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# TEST REPORT ON SAR

Model Tested: GT-I9108  
FCC ID (Requested): A3LGTI9108  
Job No: FI-127  
Report No: FI-127-S1

- Abstract -

This document reports on SAR Tests carried out in accordance with FCC/OET Bulletin 65, Supplement C(June 2001).

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Authorized By

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|                                 |                          |                                                    |              |             |
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## 1. GENERAL INFORMATION

Test Dates : Jun.18~22,2011, Jul.28, 2011  
Manufacturer : SAMSUNG ELECTRONICS Co., Ltd.  
Address : 416 Maetan3-Dong, Suwon City, Korea  
Test Standard : §2.1093; FCC/OET Bulletin 65, Supplement C(June 2001)  
FCC Classification : Licensed Portable Transmitter Held to Ear (PCE)  
Digital Transmission System(DTS)  
Unlicensed National Information Infrastructure TX(NII)  
Tested for : FCC/TCB Certification

## 2. DESCRIPTION OF DEVICE

Test Sample : 1900 GSM/GPRS/EDGE Phone with Bluetooth and WLAN  
Model Number : GT-I9108  
Serial Number : Identical prototype (S/N : # FI-127-G)  
Tx Freq.Range: 1850.20 ~ 1909.80 MHz (GSM1900)  
2412 ~ 2462MHz (2.4GHz WLAN)  
5180 ~ 5240 MHz(5.2 GHz WLAN)  
5260 ~ 5320 MHz(5.3 GHz WLAN)  
5500 ~ 5700 MHz(5.5 GHz WLAN)  
5745 ~ 5825 MHz(5.8 GHz WLAN)  
Rx Freq.Range: 1930.20 ~ 1989.80 MHz (GSM1900)  
2412 ~ 2462 MHz (2.4GHz WLAN)  
5180 ~ 5240 MHz(5.2 GHz WLAN)  
5260 ~ 5320 MHz(5.3 GHz WLAN)  
5500 ~ 5700 MHz(5.5 GHz WLAN)  
5745 ~ 5825 MHz(5.8 GHz WLAN)  
Antenna Manufacturer : TYCO  
Model No.: 2108134G  
GPRS Multi slot class Class 12  
EDGE Multi slot class Class 10  
GSM Class B  
DTM Multislots N/A  
Antenna Dimensions : 62.13X14.80X6.67(mm)  
Separation distance between  
Main and Bluetooth antenna : 23mm

|                                                                                                                    |                          |                                                    |              |              |
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### 3. DESCRIPTION OF TEST EQUIPMENT

#### 3.1 SAR Measurement Setup

##### Robotic System

Measurements are performed using the DASY4 (or DASY5) automated dosimetric assessment system. Which is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland and consists of high precision robotics system (Stäubli), robot controller, measurement server, Samsung computer, near-field probe, probe alignment sensor, and the SAM twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Fig. 3.1).

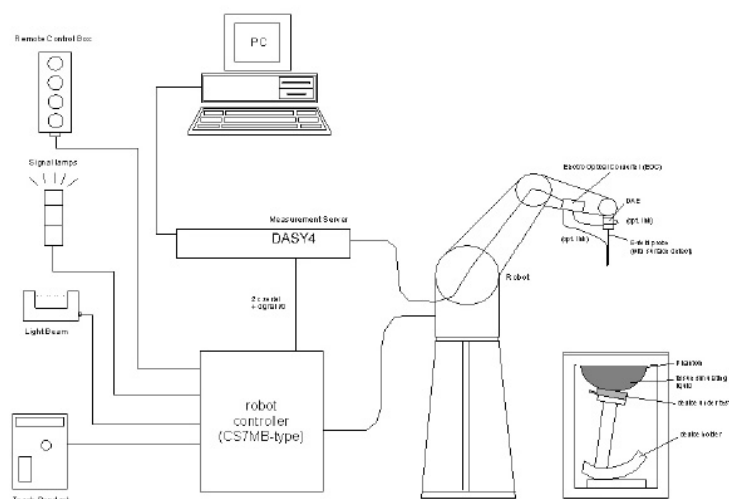


**Figure 3.1 SAR Measurement System Setup**

##### System Hardware

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and a remote control is used to drive the robot motors. The PC consists of the Samsung computer with Windows XP system and SAR Measurement Software DASY4 (or DASY5), LCD monitor, mouse and keyboard. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit that performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the measurement server.

|                                                                                                                    |                          |                                                 |              |              |
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## System Electronics

The DAE4(or DAE3) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16-bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

### 3.2 E-field Probe



The SAR measurement were conducted with the dosimetric probe ES3DV2, ES3DV3, EX3DV4 and ET3DV6, designed in the classical triangular configuration (see Fig.3.3) and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY4 software reads the reflection during a software approach and looks for the maximum using a 2<sup>nd</sup> order fitting (see Fig.3.2). The approach is

**Figure 3.2 DAE System** stopped at reaching the maximum.

### Probe Specifications

|              |                                                                     |
|--------------|---------------------------------------------------------------------|
| Construction | Symmetrical design with triangular core                             |
|              | Interleaved sensors                                                 |
|              | Built-in shielding against static charges                           |
|              | PEEK enclosure material (resistant to organic solvents, e.g., DGBE) |
| Calibration  | Basic Broad Band Calibration in air: 10-3000 MHz                    |
|              | Conversion Factors (CF) for HSL 900 and HSL 1800                    |

Additional CF for other liquids and frequencies upon request

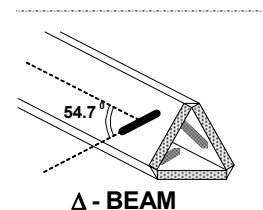


**Figure 3.3 Triangular Probe Configuration**

|                                                                                                                    |                          |                                                 |              |              |
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Frequency 10 MHz to > 6 GHz; Linearity:  $\pm 0.2$  dB (30 MHz to 3 GHz)

Directivity **[ES3DV3], [ET3DV6]**  
 $\pm 0.2$  dB in HSL (rotation around probe axis)  
 $\pm 0.3$  dB in tissue material (rotation normal to probe axis)  
**[EX3DV4]**  
 $\pm 0.3$  dB in HSL (rotation around probe axis)  
 $\pm 0.5$  dB in tissue material (rotation normal to probe axis)

Dynamic Range **[ES3DV3], [ET3DV6]**  
 $5\mu\text{W/g}$  to  $> 100\text{mW/g}$ ; Linearity:  $\pm 0.2\text{dB}$   
**[EX3DV4]**  
 $10\mu\text{W/g}$  to  $> 100\text{ mW/g}$ ; Linearity:  $\pm 0.2$  dB

Dimensions **[ES3DV3], [ES3DV2]**  
Overall length: 330 mm (Tip: 20 mm)  
Tip diameter: 3.9 mm (Body: 12 mm)  
Distance from probe tip to dipole centers: 2.1 mm  
**[EX3DV4]**  
Overall length: 330 mm (Tip: 20 mm)  
Tip diameter: 2.5 mm (Body: 12 mm)  
Typical distance from probe tip to dipole centers: 1 mm  
**[ET3DV6]**  
Overall length: 330mm  
Tip length: 16mm  
Body diameter: 12mm  
Tip diameter: 6.8mm  
Distance from probe tip to dipole centers: 2.7mm



[ES3DV3] ,[ES3DV2]



[EX3DV4]

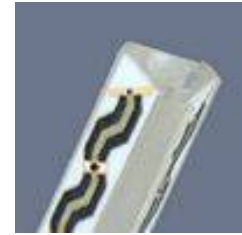
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Application **[ES3DV3], [ES3DV2]**

General dosimetry up to 5 GHz  
Dosimetry in strong gradient fields  
Compliance tests of mobile phones

**[EX3DV4]**

High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30 %.



[ET3DV6]

**[ET3DV6]**

General dosimetry up to 3 GHz  
Compliance tests of mobile phones  
Fast automatic scanning in arbitrary phantoms

Optical

**[ET3DV6]**

Surface

$\pm 0.2$  mm repeatability in air and clear liquids over diffuse reflecting surfaces

Detection

### 3.3 Phantom

#### SAM Twin Phantom

The SAM Twin Phantom V4.0 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. (See Figure 3.5)



**Figure3.5 SAM Twin Phantom**

|                                                                                                                    |                          |                                                 |              |              |
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### SAM Twin Phantom Specification

|                 |                                                                                                                                                                                                                                                                                                                          |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Construction    | The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-2003, EN 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. |
| Shell Thickness | $2 \pm 0.2$ mm                                                                                                                                                                                                                                                                                                           |
| Filling Volume  | Approx. 25 liters                                                                                                                                                                                                                                                                                                        |
| Dimensions      | Height: 810 mm; Length: 1000 mm; Width: 500 mm                                                                                                                                                                                                                                                                           |

### Modular Flat Phantom

The Modular Flat Phantom V5.1 is constructed of a fiberglass shell integrated in a wooden table. Also It consists of three identical flat phantoms (modules) which can be installed and removed separately without emptying the liquid, as well as a wooden support.. It enables the dosimetric evaluation of 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. (See Figure 3.6)



**Figure 3.6 Modular Flat Phantom**

### Modular Flat Phantom Specification

|                 |                                                                                                                                                                                                                |  |  |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Construction    | The shell corresponds to the specifications of IEEE 1528-2003. It enables the dosimetric evaluation of body mounted usage above 800 MHz at the flat phantom region. A cover prevents evaporation of the liquid |  |  |
| Shell Thickness | $2 \pm 0.2$ mm                                                                                                                                                                                                 |  |  |
| Filling Volume  | Approx. 10 liters                                                                                                                                                                                              |  |  |
| Dimension       | Wooden support - Height: 810 mm; Length: 830 mm; Width: 500 mm<br>Each Module - Height:190 mm; Length: 200 mm; width: 300 mm                                                                                   |  |  |

|                                                                                                                    |                          |                                                 |              |              |
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### 3.4 Brain Simulating Mixture Characterization

The brain mixtures consist of a viscous gel using hydroxethylcellulose (HEC) gelling agent and saline solution (see Table 3.1). Preservation with a bactericide is added and visual inspection is made to make sure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue.

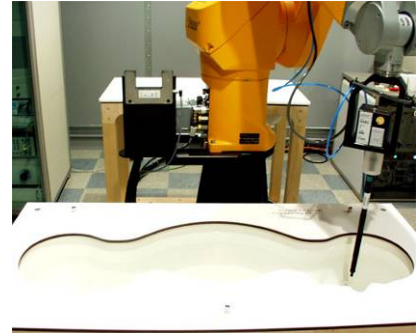


**Figure 3.7 Simulated Tissue**

**Table 3.1 Composition of the Brain Tissue Equivalent Matter**

| INGREDIENTS                | 1900MHz Brain | 1900MHz Muscle | 2450MHz Brain | 2450MHz Muscle | 5200~5800MHz Brain | 5200~5800MHz Muscle |
|----------------------------|---------------|----------------|---------------|----------------|--------------------|---------------------|
| WATER                      | 55.24%        | 70.23%         | 71.88%        | 73.4%          | 65.52%             | 78.66%              |
| SUGAR                      | -             | -              | -             | -              |                    |                     |
| SALT                       | 0.31%         | 0.29%          | 0.16%         | 0.06%          |                    |                     |
| DGBE                       | 44.45%        | 29.48%         | 7.99%         | 26.54%         |                    |                     |
| Triton X-100               | -             | -              | 19.97%        | -              | 17.24%             | 10.67%              |
| BACTERIACIDE               | -             | -              | -             | -              |                    |                     |
| HEC                        | -             | -              | -             | -              |                    |                     |
| Dielectric Constant Target | 40            | 53.3           | 39.2          | 52.7           | 35.575             | 48.539              |
| Conductivity Target (S/m)  | 1.4           | 1.52           | 1.8           | 1.95           | 5.018              | 5.708               |

### 3.5 Device Holder for Transmitters

In combination with the Twin SAM Phantom V4.0, the Mounting Device (see Fig. 3.7) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is

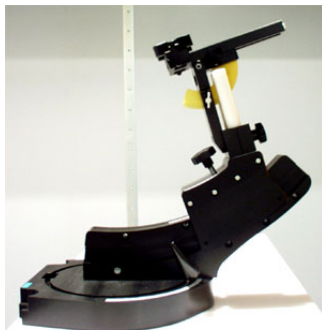


**Figure 3.8 Device Holder**

the ear opening. The devices can be easily, accurately and repeatedly be positioned according to the EN 50360:2001 and FCC specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

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

|                                                                                                                    |                          |                                                 |              |              |
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### 3.6 Validation Dipole

The reference dipole should have a return loss better than –20 dB (measured in the setup) at the resonant frequency to reduce the uncertainty in the power measurement.

|             |                                                                                                                                                                             |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency   | 1900, 2450 MHz, 5000MHz                                                                                                                                                     |
| Return Loss | < -20 dB at specified validation position                                                                                                                                   |
| Dimensions  | D1900V2: dipole length: 68 mm; overall height: 300 mm<br>D2450V2: dipole length: 51.8 mm; overall height: 300 mm<br>D5GHzV2: dipole length: 20.6 mm; overall height: 300 mm |

**Note:**

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

| D2450V2<br>S/N:807 | Parameters       |               |               |               |
|--------------------|------------------|---------------|---------------|---------------|
| Date of Cal        | Return loss (dB) | Deviation (%) | Impedance (Ω) | Deviation (Ω) |
| 2010.02.04         | -26.8            | 0             | 54.4          | 0             |
| 2011.03.31         | -26.6            | 0.75          | 50.1          | -4.3          |

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|                                                                                                                    |                          |                                                 |              |              |
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### 3.7 Equipment Calibration

**Table 3.2 Test Equipment Calibration**

| Type                            | Calibration Due Date | Serial No.      |
|---------------------------------|----------------------|-----------------|
| SPEAG E-Field Probe EX3DV4      | Apr.14, 2012         | 3750            |
| SPEAG DAE4                      | Feb.22, 2012         | 486             |
| SPEAG Validation Dipole D1900V2 | Feb.23, 2013         | 5d082           |
| SPEAG Validation Dipole D2450V2 | Feb.04, 2012         | 807             |
| SPEAG Validation Dipole D5GHzV2 | Mar. 14,2013         | 1099            |
| Stäubli Robot RX90BL            | Not Required         | F02/5R79A1/A/01 |
| SPEAG SAM Twin Phantom V4.0     | Not Required         | TP-1247         |
| SPEAG SAM Twin Phantom V4.0     | Not Required         | TP-1248         |
| Modular Phantom                 | Not Required         | 1001            |
| E4438C Signal Generator         | Jan.26, 2012         | MY45094010      |
| NRVD Dual Channel Power Meter   | Feb.07, 2012         | 836416/028      |
| NRV-Z53 Thermal Power Sensor    | Feb.07, 2012         | 835324/001      |
| NRV-Z53 Thermal Power Sensor    | Feb.07, 2012         | 835324/006      |
| E4419B Power Meter              | Nov.30, 2011         | GB43312299      |
| E9300B Power Sensor             | Jan.28, 2012         | MY41495557      |
| BBS3Q7ECK Power Amp             | Jan.20, 2012         | 1052            |
| HP-8753ES Network Analyzer      | Oct.29, 2011         | US39173712      |
| HP85070C Dielectric Probe Kit   | Not Required         | US99360087      |
| DASY4 S/W (ver 4.7)             | Not Required         | -               |
| E4440A Spectrum Analyzer        | Feb.24, 2012         | MY45304704      |
| 777D Dual Directional Coupler   | Mar.24, 2012         | 07526           |
| Base Station Simulator          | Dec.20, 2011         | GB46490112      |
| 772D Dual Directional Coupler   | Mar.4,2012           | ZA200100954     |
| PRE-AMPLIFIER 8449B             | Dec.15,2011          | 3008A00691      |

**NOTE:**

The E-field probe was calibrated by SPEAG, by temperature measurement procedure. Dipole Validation measurement is performed by Samsung Lab. before each test. (see § 7.2) The brain simulating material is calibrated by Samsung using the dielectric probe system and network analyzer to determine the conductivity and permittivity (dielectric constant) of the brain-equivalent material. (see § 7.1)

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|                                                                                                                    |                          |                                                 |              |              |
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## 4. SAR MEASUREMENT PROCEDURE

The evaluation was performed using the following procedure.

### STEP 1

The SAR measurement was taken at a selected spatial reference point to monitor power variations during testing. This fixed location point was measured and used as a reference value.

### STEP 2

The SAR distribution at the exposed side of the head was measured at a distance of 3.9mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 20mm x 20mm. Based on the area scan data, the area of the maximum absorption was determined by spline interpolation. If area scan will be performed at over 4.5GHz, the projected area of transmitter are measured in an area scan with a resolution  $\leq 1.0$  cm.

### STEP 3

Around this point, a volume of 32mm x 32mm x 30mm (fine resolution volume scan, zoom scan) was assessed by measuring 5 x 5 x 7 points for below 3 GHz and a volume of 24mm x 24mm x 20mm was assessed by measuring 7 x 7 x 11 point for over 3 GHz. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

The data at the surface was extrapolated, since the center of the dipoles is 2.7mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluated the points between the surface and the probe tip. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions). The volume was integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

### STEP 4

The SAR value at the same location as in step 1 was again measured.

(If the value changed by more than 5%, the evaluation is repeated.)

|                                                                                                                    |                          |                                                 |              |              |
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## 5. DESCRIPTION OF TEST POSITION

### 5.1 SAM Phantom Shape

Figure 5.1 shows the front, back and side views of SAM. The point “M” is the reference point for the center of mouth, “LE” is the left ear reference point (ERP), and “RE” is the right ERP. The ERPs are 15 mm posterior to the entrance to ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 5.2.



**Figure 5.1 Front, back and side view of SAM**

The plane passing through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck-Front) perpendicular to the reference plane and passing through the RE (or LE) is called the Reference Pivoting Line (see Figure 5.3). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines should be marked on the external phantom shell to facilitate handset positioning. Posterior to the N-F line, the thickness of the phantom shell with the shape of an ear is a flat surface 6 mm thick at the ERPs.

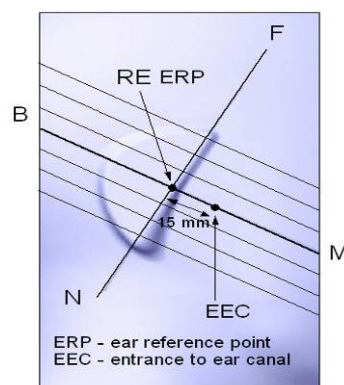


**Figure 5.2 Close up side view**

### 5.2 “cheek” Position

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The test device was placed in a normal operating position with the “test device reference point” located along the “vertical centerline” on the front of the device aligned to the “ear reference point” (see Fig. 5.4). The “test device reference point” was then located at the same level as the center of the ear reference point. The test device was positioned so that the “vertical centerline” was bisecting the front surface of the handset at its tip and bottom edges, positioning the “ear reference point” on the outer surface of the both the left and right head

|                                                                                                                    |                          |                                                 |              |              |
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phantoms on the ear reference point

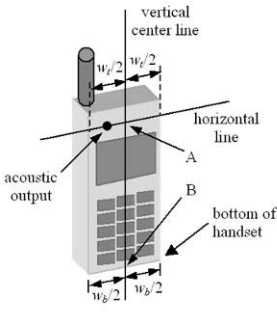


**Figure 5.4 Handset vertical and horizontal reference lines**

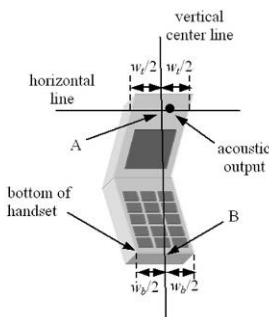
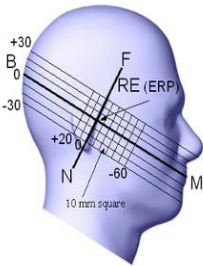


**Figure 5.3 Side view of the phantom showing relevant markings**



**Step 1**

The test device was positioned with the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 5.5), such that the plane defined by the vertical center line and the horizontal line of the phone is approximately parallel to the sagittal plane of the phantom

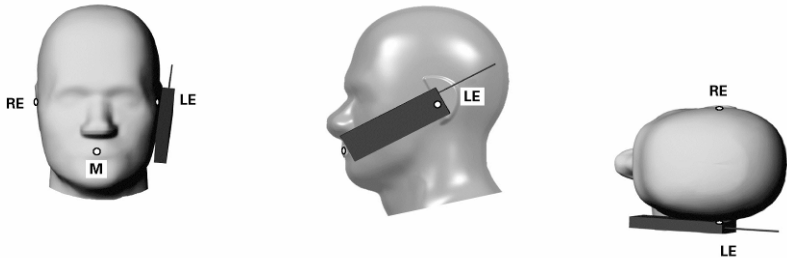


**Figure 5.5 Front, Side and Top View of Cheek/Touch Position**

**Step 2**

The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the ear.

**Step 3**

While maintaining the handset in this plane, the handset was rotated around the LE-RE line until the vertical centerline was in the plane normal to MB-NF including the line MB (reference plane).

|                                                                                                                    |                          |                                                 |              |              |
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#### Step 4

Rotate the handset around the vertical centerline until the phone (horizontal line) was symmetrical with respect to the line NF.

#### Step 5

While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the phone contact with the ear, the handset was rotated about the line NF until any point on the handset made contact with a phantom point below the ear (cheek). See Figure 5.2.

### 5.3 “tilted” Position

With the test device aligned in the “cheek” position :

#### Step 1

Repeat steps 1 to 5 of 5.2 to place the device in the “Cheek/Touch Position”

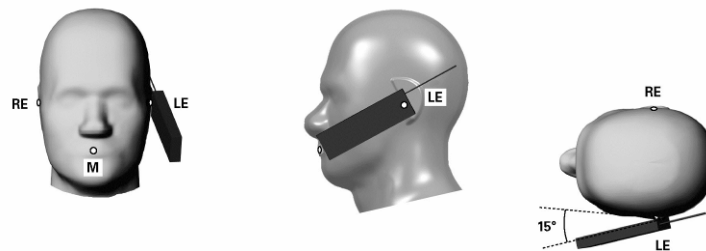


**Figure 5.6 Front, side and Top View of Ear/Tilt 15° Position**

#### Step 2

While maintaining the orientation of the phone, the phone was retracted parallel to the reference plane far enough to enable a rotation of the phone by 15 degree.

#### Step 3

The phone was then rotated around the horizontal line by 15 degree.

#### Step 4

While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the phone touches the head. (In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced. The tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head.

|                                                                                                                    |                          |                                                 |              |              |
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5.4 Body Configurations for Single TX SAR considerations

5.4.1 Transmit Antenna Separation Distances

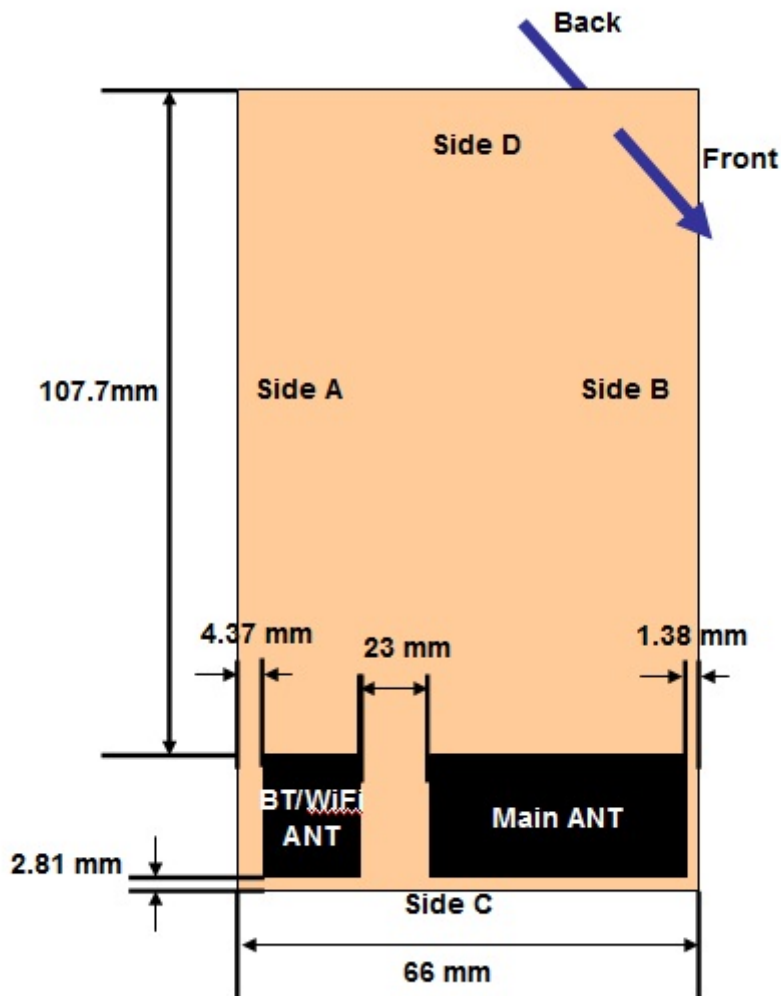


Figure 5.7 Antenna Locations, as viewed from front of device

Note : Per Oct 2010 TCB FCC Workshop, the edges with antennas within 2.5Cm are required to be evaluated for SAR

Table 5.1 Mobile Hotspot Sides for SAR Testing

| Mode    | Back | Front | Side A | Side B | Side C | Side D |
|---------|------|-------|--------|--------|--------|--------|
| GSM1900 | Yes  | Yes   | No     | Yes    | Yes    | No     |
| WLAN    | Yes  | Yes   | Yes    | No     | Yes    | No     |

|                                                                                                                    |                          |                                                 |              |              |
|--------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------|--------------|--------------|
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## 6. MEASUREMENT UNCERTAINTY

**Table 6.1 Uncertainty Budget at 1900MHz**

| Error Description                            | Uncertainty Value (±%) | Probability Distribution | Divisor | C <sub>i</sub> | Standard uncertainty (±%) | $v_i^2$ or $v_{eff}$ |
|----------------------------------------------|------------------------|--------------------------|---------|----------------|---------------------------|----------------------|
| <b>Measurement System</b>                    |                        |                          |         |                |                           |                      |
| Probe Calibration                            | 12.00                  | normal                   | 2.000   | 1              | 6.00                      | ∞                    |
| Axial Isotropy                               | 4.70                   | rectangular              | 1.732   | 0.7            | 1.90                      | ∞                    |
| Hemispherical Isotropy                       | 9.60                   | rectangular              | 1.732   | 0.7            | 3.88                      | ∞                    |
| Linearity                                    | 4.70                   | rectangular              | 1.732   | 1              | 2.71                      | ∞                    |
| System Detection Limits                      | 0.25                   | rectangular              | 1.732   | 1              | 0.14                      | ∞                    |
| Boundary effects                             | 1.00                   | rectangular              | 1.732   | 1              | 0.58                      | ∞                    |
| Readout electronics                          | 0.30                   | normal                   | 1.000   | 1              | 0.30                      | ∞                    |
| Response time                                | 0.80                   | rectangular              | 1.732   | 1              | 0.46                      | ∞                    |
| RF ambient conditions                        | 3.00                   | rectangular              | 1.732   | 1              | 1.73                      | ∞                    |
| Integration time                             | 0.00                   | rectangular              | 1.732   | 1              | 0.00                      | ∞                    |
| Mechanical constrains of robot               | 1.50                   | rectangular              | 1.732   | 1              | 0.87                      | ∞                    |
| Probe positioning                            | 2.90                   | rectangular              | 1.732   | 1              | 1.67                      | ∞                    |
| Extrapolation and integration                | 1.00                   | rectangular              | 1.732   | 1              | 0.58                      | ∞                    |
| <b>Test Sample Related</b>                   |                        |                          |         |                |                           |                      |
| Test Sample positioning                      | 1.50                   | normal                   | 1.000   | 1              | 1.50                      | 14                   |
| Device holded uncertainty                    | 3.44                   | normal                   | 1.000   | 1              | 3.44                      | ∞                    |
| Power Drift                                  | 5.00                   | rectangular              | 1.732   | 1              | 2.89                      | ∞                    |
| <b>Phantom and Setup</b>                     |                        |                          |         |                |                           |                      |
| Modular Phantom uncertainty                  | 6.02                   | normal                   | 1.000   | 1              | 6.02                      | 2                    |
| Phantom uncertainty                          | 4.00                   | rectangular              | 1.732   | 1              | 2.31                      | ∞                    |
| Liquid conductivity (deviation from target)  | 5.00                   | rectangular              | 1.732   | 0.64           | 1.85                      | ∞                    |
| Liquid conductivity (measurement error)      | 1.84                   | normal                   | 1.000   | 0.64           | 1.18                      | ∞                    |
| Liquid permittivity (deviation from target)  | 5.00                   | rectangular              | 1.732   | 0.6            | 1.73                      | ∞                    |
| Liquid permittivity (measurement error)      | 4.54                   | normal                   | 1.000   | 0.6            | 2.73                      | ∞                    |
| <b>Combined Standard Uncertainty</b>         |                        | Normal                   | -       | -              | <b>12.24</b>              | <b>62037</b>         |
| <b>Extended Standard Uncertainty(K=2.00)</b> |                        |                          |         |                | <b>24.48</b>              | <b>62037</b>         |

|                                                                                                                    |                          |                                                 |              |              |
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**Table 6.2 Uncertainty Budget at 2450MHz**

| Error Description                            | Uncertainty Value ( $\pm\%$ ) | Probability Distribution | Divisor | $C_i$ | Standard uncertainty ( $\pm\%$ ) | $v_i^2$ or $v_{eff}$ |
|----------------------------------------------|-------------------------------|--------------------------|---------|-------|----------------------------------|----------------------|
| <b>Measurement System</b>                    |                               |                          |         |       |                                  |                      |
| Probe Calibration                            | 12.00                         | normal                   | 2.000   | 1     | 6.00                             | $\infty$             |
| Axial Isotropy                               | 4.70                          | rectangular              | 1.732   | 0.7   | 1.90                             | $\infty$             |
| Hemispherical Isotropy                       | 9.60                          | rectangular              | 1.732   | 0.7   | 3.88                             | $\infty$             |
| Linearity                                    | 4.70                          | rectangular              | 1.732   | 1     | 2.71                             | $\infty$             |
| System Detection Limits                      | 0.25                          | rectangular              | 1.732   | 1     | 0.14                             | $\infty$             |
| Boundary effects                             | 1.00                          | rectangular              | 1.732   | 1     | 0.58                             | $\infty$             |
| Readout electronics                          | 0.30                          | normal                   | 1.000   | 1     | 0.30                             | $\infty$             |
| Response time                                | 0.80                          | rectangular              | 1.732   | 1     | 0.46                             | $\infty$             |
| RF ambient conditions                        | 3.00                          | rectangular              | 1.732   | 1     | 1.73                             | $\infty$             |
| Integration time                             | 0.00                          | rectangular              | 1.732   | 1     | 0.00                             | $\infty$             |
| Mechanical constrains of robot               | 1.50                          | rectangular              | 1.732   | 1     | 0.87                             | $\infty$             |
| Probe positioning                            | 2.90                          | rectangular              | 1.732   | 1     | 1.67                             | $\infty$             |
| Extrapolation and integration                | 1.00                          | rectangular              | 1.732   | 1     | 0.58                             | $\infty$             |
| <b>Test Sample Related</b>                   |                               |                          |         |       |                                  |                      |
| Test Sample positioning                      | 4.22                          | normal                   | 1.000   | 1     | 4.22                             | 14                   |
| Device holded uncertainty                    | 3.44                          | normal                   | 1.000   | 1     | 3.44                             | $\infty$             |
| Power Drift                                  | 5.00                          | rectangular              | 1.732   | 1     | 2.89                             | $\infty$             |
| <b>Phantom and Setup</b>                     |                               |                          |         |       |                                  |                      |
| Modular Phantom uncertainty                  | 2.32                          | Normal                   | 1.0001  | 1     | 2.32                             | 2                    |
| Phantom uncertainty                          | 4.00                          | rectangular              | 1.732   | 1     | 2.31                             | $\infty$             |
| Liquid conductivity (deviation from target)  | 5.00                          | rectangular              | 1.732   | 0.64  | 1.85                             | $\infty$             |
| Liquid conductivity (measurement error)      | 2.04                          | normal                   | 1.000   | 0.64  | 1.30                             | $\infty$             |
| Liquid permittivity (deviation from target)  | 5.00                          | rectangular              | 1.732   | 0.6   | 1.73                             | $\infty$             |
| Liquid permittivity (measurement error)      | 4.27                          | normal                   | 1.000   | 0.6   | 2.56                             | $\infty$             |
| <b>Combined Standard Uncertainty</b>         |                               | Normal                   | -       | -     | <b>11.57</b>                     | <b>792</b>           |
| <b>Extended Standard Uncertainty(K=2.00)</b> |                               |                          |         |       | <b>23.15</b>                     | <b>792</b>           |

|                                                                                                                    |                          |                                                 |              |              |
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**Table 6.3 Uncertainty Budget at 5800MHz**

| Error Description                            | Uncertainty Value ( $\pm\%$ ) | Probability Distribution | Divisor | $C_i$ | Standard uncertainty ( $\pm\%$ ) | $v_i^2$ or $v_{eff}$ |
|----------------------------------------------|-------------------------------|--------------------------|---------|-------|----------------------------------|----------------------|
| <b>Measurement System</b>                    |                               |                          |         |       |                                  |                      |
| Probe Calibration                            | 13.1                          | normal                   | 2.000   | 1     | 6.55                             | $\infty$             |
| Axial Isotropy                               | 4.70                          | rectangular              | 1.732   | 0.7   | 1.90                             | $\infty$             |
| Hemispherical Isotropy                       | 9.60                          | rectangular              | 1.732   | 0.7   | 3.88                             | $\infty$             |
| Linearity                                    | 4.70                          | rectangular              | 1.732   | 1     | 2.71                             | $\infty$             |
| System Detection Limits                      | 0.25                          | rectangular              | 1.732   | 1     | 0.14                             | $\infty$             |
| Boundary effects                             | 1.00                          | rectangular              | 1.732   | 1     | 0.58                             | $\infty$             |
| Readout electronics                          | 0.30                          | normal                   | 1.000   | 1     | 0.30                             | $\infty$             |
| Response time                                | 0.80                          | rectangular              | 1.732   | 1     | 0.46                             | $\infty$             |
| RF ambient conditions                        | 3.00                          | rectangular              | 1.732   | 1     | 1.73                             | $\infty$             |
| Integration time                             | 0.00                          | rectangular              | 1.732   | 1     | 0.00                             | $\infty$             |
| Mechanical constrains of robot               | 1.50                          | rectangular              | 1.732   | 1     | 0.87                             | $\infty$             |
| Probe positioning                            | 2.90                          | rectangular              | 1.732   | 1     | 1.67                             | $\infty$             |
| Extrapolation and integration                | 1.00                          | rectangular              | 1.732   | 1     | 0.58                             | $\infty$             |
| <b>Test Sample Related</b>                   |                               |                          |         |       |                                  |                      |
| Test Sample positioning                      | 4.22                          | normal                   | 1.000   | 1     | 4.22                             | 14                   |
| Device holded uncertainty                    | 3.44                          | normal                   | 1.000   | 1     | 3.44                             | $\infty$             |
| Power Drift                                  | 5.00                          | rectangular              | 1.732   | 1     | 2.89                             | $\infty$             |
| <b>Phantom and Setup</b>                     |                               |                          |         |       |                                  |                      |
| Modular Phantom uncertainty                  | 2.32                          | Normal                   | 1.0001  | 1     | 2.32                             | 2                    |
| Phantom uncertainty                          | 4.00                          | rectangular              | 1.732   | 1     | 2.31                             | $\infty$             |
| Liquid conductivity (deviation from target)  | 5.00                          | rectangular              | 1.732   | 0.64  | 1.85                             | $\infty$             |
| Liquid conductivity (measurement error)      | 1.12                          | normal                   | 1.000   | 0.64  | 1.30                             | $\infty$             |
| Liquid permittivity (deviation from target)  | 5.00                          | rectangular              | 1.732   | 0.6   | 1.73                             | $\infty$             |
| Liquid permittivity (measurement error)      | 3.06                          | normal                   | 1.000   | 0.6   | 2.56                             | $\infty$             |
| <b>Combined Standard Uncertainty</b>         |                               | Normal                   | -       | -     | <b>11.68</b>                     | <b>822</b>           |
| <b>Extended Standard Uncertainty(K=2.00)</b> |                               |                          |         |       | <b>23.36</b>                     | <b>822</b>           |

|                                                                                                                    |                          |                                                 |              |              |
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## 7. SYSTEM VERIFICATION

### 7.1 Tissue Verification

**Table 7.1 MEASURED TISSUE PARAMETERS(5GHz Head)**

| Tissue Type | Calibrated for Tests Performed on | Measured Frequency (MHz) | Measured Dielectric Constant | Measured Dielectric Constant | Measured Conductivity (S/m) | Target Dielectric Constant | Target Conductivity (S/m) | Dielectric Constant Dev(%) | Conductivity Dev(%) |
|-------------|-----------------------------------|--------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|----------------------------|---------------------|
| 5200~5800H  | 07/28/2011                        | 5170                     | 34.71                        | 34.71                        | 4.81                        | 36.03                      | 4.629                     | 3.80%                      | -3.76%              |
|             |                                   | 5210                     | 34.63                        | 34.63                        | 4.86                        | 35.99                      | 4.67                      | 3.93%                      | -3.91%              |
|             |                                   | 5250                     | 34.56                        | 34.56                        | 4.85                        | 35.95                      | 4.71                      | 4.02%                      | -2.89%              |
|             |                                   | 5270                     | 34.52                        | 34.52                        | 4.93                        | 35.93                      | 4.73                      | 4.08%                      | -4.06%              |
|             |                                   | 5310                     | 35.05                        | 35.05                        | 4.86                        | 35.89                      | 4.77                      | 2.40%                      | -1.85%              |
|             |                                   | 5350                     | 34.34                        | 34.34                        | 5.02                        | 35.85                      | 4.81                      | 4.40%                      | -4.18%              |
|             |                                   | 5470                     | 34.97                        | 34.97                        | 5.16                        | 35.695                     | 4.934                     | 2.07%                      | -4.38%              |
|             |                                   | 5510                     | 34.88                        | 34.88                        | 5.06                        | 35.635                     | 4.976                     | 2.16%                      | -1.66%              |
|             |                                   | 5550                     | 34.80                        | 34.80                        | 5.26                        | 35.575                     | 5.018                     | 2.23%                      | -4.60%              |
|             |                                   | 5570                     | 34.77                        | 34.77                        | 5.29                        | 35.545                     | 5.039                     | 2.23%                      | -4.74%              |
|             |                                   | 5610                     | 34.67                        | 34.67                        | 5.34                        | 35.49                      | 5.08                      | 2.37%                      | -4.87%              |
|             |                                   | 5650                     | 34.59                        | 34.59                        | 5.31                        | 35.45                      | 5.12                      | 2.49%                      | -3.71%              |
|             |                                   | 5670                     | 34.74                        | 34.74                        | 5.32                        | 35.43                      | 5.14                      | 1.99%                      | -3.38%              |
|             |                                   | 5710                     | 34.68                        | 34.68                        | 5.37                        | 35.39                      | 5.18                      | 2.05%                      | -3.54%              |
|             |                                   | 5750                     | 34.63                        | 34.63                        | 5.41                        | 35.35                      | 5.22                      | 2.08%                      | -3.51%              |
|             |                                   | 5770                     | 34.57                        | 34.57                        | 5.42                        | 35.33                      | 5.24                      | 2.20%                      | -3.32%              |
|             |                                   | 5810                     | 34.49                        | 34.49                        | 5.48                        | 35.29                      | 5.281                     | 2.32%                      | -3.63%              |
|             |                                   | 5850                     | 34.43                        | 34.43                        | 5.52                        | 35.25                      | 5.323                     | 2.38%                      | -3.57%              |

|                                                                                                                    |                          |                                                 |              |              |
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**Table 7.2 MEASURED TISSUE PARAMETERS(5GHz Body)**

| Tissue Type | Calibrated for Tests Performed on | Measured Frequency (MHz) | Measured Dielectric Constant | Measured Conductivity (S/m) | Target Dielectric Constant | Target Conductivity (S/m) | Dielectric Constant Dev(%) | Conductivity Dev(%) |
|-------------|-----------------------------------|--------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|----------------------------|---------------------|
| 5200~5800B  | 06/27/2011                        | 5170                     | 48.39                        | 5.45                        | 49.055                     | 5.264                     | -1.36%                     | 3.53%               |
|             |                                   | 5210                     | 48.21                        | 5.51                        | 49.001                     | 5.311                     | -1.61%                     | 3.75%               |
|             |                                   | 5250                     | 48.13                        | 5.56                        | 48.946                     | 5.358                     | -1.67%                     | 3.77%               |
|             |                                   | 5270                     | 48.1                         | 5.59                        | 48.919                     | 5.381                     | -1.67%                     | 3.88%               |
|             |                                   | 5310                     | 47.98                        | 5.64                        | 48.865                     | 5.428                     | -1.81%                     | 3.91%               |
|             |                                   | 5350                     | 47.89                        | 5.69                        | 48.811                     | 5.47                      | -1.89%                     | 4.02%               |
|             |                                   | 5470                     | 47.19                        | 5.65                        | 48.648                     | 5.615                     | -3.00%                     | 0.62%               |
|             |                                   | 5510                     | 47.12                        | 5.69                        | 48.594                     | 5.661                     | -3.03%                     | 0.51%               |
|             |                                   | 5550                     | 47.02                        | 5.75                        | 48.539                     | 5.708                     | -3.13%                     | 0.74%               |
|             |                                   | 5570                     | 47.98                        | 5.77                        | 48.512                     | 5.731                     | -1.10%                     | 0.68%               |
|             |                                   | 5610                     | 46.89                        | 5.82                        | 48.458                     | 5.778                     | -3.24%                     | 0.73%               |
|             |                                   | 5650                     | 46.81                        | 5.87                        | 48.404                     | 5.825                     | -3.29%                     | 0.77%               |
|             |                                   | 5670                     | 46.17                        | 5.73                        | 48.376                     | 5.848                     | -4.56%                     | -2.02%              |
|             |                                   | 5710                     | 46.17                        | 5.79                        | 48.322                     | 5.895                     | -4.45%                     | -1.78%              |
|             |                                   | 5750                     | 46.09                        | 5.85                        | 48.268                     | 5.942                     | -4.51%                     | -1.55%              |
|             |                                   | 5770                     | 46.07                        | 5.88                        | 48.241                     | 5.965                     | -4.50%                     | -1.42%              |
|             |                                   | 5810                     | 46                           | 5.93                        | 48.186                     | 6.012                     | -4.54%                     | -1.36%              |
|             |                                   | 5850                     | 45.92                        | 5.98                        | 48.132                     | 6.058                     | -4.60%                     | -1.29%              |

**Table 7.3 MEASURED TISSUE PARAMETERS(2450MHz,1900MHz)**

|                                  | 1900MHzHead |          | 1900MHzBody |          | 2450MHzHead |          | 2450MHzBody |          |
|----------------------------------|-------------|----------|-------------|----------|-------------|----------|-------------|----------|
|                                  | Target      | Measured | Target      | Measured | Target      | Measured | Target      | Measured |
| Date                             | Jun22,2011  |          | Jun22,2011  |          | Jun.18,2011 |          | Jun.18,2011 |          |
| Liquid Temperature(°C)           | 21.9        |          | 22.1        |          | 21.9        |          | 21.8        |          |
| Dielectric Constant: $\epsilon'$ | 40          | 39.6     | 53.3        | 52.1     | 39.2        | 38       | 52.7        | 51.9     |
| Conductivity:                    | 1.4         | 1.36     | 1.52        | 1.55     | 1.8         | 1.86     | 1.95        | 2.03     |
| Tissue Batch Number              | 1900F3001P  |          | 1900B1001Q  |          | 2450MF1001Y |          | 2450B2001A  |          |

The measured value must be within  $\pm 5\%$  of the target value.

|                                                                                                                    |                          |                                                 |              |              |
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## 7.2 Test System Validation

Prior to assessment, the system is verified to the  $\pm 10\%$  of the specification at 1900MHz, 2450MHz, 5200MHz, 5500MHz and 5800MHz by using the system validation kit(s).  
(see Appendix E, Graphic Plot Attached)

**Table 7.2 System Validation Results**

| System Validation Kit | Tissue         | Targeted SAR <sub>1g</sub> (mW/g) | Normalized SAR <sub>1g</sub> (mW/g) | Measured SAR <sub>1g</sub> (mW/g) | Deviation (%) | Date         | Liquid Temperature(°C) | Ambient Temperature(°C) | Input Power (mW) |
|-----------------------|----------------|-----------------------------------|-------------------------------------|-----------------------------------|---------------|--------------|------------------------|-------------------------|------------------|
| 5d082                 | 1900MHz Brain  | 41.4                              | 41.4                                | 4.14                              | 0             | Jun.22, 2011 | 21.9                   | 22.3                    | 100              |
| 5d082                 | 1900MHz Muscle | 40.7                              | 40.3                                | 4.03                              | -0.98         | Jun.22, 2011 | 22.1                   | 22.6                    | 100              |
| 807                   | 2450MHz Brain  | 54.4                              | 54.8                                | 5.48                              | 0.74          | Jun.18, 2011 | 21.9                   | 22.0                    | 100              |
| 807                   | 2450MHz Muscle | 51.1                              | 51.2                                | 5.12                              | 0.20          | Jun.18, 2011 | 21.8                   | 22.0                    | 100              |
| 1099                  | 5200MHz Brain  | 82.6                              | 81.0                                | 1.62                              | -1.93         | Jul.28, 2011 | 21.9                   | 22.3                    | 20               |
| 1099                  | 5200MHz Muscle | 75.6                              | 75.6                                | 1.53                              | 1.19          | Jul.28, 2011 | 21.9                   | 22.3                    | 20               |
| 1099                  | 5500MHz Brain  | 88.9                              | 93                                  | 1.86                              | 4.61          | Jul.28, 2011 | 21.9                   | 22.3                    | 20               |
| 1099                  | 5500MHz Muscle | 80.5                              | 80.5                                | 1.61                              | 0             | Jul.28, 2011 | 21.9                   | 22.3                    | 20               |
| 1099                  | 5800MHz Brain  | 82.6                              | 80.5                                | 1.61                              | -2.54         | Jul.28, 2011 | 21.9                   | 22.3                    | 20               |
| 1099                  | 5800MHz Muscle | 75.1                              | 71                                  | 1.42                              | 5.46          | Jul.28, 2011 | 21.9                   | 22.3                    | 20               |

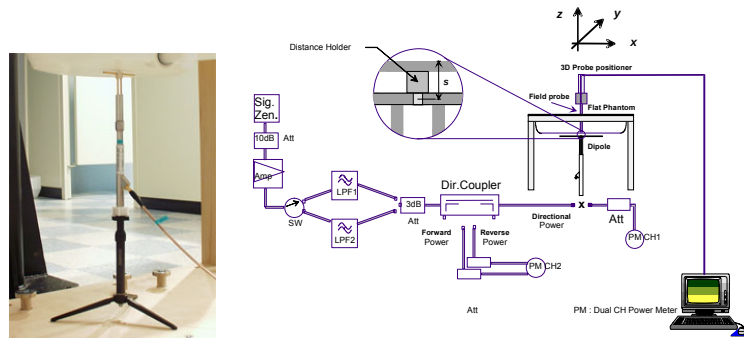


**Figure 7.1 Dipole Validation Test Setup**

|                                                                                                                    |                          |                                                 |              |              |
|--------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------|--------------|--------------|
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## 8. SAR MEASUREMENT RESULTS

### Procedures Used To Establish Test Signal

The handset was placed into simulated call mode using base station simulator. Such test signals offer a consistent means for testing SAR and are recommended for evaluating SAR. When test modes are not available or inappropriate for testing a handset, the actual transmission is activated through a base station simulator or similar equipment. See data pages for actual procedure used in measurement.

### Device Test Conditions

The handset is battery operated. Each SAR measurement was taken with a fully charged battery. In order to verify that the device was tested at full power, conducted output power measurements were performed before and after each SAR measurement to confirm the output power. If a conducted power deviation of more than 5% occurred, the test was repeated. And all Tx(1~4Tx) conducted power were also investigated for Body-Worn SAR Measurement. In case of EGPRS, CP chipset doesn't support 3Tx and 4Tx slot unlike GPRS.

**Table 8.1 GPRS Power Table for GT-I9108**

|         |     | Maximum Burst-Averaged Output Power    |           |          |          |          |           |          |
|---------|-----|----------------------------------------|-----------|----------|----------|----------|-----------|----------|
|         |     | Voice(dBm)                             | GPRS(dBm) |          |          |          | EDGE(dBm) |          |
|         |     |                                        | 1Tx slot  | 2Tx slot | 3Tx slot | 4Tx slot | 1Tx slot  | 2Tx slot |
| GSM1900 | 512 | 29.1                                   | 29.1      | 29.1     | 26.1     | 26.06    | 27.23     | 25.78    |
|         | 661 | 29.23                                  | 29.23     | 29.2     | 26.2     | 26.15    | 26.77     | 25.65    |
|         | 810 | 29.27                                  | 29.27     | 29.25    | 26.24    | 26.2     | 27.25     | 25.37    |
|         |     | Calculated Frame-Averaged Output Power |           |          |          |          |           |          |
|         |     | Voice(dBm)                             | GPRS(dBm) |          |          |          | EDGE(dBm) |          |
|         |     |                                        | 1Tx slot  | 2Tx slot | 3Tx slot | 4Tx slot | 1Tx slot  | 2Tx slot |
| GSM1900 | 512 | 20.07                                  | 20.07     | 23.08    | 21.84    | 23.05    | 18.20     | 19.76    |
|         | 661 | 20.20                                  | 20.20     | 23.18    | 21.94    | 23.14    | 17.74     | 19.63    |
|         | 810 | 20.24                                  | 20.24     | 23.23    | 21.98    | 23.19    | 18.22     | 19.35    |

|                                                                                                                    |                          |                                                 |              |              |
|--------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------|--------------|--------------|
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**Table 8.2 IEEE 802.11b Average RF Power**

| Mode    | Frequency<br>[MHz] | Channel | Conducted Power[dBm] |       |       |       |
|---------|--------------------|---------|----------------------|-------|-------|-------|
|         |                    |         | Data Rate [Mbps]     |       |       |       |
|         |                    |         | 1                    | 2     | 5.5   | 11    |
| 802.11b | 2412               | 1       | 16.68                | 16.69 | 16.71 | 16.75 |
| 802.11b | 2437               | 6       | 16.98                | 16.84 | 17.02 | 16.99 |
| 802.11b | 2462               | 11      | 17.08                | 17.08 | 17.16 | 17.17 |

**Table 8.3 IEEE 802.11g Average RF Power**

| Mode    | Frequency<br>[MHz] | Channel | Conducted Power[dBm] |       |       |       |       |       |       |       |
|---------|--------------------|---------|----------------------|-------|-------|-------|-------|-------|-------|-------|
|         |                    |         | Data Rate [Mbps]     |       |       |       |       |       |       |       |
|         |                    |         | 6                    | 9     | 12    | 18    | 24    | 36    | 48    | 54    |
| 802.11g | 2412               | 1       | 11.25                | 11.22 | 11.29 | 11.30 | 11.40 | 11.35 | 11.32 | 11.25 |
| 802.11g | 2437               | 6       | 11.55                | 11.54 | 11.62 | 11.65 | 11.56 | 11.55 | 11.62 | 11.60 |
| 802.11g | 2462               | 11      | 11.62                | 11.65 | 11.59 | 11.60 | 11.60 | 11.62 | 11.60 | 11.60 |

**Table 8.3 IEEE 802.11n Average RF Power**

| Mode    | Frequency<br>[MHz] | Channel | Conducted Power[dBm] |       |       |        |       |       |       |       |
|---------|--------------------|---------|----------------------|-------|-------|--------|-------|-------|-------|-------|
|         |                    |         | Data Rate [Mbps]     |       |       |        |       |       |       |       |
|         |                    |         | 6.5                  | 13    | 20    | 26     | 39    | 52    | 58    | 65    |
| 802.11g | 2412               | 1       | 12.18                | 12.21 | 12.15 | 12.16  | 12.14 | 12.04 | 12.12 | 12.19 |
| 802.11g | 2437               | 6       | 12.36                | 12.34 | 12.32 | 12.33  | 12.31 | 12.34 | 12.38 | 12.32 |
| 802.11g | 2462               | 11      | 12.36                | 12.32 | 12.37 | 12.247 | 12.33 | 12.31 | 12.36 | 12.39 |

**Table 8.4 IEEE 802.11a Average RF Power**

| Mode    | Freq<br>[MHz] | Channel | Conducted Power [dBm] |       |       |       |       |        |       |       |
|---------|---------------|---------|-----------------------|-------|-------|-------|-------|--------|-------|-------|
|         |               |         | Data Rate [Mbps]      |       |       |       |       |        |       |       |
|         |               |         | 6                     | 9     | 12    | 18    | 24    | 36     | 48    | 54    |
| 802.11a | 5180          | 36      | 12.16                 | 12.22 | 12.17 | 12.14 | 12.18 | 12.04  | 12.32 | 12.43 |
| 802.11a | 5200          | 40      | 12.14                 | 12.35 | 12.23 | 12.3  | 12.33 | 12.38  | 12.44 | 12.49 |
| 802.11a | 5220          | 44      | 12.18                 | 12.07 | 12.2  | 12.2  | 12.15 | 12.1   | 12.13 | 12.16 |
| 802.11a | 5240          | 48      | 12.27                 | 12.34 | 12.19 | 12.13 | 12.24 | 12.23  | 12.33 | 12.2  |
| 802.11a | 5260          | 52      | 12.12                 | 12.19 | 12.18 | 12.24 | 12.22 | 12.3   | 12.28 | 12.27 |
| 802.11a | 5280          | 56      | 12.15                 | 12.18 | 12.2  | 12.18 | 12.13 | 12.17  | 12.21 | 12.3  |
| 802.11a | 5300          | 60      | 12.14                 | 12.22 | 12.15 | 12.13 | 12.1  | 12.07  | 12.11 | 12.04 |
| 802.11a | 5320          | 64      | 13.02                 | 12.96 | 13    | 13.11 | 13.1  | 12.8   | 13.11 | 13.17 |
| 802.11a | 5500          | 100     | 12.4                  | 12.37 | 12.46 | 12.42 | 12.43 | 12.43  | 12.47 | 12.49 |
| 802.11a | 5520          | 104     | 12.3                  | 12.33 | 12.28 | 12.32 | 12.37 | 12.34  | 12.33 | 12.36 |
| 802.11a | 5540          | 108     | 12.17                 | 12.24 | 12.21 | 12.23 | 12.26 | 12.249 | 12.28 | 12.23 |
| 802.11a | 5560          | 112     | 12.2                  | 12.16 | 12.11 | 12.14 | 12.17 | 12.15  | 12.27 | 12.29 |
| 802.11a | 5580          | 116     | 11.96                 | 12.04 | 12.06 | 12.03 | 12.1  | 12.07  | 12.18 | 12.06 |
| 802.11a | 5600          | 120     | 11.98                 | 11.99 | 12.03 | 11.97 | 12.01 | 12.06  | 12.11 | 12.03 |
| 802.11a | 5620          | 124     | 11.9                  | 11.97 | 11.95 | 11.98 | 11.99 | 11.94  | 11.97 | 11.98 |
| 802.11a | 5640          | 128     | 11.86                 | 11.84 | 11.88 | 11.91 | 11.94 | 11.93  | 11.98 | 11.89 |
| 802.11a | 5660          | 132     | 11.83                 | 11.81 | 11.78 | 11.81 | 11.83 | 11.9   | 11.87 | 11.84 |
| 802.11a | 5680          | 136     | 11.79                 | 11.71 | 11.74 | 11.71 | 11.81 | 11.77  | 11.83 | 11.79 |
| 802.11a | 5700          | 140     | 11.77                 | 11.78 | 11.73 | 11.8  | 11.76 | 11.74  | 11.68 | 11.83 |
| 802.11a | 5745          | 149     | 11.94                 | 11.94 | 11.96 | 11.9  | 12.01 | 11.86  | 11.98 | 11.91 |
| 802.11a | 5765          | 153     | 11.7                  | 11.77 | 11.7  | 11.66 | 11.61 | 11.48  | 11.6  | 11.59 |
| 802.11a | 5785          | 157     | 11.5                  | 11.38 | 11.57 | 11.44 | 11.58 | 11.53  | 11.42 | 11.44 |
| 802.11a | 5805          | 161     | 12                    | 11.87 | 12.06 | 12.1  | 12.16 | 12.02  | 12.16 | 12.23 |
| 802.11a | 5825          | 165     | 12.15                 | 12.07 | 12.22 | 12.28 | 12.38 | 12.21  | 12.29 | 12.44 |

**Table 8.5 IEEE 802.11n Average RF Power**

| Mode    | Freq<br>[MHz] | Channel | Conducted Power [dBm] |       |       |       |       |       |       |       |
|---------|---------------|---------|-----------------------|-------|-------|-------|-------|-------|-------|-------|
|         |               |         | Data Rate [Mbps]      |       |       |       |       |       |       |       |
|         |               |         | 6.5                   | 13    | 20    | 26    | 39    | 52    | 58    | 65    |
| 802.11n | 5180          | 36      | 9.62                  | 9.61  | 9.66  | 9.69  | 9.72  | 9.85  | 9.71  | 9.76  |
| 802.11n | 5200          | 40      | 9.52                  | 9.56  | 9.62  | 9.68  | 9.61  | 9.63  | 9.64  | 9.65  |
| 802.11n | 5220          | 44      | 9.47                  | 9.51  | 9.56  | 9.58  | 9.50  | 9.59  | 9.65  | 9.69  |
| 802.11n | 5240          | 48      | 9.37                  | 9.42  | 9.49  | 9.48  | 9.51  | 9.44  | 9.46  | 9.57  |
| 802.11n | 5260          | 52      | 10.25                 | 10.27 | 10.36 | 10.32 | 10.35 | 10.42 | 10.43 | 10.44 |
| 802.11n | 5280          | 56      | 10.21                 | 10.16 | 10.18 | 10.31 | 10.35 | 10.36 | 10.28 | 10.32 |
| 802.11n | 5300          | 60      | 10.12                 | 10.14 | 10.15 | 10.19 | 10.25 | 10.22 | 10.21 | 10.23 |
| 802.11n | 5320          | 64      | 10.01                 | 10.06 | 10.03 | 10.07 | 10.15 | 10.13 | 10.14 | 10.15 |
| 802.11n | 5500          | 100     | 9.63                  | 9.68  | 9.62  | 9.74  | 9.70  | 9.71  | 9.72  | 9.71  |
| 802.11n | 5520          | 104     | 9.49                  | 9.54  | 9.59  | 9.53  | 9.52  | 9.60  | 9.59  | 9.58  |
| 802.11n | 5540          | 108     | 9.41                  | 9.40  | 9.39  | 9.44  | 9.50  | 9.43  | 9.48  | 9.52  |
| 802.11n | 5560          | 112     | 9.30                  | 9.29  | 9.33  | 9.28  | 9.34  | 9.35  | 9.38  | 9.37  |
| 802.11n | 5580          | 116     | 9.19                  | 9.26  | 9.23  | 9.20  | 9.29  | 9.33  | 9.31  | 9.28  |
| 802.11n | 5600          | 120     | 9.12                  | 9.09  | 9.13  | 9.14  | 9.21  | 9.22  | 9.29  | 9.26  |
| 802.11n | 5620          | 124     | 9.03                  | 9.10  | 9.13  | 9.11  | 9.12  | 9.15  | 9.16  | 9.13  |
| 802.11n | 5640          | 128     | 8.99                  | 8.87  | 8.78  | 9.00  | 8.92  | 9.01  | 9.09  | 9.08  |
| 802.11n | 5660          | 132     | 8.85                  | 8.87  | 8.92  | 8.91  | 8.93  | 9.02  | 8.97  | 8.99  |
| 802.11n | 5680          | 136     | 8.79                  | 8.83  | 8.86  | 8.83  | 8.91  | 8.90  | 8.87  | 8.94  |
| 802.11n | 5700          | 140     | 8.74                  | 8.82  | 8.84  | 8.83  | 8.88  | 8.89  | 8.85  | 8.91  |
| 802.11n | 5745          | 149     | 12.07                 | 12.09 | 12.11 | 12.09 | 12.16 | 12.11 | 12.13 | 12.15 |
| 802.11n | 5765          | 153     | 12.00                 | 12.08 | 12.09 | 12.11 | 12.10 | 12.17 | 12.18 | 12.19 |
| 802.11n | 5785          | 157     | 12.11                 | 12.16 | 12.10 | 12.13 | 12.14 | 12.17 | 12.19 | 12.17 |
| 802.11n | 5805          | 161     | 12.12                 | 12.14 | 12.18 | 12.17 | 12.19 | 12.20 | 12.22 | 12.21 |
| 802.11n | 5825          | 165     | 12.14                 | 12.17 | 12.21 | 12.22 | 12.16 | 12.24 | 12.23 | 12.21 |

## Simultaneous Transmission

Refer to the FCC OET document, 'SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas' (Feb 2008)

**Table 8.6 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 |      |             |             |     |

**Table 8.7 Summary of SAR Evaluation Requirements for Cell phones with Multiple Transmitters**

|                         | Individual Transmitter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Simultaneous Transmission                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Licensed Transmitters   | <u>Routine evaluation required</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p><b>SAR not required:</b></p> <p><u>Unlicensed only</u></p> <ul style="list-style-type: none"> <li>o when stand-alone 1-g SAR is not required and antenna is &gt; 5 cm from other antennas</li> </ul> <p><u>Licensed &amp; Unlicensed</u></p> <ul style="list-style-type: none"> <li>o when the sum of the 1-g SAR is &lt;1.6 W/kg for all simultaneous transmitting antennas</li> <li>o when SAR to antenna separation ratio of simultaneous transmitting antenna pair is &lt; 0.3</li> </ul> |
| Unlicensed Transmitters | <p><b>When there is no simultaneous transmission –</b></p> <ul style="list-style-type: none"> <li>o output &lt; 60/f: SAR not required</li> <li>o output ≥ 60/f: stand-alone SAR required</li> </ul> <p><b>When there is simultaneous transmission –</b></p> <p><u>Stand-alone SAR not required when</u></p> <ul style="list-style-type: none"> <li>o output ≤ 2.P<sub>Ref</sub> and antenna is &gt; 5.0 cm from other antennas</li> <li>o output ≤ P<sub>Ref</sub> and antenna is ≥ 2.5 cm from other antennas</li> <li>o output ≤ P<sub>Ref</sub> and antenna is &lt; 2.5 cm from other antennas, each with either output power ≤ P<sub>Ref</sub> or 1-g SAR &lt; 1.2 W/kg</li> </ul> <p><u>Otherwise stand-alone SAR is required</u></p> <p><b>When stand-alone SAR is required</b></p> <ul style="list-style-type: none"> <li>o test SAR on highest output channel for each wireless mode and exposure condition</li> <li>o if SAR for highest output channel is &gt; 50% of SAR limit, evaluate all channels according to normal procedures</li> </ul> | <p><b>SAR required:</b></p> <p><u>Licensed &amp; Unlicensed</u></p> <p>antenna pairs with SAR to antenna separation ratio ≥ 0.3; test is only required for the configuration that results in the highest SAR in standalone configuration for each wireless mode and exposure condition</p> <p>Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply</p>                            |

|                                                                                                                    |                          |                                                 |              |              |
|--------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------|--------------|--------------|
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**Table 8.8 Simultaneous Transmission Scenario (Head to Ear)**

| Simult Tx | Configuration | GSM1900<br>SAR(W/Kg) | WIFI 2.4 GHz<br>SAR(W/Kg) | $\Sigma$ SAR(W/Kg) |
|-----------|---------------|----------------------|---------------------------|--------------------|
| Head SAR  | Right Cheek   | 0.079                | 0.080                     | 0.159              |
|           | Right Tilt    | 0.013                | 0.061                     | 0.074              |
|           | Left Cheek    | 0.077                | 0.165                     | 0.242              |
|           | Left Tilt     | 0.021                | 0.033                     | 0.054              |
| Simult Tx | Configuration | GSM1900<br>SAR(W/Kg) | WIFI 5GHz<br>SAR(W/Kg)    | $\Sigma$ SAR(W/Kg) |
| Head SAR  | Right Cheek   | 0.079                | 0.139                     | 0.218              |
|           | Right Tilt    | 0.013                | 0.062                     | 0.075              |
|           | Left Cheek    | 0.077                | 0.151                     | 0.228              |
|           | Left Tilt     | 0.021                | 0.025                     | 0.046              |

**Table 8.9 Simultaneous Transmission Scenario in Hotspot mode**

| Simult Tx | Configuration | GSM1900<br>SAR(W/Kg) | WIFI 2.4 GHz<br>SAR(W/Kg) | $\Sigma$ SAR(W/Kg) |
|-----------|---------------|----------------------|---------------------------|--------------------|
| Body SAR  | Back          | 0.377                | 0.092                     | 0.469              |
|           | Front         | 0.160                | 0.104                     | 0.264              |
|           | Side A        | -                    | 0.075                     | 0.075              |
|           | Side B        | 0.111                | -                         | 0.111              |
|           | Side C        | 0.439                | 0.064                     | 0.503              |
|           | Side D        | -                    | -                         | -                  |

Note : “-“SAR Result shown in the table are zero for summation purposes. SAR was not required to be measured due to exclusions mentioned in Section 5.4. WIFI 5 GHz is disabled in hotspot mode.

### Conclusion

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 per FCC KDB Publication 648474 since the numerical sums are below the limit.

Based on the output power, antenna separation distance, and Body SAR, a stand-alone BT SAR test is not required. The summation of BT SAR and Licensed Transmitter SAR is  $0.439 + 0 = 0.439$ , which is less than 1.6 W/Kg, therefore, a simultaneous SAR evaluation is not required.

|                                                                                                                    |                          |                                                 |              |              |
|--------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------|--------------|--------------|
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## 8.1 GSM1900 Head SAR Results

| Frequency                                                                                           |     | Mode    | Conducted |       | Side  | Test Position                          | Antenna Type | Battery  | SAR Level (W/kg) | Power Drift(dB) |
|-----------------------------------------------------------------------------------------------------|-----|---------|-----------|-------|-------|----------------------------------------|--------------|----------|------------------|-----------------|
| MHz                                                                                                 | Ch  |         | Start     | End   |       |                                        |              |          |                  |                 |
| 1880                                                                                                | 661 | GSM1900 | 29.24     | 29.31 | Right | Cheek/Touch                            | Intenna      | Standard | <b>0.079</b>     | 0.110           |
| 1880                                                                                                | 661 | GSM1900 | 29.27     | 29.35 | Right | Ear/Tilt 15°                           | Intenna      | Standard | 0.013            | 0.0062          |
| 1880                                                                                                | 661 | GSM1900 | 29.14     | 29.17 | Left  | Cheek/Touch                            | Intenna      | Standard | 0.077            | 0.181           |
| 1880                                                                                                | 661 | GSM1900 | 29.28     | 29.31 | Left  | Ear/Tilt 15°                           | Intenna      | Standard | 0.021            | 0.094           |
| ANSI / IEEE C95.1 1992 – SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure / General Population |     |         |           |       |       | 1.6W/kg (mW/g)<br>averaged over 1 gram |              |          |                  |                 |

### NOTES:

- The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [June 2001].
- All modes of operation were investigated, and the worst-case results are reported.
- Tissue parameters and temperatures are listed on the SAR plot.
- Liquid tissue depth is  $15.2 \pm 0.2$ cm
- Battery is fully charged for all readings.
- Test Configuration ☐ Manu. Test Codes ☒ Base Station Simulator
- Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (June, 2001), if the SAR measured at the middle channel for each test configuration (left, right, cheek/touch, tilt/ear, extended and retracted) is least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

|                                                                                                                    |                          |                                                 |              |              |
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## 8.2 GPRS1900 Body SAR Results

| Frequency                                                                                               |     | Mode    | Conducted |       | Test Position   | Antenna Type                           | Battery  | SAR Level (W/kg) | Power Drift(dB) |
|---------------------------------------------------------------------------------------------------------|-----|---------|-----------|-------|-----------------|----------------------------------------|----------|------------------|-----------------|
| MHz                                                                                                     | Ch  |         | Start     | End   |                 |                                        |          |                  |                 |
| 1880                                                                                                    | 661 | GSM1900 | 29.25     | 29.27 | 10mm Back 2Tx   | Intenna                                | Standard | 0.365            | 0.0048          |
| 1880                                                                                                    | 661 | GSM1900 | 29.26     | 29.29 | 10mm Back 3Tx   | Intenna                                | Standard | 0.286            | 0.101           |
| 1880                                                                                                    | 661 | GSM1900 | 26.17     | 26.18 | 10mm Back 4Tx   | Intenna                                | Standard | 0.377            | -0.030          |
| 1880                                                                                                    | 661 | GSM1900 | 26.27     | 26.25 | 10mm Front 4Tx  | Intenna                                | Standard | 0.160            | 0.169           |
| 1880                                                                                                    | 661 | GSM1900 | 26.24     | 26.21 | 10mm Side C 4Tx | Intenna                                | Standard | <b>0.439</b>     | -0.030          |
| 1880                                                                                                    | 661 | GSM1900 | 26.29     | 26.25 | 10mm side B 4Tx | Intenna                                | Standard | 0.111            | -0.128          |
| ANSI / IEEE C95.1 1992 – SAFETY LIMIT<br>Spatial Peak<br><br>Uncontrolled Exposure / General Population |     |         |           |       |                 | 1.6W/kg (mW/g)<br>averaged over 1 gram |          |                  |                 |

### NOTES:

- The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [June 2001].
- All modes of operation were investigated, and the worst-case results are reported.
- Tissue parameters and temperatures are listed on the SAR plot.
- Liquid tissue depth is  $15.2 \pm 0.2$ cm
- Battery is fully charged for all readings.
- Test Configuration ☐ With Holster ☒ Without Holster
- Justification for reduced test configurations: This model supports GPRS CLASS 12(max 4Tx) and EDGE. The burst power and timing period is more than 2dB higher in GPRS mode than in GSM1900and EDGE mode. Hence, the GSM1900 and EDGE mode was not reported. And all Tx(1~4Tx) cases were also investigated and the worst-case results are reported.(4Tx)
- Body SAR was tested at 1cm distance because battery operated personal wireless routers(hotspots) enable multiple Wi-Fi connections, per TCB workshop October 2010. But position 'Side A' and 'Side D' were not tested because antenna distance was >2.5cm.

|                                                                                                                    |                          |                                                 |              |              |
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### 8.3 2.4GHz WLAN Head SAR Results

| Frequency                                                                                           |    | Mode | Conducted |       | Side  | Test Position                          | Antenna Type | Data Rate(Mbps) | Battery  | SAR Level (W/kg) | Power Drift(dB) |
|-----------------------------------------------------------------------------------------------------|----|------|-----------|-------|-------|----------------------------------------|--------------|-----------------|----------|------------------|-----------------|
| MHz                                                                                                 | Ch |      | Start     | End   |       |                                        |              |                 |          |                  |                 |
| 2462                                                                                                | 11 | WLAN | 16.97     | 17.04 | Right | Cheek/Touch                            | Intenna      | 11              | Standard | 0.080            | 0.000619        |
| 2462                                                                                                | 11 | WLAN | 16.87     | 16.88 | Right | Ear/Tilt 15°                           | Intenna      | 11              | Standard | 0.061            | 0.148           |
| 2462                                                                                                | 11 | WLAN | 16.98     | 16.94 | Left  | Cheek/Touch                            | Intenna      | 11              | Standard | <b>0.165</b>     | 0.183           |
| 2462                                                                                                | 11 | WLAN | 16.88     | 16.92 | Left  | Ear/Tilt 15°                           | Intenna      | 11              | Standard | 0.033            | -0.137          |
| ANSI / IEEE C95.1 1992 – SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure / General Population |    |      |           |       |       | 1.6W/kg (mW/g)<br>averaged over 1 gram |              |                 |          |                  |                 |

#### NOTES:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [June 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Tissue parameters and temperatures are listed on the SAR plot.
4. Liquid tissue depth is  $15.2 \pm 0.2\text{cm}$
5. Battery is fully charged for all readings.
6. Test Configuration ☒ Manu. Test Codes ☐ Base Station Simulator
7. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (June, 2001), if the SAR measured at the middle channel for each test configuration (left, right, cheek/touch, tilt/ear, extended and retracted) is least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
8. Justification for reduced test configurations for WIFI channels per Publication 248227 and April 2010 FCC/TCB Meeting Notes: Other IEEE 802.11 modes (including 802.11n) were investigated since the average output powers were greater than 0.25 dB than that of the corresponding channel in the lowest data rate IEEE 802.11b mode.
9. WLAN Transmission was verified using a spectrum analyzer.

|                                                                                                                    |                          |                                                 |              |              |
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## 8.4 2.4GHz WLAN Body SAR Results

| Frequency                                                                                           |    | Mode | Conducted |       | Test Position | Antenna Type                           | Data Rate(Mbps) | Battery  | SAR Level (W/kg) | Power Drift(dB) |
|-----------------------------------------------------------------------------------------------------|----|------|-----------|-------|---------------|----------------------------------------|-----------------|----------|------------------|-----------------|
| MHz                                                                                                 | Ch |      | Start     | End   |               |                                        |                 |          |                  |                 |
| 2462                                                                                                | 11 | WLAN | 16.98     | 17.01 | 10mm Back     | Intenna                                | 11              | Standard | 0.092            | 0.011           |
| 2462                                                                                                | 11 | WLAN | 16.85     | 16.98 | 10mm Front    | Intenna                                | 11              | Standard | <b>0.104</b>     | 0.050           |
| 2462                                                                                                | 11 | WLAN | 16.97     | 16.95 | 10mm side C   | Intenna                                | 11              | Standard | 0.064            | 0.081           |
| 2462                                                                                                | 11 | WLAN | 16.85     | 16.98 | 10mm side A   | Intenna                                | 11              | Standard | 0.075            | 0.171           |
| ANSI / IEEE C95.1 1992 – SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure / General Population |    |      |           |       |               | 1.6W/kg (mW/g)<br>averaged over 1 gram |                 |          |                  |                 |

### NOTES:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [June 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Tissue parameters and temperatures are listed on the SAR plot.
4. Liquid tissue depth is  $15.2 \pm 0.2\text{cm}$
5. Battery is fully charged for all readings.
6. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (June, 2001), if the SAR measured at the middle channel for each test configuration (left, right, cheek/touch, tilt/ear, extended and retracted) is least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
7. Justification for reduced test configurations for WIFI channels per Publication 248227 and April 2010 FCC/TCB Meeting Notes: Other IEEE 802.11 modes (including 802.11n) were investigated since the average output powers were 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. Side B and Side D were not tested since the antenna distance from the edges was greater than 2.5 cm per Oct 2010 TCB Workshop guidance (see Section 5.4).

|                                                                                                                    |                          |                                                 |              |              |
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## 8.5 5GHz WLAN Head SAR Results

| Frequency                                                                                           |     | Mode    | Conducted |       | Side  | Test Position                          | Data Rate(Mbps) | Antenna Type | Battery  | SAR Level (W/kg) | Power Drift(dB) |
|-----------------------------------------------------------------------------------------------------|-----|---------|-----------|-------|-------|----------------------------------------|-----------------|--------------|----------|------------------|-----------------|
| MHz                                                                                                 | Ch  |         | Start     | End   |       |                                        |                 |              |          |                  |                 |
| 5240                                                                                                | 48  | 5.2 GHz | 12.16     | 12.19 | Right | Cheek/Touch                            | 6               | Intenna      | Standard | 0.139            | -0.028          |
| 5320                                                                                                | 64  | 5.3 GHz | 12.94     | 13.02 | Right | Cheek/Touch                            | 6               | Intenna      | Standard | 0.083            | 0.064           |
| 5500                                                                                                | 100 | 5.5 GHz | 12.31     | 12.34 | Right | Cheek/Touch                            | 6               | Intenna      | Standard | 0.114            | -0.101          |
| 5825                                                                                                | 165 | 5.8 GHz | 12.38     | 12.41 | Right | Cheek/Touch                            | 54              | Intenna      | Standard | 0.054            | 0.067           |
| 5240                                                                                                | 48  | 5.2 GHz | 12.34     | 12.28 | Right | Ear/Tilt 15°                           | 6               | Intenna      | Standard | 0.029            | 0.108           |
| 5320                                                                                                | 64  | 5.3 GHz | 13.02     | 13.09 | Right | Ear/Tilt 15°                           | 6               | Intenna      | Standard | 0.037            | -0.009          |
| 5500                                                                                                | 100 | 5.5 GHz | 12.31     | 12.35 | Right | Ear/Tilt 15°                           | 6               | Intenna      | Standard | 0.062            | -0.163          |
| 5825                                                                                                | 165 | 5.8 GHz | 12.41     | 12.37 | Right | Ear/Tilt 15°                           | 54              | Intenna      | Standard | 0.033            | -0.084          |
| 5240                                                                                                | 48  | 5.2 GHz | 12.24     | 12.20 | Left  | Cheek/Touch                            | 6               | Intenna      | Standard | 0.139            | -0.052          |
| 5320                                                                                                | 64  | 5.3 GHz | 13.09     | 13.11 | Left  | Cheek/Touch                            | 6               | Intenna      | Standard | 0.107            | -0.195          |
| 5500                                                                                                | 100 | 5.5 GHz | 12.34     | 12.38 | Left  | Cheek/Touch                            | 6               | Intenna      | Standard | <b>0.151</b>     | -0.068          |
| 5825                                                                                                | 165 | 5.8 GHz | 12.42     | 12.36 | Left  | Cheek/Touch                            | 54              | Intenna      | Standard | 0.112            | -0.131          |
| 5240                                                                                                | 48  | 5.2 GHz | 12.22     | 12.12 | Left  | Ear/Tilt 15°                           | 6               | Intenna      | Standard | 0.019            | 0.008           |
| 5320                                                                                                | 64  | 5.3 GHz | 13.10     | 13.05 | Left  | Ear/Tilt 15°                           | 6               | Intenna      | Standard | 0.016            | 0.074           |
| 5500                                                                                                | 100 | 5.5 GHz | 12.22     | 12.29 | Left  | Ear/Tilt 15°                           | 6               | Intenna      | Standard | 0.025            | -0.169          |
| 5825                                                                                                | 165 | 5.8 GHz | 12.39     | 12.41 | Left  | Ear/Tilt 15°                           | 54              | Intenna      | Standard | 0.014            | 0.032           |
| ANSI / IEEE C95.1 1992 – SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure / General Population |     |         |           |       |       | 1.6W/kg (mW/g)<br>averaged over 1 gram |                 |              |          |                  |                 |

### NOTES:

- The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [June 2001].
- All modes of operation were investigated, and the worst-case results are reported.
- Tissue parameters and temperatures are listed on the SAR plot.
- Liquid tissue depth is  $15.2 \pm 0.2\text{cm}$
- Battery is fully charged for all readings.
- Test Configuration ☒ Manu. Test ☐ Base Station Simulator  
Codes
- Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (June, 2001), if the SAR measured at the middle channel for each test configuration (left, right, cheek/touch, tilt/ear, extended and retracted) is least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
- Justification for reduced test configurations for WIFI channels per Publication 248227 and April 2010 FCC/TCB Meeting Notes: Other IEEE 802.11 modes (including 802.11n) were investigated since the average output powers were greater than 0.25 dB than that of the corresponding channel in the lowest data rate IEEE 802.11b mode.
- WLAN Transmission was verified using a spectrum analyzer.

|                                                                                                                    |                          |                                                 |              |              |
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## 8.6 5GHzWLAN Body SAR Results

| Frequency                                                                                |     | Mode | Conducted |       | Test Position                          | Antenna Type | Data Rate(Mbps) | Battery  | SAR Level (W/kg) | Power Drift(dB) |
|------------------------------------------------------------------------------------------|-----|------|-----------|-------|----------------------------------------|--------------|-----------------|----------|------------------|-----------------|
| MHz                                                                                      | Ch  |      | Start     | End   |                                        |              |                 |          |                  |                 |
| 5240                                                                                     | 48  | WLAN | 12.17     | 12.18 | 1.5 cm [w/o]                           | Intenna      | 6               | Standard | <b>0.0928</b>    | 0.113           |
| 5320                                                                                     | 64  | WLAN | 13.04     | 13.01 | 1.5 cm [w/o]                           | Intenna      | 6               | Standard | 0.0746           | 0.0944          |
| 5500                                                                                     | 100 | WLAN | 12.25     | 12.35 | 1.5 cm [w/o]                           | Intenna      | 6               | Standard | 0.0465           | -0.11           |
| 5825                                                                                     | 165 | WLAN | 12.33     | 12.34 | 1.5 cm [w/o]                           | Intenna      | 54              | Standard | 0.0573           | 0.0979          |
| ANSI / IEEE C95.1 1992 – SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure / General |     |      |           |       | 1.6W/kg (mW/g)<br>averaged over 1 gram |              |                 |          |                  |                 |

### NOTES:

- The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [June 2001].
- All modes of operation were investigated, and the worst-case results are reported.
- Tissue parameters and temperatures are listed on the SAR plot.
- Liquid tissue depth is  $15.2 \pm 0.2\text{cm}$
- Battery is fully charged for all readings.
- Test Configuration ☐ With Holster ☒ Without Holster
- Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (June, 2001), if the SAR measured at the middle channel for each test configuration (left, right, cheek/touch, tilt/ear, extended and retracted) is least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
- Justification for reduced test configurations for WIFI channels per Publication 248227 and April 2010 FCC/TCB Meeting Notes: Other IEEE 802.11 modes (including 802.11n) were investigated since the average output powers were greater than 0.25 dB than that of the corresponding channel in the lowest data rate IEEE 802.11b mode.
- WLAN Transmission was verified using a spectrum analyzer

|                                                                                                                    |                          |                                                 |              |              |
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## 9. CONCLUSION

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC. These measurements are taken to simulate the RF effects exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The test results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because innumerable factors may interact to determine the specific biological outcome of an exposure to electromagnetic fields, any protection guide shall consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

The highest reported SAR values are as follows:

GSM1900: Head: 0.079W/Kg : Body-worn: 0.439W/Kg

2.4GHz WLAN: Head: 0.165W/Kg : Body-worn: 0.104W/Kg

5GHz WLAN: Head: 0.151W/Kg : Body-worn: 0.0928W/Kg

|                                                                                                                    |                          |                                                 |              |              |
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|                                                                                                                    |                          |                                                 |              |              |
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## APPENDIX A

### SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in ) an incremental mass (dm) contained in a volume element (dV) of a given density (p). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Fig. A.1) .

$$SAR = \frac{d}{dt} \left( \frac{dU}{dm} \right) = \frac{d}{dt} \left( \frac{dU}{p dv} \right)$$

Figure A.1 SAR Mathematical Equation

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

$$SAR = \sigma E^2 / p$$

**Where :**

- $\sigma$  = conductivity of the tissue-simulant material (S/m)
- $p$  = mass density of the tissue-simulant material (kg/m<sup>3</sup>)
- $E$  = Total RMS electric field strength (V/m)

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

## APPENDIX B

### Probe Calibration Process

#### Dosimetric Assessment Procedure

Each probe is calibrated according to a dosimetric assessment procedure described in **K. Pokovic, T.Schmid, N. Kuster, *Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies*, ICECOM97, Oct. 1997, pp. 120-124** with an accuracy better than +/-10%. The spherical isotropy was evaluated with the procedure described in **K. Pokovic, T.Schmid, N. Kuster, *E-field Probe with improved isotropy in brain simulating liquids*, Proceedings of the ELMAR, Zadar, June 23-25, 1996, pp. 172-175** and found to be better than +/-0.25dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe is tested.

#### Free Space Assessment

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

#### Temperature Assessment

E-field temperature correlation calibration is performed in a flat phantom flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe (see Fig. B.2).

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

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

where:

$\Delta t$  = exposure time (30 seconds)

$C$  = heat capacity of tissue (brain or muscle).

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

SAR is proportional to  $\Delta T / \Delta t$ , the initial rate of tissue heating, before thermal diffusion takes place. Now it's possible to quantify the electric field in the simulated tissue by equating the thermally derived SAR to the E-field;

where:

$\sigma$  = simulated tissue conductivity

$p$  = Tissue density (1.25 g/cm<sup>3</sup> for brain tissue)

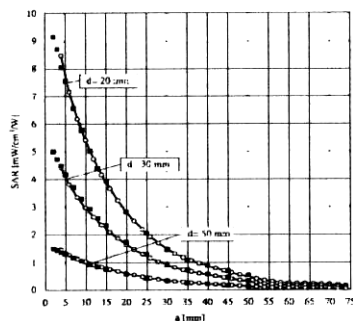


Figure B.1. E-Field and Temperature measurements at 900MHz

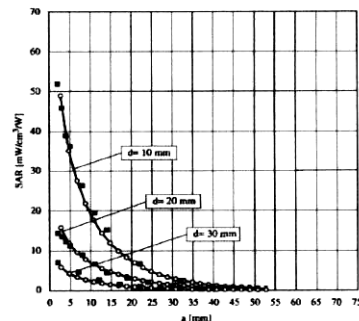


Figure B.2. E-Field and temperature measurements at 1.9GHz

## APPENDIX C

### ANSI/IEEE C95.1 – 1992 RF EXPOSURE LIMITS

#### Uncontrolled Environment

UNCONTROLLED ENVIRONMENTS are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

#### Controlled Environment

CONTROLLED ENVIRONMENTS are defined as locations where there is the exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

**Table C.1 Safety Limits for Partial Body Exposure**

|                                                              | UNCONTROLLED ENVIRONMENT<br>General Population<br>(W/kg) or (mW/g) | CONTROLLED ENVIRONMENT<br>General Population<br>(W/kg) or (mW/g) |
|--------------------------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------------------|
| SPATIAL PEAK SAR <sup>1</sup><br>Brain                       | 1.60                                                               | 8.00                                                             |
| SPATIAL PEAK SAR <sup>2</sup><br>Whole Body                  | 0.08                                                               | 0.40                                                             |
| SPATIAL PEAK SAR <sup>3</sup><br>Hands, Feet, Ankles, Wrists | 4.00                                                               | 20.00                                                            |

<sup>1</sup> The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as tissue volume in the shape of a cube) and over the appropriate averaging time.

<sup>2</sup> The Spatial Average value of the SAR averaged over the whole body.

<sup>3</sup> The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

## **APPENDIX D**

### **The Validation Measurements**

DUT: Dipole 1900 MHz; Serial: 5d082

Program Name: 1900MHz Dipole Validation 2011.06.22

Procedure Name: 1900MHz @ 100mW

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-22/Jun/2011

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

Medium parameters used:  $f = 1900 \text{ MHz}$ ,  $\sigma = 1.36 \text{ mho/m}$ ,  $\epsilon_r = 39.6$ ,  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(7.16, 7.16, 7.16); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

1900MHz @ 100mW/Area Scan (51x51x1): Measurement grid:  $dx=20\text{mm}, dy=20\text{mm}$   
Maximum value of SAR (interpolated) = 5.61 mW/g

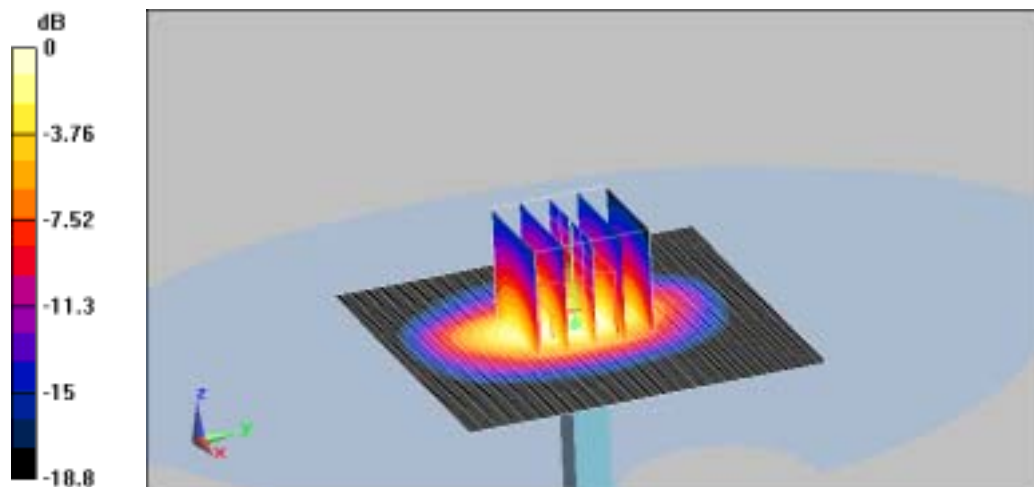
1900MHz @ 100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid:  $dx=8\text{mm}, dy=8\text{mm}, dz=5\text{mm}$

Reference Value = 53 V/m; Power Drift = -0.144 dB

Peak SAR(extrapolated) = 7.83 W/kg

SAR(1 g) = 4.14 mW/g; SAR(10 g) = 212 mW/g

Maximum value of SAR (measured) = 4.56 mW/g



0 dB = 4.56 mW/g

DUT: Dipole 1900 MHz; Serial: 5d082

Program Name: 1900MHz Dipole Validation 2011.06.22

Procedure Name: 1900MHz @ 100mW

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.1;Test Date-22/Jun/2011

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

Medium parameters used:  $f = 1900 \text{ MHz}$ ,  $\sigma = 1.55 \text{ mho/m}$ ,  $\epsilon_r = 52.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(7.12, 7.12, 7.12); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

1900MHz @ 100mW/Area Scan (51x51x1): Measurement grid:  $dx=20\text{mm}, dy=20\text{mm}$   
Maximum value of SAR (interpolated) = 4.71 mW/g

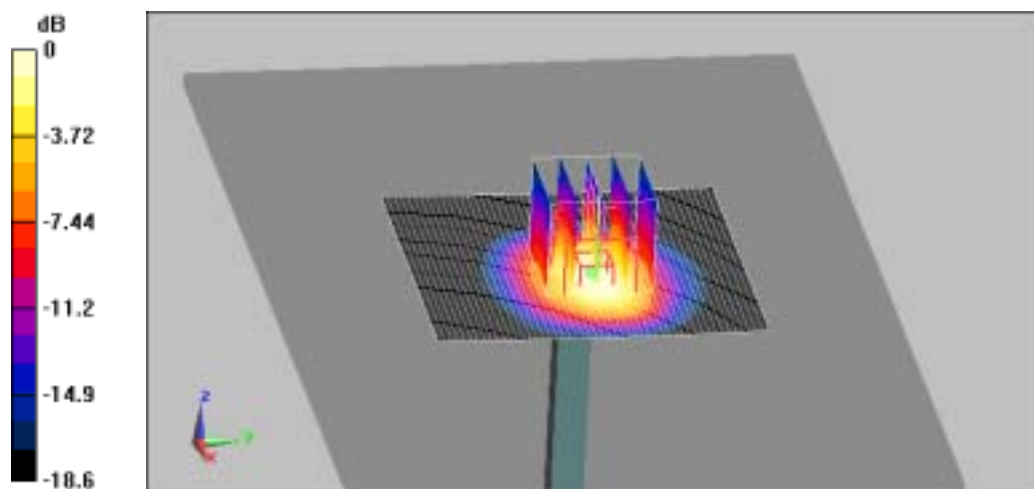
1900MHz @ 100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid:  $dx=8\text{mm}, dy=8\text{mm}, dz=5\text{mm}$

Reference Value = 48.5V/m; Power Drift = -0.31 dB

Peak SAR(extrapolated) = 7.43 W/kg

SAR(1 g) = 4.03 mW/g; SAR(10 g) = 2.09 mW/g

Maximum value of SAR (measured) = 4.48 mW/g



0 dB = 4.48 mW/g

DUT: Dipole 2450 MHz; Serial:807

Program Name: 2450MHz Dipole Validation 2011.06.18

Procedure Name: 2450MHz @ 100mW

Meas. Ambient Temp(celsius)-22.0,Tissue Temp(celsius)-21.9;Test Date-18/Jun/2011

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

Medium parameters used:  $f = 2450 \text{ MHz}$ ;  $\sigma = 1.86 \text{ mho/m}$ ;  $\epsilon_r = 38$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(6.47, 6.47, 6.47); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1248
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

2450MHz @ 100mW/Area Scan (51x51x1): Measurement grid:  $dx=20\text{mm}, dy=20\text{mm}$   
Maximum value of SAR (interpolated) = 7.37 mW/g

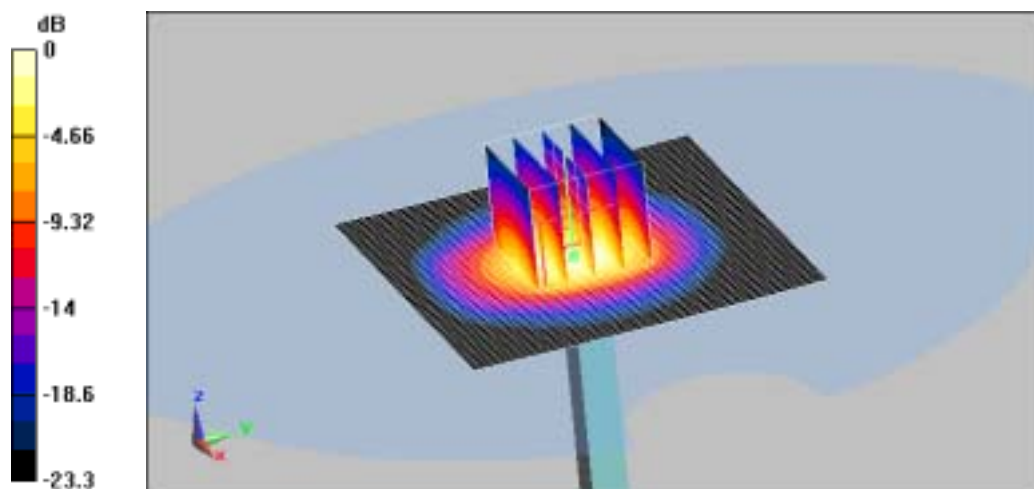
2450MHz @ 100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid:  $dx=8\text{mm}, dy=8\text{mm}, dz=5\text{mm}$

Reference Value = 56.8V/m; Power Drift = -0.09 dB

Peak SAR(extrapolated) = 11.9 W/kg

SAR(1 g) = 5.48 mW/g; SAR(10 g) = 2.5 mW/g

Maximum value of SAR (measured) = 6.15 mW/g



0 dB = 6.15 mW/g

DUT: Dipole 2450 MHz; Serial: 807

Program Name: 2450MHz Dipole Validation 2011.06.18

Procedure Name: 2450MHz @ 100mW

Meas. Ambient Temp(celsius)-22.0,Tissue Temp(celsius)-21.8;Test Date-18/Jun/2011

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

Medium parameters used:  $f = 2450 \text{ MHz}$ ,  $\sigma = 2.03 \text{ mho/m}$ ,  $\epsilon_r = 51.9$ ,  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(6.76, 6.76, 6.76); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

2450MHz @ 100mW/Area Scan (51x51x1): Measurement grid:  $dx=20\text{mm}, dy=20\text{mm}$   
Maximum value of SAR (interpolated) = 5.83 mW/g

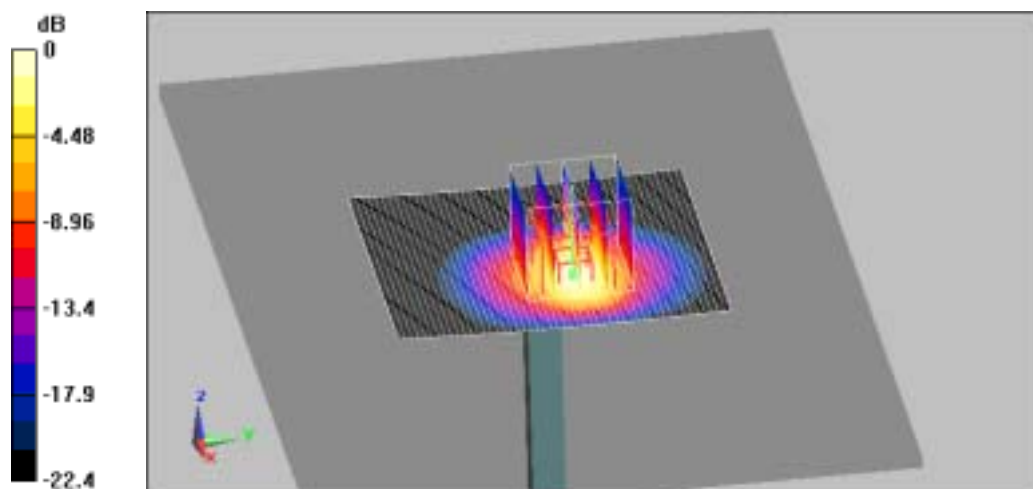
2450MHz @ 100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid:  $dx=8\text{mm}, dy=8\text{mm}, dz=5\text{mm}$

Reference Value = 33 V/m; Power Drift = -0.037 dB

Peak SAR(extrapolated) = 10.7 W/kg

SAR(1 g) = 5.12 mW/g; SAR(10 g) = 234 mW/g

Maximum value of SAR (measured) = 5.84 mW/g



0 dB = 5.84 mW/g

DUT: Dipole 5000MHz; Serial: D5GHzV2 - SN:1099

Program Name: 5200MHz Dipole Validation 2011.07.28

Procedure Name: 5200MHz @ 20mW

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System: CW; Frequency: 5200 MHz Duty Cycle: 1:1

Medium parameters used:  $f = 5200 \text{ MHz}$ ,  $\sigma = 4.86 \text{ mho/m}$ ,  $\epsilon_r = 34.6$ ,  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.61, 4.61, 4.61); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

5200MHz @ 20mW/Area Scan (101x101x1): Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
Maximum value of SAR (interpolated) = 3.53 mW/g

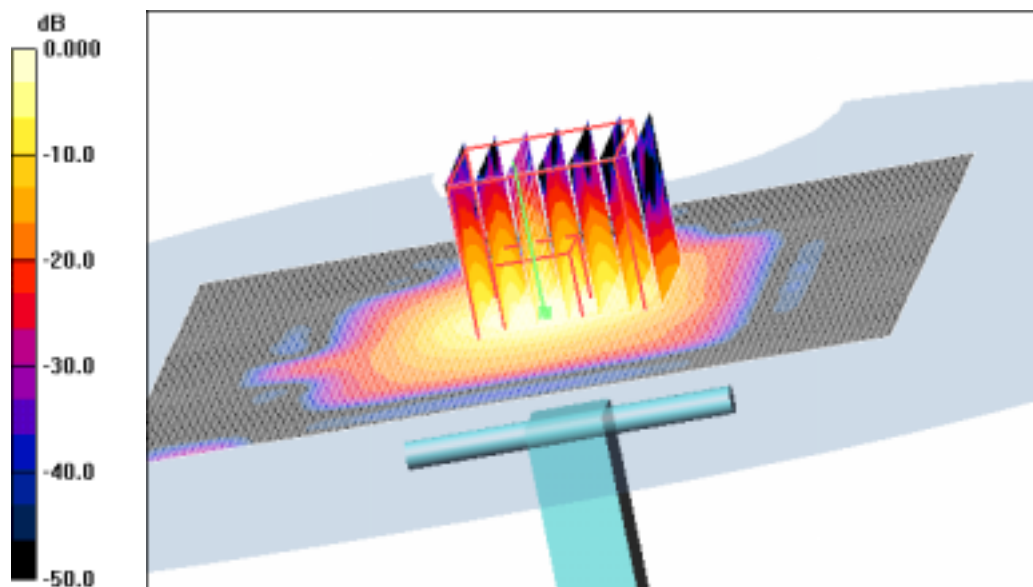
5200MHz @ 20mW/Zoom Scan (7x7x1)/Cube 0: Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 29.2V/m; Power Drift = -0.173 dB

Peak SAR(extrapolated) = 6.96 W/kg

SAR(1 g) = 162 mW/g; SAR(10 g) = 0.414 mW/g

Maximum value of SAR (measured) = 3.44 mW/g



0 dB = 3.44 mW/g

DUT: Dipole 5000MHz; Serial: D5GHzV2 - SN:1099

Program Name: 5500MHz Dipole Head Validation 2011.07.28

Procedure Name: 5500MHz @ 20mW

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System: CW; Frequency: 5500 MHz Duty Cycle: 1:1

Medium parameters used:  $f = 5500 \text{ MHz}$ ,  $\sigma = 5.05 \text{ mho/m}$ ,  $\epsilon_r = 34.9$ ,  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.23, 4.23, 4.23); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

5500MHz @ 20mW/Zoom Scan (7x7x11)/Cube 0: Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 29.6V/m; Power Drift = 0.0% dB

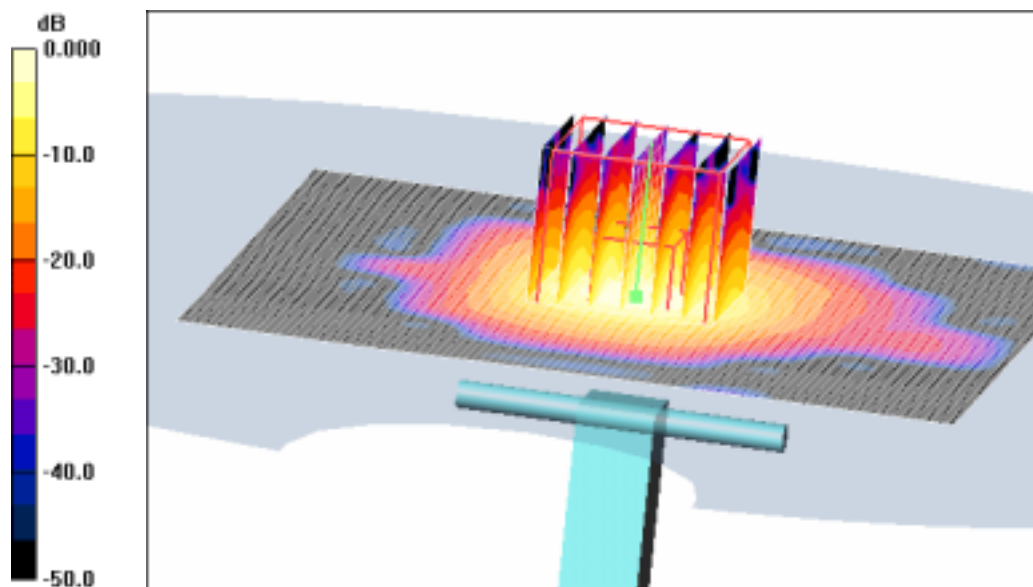
Peak SAR(extrapolated) = 7.89 W/kg

SAR(1 g) = 186 mW/g; SAR(10 g) = 0.515 mW/g

Maximum value of SAR (measured) = 3.90 mW/g

5500MHz @ 20mW/Area Scan (101x101x1): Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 3.85 mW/g



0 dB = 3.85 mW/g

DUT: Dipole 5000MHz; Serial: D5GHzV2 - SN:1099

Program Name: 5800MHz Dipole Head Validation 2011.07.28

Procedure Name: 5800MHz @ 20mW

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System: CW; Frequency: 5800 MHz Duty Cycle: 1:1

Medium parameters used:  $f = 5800 \text{ MHz}$ ,  $\sigma = 5.48 \text{ mho/m}$ ,  $\epsilon_r = 34.5$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.07, 4.07, 4.07); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

5800MHz @ 20mW/Area Scan (101x101x1): Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
Maximum value of SAR (interpolated) = 3.31 mW/g

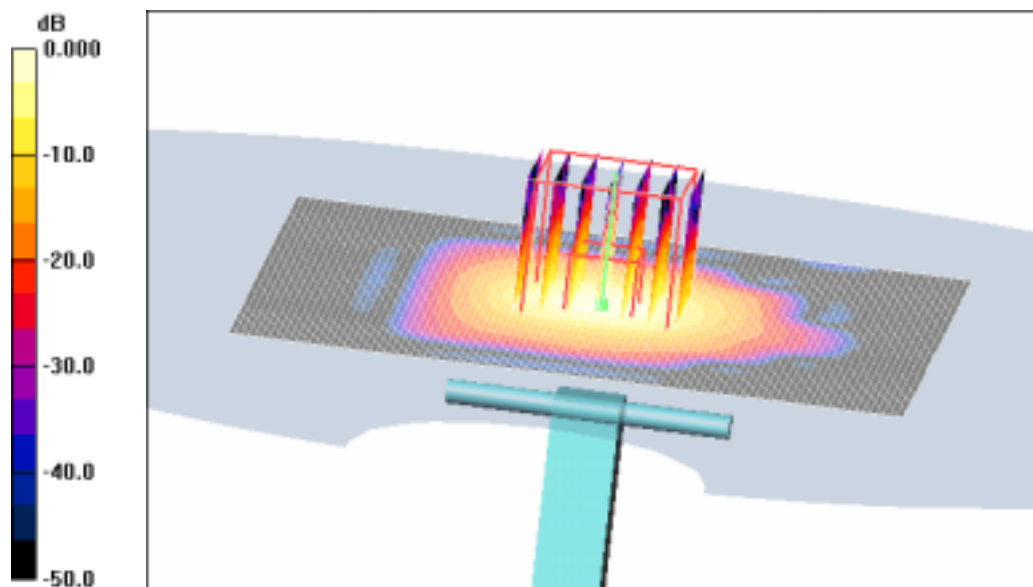
5800MHz @ 20mW/Zoom Scan (7x7x1)/Cube 0: Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 26.4V/m; Power Drift = 0.16 dB

Peak SAR(extrapolated) = 7.01 W/kg

SAR(1 g) = 161 mW/g; SAR(10 g) = 0.452 mW/g

Maximum value of SAR (measured) = 3.43 mW/g



0 dB = 3.43 mW/g

DUT: Dipole 5000MHz; Serial: D5GHzV2 - SN:1099

Program Name: 5200MHz Dipole Body Validation 2011.07.28

Procedure Name: 5200MHz @ 20mW

Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-21.8;Test Date-28/Jul/2011

Communication System: CW; Frequency: 5200 MHz Duty Cycle: 1:1

Medium parameters used:  $f = 5200 \text{ MHz}$ ,  $\sigma = 5.38 \text{ mho/m}$ ,  $\epsilon_r = 47.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.02, 4.02, 4.02); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

5200MHz @ 20mW/Area Scan (101x101x1): Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
Maximum value of SAR (interpolated) = 3.24 mW/g

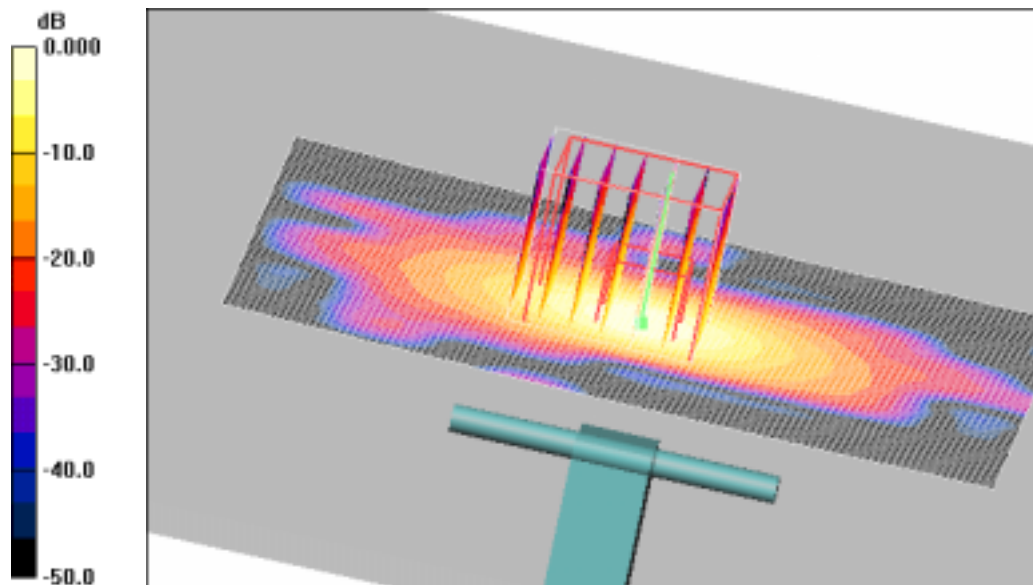
5200MHz @ 20mW/Zoom Scan (7x7x1)/Cube 0: Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 25.0V/m; Power Drift = 0.00 dB

Peak SAR(extrapolated) = 6.09 W/kg

SAR(1 g) = 153 mW/g; SAR(10 g) = 0.390 mW/g

Maximum value of SAR (measured) = 3.19 mW/g



0 dB = 3.19 mW/g

DUT: Dipole 5000MHz; Serial: D5GHzV2 - SN:1099

Program Name: 5500MHz Dipole Body Validation 2011.07.28

Procedure Name: 5500MHz @ 20mW

Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-21.8;Test Date-28/Jul/2011

Communication System: CW; Frequency: 5500 MHz Duty Cycle: 1:1

Medium parameters used:  $f = 5500 \text{ MHz}$ ,  $\sigma = 5.69 \text{ mho/m}$ ,  $\epsilon_r = 47.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(3.52, 3.52, 3.52); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

5500MHz @ 20mW/Zoom Scan (7x7x11)/Cube 0: Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 17.1V/m; PowerDrift = 0.17 dB

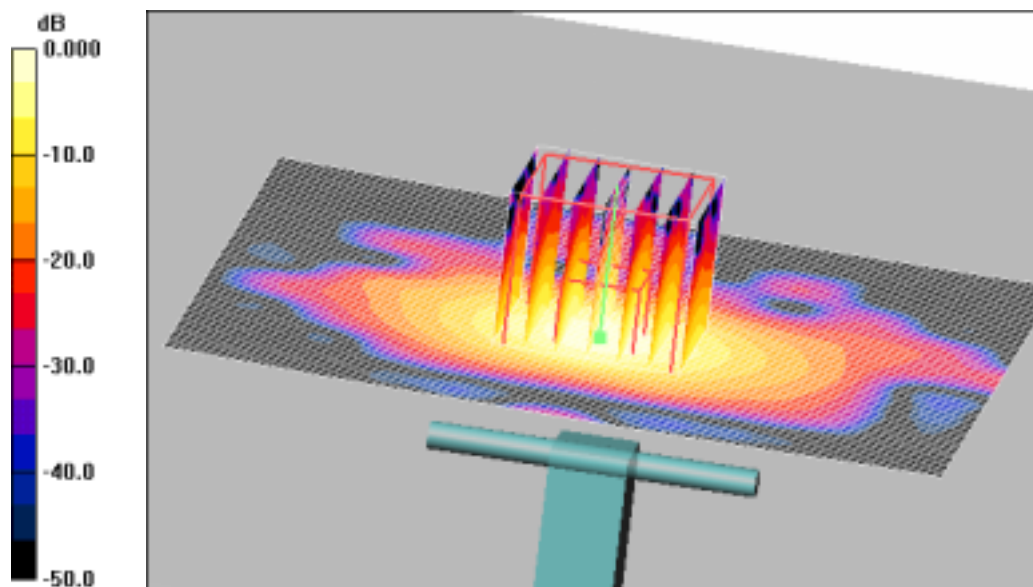
Peak SAR(extrapolated) = 6.51 W/kg

SAR(1 g) = 161 mW/g; SAR(10 g) = 0.446 mW/g

Maximum value of SAR (measured) = 3.38 mW/g

5500MHz @ 20mW/Area Scan (101x101x1): Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 3.36 mW/g



0 dB = 3.36 mW/g

DUT: Dipole 5000MHz; Serial: D5GHzV2 - SN:1099

Program Name: 5800MHz Dipole Body Validation 2011.07.28

Procedure Name: 5800MHz @ 20mW

Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-21.8;Test Date-28/Jul/2011

Communication System: CW; Frequency: 5800 MHz Duty Cycle: 1:1

Medium parameters used:  $f = 5800 \text{ MHz}$ ;  $\sigma = 5.93 \text{ mho/m}$ ;  $\epsilon_r = 46$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(3.53, 3.53, 3.53); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

5800MHz @ 20mW/Area Scan (101x101x1): Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
Maximum value of SAR (interpolated) =  $3.07 \text{ mW/g}$

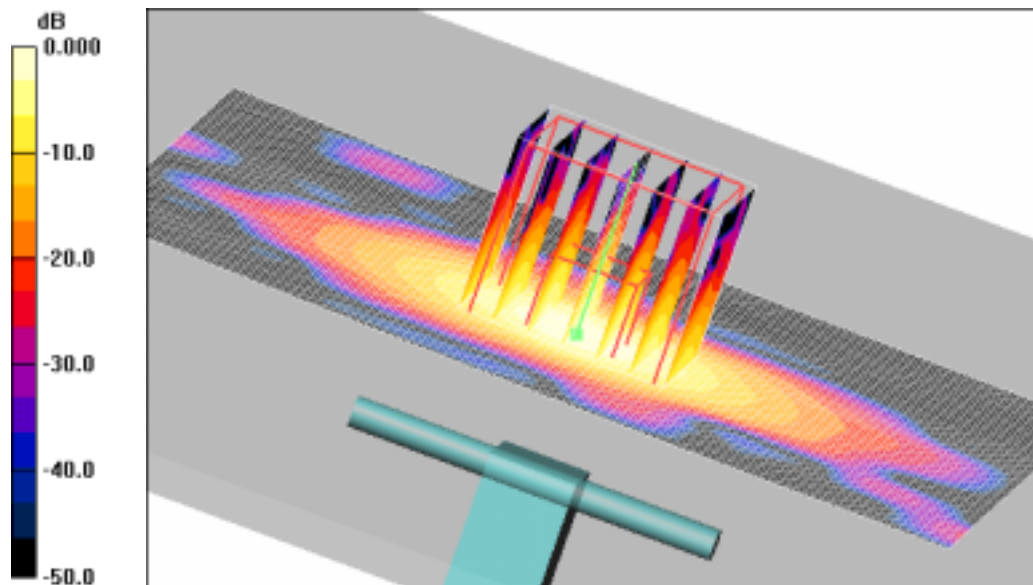
5800MHz @ 20mW/Zoom Scan (7x7x1)/Cube 0: Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value =  $16.0\text{V/m}$ ; Power Drift =  $0.1\%$  dB

Peak SAR(extrapolated) =  $5.82 \text{ W/kg}$

SAR(1 g) =  $142 \text{ mW/g}$ ; SAR(10 g) =  $0.393 \text{ mW/g}$

Maximum value of SAR (measured) =  $3.02 \text{ mW/g}$



0 dB =  $3.02 \text{ mW/g}$

## **APPENDIX E**

### **Plots of The SAR Measurements**

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 GSM1900 Right (Job No. : FI-127)

Procedure Name: Cheek, Ch661, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-22/Jun/2011

Communication System: GSM 1900;Frequency: 1880 MHzDuty Cycle: 1:8.3

Medium parameters used:  $f = 1880 \text{ MHz}$   $\sigma = 1.36 \text{ mho/m}$ ;  $\epsilon_r = 39.6$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(7.16, 7.16, 7.16); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (61x71x1): Measurement grid:

$dx=20\text{mm}$ ,  $dy=20\text{mm}$

Maximum value of SAR (interpolated) =  $0.074 \text{ mW/g}$

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

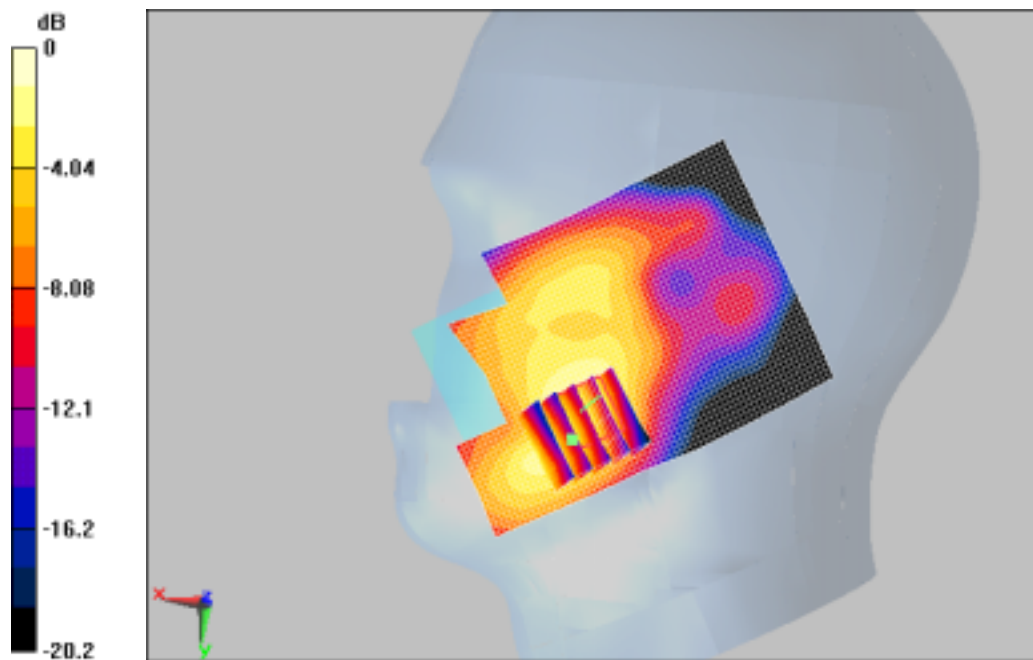
$dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $4.93\text{V/m}$ ; PowerDrift =  $0.1\text{D dB}$

Peak SAR(extrapolated) =  $0.130 \text{ W/g}$

SAR(1 g) =  $0.079 \text{ mW/g}$ ; SAR(10 g) =  $0.045 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.085 \text{ mW/g}$



0 dB =  $0.08\text{mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 GSM1900 Right (Job No. : FI-127)

Procedure Name: Tilt, Ch.661, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-22/Jun/2011

Communication System: GSM 1900; Frequency: 1880 MHz Duty Cycle: 1:8.3

Medium parameters used:  $f = 1880 \text{ MHz}$ ;  $\sigma = 1.36 \text{ mho/m}$ ;  $\epsilon_r = 39.6$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(7.16, 7.16, 7.16); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Tilt, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid:

$dx=20\text{mm}$ ,  $dy=20\text{mm}$

Maximum value of SAR (interpolated) =  $0.016 \text{ mW/g}$

Tilt, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

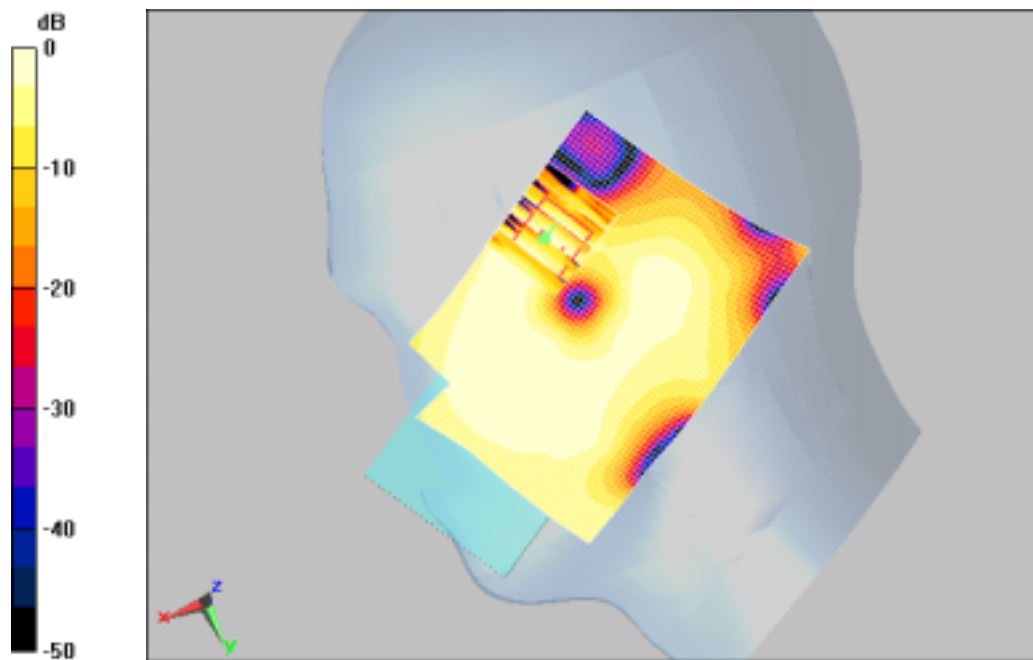
$dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $1.75\text{V/m}$ ; Power Drift =  $0.002 \text{ dB}$

Peak SAR(extrapolated) =  $0.033 \text{ W/g}$

SAR(1 g) =  $0.013 \text{ mW/g}$ ; SAR(10 g) =  $0.00574 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.013 \text{ mW/g}$



0 dB =  $0.03 \text{ mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 GSM1900 Left (Job No. : FI-127)

Procedure Name: Cheek, Ch661, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-22/Jun/2011

Communication System: GSM 1900;Frequency: 1880 MHzDuty Cycle: 1:8.3

Medium parameters used:  $f = 1880 \text{ MHz}$   $\sigma = 1.36 \text{ mho/m}$ ;  $\epsilon_r = 39.6$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750;ConvF(7.16, 7.16, 7.16);Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

**Cheek, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (61x71x1):** Measurement grid:

$dx=20\text{mm}$ ,  $dy=20\text{mm}$

Maximum value of SAR (interpolated) =  $0.089 \text{ mW/g}$

**Cheek, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:

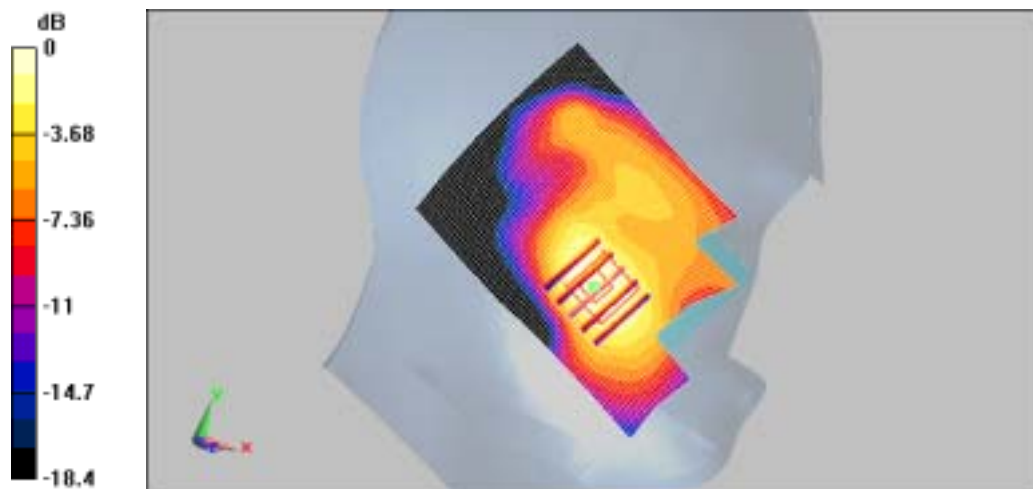
$dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $5.05\text{V/m}$ ; PowerDrift =  $0.18 \text{ dB}$

Peak SAR(extrapolated) =  $0.120 \text{ W/g}$

**SAR(1 g) =  $0.077 \text{ mW/g}$ ; SAR(10 g) =  $0.048 \text{ mW/g}$**

Maximum value of SAR (measured) =  $0.085 \text{ mW/g}$



0 dB =  $0.08\text{mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 GSM1900 Left (Job No. : FI-127)

Procedure Name: Tilt, Ch.661, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-22/Jun/2011

Communication System: GSM 1900; Frequency: 1880 MHz Duty Cycle: 1:8.3

Medium parameters used:  $f = 1880 \text{ MHz}$ ;  $\sigma = 1.36 \text{ mho/m}$ ;  $\epsilon_r = 39.6$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(7.16, 7.16, 7.16); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Tilt, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid:

$dx=20\text{mm}$ ,  $dy=20\text{mm}$

Maximum value of SAR (interpolated) =  $0.023 \text{ mW/g}$

Tilt, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

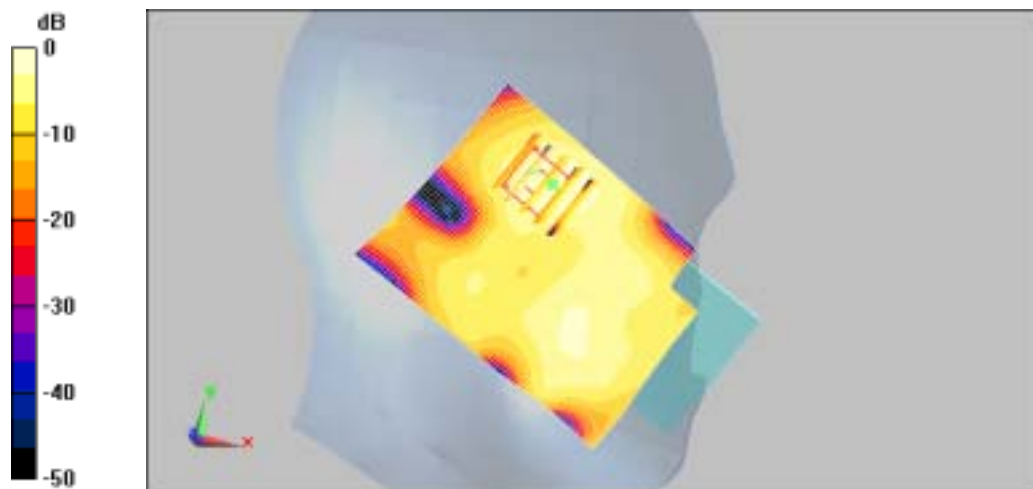
$dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $1.55\text{V/m}$ ; Power Drift =  $0.09\text{ dB}$

Peak SAR(extrapolated) =  $0.036 \text{ W/g}$

SAR(1 g) =  $0.021 \text{ mW/g}$ ; SAR(10 g) =  $0.012 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.024 \text{ mW/g}$



0 dB =  $0.02 \text{ mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 GSM1900 Right (Job No. : FI-127)

Procedure Name: Cheek, Ch661, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-22/Jun/2011

Communication System: GSM 1900;Frequency: 1880 MHzDuty Cycle: 1:8.3

Medium parameters used:  $f = 1880 \text{ MHz}$   $\sigma = 1.36 \text{ mho/m}$ ;  $\epsilon_r = 39.6$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(7.16, 7.16, 7.16); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid:

$dx=20\text{mm}$ ,  $dy=20\text{mm}$

Maximum value of SAR (interpolated) =  $0.074 \text{ mW/g}$

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

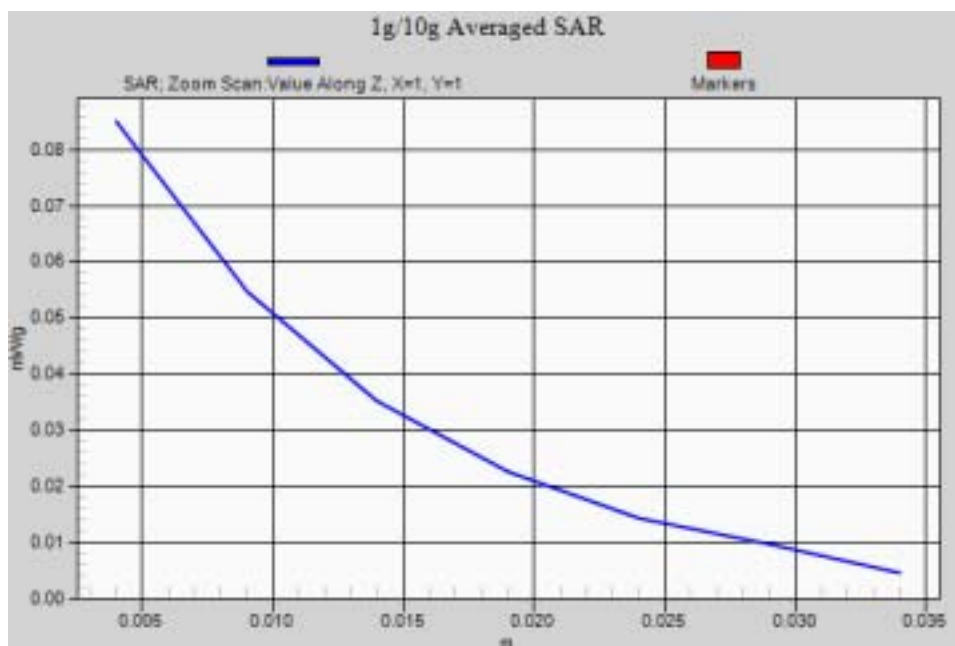
$dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $4.93\text{V/m}$ ; PowerDrift =  $0.1\text{D dB}$

Peak SAR(extrapolated) =  $0.130 \text{ W/kg}$

SAR(1 g) =  $0.079 \text{ mW/g}$ ; SAR(10 g) =  $0.045 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.085 \text{ mW/g}$



DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 GPRS1900 Body (Job No. : FI-127)

Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard, Back, 4Tx

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.1;Test Date-22/Jun/2011

Communication System:GPRS 1900;Frequency: 1880 MHzDuty Cycle: 1:2.075

Medium parameters used:  $f = 1880 \text{ MHz}$ ,  $\sigma = 1.55 \text{ mho/m}$ ,  $\epsilon_r = 52.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section:Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(7.12, 7.12, 7.12); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Body, Ch.661,Ant.Intenna, Bat.Standard, Back, 4Tx/Area Scan (101x141x1):

Measurement grid:  $dx=0\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) =  $0.427 \text{ mW/g}$

Body, Ch.661,Ant.Intenna, Bat.Standard, Back, 4Tx/Zoom Scan(5x5x7)/Cube 0:

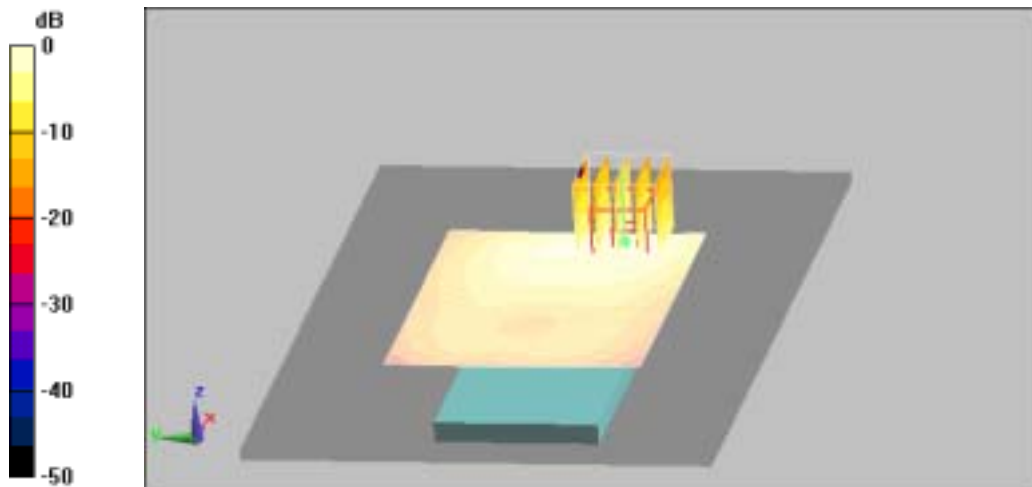
Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $5.71\text{V/m}$ ; PowerDrift =  $-0.00 \text{ dB}$

Peak SAR(extrapolated) =  $0.657 \text{ W/kg}$

SAR(1 g) =  $0.77 \text{ mW/g}$ ; SAR(10 g) =  $0.200 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.433 \text{ mW/g}$



0 dB =  $0.43\text{mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 GPRS1900 Body (Job No. : FI-127)

Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard, Front, 4Tx

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.1;Test Date-22/Jun/2011

Communication System:GPRS 1900;Frequency: 1880 MHzDuty Cycle: 1:2.075

Medium parameters used:  $f = 1880 \text{ MHz}$   $\sigma = 1.55 \text{ mho/m}$ ;  $\epsilon_r = 52.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section:Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(7.12, 7.12, 7.12); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Body, Ch.661,Ant.Intenna, BatStandard, Front, 4Tx/Area Scan (101x141x1):

Measurement grid:  $dx=0\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) =  $0.195 \text{ mW/g}$

Body, Ch.661,Ant.Intenna, BatStandard, Front, 4Tx/Zoom Scan(5x5x7)/Cube 0

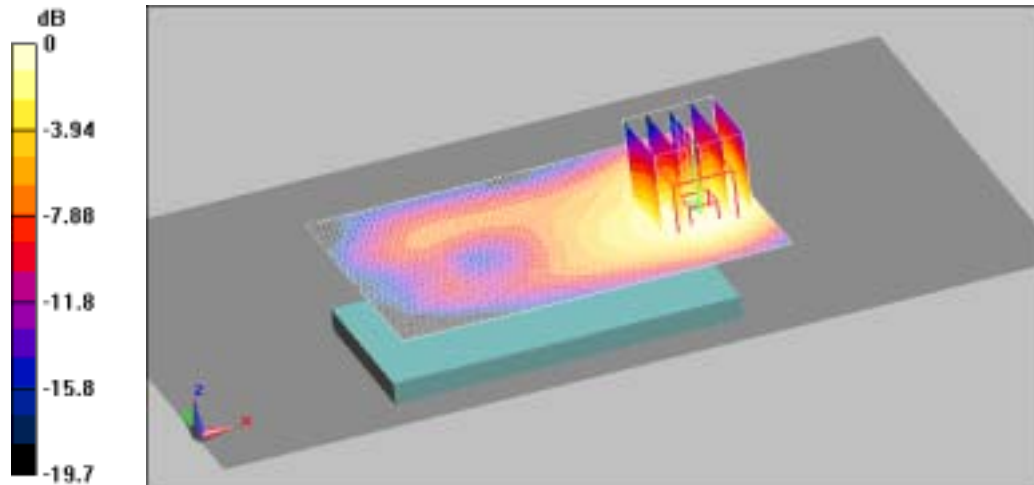
Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $4.61\text{V/m}$ ; PowerDrift =  $0.10 \text{ dB}$

Peak SAR(extrapolated) =  $0.253 \text{ W/kg}$

SAR(1 g) =  $0.160 \text{ mW/g}$ ; SAR(10 g) =  $0.096 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.173 \text{ mW/g}$



0 dB =  $0.17\text{mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 GPRS1900 Body (Job No. : FI-127)

Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard, Side C, 4Tx

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.1;Test Date-22/Jun/2011

Communication System:GPRS 1900;Frequency: 1880 MHzDuty Cycle: 1:2.075

Medium parameters used:  $f = 1880 \text{ MHz}$ ,  $\sigma = 1.55 \text{ mho/m}$ ,  $\epsilon_r = 52.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section:Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750;ConvF(7.12, 7.12, 7.12);Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Body, Ch.661,Ant.Intenna, BatStandard, Side C,4Tx/Area Scan (101x141x1):

Measurement grid:  $dx=0\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) =  $0.515 \text{ mW/g}$

Body, Ch.661,Ant.Intenna, BatStandard, Side C,4Tx/Zoom Scan (5x5x7)/Cube 0:

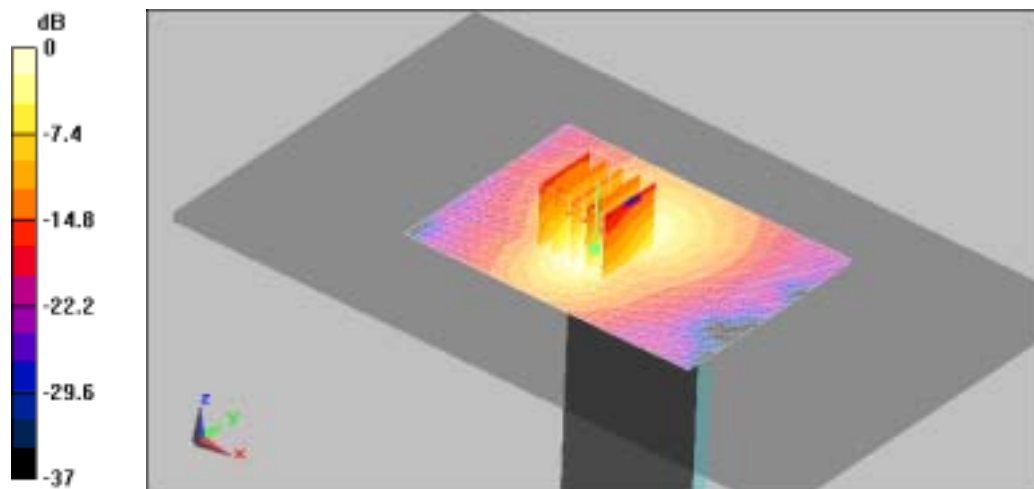
Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $12.9\text{V/m}$ ; PowerDrift =  $-0.00 \text{ dB}$

Peak SAR(extrapolated) =  $0.784 \text{ W/g}$

SAR(1 g) =  $0.439 \text{ mW/g}$ ; SAR(10 g) =  $0.229 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.506 \text{ mW/g}$



0 dB =  $0.506 \text{ mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 GPRS1900 Body (Job No. : FI-127)

Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard, Side B, 4Tx

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.1;Test Date-22/Jun/2011

Communication System:GPRS 1900;Frequency: 1880 MHzDuty Cycle: 1:2.075

Medium parameters used:  $f = 1880 \text{ MHz}$   $\sigma = 1.55 \text{ mho/m}$ ;  $\epsilon_r = 52.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section:Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750;ConvF(7.12, 7.12, 7.12);Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Body, Ch.661,Ant.Intenna, BatStandard, Side B,4Tx/Area Scan (51x71x1):

Measurement grid:  $dx=20\text{mm}$ ,  $dy=20\text{mm}$

Maximum value of SAR (interpolated) =  $0.098 \text{ mW/g}$

Body, Ch.661,Ant.Intenna, BatStandard, Side B,4Tx/Zoom Scan (5x5x7)/Cube 0:

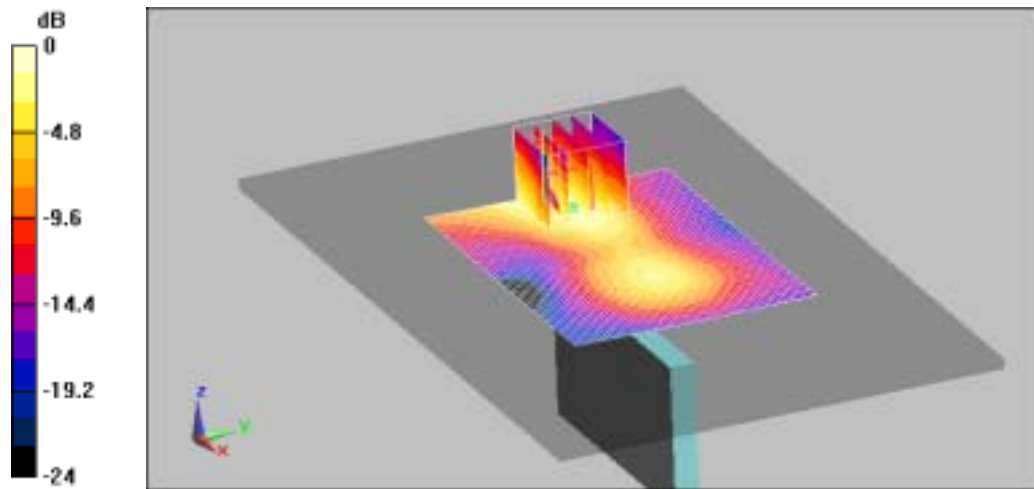
Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $4.58\text{V/m}$ ; PowerDrift =  $-0.28 \text{ dB}$

Peak SAR(extrapolated) =  $0.263 \text{ W/g}$

SAR(1 g) =  $0.111 \text{ mW/g}$ ; SAR(10 g) =  $0.060 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.116 \text{ mW/g}$



0 dB =  $0.116\text{mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 GPRS1900 Body (Job No. : FI-127)

Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard, Side C, 4Tx

Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.1;Test Date-22/Jun/2011

Communication System:GPRS 1900;Frequency: 1880 MHzDuty Cycle: 1:2.075

Medium parameters used:  $f = 1880 \text{ MHz}$ ,  $\sigma = 1.55 \text{ mho/m}$ ,  $\epsilon_r = 52.1$ ,  $\rho = 1000 \text{ kg/m}^3$

Phantom section:Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750;ConvF(7.12, 7.12, 7.12);Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Body, Ch.661,Ant.Intenna, BatStandard, Side C,4Tx/Area Scan (101x141x1):

Measurement grid:  $dx=0\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) =  $0.515 \text{ mW/g}$

Body, Ch.661,Ant.Intenna, BatStandard, Side C,4Tx/Zoom Scan (5x5x7)/Cube 0:

Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $12.9\text{V/m}$ ; PowerDrift =  $-0.00 \text{ dB}$

Peak SAR(extrapolated) =  $0.784 \text{ W/kg}$

SAR(1 g) =  $0.439 \text{ mW/g}$ ; SAR(10 g) =  $0.229 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.506 \text{ mW/g}$



DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN Right (Job No. : FI-127)

Procedure Name: Cheek, Ch11, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.0,Tissue Temp(celsius)-21.9;Test Date-18/Jun/2011

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

Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 1.86 \text{ mho/m}$ ;  $\epsilon_r = 38$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(6.47, 6.47, 6.47); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1248
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Cheek, Ch.11, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid:

$dx=20\text{mm}$ ,  $dy=20\text{mm}$

Maximum value of SAR (interpolated) =  $0.094 \text{ mW/g}$

Cheek, Ch.11, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

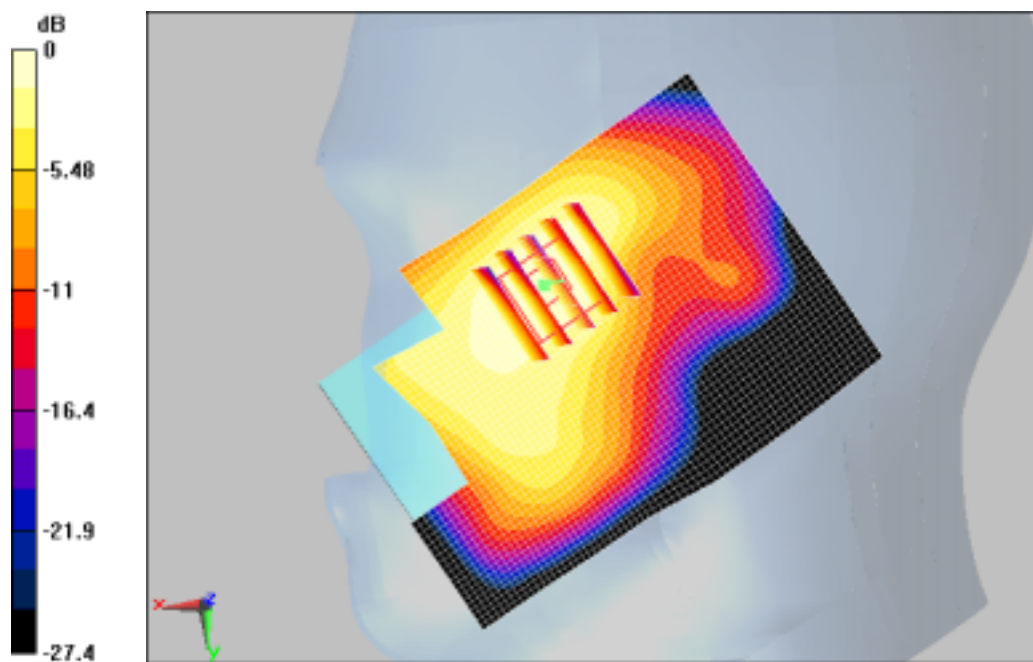
$dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $4.97\text{V/m}$ ; PowerDrift =  $0.00619 \text{ dB}$

Peak SAR(extrapolated) =  $0.136 \text{ W/g}$

$\text{SAR}(1 \text{ g}) = 0.080 \text{ mW/g}$ ;  $\text{SAR}(10 \text{ g}) = 0.047 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.087 \text{ mW/g}$



0 dB =  $0.08 \text{ mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN Right (Job No. : FI-127)

Procedure Name: Tilt, Ch.11, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.0,Tissue Temp(celsius)-21.9;Test Date-18/Jun/2011

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

Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 1.86 \text{ mho/m}$ ;  $\epsilon_r = 38$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(6.47, 6.47, 6.47); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1248
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Tilt, Ch.11, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid:

$dx=20\text{mm}$ ,  $dy=20\text{mm}$

Maximum value of SAR (interpolated) =  $0.093 \text{ mW/g}$

Tilt, Ch.11, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

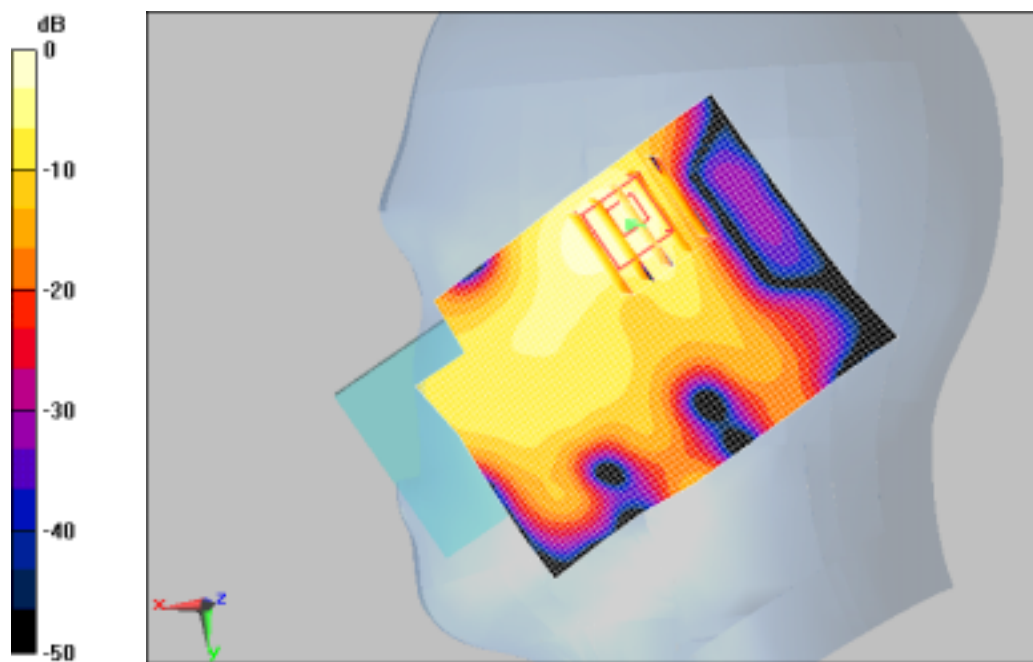
$dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $2.27\text{V/m}$ ; PowerDrift =  $0.14 \text{ dB}$

Peak SAR(extrapolated) =  $0.107 \text{ W/kg}$

SAR(1 g) =  $0.061 \text{ mW/g}$ ; SAR(10 g) =  $0.031 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.065 \text{ mW/g}$



0 dB =  $0.06\text{mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN Left (Job No. : FI-127)

Procedure Name: Cheek, Ch11, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.0,Tissue Temp(celsius)-21.9;Test Date-18/Jun/2011

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

Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 1.86 \text{ mho/m}$ ;  $\epsilon_r = 38$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(6.47, 6.47, 6.47); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1248
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

**Cheek, Ch.11, Ant.Intenna, Bat.Standard/Area Scan (51x71x1):** Measurement grid:

$dx=20\text{mm}$ ,  $dy=20\text{mm}$

Maximum value of SAR (interpolated) =  $0.160 \text{ mW/g}$

**Cheek, Ch.11, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:

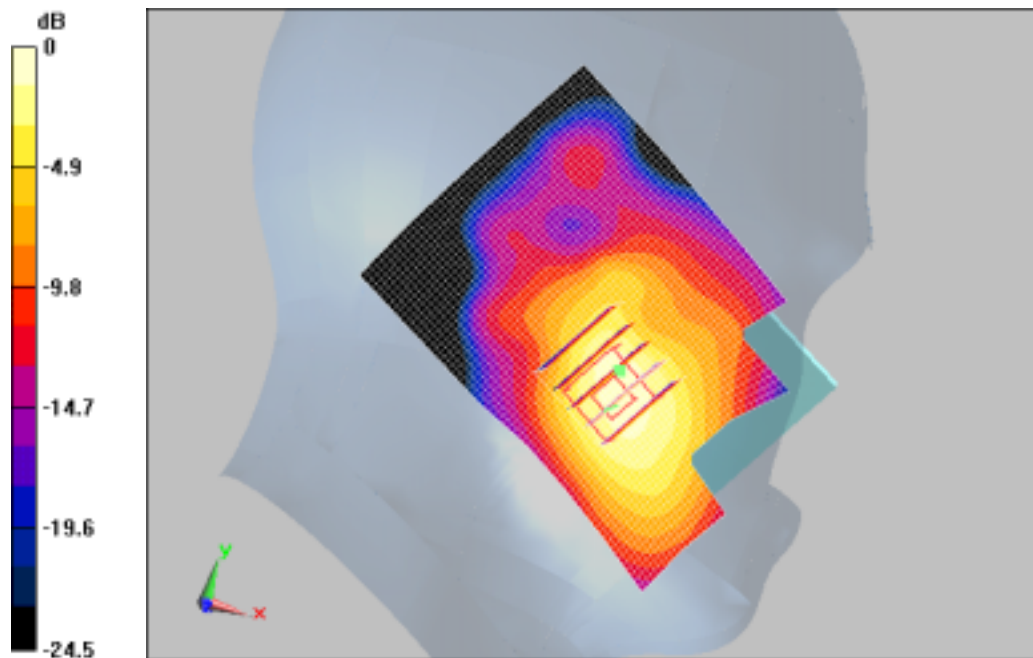
$dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $5.7 \text{ V/m}$ ; Power Drift =  $0.183 \text{ dB}$

Peak SAR(extrapolated) =  $0.293 \text{ W/g}$

$\text{SAR}(1 \text{ g}) = 0.165 \text{ mW/g}$ ;  $\text{SAR}(10 \text{ g}) = 0.090 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.181 \text{ mW/g}$



0 dB =  $0.18 \text{ mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN Left (Job No. : FI-127)

Procedure Name: Tilt, Ch.11, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.0,Tissue Temp(celsius)-21.9;Test Date-18/Jun/2011

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

Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 1.86 \text{ mho/m}$ ;  $\epsilon_r = 38$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(6.47, 6.47, 6.47); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1248
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Tilt, Ch.11, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid:

$dx=20\text{mm}$ ,  $dy=20\text{mm}$

Maximum value of SAR (interpolated) =  $0.039 \text{ mW/g}$

Tilt, Ch.11, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

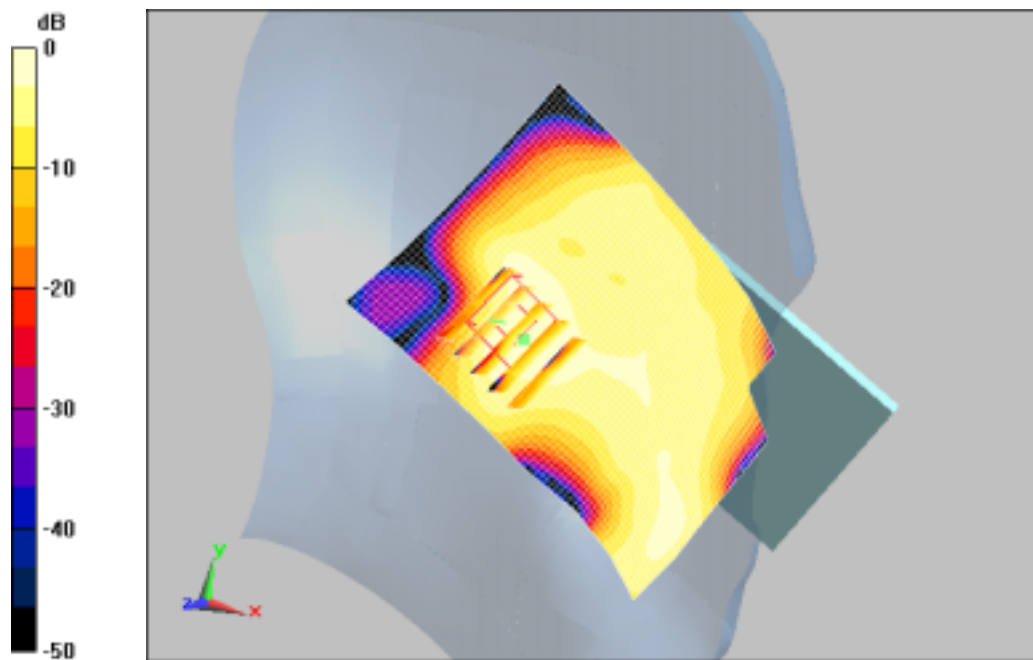
$dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $2.6 \text{ V/m}$ ; Power Drift =  $-0.137 \text{ dB}$

Peak SAR(extrapolated) =  $0.063 \text{ W/kg}$

SAR(1 g) =  $0.033 \text{ mW/g}$ ; SAR(10 g) =  $0.017 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.036 \text{ mW/g}$



0 dB =  $0.03 \text{ mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN Left (Job No. : FI-127)

Procedure Name: Cheek, Ch11, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-21.9;Test Date-19/Jul/2011

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

Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 1.86 \text{ mho/m}$ ;  $\epsilon_r = 38$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(6.47, 6.47, 6.47); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1248
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

**Cheek, Ch.11, Ant.Intenna, Bat.Standard/Area Scan (51x71x1):** Measurement grid:

$dx=20\text{mm}$ ,  $dy=20\text{mm}$

Maximum value of SAR (interpolated) =  $0.160 \text{ mW/g}$

**Cheek, Ch.11, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:

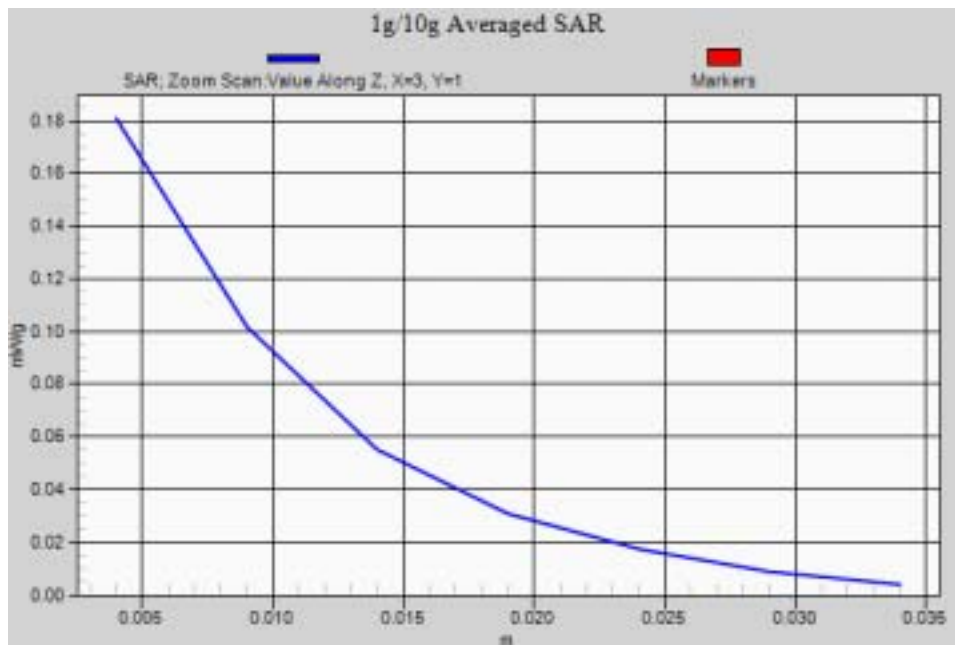
$dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $5.7 \text{ V/m}$ ; Power Drift =  $0.183 \text{ dB}$

Peak SAR(extrapolated) =  $0.293 \text{ W/kg}$

$\text{SAR}(1 \text{ g}) = 0.165 \text{ mW/g}$ ;  $\text{SAR}(10 \text{ g}) = 0.090 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.181 \text{ mW/g}$



DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN Body (Job No : FI-127)

Procedure Name: Body, Ch.11, Ant.Intenna, BatStandard, Back

Meas. Ambient Temp(celsius)-22.0,Tissue Temp(celsius)-21.8;Test Date-18/Jun/2011

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

Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 2.03 \text{ mho/m}$ ;  $\epsilon_r = 51.9$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section:Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(6.76, 6.76, 6.76); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Body, Ch.11, Ant.Intenna, BatStandard, Back/Area Scan (51x71x1): Measurement grid:  
dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.090 mW/g

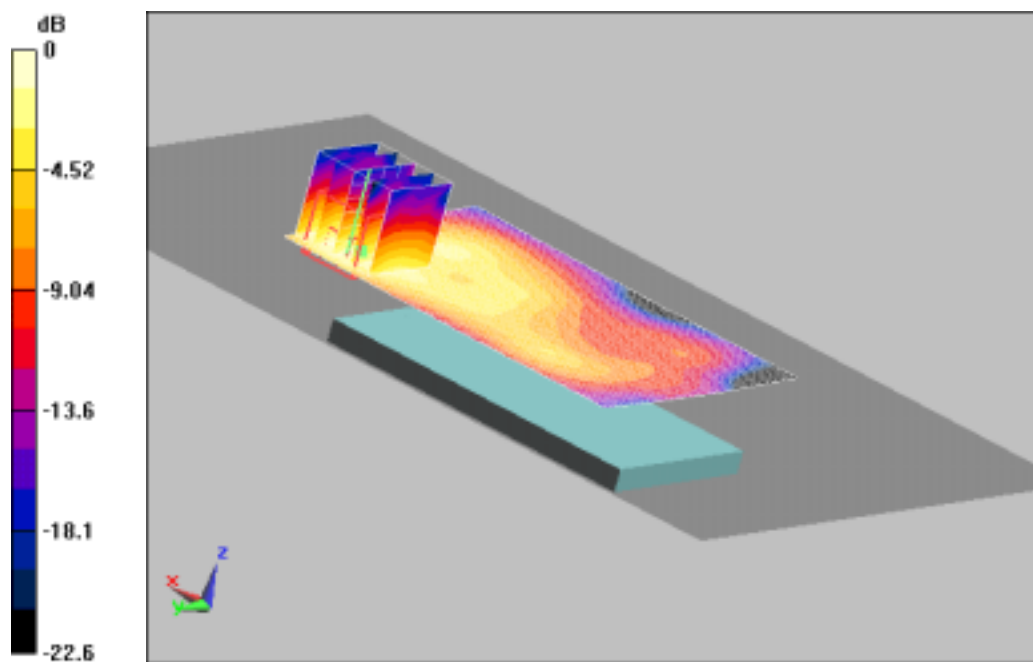
Body, Ch.11, Ant.Intenna, BatStandard, Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.73V/m; PowerDrift = 0.011 dB

Peak SAR(extrapolated) = 0.175 W/g

SAR(1 g) = 0.092 mW/g; SAR(10 g) = 0.049 mW/g

Maximum value of SAR (measured) = 0.099 mW/g



0 dB = 0.09mW/g

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN Body (Job No : FI-127)

Procedure Name: Body, Ch.11, Ant.Intenna, BatStandard, Front

Meas. Ambient Temp(celsius)-22.0,Tissue Temp(celsius)-21.8;Test Date-18/Jun/2011

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

Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 2.03 \text{ mho/m}$ ;  $\epsilon_r = 51.9$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section:Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(6.76, 6.76, 6.76); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Body, Ch.11, Ant.Intenna, BatStandard, Front/Area Scan (101x141x1): Measurement

grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.111 mW/g

Body, Ch.11, Ant.Intenna, BatStandard, Front/Zoom Scan (5x5x7)/Cube 0: Measurement

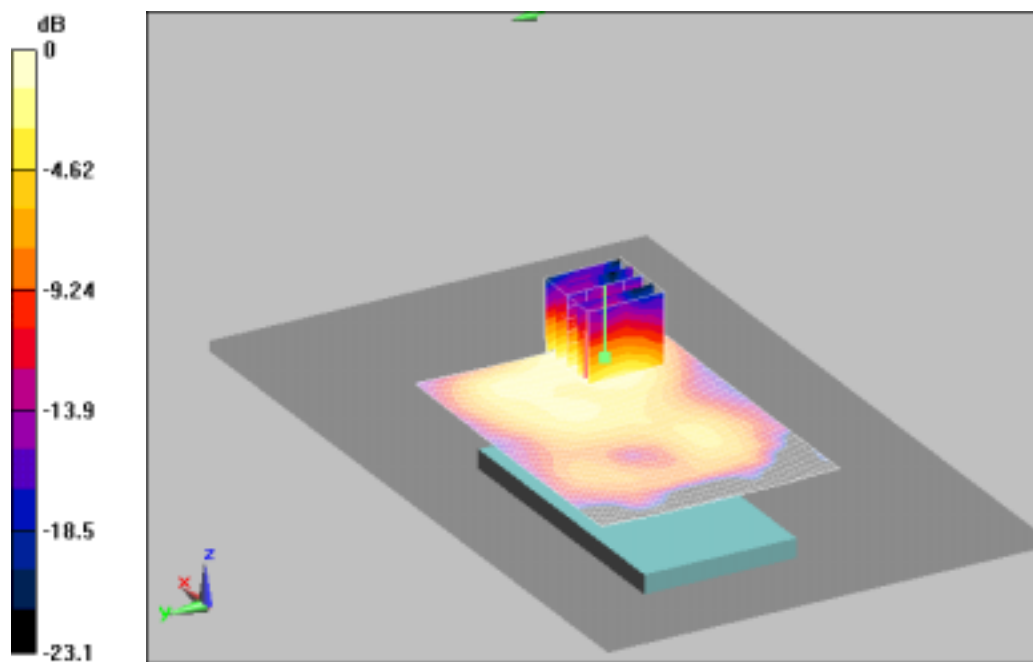
grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.18V/m; PowerDrift = 0.03 dB

Peak SAR(extrapolated) = 0.186 W/g

SAR(1 g) = 0.104 mW/g; SAR(10 g) = 0.056 mW/g

Maximum value of SAR (measured) = 0.115 mW/g



0 dB = 0.15mW/g

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN Body (Job No : FI-127)

Procedure Name: Body, Ch.11, Ant.Intenna, BatStandard, Side C

Meas. Ambient Temp(celsius)-22.0,Tissue Temp(celsius)-21.8;Test Date-18/Jun/2011

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

Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 2.03 \text{ mho/m}$ ;  $\epsilon_r = 51.9$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section:Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750;ConvF(6.76, 6.76, 6.76);Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Body, Ch.11, Ant.Intenna, BatStandard, Side C/Area Scan (101x141x1): Measurement

grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.069 mW/g

Body, Ch.11, Ant.Intenna, BatStandard, Side C/Zoom Scan (5x5x7)/Cube 0 Measurement

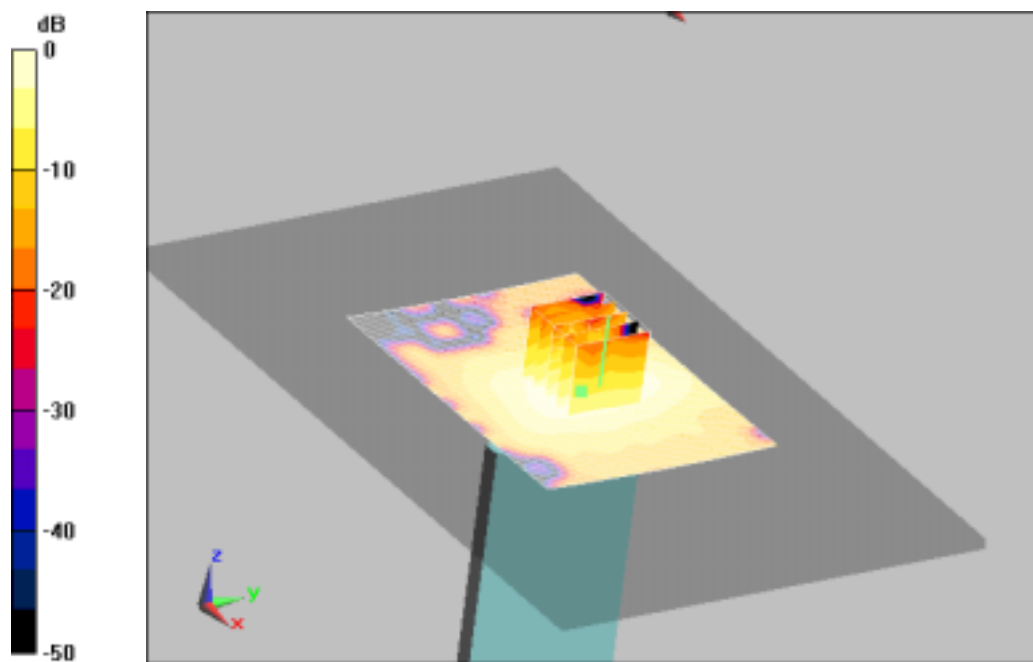
grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.23V/m; PowerDrift = 0.08 dB

Peak SAR(extrapolated) = 0.120 W/g

SAR(1 g) = 0.064 mW/g; SAR(10 g) = 0.035 mW/g

Maximum value of SAR (measured) = 0.069 mW/g



0 dB = 0.00mW/g

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN Body (Job No : FI-127)

Procedure Name: Body, Ch.11, Ant.Intenna, Bat.Standard, Side A

Meas. Ambient Temp(celsius)-22.0,Tissue Temp(celsius)-21.8;Test Date-18/Jun/2011

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

Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 2.03 \text{ mho/m}$ ;  $\epsilon_r = 51.9$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section:Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(6.76, 6.76, 6.76); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Body, Ch.11, Ant.Intenna, Bat.Standard, Side A/Area Scan (51x71x1): Measurement grid:

$dx=20\text{mm}$ ,  $dy=20\text{mm}$

Maximum value of SAR (interpolated) =  $0.086 \text{ mW/g}$

Body, Ch.11, Ant.Intenna, Bat.Standard, Side A/Zoom Scan (5x5x7)/Cube 0 Measurement

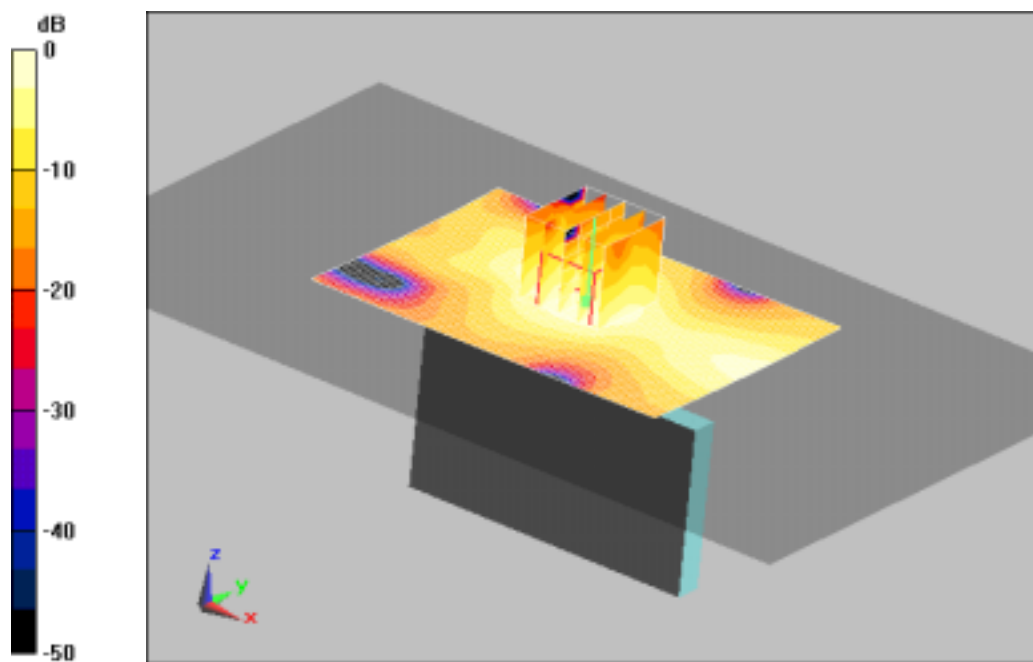
grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $5.95\text{V/m}$ ; Power Drift =  $0.17 \text{ dB}$

Peak SAR(extrapolated) =  $0.139 \text{ W/kg}$

SAR(1 g) =  $0.075 \text{ mW/g}$ ; SAR(10 g) =  $0.040 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.081 \text{ mW/g}$



0 dB =  $0.08\text{mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN Body (Job No : FI-127)

Procedure Name: Body, Ch.11, Ant.Intenna, Bat.Standard, Front

Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-21.9;Test Date-18/Jul/2011

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

Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 2.03 \text{ mho/m}$ ;  $\epsilon_r = 51.9$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section:Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(6.76, 6.76, 6.76); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Body, Ch.11, Ant.Intenna, Bat.Standard, Front/Area Scan (101x141x1): Measurement  
grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.111 mW/g

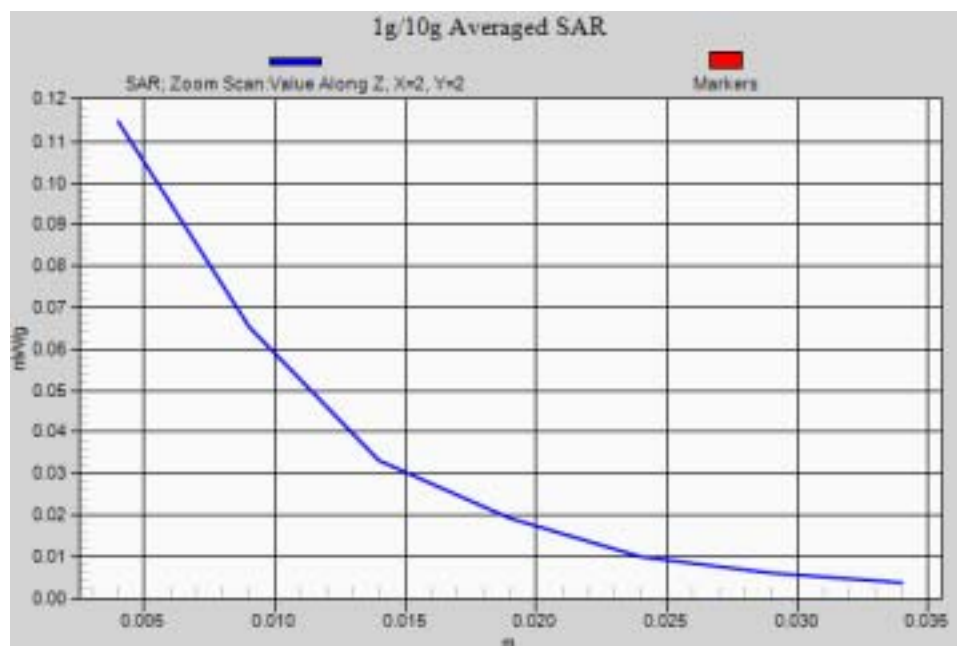
Body, Ch.11, Ant.Intenna, Bat.Standard, Front/Zoom Scan (5x5x7)/Cube 0: Measurement  
grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.18V/m; Power Drift = 0.03 dB

Peak SAR(extrapolated) = 0.186 W/g

SAR(1 g) = 0.104 mW/g; SAR(10 g) = 0.056 mW/g

Maximum value of SAR (measured) = 0.115 mW/g



DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN 5GHz Left (Job No. : FI-127)

Procedure Name: Cheek, Ch48, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System:WLAN 5000MHz; Frequency: 5240 MHzDuty Cycle: 1:1  
Medium parameters used:  $f = 5240 \text{ MHz}$ ,  $\sigma = 4.85 \text{ mho/m}$ ,  $\epsilon_r = 34.6$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.61, 4.61, 4.61); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

Cheek, Ch48, Ant.Intenna, Bat.Standard/Area Scan (81x141x1): Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.248 mW/g

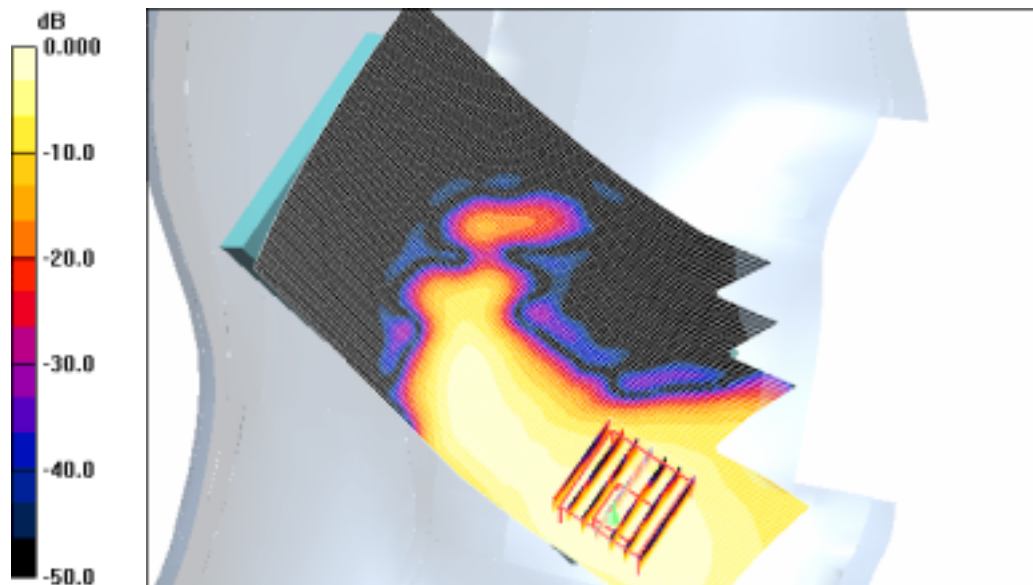
Cheek, Ch48, Ant.Intenna, Bat.Standard/Zoom Scan 2 (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.86V/m; Power Drift = -0.52 dB

Peak SAR(extrapolated) = 0.461 W/g

SAR(1 g) = 0.139 mW/g; SAR(10 g) = 0.053 mW/g

Maximum value of SAR (measured) = 0.251 mW/g



0 dB = 0.25mW/g

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN 5GHz Left (Job No. : FI-127)

Procedure Name: Tilt, Ch.48, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System:WLAN 5000MHz; Frequency: 5240 MHzDuty Cycle: 1:1  
Medium parameters used:  $f = 5240 \text{ MHz}$   $\sigma = 4.85 \text{ mho/m}$ ;  $\epsilon_r = 34.6$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.61, 4.61, 4.61); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

Tilt, Ch.48, Ant.Intenna, Bat.Standard/Zoom Scan (7x7x11)/Cube 0: Measurement grid:

$dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 2.96V/m; PowerDrift = 0.008 dB

Peak SAR(extrapolated) = 0.092 W/g

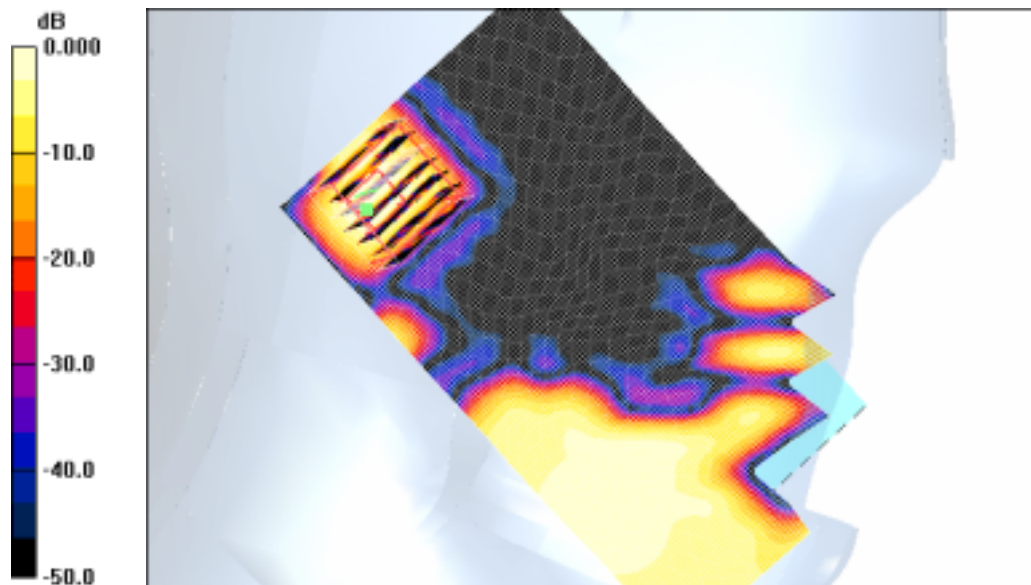
SAR(1 g) = 0.019 mW/g; SAR(10 g) = 0.00585 mW/g

Maximum value of SAR (measured) = 0.046 mW/g

Tilt, Ch.48, Ant.Intenna, Bat.Standard/Area Scan (81x141x1): Measurement grid:

$dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.074 mW/g



0 dB = 0.074mW/g

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN 5GHz Head Right (Job No : FI-127)

Procedure Name: Cheek, Ch48, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System:WLAN 5000MHz; Frequency: 5240 MHzDuty Cycle: 1:1  
Medium parameters used:  $f = 5240 \text{ MHz}$   $\sigma = 4.85 \text{ mho/m}$ ;  $\epsilon_r = 34.6$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.61, 4.61, 4.61); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

Cheek, Ch48, Ant.Intenna, Bat.Standard/Zoom Scan 2 (7x7x11)/Cube 0: Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value =  $3.00\text{V/m}$ ; Power Drift =  $-0.08 \text{ dB}$

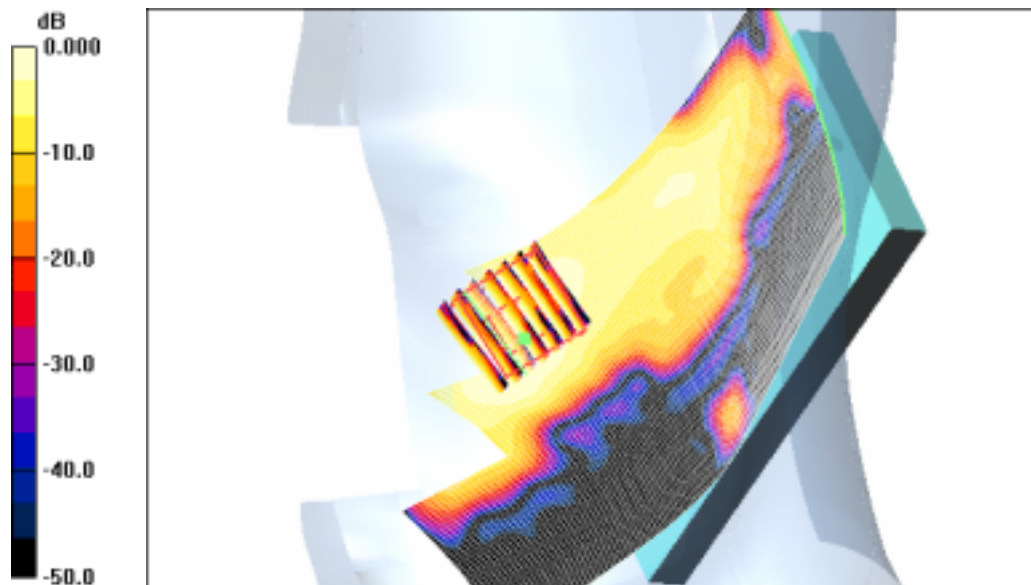
Peak SAR(extrapolated) =  $0.418 \text{ W/kg}$

SAR(1 g) =  $0.139 \text{ mW/g}$ ; SAR(10 g) =  $0.052 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.261 \text{ mW/g}$

Cheek, Ch48, Ant.Intenna, Bat.Standard/Area Scan (81x141x1): Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) =  $0.249 \text{ mW/g}$



0 dB =  $0.29\text{mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN 5GHz Head Right (Job No : FI-127)

Procedure Name: Tilt, Ch.48, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System:WLAN 5000MHz; Frequency: 5240 MHzDuty Cycle: 1:1  
Medium parameters used:  $f = 5240 \text{ MHz}$   $\sigma = 4.85 \text{ mho/m}$ ;  $\epsilon_r = 34.6$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.61, 4.61, 4.61); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

Tilt, Ch.48, Ant.Intenna, Bat.Standard/Area Scan 2 (81x141x1): Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.141 mW/g

Tilt, Ch.48, Ant.Intenna, Bat.Standard/Zoom Scan 2 (7x7x11)/Cube 0: Measurement grid:

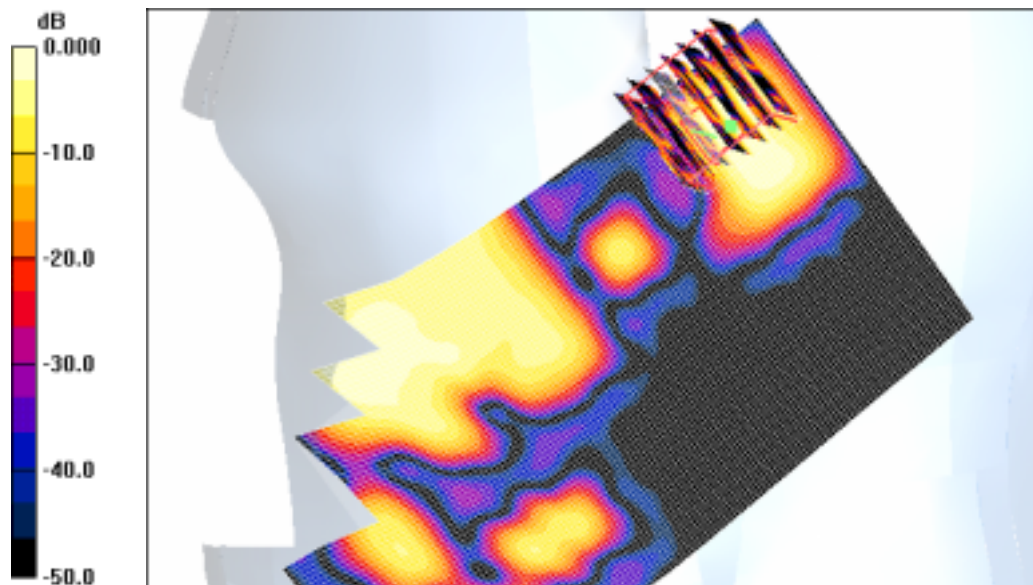
dx=4mm, dy=4mm, dz=2mm

Reference Value = 2.42V/m; PowerDrift = 0.18 dB

Peak SAR(extrapolated) = 0.151 W/g

SAR(1 g) = 0.029 mW/g; SAR(10 g) = 0.0065 mW/g

Maximum value of SAR (measured) = 0.064 mW/g



0 dB = 0.004mW/g

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN 5GHz Left (Job No. : FI-127)

Procedure Name: Cheek, Ch64, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System:WLAN 5000MHz; Frequency: 5320 MHzDuty Cycle: 1:1  
Medium parameters used:  $f = 5320 \text{ MHz}$   $\sigma = 4.86 \text{ mho/m}$ ;  $\epsilon_r = 35$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.4, 4.4, 4.4); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

Cheek, Ch64, Ant.Intenna, Bat.Standard/Zoom Scan 2 (7x7x11)/Cube 0: Measurement

grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value =  $4.05\text{V/m}$ ; Power Drift =  $-0.05 \text{ dB}$

Peak SAR(extrapolated) =  $0.355 \text{ W/kg}$

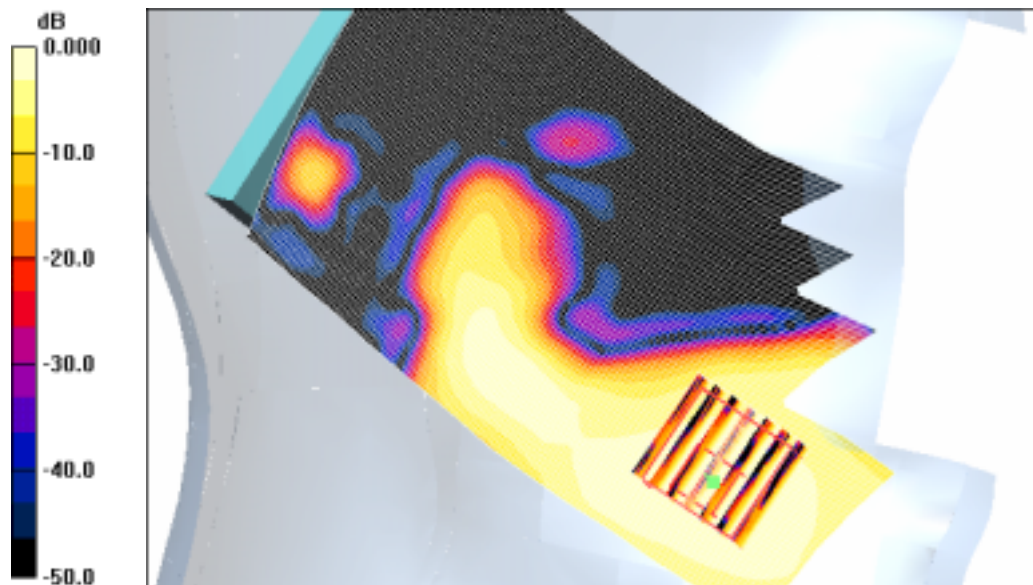
SAR(1 g) =  $0.107 \text{ mW/g}$ ; SAR(10 g) =  $0.040 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.189 \text{ mW/g}$

Cheek, Ch64, Ant.Intenna, Bat.Standard/Area Scan (81x141x1): Measurement grid:

$dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) =  $0.196 \text{ mW/g}$



0 dB =  $0.196 \text{ mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN 5GHz Left (Job No. : FI-127)

Procedure Name: Tilt, Ch.64, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System:WLAN 5000MHz; Frequency: 5320 MHzDuty Cycle: 1:1

Medium parameters used:  $f = 5320 \text{ MHz}$   $\sigma = 4.86 \text{ mho/m}$ ;  $\epsilon_r = 35$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.4, 4.4, 4.4); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

Tilt, Ch.64, Ant.Intenna, Bat.Standard/Zoom Scan 2(7x7x11)/Cube 0: Measurement grid:

$dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value =  $3.05\text{V/m}$ ; PowerDrift =  $0.07\text{ dB}$

Peak SAR(extrapolated) =  $0.157 \text{ W/kg}$

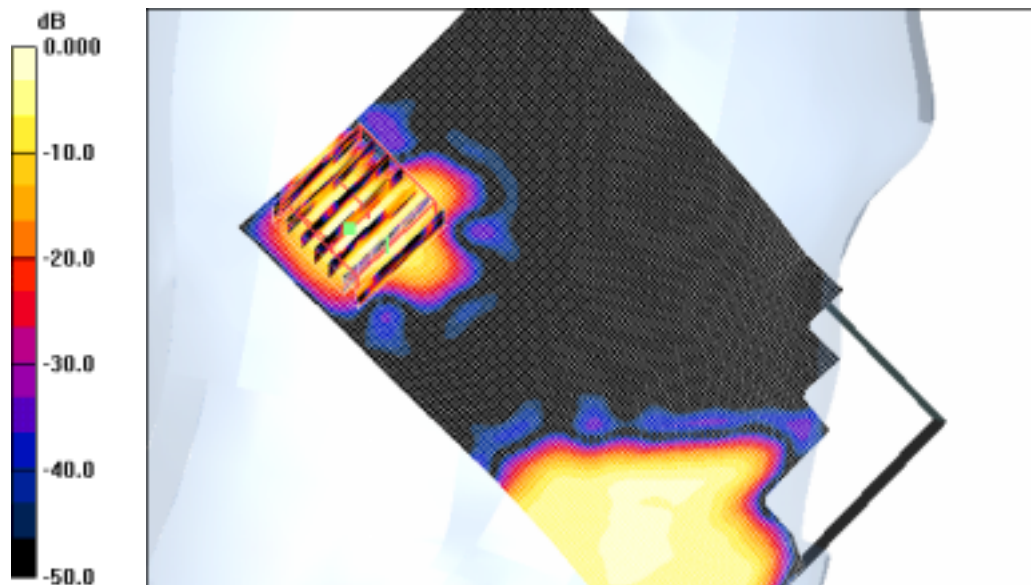
SAR(1 g) =  $0.016 \text{ mW/g}$ ; SAR(10 g) =  $0.00539 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.039 \text{ mW/g}$

Tilt, Ch.64, Ant.Intenna, Bat.Standard/Area Scan (81x141x1): Measurement grid:

$dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) =  $0.096 \text{ mW/g}$



0 dB =  $0.001 \text{ mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN 5GHz Head Right (Job No : FI-127)

Procedure Name: Cheek, Ch64, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System:WLAN 5000MHz; Frequency: 5320 MHzDuty Cycle: 1:1  
Medium parameters used:  $f = 5320 \text{ MHz}$   $\sigma = 4.86 \text{ mho/m}$ ;  $\epsilon_r = 35$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.4, 4.4, 4.4); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

Cheek, Ch64, Ant.Intenna, Bat.Standard/Area Scan (81x141x1): Measurement grid:

$dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) =  $0.281 \text{ mW/g}$

Cheek, Ch64, Ant.Intenna, Bat.Standard/Zoom Scan (7x7x11)/Cube 0: Measurement grid:

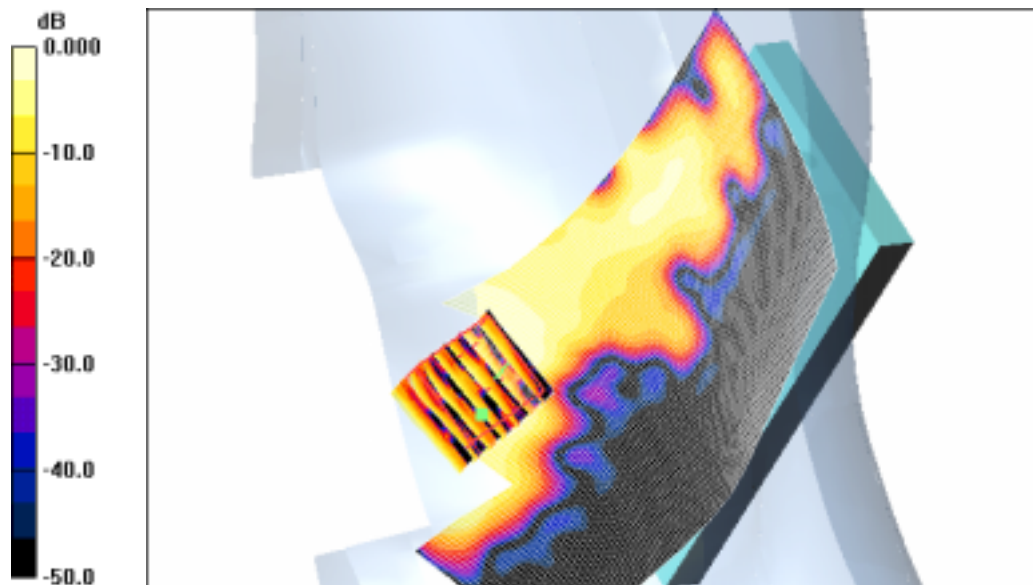
$dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value =  $2.95\text{V/m}$ ; PowerDrift =  $0.004 \text{ dB}$

Peak SAR(extrapolated) =  $0.206 \text{ W/kg}$

SAR(1 g) =  $0.083 \text{ mW/g}$ ; SAR(10 g) =  $0.027 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.152 \text{ mW/g}$



0 dB =  $0.12 \text{ mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN 5GHz Head Right (Job No : FI-127)

Procedure Name: Tilt, Ch.64, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System:WLAN 5000MHz; Frequency: 5320 MHzDuty Cycle: 1:1  
Medium parameters used:  $f = 5320 \text{ MHz}$   $\sigma = 4.86 \text{ mho/m}$ ;  $\epsilon_r = 35$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.4, 4.4, 4.4); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

Tilt, Ch.64, Ant.Intenna, Bat.Standard/Area Scan (81x141x1): Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.151 mW/g

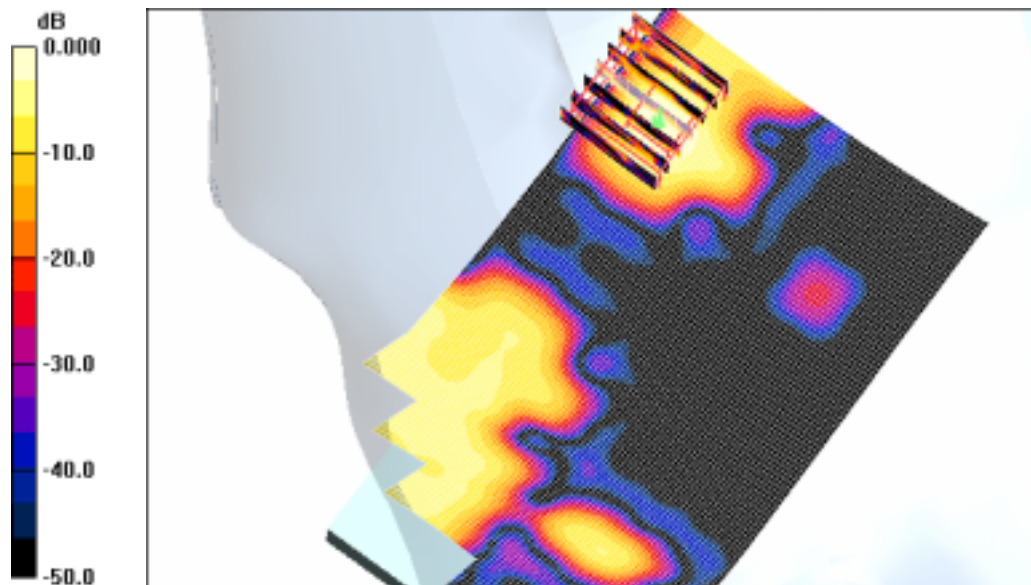
Tilt, Ch.64, Ant.Intenna, Bat.Standard/Zoom Scan 22 (7x7x11)/Cube 0 Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 2.32V/m; PowerDrift = -0.009 dB

Peak SAR(extrapolated) = 0.167 W/g

SAR(1 g) = 0.037 mW/g; SAR(10 g) = 0.00719 mW/g

Maximum value of SAR (measured) = 0.088 mW/g



0 dB = 0.08mW/g

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN 5GHz Left (Job No. : FI-127)

Procedure Name: Cheek, Ch100, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System:WLAN 5000MHz; Frequency: 5500 MHzDuty Cycle: 1:1  
Medium parameters used:  $f = 5500 \text{ MHz}$   $\sigma = 5.05 \text{ mho/m}$ ;  $\epsilon_r = 34.9$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.23, 4.23, 4.23); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

Cheek, Ch.100, Ant.Intenna, Bat.Standard/Zoom Scan 2 (7x7x11)/Cube 0: Measurement

grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value =  $4.11\text{V/m}$ ; Power Drift =  $-0.08 \text{ dB}$

Peak SAR(extrapolated) =  $0.512 \text{ W/kg}$

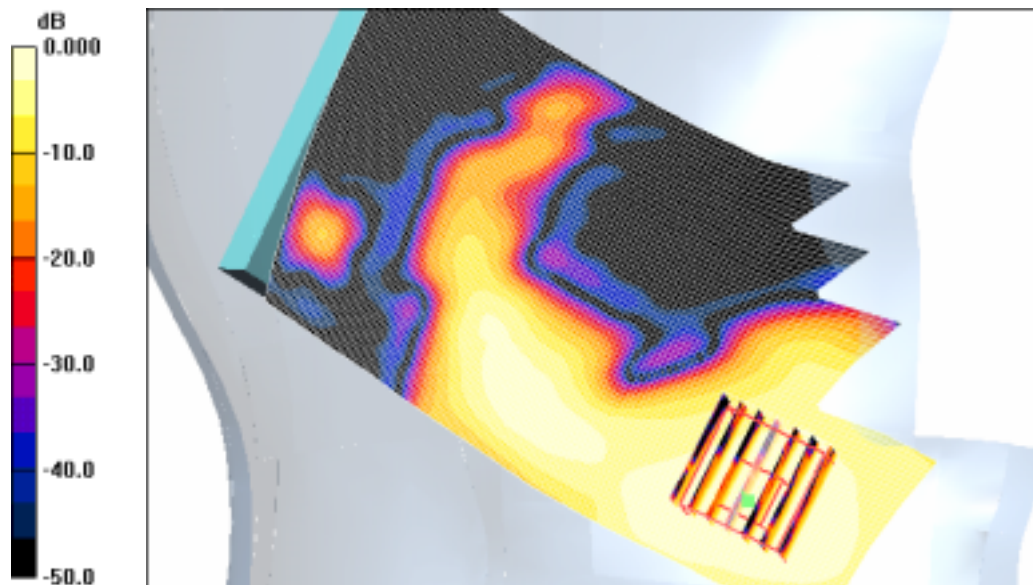
SAR(1 g) =  $0.151 \text{ mW/g}$ ; SAR(10 g) =  $0.058 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.270 \text{ mW/g}$

Cheek, Ch.100, Ant.Intenna, Bat.Standard/Area Scan (1x14x1): Measurement grid:

$dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) =  $0.270 \text{ mW/g}$



0 dB =  $0.270\text{mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN 5GHz Left (Job No. : FI-127)

Procedure Name: Tilt, Ch100, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System:WLAN 5000MHz; Frequency: 5500 MHzDuty Cycle: 1:1  
Medium parameters used:  $f = 5500 \text{ MHz}$   $\sigma = 5.05 \text{ mho/m}$ ;  $\epsilon_r = 34.9$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.23, 4.23, 4.23); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

Tilt, Ch100, Ant.Intenna, Bat.Standard/Area Scan (81x141x1): Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.126 mW/g

Tilt, Ch100, Ant.Intenna, Bat.Standard/Zoom Scan (7x7x11)/Cube Q: Measurement grid:

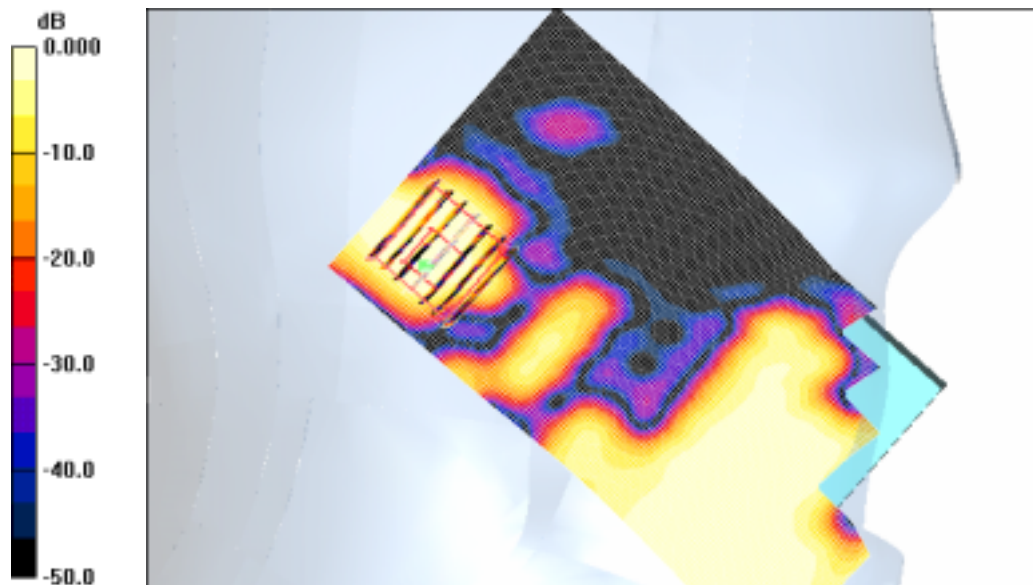
dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.19V/m; PowerDrift = -0.69 dB

Peak SAR(extrapolated) = 0.085 W/g

SAR(1 g) = 0.025 mW/g; SAR(10 g) = 0.00834 mW/g

Maximum value of SAR (measured) = 0.057 mW/g



0 dB = 0.07mW/g

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN 5GHz Head Right (Job No : FI-127)

Procedure Name: Cheek, Ch100, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System:WLAN 5000MHz; Frequency: 5500 MHzDuty Cycle: 1:1  
Medium parameters used:  $f = 5500 \text{ MHz}$   $\sigma = 5.05 \text{ mho/m}$ ;  $\epsilon_r = 34.9$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.23, 4.23, 4.23); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

Cheek, Ch.100, Ant.Intenna, Bat.Standard/Area Scan 81x141x1): Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.365 mW/g

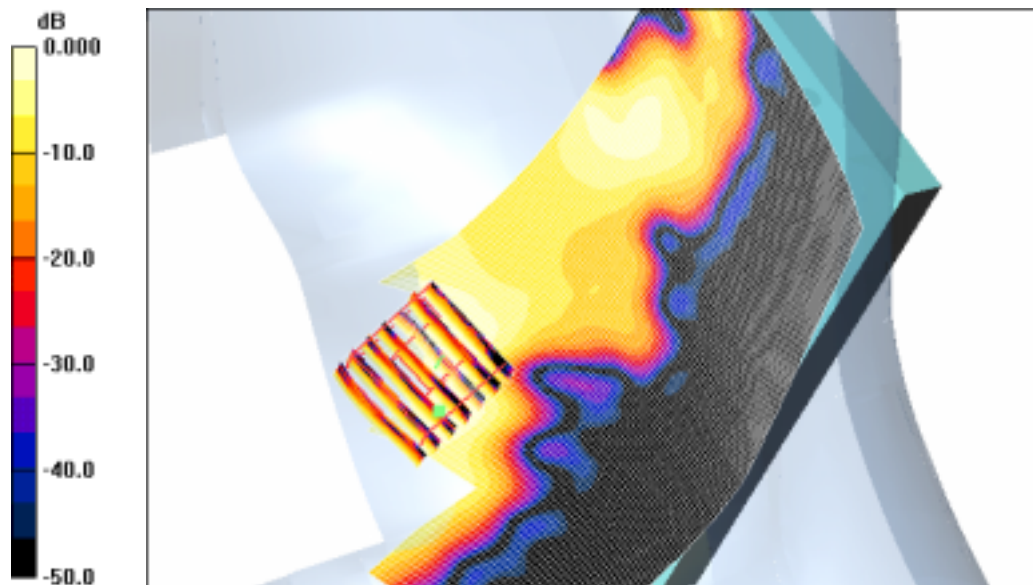
Cheek, Ch.100, Ant.Intenna, Bat.Standard/Zoom Scan 2 (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 5.38V/m; PowerDrift = -0.01 dB

Peak SAR(extrapolated) = 0.355 W/g

SAR(1 g) = 0.114 mW/g; SAR(10 g) = 0.042 mW/g

Maximum value of SAR (measured) = 0.215 mW/g



0 dB = 0.25mW/g

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN 5GHz Head Right (Job No : FI-127)

Procedure Name: Tilt, Ch.100, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System: WLAN 5000MHz; Frequency: 5500 MHzDuty Cycle: 1:1  
Medium parameters used:  $f = 5500 \text{ MHz}$   $\sigma = 5.05 \text{ mho/m}$ ;  $\epsilon_r = 34.9$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.23, 4.23, 4.23); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

Tilt, Ch.100, Ant.Intenna, Bat.Standard/Area Scan (81x141x1): Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.233 mW/g

Tilt, Ch.100, Ant.Intenna, Bat.Standard/Zoom Scan (7x7x11)/Cube 0: Measurement grid:

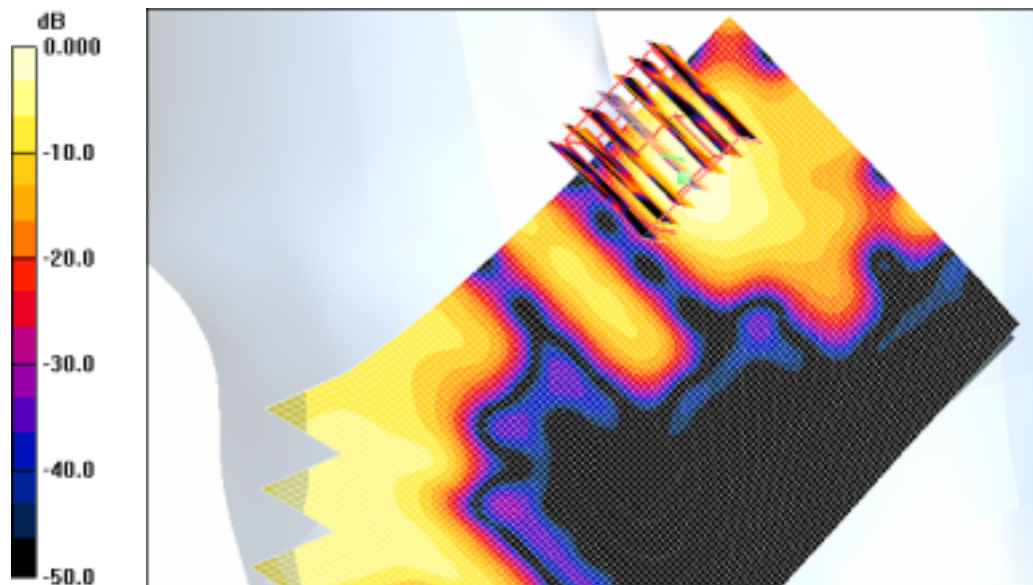
dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.93V/m; PowerDrift = -0.63 dB

Peak SAR(extrapolated) = 0.238 W/g

SAR(1 g) = 0.062 mW/g; SAR(10 g) = 0.013 mW/g

Maximum value of SAR (measured) = 0.142 mW/g



0 dB = 0.142mW/g

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN 5GHz Left (Job No. : FI-127)

Procedure Name: Cheek, Ch165, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System:WLAN 5000MHz; Frequency: 5825 MHzDuty Cycle: 1:1  
Medium parameters used:  $f = 5825 \text{ MHz}$ ,  $\sigma = 5.48 \text{ mho/m}$ ,  $\epsilon_r = 34.5$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.07, 4.07, 4.07); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

Cheek, Ch.165, Ant.Intenna, Bat.Standard/Zoom Scan (7x7x11)/Cube 0: Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 4.20V/m; Power Drift = -0.31 dB

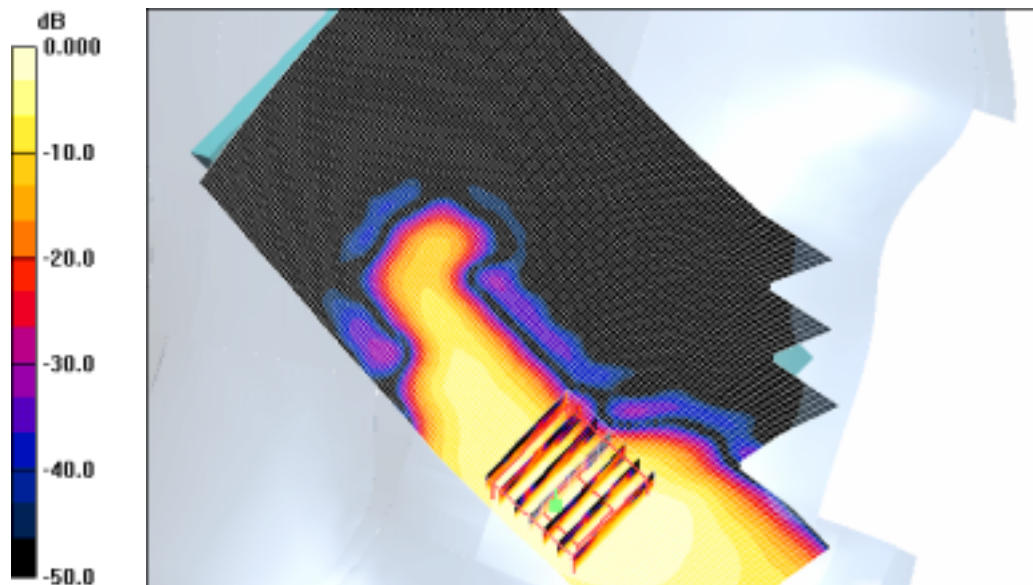
Peak SAR(extrapolated) = 0.369 W/kg

SAR(1 g) = 0.112 mW/g; SAR(10 g) = 0.038 mW/g

Maximum value of SAR (measured) = 0.209 mW/g

Cheek, Ch.165, Ant.Intenna, Bat.Standard/Area Scan (1x141x1): Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

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



0 dB = 0.23mW/g

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN 5GHz Left (Job No. : FI-127)

Procedure Name: Tilt, Ch165, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System:WLAN 5000MHz; Frequency: 5825 MHzDuty Cycle: 1:1  
Medium parameters used:  $f = 5825 \text{ MHz}$ ,  $\sigma = 5.48 \text{ mho/m}$ ,  $\epsilon_r = 34.5$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.07, 4.07, 4.07); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

Tilt, Ch165, Ant.Intenna, Bat.Standard/Area Scan (81x141x1): Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.062 mW/g

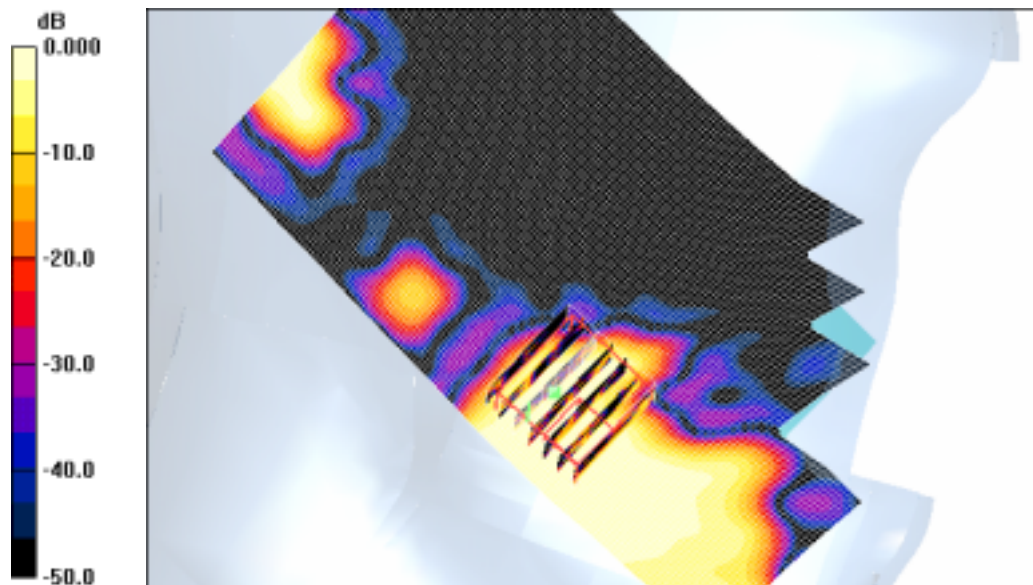
Tilt, Ch165, Ant.Intenna, Bat.Standard/Zoom Scan 22 (7x7x11)/Cube 0 Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 2.99V/m; PowerDrift = 0.032 dB

Peak SAR(extrapolated) = 0.103 W/kg

SAR(1 g) = 0.014 mW/g; SAR(10 g) = 0.00369 mW/g

Maximum value of SAR (measured) = 0.035 mW/g



0 dB = 0.08mW/g

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN 5GHz Head Right (Job No : FI-127)

Procedure Name: Cheek, Ch165, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System:WLAN 5000MHz; Frequency: 5825 MHzDuty Cycle: 1:1  
Medium parameters used:  $f = 5825 \text{ MHz}$ ,  $\sigma = 5.48 \text{ mho/m}$ ,  $\epsilon_r = 34.5$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.07, 4.07, 4.07); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

Cheek, Ch.165, Ant.Intenna, Bat.Standard/Area Scan (81x141x1): Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.110 mW/g

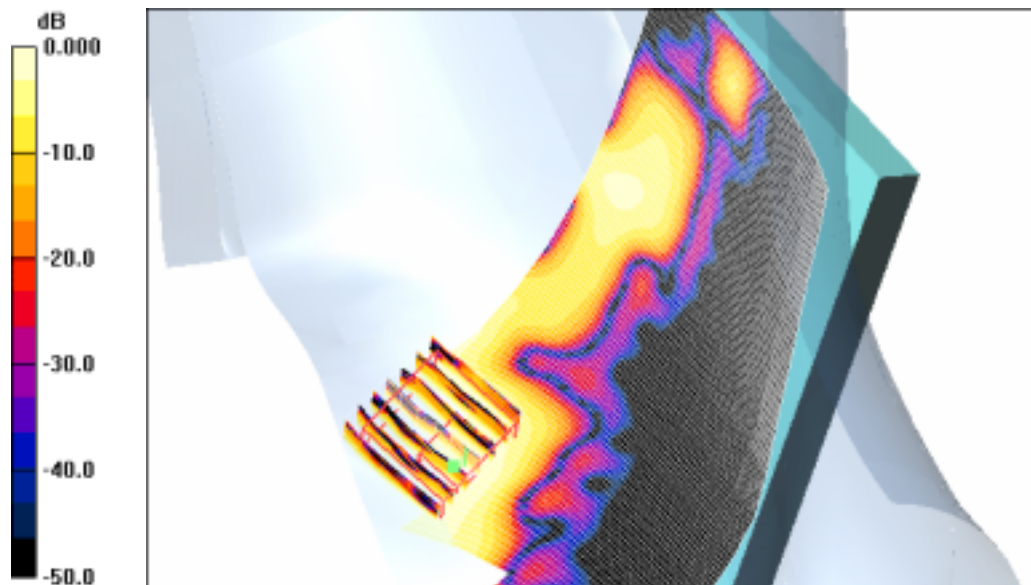
Cheek, Ch.165, Ant.Intenna, Bat.Standard/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 5.32V/m; PowerDrift = 0.067 dB

Peak SAR(extrapolated) = 0.155 W/g

SAR(1 g) = 0.054 mW/g; SAR(10 g) = 0.020 mW/g

Maximum value of SAR (measured) = 0.103 mW/g



0 dB = 0.10mW/g

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN 5GHz Head Right (Job No : FI-127)

Procedure Name: Tilt, Ch.165, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System:WLAN 5000MHz; Frequency: 5825 MHzDuty Cycle: 1:1  
Medium parameters used:  $f = 5825 \text{ MHz}$ ,  $\sigma = 5.48 \text{ mho/m}$ ,  $\epsilon_r = 34.5$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.07, 4.07, 4.07); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

Tilt, Ch.165, Ant.Intenna, Bat.Standard/Zoom Scan 2(7x7x11)/Cube 0: Measurement

grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value =  $1.44\text{V/m}$ ; PowerDrift =  $-0.04 \text{ dB}$

Peak SAR(extrapolated) =  $0.172 \text{ W/kg}$

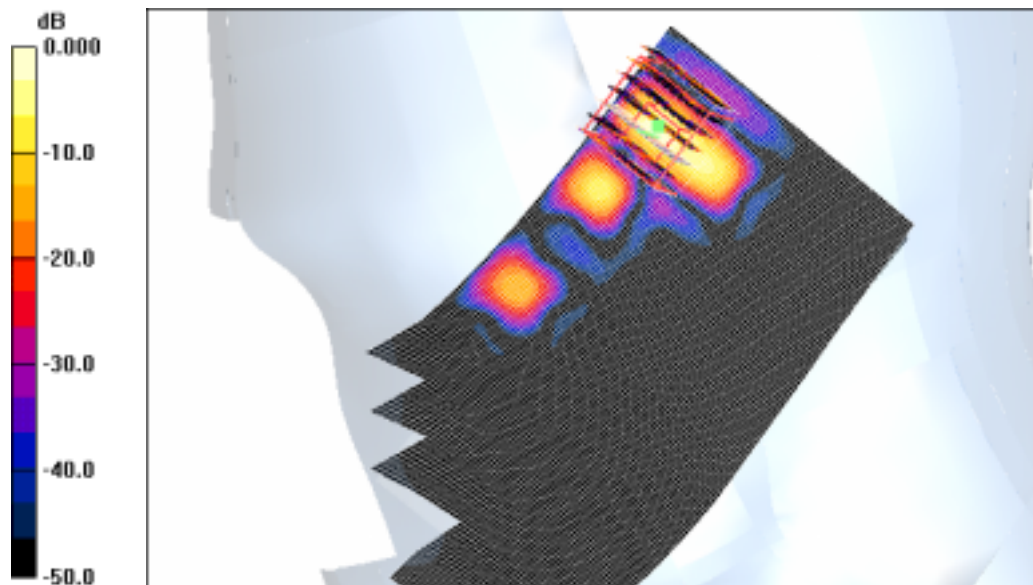
SAR(1 g) =  $0.033 \text{ mW/g}$ ; SAR(10 g) =  $0.00614 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.088 \text{ mW/g}$

Tilt, Ch.165, Ant.Intenna, Bat.Standard/Area Scan (81x41x1): Measurement grid:

$dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) =  $0.094 \text{ mW/g}$



0 dB =  $0.001 \text{ mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 WLAN 5GHz Left (Job No. : FI-127)

Procedure Name: Cheek, Ch100, Ant.Intenna, Bat.Standard

Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-28/Jul/2011

Communication System:WLAN 5000MHz; Frequency: 5500 MHzDuty Cycle: 1:1  
Medium parameters used:  $f = 5500 \text{ MHz}$ ,  $\sigma = 5.05 \text{ mho/m}$ ,  $\epsilon_r = 34.9$ ,  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.23, 4.23, 4.23); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1247
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

**Cheek, Ch.100, Ant.Intenna, Bat.Standard/Zoom Scan 2 (7x7x11)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value =  $4.11\text{V/m}$ ; Power Drift =  $-0.08 \text{ dB}$

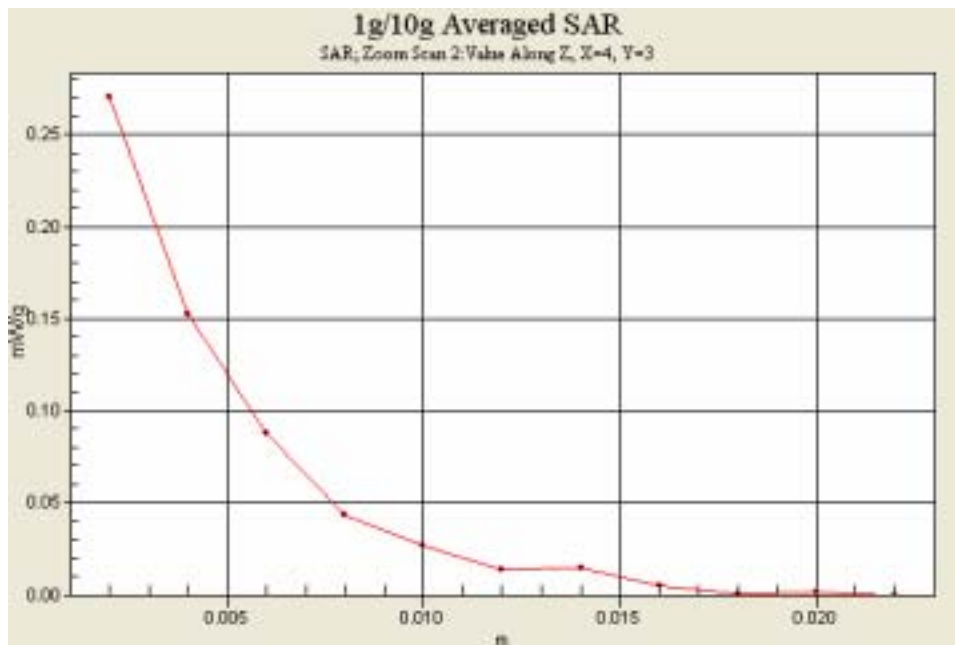
Peak SAR(extrapolated) =  $0.512 \text{ W/kg}$

**SAR(1 g) =  $0.151 \text{ mW/g}$ ; SAR(10 g) =  $0.058 \text{ mW/g}$**

Maximum value of SAR (measured) =  $0.270 \text{ mW/g}$

**Cheek, Ch.100, Ant.Intenna, Bat.Standard/Area Scan (1x14x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) =  $0.270 \text{ mW/g}$



DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 5GHz WLAN Body (Job No. : FI-127)

Procedure Name: Body, Ch.48, Ant.Intenna, Bat.Standard, Back

Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-21.8;Test Date-28/Jul/2011

Communication System:5GHz; Frequency: 5240 MHzDuty Cycle: 1:1

Medium parameters used:  $f = 5240 \text{ MHz}$ ,  $\sigma = 5.56 \text{ mho/m}$ ,  $\epsilon_r = 48.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section:Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.02, 4.02, 4.02); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Body, Ch.48, Ant.Intenna, Bat.Standard, Back/Area Scan (81x131x1): Measurement grid:  
 $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) =  $0.197 \text{ mW/g}$

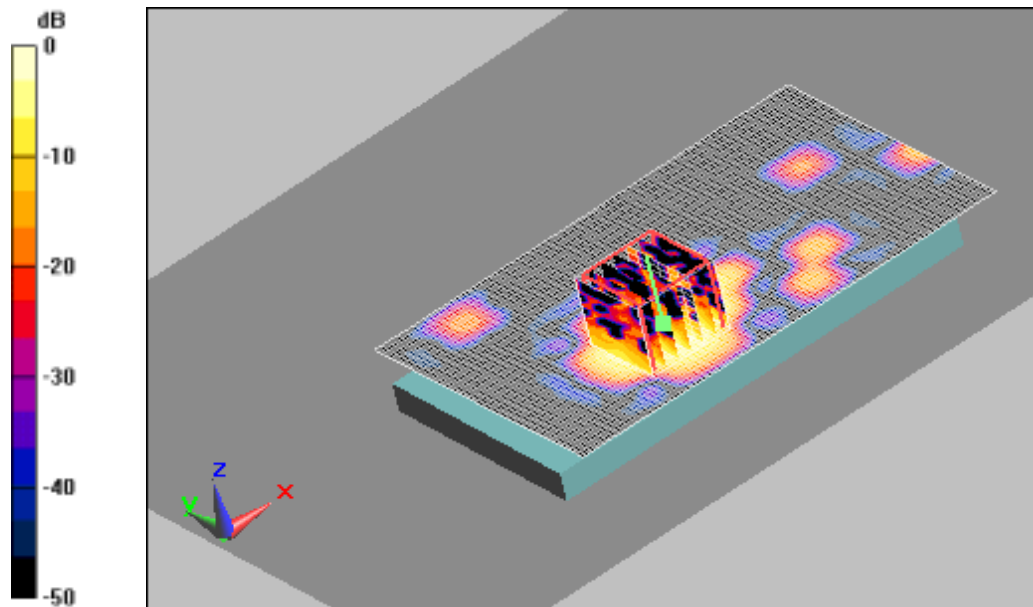
Body, Ch.48, Ant.Intenna, Bat.Standard, Back/Zoom Scan (7x7x11)/Cube 0: Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value =  $1.29\text{V/m}$ ; Power Drift =  $0.1\text{B dB}$

Peak SAR(extrapolated) =  $0.305 \text{ W/g}$

SAR(1 g) =  $0.093 \text{ mW/g}$ ; SAR(10 g) =  $0.027 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.178 \text{ mW/g}$



0 dB =  $0.18\text{mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 5GHz WLAN Body (Job No. : FI-127)

Procedure Name: Body, Ch.64, Ant.Intenna, Bat.Standard, Back

Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-21.8;Test Date-28/Jul/2011

Communication System:5GHz; Frequency: 5320 MHzDuty Cycle: 1:1

Medium parameters used:  $f = 5320 \text{ MHz}$   $\sigma = 5.64 \text{ mho/m}$ ;  $\epsilon_r = 48$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section:Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750;ConvF(3.83, 3.83, 3.83);Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Body, Ch.64, Ant.Intenna, Bat.Standard, Back/Area Scan (81x131x1): Measurement grid:  
dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.177 mW/g

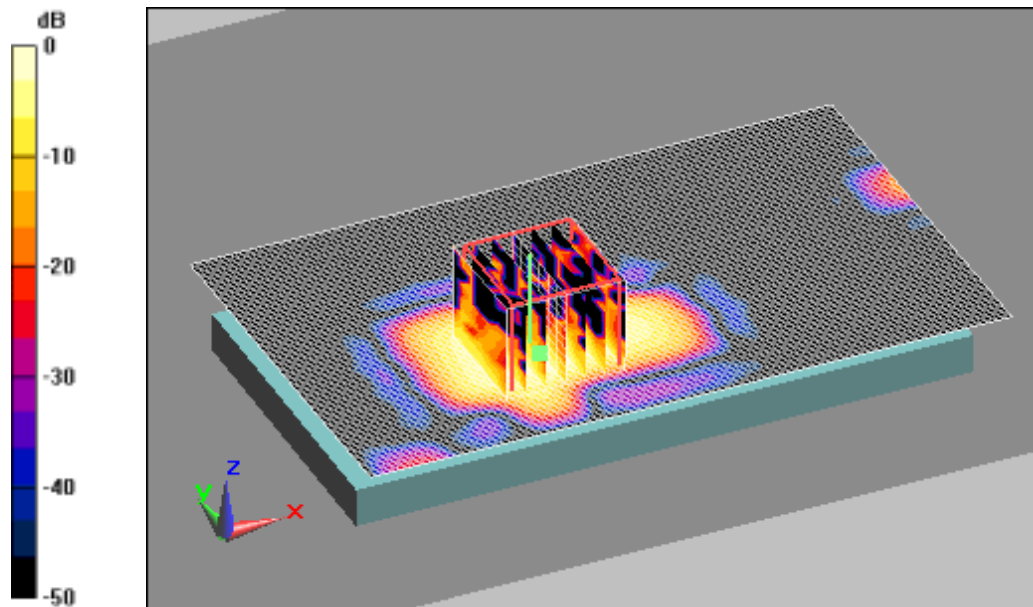
Body, Ch.64, Ant.Intenna, Bat.Standard, Back/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.1 V/m; Power Drift = 0.094 dB

Peak SAR(extrapolated) = 0.266 W/g

SAR(1 g) = 0.075 mW/g; SAR(10 g) = 0.023 mW/g

Maximum value of SAR (measured) = 0.156 mW/g



0 dB = 0.15mW/g

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 5GHz WLAN Body (Job No. : FI-127)

Procedure Name: Body, Ch.100, Ant.Intenna, Bat.Standard, Back

Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-21.8;Test Date-28/Jul/2011

Communication System:5GHz; Frequency: 5500 MHzDuty Cycle: 1:1

Medium parameters used:  $f = 5500 \text{ MHz}$   $\sigma = 5.69 \text{ mho/m}$ ;  $\epsilon_r = 47.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section:Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(3.52, 3.52, 3.52); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Body, Ch.100,Ant.Intenna, BatStandard, Back/Area Scan (81x131x1): Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) =  $0.206 \text{ mW/g}$

Body, Ch.100,Ant.Intenna, BatStandard, Back/Zoom Scan (7x7x11)/Cube 0:

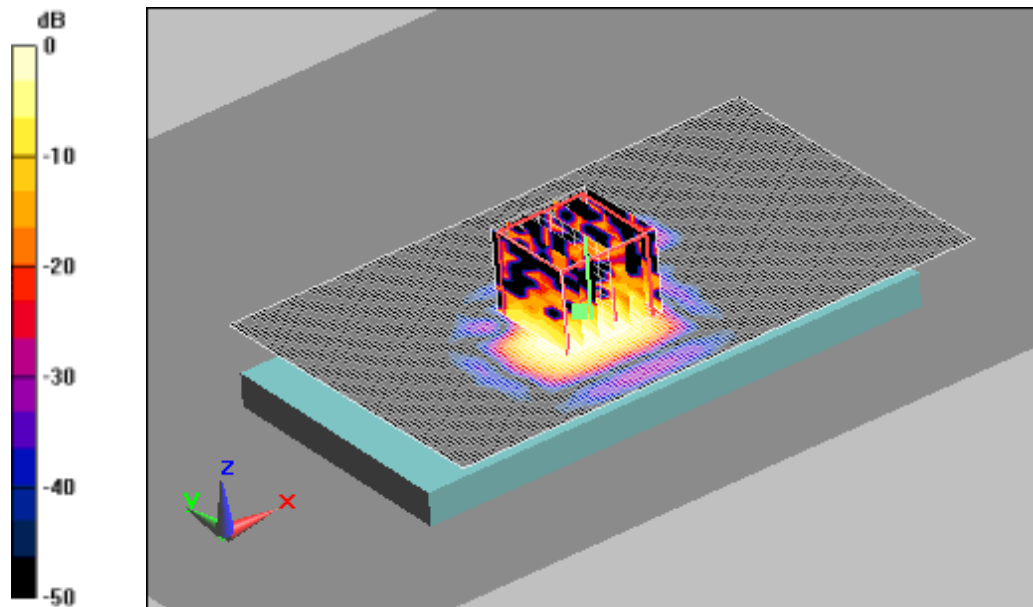
Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value =  $1.08\text{V/m}$ ; PowerDrift =  $-0.110 \text{ dB}$

Peak SAR(extrapolated) =  $0.288 \text{ W/kg}$

SAR(1 g) =  $0.047 \text{ mW/g}$ ; SAR(10 g) =  $0.013 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.109 \text{ mW/g}$



0 dB =  $0.10\text{mW/g}$

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 5GHz WLAN Body (Job No. : FI-127)

Procedure Name: Body, Ch.165 Ant.Intenna, BatStandard, Back

Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-21.8;Test Date-28/Jul/2011

Communication System:5GHz; Frequency: 5825 MHzDuty Cycle: 1:1

Medium parameters used:  $f = 5825$  MHz  $\sigma = 5.93$  mho/m;  $\epsilon_r = 46$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section:Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(3.53, 3.53, 3.53); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Body, Ch.165 Ant.Intenna, BatStandard, Back/Area Scan (81x131x1): Measurement grid:  
dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.162 mW/g

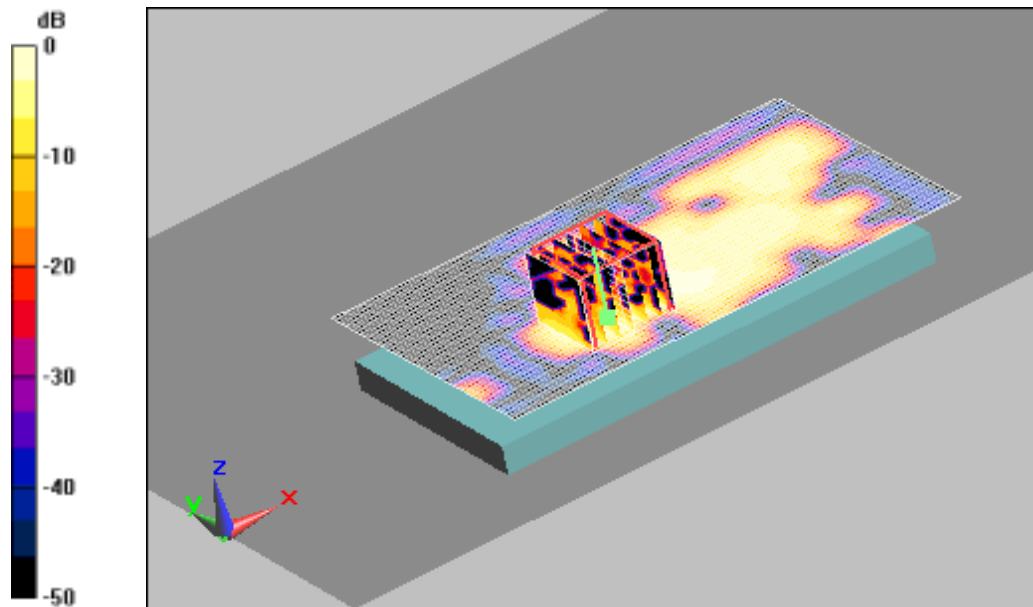
Body, Ch.165 Ant.Intenna, BatStandard, Back/Zoom Scan (7x7x11)/Cube 0: Measurement  
grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.06V/m; PowerDrift = 0.03 dB

Peak SAR(extrapolated) = 0.230 W/g

SAR(1 g) = 0.057 mW/g; SAR(10 g) = 0.018 mW/g

Maximum value of SAR (measured) = 0.133 mW/g



0 dB = 0.13mW/g

DUT: GT-I9108; Serial: FI-127-G

Program Name: GT-I9108 5GHz WLAN Body (Job No. : FI-127)

Procedure Name: Body, Ch.48, Ant.Intenna, Bat.Standard, Back

Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-21.8;Test Date-28/Jul/2011

Communication System:5GHz; Frequency: 5240 MHzDuty Cycle: 1:1

Medium parameters used:  $f = 5240 \text{ MHz}$ ,  $\sigma = 5.56 \text{ mho/m}$ ,  $\epsilon_r = 48.1$ ,  $\rho = 1000 \text{ kg/m}^3$

Phantom section:Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3750; ConvF(4.02, 4.02, 4.02); Calibrated: 2011-04-14
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY4, V4.7 Build 80; SEMCADX Version 13.4 Build 125

Body, Ch.48, Ant.Intenna, Bat.Standard, Back/Area Scan (81x131x1): Measurement grid:  
 $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) =  $0.197 \text{ mW/g}$

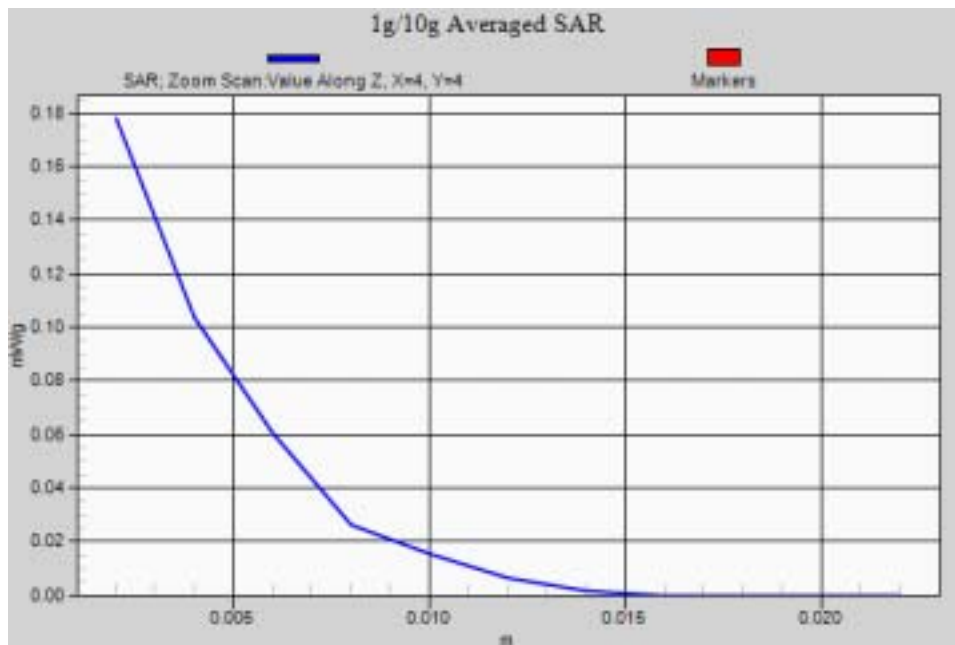
Body, Ch.48, Ant.Intenna, Bat.Standard, Back/Zoom Scan (7x7x11)/Cube 0: Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value =  $1.29\text{V/m}$ ; Power Drift =  $0.1\text{B dB}$

Peak SAR(extrapolated) =  $0.305 \text{ W/kg}$

SAR(1 g) =  $0.093 \text{ mW/g}$ ; SAR(10 g) =  $0.027 \text{ mW/g}$

Maximum value of SAR (measured) =  $0.178 \text{ mW/g}$



## **APPENDIX F**

### **Probe Calibration**



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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

Client **Samsung (Dymstec)**

Certificate No: **EX3-3750\_Apr11**

## CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3750**

Calibration procedure(s) **QA CAL-01.v7, QA CAL-14.v3, 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 ( $22 \pm 3$ )°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards          | ID              | Cal Date (Certificate No.)        | Scheduled Calibration  |
|----------------------------|-----------------|-----------------------------------|------------------------|
| Power meter 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<br><b>Katja Pokovic</b> | Function<br><b>Technical Manager</b> | Signature<br> |
| Approved by:   | Name<br><b>Niels Kuster</b>  | Function<br><b>Quality Manager</b>   | Signature<br> |

Issued: April 14, 2011

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



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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

## 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 $\phi$      | $\phi$ rotation around probe axis                                                                                                                       |
| Polarization $\vartheta$ | $\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center),<br>i.e., $\vartheta = 0$ 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  $\vartheta = 0$  ( $f \leq 900$  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  $E^2$ -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*.
- DCP<sub>x,y,z</sub>**: 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.

# Probe EX3DV4

## SN:3750

Manufactured: March 26, 2010  
Calibrated: April 14, 2011

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

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3750

### Basic Calibration Parameters

|                                                    | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|----------------------------------------------------|----------|----------|----------|-----------|
| Norm ( $\mu\text{V}/(\text{V/m})^2$ ) <sup>A</sup> | 0.45     | 0.51     | 0.55     | ± 10.1 %  |
| DCP (mV) <sup>B</sup>                              | 96.3     | 100.0    | 95.8     |           |

### Modulation Calibration Parameters

| UID   | Communication System Name | PAR  |   | A<br>dB | B<br>dB | C<br>dB | VR<br>mV | Unc <sup>E</sup><br>(k=2) |
|-------|---------------------------|------|---|---------|---------|---------|----------|---------------------------|
| 10000 | CW                        | 0.00 | X | 0.00    | 0.00    | 1.00    | 107.2    | ±3.0 %                    |
|       |                           |      | Y | 0.00    | 0.00    | 1.00    | 120.0    |                           |
|       |                           |      | Z | 0.00    | 0.00    | 1.00    | 115.4    |                           |

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<sup>2</sup>-field uncertainty inside TSL (see Pages 5 and 6).

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

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

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3750

### 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) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|-------|------------|-------------|
| 750                  | 41.9                               | 0.89                            | 8.65    | 8.65    | 8.65    | 0.79  | 0.69       | ± 12.0 %    |
| 850                  | 41.5                               | 0.92                            | 8.26    | 8.26    | 8.26    | 0.79  | 0.70       | ± 12.0 %    |
| 1750                 | 40.1                               | 1.37                            | 7.37    | 7.37    | 7.37    | 0.78  | 0.63       | ± 12.0 %    |
| 1900                 | 40.0                               | 1.40                            | 7.16    | 7.16    | 7.16    | 0.71  | 0.68       | ± 12.0 %    |
| 2450                 | 39.2                               | 1.80                            | 6.47    | 6.47    | 6.47    | 0.65  | 0.66       | ± 12.0 %    |
| 3500                 | 37.9                               | 2.91                            | 5.92    | 5.92    | 5.92    | 0.26  | 1.50       | ± 13.1 %    |
| 5200                 | 36.0                               | 4.66                            | 4.61    | 4.61    | 4.61    | 0.45  | 1.80       | ± 13.1 %    |
| 5300                 | 35.9                               | 4.76                            | 4.40    | 4.40    | 4.40    | 0.45  | 1.80       | ± 13.1 %    |
| 5500                 | 35.6                               | 4.96                            | 4.23    | 4.23    | 4.23    | 0.45  | 1.80       | ± 13.1 %    |
| 5600                 | 35.5                               | 5.07                            | 4.01    | 4.01    | 4.01    | 0.50  | 1.80       | ± 13.1 %    |
| 5800                 | 35.3                               | 5.27                            | 4.07    | 4.07    | 4.07    | 0.50  | 1.80       | ± 13.1 %    |

<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.

## DASY/EASY - Parameters of Probe: EX3DV4- SN:3750

### Calibration Parameter Determined in Body Tissue Simulating Media

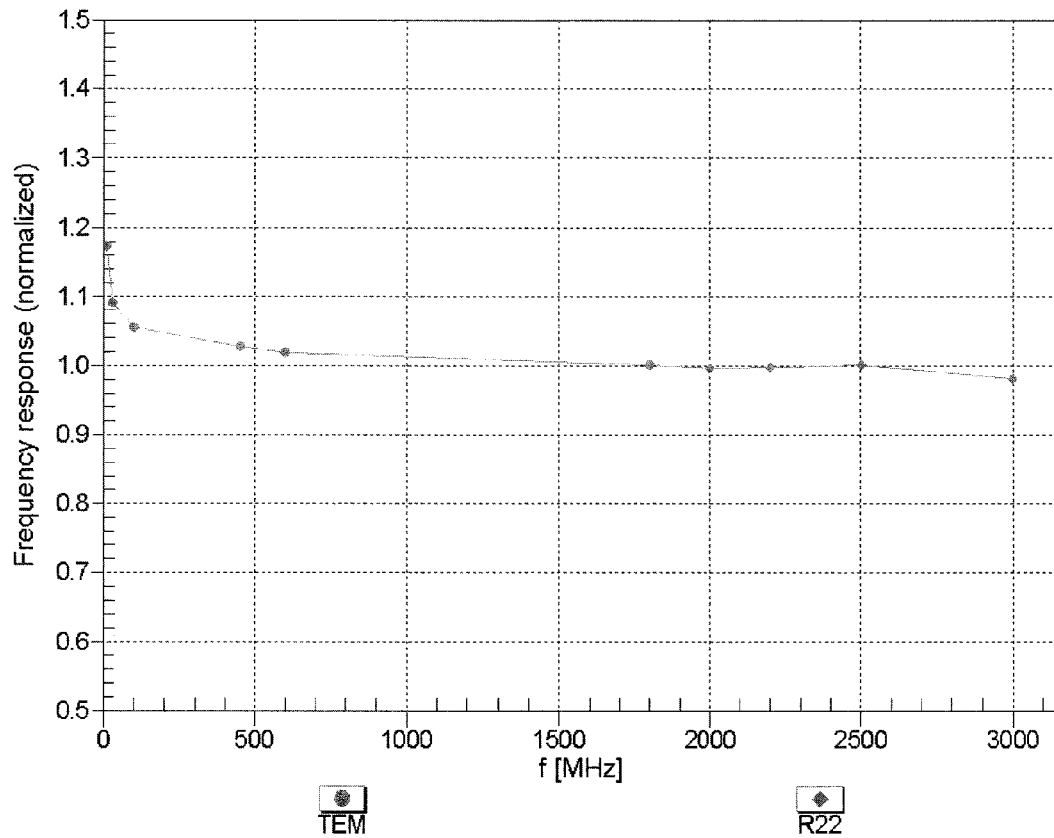
| f (MHz) <sup>C</sup> | Relative Permittivity <sup>F</sup> | Conductivity (S/m) <sup>F</sup> | ConvF X | ConvF Y | ConvF Z | Alpha | Depth (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|-------|------------|-------------|
| 750                  | 55.5                               | 0.96                            | 8.48    | 8.48    | 8.48    | 0.79  | 0.72       | ± 12.0 %    |
| 850                  | 55.2                               | 0.99                            | 8.34    | 8.34    | 8.34    | 0.79  | 0.70       | ± 12.0 %    |
| 1750                 | 53.4                               | 1.49                            | 7.49    | 7.49    | 7.49    | 0.79  | 0.73       | ± 12.0 %    |
| 1900                 | 53.3                               | 1.52                            | 7.12    | 7.12    | 7.12    | 0.79  | 0.70       | ± 12.0 %    |
| 2450                 | 52.7                               | 1.95                            | 6.76    | 6.76    | 6.76    | 0.79  | 0.65       | ± 12.0 %    |
| 3500                 | 51.3                               | 3.31                            | 5.67    | 5.67    | 5.67    | 0.28  | 1.60       | ± 13.1 %    |
| 5200                 | 49.0                               | 5.30                            | 4.02    | 4.02    | 4.02    | 0.50  | 1.90       | ± 13.1 %    |
| 5300                 | 48.9                               | 5.42                            | 3.83    | 3.83    | 3.83    | 0.52  | 1.90       | ± 13.1 %    |
| 5500                 | 48.6                               | 5.65                            | 3.52    | 3.52    | 3.52    | 0.55  | 1.90       | ± 13.1 %    |
| 5600                 | 48.5                               | 5.77                            | 3.35    | 3.35    | 3.35    | 0.58  | 1.90       | ± 13.1 %    |
| 5800                 | 48.2                               | 6.00                            | 3.53    | 3.53    | 3.53    | 0.58  | 1.90       | ± 13.1 %    |

<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.

## Frequency Response of E-Field

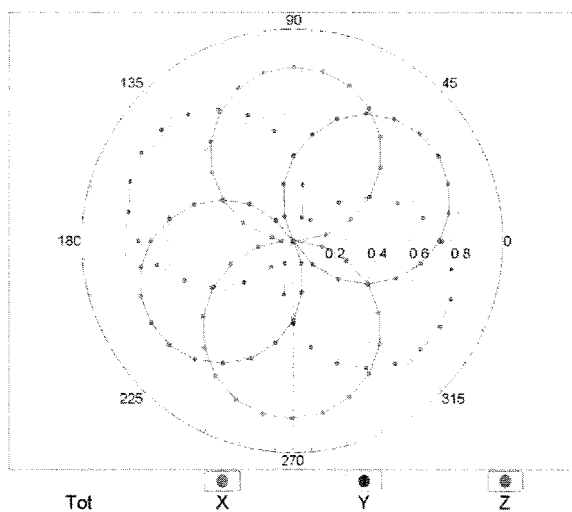
(TEM-Cell:ifi110 EXX, Waveguide: R22)



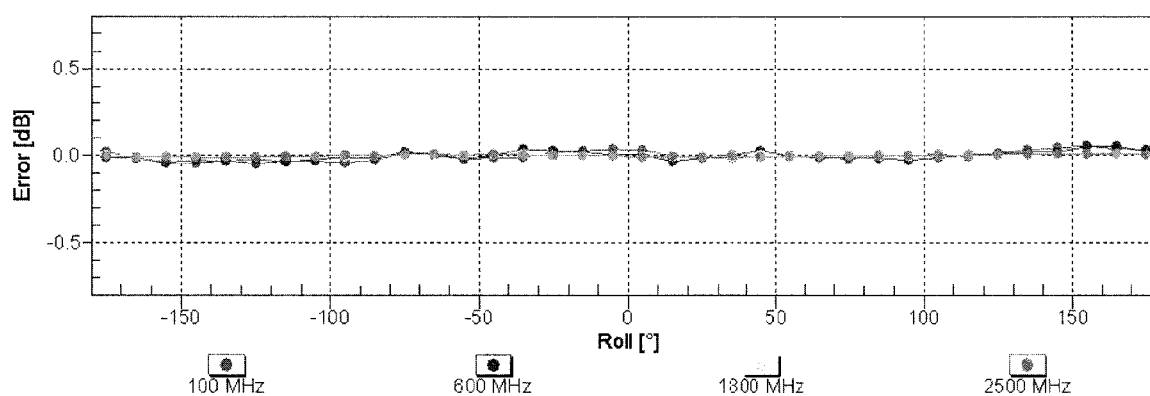
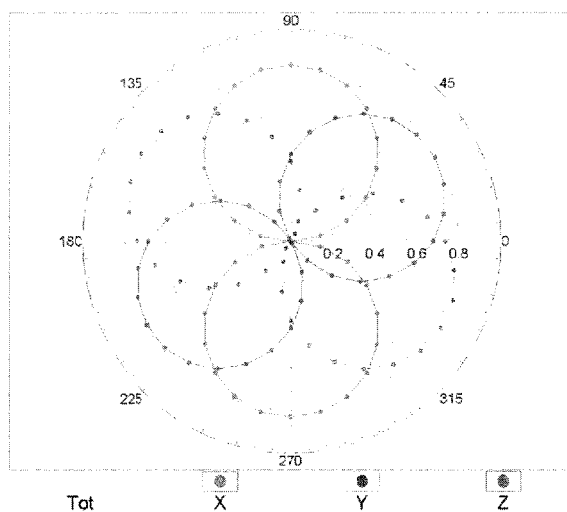
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

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

f=600 MHz,TEM

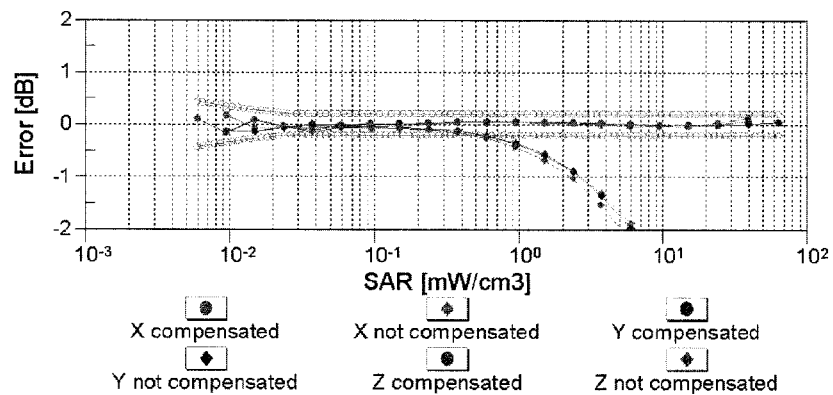
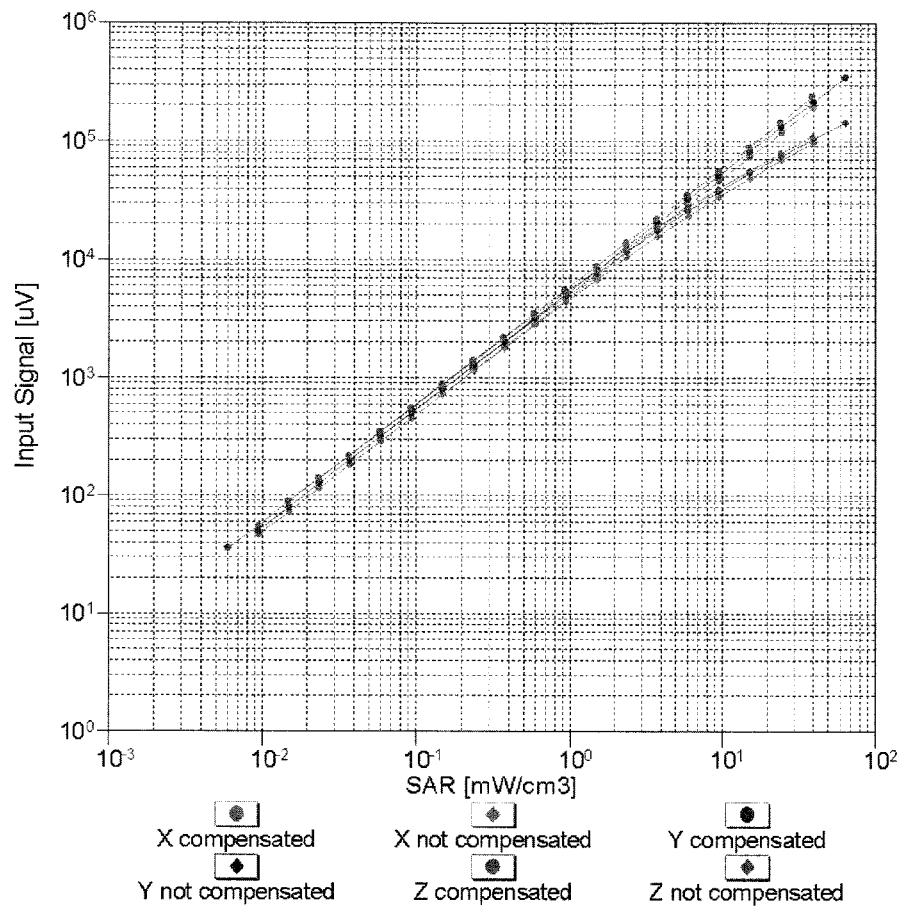


f=1800 MHz,R22



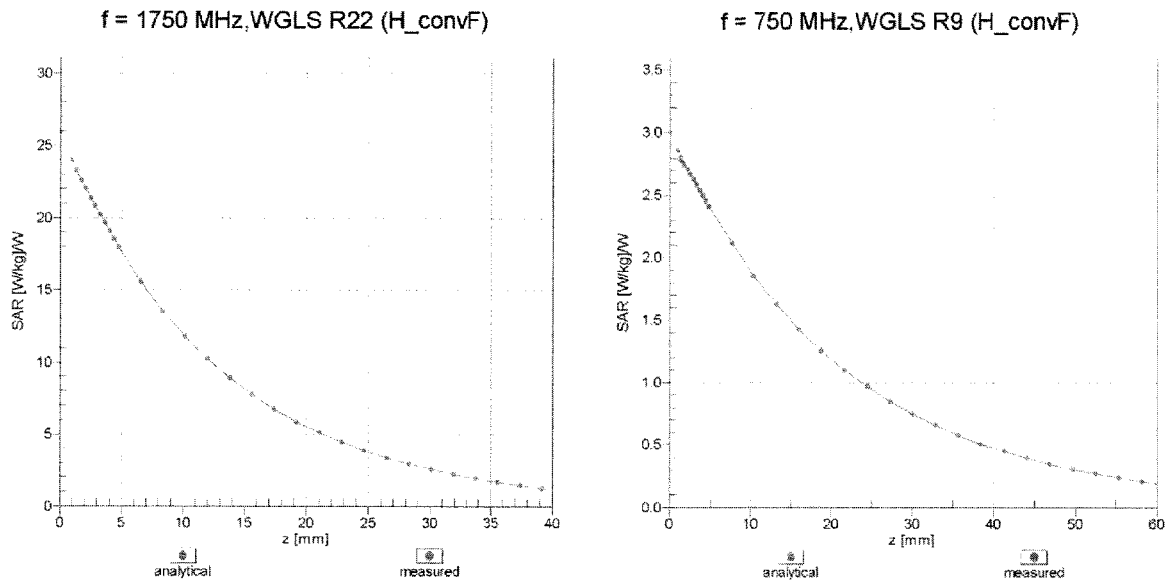
Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

## Dynamic Range $f(\text{SAR}_{\text{head}})$ (TEM cell , $f = 900 \text{ MHz}$ )



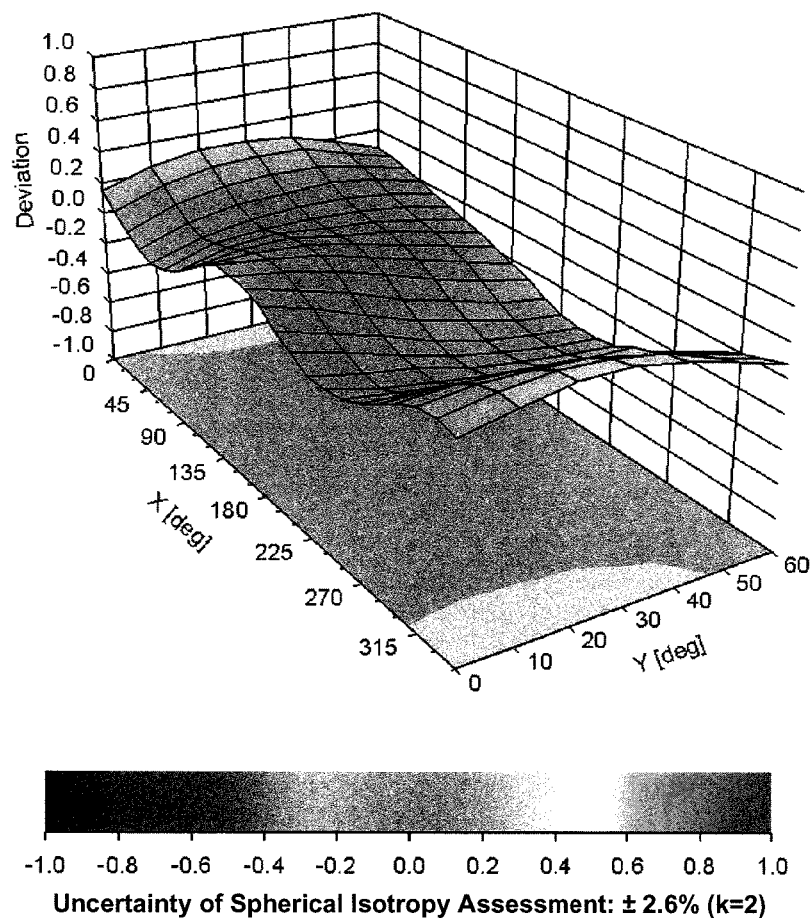
Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

## Conversion Factor Assessment



## Deviation from Isotropy in Liquid

Error ( $\phi, \vartheta$ ),  $f = 900 \text{ MHz}$



## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3750

### 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                                    | 9 mm           |
| Tip Diameter                                  | 2.5 mm         |
| Probe Tip to Sensor X Calibration Point       | 1 mm           |
| Probe Tip to Sensor Y Calibration Point       | 1 mm           |
| Probe Tip to Sensor Z Calibration Point       | 1 mm           |
| Recommended Measurement Distance from Surface | 2 mm           |