SAR TEST REPORT
FULL REPORT
No. I13GW6405-FCC

For

WAVE DEVELOPMENT GROUP LIMITED

WCDMA/GSM（GPRS） Dual-Mode Digital Mobile Phone

WAVE

With

Hardware Version: N/A

Software Version: N/A

DATE:2013-6-18

FCC ID:SXCP503

DAT-PL-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.

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Revision Version

Report Number	Revision	Date	Memo
I13GW6405-FCC	00	2013-06-18	Initial creation of test report

TABLE OF CONTENT

1 Test Laboratory

1.1 Testing 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
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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

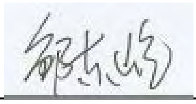
1.3 Project Data

Project Leader:	Li Guoqing
Test Engineer:	Li Guoqing
Testing Start Date:	May 29, 2013
Testing End Date:	Jun 17, 2013

1.4 Signature

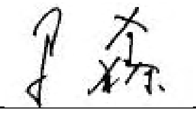
Pan Yang

(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 WAVE are as follows (with expanded uncertainty 22.4%)

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

Band	Position	Reported SAR 1g(W/Kg)
GSM 850	Head	0.219
	Body	1.169
PCS 1900	Head	0.104
	Body	1.176
WCDMA Band V	Head	0.245
	Body	0.889
WiFi 2450	Head	0.109
	Body	0.162

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 2-1)**, and the values are: **1.176 W/Kg (1g).**

Table 2-2: Simultaneous Transmission with 2.4GHz WLAN(Head)

Simult Tx	Configuration	GSM 835MHz SAR(W/Kg)	2.4 GHz WLAN SAR(W/Kg)	SUM SAR(W/Kg)
Head SAR	Right Cheek	0.219	0.109	0.328
	Left Cheek	0.094	0.074	0.168

Simult Tx	Configuration	GSM 1900MHz SAR(W/Kg)	2.4 GHz WLAN SAR(W/Kg)	SUM SAR(W/Kg)
Head SAR	Right Cheek	0.104	0.109	0.213
	Left Cheek	0.073	0.074	0.157

Simult Tx	Configuration	WCDMA 850MHz SAR(W/Kg)	2.4 GHz WLAN SAR(W/Kg)	SUM SAR(W/Kg)
Head SAR	Right Cheek	0.196	0.109	0.305
	Left Cheek	0.245	0.074	0.319

Table 2-3: Simultaneous Transmission with 2.4GHz WLAN(Body)

Simult Tx	Configuration	GSM 835MHz SAR(W/Kg)	2.4 GHz WLAN SAR(W/Kg)	SUM SAR(W/Kg)
Body SAR	Toward Ground	1.169	0.162	1.331
	Toward Phantom	0.260	0.00092	0.26092

Simult Tx	Configuration	GSM 1900MHz SAR(W/Kg)	2.4 GHz WLAN SAR(W/Kg)	SUM SAR(W/Kg)
Body SAR	Toward Ground	1.176	0.162	1.338
	Toward Phantom	0.311	0.00092	0.31192

Simult Tx	Configuration	WCDMA 850MHz SAR(W/Kg)	2.4 GHz WLAN SAR(W/Kg)	SUM SAR(W/Kg)
Body SAR	Toward Ground	0.889	0.162	1.051
	Toward Phantom	0.122	0.00092	0.12292

Table 2-4: Simultaneous Transmission with BT(Head)

Simult Tx	Configuration	GSM 835MHz SAR(W/Kg)	BT SAR(W/Kg)	SUM SAR(W/Kg)
Head SAR	Right Cheek	0.219	0.019	0.238
	Left Cheek	0.094	0.019	0.113

Simult Tx	Configuration	GSM 1900MHz SAR(W/Kg)	BT SAR(W/Kg)	SUM SAR(W/Kg)
Head SAR	Right Cheek	0.104	0.019	0.123
	Left Cheek	0.073	0.019	0.092

Simult Tx	Configuration	WCDMA 850MHz SAR(W/Kg)	BT SAR(W/Kg)	SUM SAR(W/Kg)
Head SAR	Right Cheek	0.196	0.019	0.215
	Left Cheek	0.245	0.019	0.264

Table 2-5: Simultaneous Transmission with BT(Body)

Simult Tx	Configuration	GSM 835MHz SAR(W/Kg)	BT SAR(W/Kg)	SUM SAR(W/Kg)
Body SAR	Toward Ground	1.169	0.019	1.188
	Toward Phantom	0.260	0.019	0.279

Simult Tx	Configuration	GSM 1900MHz SAR(W/Kg)	BT SAR(W/Kg)	SUM SAR(W/Kg)
Body SAR	Toward Ground	1.176	0.019	1.195
	Toward Phantom	0.311	0.019	0.330

Simult Tx	Configuration	WCDMA 850MHz SAR(W/Kg)	BT SAR(W/Kg)	SUM SAR(W/Kg)
Body SAR	Toward Ground	0.889	0.019	0.908
	Toward Phantom	0.122	0.019	0.141

According to the above table, the maximum sum of reported SAR values for GSM and WiFi is **1.338 W/kg (1g)**. The above numerical SAR results for all worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured simultaneous SAR summation is required per FCC KDB Publication 447498 D01 v05. The detail for simultaneous transmission consideration is described in chapter 13.

3 Client Information

3.1 Applicant Information

Company Name:	WAVE DEVELOPMENT GROUP LIMITED
Address /Post:	7/F, Ruttonjee House, 11 Duddell Street,Central Hong Kong
City:	Hong Kong
Country:	China

3.2 Manufacturer Information

Company Name:	ShenZhen Wave Multimedia Co.,Ltd
Address /Post:	Kegu Industrial Park,No.388,Baotian 1 Rd,Xixiang,Baoan District,ShenZhen.
City:	Shenzhen
Country:	China

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

4.1 About EUT

Description:	WCDMA/GSM（GPRS）Dual-Mode Digital Mobile Phone
Model name:	WAVE
Operation Model(s):	GSM835/1900, WCDMA850, Wifi2412-2462
Tx Frequency:	824.2-848.8, 1850.2-1909.8MHz （GSM）
	826.4-846.6MHz (WCDMA)
	2412-2462 MHz (Wi-Fi) 2402 ~ 2480 MHz (BT)
GPRS Multislot Class:	12
Operation mode:	A
EGPRS Multislot Class:	12
Test device Production information:	Production unit
Device type:	Portable device
Antenna type:	Inner antenna
Hotspot mode:	Support simultaneous transmission of hotspot and voice (or data)
Form factor:	15.3cm×7.7cm
FCC ID:	SXCP503

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	IMEI1:867588018700027 IMEI2:867588018700035	N/A	N/A

*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	BP01	N/A	Shenzhen YouTeLi Battery Co., Ltd.
AE2	Headset	N/A	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

KDB248227 SAR meas for 802.11abg v01r02: SAR measurement procedures for 802.112abg transmitters.

KDB447498 D01 General RF Exposure Guidance v05: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

KDB865664 D01: SAR Measurement Requirements for 100 MHz to 6 GHz

KDB941225 D01 SAR test for 3G devides v02: Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE.

KDB941225 D03 SAR test Redution GSM GPRS EDGE v01: Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE.

KDB941225 D06 hotspot SAR v01: SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities.;

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

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

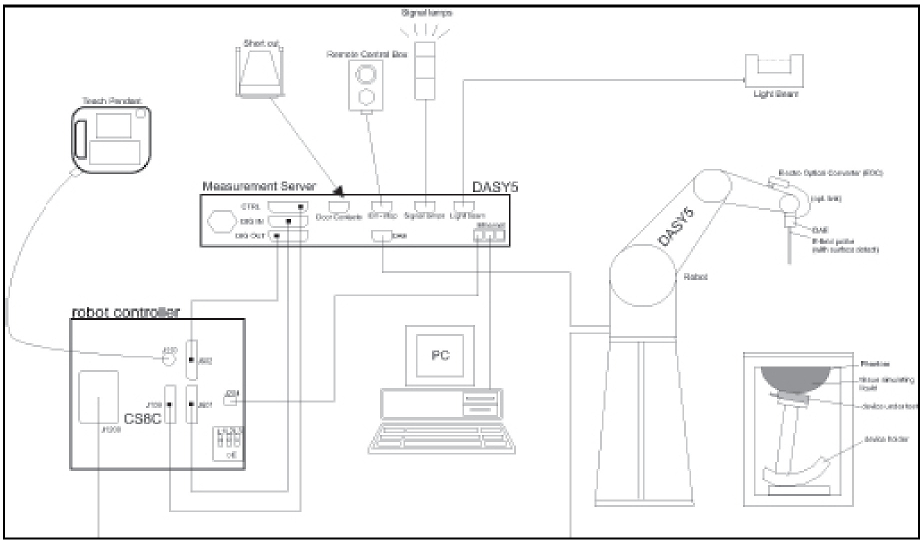
Where: σ is the conductivity of the tissue, ρ is the mass density of tissue and E is the RMS electrical field strength.

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(EX3DV4)
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

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 3 Near-field Probe

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 waveguide 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).

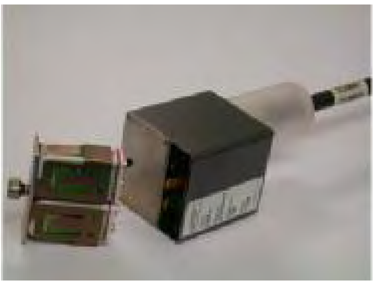
7.4 Other Test Equipment

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.

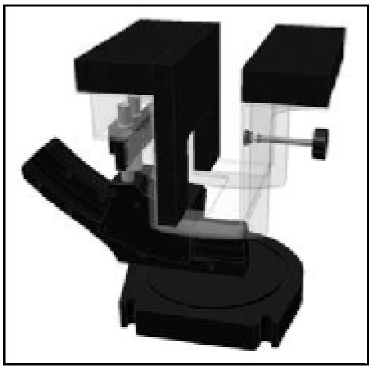
The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference 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).

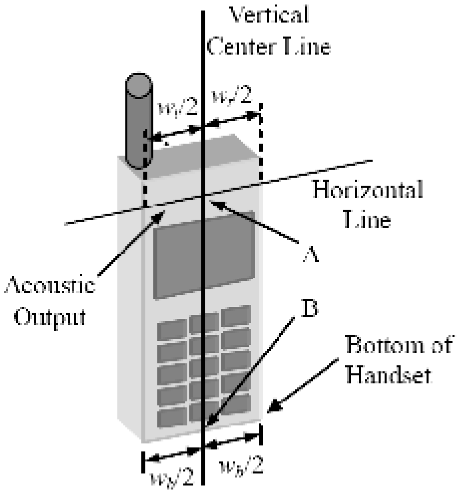
Shell Thickness: 2 ± 0. 2 mm
Filling Volume: Approx. 25 liters
Dimensions: 810 x l000 x 500 mm (H x L x W)
Available: Special

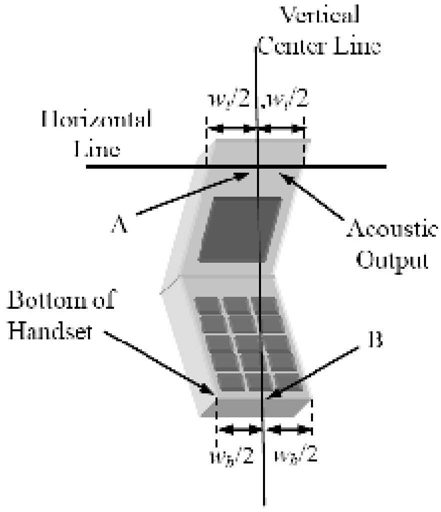
Picture 9: SAM Twin Phantom

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

8.1 General considerations

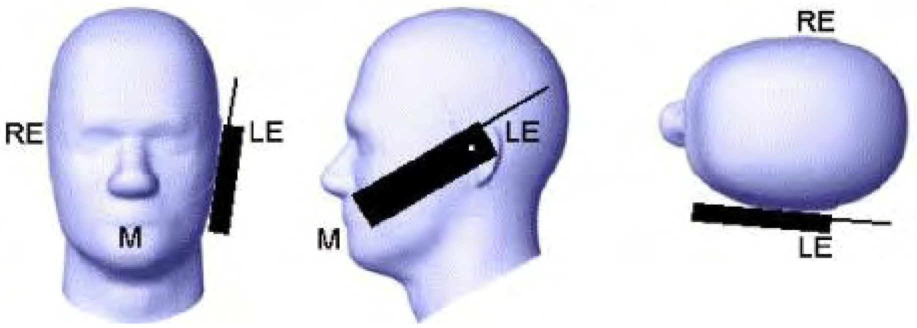
This standard specifies two handset test positions against the head phantom – the “cheek” position and the “tilt” position.



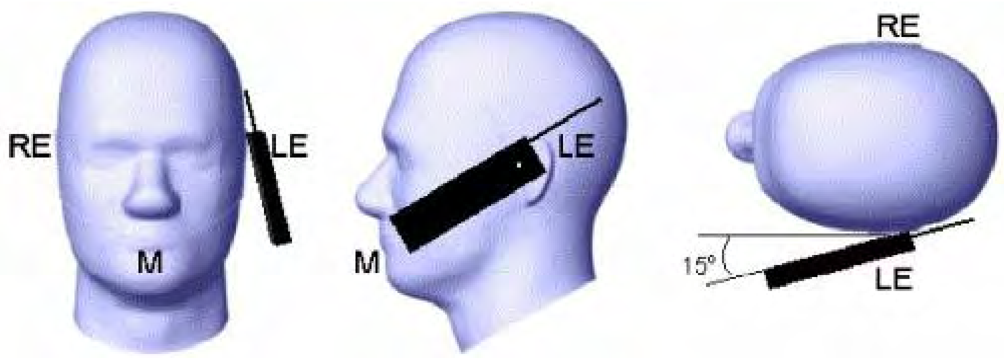


w_t	Width of the handset at the level of the acoustic
w_b	Width of the bottom of the handset
A	Midpoint of the width w_t of the handset at the level of the acoustic output
B	Midpoint of the width w_b of the bottom of the handset

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



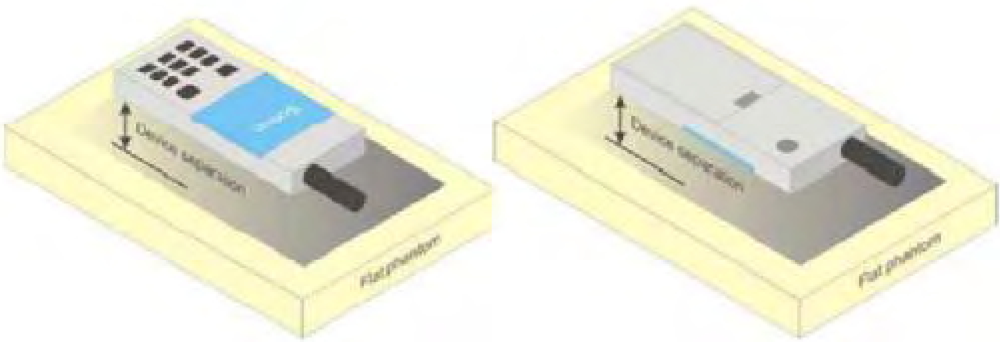
Picture 11 Cheek position of the wireless device on the left side of SAM



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.

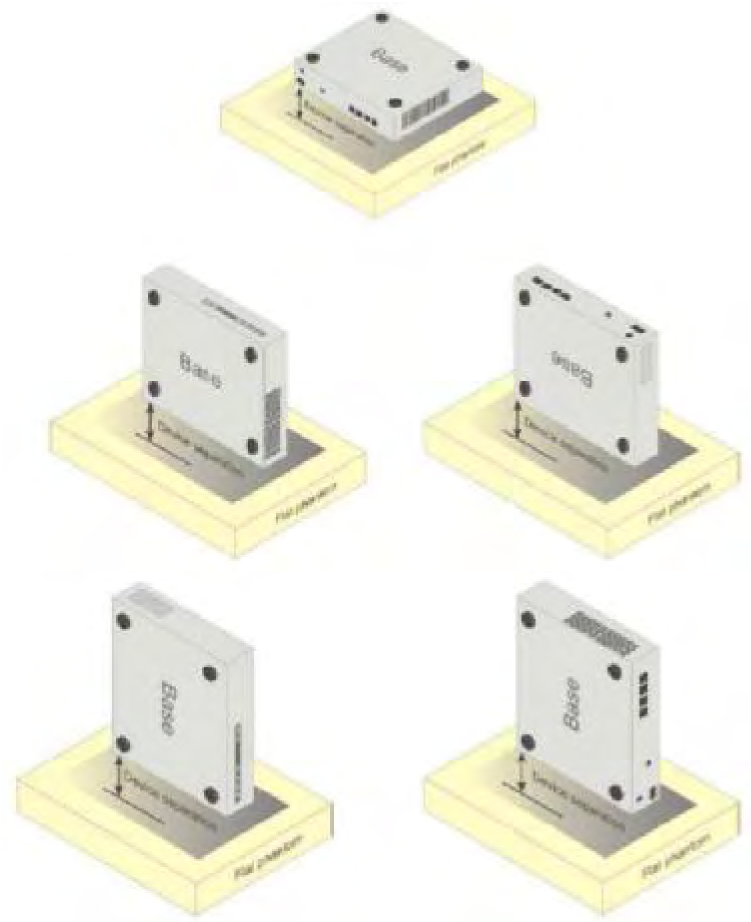


Picture 13 Test positions for body-worn devices

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

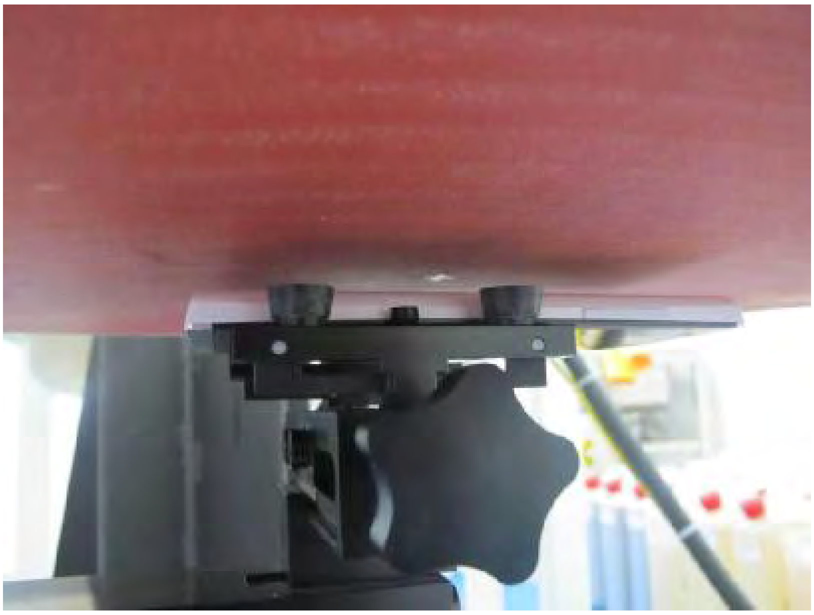
Picture 15-4: Right Head Touch Cheek Position

Picture 15-5: Right Head Tilt 15° Position

Test positions for body:

The Body SAR is tested at the following 6 test positions all with the distance =10mm between the EUT and the phantom bottom :

Picture 15-6: Toward Phantom



Picture 15-7: Toward Ground

Picture 15-8: Toward Bottom

Picture 15-9: Toward Left

Picture 15-10: Toward Right

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	2450 Head	2450 Body
Ingredients (% by weight)						
Water	41.45	52.5	55.242	69.91	58.79	72.60
Sugar	56.0	45.0	\	\	\	\
Salt	1.45	1.4	0.306	0.13	0.06	0.18
Preventol	0.1	0.1	\	\	\	\
Cellulose	1.0	1.0	\	\	\	\
Clycol Monobutyl	\	\	44.452	29.96	41.15	27.22
Dielectric Parameters Target Value	f=850MHz ε=41.5 σ=0.90	f=850MHz ε=55.2 σ=0.97	f=1900MHz ε=40.0 σ=1.40	f=1900MHz ε=53.3 σ=1.52	f=2450MHz ε=39.2 σ=1.80	f=2450MHz ε=52.7 σ=1.95

Table 9-2. Targets for tissue simulating liquid

Frequency (MHz)	Liquid Type	Conductivity (σ)	± 5% Range	Permittivity (ε)	± 5% Range
850	Head	0.90	0.86～095	41.5	39.4～43.6
1900	Head	1.40	1.33～1.47	40.0	38.0～42.0
2450	Head	1.80	1.71～1.89	39.2	37.2～41.2
850	Body	0.97	0.92～1.02	55.2	52.4～58.0
1900	Body	1.52	1.44～1.59	53.3	50.6～55.9
2450	Body	1.95	1.85～2.05	52.7	50.1～55.3

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%.

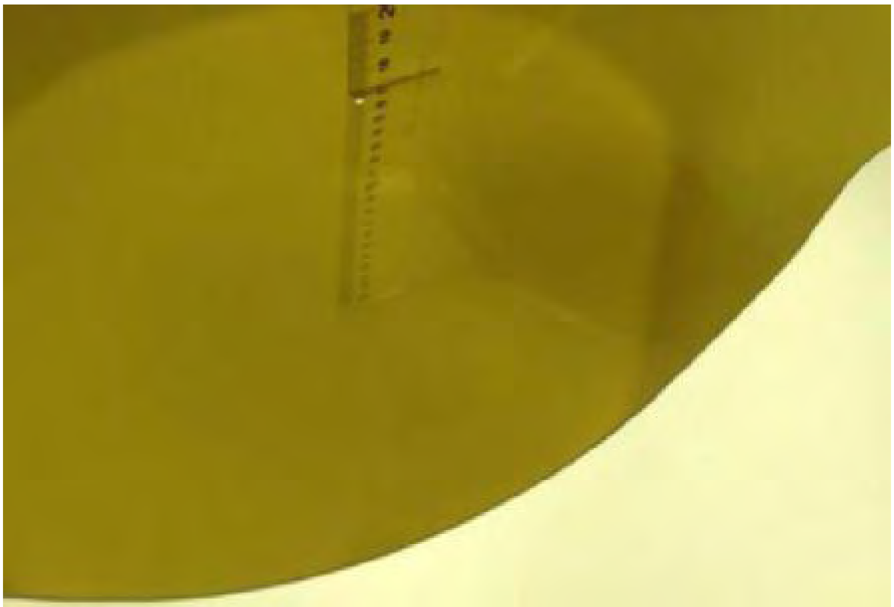
Liquid temperature during the test: 22.5°C

Measurement Date : 850 MHz Head___Jun 17th, 2013___1900 MHz Head__May 29th, 2013__

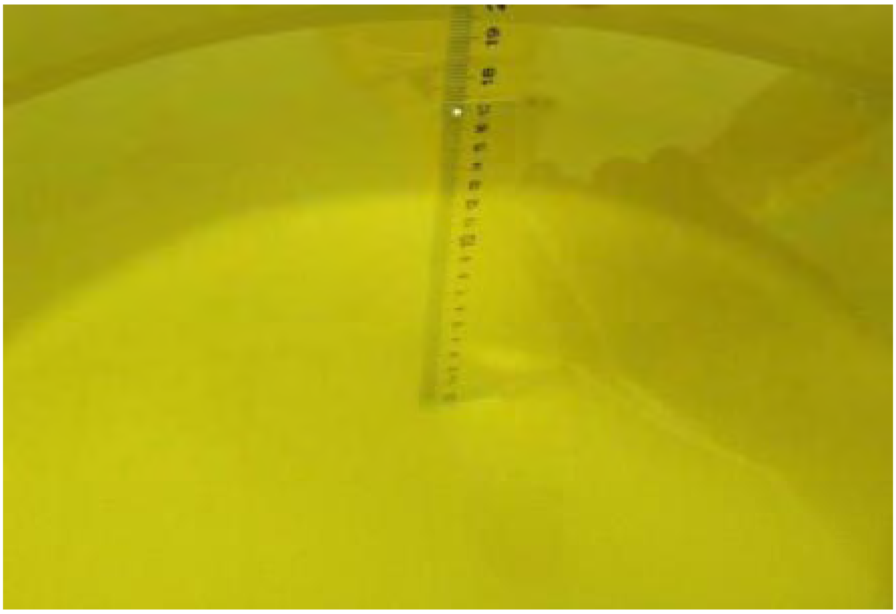
850 MHz Body___Jun 17th, 2013____1900 MHz Body__May 29th, 2013__

2450 MHz Head___May 30th, 2013___2450 MHz Body__May 30th, 2013__

/	Frequency	Permittivity ε	Conductivity σ (S/m)
Measurement value	850 MHz Head	40.33	0.939
	1900 MHz Head	40.53	1.459
	2450 MHz Head	38.87	1.824
	850 MHz Body	55.75	1.031
	1900 MHz Body	53.24	1.524
	2450 MHz Body	53.95	1.918

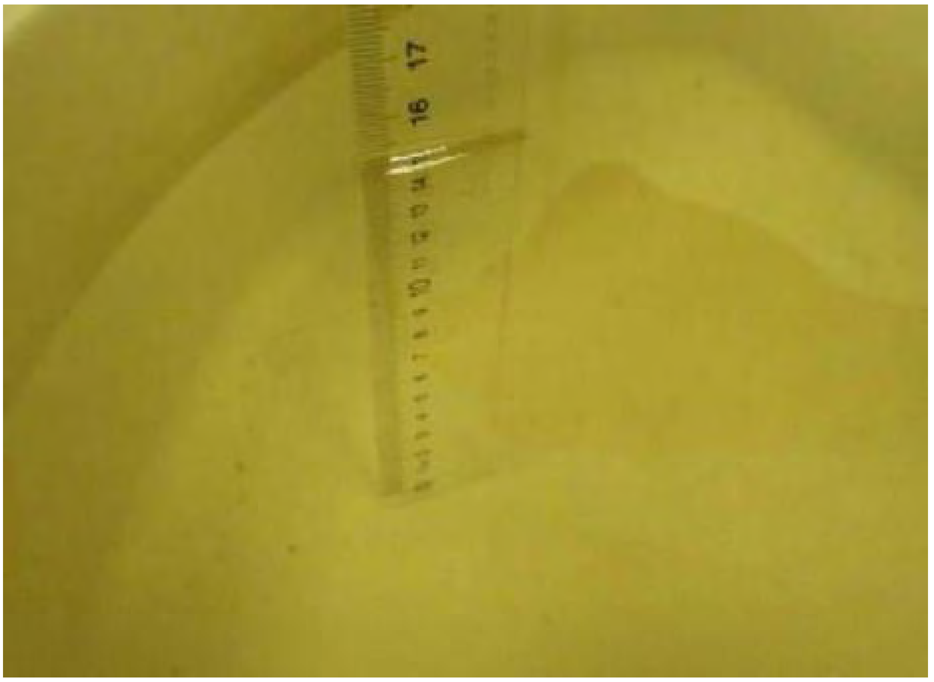


Picture 16-1: Liquid depth in the Flat Phantom (850 MHz Head)

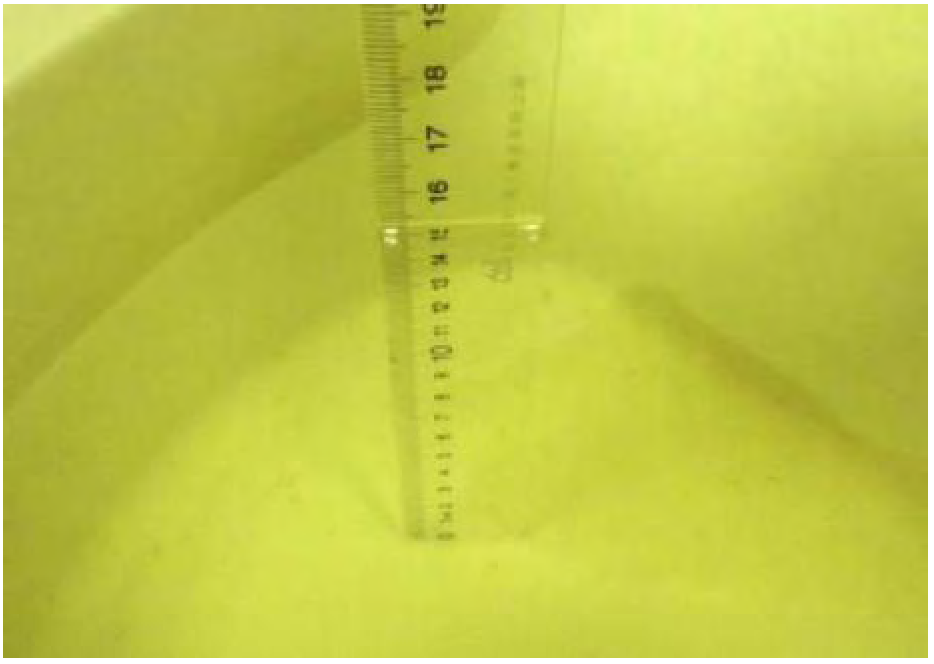


Picture 16-2: Liquid depth in the Flat Phantom (1900 MHz Head)

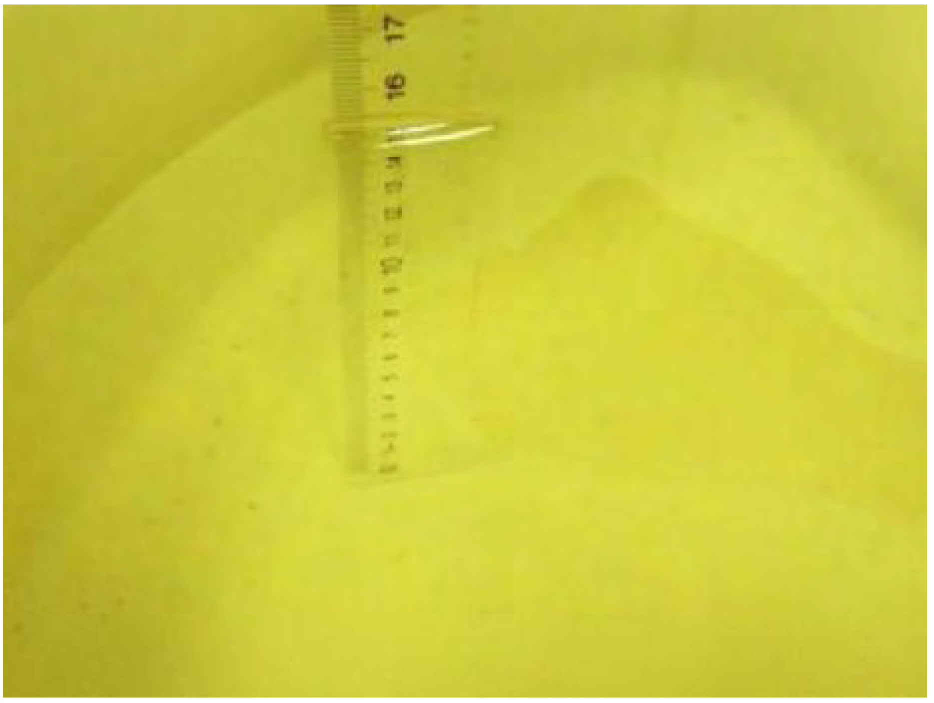
Picture 16-3: Liquid depth in the Flat Phantom (2450 MHz Head)



Picture 16-4: Liquid depth in the Flat Phantom (850 MHz Body)



Picture 16-5: Liquid depth in the Flat Phantom (1900 MHz Body)



Picture 16-6: Liquid depth in the Flat Phantom (2450 MHz Body)

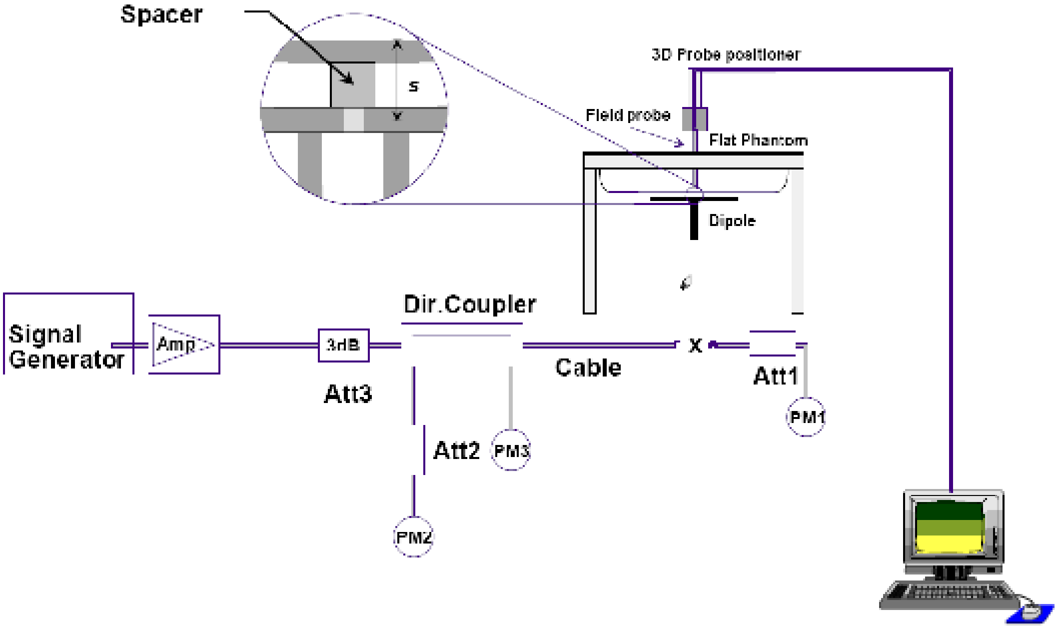
10 System Validation

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.

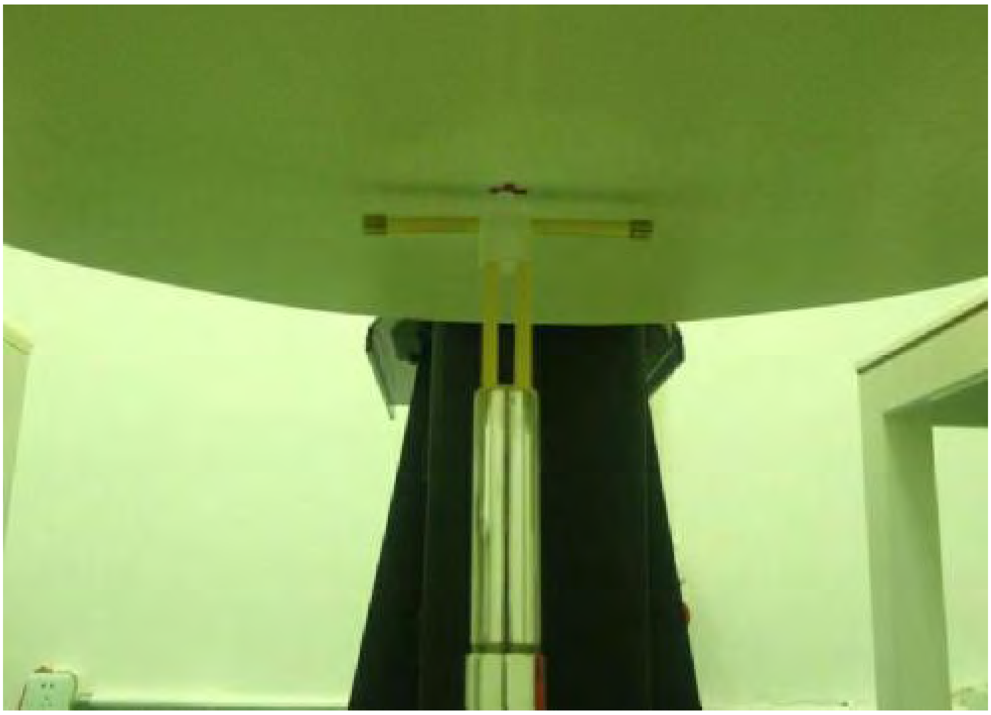
10.2 System Setup

In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave 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 : 850 MHz Head Jun 17th, 2013 1900 MHz Head May 29th, 2013
2450 MHz Head May 30th, 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
	850 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%
	2450 MHz	6.26	13.50	6.37	13.90	+1.76%	+2.96%

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 : 850 MHz Body Jun 17th, 2013 1900 MHz Body May 29th, 2013
2450 MHz Body May 30th, 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
	850 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%
	2450 MHz	6.20	13.30	6.19	13.40	-1.12%	-0.74%

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

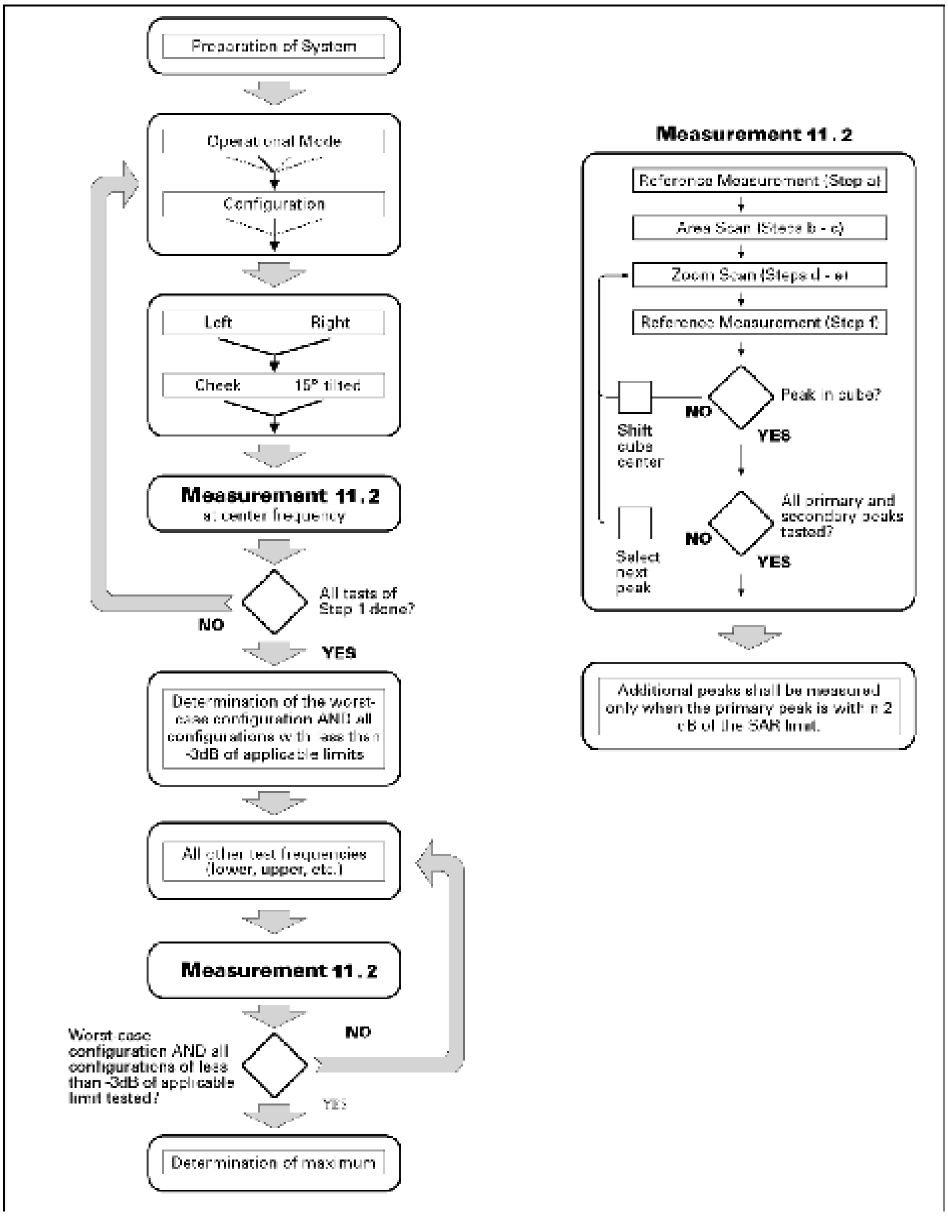
Step 1: The tests described in 11.2 shall be performed at the channel that is closest to the centre of the transmit frequency band (f_c) for:

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 ln(2)/2 mm for frequencies of 3 GHz and greater, where δ is the plane wave skin depth and ln(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 ln(2)/2 mm for frequencies of 3 GHz and greater, where δ is the plane wave skin depth and ln(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 Manufacturing tolerance

Table 12-1: GSM Speech

GSM 835			
Channel	Channel 251	Channel 190	Channel 128
Target (dBm)	32.0	32.0	32.0
Tolerance ±(dB)	1.0	1.0	1.0
GSM 1900			
Channel	Channel 810	Channel 661	Channel 512
Target (dBm)	29.0	29.0	29.0
Tolerance ±(dB)	1.0	1.0	1.0

Table 12-2: GPRS (GMSK Modulation)

GSM 850 GPRS				
Channel		**251**	**190**	**128**
1 Txslots	Target (dBm)	32.0	32.0	32.0
	Tolerance ±(dB)	1.0	1.0	1.0
2 Txslots	Target (dBm)	31.0	31.0	31.0
	Tolerance ±(dB)	1.0	1.0	1.0
3 Txslots	Target (dBm)	30.0	30.0	30.0
	Tolerance ±(dB)	1.0	1.0	1.0
4 Txslots	Target (dBm)	29.0	29.0	29.0
	Tolerance ±(dB)	1.0	1.0	1.0
GSM 1900 GPRS				
Channel		**810**	**661**	**512**
1 Txslots	Target (dBm)	29.0	29.0	29.0
	Tolerance ±(dB)	1.0	1.0	1.0
2 Txslots	Target (dBm)	28.0	28.0	28.0
	Tolerance ±(dB)	1.0	1.0	1.0
3 Txslots	Target (dBm)	27.0	27.0	27.0
	Tolerance ±(dB)	1.0	1.0	1.0
4 Txslots	Target (dBm)	26.0	26.0	26.0
	Tolerance ±(dB)	1.0	1.0	1.0

Table 12-3: E-GPRS (GMSK Modulation)

GSM 850 E-GPRS				
Channel		**251**	**190**	**128**
1 Txslots	Target (dBm)	32.0	32.0	32.0
	Tolerance ±(dB)	1.0	1.0	1.0
2 Txslots	Target (dBm)	31.0	31.0	31.0
	Tolerance ±(dB)	1.0	1.0	1.0
3 Txslots	Target (dBm)	30.0	30.0	30.0
	Tolerance ±(dB)	1.0	1.0	1.0
4 Txslots	Target (dBm)	29.0	29.0	29.0
	Tolerance ±(dB)	1.0	1.0	1.0
GSM 1900 E-GPRS				
Channel		**810**	**661**	**512**
1 Txslots	Target (dBm)	29.0	29.0	29.0
	Tolerance ±(dB)	1.0	1.0	1.0
2 Txslots	Target (dBm)	28.0	28.0	28.0
	Tolerance ±(dB)	1.0	1.0	1.0
3 Txslots	Target (dBm)	27.0	27.0	27.0
	Tolerance ±(dB)	1.0	1.0	1.0
4 Txslots	Target (dBm)	26.0	26.0	26.0
	Tolerance ±(dB)	1.0	1.0	1.0

Table 12-4: E-GPRS (8PSK Modulation)

GSM 850 E-GPRS				
Channel		**251**	**190**	**128**
1 Txslots	Target (dBm)	25.0	25.0	25.0
	Tolerance ±(dB)	1.0	1.0	1.0
2 Txslots	Target (dBm)	24.0	24.0	24.0
	Tolerance ±(dB)	1.0	1.0	1.0
3 Txslots	Target (dBm)	23.0	23.0	23.0
	Tolerance ±(dB)	1.0	1.0	1.0
4 Txslots	Target (dBm)	22.0	22.0	22.0
	Tolerance ±(dB)	1.0	1.0	1.0
GSM 1900 E-GPRS				
Channel		**810**	**661**	**512**
1 Txslots	Target (dBm)	24.0	24.0	24.0
	Tolerance ±(dB)	1.0	1.0	1.0
2 Txslots	Target (dBm)	23.0	23.0	23.0
	Tolerance ±(dB)	1.0	1.0	1.0
3 Txslots	Target (dBm)	22.0	22.0	22.0
	Tolerance ±(dB)	1.0	1.0	1.0
4 Txslots	Target (dBm)	21.0	21.0	21.0
	Tolerance ±(dB)	1.0	1.0	1.0

Table 12-5: WCDMA

WCDMA 850 CS			
Channel	Channel 4132	Channel 4182	Channel 4233
Target (dBm)	24.5	24.5	24.5
Tolerance ±(dB)	1.0	1.0	1.0

Table 12-6: HSDPA

WCDMA 850				
Channel		4132	4182	4233
1	Target (dBm)	24.0	24.0	24.0
	Tolerance ±(dB)	1.0	1.0	1.0
2	Target (dBm)	23.0	23.0	23.0
	Tolerance ±(dB)	1.0	1.0	1.0
3	Target (dBm)	23.5	23.5	23.5
	Tolerance ±(dB)	1.0	1.0	1.0
4	Target (dBm)	23.0	23.0	23.0
	Tolerance ±(dB)	1.0	1.0	1.0

Table 12-7: HSUPA

WCDMA 850				
Channel		4132	4182	4233
1	Target (dBm)	24.0	24.0	24.0
	Tolerance ±(dB)	1.0	1.0	1.0
2	Target (dBm)	23.0	23.0	23.0
	Tolerance ±(dB)	1.0	1.0	1.0
3	Target (dBm)	23.5	23.5	23.5
	Tolerance ±(dB)	1.0	1.0	1.0
4	Target (dBm)	23.0	23.0	23.0
	Tolerance ±(dB)	1.0	1.0	1.0
5	Target (dBm)	23.0	23.0	23.0
	Tolerance ±(dB)	1.0	1.0	1.0

Table 12-8: WiFi

WiFi 802.11b			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	12.0	12.0	12.0
Tolerance ±(dB)	1.0	1.0	1.0
WiFi 802.11g			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	11.5	11.5	11.5
Tolerance ±(dB)	1.0	1.0	1.0
WiFi 802.11n			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	10.0	10.0	10.0
Tolerance ±(dB)	1.0	1.0	1.0

12.2 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/PCS1900

GSM 850MHZ	Conducted Power (dBm)		
	Channel 251(848.6MHz)	**Channel 189(836.6MHz)**	**Channel 128(824.2MHz)**
	32.55	**32.58**	**32.67**
GSM 1900MHZ	**Conducted Power (dBm)**		
	Channel 810(1909.8MHz)	**Channel 661(1880MHz)**	**Channel 512(1850.2MHz)**
	29.71	**29.74**	**29.81**

Table 12-2: The conducted power measurement results for GPRS and EGPRS

GSM 850 GPRS(GMSK)	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	251	**189**	**128**		**251**	**189**	**128**
1 Txslot	32.55	32.58	32.62	-9.03dB	23.52	23.55	23.59
2 Txslots	31.51	31.52	31.58	-6.02dB	25.49	25.50	25.56
3 Txslots	30.55	30.61	30.63	-4.26dB	26.29	26.35	26.37
4 Txslots	**29.66**	**29.69**	**29.72**	-3.01dB	**26.65**	**26.68**	**26.71**
GSM 850 EGPRS(GMSK)	Measured Power (dBm)				Averaged Power (dBm)		
	251	**189**	**128**		**251**	**189**	**128**
1 Txslot	32.51	32.48	32.45	-9.03dB	23.48	23.45	23.42
2 Txslots	31.48	31.44	31.41	-6.02dB	25.46	25.42	25.39
3 Txslots	30.39	30.32	30.29	-4.26dB	26.13	26.06	26.03
4 Txslots	**29.28**	**29.22**	**29.15**	-3.01dB	**26.27**	**26.21**	**26.14**
GSM 850 EGPRS(8PSK)	Measured Power (dBm)				Averaged Power (dBm)		
	251	**189**	**128**		**251**	**189**	**128**
1 Txslot	25.46	25.44	25.40	-9.03dB	16.43	16.40	16.37
2 Txslots	24.43	24.39	24.36	-6.02dB	18.41	18.37	18.34
3 Txslots	23.34	23.27	23.24	-4.26dB	19.08	19.01	18.98
4 Txslots	**22.18**	**22.12**	**22.05**	-3.01dB	**19.17**	**19.11**	**19.04**
PCS1900 GPRS(GMSK)	Measured Power (dBm)				Averaged Power (dBm)		
	810	**661**	**512**		**810**	**661**	**512**
1 Txslot	29.45	29.52	29.65	-9.03dB	20.42	20.49	20.62
2 Txslots	28.33	27.98	27.86	-6.02dB	22.31	21.96	21.84
3 Txslots	27.51	27.10	27.53	-4.26dB	23.28	23.84	23.27
4 Txslots	**26.44**	**26.95**	**26.85**	-3.01dB	**23.43**	**23.94**	**23.84**
PCS1900 EGPRS(GMSK)	Measured Power (dBm)				Averaged Power (dBm)		
	810	**661**	**512**		**810**	**661**	**512**

1 Txslot	29.30	29.13	28.99	-9.03dB	20.27	20.10	19.96
2 Txslots	28.56	28.34	28.03	-6.02dB	22.54	22.32	22.01
3 Txslots	27.34	27.25	27.16	-4.26dB	23.08	22.99	22.90
4 Txslots	**26.57**	**26.55**	**26.34**	-3.01dB	**23.56**	**23.54**	**23.33**
PCS1900 EGPRS(8PSK)	Measured Power (dBm)				Averaged Power (dBm)		
	810	**661**	**512**		**810**	**661**	**512**
1 Txslot	24.25	24.08	23.94	-9.03dB	15.22	15.05	14.91
2 Txslots	23.51	23.28	22.98	-6.02dB	17.49	17.27	16.96
3 Txslots	22.29	22.20	22.11	-4.26dB	18.03	17.94	17.85
4 Txslots	**21.52**	**21.50**	**21.29**	-3.01dB	**18.51**	**18.49**	**18.28**

NOTES:

1) Division Factors

To average the power, the division factor is as follows:

1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

According to the conducted power as above, the body measurements are performed with 4Txslots for 850MHz and 4 Txslots for 1900MHz.

12.3 WCDMA Measurement result

Table 12-3: The conducted Power for WCDMA

Item	band	WCDMA BAND V result(dBm)		
	ARFCN	4233 (846.6MHz)	4182 (836.4MHz)	4132 (826.4MHz)
WCDMA	RMC	25.37	25.29	25.40
HSDPA	1	24.88	24.91	24.92
	2	23.67	23.60	23.71
	3	24.16	24.10	24.12
	4	23.68	23.62	23.69
HSUPA	1	24.85	24.81	24.82
	2	23.62	23.59	23.60
	3	24.05	23.94	23.96
	4	23.61	23.52	23.54
	5	23.52	23.41	23.43

Note: HSUPA body SAR are not required, because maximum average output power of each RF channel with HSUPA active is not 1/4 dB higher than that measured without HSUPA and the maximum SAR for WCDMA2100/835 is not above 75% of the SAR limit.

12.4 Wi-Fi and BT Measurement result

Table 12-4: The output power of BT antenna

For GFSK

Channel	Ch0 (2402 MHz)	Ch39 (2441MHz)	CH78 (2480MHz)
Conducted Output Power (dBm)	-1.36	-1.30	-0.90

For π/4 DQPSK

Channel	Ch0 (2402 MHz)	Ch39 (2441MHz)	CH78 (2480MHz)
Conducted Output Power (dBm)	-1.22	-1.13	-0.46

For 8DPSK

Channel	Ch0 (2402 MHz)	Ch39 (2441MHz)	CH78 (2480MHz)
Conducted Output Power (dBm)	-1.04	-0.94	-0.48

NOTE:BT standalone SAR are not required, because maximum average output power is less than 10mW.

When the standalone SAR test exclusion is applied to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to the following to determine simultaneous transmission SAR test exclusion:

(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√f(GHz)/x] W/kg for test separation distances ≤ 50 mm;
where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.

Table 12-5:The average conducted power for WiFi

802.11b（dBm）

Channel\data rate	1Mbps	2Mbps	5.5Mbps	11Mbps
1	12.31	12.07	11.76	12.11
6	12.17	12.26	12.20	12.30
11	11.99	12.01	11.97	11.95

802.11g（dBm）

Channel\ data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
1	11.76	11.69	12.01	12.14	11.99	12.01	11.52	11.64
6	11.86	11.79	11.77	11.43	11.54	11.73	12.11	11.70
11	11.73	11.77	11.69	11.71	11.59	11.86	11.54	11.76

20M 802.11n（dBm）

Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
1	10.34	10.68	10.72	10.79	10.47	10.61	10.68	10.78
6	10.63	10.87	10.67	10.81	10.55	10.77	10.81	10.85
11	10.52	10.46	10.53	10.65	10.49	10.52	10.50	10.74

The peak conducted power for Wi-Fi is as following:

802.11b（dBm）

Channel\data rate	1Mbps	2Mbps	5.5Mbps	11Mbps
1	16.70	16.73	16.79	17.10
6	16.15	16.27	16.34	16.60
11	15.01	15.22	15.25	15.27

802.11g（dBm）

Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
1	18.96	19.03	18.59	18.91	19.29	19.97	19.11	18.87
6	18.82	18.92	18.45	18.72	19.11	19.22	18.93	18.64
11	18.54	18.62	18.21	18.57	18.87	19.06	18.89	18.52

802.11n（dBm）

Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
1	19.18	18.86	18.16	18.52	18.70	18.12	17.63	17.12
6	18.26	17.92	17.88	17.32	17.79	18.03	17.35	17.09
11	17.05	16.32	16.52	16.33	16.46	17.01	16.87	16.92

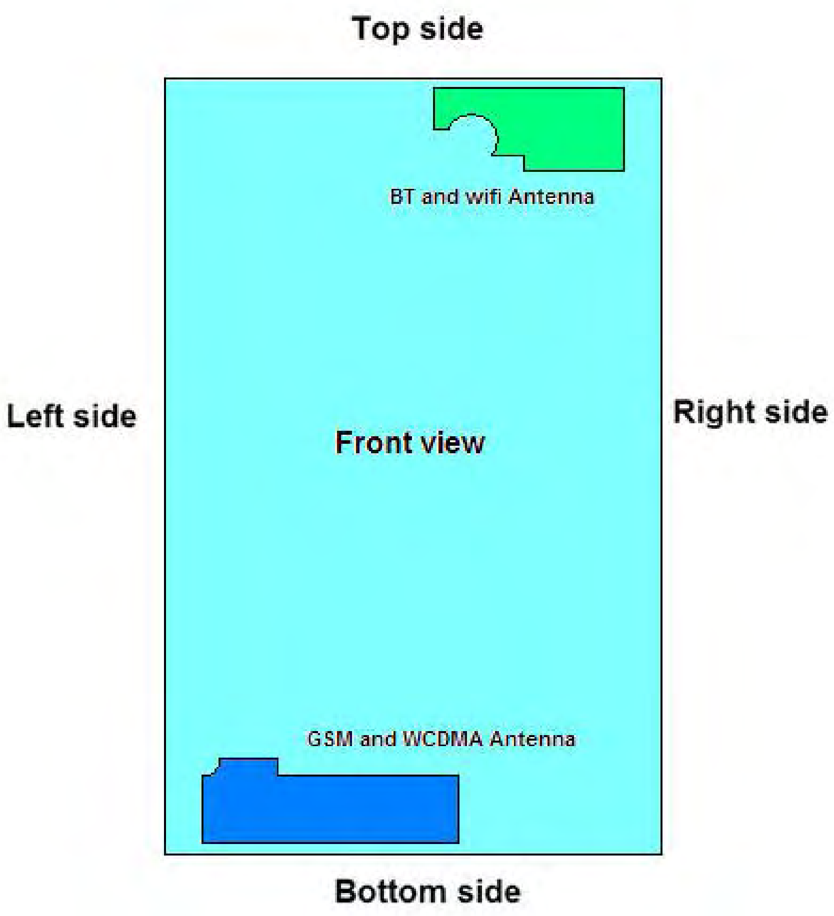
SAR is not required for 802.11g/n channels if the output power is less than 0.25dB higher than that measured on the corresponding 802.11b channels, and for each frequency band, testing at higher data rates and higher order modulations is not required when the maximum average output power for each of these configurations is less than 0.25dB higher than those measured at the lowest data rate. According to the above conducted power, the EUT should be tested for "802.11b, 1Mbps, channel 1".

13 Simultaneous TX SAR Considerations

13.1 Introduction

The following procedures adopted from “FCC SAR Considerations for Cell Phones with Multiple Transmitters” are applicable to handsets with built-in unlicensed transmitters such as 802.11 a/b/g and Bluetooth devices which may simultaneously transmit with the licensed transmitter.
For this device, the BT and Wi-Fi can transmit simultaneous with other transmitters.

13.2 Transmit Antenna Separation Distances



Picture 13.1 Antenna Locations

13.3 Standalone SAR Test Exclusion Considerations

Standalone 1-g head or body SAR evaluation by measurement or numerical simulation is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied. The 1-g SAR test exclusion threshold for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

According to the KDB447498 appendix A, the SAR test exclusion threshold for 2450MHz at 5mm test separation distances is 10mW.

Appendix A

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

Picture 12.2 Power Thresholds

14 Evaluation of Simultaneous

Table 14-1: Summary of Transmitters

Band/Mode	F(GHz)	SAR test exclusion threshold (mW)	RF output power (mW)
Bluetooth	2.441	10	0.8995
2.4GHz WLAN 802.11 b/g	2.45	10	17.02

According to the conducted power measurement result, we can draw the conclusion that: stand-alone SAR for WiFi should be performed. Then, simultaneous transmission SAR for WiFi/BT is considered with measurement results of GSM/WCDMA and WiFi/BT.

Table 14-2: Simultaneous Transmission with 2.4GHz WLAN(Head)

Simult Tx	Configuration	GSM 835MHz SAR(W/Kg)	2.4 GHz WLAN SAR(W/Kg)	SUM SAR(W/Kg)
Head SAR	Right Cheek	0.219	0.109	0.328
	Left Cheek	0.094	0.074	0.168

Simult Tx	Configuration	GSM 1900MHz SAR(W/Kg)	2.4 GHz WLAN SAR(W/Kg)	SUM SAR(W/Kg)
Head SAR	Right Cheek	0.104	0.109	0.213
	Left Cheek	0.073	0.074	0.157

Simult Tx	Configuration	WCDMA 850MHz SAR(W/Kg)	2.4 GHz WLAN SAR(W/Kg)	SUM SAR(W/Kg)
Head SAR	Right Cheek	0.196	0.109	0.305
	Left Cheek	0.245	0.074	0.319

Table 14-3: Simultaneous Transmission with 2.4GHz WLAN(Body)

Simult Tx	Configuration	GSM 835MHz SAR(W/Kg)	2.4 GHz WLAN SAR(W/Kg)	SUM SAR(W/Kg)
Body SAR	Toward Ground	1.169	0.162	1.331
	Toward Phantom	0.260	0.00092	0.26092

Simult Tx	Configuration	GSM 1900MHz SAR(W/Kg)	2.4 GHz WLAN SAR(W/Kg)	SUM SAR(W/Kg)
Body SAR	Toward Ground	1.176	0.162	1.338
	Toward Phantom	0.311	0.00092	0.31192

Simult Tx	Configuration	WCDMA 850MHz SAR(W/Kg)	2.4 GHz WLAN SAR(W/Kg)	SUM SAR(W/Kg)
Body SAR	Toward Ground	0.889	0.162	1.051
	Toward Phantom	0.122	0.00092	0.12292

Table 14-4: Simultaneous Transmission with BT(Head)

Simult Tx	Configuration	GSM 835MHz SAR(W/Kg)	BT SAR(W/Kg)	SUM SAR(W/Kg)
Head SAR	Right Cheek	0.219	0.019	0.238
	Left Cheek	0.094	0.019	0.113

Simult Tx	Configuration	GSM 1900MHz SAR(W/Kg)	BT SAR(W/Kg)	SUM SAR(W/Kg)
Head SAR	Right Cheek	0.104	0.019	0.123
	Left Cheek	0.073	0.019	0.092

Simult Tx	Configuration	WCDMA 850MHz SAR(W/Kg)	BT SAR(W/Kg)	SUM SAR(W/Kg)
Head SAR	Right Cheek	0.196	0.019	0.215
	Left Cheek	0.245	0.019	0.264

Table 14-5: Simultaneous Transmission with BT(Body)

Simult Tx	Configuration	GSM 835MHz SAR(W/Kg)	BT SAR(W/Kg)	SUM SAR(W/Kg)
Body SAR	Toward Ground	1.169	0.019	1.188
	Toward Phantom	0.260	0.019	0.279

Simult Tx	Configuration	GSM 1900MHz SAR(W/Kg)	BT SAR(W/Kg)	SUM SAR(W/Kg)
Body SAR	Toward Ground	1.176	0.019	1.195
	Toward Phantom	0.311	0.019	0.330

Simult Tx	Configuration	WCDMA 850MHz SAR(W/Kg)	BT SAR(W/Kg)	SUM SAR(W/Kg)
Body SAR	Toward Ground	0.889	0.019	0.908
	Toward Phantom	0.122	0.019	0.141

The above numerical SAR results for all worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured simultaneous SAR summation is required per FCC KDB Publication 447498 D01 v05.
According to the above table, the sum of reported SAR values for GSM and WiFi/BT ＜1.6W/kg. So the simultaneous transmission SAR is not required for WiFi/BT transmitter.

15 SAR Test Result

Table 15-1: Duty Cycle

	Duty Cycle
Speech for GSM835/1900	1:8.3
GPRS for GSM835/1900	1:2
WCDMA850 and WiFi	1:1

Table 15-2: SAR Values (GSM 835 MHz Band - Head)

Frequency		Side	Test Position	Maximum allowed Power (dBm)	Measured average power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.								
836.6	190	Left	Touch	33.0	32.58	1.102	0.085	0.094	-0.09
836.6	190	Left	Tilt	33.0	32.58	1.102	0.054	0.059	-0.06
836.6	190	Right	Touch	33.0	32.58	1.102	0.188	0.207	-0.02
836.6	190	Right	Tilt	33.0	32.58	1.102	0.061	0.067	-0.06
848.8	251	Right	Touch	33.0	32.55	1.109	0.197	**0.219**	0.10
824.2	128	Right	Touch	33.0	32.67	1.079	0.183	0.197	0.12

Table 15-3: SAR Values (GSM 835 MHz Band - Body)

Frequency		Mode (number of timeslots)	Test Position	Maximum allowed Power (dBm)	Measured average power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.								
836.6	190	GPRS (4)	Ground	30.0	29.69	1.074	1.010	1.085	-0.02
836.6	190	GPRS (4)	Phantom	30.0	29.69	1.074	0.242	0.260	-0.14
836.6	190	GPRS (4)	Left	30.0	29.69	1.074	0.151	0.162	-0.02
836.6	190	GPRS (4)	Right	30.0	29.69	1.074	0.204	0.219	0.07
836.6	190	GPRS (4)	Bottom	30.0	29.69	1.074	0.145	0.156	-0.03
848.8	251	GPRS (4)	Ground	30.0	29.66	1.081	1.000	1.081	0.06
824.2	128	GPRS (4)	Ground	30.0	29.72	1.067	0.982	1.047	0.01
836.6	190	E-GPRS (4)	Ground	30.0	29.22	1.197	0.977	**1.169**	-0.03
836.6	190	Speech	Ground (Headset)	33.0	32.58	1.102	0.532	0.586	0.07

Note:

1. The distance between the EUT and the phantom bottom is 10mm.

Table 15-4: SAR Values (GSM 1900 MHz Band - Head)

Frequency		Side	Test Position	Maximum allowed Power (dBm)	Measured average power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.								
1880	661	Left	Touch	30.00	29.74	1.062	0.069	0.073	-0.02
1880	661	Left	Tilt	30.00	29.74	1.062	0.035	0.037	0.02
1880	661	Right	Touch	30.00	29.74	1.062	0.084	0.089	0.09
1880	661	Right	Tilt	30.00	29.74	1.062	0.048	0.051	-0.11
1909.8	810	Right	Touch	30.00	29.71	1.069	0.068	0.073	-0.03
1850.2	512	Right	Touch	30.00	29.81	1.045	0.100	**0.104**	-0.12

Table 15-5: SAR Values (GSM 1900 MHz Band - Body)

Frequency		Mode (number of timeslots)	Test Position	Maximum allowed Power (dBm)	Measured average power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.								
1880	661	GPRS (4)	Ground	27.0	26.95	1.012	0.958	0.969	-0.08
1880	661	GPRS (4)	Phantom	27.0	26.95	1.012	0.307	0.311	0.09
1880	661	GPRS (4)	Left	27.0	26.95	1.012	0.175	0.177	-0.05
1880	661	GPRS (4)	Right	27.0	26.95	1.012	0.097	0.098	0.01
1880	661	GPRS (4)	Bottom	27.0	26.95	1.012	0.507	0.513	-0.15
1909.8	810	GPRS (4)	Ground	27.0	26.44	1.138	0.996	1.133	-0.05
1850.2	512	GPRS (4)	Ground	27.0	26.85	1.035	1.040	1.077	-0.08
1850.2	512	E-GPRS (4)	Ground	27.0	26.34	1.164	1.010	**1.176**	-0.09
1850.2	512	Speech	Ground (Headset)	30.00	29.81	1.045	0.529	0.553	0.04

Note:The distance between the EUT and the phantom bottom is 10mm.

measured Max output power: 32.55 dBm --> 1798.87 mW ,maximum output power: 33 dBm --> 1995.26 mW , scaled factor: 1995.26 mW / 1798.87 mW = 1.109,measured SAR value 0.219 W/kg,scaled SAR: 0.219w/kg * 1.109 = 0.243 W/kg

Table 15-6: SAR Values (WCDMA 850 MHz Band - Head)

Frequency		Side	Test Position	Maximum allowed Power (dBm)	Measured average power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.								
836.4	4182	Left	Touch	25.5	25.29	1.05	0.187	0.196	0.17
836.4	4182	Left	Tilt	25.5	25.29	1.05	0.114	0.120	0.06
836.4	4182	Right	Touch	25.5	25.29	1.05	0.187	0.196	0.17
836.4	4182	Right	Tilt	25.5	25.29	1.05	0.114	0.120	0.06
846.6	4233	Left	Touch	25.5	25.37	1.03	0.238	**0.245**	0.11
826.4	4132	Left	Touch	25.5	25.40	1.023	0.150	0.153	0.02

Table 15-7: SAR Values (WCDMA 850 MHz Band - Body)

Frequency		Test Position	Maximum allowed Power (dBm)	Measured average power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.							
836.4	4182	Ground	25.5	25.29	1.05	0.579	0.608	-0.02
836.4	4182	Phantom	25.5	25.29	1.05	0.116	0.122	0.03
836.4	4182	Left	25.5	25.29	1.05	0.078	0.082	-0.10
836.4	4182	Right	25.5	25.29	1.05	0.096	0.101	0.09
836.4	4182	Bottom	25.5	25.29	1.05	0.081	0.085	-0.02
846.6	4233	Ground	25.5	25.37	1.03	0.863	**0.889**	-0.06
826.4	4132	Ground	25.5	25.40	1.023	0.542	0.555	-0.03
846.6	4233	Ground (Headset)	25.5	25.37	1.03	0.776	0.800	-0.05

Note1: The distance between the EUT and the phantom bottom is 10mm.

measured output power: 25.37 dBm --> 344.35 mW ,maximum output power: 25.5 dBm --> 354.81 mW ,scaled factor: 354.81 mW / 344.35 mW = 1.03,measured SAR value 0.245 W/kg,scaled SAR: 0.245 w/kg * 1.03 = 0.252 W/kg

Table 15-8: SAR Values (Wi-Fi 802.11b - Head)

Frequency		Side	Test Position	Maximum allowed Power (dBm)	Measured average power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.								
2412	1	Left	Touch	13.0	12.31	1.172	0.063	0.074	0.11
2412	1	Left	Tilt	13.0	12.31	1.172	0.016	0.019	0.19
2412	1	Right	Touch	13.0	12.31	1.172	0.093	**0.109**	0.20
2412	1	Right	Tilt	13.0	12.31	1.172	0.019	0.022	0.16

Table 15-9: SAR Values (Wi-Fi 802.11b - Body)

Frequency		Test Position	Maximum allowed Power (dBm)	Measured average power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.							
2412	1	Phantom	13.0	12.31	1.172	0.000786	0.00092	0.04
2412	1	Ground	13.0	12.31	1.172	0.138	**0.162**	-0.02
2412	1	Left	13.0	12.31	1.172	0.00114	0.00134	-0.07
2412	1	Right	13.0	12.31	1.172	0.000179	0.00021	-0.11
2412	1	Top	13.0	12.31	1.172	0.000655	0.00077	-0.14
2412	1	Bottom	13.0	12.31	1.172	0.00026	0.0003	-0.09

Note1: The distance between the EUT and the phantom bottom is 10mm.

measured output power: 12.31 dBm --> 17.02 mW ,maximum output power: 13 dBm --> 19.95 mW , scaled factor: 19.95 mW / 17.02 mW = 1.172,measured SAR value 0.467 W/kg,scaled SAR: 0.162 w/kg * 1.172 = 0.190 W/kg

16 SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.

The following procedures are applied to determine if repeated measurements are required.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.

2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.

3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Table 16-1: SAR Measurement Variability for Head Value (1g)

Frequency		Side	Test Position	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio
MHz	Ch.					
N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 16-2: SAR Measurement Variability for Body Value (1g)

Frequency		Mode(number of timeslots)	Test Position	Spacing (mm)	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio
MHz	Ch.						
836.6	190	GPRS (4)	Ground	10	1.01	0.996	1.01
848.8	251	GPRS (4)	Ground	10	1.000	0.987	1.01
824.2	128	GPRS (4)	Ground	10	0.982	0.975	1.01
836.6	190	E-GPRS (4)	Ground	10	0.977	0.972	1.01
1880	661	GPRS (4)	Ground	10	0.958	0.962	1.00
1850.2	512	GPRS (4)	Ground	10	1.04	1.03	1.01
1909.8	810	GPRS (4)	Ground	10	0.996	0.991	1.01
1850.2	512	E-GPRS (4)	Ground	10	1.01	1.02	1.01
846.6	4233	Band V	Ground	10	0.889	0.855	1.04
846.6	4233	Band V	Ground (Headset)	10	0.800	0.774	1.03

17 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%**	

18 MAIN TEST INSTRUMENTS

Table 18-1: List of Main Instruments

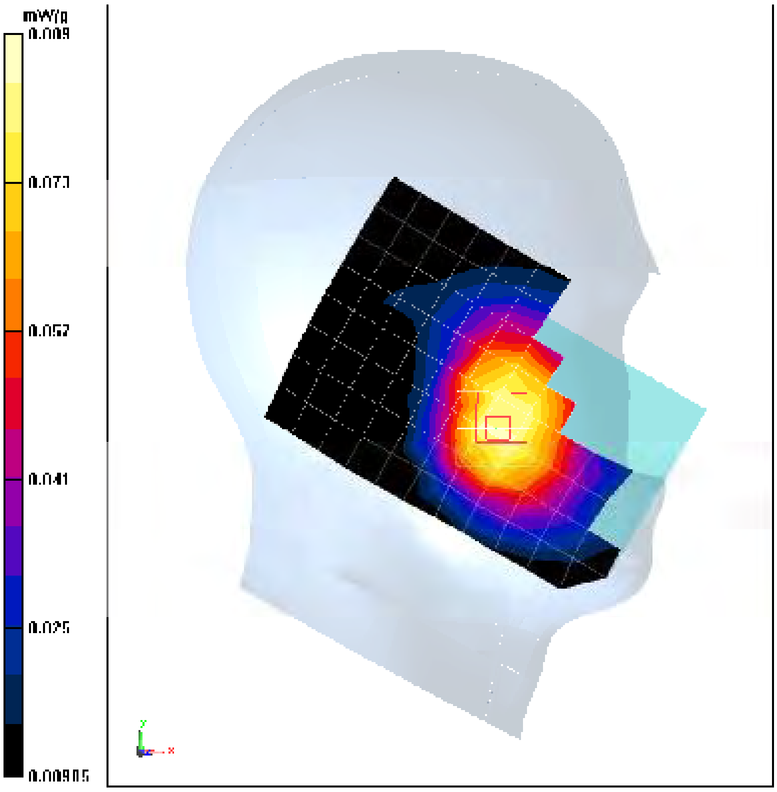
No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	E8362B	MY43021471	Jul 07, 2012	One year
02	Power meter	E4417A	GB41050460	Aug 01,2012	One year
03	Power sensor	E9327A	US40440198	Jul 17,2012	
04	Signal Generator	SMP04	100064	Feb 08,2013	One Year
05	Amplifier	150W1000	150W1000	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	E-field Probe	EX3DV4	3754	Aug 17, 2012	One year
10	DAE	DAE4	797	Jul 12,2012	One year
11	Dipole Validation Kit	SPEAG D900V2	1d059	Jul 10,2012	One year
12	Dipole Validation Kit	SPEAG D1900V2	5d024	Jul 11,2012	One year
13	Dipole Validation Kit	SPEAG D2450V2	803	Jul 09, 2012	One year

END OF REPORT BODY

ANNEX A GRAPH RESULTS

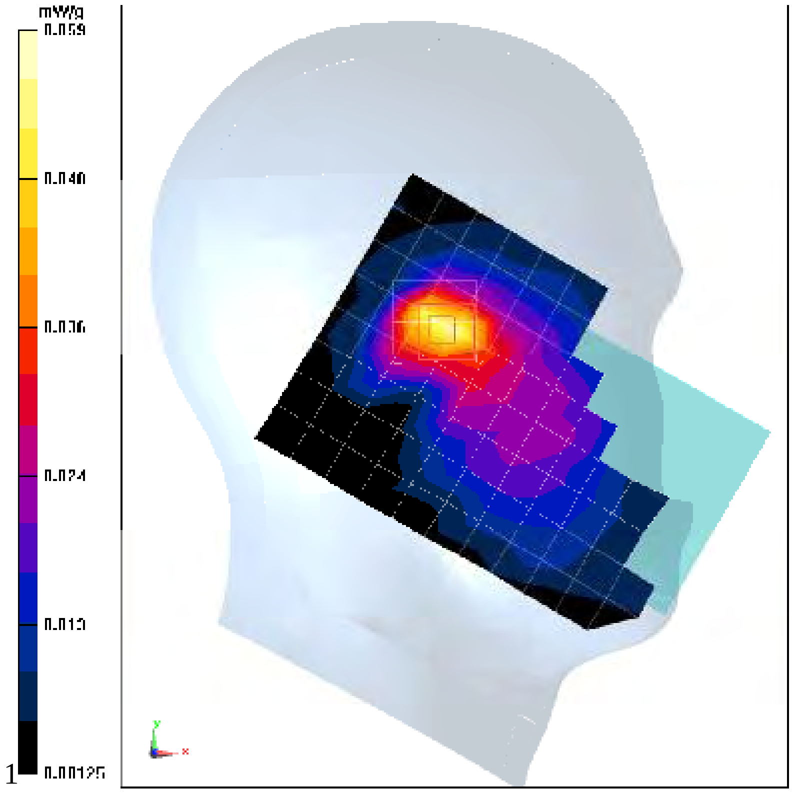
GSM850 Left Cheek Middle

Date/Time: 06/17/2013
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°C Liquid Temperature:22.5°C
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 (14x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.084 mW/g
Middle Cheek Left GSM850MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.713 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.1120mW/g
SAR(1 g) = 0.085 mW/g; SAR(10 g) = 0.064 mW/g
Maximum value of SAR (measured) = 0.089 mW/g



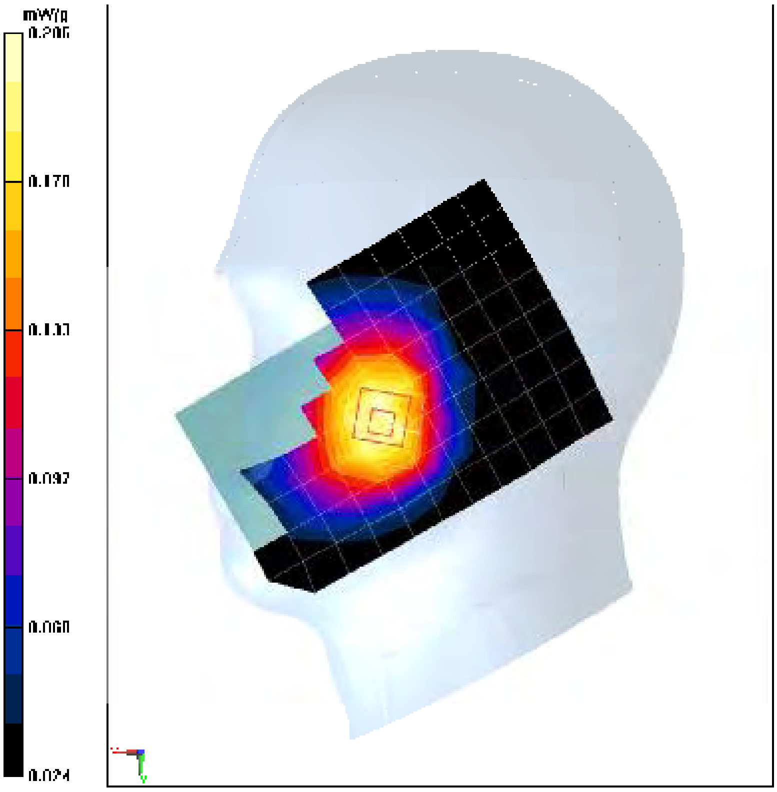
GSM850 Left Tilt Middle

Date/Time: 06/17/2013
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°C Liquid Temperature:22.5°C
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 (14x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.056 mW/g
Middle Tilt Left GSM850MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.408 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.0960mW/g
SAR(1 g) = 0.054 mW/g; SAR(10 g) = 0.032 mW/g
Maximum value of SAR (measured) = 0.059 mW/g



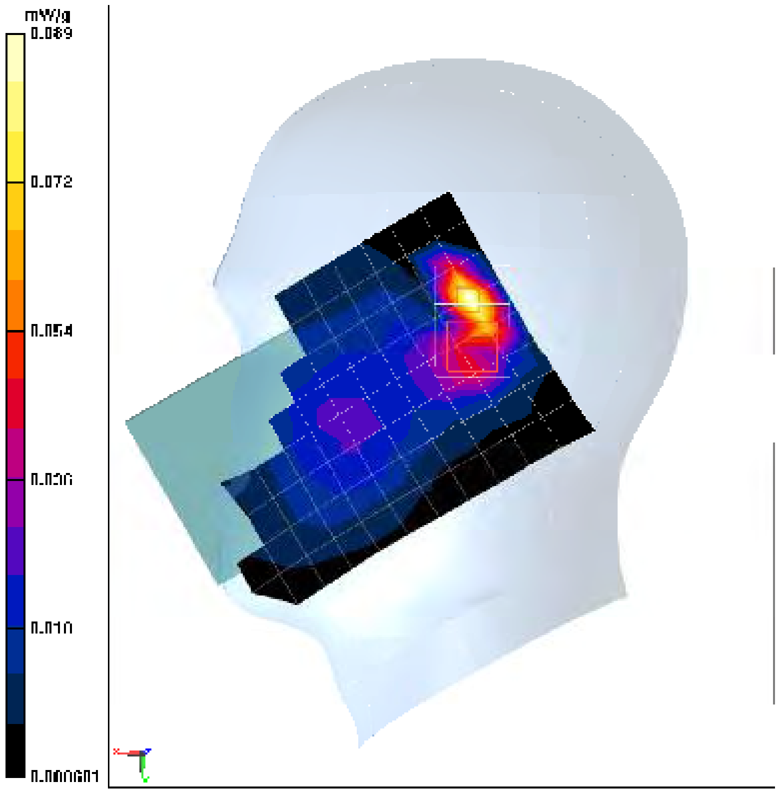
GSM850 Right Cheek Middle

Date/Time: 06/17/2013
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°C Liquid Temperature:22.5°C
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/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.199 mW/g
Middle Cheek Right GSM850MHz/Zoom Scan (7x7x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.825 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.2390mW/g
SAR(1 g) = 0.188 mW/g; SAR(10 g) = 0.143 mW/g
Maximum value of SAR (measured) = 0.206 mW/g



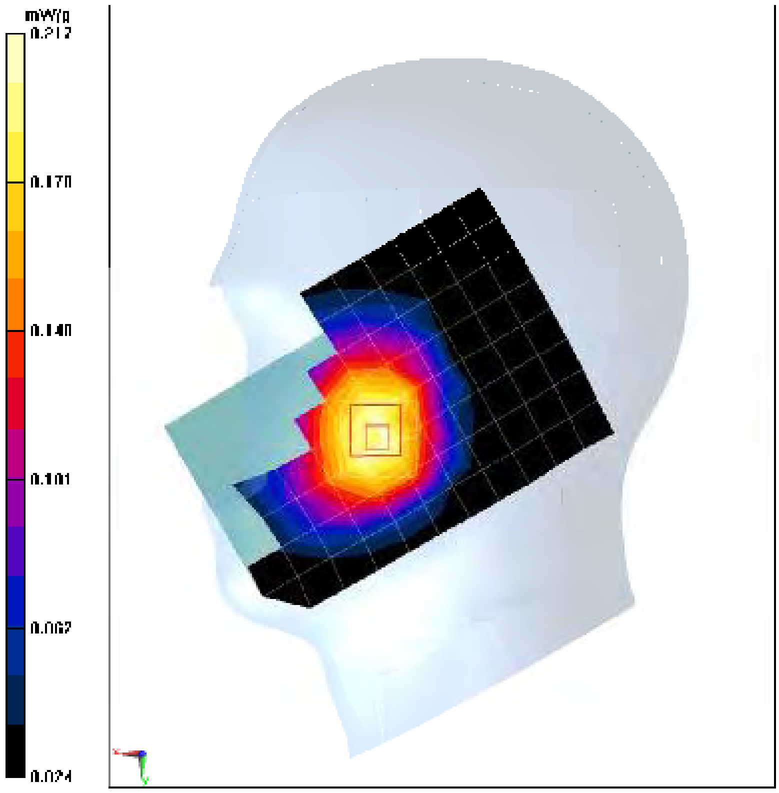
GSM850 Right Tilt Middle

Date/Time: 06/17/2013
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°C Liquid Temperature:22.5°C
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/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.094 mW/g
Middle Tilt Right GSM850MHz/Zoom Scan (7x7x7) (5x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.092 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.1930mW/g
SAR(1 g) = 0.061 mW/g; SAR(10 g) = 0.028 mW/g
Maximum value of SAR (measured) = 0.089 mW/g



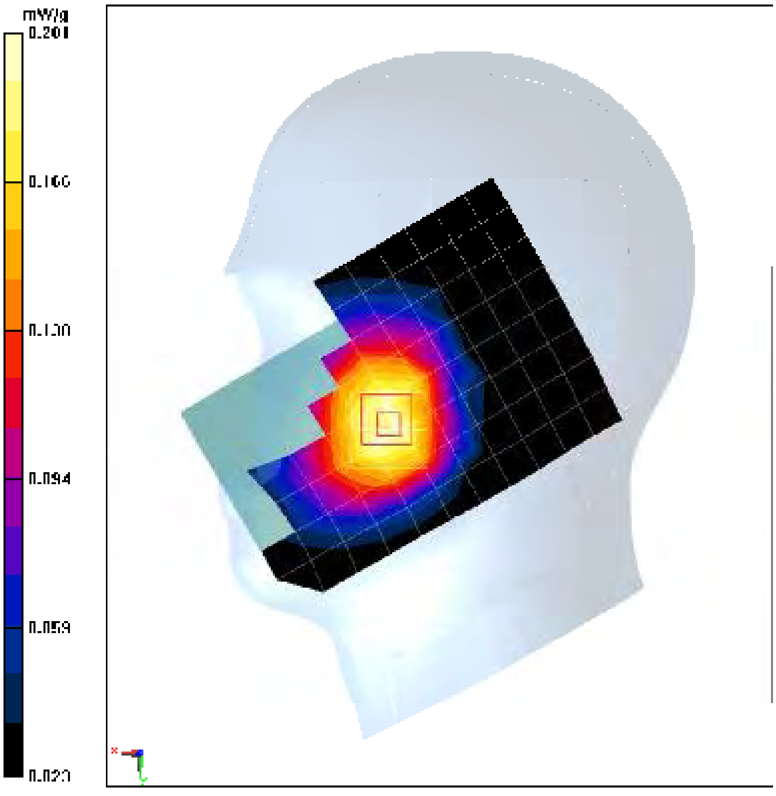
GSM850 Right Cheek High

Date/Time: 06/17/2013
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°C Liquid Temperature:22.5°C
Communication System: GSM 850MHz; Frequency: 848.8 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF (6.02, 6.02, 6.02)
High Cheek Right GSM850MHz/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.208 mW/g
High Cheek Right GSM850MHz/Zoom Scan (7x7x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.568 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.2520mW/g
SAR(1 g) = 0.197 mW/g; SAR(10 g) = 0.150 mW/g
Maximum value of SAR (measured) = 0.217 mW/g



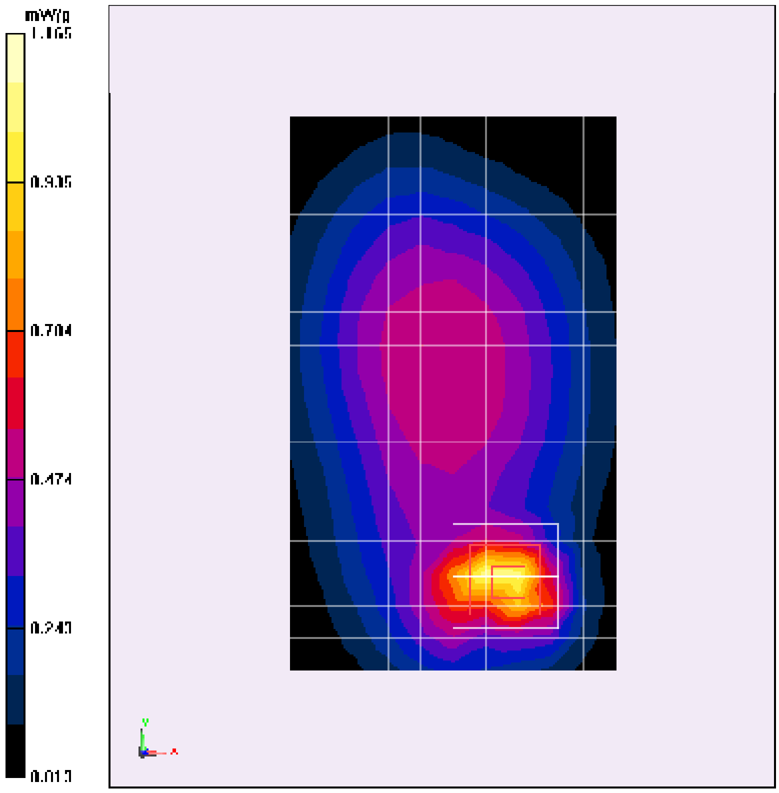
GSM850 Right Cheek Low

Date/Time: 06/17/2013
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°C Liquid Temperature:22.5°C
Communication System: GSM 850MHz; Frequency: 824.2 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF (6.02, 6.02, 6.02)
Low Cheek Right GSM850MHz/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.194 mW/g
Low Cheek Right GSM850MHz/Zoom Scan (7x7x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.897 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.2340mW/g
SAR(1 g) = 0.183 mW/g; SAR(10 g) = 0.141 mW/g
Maximum value of SAR (measured) = 0.201 mW/g



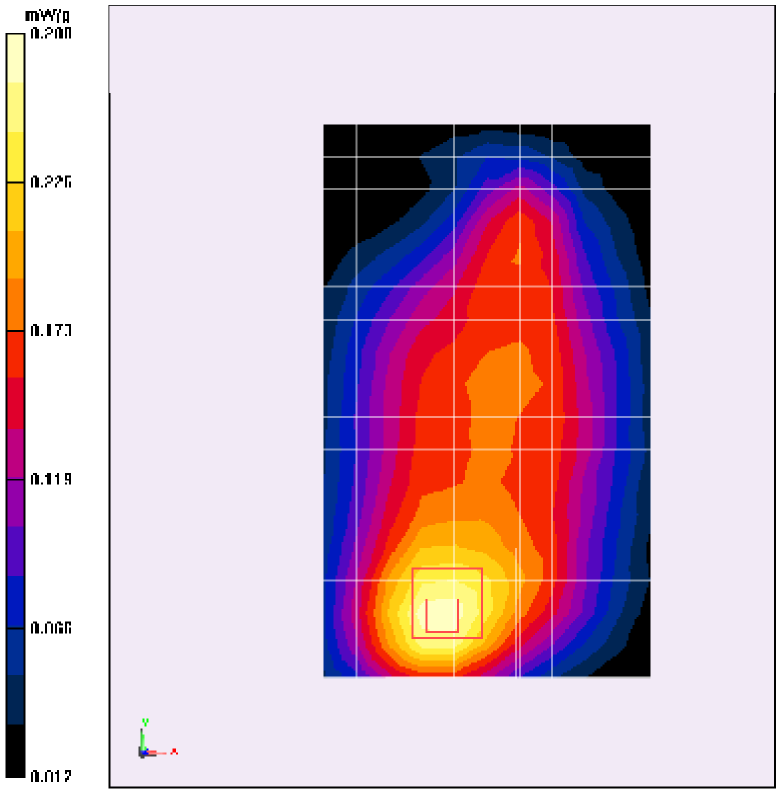
GSM850 Body Toward Ground GPRS 4TS Middle

Date/Time: 06/17/2013
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°C Liquid Temperature:22.5°C
Communication System: GPRS 4TS 850MHz; Frequency: 836.6 MHz; Duty Cycle: 1:2
Probe: ES3DV3 - SN3158ConvF (5.99, 5.99, 5.99)
Middle Toward Ground GPRS 4TS 850MHz/Area Scan (11x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.066 mW/g
Middle Toward Ground GPRS 4TS 850MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.201 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.8410mW/g
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.543 mW/g
Maximum value of SAR (measured) = 1.165 mW/g



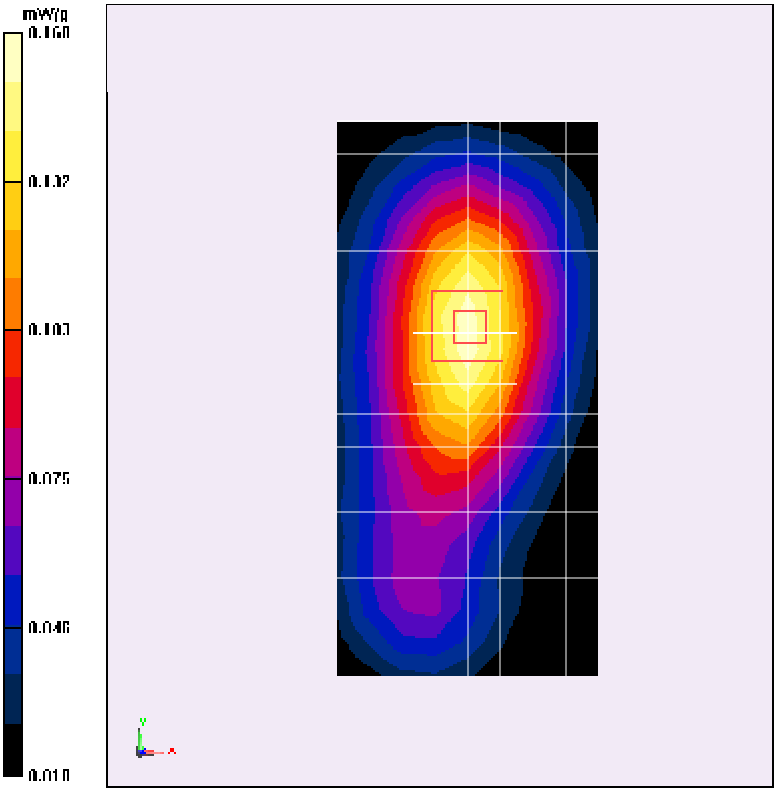
GSM850 Body Toward Phantom GPRS 4TS Middle

Date/Time: 06/17/2013
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°C   Liquid Temperature:22.5°C
Communication System: GPRS 4TS 850MHz; Frequency: 836.6 MHz; Duty Cycle: 1:2
Probe: ES3DV3 - SN3158ConvF (5.99, 5.99, 5.99)
Middle Toward Phantom GPRS 4TS 850MHz/Area Scan (11x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.275 mW/g
Middle Toward Phantom GPRS 4TS 850MHz/Zoom Scan (7x7x7) (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.531 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.3620mW/g
SAR(1 g) = 0.242 mW/g; SAR(10 g) = 0.161 mW/g
Maximum value of SAR (measured) = 0.280 mW/g



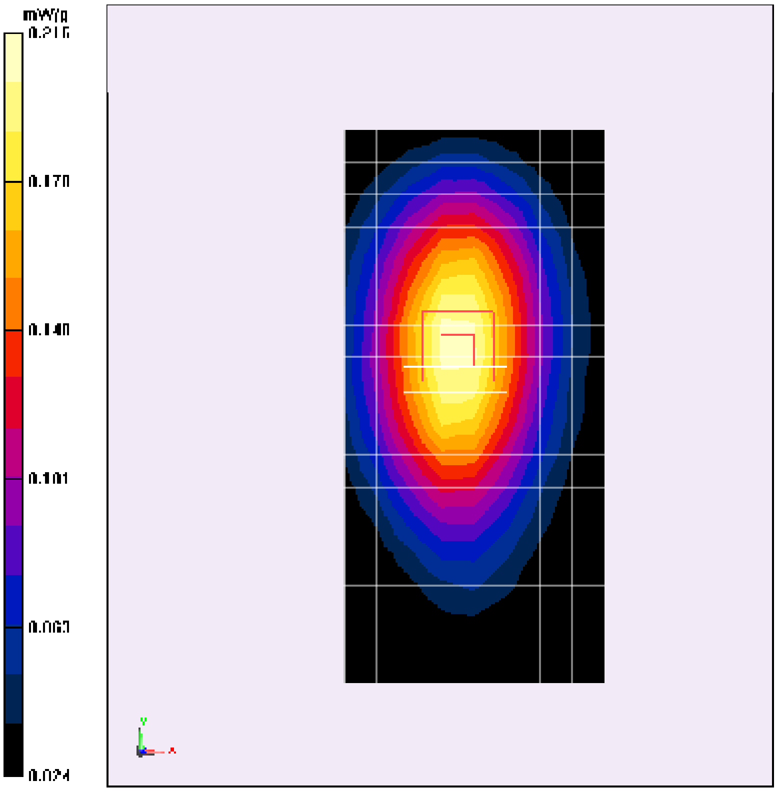
GSM850 Body Left GPRS 4TS Middle

Date/Time: 06/17/2013
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°C Liquid Temperature:22.5°C
Communication System: GPRS 4TS 850MHz; Frequency: 836.6 MHz; Duty Cycle: 1:2
Probe: ES3DV3 - SN3158ConvF (5.99, 5.99, 5.99)
Middle Left GPRS 4TS 850MHz/Area Scan (9x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.158 mW/g
Middle Left GPRS 4TS 850MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.734 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.2120mW/g
SAR(1 g) = 0.151 mW/g; SAR(10 g) = 0.104 mW/g
Maximum value of SAR (measured) = 0.160 mW/g



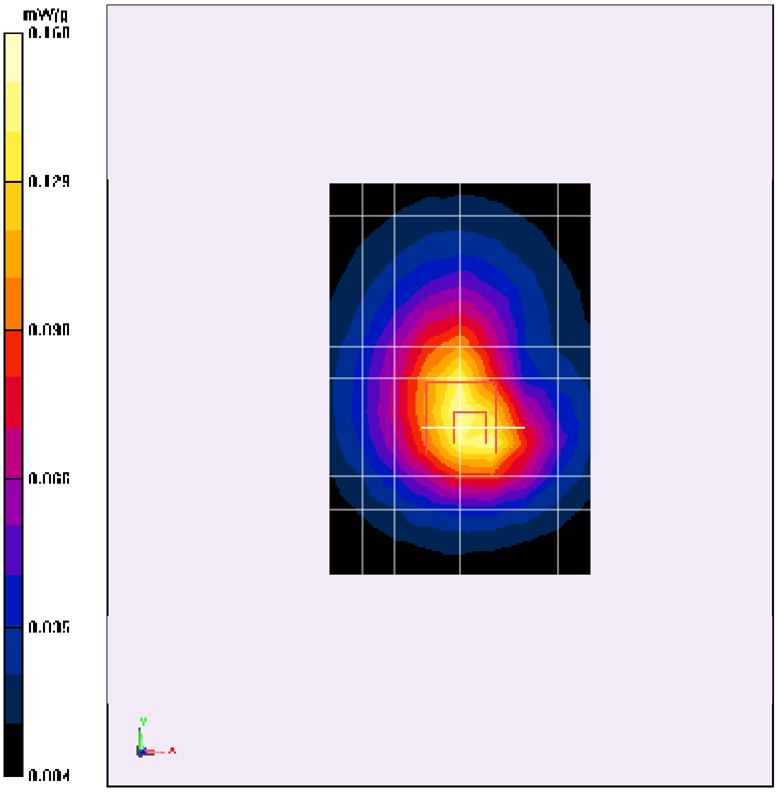
GSM850 Body Right GPRS 4TS Middle

Date/Time: 06/17/2013
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°C Liquid Temperature:22.5°C
Communication System: GPRS 4TS 850MHz; Frequency: 836.6 MHz; Duty Cycle: 1:2
Probe: ES3DV3 - SN3158ConvF (5.99, 5.99, 5.99)
Middle Right GPRS 4TS 850MHz/Area Scan (9x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.208 mW/g
Middle Right GPRS 4TS 850MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.396 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.2880mW/g
SAR(1 g) = 0.204 mW/g; SAR(10 g) = 0.142 mW/g
Maximum value of SAR (measured) = 0.216 mW/g



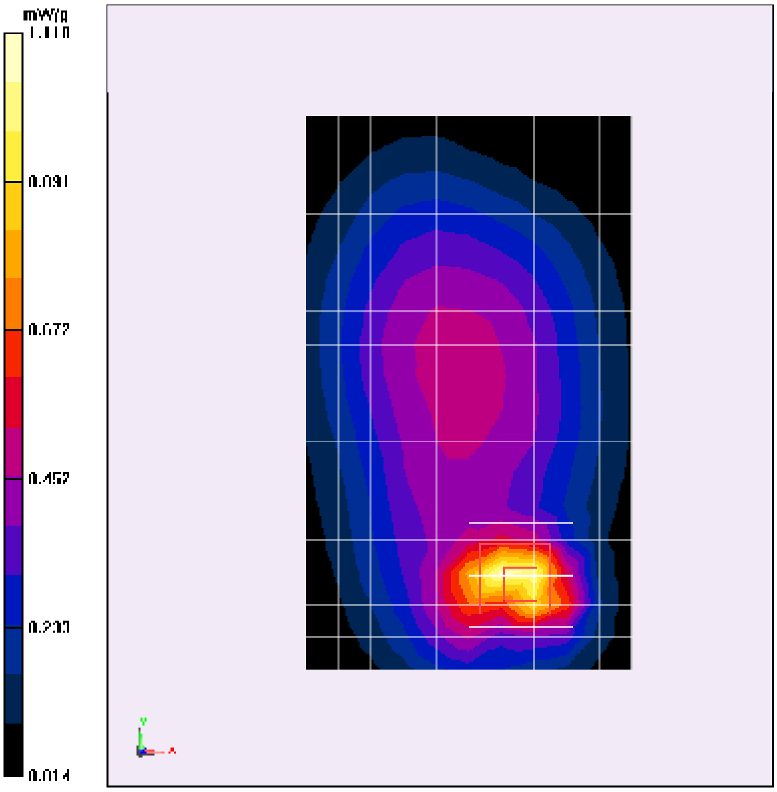
GSM850 Body Bottom GPRS 4TS Middle

Date/Time: 06/17/2013
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°C Liquid Temperature:22.5°C
Communication System: GPRS 4TS 850MHz; Frequency: 836.6 MHz; Duty Cycle: 1:2
Probe: ES3DV3 - SN3158ConvF (5.99, 5.99, 5.99)
Middle Bottom GPRS 4TS 850MHz/Area Scan (9x13x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.153 mW/g
Middle Bottom GPRS 4TS 850MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.615 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.2600mW/g
SAR(1 g) = 0.145 mW/g; SAR(10 g) = 0.085 mW/g
Maximum value of SAR (measured) = 0.160 mW/g



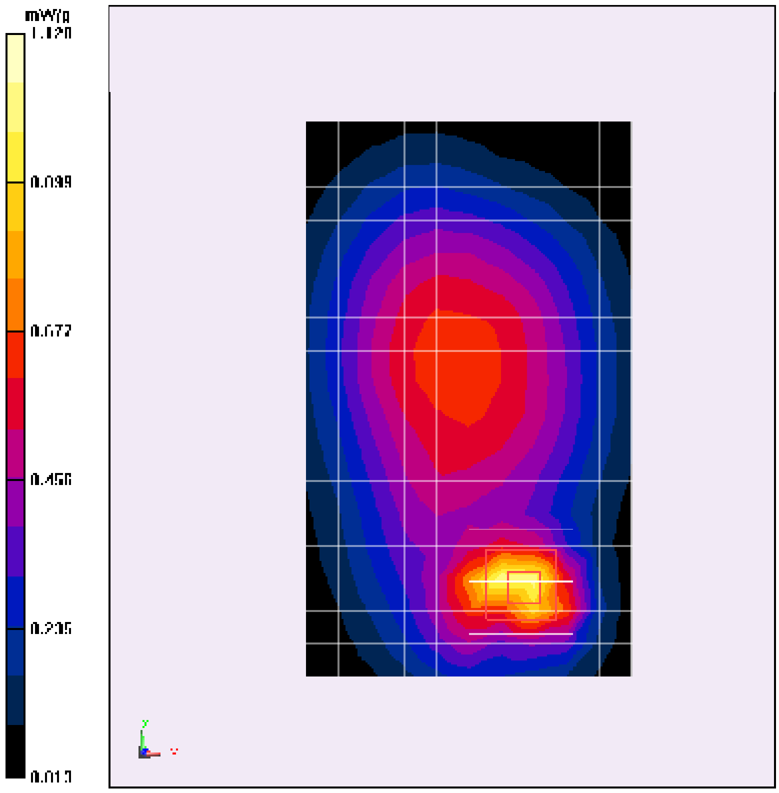
GSM850 Body Toward Ground GPRS 4TS High

Date/Time: 06/17/2013
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°C Liquid Temperature:22.5°C
Communication System: GPRS 4TS 850MHz; Frequency: 848.8 MHz; Duty Cycle: 1:2
Probe: ES3DV3 - SN3158ConvF (5.99, 5.99, 5.99)
High Toward Ground GPRS 4TS 850MHz/Area Scan (11x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.073 mW/g
High Toward Ground GPRS 4TS 850MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.638 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.8220mW/g
SAR(1 g) = 1 mW/g; SAR(10 g) = 0.541 mW/g
Maximum value of SAR (measured) = 1.110 mW/g



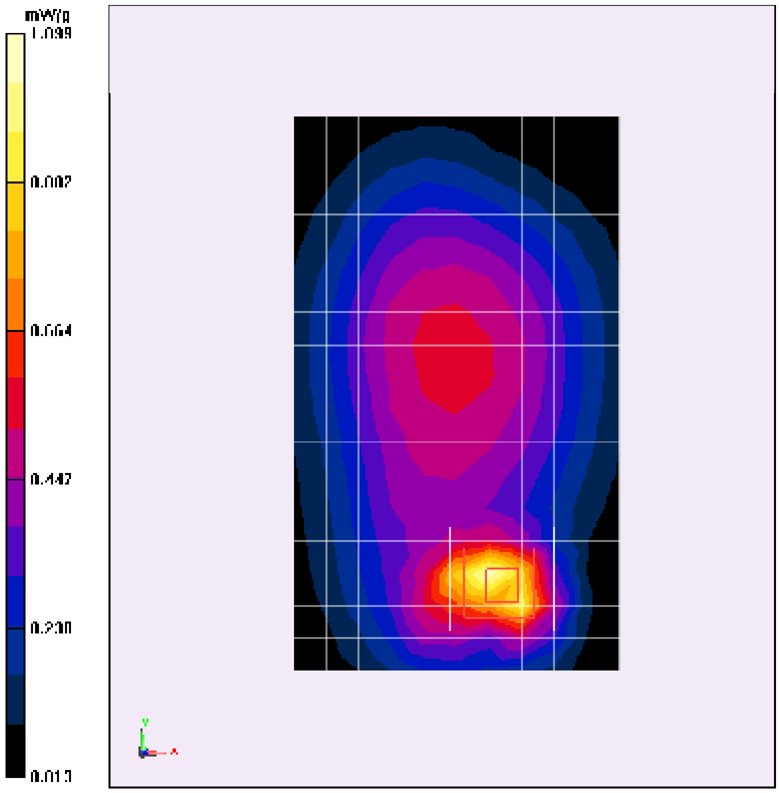
GSM850 Body Toward Ground GPRS 4TS Low

Date/Time: 06/17/2013
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°C Liquid Temperature:22.5°C
Communication System: GPRS 4TS 850MHz; Frequency: 824.2 MHz; Duty Cycle: 1:2
Probe: ES3DV3 - SN3158ConvF (5.99, 5.99, 5.99)
Low Toward Ground GPRS 4TS 850MHz/Area Scan (11x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.037 mW/g
Low Toward Ground GPRS 4TS 850MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.132 V/m; Power Drift = 0.0015 dB
Peak SAR (extrapolated) = 1.7880mW/g
SAR(1 g) = 0.982 mW/g; SAR(10 g) = 0.532 mW/g
Maximum value of SAR (measured) = 1.120 mW/g



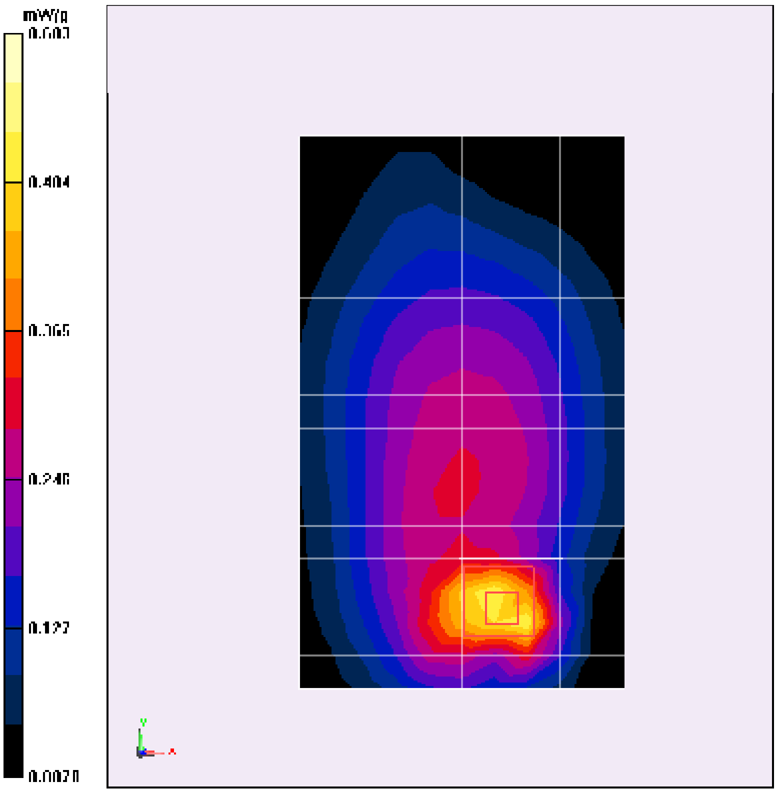
GSM850 Body Toward Ground E-GPRS 4TS Middle

Date/Time: 06/17/2013
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°C Liquid Temperature:22.5°C
Communication System: E-GPRS 4TS 850MHz; Frequency: 836.6 MHz; Duty Cycle: 12
Probe: ES3DV3 - SN3158ConvF (5.99, 5.99, 5.99)
Middle Toward Ground E-GPRS 4TS 850MHz/Area Scan (11x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.072 mW/g
Middle Toward Ground E-GPRS 4TS 850MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.072 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.7880mW/g
SAR(1 g) = 0.977 mW/g; SAR(10 g) = 0.527 mW/g
Maximum value of SAR (measured) = 1.099 mW/g



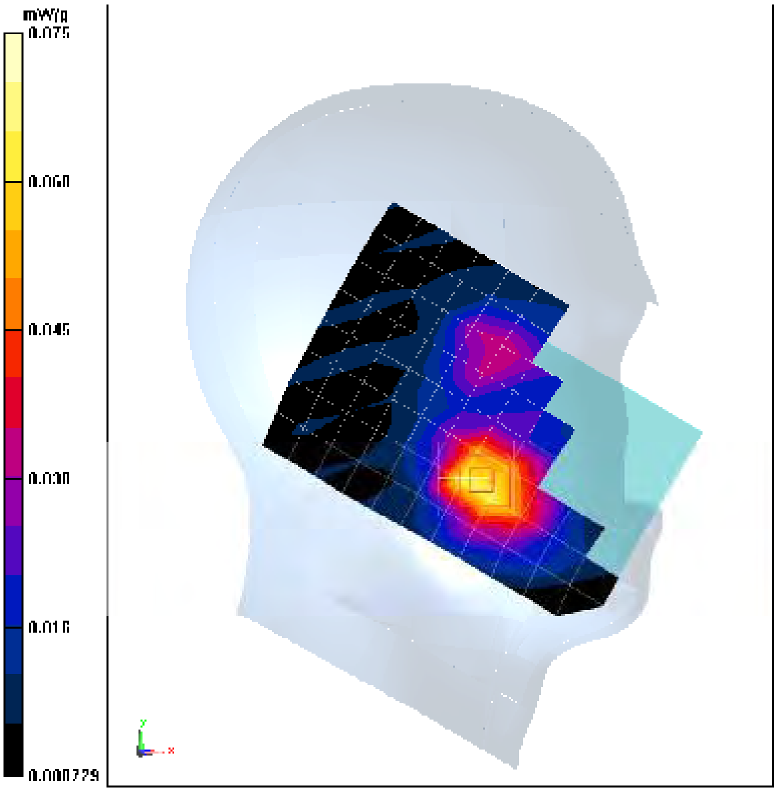
GSM850 Body Toward Ground Middle With Headset

Date/Time: 06/17/2013
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°C Liquid Temperature:22.5°C
Communication System: GSM 850MHz; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF (5.99, 5.99, 5.99)
Middle Toward Ground GSM850MHz With Headset/Area Scan (11x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.524 mW/g
Middle Toward Ground GSM850MHz With Headset/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.311 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.9090mW/g
SAR(1 g) = 0.532 mW/g; SAR(10 g) = 0.303 mW/g
Maximum value of SAR (measured) = 0.603 mW/g



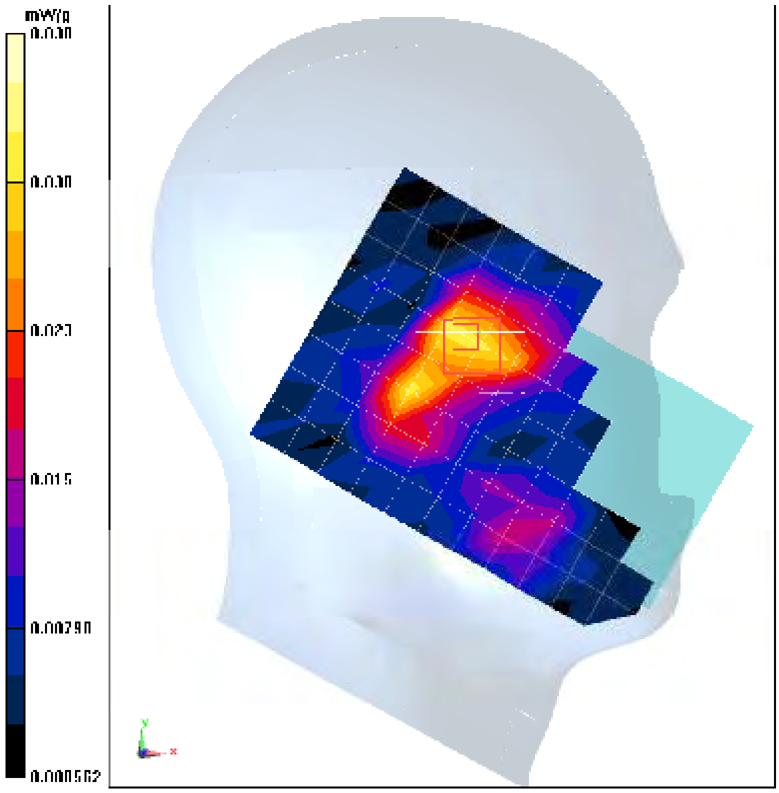
GSM1900 Left Cheek Middle

Date/Time: 05/29/2013
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°C Liquid Temperature:22.5°C
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 (14x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.065 mW/g
Middle Cheek Left GSM1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.898 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.1200mW/g
SAR(1 g) = 0.069 mW/g; SAR(10 g) = 0.039 mW/g
Maximum value of SAR (measured) = 0.075 mW/g



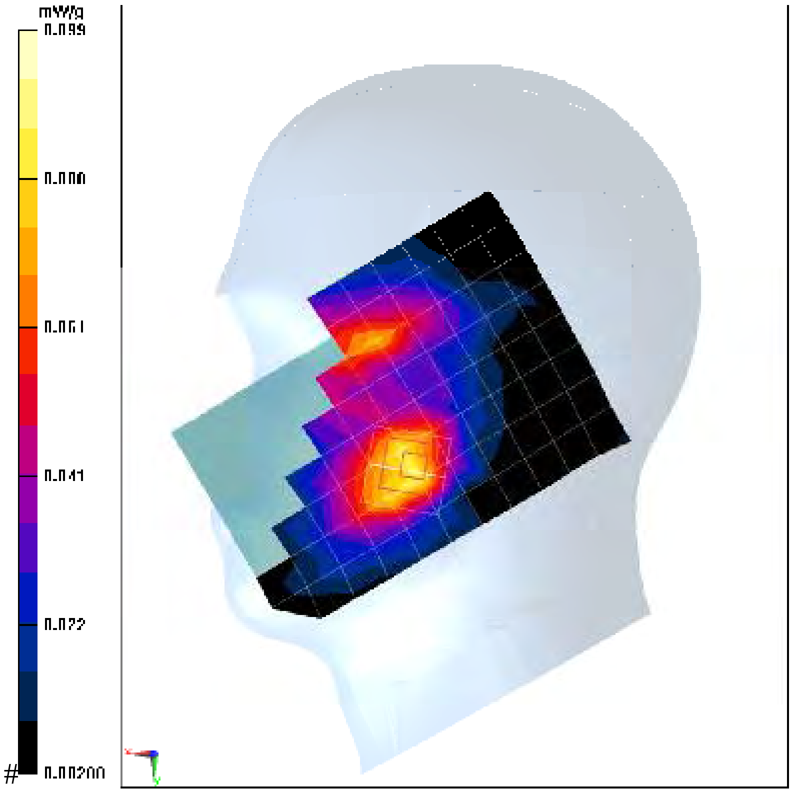
GSM1900 Left Tilt Middle

Date/Time: 05/29/2013
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°C Liquid Temperature:22.5°C
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 (14x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.032 mW/g
Middle Tilt Left GSM1900MHz/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.750 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.0600mW/g
SAR(1 g) = 0.035 mW/g; SAR(10 g) = 0.020 mW/g
Maximum value of SAR (measured) = 0.038 mW/g



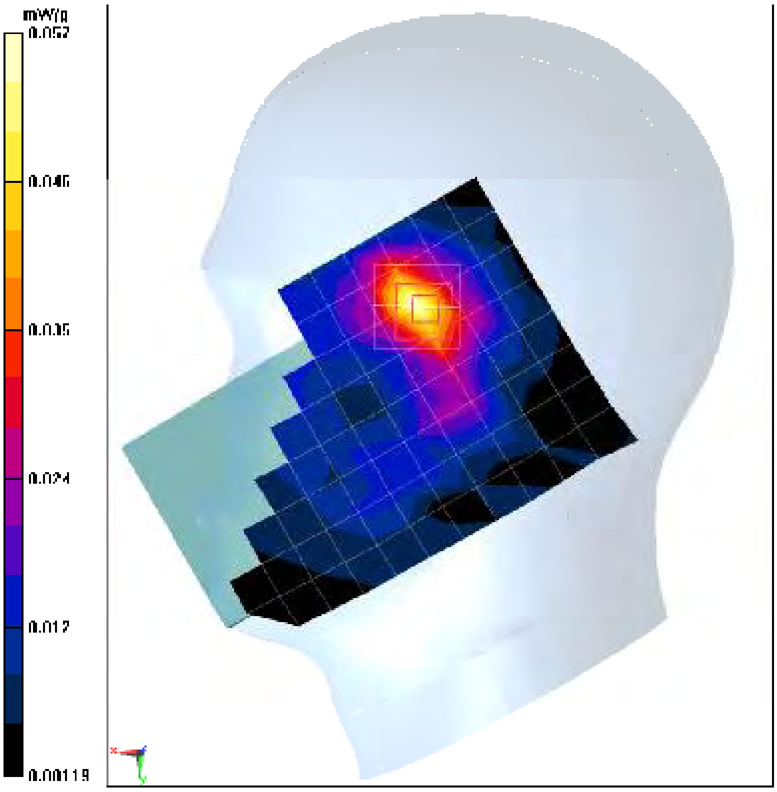
GSM1900 Right Cheek Middle

Date/Time: 05/29/2013
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°C Liquid Temperature:22.5°C
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/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.085 mW/g
Middle Cheek Right GSM1900MHz/Zoom Scan (7x7x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.267 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.1470mW/g
SAR(1 g) = 0.084 mW/g; SAR(10 g) = 0.049 mW/g
Maximum value of SAR (measured) = 0.099 mW/g



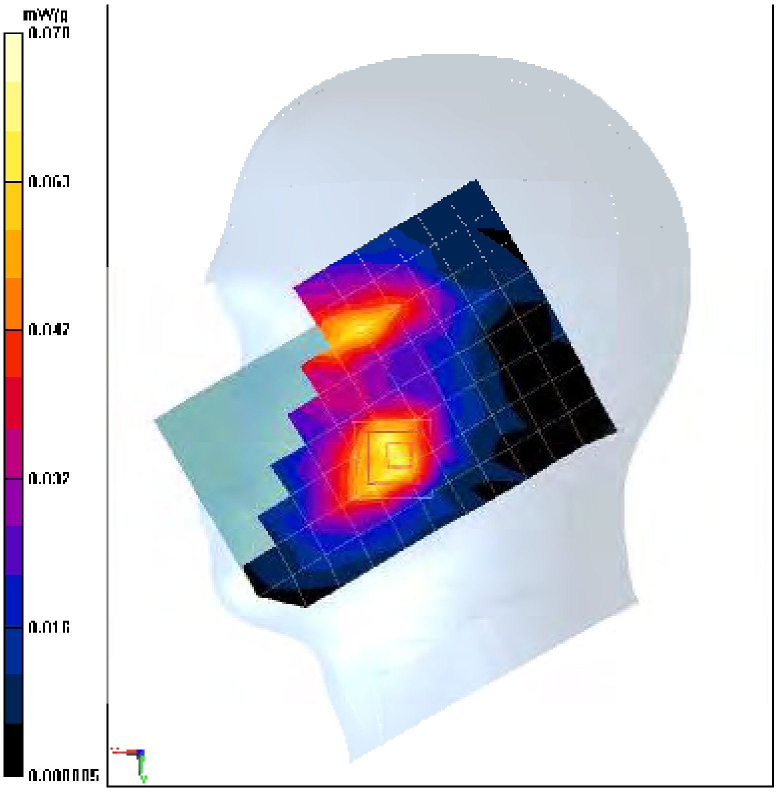
GSM1900 Right Tilt Middle

Date/Time: 05/29/2013
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°C Liquid Temperature:22.5°C
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/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.057 mW/g
Middle Tilt Right GSM1900MHz/Zoom Scan (7x7x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.540 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.0910mW/g
SAR(1 g) = 0.048 mW/g; SAR(10 g) = 0.026 mW/g
Maximum value of SAR (measured) = 0.057mW/g



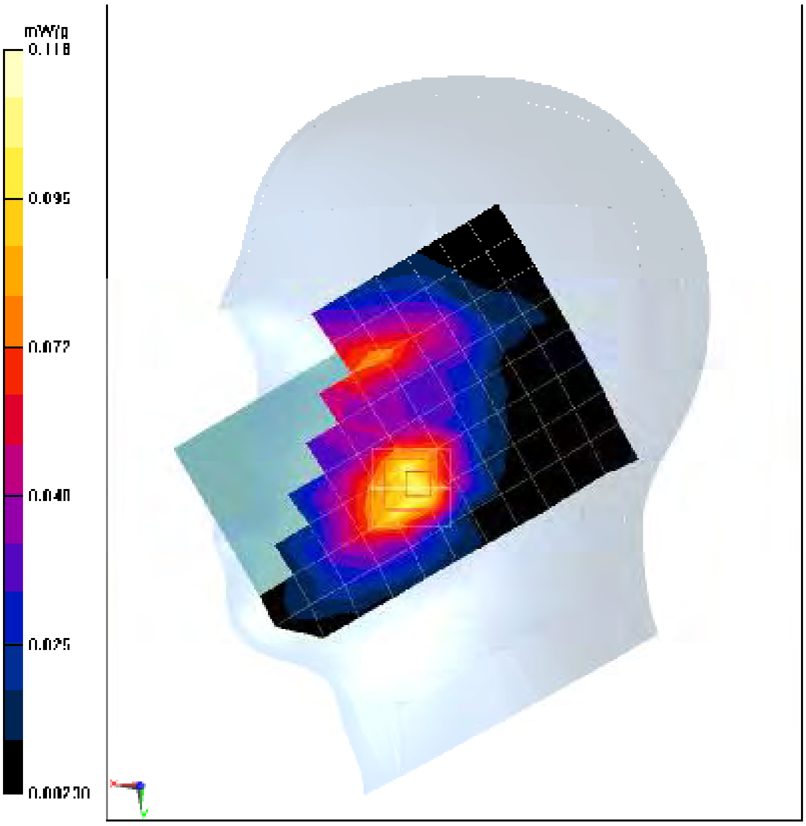
GSM1900 Right Cheek High

Date/Time: 05/29/2013
Electronics: DAE4 Sn797
Medium: Head 1900MHz
Medium parameters used: f = 1910 MHz; σ = 1.459 mho/m;εr = 40.495; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: GSM 1900MHz; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(5.06, 5.06, 5.06)
High Cheek Right GSM1900MHz/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.069 mW/g
High Cheek Right GSM1900MHz/Zoom Scan (7x7x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.553 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.1200mW/g
SAR(1 g) = 0.068 mW/g; SAR(10 g) = 0.038 mW/g
Maximum value of SAR (measured) = 0.078 mW/g



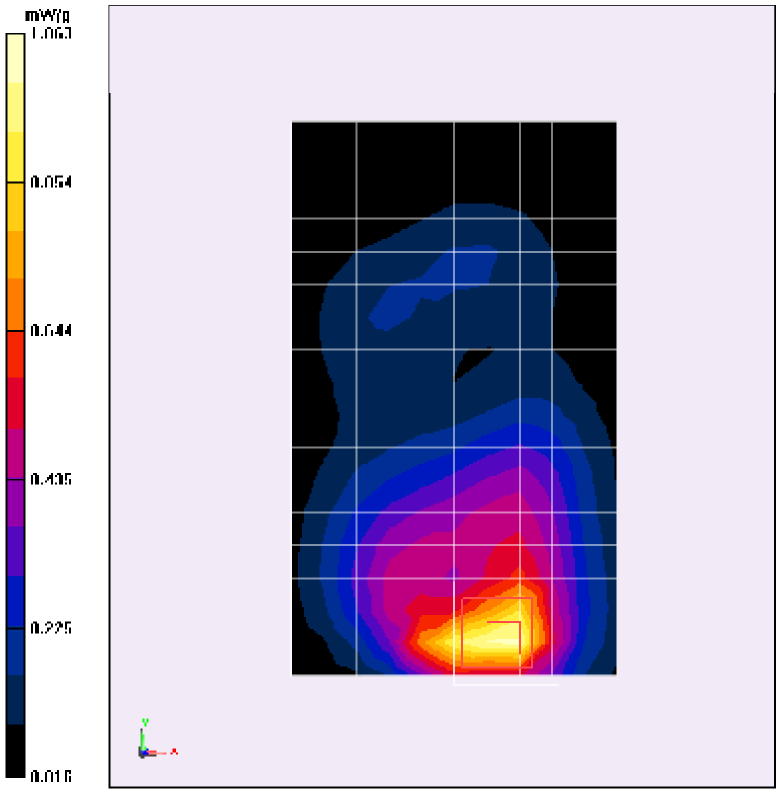
GSM1900 Right Cheek Low

Date/Time: 05/29/2013
Electronics: DAE4 Sn797
Medium: Head 1900MHz
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.415 mho/m;εr = 40.792; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: GSM 1900MHz; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3158ConvF(5.06, 5.06, 5.06)
Low Cheek Right GSM1900MHz/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.103 mW/g
Low Cheek Right GSM1900MHz/Zoom Scan (7x7x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.391 V/m; Power Drift = -0.12dB
Peak SAR (extrapolated) = 0.1680mW/g
SAR(1 g) = 0.100 mW/g; SAR(10 g) = 0.059 mW/g
Maximum value of SAR (measured) = 0.118 mW/g



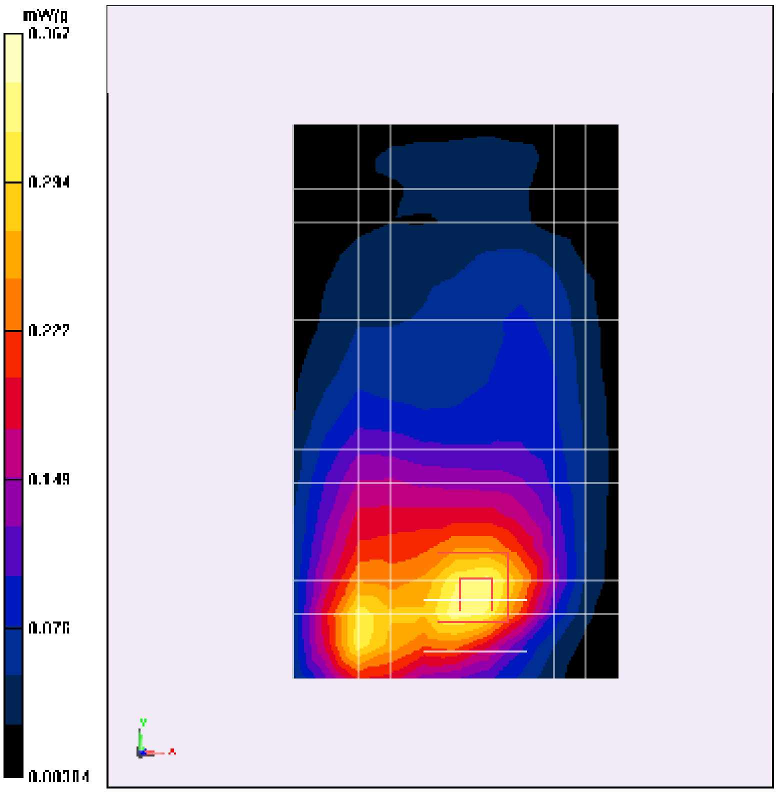
GSM1900 Body Toward Ground GPRS 4TS Middle

Date/Time: 05/29/2013
Electronics: DAE4 Sn797
Medium: Body 1800MHz
Medium parameters used: f = 1880 MHz; σ = 1.504 mho/m;εr = 53.319; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: GPRS 4TS 1900MHz; Frequency: 1880 MHz; Duty Cycle: 1:2
Probe: ES3DV3 - SN3158ConvF(4.60, 4.60, 4.60)
Middle Toward Ground GPRS 4TS 1900MHz/Area Scan (11x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.014 mW/g
Middle Toward Ground GPRS 4TS 1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.085 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.6750mW/g
SAR(1 g) = 0.958 mW/g; SAR(10 g) = 0.531 mW/g
Maximum value of SAR (measured) = 1.063 mW/g



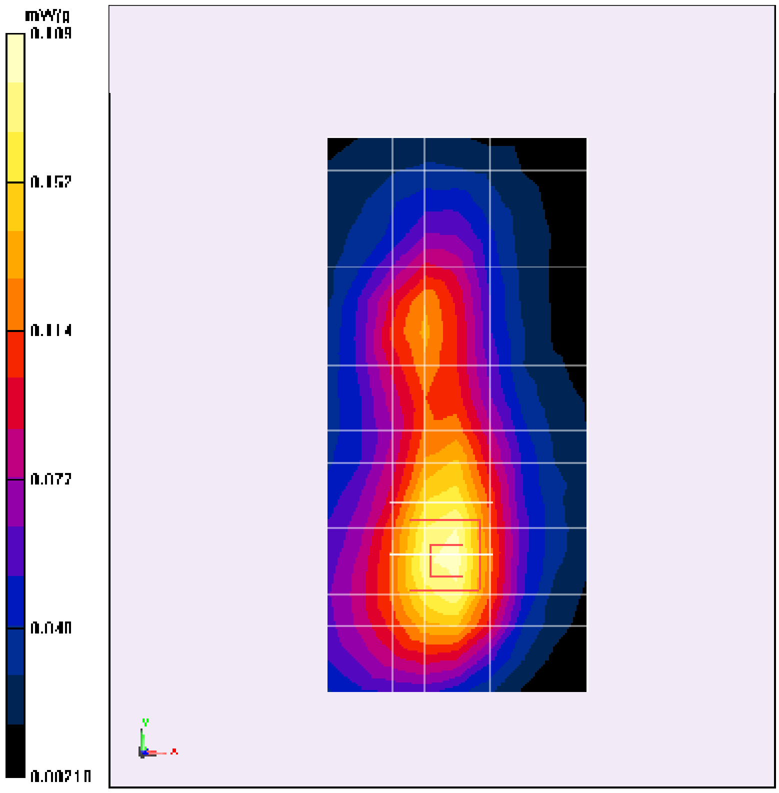
GSM1900 Body Toward Phantom GPRS 4TS Middle

Date/Time: 05/29/2013
Electronics: DAE4 Sn797
Medium: Body 1800MHz
Medium parameters used: f = 1880 MHz; σ = 1.504 mho/m;εr = 53.319; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: GPRS 4TS 1900MHz; Frequency: 1880 MHz; Duty Cycle: 1:2
Probe: ES3DV3 - SN3158ConvF(4.60, 4.60, 4.60)
Middle Toward Phantom GPRS 4TS 1900MHz/Area Scan (11x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.336 mW/g
Middle Toward Phantom GPRS 4TS 1900MHz/Zoom Scan (7x7x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.627 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.4740mW/g
SAR(1 g) = 0.307 mW/g; SAR(10 g) = 0.187 mW/g
Maximum value of SAR (measured) = 0.367 mW/g



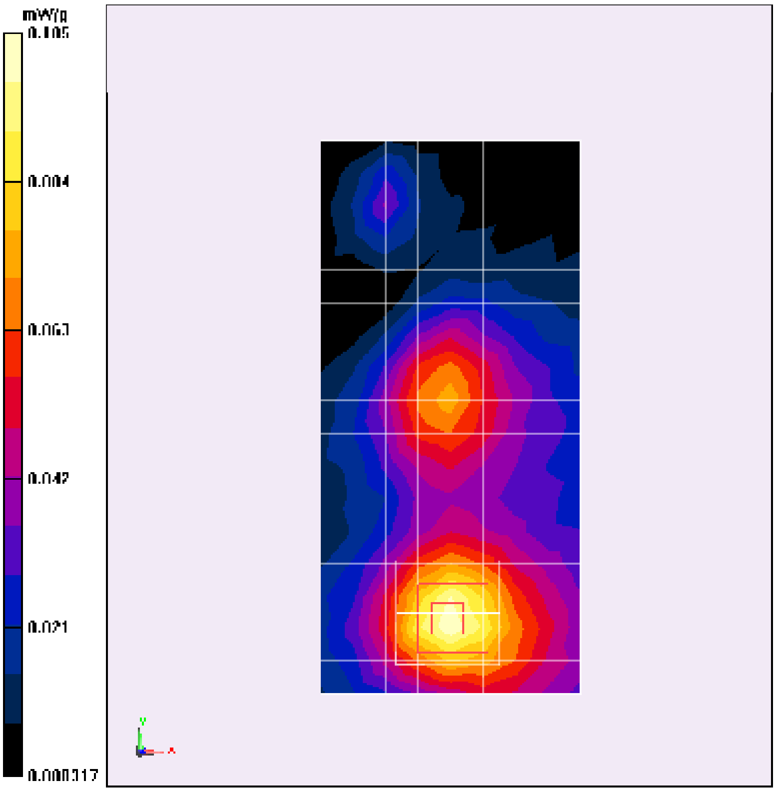
GSM1900 Body Left GPRS 4TS Middle

Date/Time: 05/29/2013
Electronics: DAE4 Sn797
Medium: Body 1900MHz
Medium parameters used: f = 1880 MHz; σ = 1.504 mho/m;εr = 53.319; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: GPRS 4TS 1900MHz; Frequency: 1880 MHz; Duty Cycle: 1:2
Probe: ES3DV3 - SN3158ConvF(4.60, 4.60, 4.60)
Middle Left GPRS 4TS 1900MHz/Area Scan (9x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.183 mW/g
Middle Left GPRS 4TS 1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.710 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.2900mW/g
SAR(1 g) = 0.175 mW/g; SAR(10 g) = 0.104 mW/g
Maximum value of SAR (measured) = 0.189 mW/g



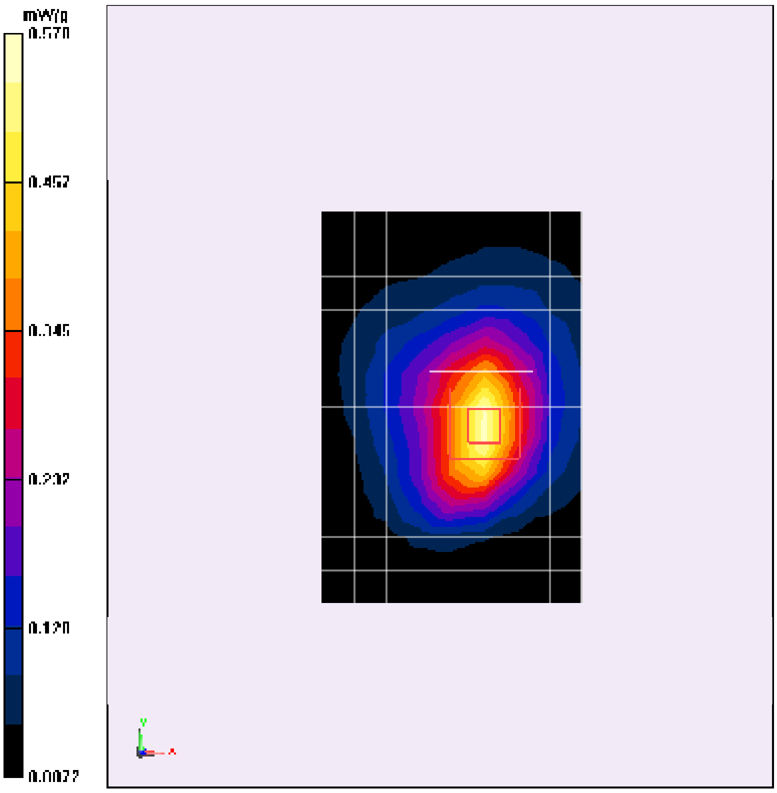
GSM1900 Body Right GPRS 4TS Middle

Date/Time: 05/29/2013
Electronics: DAE4 Sn797
Medium: Body 1900MHz
Medium parameters used: f = 1880 MHz; σ = 1.504 mho/m;εr = 53.319; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: GPRS 4TS 1900MHz; Frequency: 1880 MHz; Duty Cycle: 1:2
Probe: ES3DV3 - SN3158ConvF(4.60, 4.60, 4.60)
Middle Right GPRS 4TS 1900MHz/Area Scan (9x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.103 mW/g
Middle Right GPRS 4TS 1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.748 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.1580mW/g
SAR(1 g) = 0.097 mW/g; SAR(10 g) = 0.057 mW/g
Maximum value of SAR (measured) = 0.105 mW/g



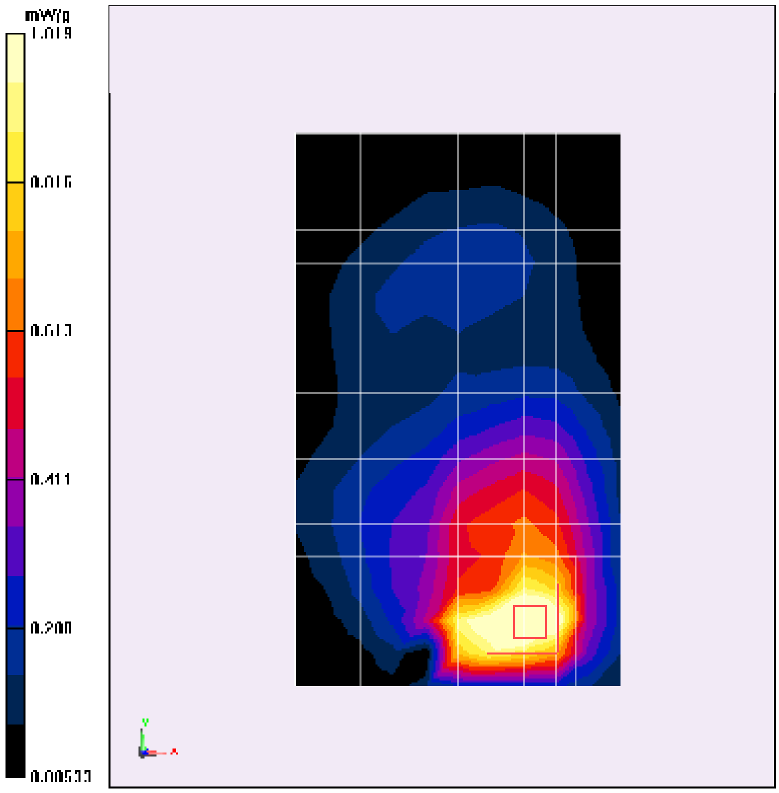
GSM1900 Body Bottom GPRS 4TS Middle

Date/Time: 05/29/2013
Electronics: DAE4 Sn797
Medium: Body 1900MHz
Medium parameters used: f = 1880 MHz; σ = 1.504 mho/m;εr = 53.319; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: GPRS 4TS 1900MHz; Frequency: 1880 MHz; Duty Cycle: 1:2
Probe: ES3DV3 - SN3158ConvF(4.60, 4.60, 4.60)
Middle Bottom GPRS 4TS 1900MHz/Area Scan (9x13x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.554 mW/g
Middle Bottom GPRS 4TS 1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.973 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 0.8350mW/g
SAR(1 g) = 0.507 mW/g; SAR(10 g) = 0.286 mW/g
Maximum value of SAR (measured) = 0.570 mW/g



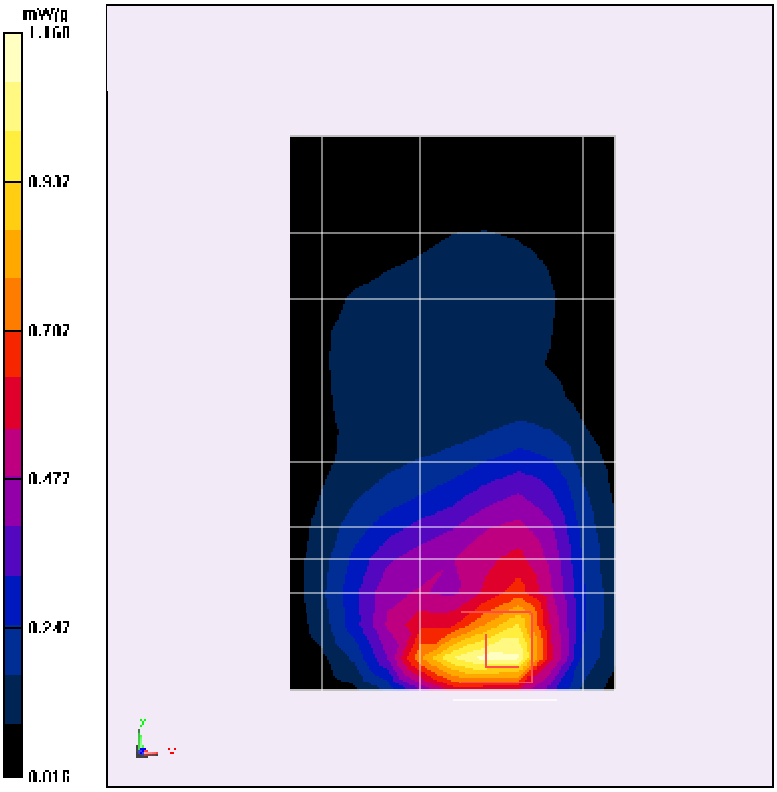
GSM1900 Body Toward Ground GPRS 4TS High

Date/Time: 05/29/2013
Electronics: DAE4 Sn797
Medium: Body 1900MHz
Medium parameters used: f = 1910 MHz; σ = 1.534 mho/m;εr = 53.187; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: GPRS 4TS 1900MHz; Frequency: 1909.8 MHz; Duty Cycle: 1:2
Probe: ES3DV3 - SN3158ConvF(4.60, 4.60, 4.60)
High Toward Ground GPRS 4TS 1900MHz/Area Scan (11x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.341 mW/g
High Toward Ground GPRS 4TS 1900MHz/Zoom Scan (7x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.055 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.8180mW/g
SAR(1 g) = 0.996 mW/g; SAR(10 g) = 0.535 mW/g
Maximum value of SAR (measured) = 1.019 mW/g



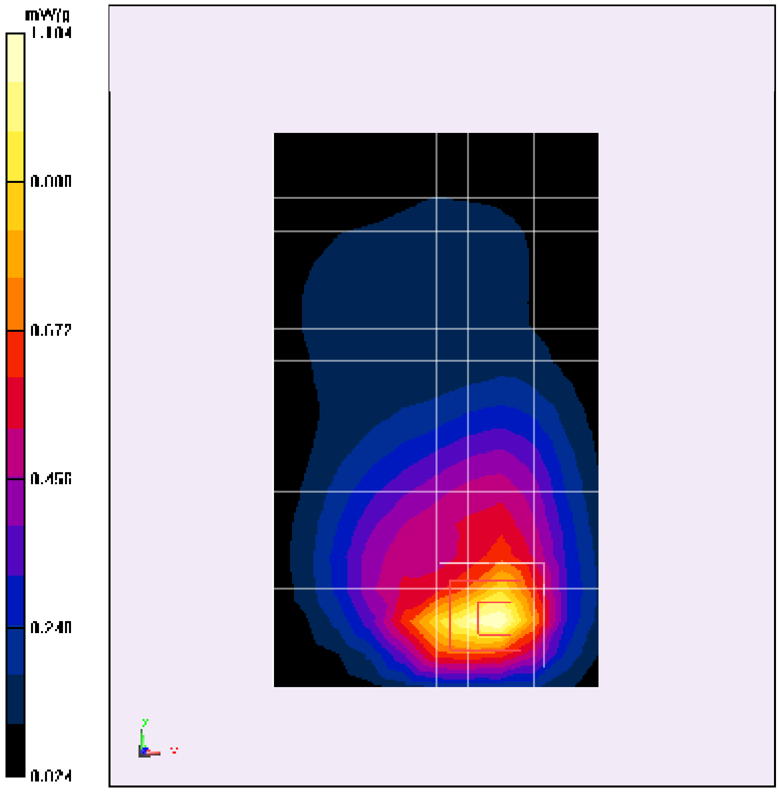
GSM1900 Body Toward Ground GPRS 4TS Low

Date/Time: 05/29/2013
Electronics: DAE4 Sn797
Medium: Body 1800MHz
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.483 mho/m;εr = 53.517; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: GPRS 4TS 1900MHz; Frequency: 1850.2 MHz; Duty Cycle: 1:2
Probe: ES3DV3 - SN3158ConvF(4.60, 4.60, 4.60)
Low Toward Ground GPRS 4TS 1900MHz/Area Scan (11x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.124 mW/g
Low Toward Ground GPRS 4TS 1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.867 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.8180mW/g
SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.580 mW/g
Maximum value of SAR (measured) = 1.168 mW/g



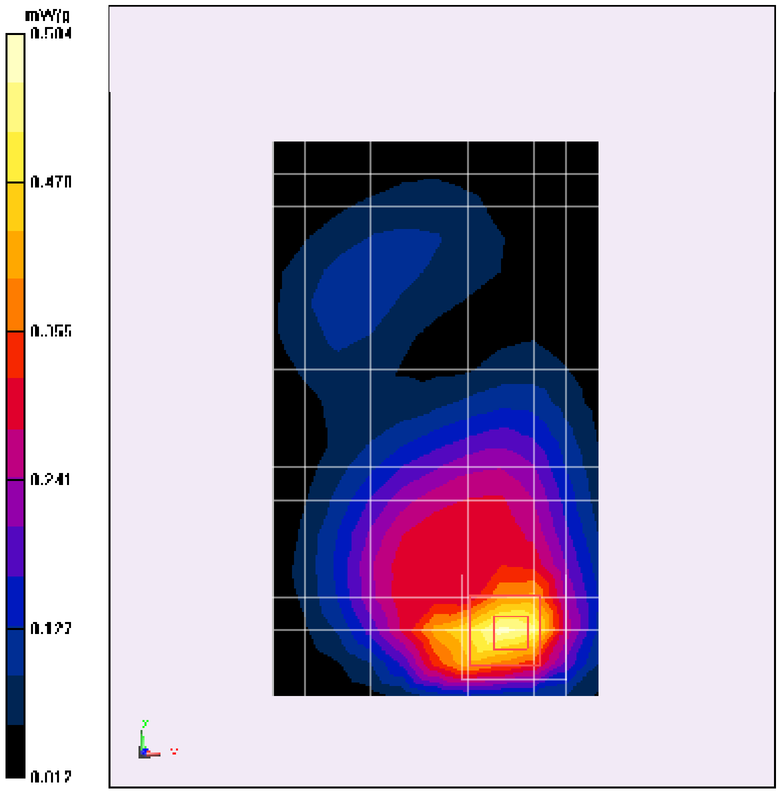
GSM1900 Body Toward Ground E-GPRS 4TS Low

Date/Time: 05/29/2013
Electronics: DAE4 Sn797
Medium: Body 1800MHz
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.483 mho/m;εr = 53.517; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: E-GPRS 4TS 1900MHz; Frequency: 1850.2 MHz; Duty Cycle: 1:2
Probe: ES3DV3 - SN3158ConvF(4.60, 4.60, 4.60)
Low Toward Ground E-GPRS 4TS 1900MHz/Area Scan (11x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.106 mW/g
Low Toward Ground E-GPRS 4TS 1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.138 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 1.7350mW/g
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.566 mW/g
Maximum value of SAR (measured) = 1.104 mW/g



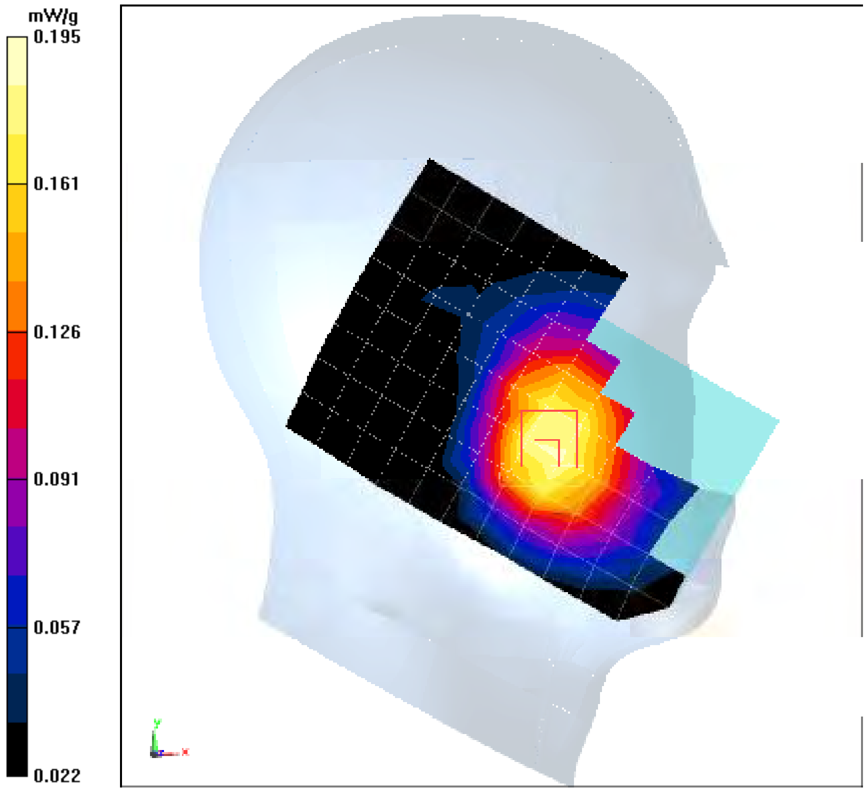
GSM1900 Body Toward Ground Low With Headset

Date/Time: 05/29/2013
Electronics: DAE4 Sn797
Medium: Body 1800MHz
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.483 mho/m;εr = 53.517; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
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 With Headset/Area Scan (11x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.565 mW/g
Low Toward Ground GSM1900MHz With Headset/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.003 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.8900mW/g
SAR(1 g) = 0.529 mW/g; SAR(10 g) = 0.301 mW/g
Maximum value of SAR (measured) = 0.584 mW/g



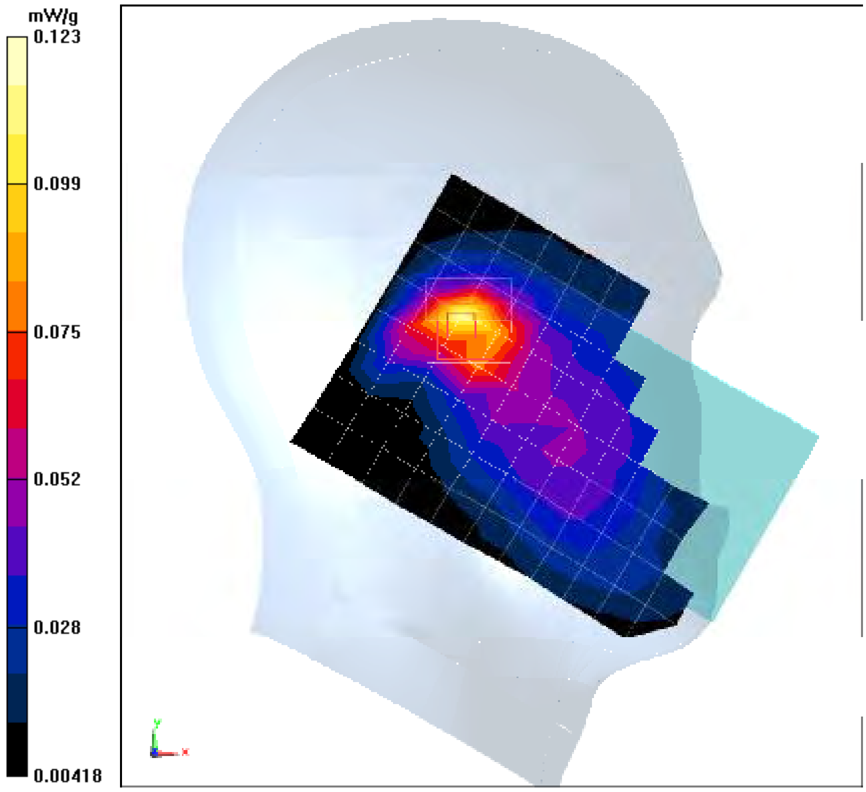
WCDMA850 Left Cheek Middle

Date/Time: 06/17/2013
Electronics: DAE4 Sn797
Medium: Head 850MHz
Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.926 mho/m;εr = 40.6; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: WCDMA Band V; Frequency: 836.4 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3158ConvF (6.02, 6.02, 6.02)
Middle Cheek Left WCDMA850MHz/Area Scan (14x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.187 mW/g
Middle Cheek Left WCDMA850MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.843 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.2450mW/g
SAR(1 g) = 0.187 mW/g; SAR(10 g) = 0.142 mW/g
Maximum value of SAR (measured) = 0.195 mW/g



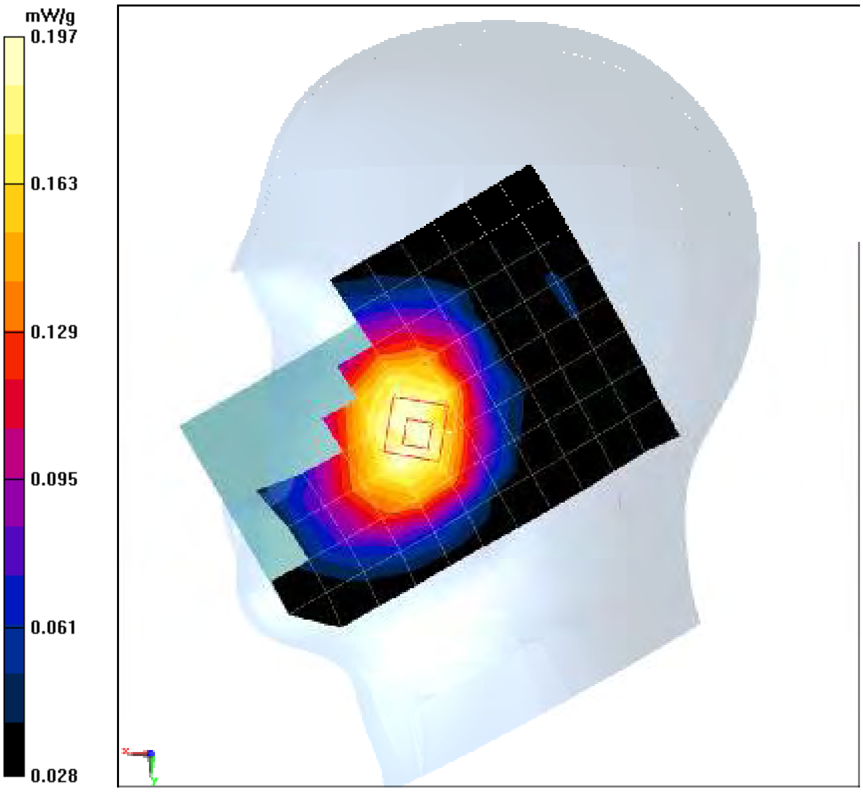
WCDMA850 Left Tilt Middle

Date/Time: 06/17/2013
Electronics: DAE4 Sn797
Medium: Head 850MHz
Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.926 mho/m; εr = 40.6; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: WCDMA Band V; Frequency: 836.4 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3158ConvF (6.02, 6.02, 6.02)
Middle Tilt Left WCDMA850MHz/Area Scan (14x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.117 mW/g
Middle Tilt Left WCDMA850MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.132 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.2120mW/g
SAR(1 g) = 0.114 mW/g; SAR(10 g) = 0.066 mW/g
Maximum value of SAR (measured) = 0.123 mW/g



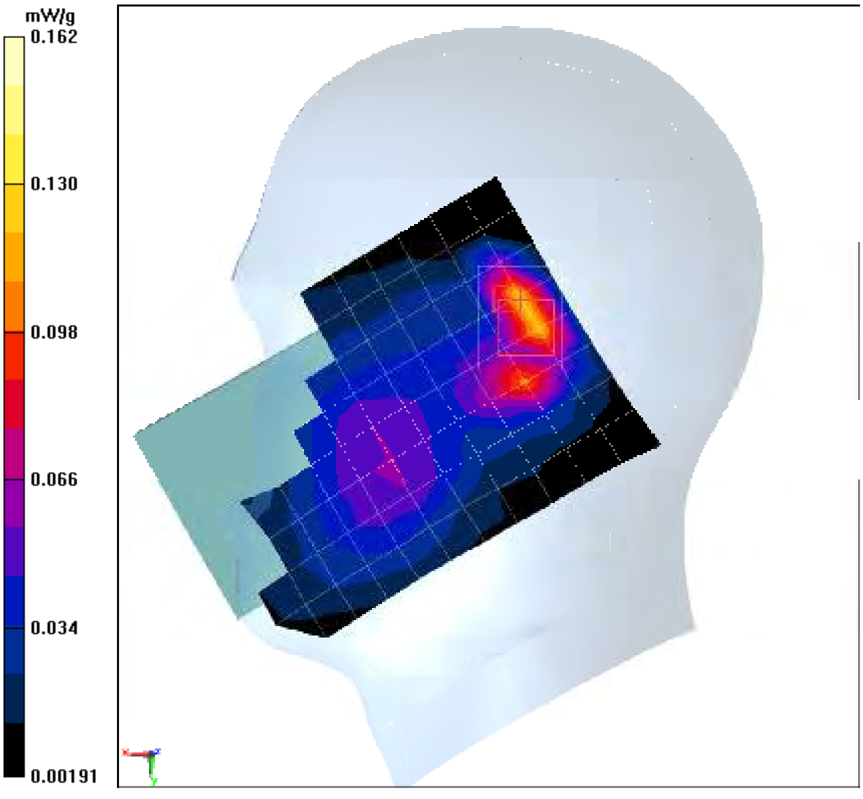
WCDMA850 Right Cheek Middle

Date/Time: 06/17/2013
Electronics: DAE4 Sn797
Medium: Head 850MHz
Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.926 mho/m;εr = 40.6; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: WCDMA Band V; Frequency: 836.4 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3158ConvF (6.02, 6.02, 6.02)
Middle Cheek Right WCDMA850MHz Head/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.202 mW/g
Middle Cheek Right WCDMA850MHz Head/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.700 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.2270mW/g
SAR(1 g) = 0.183 mW/g; SAR(10 g) = 0.141 mW/g
Maximum value of SAR (measured) = 0.197 mW/g



WCDMA850 Right Tilt Middle

Date/Time: 06/17/2013
Electronics: DAE4 Sn797
Medium: Head 850MHz
Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.926 mho/m; εr = 40.6; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: WCDMA Band V; Frequency: 836.4 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3158ConvF (6.02, 6.02, 6.02)
Middle Tilt Right WCDMA850MHz Head/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.123 mW/g
Middle Tilt Right WCDMA850MHz Head/Zoom Scan (7x7x7) (5x6x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.428 V/m; Power Drift = -0.0061 dB
Peak SAR (extrapolated) = 0.3510mW/g
SAR(1 g) = 0.115 mW/g; SAR(10 g) = 0.054 mW/g
Maximum value of SAR (measured) = 0.162 mW/g



WCDMA850 Left Cheek High

Date/Time: 06/17/2013
Electronics: DAE4 Sn797
Medium: Head 850MHz
Medium parameters used: f = 846.6 MHz; σ = 0.936 mho/m;εr = 40.391; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: WCDMA Band V; Frequency: 846.6 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3158ConvF (6.02, 6.02, 6.02)
High Cheek Left WCDMA850MHz/Area Scan (14x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.244 mW/g
High Cheek Left WCDMA850MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.851 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.3090mW/g
SAR(1 g) = 0.238 mW/g; SAR(10 g) = 0.180 mW/g
Maximum value of SAR (measured) = 0.248 mW/g