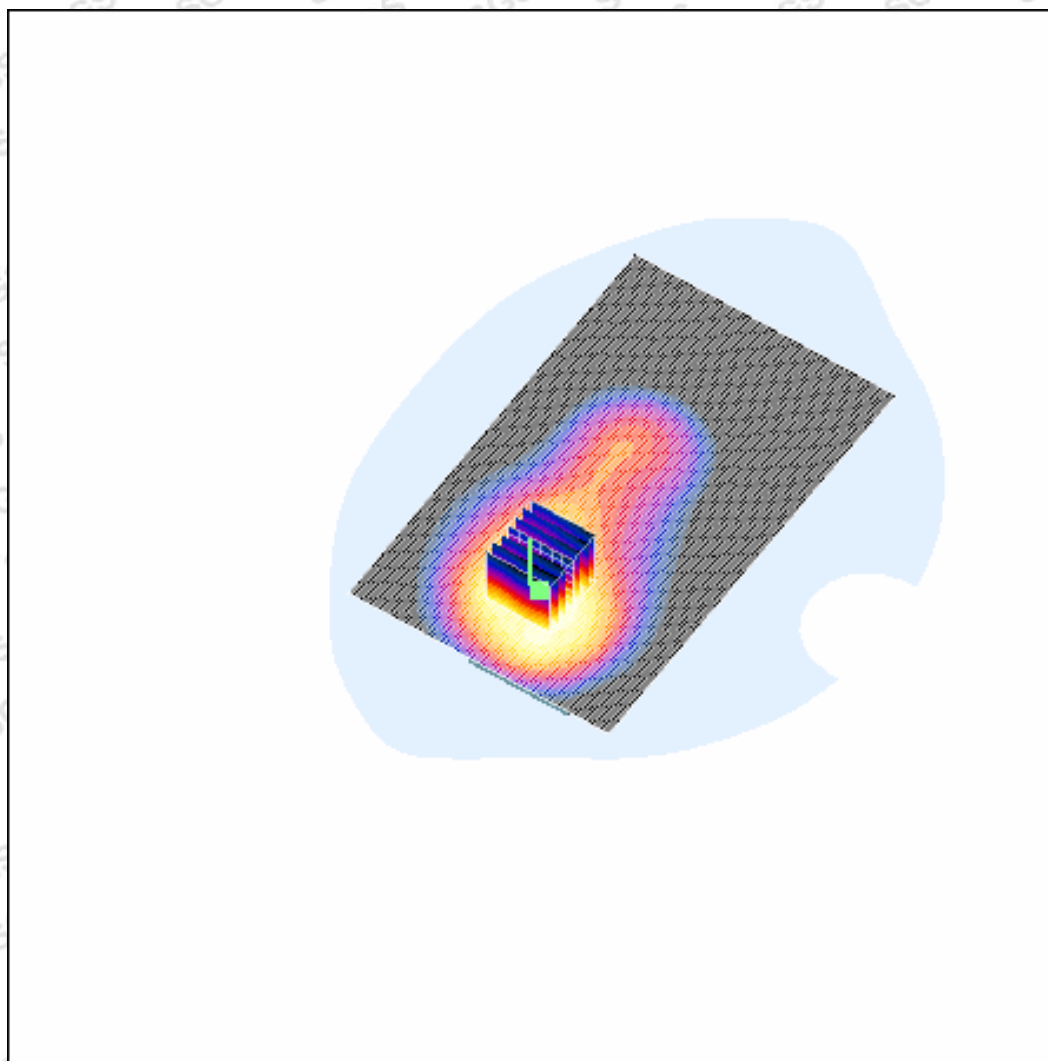
Peak SAR (extrapolated) = 1.20 W/kg

SAR(1 g) = 0.683 mW/g; SAR(10 g) = 0.388 mW/g

Maximum value of SAR (measured) = 0.740 mW/g

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SHGSM



0 dB = 0.740mW/g

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Appendix

1. Photographs of Test Setup

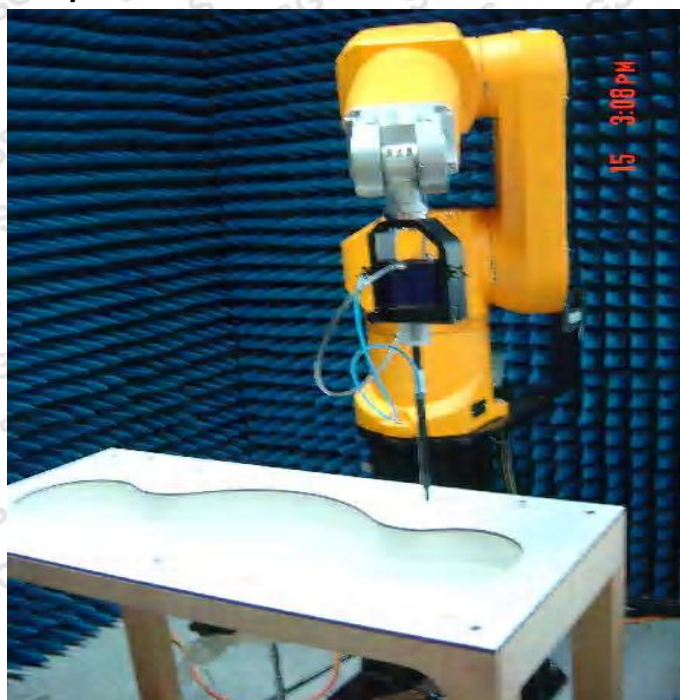


Fig.1 Photograph of the SAR measurement System

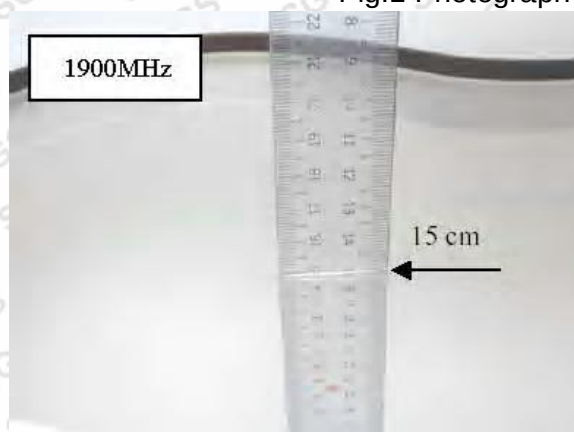


Fig.2 Photograph of the Tissue Simulant Liquid depth 15cm for Head

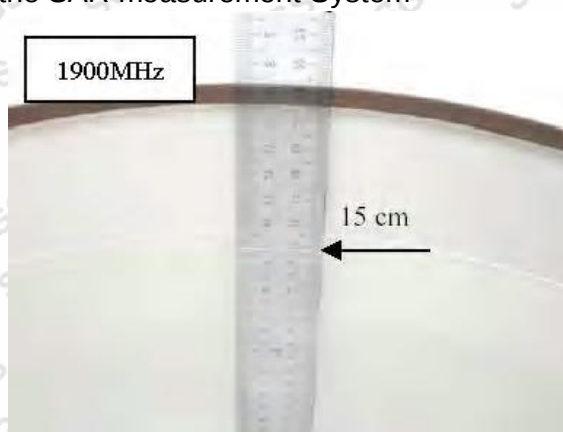


Fig.3 Photograph of the Tissue Simulant Liquid depth 15cm for Body-Worn

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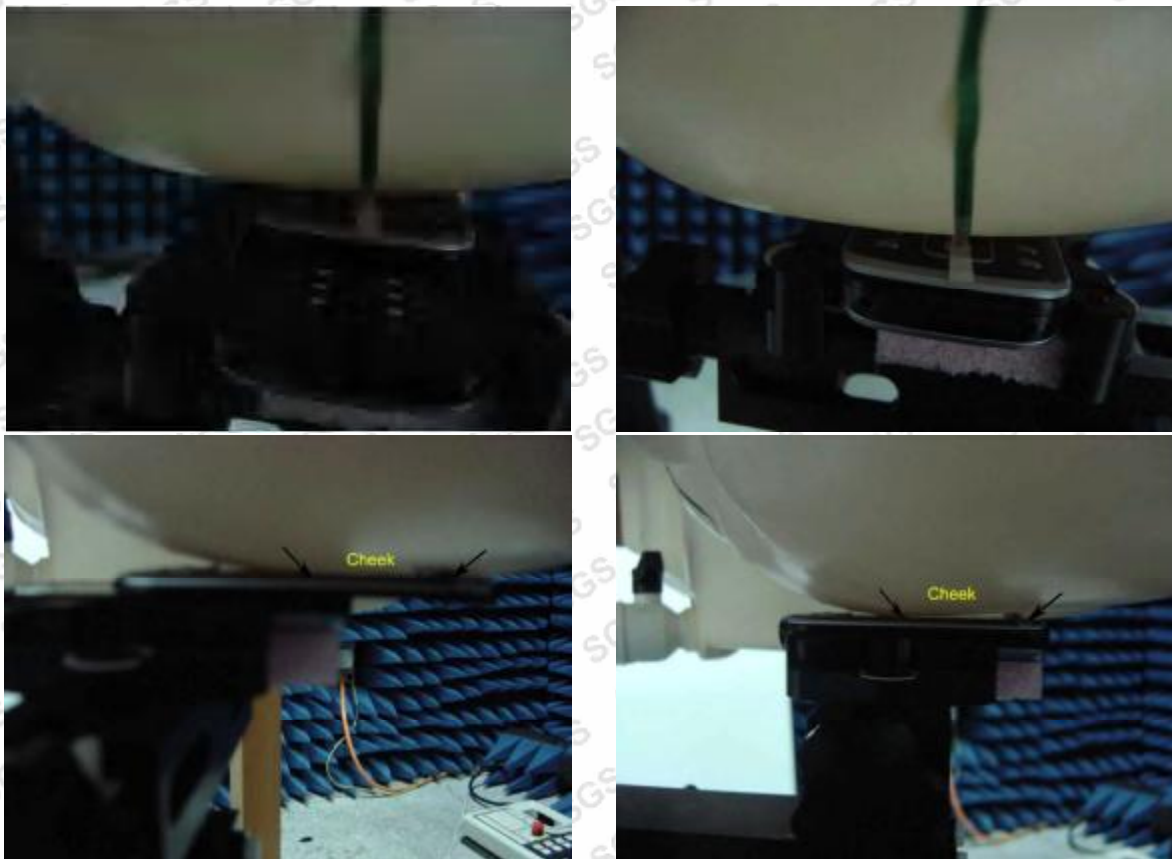
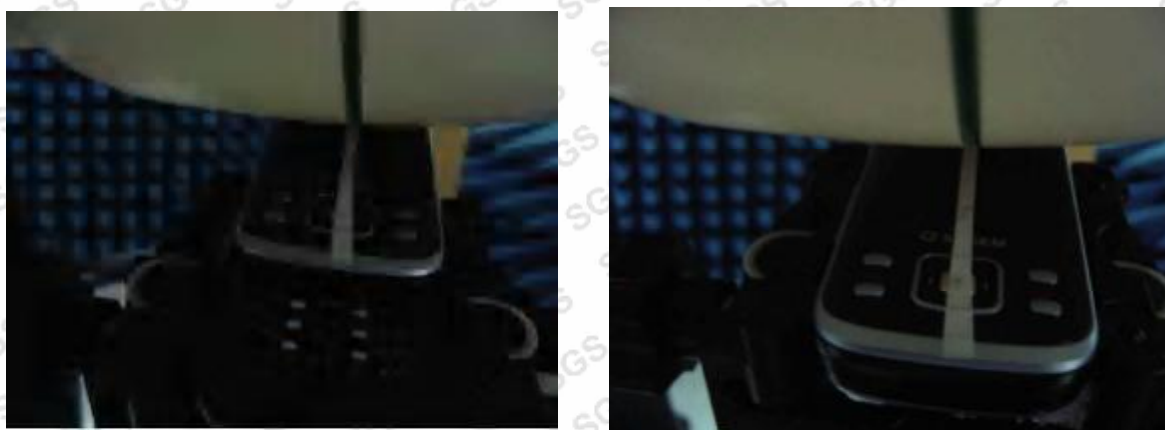


Fig.4 Photograph of the Left Hand Side Cheek status



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Fig.5 Photograph of the Left Hand Side Tilt status

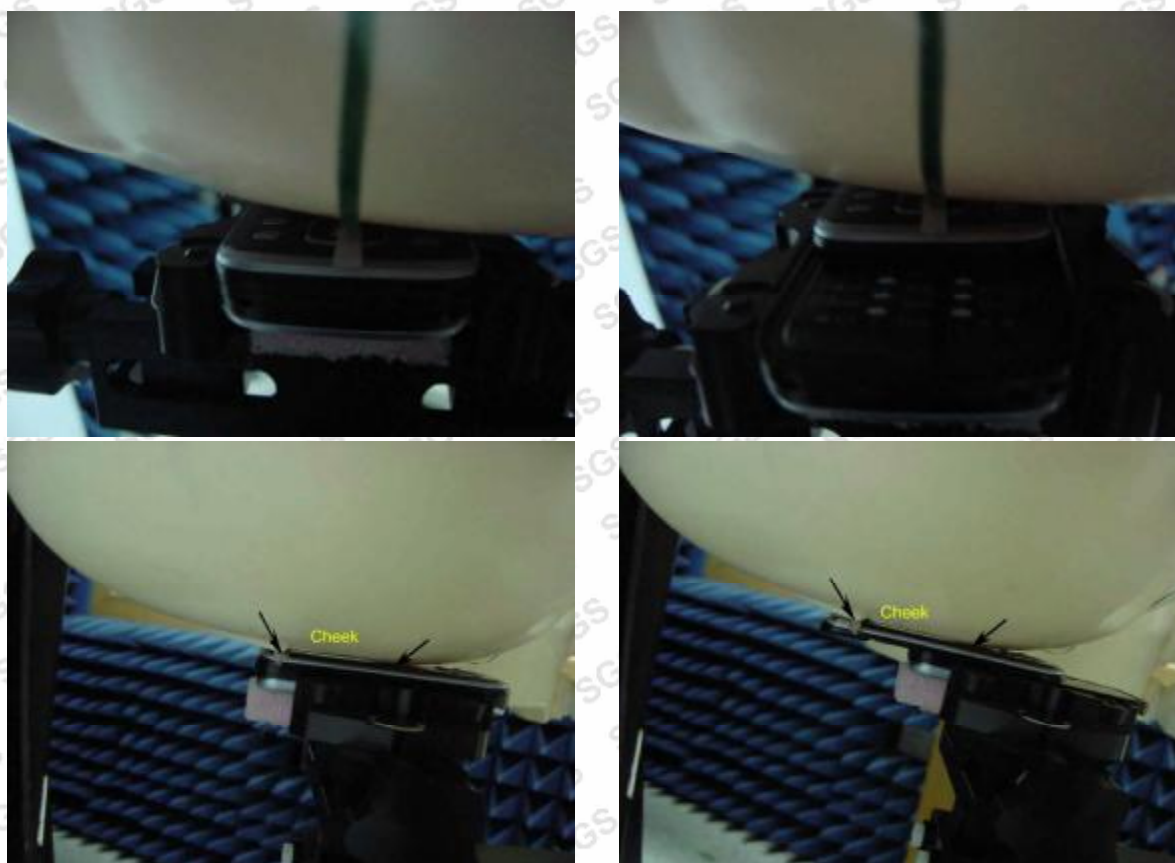


Fig.6 Photograph of the Right Hand Side Cheek status

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Fig.7 Photograph of the Right Hand Side Tilt status

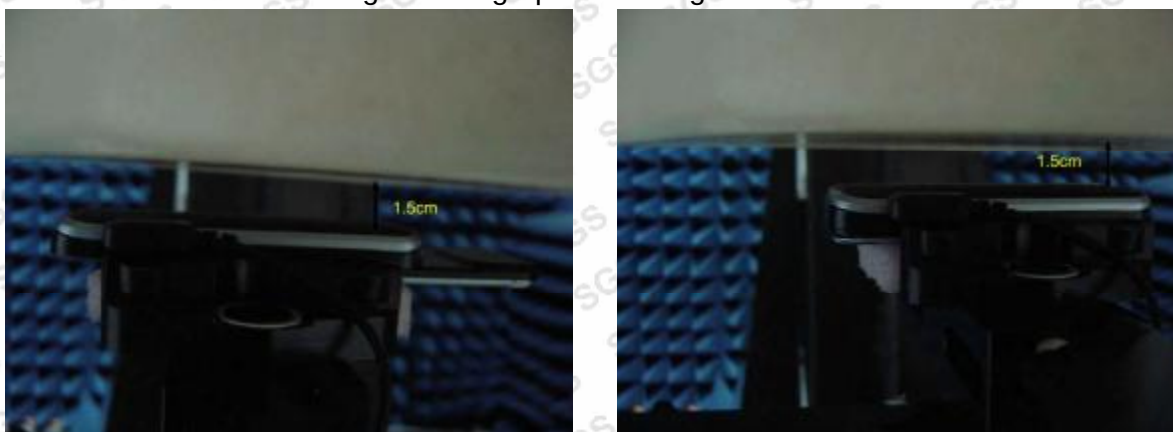


Fig.8 Photograph of the BodyWorn status

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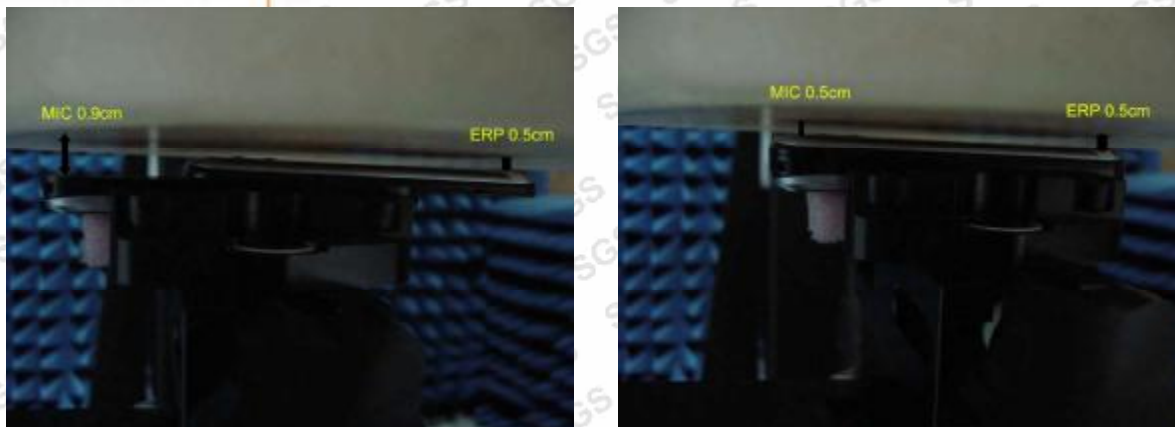


Fig.9 Photograph of the Flat Phantom status

2. Photographs of the EUT



Fig.10 Front View

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Fig.11 Back View

3. Photographs of the battery

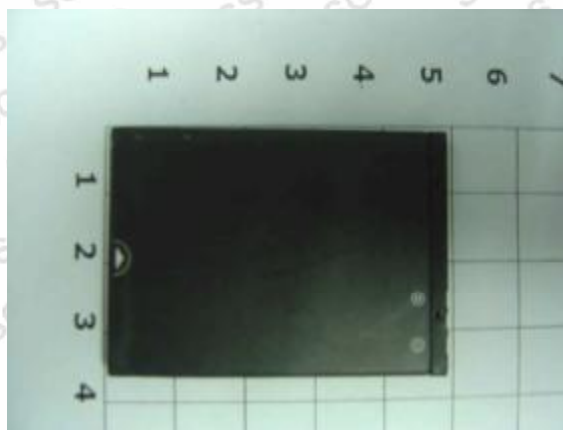


Fig. 12 Battery

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4. Photograph of the charger and Headset



Fig.13 Charger



Fig14 Headset

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5. Probe Calibration certificate

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 Accreditation Service (SAS)
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: SGS China (Auden)

Certificate No: ES3-3088_Jan08

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3088

Calibration procedure(s): QA CAL-01.v8
Calibration procedure for dosimetric E-field probes

Calibration date: January 18, 2008

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&PE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	20-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41495277	25-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41498087	25-Mar-07 (METAS, No. 217-00670)	Mar-08
Reference 3 dB Attenuator	SN: S9054 (3c)	8-Aug-07 (METAS, No. 217-00718)	Aug-08
Reference 20 dB Attenuator	SN: S9086 (20b)	20-Mar-07 (METAS, No. 217-00671)	Mar-08
Reference 30 dB Attenuator	SN: S5129 (30b)	8-Aug-07 (METAS, No. 217-00770)	Aug-08
Reference Probe ES3DV2	SN: 3013	2-Jan-08 (SPEAG, No. ES3-3013_Jan08)	Jan-09
DAE4	SN: 654	20-Apr-07 (SPEAG, No. DAE4 654_Apr07)	Apr-08
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 6648C	US3642101700	4-Aug-99 (SPEAG, in house check Oct-07)	In house check: Oct-08
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-07)	In house check: Oct-08

Calibrated by: Name: Kaja Pokovic, Function: Technical Manager, Signature: [Signature]

Approved by: Name: Nils Kuster, Function: Quality Manager, Signature: [Signature]

Issued: January 18, 2008

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

Certificate No: ES3-3088_Jan08

Page 1 of 9

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ES3DV3 SN:3088

January 18, 2008

Probe ES3DV3

SN:3088

Manufactured:	July 20, 2005
Last calibrated:	December 12, 2006
Recalibrated:	January 18, 2008

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: ES3-3088_Jan08

Page 3 of 9

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ES3DV3 SN:3088

January 18, 2008

DASY - Parameters of Probe: ES3DV3 SN:3088

Sensitivity in Free Space^A

NormX	1.31 ± 10.1%	$\mu V/(V/m)^2$
NormY	1.26 ± 10.1%	$\mu V/(V/m)^2$
NormZ	1.24 ± 10.1%	$\mu V/(V/m)^2$

Diode Compression^B

DCP X	92 mV
DCP Y	93 mV
DCP Z	93 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	3.0 mm	4.0 mm
SAR _{iso} [%] Without Correction Algorithm	11.0	6.8
SAR _{iso} [%] With Correction Algorithm	0.9	0.4

TSL 1750 MHz Typical SAR gradient: 10 % per mm

Sensor Center to Phantom Surface Distance	3.0 mm	4.0 mm
SAR _{iso} [%] Without Correction Algorithm	9.6	5.1
SAR _{iso} [%] With Correction Algorithm	0.7	0.0

Sensor Offset

Probe Tip to Sensor Center 2.0 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 E² field uncertainty inside TSL (see Page 6).

^B Numerical linearization parameter: uncertainty not required.

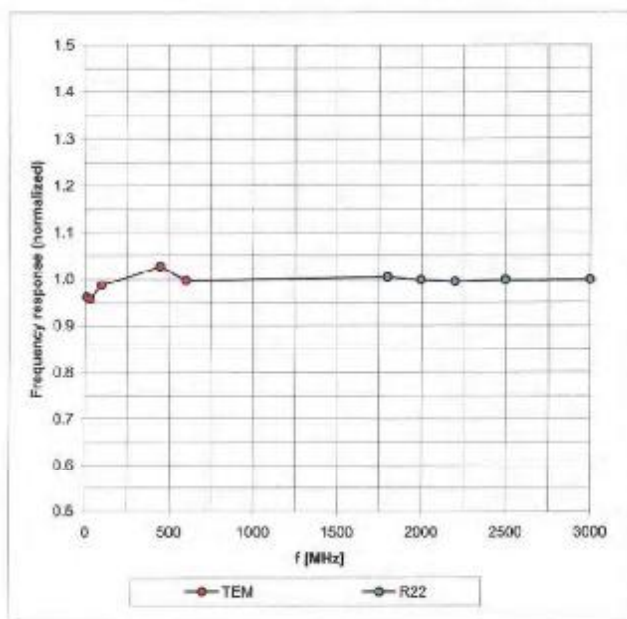
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ES3DV3 SN:3088

January 18, 2008

Frequency Response of E-Field

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



Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

Certificate No: ES3-3088_jan08

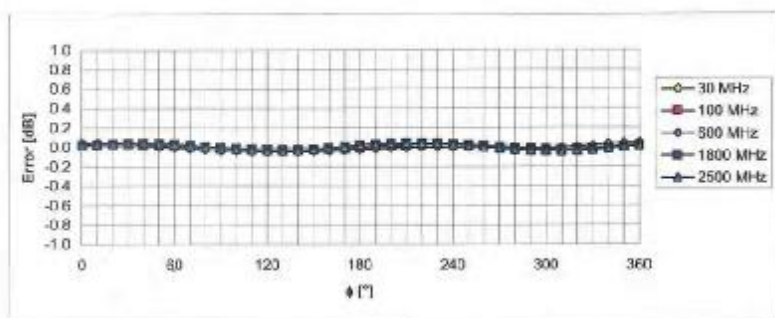
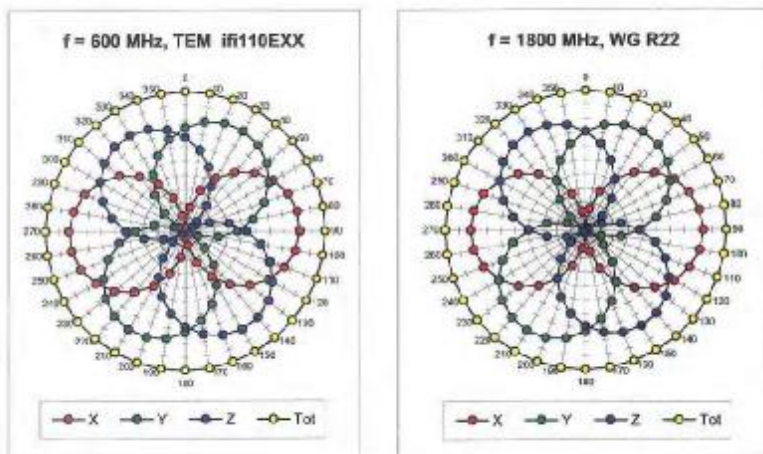
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ES3DV3 SN:3088

January 18, 2008

Receiving Pattern (ϕ), $\theta = 0^\circ$



Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Certificate No: ES3-3088_Jan08

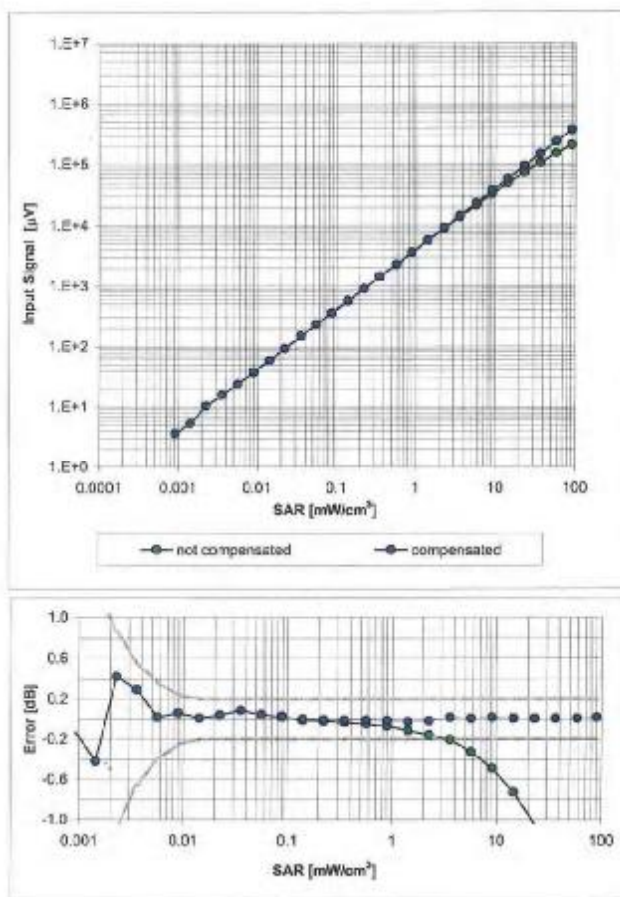
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ES3DV3 SN:3088

January 18, 2008

Dynamic Range f(SAR_{head}) (Waveguide R22, f = 1800 MHz)



Uncertainty of Linearity Assessment: $\pm 0.6\%$ (k=2)

Certificate No: ES3-3088_Jan08

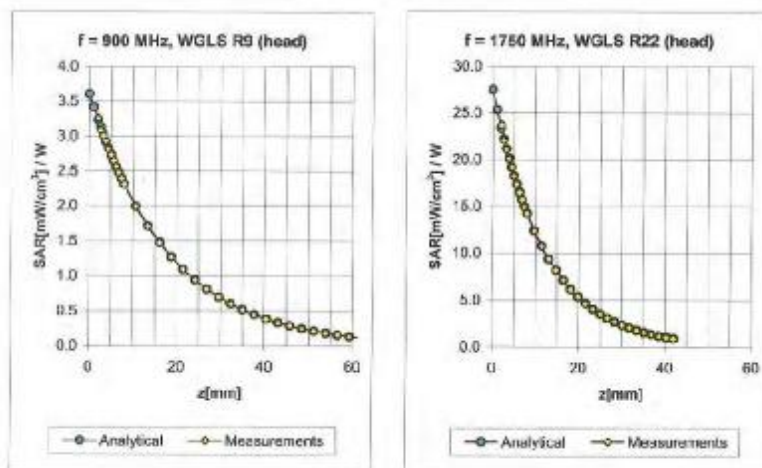
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ES3DV3 SN:3088

January 18, 2008

Conversion Factor Assessment



f [MHz]	Validity [MHz] ²	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.90	1.23	6.15 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.93	1.16	5.04 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.73	1.35	4.84 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.70	1.39	4.53 ± 11.8% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.95	1.14	5.81 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.90	1.17	4.92 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.84	1.23	4.60 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.84	1.17	4.13 ± 11.8% (k=2)

² 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.

Certificate No: ES3-3088_Jan08

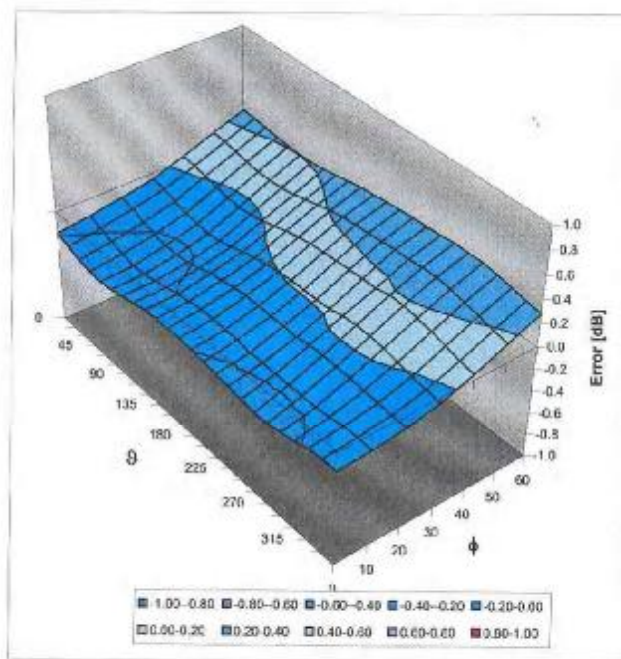
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ES3DV3 SN:3088

January 18, 2008

Deviation from Isotropy in HSL[™] Error (ϕ , θ), $f = 900$ MHz



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ ($k=2$)

Certificate No: ES3-3088_Jan08

Page 9 of 9

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6. DAE Calibration certification

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 Accreditation Service (SAS)
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 **SGS - CSTC (MTT)**

Certificate No: **DAE3-569_Nov07**

CALIBRATION CERTIFICATE

Object **DAE3 - SD 000 D03 AA - SN: 569**

Calibration procedure(s) **QA CAL-06.v12**
Calibration procedure for the data acquisition electronics (DAE)

Calibration date: **November 19, 2007**

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&E critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by: Certificate No.)	Scheduled Calibration
Fuke Process Calibrator Type 702	SN: 6295803	04-Oct-07 (EICAL AG, No: 6467)	Oct-08
Kathley Multimeter Type 2001	SN: 0910278	03-Oct-07 (EICAL AG, No: 6465)	Oct-08
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Calibrator Box V1.1	SE UMS 006 AB 1004	20-Jun-07 (SPEAG, in house check)	In house check Jun-08

Calibrated by:	Name Dominique Steffen	Function Technician	Signature
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Approved by:	F. Bombolt	R&D Director	
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Issued: November 19, 2007

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

Certificate No. **DAE3-569_Nov07**

Page 1 of 5

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DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1 μ V , full range = -100...+300 mV
Low Range: 1LSB = 61nV , full range = -1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.776 $\pm$ 0.1% (k=2)	404.362 $\pm$ 0.1% (k=2)	404.137 $\pm$ 0.1% (k=2)
Low Range	3.94862 $\pm$ 0.7% (k=2)	3.94274 $\pm$ 0.7% (k=2)	3.94290 $\pm$ 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	265 ° $\pm$ 1 °
---	-----------------

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Appendix

1. DC Voltage Linearity

High Range	Input (μV)	Reading (μV)	Error (%)
Channel X + Input	200000	199999.4	0.00
Channel X + Input	20000	20003.10	0.02
Channel X - Input	20000	-19998.40	-0.01
Channel Y + Input	200000	199999.8	0.00
Channel Y + Input	20000	20000.56	0.00
Channel Y - Input	20000	-20003.76	0.02
Channel Z + Input	200000	199999.7	0.00
Channel Z + Input	20000	19999.91	0.00
Channel Z - Input	20000	-20001.93	0.01

Low Range	Input (μV)	Reading (μV)	Error (%)
Channel X + Input	2000	2000	0.00
Channel X + Input	200	199.91	-0.05
Channel X - Input	200	-200.13	0.06
Channel Y + Input	2000	2000	0.00
Channel Y + Input	200	199.90	-0.55
Channel Y - Input	200	-200.33	0.17
Channel Z + Input	2000	2000	0.00
Channel Z + Input	200	198.87	-0.56
Channel Z - Input	200	-200.97	0.48

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	-5.51	-5.11
	-200	9.14	5.16
Channel Y	200	7.38	7.24
	-200	-8.13	-8.74
Channel Z	200	-5.41	5.65
	-200	4.80	4.15

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	1.82	0.97
Channel Y	200	0.44	-	3.38
Channel Z	200	-0.57	-0.43	-

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SHGSM

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	16395	15475
Channel Y	15747	16647
Channel Z	16314	16212

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Input 10M Ω

	Average (μ V)	min. Offset (μ V)	max. Offset (μ V)	Std. Deviation (μ V)
Channel X	-0.02	-0.85	1.22	0.32
Channel Y	-0.62	-1.53	0.45	0.30
Channel Z	-0.95	-2.89	-0.14	0.35

6. Input Offset Current

Nominal input circuitry offset current on all channels: <25fA

7. Input Resistance

	Zeroing (M Ω m)	Measuring (M Ω m)
Channel X	0.2000	199.3
Channel Y	0.2000	203.2
Channel Z	0.2001	204.8

8. Low Battery Alarm Voltage (verified during pre test)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (verified during pre test)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.0	+6	+14
Supply (- Vcc)	-0.01	-8	-9

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7. Dipole Calibration certification

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



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

Accredited by the Swiss Accreditation Service (SAS)
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 **SGS China (Auden)**

Certificate No: D1900V2-5d028_Doc07

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d028**

Calibration procedure(s) **QA CAL-05.v7
Calibration procedure for dipole validation kits**

Calibration date: **December 21, 2007**

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 $(22 \pm 3)^\circ\text{C}$ 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-442A	G937490704	04-Oct-07 (METAS, No. 217-00736)	Oct-08
Power sensor HP 8481A	US37292783	04-Oct-07 (METAS, No. 217-00736)	Oct-08
Reference 20 dB Attenuator	SN: 5086 (20g)	07-Aug-07 (METAS, No. 217-00718)	Aug-08
Reference 10 dB Attenuator	SN: 5047.2 (10r)	07-Aug-07 (METAS, No. 217-00718)	Aug-08
Reference Probe ET3DV6 (HF)	SN: 1507	26-Oct-07 (SPEAG, No. ET3-1507_Doc07)	Oct-08
DAE4	SN 801	30-Jun-07 (SPEAG, No. DAE4-801_Jan07)	Jan-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41082317	18-Oct-07 (SPEAG, in house check Oct-07)	In house check: Oct-08
RF generator R&S SM1-06	100005	4-Aug-99 (SPEAG, in house check Oct-07)	In house check: Oct-08
Network Analyzer HP 8763E	US37390585 S4206	18-Oct-07 (SPEAG, in house check Oct-07)	In house check: Oct-08

Calibrated by:	Name Claudio Leubler	Function Laboratory Technician	Signature
Approved by:	Name Kerle Poturkic	Technical Manager	

Issued: December 31, 2007

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

Certificate No: D1900V2-5d028_Doc07

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Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland



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S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
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:

- 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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- 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:

- 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.

Certificate No: D1600V2-5d028_Dec07

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SGS-CSTC Standards Technical Services, Co. Ltd.
Shanghai Branch GSM Laboratory

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SHGSM

Member of the SGS Group (Société Générale de Surveillance)

Measurement Conditions

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

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	39.0 $\pm$ 6 %	1.46 mho/m $\pm$ 6 %
Head TSL temperature during test	(21.5 $\pm$ 0.2) °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	condition	
SAR measured	250 mW input power	9.82 mW / g
SAR normalized	normalized to 1W	39.3 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	37.9 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.14 mW / g
SAR normalized	normalized to 1W	20.6 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	20.2 mW / g $\pm$ 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	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.5 ± 8 %	1.54 mho/m ± 6 %
Body TSL temperature during test	(21.5 ± 0.2) °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.34 mW / g
SAR normalized	normalized to 1W	37.4 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	37.2 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.97 mW / g
SAR normalized	normalized to 1W	19.9 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	19.8 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	$53.7 \Omega + 5.2 j\Omega$
Return Loss	-24.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$49.5 \Omega + 3.4 j\Omega$
Return Loss	-29.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.198 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	December 17, 2002

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DASY4 Validation Report for Head TSL

Date/Time: 21.12.2007 09:54:50

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d028

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL U10 BB;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.46$ mho/m; $\epsilon_r = 39$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.86, 4.86, 4.86); Calibrated: 26.10.2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 5.0 (ficot); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

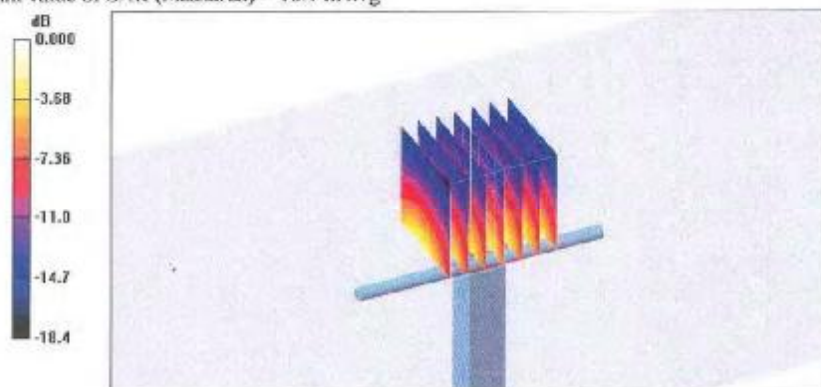
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.9 V/m; Power Drift = 0.010 dB

Peak SAR (extrapolated) = 17.2 W/kg

SAR(1 g) = 9.82 mW/g; SAR(10 g) = 5.14 mW/g

Maximum value of SAR (measured) = 10.9 mW/g

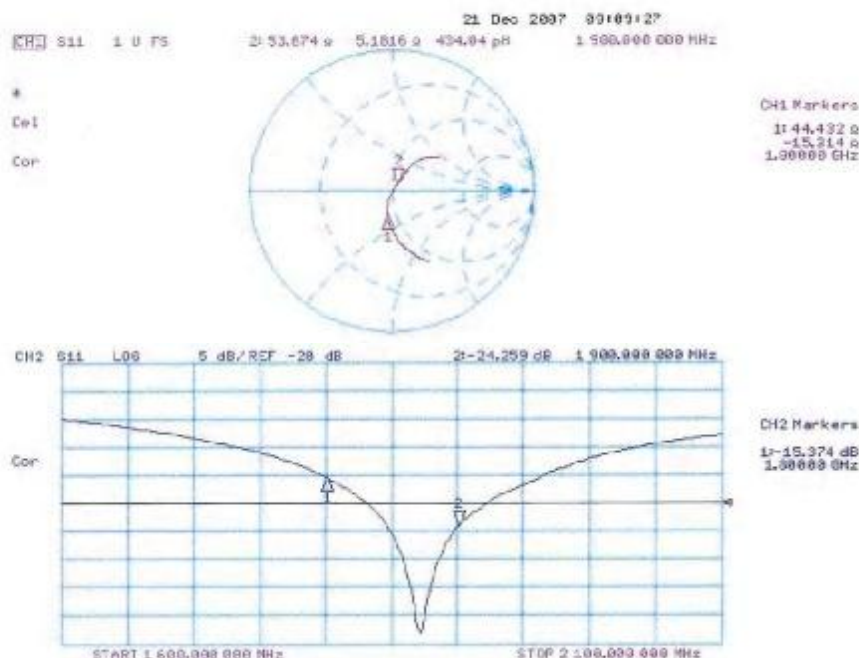


Certificate No: D1900V2-5d028_Dec07

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Impedance Measurement Plot for Head TSL



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DASY4 Validation Report for Body TSL

Date/Time: 21.12.2007 11:05:06

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d028

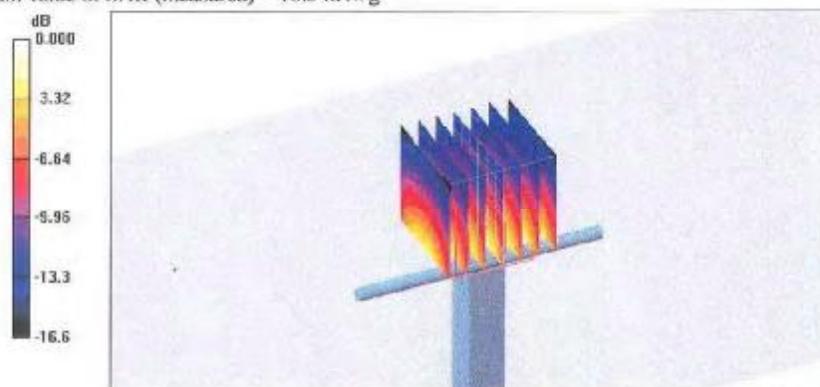
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: MSL U10 BB;
Medium parameters used: $f = 1900$ MHz; $\sigma = 1.54$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET5DV6 - SN1507 (HF); ConvF(4.48, 4.48, 4.48); Calibrated: 26.10.2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DA54 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.3 V/m; Power Drift = -0.044 dB
Peak SAR (extrapolated) = 16.0 W/kg
SAR(1 g) = 9.34 mW/g; SAR(10 g) = 4.97 mW/g
Maximum value of SAR (measured) = 10.5 mW/g



Certificate No: D1900V2-5d028_Dec07

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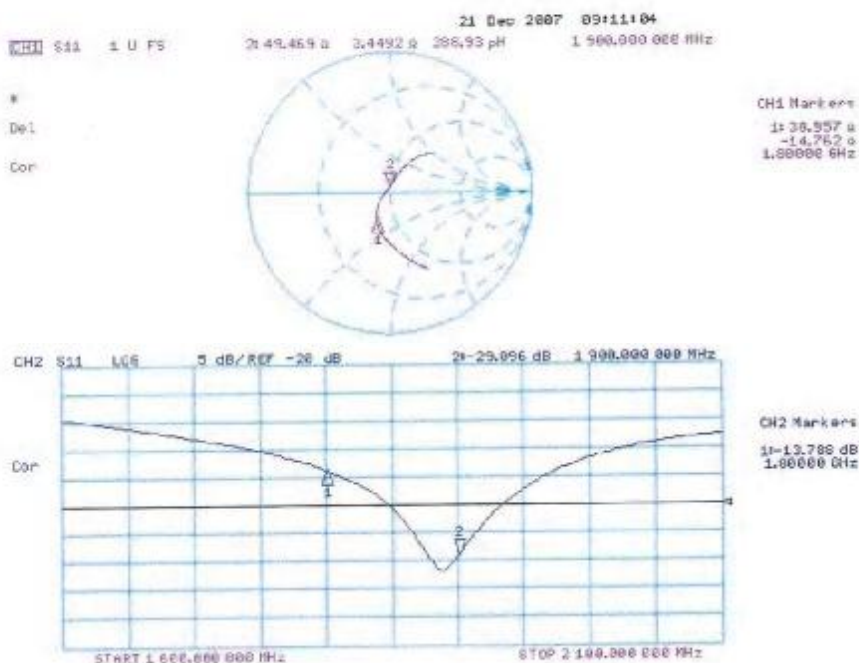
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SHGSM

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Impedance Measurement Plot for Body TSL



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8. Uncertainty analysis

Error Description	Tol. (± %)	Prob. dist.	Div.	(c_1) (1g)	(c_2) (10g)	Std. unc. (± %) (1g)	(± %) (10g)	(v_i)
Measurement System								
Probe Calibration	4.8	N	1	1	1	4.8	4.8	∞
Axial Isotropy	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
Hemispherical Isotropy	0	R	$\sqrt{3}$	1	1	0	0	∞
Boundary Effects	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Linearity	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
System Detection Limit	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Readout Electronics	1.0	N	1	1	1	1.0	1.0	∞
Response Time	0	R	$\sqrt{3}$	1	1	0	0	∞
Integration Time	0	R	$\sqrt{3}$	1	1	0	0	∞
RF Ambient Conditions	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
Probe Positioner	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	∞
Probe Positioning	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
Algorithms for Max. SAR Eval.	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Dipole								
Dipole Axis to Liquid Distance	2.0	R	$\sqrt{3}$	1	1	1.2	1.2	∞
Input power and SAR drift meas.	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
Phantom and Tissue Param.								
Phantom Uncertainty	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
Liquid Conductivity (target)	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (meas.)	2.5	N	1	0.64	0.43	1.6	1.1	∞
Liquid Permittivity (target)	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (meas.)	2.5	N	1	0.6	0.49	1.5	1.2	∞
Combined Stdandard Uncertainty						8.4	8.1	∞
Coverage Factor for 95%		kp=2						
Expanded Uncertainty						16.8	16.2	

Dasy4 Uncertainty Budget

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9. Phantom description

Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 345 97 00, Fax +41 1 345 97 79

Certificate of conformity / First Article Inspection

Item	SAM Twin Phantom V4.0
Type No	QD 000 P40 CA
Series No	TP-1150 and higher
Manufacturer / Origin	Untersee Composites Hauptstr. 89 CH-8559 Frutzwilen Switzerland

Tests

The series production process used allows the limitation to test of first articles. Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1005. Certain parameters have been retested using further series units (called samples).

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

Standards

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

Conformity

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

Date 28.02.2002

Signature / Stamp

F. Bombelt

**Schmid & Partner
Engineering AG**

Zeughausstrasse 43, CH-8004 Zurich
Tel. +41 1 345 97 00, Fax +41 1 345 97 79

Volker Kopp

Doc No 841 - QD 000 P40 CA - B

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10. CNAS Certificate



End of Report

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