



Specific Absorption Rate (SAR) Test Report
for
Hewlett-Packard Company
on the
iPAQ Data Messenger

Report Number : FA850821A
Trade Name : HP
Model Name : HSTNH-C19C
FCC ID : B94HHC19C
Date of Testing : Aug. 30, 2008 ~ Sep. 15, 2008
Date of Report : Oct. 07, 2008
Date of Review : Oct. 07, 2008

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- Report Version: Rev. 03

SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



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1. Statement of Compliance

The Specific Absorption Rate (SAR) maximum results found during testing for the **Hewlett-Packard Company iPAQ Data Messenger HP HSTNH-C19C** are as follows (with expanded uncertainty 21.9%):

Position \ SAR	GSM850 (W/kg)	GSM1900 (W/Kg)	WCDMA Band II (W/Kg)
Head	0.449	0.404	1.04
Body	1.26	0.575	0.714

They are in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1999 and had been tested in accordance with the measurement methods and procedures specified in IEEE P1528-2003, and OET Bulletin 65 Supplement C (Edition 01-01).

Approved by

Roy Wu
Manager



2. Administration Data

2.1 Testing Laboratory

Company Name : SPORTON INTERNATIONAL INC.
Address : No.52, Hwa-Ya 1st RD., Hwa Ya Technology Park, Kwei-Shan Hsiang,
TaoYuan Hsien, Taiwan, R.O.C.
Test Site : SAR01-HY
Telephone Number : 886-3-327-3456
Fax Number : 886-3-328-4978

2.2 Applicant

Company Name : Hewlett-Packard Company
Address : 10955 Tantau Ave., Cupertino, CA 95014-0770, USA

2.3 Manufacturer

Company Name : COMPAL COMMUNICATIONS, INC.
Address : No. 385, YangGuang Street, Neihu, Taipei, Taiwan

2.4 Application Details

Date of reception of application: May 08, 2008
Start of test : Aug. 30, 2008
End of test : Sep. 15, 2008



3. General Information

3.1 Description of Device Under Test (DUT)

Product Feature & Specification	
DUT Type :	iPAQ Data Messenger
Trade Name :	HP
Model Name :	HSTNH-C19C
FCC ID :	B94HHC19C
Tx Frequency :	GSM850 : 824 MHz ~ 849 MHz GSM1900 : 1850 MHz ~ 1910 MHz WCDMA Band II : 1850 MHz ~ 1910 MHz
Rx Frequency :	GSM850 : 869 MHz ~ 894 MHz GSM1900 : 1930 MHz ~ 1990 MHz WCDMA Band II : 1930 MHz ~ 1990 MHz
Maximum Output Power to Antenna :	GSM850 : 32.54 dBm GSM1900 : 29.73 dBm WCDMA Band II : 23.77 dBm
Antenna Type :	Fixed Internal Antenna
HW Version :	DVT1-4
SW Version :	DB672
Type of Modulation :	GSM / GPRS : GMSK EDGE : 8PSK WCDMA : QPSK HSDPA : QPSK / 16QAM HSUPA : BPSK
DUT Stage :	Identical Prototype

3.2 Basic Description of Accessories

AC Adapter 1	Brand Name	HP
	Model Name	PSAA05A-050 PSAA05K-050 PSAA05E-050
	Power Rating	I/P: 100-240Vac, 50-60Hz, 200mA, O/P: 5Vdc, 1A
	AC Power Cord Type	1.93 meter shielded cable without ferrite core
AC Adapter 2	Brand Name	HP
	Model Name	PSB05R-050Q
	Power Rating	I/P: 100-240Vac, 50-60Hz, 200mA, 12-17vA; O/P: 5Vdc, 1A
Battery 1	Brand Name	HP
	Model Name	HSTNH-W19B-S
	Part Number	490165-001
	Power Rating	3.7Vdc, 1140mAh
	Type	Li-ion
Battery 2	Brand Name	HP
	Model Name	HSTNH-W19B-H
	Part Number	504054-001
	Power Rating	3.7Vdc, 2280mAh
	Type	Li-ion
Earphone	Brand Name	HP
	Part Number	486112-001
	Signal Line Type	1.53 meter non-shielded cable without ferrite core
USB Cable 1	Brand Name	HP
	Part Number	486113-001
	Signal Line Type	1.1 meter shielded cable without ferrite core
USB Cable 2	Brand Name	HP
	Part Number	486113-001
	Signal Line Type	1.52 meter shielded cable without ferrite core
LCD Panel	Brand Name	EPSON
	Model Name	L5F30815TXX

Remark:

1. PSAA05A-050, PSAA05K-050, and PSAA05E-050 are almost the same; the differences among them are plugs and appearances.
2. Above EUT's information was declared by manufacturer. Please refer to the specifications of manufacturer or User's Manual for more detailed features description.

3.3 Product Photos

Refer to Appendix D.



3.4 Applied Standards

47 CFR Part 2 (2.1093),
IEEE C95.1-1999,
IEEE C95.3-2002,
IEEE P1528-2003, and
OET Bulletin 65 Supplement C (Edition 01-01)
Preliminary Guidance for Reviewing Applications for Certification of 3G Device. May 2006.
SAR Measurement Procedures for 3G Devices. June 2006.
KDB 648474 D01 v01r03 SAR Handsets Multi Xmitter and Ant
KDB 941225 D01 v02 SAR test for 3G devices

3.5 Device Category and SAR Limits

This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. Limit for General Population/Uncontrolled exposure should be applied for this device, it is 1.6 W/kg as averaged over any 1 gram of tissue.

3.6 Test Conditions

3.6.1 Ambient Condition

Table with 6 columns: Test Item, HSL_850, HSL_850, HSL_850, MSL_850, MSL_850. Rows include Test Date, Tissue simulating liquid temperature (°C), Ambient Temperature (°C), and Humidity (%).

Table with 8 columns: Test Item, HSL_1900, HSL_1900, HSL_1900, MSL_1900, MSL_1900, MSL_1900, MSL_1900. Rows include Test Date, Tissue simulating liquid temperature (°C), Ambient Temperature (°C), and Humidity (%).

3.6.2 Test Configuration

The DUT was set from the emulator to radiate maximum output power during all tests.

The device was controlled by using a base station emulator R&S CMU200. Communication between the device and the emulator was established by air link. The distance between the DUT and the antenna of the emulator is larger than 50 cm and the output power radiated from the emulator antenna is at least 30 dB smaller than the output power of DUT.

For SAR testing, EUT is in GSM or GPRS/EDGE or WCDMA/HSDPA/HSUPA link mode. In GSM link mode, its crest factor is 8.3. In GPRS/EDGE link mode, its crest factor is 4, because EUT is GPRS/EDGE class 10 device. In WCDMA/HSDPA/HSUPA link mode, its crest factor is 1.

Measurements were performed on the lowest, middle, and highest channel for each testing position. However, measurements were performed only on the middle channel if the SAR is below 3 dB of limit.

FCC revised KDB 648474 on June 23, 2008. According KDB 648474, the simultaneous transmission SAR (volume scan) was not required, because the summation of SAR is 1.32W/kg less than 1.6W/kg. The FCC rule please refer to figure 3.1.

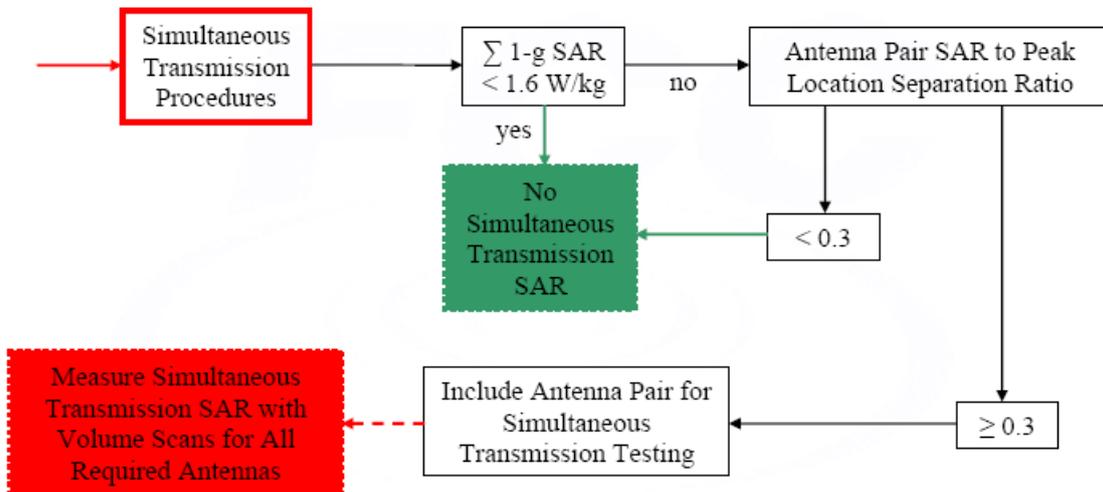


Fig. 3.1 KDB 648474 Simultaneous Transmission SAR Procedures for a Cell Phone

4. Specific Absorption Rate (SAR)

4.1 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.

4.2 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:

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

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

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

$$\text{SAR} = C \frac{\delta T}{\delta t}$$

, where C is the specific heat capacity, δT is the temperature rise and δt the exposure duration,

or related to the electrical field in the tissue by

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

, where σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the rms electrical field strength.

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

5. SAR Measurement Setup

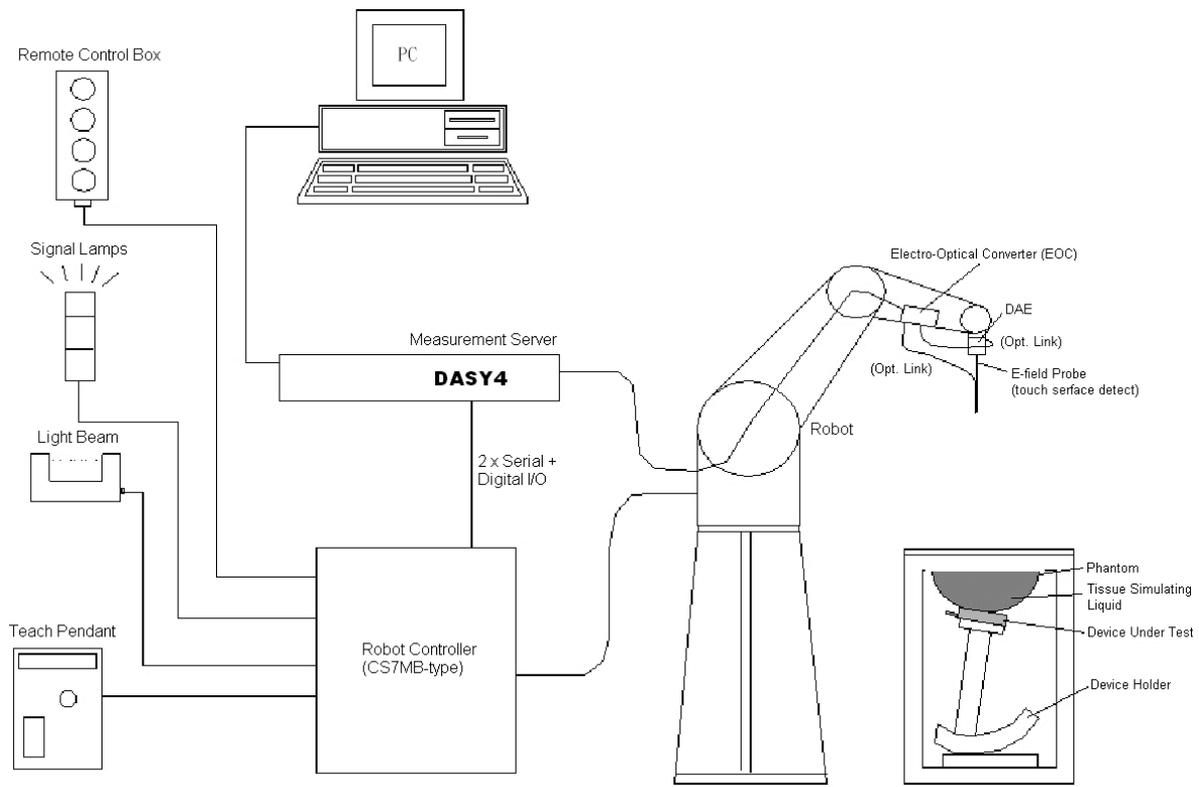


Fig. 5.1 DASY System

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

- A standard high precision 6-axis robot with controller, a teach pendant and software
- A data acquisition electronic (DAE) attached to the robot arm extension
- A dosimetric probe equipped with an optical surface detector system
- The electro-optical converter (ECO) performs the conversion between optical and electrical signals
- A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the accuracy of the probe positioning
- A computer operating Windows XP
- DASY4 software
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom
- A device holder
- Tissue simulating liquid
- Dipole for evaluating the proper functioning of the system

Some of the components are described in details in the following sub-sections.

5.1 DASY E-Field Probe System

The SAR measurement is conducted with the dosimetric probe ET3DV6 (manufactured by SPEAG). The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

5.1.1 ET3DV6 E-Field Probe Specification

<ET3DV6>

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents)
Frequency	10 MHz to 3 GHz
Directivity	± 0.2 dB in brain tissue (rotation around probe axis) ± 0.4 dB in brain tissue (rotation perpendicular to probe axis)
Dynamic Range	5 μ W/g to 100mW/g; Linearity: ±0.2dB
Surface Detection	± 0.2 mm repeatability in air and clear liquids on reflecting surface
Dimensions	Overall length: 330mm Tip length: 16mm Body diameter: 12mm Tip diameter: 6.8mm Distance from probe tip to dipole centers: 2.7mm
Application	General dosimetry up to 3GHz Compliance tests for mobile phones and Wireless LAN Fast automatic scanning in arbitrary phantoms



Fig. 5.2 Probe Setup on Robot

5.1.2 ET3DV6 E-Field Probe Calibration

Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than $\pm 10\%$. The spherical isotropy shall be evaluated and within $\pm 0.25\text{dB}$. The sensitivity parameters (NormX, NormY, and NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested. The calibration data are as below:

➤ **ET3DV6 sn1787**

Sensitivity	X axis : 1.63 μV		Y axis : 1.67 μV		Z axis : 2.18 μV	
Diode compression point	X axis : 90 mV		Y axis : 93 mV		Z axis : 92 mV	
Conversion factor (Head / Body)	Frequency (MHz)	X axis	Y axis	Z axis		
	800~1000	6.06 / 5.91	6.06 / 5.91	6.06 / 5.91		
	1850~2050	5.01 / 4.49	5.01 / 4.49	5.01 / 4.49		
Boundary effect (Head / Body)	Frequency (MHz)	Alpha	Depth			
	800~1000	0.30 / 0.31	2.80 / 2.98			
	1850~2050	0.59 / 0.68	1.96 / 1.95			

➤ **ET3DV6 sn1788**

Sensitivity	X axis : 1.72 μV		Y axis : 1.66 μV		Z axis : 1.70 μV	
Diode compression point	X axis : 91 mV		Y axis : 93 mV		Z axis : 94 mV	
Conversion factor (Head / Body)	Frequency (MHz)	X axis	Y axis	Z axis		
	800~1000	6.54 / 6.37	6.54 / 6.37	6.54 / 6.37		
	1710~1910	5.28 / 4.75	5.28 / 4.75	5.28 / 4.75		
Boundary effect (Head / Body)	Frequency (MHz)	Alpha	Depth			
	800~1000	0.22 / 0.28	3.28 / 2.94			
	1710~1910	0.59 / 0.63	2.15 / 2.39			

NOTE: The probe parameters have been calibrated by the SPEAG.

5.2 DATA Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists 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 and 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 200M Ohm; the inputs are symmetrical and floating. Common mode rejection is above 80dB.

5.3 Robot

The DASY system uses the high precision robots RX90BL type out of the newer series from Stäubli SA (France). For the 6-axis controller DASY system, the CS7MB robot controller version from Stäubli is used. The RX robot series have many features that are important for our application:

- High precision (repeatability 0.02 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)
- 6-axis controller

5.4 Measurement Server

The DASY measurement server is based on a PC/104 CPU board with
166 MHz CPU
32 MB chipset and
64 MB RAM.

Communication with
the DAE4 electronic box
the 16-bit AD-converter system for optical detection and digital I/O interface.

The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.

5.5 SAM Twin Phantom

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

- Left head
- Right head
- Flat phantom

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

The phantom can be used with the following tissue simulating liquids:

- *Water-sugar based liquid
- *Glycol based liquids

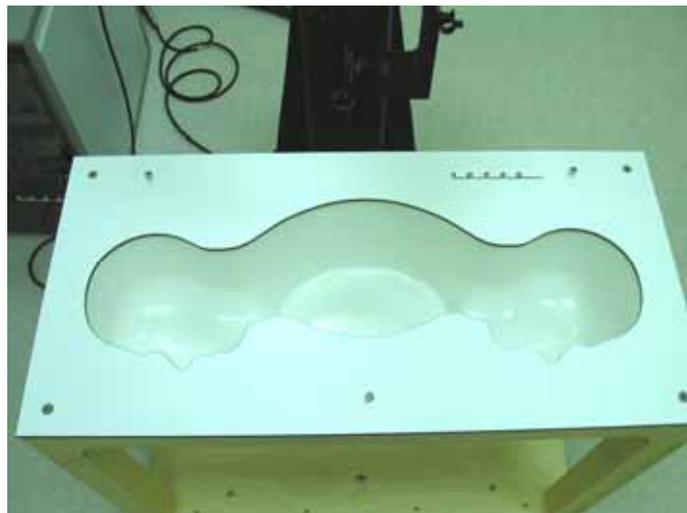


Fig. 5.3 Top View of Twin Phantom



Fig. 5.4 Bottom View of Twin Phantom

5.6 Device Holder for SAM Twin 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 in 5 mm distance, a positioning uncertainty of $\pm 0.5\text{mm}$ would produce a SAR uncertainty of $\pm 20\%$. An accurate device position is therefore crucial for accurate and repeatable measurement. The position in which the devices must be measured, are defined by the standards.

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

Thus the device needs no repositioning when changing the angles.

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



Fig. 5.5 Device Holder



5.7 Data Storage and Evaluation

5.7.1 Data Storage

The DASY software stores the assessed data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all the necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files. The post-processing software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of erroneous parameter settings. For example, if a measurement has been performed with an incorrect crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be reevaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type (e.g., [V/m], [A/m], [mW/g]). Some of these units are not available in certain situations or give meaningless results, e.g., a SAR-output in a non-loss media, will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

5.7.2 Data Evaluation

The DASY post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software :

- Probe parameters :**
 - Sensitivity Norm_i, a_{i0}, a_{i1}, a_{i2}
 - Conversion factor ConvF_i
 - Diode compression point dcp_i
- Device parameters :**
 - Frequency f
 - Crest factor cf
- Media parameters :**
 - Conductivity
 - Density

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY4 components. In the direct measuring mode of the multi-meter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power.

The formula for each channel can be given as :

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

with V_i = compensated signal of channel i ($i = x, y, z$)
 U_i = input signal of channel i ($i = x, y, z$)
 cf = crest factor of exciting field (DASY parameter)
 dcp_i = diode compression point (DASY parameter)

From the compensated input signals, the primary field data for each channel can be evaluated :

E-field probes : $E_i = \sqrt{\frac{V_i}{Norm_i ConvF}}$

H-field probes : $H_i = \sqrt{V_i} \frac{a_{i0} + a_{i1}f + a_{i2}f^2}{f}$

with V_i = compensated signal of channel i ($i = x, y, z$)
 $Norm_i$ = sensor sensitivity of channel i ($i = x, y, z$)
 $\mu V/(V/m)^2$ for E-field Probes
 $ConvF$ = sensitivity enhancement in solution
 a_{ij} = sensor sensitivity factors for H-field probes
 f = carrier frequency [GHz]
 E_i = electric field strength of channel i in V/m
 H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude) :

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The primary field data are used to calculate the derived field units.

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1000}$$

with SAR = local specific absorption rate in mW/g
 E_{tot} = total field strength in V/m
 σ = conductivity in [mho/m] or [Siemens/m]
 ρ = equivalent tissue density in g/cm³

* Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid.

The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = \frac{E_{tot}^2}{3770} \quad \text{or} \quad P_{pwe} = H_{tot}^2 \cdot 37.7$$

with P_{pwe} = equivalent power density of a plane wave in mW/cm²
 E_{tot} = total electric field strength in V/m
 H_{tot} = total magnetic field strength in A/m



5.8 Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	Dosimetric E-Filed Probe	ET3DV6	1787	Aug. 26, 2008	Aug. 25, 2009
SPEAG	Dosimetric E-Filed Probe	ET3DV6	1788	Sep. 26, 2007	Sep. 25, 2008
SPEAG	835MHz System Validation Kit	D835V2	499	Mar. 17, 2008	Mar. 16, 2010
SPEAG	1900MHz System Validation Kit	D1900V2	5d041	Mar. 28, 2008	Mar. 27, 2010
SPEAG	Data Acquisition Electronics	DAE4	778	Sep. 17, 2007	Sep. 16, 2008
SPEAG	Data Acquisition Electronics	DAE3	393	Aug. 25, 2008	Aug. 24, 2009
SPEAG	Device Holder	N/A	N/A	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1303	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1446	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1383	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 001 BB	1029	NCR	NCR
Agilent	PNA Series Network Analyzer	E8358A	US40260131	Apr. 02, 2008	Apr. 01, 2009
Agilent	Wireless Communication Test Set	E5515C	GB46311322	Dec. 22, 2006	Dec. 21, 2008
R&S	Universal Radio Communication Tester	CMU200	103937	Oct. 19, 2007	Oct. 18, 2008
Agilent	Dielectric Probe Kit	85070D	US01440205	NCR	NCR
Agilent	Dual Directional Coupler	778D	50422	NCR	NCR
AR	Power Amplifier	5S1G4M2	0328767	NCR	NCR
R&S	Power Meter	NRVD	101394	Oct. 31, 2007	Oct. 30, 2008
R&S	Power Sensor	NRV-Z1	100130	Oct. 31, 2007	Oct. 30, 2008

Table 5.1 Test Equipment List

6. Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous tissue simulating liquid. The liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is (head SAR) or from the flat phantom to the liquid top surface (body SAR) is 15.2cm.

The following ingredients for tissue simulating liquid are used:

- **Water:** deionized water (pure H₂O), resistivity $\geq 16\text{M}\Omega$ - as basis for the liquid
- **Sugar:** refined sugar in crystals, as available in food shops – to reduce relative permittivity
- **Salt:** pure NaCl – to increase conductivity
- **Cellulose:** Hydroxyethyl-cellulose, medium viscosity (75-125 mPa.s, 2% in water, 20°C), CAS#54290-to increase viscosity and to keep sugar in solution.
- **Preservative:** Preventol D-7 Bayer AG, D-51368 Leverkusen, CAS#55965-84-9- to prevent the spread of bacteria and molds.
- **DGMBE:** Deithlenglycol-monobuthyl ether (DGMBE), Fluka Chemie GmbH, CAS#112-34-5 – to reduce relative permittivity.

Table 6.1 gives the recipes for one liter of head and body tissue simulating liquid for frequency band 850MHZ and 1900 MHz.

Ingredient	HSL-850	MSL-850	HSL-1900	MSL-1900
Water	532.98 g	631.68 g	552.42 g	716.56 g
Cellulose	0 g	0 g	0 g	0 g
Salt	18.3 g	11.72 g	3.06 g	4.0 g
Preventol D-7	2.4 g	1.2 g	0 g	0 g
Sugar	766.0 g	600.0 g	0 g	0 g
DGMBE	0 g	0 g	444.52 g	300.67 g
Total amount	1 liter (1.3 kg)	1 liter (1.3 kg)	1 liter (1.0 kg)	1 liter (1.0 kg)
Dielectric Parameters at 22°	f = 835 MHz $\epsilon_r = 41.5 \pm 5\%$, $\sigma = 0.90 \pm 5\%$ S/m	f = 835 MHz $\epsilon_r = 55.2 \pm 5\%$, $\sigma = 0.97 \pm 5\%$ S/m	f = 1900 MHz $\epsilon_r = 40.0 \pm 5\%$, $\sigma = 1.4 \pm 5\%$ S/m	f = 1900 MHz $\epsilon_r = 53.3 \pm 5\%$, $\sigma = 1.52 \pm 5\%$ S/m

Table 6.1 Recipes for Tissue Simulating Liquid

The dielectric parameters of the liquids were verified prior to the SAR evaluation using an Agilent 85070D Dielectric Probe Kit and an Agilent Network Analyzer.

Table 6.2 shows the measuring results for head and muscle simulating liquid.

Band	Position	Frequency (MHz)	Conductivity (σ)	Permittivity (ϵ_r)	Measurement Date
GSM850	Head	824.2	0.887	40.5	Aug. 30, 2008
		836.4	0.901	40.6	
		848.8	0.909	40.6	
	Head	824.2	0.887	40.5	Sep. 05, 2008
		836.4	0.900	40.6	
		848.8	0.909	40.6	
	Head	824.2	0.896	40.6	Sep. 15, 2008
		836.4	0.907	40.5	
		848.8	0.916	40.3	
	Body	824.2	0.967	56.3	Sep. 04, 2008
		836.4	0.978	56.3	
		848.8	0.988	56.1	
Body	824.2	0.955	56.3	Sep. 15, 2008	
	836.4	0.967	56.3		
	848.8	0.976	56.1		
GSM1900	Head	1850.2	1.35	41.9	Aug. 30, 2008
		1880.0	1.39	41.8	
		1909.8	1.44	42.0	
	Body	1852.4	1.47	51.6	Aug. 31, 2008
		1880.0	1.50	51.5	
WCDMA Band II	Head	1852.4	1.35	41.9	Aug. 30, 2008
		1880.0	1.39	41.8	
		1907.6	1.43	42.0	
	Head	1852.4	1.35	41.9	Sep. 04, 2008
		1880.0	1.39	41.8	
		1907.6	1.43	42.0	
	Head	1852.4	1.35	41.8	Sep. 15, 2008
		1880.0	1.39	41.8	
		1907.6	1.43	41.9	
	Body	1852.4	1.47	51.4	Sep. 05, 2008
		1880.0	1.50	51.3	
		1907.6	1.53	51.2	
	Body	1852.4	1.46	53.0	Sep. 15, 2008
		1880.0	1.48	52.9	
		1907.6	1.54	52.2	

Table 6.2 Measuring Results for Simulating Liquid

The measuring data are consistent with $\epsilon_r = 41.5 \pm 5\%$ and $\sigma = 0.9 \pm 5\%$ for head GSM850, $\epsilon_r = 55.2 \pm 5\%$ and $\sigma = 0.97 \pm 5\%$ for body GSM850, $\epsilon_r = 40.0 \pm 5\%$ and $\sigma = 1.4 \pm 5\%$ for head GSM1900 and WCDMA Band II, and $\epsilon_r = 53.3 \pm 5\%$ and $\sigma = 1.52 \pm 5\%$ for body GSM1900 and WCDMA Band II.

7. Uncertainty Assessment

The component of uncertainty may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainty by the statistical analysis of a series of observations is termed a Type A evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience and knowledge of the behavior and properties of relevant materials and instruments, manufacture’s specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in Table 7.1

Uncertainty Distributions	Normal	Rectangular	Triangular	U-shape
Multiplying factor^(a)	1/k ^(b)	1/ 3	1/ 6	1/ 2

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b) is the coverage factor

Table 7.1 Multiplying Factions for Various Distributions

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual “root-sum-squares” (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is showed in Table 7.2.



Error Description	Uncertainty Value ± %	Probability Distribution	Divisor	Ci (1g)	Standard Unc. (1g)	vi or Veff
Measurement Equipment						
Probe Calibration	±5.9 %	Normal	1	1	±5.9 %	∞
Axial Isotropy	±4.7 %	Rectangular	√3	0.7	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	Rectangular	√3	0.7	±3.9 %	∞
Boundary Effects	±1.0 %	Rectangular	√3	1	±0.6 %	∞
Linearity	±4.7 %	Rectangular	√3	1	±2.7 %	∞
System Detection Limits	±1.0 %	Rectangular	√3	1	±0.6 %	∞
Readout Electronics	±0.3 %	Normal	1	1	±0.3 %	∞
Response Time	±0.8 %	Rectangular	√3	1	±0.5 %	∞
Integration Time	±2.6 %	Rectangular	√3	1	±1.5 %	∞
RF Ambient Noise	±3.0 %	Rectangular	√3	1	±1.7 %	∞
RF Ambient Reflections	±3.0 %	Rectangular	√3	1	±1.7 %	∞
Probe Positioner	±0.4 %	Rectangular	√3	1	±0.2 %	∞
Probe Positioning	±2.9 %	Rectangular	√3	1	±1.7 %	∞
Max. SAR Eval.	±1.0 %	Rectangular	√3	1	±0.6 %	∞
Test Sample Related						
Device Positioning	±2.9 %	Normal	1	1	±2.9	145
Device Holder	±3.6 %	Normal	1	1	±3.6	5
Power Drift	±5.0 %	Rectangular	√3	1	±2.9	∞
Phantom and Setup						
Phantom Uncertainty	±4.0 %	Rectangular	√3	1	±2.3	∞
Liquid Conductivity (target)	±5.0 %	Rectangular	√3	0.64	±1.8	∞
Liquid Conductivity (meas.)	±2.5 %	Normal	1	0.64	±1.6	∞
Liquid Permittivity (target)	±5.0 %	Rectangular	√3	0.6	±1.7	∞
Liquid Permittivity (meas.)	±2.5 %	Normal	1	0.6	±1.5	∞
Combined Standard Uncertainty					±10.9	387
Coverage Factor for 95 %		K=2				
Expanded uncertainty (Coverage factor = 2)					±21.9	

Table 7.2 Uncertainty Budget of DASYS

8. SAR Measurement Evaluation

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 performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

8.1 Purpose of System Performance check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

8.2 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 which comes from a signal generator at frequency 835 MHz and 1900 MHz. 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:

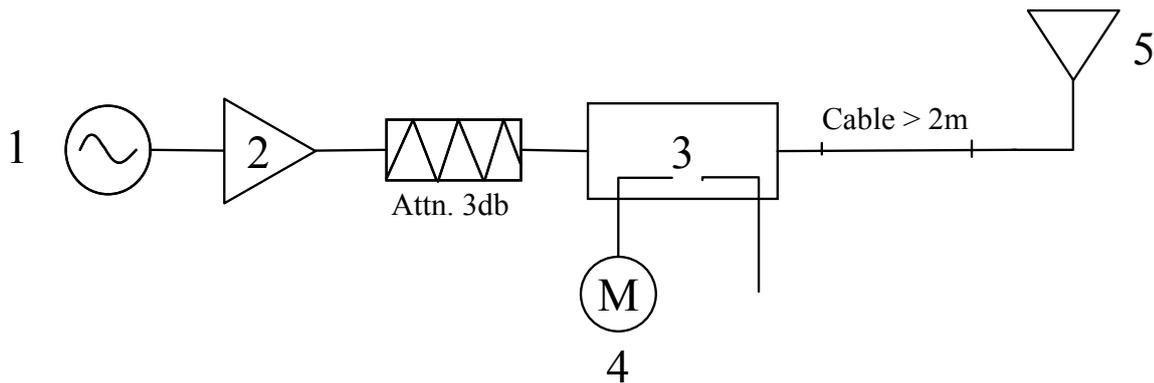


Fig. 8.1 System Setup for System Evaluation

1. Signal Generator
2. Amplifier
3. Directional Coupler
4. Power Meter
5. 835 MHz or 1900 MHz Dipole

The output power on dipole port must be calibrated to 20dBm (100mW) before dipole is connected.



Fig 8.2 Dipole Setup

8.3 Validation Results

Comparing to the original SAR value provided by SPEAG, the validation data should be within its specification of 10 %. Table 8.1 shows the target SAR and measured SAR after normalized to 1W input power.

Frequency	Position	SAR	Target (W/kg)	Measurement data (W/kg)	Variation	Measurement Date
835MHz	Head	SAR (1g)	9.16	9.24	0.9 %	Aug. 30, 2008
		SAR (10g)	6.0	6.02	0.3 %	
	Head	SAR (1g)	9.16	9.64	5.2 %	Sep. 05, 2008
		SAR (10g)	6.0	6.32	5.3 %	
	Head	SAR (1g)	9.16	9.29	1.4 %	Sep. 15, 2008
		SAR (10g)	6.0	6.1	1.7 %	
	Body	SAR (1g)	9.52	10.2	7.1 %	Sep. 04, 2008
		SAR (10g)	6.37	6.76	6.1 %	
	Body	SAR (1g)	9.52	10.1	6.1 %	Sep. 15, 2008
		SAR (10g)	6.37	6.64	4.2 %	
1900MHz	Head	SAR (1g)	39.5	39.3	-0.5 %	Aug. 30, 2008
		SAR (10g)	20.6	20.6	0.0 %	
	Head	SAR (1g)	39.5	39.6	0.3 %	Sep. 04, 2008
		SAR (10g)	20.6	20.7	0.5 %	
	Head	SAR (1g)	39.5	39.4	-0.3 %	Sep. 15, 2008
		SAR (10g)	20.6	20.4	-1.0 %	
	Body	SAR (1g)	40.1	36.3	-9.5 %	Aug. 31, 2008
		SAR (10g)	21.3	19.4	-8.9 %	
	Body	SAR (1g)	40.1	40.9	2.0 %	Sep. 05, 2008
		SAR (10g)	21.3	21.5	0.9 %	
Body	SAR (1g)	40.1	43.7	9.0 %	Sep. 15, 2008	
	SAR (10g)	21.3	23.1	8.5 %		

Table 8.1 Target and Measurement Data Comparison

The table above indicates the system performance check can meet the variation criterion.

9. Description for DUT Testing Position

This DUT was tested in nine different positions. They are as illustrated below:

1. Right Cheek for EUT Slide Off
2. Right Cheek for EUT Slide Left
3. Right Tilted for EUT Slide Off
4. Left Cheek for EUT Slide Off
5. Left Cheek for EUT Slide Left
6. Left Tilted for EUT Slide Off
7. Face with 1.5cm Gap for EUT Slide Off
8. Bottom with 1.5cm Gap for EUT Slide Off
9. Bottom with 1.5cm Gap for EUT Slide Left

1) “Cheek Position”

- i) To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M, RE and LE) and align the center of the ear piece with the line RE-LE.
- ii) To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost (see Fig. 9.1).

2) “Tilted Position”

- i) To position the device in the “cheek” position described above.
- ii) While maintaining the device the reference plane described above and pivoting against the ear, move it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost (see Fig. 9.2).

3) “Body Worn”

- i) To position the device parallel to the phantom surface.
- ii) To adjust the phone parallel to the flat phantom.
- iii) To adjust the distance between the EUT surface and the flat phantom to 1.5 cm.

Remark: Please refer to Appendix E for the test setup photos.

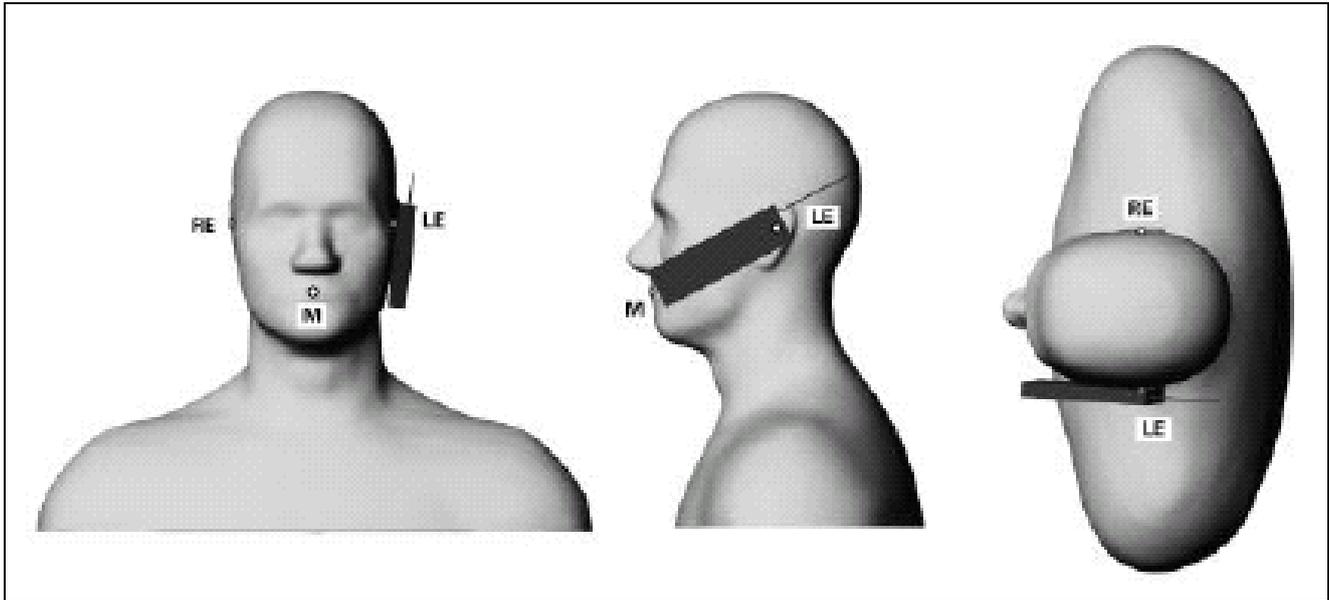


Fig. 9.1 Phone Position 1, “Cheek” or “Touch” Position. The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the plane for phone positioning, are indicated.

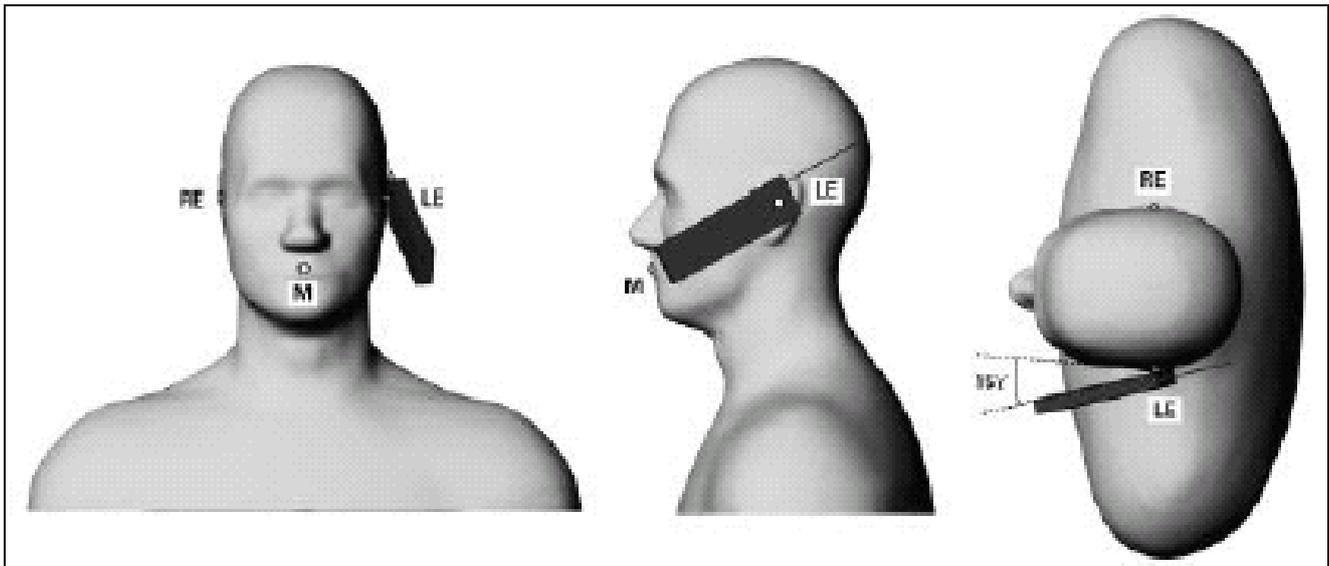


Fig. 9.2 Phone Position 2, “Tilted Position”. The reference point for the right ear (RE), left ear (LE) and mouth (M), which define the plane for phone positioning, are indicated.



10. Measurement Procedures

The measurement procedures are as follows:

- Linking DUT with base station emulator CMU200 in middle channel
- Setting CMU200 to allow DUT to radiate maximum output power
- Measuring output power through RF cable and power meter
- Placing the DUT in the positions described in the last section
- Setting scan area, grid size and other setting on the DASY4 software
- Taking data for the middle channel on each testing position
- Finding out the largest SAR result on these testing positions of each band
- Measuring output power and SAR results for the low and high channels in this worst case testing position

According to the IEEE P1528 draft standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

- Power reference measurement
- Area scan
- Zoom scan
- Power reference measurement

10.1 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the IEEE1528-2003 standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY4 software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

Base on the Draft: SCC-34, SC-2, WG-2-Computational Dosimetry, IEEE P1528/D1.2 (Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques), a new algorithm has been implemented. The spatial-peak SAR can be computed over any required mass.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose , the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.



The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

- extraction of the measured data (grid and values) from the Zoom Scan
- calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
- generation of a high-resolution mesh within the measured volume
- interpolation of all measured values from the measurement grid to the high-resolution grid
- extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
- calculation of the averaged SAR within masses of 1g and 10g

10.2 Scan Procedures

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan measures 5x5x7 points with step size 8, 8 and 5 mm. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 1 g.

10.3 SAR Averaged Methods

In DASYS, the interpolation and extrapolation are both based on the modified Quadratic Shepard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5 mm.



11. SAR Test Results

11.1 Conducted Power

Mode \ Channel	Band	GSM 850 (dBm)			GSM 1900 (dBm)		
		128	189	251	512	661	810
GSM		32.53	32.53	32.49	29.73	29.67	29.54
GPRS 8		32.53	32.54	32.50	29.73	29.68	29.54
GPRS 10		32.48	32.49	32.46	29.69	29.62	29.47
EGPRS 8		26.65	26.63	26.57	25.78	25.74	25.61
EGPRS 10		26.63	26.62	26.56	25.74	25.70	25.56

Mode \ Channel	Band	WCDMA Band II (dBm)		
		9262	9400	9538
AMR (voice)		23.40	23.75	23.32
12.2K		23.40	23.77	23.37
12.2K+HSDPA	(2/15)	23.30	23.66	23.33
	(12/15)	22.74	23.11	22.82
	(15/8)	22.87	23.19	22.95
	(15/4)	22.35	22.62	22.41
12.2K+HSUPA	(11/15)	22.55	22.76	22.50
	(6/15)	20.79	20.83	20.77
	(15/9)	21.71	21.91	21.77
	β(2/15)	21.29	21.45	21.20
	(15/15)	22.62	23.09	22.92



11.2 Test Records for Head SAR Test

Position	EUT Slide	Battery	Band	Chan.	Freq. (MHz)	Modulation Type	Measured 1g SAR (W/kg)	Power Drift	Limit (W/kg)	Result
Right Cheek	Off	1	GSM850	189	836.4	GMSK	0.334	-0.132	1.6	Pass
Right Tilted	Off	1	GSM850	189	836.4	GMSK	0.284	-0.074	1.6	Pass
Left Cheek	Off	1	GSM850	189	836.4	GMSK	0.341	0.002	1.6	Pass
Left Tilted	Off	1	GSM850	189	836.4	GMSK	0.247	-0.032	1.6	Pass
Left Cheek	Off	1	GSM850	128	836.4	GMSK	0.449	-0.063	1.6	Pass
Left Cheek	Off	1	GSM850	251	848.8	GMSK	0.293	-0.088	1.6	Pass
Left Cheek	Left	1	GSM850	128	824.2	GMSK	0.165	0.032	1.6	Pass
Left Cheek	Off	2	GSM850	128	824.2	GMSK	0.371	-0.191	1.6	Pass
Right Cheek	Off	1	GSM1900	661	1880.0	GMSK	0.404	0.089	1.6	Pass
Right Tilted	Off	1	GSM1900	661	1880.0	GMSK	0.221	-0.03	1.6	Pass
Left Cheek	Off	1	GSM1900	661	1880.0	GMSK	0.338	0.007	1.6	Pass
Left Tilted	Off	1	GSM1900	661	1880.0	GMSK	0.252	-0.137	1.6	Pass
Right Cheek	Off	1	GSM1900	512	1850.2	GMSK	0.354	0.039	1.6	Pass
Right Cheek	Off	1	GSM1900	810	1909.8	GMSK	0.354	-0.073	1.6	Pass
Right Cheek	Off	1	WCDMA Band II	9400	1880.0	QPSK	0.809	0.167	1.6	Pass
Right Tilted	Off	1	WCDMA Band II	9400	1880.0	QPSK	0.477	0.174	1.6	Pass
Left Cheek	Off	1	WCDMA Band II	9400	1880.0	QPSK	0.711	-0.131	1.6	Pass
Left Tilted	Off	1	WCDMA Band II	9400	1880.0	QPSK	0.434	0.12	1.6	Pass
Right Cheek	Off	1	WCDMA Band II	9262	1852.4	QPSK	0.806	-0.177	1.6	Pass
Right Cheek	Off	1	WCDMA Band II	9538	1907.6	QPSK	0.744	-0.181	1.6	Pass
Right Cheek	Left	1	WCDMA Band II	9262	1852.4	QPSK	0.941	0.05	1.6	Pass
Right Cheek	Left	1	WCDMA Band II	9400	1880.0	QPSK	1.03	0.136	1.6	Pass
Right Cheek	Left	1	WCDMA Band II	9538	1907.6	QPSK	0.938	0.136	1.6	Pass
Right Cheek	Left	2	WCDMA Band II	9400	1880.0	QPSK	1.04	-0.00167	1.6	Pass
Right Cheek	Left	2	WCDMA Band II	9262	1852.4	QPSK	0.842	0.129	1.6	Pass
Right Cheek	Left	2	WCDMA Band II	9538	1907.6	QPSK	0.91	0.112	1.6	Pass



11.3 Test Records for Body SAR Test

Position	EUT Slide	Battery	Ear-phone	Band	Chan.	Freq. (MHz)	Modulation Type	Measured 1g SAR (W/kg)	Power Drift	Limit (W/kg)	Result
Face With 1.5cm Gap	Off	1	v	GSM850 (GPRS10)	189	836.4	GMSK	0.451	-0.113	1.6	Pass
Bottom With 1.5cm Gap	Off	1	v	GSM850 (GPRS10)	189	836.4	GMSK	1.07	-0.015	1.6	Pass
Bottom With 1.5cm Gap	Off	1	v	GSM850 (EGPRS10)	189	836.4	8PSK	0.3	-0.061	1.6	Pass
Bottom With 1.5cm Gap	Off	1	v	GSM850 (GPRS10)	128	824.2	GMSK	1.25	-0.081	1.6	Pass
Bottom With 1.5cm Gap	Off	1	v	GSM850 (GPRS10)	251	848.8	GMSK	0.93	0.038	1.6	Pass
Bottom With 1.5cm Gap	Left	1	v	GSM850 (GPRS10)	128	824.2	GMSK	1.26	-0.091	1.6	Pass
Bottom With 1.5cm Gap	Left	1	v	GSM850 (GPRS10)	189	836.4	GMSK	1.16	-0.095	1.6	Pass
Bottom With 1.5cm Gap	Left	1	v	GSM850 (GPRS10)	251	848.8	GMSK	1.05	0.021	1.6	Pass
Bottom With 1.5cm Gap	Left	2	v	GSM850 (GPRS10)	128	824.2	GMSK	0.588	-0.054	1.6	Pass
Face With 1.5cm Gap	Off	1	v	GSM1900 (GPRS10)	661	1880	GMSK	0.347	0.168	1.6	Pass
Bottom With 1.5cm Gap	Off	1	v	GSM1900 (GPRS10)	661	1850	GMSK	0.575	-0.001	1.6	Pass
Bottom With 1.5cm Gap	Off	1	v	GSM1900 (EGPRS10)	661	1880	8PSK	0.224	-0.134	1.6	Pass
Bottom With 1.5cm Gap	Off	1	v	GSM1900 (GPRS10)	512	1910	GMSK	0.571	-0.129	1.6	Pass
Bottom With 1.5cm Gap	Off	1	v	GSM1900 (GPRS 10)	810	1880	GMSK	0.543	-0.006	1.6	Pass
Face With 1.5cm Gap	Off	1	v	WCDMA Band V (RMK 12.2K)	9400	1880.0	QPSK	0.386	0.149	1.6	Pass
Bottom With 1.5cm Gap	Off	1	v	WCDMA Band V (RMK 12.2K)	9400	1880.0	QPSK	0.714	0.191	1.6	Pass
Bottom With 1.5cm Gap	Off	1	v	WCDMA Band V (RMK 12.2K+HSDPA)	9400	1880.0	QPSK	0.649	0.382	1.6	Pass
Bottom With 1.5cm Gap	Off	1	v	WCDMA Band V (RMK 12.2K+HSUPA)	9400	1880.0	BPSK	0.498	-0.135	1.6	Pass
Bottom With 1.5cm Gap	Off	1	v	WCDMA Band V (RMK 12.2K)	9262	1852.4	QPSK	0.664	0.086	1.6	Pass
Bottom With 1.5cm Gap	Off	1	v	WCDMA Band II (RMK 12.2K)	9538	1907.6	QPSK	0.614	-0.041	1.6	Pass
Bottom With 1.5cm Gap	Left	1	v	WCDMA Band II (RMK 12.2K)	9400	1880.0	QPSK	0.504	0.017	1.6	Pass
Bottom With 1.5cm Gap	Off	2	v	WCDMA Band II (RMK 12.2K)	9400	1880.0	QPSK	0.386	-0.12	1.6	Pass

Remark: Test Engineer : Gordon Lin, Jason Wang, Robert Liu, Eric Huang, and A-Rod Chen



12. References

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- [3] Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01), “Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to RF Emissions”, June 2001
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- [5] IEEE Std. C95.1-1999, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, 1999
- [6] Robert J. Renka, “Multivariate Interpolation Of Large Sets Of Scattered Data”, University of North Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988, pp. 139-148
- [7] DASY4 System Handbook

Appendix A - System Performance Check Data

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/30

System Check_Head_835MHz

DUT: Dipole 835 MHz

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL_850 Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.9 \text{ mho/m}$; $\epsilon_r = 40.6$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.0 °C; Liquid Temperature : 21.5 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.54, 6.54, 6.54); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Pin=100mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.996 mW/g

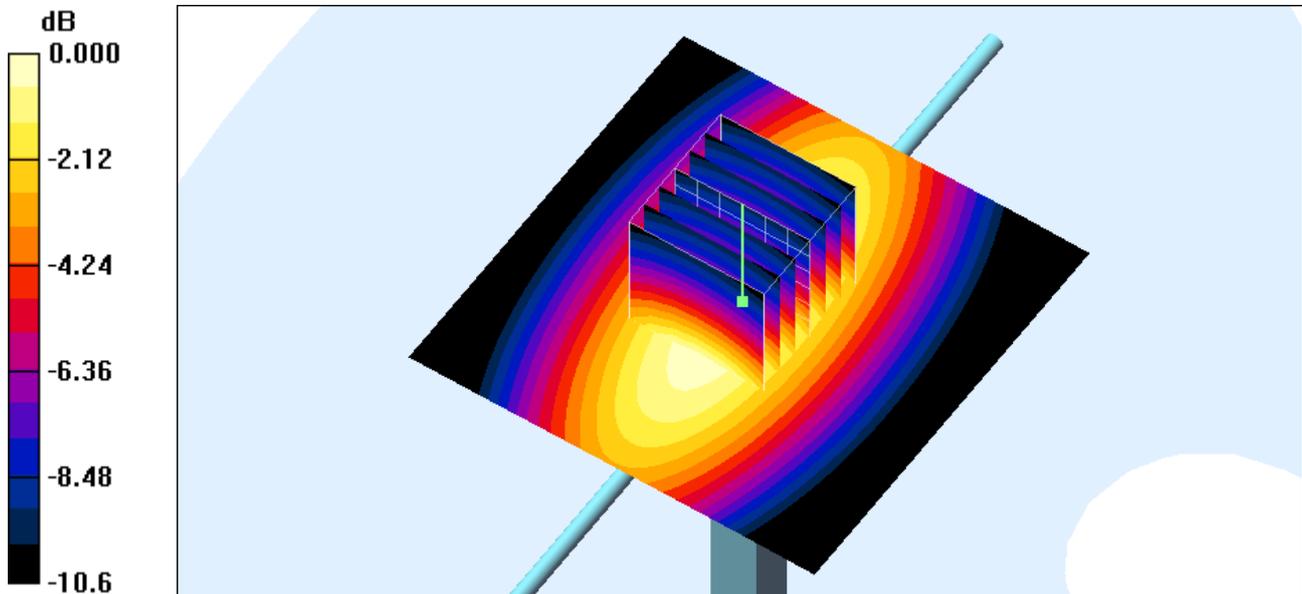
Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 34.3 V/m; Power Drift = -0.015 dB

Peak SAR (extrapolated) = 1.37 W/kg

SAR(1 g) = 0.924 mW/g; SAR(10 g) = 0.602 mW/g

Maximum value of SAR (measured) = 0.996 mW/g



0 dB = 0.996mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/9/5

System Check_Head_835MHz

DUT: Dipole 835 MHz

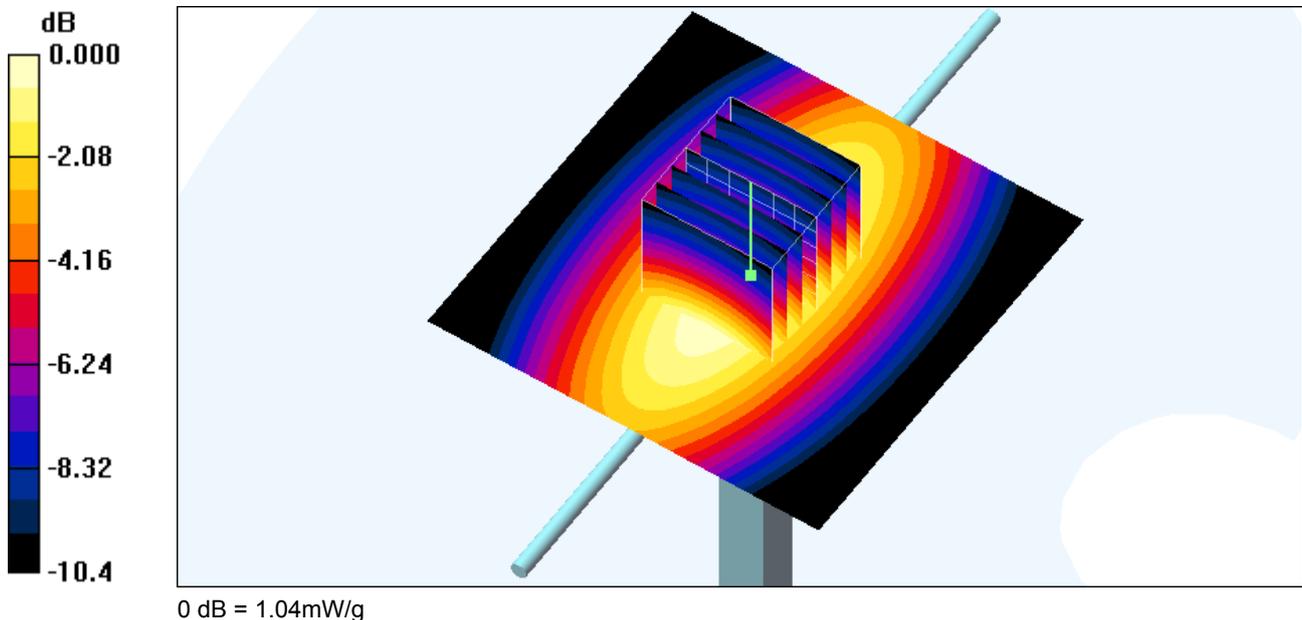
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL_850 Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.9 \text{ mho/m}$; $\epsilon_r = 40.6$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 22.4 °C; Liquid Temperature : 21.4 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(6.06, 6.06, 6.06); Calibrated: 2008/8/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Pin=100mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.05 mW/g

Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 35.5 V/m; Power Drift = -0.030 dB
Peak SAR (extrapolated) = 1.41 W/kg
SAR(1 g) = 0.964 mW/g; SAR(10 g) = 0.632 mW/g
Maximum value of SAR (measured) = 1.04 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/9/15

System Check_Head_835MHz

DUT: Dipole 835 MHz

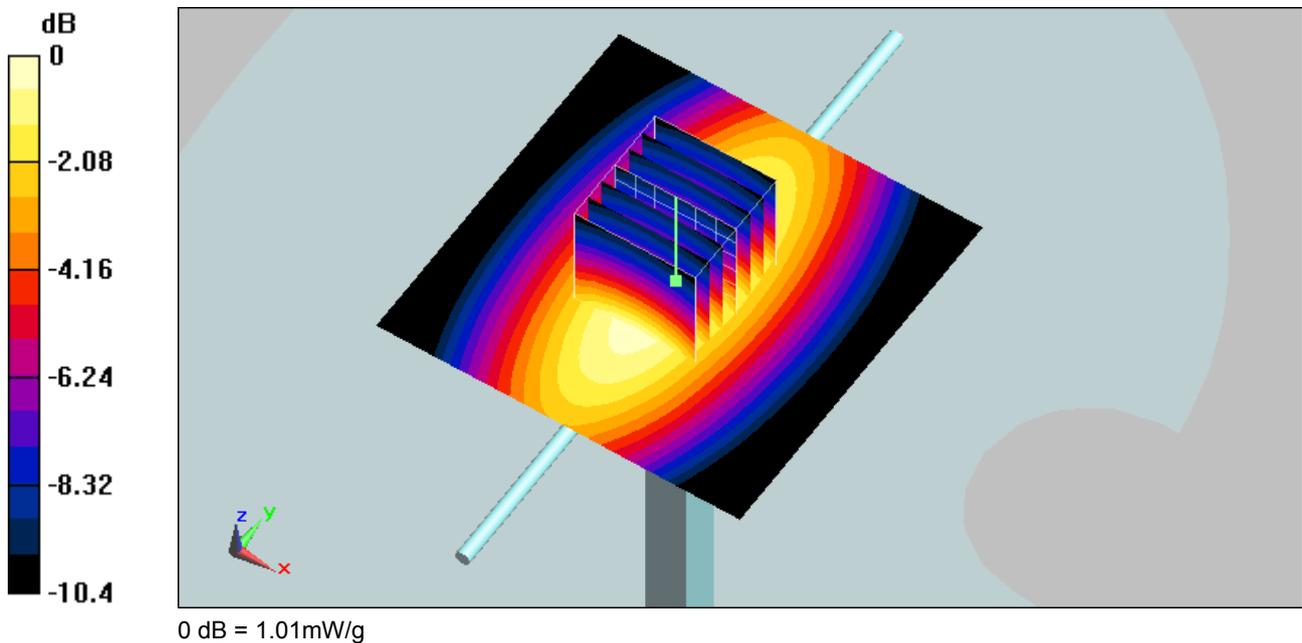
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL_850 Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.906 \text{ mho/m}$; $\epsilon_r = 40.5$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 22.5 ; Liquid Temperature : 21.5

DASY5 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(6.06, 6.06, 6.06); Calibrated: 2008/8/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 2008/8/25
- Phantom: SAM - Front; Type: SAM; Serial: TP-1446
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Pin=100mW/Area Scan (61x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 1 mW/g

Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$
Reference Value = 34.5 V/m; Power Drift = 0.013 dB
Peak SAR (extrapolated) = 1.35 W/kg
SAR(1 g) = 0.929 mW/g; SAR(10 g) = 0.610 mW/g
Maximum value of SAR (measured) = 1.01 mW/g





Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/9/4

System Check_Body_835MHz

DUT: Dipole 835 MHz

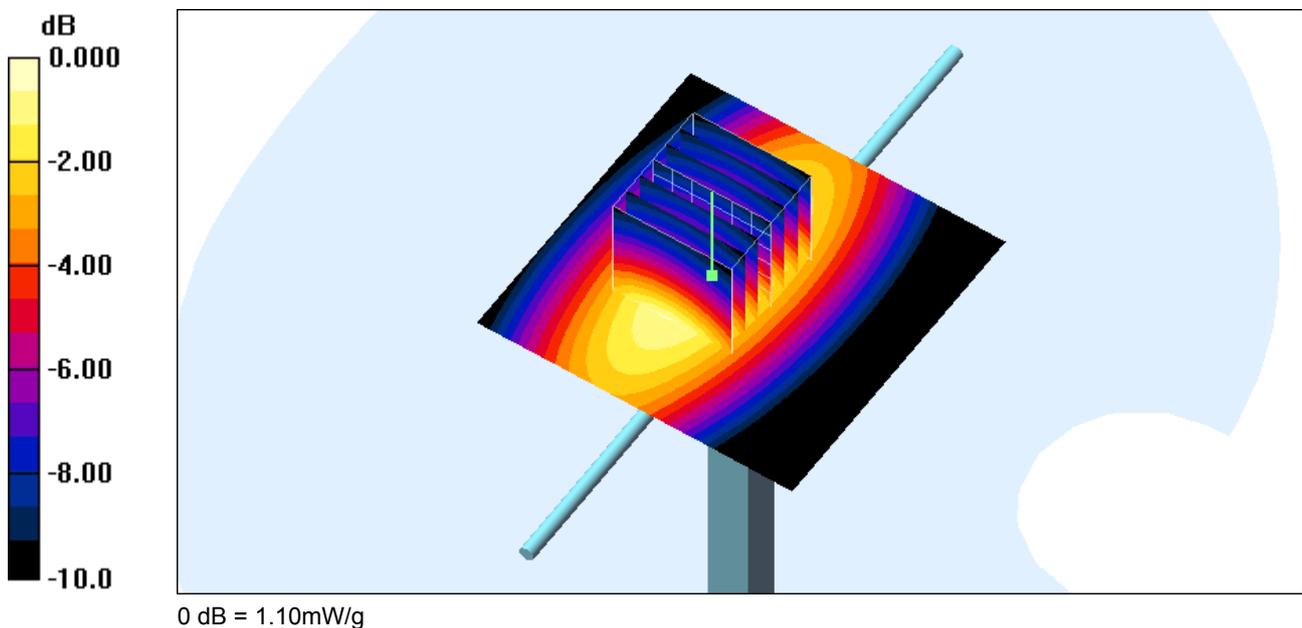
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: MSL_850 Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.977 \text{ mho/m}$; $\epsilon_r = 56.3$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 22.4 °C; Liquid Temperature : 21.3 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(5.91, 5.91, 5.91); Calibrated: 2008/8/26
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection) Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Pin=100mW/Area Scan (41x41x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.996 mW/g

Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 31.8 V/m; Power Drift = -0.023 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.676 mW/g
Maximum value of SAR (measured) = 1.10 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/9/15

System Check_Body_835MHz

DUT: Dipole 835 MHz

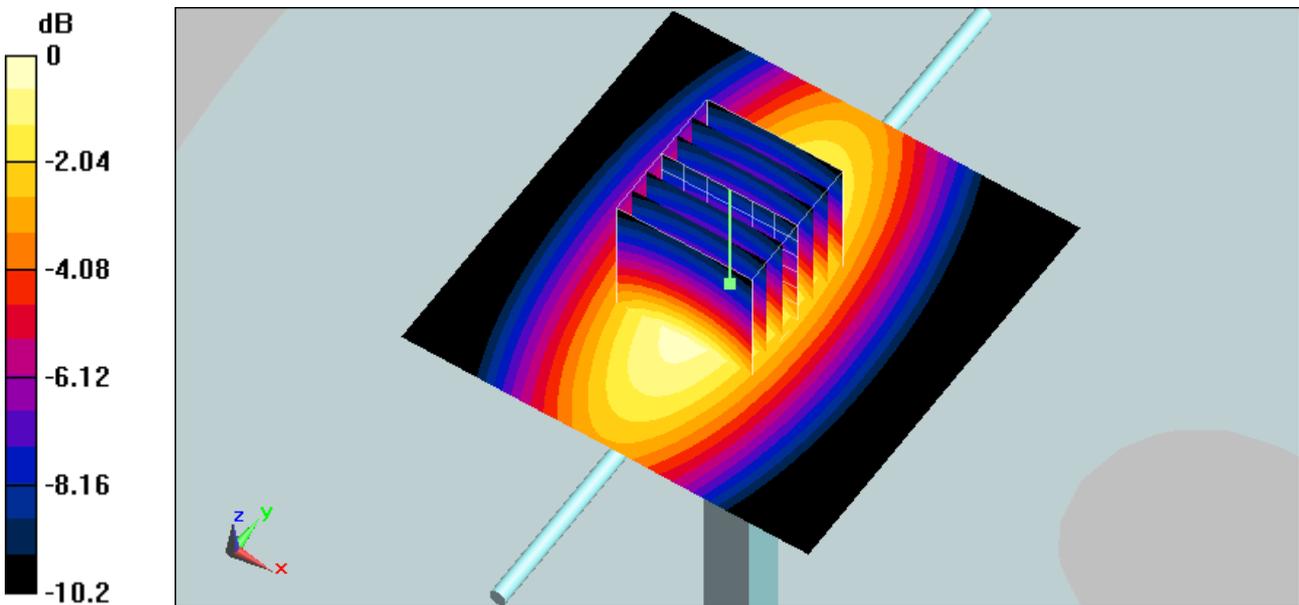
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: MSL_850 Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.965 \text{ mho/m}$; $\epsilon_r = 56.3$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 22.2 ; Liquid Temperature : 21.5

DASY5 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(5.91, 5.91, 5.91); Calibrated: 2008/8/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 2008/8/25
- Phantom: SAM - Front; Type: SAM; Serial: TP-1446
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Pin=100mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.08 mW/g

Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 35 V/m; Power Drift = 0.00329 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.664 mW/g
Maximum value of SAR (measured) = 1.1 mW/g



0 dB = 1.1mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/30

System Check_Head_1900MHz

DUT: Dipole 1900 MHz

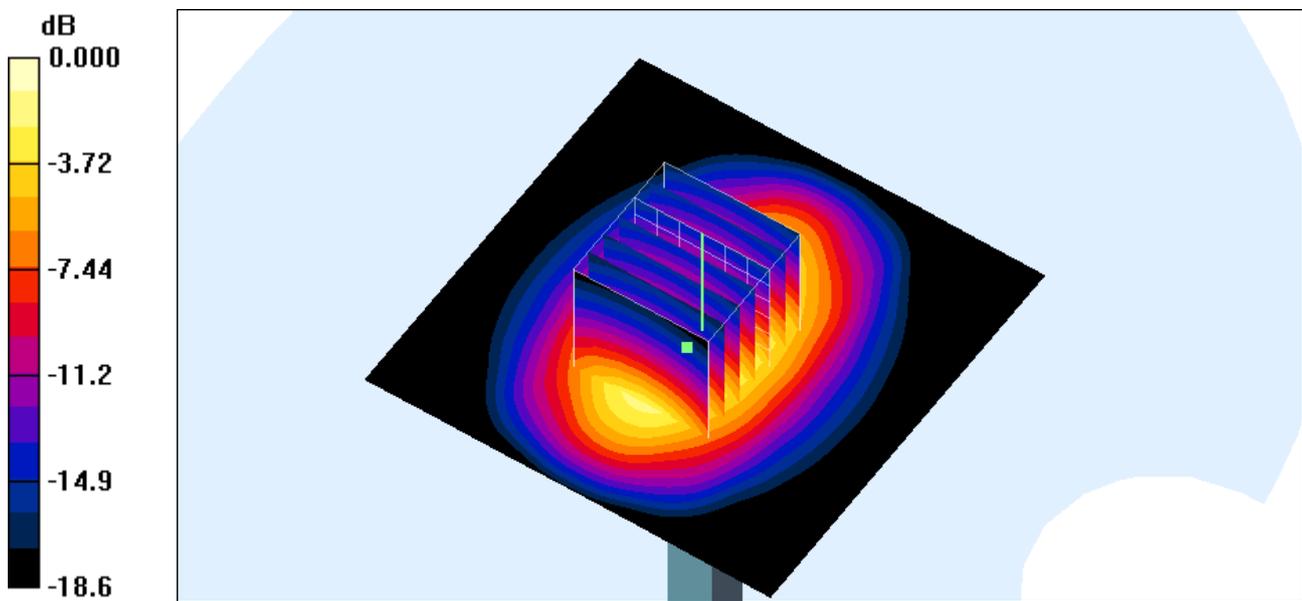
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL_1900 Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 41.9$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 22.6 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(5.28, 5.28, 5.28); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Pin=100mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.73 mW/g

Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.7 V/m; Power Drift = -0.019 dB
Peak SAR (extrapolated) = 7.05 W/kg
SAR(1 g) = 3.93 mW/g; SAR(10 g) = 2.06 mW/g
Maximum value of SAR (measured) = 4.45 mW/g



0 dB = 4.45mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/9/4

System Check_Head_1900MHz

DUT: Dipole 1900 MHz

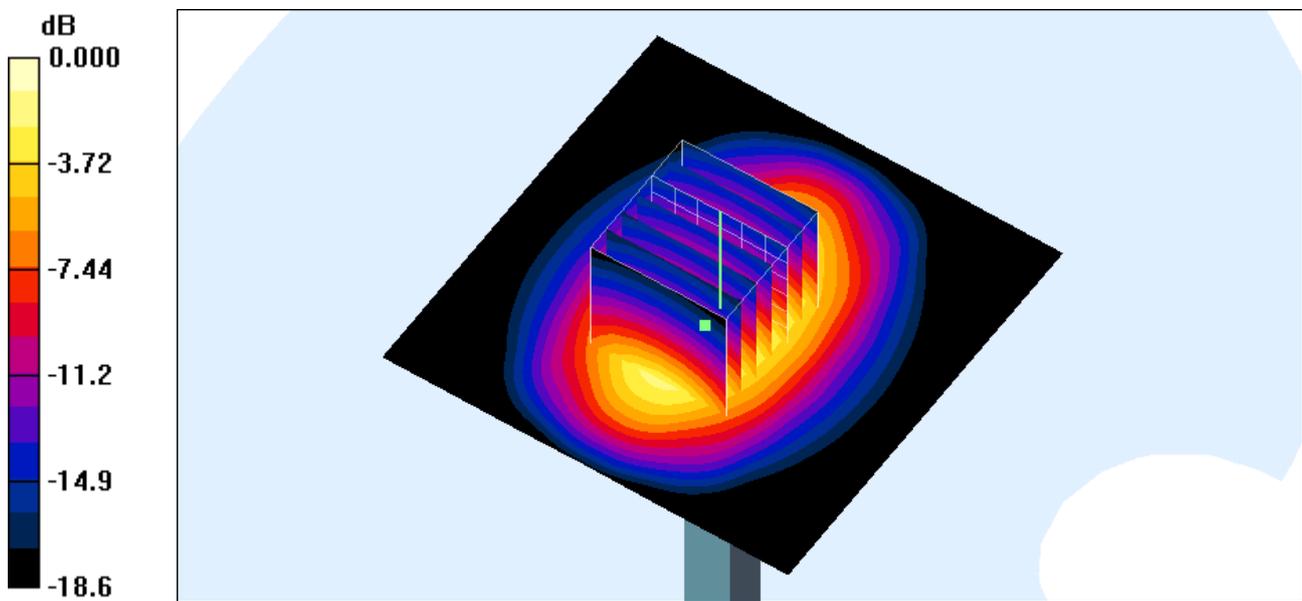
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL_1900 Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 41.9$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 22.7 °C; Liquid Temperature : 21.5 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(5.01, 5.01, 5.01); Calibrated: 2008/8/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Pin=100mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.74 mW/g

Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.3 V/m; Power Drift = 0.001 dB
Peak SAR (extrapolated) = 7.26 W/kg
SAR(1 g) = 3.96 mW/g; SAR(10 g) = 2.07 mW/g
Maximum value of SAR (measured) = 4.42 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/9/15

System Check_Head_1900MHz

DUT: Dipole 1900 MHz

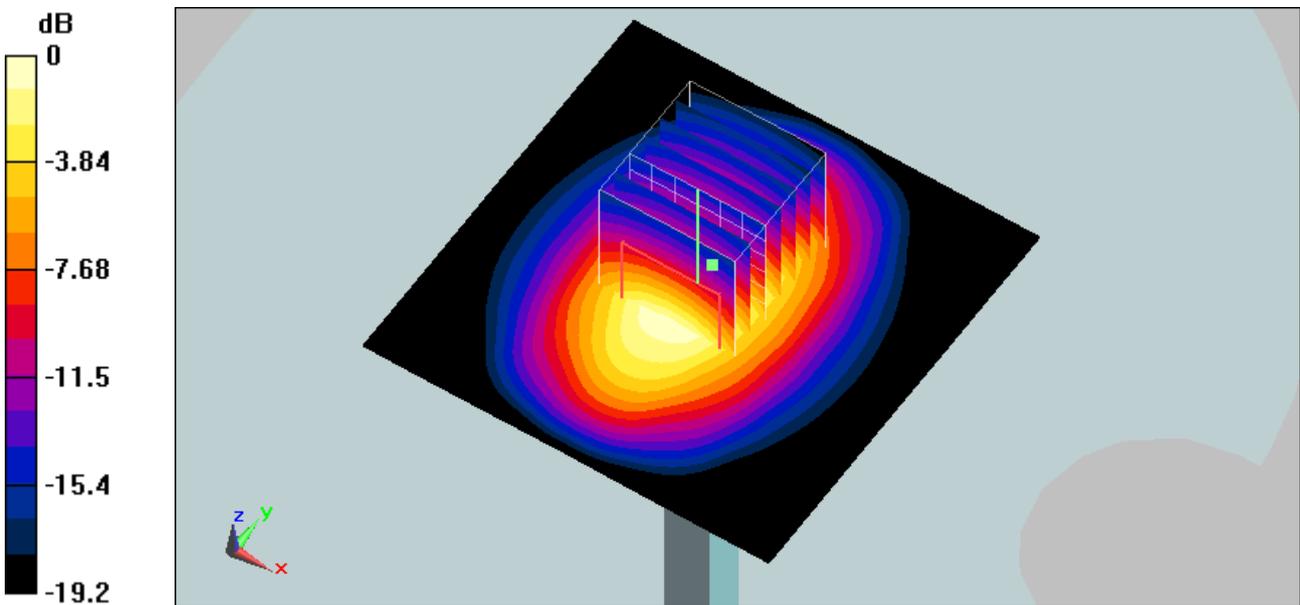
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
 Medium: HSL_1900 Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$
 Ambient Temperature : 22.2 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(5.01, 5.01, 5.01); Calibrated: 2008/8/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 2008/8/25
- Phantom: SAM-Back; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Pin=100mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
 Maximum value of SAR (interpolated) = 4.6 mW/g

Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 57.9 V/m; Power Drift = -0.036 dB
 Peak SAR (extrapolated) = 7.36 W/kg
SAR(1 g) = 3.94 mW/g; SAR(10 g) = 2.04 mW/g
 Maximum value of SAR (measured) = 4.43 mW/g





Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/31

System Check_Body_1900MHz

DUT: Dipole 1900 MHz

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

Medium: MSL_1900 Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.52 \text{ mho/m}$; $\epsilon_r = 51.4$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8 °C; Liquid Temperature : 21.4 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(4.75, 4.75, 4.75); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Pin=100mW/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 4.13 mW/g

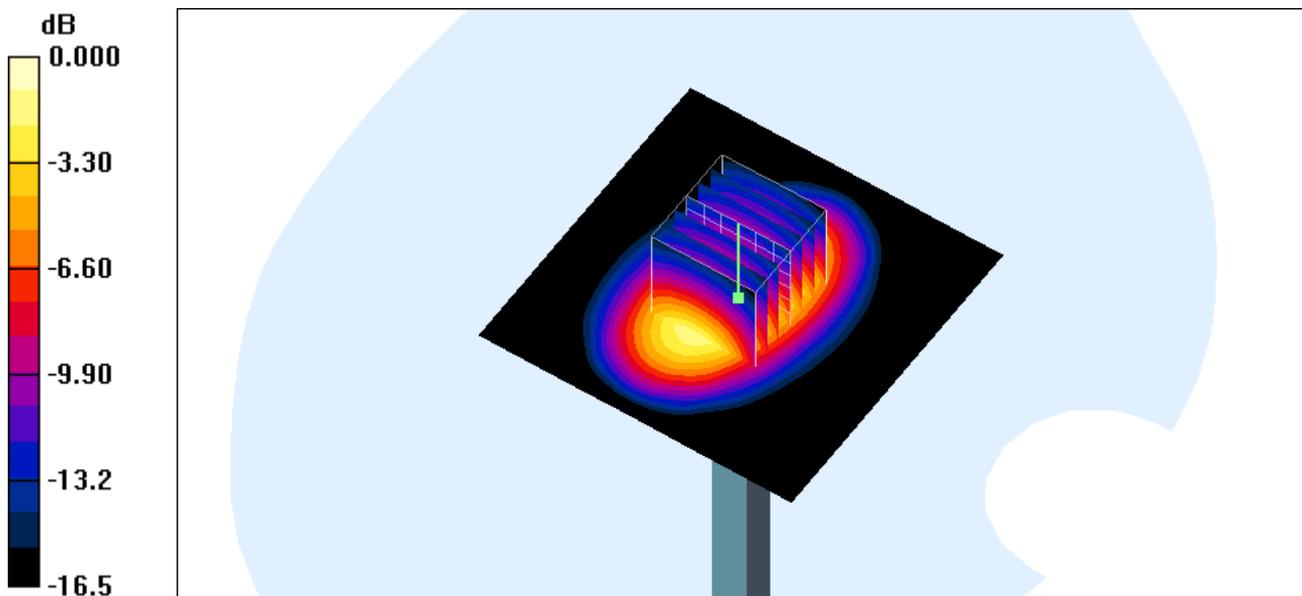
Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.0 V/m; Power Drift = 0.071 dB

Peak SAR (extrapolated) = 6.12 W/kg

SAR(1 g) = 3.63 mW/g; SAR(10 g) = 1.94 mW/g

Maximum value of SAR (measured) = 4.07 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/9/5

System Check_Body_1900MHz

DUT: Dipole 1900 MHz

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

Medium: MSL_1900 Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.52 \text{ mho/m}$; $\epsilon_r = 51.2$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.6 °C; Liquid Temperature : 21.4 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(4.49, 4.49, 4.49); Calibrated: 2008/8/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Pin=100mW/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 4.66 mW/g

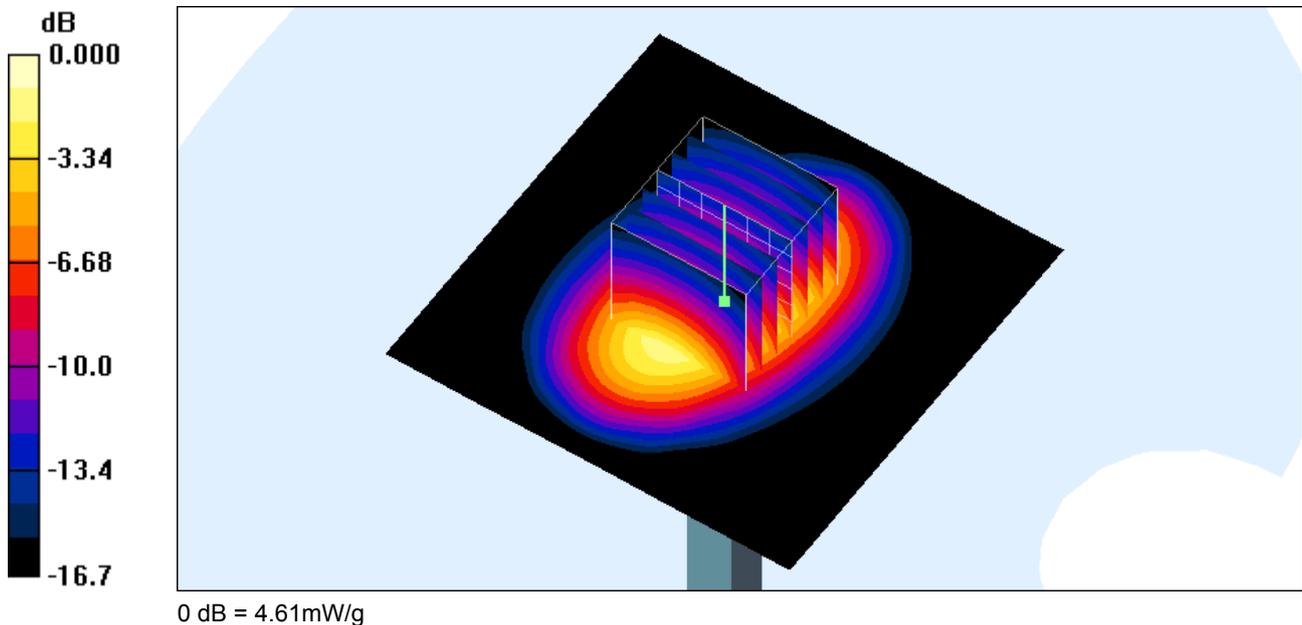
Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.6 V/m; Power Drift = -0.011 dB

Peak SAR (extrapolated) = 7.48 W/kg

SAR(1 g) = 4.09 mW/g; SAR(10 g) = 2.15 mW/g

Maximum value of SAR (measured) = 4.61 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/9/15

System Check_Body_1900MHz

DUT: Dipole 1900 MHz

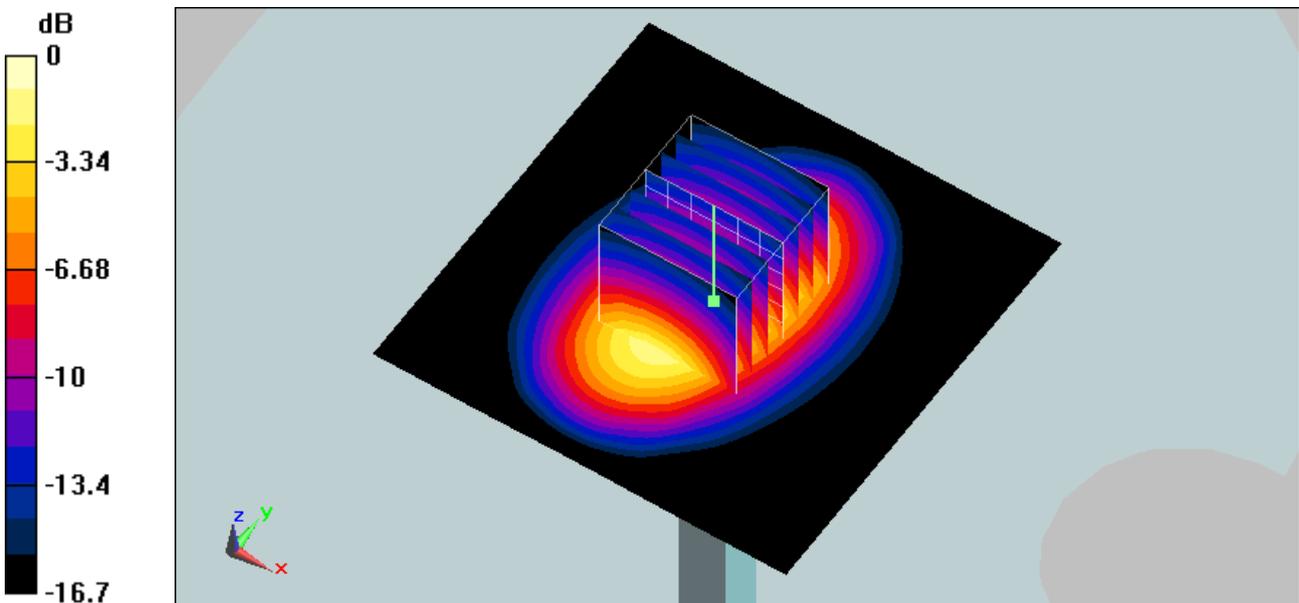
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
 Medium: MSL_1900 Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.52 \text{ mho/m}$; $\epsilon_r = 52.4$; $\rho = 1000 \text{ kg/m}^3$
 Ambient Temperature : 22.4 ; Liquid Temperature : 21.6

DASY5 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(4.49, 4.49, 4.49); Calibrated: 2008/8/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 2008/8/25
- Phantom: SAM - Front; Type: SAM; Serial: TP-1446
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Pin=100mW/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 5 mW/g

Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 59.4 V/m; Power Drift = 0.011 dB
 Peak SAR (extrapolated) = 7.9 W/kg
SAR(1 g) = 4.37 mW/g; SAR(10 g) = 2.31 mW/g
 Maximum value of SAR (measured) = 4.91 mW/g



0 dB = 4.91mW/g

Appendix B - SAR Measurement Data

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/30

Right Cheek_GSM850 Ch189

DUT: 850821

Communication System: GSM850; Frequency: 836.4 MHz; Duty Cycle: 1:8.3

Medium: HSL_850 Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.901$ mho/m; $\epsilon_r = 40.6$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.0 °C; Liquid Temperature : 21.5 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.54, 6.54, 6.54); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch189/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.360 mW/g

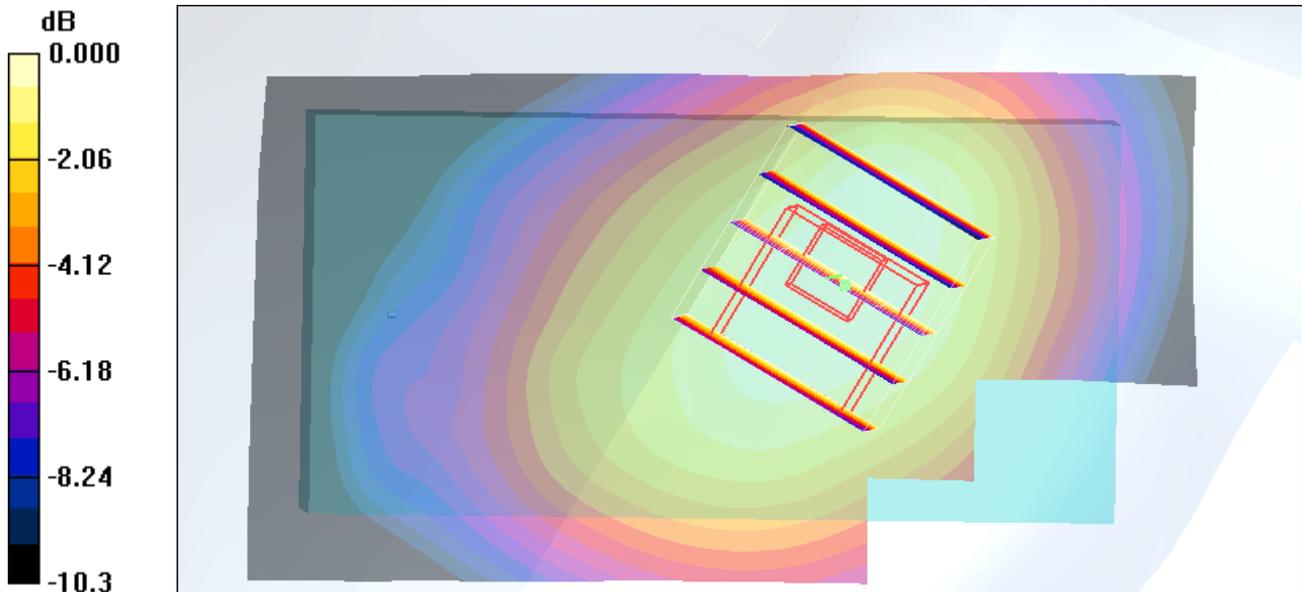
Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.70 V/m; Power Drift = -0.132 dB

Peak SAR (extrapolated) = 0.463 W/kg

SAR(1 g) = 0.334 mW/g; SAR(10 g) = 0.247 mW/g

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



0 dB = 0.354mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/30

Right Tilted_GSM850 Ch189

DUT: 850821

Communication System: GSM850; Frequency: 836.4 MHz; Duty Cycle: 1:8.3
Medium: HSL_850 Medium parameters used: $f = 836.4 \text{ MHz}$; $\sigma = 0.901 \text{ mho/m}$; $\epsilon_r = 40.6$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 23.0 °C; Liquid Temperature : 21.5 °C

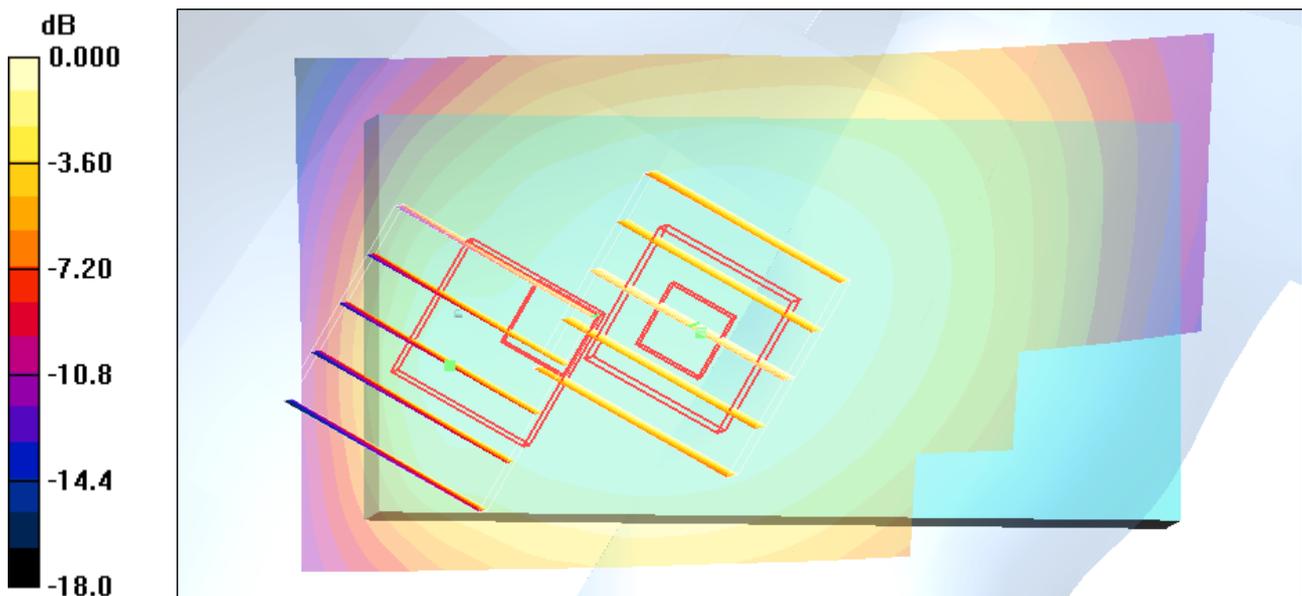
DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.54, 6.54, 6.54); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch189/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.288 mW/g

Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.3 V/m; Power Drift = -0.074 dB
Peak SAR (extrapolated) = 0.355 W/kg
SAR(1 g) = 0.284 mW/g; SAR(10 g) = 0.216 mW/g
Maximum value of SAR (measured) = 0.299 mW/g

Ch189/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.3 V/m; Power Drift = -0.074 dB
Peak SAR (extrapolated) = 0.381 W/kg
SAR(1 g) = 0.217 mW/g; SAR(10 g) = 0.152 mW/g
Maximum value of SAR (measured) = 0.259 mW/g



0 dB = 0.259mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/30

Left Cheek_GSM850 Ch128

DUT: 850821

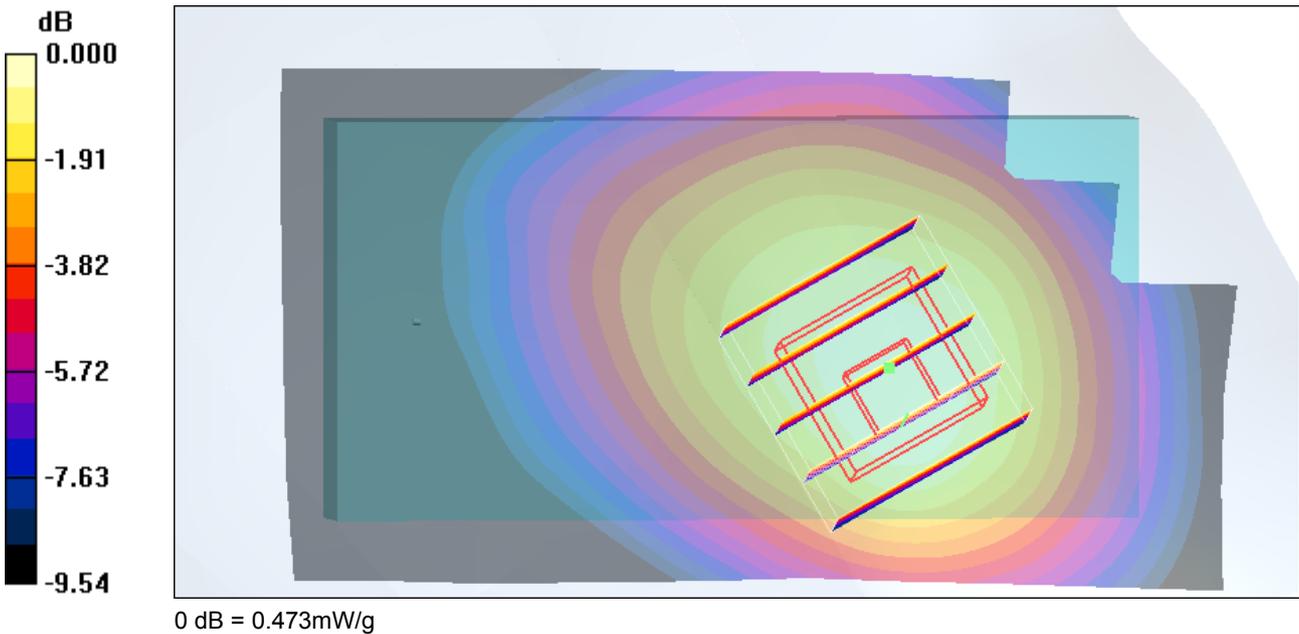
Communication System: GSM850; Frequency: 824.2 MHz; Duty Cycle: 1:8.3
Medium: HSL_850 Medium parameters used: $f = 824.2 \text{ MHz}$; $\sigma = 0.887 \text{ mho/m}$; $\epsilon_r = 40.5$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 23.2 °C; Liquid Temperature : 21.5 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.54, 6.54, 6.54); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch128/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.483 mW/g

Ch128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 8.82 V/m; Power Drift = -0.063 dB
Peak SAR (extrapolated) = 0.594 W/kg
SAR(1 g) = 0.449 mW/g; SAR(10 g) = 0.324 mW/g
Maximum value of SAR (measured) = 0.473 mW/g





Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/30

Left Tilted_GSM850 Ch189

DUT: 850821

Communication System: GSM850; Frequency: 836.4 MHz; Duty Cycle: 1:8.3
Medium: HSL_850 Medium parameters used: $f = 836.4 \text{ MHz}$; $\sigma = 0.901 \text{ mho/m}$; $\epsilon_r = 40.6$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 23.1 °C; Liquid Temperature : 21.5 °C

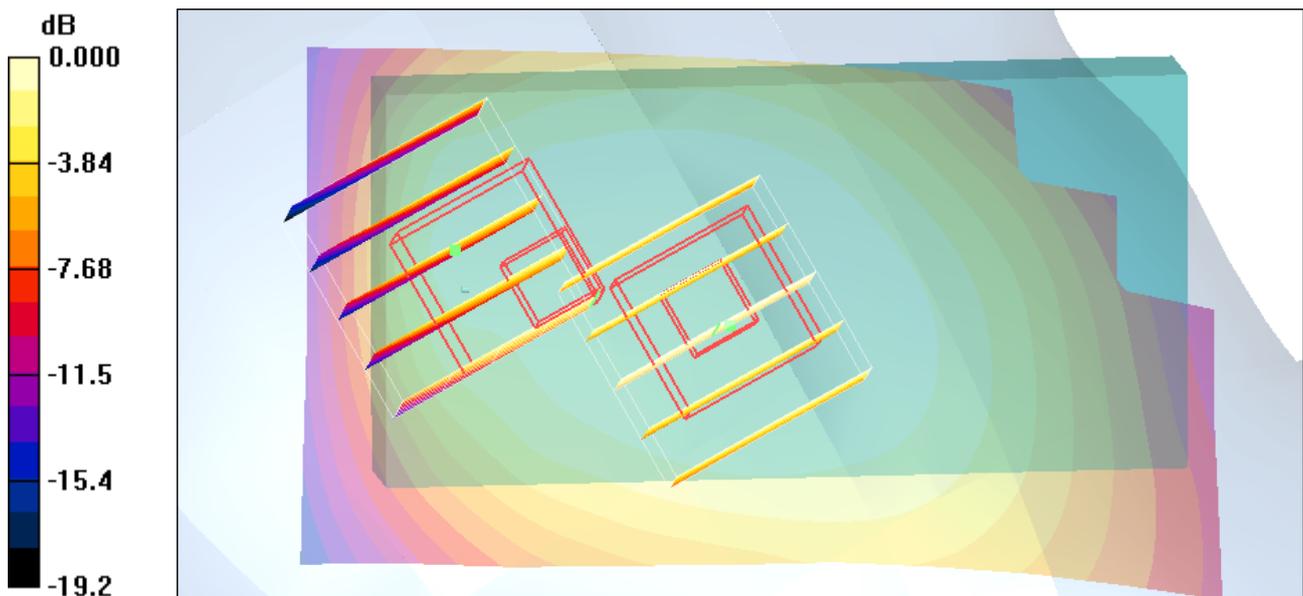
DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.54, 6.54, 6.54); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch189/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.259 mW/g

Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.1 V/m; Power Drift = -0.032 dB
Peak SAR (extrapolated) = 0.305 W/kg
SAR(1 g) = 0.247 mW/g; SAR(10 g) = 0.187 mW/g
Maximum value of SAR (measured) = 0.260 mW/g

Ch189/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.1 V/m; Power Drift = -0.032 dB
Peak SAR (extrapolated) = 0.322 W/kg
SAR(1 g) = 0.181 mW/g; SAR(10 g) = 0.124 mW/g
Maximum value of SAR (measured) = 0.214 mW/g



0 dB = 0.214mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/30

Right Cheek_GSM1900 Ch661

DUT: 850821

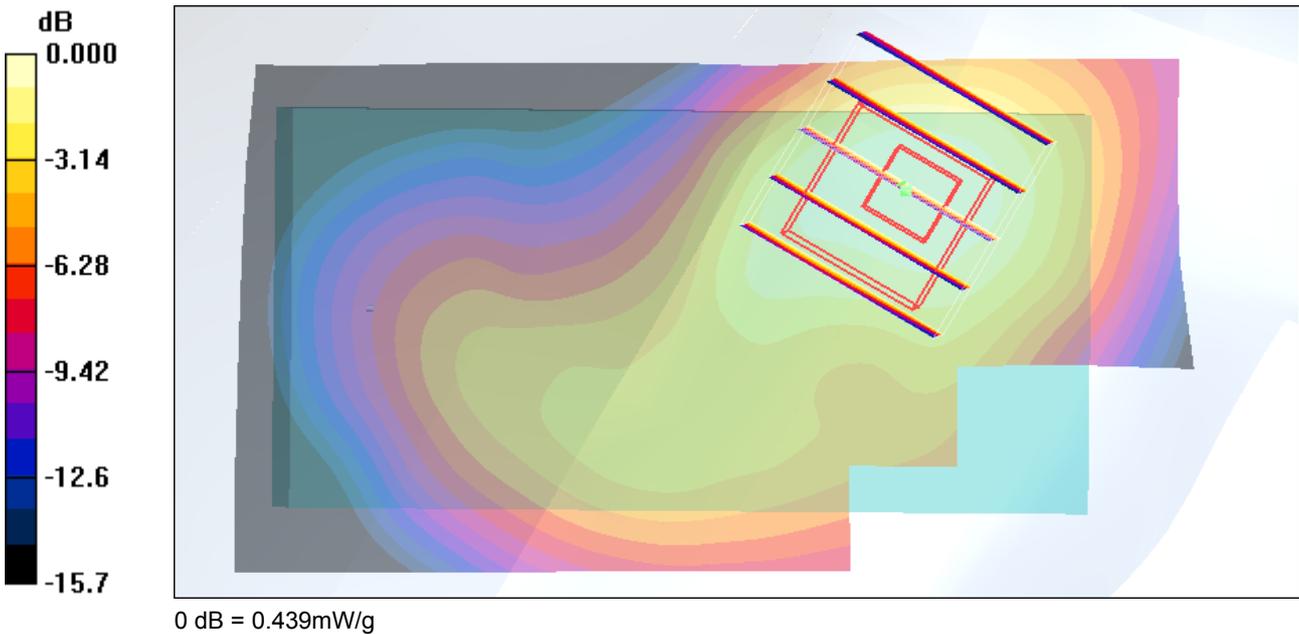
Communication System: PCS; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: HSL_1900 Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ϵ_r = 41.8; ρ = 1000 kg/m³
Ambient Temperature : 22.8 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(5.28, 5.28, 5.28); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.463 mW/g

Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.99 V/m; Power Drift = 0.089 dB
Peak SAR (extrapolated) = 0.610 W/kg
SAR(1 g) = 0.404 mW/g; SAR(10 g) = 0.252 mW/g
Maximum value of SAR (measured) = 0.439 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/30

Right Tilted_GSM1900 Ch661

DUT: 850821

Communication System: PCS; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium: HSL_1900 Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8 ; Liquid Temperature : 21.6

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(5.28, 5.28, 5.28); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch661/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.262 mW/g

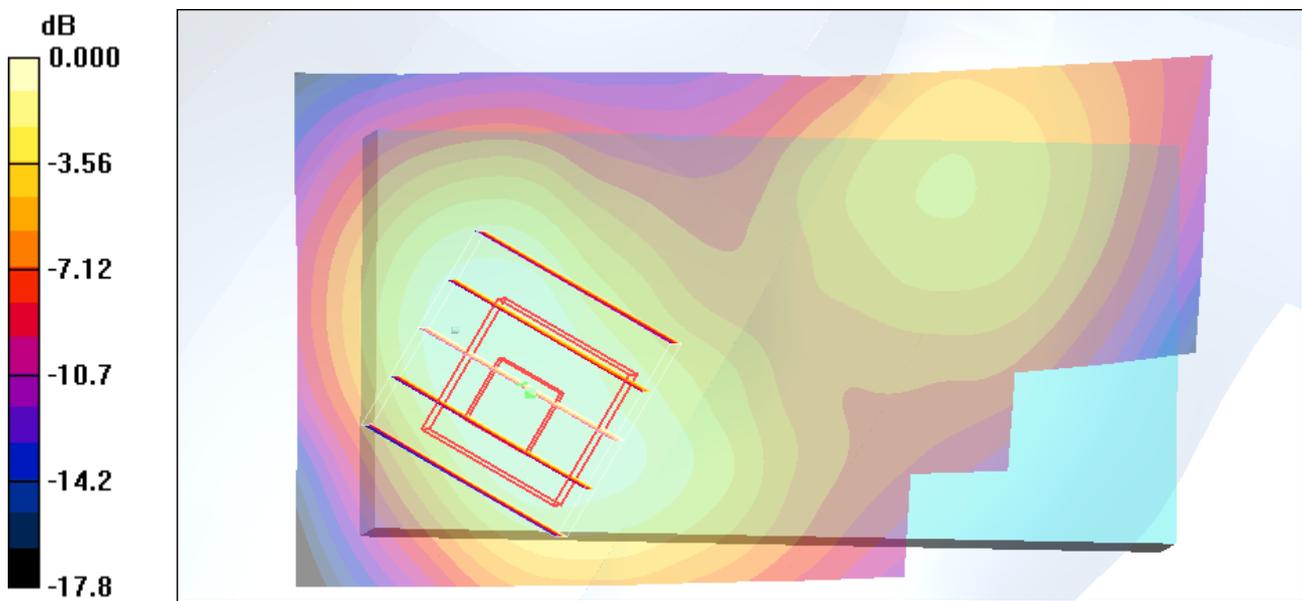
Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.7 V/m; Power Drift = -0.030 dB

Peak SAR (extrapolated) = 0.334 W/kg

SAR(1 g) = 0.221 mW/g; SAR(10 g) = 0.140 mW/g

Maximum value of SAR (measured) = 0.227 mW/g



0 dB = 0.227mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/30

Left Cheek_GSM1900 Ch661

DUT: 850821

Communication System: PCS; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: HSL_1900 Medium parameters used: f = 1880 MHz; $\sigma = 1.39$ mho/m; $\epsilon_r = 41.8$; $\rho = 1000$ kg/m³
Ambient Temperature : 22.7 ; Liquid Temperature : 21.6

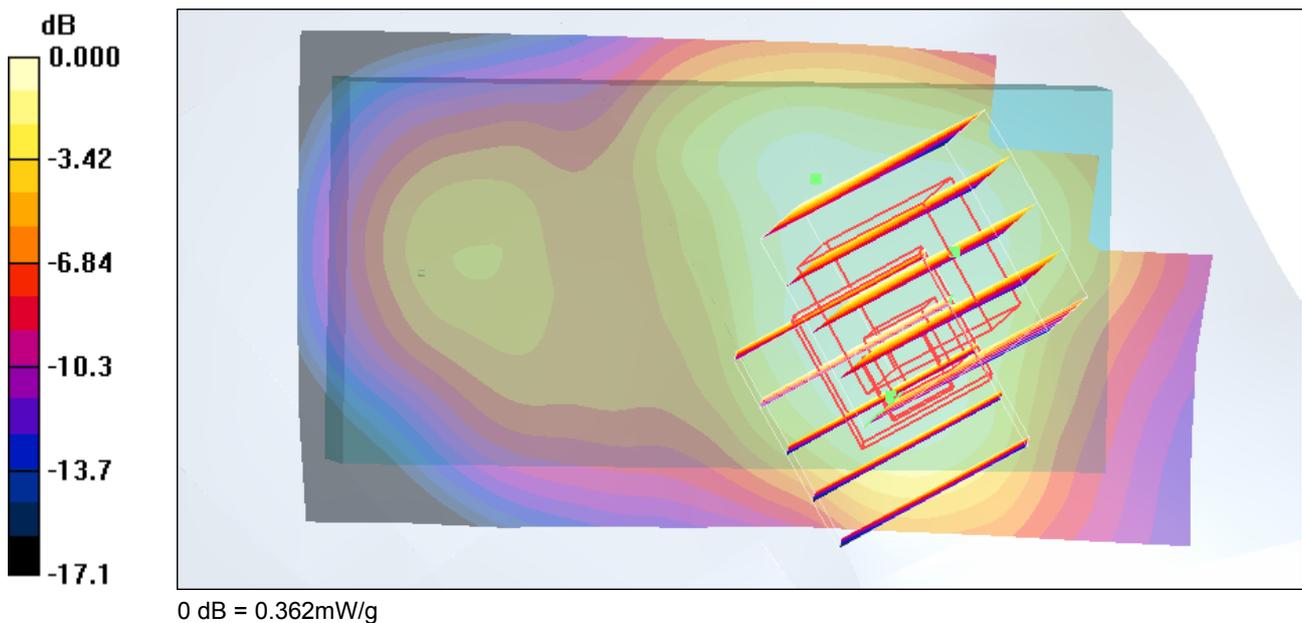
DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(5.28, 5.28, 5.28); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.368 mW/g

Ch661/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.92 V/m; Power Drift = 0.007 dB
Peak SAR (extrapolated) = 0.498 W/kg
SAR(1 g) = 0.338 mW/g; SAR(10 g) = 0.226 mW/g
Maximum value of SAR (measured) = 0.366 mW/g

Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.92 V/m; Power Drift = 0.007 dB
Peak SAR (extrapolated) = 0.502 W/kg
SAR(1 g) = 0.337 mW/g; SAR(10 g) = 0.226 mW/g
Maximum value of SAR (measured) = 0.362 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/30

Left Tilted_GSM1900 Ch661

DUT: 850821

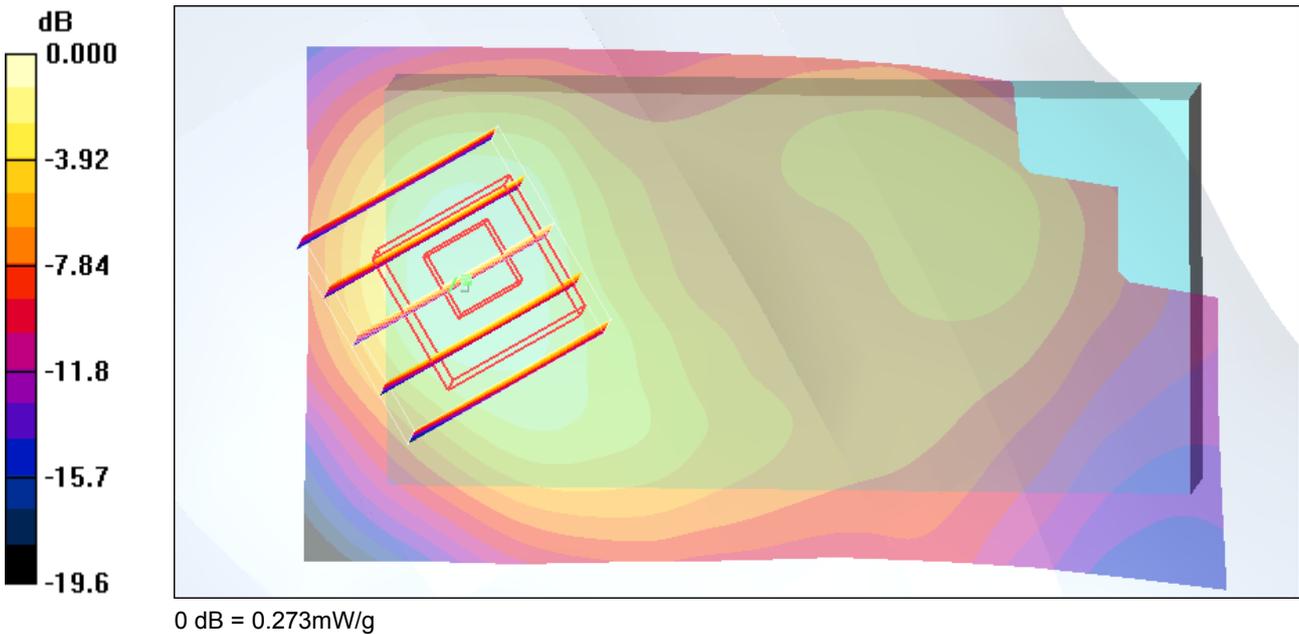
Communication System: PCS; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: HSL_1900 Medium parameters used: f = 1880 MHz; $\sigma = 1.39$ mho/m; $\epsilon_r = 41.8$; $\rho = 1000$ kg/m³
Ambient Temperature : 22.8 ; Liquid Temperature : 21.6

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(5.28, 5.28, 5.28); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.290 mW/g

Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.7 V/m; Power Drift = -0.137 dB
Peak SAR (extrapolated) = 0.382 W/kg
SAR(1 g) = 0.252 mW/g; SAR(10 g) = 0.149 mW/g
Maximum value of SAR (measured) = 0.273 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/9/15

Right Cheek_WCDMA1900 Ch9400_Slide Left_Battery2

DUT: 850821

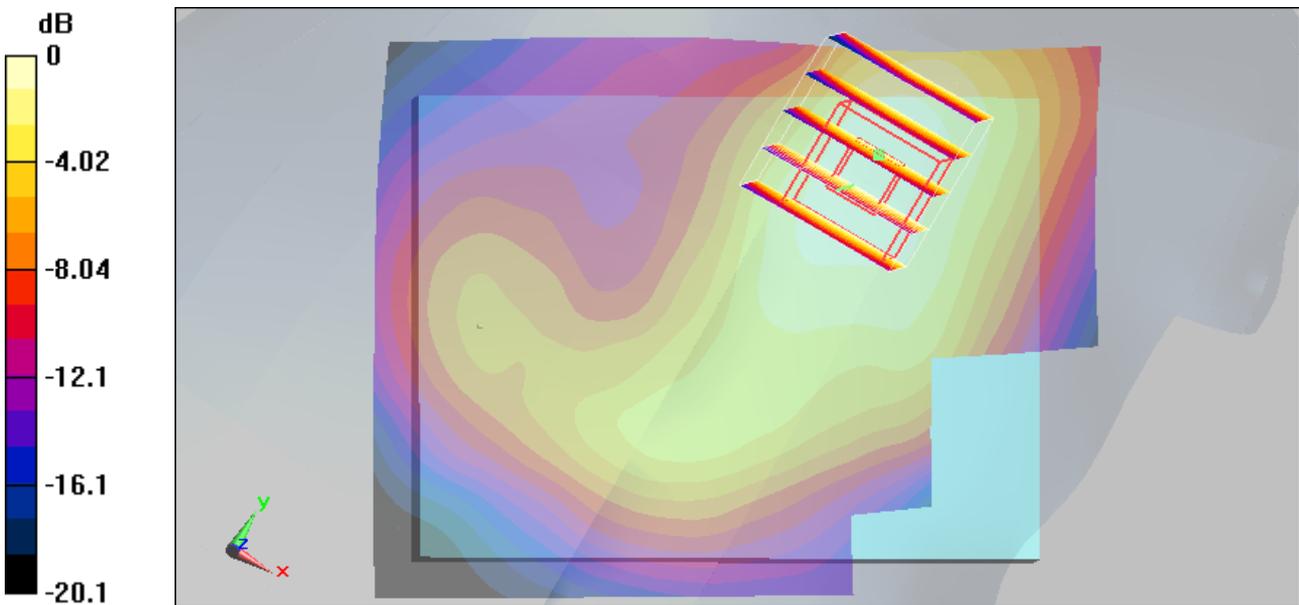
Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL_1900 Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 22.2 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(5.01, 5.01, 5.01); Calibrated: 2008/8/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 2008/8/25
- Phantom: SAM-Back; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Ch9400/Area Scan (71x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 1.16 mW/g

Ch9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 14.7 V/m; Power Drift = -0.00167 dB
Peak SAR (extrapolated) = 1.65 W/kg
SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.638 mW/g
Maximum value of SAR (measured) = 1.13 mW/g



0 dB = 1.13mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/30

Right Tilted_WCDMA1900 Ch9400

DUT: 850821

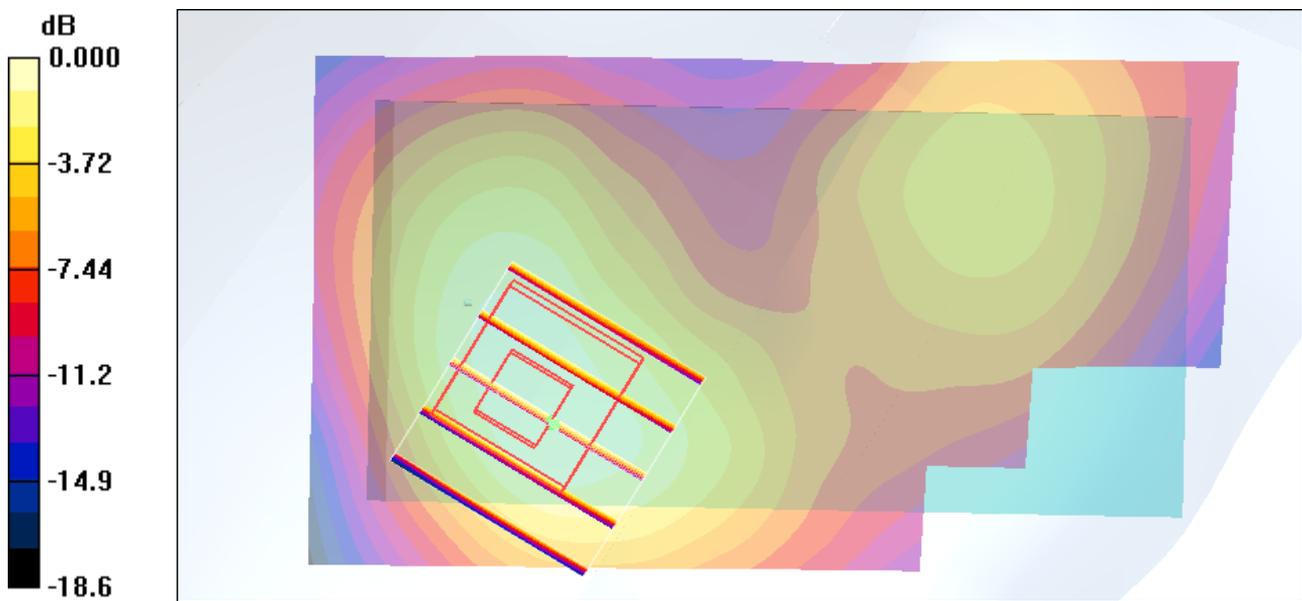
Communication System: WCDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: HSL_1900 Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 22.7 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(5.28, 5.28, 5.28); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch9400/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.509 mW/g

Ch9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.1 V/m; Power Drift = 0.174 dB
Peak SAR (extrapolated) = 0.742 W/kg
SAR(1 g) = 0.477 mW/g; SAR(10 g) = 0.300 mW/g
Maximum value of SAR (measured) = 0.503 mW/g



0 dB = 0.503mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/30

Left Cheek_WCDMA1900 Ch9400

DUT: 850821

Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL_1900 Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 22.7 °C; Liquid Temperature : 21.6 °C

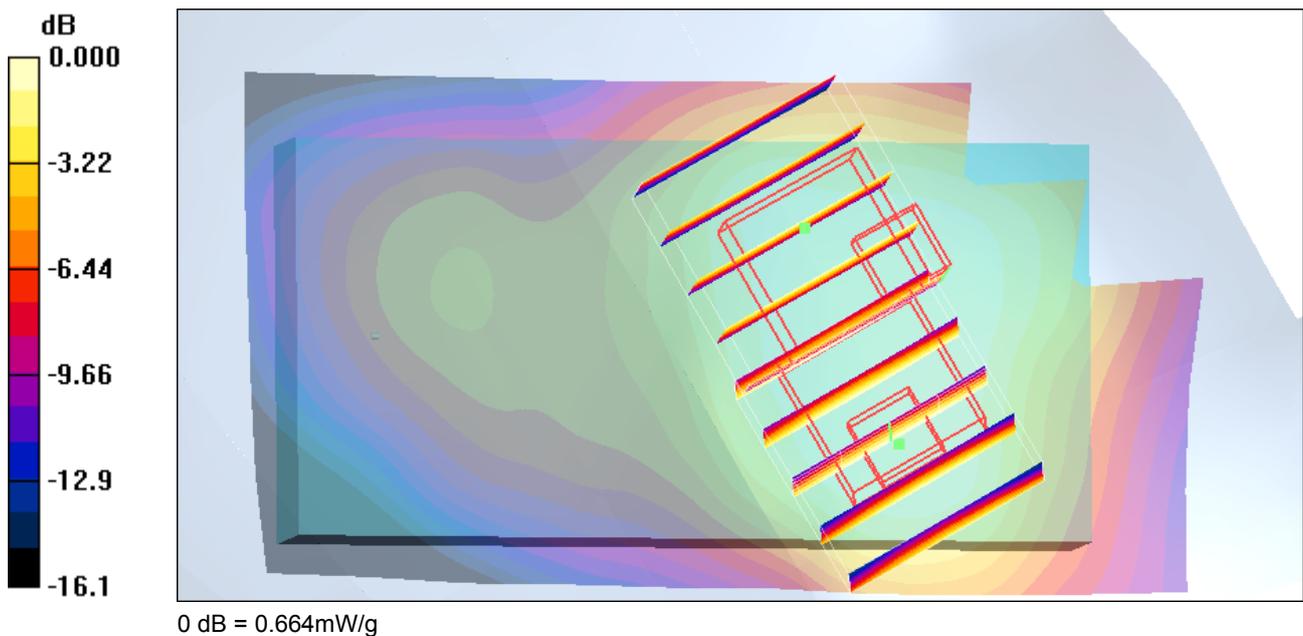
DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(5.28, 5.28, 5.28); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch9400/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.741 mW/g

Ch9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 12.5 V/m; Power Drift = -0.131 dB
Peak SAR (extrapolated) = 1.06 W/kg
SAR(1 g) = 0.711 mW/g; SAR(10 g) = 0.466 mW/g
Maximum value of SAR (measured) = 0.763 mW/g

Ch9400/Zoom Scan (5x5x7)/Cube 1: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 12.5 V/m; Power Drift = -0.131 dB
Peak SAR (extrapolated) = 0.877 W/kg
SAR(1 g) = 0.596 mW/g; SAR(10 g) = 0.412 mW/g
Maximum value of SAR (measured) = 0.664 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/30

Left Tilted_WCDMA1900 Ch9400

DUT: 850821

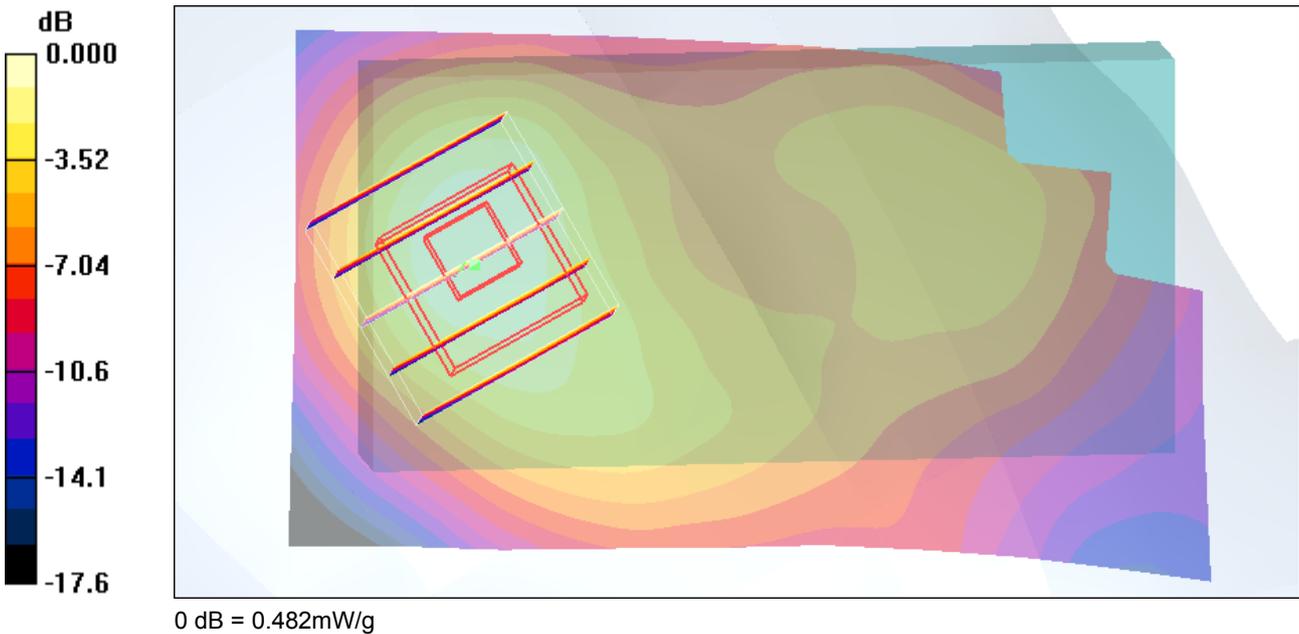
Communication System: WCDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: HSL_1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.39$ mho/m; $\epsilon_r = 41.8$; $\rho = 1000$ kg/m³
Ambient Temperature : 22.9 °C; Liquid Temperature : 21.6 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(5.28, 5.28, 5.28); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch9400/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.492 mW/g

Ch9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.7 V/m; Power Drift = 0.120 dB
Peak SAR (extrapolated) = 0.645 W/kg
SAR(1 g) = 0.434 mW/g; SAR(10 g) = 0.260 mW/g
Maximum value of SAR (measured) = 0.482 mW/g





Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/9/4

Body_GSM850 Ch189_Face with 1.5cm Gap_GPRS10

DUT: 850821

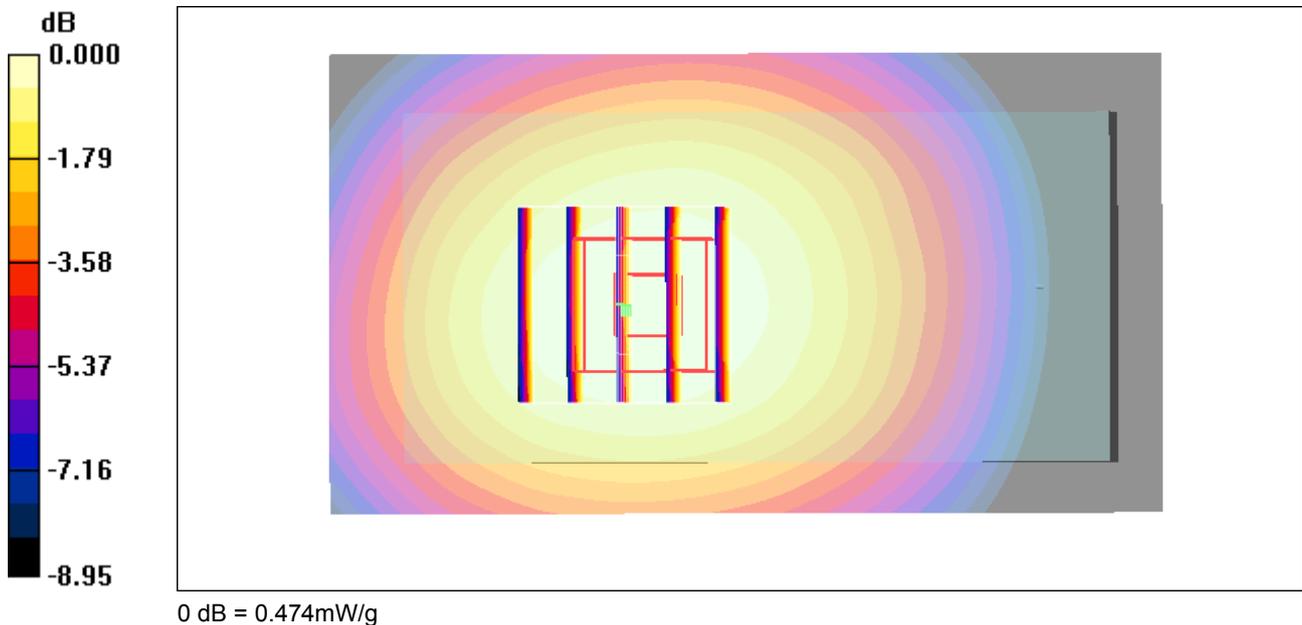
Communication System: GSM850; Frequency: 836.4 MHz; Duty Cycle: 1:4
Medium: MSL_850 Medium parameters used: $f = 836.4 \text{ MHz}$; $\sigma = 0.978 \text{ mho/m}$; $\epsilon_r = 56.3$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 22.4 ; Liquid Temperature : 21.3

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(5.91, 5.91, 5.91); Calibrated: 2008/8/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch189/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.480 mW/g

Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 10.1 V/m; Power Drift = -0.113 dB
Peak SAR (extrapolated) = 0.544 W/kg
SAR(1 g) = 0.451 mW/g; SAR(10 g) = 0.339 mW/g
Maximum value of SAR (measured) = 0.474 mW/g





Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/9/5

Body_GSM850 Ch128_Bottom with 1.5cm Gap_GPRS10_Slide Left

DUT: 850821

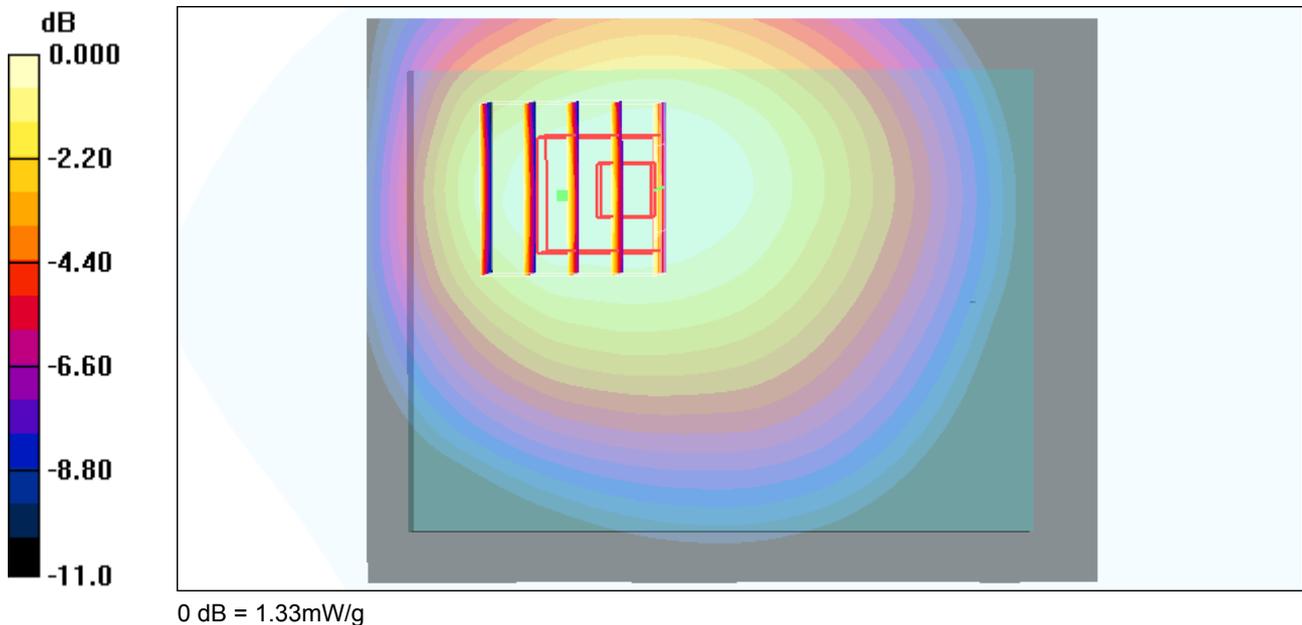
Communication System: GSM850; Frequency: 824.2 MHz; Duty Cycle: 1:4
Medium: MSL_850 Medium parameters used: $f = 824.2 \text{ MHz}$; $\sigma = 0.967 \text{ mho/m}$; $\epsilon_r = 56.3$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 22.5 ; Liquid Temperature : 21.3

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(5.91, 5.91, 5.91); Calibrated: 2008/8/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch128/Area Scan (71x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.35 mW/g

Ch128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.7 V/m; Power Drift = -0.091 dB
Peak SAR (extrapolated) = 1.54 W/kg
SAR(1 g) = 1.26 mW/g; SAR(10 g) = 0.935 mW/g
Maximum value of SAR (measured) = 1.33 mW/g





Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/31

Body_GSM1900 Ch661_Face With 1.5cm Gap_GPRS10

DUT: 850821

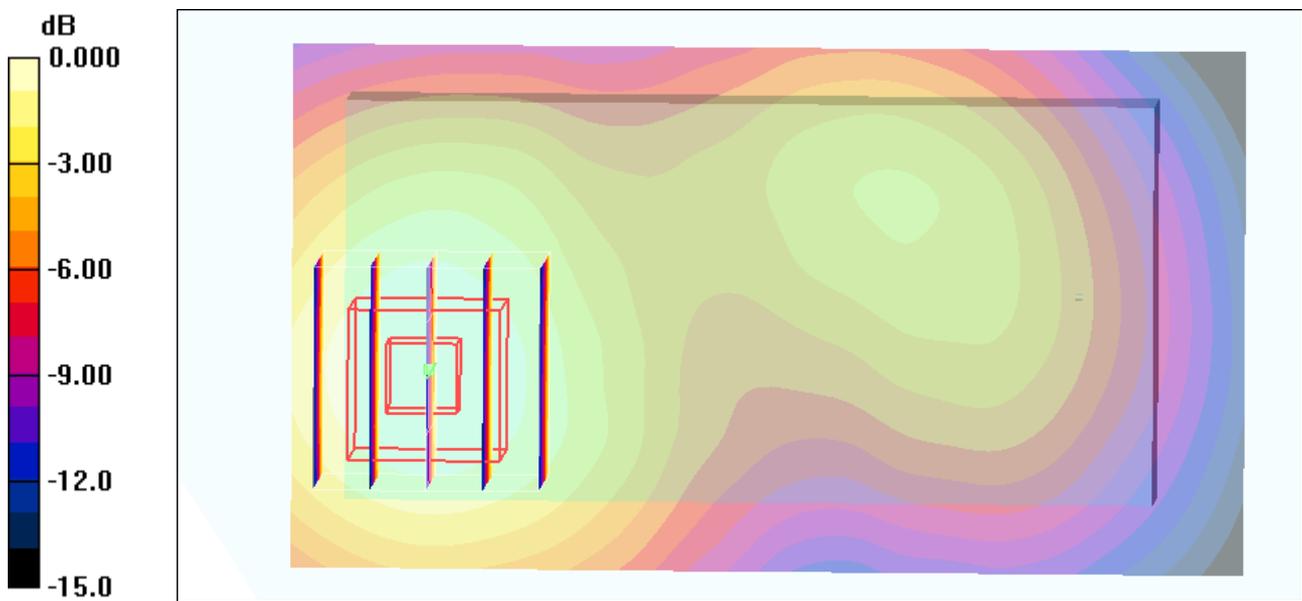
Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:4
Medium: MSL_1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 51.5$; $\rho = 1000$ kg/m³
Ambient Temperature : 22.9 ; Liquid Temperature : 21.4

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(4.75, 4.75, 4.75); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.382 mW/g

Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.00 V/m; Power Drift = 0.168 dB
Peak SAR (extrapolated) = 0.543 W/kg
SAR(1 g) = 0.347 mW/g; SAR(10 g) = 0.215 mW/g
Maximum value of SAR (measured) = 0.373 mW/g



0 dB = 0.373mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/31

Body_GSM1900 Ch661_Bottom With 1.5cm Gap_GPRS10

DUT: 850821

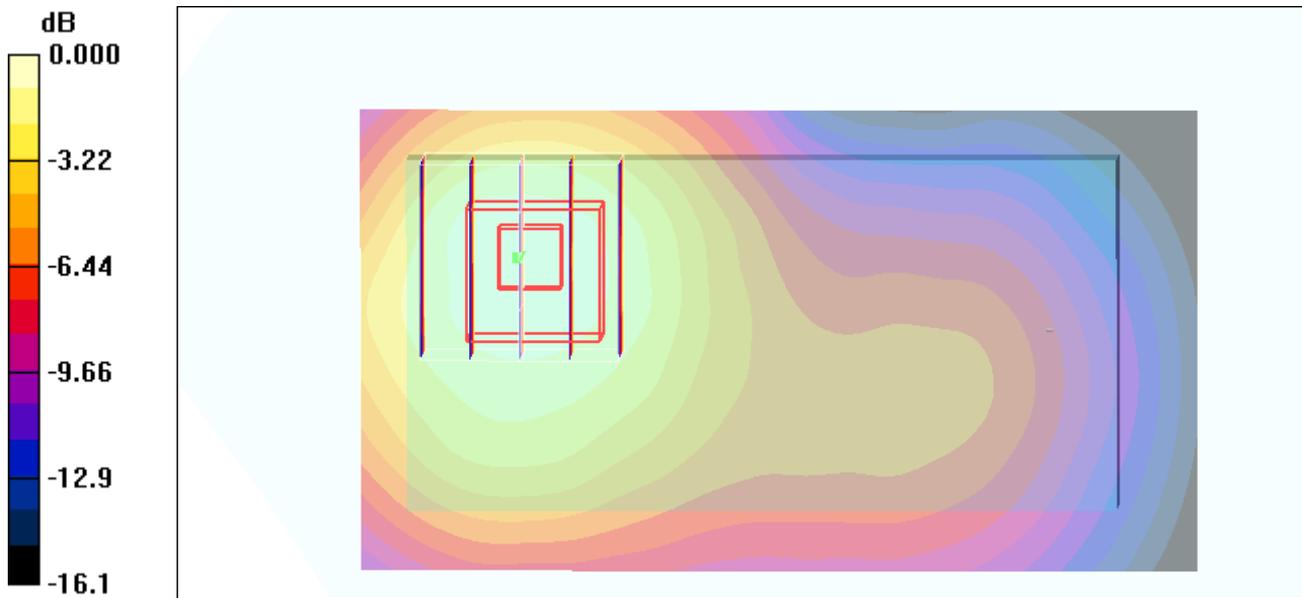
Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:4
Medium: MSL_1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 51.5$; $\rho = 1000$ kg/m³
Ambient Temperature : 22.9 ; Liquid Temperature : 21.4

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(4.75, 4.75, 4.75); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.616 mW/g

Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.87 V/m; Power Drift = -0.001 dB
Peak SAR (extrapolated) = 1.00 W/kg
SAR(1 g) = 0.575 mW/g; SAR(10 g) = 0.338 mW/g
Maximum value of SAR (measured) = 0.627 mW/g



0 dB = 0.627mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/9/5

Body_WCDMA1900 Ch9400_Face With 1.5cm Gap_RMC12.2K

DUT: 850821

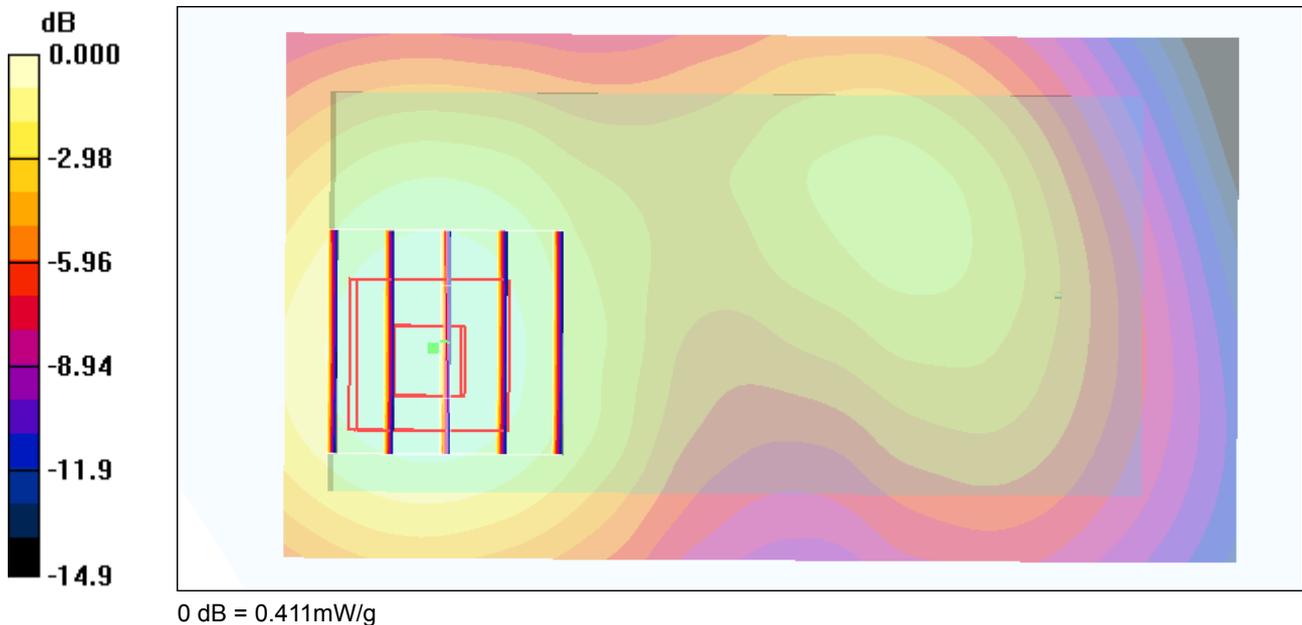
Communication System: WCDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: MSL_1900 Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 22.6 ; Liquid Temperature : 21.4

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(4.49, 4.49, 4.49); Calibrated: 2008/8/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch9400/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.410 mW/g

Ch9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.65 V/m; Power Drift = 0.149 dB
Peak SAR (extrapolated) = 0.630 W/kg
SAR(1 g) = 0.386 mW/g; SAR(10 g) = 0.238 mW/g
Maximum value of SAR (measured) = 0.411 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/9/5

Body_WCDMA1900 Ch9400_Bottom With 1.5cm Gap_RMC12.2K

DUT: 850821

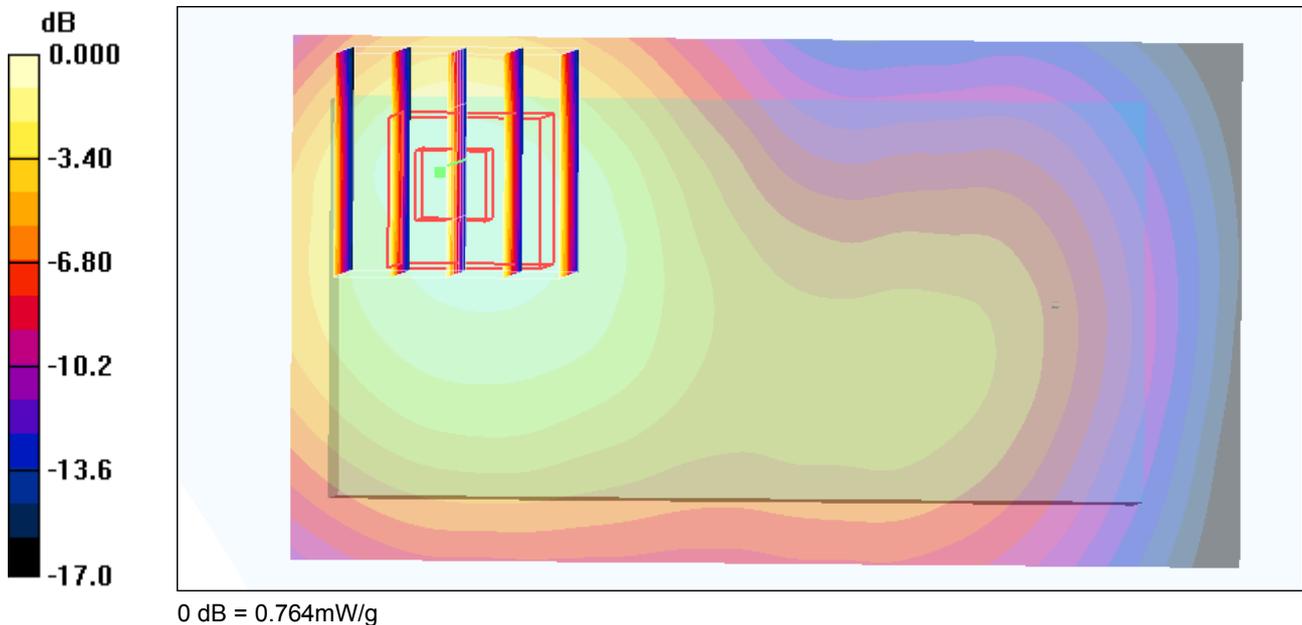
Communication System: WCDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: MSL_1900 Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 22.6 ; Liquid Temperature : 21.4

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(4.49, 4.49, 4.49); Calibrated: 2008/8/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch9400/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.771 mW/g

Ch9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 9.85 V/m; Power Drift = 0.191 dB
Peak SAR (extrapolated) = 1.30 W/kg
SAR(1 g) = 0.714 mW/g; SAR(10 g) = 0.416 mW/g
Maximum value of SAR (measured) = 0.764 mW/g





Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/30

Left Cheek_GSM850 Ch128_2D

DUT: 850821

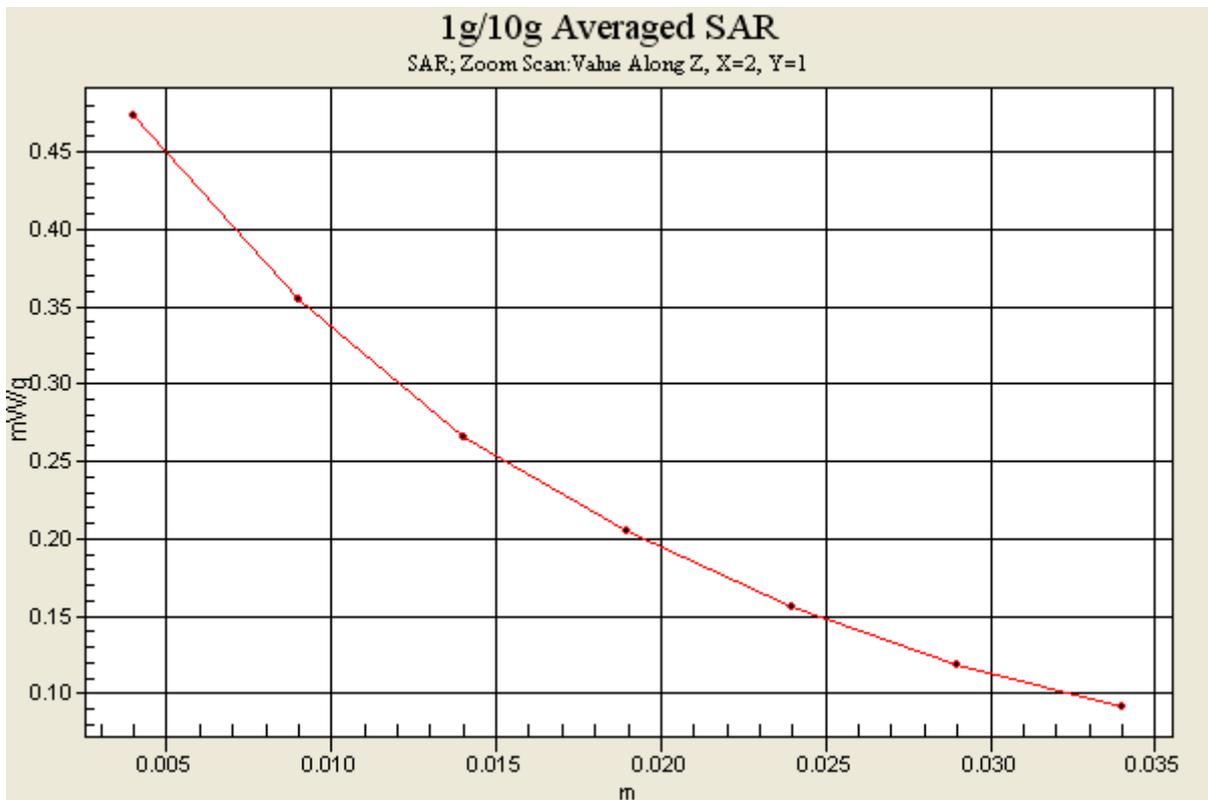
Communication System: GSM850; Frequency: 824.2 MHz; Duty Cycle: 1:8.3
Medium: HSL_850 Medium parameters used: f = 824.2 MHz; sigma = 0.887 mho/m; epsilon_r = 40.5; rho = 1000 kg/m^3
Ambient Temperature : 23.2 ; Liquid Temperature : 21.5

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.54, 6.54, 6.54); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch128/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.483 mW/g

Ch128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.82 V/m; Power Drift = -0.063 dB
Peak SAR (extrapolated) = 0.594 W/kg
SAR(1 g) = 0.449 mW/g; SAR(10 g) = 0.324 mW/g
Maximum value of SAR (measured) = 0.473 mW/g



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/30



Right Cheek_GSM1900 Ch661_2D

DUT: 850821

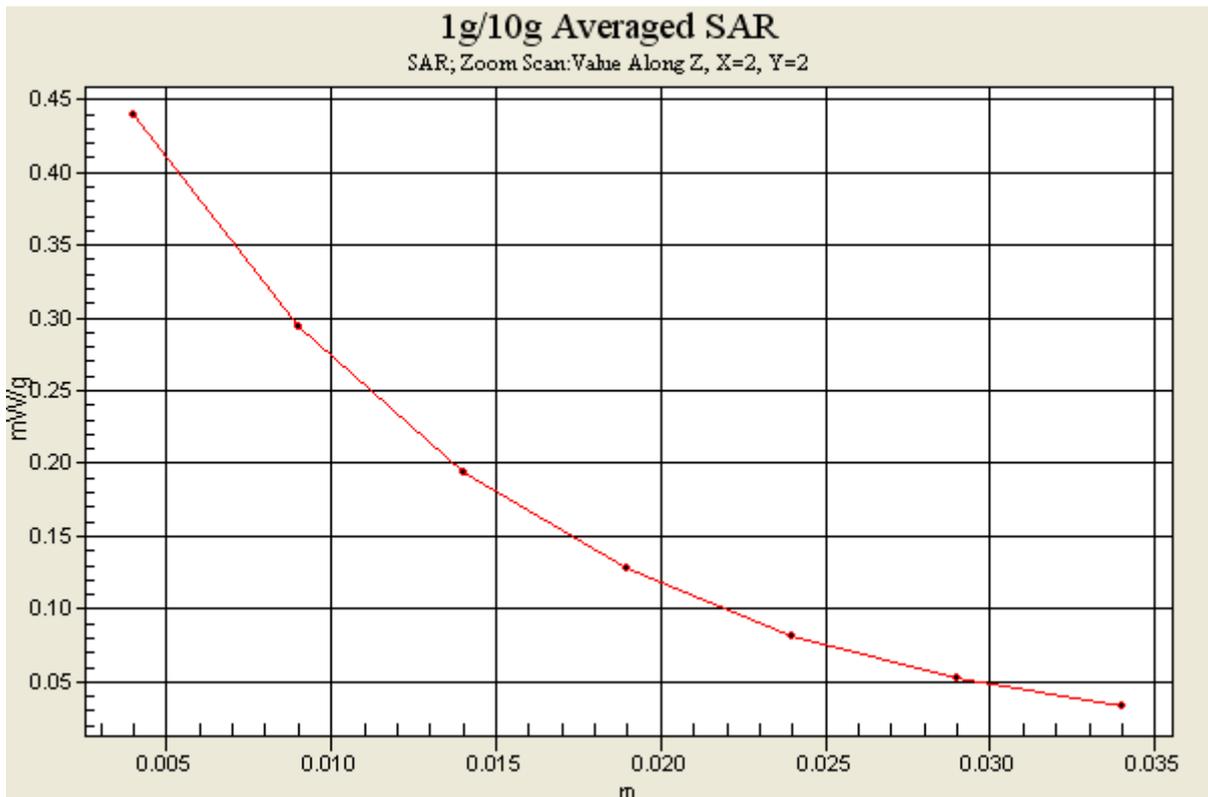
Communication System: PCS; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: HSL_1900 Medium parameters used: f = 1880 MHz; $\sigma = 1.39$ mho/m; $\epsilon_r = 41.8$; $\rho = 1000$ kg/m³
Ambient Temperature : 22.8 ; Liquid Temperature : 21.6

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(5.28, 5.28, 5.28); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.463 mW/g

Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.99 V/m; Power Drift = 0.089 dB
Peak SAR (extrapolated) = 0.610 W/kg
SAR(1 g) = 0.404 mW/g; SAR(10 g) = 0.252 mW/g
Maximum value of SAR (measured) = 0.439 mW/g





Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/9/15

Right Cheek_WCDMA1900 Ch9400_Slide Left_Battery2_2D

DUT: 850821

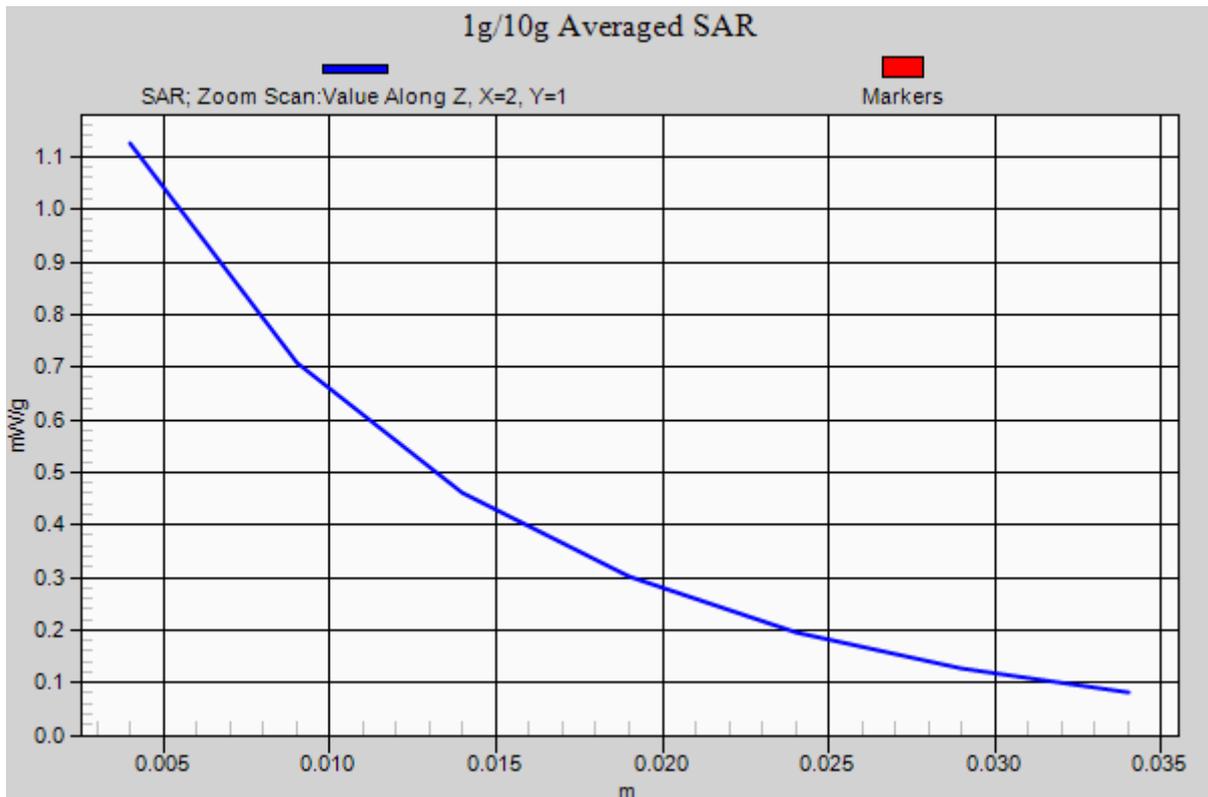
Communication System: WCDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: HSL_1900 Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 41.8$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 22.2 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(5.01, 5.01, 5.01); Calibrated: 2008/8/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 2008/8/25
- Phantom: SAM-Back; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Ch9400/Area Scan (71x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 1.16 mW/g

Ch9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 14.7 V/m; Power Drift = -0.00167 dB
Peak SAR (extrapolated) = 1.65 W/kg
SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.638 mW/g
Maximum value of SAR (measured) = 1.13 mW/g





Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/9/5

Body_GSM850 Ch128_Bottom with 1.5cm Gap_GPRS10_Slide Left_2D

DUT: 850821

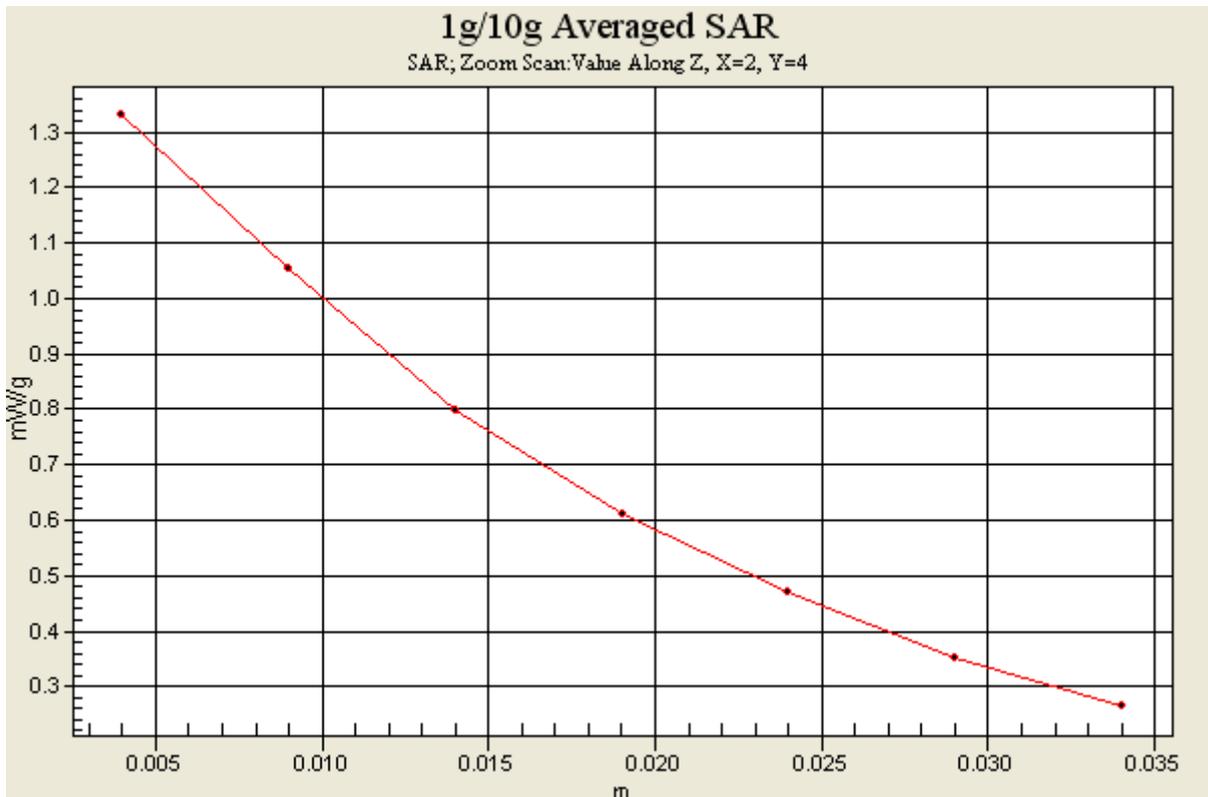
Communication System: GSM850; Frequency: 824.2 MHz; Duty Cycle: 1:4
Medium: MSL_850 Medium parameters used: $f = 824.2$ MHz; $\sigma = 0.967$ mho/m; $\epsilon_r = 56.3$; $\rho = 1000$ kg/m³
Ambient Temperature : 22.5 ; Liquid Temperature : 21.3

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(5.91, 5.91, 5.91); Calibrated: 2008/8/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch128/Area Scan (71x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.35 mW/g

Ch128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.7 V/m; Power Drift = -0.091 dB
Peak SAR (extrapolated) = 1.54 W/kg
SAR(1 g) = 1.26 mW/g; SAR(10 g) = 0.935 mW/g
Maximum value of SAR (measured) = 1.33 mW/g





Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/8/31

Body_GSM1900 Ch661_Bottom With 1.5cm Gap_GPRS10_2D

DUT: 850821

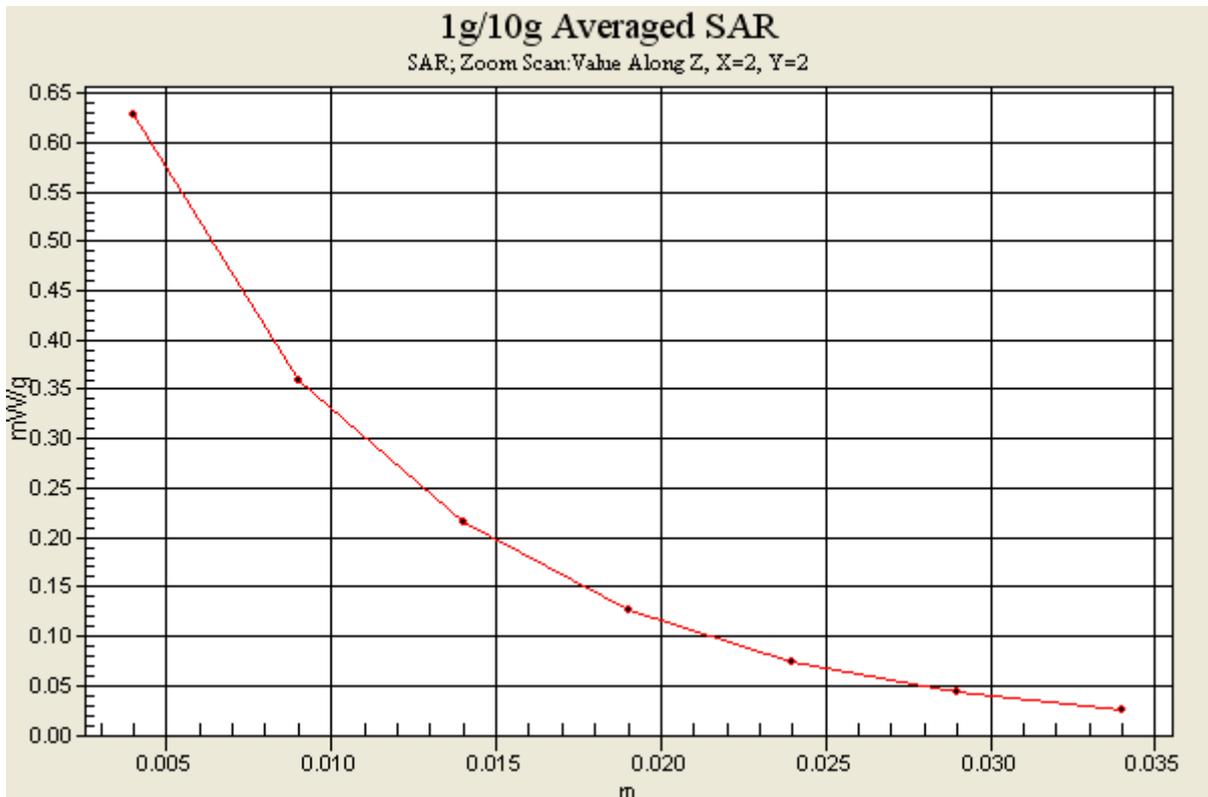
Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4
Medium: MSL_1900 Medium parameters used: f = 1880 MHz; sigma = 1.5 mho/m; epsilon_r = 51.5; rho = 1000 kg/m^3
Ambient Temperature : 22.9 ; Liquid Temperature : 21.4

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(4.75, 4.75, 4.75); Calibrated: 2007/9/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Left; Type: QD 000 P40 C; Serial: TP-1477
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.616 mW/g

Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.87 V/m; Power Drift = -0.001 dB
Peak SAR (extrapolated) = 1.00 W/kg
SAR(1 g) = 0.575 mW/g; SAR(10 g) = 0.338 mW/g
Maximum value of SAR (measured) = 0.627 mW/g





Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2008/9/5

Body_WCDMA1900 Ch9400_Bottom With 1.5cm Gap_RMC12.2K_2D

DUT: 850821

Communication System: WCDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: MSL_1900 Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 22.6 ; Liquid Temperature : 21.4

DASY4 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(4.49, 4.49, 4.49); Calibrated: 2008/8/26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2007/9/17
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Ch9400/Area Scan (51x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.771 mW/g

Ch9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 9.85 V/m; Power Drift = 0.191 dB
Peak SAR (extrapolated) = 1.30 W/kg
SAR(1 g) = 0.714 mW/g; SAR(10 g) = 0.416 mW/g
Maximum value of SAR (measured) = 0.764 mW/g

