SAR TEST REPORT
FULL REPORT
No. I13GC6877

For

ENJOY GROUP(HK) CO,LIMITED

GSM Digital Mobile Phone

W60

With

Hardware Version: W59_-MB-_REV1.2

Software Version: MT6250_S00.6250M_W60_BT_V01

FCC ID:ZHN-W60

DATE:2013-5-22

DAT-P-L-162/04-01

TESTING
No. L0570

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of China Telecommunication Technology Labs. Beijing.

Test Laboratory:

China Telecommunication Technology Labs.

No. 11, Yue Tan Nan Jie, Xi Cheng District, Beijing, P. R. China 100191.

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Revision Version

Report Number	Revision	Date	Memo
I13GC6877	00	2013-05-22	Initial creation of test report

TABLE OF CONTENT

1 Test Laboratory

11.1Testing Location

Company Name:	China Telecommunication Technology Labs.
Address:	No. 11, Yue Tan Nan Jie, Xi Cheng District,BEIJING
Postal Code:	100045
Telephone:	+86 10 68094053
Fax:	+86 10 68011404

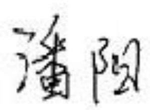
1.2 Testing Environment

Temperature:	Min. = 19 °C, Max. = 23°C
Relative humidity:	Min. = 30%, Max. = 70%
Ground system resistance:	< 0.5 Ω
Ambient noise & Reflection:	< 0.012 W/kg

1.3 Project Data

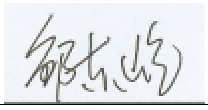
Project Leader:	Li Guoqing
Test Engineer:	Li Guoqing
Testing Start Date:	May 20, 2013
Testing End Date:	May 21, 2013

1.4 Signature



Pan Yang

(Prepared this test report)



Zou Dongyi

(Reviewed this test report)

Deputy Director of the laboratory

(Approved this test report)

2 Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for W60 are as follows (with expanded uncertainty 22.4%)

Table 2-1: Max. SAR Measured(1g)

Band	Position	SAR 1g (W/Kg)
GSM 850	Head	0.038
	Body	0.064
GSM 1900	Head	0.293
	Body	0.118

Table 2-2: The maximum of SAR values

	Maximum SAR value for Head	**Maximum SAR value for Body**
GSM	0.293	0.118

The SAR values found for the Mobile Phone are below the maximum recommended levels of 1.6 W/Kg as averaged over any 1g tissue according to the ANSI C95.1-1999.

For body worn operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

The measurement together with the test system set-up is described in chapter 7 of this test report.

A detailed description of the equipment under test can be found in chapter 3 of this test report.

The maximum SAR value is obtained at the case of **(Table 1)**, and the values are: **0.293W/Kg (1g).**

3 Client Information

3.1 Applicant Information

Company Name:	ENJOY GROUP(HK) Co,Limited
Address /Post:	7m.1305A,Fujian dasha Caitian road, Futian District, Shenzhen, Guangdong, China
City:	Shenzhen
Country:	China

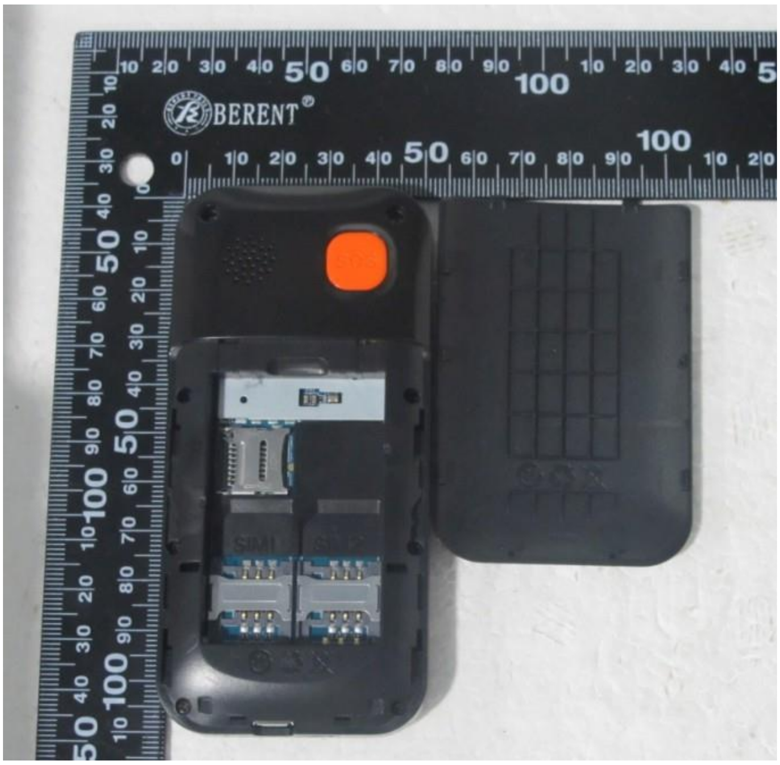
3.2 Manufacturer Information

Company Name:	ENJOY GROUP(HK) Co,Limited
Address /Post:	7m.1305A,Fujian dasha Caitian road, Futian District, Shenzhen, Guangdong, China
City:	Shenzhen
Country:	China

4 Equipment Under Test (EUT) and Ancillary Equipment (AE)

4.1 About EUT

Description:	GSM Digital Mobile Phone
Model name:	W60
Brand name:	W60
Operation Model(s):	GSM850/1900
Tx Frequency:	824-850MHz, 1850-1910MHz （GSM）
	2402 ~ 2480 MHz (BT)
Test device Production information:	Production unit
Device type:	Portable device
Antenna type:	Inner antenna
Form factor:	11.0cm×5.4cm
FCC ID:	ZHN-W60



Picture 1: Constituents of the sample

4.2 Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version:
S1	IMEI1: 354223050750132 IMEI2: 354223050750140	W59_-MB-_REV1.2	MT6250_S00.6250M_W60_BT_V01

*EUT ID: is used to identify the test sample in the lab internally.

4.3 Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
AE1	Battery	BL-4C	N/A	N/A

*AE ID: is used to identify the test sample in the lab internally.

5 TEST METHODOLOGY

5.1 Applicable Limit Regulations

ANSI C95.1–1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
It specifies the maximum exposure limit of **1.6 W/kg** as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

5.2 Applicable Measurement Standards

IEEE 1528–2003: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.

OET Bulletin 65 (Edition 97-01) and Supplement C(Edition 01-01): Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits.

KDB648474 D01 SAR Handsets Multi Xmiter and Ant, v01r05: SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas.

KDB941225 D03: Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE

6 Specific Absorption Rate (SAR)

6.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

6.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

$$SAR = \frac{d}{dt}\left(\frac{dW}{dm}\right) = \frac{d}{dt}\left(\frac{dW}{\rho dv}\right)$$

SAR is expressed in units of Watts per kilogram (W/kg)

SAR measurement can be either related to the temperature elevation in tissue by

$$SAR = c\left(\frac{\delta T}{\delta t}\right)$$

Where: C is the specific head capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

$$SAR = \frac{\sigma |E|^2}{\rho}$$

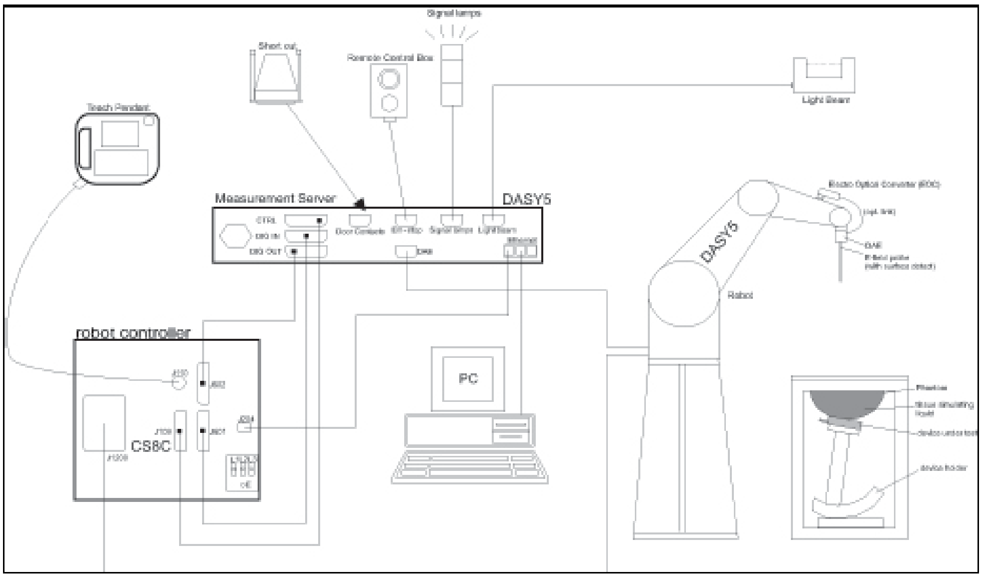
Where: σ is the conductivity of the tissue, ρ is the mass density of tissue and E is the RMS electrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

7 SAR MEASUREMENT SETUP

7.1 Measurement Set-up

The DASY5 system for performing compliance tests is illustrated above graphically. This system consists of the following items:



Picture 2 SAR Lab Test Measurement Set-up

- A standard high precision 6-axis robot (Stäubli TX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as
- warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

7.2 DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multifiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY5 software reads the reflection durning a software approach and looks for the maximum using 2nd ord curve fitting. The approach is stopped at reaching the maximum.

Probe Specifications:
Model: ES3DV3
Frequency Range: 10MHz — 2.6GHz(ES3DV3)
Calibration: In head and body simulating tissue at Frequencies from 835 up to 5800MHz
Linearity: ± 0.2 dB(30 MHz to 2.6 GHz) for ES3DV3

Picture 3 Near-field Probe

Dynamic Range: 10 mW/kg — 100W/kg
Probe Length: 330 mm
Probe Tip Length: 20 mm
Body Diameter: 12 mm
Tip Diameter: 2.5 mm (3.9 mm for ES3DV3)
Tip-Center: 1 mm (2.0mm for ES3DV3)
Application: SAR Dosimetry Testing
Compliance tests of mobile phones
Dosimetry in strong gradient fields

Picture 4 E-field Probe

7.3 E-field Probe Calibration

Each E-Probe/Probe Amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm^2) using an RF Signal generator, TEM cell, and RF Power Meter.

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if thefrequency is below 1 GHz and inn a W60guide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1 mW/ cm^2.
E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C\frac{\Delta T}{\Delta t}$$

Where:
Δt = Exposure time (30 seconds),
C = Heat capacity of tissue (brain or muscle),
ΔT = Temperature increase due to RF exposure.

$$SAR = \frac{|E|^2 \cdot \sigma}{\rho}$$

Where:
σ = Simulated tissue conductivity,
ρ = Tissue density (kg/m^3).

7.4 Other Test Equipment

7.4.1 Data Acquisition Electronics(DAE)

The data acquisition electronics consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.
The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Picture5: DAE

7.4.2 Robot

The SPEAG DASY system uses the high precision robots (DASY5: TX90) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability 0.02mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; no belt drives)
- Jerk-free straight movements (brushless synchron motors; no stepper motors)
- Low ELF interference (motor control fields shielded via the closed metallic construction shields)

Picture6: DASY 5

7.4.3 Measurement Server

The Measurement server is based on a PC/104 CPU broad with CPU (DASY5: 400 MHz, Intel Celeron), chipdisk (DASY5: 128MB), RAM (DASY5: 128MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O broad, which is directly connected to the PC/104 bus of the CPU broad.
The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is reserved for future applications. Please note that this expansion port does not have a standardized pinout, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.

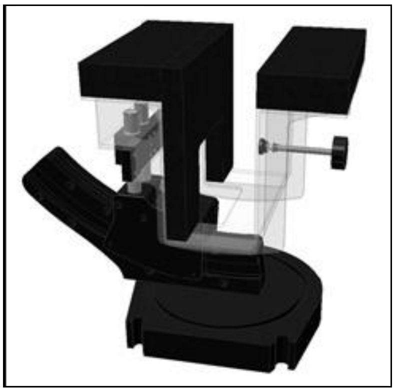
Picture 7: Server for DASY 5

7.4.4 Device Holder for Phantom

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 at 5mm distance, a positioning uncertainty of ±0.5mm would produce a SAR uncertainty of ±20%. 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 the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.
The DASY device holder is constructed of low-loss
POM material having the following dielectric
parameters: relative permittivity ε =3 and loss tangent δ =0.02. The amount of dielectric material has 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.
<Laptop Extension Kit>
The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper

part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin-SAM and ELI phantoms.

Picture 8-1: Device Holder



Picture 8-2: Laptop Extension Kit

7.4.5 Phantom

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a table. The shape of the shell is based on data from an anatomical study designed to
Represent the 90th percentile of the population. The phantom enables the dissymmetric evaluation of SAR for both left and right handed handset usage, as well as body-worn usage using the flat phantom region. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. The shell phantom has a 2mm shell thickness (except the ear region where shell thickness increases to 6 mm).

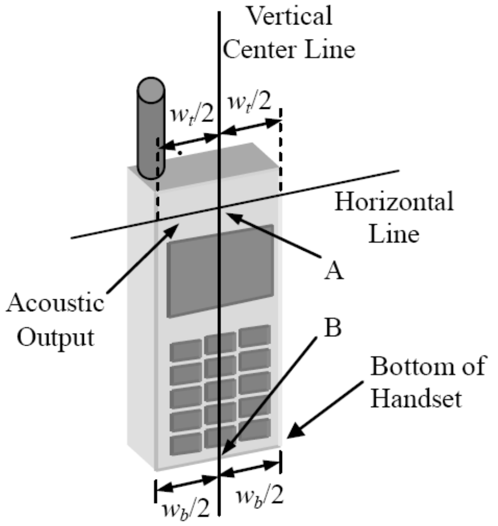
Shell Thickness: 2 ± 0. 2 mm
Filling Volume: Approx. 25 liters
Dimensions: 810 x l000 x 500 mm (H x L x W)
Available: Special

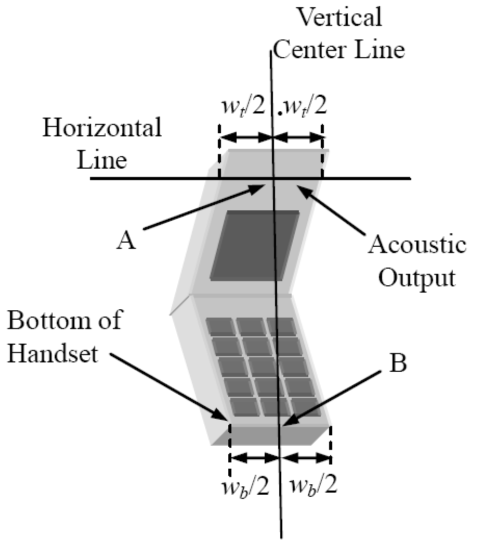
Picture 9: SAM Twin Phantom

8. Position of the wireless device in relation to the phantom

8.1 General considerations

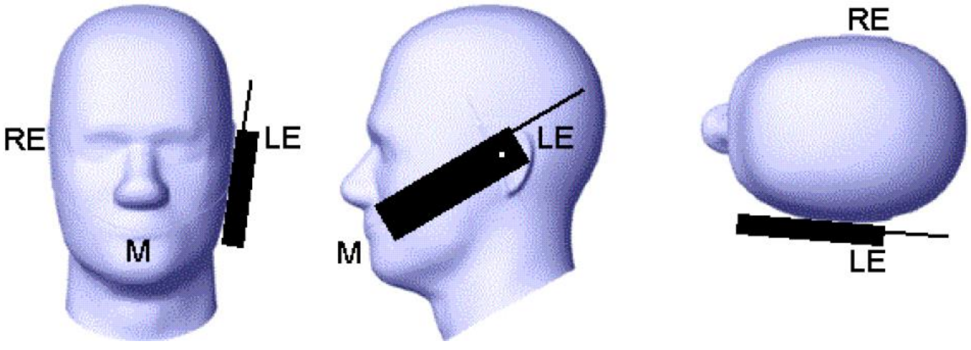
This standard specifies two handset test positions against the head phantom – the “cheek” position and the “tilt” position.



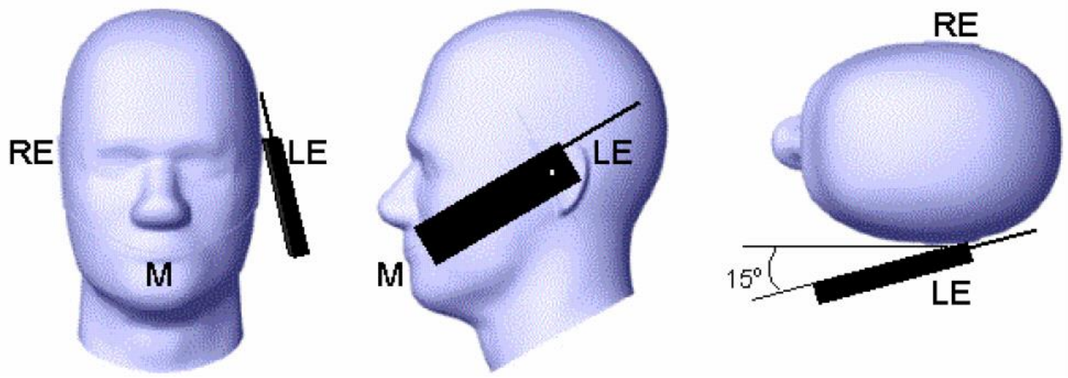


w_t	Width of the handset at the level of the acoustic
w_b	Width of the bottom of the handset
A	Midpoint of the width w_t of the handset at the level of the acoustic output
B	Midpoint of the width w_b of the bottom of the handset

Picture 10-a Typical “fixed” case handset **Picture 10-b Typical “clam-shell” case handset**



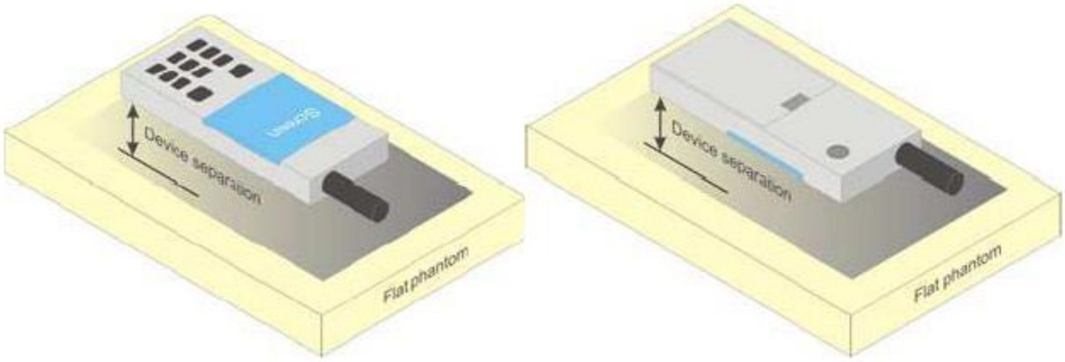
Picture 11 Cheek position of the wireless device on the left side of SAM



Picture 12 Tilt position of the wireless device on the left side of SAM

8.2 Body-worn device

A typical example of a body-worn device is a mobile phone, wireless enabled PDA or other battery operated wireless device with the ability to transmit while mounted on a person's body using a carry accessory approved by the wireless device manufacturer.

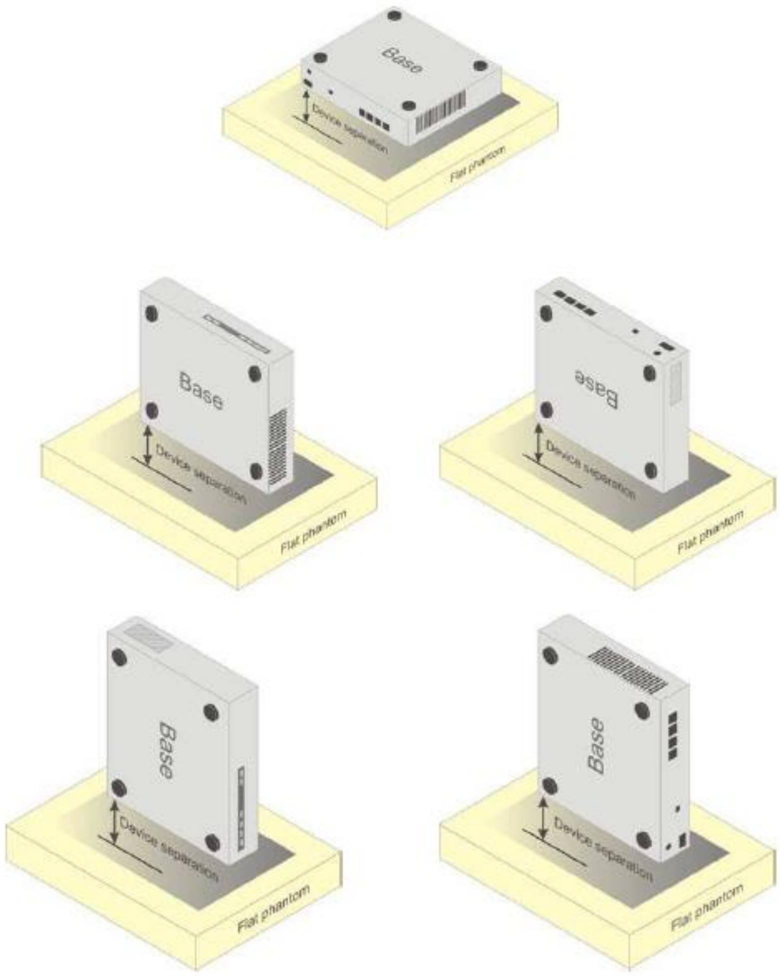


Picture 13 Test positions for body-worn devices

8.3 Desktop device

A typical example of a desktop device is a wireless enabled desktop computer placed on a table or desk when used.

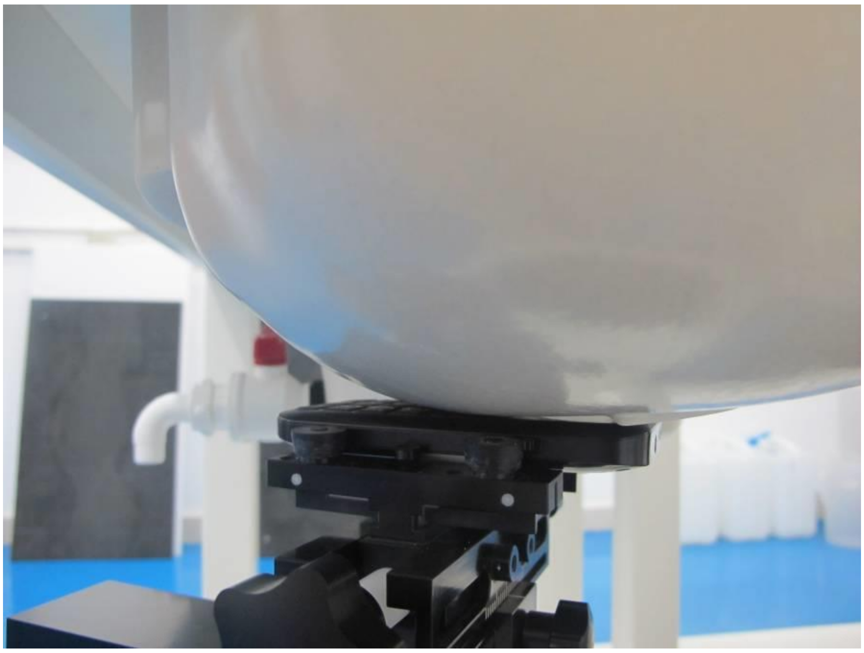
The DUT shall be positioned at the distance and in the orientation to the phantom that corresponds to the intended use as specified by the manufacturer in the user instructions. For devices that employ an external antenna with variable positions, tests shall be performed for all antenna positions specified. Picture 14 shows positions for desktop device SAR tests. If the intended use is not specified, the device shall be tested directly against the flat phantom.



Picture 14 Test positions for desktop devices

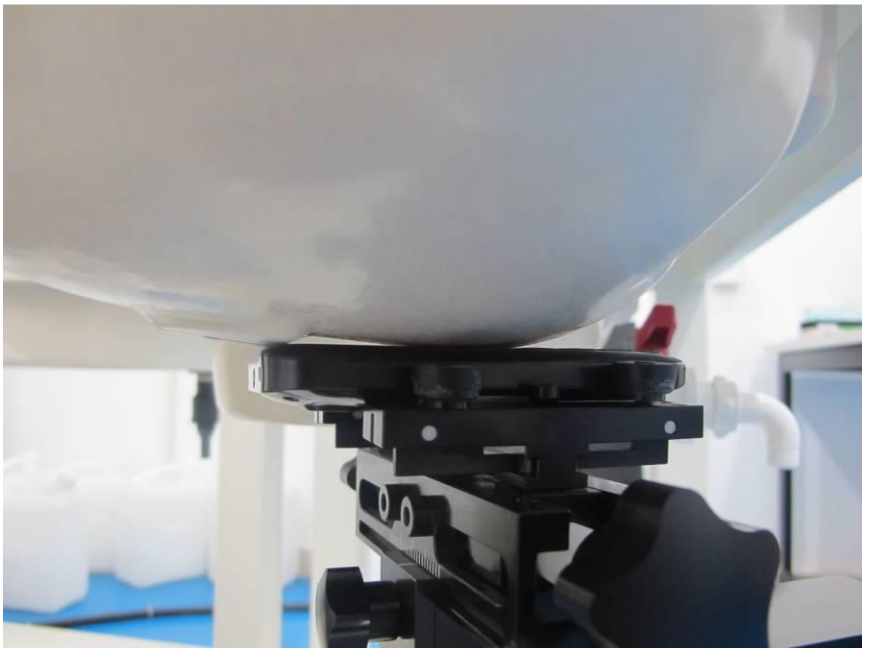
8.4 DUT Setup Photos

Picture 15-1: Specific Absorption Rate Test Layout

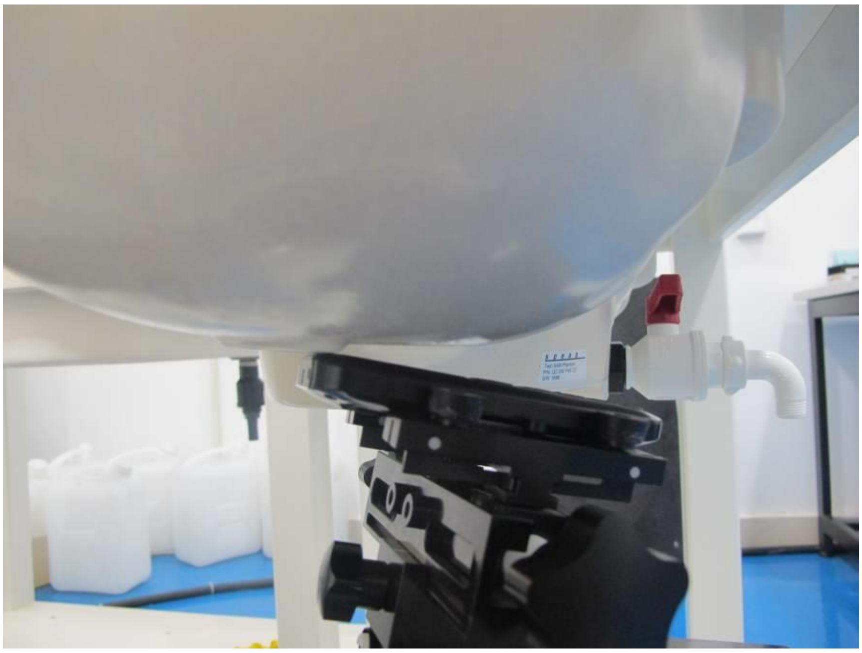


Picture 15-2: Left Head Touch Cheek Position

Picture 15-3: Left Head Tilt 15° Position



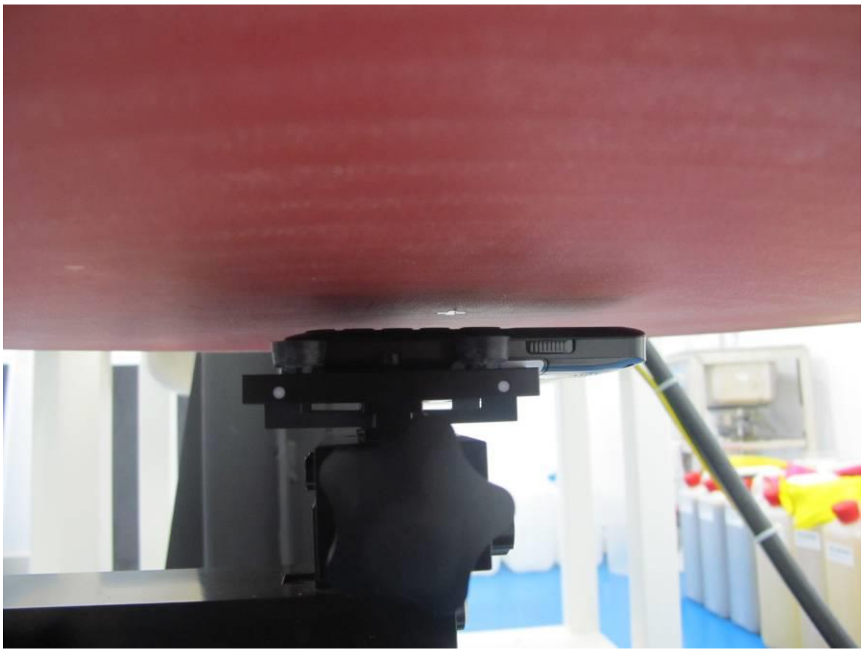
Picture 15-4: Right Head Touch Cheek Position



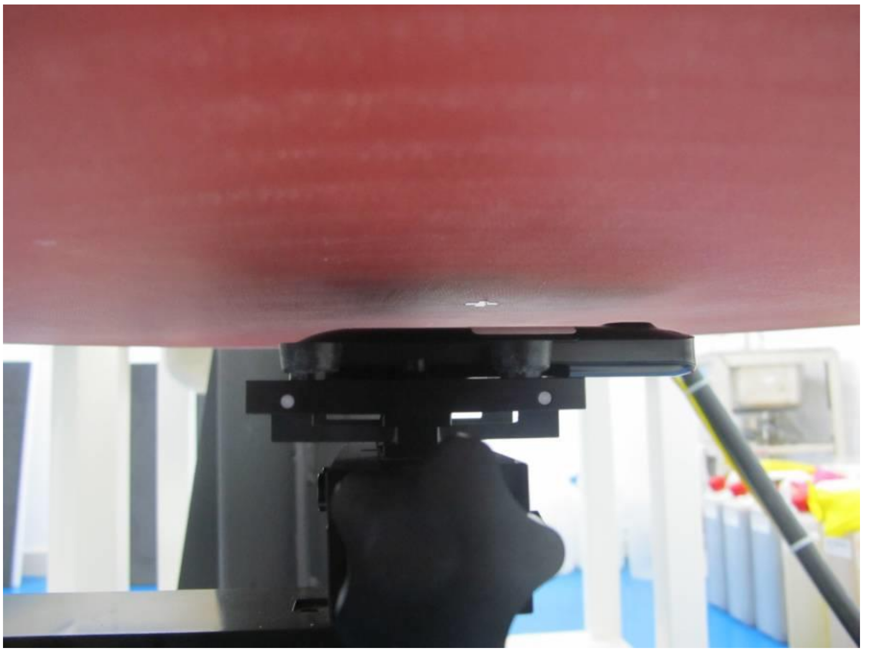
Picture 15-5: Right Head Tilt 15° Position

Test positions for body:

The Body SAR is tested at the following 2 test positions all with the distance =10mm between the EUT and the phantom bottom :



Picture 15-6: Toward Phantom



Picture 15-7: Toward Ground

9 Tissue Simulating Liquids

9.1 Equivalent Tissues

The liquid used for the frequency range of 800-3000 MHz consisted of water, sugar, salt and Cellulose. The liquid has been previously proven to be suited for worst-case. The Table 9-1 and 9-2 shows the detail solution. It’s satisfying the latest tissue dielectric parameters requirements proposed by the IEEE 1528 and IEC 62209.

Table 9-1. Composition of the Head Tissue Equivalent Matter

Frequency (MHz)	850 Head	850 Body	1900 Head	1900 Body
Ingredients (% by weight)				
Water	41.45	52.5	54.89	69.91
Sugar	56.0	45.0	/	/
Salt	1.45	1.4	0.18	0.13
Preventol	0.1	0.1	/	/
Cellulose	1.0	1.0	/	/
Clycol Monobutyl	/	/	44.93	29.96
Dielectric Parameters Target Value	f=850MHz ε=41.5 σ=0.92	f=850MHz ε=55.2 σ=0.97	f=1900MHz ε=40.0 σ=1.40	f=1900MHz ε=53.3 σ=1.52

Table 9-2. Targets for tissue simulating liquid

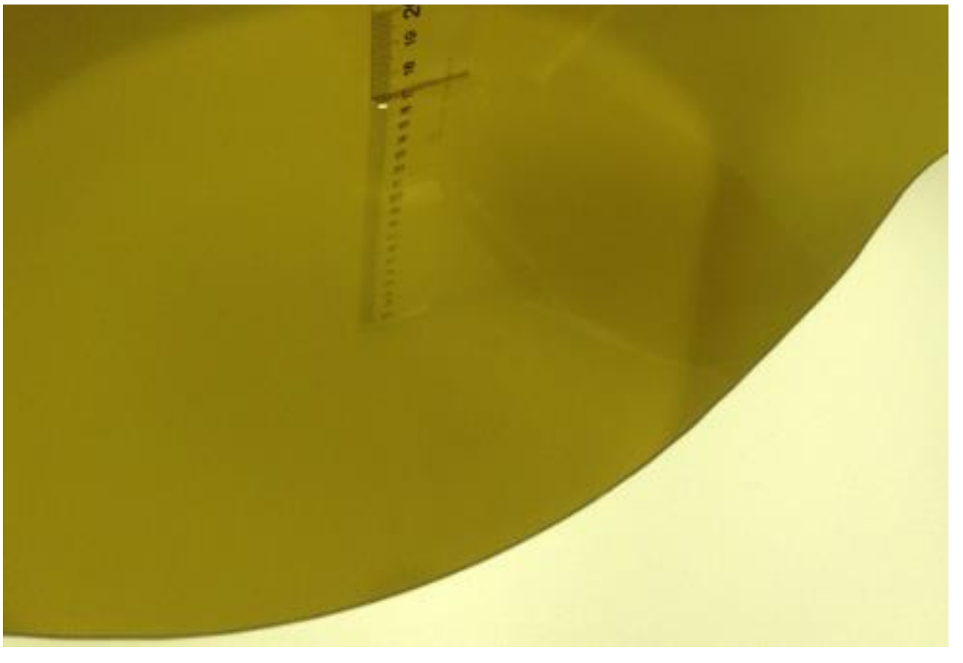
Frequency (MHz)	Liquid Type	Conductivity (σ)	± 5% Range	Permittivity (ε)	± 5% Range
850	Head	0.92	0.87～0.97	41.5	39.4～43.6
1900	Head	1.40	1.33～1.47	40.0	38.0～42.0
850	Body	0.99	0.94～1.04	55.2	52.4～58.0
1900	Body	1.52	1.44～1.59	53.3	50.6～55.9

9.2 Dielectric Performance

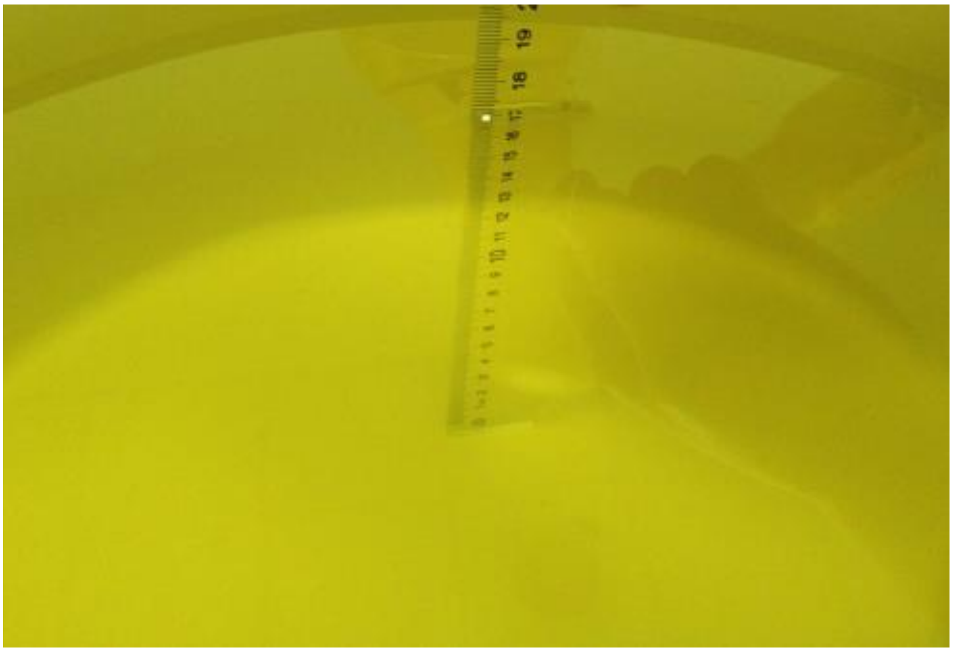
Table 9-3: Dielectric Performance of Tissue Simulating Liquid

Measurement is made at temperature 22.5 °C and relative humidity 45%.
Liquid temperature during the test: 22.5°C
Measurement Date : 850 MHz Head May 20th, 2013 1900 MHz Head May 21th, 2013
850 MHz Body May 20th, 2013 1900 MHz Body May 21th, 2013

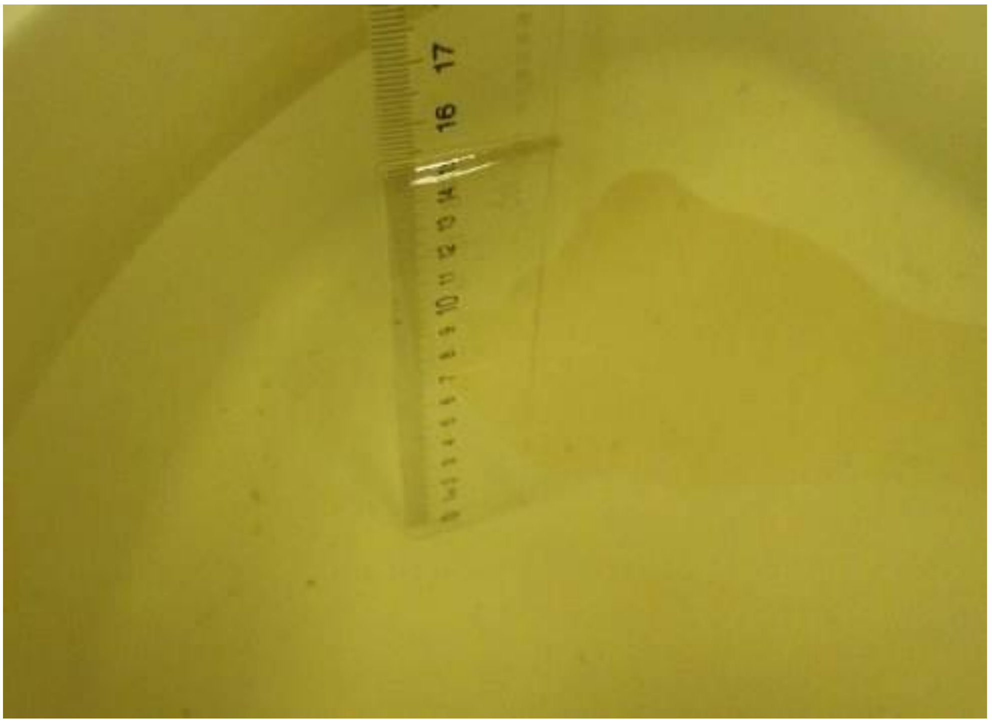
/	Frequency	Permittivity ε	Conductivity σ (S/m)
Measurement value	850 MHz Head	40.33	0.939
	1900 MHz Head	40.53	1.459
	850 MHz Body	55.75	1.031
	1900 MHz Body	53.24	1.524



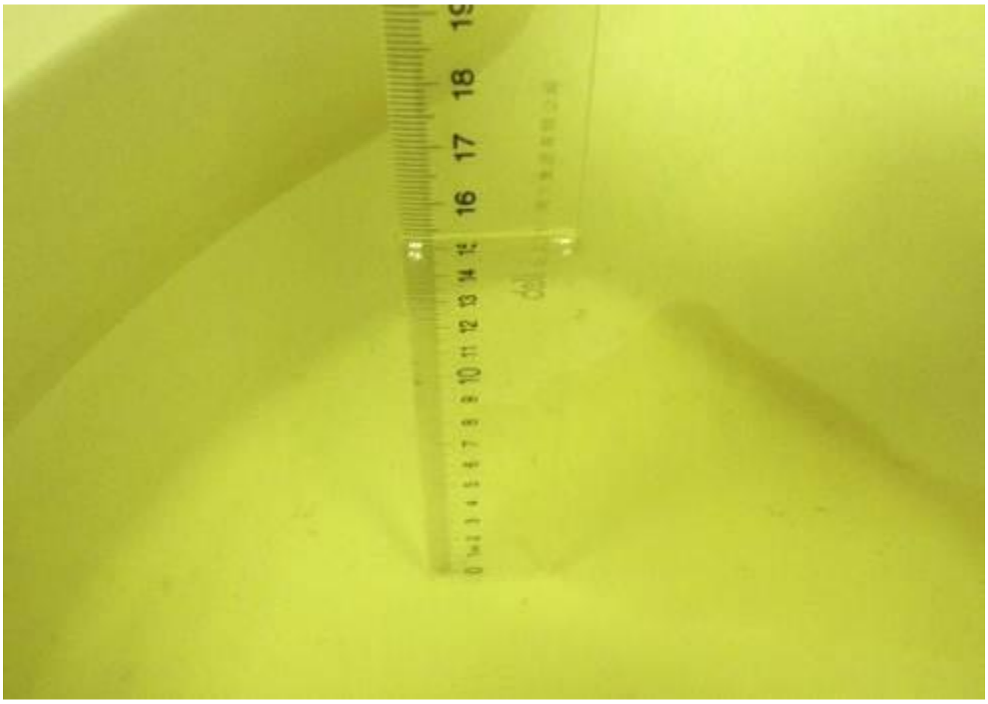
Picture 16-1: Liquid depth in the Flat Phantom (850 MHz Head)



Picture 16-2: Liquid depth in the Flat Phantom (1900 MHz Head)



Picture 16-3: Liquid depth in the Flat Phantom (850 MHz Body)



Picture 16-4: Liquid depth in the Flat Phantom (1900 MHz Body)

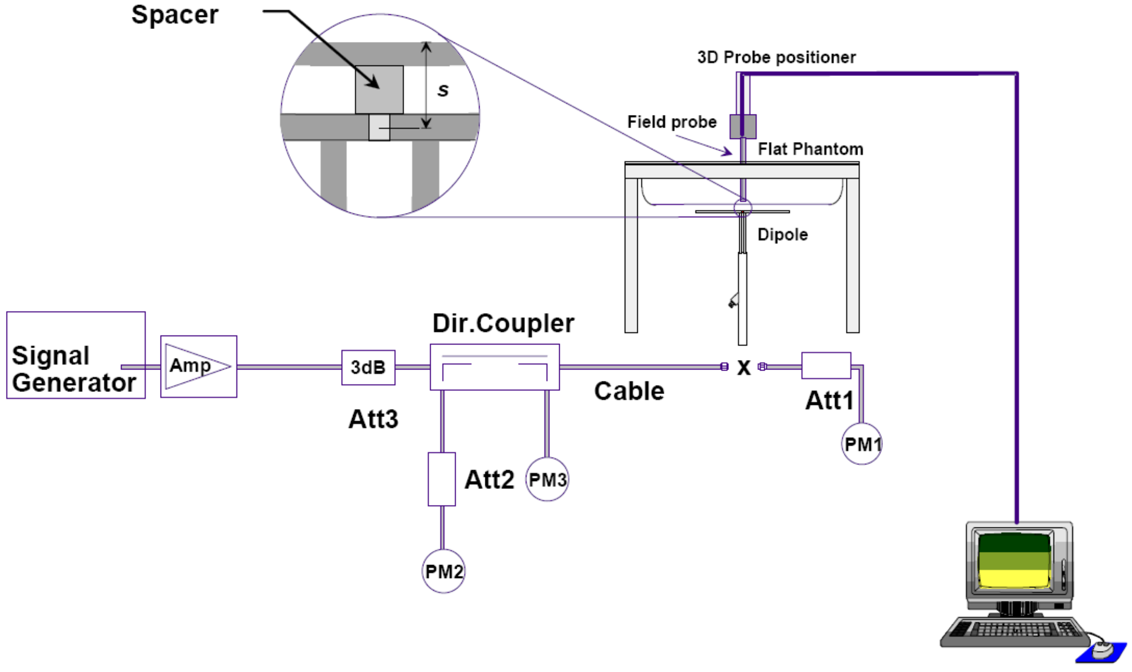
10 System Validation

10.1 System Validation

Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performace check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

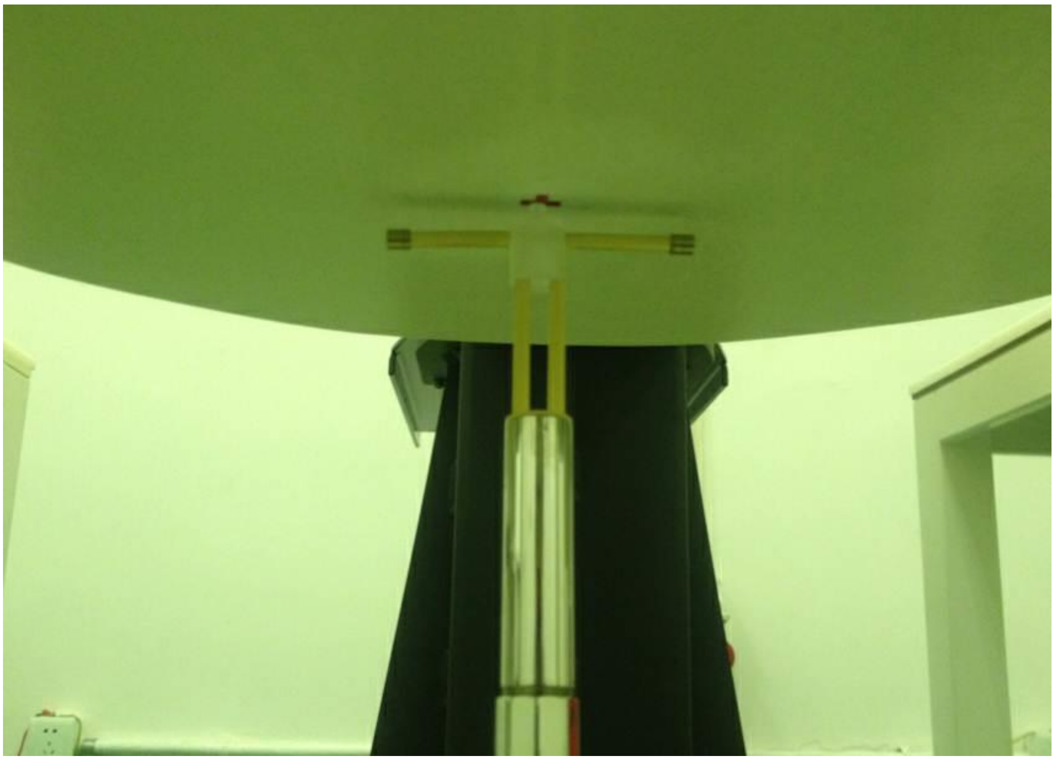
10.2 System Setup

In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous W60 that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:



Picture 17 System Setup for System Evaluation

The output power on dipole port must be calibrated to 24 dBm (250mW) before dipole is connected.



Picture 18 Photo of Dipole Setup

Table 10-1: System Validation of Head

Measurement is made at temperature 22.5 °C and relative humidity 45%.
Liquid temperature during the test: 22.5°C
Measurement Date : 900 MHz Head May 20th, 2013 1900 MHz Head May 21th, 2013

Verification results	Frequency	Target value (W/kg)		Measured value (W/kg)		Deviation	
		10 g Average	1 g Average	10 g Average	1 g Average	10 g Average	1 g Average
	900 MHz	1.68	2.62	1.73	2.71	+2.98%	+3.44%
	1900 MHz	5.18	9.80	4.91	10.00	-5.21%	+2.04%

Table 10-2: System Validation of Body

Measurement is made at temperature 22.5 °C and relative humidity 45%.
Liquid temperature during the test: 22.5°C
Measurement Date : 900 MHz Body___May 20th, 2013___1900 MHz Body___May 21th, 2013___

Verification results	Frequency	Target value (W/kg)		Measured value (W/kg)		Deviation	
		10 g Average	1 g Average	10 g Average	1 g Average	10 g Average	1 g Average
	900 MHz	1.75	2.73	1.78	2.74	+1.71%	+0.37%
	1900 MHz	5.38	10.10	5.03	9.72	-6.51%	-3.76%

11 Measurement Procedures

11.1 Tests to be performed

In order to determine the highest value of the peak spatial-average SAR of a handset, all device positions, configurations and operational modes shall be tested for each frequency band according to steps 1 to 3 below. A flowchart of the test process is shown in Picture 19

Step 1: The tests described in 11.2 shall be performed at the channel that is closest to the centre of the transmit frequency band (f_c) for:

a) all device positions (cheek and tilt, for both left and right sides of the SAM phantom, as described in Chapter 8),

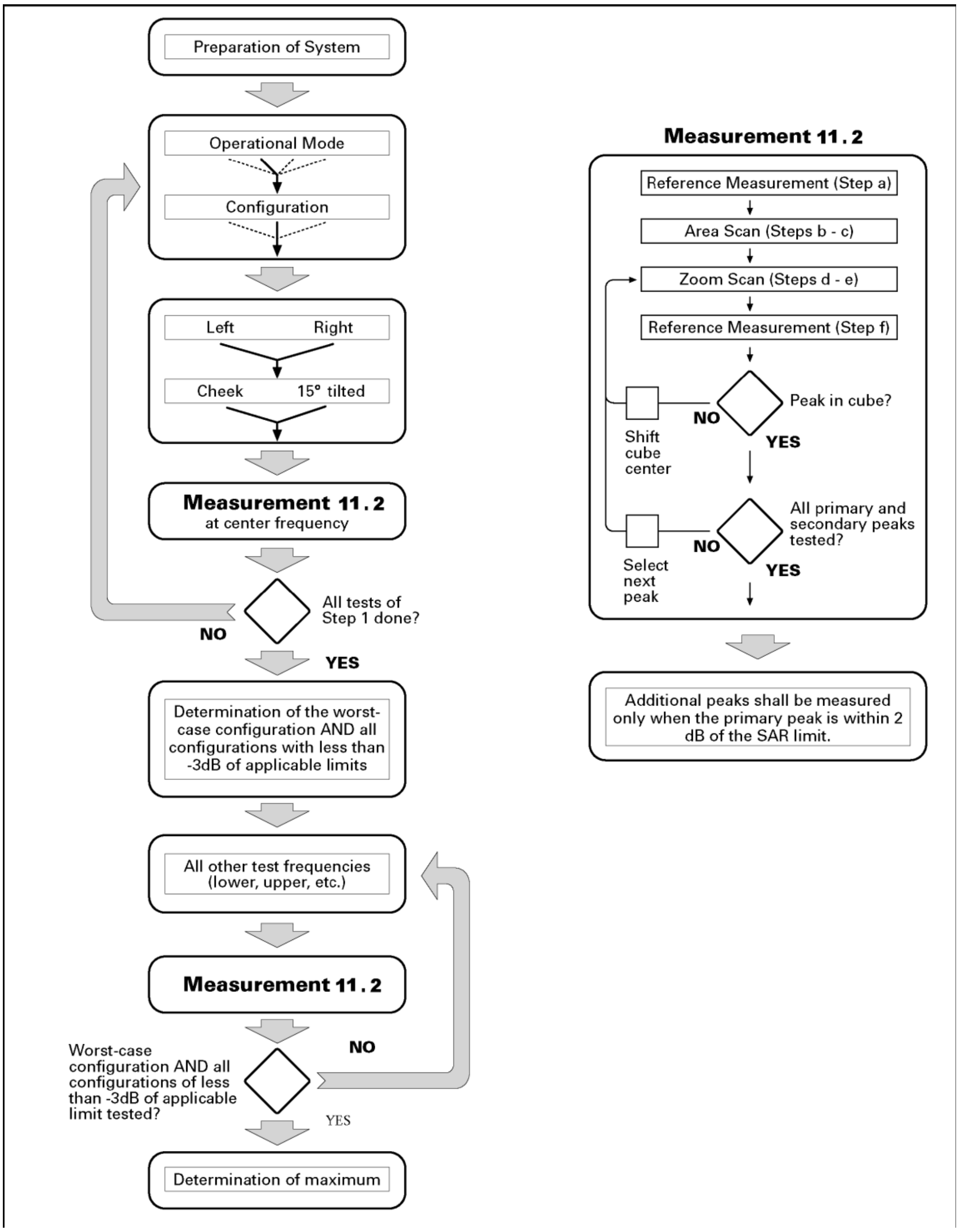
b) all configurations for each device position in a), e.g., antenna extended and retracted, and

c) all operational modes, e.g., analogue and digital, for each device position in a) and configuration in b) in each frequency band.

If more than three frequencies need to be tested according to 11.1 (i.e., N_c > 3), then all frequencies, configurations and modes shall be tested for all of the above test conditions.

Step 2: For the condition providing highest peak spatial-average SAR determined in Step 1, perform all tests described in 11.2 at all other test frequencies, i.e., lowest and highest frequencies. In addition, for all other conditions (device position, configuration and operational mode) where the peak spatial-average SAR value determined in Step 1 is within 3 dB of the applicable SAR limit, it is recommended that all other test frequencies shall be tested as well.

Step 3: Examine all data to determine the highest value of the peak spatial-average SAR found in Steps 1 to 2.



Picture 19 Block diagram of the tests to be performed

11.2 Measurement procedure

The following procedure shall be performed for each of the test conditions (see Picture 19) described in 11.1:

a) Measure the local SAR at a test point within 8 mm or less in the normal direction from the inner surface of the phantom.

b) Measure the two-dimensional SAR distribution within the phantom (area scan procedure). The boundary of the measurement area shall not be closer than 20 mm from the phantom side walls. The distance between the measurement points should enable the detection of the location of local maximum with an accuracy of better than half the linear dimension of the tissue cube after interpolation. A maximum grip spacing of 20 mm for frequencies below 3 GHz and (60/f [GHz]) mm for frequencies of 3GHz and greater is recommended. The maximum distance between the geometrical centre of the probe detectors and the inner surface of the phantom shall be 5 mm for frequencies below 3 GHz and δ In(2)/2 mm for frequencies of 3 GHz and greater, where δ is the plane W60 skin depth and In(x) is the natural logarithm. The maximum variation of the sensor-phantom surface shall be ±1 mm for frequencies below 3 GHz and ±0.5 mm for frequencies of 3 GHz and greater. At all measurement points the angle of the probe with respect to the line normal to the surface should be less than 5°. If this cannot be achieved for a measurement distance to the phantom inner surface shorter than the probe diameter, additional uncertainty evaluation is needed.

c) From the scanned SAR distribution, identify the position of the maximum SAR value, in addition identify the positions of any local maxima with SAR values within 2 dB of the maximum value that are not within the zoom-scan volume; additional peaks shall be measured only when the primary peak is within 2 dB of the SAR limit. This is consistent with the 2 dB threshold already stated;

d) Measure the three-dimensional SAR distribution at the local maxima locations identified in step c). The horizontal grid step shall be (24 / f[GHz]) mm or less but not more than 8 mm. The minimum zoom size of 30 mm by 30 mm and 30 mm for frequencies below 3 GHz. For higher frequencies, the minimum zoom size of 22 mm by 22 mm and 22 mm. The grip step in the vertical direction shall be (8-f[GHz]) mm or less but not more than 5 mm, if uniform spacing is used. If variable spacing is used in the vertical direction, the maximum spacing between the two closest measured points to the phantom shell shall be (12 / f[GHz]) mm or less but not more than 4 mm, and the spacing between father points shall increase by an incremental factor not exceeding 1.5. When variable spacing is used, extrapolation routines shall be tested with the same spacing as used in measurements. The maximum distance between the geometrical centre of the probe detectors and the inner surface of the phantom shall be 5 mm for frequencies below 3 GHz and δ In(2)/2 mm for frequencies of 3 GHz and greater, where δ is the plane W60 skin depth and In(x) is the natural logarithm. Separate grids shall be centered on each of the local SAR maxima found in step c). Uncertainties due to field distortion between the media boundary and the dielectric enclosure of the probe should also be minimized, which is achieved is the distance between the phantom surface and physical tip of the probe is larger than probe tip diameter. Other methods may utilize correction procedures for these boundary effects that enable high precision measurements closer than half the probe diameter. For all measurement points, the angle of the probe with respect to the flat phantom surface shall be less than 5°. If this cannot be achieved an additional uncertainty evaluation is needed.

e) Use post processing(e.g. interpolation and extrapolation) procedures to determine the local SAR values at the spatial resolution needed for mass averaging.

11.3 Power Drift

To control the output power stability during the SAR test, DASY5 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in Table 13-1 to Table 13-4 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

12 Conducted Output Power

12.1 GSM Measurement result

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMU200) to ensure the maximum power transmission and proper modulation. This result contains conducted output power for the EUT. In all cases, the measured peak output power should be greater and within 5% than EMI measurement.

Table 12-1: The conducted power measurement results for GSM850/GSM1900

GSM 850MHZ	Conducted Power (dBm)		
	Channel 128(824.2MHz)	Channel 190(836.6MHz)	Channel 251(848.8MHz)
	32.43	32.25	32.30
GSM 1900MHZ	Conducted Power (dBm)		
	Channel 512(1850.2MHz)	Channel 661(1880.0MHz)	Channel 810(1909.8MHz)
	29.32	29.45	29.61

12.2 BT Measurement result

Table 12-2: The output power of BT antenna

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz
Conducted Output Power(dBm)	0.34	-0.38	-0.45

Note: According to the EN62479,SAR testing is not required, when conducted power of BT<=20mW.

13 SAR Test Result

Table 13-1: SAR Values (GSM 850 MHz Band-Head)

Frequency		Mode/Band	Side	Test Position	SAR(1g)	Power Drift(dB)
MHz	Ch.				(W/kg)	
836.6	190	GSM850	Right	Touch	0.031	-0.16
836.6	190	GSM850	Right	Tilt	0.027	0.05
836.6	190	GSM850	Left	Touch	0.032	-0.02
836.6	190	GSM850	Left	Tilt	0.022	-0.11
848.8	251	GSM850	Left	Touch	0.033	-0.18
824.2	128	GSM850	Left	Touch	0.038	0.11

Table 13-2: SAR Values (GSM 850 MHz Band-Body)

Frequency		Mode/Band	Service/Headset	Test Position	Spacing (mm)	SAR(1g)	Power Drift(dB)
MHz	Ch.					(W/kg)	
836.6	190	GSM850	Speech	Toward Ground	10	0.061	0.03
836.6	190	GSM850	Speech	Toward Phantom	10	0.021	-0.09
848.8	251	GSM850	Speech	Toward Ground	10	0.064	0.05
824.2	128	GSM850	Speech	Toward Ground	10	0.062	0.01

Table 13-3: SAR Values (GSM 1900 MHz Band-Head)

Frequency		Mode/Band	Side	Test Position	SAR(1g)	Power Drift(dB)
MHz	Ch.				(W/kg)	
1880.0	661	GSM1900	Right	Touch	0.209	-0.11
1880.0	661	GSM1900	Right	Tilt	0.168	-0.03
1880.0	661	GSM1900	Left	Touch	0.249	0.06
1880.0	661	GSM1900	Left	Tilt	0.197	0.14
1909.8	810	GSM1900	Left	Touch	0.197	-0.12
1850.2	512	GSM1900	Left	Touch	0.293	-0.01

Table 13-4: SAR Values (GSM 1900 MHz Band-Body)

Frequency		Mode/Band	Service/Headset	Test Position	Spacing (mm)	SAR(1g)	Power Drift(dB)
MHz	Ch.					(W/kg)	
1880.0	661	GSM1900	Speech	Toward Ground	10	0.118	0.01
1880.0	661	GSM1900	Speech	Toward Phantom	10	0.067	-0.09
1909.8	810	GSM1900	Speech	Toward Ground	10	0.106	-0.05
1850.2	512	GSM1900	Speech	Toward Ground	10	0.090	-0.16

14 Measurement Uncertainty

Measurement uncertainty evaluation for SAR test

Error Description	Unc. value, ±%	Prob. Dist.	Div.	c_i 1g	c_i 1g	Std.Unc. ±%,1g	Std.Unc. ±%,1g	V_i v_{eff}
Measurement System								
Probe Calibration	6.0	N	1	1	1	6.0	6.0	∞
Axial Isotropy	0.5	R	$\sqrt{3}$	0.7	0.7	0.2	0.2	∞
Hemispherical Isotropy	2.6	R	$\sqrt{3}$	0.7	0.7	1.1	1.1	∞
Boundary Effects	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
Linearity	0.6	R	$\sqrt{3}$	1	1	0.3	0.3	∞
System Detection Limits	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Readout Electronics	0.7	N	1	1	1	0.7	0.7	∞
Response Time	0	R	$\sqrt{3}$	1	1	0	0	∞
Integration Time	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
RF Ambient Noise	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
RF Ambient Reflections	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
Probe Positioner	1.5	R	$\sqrt{3}$	1	1	0.9	0.9	∞
Probe Positioning	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
Max. SAR Eval.	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Test Sample Related								
Device Positioning	2.9	N	1	1	1	2.9	2.9	145
Device Holder	3.6	N	1	1	1	3.6	3.6	5
Phantom and Setup								
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	∞

Measurement uncertainty evaluation for system validation

Error Description	Unc. value, ±%	Prob. Dist.	Div.	c_i 1g	c_i 1g	Std.Unc. ±%,1g	Std.Unc. ±%,1g	V_i v_{eff}
Measurement System								
Probe Calibration	6.0	N	1	1	1	6.0	6.0	∞
Axial Isotropy	0.5	R	$\sqrt{3}$	0.7	0.7	0.2	0.2	∞
Hemispherical Isotropy	2.6	R	$\sqrt{3}$	0.7	0.7	1.1	1.1	∞
Boundary Effects	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
Linearity	0.6	R	$\sqrt{3}$	1	1	0.3	0.3	∞
System Detection Limits	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Readout Electronics	0.7	N	1	1	1	0.7	0.7	∞
Response Time	0	R	$\sqrt{3}$	1	1	0	0	∞
Integration Time	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
RF Ambient Noise	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
RF Ambient Reflections	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
Probe Positioner	1.5	R	$\sqrt{3}$	1	1	0.9	0.9	∞
Probe Positioning	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
Max. SAR Eval.	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Diople								
Power Drift	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Dipole Positioning	2.0	N	1	1	1	2.0	2.0	∞
Dipole Input Power	5.0	N	1	1	1	5.0	5.0	∞
Phantom and Setup								
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 Std Uncertainty						±11.2%	±10.9%	387
Expanded Std Uncertainty						**±22.4%**	**±21.8%**	

15 MAIN TEST INSTRUMENTS

Table 15-1: List of Main Instruments

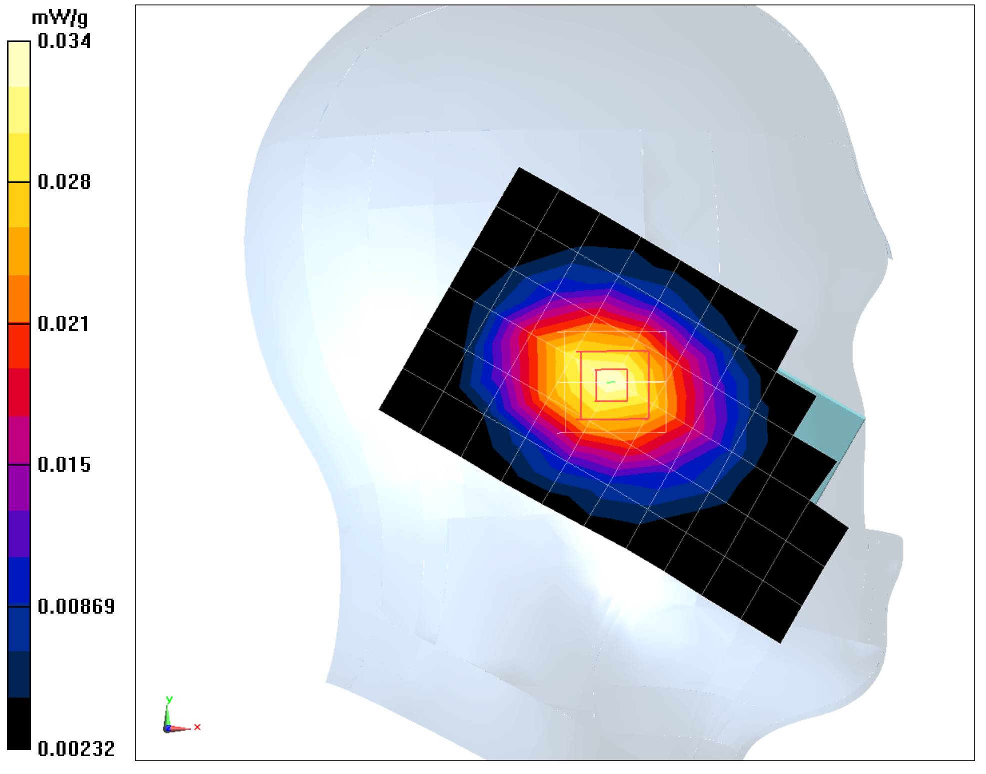
No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	E8362B	MY43021471	Jul 07, 2012	One year
02	Power meter	E4417A	GB41050460	Aug 01,2012	One year
03	Power sensor	E9327A	US40440198	Jul 17,2012	
04	Signal Generator	SMP04	100064	Feb 08,2013	One Year
05	Amplifier	150W1000	150W1000	No Calibration Requested	
06	Coupler	4242-20	04200	Aug 06, 2012	One year
07	BTS	CMU200	1100000802	Jul 17,2012	One year
08	E-field Probe	ES3DV3	3158	Jul 19,2012	One year
09	DAE	DAE4	797	Jul 12,2012	One year
10	Dipole Validation Kit	SPEAG D900V2	1d059	Jul 10,2012	One year
11	Dipole Validation Kit	SPEAG D1900V2	5d024	Jul 11,2012	One year

END OF REPORT BODY

ANNEX A GRAPH RESULTS

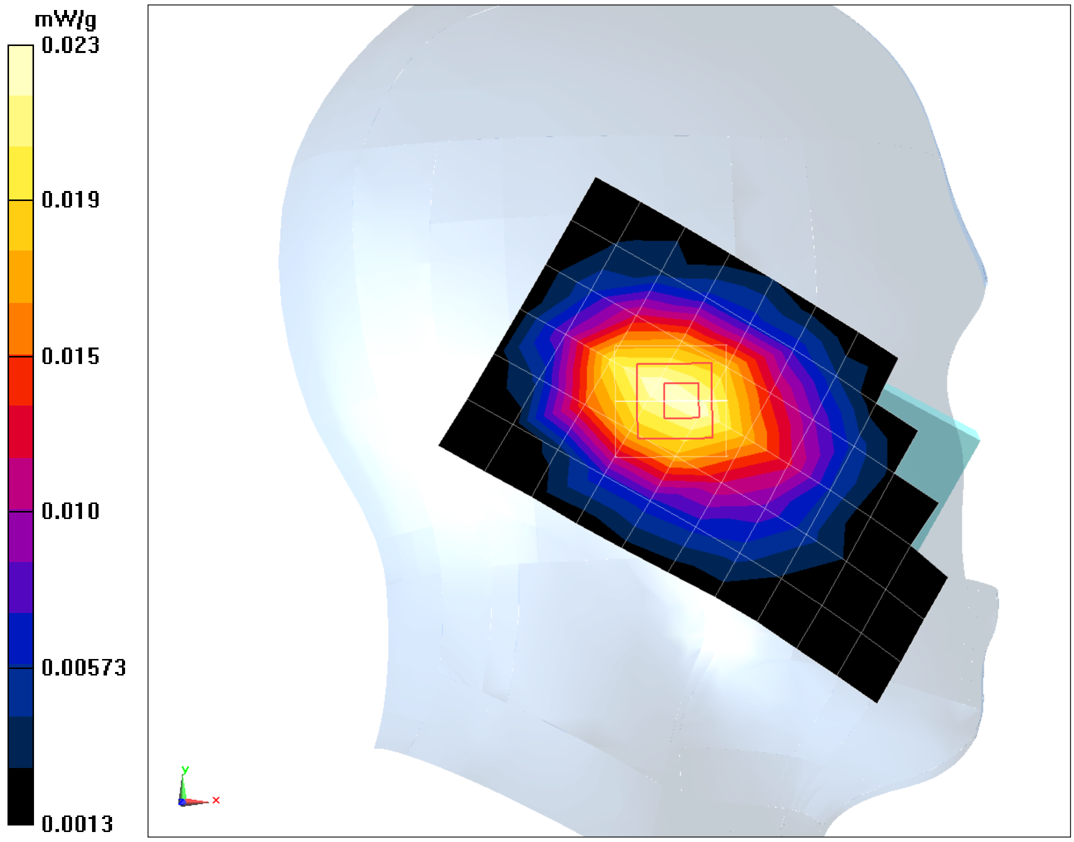
GSM850 Left Cheek Middle

Date/Time: 05/20/2013
Electronics: DAE4 Sn797
Medium: Head 850MHz
Medium parameters used: f = 837 MHz; σ = 0.92 mho/m;εr = 40.401; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 850MHz; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(6.02, 6.02, 6.02)
Middle Cheek Left GSM850MHz/Area Scan (11x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.035 mW/g
Middle Cheek Left GSM850MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.689 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.0450mW/g
SAR(1 g) = 0.032 mW/g; SAR(10 g) = 0.023 mW/g
Maximum value of SAR (measured) = 0.034 mW/g



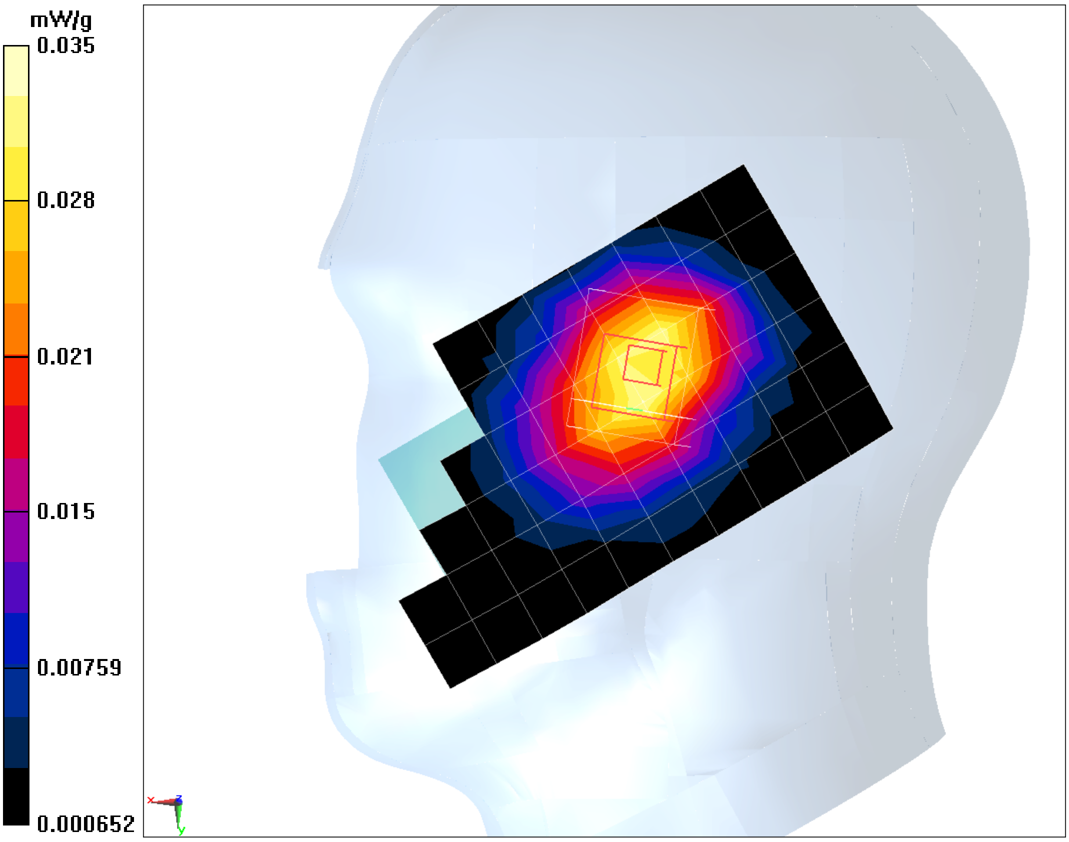
GSM850 Left Tilt Middle

Date/Time: 05/20/2013
Electronics: DAE4 Sn797
Medium: Head 850MHz
Medium parameters used: f = 837 MHz; σ = 0.92 mho/m;εr = 40.401; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 850MHz; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(6.02, 6.02, 6.02)
Middle Tilt Left GSM850MHz/Area Scan (11x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.023 mW/g
Middle Tilt Left GSM850MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.847 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.0310mW/g
SAR(1 g) = 0.022 mW/g; SAR(10 g) = 0.016 mW/g



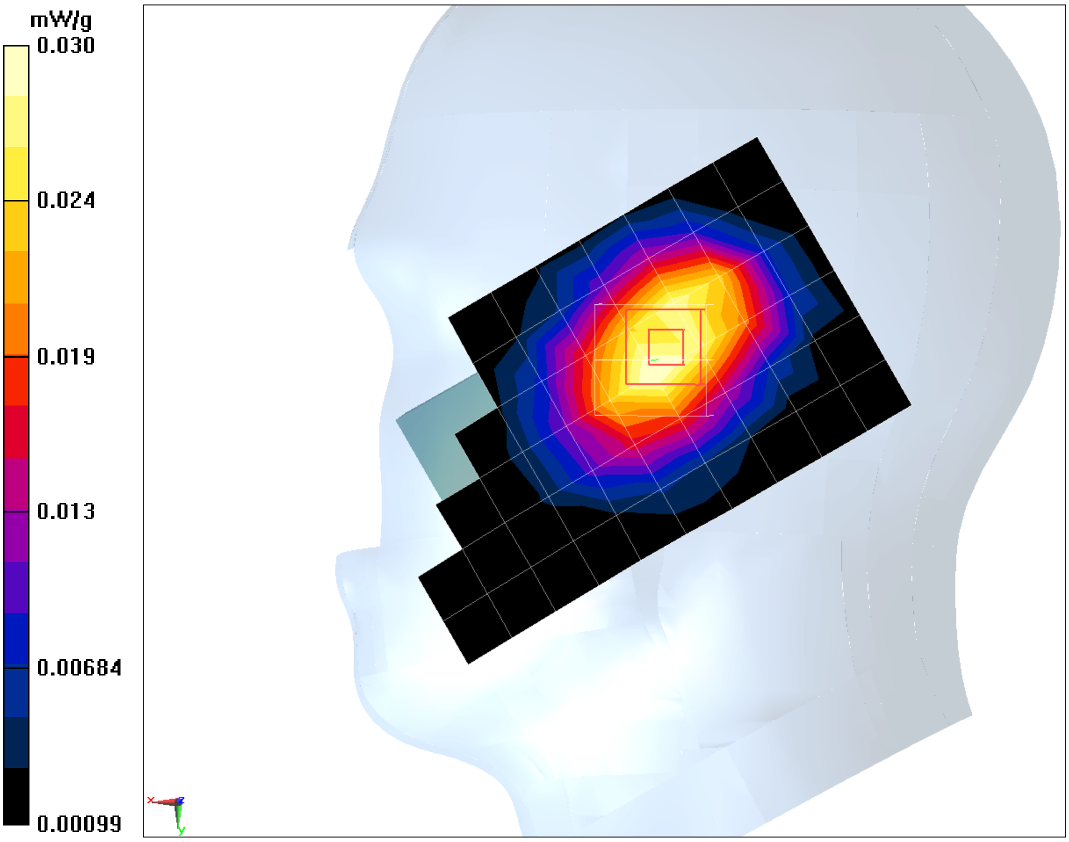
GSM850 Right Cheek Middle

Date/Time: 05/20/2013
Electronics: DAE4 Sn797
Medium: Head 850MHz
Medium parameters used: f = 837 MHz; σ = 0.92 mho/m;εr = 40.401; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 850MHz; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(6.02, 6.02, 6.02)
Middle Cheek Right GSM850MHz Head/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.033 mW/g
Middle Cheek Right GSM850MHz Head/Zoom Scan (7x7x7) (5x6x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.383 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.0450mW/g
SAR(1 g) = 0.031 mW/g; SAR(10 g) = 0.022 mW/g
Maximum value of SAR (measured) = 0.035 mW/g



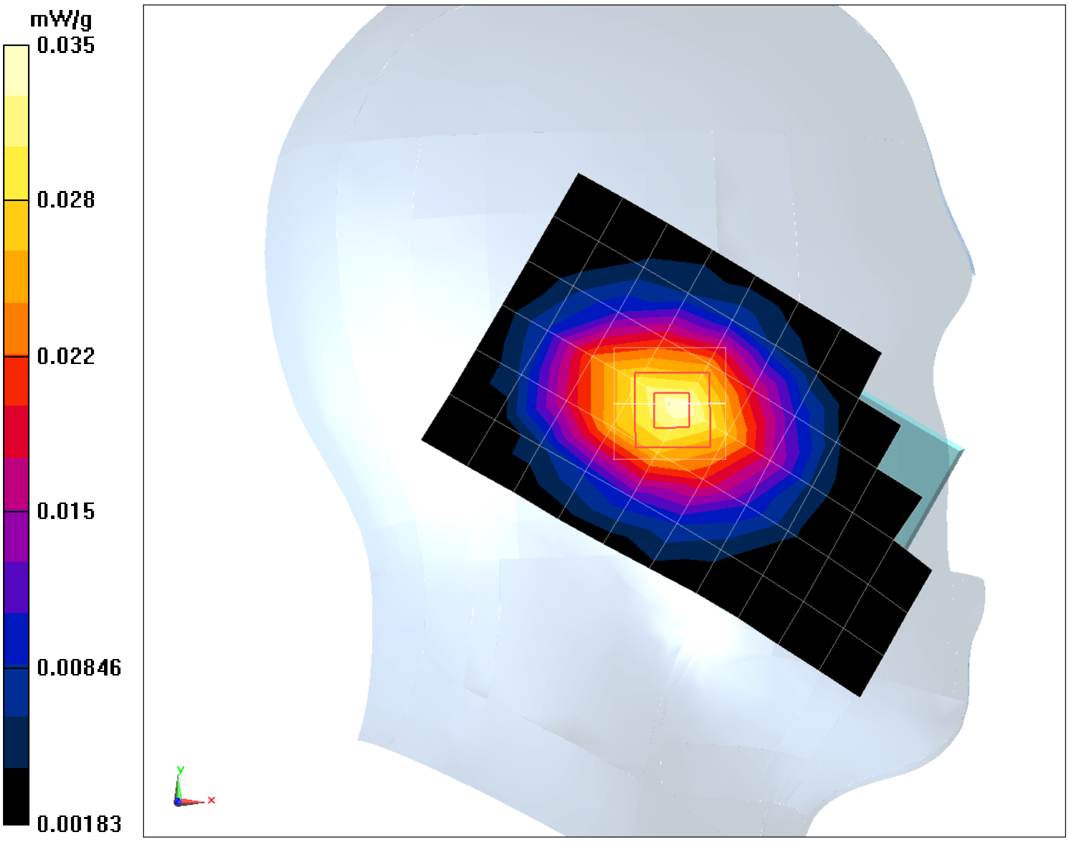
GSM850 Right Tilt Middle

Date/Time: 05/20/2013
Electronics: DAE4 Sn797
Medium: Head 850MHz
Medium parameters used: f = 837 MHz; σ = 0.92 mho/m;εr = 40.401; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 850MHz; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(6.02, 6.02, 6.02)
Middle Tilt Right GSM850MHz Head/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.031 mW/g
Middle Tilt Right GSM850MHz Head/Zoom Scan (7x7x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.553 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.0380mW/g
SAR(1 g) = 0.027 mW/g; SAR(10 g) = 0.019 mW/g
Maximum value of SAR (measured) = 0.030 mW/g



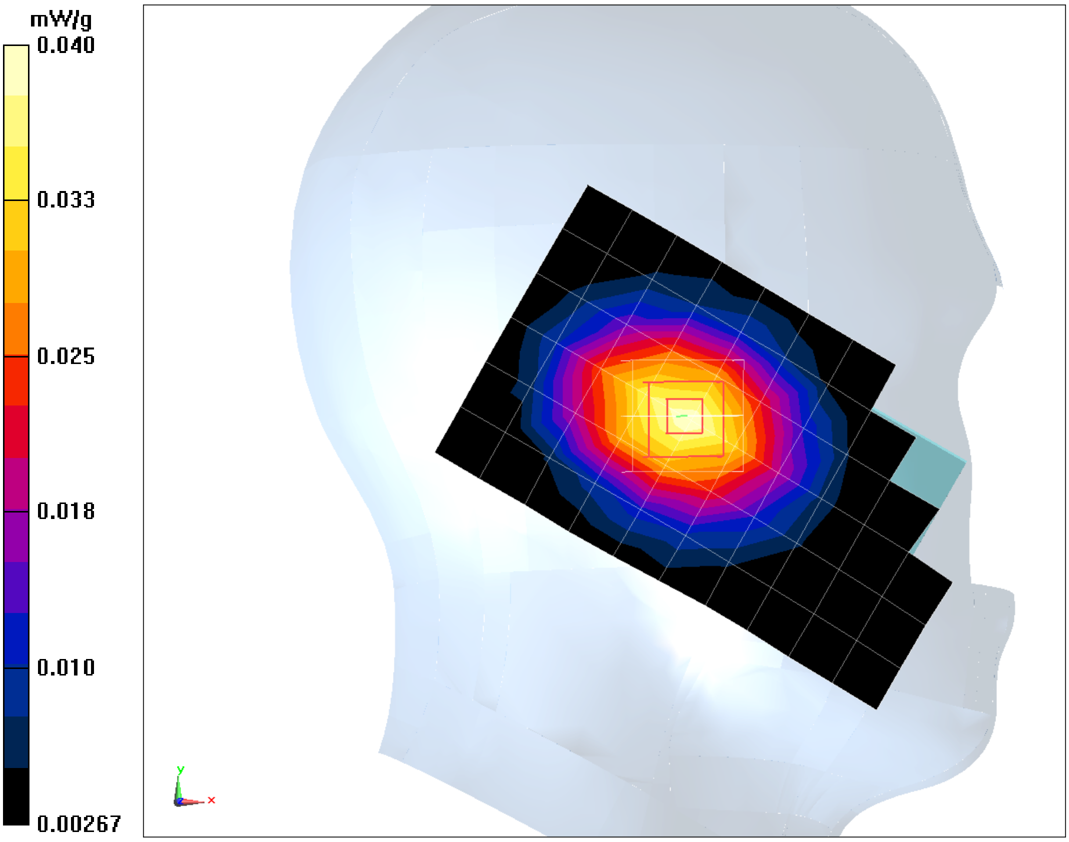
GSM850 Left Cheek High

Date/Time: 05/20/2013
Electronics: DAE4 Sn797
Medium: Head 850MHz
Medium parameters used: f = 849 MHz; σ = 0.932 mho/m;εr = 40.265; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 850MHz; Frequency: 848.8 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(6.02, 6.02, 6.02)
High Cheek Left GSM850MHz/Area Scan (11x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.035 mW/g
High Cheek Left GSM850MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.938 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 0.0440mW/g
SAR(1 g) = 0.033 mW/g; SAR(10 g) = 0.023 mW/g



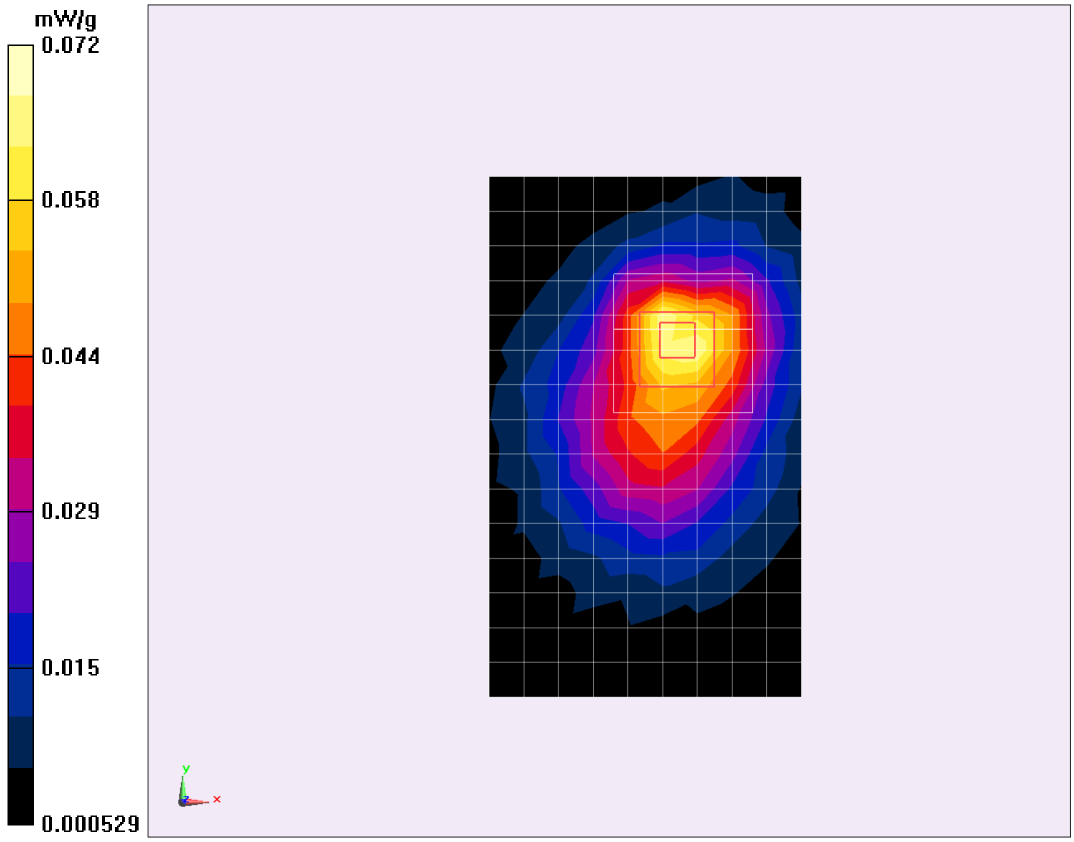
GSM850 Left Cheek Low

Date/Time: 05/20/2013
Electronics: DAE4 Sn797
Medium: Head 850MHz
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.908 mho/m;εr = 40.548; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 850MHz; Frequency: 824.2 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(6.02, 6.02, 6.02)
Low Cheek Left GSM850MHz Head/Area Scan (11x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.040 mW/g
Low Cheek Left GSM850MHz Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.149 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.0520mW/g
SAR(1 g) = 0.038 mW/g; SAR(10 g) = 0.027 mW/g



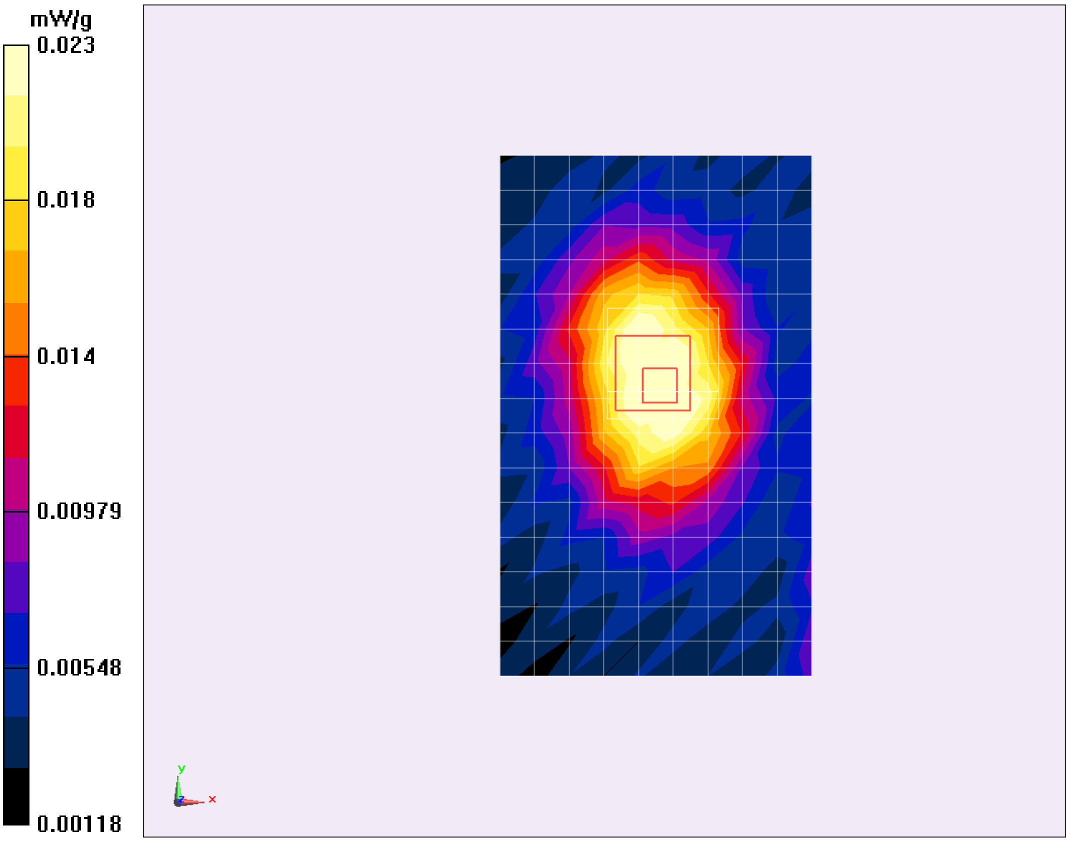
GSM850 Body Toward Ground Middle

Date/Time: 05/20/2013
Electronics: DAE4 Sn797
Medium: Body 850MHz
Medium parameters used: f = 837 MHz; σ = 1.018 mho/m;εr = 55.879; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 850MHz; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(5.99, 5.99, 5.99)
Measurement grid: dx=10mm, dy=10mm
Middle Toward Ground GSM850MHz/Area Scan (10x16x1): Maximum value of SAR (measured) = 0.068 mW/g
Middle Toward Ground GSM850MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.492 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.0980mW/g
SAR(1 g) = 0.061 mW/g; SAR(10 g) = 0.038 mW/g
Maximum value of SAR (measured) = 0.072 mW/g



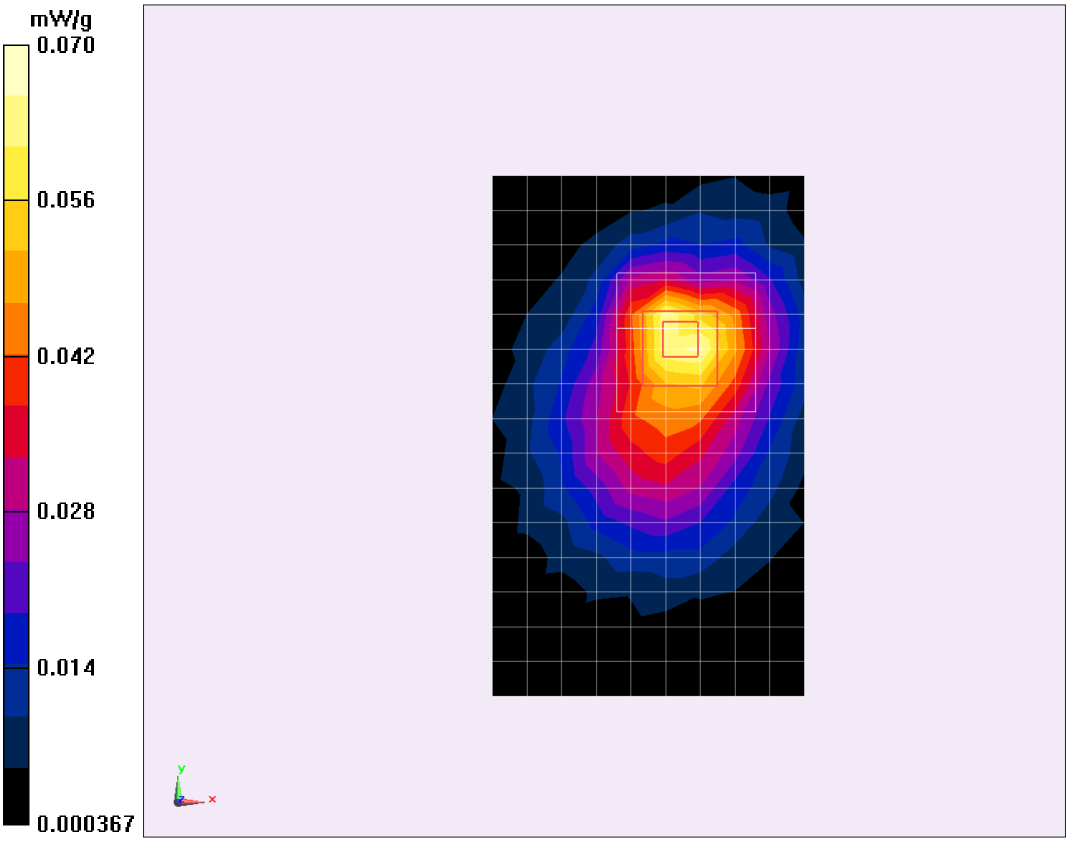
GSM850 Body Toward Phantom Middle

Date/Time: 05/20/2013
Electronics: DAE4 Sn797
Medium: Body 850MHz
Medium parameters used: f = 837 MHz; σ = 1.018 mho/m;εr = 55.879; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 850MHz; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(5.99, 5.99, 5.99)
Middle Toward Phantom GSM850MHz/Area Scan (10x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.025 mW/g
Middle Toward Phantom GSM850MHz/Zoom Scan (7x7x7) (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.532 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.0320mW/g
SAR(1 g) = 0.021 mW/g; SAR(10 g) = 0.014 mW/g
Maximum value of SAR (measured) = 0.023 mW/g



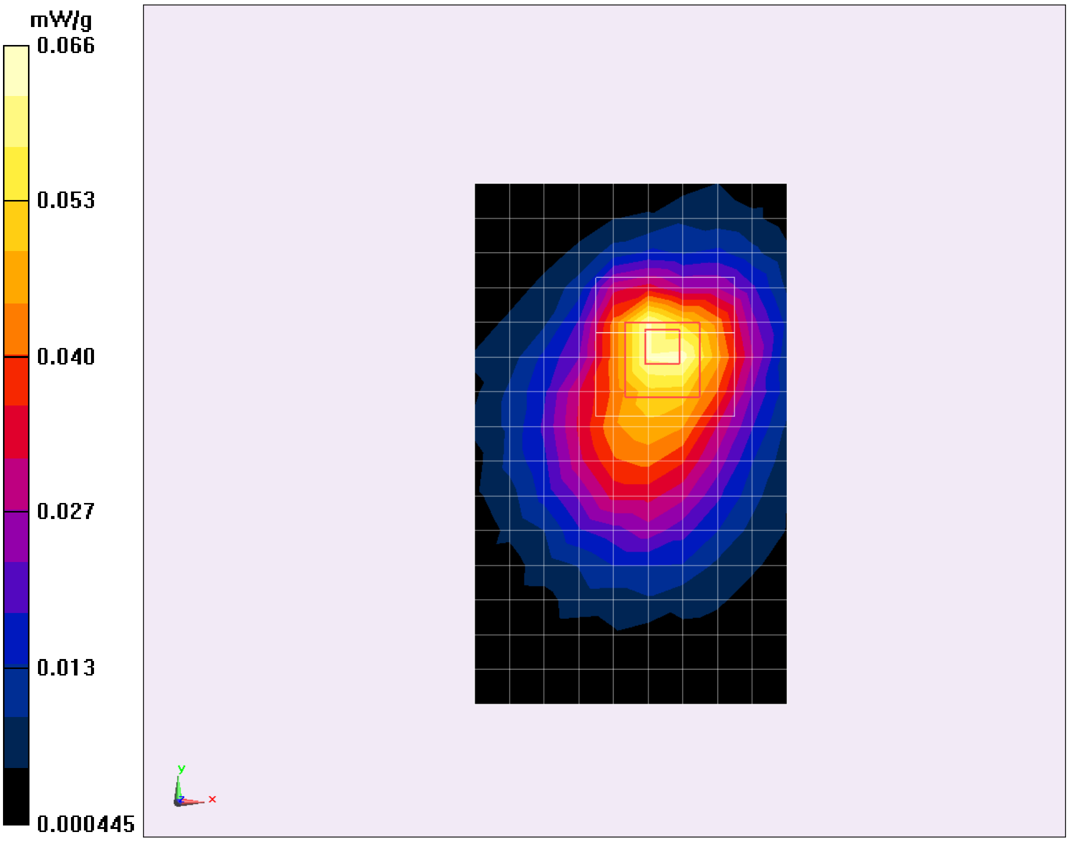
GSM850 Body Toward Ground High

Date/Time: 05/20/2013
Electronics: DAE4 Sn797
Medium: Body 850MHz
Medium parameters used: f = 849 MHz; σ = 1.03 mho/m;εr = 55.763; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 850MHz; Frequency: 848.8 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(5.99, 5.99, 5.99)
High Toward Ground GSM850MHz/Area Scan (10x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.066 mW/g
High Toward Ground GSM850MHz/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.293 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.1040mW/g
SAR(1 g) = 0.064 mW/g; SAR(10 g) = 0.040 mW/g
Maximum value of SAR (measured) = 0.070 mW/g



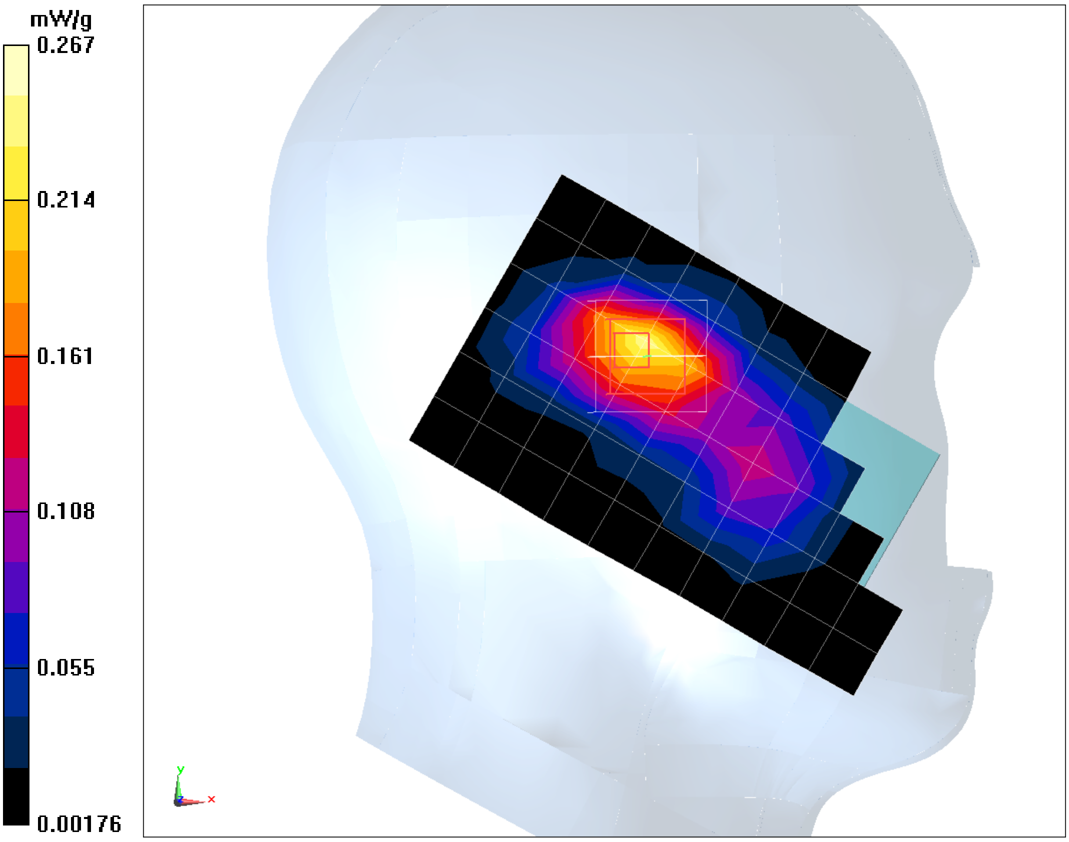
GSM850 Body Toward Ground Low

Date/Time: 05/20/2013
Electronics: DAE4 Sn797
Medium: Body 850MHz
Medium parameters used (interpolated): f = 824.2 MHz; σ = 1.005 mho/m;εr = 56.007; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 850MHz; Frequency: 824.2 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(5.99, 5.99, 5.99)
Low Toward Ground GSM850MHz/Area Scan (10x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.064 mW/g
Low Toward Ground GSM850MHz/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.578 V/m; Power Drift = 0.0052 dB
Peak SAR (extrapolated) = 0.0980mW/g
SAR(1 g) = 0.062 mW/g; SAR(10 g) = 0.040 mW/g
Maximum value of SAR (measured) = 0.066 mW/g



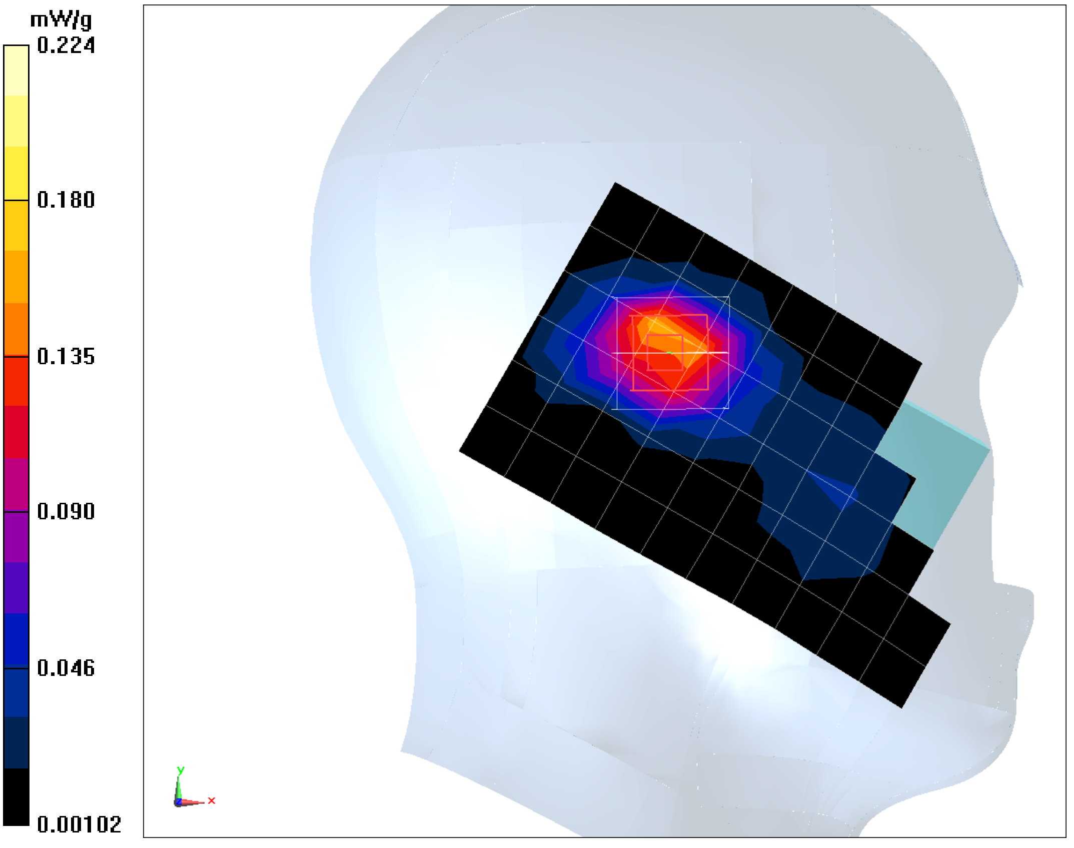
GSM1900 Left Cheek Middle

Date/Time: 05/21/2013
Electronics: DAE4 Sn797
Medium: Head 1900MHz
Medium parameters used: f = 1880 MHz; σ = 1.442 mho/m;εr = 40.614; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 1900MHz; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(5.06, 5.06, 5.06)
Middle Cheek Left GSM1900MHz/Area Scan (11x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.249 mW/g
Middle Cheek Left GSM1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.261 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.4900mW/g
SAR(1 g) = 0.249 mW/g; SAR(10 g) = 0.130 mW/g
Maximum value of SAR (measured) = 0.267 mW/g



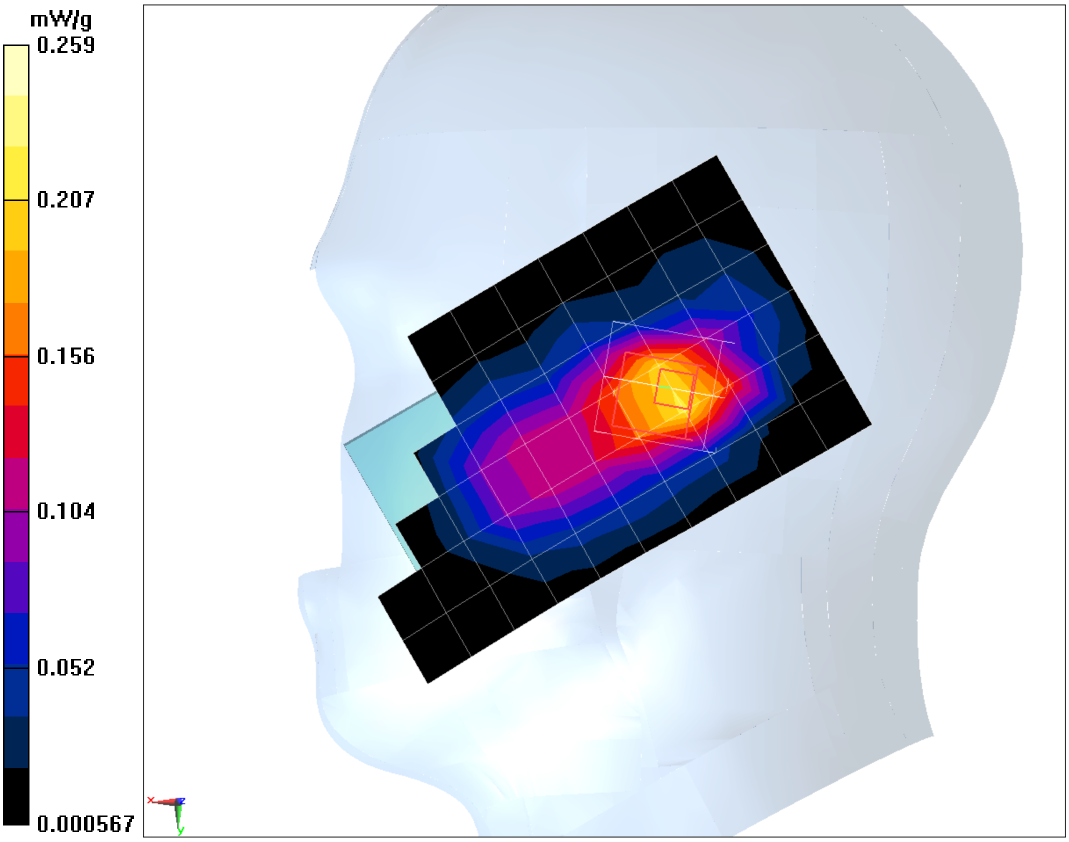
GSM1900 Left Tilt Middle

Date/Time: 05/21/2013
Electronics: DAE4 Sn797
Medium: Head 1900MHz
Medium parameters used: f = 1880 MHz; σ = 1.442 mho/m;εr = 40.614; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 1900MHz; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(5.06, 5.06, 5.06)
Middle Tilt Left GSM1900MHz/Area Scan (11x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.160 mW/g
Middle Tilt Left GSM1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.705 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.3930mW/g
SAR(1 g) = 0.197 mW/g; SAR(10 g) = 0.095 mW/g
Maximum value of SAR (measured) = 0.224 mW/g



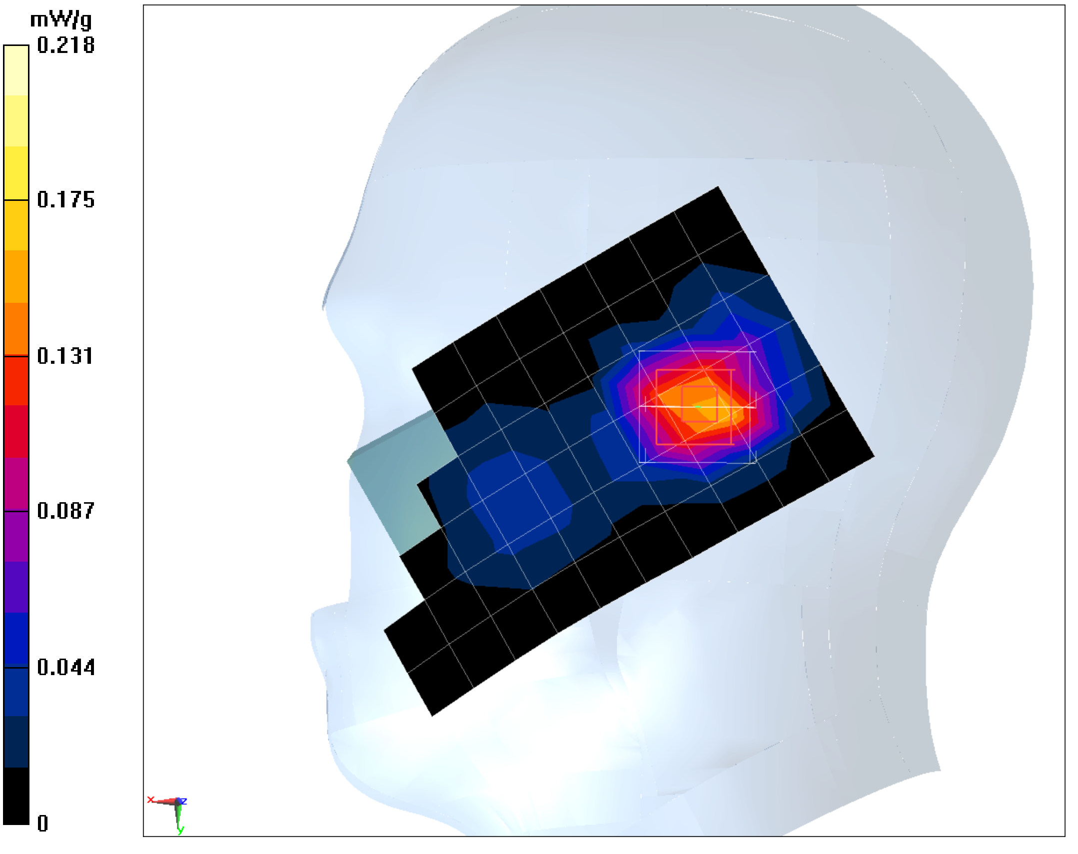
GSM1900 Right Cheek Middle

Date/Time: 05/21/2013
Electronics: DAE4 Sn797
Medium: Head 1900MHz
Medium parameters used: f = 1880 MHz; σ = 1.442 mho/m;εr = 40.614; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 1900MHz; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(5.06, 5.06, 5.06)
Middle Cheek Right GSM1900MHz Head/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.214 mW/g
Middle Cheek Right GSM1900MHz Head/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.621 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.3970mW/g
SAR(1 g) = 0.209 mW/g; SAR(10 g) = 0.111 mW/g
Maximum value of SAR (measured) = 0.259 mW/g



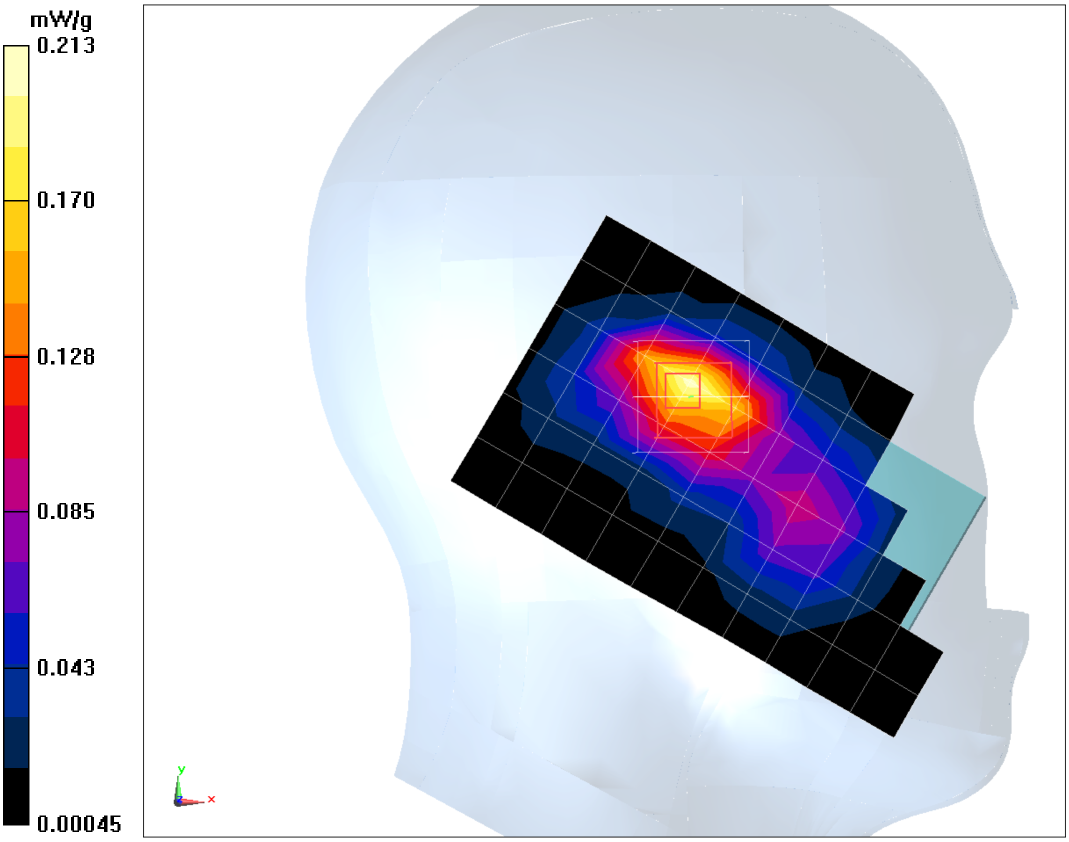
GSM1900 Right Tilt Middle

Date/Time: 05/21/2013
Electronics: DAE4 Sn797
Medium: Head 1900MHz
Medium parameters used: f = 1880 MHz; σ = 1.442 mho/m;εr = 40.614; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 1900MHz; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(5.06, 5.06, 5.06)
Middle Tilt Right GSM1900MHz Head/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.160 mW/g
Middle Tilt Right GSM1900MHz Head/Zoom Scan (7x7x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.343 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.3320mW/g
SAR(1 g) = 0.168 mW/g; SAR(10 g) = 0.081 mW/g
Maximum value of SAR (measured) = 0.218 mW/g



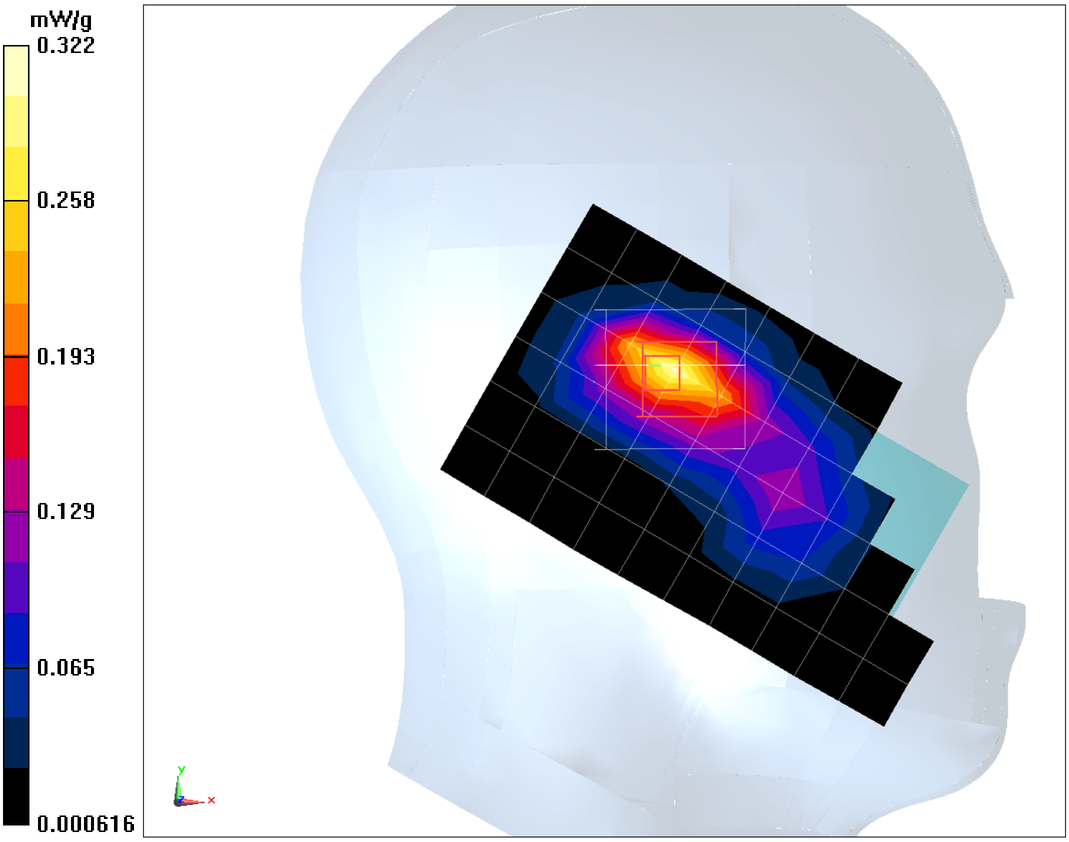
GSM1900 Left Cheek High

Date/Time: 05/21/2013
Electronics: DAE4 Sn797
Medium: Head 1900MHz
Medium parameters used (extrapolated): f = 1909.8 MHz; σ = 1.458 mho/m;εr = 40.605; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 1900MHz; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(5.06, 5.06, 5.06)
High Cheek Left GSM1900MHz/Area Scan (11x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.209 mW/g
High Cheek Left GSM1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.068 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.3860mW/g
SAR(1 g) = 0.197 mW/g; SAR(10 g) = 0.104 mW/g
Maximum value of SAR (measured) = 0.213 mW/g



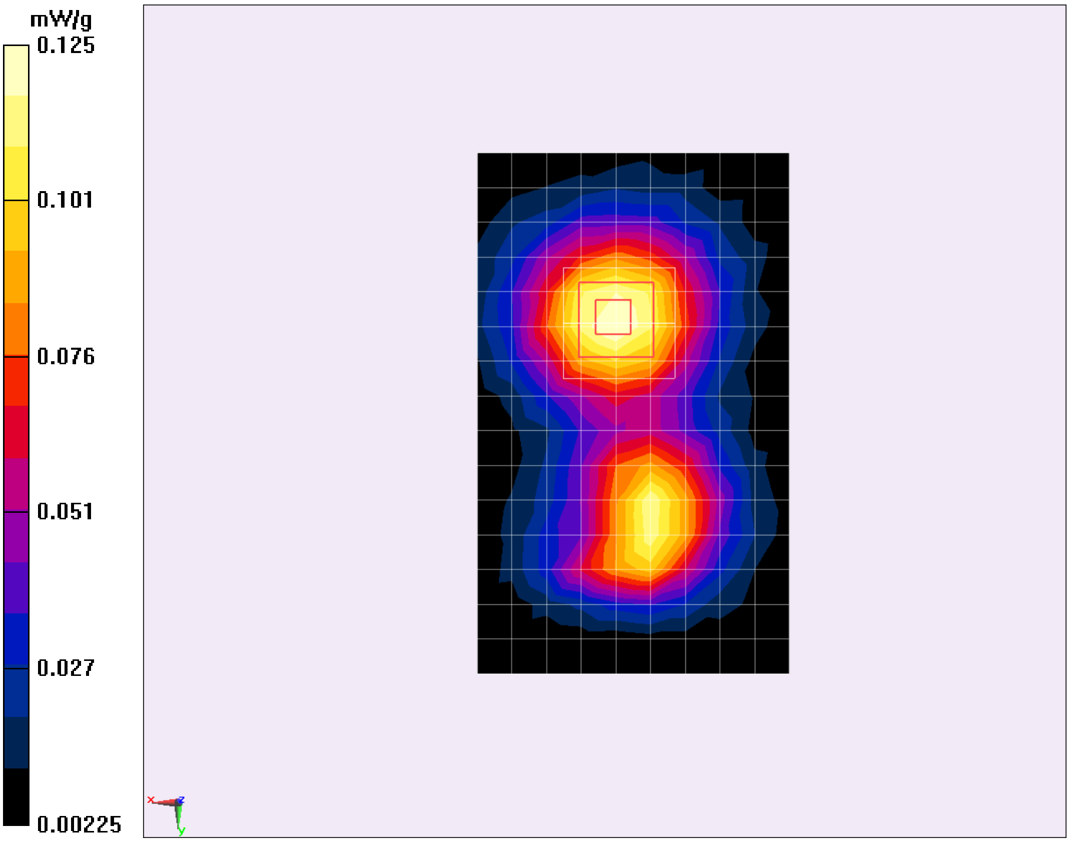
GSM1900 Left Cheek Low

Date/Time: 05/21/2013
Electronics: DAE4 Sn797
Medium: Head 1900MHz
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.42 mho/m;εr = 39.856; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 1900MHz; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(5.06, 5.06, 5.06)
Low Cheek Left GSM1900MHz Head/Area Scan (11x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.309 mW/g
Low Cheek Left GSM1900MHz Head/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.323 V/m; Power Drift = -0.0039 dB
Peak SAR (extrapolated) = 0.5730mW/g
SAR(1 g) = 0.293 mW/g; SAR(10 g) = 0.148 mW/g
Maximum value of SAR (measured) = 0.322 mW/g



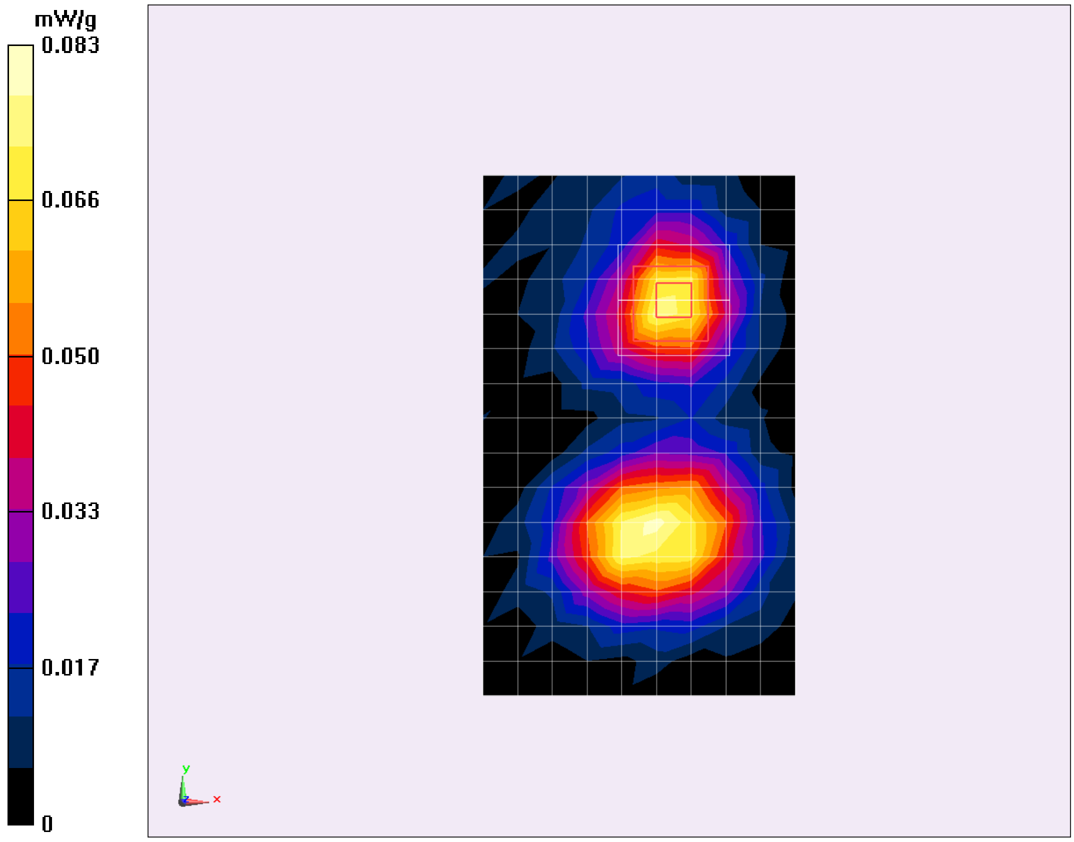
GSM1900 Body Toward Ground Middle

Date/Time: 05/21/2013
Electronics: DAE4 Sn797
Medium: Body 1900MHz
Medium parameters used: f = 1880 MHz; σ = 1.504 mho/m;εr = 53.32; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 1900MHz; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(4.60, 4.60, 4.60)
Middle Toward Ground GSM1900MHz/Area Scan (10x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.129 mW/g
Middle Toward Ground GSM1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.477 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.1860mW/g
SAR(1 g) = 0.118 mW/g; SAR(10 g) = 0.072 mW/g
Maximum value of SAR (measured) = 0.125 mW/g



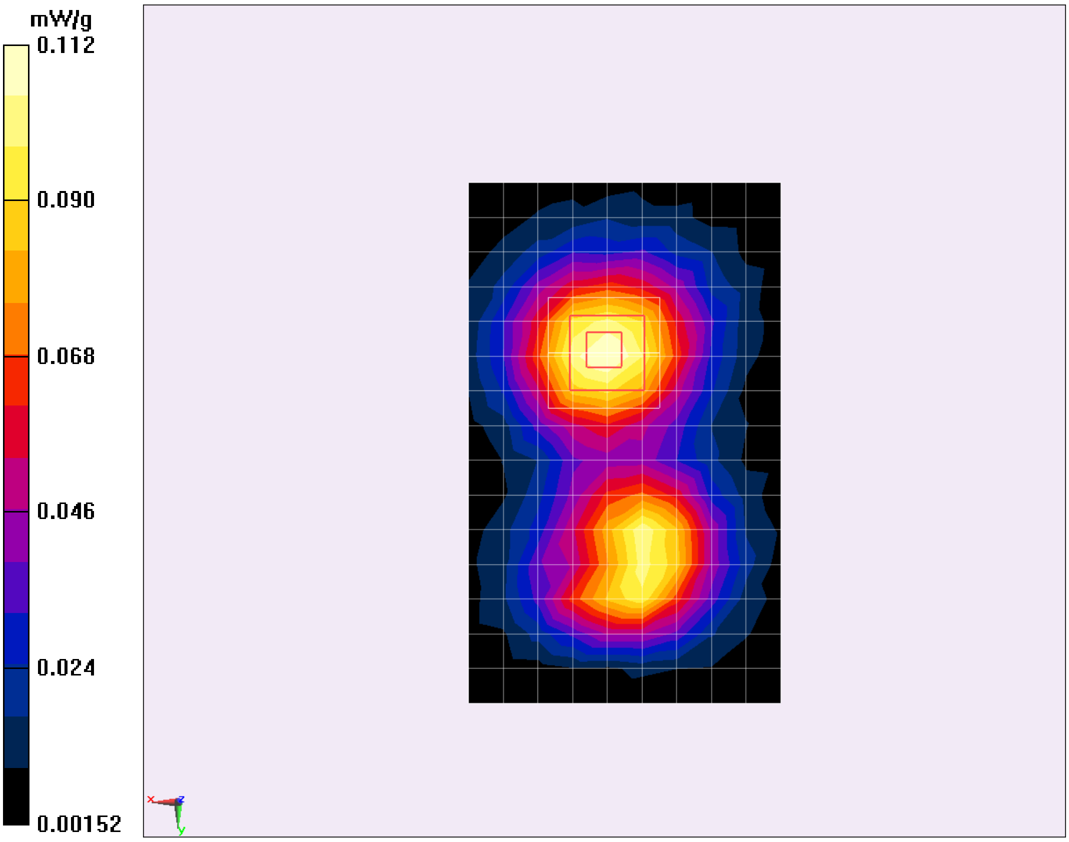
GSM1900 Body Toward Phantom Middle

Date/Time: 05/21/2013
Electronics: DAE4 Sn797
Medium: Body 1900MHz
Medium parameters used: f = 1880 MHz; σ = 1.504 mho/m;εr = 53.32; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 1900MHz; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(4.60, 4.60, 4.60)
Middle Toward Phantom GSM1900MHz/Area Scan (10x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.080 mW/g
Middle Toward Phantom GSM1900MHz/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.855 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.1130mW/g
SAR(1 g) = 0.067 mW/g; SAR(10 g) = 0.036 mW/g
Maximum value of SAR (measured) = 0.083 mW/g



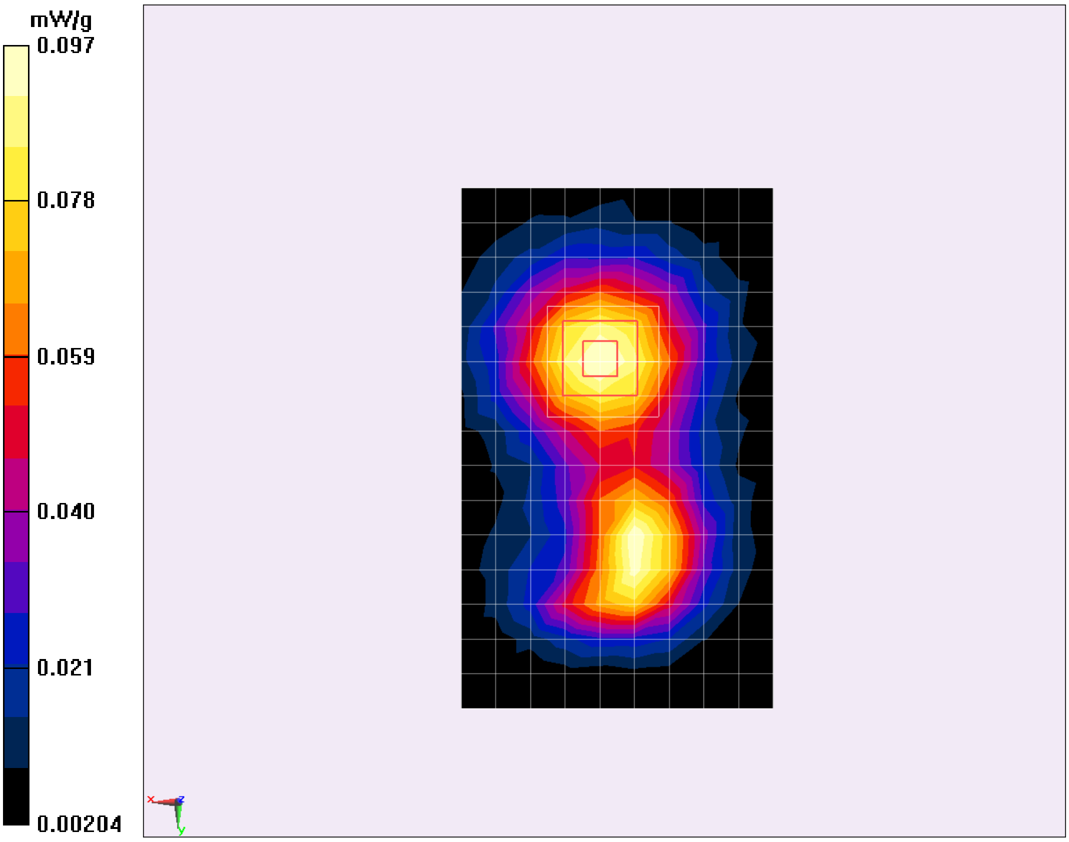
GSM1900 Body Toward Ground High

Date/Time: 05/21/2013
Electronics: DAE4 Sn797
Medium: Body 1900MHz
Medium parameters used: f = 1910 MHz; σ = 1.534 mho/m;εr = 53.19; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 1900MHz; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(4.60, 4.60, 4.60)
High Toward Ground GSM1900MHz/Area Scan (10x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.116 mW/g
High Toward Ground GSM1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.284 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.1670mW/g
SAR(1 g) = 0.106 mW/g; SAR(10 g) = 0.064 mW/g
Maximum value of SAR (measured) = 0.112 mW/g



GSM1900 Body Toward Ground Low

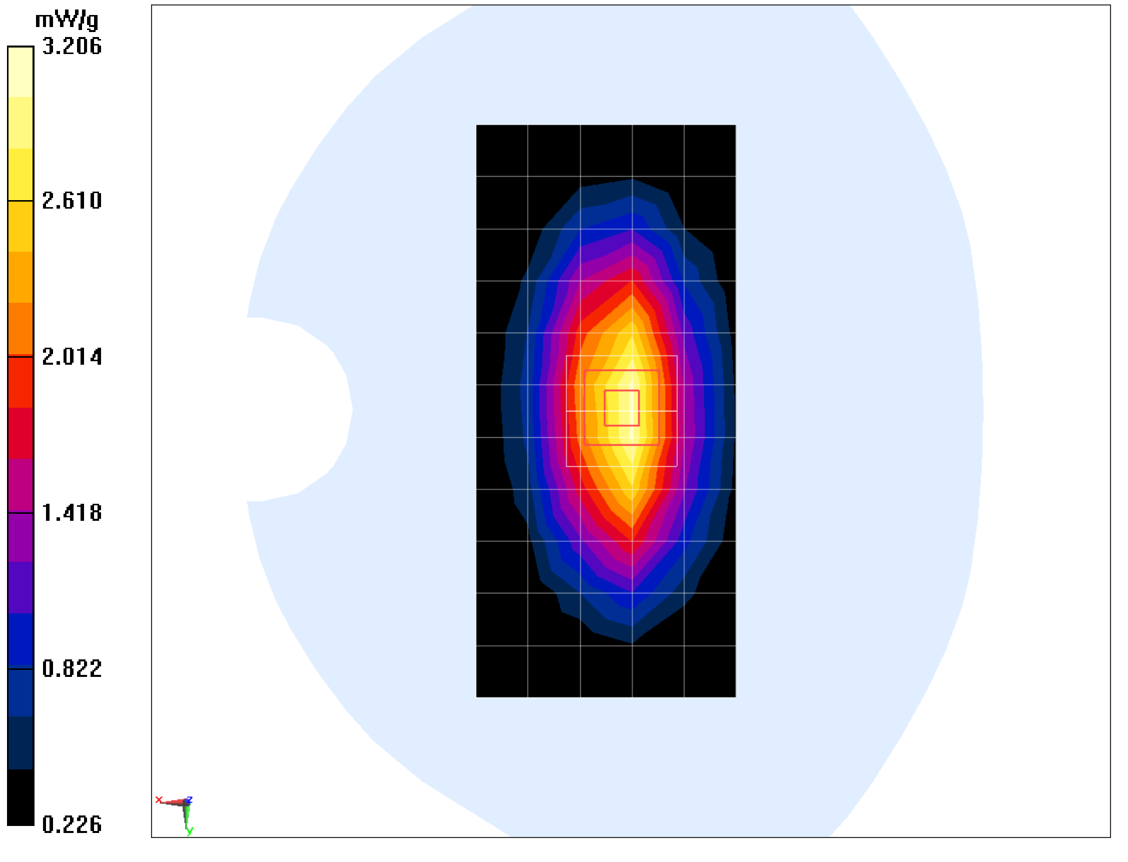
Date/Time: 05/21/2013
Electronics: DAE4 Sn797
Medium: Body 1900MHz
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.475 mho/m;εr = 53.44; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 1900MHz; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(4.60, 4.60, 4.60)
Low Toward Ground GSM1900MHz/Area Scan (10x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.101 mW/g
Low Toward Ground GSM1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.574 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.1430mW/g
SAR(1 g) = 0.090 mW/g; SAR(10 g) = 0.055 mW/g
Maximum value of SAR (measured) = 0.097 mW/g



ANNEX B SYSTEM VALIDATION RESULTS

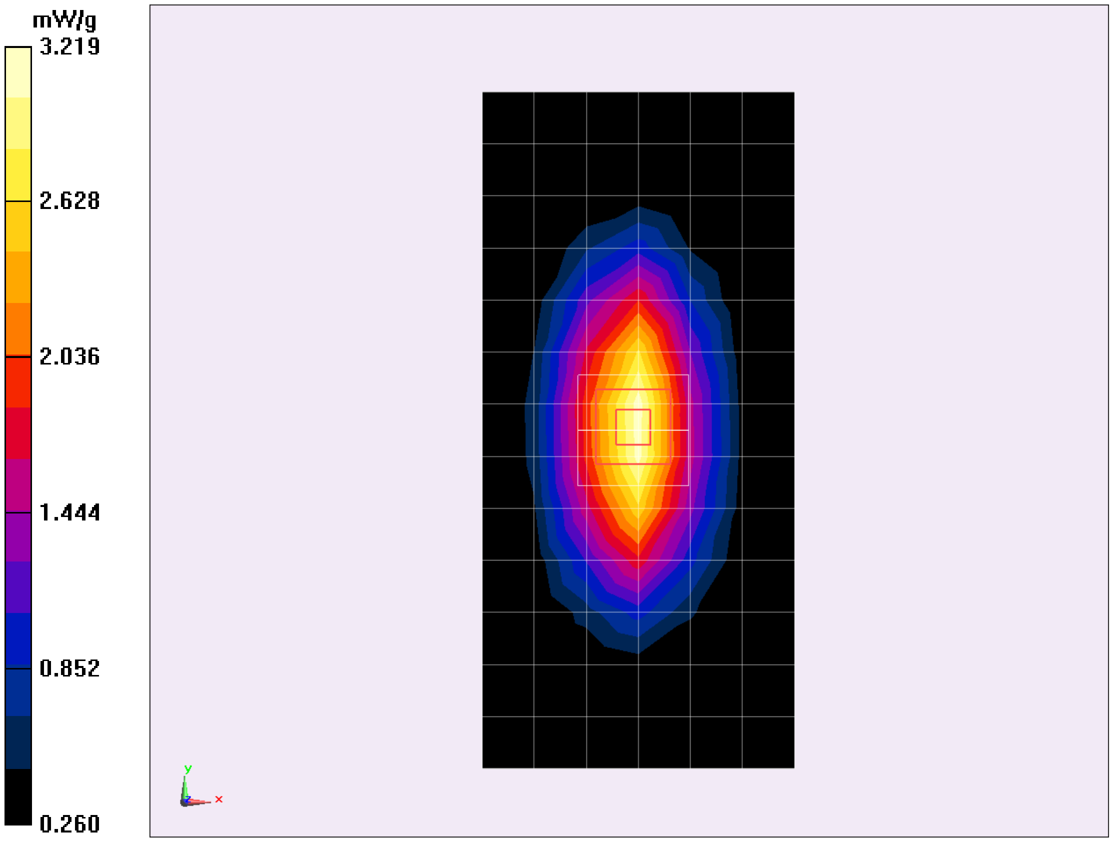
900MHz System Validation Head

Date/Time: 05/20/2013
Electronics: DAE4 Sn797
Medium: Head 850MHz
Medium parameters used: f = 900 MHz; σ = 0.981 mho/m;εr = 39.604; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3158ConvF(5.93, 5.93, 5.93)
System Performance Check-9000MHz Head /Area Scan (6x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 3.058 mW/g
System Performance Check-9000MHz Head /Zoom Scan (7x7x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 58.608 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 4.1470mW/g
SAR(1 g) = 2.71 mW/g; SAR(10 g) = 1.73 mW/g
Maximum value of SAR (measured) = 3.206 mW/g



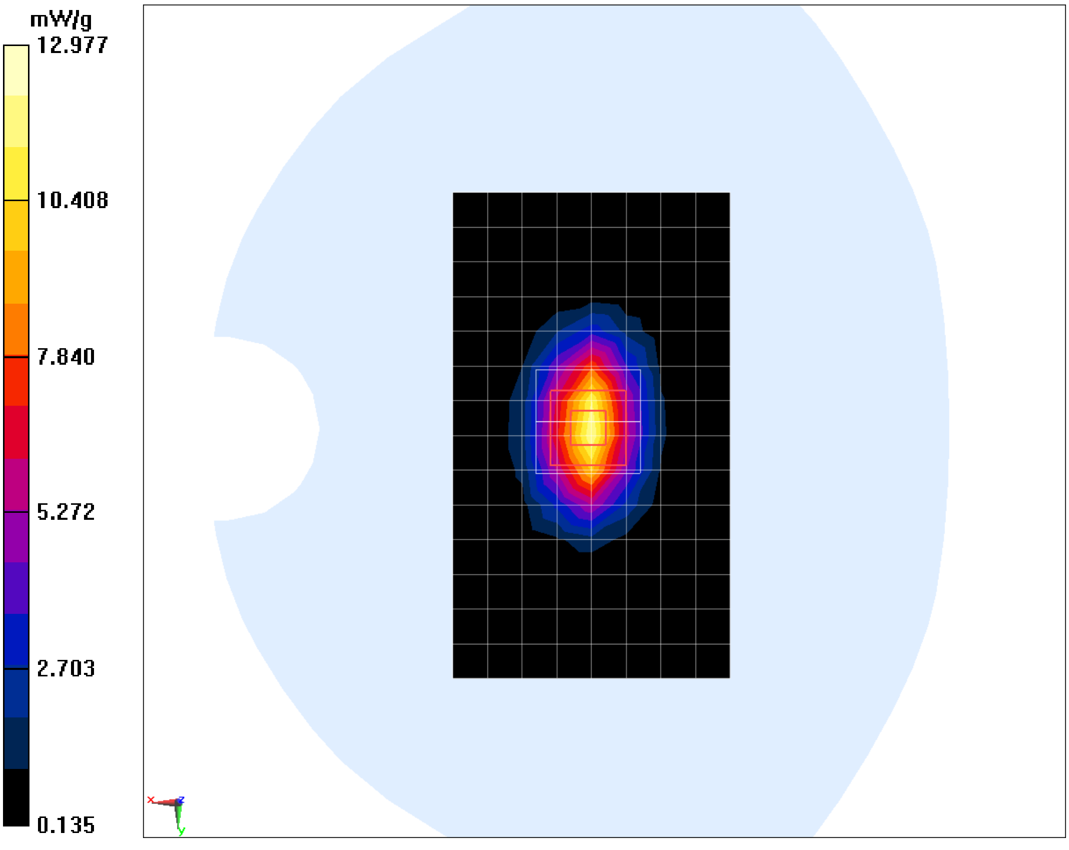
900MHz System Validation Body

Date/Time: 05/20/2013
Electronics: DAE4 Sn797
Medium: Body 850MHz
Medium parameters used: f = 900 MHz; σ = 1.081 mho/m;εr = 55.231; ρ = 1000 kg/m3
Ambient Temperature:22.5° C Liquid Temperature:22.5° C
Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3158ConvF(5.95, 5.95, 5.95)
System Performance Check-9000MHz Body /Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 3.142 mW/g
System Performance Check-9000MHz Body /Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 54.725 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 4.1560 mW/g
SAR(1 g) = 2.74 mW/g; SAR(10 g) = 1.78 mW/g
Maximum value of SAR (measured) = 3.219 mW/g



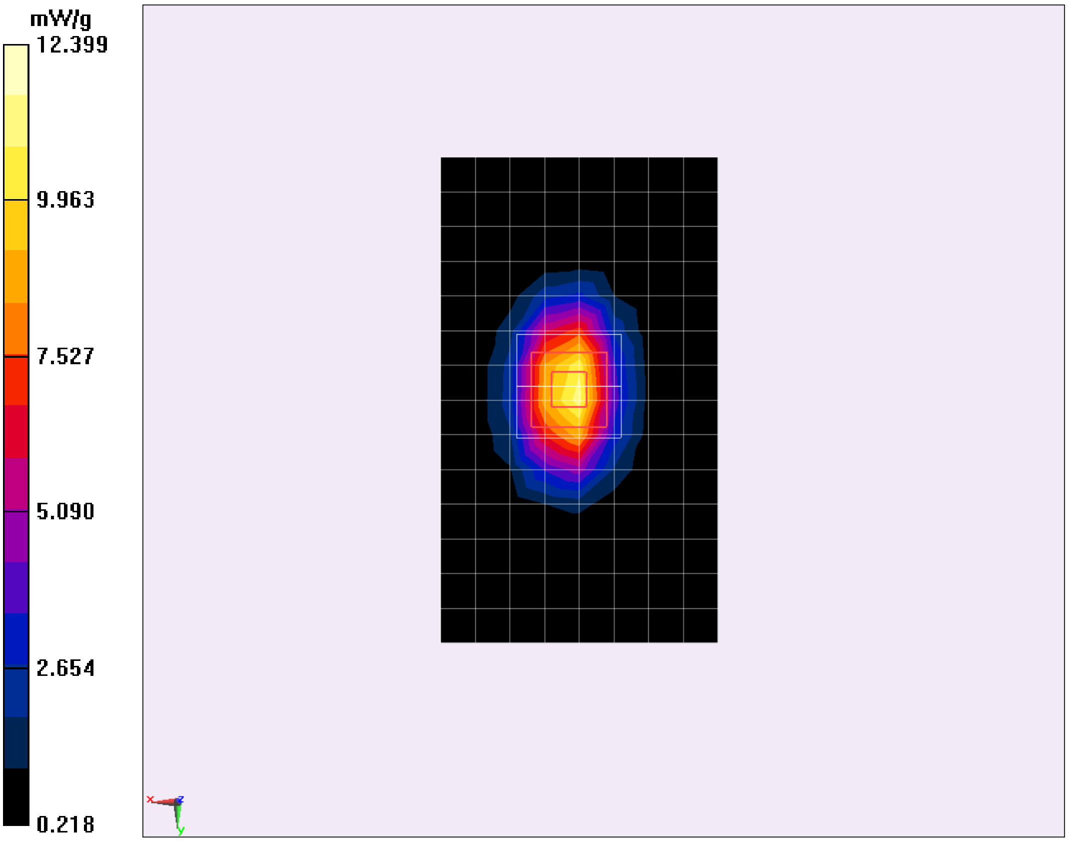
1900MHz System Validation Head

Date/Time: 05/21/2013
Electronics: DAE4 Sn797
Medium: Head 1900MHz
Medium parameters used: f = 1900 MHz; σ = 1.459 mho/m; εr = 40.531; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3158ConvF(5.06, 5.06, 5.06)
System Performance Check 1900MHz Head/Area Scan (9x15x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 12.167 mW/g
System Performance Check 1900MHz Head/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.877 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 20.3730 mW/g
SAR(1 g) = 10 mW/g; SAR(10 g) = 4.91 mW/g
Maximum value of SAR (measured) = 12.977 mW/g



1900MHz System Validation Body

Date/Time: 05/21/2013
Electronics: DAE4 Sn797
Medium: Body 1900MHz
Medium parameters used: f = 1900 MHz; σ = 1.524 mho/m; εr = 53.237; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN3844ConvF(7.92, 7.92, 7.92)
System Performance Check 1900MHz Body/Area Scan (9x15x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 11.272 mW/g
System Performance Check 1900MHz Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90.628 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 17.9180 mW/g
SAR(1 g) = 9.72 mW/g; SAR(10 g) = 5.03 mW/g
Maximum value of SAR (measured) = 12.399 mW/g



ANNEX C Calibration certificate

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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 CTTL (PTT) **Certificate No: ES3-3158_Jul12**

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3158

Calibration procedure(s): QA CAL-01.v8, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: July 19, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 660	10-Jan-12 (No. DAE4-660_Jan12)	Jan-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 19, 2012

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

Certificate No: ES3-3158_Jul12 Page 1 of 11