

# SAR TEST REPORT

Equipment Under Test : PCS GSM/GPRS with Bluetooth, WLAN and NFC(Felica) Phone  
Model No. : L-02D  
Applicant : LG Electronics MobileComm U.S.A., Inc.  
Address of Applicant : 10101 Old Grove Road, San Diego, CA 92131  
FCC ID : ZNFL02D  
Device Category : Portable Device  
Exposure Category : General Population/Uncontrolled Exposure  
Date of Receipt : 2011-10-05  
Date of Test(s) : 2011-10-17 ~ 2011-11-07  
Date of Issue : 2011-11-10  
Max. SAR : 0.834 W/kg (PCS1900), 0.992 W/kg (WLAN)

## Standards:

**FCC OET Bulletin 65 supplement C**  
**IEEE 1528, 2003**  
**ANSI/IEEE C95.1, C95.3**

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

## Remarks:

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

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS Korea Co., Ltd. (Gunpo Laboratory) or testing done by SGS Korea Co., Ltd. (Gunpo Laboratory) in connection with distribution or use of the product described in this report must be approved by SGS Korea Co., Ltd. (Gunpo Laboratory) in writing.

Tested by : Fred Jeong



2011-11-10

Approved by : Charles Kim



2011-11-10

## **Contents**

### **1. General Information**

|      |                                                         |    |
|------|---------------------------------------------------------|----|
| 1.1  | Testing Laboratory.....                                 | 3  |
| 1.2  | Details of Applicant.....                               | 3  |
| 1.3  | Version of Report.....                                  | 3  |
| 1.4  | Description of EUT(s).....                              | 3  |
| 1.5  | Operation description.....                              | 4  |
| 1.6  | Evaluation procedures.....                              | 4  |
| 1.7  | The SAR Measurement System.....                         | 5  |
| 1.8  | System Components.....                                  | 7  |
| 1.9  | SAR System Verification.....                            | 8  |
| 1.10 | Tissue Simulant Fluid for the Frequency Band.....       | 10 |
| 1.11 | Test Standards and Limits.....                          | 11 |
| 1.12 | Justification for Extended SAR Dipole Calibrations..... | 12 |

### **2. Instruments List..... 13**

### **3. Summary of Results..... 14**

|     |                                                                           |    |
|-----|---------------------------------------------------------------------------|----|
| 3.1 | FCC Power Measurement Procedures.....                                     | 14 |
| 3.2 | RF Conducted Power.....                                                   | 14 |
| 3.3 | KDB 648474 D01 SAR Handsets Multi Xmitter and Ant v01r05 _Sept. 2008..... | 17 |
| 3.4 | SAR Test Configuration.....                                               | 19 |
| 3.5 | SAR Data Summary.....                                                     | 20 |

## **APPENDIX**

- A. DASY4 SAR Report
- B. Uncertainty Analysis
- C. Calibration certificate

## 1. General Information

### 1.1 Testing Laboratory

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Telephone : 82-31-428-5700  
FAX : 82-31-427-2371  
Homepage : [www.kr.sgs.com/ee](http://www.kr.sgs.com/ee)

### 1.2 Details of Manufacturer

Manufacturer : LG Electronics MobileComm U.S.A., Inc.  
Address : 10101 Old Grove Road, San Diego, CA 92131  
Contact Person : Hee-ju An  
Phone No. : 82-10-2846-2750  
E-mail : [heeju.an@lge.com](mailto:heeju.an@lge.com)

### 1.3 Version of Report

| Version Number | Date       | Revision      |
|----------------|------------|---------------|
| 00             | 2011-10-20 | Initial issue |
| 01             | 2011-11-10 | Revision 01   |

### 1.4 Description of EUT(s)

|                                    |                                                                                                      |
|------------------------------------|------------------------------------------------------------------------------------------------------|
| <b>EUT Type</b>                    | : PCS GSM/GPRS with Bluetooth, WLAN and NFC(Felica) Phone                                            |
| <b>Model</b>                       | : L-02D                                                                                              |
| <b>Serial Number</b>               | : N/A                                                                                                |
| <b>Mode of Operation</b>           | : PCS1900, WLAN, Bluetooth                                                                           |
| <b>Duty Cycle</b>                  | : 8(GSM), 8(GPRS 1Tx Slot), 4(GPRS 2Tx Slot),<br>2.67(GPRS 3Tx Slot), 2(GPRS 4Tx Slot), 1(WLAN)      |
| <b>Body worn Accessory</b>         | : None                                                                                               |
| <b>Tx Frequency Range</b>          | : 1850.2 MHz ~ 1909.8 MHz (PCS1900)<br>2412 MHz ~ 2462 MHz (WLAN)<br>2402 MHz ~ 2480 MHz (Bluetooth) |
| <b>Conducted Average Max Power</b> | : 29.60 dBm(PCS1900),<br>16.56 dBm(WLAN), 4.89dBm(Bluetooth)                                         |
| <b>Battery Type</b>                | : 3.7 V d.c. (Lithium-ion Battery)                                                                   |

## 1.5 Operation Configuration

The device in GSM mode was controlled by using a Communication tester (CMU 200). Communication between the device and the tester was established by air link. And the client provided a special driver and test program which can control the frequency and power of the WLAN module. Measurements were performed at the lowest, middle and highest channels of the operating band. The EUT was set to maximum power level during all tests and at the beginning of each test the battery was fully charged.

The DASY4 system measures power drift during SAR testing by comparing e-field in the same location at the beginning and at the end of measurement. Based on the RF Power and antenna separation distance, stand-alone BT SAR and simultaneous SAR evaluation are not required.

## 1.6 EVALUATION PROCEDURES

### - Power Reference Measurement Procedures

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The Minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 4 mm. This distance cannot be smaller than the Distance of sensor calibration points to probe tip as defined in the probe properties (for example, 2.7 mm for an ET3DV6 probe type).

- 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 1 g and 10 g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

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

The probe is calibrated at the center of the dipole sensors that is located 1 mm to 2.7 mm 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. The angle between the probe axis and the surface normal line is less than 30 degree.

In the Area Scan, the gradient of the interpolation function is evaluated to find all the extreme of the SAR distribution. The uncertainty on the locations of the extreme is less than 1/20 of the grid size. Only local maximum within -2 dB of the global maximum are searched and passed for the Cube Scan measurement. In the Cube Scan, the interpolation function is used to extrapolate the Peak SAR from the lowest measurement points to the inner phantom surface (the extrapolation distance). 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.

The maximum search is automatically performed after each area scan measurement. It is based on splines in two or three dimensions. The procedure can find the maximum for most SAR distributions even with relatively large grid spacing. After the area scanning measurement, the probe is automatically moved to a position at the interpolated maximum. The following scan can directly use this position for reference, e.g., for a finer resolution grid or the cube evaluations. The 1 g and 10 g peak evaluations are only available for the predefined cube 7x7x7 scans. The routines are verified and optimized for the grid dimensions used in these cube measurements. The measured volume of 30x30x30mm contains about 30 g of tissue. The first procedure is an extrapolation (incl. Boundary correction) to get the points between the lowest measured plane and the surface. The next step uses 3D interpolation to get all points within the measured volume. In the last step, a 1 g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is moved around until the highest averaged SAR is found. If the highest SAR is found at the edge of the measured volume, the system will issue a warning: higher SAR values might be found outside of the measured volume. In that case the cube measurement can be repeated, using the new interpolated maximum as the center.

## 1.7 The SAR Measurement System

A photograph of the SAR measurement System is given in Fig. a. This SAR Measurement System uses a Computer-controlled 3-D stepper motor system ( Speag Dasy 4 professional system ). A Model ET3DV6 1782 E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation  $SAR = \sigma (|E_i|^2) / \rho$  where  $\sigma$  and  $\rho$  are the conductivity and mass density of the tissue-simulant. The DASY4 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Staubli RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimeter probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

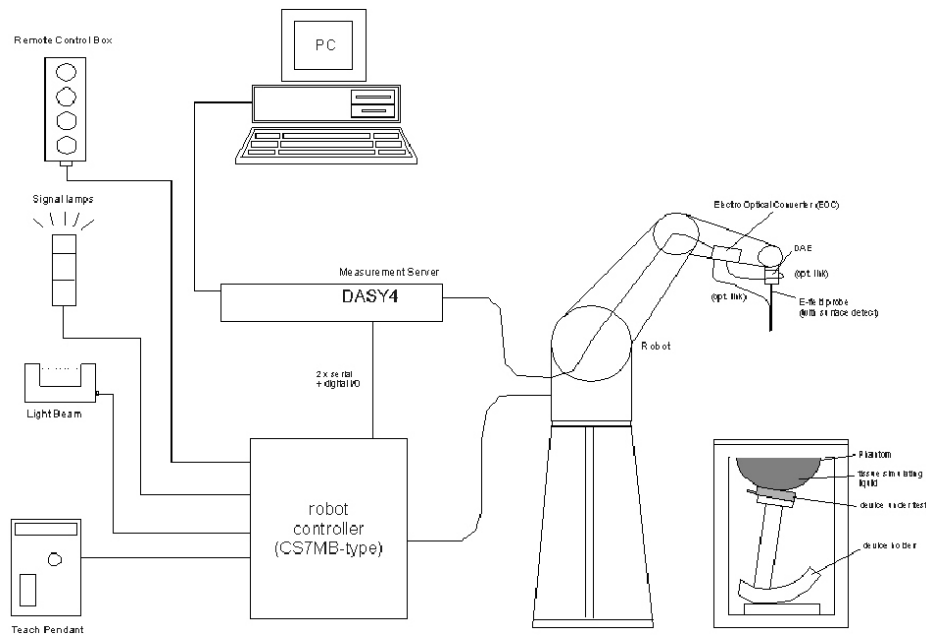


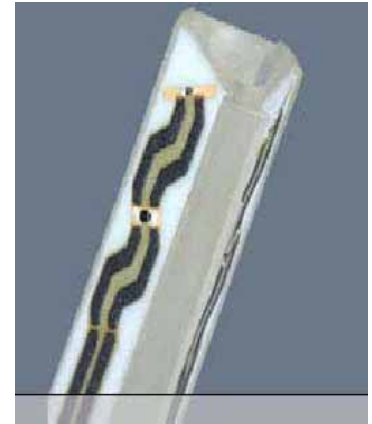
Fig a. The microwave circuit arrangement used for SAR system verification

- The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 2000 or Windows XP.
- DASY4 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing body usage.
- The device holder for flat phantom.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validate the proper functioning of the system.

## 1.8 System Components

### ET3DV6 E-Field Probe

|                      |                                                                                                                                                           |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Construction</b>  | : Symmetrical design with triangular core 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 2.5 GHz In brain simulating tissue (accuracy $\pm 8\%$ )                                                                          |
| <b>Frequency</b>     | : 10 MHz to >6 GHz; Linearity: $\pm 0.2$ dB (30 MHz to 3 GHz)                                                                                             |
| <b>Directivity</b>   | : $\pm 0.2$ dB in brain tissue (rotation around probe axis)<br>$\pm 0.4$ dB in brain tissue (rotation normal to probe axis)                               |
| <b>Dynamic Range</b> | : $5\ \mu\text{W/g}$ to $>100\ \text{mW/g}$ ; Linearity: $\pm 0.2$ dB                                                                                     |
| <b>Srfce. Detect</b> | : $\pm 0.2$ mm repeatability in air and clear liquids over diffuse reflecting surfaces                                                                    |
| <b>Dimensions</b>    | : Overall length: 330 mm<br>Tip length: 16 mm<br>Body diameter: 12 mm<br>Tip diameter: 6.8 mm<br>Distance from probe tip to dipole centers: 2.7 mm        |
| <b>Application</b>   | : General dosimetry up to 3 GHz Compliance tests of mobile phone                                                                                          |



ET3DV6 E-Field Probe

#### NOTE:

1. The Probe parameters have been calibrated by the SPEAG. Please reference "APPENDIX D" for the Calibration Certification Report.

## SAM Phantom

**Construction:** The SAM Phantom is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90 % of all users. 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 the 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 in the robot

**Shell Thickness:** 2.0 mm  $\pm$  0.1 mm

**Filling Volume:** Approx. 25 liters



SAM Phantom

## DEVICE HOLDER

**Construction** In combination with the Twin SAM PhantomV4.0/V4.0C or Twin SAM, the Mounting Device (made from POM) enables the rotation of the mounted transmitter in spherical coordinates, whereby the rotation point is the ear opening. The devices can be easily and accurately positioned according to IEC, IEEE, CENELEC, FCC or other specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).



Device Holder

## 1.9 SAR System Verification

The microwave circuit arrangement for system verification is sketched in Fig. b. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within  $\pm 10$  % from the target SAR values. These tests were done at 1900 MHz and 2450 MHz. The tests for EUT were conducted within 24 hours after each validation. The obtained results from the system accuracy verification are displayed in the table 1. During the tests, the ambient temperature of the laboratory was in the range  $(22 \pm 2)^\circ \text{C}$ , the relative humidity was in the range  $(55 \pm 5) \% \text{ R.H.}$  and the liquid depth above the ear reference points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

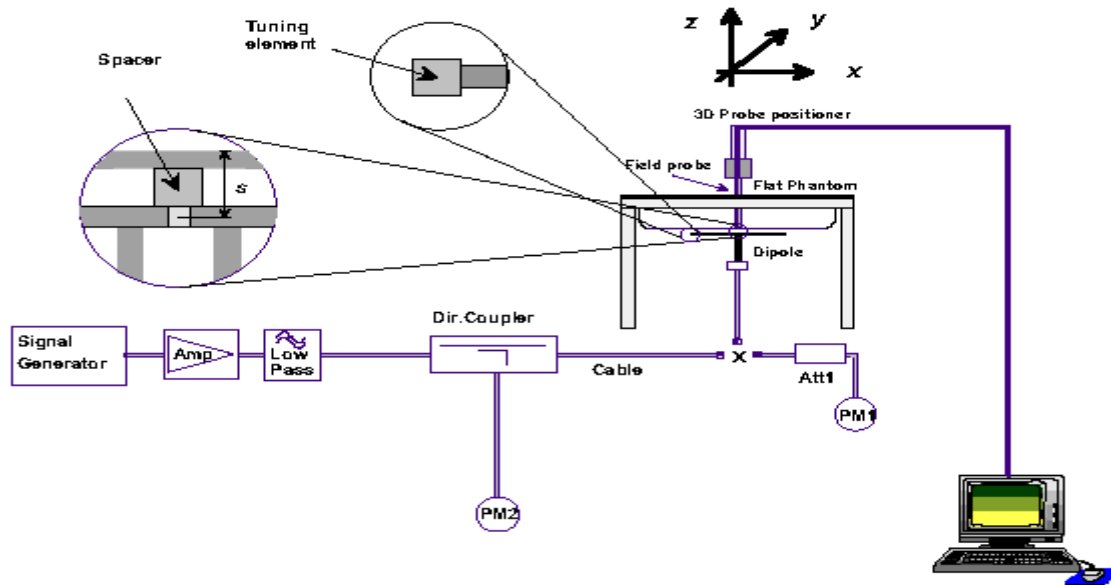


Fig b. System verification Setup Diagram



Fig c. Photo of the dipole Antenna

## System Validation Results

| Validation Kit        | Tissue Frequency (MHz) | Tissue Type | Amb. Temp (°C) | Liquid Temp (°C) | Input Power (W) | Measured SAR 1 g | Target SAR 1 g (1 W) | Normalized SAR 1 g (1 W) | Deviation (%) | Date       |
|-----------------------|------------------------|-------------|----------------|------------------|-----------------|------------------|----------------------|--------------------------|---------------|------------|
| D1900V2<br>S/N: 5d033 | 1900                   | Head        | 21.9           | 22.1             | 0.25            | <b>10.2 W/kg</b> | 39.4 W/kg            | <b>40.8 W/kg</b>         | 3.55          | 2011-10-17 |
| D1900V2<br>S/N: 5d033 | 1900                   | Body        | 21.9           | 22.1             | 0.25            | <b>9.93 W/kg</b> | 41.3 W/kg            | <b>39.7 W/kg</b>         | -3.87         | 2011-10-17 |
| D2450V2<br>S/N: 734   | 2450                   | Head        | 21.9           | 22.0             | 0.25            | <b>13.2 W/kg</b> | 51.7 W/kg            | <b>52.8 W/kg</b>         | 2.13          | 2011-11-07 |
| D2450V2<br>S/N: 734   | 2450                   | Body        | 21.9           | 22.0             | 0.25            | <b>13.2 W/kg</b> | 53.5 W/kg            | <b>52.8 W/kg</b>         | -1.31         | 2011-11-07 |

Table 1. System validation Results

### 1.10 Tissue Simulant Fluid for the Frequency Band

The dielectric properties for this simulant fluid were measured by using the Agilent Model 85070D Dielectric Probe (rates frequency band 200 MHz to 20 GHz) in conjunction with Agilent E5070B Network Analyzer (300 KHz - 3 GHz ) by using a procedure detailed in Section V.

| Test Date  | Tissue Type | Tissue Temp. (°C) | Frequency (MHz) | Measured                        |                              | Target                          |                              | Deviation (%)                   |                              |
|------------|-------------|-------------------|-----------------|---------------------------------|------------------------------|---------------------------------|------------------------------|---------------------------------|------------------------------|
|            |             |                   |                 | Dielectric Constant, $\epsilon$ | Conductivity, $\sigma$ (s/m) | Dielectric Constant, $\epsilon$ | Conductivity, $\sigma$ (s/m) | Dielectric Constant, $\epsilon$ | Conductivity, $\sigma$ (s/m) |
| 10/17/2011 | 1900H       | 22.1              | 1850            | 39.6                            | 1.42                         | 40.0                            | 1.40                         | -1.00                           | 1.43                         |
|            |             |                   | 1880            | 39.4                            | 1.43                         |                                 |                              | -1.50                           | 2.14                         |
|            |             |                   | 1900            | 39.3                            | 1.43                         |                                 |                              | -1.75                           | 2.14                         |
|            |             |                   | 1910            | 39.3                            | 1.45                         |                                 |                              | -1.75                           | 3.57                         |
| 10/17/2011 | 1900B       | 22.1              | 1850            | 53.5                            | 1.46                         | 53.3                            | 1.52                         | 0.38                            | -3.95                        |
|            |             |                   | 1880            | 53.5                            | 1.48                         |                                 |                              | 0.38                            | -2.63                        |
|            |             |                   | 1900            | 53.4                            | 1.50                         |                                 |                              | 0.19                            | -1.32                        |
|            |             |                   | 1910            | 53.4                            | 1.51                         |                                 |                              | 0.19                            | -0.66                        |
| 11/07/2011 | 2450H       | 22.0              | 2412            | 38.1                            | 1.81                         | 39.2                            | 1.80                         | -2.81                           | 0.56                         |
|            |             |                   | 2437            | 37.9                            | 1.85                         |                                 |                              | -3.32                           | 2.78                         |
|            |             |                   | 2450            | 37.8                            | 1.87                         |                                 |                              | -3.57                           | 3.89                         |
|            |             |                   | 2462            | 37.7                            | 1.88                         |                                 |                              | -3.83                           | 4.44                         |
| 11/07/2011 | 2450B       | 22.0              | 2412            | 51.4                            | 1.95                         | 52.7                            | 1.95                         | -2.47                           | 0.00                         |
|            |             |                   | 2437            | 51.3                            | 1.98                         |                                 |                              | -2.66                           | 1.54                         |
|            |             |                   | 2450            | 51.3                            | 2.01                         |                                 |                              | -2.66                           | 3.08                         |
|            |             |                   | 2462            | 51.3                            | 2.02                         |                                 |                              | -2.66                           | 3.59                         |

### The composition of the brain tissue simulating liquid

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

| Ingredients (% by weight) | Frequency (MHz) |       |       |      |       |       |           |      |      |      |
|---------------------------|-----------------|-------|-------|------|-------|-------|-----------|------|------|------|
|                           | 450             |       | 835   |      | 915   |       | 1800/1900 |      | 2450 |      |
| Tissue Type               | Head            | Body  | Head  | Body | Head  | Body  | Head      | Body | Head | Body |
| Water                     | 38.56           | 51.16 | 41.45 | 52.4 | 41.05 | 56.0  | 54.9      | 40.4 | 62.7 | 73.2 |
| Salt (NaCl)               | 3.95            | 1.49  | 1.45  | 1.4  | 1.35  | 0.76  | 0.18      | 0.5  | 0.5  | 0.04 |
| Sugar                     | 56.32           | 46.78 | 56.0  | 45.0 | 56.5  | 41.76 | 0.0       | 58.0 | 0.0  | 0.0  |
| HEC                       | 0.98            | 0.52  | 1.0   | 1.0  | 1.0   | 1.21  | 0.0       | 1.0  | 0.0  | 0.0  |
| Bactericide               | 0.19            | 0.05  | 0.1   | 0.1  | 0.1   | 0.27  | 0.0       | 0.1  | 0.0  | 0.0  |
| Triton X-100              | 0.0             | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0       | 0.0  | 36.8 | 0.0  |
| DGBE                      | 0.0             | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 44.92     | 0.0  | 0.0  | 26.7 |
| Dielectric Constant       | 43.42           | 58.0  | 42.54 | 56.1 | 42.0  | 56.8  | 39.9      | 54.0 | 39.8 | 52.5 |
| Conductivity (S/m)        | 0.85            | 0.83  | 0.91  | 0.95 | 1.0   | 1.07  | 1.42      | 1.45 | 1.88 | 1.78 |

Salt: 99 % Pure Sodium Chloride

Sugar: 98 % Pure Sucrose

Water: De-ionized, 16 MΩ<sup>+</sup> resistivity

HEC: Hydroxyethyl Cellulose

DGBE: 99 % Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]

Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

### 1.11 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (“SAR”) in Section 4.2 of “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz,” ANSI/IEEE C95.3–2003, Copyright 2003 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in “Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields,” NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and shall apply for portable devices transmitting in the frequency range from 100 kHz to 6 GHz. Portable devices that transmit at frequencies above 6 GHz are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter. Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

(1) Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over an 10 grams of tissue (defined as a tissue volume in the shape of a cube). Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.

(2) Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure. Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these

devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section.(Table .4)

| Human Exposure                                      | Uncontrolled Environment<br>General Population | Controlled Environment<br>Occupational |
|-----------------------------------------------------|------------------------------------------------|----------------------------------------|
| <b>Partial Peak SAR</b><br>(Partial)                | 1.60 m W/g                                     | 8.00 m W/g                             |
| <b>Partial Average SAR</b><br>(Whole Body)          | 0.08 m W/g                                     | 0.40 m W/g                             |
| <b>Partial Peak SAR</b><br>(Hands/Feet/Ankle/Wrist) | 4.00 m W/g                                     | 20.00 m W/g                            |

Table .4 RF exposure limits

### 1.12 Justification for Extended SAR Dipole Calibrations

Usage of SAR dipoles calibrated less than 2 years ago but more than 1 year ago were confirmed in maintaining return loss (< -20 dB, within 20 % of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB publication 450824:

| D1900V2_Body (SN : 5d033) |                  |            |                        |                |
|---------------------------|------------------|------------|------------------------|----------------|
| Measurement Date          | Return Loss (dB) | $\Delta\%$ | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2010-05-26                | -25.4            | -          | 47.1                   | -              |
| 2011-06-07                | -24.3            | 4.33       | 46.4                   | 1.49           |

| D1900V2_Head (SN : 5d033) |                  |            |                        |                |
|---------------------------|------------------|------------|------------------------|----------------|
| Measurement Date          | Return Loss (dB) | $\Delta\%$ | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2010-05-26                | -28.4            | -          | 49.5                   | -              |
| 2011-06-07                | -27.8            | -2.11      | 47.7                   | -3.64          |

| D2450V2_Body (SN : 734) |                  |            |                        |                |
|-------------------------|------------------|------------|------------------------|----------------|
| Measurement Date        | Return Loss (dB) | $\Delta\%$ | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2010-05-27              | -27.1            | -          | 49.8                   | -              |
| 2011-06-07              | -26.2            | -3.32      | 48.3                   | -3.01          |

| D2450V2_Head (SN : 734) |                  |            |                        |                |
|-------------------------|------------------|------------|------------------------|----------------|
| Measurement Date        | Return Loss (dB) | $\Delta\%$ | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2010-05-27              | -26.4            | -          | 53.8                   | -              |
| 2011-06-07              | 25.9             | -1.89      | 51.6                   | -4.09          |

## 2. Instruments List

| Maunfacturer                   | Device                            | Type             | Serial Number      | Due date of Calibration |
|--------------------------------|-----------------------------------|------------------|--------------------|-------------------------|
| Stäubli                        | Robot                             | RX90BL           | F03/5W05A1/A/01    | N/A                     |
| Schmid& Partner Engineering AG | Dosimetric E-Field Probe          | ET3DV6           | 1782               | April 14, 2012          |
| Schmid& Partner Engineering AG | 1900 MHz System Validation Dipole | D1900V2          | 5d033              | May 26, 2012            |
| Schmid& Partner Engineering AG | 2450 MHz System Validation Dipole | D2450V2          | 734                | May 27, 2012            |
| Schmid& Partner Engineering AG | Data acquisition Electronics      | DAE3             | 567                | January 27, 2012        |
| Schmid& Partner Engineering AG | Software                          | DASY 4 V4.7      | -                  | N/A                     |
| Schmid& Partner Engineering AG | Phantom                           | SAM Phantom V4.0 | TP-1645<br>TP-1300 | N/A                     |
| Agilent                        | Network Analyzer                  | E5070B           | MY42100282         | March 31, 2012          |
| Agilent                        | Dielectric Probe Kit              | 85070D           | 2184               | N/A                     |
| Agilent                        | Power Meter                       | E4419B           | GB43311126         | July 04, 2012           |
| Agilent                        | Power Sensor                      | E9300H           | MY41495307         | September 29, 2012      |
|                                |                                   |                  | MY41495308         | September 29, 2012      |
| Agilent                        | Signal Generator                  | E4421B           | MY43350132         | July 05, 2012           |
| Empower RF Systems             | Power Amplifier                   | 2001-BBS3Q7ECK   | 1032 D/C 0336      | April 01, 2012          |
| Agilent                        | Dual Directional Coupler          | 777D             | 50128              | July 10, 2012           |
|                                |                                   | 778D             | 50454              | July 06, 2012           |
| Microlab                       | LP Filter                         | LA-15N<br>LA-30N | N/A                | September 29, 2012      |
| R&S                            | Mobile Test Unit                  | CMU 200          | 109495             | July 04, 2012           |

## 3. Summary of Results

### 3.1 FCC Power Measurement Procedures

Power measurements were performed using a base station simulator under digital average power.

The handset was placed into a simulated call using a base station simulator in shielded chamber. SAR measurements were taken with a fully charged battery. In order to verify that the device was tested and maintained at full power, this was configured with the base station simulator. The SAR measurement Software calculates a reference point at the start and end of the test to check for power drifts. If conducted power deviations of more than 5 % occurred, the tests were repeated.

### 3.2 RF Conducted Power

#### GSM Conducted Powers

|               | Channel | Frequency (MHz) | Maximum Averaged Output Power (dBm) |            |           |           |           |
|---------------|---------|-----------------|-------------------------------------|------------|-----------|-----------|-----------|
|               |         |                 | GSM                                 | GPRS(GMSK) |           |           |           |
|               |         |                 |                                     | 1 Tx Slot  | 2 Tx Slot | 3 Tx Slot | 4 Tx Slot |
| PCS 1900 Band | 512     | 1850.2          | <b>29.60</b>                        | 29.60      | 26.60     | 24.60     | 23.60     |
|               | 661     | 1880.0          | 29.60                               | 29.50      | 26.60     | 24.80     | 23.60     |
|               | 810     | 1909.8          | 29.50                               | 29.40      | 26.50     | 24.70     | 23.60     |

|               | Channel | Frequency (MHz) | Calculated Maximum Frame-Averaged Output Power (dBm) |            |           |           |           |
|---------------|---------|-----------------|------------------------------------------------------|------------|-----------|-----------|-----------|
|               |         |                 | GSM                                                  | GPRS(GMSK) |           |           |           |
|               |         |                 |                                                      | 1 Tx Slot  | 2 Tx Slot | 3 Tx Slot | 4 Tx Slot |
| PCS 1900 Band | 512     | 1850.2          | 20.57                                                | 20.57      | 20.58     | 20.34     | 20.59     |
|               | 661     | 1880.0          | 20.57                                                | 20.47      | 20.58     | 20.54     | 20.59     |
|               | 810     | 1909.8          | 20.47                                                | 20.37      | 20.48     | 20.44     | 20.59     |

#### Notes :

1. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
2. GPRS/EDGE output powers were measured with CS1. EDGE (8-PSK) power were measured with MCS5.

GSM Class : B

GPRS Multislot class : 12 (Max 4 Tx Uplink slots)

DTM Multislot Class : N/A

# WLAN

| 802.11b Mode    |             | Rated  | Measured Power |
|-----------------|-------------|--------|----------------|
| Frequency (MHz) | Channel No. | (Mbps) | (dBm)          |
| 2412            | 1           | 1      | 16.19          |
|                 |             | 2      | 16.16          |
|                 |             | 5.5    | 16.15          |
|                 |             | 11     | 16.09          |
| 2437            | 6           | 1      | 16.41          |
|                 |             | 2      | 16.39          |
|                 |             | 5.5    | 16.36          |
|                 |             | 11     | 16.31          |
| 2462            | 11          | 1      | <b>16.56</b>   |
|                 |             | 2      | 16.54          |
|                 |             | 5.5    | 16.50          |
|                 |             | 11     | 16.41          |

| 802.11g Mode    |             | Rated  | Measured Power |
|-----------------|-------------|--------|----------------|
| Frequency (MHz) | Channel No. | (Mbps) | (dBm)          |
| 2412            | 1           | 6      | 14.10          |
|                 |             | 9      | 14.02          |
|                 |             | 12     | 13.93          |
|                 |             | 18     | 13.70          |
|                 |             | 24     | 13.53          |
|                 |             | 36     | 13.23          |
|                 |             | 48     | 12.95          |
|                 |             | 54     | 12.74          |
| 2437            | 6           | 6      | 14.36          |
|                 |             | 9      | 14.02          |
|                 |             | 12     | 13.93          |
|                 |             | 18     | 13.70          |
|                 |             | 24     | 13.53          |
|                 |             | 36     | 13.23          |
|                 |             | 48     | 12.95          |
|                 |             | 54     | 12.74          |
| 2462            | 11          | 6      | 14.36          |
|                 |             | 9      | 14.25          |
|                 |             | 12     | 14.11          |
|                 |             | 18     | 13.99          |
|                 |             | 24     | 13.76          |
|                 |             | 36     | 13.50          |
|                 |             | 48     | 13.29          |
|                 |             | 54     | 13.10          |

| 802.11nMode     |             | Rated  | Measured Power |
|-----------------|-------------|--------|----------------|
| Frequency (MHz) | Channel No. | (Mbps) | (dBm)          |
| 2412            | 1           | MCS0   | 13.12          |
|                 |             | MCS1   | 12.95          |
|                 |             | MCS2   | 12.70          |
|                 |             | MCS3   | 12.58          |
|                 |             | MCS4   | 12.22          |
|                 |             | MCS5   | 11.98          |
|                 |             | MCS6   | 11.79          |
|                 |             | MCS7   | 11.65          |
| 2437            | 6           | MCS0   | 13.39          |
|                 |             | MCS1   | 13.19          |
|                 |             | MCS2   | 12.99          |
|                 |             | MCS3   | 12.76          |
|                 |             | MCS4   | 12.42          |
|                 |             | MCS5   | 12.18          |
|                 |             | MCS6   | 12.10          |
|                 |             | MCS7   | 12.01          |
| 2462            | 11          | MCS0   | 13.50          |
|                 |             | MCS1   | 13.24          |
|                 |             | MCS2   | 13.06          |
|                 |             | MCS3   | 12.93          |
|                 |             | MCS4   | 12.56          |
|                 |             | MCS5   | 12.24          |
|                 |             | MCS6   | 12.18          |
|                 |             | MCS7   | 12.06          |

#### Bluetooth

| Channel | Frequency (MHz) | GFSK (dBm)  | 8DPSK (dBm) |
|---------|-----------------|-------------|-------------|
| Low     | 2402            | 4.52        | 2.42        |
| Middle  | 2441            | <b>4.89</b> | 2.75        |
| High    | 2480            | 4.64        | 2.43        |

### 3.3 KDB 648474 D01 SAR Handsets Multi Xmitter and Ant v01r05 \_Sept. 2008

#### Summary of SAR Evaluation Requirements for Cell Phone with Multiple Transmitters

These procedures were followed according to KDB 648474 document “SAR Handsets Multi Xmitter and Ant v01r05”, September 2008. The procedures are applicable to phones with built-in unlicensed transmitters, such as 802.11 a/b/g and Bluetooth devices.

#### <Output Power Thresholds for Unlicensed Transmitters>

|                                                                                                         | 2.45 | 5.15 - 5.35 | 5.47 - 5.85 | GHz |
|---------------------------------------------------------------------------------------------------------|------|-------------|-------------|-----|
| $P_{Ref}$                                                                                               | 12   | 6           | 5           | mW  |
| Device output power should be rounded to the nearest mW to compare with values specified in this table. |      |             |             |     |

#### <SAR Evaluation Requirements for Cellphones with Multiple Transmitters>

|                         | Individual Transmitter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Simultaneous Transmission                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Licensed Transmitters   | <u>Routine evaluation required</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | SAR not required:<br>Unlicensed only                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Unlicensed Transmitters | <p><u>When there is no simultaneous transmission –</u></p> <ul style="list-style-type: none"> <li>output <math>\leq 60</math> f: SAR not required</li> <li>output <math>&gt; 60</math> f: stand-alone SAR required</li> </ul> <p><u>When there is simultaneous transmission –</u></p> <p><u>Stand-alone SAR not required when</u></p> <ul style="list-style-type: none"> <li>output <math>\leq 2 \cdot P_{Ref}</math> and antenna is <math>\geq 5.0</math> cm from other antennas</li> <li>output <math>\leq P_{Ref}</math> and antenna is <math>\geq 2.5</math> cm from other antennas</li> <li>output <math>\leq P_{Ref}</math> and antenna is <math>&lt; 2.5</math> cm from other antennas, each with either output power <math>\leq P_{Ref}</math> or 1-g SAR <math>&lt; 1.2</math> W/kg</li> </ul> <p><u>Otherwise stand-alone SAR is required</u></p> <p><u>When stand-alone SAR is required</u></p> <ul style="list-style-type: none"> <li>test SAR on highest output channel for each wireless mode and exposure condition</li> <li>if SAR for highest output channel is <math>&gt; 50\%</math> of SAR limit, evaluate all channels according to normal procedures</li> </ul> | <ul style="list-style-type: none"> <li>when stand-alone 1-g SAR is not required and antenna is <math>\geq 5</math> cm from other antennas</li> </ul> <p><u>Licensed &amp; Unlicensed</u></p> <ul style="list-style-type: none"> <li>when the sum of the 1-g SAR is <math>&lt; 1.6</math> W/kg for all simultaneous transmitting antennas</li> <li>when SAR to peak location separation ratio of simultaneous transmitting antenna pair is <math>&lt; 0.3</math></li> </ul> <p><u>SAR required:</u></p> <p><u>Licensed &amp; Unlicensed</u></p> <p>antenna pairs with SAR to peak location separation ratio <math>\geq 0.3</math>; test is only required for the configuration that results in the highest SAR in stand-alone configuration for each wireless mode and exposure condition</p> <p><u>Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply</u></p> |
| Jaw, Mouth and Nose     | <p><u>Flat phantom SAR required</u></p> <ul style="list-style-type: none"> <li>when measurement is required in tight regions of SAM and it is not feasible or the results can be questionable due to probe tilt, calibration, positioning and orientation issues</li> <li>position rectangular and clam-shell phones according to flat phantom procedures and conduct SAR measurements for these specific locations</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | When simultaneous transmission SAR testing is required, contact the FCC Laboratory for interim guidance.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

<KDB 648474 Simultaneous SAR evaluation>

| Mode (f)  | P (dBm) | P (mW) | Stand-alone SAR |
|-----------|---------|--------|-----------------|
| PCS 1900  | 29.60   | 912.01 | Yes             |
| WLAN      | 16.56   | 45.29  | Yes             |
| Bluetooth | 4.89    | 3.08   | No              |

<Simultaneous Transmission Summation for Held to Ear Voice Call with Hotspot Active Scenario>

| Simultaneous TX | configuration | 1900 GSM SAR(W/kg) | WIFI SAR (W/kg) | $\Sigma$ SAR (W/kg) |
|-----------------|---------------|--------------------|-----------------|---------------------|
| Head SAR        | Right Cheek   | 0.520              | 0.970           | 1.490               |
|                 | Right Tilt    | 0.208              | 0.981           | 1.189               |
|                 | Left Cheek    | 0.388              | 0.992           | 1.380               |
|                 | Left Tilt     | 0.157              | 0.869           | 1.026               |

<Simultaneous Transmission Summation for 2G Hotspot Data and WIFI Hotspot Active Scenario>

| Simultaneous TX | configuration | 1900 GSM SAR(W/kg) | WIFI SAR (W/kg) | $\Sigma$ SAR (W/kg) |
|-----------------|---------------|--------------------|-----------------|---------------------|
| Body SAR        | Back          | 0.834              | 0.565           | 1.399               |
|                 | Front         | 0.578              | 0.303           | 0.881               |
|                 | Left          | 0.253              | -               | 0.253               |
|                 | Right         | 0.331              | 0.020           | 0.351               |
|                 | Bottom        | 0.679              | -               | 0.679               |
|                 | Top           | -                  | 0.368           | 0.368               |

\*\* The above tables represent the worst-case simultaneous transmission scenarios possible with this device.

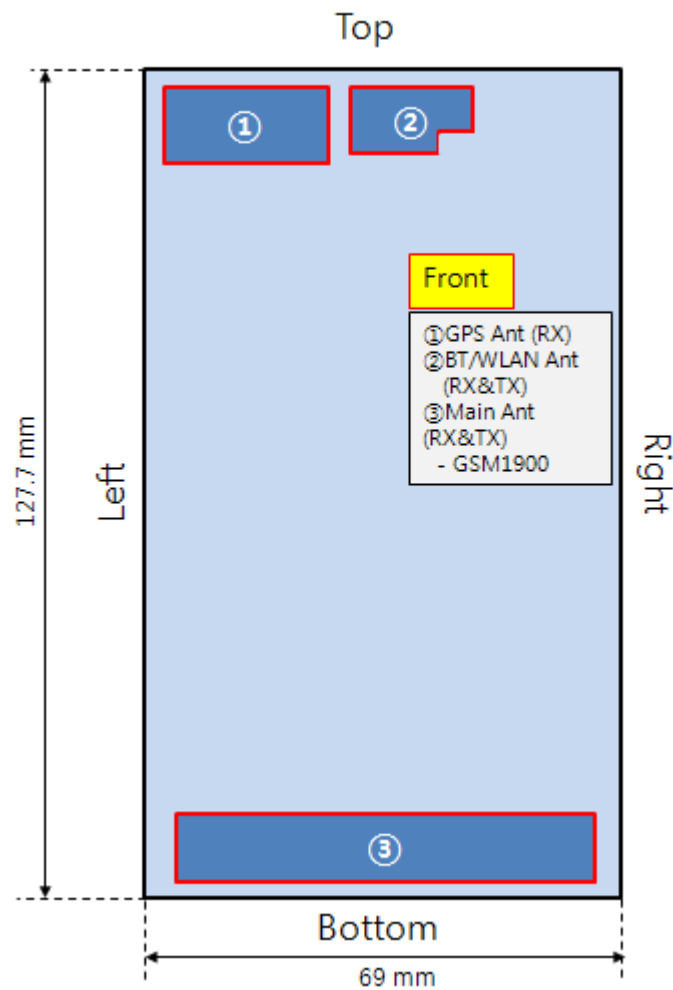
Note : "-" SAR results shown in the table are zero for summation purposes. SAR was not required to be measured due to exclusions mentioned in Section "3.4 SAR Test Configuration".

The above numerical summed SAR was below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit. Therefore, no volumetric SAR summation is required since the numerical sums are below the limit.

### 3.4 SAR Test Configuration

| Mode      | Front | Back | Edge A (Left) | Edge B (Right) | Edge C (Bottom) | Edge D (Top) |
|-----------|-------|------|---------------|----------------|-----------------|--------------|
| GPRS 1900 | Yes   | Yes  | Yes           | Yes            | Yes             | No           |
| WLAN      | Yes   | Yes  | No            | Yes            | No              | Yes          |

### Antenna Distance



<Note>

1. Particular DUT edges were not necessary to be evaluated for Wireless Router SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06 guidance, page 2.
2. For more information about “Antenna Distance”, refer to the submitted documents of the Antenna Distance from manufacturer.

### 3.5 SAR Data Summary

#### PCS 1900 Head SAR

|                          |            |
|--------------------------|------------|
| Ambient Temperature (°C) | 21.9       |
| Liquid Temperature (°C)  | 22.1       |
| Date                     | 2011-10-17 |

| Mode / Band | Head  | EUT Position | Traffic Channel |         | Conducted Power (dBm) | Power Drift (dB) | 1 g SAR (W/kg) | 1 g SAR Limits (W/kg) |
|-------------|-------|--------------|-----------------|---------|-----------------------|------------------|----------------|-----------------------|
|             |       |              | Frequency (MHz) | Channel |                       |                  |                |                       |
| PCS1900     | Left  | Cheek        | 1880.0          | 661     | 29.60                 | -0.077           | 0.388          | 1.6                   |
| PCS1900     | Left  | Tilt         | 1880.0          | 661     | 29.60                 | 0.094            | 0.157          |                       |
| PCS1900     | Right | Cheek        | 1880.0          | 661     | 29.60                 | -0.196           | <b>0.520</b>   |                       |
| PCS1900     | Right | Tilt         | 1880.0          | 661     | 29.60                 | 0.030            | 0.208          |                       |

#### <Note>

1. The test data reported are the worst-case SAR value with the position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Battery is fully charged for all readings and the standard batteries are the only options.
4. Liquid tissue depth was at least 15 cm.
5. Justification for reduced test configuration : Per FCC/OET Bulletin 65 Supplement C [July 2001], if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channel is optional for such test configurations.

## PCS1900 Body Hotspot SAR

|                          |            |
|--------------------------|------------|
| Ambient Temperature (°C) | 21.9       |
| Liquid Temperature (°C)  | 22.1       |
| Date                     | 2011-10-17 |

| Mode<br>(Service) | EUT<br>Position | # of<br>GPRS<br>Slots | Traffic Channel    |         | Conducted<br>Power<br>(dBm) | Power<br>Drift(dB) | 1 g SAR<br>(W/kg) | 1 g SAR<br>Limits<br>(W/kg) |
|-------------------|-----------------|-----------------------|--------------------|---------|-----------------------------|--------------------|-------------------|-----------------------------|
|                   |                 |                       | Frequency<br>(MHz) | Channel |                             |                    |                   |                             |
| GPRS              | Front           | 2                     | 1880.0             | 661     | 26.60                       | -0.033             | 0.578             | 1.6                         |
|                   | Back            | 2                     | 1850.2             | 512     | 26.60                       | -0.059             | 0.757             |                             |
|                   | Back            | 2                     | 1880.0             | 661     | 26.60                       | -0.067             | 0.829             |                             |
|                   | Back            | 2                     | 1909.8             | 810     | 26.50                       | 0.039              | 0.800             |                             |
|                   | Left(Edge A)    | 2                     | 1880.0             | 661     | 26.60                       | -0.012             | 0.253             |                             |
|                   | Right(Edge B)   | 2                     | 1880.0             | 661     | 26.60                       | -0.040             | 0.331             |                             |
|                   | Bottom(Edge C)  | 2                     | 1880.0             | 661     | 26.60                       | -0.006             | 0.679             |                             |
|                   | Back            | 1                     | 1850.2             | 512     | 29.60                       | 0.017              | 0.551             |                             |
|                   | Back            | 1                     | 1880.0             | 661     | 29.50                       | -0.093             | <b>0.834</b>      |                             |
|                   | Back            | 1                     | 1909.8             | 810     | 29.40                       | -0.020             | 0.779             |                             |
|                   | Back            | 3                     | 1880.0             | 661     | 24.80                       | 0.098              | 0.763             |                             |
|                   | Back            | 4                     | 1880.0             | 661     | 23.60                       | 0.021              | 0.756             |                             |

<Note>

1. The test data reported are the worst-case SAR value with the position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Battery is fully charged for all readings and the standard batteries are the only options.
4. Liquid tissue depth was at least 15 cm.
5. Justification for reduced test configuration : Per FCC/OET Bulletin 65 Supplement C [July 2001], if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channel is optional for such test configurations.
6. The distance from EUT to flat phantom for testing Body SAR is 10 mm.
7. Top was not tested since the antenna distance to edge was greater than 2.5 cm per KDB941225 D06.
8. GPRS body-worn SAR testing is more conservative than GSM voice body-worn testing with accessory.

## 2.4 GHz WLAN Head SAR

|                          |            |
|--------------------------|------------|
| Ambient Temperature (°C) | 21.9       |
| Liquid Temperature (°C)  | 22.0       |
| Date                     | 2011-11-11 |

| Mode         | Service | Head  | EUT Position | Traffic Channel |         | Data Rate (Mbps) | Conducted Power (dBm) | Power Drift (dB) | 1 g SAR (W/kg) | 1 g SAR Limits (W/kg) |
|--------------|---------|-------|--------------|-----------------|---------|------------------|-----------------------|------------------|----------------|-----------------------|
|              |         |       |              | Frequency (MHz) | Channel |                  |                       |                  |                |                       |
| IEEE 802.11b | DSSS    | Left  | Cheek        | 2412            | 1       | 1                | 16.19                 | -0.052           | 0.481          | 1.6                   |
|              |         | Left  | Cheek        | 2437            | 6       | 1                | 16.41                 | 0.020            | 0.679          |                       |
|              |         | Left  | Cheek        | 2462            | 11      | 1                | 16.56                 | -0.187           | <b>0.992</b>   |                       |
|              |         | Left  | Tilt         | 2412            | 1       | 1                | 16.19                 | -0.002           | 0.418          |                       |
|              |         | Left  | Tilt         | 2437            | 6       | 1                | 16.41                 | 0.058            | 0.622          |                       |
|              |         | Left  | Tilt         | 2462            | 11      | 1                | 16.56                 | 0.154            | 0.869          |                       |
|              |         | Right | Cheek        | 2412            | 1       | 1                | 16.19                 | -0.037           | 0.506          |                       |
|              |         | Right | Cheek        | 2437            | 6       | 1                | 16.41                 | 0.024            | 0.762          |                       |
|              |         | Right | Cheek        | 2462            | 11      | 1                | 16.56                 | 0.038            | 0.970          |                       |
|              |         | Right | Tilt         | 2412            | 1       | 1                | 16.19                 | 0.006            | 0.459          |                       |
|              |         | Right | Tilt         | 2437            | 6       | 1                | 16.41                 | 0.142            | 0.690          |                       |
|              |         | Right | Tilt         | 2462            | 11      | 1                | 16.56                 | -0.083           | 0.981          |                       |

### <Note>

1. The test data reported are the worst-case SAR value with the position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Battery is fully charged for all readings and the standard batteries are the only options.
4. Liquid tissue depth was at least 15 cm.
5. Justification for reduced test configuration : Per FCC/OET Bulletin 65 Supplement C [July 2001], if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channel is optional for such test configurations.
6. WLAN could be used for data transmission during voice communication at the same time.
7. KDB 248227 <SAR Measurement Procedures for 802.11 a/b/g Transmitters>
  - Channel 1, 6 and 11 were tested by the definition of “default test channels”.
  - Highest average RF output power channel for the lowest data rate were selected for SAR evaluation. Other mode were not tested since the average output powers were not greater than 0.25 dB than that of the corresponding channel in the lowest data rate IEEE 802.11b mode.
8. WLAN transmission was verified using a spectrum analyzer.

## 2.4 GHz WLAN Body Hotspot SAR

|                          |            |
|--------------------------|------------|
| Ambient Temperature (°C) | 21.9       |
| Liquid Temperature (°C)  | 22.0       |
| Date                     | 2011-11-07 |

| Mode         | Service | EUT Position   | Traffic Channel |         | Data Rate (Mbps) | Conducted Power (dBm) | Power Drift (dB) | 1 g SAR (W/kg) | 1 g SAR Limits (W/kg) |
|--------------|---------|----------------|-----------------|---------|------------------|-----------------------|------------------|----------------|-----------------------|
|              |         |                | Frequency (MHz) | Channel |                  |                       |                  |                |                       |
| IEEE 802.11b | DSSS    | Front          | 2462            | 11      | 1                | 16.56                 | -0.054           | 0.303          | 1.6                   |
|              |         | Back           | 2462            | 11      | 1                | 16.56                 | -0.019           | <b>0.565</b>   |                       |
|              |         | Right (Edge B) | 2462            | 11      | 1                | 16.56                 | -0.009           | 0.020          |                       |
|              |         | Top (Edge D)   | 2462            | 11      | 1                | 16.56                 | -0.198           | 0.368          |                       |

### <Note>

1. The test data reported are the worst-case SAR value with the position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Battery is fully charged for all readings and the standard batteries are the only options.
4. Liquid tissue depth was at least 15 cm.
5. Justification for reduced test configuration : Per FCC/OET Bulletin 65 Supplement C [July 2001], if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channel is optional for such test configurations.
6. The distance from EUT to flat phantom for testing Body SAR is 10 mm.
7. KDB 248227 <SAR Measurement Procedures for 802.11 a/b/g Transmitters>
  - Channel 1, 6 and 11 were tested by the definition of “default test channels”.
  - Highest average RF output power channel for the lowest data rate were selected for SAR evaluation. Other mode were not tested since the average output powers were not greater than 0.25 dB than that of the corresponding channel in the lowest data rate IEEE 802.11b mode.
8. WLAN transmission was verified using a spectrum analyzer.
9. Left and Bottom was not tested since the antenna distance to edge was greater than 2.5 cm per KDB941225 D06.

## Appendix

### List

|            |                                                 |                                                                            |
|------------|-------------------------------------------------|----------------------------------------------------------------------------|
| Appendix A | DASY4 Report<br>(Plots of the SAR Measurements) | - Validation Test<br>(1900 MHz, 2450 MHz)<br>- PCS1900 Test<br>- WLAN Test |
| Appendix B | Uncertainty Analysis                            |                                                                            |
| Appendix C | Calibration Certificate                         | - PROBE<br>- DAE3<br>- DIPOLE                                              |



Report File No. : F690501/RF-SAR001964-A1  
Date of Issue : 2011-11-10  
Page : 25 / 104

## **Appendix A**

### **Test Plot - DASY4 Report**

## 1900 MHz Validation Test\_Head

Date: 2011-10-17

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: [Validation 1900 MHz\\_Head.da4](#)

Input Power : 250 mW

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d033

Program Name: Validation 1900 MHz\_Head

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

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.43$  mho/m;  $\epsilon_r = 39.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.95, 4.95, 4.95); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Validation 1900 MH\_Head/Area Scan (61x71x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 12.7 mW/g

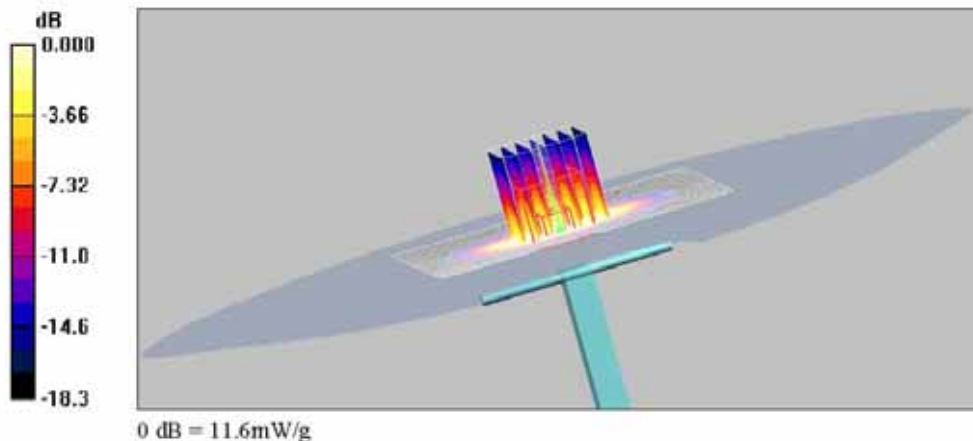
**Validation 1900 MH\_Head/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.0 V/m; Power Drift = -0.010 dB

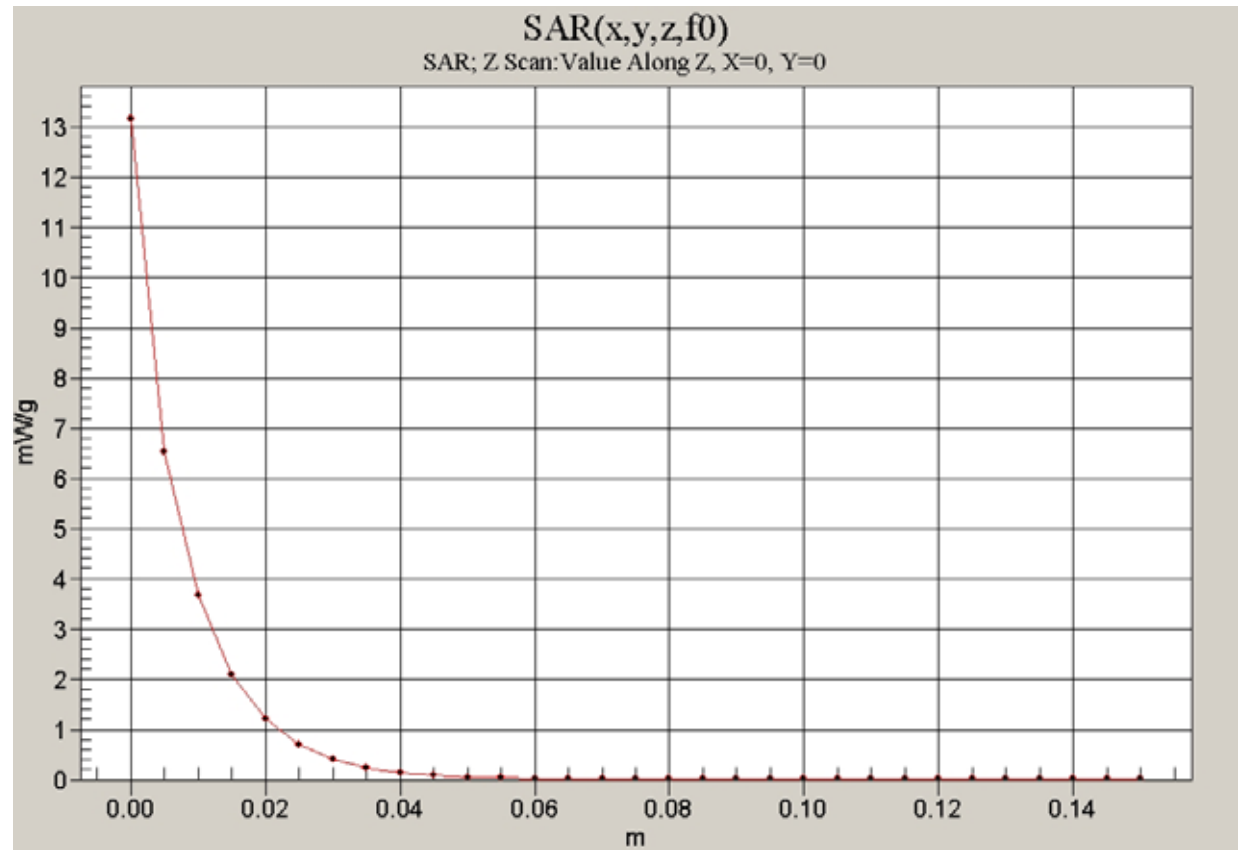
Peak SAR (extrapolated) = 18.4 W/kg

SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.22 mW/g

Maximum value of SAR (measured) = 11.6 mW/g



## Z Scan



## 1900 MHz Validation Test\_Body

Date: 2011-10-17

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: Validation 1900 MHz\_Body.da4

Input Power : 250 mW

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d033

Program Name: Validation 1900 MHz\_Body

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

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.5$  mho/m;  $\epsilon_r = 53.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Validation 1900 MH\_Body/Area Scan (61x71x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 12.4 mW/g

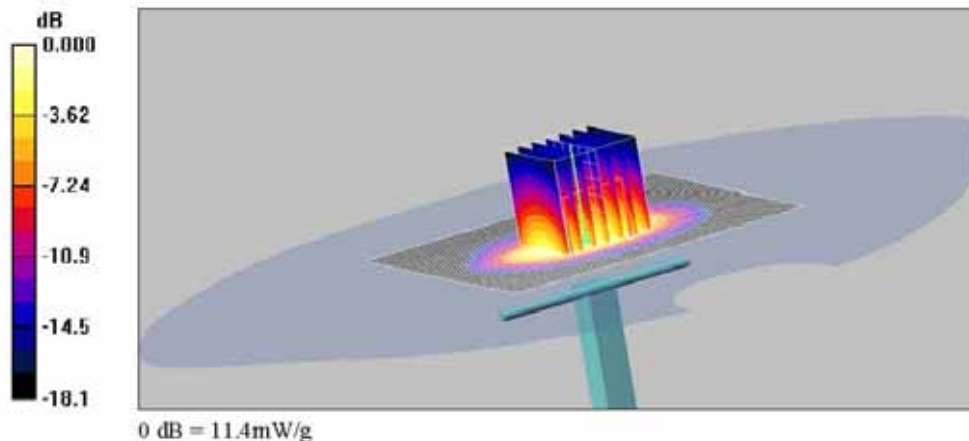
**Validation 1900 MH\_Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.1 V/m; Power Drift = -0.026 dB

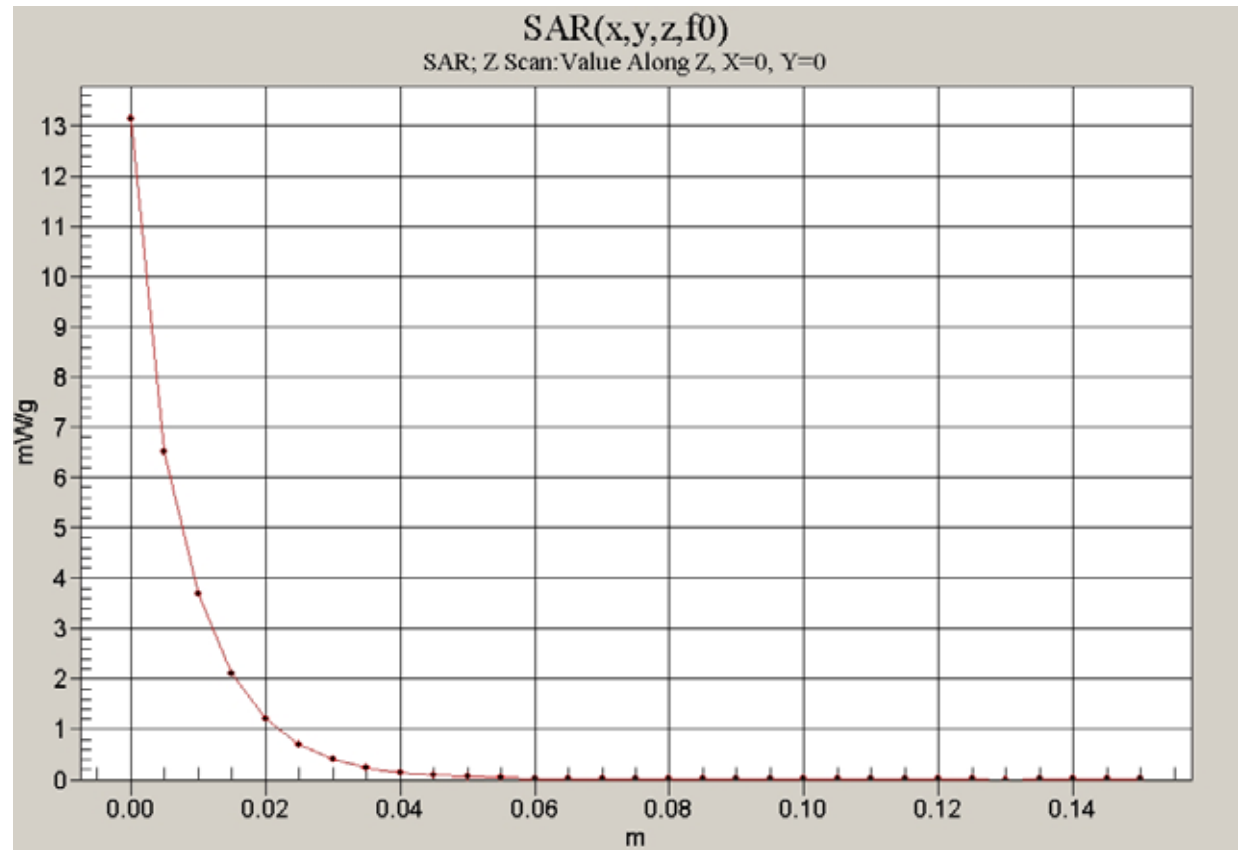
Peak SAR (extrapolated) = 17.4 W/kg

SAR(1 g) = 9.93 mW/g; SAR(10 g) = 5.09 mW/g

Maximum value of SAR (measured) = 11.4 mW/g



## Z Scan



## 2450 MHz Validation Test\_Head

Date: 2011-11-07

Test Laboratory: SGS Korea (Gunpo Laboratory)  
File Name: [Validation 2450 MHz\\_Head.da4](#)

Input Power : 250 mW

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:734**  
**Program Name: Validation 2450 MHz\_Head**

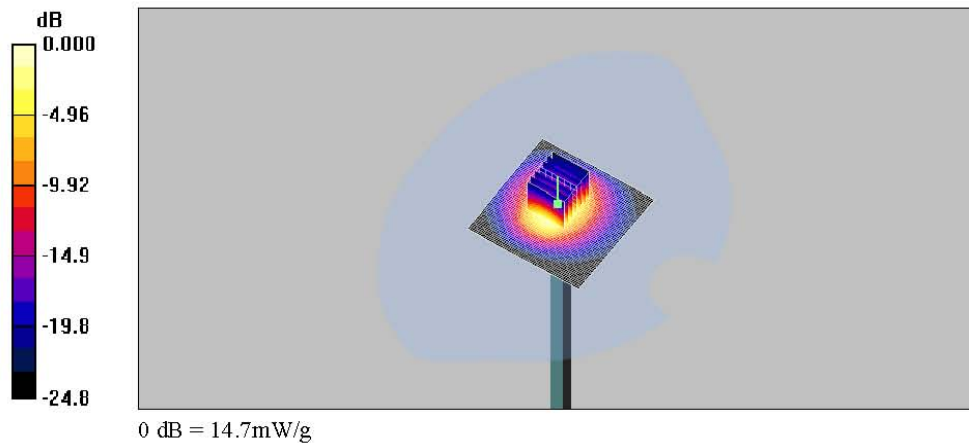
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1  
Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.87$  mho/m;  $\epsilon_r = 37.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

DASY4 Configuration:

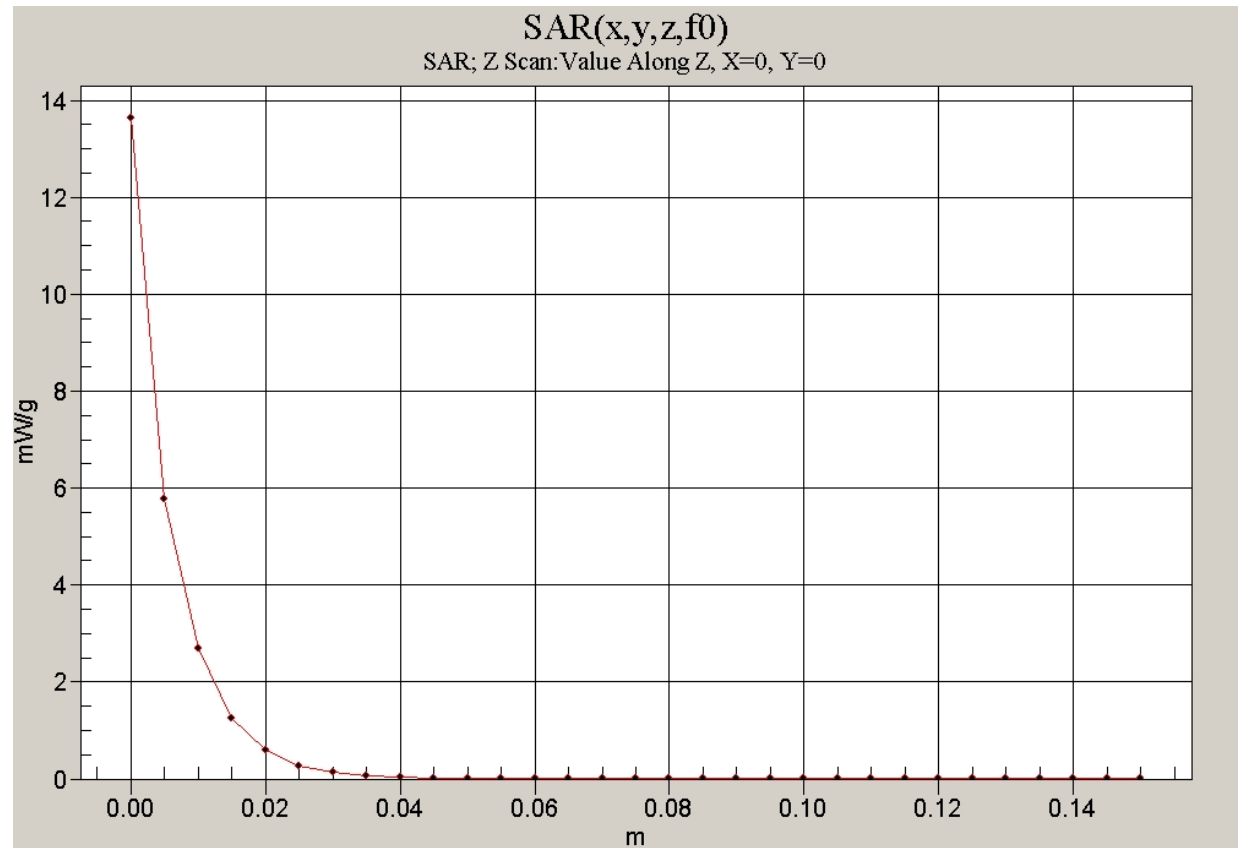
- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Validation 2450 MHz/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 16.7 mW/g

**Validation 2450 MHz/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 83.9 V/m; Power Drift = -0.027 dB  
Peak SAR (extrapolated) = 29.4 W/kg  
**SAR(1 g) = 13.2 mW/g; SAR(10 g) = 5.99 mW/g**  
Maximum value of SAR (measured) = 14.7 mW/g



## Z Scan



## 2450 MHz Validation Test\_Body

Date: 2011-11-07

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: [Validation 2450 MHz\\_Body.da4](#)

Input Power : 250 mW

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:734

Program Name: Validation 2450 MHz\_Body

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 2.01$  mho/m;  $\epsilon_r = 51.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(3.94, 3.94, 3.94); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Validation 2450 MHz/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 16.5 mW/g

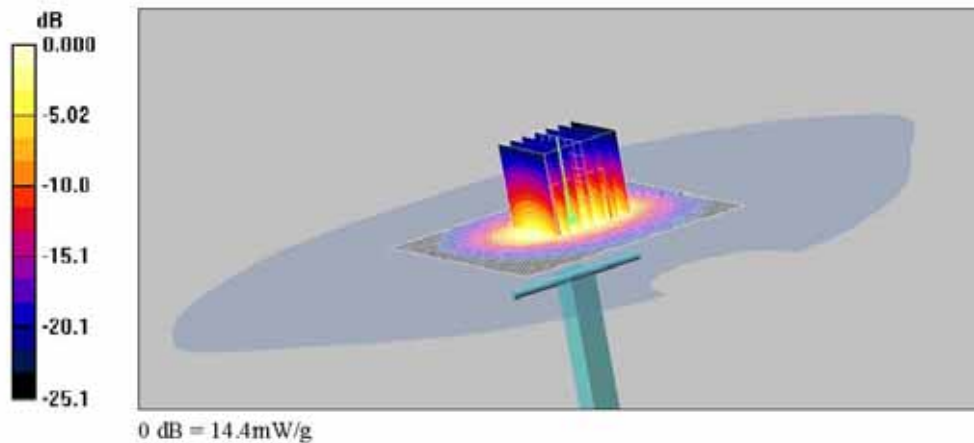
**Validation 2450 MHz/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 78.1 V/m; Power Drift = -0.061 dB

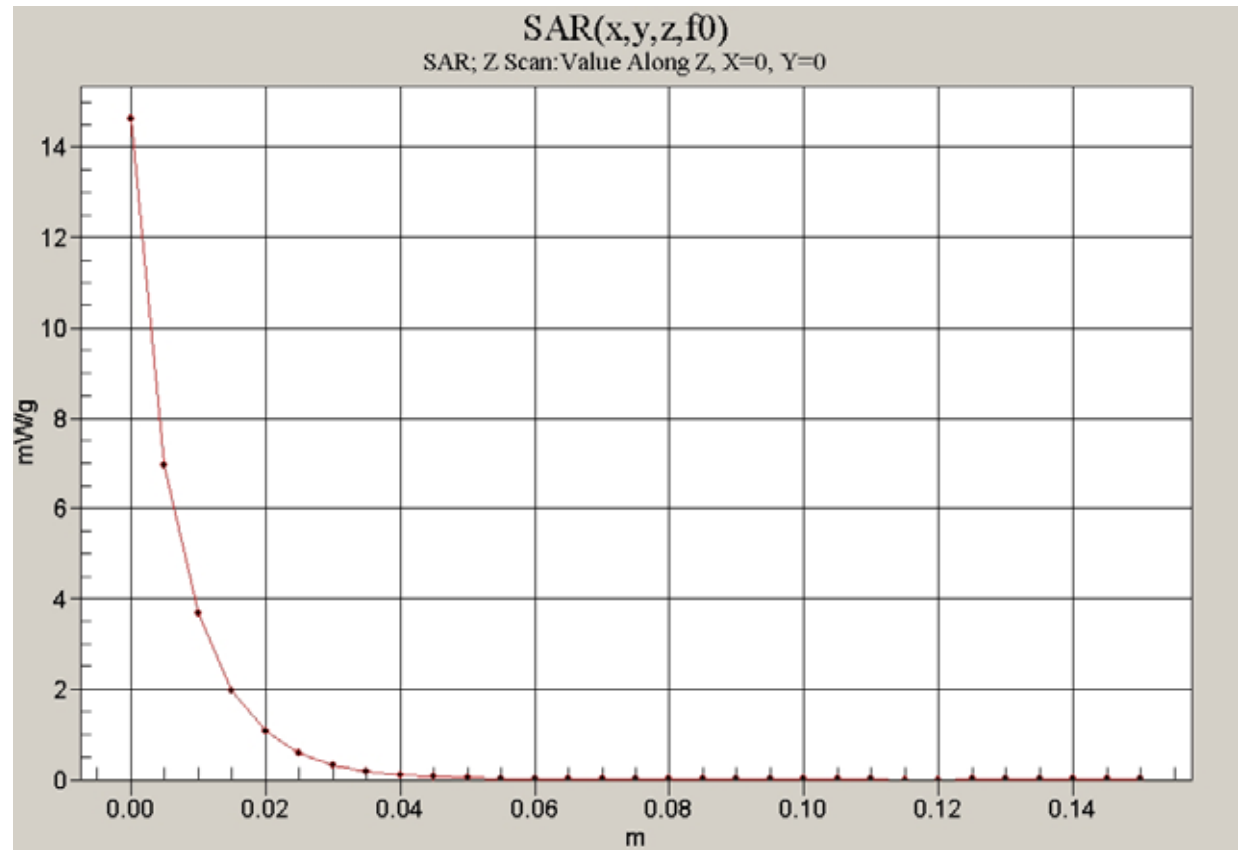
Peak SAR (extrapolated) = 33.1 W/kg

SAR(1 g) = 13.2 mW/g; SAR(10 g) = 5.86 mW/g

Maximum value of SAR (measured) = 14.4 mW/g



## Z Scan



## PCS1900 Head SAR Test

Date: 2011-10-17

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [PCS1900\\_LE.da4](#)

DUT: DS1007; Type: Mobile Phone; Serial: N/A  
 Program Name: PCS1900\_Head

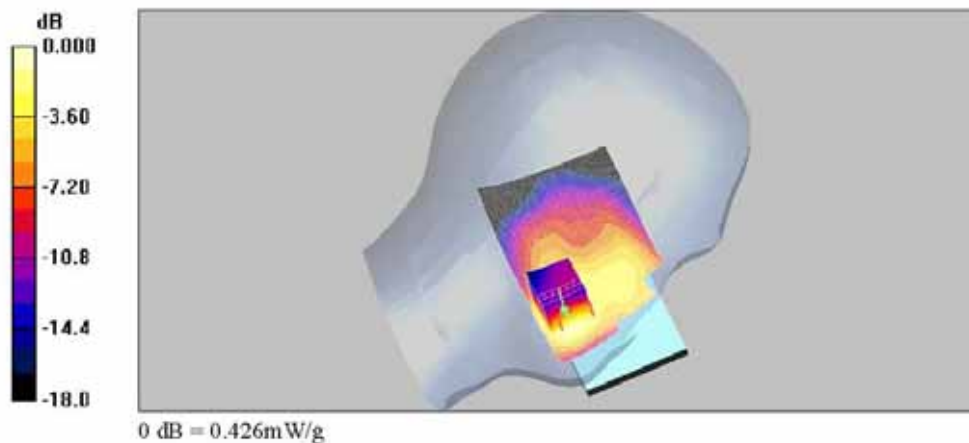
Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8  
 Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.43$  mho/m;  $\epsilon_r = 39.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.95, 4.95, 4.95); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**PCS1900\_LE\_Mid\_Cheek/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm  
 Maximum value of SAR (interpolated) = 0.416 mW/g

**PCS1900\_LE\_Mid\_Cheek/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 6.31 V/m; Power Drift = -0.077 dB  
 Peak SAR (extrapolated) = 0.606 W/kg  
 SAR(1 g) = 0.388 mW/g; SAR(10 g) = 0.234 mW/g  
 Maximum value of SAR (measured) = 0.426 mW/g



Date: 2011-10-17

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: PCS1900\_LE.da4

DUT: DS1007; Type: Mobile Phone; Serial: N/A

Program Name: PCS1900\_Head

Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8

Medium parameters used:  $f = 1880 \text{ MHz}$ ;  $\sigma = 1.43 \text{ mho/m}$ ;  $\epsilon_r = 39.4$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.95, 4.95, 4.95); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**PCS1900\_LE\_Mid\_Tilt/Area Scan (61x91x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (interpolated) =  $0.183 \text{ mW/g}$

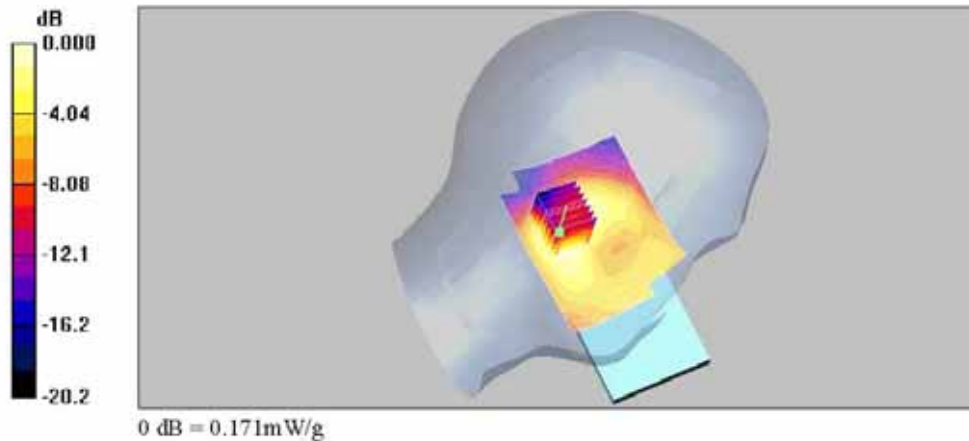
**PCS1900\_LE\_Mid\_Tilt/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $9.70 \text{ V/m}$ ; Power Drift =  $0.094 \text{ dB}$

Peak SAR (extrapolated) =  $0.228 \text{ W/kg}$

SAR(1 g) =  $0.157 \text{ mW/g}$ ; SAR(10 g) =  $0.096 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.171 \text{ mW/g}$



Date: 2011-10-17

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [PCS1900\\_RE.d4](#)

DUT: DS1007; Type: Mobile Phone; Serial: N/A  
 Program Name: PCS1900\_Head

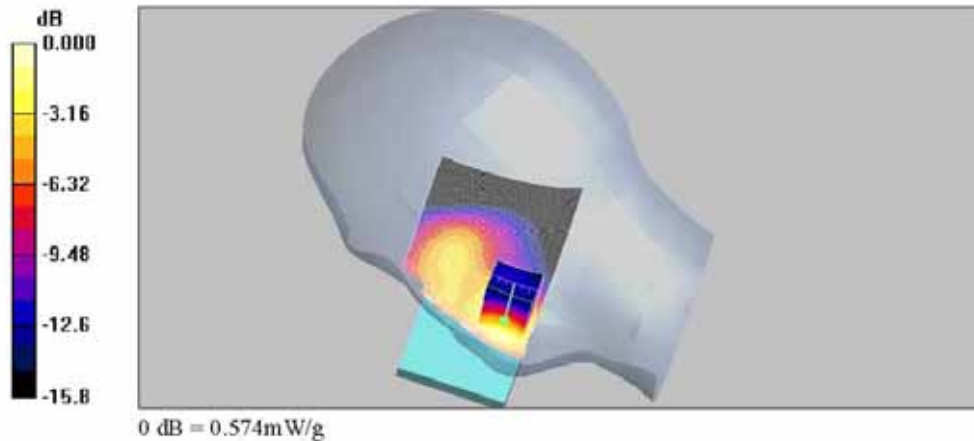
Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8  
 Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.43$  mho/m;  $\epsilon_r = 39.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Right Section

DASY4 Configuration:

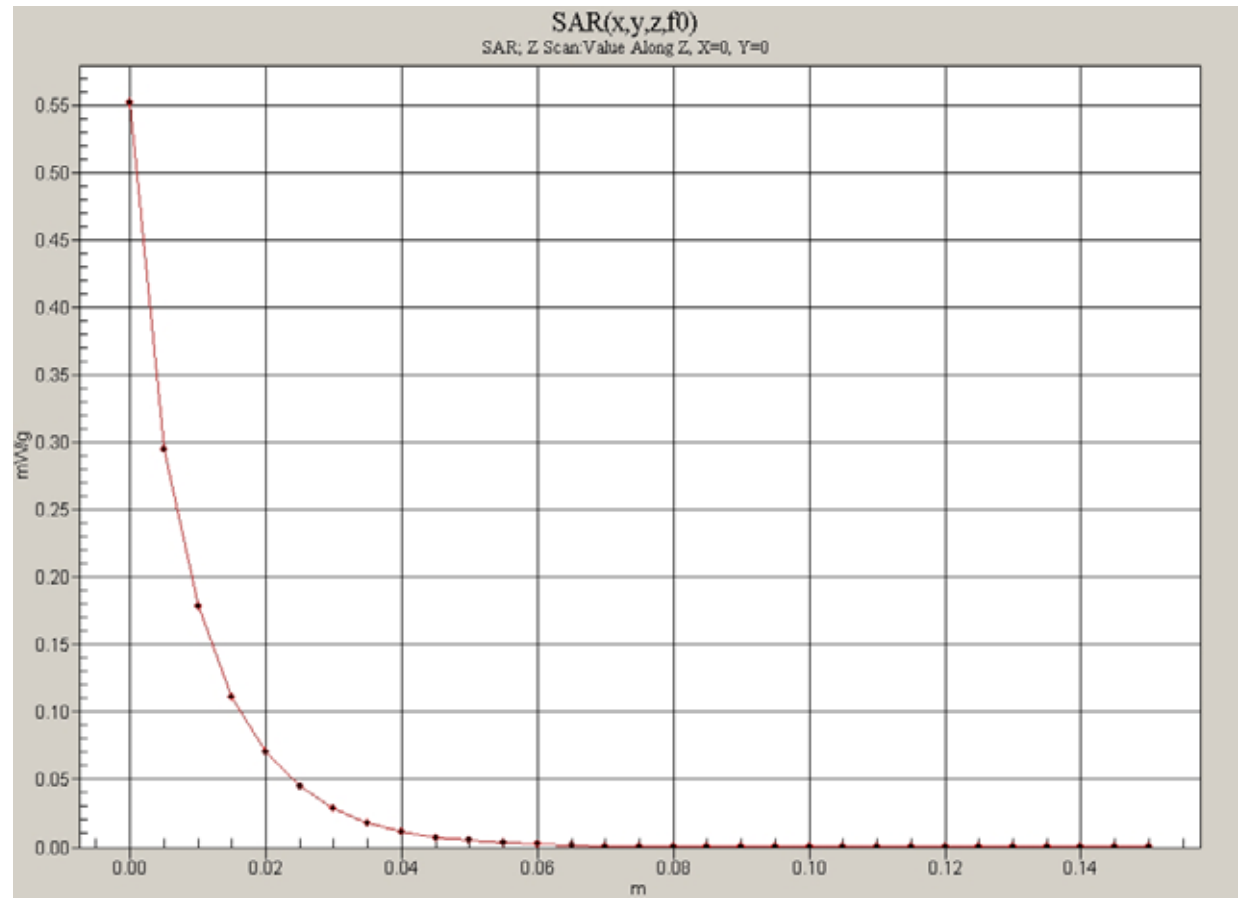
- Probe: ET3DV6 - SN1782; ConvF(4.95, 4.95, 4.95); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**PCS1900\_RE\_Mid\_Cheek/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm  
 Maximum value of SAR (interpolated) = 0.588 mW/g

**PCS1900\_RE\_Mid\_Cheek/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 6.10 V/m; Power Drift = -0.196 dB  
 Peak SAR (extrapolated) = 0.831 W/kg  
 SAR(1 g) = 0.520 mW/g; SAR(10 g) = 0.304 mW/g  
 Maximum value of SAR (measured) = 0.574 mW/g



## Z Scan



Date: 2011-10-17

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: PCS1900\_RE.da4

DUT: DS1007; Type: Mobile Phone; Serial: N/A

Program Name: PCS1900\_Head

Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.43$  mho/m;  $\epsilon_r = 39.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.95, 4.95, 4.95); Calibrated: 2011-04-14

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn567; Calibrated: 2011-01-27

- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645

- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**PCS1900\_RE\_Mid\_Tilt/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.236 mW/g

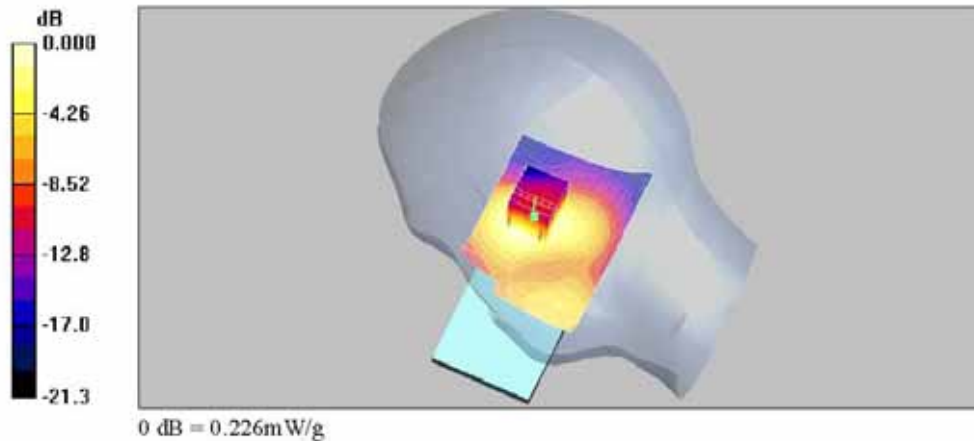
**PCS1900\_RE\_Mid\_Tilt/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.36 V/m; Power Drift = 0.030 dB

Peak SAR (extrapolated) = 0.304 W/kg

SAR(1 g) = 0.208 mW/g; SAR(10 g) = 0.126 mW/g

Maximum value of SAR (measured) = 0.226 mW/g



## PCS1900 Body SAR Test

Date: 2011-10-17

Test Laboratory: SGS Korea (Gunpo Laboratory)  
File Name: GPRS1900\_Body\_1cm\_2Tx\_Front.da4

DUT: DS1007; Type: Mobile Phone; Serial: N/A  
Program Name: PCS1900\_Body

Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:4  
Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.48$  mho/m;  $\epsilon_r = 53.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**PCS1900\_Front\_Mid\_1cm\_2Tx/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.653 mW/g

**PCS1900\_Front\_Mid\_1cm\_2Tx/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.8 V/m; Power Drift = -0.033 dB

Peak SAR (extrapolated) = 0.896 W/kg

SAR(1 g) = 0.578 mW/g; SAR(10 g) = 0.359 mW/g

Maximum value of SAR (measured) = 0.630 mW/g

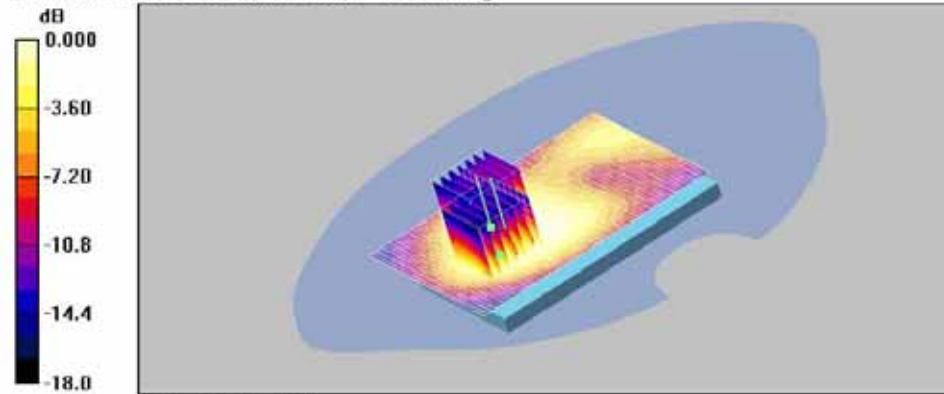
**PCS1900\_Front\_Mid\_1cm\_2Tx/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.8 V/m; Power Drift = -0.033 dB

Peak SAR (extrapolated) = 0.866 W/kg

SAR(1 g) = 0.541 mW/g; SAR(10 g) = 0.333 mW/g

Maximum value of SAR (measured) = 0.611 mW/g



0 dB = 0.611mW/g

Date: 2011-10-17

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: GPRS1900\_Body\_1cm\_2Tx\_Back.daf

DUT: DS1007; Type: Mobile Phone; Serial: N/A

Program Name: PCS1900\_Body

Communication System: PCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:4

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.46$  mho/m;  $\epsilon_r = 53.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn567; Calibrated: 2011-01-27

- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645

- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**PCS1900\_Back\_Low\_1cm\_2Tx/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm

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

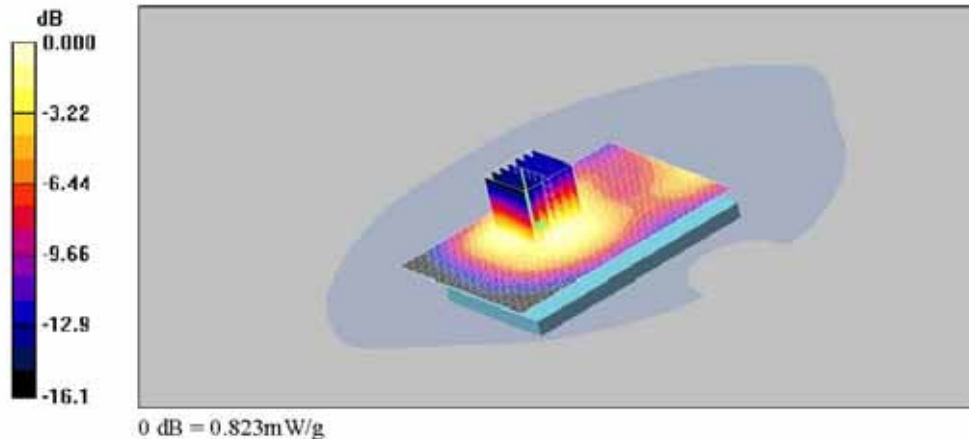
**PCS1900\_Back\_Low\_1cm\_2Tx/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 15.7 V/m; Power Drift = -0.059 dB

Peak SAR (extrapolated) = 1.20 W/kg

SAR(1 g) = 0.757 mW/g; SAR(10 g) = 0.459 mW/g

Maximum value of SAR (measured) = 0.823 mW/g



Date: 2011-10-17

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: GPRS1900\_Body\_1cm\_2Tx\_Back.daf

DUT: DS1007; Type: Mobile Phone; Serial: N/A

Program Name: PCS1900\_Body

Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:4

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.48$  mho/m;  $\epsilon_r = 53.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn567; Calibrated: 2011-01-27

- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645

- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**PCS1900\_Back\_Mid\_1cm\_2Tx/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.889 mW/g

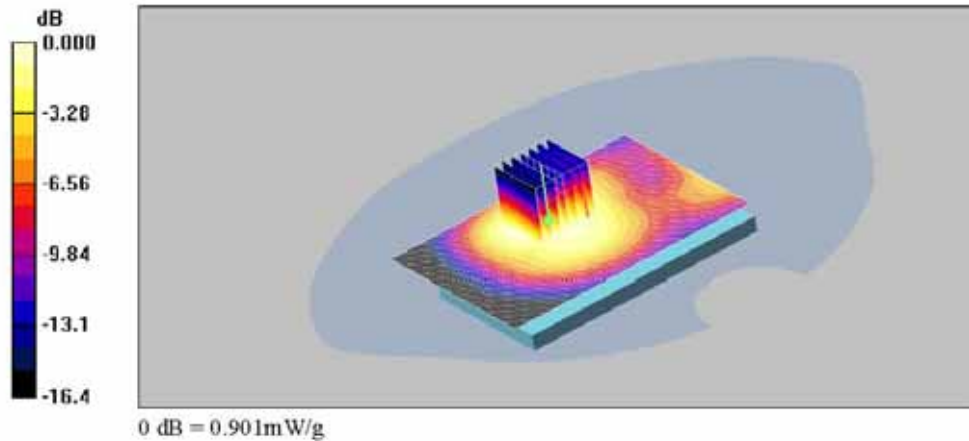
**PCS1900\_Back\_Mid\_1cm\_2Tx/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 18.8 V/m; Power Drift = -0.067 dB

Peak SAR (extrapolated) = 1.32 W/kg

SAR(1 g) = 0.829 mW/g; SAR(10 g) = 0.502 mW/g

Maximum value of SAR (measured) = 0.901 mW/g



Date: 2011-10-17

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: GPRS1900\_Body\_1cm\_2Tx\_Back.d4

DUT: DS1007; Type: Mobile Phone; Serial: N/A

Program Name: PCS1900\_Body

Communication System: PCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:4

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.51$  mho/m;  $\epsilon_r = 53.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**PCS1900\_Back\_High\_1cm\_2Tx/Area Scan (61x91x1)**; Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.863 mW/g

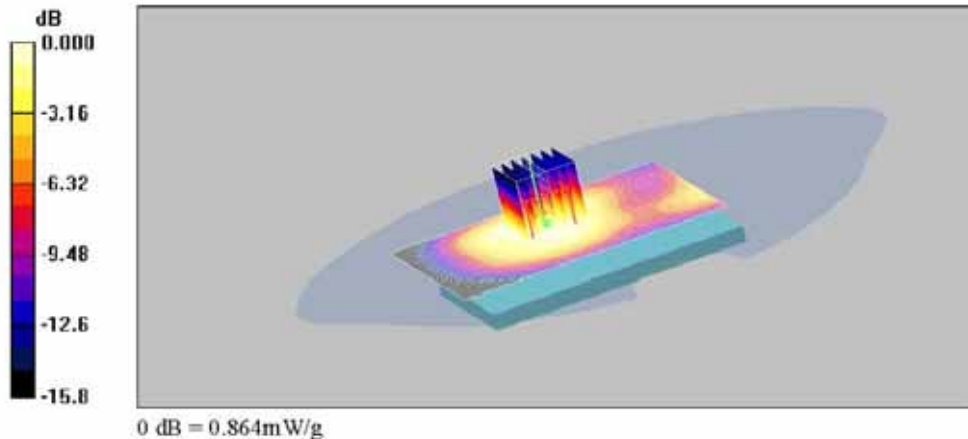
**PCS1900\_Back\_High\_1cm\_2Tx/Zoom Scan (7x7x7)/Cube 0**; Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.5 V/m; Power Drift = 0.039 dB

Peak SAR (extrapolated) = 1.28 W/kg

SAR(1 g) = 0.800 mW/g; SAR(10 g) = 0.489 mW/g

Maximum value of SAR (measured) = 0.864 mW/g



Date: 2011-10-17

Test Laboratory: SGS Korea (Gunpo Laboratory)  
File Name: GPRS1900\_Body\_1cm\_2Tx\_Edge A.da4

DUT: DS1007\_Side; Type: Mobile Phone; Serial: N/A  
Program Name: GPRS1900\_Body

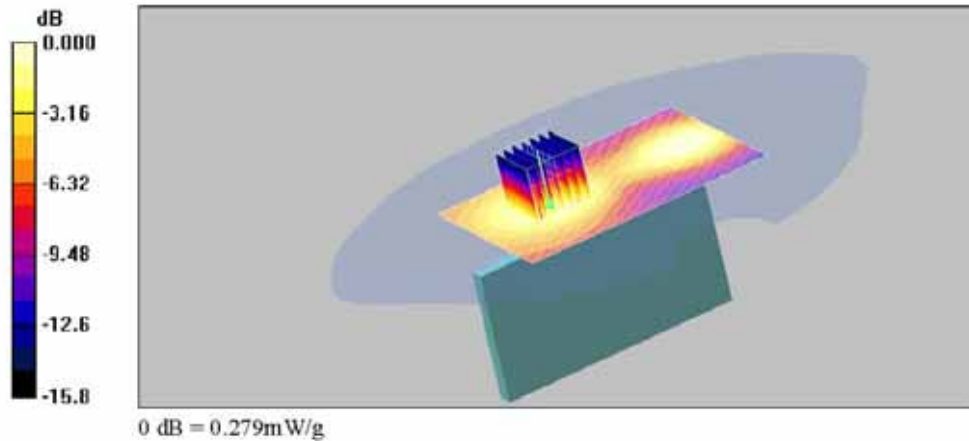
Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:4  
Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.48$  mho/m;  $\epsilon_r = 53.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**GPRS1900\_Edge A\_Mid\_1cm\_2Tx/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.281 mW/g

**GPRS1900\_Edge A\_Mid\_1cm\_2Tx/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 9.00 V/m; Power Drift = -0.012 dB  
Peak SAR (extrapolated) = 0.392 W/kg  
**SAR(1 g) = 0.253 mW/g; SAR(10 g) = 0.152 mW/g**  
Maximum value of SAR (measured) = 0.279 mW/g



Date: 2011-10-17

Test Laboratory: SGS Korea (Gunpo Laboratory)  
File Name: GPRS1900\_Body\_1cm\_2Tx\_Edge B.da4

DUT: DS1007\_Side; Type: Mobile Phone; Serial: N/A  
Program Name: GPRS1900\_Body

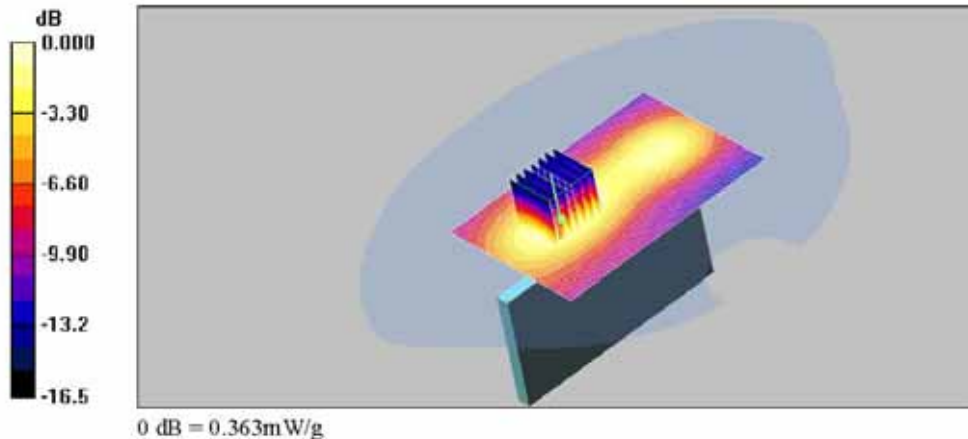
Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:4  
Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.48$  mho/m;  $\epsilon_r = 53.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**GPRS1900\_Edge B\_Mid\_1cm\_2Tx/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.379 mW/g

**GPRS1900\_Edge B\_Mid\_1cm\_2Tx/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 12.3 V/m; Power Drift = -0.040 dB  
Peak SAR (extrapolated) = 0.536 W/kg  
**SAR(1 g) = 0.331 mW/g; SAR(10 g) = 0.191 mW/g**  
Maximum value of SAR (measured) = 0.363 mW/g



Date: 2011-10-17

Test Laboratory: SGS Korea (Gunpo Laboratory)  
File Name: GPRS1900\_Body\_1cm\_2Tx\_Edge C.da4

DUT: DS1007\_Top&Bottom; Type: Mobile Phone; Serial: N/A  
Program Name: GPRS1900\_Body

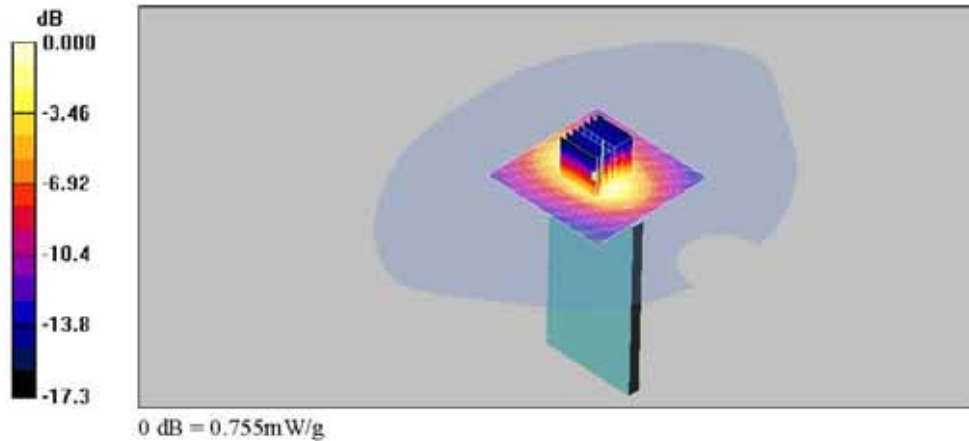
Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:4  
Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.48$  mho/m;  $\epsilon_r = 53.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**GPRS1900\_Edge C\_Mid\_1cm\_2Tx/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.757 mW/g

**GPRS1900\_Edge C\_Mid\_1cm\_2Tx/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 24.3 V/m; Power Drift = -0.006 dB  
Peak SAR (extrapolated) = 1.18 W/kg  
**SAR(1 g) = 0.679 mW/g; SAR(10 g) = 0.367 mW/g**  
Maximum value of SAR (measured) = 0.755 mW/g



Date: 2011-10-17

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: GPRS1900\_Body\_1cm\_1Tx\_Back.daf

DUT: L-02D; Type: Mobile Phone; Serial: N/A

Program Name: PCS1900\_Body

Communication System: PCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.46$  mho/m;  $\epsilon_r = 53.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn567; Calibrated: 2011-01-27

- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645

- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**PCS1900\_Back\_Low\_1cm\_1Tx/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm

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

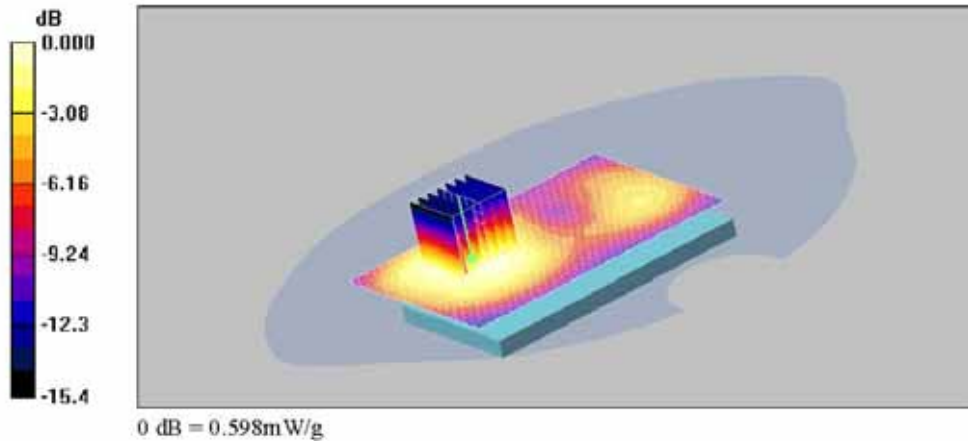
**PCS1900\_Back\_Low\_1cm\_1Tx/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.87 V/m; Power Drift = 0.017 dB

Peak SAR (extrapolated) = 0.854 W/kg

**SAR(1 g) = 0.551 mW/g; SAR(10 g) = 0.339 mW/g**

Maximum value of SAR (measured) = 0.598 mW/g



Date: 2011-10-17

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: GPRS1900\_Body\_1cm\_1Tx\_Back.d4

DUT: L-02D; Type: Mobile Phone; Serial: N/A

Program Name: PCS1900\_Body

Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.48$  mho/m;  $\epsilon_r = 53.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn567; Calibrated: 2011-01-27

- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645

- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**PCS1900\_Back\_Mid\_1cm\_1Tx/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.895 mW/g

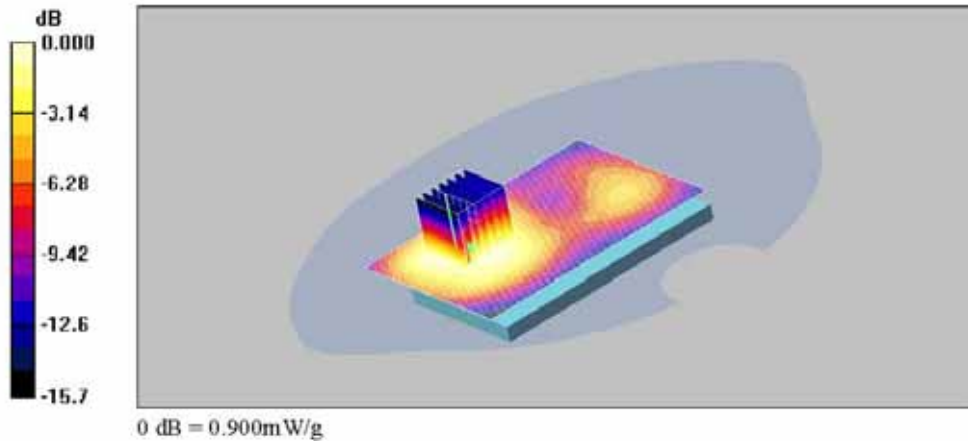
**PCS1900\_Back\_Mid\_1cm\_1Tx/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.3 V/m; Power Drift = -0.093 dB

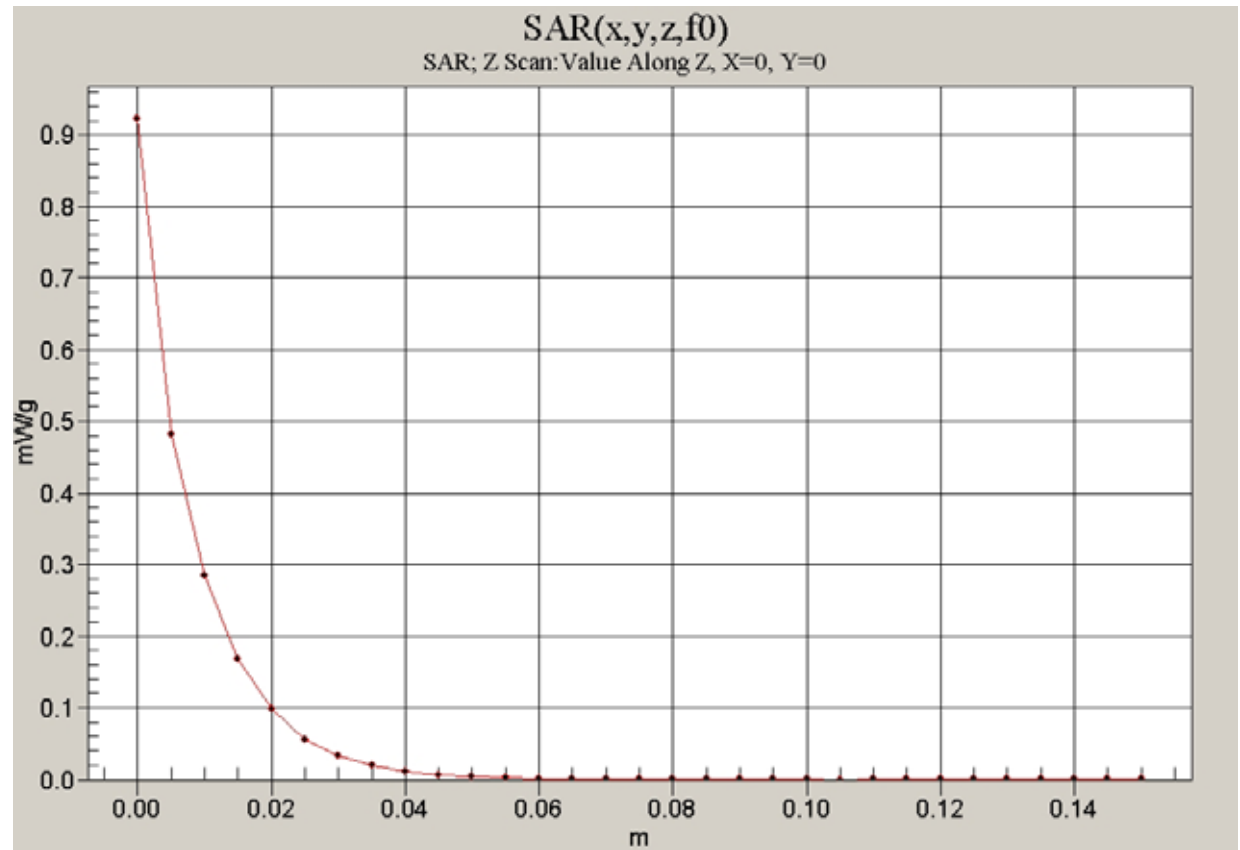
Peak SAR (extrapolated) = 1.32 W/kg

SAR(1 g) = 0.834 mW/g; SAR(10 g) = 0.512 mW/g

Maximum value of SAR (measured) = 0.900 mW/g



## Z Scan



Date: 2011-10-17

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: GPRS1900\_Body\_1cm\_1Tx\_Back.d4

DUT: L-02D; Type: Mobile Phone; Serial: N/A

Program Name: PCS1900\_Body

Communication System: PCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.51$  mho/m;  $\epsilon_r = 53.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**PCS1900\_Back\_High\_1cm\_1Tx/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.838 mW/g

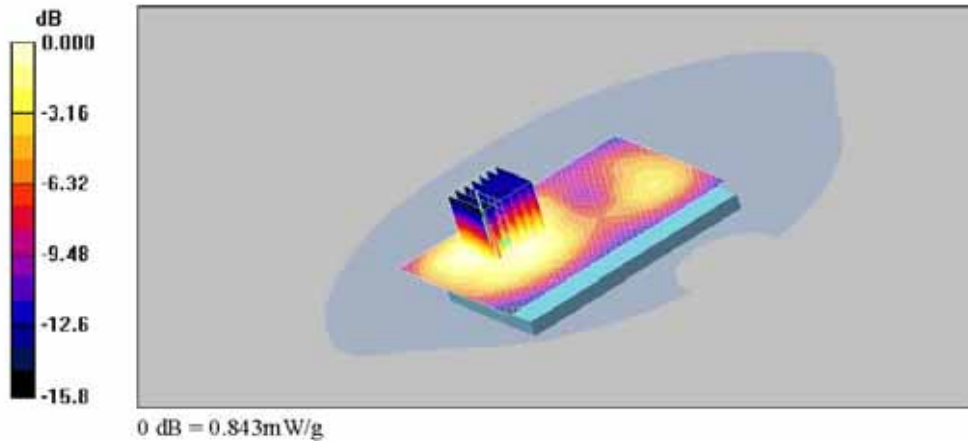
**PCS1900\_Back\_High\_1cm\_1Tx/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.77 V/m; Power Drift = -0.020 dB

Peak SAR (extrapolated) = 1.24 W/kg

SAR(1 g) = 0.779 mW/g; SAR(10 g) = 0.476 mW/g

Maximum value of SAR (measured) = 0.843 mW/g



Date: 2011-10-17

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: GPRS1900\_Body\_1cm\_3Tx\_Back.d4

DUT: L-02D; Type: Mobile Phone; Serial: N/A

Program Name: PCS1900\_Body

Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:2.67

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.48$  mho/m;  $\epsilon_r = 53.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**PCS1900\_Back\_Mid\_1cm\_3Tx/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm

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

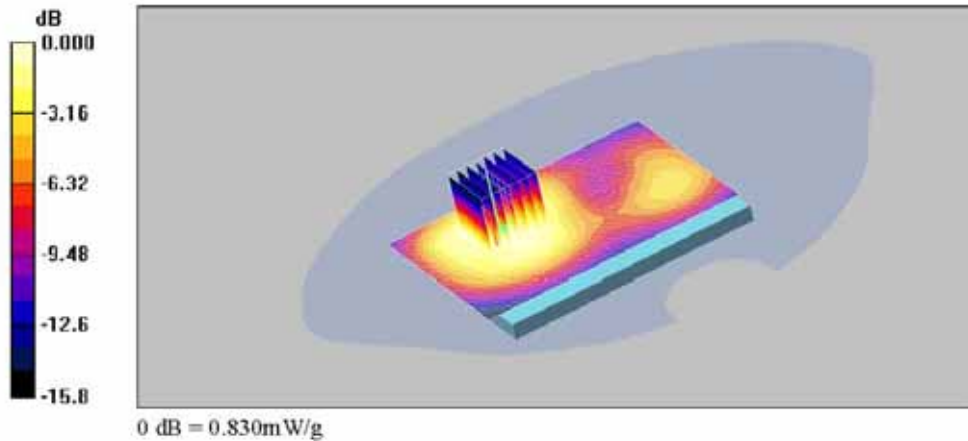
**PCS1900\_Back\_Mid\_1cm\_3Tx/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.67 V/m; Power Drift = 0.098 dB

Peak SAR (extrapolated) = 1.17 W/kg

**SAR(1 g) = 0.763 mW/g; SAR(10 g) = 0.470 mW/g**

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



Date: 2011-10-17

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: GPRS1900\_Body\_1cm\_4Tx\_Back.d4

DUT: L-02D; Type: Mobile Phone; Serial: N/A

Program Name: PCS1900\_Body

Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:2

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.48$  mho/m;  $\epsilon_r = 53.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn567; Calibrated: 2011-01-27

- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645

- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**PCS1900\_Back\_Mid\_1cm\_4Tx/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.815 mW/g

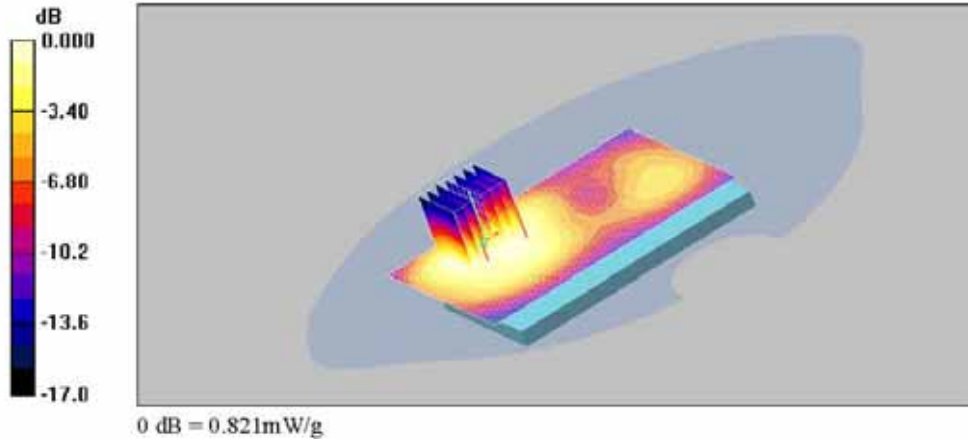
**PCS1900\_Back\_Mid\_1cm\_4Tx/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.89 V/m; Power Drift = 0.021 dB

Peak SAR (extrapolated) = 1.15 W/kg

SAR(1 g) = 0.756 mW/g; SAR(10 g) = 0.469 mW/g

Maximum value of SAR (measured) = 0.821 mW/g



## WLAN Head SAR Test

Date: 2011-11-07

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_11b\_LE.da4

DUT: L-02D; Type: Mobile Phone; Serial: N/A

Program Name: WLAN\_11b\_Head

Communication System: WLAN; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 2412$  MHz;  $\sigma = 1.81$  mho/m;  $\epsilon_r = 38.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn567; Calibrated: 2011-01-27

- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645

- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_11b\_LE\_Low\_Cheek/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.472 mW/g

**WLAN\_11b\_LE\_Low\_Cheek/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm,

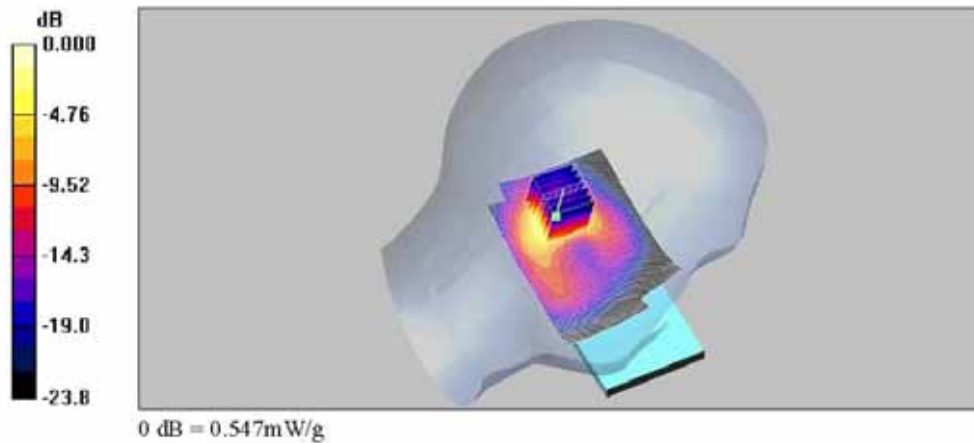
dy=5mm, dz=5mm

Reference Value = 16.3 V/m; Power Drift = -0.052 dB

Peak SAR (extrapolated) = 1.23 W/kg

SAR(1 g) = 0.481 mW/g; SAR(10 g) = 0.196 mW/g

Maximum value of SAR (measured) = 0.547 mW/g



Date: 2011-11-07

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: [WLAN\\_11b\\_LE.da4](#)

DUT: L-02D; Type: Mobile Phone; Serial: N/A

Program Name: WLAN\_11b\_Head

Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 2437 \text{ MHz}$ ;  $\sigma = 1.85 \text{ mho/m}$ ;  $\epsilon_r = 37.9$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn567; Calibrated: 2011-01-27

- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645

- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_11b\_LE\_Mid\_Cheek/Area Scan (61x91x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.664 mW/g

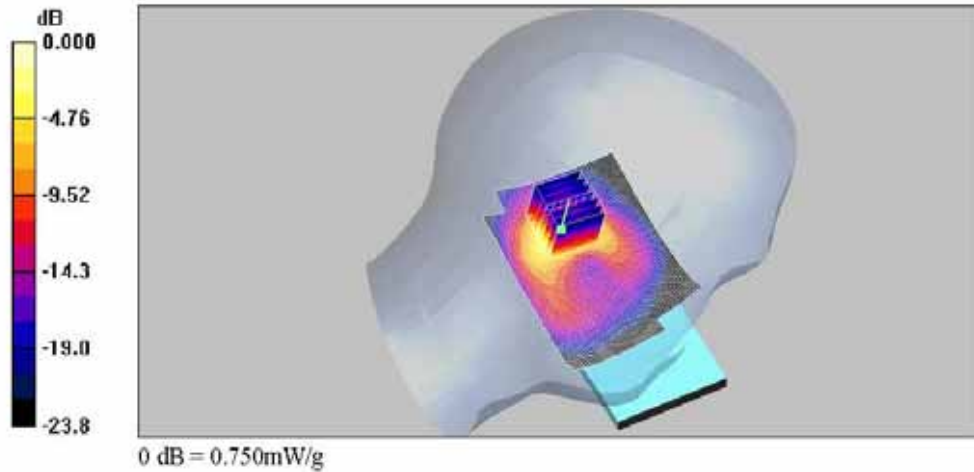
**WLAN\_11b\_LE\_Mid\_Cheek/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 19.8 V/m; Power Drift = 0.020 dB

Peak SAR (extrapolated) = 1.71 W/kg

SAR(1 g) = 0.679 mW/g; SAR(10 g) = 0.276 mW/g

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



Date: 2011-11-07

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_11b\_LE.da4

DUT: L-02D; Type: Mobile Phone; Serial: N/A  
 Program Name: WLAN\_11b\_Head

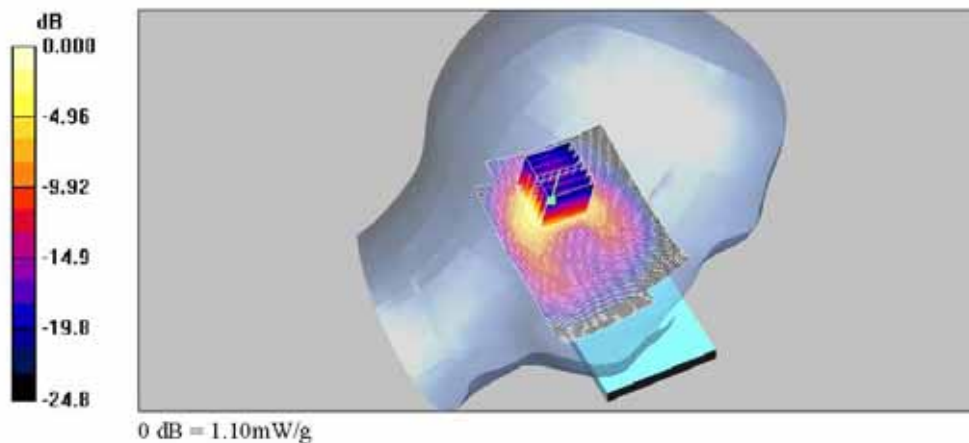
Communication System: WLAN; Frequency: 2462 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 1.88 \text{ mho/m}$ ;  $\epsilon_r = 37.7$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Left Section

DASY4 Configuration:

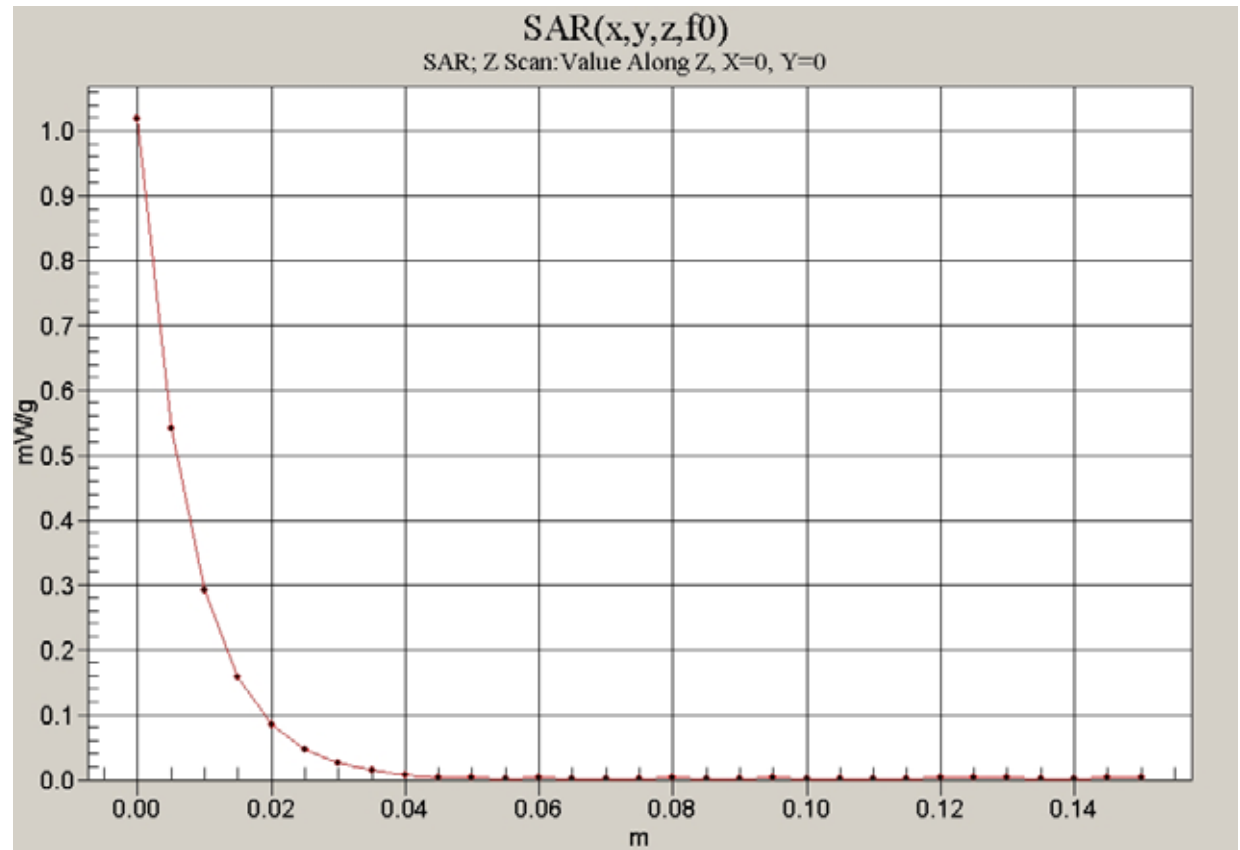
- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_11b\_LE\_High\_Cheek/Area Scan (61x91x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
 Maximum value of SAR (interpolated) =  $0.965 \text{ mW/g}$

**WLAN\_11b\_LE\_High\_Cheek/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$   
 Reference Value =  $23.7 \text{ V/m}$ ; Power Drift =  $-0.187 \text{ dB}$   
 Peak SAR (extrapolated) =  $2.56 \text{ W/kg}$   
 $\text{SAR}(1 \text{ g}) = 0.992 \text{ mW/g}$ ;  $\text{SAR}(10 \text{ g}) = 0.395 \text{ mW/g}$   
 Maximum value of SAR (measured) =  $1.10 \text{ mW/g}$



## Z Scan



Date: 2011-11-07

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_11b\_LE.da4

DUT: L-02D; Type: Mobile Phone; Serial: N/A

Program Name: WLAN\_11b\_Head

Communication System: WLAN; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 2412$  MHz;  $\sigma = 1.81$  mho/m;  $\epsilon_r = 38.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_11b\_LE\_Low\_Tilt/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.508 mW/g

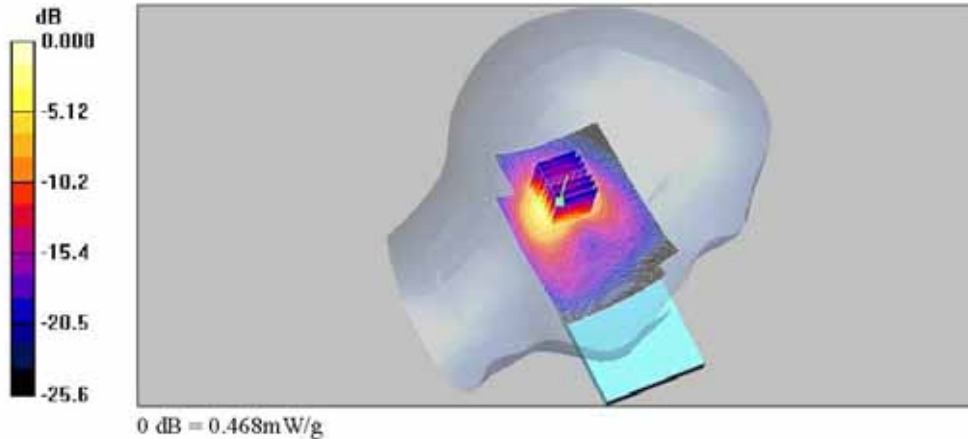
**WLAN\_11b\_LE\_Low\_Tilt/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.7 V/m; Power Drift = -0.002 dB

Peak SAR (extrapolated) = 1.01 W/kg

SAR(1 g) = 0.418 mW/g; SAR(10 g) = 0.180 mW/g

Maximum value of SAR (measured) = 0.468 mW/g



Date: 2011-11-07

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_11b\_LE.da4

DUT: L-02D; Type: Mobile Phone; Serial: N/A  
 Program Name: WLAN\_11b\_Head

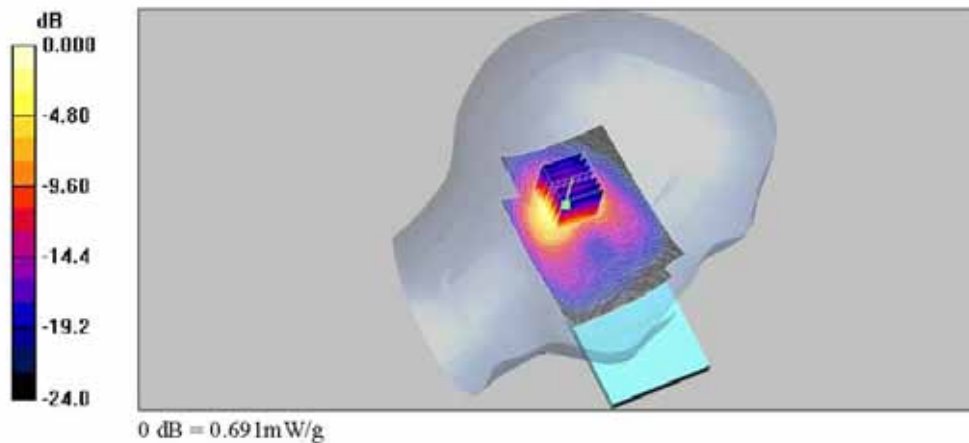
Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.85$  mho/m;  $\epsilon_r = 37.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_11b\_LE\_Mid\_Tilt/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm  
 Maximum value of SAR (interpolated) = 0.751 mW/g

**WLAN\_11b\_LE\_Mid\_Tilt/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 17.7 V/m; Power Drift = 0.058 dB  
 Peak SAR (extrapolated) = 1.50 W/kg  
 SAR(1 g) = 0.622 mW/g; SAR(10 g) = 0.265 mW/g  
 Maximum value of SAR (measured) = 0.691 mW/g



Date: 2011-11-07

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_11b\_LE.da4

DUT: L-02D; Type: Mobile Phone; Serial: N/A  
 Program Name: WLAN\_11b\_Head

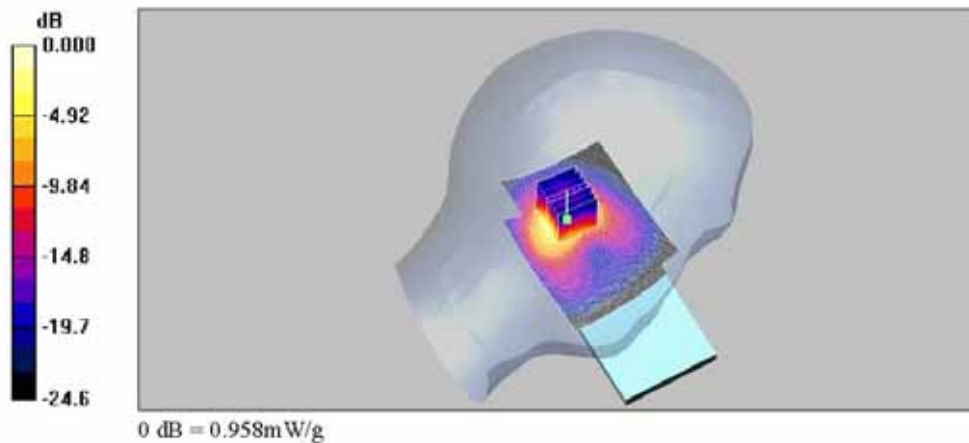
Communication System: WLAN; Frequency: 2462 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 1.88 \text{ mho/m}$ ;  $\epsilon_r = 37.7$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_11b\_LE\_High\_Tilt/Area Scan (61x91x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
 Maximum value of SAR (interpolated) = 1.05 mW/g

**WLAN\_11b\_LE\_High\_Tilt/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$   
 Reference Value = 20.4 V/m; Power Drift = 0.154 dB  
 Peak SAR (extrapolated) = 2.14 W/kg  
 SAR(1 g) = 0.869 mW/g; SAR(10 g) = 0.366 mW/g  
 Maximum value of SAR (measured) = 0.958 mW/g



Date: 2011-11-07

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_11b\_RE.da4

DUT: L-02D; Type: Mobile Phone; Serial: N/A  
 Program Name: WLAN 11b\_Head

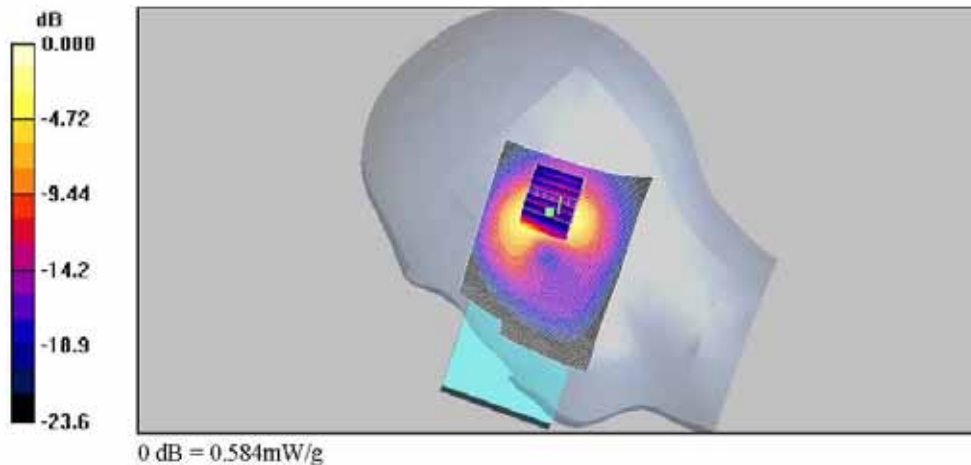
Communication System: WLAN; Frequency: 2412 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 2412 \text{ MHz}$ ;  $\sigma = 1.81 \text{ mho/m}$ ;  $\epsilon_r = 38.1$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP 2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN 11b\_RE\_Low\_Cheek/Area Scan (61x91x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
 Maximum value of SAR (interpolated) = 0.481 mW/g

**WLAN 11b\_RE\_Low\_Cheek/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$   
 Reference Value = 16.0 V/m; Power Drift = -0.037 dB  
 Peak SAR (extrapolated) = 1.28 W/kg  
 SAR(1 g) = 0.506 mW/g; SAR(10 g) = 0.210 mW/g  
 Maximum value of SAR (measured) = 0.584 mW/g



Date: 2011-11-07

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_11b\_RE.da4

DUT: L-02D; Type: Mobile Phone; Serial: N/A  
 Program Name: WLAN\_11b\_Head

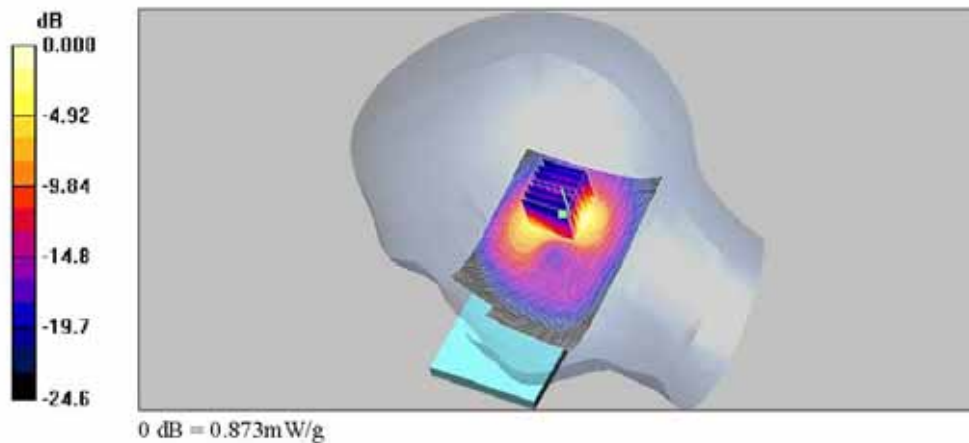
Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.85$  mho/m;  $\epsilon_r = 37.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_11b\_RE\_Mid\_Cheek/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm  
 Maximum value of SAR (interpolated) = 0.715 mW/g

**WLAN\_11b\_RE\_Mid\_Cheek/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 19.5 V/m; Power Drift = 0.024 dB  
 Peak SAR (extrapolated) = 2.00 W/kg  
 SAR(1 g) = 0.762 mW/g; SAR(10 g) = 0.310 mW/g  
 Maximum value of SAR (measured) = 0.873 mW/g



Date: 2011-11-07

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_11b\_RE.da4

DUT: L-02D; Type: Mobile Phone; Serial: N/A  
 Program Name: WLAN\_11b\_Head

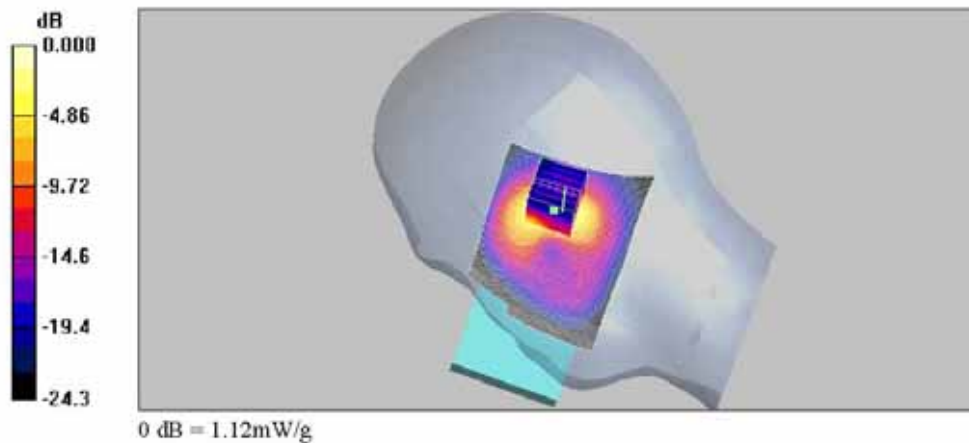
Communication System: WLAN; Frequency: 2462 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 1.88 \text{ mho/m}$ ;  $\epsilon_r = 37.7$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_11b\_RE\_High\_Cheek/Area Scan (61x91x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
 Maximum value of SAR (interpolated) = 0.914 mW/g

**WLAN\_11b\_RE\_High\_Cheek/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$   
 Reference Value = 21.1 V/m; Power Drift = 0.038 dB  
 Peak SAR (extrapolated) = 2.46 W/kg  
 SAR(1 g) = 0.970 mW/g; SAR(10 g) = 0.393 mW/g  
 Maximum value of SAR (measured) = 1.12 mW/g



Date: 2011-11-07

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_11b\_RE.da4

DUT: L-02D; Type: Mobile Phone; Serial: N/A  
 Program Name: WLAN\_11b\_Head

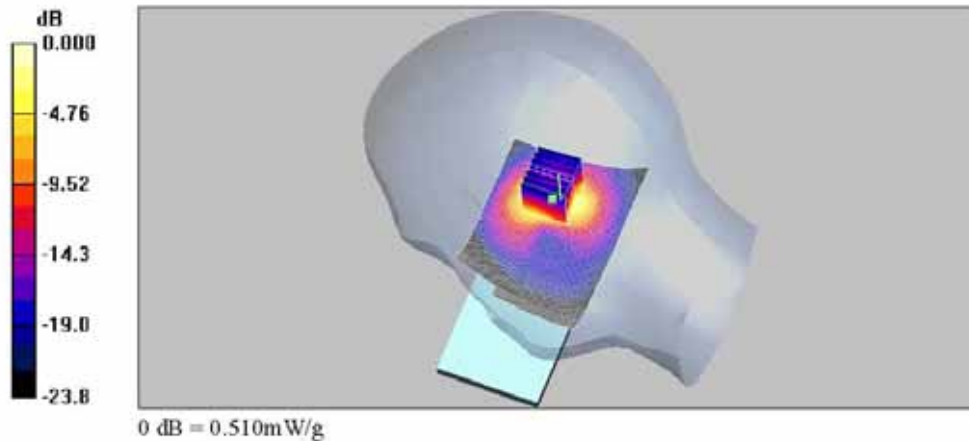
Communication System: WLAN; Frequency: 2412 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 2412 \text{ MHz}$ ;  $\sigma = 1.81 \text{ mho/m}$ ;  $\epsilon_r = 38.1$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_11b\_RE\_Low\_Tilt/Area Scan (61x91x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
 Maximum value of SAR (interpolated) =  $0.487 \text{ mW/g}$

**WLAN\_11b\_RE\_Low\_Tilt/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$   
 Reference Value =  $14.4 \text{ V/m}$ ; Power Drift =  $0.006 \text{ dB}$   
 Peak SAR (extrapolated) =  $1.10 \text{ W/kg}$   
 $\text{SAR}(1 \text{ g}) = 0.459 \text{ mW/g}$ ;  $\text{SAR}(10 \text{ g}) = 0.198 \text{ mW/g}$   
 Maximum value of SAR (measured) =  $0.510 \text{ mW/g}$



Date: 2011-11-07

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_11b\_RE.da4

DUT: L-02D; Type: Mobile Phone; Serial: N/A

Program Name: WLAN\_11b\_Head

Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 2437 \text{ MHz}$ ;  $\sigma = 1.85 \text{ mho/m}$ ;  $\epsilon_r = 37.9$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_11b\_RE\_Mid\_Tilt/Area Scan (61x91x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (interpolated) =  $0.735 \text{ mW/g}$

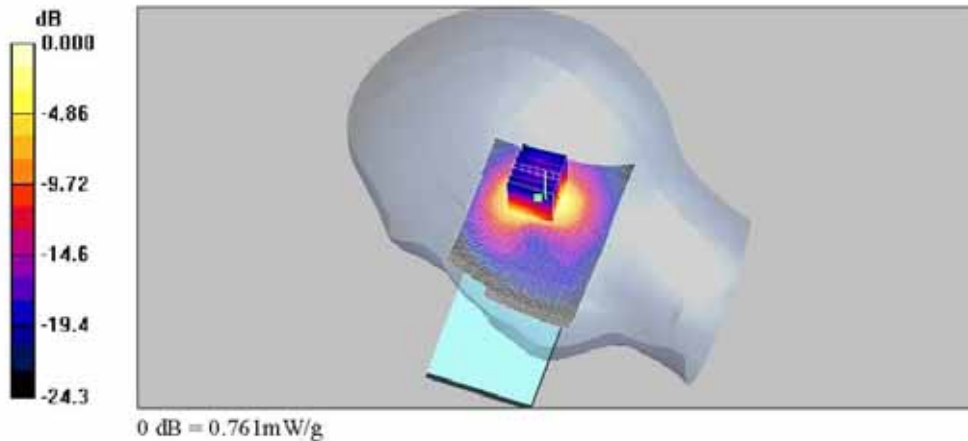
**WLAN\_11b\_RE\_Mid\_Tilt/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $17.5 \text{ V/m}$ ; Power Drift =  $0.142 \text{ dB}$

Peak SAR (extrapolated) =  $1.63 \text{ W/kg}$

SAR(1 g) =  $0.690 \text{ mW/g}$ ; SAR(10 g) =  $0.297 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.761 \text{ mW/g}$



Date: 2011-11-07

Test Laboratory: SGS Korea (Gumpo Laboratory)

File Name: WLAN\_11b\_RE.da4

DUT: L-02D; Type: Mobile Phone; Serial: N/A

Program Name: WLAN\_11b\_Head

Communication System: WLAN; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 2462$  MHz;  $\sigma = 1.88$  mho/m;  $\epsilon_r = 37.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn567; Calibrated: 2011-01-27

- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645

- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_11b\_RE\_High\_Tilt/Area Scan (61x91x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.01 mW/g

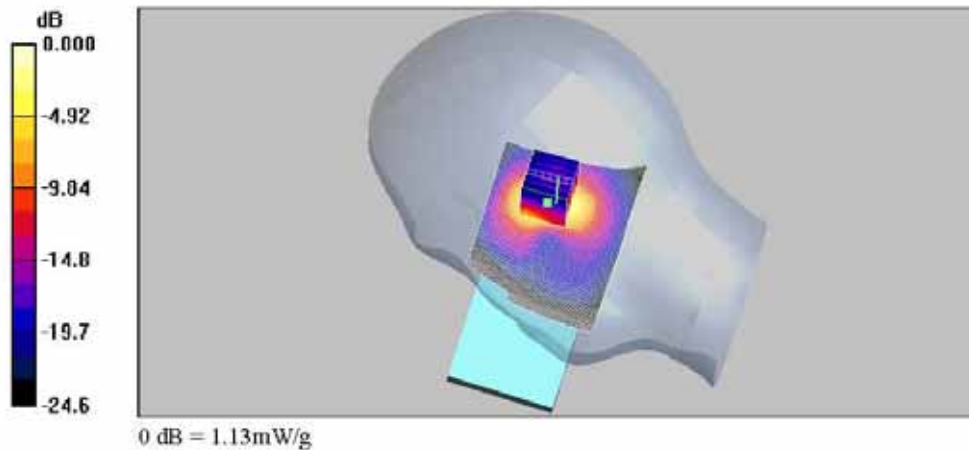
**WLAN\_11b\_RE\_High\_Tilt/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 20.3 V/m; Power Drift = -0.083 dB

Peak SAR (extrapolated) = 2.48 W/kg

SAR(1 g) = 0.981 mW/g; SAR(10 g) = 0.407 mW/g

Maximum value of SAR (measured) = 1.13 mW/g



## WLAN Body SAR Test

Date: 2011-11-07

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: [WLAN\\_11b\\_Front.da4](#)

DUT: L-02D; Type: Mobile Phone; Serial: N/A

Program Name: WLAN\_Body

Communication System: WLAN; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 2.02 \text{ mho/m}$ ;  $\epsilon_r = 51.3$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(3.94, 3.94, 3.94); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_11b\_Front\_High/Area Scan (61x101x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.314 mW/g

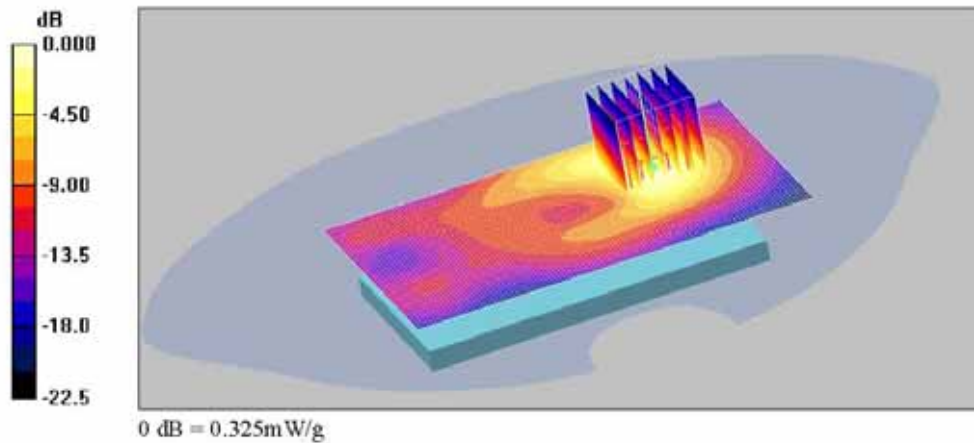
**WLAN\_11b\_Front\_High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 3.78 V/m; Power Drift = -0.054 dB

Peak SAR (extrapolated) = 0.740 W/kg

SAR(1 g) = 0.303 mW/g; SAR(10 g) = 0.146 mW/g

Maximum value of SAR (measured) = 0.325 mW/g



Date: 2011-11-07

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_11b\_Back.daf

DUT: L-02D; Type: Mobile Phone; Serial: N/A

Program Name: WLAN\_Body

Communication System: WLAN; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 2.02 \text{ mho/m}$ ;  $\epsilon_r = 51.3$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(3.94, 3.94, 3.94); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_11b\_Back\_High/Area Scan (61x101x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

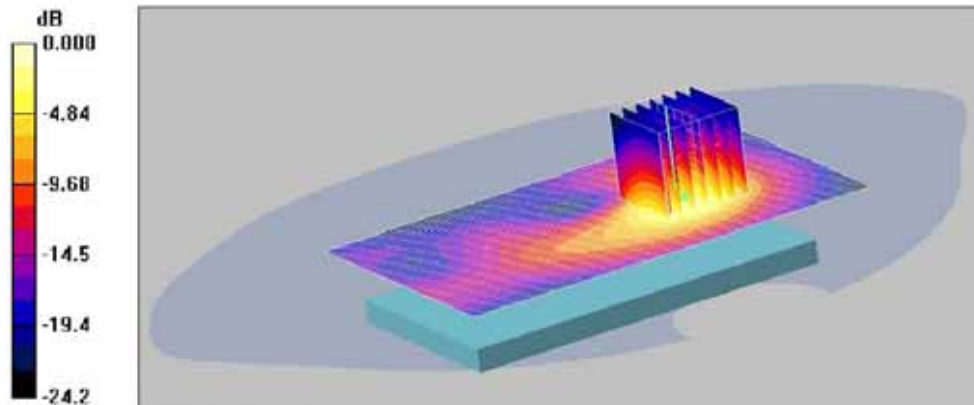
**WLAN\_11b\_Back\_High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 4.59 V/m; Power Drift = -0.019 dB

Peak SAR (extrapolated) = 1.47 W/kg

SAR(1 g) = 0.565 mW/g; SAR(10 g) = 0.257 mW/g

Maximum value of SAR (measured) = 0.604 mW/g



0 dB = 0.604mW/g

Date: 2011-11-07

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_11b\_Right Side.da4

DUT: L-02D; Type: Mobile Phone; Serial: N/A

Program Name: WLAN\_Body

Communication System: WLAN; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 2.02 \text{ mho/m}$ ;  $\epsilon_r = 51.3$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(3.94, 3.94, 3.94); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_11b\_Right Side\_High/Area Scan (61x91x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (interpolated) = 0.021 mW/g

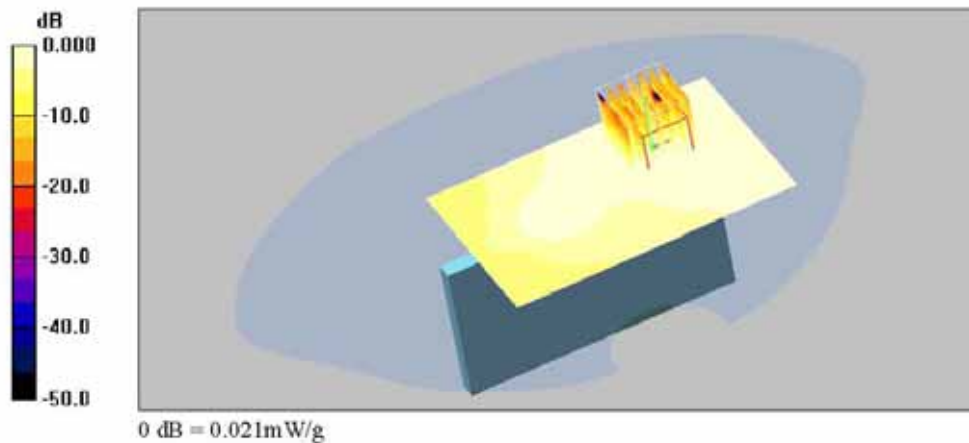
**WLAN\_11b\_Right Side\_High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 2.85 V/m; Power Drift = -0.009 dB

Peak SAR (extrapolated) = 0.048 W/kg

SAR(1 g) = 0.020 mW/g; SAR(10 g) = 0.011 mW/g

Maximum value of SAR (measured) = 0.021 mW/g



Date: 2011-11-07

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: [WLAN\\_11b\\_Top.da4](#)

DUT: L-02D; Type: Mobile Phone; Serial: N/A

Program Name: WLAN\_Body

Communication System: WLAN; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 2.02 \text{ mho/m}$ ;  $\epsilon_r = 51.3$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(3.94, 3.94, 3.94); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM with CRP\_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_11b\_Top\_High/Area Scan (71x81x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

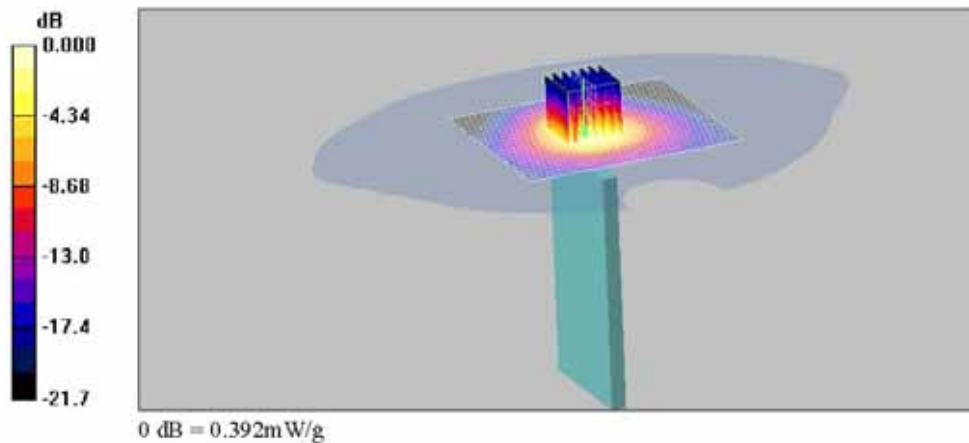
**WLAN\_11b\_Top\_High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 13.4 V/m; Power Drift = -0.198 dB

Peak SAR (extrapolated) = 0.912 W/kg

SAR(1 g) = 0.368 mW/g; SAR(10 g) = 0.179 mW/g

Maximum value of SAR (measured) = 0.392 mW/g



## Appendix B

### Uncertainty Analysis

| a                                                    | b                   | c          | d               | e =<br>f(d,k) | g          | i =<br>cxg/e | k            |
|------------------------------------------------------|---------------------|------------|-----------------|---------------|------------|--------------|--------------|
| Uncertainty Component                                | Section in<br>P1528 | Tol<br>(%) | Prob .<br>Dist. | Div.          | Ci<br>(1g) | 1g<br>ui (%) | Vi<br>(Veff) |
| Probe calibration                                    | E.2.1               | 6.3        | N               | 1             | 1          | 6.30         | $\infty$     |
| Axial isotropy                                       | E.2.2               | 0.5        | R               | 1.73          | 0.71       | 0.20         | $\infty$     |
| hemispherical isotropy                               | E.2.2               | 2.6        | R               | 1.73          | 0.71       | 1.06         | $\infty$     |
| Boundary effect                                      | E.2.3               | 0.8        | R               | 1.73          | 1          | 0.46         | $\infty$     |
| Linearity                                            | E.2.4               | 0.6        | R               | 1.73          | 1          | 0.35         | $\infty$     |
| System detection limit                               | E.2.5               | 0.25       | R               | 1.73          | 1          | 0.14         | $\infty$     |
| Readout electronics                                  | E.2.6               | 0.3        | N               | 1             | 1          | 0.30         | $\infty$     |
| Response time                                        | E.2.7               | 0          | R               | 1.73          | 1          | 0.00         | $\infty$     |
| Integration time                                     | E.2.8               | 2.6        | R               | 1.73          | 1          | 1.50         | $\infty$     |
| RF ambient Condition - Noise                         | E.6.1               | 3          | R               | 1.73          | 1          | 1.73         | $\infty$     |
| RF ambient Condition - reflections                   | E.6.1               | 3          | R               | 1.73          | 1          | 1.73         | $\infty$     |
| Probe positioning - mechanical tolerance             | E.6.2               | 1.5        | R               | 1.73          | 1          | 0.87         | $\infty$     |
| Probe positioning - with respect to phantom          | E.6.3               | 2.9        | R               | 1.73          | 1          | 1.67         | $\infty$     |
| Max. SAR evaluation                                  | E.5.2               | 1          | R               | 1.73          | 1          | 0.58         | $\infty$     |
| Test sample positioning                              | E.4.2               | 2.3        | N               | 1             | 1          | 2.30         | 9            |
| Device holder uncertainty                            | E.4.1               | 3.6        | N               | 1             | 1          | 3.60         | $\infty$     |
| Output power variation - SAR drift measurement       | 6.62                | 5          | R               | 1.73          | 1          | 2.89         | $\infty$     |
| Phantom uncertainty (shape and thickness tolerances) | E.3.1               | 4          | R               | 1.73          | 1          | 2.31         | $\infty$     |
| Liquid conductivity - deviation from target values   | E.3.2               | 5          | R               | 1.73          | 0.64       | 1.85         | $\infty$     |
| Liquid conductivity - measurement uncertainty        | E.3.2               | 1.2        | N               | 1             | 0.64       | 0.77         | 5            |
| Liquid permittivity - deviation from target values   | E.3.3               | 5          | R               | 1.73          | 0.6        | 1.73         | $\infty$     |
| Liquid permittivity - measurement uncertainty        | E.3.3               | 1.1        | N               | 1             | 0.6        | 0.66         | 5            |
| Combined standard uncertainty                        |                     |            |                 | RSS           |            | 9.63         | 2754         |
| Expanded uncertainty<br>(95% CONFIDENCE INTERVAL)    |                     |            |                 | K=2           |            | 19.27        |              |



Report File No. : F690501/RF-SAR001964-A1  
Date of Issue : 2011-11-10  
Page : 70 / 104

## **Appendix C**

### **Calibration Certificate**

**- PROBE**

**- DAE 3**

**- 1900 MHz, 2450 MHz DIPOLE**

## - PROBE Calibration Certificate

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



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

Accredited by the Swiss Accreditation Service (SAS)  
 The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **SGS (Dymstec)**

Certificate No: **ET3-1782\_Apr11**

### CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1782**

Calibration procedure(s) **QA CAL-01.v7, QA CAL-12.v6, QA CAL-23.v4, QA CAL-25.v3**  
**Calibration procedure for dosimetric E-field probes**

Calibration date: **April 14, 2011**

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

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

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards          | ID              | Cal Date (Certificate No.)        | Scheduled Calibration  |
|----------------------------|-----------------|-----------------------------------|------------------------|
| Power meter E4419B         | GB41293874      | 31-Mar-11 (No. 217-01372)         | Apr-12                 |
| Power sensor E4412A        | MY41495277      | 31-Mar-11 (No. 217-01372)         | Apr-12                 |
| Power sensor E4412A        | MY41498087      | 31-Mar-11 (No. 217-01372)         | Apr-12                 |
| Reference 3 dB Attenuator  | SN: S5054 (3c)  | 29-Mar-11 (No. 217-01369)         | Apr-12                 |
| Reference 20 dB Attenuator | SN: S5086 (20b) | 29-Mar-11 (No. 217-01367)         | Apr-12                 |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 29-Mar-11 (No. 217-01370)         | Apr-12                 |
| Reference Probe ES3DV2     | SN: 3013        | 29-Dec-10 (No. ES3-3013_Dec10)    | Dec-11                 |
| DAE4                       | SN: 654         | 23-Apr-10 (No. DAE4-654_Apr10)    | Apr-11                 |
| Secondary Standards        | ID              | Check Date (in house)             | Scheduled Check        |
| RF generator HP 8648C      | US3642U01700    | 4-Aug-99 (in house check Oct-09)  | In house check: Oct-11 |
| Network Analyzer HP 8753E  | US37390585      | 18-Oct-01 (in house check Oct-10) | In house check: Oct-11 |

| Calibrated by:                                                                                                  | Name           | Function              | Signature |
|-----------------------------------------------------------------------------------------------------------------|----------------|-----------------------|-----------|
|                                                                                                                 | Jeton Kastrati | Laboratory Technician |           |
| Approved by:                                                                                                    | Name           | Function              | Signature |
|                                                                                                                 | Katja Pokovic  | Technical Manager     |           |
| This calibration certificate shall not be reproduced except in full without written approval of the laboratory. |                |                       |           |
| Issued: April 14, 2011                                                                                          |                |                       |           |

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



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

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

### Glossary:

|                        |                                                                                                                                              |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| TSL                    | tissue simulating liquid                                                                                                                     |
| NORM <sub>x,y,z</sub>  | sensitivity in free space                                                                                                                    |
| ConvF                  | sensitivity in TSL / NORM <sub>x,y,z</sub>                                                                                                   |
| DCP                    | diode compression point                                                                                                                      |
| CF                     | crest factor (1/duty_cycle) of the RF signal                                                                                                 |
| A, B, C                | modulation dependent linearization parameters                                                                                                |
| Polarization $\varphi$ | $\varphi$ rotation around probe axis                                                                                                         |
| Polarization $\beta$   | $\beta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\beta = 0$ is normal to probe axis |

### Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

### Methods Applied and Interpretation of Parameters:

- NORM<sub>x,y,z</sub>: Assessed for E-field polarization  $\beta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not affect the E<sup>2</sup>-field uncertainty inside TSL (see below ConvF).
- NORM(f)<sub>x,y,z</sub> = NORM<sub>x,y,z</sub> \* frequency\_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A<sub>x,y,z</sub>; B<sub>x,y,z</sub>; C<sub>x,y,z</sub> are numerical linearization parameters in dB assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media.
- VR: VR is the validity range of the calibration related to the average diode voltage or DAE voltage in mV.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for  $f \leq 800$  MHz) and inside waveguide using analytical field distributions based on power measurements for  $f > 800$  MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM<sub>x,y,z</sub> \* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from  $\pm 50$  MHz to  $\pm 100$  MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

ET3DV6 – SN:1782

April 14, 2011

# Probe ET3DV6

## SN:1782

Manufactured: April 15, 2003  
Calibrated: April 14, 2011

Calibrated for DASY/EASY Systems  
(Note: non-compatible with DASY2 system!)

ET3DV6-SN:1782

April 14, 2011

## DASY/EASY - Parameters of Probe: ET3DV6 - SN:1782

### Basic Calibration Parameters

|                                       | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---------------------------------------|----------|----------|----------|-----------|
| Norm ( $\mu V/(V/m)^2$ ) <sup>A</sup> | 2.07     | 1.66     | 1.92     | ± 10.1 %  |
| DCP (mV) <sup>B</sup>                 | 96.4     | 96.6     | 97.6     |           |

### Modulation Calibration Parameters

| UID   | Communication System Name | PAR  |   | A<br>dB | B<br>dB | C<br>dB | VR<br>mV | Unc <sup>C</sup><br>(k=2) |
|-------|---------------------------|------|---|---------|---------|---------|----------|---------------------------|
| 10000 | CW                        | 0.00 | X | 0.00    | 0.00    | 1.00    | 111.1    | ±1.9 %                    |
|       |                           |      | Y | 0.00    | 0.00    | 1.00    | 141.0    |                           |
|       |                           |      | Z | 0.00    | 0.00    | 1.00    | 145.1    |                           |

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k=2$ , which for a normal distribution corresponds to a coverage probability of approximately 95%.

<sup>A</sup> The uncertainties of NormX,Y,Z do not affect the  $E^2$ -field uncertainty inside TSL (see Pages 5 and 6).

<sup>B</sup> Numerical linearization parameter; uncertainty not required.

<sup>C</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

ET3DV6- SN:1782

April 14, 2011

## DASY/EASY - Parameters of Probe: ET3DV6 - SN:1782

### Calibration Parameter Determined in Head Tissue Simulating Media

| f (MHz) <sup>c</sup> | Relative Permittivity <sup>f</sup> | Conductivity (S/m) <sup>f</sup> | ConvF X | ConvF Y | ConvF Z | Alpha | Depth (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|-------|------------|-------------|
| 450                  | 43.5                               | 0.87                            | 6.89    | 6.89    | 6.89    | 0.21  | 2.29       | ± 13.4 %    |
| 835                  | 41.5                               | 0.90                            | 6.22    | 6.22    | 6.22    | 0.88  | 1.63       | ± 12.0 %    |
| 1750                 | 40.1                               | 1.37                            | 5.14    | 5.14    | 5.14    | 0.57  | 2.53       | ± 12.0 %    |
| 1900                 | 40.0                               | 1.40                            | 4.95    | 4.95    | 4.95    | 0.58  | 2.54       | ± 12.0 %    |
| 2450                 | 39.2                               | 1.80                            | 4.37    | 4.37    | 4.37    | 0.80  | 1.93       | ± 12.0 %    |

<sup>c</sup> Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

<sup>f</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

ET3DV6-SN:1782

April 14, 2011

## DASY/EASY - Parameters of Probe: ET3DV6- SN:1782

### Calibration Parameter Determined in Body Tissue Simulating Media

| f (MHz) <sup>c</sup> | Relative Permittivity <sup>f</sup> | Conductivity (S/m) <sup>f</sup> | ConvF X | ConvF Y | ConvF Z | Alpha | Depth (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|-------|------------|-------------|
| 450                  | 56.7                               | 0.94                            | 7.49    | 7.49    | 7.49    | 0.16  | 2.34       | ± 13.4 %    |
| 835                  | 55.2                               | 0.97                            | 6.03    | 6.03    | 6.03    | 0.85  | 1.72       | ± 12.0 %    |
| 1750                 | 53.4                               | 1.49                            | 4.54    | 4.54    | 4.54    | 0.64  | 2.70       | ± 12.0 %    |
| 1900                 | 53.3                               | 1.52                            | 4.34    | 4.34    | 4.34    | 0.63  | 2.57       | ± 12.0 %    |
| 2450                 | 52.7                               | 1.95                            | 3.94    | 3.94    | 3.94    | 0.99  | 1.21       | ± 12.0 %    |

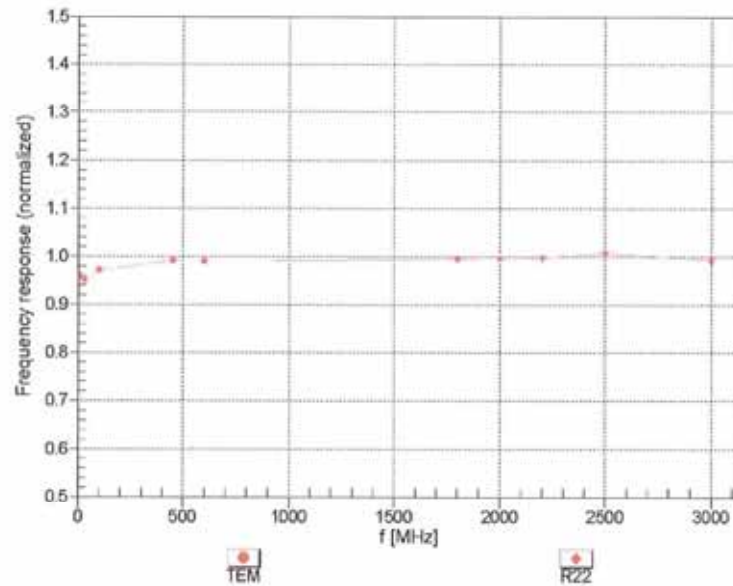
<sup>c</sup> Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

<sup>f</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

ET3DV6-SN:1782

April 14, 2011

## Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)



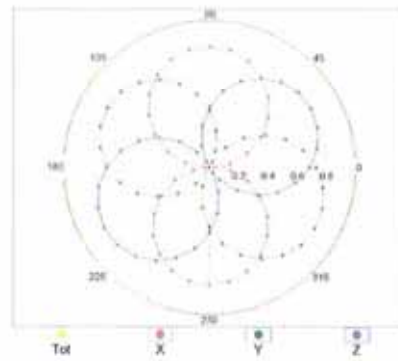
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

ET3DV6-SN:1782

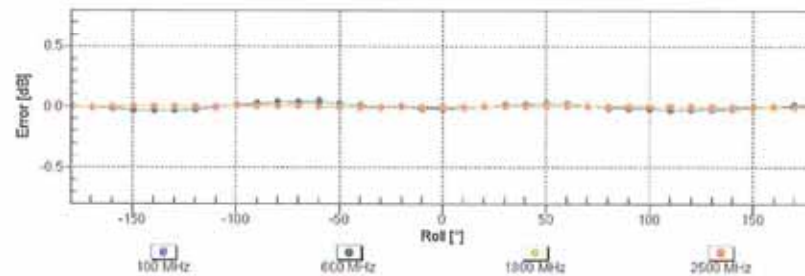
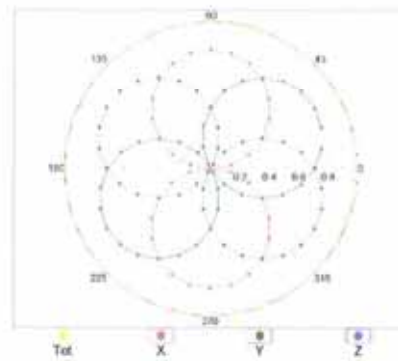
April 14, 2011

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

f=600 MHz,TEM



f=1800 MHz,R22

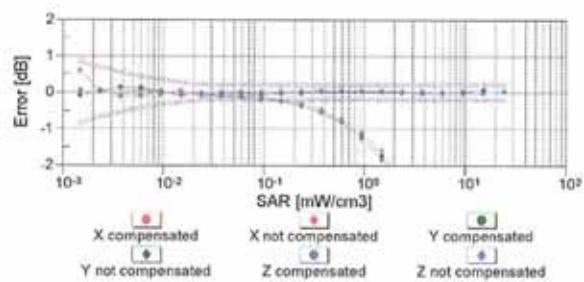
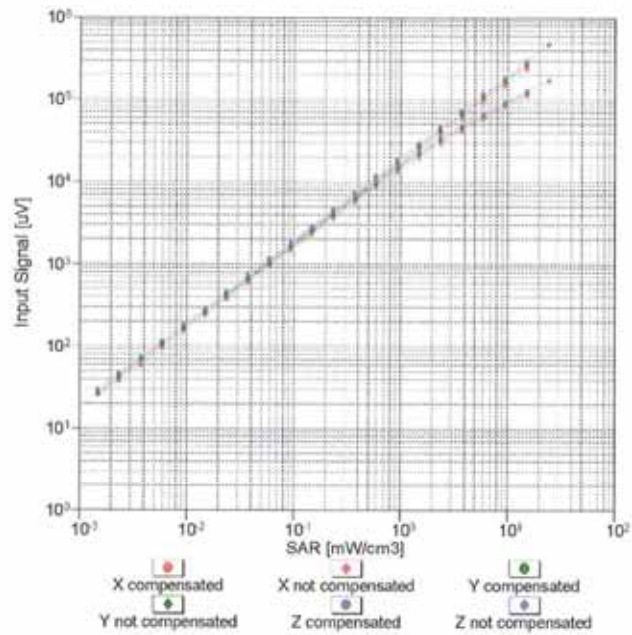


Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

ET3DV6-SN:1782

April 14, 2011

## Dynamic Range f(SAR<sub>head</sub>) (TEM cell , f = 900 MHz)

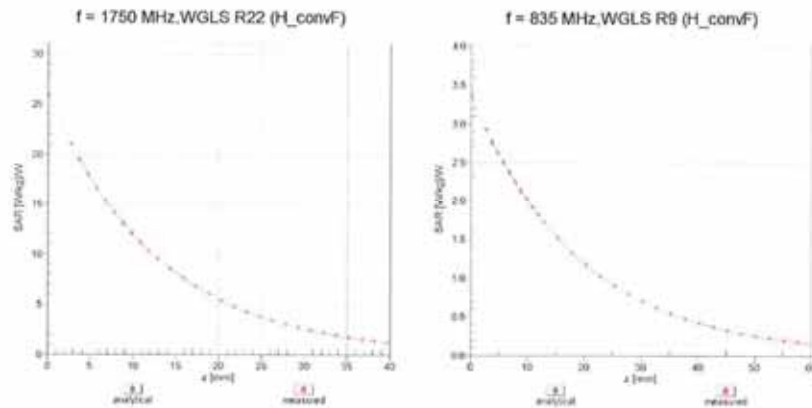


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

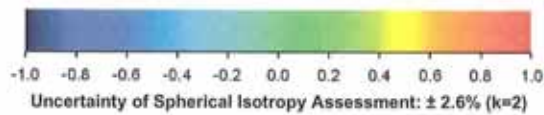
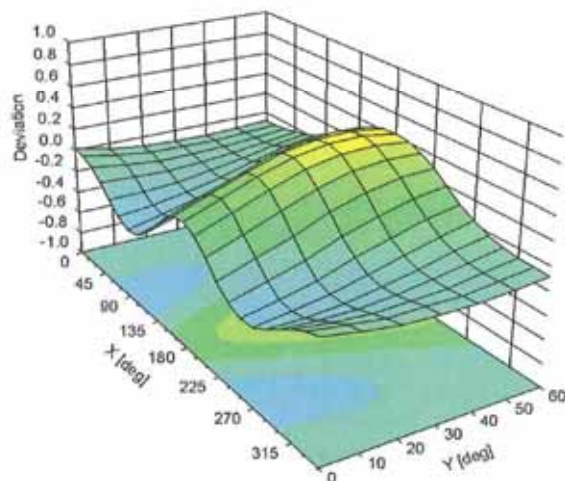
ET3DV6-SN:1782

April 14, 2011

## Conversion Factor Assessment



## Deviation from Isotropy in Liquid Error ( $\phi$ , $\theta$ ), f = 900 MHz



ET3DV6-SN:1782

April 14, 2011

## DASY/EASY - Parameters of Probe: ET3DV6 - SN:1782

### Other Probe Parameters

|                                               |                |
|-----------------------------------------------|----------------|
| Sensor Arrangement                            | Triangular     |
| Connector Angle (°)                           | Not applicable |
| Mechanical Surface Detection Mode             | enabled        |
| Optical Surface Detection Mode                | disabled       |
| Probe Overall Length                          | 337 mm         |
| Probe Body Diameter                           | 10 mm          |
| Tip Length                                    | 10 mm          |
| Tip Diameter                                  | 6.8 mm         |
| Probe Tip to Sensor X Calibration Point       | 2.7 mm         |
| Probe Tip to Sensor Y Calibration Point       | 2.7 mm         |
| Probe Tip to Sensor Z Calibration Point       | 2.7 mm         |
| Recommended Measurement Distance from Surface | 4 mm           |

## -DAE 3 Calibration Certificate

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Accreditation No.: SCS 108

Client **SGS (Dymstec)**

Certificate No: DAE3-567\_Jan11

### CALIBRATION CERTIFICATE

Object **DAE3 - SD 000 D03 AA - SN: 567**

Calibration procedure(s) **QA CAL-06.v22  
Calibration procedure for the data acquisition electronics (DAE)**

Calibration date: **January 27, 2011**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature  $(22 \pm 3)^{\circ}\text{C}$  and humidity  $< 70\%$ .

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards             | ID #               | Cal Date (Certificate No.) | Scheduled Calibration  |
|-------------------------------|--------------------|----------------------------|------------------------|
| Keithley Multimeter Type 2001 | SN: 0810278        | 28-Sep-10 (No:10376)       | Sep-11                 |
| Secondary Standards           | ID #               | Check Date (in house)      | Scheduled Check        |
| Calibrator Box V1.1           | SE UMS 006 AB 1004 | 07-Jun-10 (in house check) | In house check: Jun-11 |

|                |                              |                                     |               |
|----------------|------------------------------|-------------------------------------|---------------|
| Calibrated by: | Name<br><b>Andrea Guntli</b> | Function<br><b>Technician</b>       | Signature<br> |
| Approved by:   | Name<br><b>Fin Bornholt</b>  | Function<br><b>R&amp;D Director</b> | Signature<br> |

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Issued: January 27, 2011

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

## Glossary

**DAE** data acquisition electronics  
**Connector angle** information used in DASY system to align probe sensor X to the robot coordinate system.

## Methods Applied and Interpretation of Parameters

- **DC Voltage Measurement:** Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- **Connector angle:** The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - **DC Voltage Measurement Linearity:** Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - **Common mode sensitivity:** Influence of a positive or negative common mode voltage on the differential measurement.
  - **Channel separation:** Influence of a voltage on the neighbor channels not subject to an input voltage.
  - **AD Converter Values with inputs shorted:** Values on the internal AD converter corresponding to zero input voltage
  - **Input Offset Measurement:** Output voltage and statistical results over a large number of zero voltage measurements.
  - **Input Offset Current:** Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - **Input resistance:** Typical value for information; DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - **Low Battery Alarm Voltage:** Typical value for information. Below this voltage, a battery alarm signal is generated.
  - **Power consumption:** Typical value for information. Supply currents in various operating modes.

### DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1 $\mu$ V , full range = -100...+300 mV

Low Range: 1LSB = 61nV , full range = -1.....+3mV

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

| Calibration Factors | X                        | Y                        | Z                        |
|---------------------|--------------------------|--------------------------|--------------------------|
| High Range          | 404.644 $\pm$ 0.1% (k=2) | 404.400 $\pm$ 0.1% (k=2) | 404.475 $\pm$ 0.1% (k=2) |
| Low Range           | 3.94940 $\pm$ 0.7% (k=2) | 3.96974 $\pm$ 0.7% (k=2) | 3.94828 $\pm$ 0.7% (k=2) |

### Connector Angle

|                                           |                 |
|-------------------------------------------|-----------------|
| Connector Angle to be used in DASY system | 5.5 ° $\pm$ 1 ° |
|-------------------------------------------|-----------------|

## Appendix

### 1. DC Voltage Linearity

| High Range |         | Reading ( $\mu\text{V}$ ) | Difference ( $\mu\text{V}$ ) | Error (%) |
|------------|---------|---------------------------|------------------------------|-----------|
| Channel X  | + Input | 200011.1                  | 0.86                         | 0.00      |
| Channel X  | + Input | 20005.53                  | 5.63                         | 0.03      |
| Channel X  | - Input | -19994.55                 | 6.05                         | -0.03     |
| Channel Y  | + Input | 200012.0                  | 3.19                         | 0.00      |
| Channel Y  | + Input | 19998.16                  | -0.94                        | -0.00     |
| Channel Y  | - Input | -19999.31                 | 0.89                         | -0.00     |
| Channel Z  | + Input | 200007.6                  | -0.57                        | -0.00     |
| Channel Z  | + Input | 20000.62                  | 1.02                         | 0.01      |
| Channel Z  | - Input | -19997.10                 | 3.20                         | -0.02     |

| Low Range |         | Reading ( $\mu\text{V}$ ) | Difference ( $\mu\text{V}$ ) | Error (%) |
|-----------|---------|---------------------------|------------------------------|-----------|
| Channel X | + Input | 1999.6                    | -0.43                        | -0.02     |
| Channel X | + Input | 200.86                    | 0.86                         | 0.43      |
| Channel X | - Input | -198.93                   | 1.07                         | -0.54     |
| Channel Y | + Input | 2000.2                    | 0.40                         | 0.02      |
| Channel Y | + Input | 200.07                    | 0.07                         | 0.03      |
| Channel Y | - Input | -199.81                   | 0.09                         | -0.05     |
| Channel Z | + Input | 1999.8                    | -0.29                        | -0.01     |
| Channel Z | + Input | 199.45                    | -0.75                        | -0.38     |
| Channel Z | - Input | -200.35                   | -0.25                        | 0.12      |

### 2. Common mode sensitivity

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

|           | Common mode Input Voltage (mV) | High Range Average Reading ( $\mu\text{V}$ ) | Low Range Average Reading ( $\mu\text{V}$ ) |
|-----------|--------------------------------|----------------------------------------------|---------------------------------------------|
| Channel X | 200                            | 3.83                                         | 1.88                                        |
|           | - 200                          | 0.20                                         | -2.32                                       |
| Channel Y | 200                            | 0.89                                         | -0.01                                       |
|           | - 200                          | -1.13                                        | -1.19                                       |
| Channel Z | 200                            | 4.39                                         | 4.66                                        |
|           | - 200                          | -6.15                                        | -6.31                                       |

### 3. Channel separation

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

|           | Input Voltage (mV) | Channel X ( $\mu\text{V}$ ) | Channel Y ( $\mu\text{V}$ ) | Channel Z ( $\mu\text{V}$ ) |
|-----------|--------------------|-----------------------------|-----------------------------|-----------------------------|
| Channel X | 200                | -                           | 2.13                        | -0.21                       |
| Channel Y | 200                | 3.01                        | -                           | 3.24                        |
| Channel Z | 200                | 1.69                        | -1.11                       | -                           |

#### 4. AD-Converter Values with inputs shorted

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

|           | High Range (LSB) | Low Range (LSB) |
|-----------|------------------|-----------------|
| Channel X | 16333            | 16454           |
| Channel Y | 16169            | 16436           |
| Channel Z | 15951            | 16115           |

#### 5. Input Offset Measurement

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

Input 10M $\Omega$

|           | Average ( $\mu$ V) | min. Offset ( $\mu$ V) | max. Offset ( $\mu$ V) | Std. Deviation ( $\mu$ V) |
|-----------|--------------------|------------------------|------------------------|---------------------------|
| Channel X | -0.23              | -1.40                  | 0.68                   | 0.42                      |
| Channel Y | -0.84              | -2.05                  | 0.49                   | 0.41                      |
| Channel Z | -0.76              | -1.62                  | 0.54                   | 0.38                      |

#### 6. Input Offset Current

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

#### 7. Input Resistance (Typical values for information)

|           | Zeroing (k $\Omega$ m) | Measuring (M $\Omega$ m) |
|-----------|------------------------|--------------------------|
| Channel X | 200                    | 200                      |
| Channel Y | 200                    | 200                      |
| Channel Z | 200                    | 200                      |

#### 8. Low Battery Alarm Voltage (Typical values for information)

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

#### 9. Power Consumption (Typical values for information)

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

## - 1900 MHz Dipole Calibration Certificate

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Accreditation No.: **SCS 108**

Client **SGS KES (Dymstec)**

Certificate No: **D1900V2-5d033\_May10**

### CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d033**

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

Calibration date: **May 26, 2010**

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

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

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards           | ID #               | Cal Date (Certificate No.)        | Scheduled Calibration  |
|-----------------------------|--------------------|-----------------------------------|------------------------|
| Power meter EPM-442A        | GB37480704         | 06-Oct-09 (No. 217-01086)         | Oct-10                 |
| Power sensor HP 8481A       | US37292783         | 06-Oct-09 (No. 217-01086)         | Oct-10                 |
| Reference 20 dB Attenuator  | SN: 5086 (20g)     | 30-Mar-10 (No. 217-01158)         | Mar-11                 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 30-Mar-10 (No. 217-01162)         | Mar-11                 |
| Reference Probe ES3DV3      | SN: 3205           | 30-Apr-10 (No. ES3-3205_Apr10)    | Apr-11                 |
| DAE4                        | SN: 601            | 02-Mar-10 (No. DAE4-601_Mar10)    | Mar-11                 |
| Secondary Standards         | ID #               | Check Date (in house)             | Scheduled Check        |
| Power sensor HP 8481A       | MY41092317         | 18-Oct-02 (in house check Oct-09) | In house check: Oct-11 |
| RF generator R&S SMT-06     | 100005             | 4-Aug-99 (in house check Oct-09)  | In house check: Oct-11 |
| Network Analyzer HP 8753E   | US37390585 S4206   | 18-Oct-01 (in house check Oct-09) | In house check: Oct-10 |

|                |                            |                                          |               |
|----------------|----------------------------|------------------------------------------|---------------|
| Calibrated by: | Name<br><b>Dimce Iliev</b> | Function<br><b>Laboratory Technician</b> | Signature<br> |
| Approved by:   | <b>Katja Pokovic</b>       | <b>Technical Manager</b>                 |               |

Issued: May 27, 2010

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Accreditation No.: **SCS 108**

## Glossary:

|       |                                 |
|-------|---------------------------------|
| TSL   | tissue simulating liquid        |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A   | not applicable or not measured  |

## Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

## Additional Documentation:

- DASY4/5 System Handbook

## Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

### Measurement Conditions

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

|                              |                           |             |
|------------------------------|---------------------------|-------------|
| DASY Version                 | DASY5                     | V5.2        |
| Extrapolation                | Advanced Extrapolation    |             |
| Phantom                      | Modular Flat Phantom V5.0 |             |
| Distance Dipole Center - TSL | 10 mm                     | with Spacer |
| Zoom Scan Resolution         | dx, dy, dz = 5 mm         |             |
| Frequency                    | 1900 MHz $\pm$ 1 MHz      |             |

### Head TSL parameters

The following parameters and calculations were applied.

|                                  | Temperature         | Permittivity   | Conductivity         |
|----------------------------------|---------------------|----------------|----------------------|
| Nominal Head TSL parameters      | 22.0 °C             | 40.0           | 1.40 mho/m           |
| Measured Head TSL parameters     | (22.0 $\pm$ 0.2) °C | 39.7 $\pm$ 6 % | 1.41 mho/m $\pm$ 6 % |
| Head TSL temperature during test | (21.5 $\pm$ 0.2) °C | ----           | ----                 |

### SAR result with Head TSL

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                               |
|-------------------------------------------------------|--------------------|-------------------------------|
| SAR measured                                          | 250 mW input power | 9.90 mW / g                   |
| SAR normalized                                        | normalized to 1W   | 39.6 mW / g                   |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | 39.4 mW /g $\pm$ 17.0 % (k=2) |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                               |
|---------------------------------------------------------|--------------------|-------------------------------|
| SAR measured                                            | 250 mW input power | 5.15 mW / g                   |
| SAR normalized                                          | normalized to 1W   | 20.6 mW / g                   |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 20.5 mW /g $\pm$ 16.5 % (k=2) |

### Body TSL parameters

The following parameters and calculations were applied.

|                                  | Temperature     | Permittivity | Conductivity     |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters      | 22.0 °C         | 53.3         | 1.52 mho/m       |
| Measured Body TSL parameters     | (22.0 ± 0.2) °C | 54.1 ± 6 %   | 1.52 mho/m ± 6 % |
| Body TSL temperature during test | (21.8 ± 0.2) °C | ----         | ----             |

### SAR result with Body TSL

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                            |
|-------------------------------------------------------|--------------------|----------------------------|
| SAR measured                                          | 250 mW input power | 10.3 mW / g                |
| SAR normalized                                        | normalized to 1W   | 41.2 mW / g                |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | 41.3 mW / g ± 17.0 % (k=2) |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                            |
|---------------------------------------------------------|--------------------|----------------------------|
| SAR measured                                            | 250 mW input power | 5.50 mW / g                |
| SAR normalized                                          | normalized to 1W   | 22.0 mW / g                |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | 22.0 mW / g ± 16.5 % (k=2) |

## Appendix

### Antenna Parameters with Head TSL

|                                      |                             |
|--------------------------------------|-----------------------------|
| Impedance, transformed to feed point | $49.5 \Omega + 3.8 j\Omega$ |
| Return Loss                          | - 28.4 dB                   |

### Antenna Parameters with Body TSL

|                                      |                             |
|--------------------------------------|-----------------------------|
| Impedance, transformed to feed point | $47.1 \Omega + 4.3 j\Omega$ |
| Return Loss                          | - 25.4 dB                   |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.205 ns |
|----------------------------------|----------|

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

### Additional EUT Data

|                 |                |
|-----------------|----------------|
| Manufactured by | SPEAG          |
| Manufactured on | March 17, 2003 |

## DASY5 Validation Report for Head TSL

Date/Time: 17.05.2010 15:51:21

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d033**

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

Medium: HSL U11 BB

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.41$  mho/m;  $\epsilon_r = 39.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.09, 5.09, 5.09); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 61

**Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement**

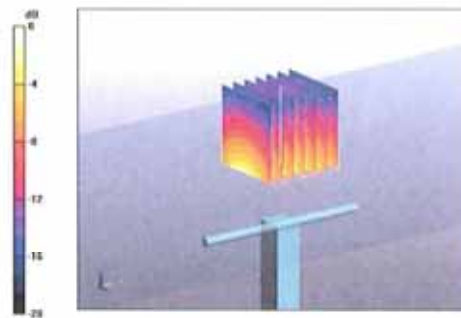
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.4 V/m; Power Drift = 0.00578 dB

Peak SAR (extrapolated) = 18.3 W/kg

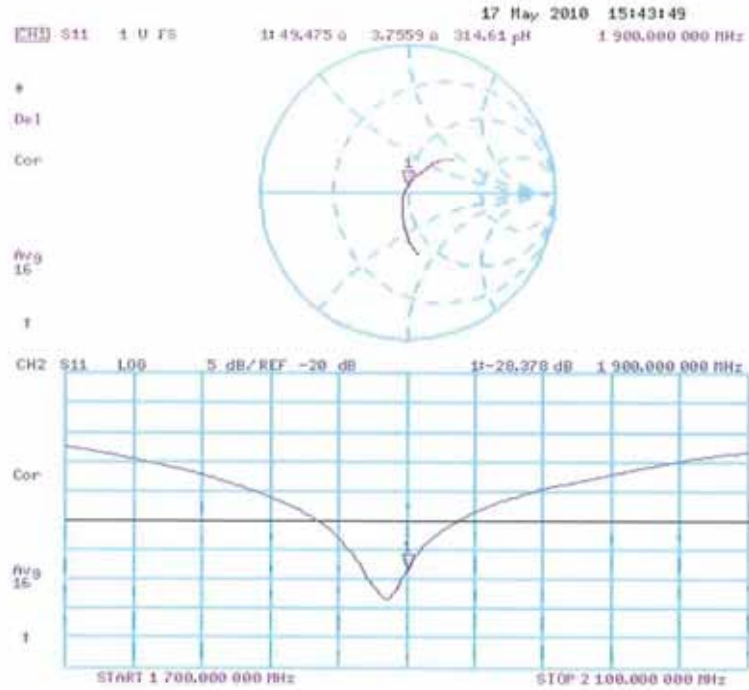
**SAR(1 g) = 9.9 mW/g; SAR(10 g) = 5.15 mW/g**

Maximum value of SAR (measured) = 12.4 mW/g



0 dB = 12.4mW/g

## Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body

Date/Time: 26.05.2010 15:04:02

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d033**

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

Medium: MSL U11 BB

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.52$  mho/m;  $\epsilon_r = 54.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.59, 4.59, 4.59); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 61

**Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement**

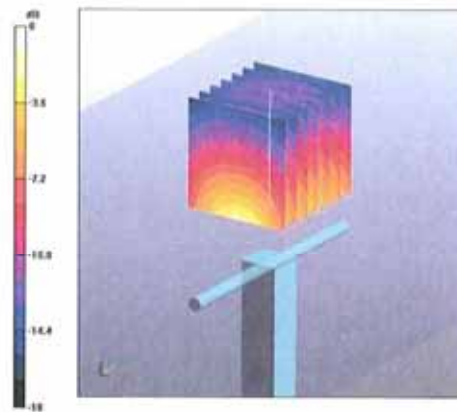
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.2 V/m; Power Drift = -0.00657 dB

Peak SAR (extrapolated) = 17.1 W/kg

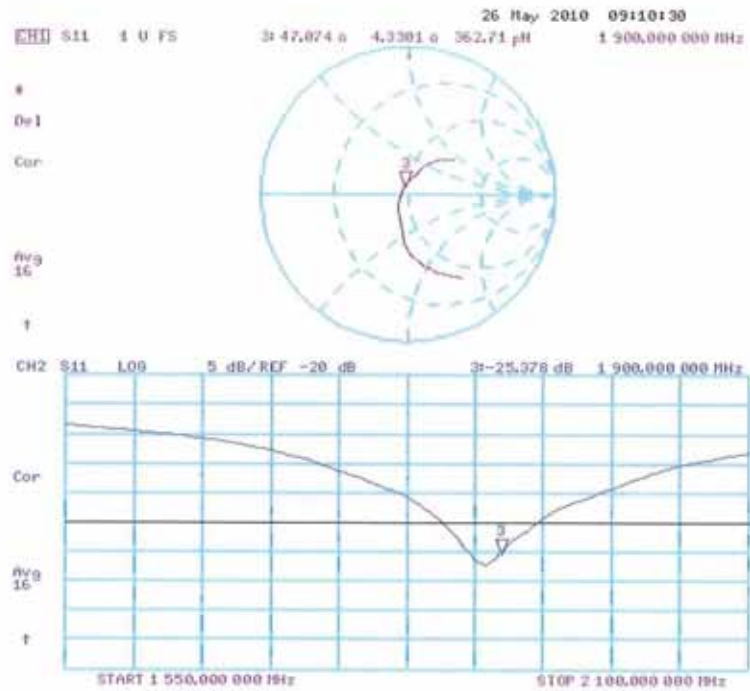
**SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.5 mW/g**

Maximum value of SAR (measured) = 12.9 mW/g



0 dB = 12.9mW/g

## Impedance Measurement Plot for Body TSL



## - 2450 MHz Dipole Calibration Certificate

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



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

Accredited by the Swiss Accreditation Service (SAS)  
 The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **SGS (Dymstec)**

Certificate No: **D2450V2-734\_May10**

### CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 734**

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

Calibration date: **May 27, 2010**

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

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

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards           | ID #               | Cal Date (Certificate No.)        | Scheduled Calibration  |
|-----------------------------|--------------------|-----------------------------------|------------------------|
| Power meter EPM-442A        | GB37480704         | 06-Oct-09 (No. 217-01086)         | Oct-10                 |
| Power sensor HP 8481A       | US37292783         | 06-Oct-09 (No. 217-01086)         | Oct-10                 |
| Reference 20 dB Attenuator  | SN: 5086 (20g)     | 30-Mar-10 (No. 217-01158)         | Mar-11                 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 30-Mar-10 (No. 217-01162)         | Mar-11                 |
| Reference Probe ES3DV3      | SN: 3205           | 30-Apr-10 (No. ES3-3205_Apr10)    | Apr-11                 |
| DAE4                        | SN: 601            | 02-Mar-10 (No. DAE4-601_Mar10)    | Mar-11                 |
| Secondary Standards         | ID #               | Check Date (in house)             | Scheduled Check        |
| Power sensor HP 8481A       | MY41092317         | 18-Oct-02 (in house check Oct-09) | In house check: Oct-11 |
| RF generator R&S SMT-06     | 100005             | 4-Aug-99 (in house check Oct-09)  | In house check: Oct-11 |
| Network Analyzer HP 8753E   | US37390585 S4206   | 18-Oct-01 (in house check Oct-09) | In house check: Oct-10 |

|                |                     |                                   |               |
|----------------|---------------------|-----------------------------------|---------------|
| Calibrated by: | Name<br>Dimce Iliev | Function<br>Laboratory Technician | Signature<br> |
| Approved by:   | Katja Pokovic       | Technical Manager                 |               |

Issued: May 27, 2010

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

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



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

Accredited by the Swiss Accreditation Service (SAS)  
 The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

## Glossary:

|       |                                 |
|-------|---------------------------------|
| TSL   | tissue simulating liquid        |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A   | not applicable or not measured  |

## Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

## Additional Documentation:

- DASY4/5 System Handbook

## Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

### Measurement Conditions

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

|                              |                           |             |
|------------------------------|---------------------------|-------------|
| DASY Version                 | DASY5                     | V5.2        |
| Extrapolation                | Advanced Extrapolation    |             |
| Phantom                      | Modular Flat Phantom V4.9 |             |
| Distance Dipole Center - TSL | 10 mm                     | with Spacer |
| Zoom Scan Resolution         | dx, dy, dz = 5 mm         |             |
| Frequency                    | 2450 MHz $\pm$ 1 MHz      |             |

### Head TSL parameters

The following parameters and calculations were applied.

|                                  | Temperature         | Permittivity   | Conductivity         |
|----------------------------------|---------------------|----------------|----------------------|
| Nominal Head TSL parameters      | 22.0 °C             | 39.2           | 1.80 mho/m           |
| Measured Head TSL parameters     | (22.0 $\pm$ 0.2) °C | 39.0 $\pm$ 6 % | 1.76 mho/m $\pm$ 6 % |
| Head TSL temperature during test | (21.5 $\pm$ 0.2) °C | ----           | ----                 |

### SAR result with Head TSL

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                               |
|-------------------------------------------------------|--------------------|-------------------------------|
| SAR measured                                          | 250 mW input power | 12.8 mW / g                   |
| SAR normalized                                        | normalized to 1W   | 51.2 mW / g                   |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | 51.7 mW /g $\pm$ 17.0 % (k=2) |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                               |
|---------------------------------------------------------|--------------------|-------------------------------|
| SAR measured                                            | 250 mW input power | 6.03 mW / g                   |
| SAR normalized                                          | normalized to 1W   | 24.1 mW / g                   |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 24.2 mW /g $\pm$ 16.5 % (k=2) |

### Body TSL parameters

The following parameters and calculations were applied.

|                                  | Temperature     | Permittivity | Conductivity     |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters      | 22.0 °C         | 52.7         | 1.95 mho/m       |
| Measured Body TSL parameters     | (22.0 ± 0.2) °C | 53.6 ± 6 %   | 1.97 mho/m ± 6 % |
| Body TSL temperature during test | (21.8 ± 0.2) °C | ----         | ----             |

### SAR result with Body TSL

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                            |
|-------------------------------------------------------|--------------------|----------------------------|
| SAR measured                                          | 250 mW input power | 13.4 mW / g                |
| SAR normalized                                        | normalized to 1W   | 53.6 mW / g                |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | 53.5 mW / g ± 17.0 % (k=2) |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                            |
|---------------------------------------------------------|--------------------|----------------------------|
| SAR measured                                            | 250 mW input power | 6.31 mW / g                |
| SAR normalized                                          | normalized to 1W   | 25.2 mW / g                |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | 25.2 mW / g ± 16.5 % (k=2) |

## Appendix

### Antenna Parameters with Head TSL

|                                      |                             |
|--------------------------------------|-----------------------------|
| Impedance, transformed to feed point | $53.8 \Omega + 3.2 j\Omega$ |
| Return Loss                          | - 26.4 dB                   |

### Antenna Parameters with Body TSL

|                                      |                             |
|--------------------------------------|-----------------------------|
| Impedance, transformed to feed point | $49.8 \Omega + 4.4 j\Omega$ |
| Return Loss                          | - 27.1 dB                   |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.153 ns |
|----------------------------------|----------|

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

### Additional EUT Data

|                 |              |
|-----------------|--------------|
| Manufactured by | SPEAG        |
| Manufactured on | May 07, 2003 |

## DASY5 Validation Report for Head TSL

Date/Time: 25.05.2010 14:48:31

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:734**

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: HSL U11 BB

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.76$  mho/m;  $\epsilon_r = 39$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 61

**Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement**

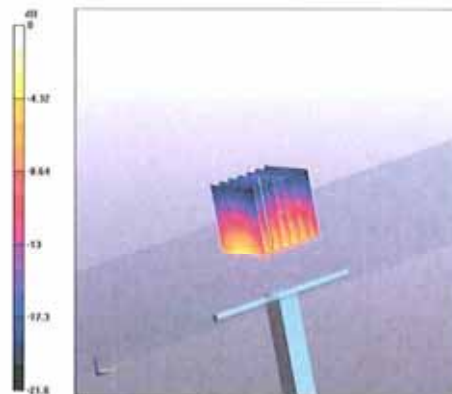
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 101.2 V/m; Power Drift = 0.030 dB

Peak SAR (extrapolated) = 26.1 W/kg

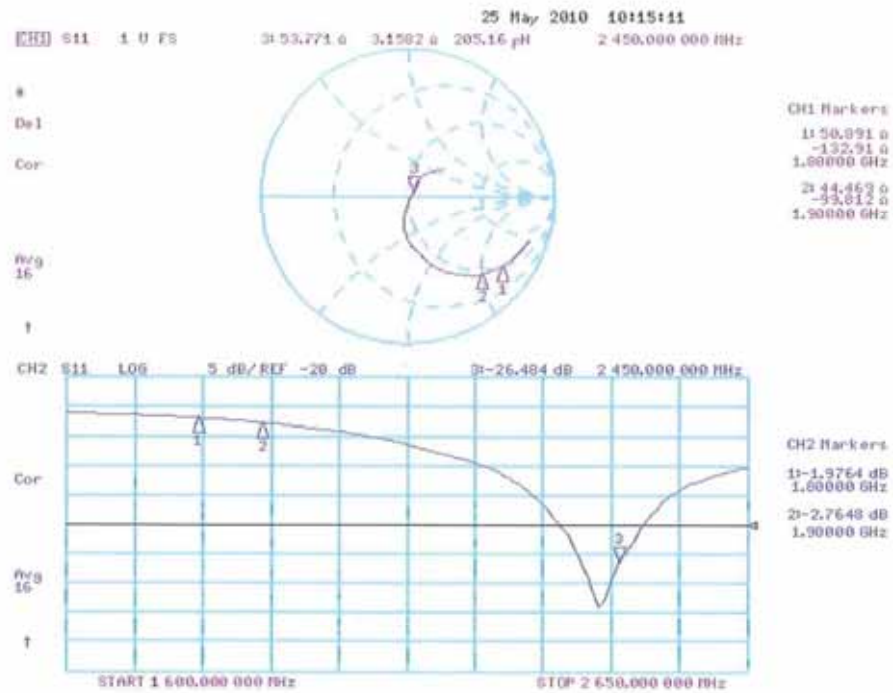
**SAR(1 g) = 12.8 mW/g; SAR(10 g) = 6.03 mW/g**

Maximum value of SAR (measured) = 16.7 mW/g



0 dB = 16.7mW/g

## Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body

Date/Time: 27.05.2010 10:14:45

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:734**

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: MSL U11 BB

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.97$  mho/m;  $\epsilon_r = 53.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.31, 4.31, 4.31); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 61

**Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement**

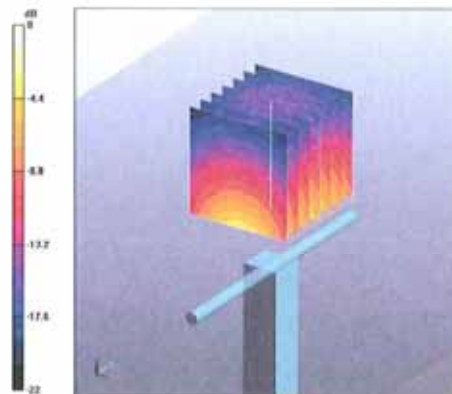
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.7 V/m; Power Drift = -0.030 dB

Peak SAR (extrapolated) = 27.3 W/kg

**SAR(1 g) = 13.4 mW/g; SAR(10 g) = 6.31 mW/g**

Maximum value of SAR (measured) = 17.4 mW/g



0 dB = 17.4mW/g

## Impedance Measurement Plot for Body TSL

