

# A Test Lab Techno Corp.

Changan Lab : No. 140 -1, Changan Street, Bade City, Taoyuan County, Taiwan R.O.C.

Tel : 886-3-271-0188 / Fax : 886-3-271-0190

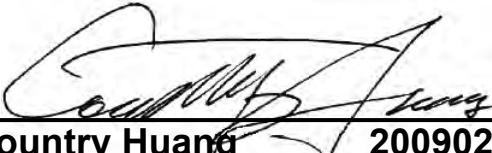


## SAR EVALUATION REPORT

<b>Test Report No.</b>	<b>: 0902FS15</b>
<b>Applicant</b>	<b>: Indigo Mobile Technologies Corp.</b>
<b>Product Type</b>	<b>: G5720 VGA Slider Phone</b>
<b>FCC ID</b>	<b>: W6M-WVE3090325B</b>
<b>Trade Name</b>	<b>: HUAWEI</b>
<b>Model Number</b>	<b>: G5720</b>
<b>Dates of Test</b>	<b>: Feb. 17 ~ Feb. 18, 2009</b>
<b>Test Environment</b>	<b>: Ambient Temperature : 22 ±2 °C Relative Humidity : 40 - 70 %</b>
<b>Test Specification</b>	<b>: Standard C95.1-2005 IEEE Std. 1528-2003 2.1093;FCC/OET Bulletin 65 Supplement C [July 2001]</b>
<b>Max. SAR</b>	<b>: 0.483 W/kg Head SAR 0.839 W/kg Body SAR</b>
<b>Test Lab</b>	<b>: Chang-an Lab</b>



1. The test operations have to be performed with cautious behavior, the test results are as attached.
2. The test results are under chamber environment of A Test Lab Techno Corp. A Test Lab Techno Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples.
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Country Huang 20090227  
Measurement Center Manager

  
Sam Chuang 20090227  
Testing Engineer



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## 1. Description of Equipment Under Test (EUT)

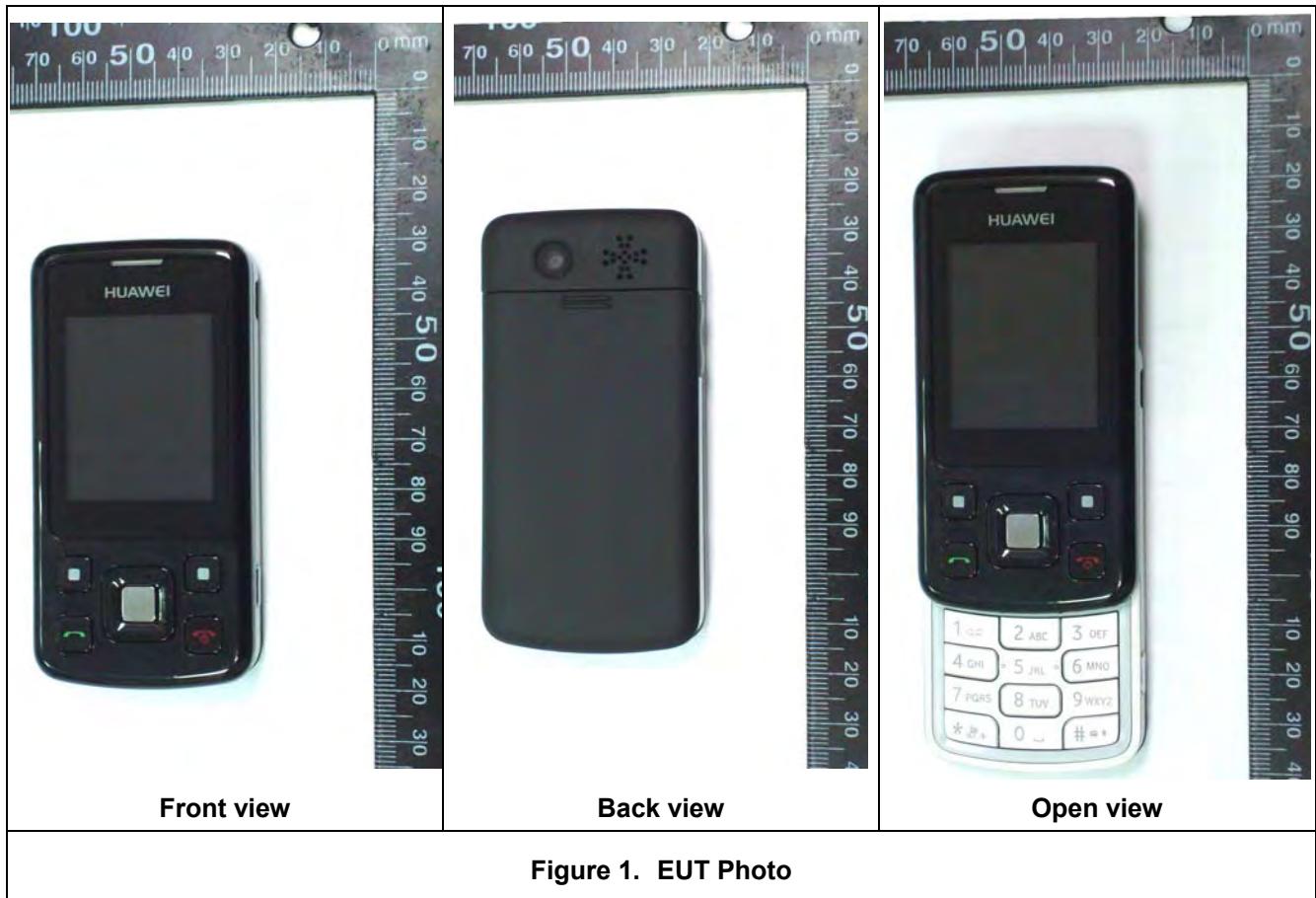
**Applicant :**

**Indigo Mobile Technologies Corp.**

**Administration Building , Huawei Base, Bantian, Longgang District, Shenzhen 518129**

<b>Manufacturer</b>	:	HUAWEI TECHNOLOGIES CO.,LTD.
<b>Manufacturer Address</b>	:	Administration Building , Huawei Base, Bantian, Longgang District, Shenzhen 518129
<b>Product Type</b>	:	G5720 VGA Slider Phone
<b>FCC ID</b>	:	W6M-WVE3090325B
<b>Trade Name</b>	:	HUAWEI
<b>Model Number</b>	:	G5720
<b>Test Device</b>	:	Production Unit
<b>Tx Frequency</b>	:	824.2 - 848.8 MHz (GSM/GPRS 850) 1850.2 - 1909.8 MHz (PCS/GPRS 1900)
<b>RF Conducted Power (Avg.)</b>	:	1.660 W (32.20 dBm) GSM/GPRS 850 1.096 W (30.40 dBm) PCS/GPRS 1900
<b>Max. SAR Measurement</b>	:	0.483 W/kg Head SAR 0.839 W/kg Body SAR
<b>HW Version</b>	:	P/N:PO-VE306-011-00B
<b>SW Version</b>	:	08A_0840_V10VE3_32
<b>Antenna Type</b>	:	Internal Type
<b>Antenna Gain</b>	:	-0.38 dB (GSM/GPRS 850) 1.29 dB (PCS/GPRS 1900)
<b>Device Category</b>	:	Portable
<b>RF Exposure Environment</b>	:	General Population / Uncontrolled
<b>Battery Option</b>	:	Standard
<b>Application Type</b>	:	Certification

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment / general population exposure limits specified in Standard C95.1-2005 and had been tested in accordance with the measurement procedures specified in IEEE Std. 1528-2003.



## 2. Other Accessories

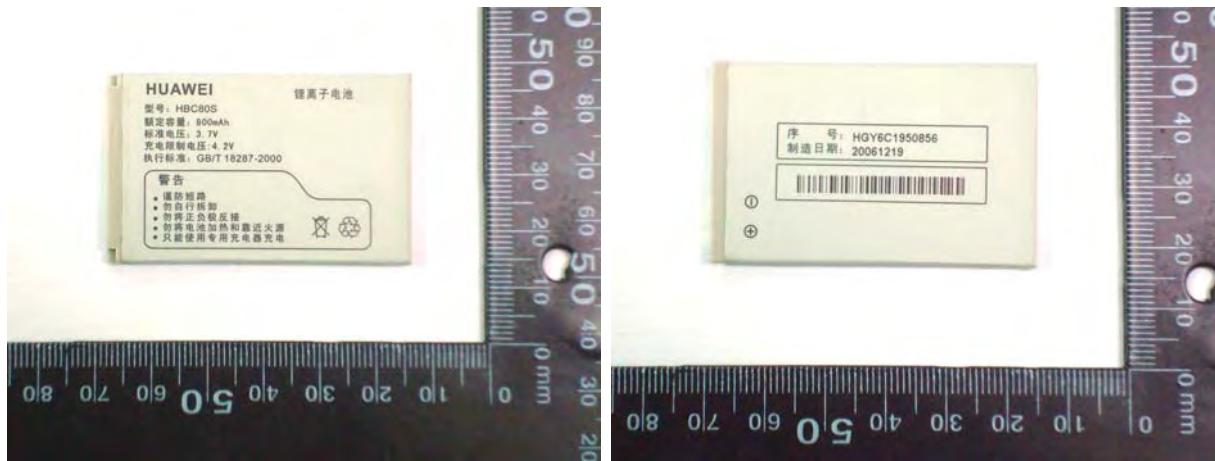


Figure 2. Li-ion Battery (3.7V 1410mAh)



Figure 3. AC Adapter



**Figure 4. Headset**

### **3. Introduction**

The A Test Lab Techno Corp. has performed measurements of the maximum potential exposure to the user of **Indigo Mobile Technologies Corp. Trade Name : HUAWEI Model(s) : G5720**. The test procedures, as described in American National Standards, Institute C95.1 - 2005 [ 1 ], FCC/OET Bulletin 65 Supplement C [July 2001] were employed and they specify the maximum exposure limit of 1.6mW/g as averaged over any 1 gram of tissue for portable devices being used within 25cm between user and EUT in the uncontrolled environment. A description of the product and operating configuration, detailed summary of the test results, methodology and procedures used in the equipment used are included within this test report.

### **4. SAR Definition**

Specific Absorption Rate (SAR) is defined as 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 ( $\rho$ ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Figure 5).

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

Figure 5. SAR Mathematical Equation

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

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

Where :

$\sigma$  = conductivity of the tissue (S/m)

$\rho$  = mass density of the tissue (kg/m<sup>3</sup>)

$E$  = RMS electric field strength (V/m)

\*Note :

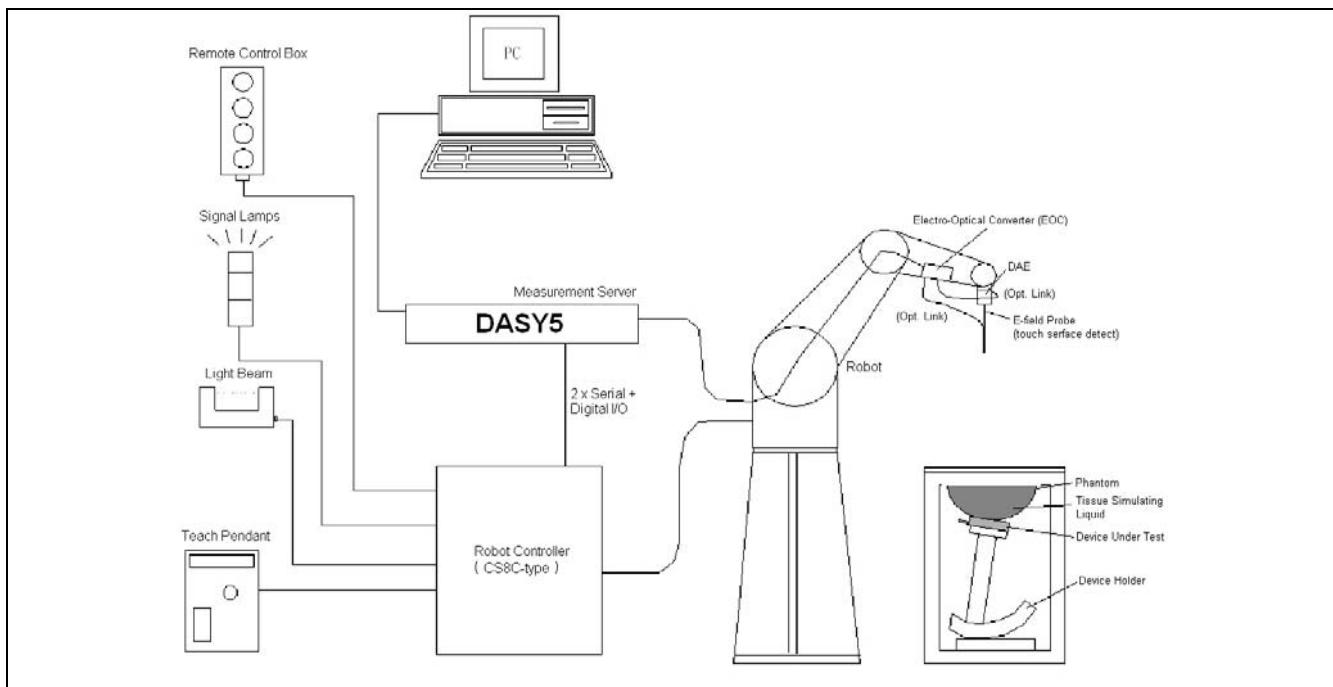
The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane [ 2 ]



## 5. **SAR Measurement Setup**

These measurements were performed with the automated near-field scanning system DASY5 from Schmid & Partner Engineering AG (SPEAG). The system is based on a high precision robot (working range greater than 0.9m) which positions the probes with a positional repeatability of better than  $\pm 0.02\text{mm}$ . Special E- and H-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines (length = 300mm) to the data acquisition unit.

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The Measurement Server is based on a PC/104 CPU board with a 400MHz intel ULV Celeron, 128MB chipdisk and 128MB RAM. The necessary circuits for communication with either the DAE4 (or DAE3) electronic box as well as the 16-bit AD-converter system for optical detection and digital I/O interface are contained on the DASY5 I/O-board, which is directly connected to the PC/104 bus of the CPU board. The PC consists of the Intel Core(TM)2 CPU @1.86GHz computer with Windows XP system and SAR Measurement Software DASY5, Post Processor SEMCAD, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection...etc. is connected to the Electro-optical converter (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the Measurement Server.



**Figure 6. SAR Lab Test Measurement Setup**

The DAE4 (or DAE3) 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 PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer. The system is described in detail in [ 3 ] .



## 6. **System Components**

### 6.1 DASY5 E-Field Probe System

The SAR measurements were conducted with the dosimetric probe ES3DV3 or ET3DV6 (manufactured by SPEAG), designed in the classical triangular configuration [3] and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multi-fiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY5 software reads the reflection during a software approach and looks for the maximum using a 2nd order fitting. The approach is stopped when reaching the maximum.

### 6.1.1 E-Field Probe Specification

<b>Construction</b>	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, e.g., glycol)
<b>Calibration</b>	In air from 10 MHz to 6 GHz In brain and muscle simulating tissue at frequencies of 835MHz, 1950MHz (accuracy $\pm 8\%$ ) Calibration for other liquids and frequencies upon request
<b>Frequency</b>	10 MHz to $> 6$ GHz; Linearity: $\pm 0.2$ dB (30 MHz to 3 GHz)
<b>Directivity</b>	$\pm 0.3$ dB in brain tissue (rotation around probe axis) $\pm 0.5$ dB in brain tissue (rotation normal probe axis)
<b>Dynamic Range</b>	10 $\mu$ W/g to $> 100$ mW/g; Linearity: $\pm 0.2$ dB
<b>Surface Detection</b>	$\pm 0.2$ mm repeatability in air and clear liquids over diffuse reflecting surface (EX3DV3 only)
<b>Dimensions</b>	Overall length: 330mm Tip length: 20mm Body diameter: 12mm Tip diameter: 2.5mm Distance from probe tip to dipole centers: 1.0mm
<b>Application</b>	General dosimetry up to 6GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms



Figure 7. E-field Probe



Figure 8.  
Probe setup on robot

### 6.1.2 E-Field Probe Calibration

Each probe is calibrated according to a dosimetric assessment procedure described in [ 4 ] with accuracy better than  $\pm 10\%$ . The spherical isotropy was evaluated with the procedure described in [ 5 ] and found to be better than  $\pm 0.25\text{dB}$ . The sensitivity parameters (NormX, NormY, and NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies below 1GHz, and in a wave guide above 1GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

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

Where :

$\Delta t$  = Exposure time (30 seconds),

$C$  = Heat capacity of tissue (head or body),

$\Delta T$  = Temperature increase due to RF exposure.

Or

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

Where :

$\sigma$  = Simulated tissue conductivity,

$\rho$  = Tissue density ( $\text{kg}/\text{m}^3$ ).



## 6.2 Data Acquisition Electronic (DAE) System

### Cell Controller

Processor : Intel Core(TM)2 CPU  
Clock Speed : @ 1.86GHz  
Operating System : Windows XP Professional

### Data Converter

Features : Signal Amplifier, multiplexer, A/D converter, and control logic  
Software : DASY5 v5.0 (Build 120) & SEMCAD X Version 13.2 Build 87  
Connecting Lines : Optical downlink for data and status info  
Optical uplink for commands and clock

## 6.3 Robot

Positioner : Stäubli Unimation Corp. Robot Model: TX90XL  
Repeatability :  $\pm 0.02$  mm  
No. of Axis : 6

## 6.4 Measurement Server

Processor : PC/104 with a 400MHz intel ULV Celeron  
I/O-board : Link to DAE4(or DAE3)  
16-bit A/D converter for surface detection system  
Digital I/O interface  
Serial link to robot  
Direct emergency stop output for robot

## 6.5 Device Holder for Transmitters

In combination with the SAM Twin Phantom V4.0, the Mounting Device (POM) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately, and repeat ably positioned according to the IEEE SCC34-SC2 and CENELEC specifications. The device holder can be locked at different phantom locations (left head, right head, and flat phantom).

**\*Note :** A simulating human hand is not used due to the complex anatomical and geometrical structure of the hand that may produced infinite number of configurations [ 6 ] . To produce the worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.

Larger DUT cannot be tested using this device holder. Instead a support of bigger polystyrene cubes and thin polystyrene plates is used to position the DUT in all relevant positions to find and measure spots with maximum SAR values. Therefore those devices are normally only tested at the flat part of the SAM.

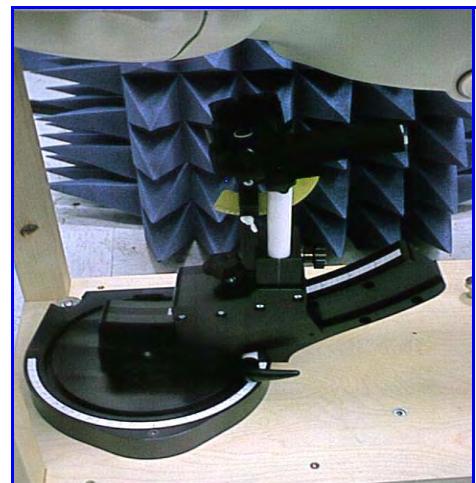


Figure 9. Device Holder

## 6.6 Phantom - SAM v4.0

The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-2003, CENELEC 50361 and IEC 62209. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points with the robot.



Figure 10. SAM Twin Phantom

<b>Shell Thickness</b>	2 ±0.2 mm
<b>Filling Volume</b>	Approx. 25 liters
<b>Dimensions</b>	810x1000x500 mm (HxLxW)

Table 1. Specification of SAM v4.0

## 6.7 Data Storage and Evaluation

### 6.7.1 Data Storage

The DASY5 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 with the extension .DA4. 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.



### 6.7.2 Data Evaluation

The DASY5 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 Normi, ai0, ai1, ai2

- Conversion factor ConvFi

- Diode compression point dcpi

**Device parameters :** - Frequency f

- Crest factor cf

**Media parameters :** - Conductivity  $\sigma$

- Density  $\rho$

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 DASY components. In the direct measuring mode of the multimeter 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 :

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

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)

$dcpi$  = diode compression point (DASY parameter)

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

**E-field probes :**

$$E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

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

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

$Hi$  = 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

$\sigma$  = conductivity in [mho/m] or [Siemens/m]

$\rho$  = equivalent tissue density in g/cm<sup>3</sup>

**\*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.

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

with  $P_{pwe}$  = equivalent power density of a plane wave in mW/cm<sup>2</sup>

$E_{tot}$  = total electric field strength in V/m

$H_{tot}$  = total magnetic field strength in A/m



## 7. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	Dosimetric E-Field Probe	ES3DV3	3150	Jan. 20, 2009	Jan. 20, 2010
SPEAG	835MHz System Validation Kit	D835V2	4d063	Jun. 06, 2008	Jun. 06, 2009
SPEAG	1900MHz System Validation Kit	D1900V2	5d018	May. 22, 2008	May. 22, 2009
SPEAG	Data Acquisition Electronics	DAE4	779	Nov. 11, 2008	Nov. 11, 2009
SPEAG	Device Holder	N/A	N/A	NCR	NCR
SPEAG	Phantom	SAM V4.0	TP-1150	NCR	NCR
SPEAG	Robot	Staubli TX90XL	F07/564ZA1/C/01	NCR	NCR
SPEAG	Software	DASY5 V5.0 Build 120	N/A	NCR	NCR
SPEAG	Software	SEMCAD X V13.2 Build 87	N/A	NCR	NCR
SPEAG	Measurement Server	SE UMS 011 AA	1025	NCR	NCR
R&S	Wireless Communication Test Set	CMU200	112387	Oct. 31, 2008	Oct. 31, 2009
Agilent	Wireless Communication Test Set	E5515C	GB47020167	Apr. 17, 2008	Apr. 17, 2009
Agilent	ENA Series Network Analyzer	E5071B	MY42402996	Nov. 04, 2008	Nov. 04, 2009
Agilent	Dielectric Probe Kit	85070C	US99360094	NCR	NCR
R&S	Power Sensor	NRP-Z22	100179	May. 03, 2008	May. 03, 2009
Agilent	Signal Generator	E8257D	MY44320425	Jul. 03, 2008	Jul. 03, 2009
Agilent	Dual Directional Coupler	778D	50334	NCR	NCR
Mini-Circuits	Power Amplifier	ZHL-42W-SMA	D111103#5	NCR	NCR
Mini-Circuits	Power Amplifier	ZVE-8G-SMA	D042005 671800514	NCR	NCR

Table 2. Test Equipment List



## 8. **Tissue Simulating Liquids**

The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the tissue.

The dielectric parameters of the liquids were verified prior to the SAR evaluation using an 85070C Dielectric Probe Kit and an 8720ES Network Analyzer.

### **IEEE SCC-34/SC-2 in 1528 recommended Tissue Dielectric Parameters**

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in 1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in human head. Other head and body tissue parameters that have not been specified in 1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equation and extrapolated according to the head parameter specified in 1528.

<b>Target Frequency</b>	<b>Head</b>		<b>Body</b>	
	<b>(MHz)</b>	<b><math>\epsilon_r</math></b>	<b><math>\sigma</math> (S/m)</b>	<b><math>\epsilon_r</math></b>
<b>150</b>	52.3	0.76	61.9	0.80
<b>300</b>	45.3	0.87	58.2	0.92
<b>450</b>	43.5	0.87	56.7	0.94
<b>835</b>	41.5	0.90	55.2	0.97
<b>900</b>	41.5	0.97	55.0	1.05
<b>915</b>	41.5	0.98	55.0	1.06
<b>1450</b>	40.5	1.20	54.0	1.30
<b>1610</b>	40.3	1.29	53.8	1.40
<b>1800 - 2000</b>	40.0	1.40	53.3	1.52
<b>2450</b>	39.2	1.80	52.7	1.95
<b>3000</b>	38.5	2.40	52.0	2.73
<b>5800</b>	35.3	5.27	48.2	6.00
( $\epsilon_r$ = relative permittivity, $\sigma$ = conductivity and $\rho$ = 1000 kg/m <sup>3</sup> )				

**Table 3. Tissue dielectric parameters for head and body phantoms**

## 8.1 Ingredients

The following ingredients are used:

- Water: deionized water (pure H<sub>2</sub>O), resistivity  $\geq 16 \text{ M } \Omega$  -as basis for the liquid
- Sugar: refied white sugar (typically 99.7 % sucrose, available as crystal sugar 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
- DGBE: Diethylenglycol-monobuthyl ether (DGBE), Fluka Chemie GmbH, CAS # 112-34-5 -to reduce relative permittivity

## 8.2 Recipes

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

Note: The goal dielectric parameters (at 22 °C) must be achieved within a tolerance of  $\pm 5\%$  for  $\epsilon$  and  $\pm 5\%$  for  $\sigma$ .

Liquid type	HSL 900-B	
Ingredient		
Water	532.63	40.29
Sugar	765.49	57.90
Cellulose	3.20	0.24
Salt	18.29	1.38
Preventol	2.40	0.18
Total amount	1,322.00	100.00
Goal dielectric parameters		
Frequency [MHz]	835	900
Relative Permittivity	41.5	41.5
Conductivity [S/m]	0.90	0.97

Liquid type	MSL 900-B	
Ingredient	Weight (g)	Weight (%)
Water	633.91	50.75
Sugar	602.12	50.75
Cellulose	-	0.00
Salt	11.76	0.94
Preventol	1.20	0.10
Total amount	1,249.00	100.00
<b>Goal dielectric parameters</b>		
Frequency [MHz]	835	900
Relative Permittivity	55.2	55.0
Conductivity [S/m]	0.97	1.05

Liquid type	HSL 1950-B	
Ingredient	Weight (g)	Weight (%)
Water	554.12	55.41
DGBE	445.08	44.51
Salt	0.80	0.08
Total amount	1,000.00	100.00
<b>Goal dielectric parameters</b>		
Frequency [MHz]	1950	2000
Relative Permittivity	40.0	40.0
Conductivity [S/m]	1.40	1.40

Liquid type	MSL 1950-B	
Ingredient	Weight (g)	Weight (%)
Water	697.94	69.79
DGBE	300.03	30.00
Salt	2.03	0.20
Total amount	1,000.00	100.00
<b>Goal dielectric parameters</b>		
Frequency [MHz]	1950	2000
Relative Permittivity	53.3	53.3
Conductivity [S/m]	1.52	1.52

## 8.3 Liquid Confirmation

### 8.3.1 Parameters

Liquid Verify								
Ambient Temperature : 22 ± 2 °C ; Relative Humidity : 40 -70%								
Liquid Type	Frequency	Temp (°C)	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)	Measured Date
835MHz Head	800MHz	22.0	εr	41.5	<b>43.0</b>	<b>3.61%</b>	± 5	Feb. 17, 2009
			σ	0.90	<b>0.88</b>	<b>-2.22%</b>	± 5	
835MHz Body	800MHz	22.0	εr	55.2	<b>55.8</b>	<b>1.09%</b>	± 5	Feb. 17, 2009
			σ	0.97	<b>0.93</b>	<b>-4.12%</b>	± 5	
835MHz Head	835MHz	22.0	εr	41.5	<b>42.8</b>	<b>3.13%</b>	± 5	Feb. 17, 2009
			σ	0.90	<b>0.912</b>	<b>1.33%</b>	± 5	
835MHz Body	835MHz	22.0	εr	55.2	<b>55.5</b>	<b>0.54%</b>	± 5	Feb. 17, 2009
			σ	0.97	<b>0.96</b>	<b>-1.03%</b>	± 5	
835MHz Head	850MHz	22.0	εr	41.5	<b>42.7</b>	<b>2.89%</b>	± 5	Feb. 17, 2009
			σ	0.90	<b>0.93</b>	<b>3.33%</b>	± 5	
835MHz Body	850MHz	22.0	εr	55.2	<b>55.4</b>	<b>0.36%</b>	± 5	Feb. 17, 2009
			σ	0.97	<b>0.97</b>	<b>0.00%</b>	± 5	
1950MHz Head	1850MHz	22.0	εr	40.0	<b>40.67</b>	<b>1.68%</b>	± 5	Feb. 17, 2009
			σ	1.40	<b>1.37</b>	<b>-2.14%</b>	± 5	
1950MHz Body	1850MHz	22.0	εr	53.3	<b>53.32</b>	<b>0.04%</b>	± 5	Feb. 18, 2009
			σ	1.52	<b>1.46</b>	<b>-3.95%</b>	± 5	
1950MHz Head	1900MHz	22.0	εr	40.0	<b>40.5</b>	<b>1.25%</b>	± 5	Feb. 17, 2009
			σ	1.40	<b>1.40</b>	<b>0.00%</b>	± 5	
1950MHz Body	1900MHz	22.0	εr	53.3	<b>53.1</b>	<b>-0.38%</b>	± 5	Feb. 18, 2009
			σ	1.52	<b>1.50</b>	<b>-1.32%</b>	± 5	
1950MHz Head	1950MHz	22.0	εr	40.0	<b>40.31</b>	<b>0.78%</b>	± 5	Feb. 17, 2009
			σ	1.40	<b>1.44</b>	<b>2.86%</b>	± 5	
1950MHz Body	1950MHz	22.0	εr	53.3	<b>52.9</b>	<b>-0.75%</b>	± 5	Feb. 18, 2009
			σ	1.52	<b>1.55</b>	<b>1.97%</b>	± 5	

Table 4. Measured Tissue dielectric parameters for head and body phantoms

### 8.3.2 Liquid Depth

The liquid level was during measurement 15cm  $\pm 0.5$ cm.

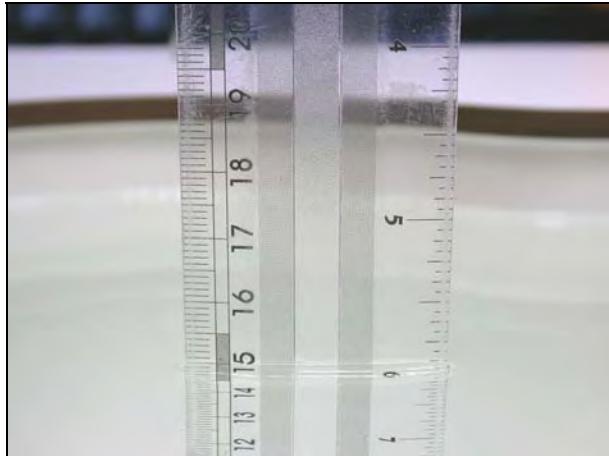


Figure 11. Head-Tissue-Simulating-Liquid



Figure 12. Body-Tissue-Simulating-Liquid

## 9. Measurement Process

### 9.1 Device and Test Conditions

The Test Device was provided by **Indigo Mobile Technologies Corp.** for this evaluation. The spatial peak SAR values were assessed for the lowest, middle and highest channels defined by **GSM 850** (#128=824.2MHz, #190=836.6MHz, #251=848.8MHz) and **PCS 1900** (#512=1850.2MHz, #661=1880.0MHz, #810=1909.8MHz) systems.

Usage	Operates with a Normal mode by client (GSM/PCS/WCDMA)				
Simulating human Head/Body	Head & Body				
EUT Battery	Fully-charged with Li-ion batteries.				

Band	Mode	CH	Frequency (MHz)	Average Conducted power (dBm)		Worst
				before	After	
GSM850	-----	Lowest	824.2	33.00	32.98	<input type="checkbox"/>
		Middle	836.6	33.10	33.08	<input type="checkbox"/>
		Highest	848.8	33.20	33.18	<input checked="" type="checkbox"/>
GPRS 850	3Down2Up	Lowest	824.2	32.70	32.68	<input type="checkbox"/>
		Middle	836.6	32.90	32.88	<input type="checkbox"/>
		Highest	848.8	33.00	32.98	<input type="checkbox"/>
	3Down1Up	Lowest	824.2	32.80	32.78	<input type="checkbox"/>
		Middle	836.6	33.00	32.98	<input type="checkbox"/>
		Highest	848.8	33.10	33.08	<input checked="" type="checkbox"/>
PCS1900	-----	Lowest	1850.2	30.20	30.18	<input type="checkbox"/>
		Middle	1880.0	30.40	30.38	<input checked="" type="checkbox"/>
		Highest	1909.8	30.30	30.28	<input type="checkbox"/>
GPRS 1900	3Down2Up	Lowest	1850.2	30.10	30.08	<input type="checkbox"/>
		Middle	1880.0	30.20	30.18	<input type="checkbox"/>
		Highest	1909.8	30.20	30.18	<input type="checkbox"/>
	3Down1Up	Lowest	1850.2	30.10	30.08	<input type="checkbox"/>
		Middle	1880.0	30.30	30.28	<input checked="" type="checkbox"/>
		Highest	1909.8	30.20	30.18	<input type="checkbox"/>

Comment: The SAR test mode is chosen by the max conducted power.

## 9.2 System Performance Check

### 9.2.1 Symmetric Dipoles for System Validation

<b>Construction</b>	Symmetrical dipole with 1/4 balun enables measurement of feed point impedance with NWA matched for use near flat phantoms filled with head simulating solutions. Includes distance holder and tripod adaptor. Calibration. Calibrated SAR value for specified position and input power at the flat phantom in head simulating solutions.
<b>Frequency</b>	835, 1900 MHz
<b>Return Loss</b>	> 20 dB at specified validation position
<b>Power Capability</b>	> 100 W (f < 1GHz); > 40 W (f > 1GHz)
<b>Options</b>	Dipoles for other frequencies or solutions and other calibration conditions are available upon request
<b>Dimensions</b>	D835V2 : dipole length 150 mm; overall height 330 mm D1900V2 : dipole length 62 mm; overall height 300 mm



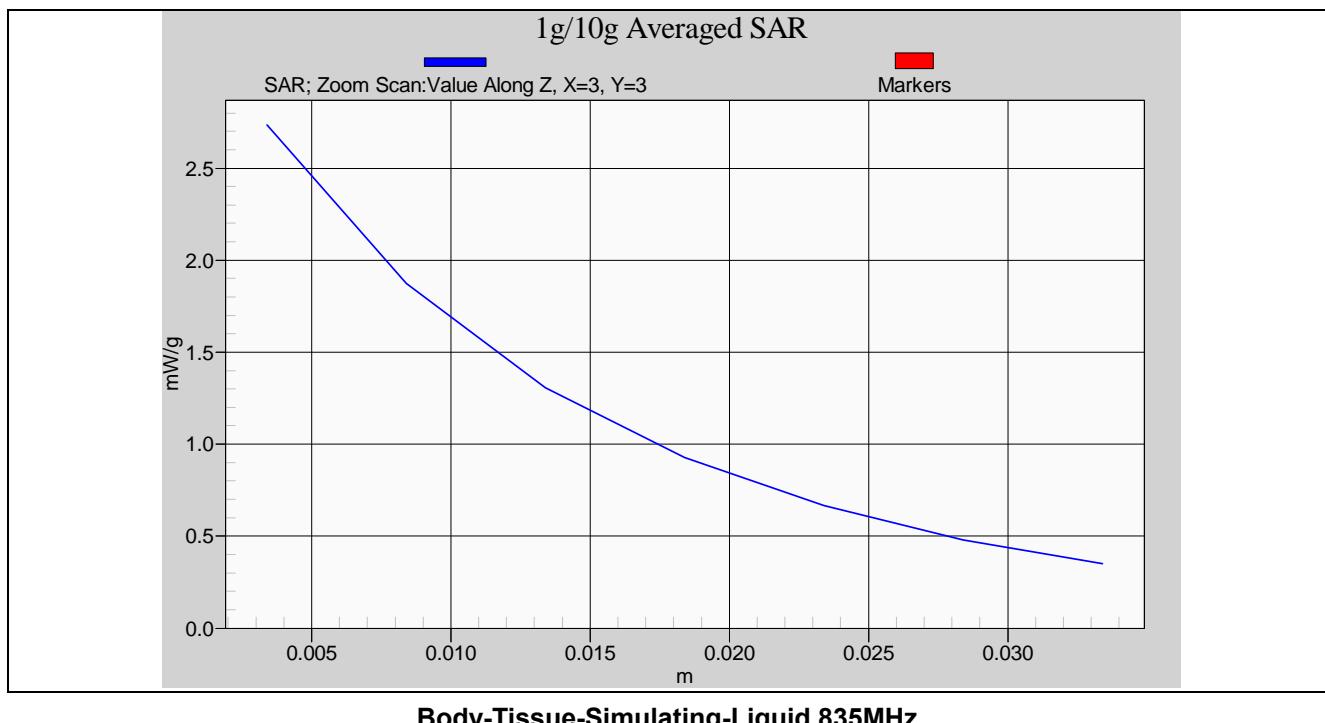
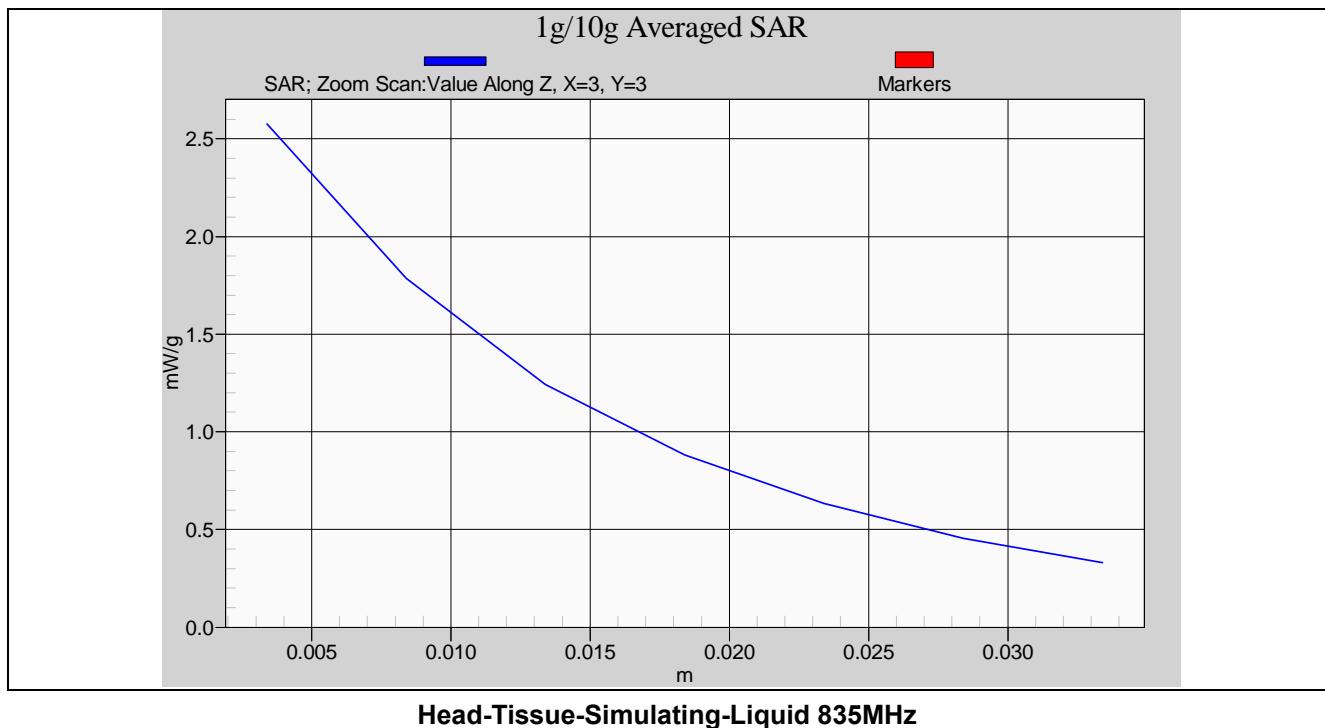
Figure 13. Validation Kit

### 9.2.2 Validation

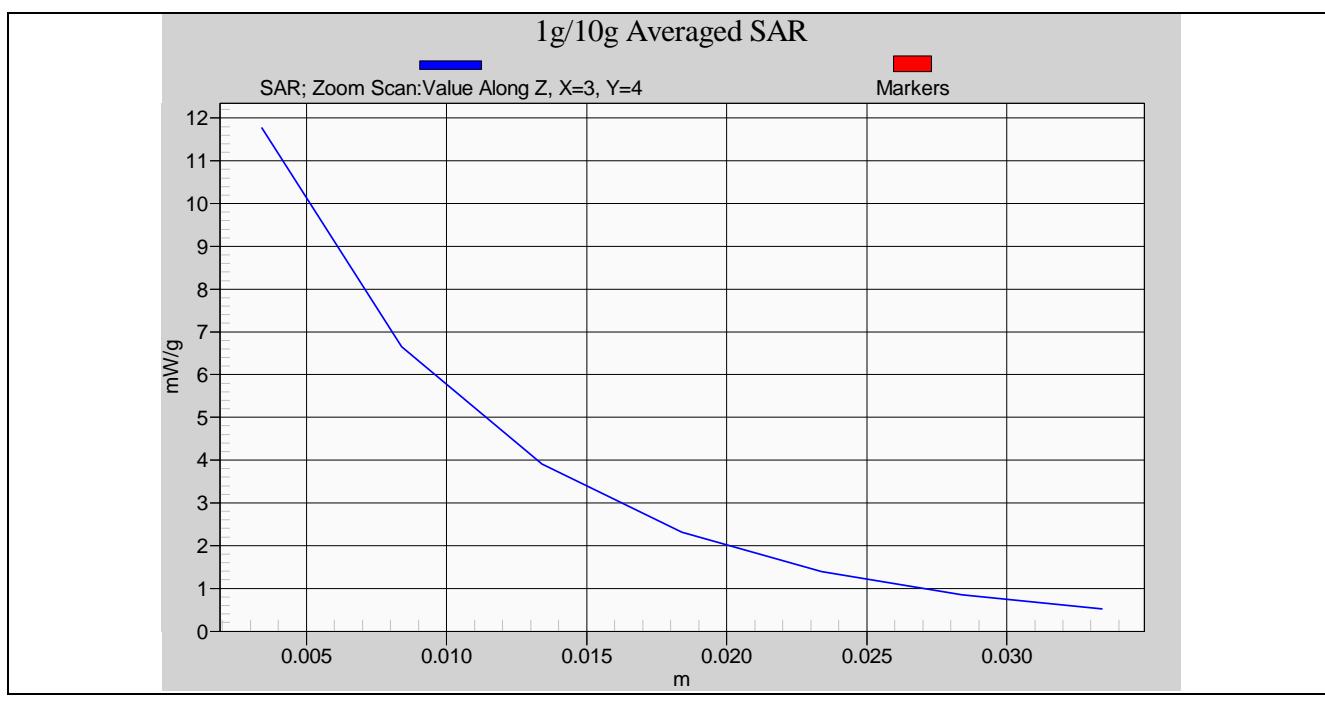
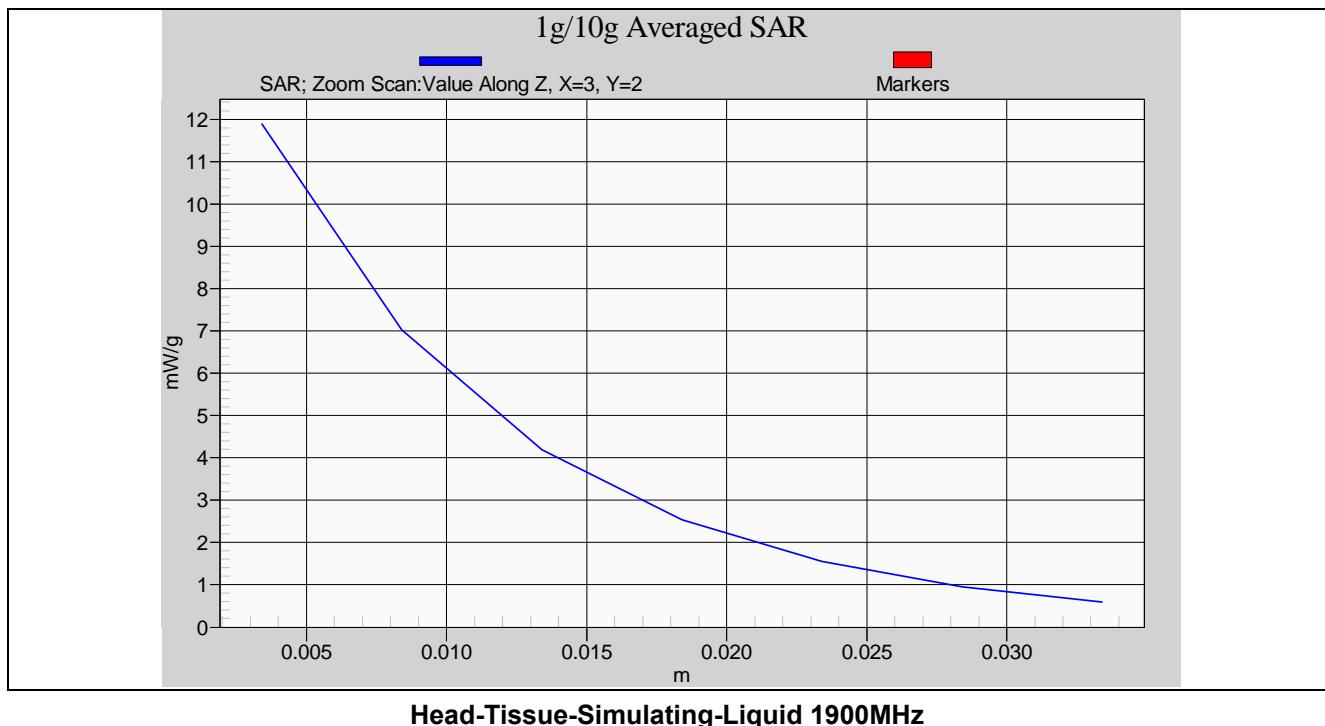
Prior to the assessment, the system validation kit was used to test whether the system was operating within its specifications of  $\pm 7\%$ . The validation was performed at 835MHz and 1900MHz.

Validation kit		Mixture Type	$SAR_{1g}$ [mW/g]		$SAR_{10g}$ [mW/g]		Date of Calibration
D835V2-SN4d063		Head	9.16		6.08		Jun. 06, 2008
		Body	9.76		6.44		
D1900V2-SN5d018		Head	39.4		20.28		May. 22, 2008
		Body	38.4		20.16		
Frequency (MHz)	Power (dBm)	$SAR_{1g}$ (mW/g)	$SAR_{10g}$ (mW/g)	Drift (dB)	Difference percentage		Date
		250mW	1.51		1g	10g	
835 (Head)	Normalize to 1 Watt	9.12	6.04	0.041	-0.4 %	-0.7 %	Feb. 17, 2009
835 (Body)	Normalize to 1 Watt	9.68	6.4	-0.016	-0.8 %	-0.6 %	Feb. 17, 2009
1900 (Head)	Normalize to 1 Watt	39.12	20.76	-0.00158	-0.7 %	2.4 %	Feb. 17, 2009
1900 (Body)	Normalize to 1 Watt	38.6	20	0.00359	0.5 %	-0.8 %	Feb. 18, 2009

### Z-axis Plot of System Performance Check



### Z-axis Plot of System Performance Check





## 9.3 Dosimetric Assessment Setup

### 9.3.1 Body Test Position

#### Body - Worn Configuration

Body - Worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations. Devices with a headset output should be tested with a headset connected to the device.

Body - Worn accessories may not always be supplied or available as options for some devices that are intended to be authorized for body-worn use. A separation distance of 15 mm between the back of the device and a flat phantom is recommended for testing body-worn SAR compliance under such circumstances.

For this test :

- The EUT is placed into the holster/belt clip and the holster is positioned against the surface of the phantom in a normal operating position.
- Since this EUT doesn't supply any body-worn accessory to the end user, for **GSM850 band** and **PCS1900** the distance of **15 mm** was tested to confirm the necessary "minimum SAR separation distance".  
( \*Note : This distance includes the 2 mm phantom shell thickness.)

### 9.3.2 Measurement Procedures

**The evaluation was performed with the following procedures :**

**Surface Check :** A surface checks job gathers data used with optical surface detection. It determines the distance from the phantom surface where the reflection from the optical detector has its peak. Any following measurement jobs using optical surface detection will then rely on this value. The surface check performs its search a specified number of times, so that the repeatability can be verified. The probe tip distance is 1.3mm to phantom inner surface during scans.

**Reference :** The reference job measures the field at a specified reference position, at 4 mm from the selected section's grid reference point.

**Area Scan :** The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a finer measurement around the hot spot. The sophisticated interpolation routines can find the maximum locations even in relatively coarse grids. When an area scan has measured all reachable points, it computes the field maxima found in the scanned area, within a range of the global maximum. Any following zoom scan within the same procedure will then perform fine scans around these maxima. The area covered the entire dimension of the EUT and the horizontal grid spacing was 15 mm x 15 mm.

**Zoom Scan :** Zoom scans are used to assess the highest averaged SAR for cubic averaging volumes with 1 g and 10 g of simulated tissue. The zoom scan measures 5 x 5 x 7 points in a 32 x 32 x 30 mm cube whose base faces are centered around the maxima returned from a preceding area scan within the same procedure.

**Drift :** The drift job measures the field at the same location as the most recent reference job within the same procedure, with the same settings. The drift measurement gives the field difference in dB from the last reference measurement. Several drift measurements are possible for each reference measurement. This allows monitoring of the power drift of the device in the batch process. If the value changed by more than 5%, the evaluation was repeated.

## 9.4 Spatial Peak SAR Evaluation

The DASY5 software includes all numerical procedures necessary to evaluate the spatial peak SAR values. Based on the Draft: SCC-34, SC-2, WG-2 - Computational Dosimetry, IEEE P1529/D0.0 (Draft Recommended Practice for Determining the Spatial-Peak Specific Absorption Rate (SAR) Associated with the Use of Wireless Handsets - Computational 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 in a volume of  $(32 \times 32 \times 30) \text{ mm}^3$  (5x5x7 points). 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. If the 10g cube or both cubes are not entirely inside the measured volumes, the system issues a warning regarding the evaluated spatial peak values within the Postprocessing engine (SEMCAD). This means that if the measured volume is shifted, higher values might be possible. To get the correct values you can use a finer measurement grid for the area scan. In complicated field distributions, a large grid spacing for the area scan might miss some details and give an incorrectly interpolated peak location.

The entire evaluation of the spatial peak values is performed within the Postprocessing 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 three stages:

### Interpolation and Extrapolation

The probe is calibrated at the center of the dipole sensors which is located 1 to 2.7mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated.

In DASY5, the choice of the coordinate system defining the location of the measurement points has no influence on the uncertainty of the interpolation, Maxima Search and SAR extrapolation routines. The interpolation, Maxima Search and extrapolation routines are all based on the modified Quadratic Shepard's method [7].



## **10. Measurement Uncertainty**

Measurement uncertainties in SAR measurements are difficult to quantify due to several variables including biological, physiological, and environmental. However, we estimate the measurement uncertainties in SAR to be less than  $\pm 21.9\%$  [8].

According to Std. C95.3 [9], the overall uncertainties are difficult to assess and will vary with the type of meter and usage situation. However, accuracy's of  $\pm 1$  to  $3$  dB can be expected in practice, with greater uncertainties in near-field situations and at higher frequencies (shorter wavelengths), or areas where large reflecting objects are present. Under optimum measurement conditions, SAR measurement uncertainties of at least  $\pm 2$  dB can be expected.

According to CENELEC [10], typical worst-case uncertainty of field measurements is  $\pm 5$  dB. For well-defined modulation characteristics the uncertainty can be reduced to  $\pm 3$  dB.

Error Description	Uncertainty value	Prob. Dist.	Div.	$(ci)$ 1g	$(ci)$ 10g	Std. Unc. (1g)	Std. Unc. (10g)	$(vi) v_{eff}$
<b>Measurement System</b>								
Probe Calibration	$\pm 5.9\%$	N	1	1	1	$\pm 5.9\%$	$\pm 5.9\%$	
Axial Isotropy	$\pm 4.7\%$	R		0.7	0.7	$\pm 1.9\%$	$\pm 1.9\%$	$\infty$
Hemispherical Isotropy	$\pm 9.6\%$	R	$\sqrt{3}$	0.7	0.7	$\pm 3.9\%$	$\pm 3.9\%$	$\infty$
Boundary Effects	$\pm 1.0\%$	R	$\sqrt{3}$	1	1	$\pm 0.6\%$	$\pm 0.6\%$	$\infty$
Linearity	$\pm 4.7\%$	R	$\sqrt{3}$	1	1	$\pm 2.7\%$	$\pm 2.7\%$	$\infty$
System Detection Limits	$\pm 1.0\%$	R	$\sqrt{3}$	1	1	$\pm 0.6\%$	$\pm 0.6\%$	$\infty$
Readout Electronics	$\pm 0.3\%$	N	1	1	1	$\pm 0.3\%$	$\pm 0.3\%$	$\infty$
Response Time	$\pm 0.8\%$	R	$\sqrt{3}$	1	1	$\pm 0.5\%$	$\pm 0.5\%$	$\infty$
Integration Time	$\pm 2.6\%$	R	$\sqrt{3}$	1	1	$\pm 1.5\%$	$\pm 1.5\%$	$\infty$
RF Ambient Noise	$\pm 3.0\%$	R	$\sqrt{3}$	1	1	$\pm 1.7\%$	$\pm 1.7\%$	$\infty$
RF Ambient Reflections	$\pm 3.0\%$	R	$\sqrt{3}$	1	1	$\pm 1.7\%$	$\pm 1.7\%$	$\infty$
Probe Positioner	$\pm 0.4\%$	R	$\sqrt{3}$	1	1	$\pm 0.2\%$	$\pm 0.2\%$	$\infty$
Probe Positioning	$\pm 2.9\%$	R	$\sqrt{3}$	1	1	$\pm 1.7\%$	$\pm 1.7\%$	$\infty$
Max. SAR Eval.	$\pm 1.0\%$	R	$\sqrt{3}$	1	1	$\pm 0.6\%$	$\pm 0.6\%$	$\infty$
<b>Test Sample Related</b>								
Device Positioning	$\pm 2.9\%$	N	1	1	1	$\pm 2.9\%$	$\pm 2.9\%$	145
Device Holder	$\pm 3.6\%$	N	1	1	1	$\pm 3.6\%$	$\pm 3.6\%$	5
Power Drift	$\pm 5.0\%$	R	$\sqrt{3}$	1	1	$\pm 2.9\%$	$\pm 2.9\%$	$\infty$
<b>Phantom and Setup</b>								
Phantom Uncertainty	$\pm 4.0\%$	R	$\sqrt{3}$	1	1	$\pm 2.3\%$	2.3 %	$\infty$
Liquid Conductivity (target)	$\pm 5.0\%$	R	$\sqrt{3}$	0.64	0.43	$\pm 1.8\%$	1.2 %	$\infty$
Liquid Conductivity (meas.)	$\pm 2.5\%$	N	1	0.64	0.43	$\pm 1.6\%$	1.1 %	$\infty$
Liquid Permittivity (target)	$\pm 5.0\%$	R	$\sqrt{3}$	0.6	0.49	$\pm 1.7\%$	1.4 %	$\infty$
Liquid Permittivity (meas.)	$\pm 2.5\%$	N	1	0.6	0.49	$\pm 1.5\%$	1.2 %	$\infty$
<b>Combined Std. Uncertainty</b>						<b><math>\pm 10.9\%</math></b>	<b><math>\pm 10.7\%</math></b>	387
<b>Expanded STD Uncertainty</b>						<b><math>\pm 21.9\%</math></b>	<b><math>\pm 21.4\%</math></b>	

Table 5. Uncertainty Budget of DASY



## **11. SAR Test Results Summary**

## 11.1 GSM 850 - Head SAR

## Ambient :

Temperature (°C) : **22 ± 2**

Relative HUMIDITY (%) : **40-70**

## Liquid :

Mixture Type : **HSL835**

Liquid Temperature (°C) : 22.0

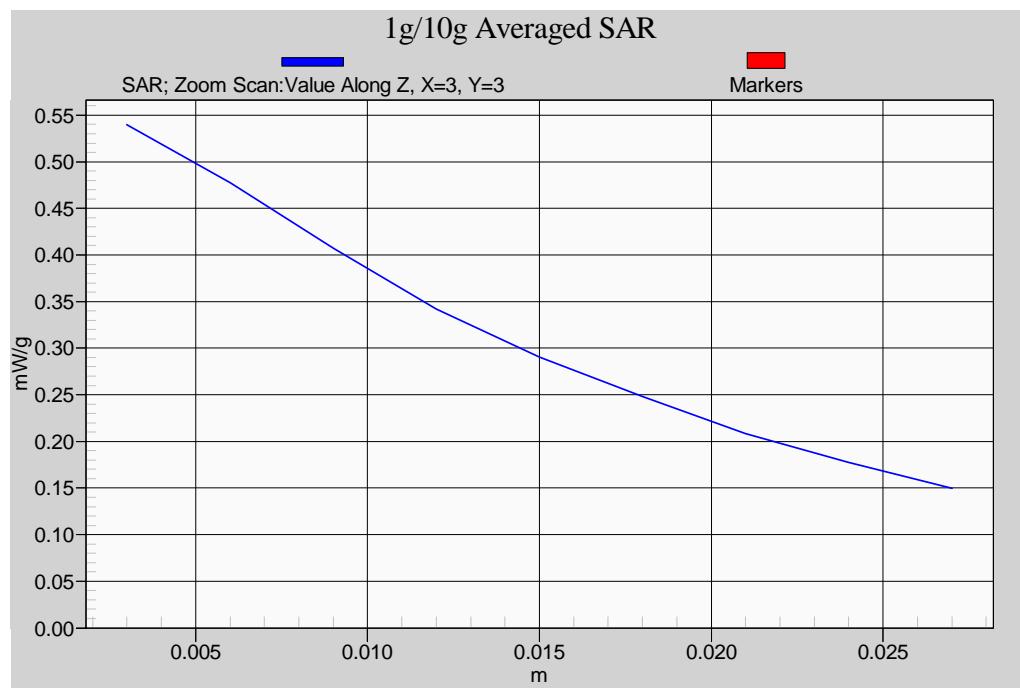
## Measurement :

Crest Factor : **8.3**

Probe S/N : 3150

Frequency		Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR <sub>1g</sub> [mW/g]	Power Drift (dB)	Remark
MHz	CH								
848.8	251	GSM 850	32.20	Right-cheek	Internal	N/A	0.478	-0.18500	EUT Open
848.8	251	GSM 850	32.20	Right-cheek	Internal	N/A	0.303	-0.18700	EUT Close
848.8	251	GSM 850	32.20	Right-Tilted	Internal	N/A	0.236	-0.03300	EUT Open
848.8	251	GSM 850	32.20	Left-cheek	Internal	N/A	0.483	-0.12300	EUT Open
848.8	251	GSM 850	32.20	Left-cheek	Internal	N/A	0.309	-0.09300	EUT Close
848.8	251	GSM 850	32.20	Left-Tilted	Internal	N/A	0.223	0.03800	EUT Open

## Z-axis Plot of SAR Measurement



## 11.2 GPRS 850 3Down1Up - Body SAR (EUT 15 mm separation to Phantom)

### Ambient :

Temperature (°C) : 22 ± 2

Relative HUMIDITY (%) : 40-70

### Liquid :

Mixture Type : MSL835

Liquid Temperature (°C) : 22.0

Depth of liquid (cm) : 15

### Measurement :

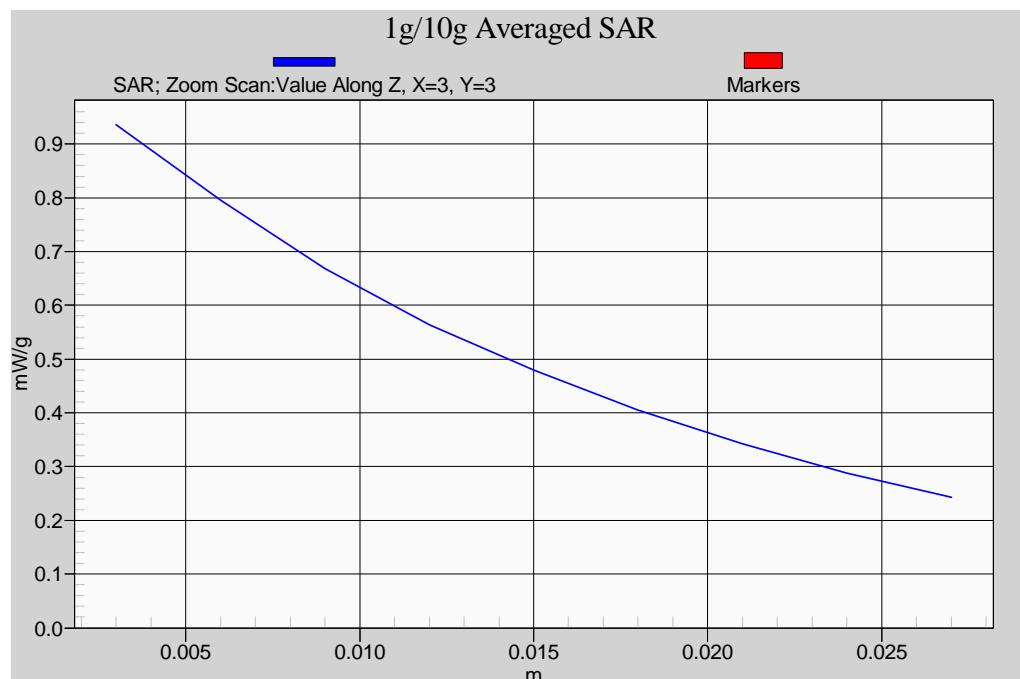
Crest Factor : 8.3

Probe S/N : 3150

Frequency		Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR <sub>1g</sub> [mW/g]	Power Drift (dB)	Remark
MHz	CH								
824.2	128	GPRS 850	32.80	Flat	Internal	Headset	0.485	-0.05900	EUT Open
836.6	190	GPRS 850	33.00	Flat	Internal	Headset	0.643	-0.19800	EUT Open
848.8	251	GPRS 850	33.10	Flat	Internal	Headset	0.839	-0.09700	EUT Open
848.8	251	GPRS 850	33.10	Flat	Internal	Headset	0.693	-0.05700	EUT Close
Std. C95.1-2005 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population					1.6 W/kg (mW/g) Averaged over 1 gram				

Detail results see Appendix B.

### Z-axis Plot of SAR Measurement



### 11.3 PCS 1900 - Head SAR

**Ambient :**

 Temperature (°C) : 22 ± 2

 Relative HUMIDITY (%) : 40-70
**Liquid :**

 Mixture Type : HSL1900

 Liquid Temperature (°C) : 22.0
**Measurement :**

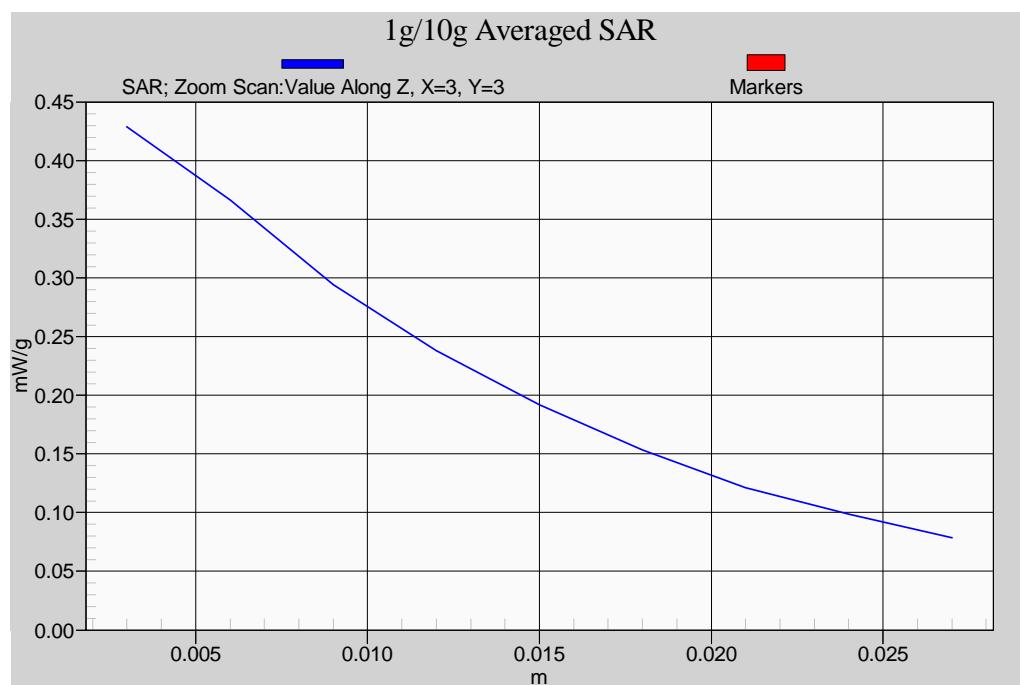
 Crest Factor : 8.3

 Probe S/N : 3150

 Depth of liquid (cm) : 15

Frequency		Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR <sub>1g</sub> [mW/g]	Power Drift (dB)	Remark
MHz	CH								
1880.0	661	PCS	30.40	Right-cheek	Internal	N/A	0.365	-0.00707	EUT Open
1880.0	661	PCS	30.40	Right-cheek	Internal	N/A	0.268	-0.14700	EUT Close
1880.0	661	PCS	30.40	Right-Tilted	Internal	N/A	0.200	-0.03600	EUT Open
1880.0	661	PCS	30.40	Left-cheek	Internal	N/A	0.293	-0.14900	EUT Open
1880.0	661	PCS	30.40	Left-Tilted	Internal	N/A	0.255	-0.10700	EUT Open
Std. C95.1-2005 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population					1.6 W/kg (mW/g) Averaged over 1 gram				

Detail results see Appendix B.

**Z-axis Plot of SAR Measurement**


## 11.4 GPRS 1900 3Down1Up - Body SAR (EUT 15 mm separation to Phantom)

### Ambient :

Temperature (°C) : 22 ± 2

Relative HUMIDITY (%) : 40-70

### Liquid :

Mixture Type : MSL1900

Liquid Temperature (°C) : 22.0

Depth of liquid (cm) : 15

### Measurement :

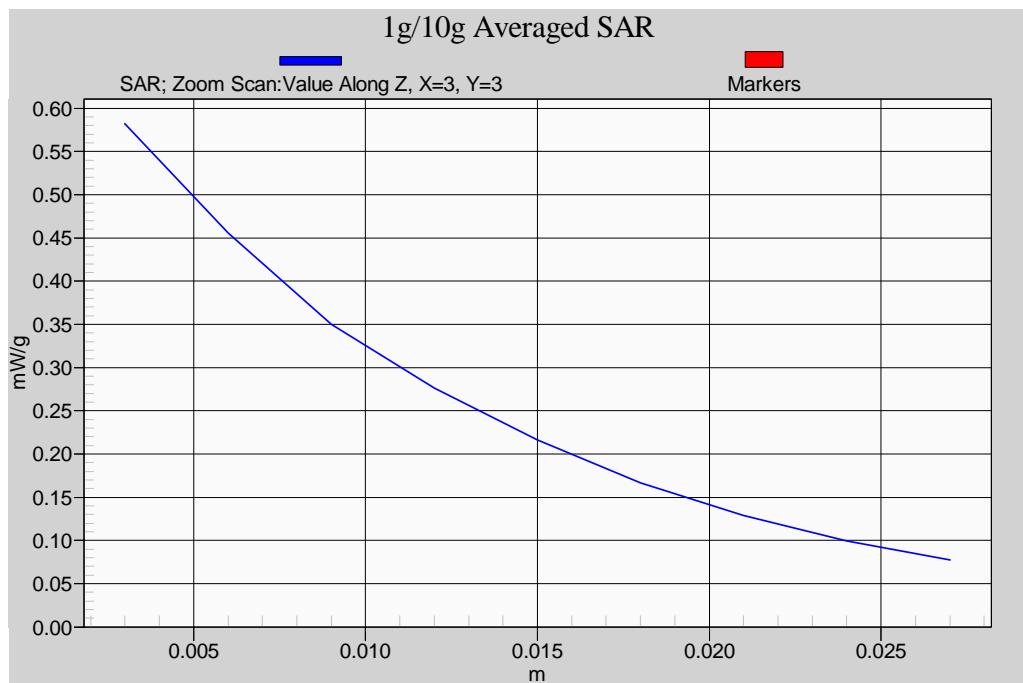
Crest Factor : 4.2

Probe S/N : 3150

Frequency		Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR <sub>1g</sub> [mW/g]	Power Drift (dB)	Remark
MHz	CH								
1880.0	661	GPRS 1900	30.30	Flat	Internal	Headset	0.492	0.05300	EUT Open
1880.0	661	GPRS 1900	30.30	Flat	Internal	Headset	0.327	-0.11600	EUT Close
Std. C95.1-2005 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population					1.6 W/kg (mW/g) Averaged over 1 gram				

Detail results see Appendix B.

### Z-axis Plot of SAR Measurement



Z-axis Plot of Flat GPRS 1900 CH661 (3Down1Up) \_ EUT Open

## 11.5 Setup Photo

### Head Setup for EUT Open



Figure 14. Right Head SAR Test Setup (Cheek)

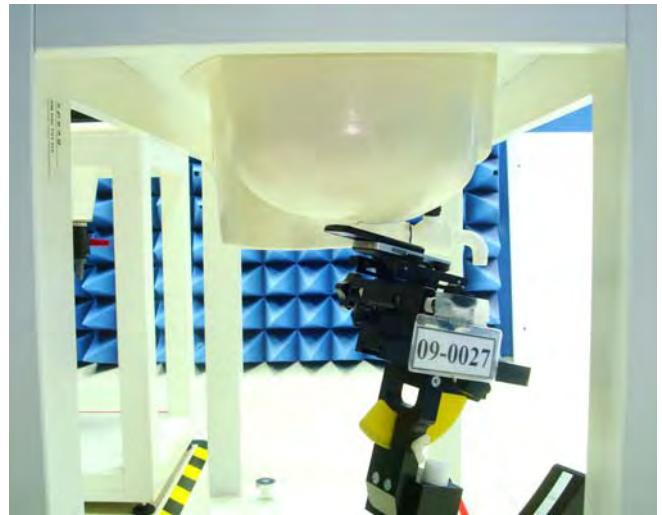


Figure 15. Right Head SAR Test Setup (Tilted)



Figure 16. Left Head SAR Test Setup (Cheek)

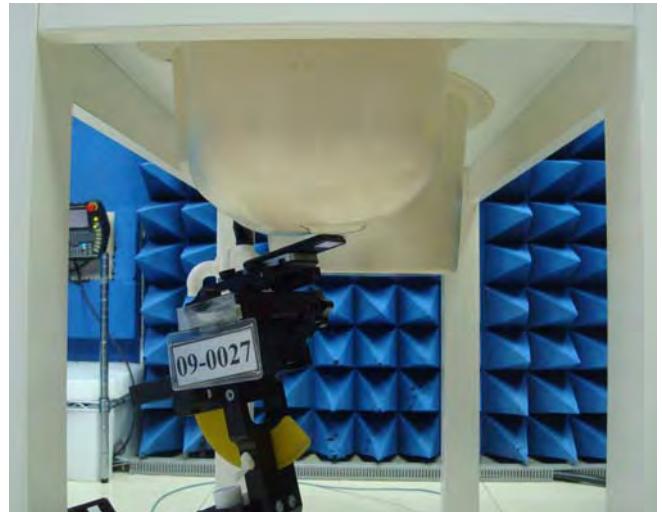


Figure 17. Left Head SAR Test Setup (Tilted)

### Head Setup for EUT Close

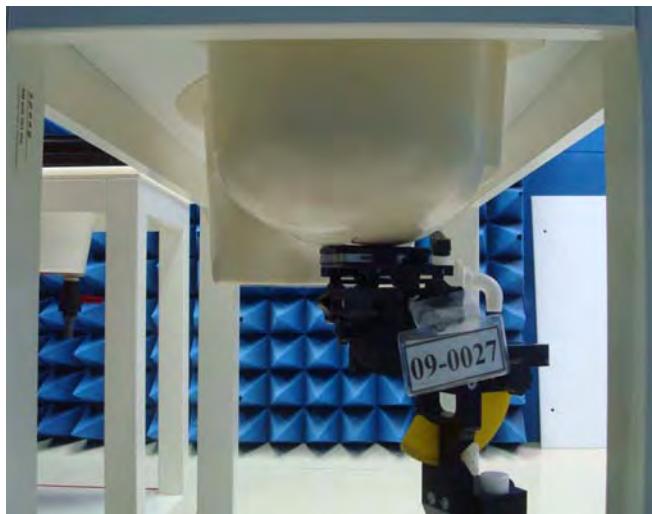


Figure 18. Right Head SAR Test Setup (Cheek)

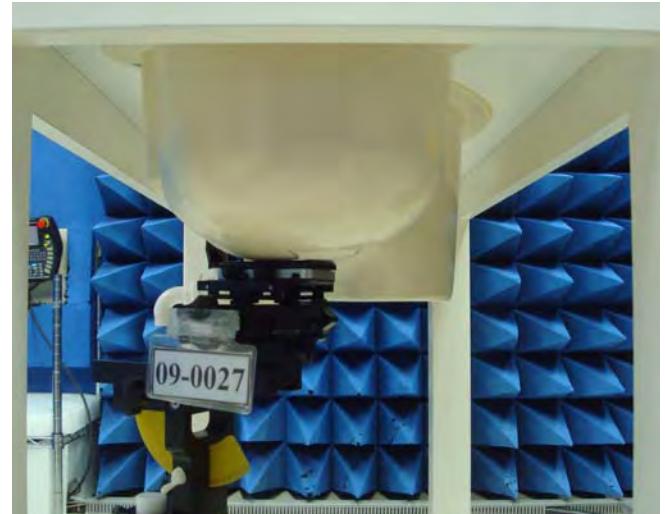
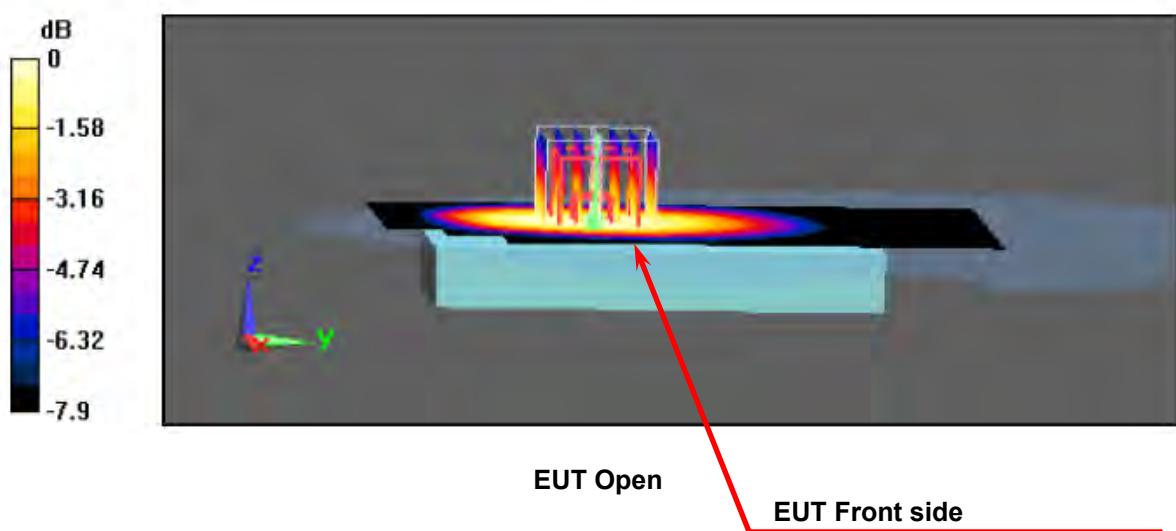
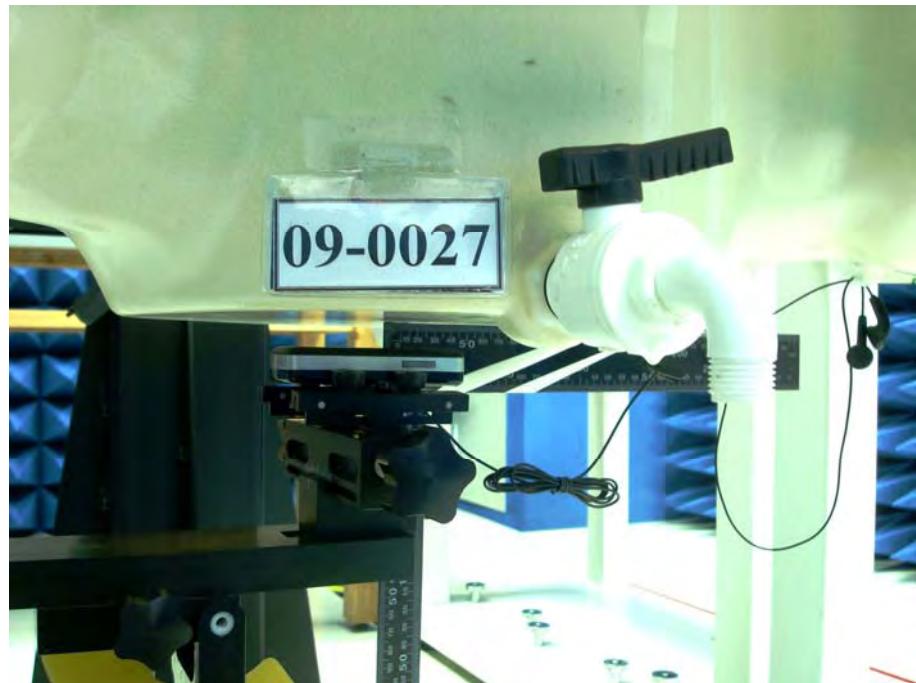
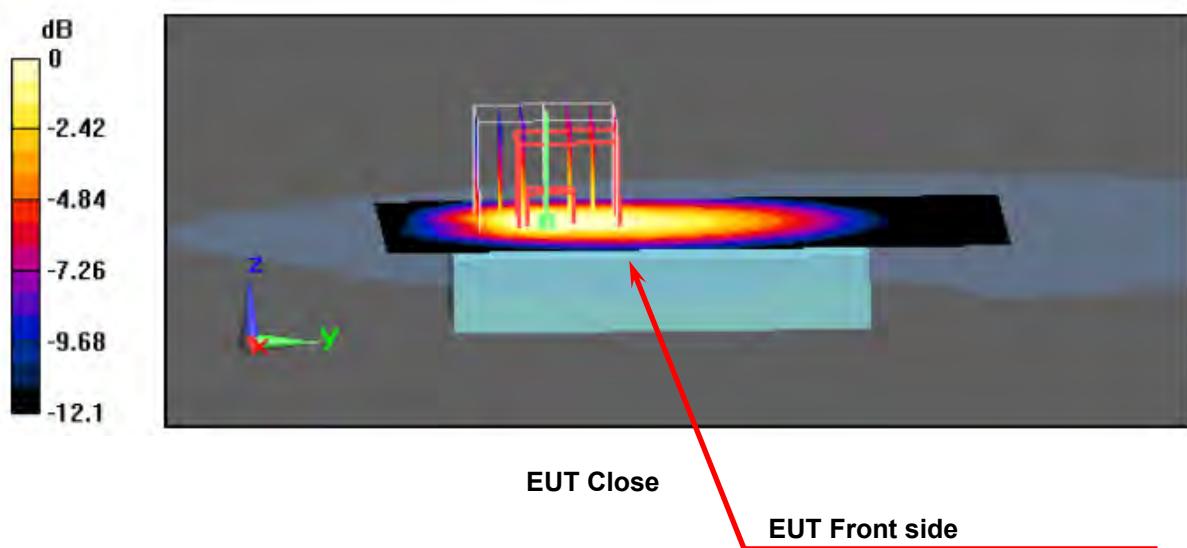


Figure 19. Left Head SAR Test Setup (Cheek)

**Body Setup for EUT Open****Figure 20. Body SAR Test Setup (Flat Section)**

**Body Setup for EUT Close****Figure 21. Body SAR Test Setup (Flat Section)**

## 11.6 Std. C95.1-2005 RF Exposure Limit

Human Exposure	Population Uncontrolled Exposure ( W/kg ) or (mW/g)	Occupational Controlled Exposure ( W/kg ) or (mW/g)
<b>Spatial Peak SAR*</b> (head)	1.60	8.00
<b>Spatial Peak SAR**</b> (Whole Body)	0.08	0.40
<b>Spatial Peak SAR***</b> (Partial-Body)	1.60	8.00
<b>Spatial Peak SAR****</b> (Hands / Feet / Ankle / Wrist )	4.00	20.00

**Table 6. Safety Limits for Partial Body Exposure**

**Notes :**

- \* The Spatial Peak value of the SAR averaged over any 1 gram of tissue.  
( defined as a tissue volume in the shape of a cube ) and over the appropriate averaging time.
- \*\* The Spatial Average value of the SAR averaged over the whole – body.
- \*\*\* The Spatial Average value of the SAR averaged over the partial – body.
- \*\*\*\* The Spatial Peak value of the SAR averaged over any 10 grams of tissue.  
( defined as a tissue volume in the shape of a cube ) and over the appropriate averaging time.

**Population / Uncontrolled Environments :** are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

**Occupational / Controlled Environments :** are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

## **12. Conclusion**

The SAR test values found for the portable mobile phone **Indigo Mobile Technologies Corp. Trade Name : HUAWEI Model(s) : G5720** is below the maximum recommended level of 1.6 W/kg (mW/g).

## **13. References**

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- [3] T. Schmid, O. Egger, and N. Kuster, "Automatic E-field scanning system for dosimetric assessments", IEEE Transactions on Microwave Theory and Techniques, vol. 44, pp. 105-113, Jan. 1996.
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- [7] 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.
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- [9] Std. C95.3-1991, "IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave", New York: IEEE, Aug. 1992.
- [10]CENELEC CLC/SC111B, European Prestandard (prENV 50166-2), *Human Exposure to Electromagnetic Fields High-frequency: 10KHz-300GHz*, Jan. 1995.



## ***Appendix A - System Performance Check***

See following Attached Pages for System Performance Check.

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/17/2009 6:00:33 PM

### System Performance Check at 835MHz\_20090217\_Head

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d063**

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

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.912$  mho/m;  $\epsilon_r = 42.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3150; ConvF(5.91, 5.91, 5.91); Calibrated: 1/20/2009
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

### System Performance Check at 835MHz/Area Scan (61x121x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.56 mW/g

### System Performance Check at 835MHz/Zoom Scan (7x7x7)/Cube 0:

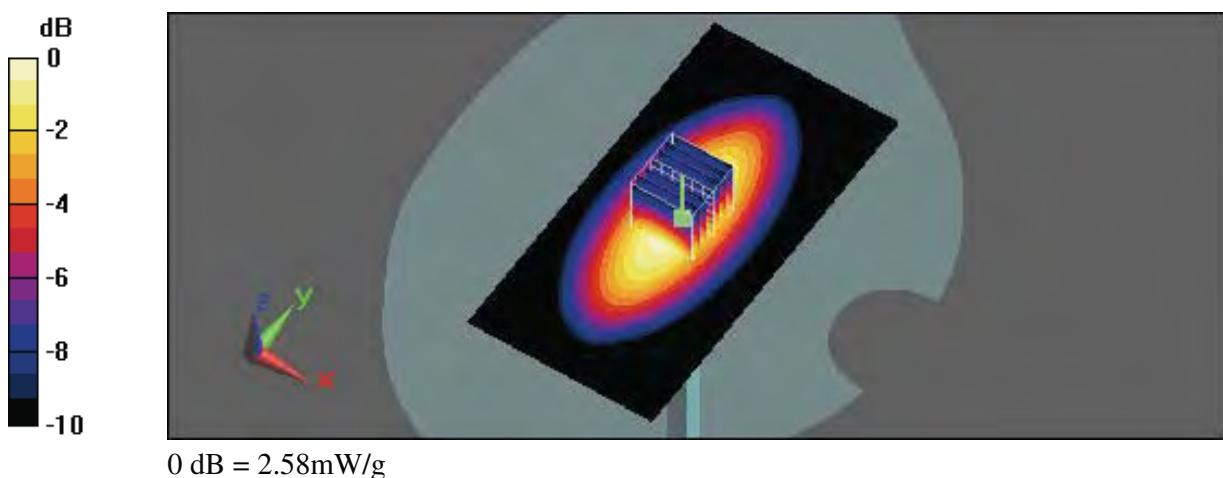
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.1 V/m; Power Drift = 0.041 dB

Peak SAR (extrapolated) = 3.28 W/kg

**SAR(1 g) = 2.28 mW/g; SAR(10 g) = 1.51 mW/g**

Maximum value of SAR (measured) = 2.58 mW/g



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/17/2009 6:53:10 PM

### System Performance Check at 835MHz\_20090217\_Body

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d063**

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

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.96$  mho/m;  $\epsilon_r = 55.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3150; ConvF(5.91, 5.91, 5.91); Calibrated: 1/20/2009
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

### System Performance Check at 835MHz/Area Scan (61x121x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.73 mW/g

### System Performance Check at 835MHz/Zoom Scan (7x7x7)/Cube 0:

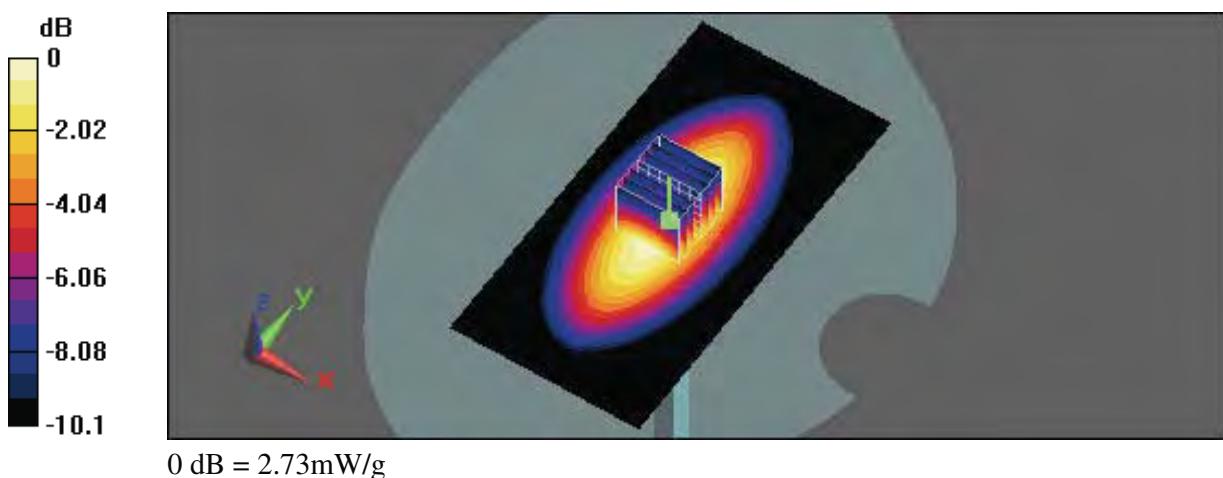
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.4 V/m; Power Drift = -0.016 dB

Peak SAR (extrapolated) = 3.54 W/kg

**SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.6 mW/g**

Maximum value of SAR (measured) = 2.73 mW/g



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/17/2009 10:57:27 PM

### System Performance Check at 1900MHz\_20090217\_Head

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d018**

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

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.4$  mho/m;  $\epsilon_r = 40.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3150; ConvF(5.04, 5.04, 5.04); Calibrated: 1/20/2009
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

### System Performance Check at 1900MHz/Area Scan (61x81x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 12.5 mW/g

### System Performance Check at 1900MHz/Zoom Scan (7x7x7)/Cube 0:

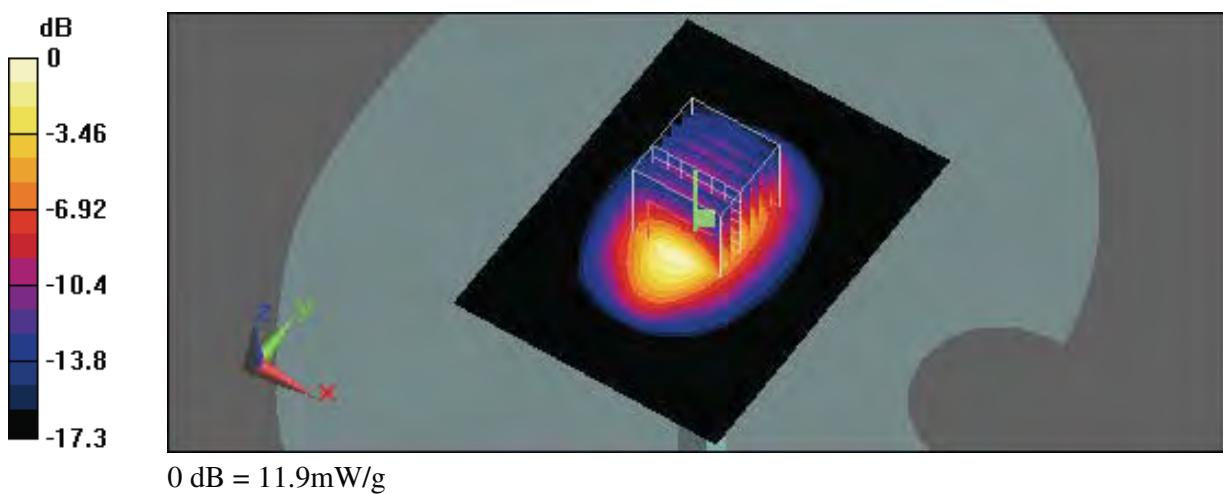
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.4 V/m; Power Drift = -0.00158 dB

Peak SAR (extrapolated) = 16.8 W/kg

**SAR(1 g) = 9.78 mW/g; SAR(10 g) = 5.19 mW/g**

Maximum value of SAR (measured) = 11.9 mW/g



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/18/2009 8:50:37 PM

### System Performance Check at 1900MHz\_20090218\_Body

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d018**

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

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.5$  mho/m;  $\epsilon_r = 53.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3150; ConvF(4.92, 4.92, 4.92); Calibrated: 1/20/2009
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

### System Performance Check at 1900MHz/Area Scan (61x81x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.9 mW/g

### System Performance Check at 1900MHz/Zoom Scan (7x7x7)/Cube 0:

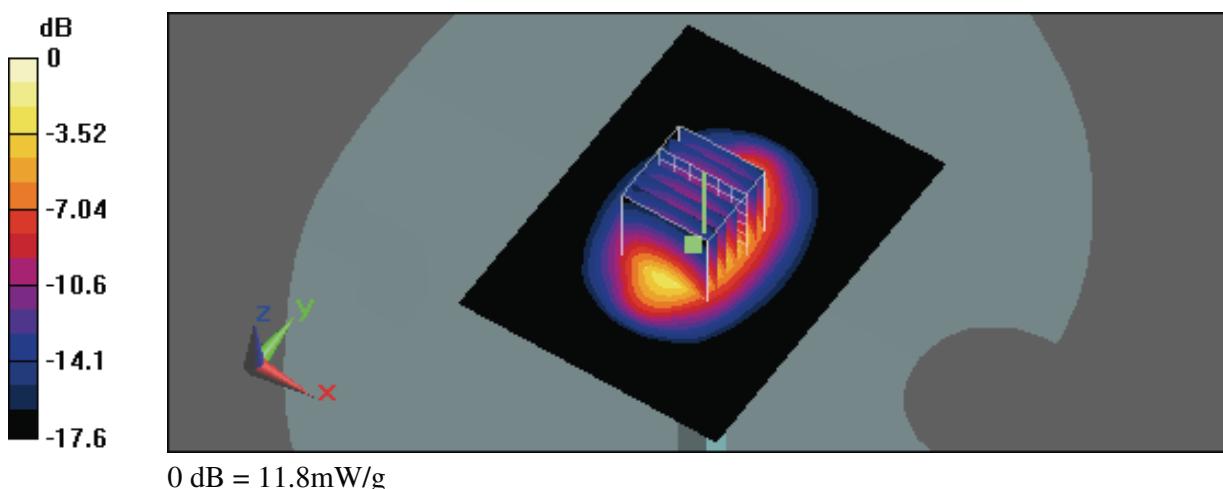
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.6 V/m; Power Drift = 0.00359 dB

Peak SAR (extrapolated) = 17.7 W/kg

**SAR(1 g) = 9.65 mW/g; SAR(10 g) = 5 mW/g**

Maximum value of SAR (measured) = 11.8 mW/g





## ***Appendix B - SAR Measurement Data***

See following Attached Pages for SAR Measurement Data.

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/17/2009 7:37:29 PM

## RC\_GSM850 CH251\_Open

**DUT: VE3\_Open; Type: Dual Band Mobile Phone; Serial: 862157000000617**

Communication System: GSM850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3  
Medium parameters used:  $f = 849$  MHz;  $\sigma = 0.924$  mho/m;  $\epsilon_r = 42.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Right Section  
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

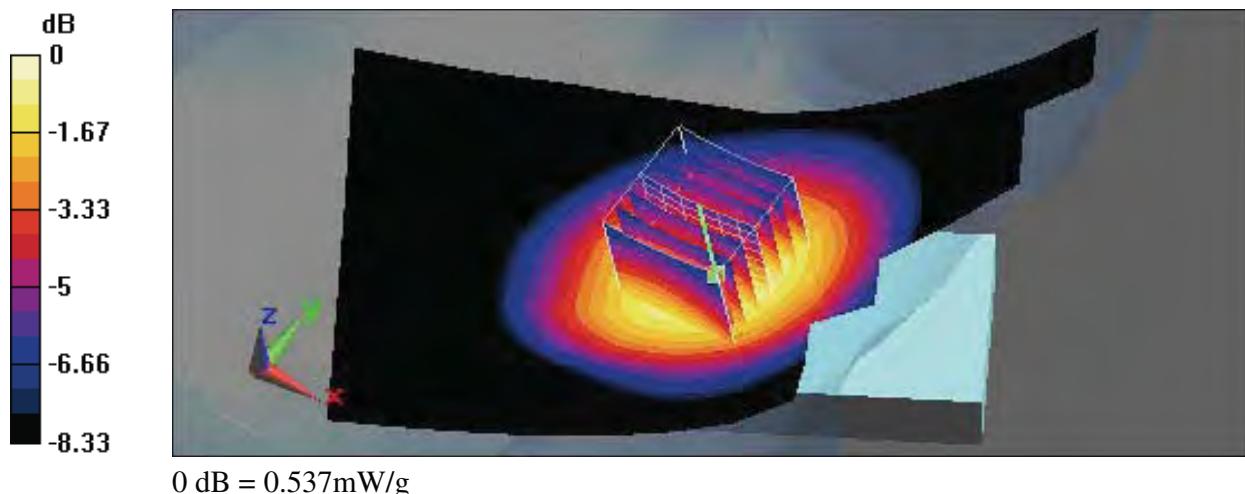
- Probe: ES3DV3 - SN3150; ConvF(5.91, 5.91, 5.91); Calibrated: 1/20/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

### Right Cheek/Area Scan (61x111x1):

Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.536 mW/g

### Right Cheek/Zoom Scan (7x7x9)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=3mm  
Reference Value = 7.28 V/m; Power Drift = -0.185 dB  
Peak SAR (extrapolated) = 0.605 W/kg  
**SAR(1 g) = 0.478 mW/g; SAR(10 g) = 0.340 mW/g**  
Maximum value of SAR (measured) = 0.537 mW/g



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/17/2009 8:03:41 PM

## RC\_GSM850 CH251\_Close

**DUT: VE3\_Close; Type: Dual Band Mobile Phone; Serial: 862157000000617**

Communication System: GSM850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3  
Medium parameters used:  $f = 849$  MHz;  $\sigma = 0.924$  mho/m;  $\epsilon_r = 42.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Right Section  
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

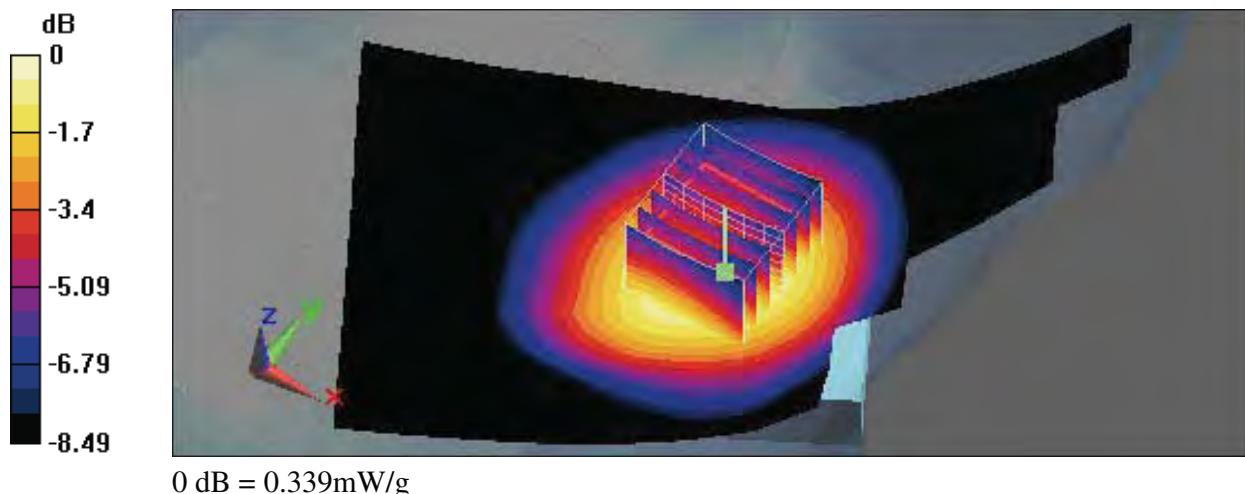
- Probe: ES3DV3 - SN3150; ConvF(5.91, 5.91, 5.91); Calibrated: 1/20/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

### Right Cheek/Area Scan (61x111x1):

Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.342 mW/g

### Right Cheek/Zoom Scan (7x7x9)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=3mm  
Reference Value = 6.52 V/m; Power Drift = -0.187 dB  
Peak SAR (extrapolated) = 0.370 W/kg  
**SAR(1 g) = 0.303 mW/g; SAR(10 g) = 0.218 mW/g**  
Maximum value of SAR (measured) = 0.339 mW/g



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/17/2009 8:33:19 PM

## RT\_GSM850 CH251\_Open

**DUT: VE3\_Open; Type: Dual Band Mobile Phone; Serial: 862157000000617**

Communication System: GSM850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3  
Medium parameters used:  $f = 849$  MHz;  $\sigma = 0.924$  mho/m;  $\epsilon_r = 42.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Right Section  
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

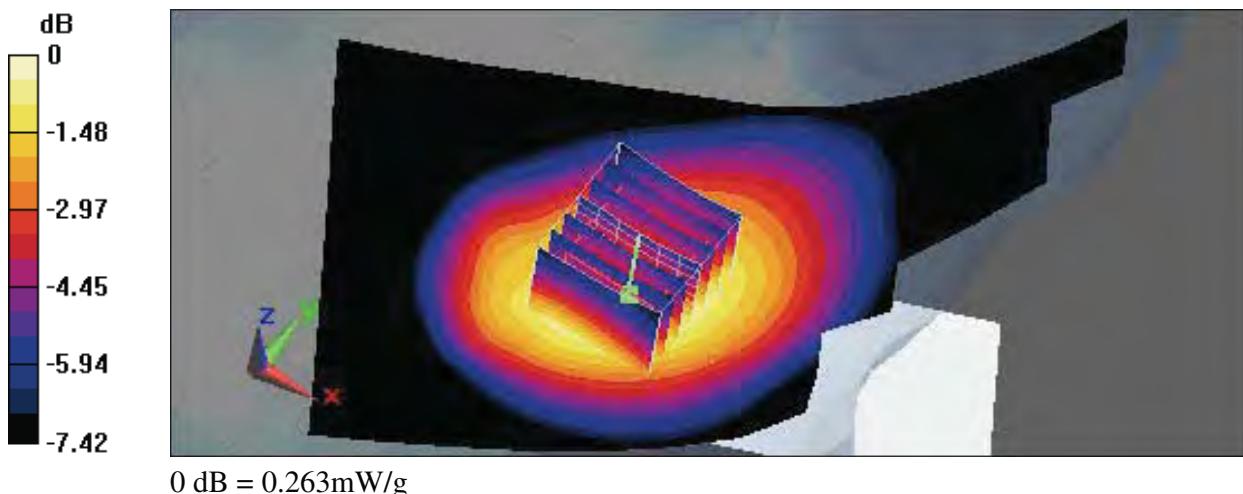
- Probe: ES3DV3 - SN3150; ConvF(5.91, 5.91, 5.91); Calibrated: 1/20/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

### Right Tilted/Area Scan (61x111x1):

Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.269 mW/g

### Right Tilted/Zoom Scan (7x7x9)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=3mm  
Reference Value = 11.8 V/m; Power Drift = -0.033 dB  
Peak SAR (extrapolated) = 0.292 W/kg  
**SAR(1 g) = 0.236 mW/g; SAR(10 g) = 0.173 mW/g**  
Maximum value of SAR (measured) = 0.263 mW/g



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/17/2009 9:00:29 PM

## LC\_GSM850 CH251\_Open

**DUT: VE3\_Open; Type: Dual Band Mobile Phone; Serial: 862157000000617**

Communication System: GSM850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3  
Medium parameters used:  $f = 849$  MHz;  $\sigma = 0.924$  mho/m;  $\epsilon_r = 42.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Left Section  
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

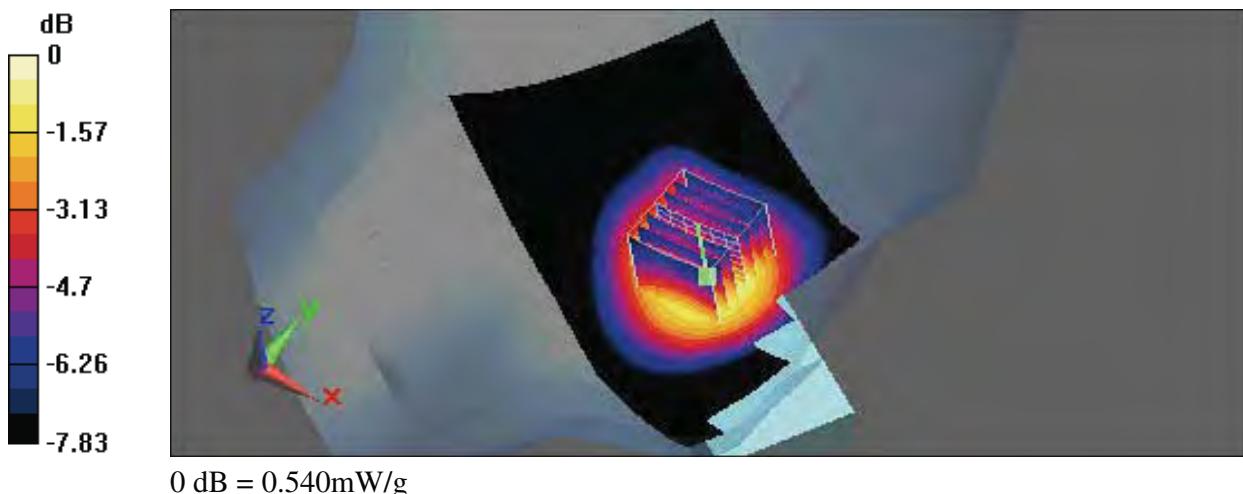
- Probe: ES3DV3 - SN3150; ConvF(5.91, 5.91, 5.91); Calibrated: 1/20/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

### Left Cheek/Area Scan (61x111x1):

Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.548 mW/g

### Left Cheek/Zoom Scan (7x7x9)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=3mm  
Reference Value = 7.09 V/m; Power Drift = -0.123 dB  
Peak SAR (extrapolated) = 0.581 W/kg  
**SAR(1 g) = 0.483 mW/g; SAR(10 g) = 0.345 mW/g**  
Maximum value of SAR (measured) = 0.540 mW/g



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/17/2009 9:27:15 PM

### LC\_GSM850 CH251\_Close

**DUT: VE3\_Close; Type: Dual Band Mobile Phone; Serial: 862157000000617**

Communication System: GSM850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3  
Medium parameters used:  $f = 849$  MHz;  $\sigma = 0.924$  mho/m;  $\epsilon_r = 42.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Left Section  
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3150; ConvF(5.91, 5.91, 5.91); Calibrated: 1/20/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

#### Left Cheek/Area Scan (61x91x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.346 mW/g

#### Left Cheek/Zoom Scan (7x7x9)/Cube 0:

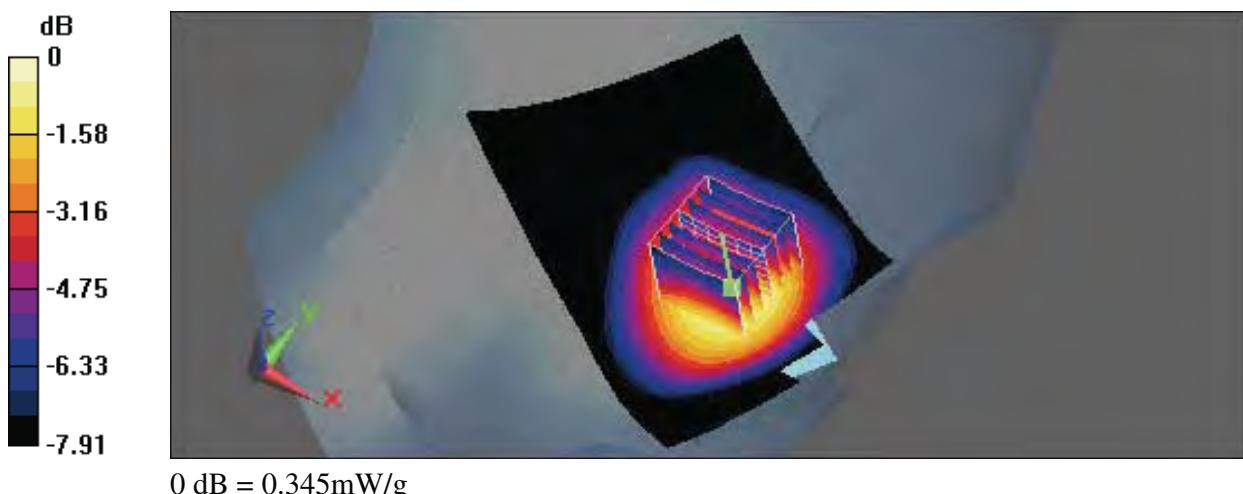
Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 6.33 V/m; Power Drift = -0.093 dB

Peak SAR (extrapolated) = 0.380 W/kg

**SAR(1 g) = 0.309 mW/g; SAR(10 g) = 0.221 mW/g**

Maximum value of SAR (measured) = 0.345 mW/g



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/17/2009 9:54:08 PM

## LT\_GSM850 CH251\_Open

**DUT: VE3\_Open; Type: Dual Band Mobile Phone; Serial: 862157000000617**

Communication System: GSM850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3  
Medium parameters used:  $f = 849$  MHz;  $\sigma = 0.924$  mho/m;  $\epsilon_r = 42.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Left Section  
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3150; ConvF(5.91, 5.91, 5.91); Calibrated: 1/20/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

### Left Tilted/Area Scan (61x111x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.252 mW/g

### Left Tilted/Zoom Scan (7x7x9)/Cube 0:

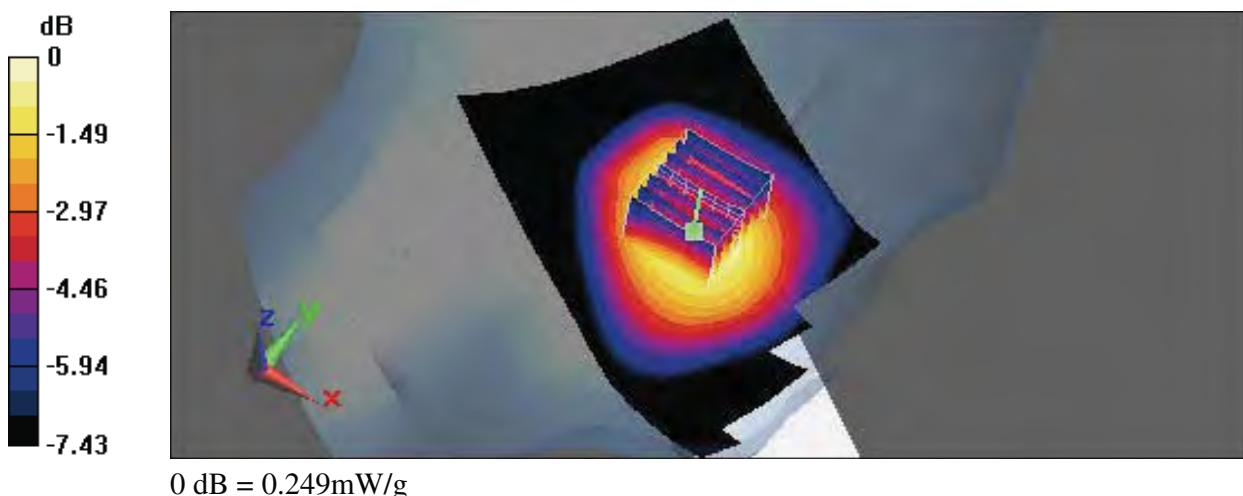
Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 11.3 V/m; Power Drift = 0.038 dB

Peak SAR (extrapolated) = 0.271 W/kg

**SAR(1 g) = 0.223 mW/g; SAR(10 g) = 0.164 mW/g**

Maximum value of SAR (measured) = 0.249 mW/g



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/18/2009 5:43:57 PM

### **Flat\_GSM850 GPRS CH128\_3Down1Up\_15mm\_Ear Phone\_Open**

**DUT: VE3\_Open; Type: Dual Band Mobile Phone; Serial: 862157000000617**

Communication System: GSM 850 GPRS(3Down, 1Up); Frequency: 824.2 MHz; Duty Cycle: 1:8.3  
 Medium parameters used (interpolated):  $f = 824.2$  MHz;  $\sigma = 0.947$  mho/m;  $\epsilon_r = 55.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3150; ConvF(5.91, 5.91, 5.91); Calibrated: 1/20/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

#### **Flat/Area Scan (61x111x1):**

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.548 mW/g

#### **Flat/Zoom Scan (7x7x9)/Cube 0:**

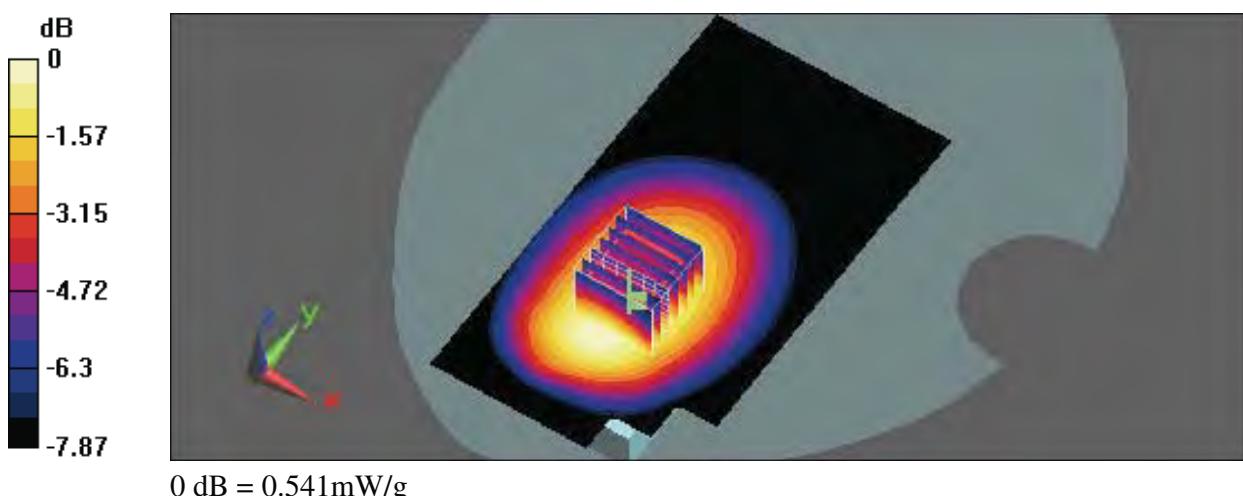
Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 7.73 V/m; Power Drift = -0.059 dB

Peak SAR (extrapolated) = 0.612 W/kg

**SAR(1 g) = 0.485 mW/g; SAR(10 g) = 0.353 mW/g**

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



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/18/2009 5:17:44 PM

### **Flat\_GSM850 GPRS CH190\_3Down1Up\_15mm\_Ear Phone\_Open**

**DUT: VE3\_Open; Type: Dual Band Mobile Phone; Serial: 862157000000617**

Communication System: GSM 850 GPRS(3Down, 1Up); Frequency: 836.6 MHz; Duty Cycle: 1:8.3  
Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.961$  mho/m;  $\epsilon_r = 55.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3150; ConvF(5.91, 5.91, 5.91); Calibrated: 1/20/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

#### **Flat/Area Scan (61x111x1):**

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.734 mW/g

#### **Flat/Zoom Scan (7x7x9)/Cube 0:**

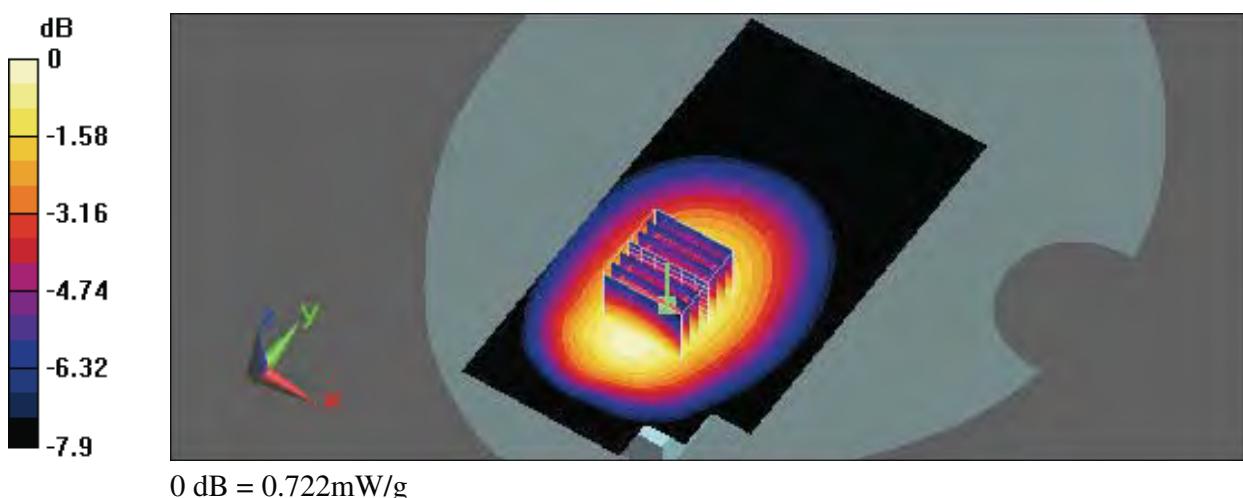
Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 9.17 V/m; Power Drift = -0.198 dB

Peak SAR (extrapolated) = 0.823 W/kg

**SAR(1 g) = 0.643 mW/g; SAR(10 g) = 0.467 mW/g**

Maximum value of SAR (measured) = 0.722 mW/g



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/18/2009 6:41:48 PM

### **Flat\_GSM850 GPRS CH251\_3Down1Up\_15mm\_Ear Phone\_Open**

**DUT: VE3\_Open; Type: Dual Band Mobile Phone; Serial: 862157000000617**

Communication System: GSM 850 GPRS(3Down, 1Up); Frequency: 848.8 MHz; Duty Cycle: 1:8.3  
Medium parameters used:  $f = 849$  MHz;  $\sigma = 0.973$  mho/m;  $\epsilon_r = 55.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3150; ConvF(5.91, 5.91, 5.91); Calibrated: 1/20/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

#### **Flat/Area Scan (61x111x1):**

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.951 mW/g

#### **Flat/Zoom Scan (7x7x9)/Cube 0:**

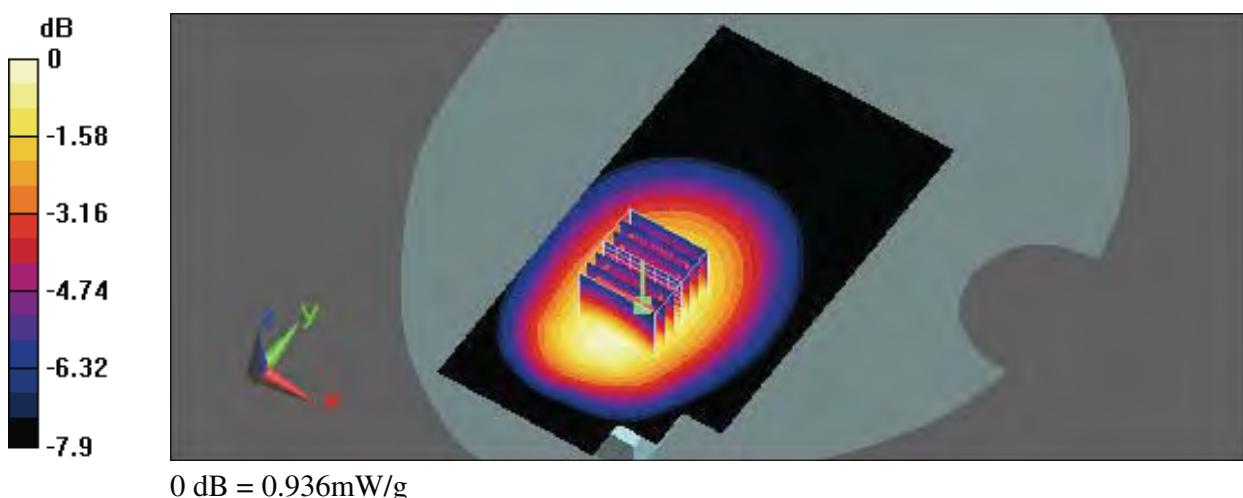
Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 10.6 V/m; Power Drift = -0.097 dB

Peak SAR (extrapolated) = 1.08 W/kg

**SAR(1 g) = 0.839 mW/g; SAR(10 g) = 0.607 mW/g**

Maximum value of SAR (measured) = 0.936 mW/g



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/18/2009 2:56:49 AM

### **Flat\_GSM850 GPRS CH251\_3Down1Up\_15mm\_Ear Phone\_Close**

**DUT: VE3\_Close; Type: Dual Band Mobile Phone; Serial: 862157000000617**

Communication System: GSM 850 GPRS(3Down, 1Up); Frequency: 848.8 MHz; Duty Cycle: 1:8.3  
 Medium parameters used:  $f = 849$  MHz;  $\sigma = 0.973$  mho/m;  $\epsilon_r = 55.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3150; ConvF(5.91, 5.91, 5.91); Calibrated: 1/20/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

#### **Flat/Area Scan (61x91x1):**

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.914 mW/g

#### **Flat/Zoom Scan (7x7x9)/Cube 0:**

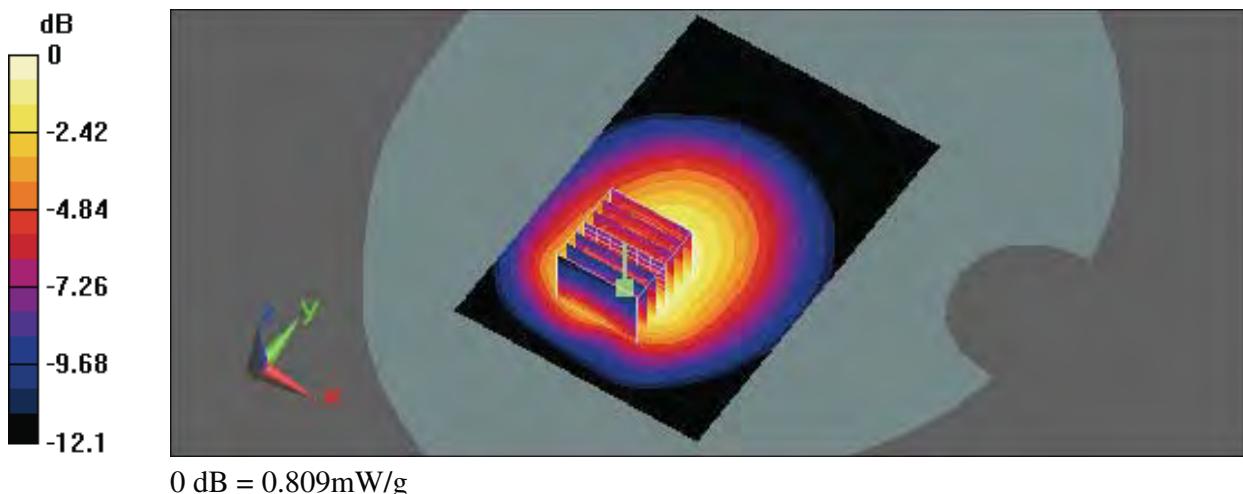
Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 11.4 V/m; Power Drift = -0.057 dB

Peak SAR (extrapolated) = 1.09 W/kg

**SAR(1 g) = 0.693 mW/g; SAR(10 g) = 0.467 mW/g**

Maximum value of SAR (measured) = 0.809 mW/g



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/18/2009 12:04:37 AM

## RC\_PCS CH661\_Open

**DUT: VE3\_Open; Type: Dual Band Mobile Phone; Serial: 862157000000617**

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 40.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3150; ConvF(5.04, 5.04, 5.04); Calibrated: 1/20/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

### Right Cheek/Area Scan (61x111x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.456 mW/g

### Right Cheek/Zoom Scan (7x7x9)/Cube 0:

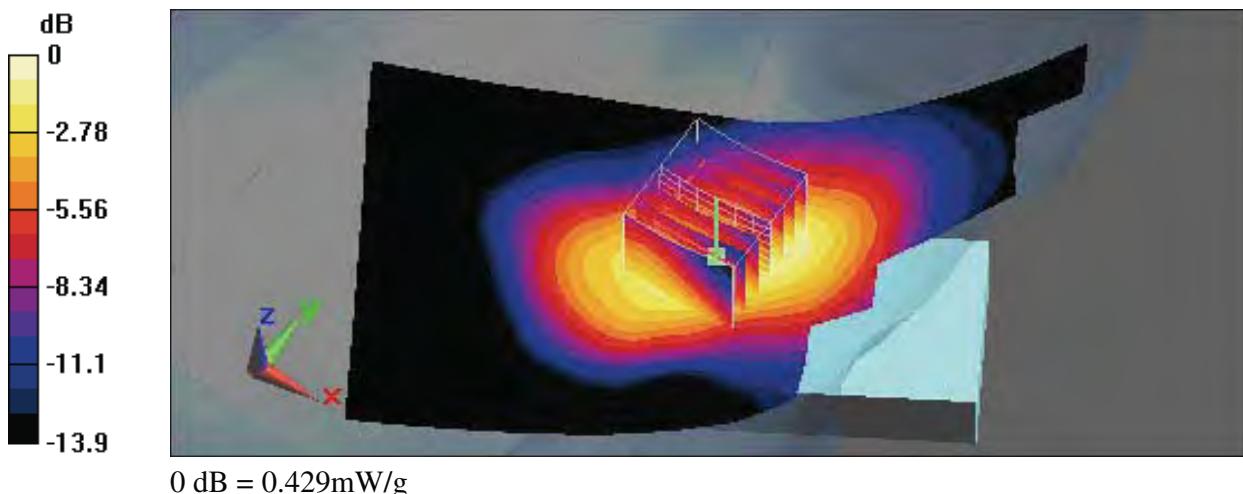
Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 2.48 V/m; Power Drift = -0.00707 dB

Peak SAR (extrapolated) = 0.487 W/kg

**SAR(1 g) = 0.365 mW/g; SAR(10 g) = 0.228 mW/g**

Maximum value of SAR (measured) = 0.429 mW/g



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/17/2009 11:39:31 PM

## RC\_PCS CH661\_Close

**DUT: VE3\_Close; Type: Dual Band Mobile Phone; Serial: 862157000000617**

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 40.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3150; ConvF(5.04, 5.04, 5.04); Calibrated: 1/20/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

### Right Cheek/Area Scan (61x91x1):

Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.309 mW/g

### Right Cheek/Zoom Scan (7x7x9)/Cube 0:

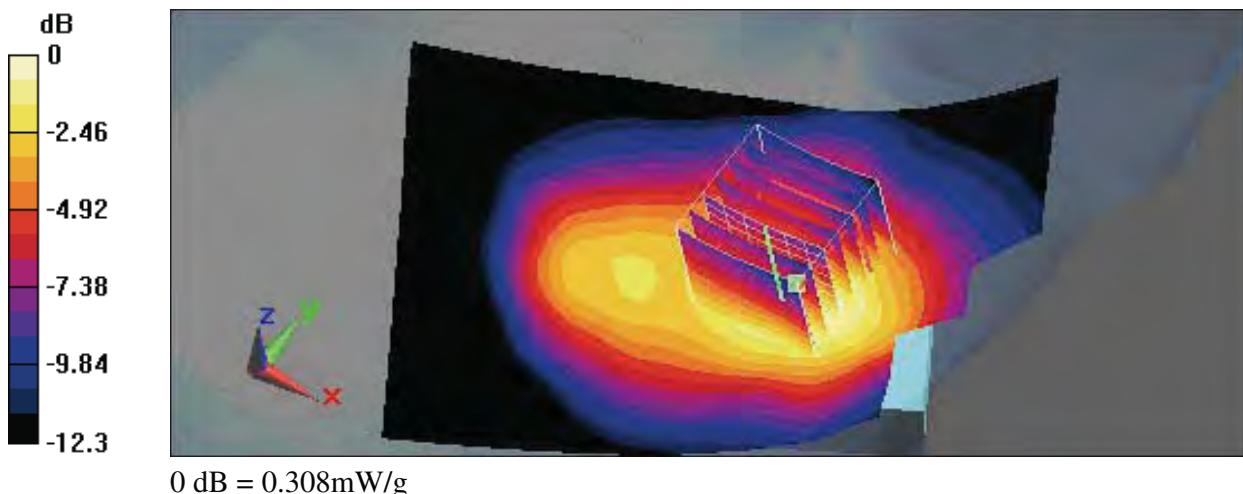
Measurement grid:  $dx=5$  mm,  $dy=5$  mm,  $dz=3$  mm

Reference Value = 7.07 V/m; Power Drift = -0.147 dB

Peak SAR (extrapolated) = 0.343 W/kg

**SAR(1 g) = 0.268 mW/g; SAR(10 g) = 0.174 mW/g**

Maximum value of SAR (measured) = 0.308 mW/g



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/18/2009 12:31:45 AM

## RT\_PCS CH661\_Open

**DUT: VE3\_Open; Type: Dual Band Mobile Phone; Serial: 862157000000617**

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 40.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3150; ConvF(5.04, 5.04, 5.04); Calibrated: 1/20/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

### Right Tilted/Area Scan (61x111x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.269 mW/g

### Right Tilted/Zoom Scan (7x7x9)/Cube 0:

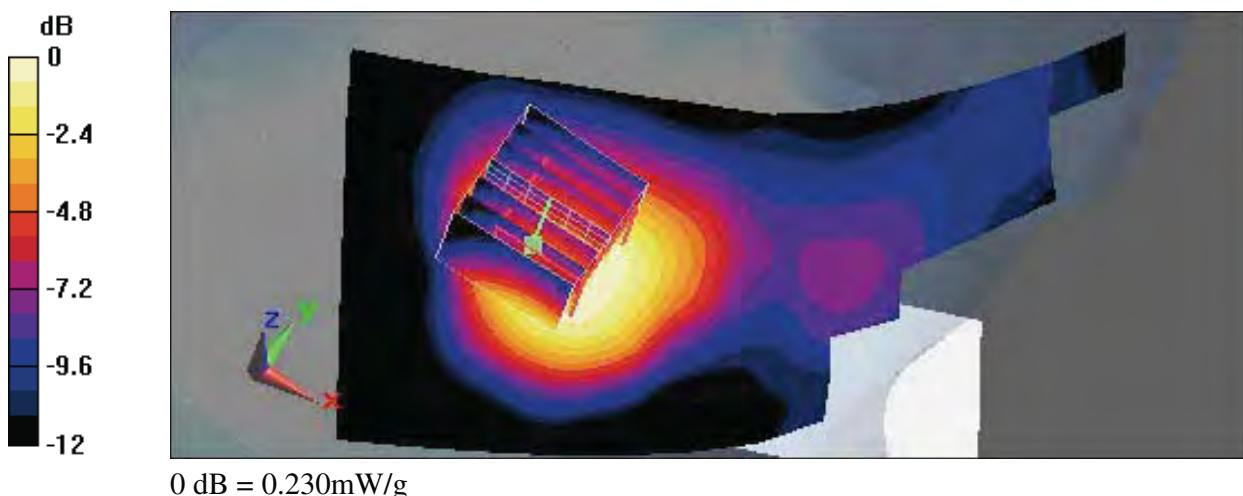
Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 6.94 V/m; Power Drift = -0.036 dB

Peak SAR (extrapolated) = 0.261 W/kg

**SAR(1 g) = 0.200 mW/g; SAR(10 g) = 0.130 mW/g**

Maximum value of SAR (measured) = 0.230 mW/g



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/18/2009 1:14:34 AM

## LC\_PCS CH661\_Open

**DUT: VE3\_Open; Type: Dual Band Mobile Phone; Serial: 862157000000617**

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 40.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3150; ConvF(5.04, 5.04, 5.04); Calibrated: 1/20/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

### Left Cheek/Area Scan (61x111x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.345 mW/g

### Left Cheek/Zoom Scan (7x7x9)/Cube 0:

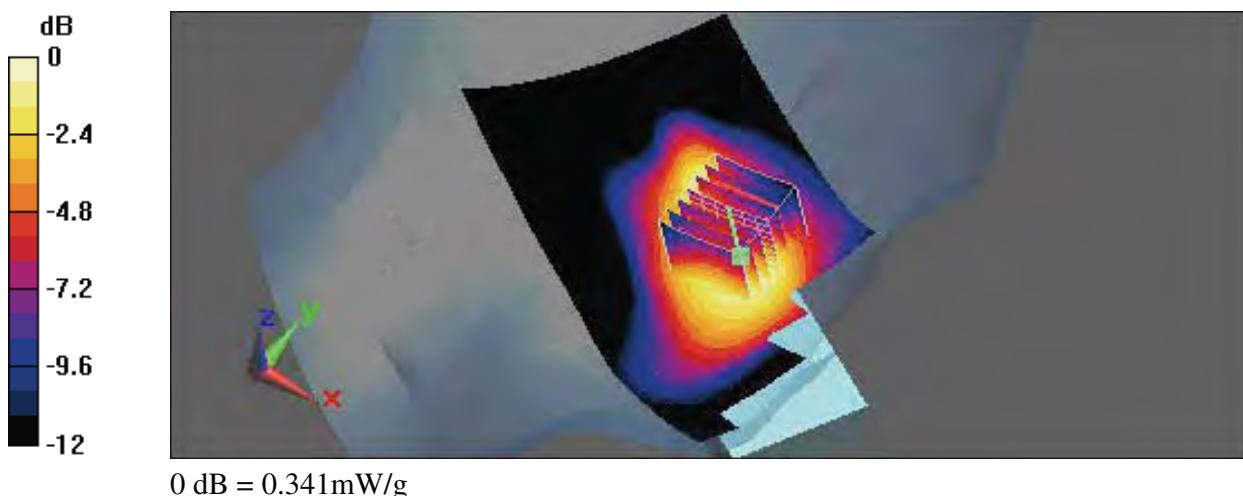
Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 3.37 V/m; Power Drift = -0.149 dB

Peak SAR (extrapolated) = 0.395 W/kg

**SAR(1 g) = 0.293 mW/g; SAR(10 g) = 0.191 mW/g**

Maximum value of SAR (measured) = 0.341 mW/g



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/18/2009 1:40:35 AM

## LT\_PCS CH661\_Open

**DUT: VE3\_Open; Type: Dual Band Mobile Phone; Serial: 862157000000617**

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 40.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3150; ConvF(5.04, 5.04, 5.04); Calibrated: 1/20/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

### Left Tilted/Area Scan (61x111x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.339 mW/g

### Left Tilted/Zoom Scan (7x7x9)/Cube 0:

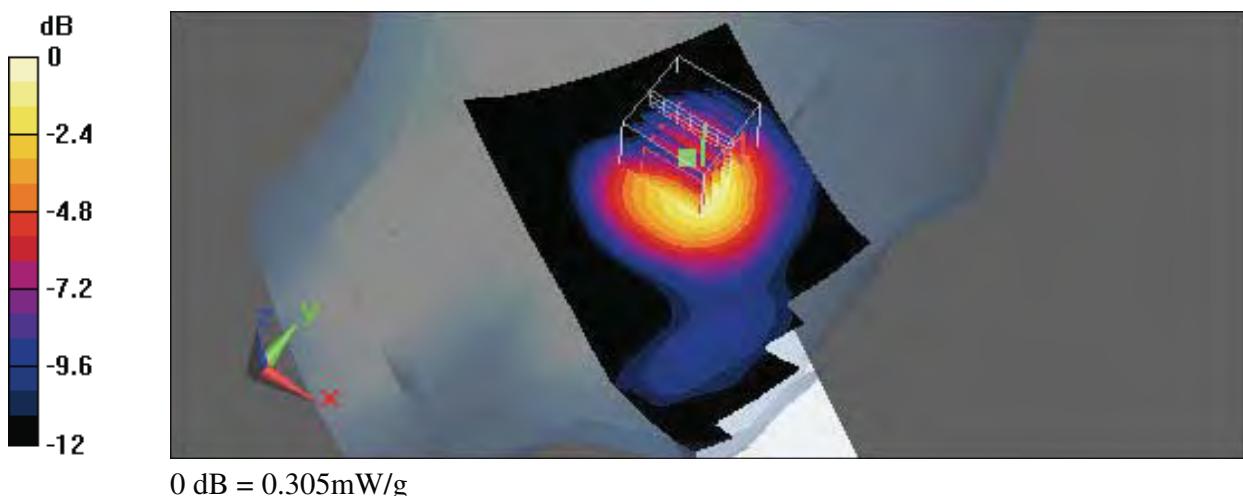
Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 6.75 V/m; Power Drift = -0.107 dB

Peak SAR (extrapolated) = 0.358 W/kg

**SAR(1 g) = 0.255 mW/g; SAR(10 g) = 0.153 mW/g**

Maximum value of SAR (measured) = 0.305 mW/g



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/18/2009 10:11:36 PM

### **Flat\_PCS GPRS CH661\_3Down1Up\_15mm\_Ear Phone\_Open**

**DUT: VE3\_Open; Type: Dual Band Mobile Phone; Serial: 862157000000617**

Communication System: PCS GPRS(3Down,1Up); Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.48$  mho/m;  $\epsilon_r = 53.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3150; ConvF(4.92, 4.92, 4.92); Calibrated: 1/20/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

#### **Flat/Area Scan (61x111x1):**

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.599 mW/g

#### **Flat/Zoom Scan (7x7x9)/Cube 0:**

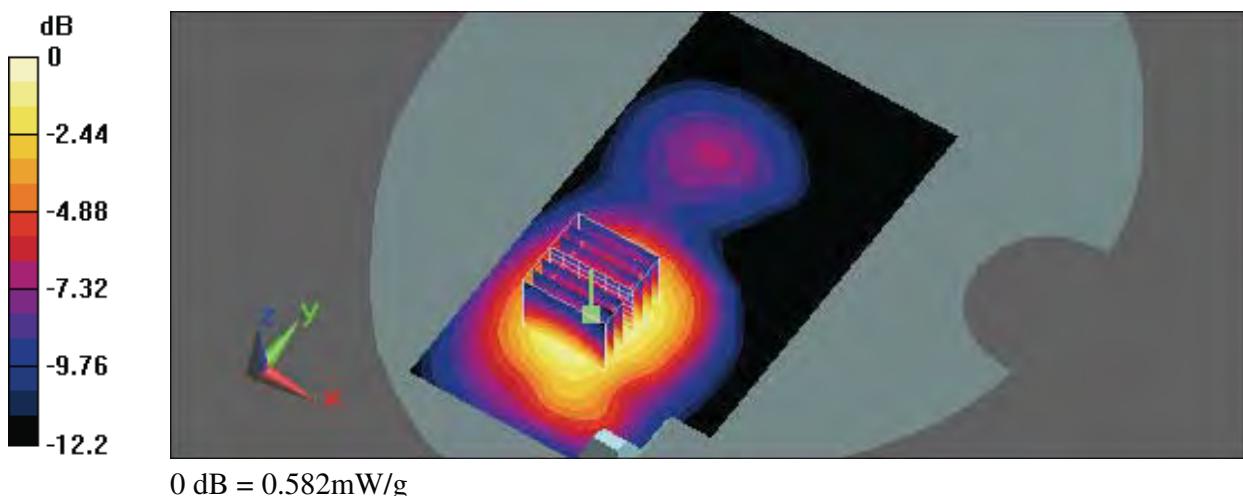
Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 7.17 V/m; Power Drift = 0.053 dB

Peak SAR (extrapolated) = 0.717 W/kg

**SAR(1 g) = 0.492 mW/g; SAR(10 g) = 0.309 mW/g**

Maximum value of SAR (measured) = 0.582 mW/g



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2/18/2009 9:46:17 PM

### **Flat\_PCS GPRS CH661\_3Down1Up\_15mm\_Ear Phone\_Close**

**DUT: VE3\_Close; Type: Dual Band Mobile Phone; Serial: 862157000000617**

Communication System: PCS GPRS(3Down,1Up); Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.48$  mho/m;  $\epsilon_r = 53.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3150; ConvF(4.92, 4.92, 4.92); Calibrated: 1/20/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 11/11/2008
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1150 and higher
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.2 Build 87

#### **Flat/Area Scan (61x91x1):**

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.399 mW/g

#### **Flat/Zoom Scan (7x7x9)/Cube 0:**

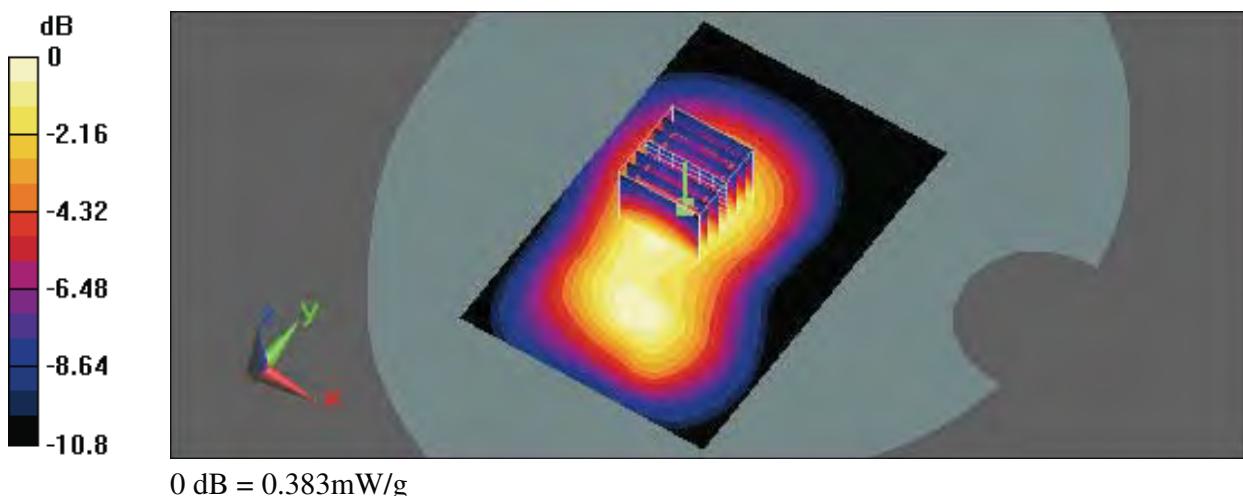
Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 10.9 V/m; Power Drift = -0.116 dB

Peak SAR (extrapolated) = 0.481 W/kg

**SAR(1 g) = 0.327 mW/g; SAR(10 g) = 0.210 mW/g**

Maximum value of SAR (measured) = 0.383 mW/g





## ***Appendix C - Calibration***

All of the instruments Calibration information are listed below.

- Dipole \_ D835V2 SN:4d063 Calibration No.D835V2-4d063 \_Jun08
- Dipole \_ D1900V2 SN:5d018 Calibration No.D1900V-5d018\_May08
- Probe \_ ES3DV3 SN:3150 Calibration No.ES3-3150\_Jan09
- DAE \_ DAE4 SN:779 Calibration No.DAE4-779\_ Nov08