



## SAR COMPLIANCE EVALUATION REPORT

**Applicant Name:**

Samsung Electronics, Co. Ltd.  
18600 Broadwick St.  
Rancho Dominguez, CA 90220  
United States

**Date of Testing:**

09/23/11 - 10/05/11 & 11/11/11

**Test Site/Location:**

PCTEST Lab, Columbia, MD, USA

**Test Report Serial No.:**

0Y1109221681-R1.A3L

**FCC ID:**

**A3LSCHI815**

**APPLICANT:**

**SAMSUNG ELECTRONICS, CO. LTD.**

**EUT Type:**

Portable Tablet

**Application Type:**

Certification

**FCC Rule Part(s):**

CFR §2.1093; FCC/OET Bulletin 65 Supplement C [June 2001]

**Model(s):**

SCH-I815

**Test Device Serial No.:**

Pre-Production [S/N : 0815-0384, 0815-0385]

| Band & Mode                                 | Tx Frequency          | Conducted Power [dBm] | SAR              |
|---------------------------------------------|-----------------------|-----------------------|------------------|
|                                             |                       |                       | 1 gm Body (W/kg) |
| Cell. CDMA/EVDO                             | 824.70 - 848.31 MHz   | 24.54                 | 0.69             |
| PCS CDMA/EVDO                               | 1851.25 - 1908.75 MHz | 24.15                 | 1.09             |
| LTE                                         | 782 MHz               | 22.05                 | 0.81             |
| 2.4 GHz WLAN                                | 2412 - 2462 MHz       | 11.74                 | N/A              |
| 5.8 GHz WLAN                                | 5745 - 5825 MHz       | 10.12                 | N/A              |
| 5.2 GHz WLAN                                | 5180 - 5240 MHz       | 9.73                  | N/A              |
| 5.3 GHz WLAN                                | 5260 - 5320 MHz       | 10.16                 | N/A              |
| 5.5 GHz WLAN                                | 5500 - 5700 MHz       | 9.90                  | N/A              |
| Bluetooth                                   | 2402 - 2480 MHz       | 8.49                  | N/A              |
| <b>Simultaneous SAR per KDB 690783 D01:</b> |                       |                       | 1.09 W/kg        |

Note: Powers in the above table represent output powers for the SAR test configurations and may not represent the highest output powers for all capabilities

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE C95.1-1992 and has been tested in accordance with the measurement procedures specified in FCC/OET Bulletin 65 Supplement C (2001), IEEE 1528-2003 and in applicable Industry Canada Radio Standards Specifications (RSS); for North American frequency bands only.

**Note: This revised Test Report (S/N: 0Y1109221681-R1.A3L) supersedes and replaces the previously issued test report on the same subject EUT for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.**

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. Test results reported herein relate only to the item(s) tested.

PCTEST certifies that no party to this application has been subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.

  
Randy Ortanez  
President



|                                         |                                                                                     |                                     |                                                                                       |                                        |
|-----------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
| <b>FCC ID:</b> A3LSCHI815               |  | <b>SAR COMPLIANCE REPORT</b>        |  | <b>Reviewed by:</b><br>Quality Manager |
| <b>Filename:</b><br>0Y1109221681-R1.A3L | <b>Test Dates:</b><br>09/23/11 - 10/05/11 & 11/11/11                                | <b>EUT Type:</b><br>Portable Tablet |                                                                                       | Page 1 of 43                           |

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## LTE Device Information per KDB pub (07/09/2011)

| Info     |                                                                                                                      |
|----------|----------------------------------------------------------------------------------------------------------------------|
| KDB Sec. | FCC ID                                                                                                               |
|          | A3LSCHI815                                                                                                           |
|          | Form Factor                                                                                                          |
|          | Tablet                                                                                                               |
| 1)       | Frequency Range of each LTE transmission band                                                                        |
|          | BAND13 (782 MHz)                                                                                                     |
| 2)       | Channel Bandwidths                                                                                                   |
|          | BAND13 (10 MHz)                                                                                                      |
| 3)       | H, M, L channel numbers and frequencies                                                                              |
| 4)(a)    | UE Category                                                                                                          |
|          | BAND13 : Uplink (Ch. 23230, 782 MHz)                                                                                 |
|          | Category 3                                                                                                           |
| (b)      | Modulations Supported in UL                                                                                          |
|          | QPSK, 16QAM                                                                                                          |
| 5)       | Description of LTE Tx and Ant. Implementation                                                                        |
|          | 1Tx/Rx, 1Rx. No Transmit Diversity.                                                                                  |
| 6)       | LTE Voice available ? Data Modes                                                                                     |
|          | No(Only Data mode)                                                                                                   |
| 7)       | LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3-6.2.5?<br>(manufacturer attestation to be provided) |
|          | See Section 11.4.1                                                                                                   |
|          | A-MPR (Additional MPR) disabled for SAR Testing?                                                                     |
|          | Yes                                                                                                                  |
| 8)       | Conducted power Table provided for 1RB (low and high offset), 50% RB (centered), 100% RB                             |
|          | Yes                                                                                                                  |
| 9-10)    | Non-LTE US Wireless Operating Modes/Bands                                                                            |
|          | RF Output Power                                                                                                      |
|          | RF Exposure Configurations                                                                                           |
|          | Cell. CDMA                                                                                                           |
|          | See Page 1                                                                                                           |
|          | Body                                                                                                                 |
|          | PCS CDMA                                                                                                             |
|          | See Page 1                                                                                                           |
|          | Body                                                                                                                 |
|          | 2.4 GHz Bluetooth                                                                                                    |
|          | See Page 1                                                                                                           |
|          | Body                                                                                                                 |
|          | 2.4 GHz Wi-Fi                                                                                                        |
|          | See Page 1                                                                                                           |
|          | Body                                                                                                                 |
|          | 5 GHz Wi-Fi                                                                                                          |
|          | See Page 1                                                                                                           |
|          | Body                                                                                                                 |
| 11)      | Simultaneous Tx conditions (Voice and Data Configurations)                                                           |
|          | See Section 15                                                                                                       |
| 12)      | Power Reduction used for SAR Compliance?                                                                             |
|          | Yes; proximity sensor                                                                                                |
| 13)      | Describe Power Reduction (LTE Modes)                                                                                 |
|          | See Section 10                                                                                                       |
| 14)      | SAR Test Plan                                                                                                        |
|          | See Section 10                                                                                                       |

|                                  |                                                                                     |                              |                                                                                       |                                 |
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## 2 INTRODUCTION

The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency (RF) radiation in ET Docket 93-62 on Aug. 6, 1996 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices. [1]

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz [3] and Health Canada RF Exposure Guidelines Safety Code 6 [24]. The measurement procedure described in IEEE/ANSI C95.3-2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave [4] is used for guidance in measuring the Specific Absorption Rate (SAR) due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the International Committee for Non-Ionizing Radiation Protection (ICNIRP) in Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," Report No. Vol 74. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

### 2.1 SAR Definition

Specific Absorption Rate 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 ( $\rho$ ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Fig. 1-1).

$$SAR = \frac{d}{dt} \left( \frac{dU}{dm} \right) = \frac{d}{dt} \left( \frac{dU}{\rho dV} \right)$$

**Figure 2-1**  
**SAR Mathematical Equation**

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

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

where:

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

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relation 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.[6]

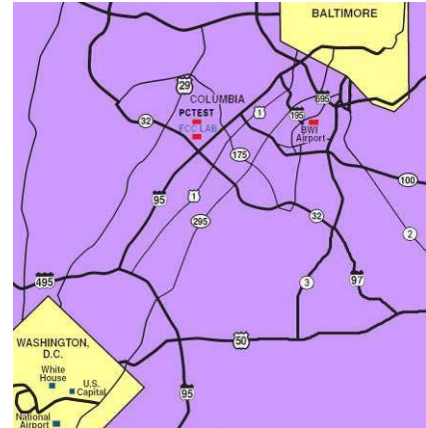
|                                         |                                                                                     |                                     |                                                                                       |                                        |
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## 3 TEST SITE LOCATION

### 3.1 INTRODUCTION

The map at the right shows the location of the PCTEST LABORATORY in Columbia, Maryland. It is in proximity to the FCC Laboratory, the Baltimore-Washington International (BWI) airport, the city of Baltimore and Washington, DC.

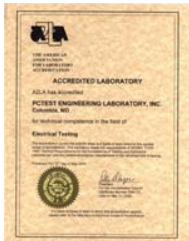
These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49' 38" W longitude. The facility is 1.5 miles north of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4 on January 27, 2006 and Industry Canada.



**Table 3-1**  
Map of the Greater Baltimore and Metropolitan Washington, D.C. area

### 3.2 Test Facility / Accreditations:

Measurements were performed at an independent accredited PCTEST Engineering Lab located in Columbia, MD 21045, U.S.A.



- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing-Aid Compatibility (HAC), Battery Safety, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST facility is an FCC registered (PCTEST Reg. No. 90864) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (IC-2451).
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and all Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (IC-2451) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS and CDMA, and EvDO mobile phones.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO Data, CDMA 1xRTT Data

|                                         |                                                                                     |                                     |                                                                                       |                                        |
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## 4 SAR MEASUREMENT SETUP

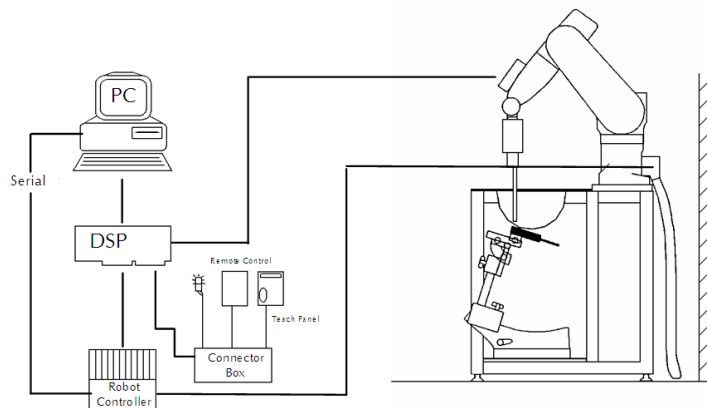
### 4.1 Robotic System

Measurements are performed using the DASY4 automated dosimetric assessment system. The DASY4 is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland and consists of a high precision robotics system (Staubli), robot controller, desktop computer, near-field probe, probe alignment sensor, and the SAM phantom containing the head or body 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 Table 4-1).

### 4.2 System Hardware

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and a remote control used to drive the robot motors. The PC consists of the SAR Measurement Software DASY4, A/D interface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit that performs the signal amplification, signal multiplexing, A/D 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 from the DAE and transfers data to the PC card.

### 4.3 System Electronics



**Table 4-1**  
**SAR Measurement System Setup**

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

|                                         |                                                                                                                                   |                                     |                                                                                       |                                        |
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## 4.4 Automated Test System Specifications

Test Software: SPEAG DASY4 version 4.7 Measurement Software  
Robot: Stäubli Unimation Corp. Robot RX60L  
Repeatability: 0.02 mm  
No. of Axes: 6

### Data Acquisition Electronic System (DAE)

#### Data Converter

Features: Signal Amplifier, multiplexer, A/D converter & control logic  
Software: SEMCAD software  
Connecting Lines: Optical Downlink for data and status info  
Optical upload for commands and clock

#### PC Interface Card

Function: Link to DAE  
16-bit A/D converter for surface detection system  
Two Serial & Ethernet link to robotics  
Direct emergency stop output for robot

#### Phantom

Type: SAM Twin Phantom (V4.0)  
Shell Material: Composite  
Thickness:  $2.0 \pm 0.2$  mm



**Table 4-2**  
**SAR Measurement System**

|                                         |                                                                                     |                                     |                                                                                       |                                        |
|-----------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
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### 5.1 Probe Measurement System



**Table 5-1  
SAR System**

The SAR measurements were conducted with the dosimetric probe designed in the classical triangular configuration (see Table 5-3) and optimized for dosimetric evaluation [9]. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multi-fiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY4 software reads the reflection during a software approach and looks for the

maximum using a 2nd order curve fitting (see Table 6-1). The approach is stopped at reaching the maximum.

### 5.2 Probe Specifications

|                          |                                                                                                   |
|--------------------------|---------------------------------------------------------------------------------------------------|
| <b>Model(s):</b>         | ES3DV2, ES3DV3, EX3DV4                                                                            |
| <b>Frequency Range:</b>  | 10 MHz – 6.0 GHz (EX3DV4)<br>10 MHz – 4 GHz (ES3DV3)                                              |
| <b>Calibration:</b>      | In head and body simulating tissue at<br>Frequencies from 300 up to 6000MHz                       |
| <b>Linearity:</b>        | ± 0.2 dB (30 MHz to 6 GHz) for EX3DV4<br>± 0.2 dB (30 MHz to 4 GHz) for ES3DV3                    |
| <b>Dynamic Range:</b>    | 10 mW/kg – 100 W/kg                                                                               |
| <b>Probe Length:</b>     | 330 mm                                                                                            |
| <b>Probe Tip Length:</b> | 20 mm                                                                                             |
| <b>Body Diameter:</b>    | 12 mm                                                                                             |
| <b>Tip Diameter:</b>     | 2.5 mm (3.9mm for ES3DV3)                                                                         |
| <b>Tip-Center:</b>       | 1 mm (2.0 mm for ES3DV3)                                                                          |
| <b>Application:</b>      | SAR Dosimetry Testing<br>Compliance tests of mobile phones<br>Dosimetry in strong gradient fields |



**Table 5-2  
Near-Field Probe**



**Table 5-3  
Triangular Probe  
Configuration**

|                                         |                                                                                     |                                     |                                                                                       |                                        |
|-----------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
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## 6 PROBE CALIBRATION PROCESS

### 6.1 Dosimetric Assessment Procedure

Each E-Probe/Probe Amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm<sup>2</sup>) using an RF Signal generator, TEM cell, and RF Power Meter.

### 6.2 Free Space Assessment

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and in a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1 mW/cm<sup>2</sup>.

### 6.3 Temperature Assessment

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

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

where:

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

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

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

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

where:

$\sigma$  = simulated tissue conductivity,

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

SAR is proportional to  $\Delta T/\Delta t$ , the initial rate of tissue heating, before thermal diffusion takes place. The electric field in the simulated tissue can be used to estimate SAR by equating the thermally derived SAR to that with the E- field component.

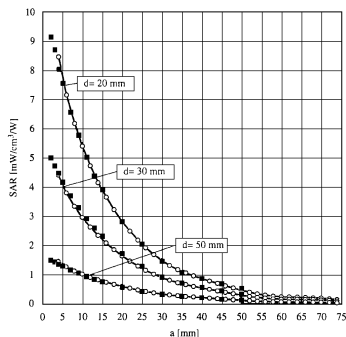


Table 6-1 E-Field and Temperature measurements at 900MHz [9]

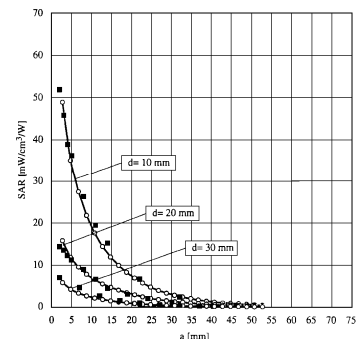


Table 6-2 E-Field and temperature measurements at 1.9GHz [9]

|                                  |                                                                                                                            |                              |                                                                                       |                                 |
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## 7 PHANTOM AND EQUIVALENT TISSUES

### 7.1 SAM Phantoms



**Figure 6-1  
SAM Phantoms**

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a table. The shape of the shell is based on data from an anatomical study designed to represent the 90<sup>th</sup> percentile of the population [12][13]. The phantom enables the dosimetric evaluation of SAR for both left and right handed handset usage, as well as body-worn usage using the flat phantom region. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. The shell phantom has a 2mm shell thickness (except the ear region where shell thickness increases to 6 mm).

### 7.2 Tissue Simulating Mixture Characterization



**Figure 6-2  
SAM Phantom with  
Simulating Tissue**

The mixture is characterized to obtain proper dielectric constant (permittivity) and conductivity of the tissue of interest. The tissue dielectric parameters recommended in IEEE 1528 and IEC 62209 have been used as targets for the compositions, and are to match within 5%, per the FCC recommendations.

**Table 7-1  
Composition of the Tissue Equivalent Matter**

| Frequency (MHz)           | 835   | 1900  |
|---------------------------|-------|-------|
| Tissue                    | Body  | Body  |
| Ingredients (% by weight) |       |       |
| Bactericide               | 0.1   |       |
| DGBE                      |       | 29.44 |
| HEC                       | 1     |       |
| NaCl                      | 0.94  | 0.39  |
| Sucrose                   | 44.9  |       |
| Water                     | 53.06 | 70.17 |

See next page for 700 MHz tissue info.

|                                         |                                                                                                                                   |                                     |                                                                                       |                                        |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
| FCC ID: A3LSCHI815                      |  <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | <b>SAR COMPLIANCE REPORT</b>        |  | <b>Reviewed by:</b><br>Quality Manager |
| <b>Filename:</b><br>0Y1109221681-R1.A3L | <b>Test Dates:</b><br>09/23/11 - 10/05/11 & 11/11/11                                                                              | <b>EUT Type:</b><br>Portable Tablet |                                                                                       | Page 10 of 43                          |

**Table 7-2**  
**Composition of the 700MHz Body Tissue Equivalent Matter**

| 2 Composition / Information on ingredients                       |                                                                                                                                                     |
|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| The Item is composed of the following ingredients:               |                                                                                                                                                     |
| H <sub>2</sub> O                                                 | Water, 35 – 58%                                                                                                                                     |
| Sucrose                                                          | Sugar, white, refined, 40 – 60%                                                                                                                     |
| NaCl                                                             | Sodium Chloride, 0 – 6%                                                                                                                             |
| Hydroxyethyl-cellulose                                           | Medium Viscosity (CAS# 9004-62-0), <0.3%                                                                                                            |
| Preventol-D7                                                     | Preservative: aqueous preparation, (CAS# 55965-84-9), containing 5-chloro-2-methyl-3(2H)-isothiazolone and 2-methyl-3(2H)-isothiazolone, 0.1 – 0.7% |
| Relevant for safety; Refer to the respective Safety Data Sheet*. |                                                                                                                                                     |

**Note:** 700MHz liquid recipes are proprietary SPEAG. The composition is approximate to the actual liquids utilized. Thus the manufacturer production sheets are provided below.

**Measurement Certificate / Material Test**

|              |                                         |
|--------------|-----------------------------------------|
| Item Name    | Body Tissue Simulating Liquid (MSL 750) |
| Product No.  | SL AAM 075 AA (Charge: 110606-1)        |
| Manufacturer | SPEAG                                   |

**Measurement Method**

TSL dielectric parameters measured using calibrated OCP probe (type DAK).

**Target Parameters**

Target parameters as defined in the IEEE 1528 and IEC 62209 compliance standards.

**Test Condition**

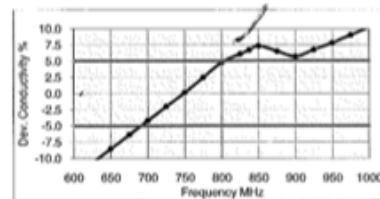
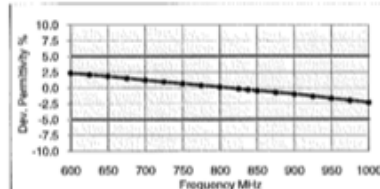
Ambient Condition 22°C ; 30% humidity  
TSL Temperature 22°C  
Test Date 8-Jun-11

**Additional Information**

TSL Density 1.212 g/cm<sup>3</sup>  
TSL Heat-capacity 3.006 kJ/(kg\*K)

**Results**

| f (MHz) | Measured |        |       | Target |       | Off-to-Target (%) |         |
|---------|----------|--------|-------|--------|-------|-------------------|---------|
|         | HP-e'    | HP-e'' | sigma | eps    | sigma | Δ-eps             | Δ-sigma |
| 600     | 57.4     | 24.88  | 0.83  | 56.1   | 0.95  | 2.4               | -12.7   |
| 625     | 57.2     | 24.53  | 0.85  | 56.0   | 0.95  | 2.1               | -10.6   |
| 650     | 57.0     | 24.18  | 0.87  | 55.9   | 0.96  | 1.8               | -8.5    |
| 675     | 56.7     | 23.90  | 0.90  | 55.8   | 0.96  | 1.5               | -6.3    |
| 700     | 56.4     | 23.61  | 0.92  | 55.7   | 0.96  | 1.2               | -4.2    |
| 725     | 56.2     | 23.37  | 0.94  | 55.6   | 0.96  | 0.9               | -2.0    |
| 750     | 55.9     | 23.12  | 0.96  | 55.5   | 0.96  | 0.7               | 0.1     |
| 775     | 55.7     | 22.95  | 0.99  | 55.4   | 0.97  | 0.4               | 2.5     |
| 800     | 55.4     | 22.78  | 1.01  | 55.3   | 0.97  | 0.1               | 4.8     |
| 825     | 55.2     | 22.61  | 1.04  | 55.2   | 0.98  | -0.2              | 6.1     |
| 838     | 55.0     | 22.52  | 1.05  | 55.2   | 0.98  | -0.3              | 6.7     |
| 850     | 54.9     | 22.44  | 1.06  | 55.2   | 0.99  | -0.4              | 7.3     |
| 875     | 54.7     | 22.30  | 1.09  | 55.1   | 1.02  | -0.7              | 6.5     |
| 900     | 54.5     | 22.17  | 1.11  | 55.0   | 1.05  | -1.0              | 5.7     |
| 925     | 54.2     | 22.05  | 1.13  | 55.0   | 1.06  | -1.3              | 6.8     |
| 950     | 54.0     | 21.94  | 1.16  | 54.9   | 1.08  | -1.7              | 7.8     |
| 975     | 53.8     | 21.85  | 1.18  | 54.9   | 1.09  | -2.0              | 9.0     |
| 1000    | 53.6     | 21.75  | 1.21  | 54.8   | 1.10  | -2.3              | 10.2    |



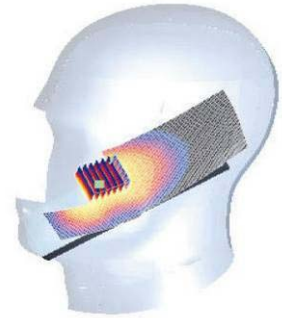
**Table 7-3**  
**700 MHz Body Tissue Equivalent Matter**

|                                  |                                               |                              |               |                                 |
|----------------------------------|-----------------------------------------------|------------------------------|---------------|---------------------------------|
| FCC ID: A3LSCHI815               | PCTEST<br>Engineering Laboratory, Inc.        | SAR COMPLIANCE REPORT        | SAMSUNG       | Reviewed by:<br>Quality Manager |
| Filename:<br>0Y1109221681-R1.A3L | Test Dates:<br>09/23/11 - 10/05/11 & 11/11/11 | EUT Type:<br>Portable Tablet | Page 11 of 43 |                                 |

### 8.1 Measurement Procedure

The evaluation was performed using the following procedure:

1. The SAR distribution at the exposed side of the head was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 15mm x 15mm.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during testing the 1 gram cube. This fixed point was measured and used as a reference value.
3. Based on the area scan data, the area of the maximum absorption was determined by spline interpolation. 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. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual for more details):
  - a. The data was extrapolated to the surface of the outer-shell of the phantom. The combined distance extrapolated was the combined distance from the center of the dipoles 2.7mm away from the tip of the probe housing plus the 1.2 mm distance between the surface and the lowest measuring point. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).
  - b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 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 then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.
  - c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete. If the SAR reference value deviated by more than 5%, the SAR evaluation was repeated.
5. For 5 GHz testing finer resolution zoom scans were performed as specified by FCC SAR Measurement Requirements for 3 – 6 GHz, KDB pub 865664. The 5 GHz zoom scan requires a minimum volume of 24mm x 24mm x 20mm and 7 x 7 x 11 points.



**Table 8-1**  
**Sample SAR Area Scan**

### 8.2 Specific Anthropomorphic Mannequin (SAM) Specifications

The phantom for handset SAR assessment testing is a low-loss dielectric shell, with shape and dimensions derived from the anthropometric data of the 90th percentile adult male head dimensions as tabulated by the US Army. The SAM Twin Phantom shell is bisected along the mid-sagittal plane into right and left halves (see Table 8-2). The perimeter sidewalls of each phantom halves are extended to allow filling with liquid to a depth that is sufficient to minimize reflections from the upper surface. The liquid depth is maintained at a minimum depth of 15 cm.



**Table 8-2**  
**SAM Twin Phantom Shell**

|                                  |                                                                                     |                              |                                                                                       |                                 |
|----------------------------------|-------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LSCH1815               |  | SAR COMPLIANCE REPORT        |  | Reviewed by:<br>Quality Manager |
| Filename:<br>0Y1109221681-R1.A3L | Test Dates:<br>09/23/11 - 10/05/11 & 11/11/11                                       | EUT Type:<br>Portable Tablet |                                                                                       | Page 12 of 43                   |

## 9 FCC RF EXPOSURE LIMITS

### 9.1 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.

### 9.2 Controlled Environment

CONTROLLED ENVIRONMENTS are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). 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 9-1**  
**SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6**

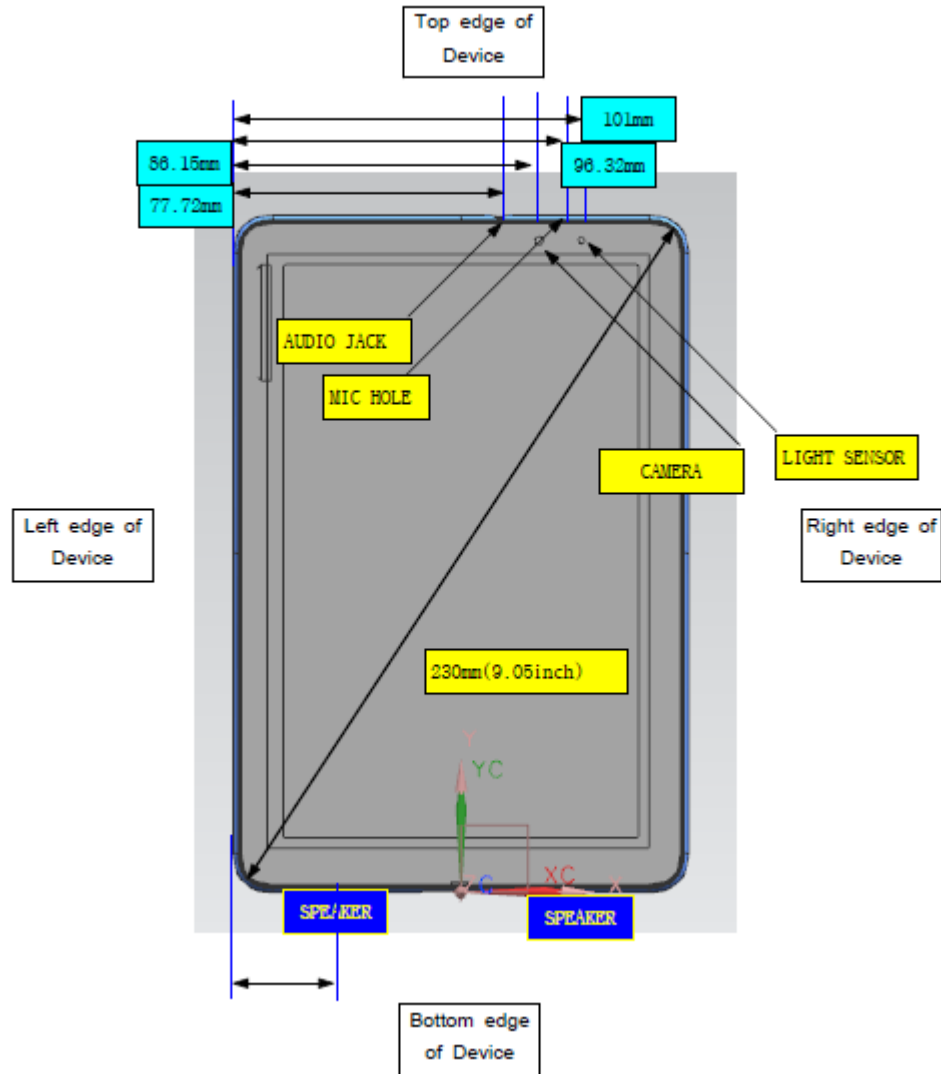
| HUMAN EXPOSURE LIMITS                           |                                                                           |                                                                   |
|-------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------|
|                                                 | UNCONTROLLED ENVIRONMENT<br><i>General Population</i><br>(W/kg) or (mW/g) | CONTROLLED ENVIRONMENT<br><i>Occupational</i><br>(W/kg) or (mW/g) |
| SPATIAL PEAK SAR<br>Brain                       | 1.6                                                                       | 8.0                                                               |
| SPATIAL AVERAGE SAR<br>Whole Body               | 0.08                                                                      | 0.4                                                               |
| SPATIAL PEAK SAR<br>Hands, Feet, Ankles, Wrists | 4.0                                                                       | 20                                                                |

1. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The Spatial Average value of the SAR averaged over the whole body.
3. 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.

|                                  |                                                                                                                                   |                              |                                                                                       |                                 |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LSCH1815               |  <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | SAR COMPLIANCE REPORT        |  | Reviewed by:<br>Quality Manager |
| Filename:<br>0Y1109221681-R1.A3L | Test Dates:<br>09/23/11 - 10/05/11 & 11/11/11                                                                                     | EUT Type:<br>Portable Tablet |                                                                                       | Page 13 of 43                   |

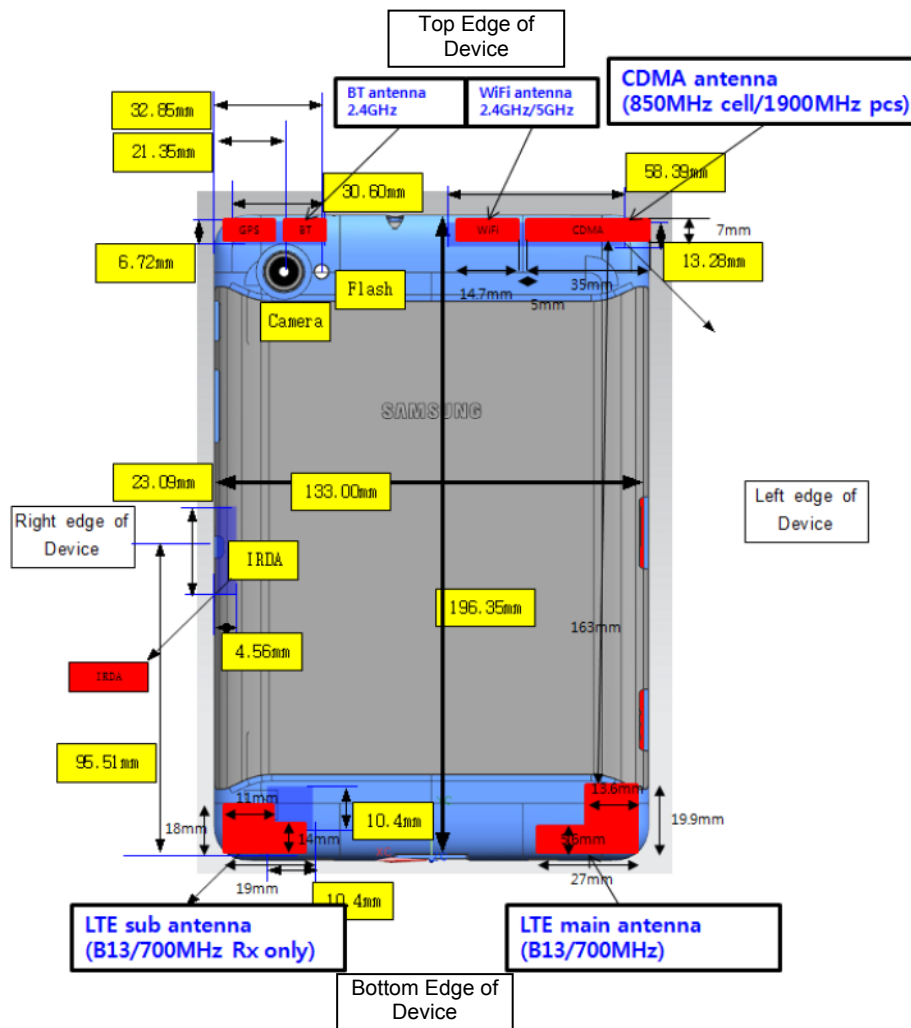
## 10 ANTENNA LOCATIONS AND KEY FEATURES

### 10.1 Antenna and Key Feature Information

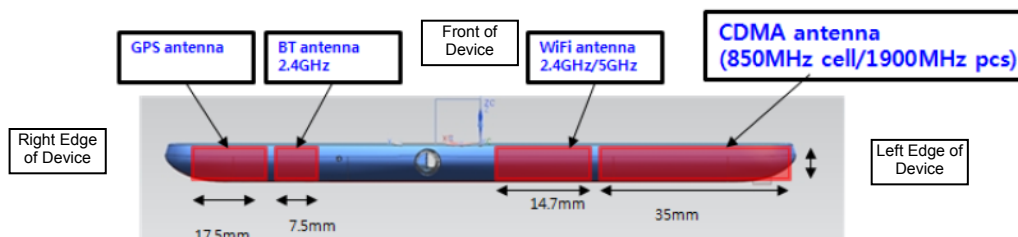


**Table 10-2**  
**Front View of Device**

|                                  |                                                                                                                            |                              |                                                                                       |                                 |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LSCH1815               |  PCTEST<br>ENGINEERING LABORATORY, INC. | SAR COMPLIANCE REPORT        |  | Reviewed by:<br>Quality Manager |
| Filename:<br>0Y1109221681-R1.A3L | Test Dates:<br>09/23/11 - 10/05/11 & 11/11/11                                                                              | EUT Type:<br>Portable Tablet |                                                                                       | Page 14 of 43                   |

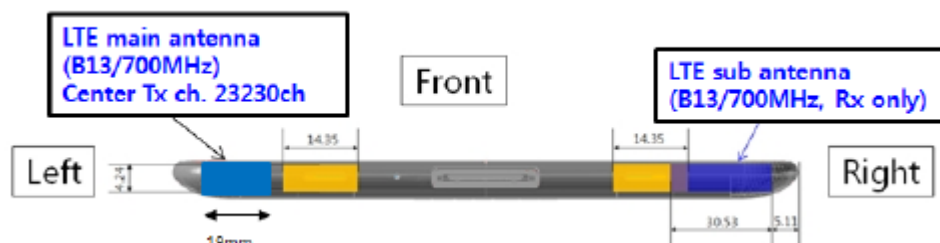


**Table 10-3**  
**Back View of Device**



**Table 10-4**  
**Top View of Device**

|                                  |                                                                                     |                              |                                                                                       |                                 |
|----------------------------------|-------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LSCH1815               |  | SAR COMPLIANCE REPORT        |  | Reviewed by:<br>Quality Manager |
| Filename:<br>0Y1109221681-R1.A3L | Test Dates:<br>09/23/11 - 10/05/11 & 11/11/11                                       | EUT Type:<br>Portable Tablet |                                                                                       | Page 15 of 43                   |



**Table 10-5**  
**Bottom View of Device**

The operational description contains information about designs including sensor sizes, coverage and locations.

Notes: Video calls are supported through the front-facing camera but not the back-facing camera.

## 10.2 SAR Testing for Tablet per KDB Publication 447498 Section 4

Lap-touching devices that have transmitting antennas located less than 20 cm from the body of the user require routine SAR evaluation. Such devices are considered portable, and are capable of being held to the body. Devices are to be setup according to KDB publication 447498 requirements and are configured with maximum output power during SAR assessment for a worst-case SAR evaluation. Since the diagonal dimension of the device is more than 20 cm (23.0 cm), this device is a tablet (not a mini-tablet).

Per KDB 447498 4) b) i), the bottom face (back of the device) is required to be tested touching the flat phantom.

Per KDB Publication 447498 4) b) ii) (2), SAR testing applies for the tablet edges with antennas located within 5 cm of each tablet edge closest to the user. According to KDB Publication 447498 4) b) ii) (2), for each antenna, SAR is only required for the edge with the most conservative exposure condition.

## 10.3 Proximity Sensor Information

The sensors pads are located near the upper half of the device to cover exposure conditions to the main antenna and along the bottom half of the device for the LTE antenna. The technical description contains information about sensors size and locations. Power reduction levels are provided in Table 11-5 and Table 11-9.

## 10.4 Display Orientation Capabilities

This device is capable of multiple display orientations supporting both portrait and landscape positions. Therefore per KDB 447498 4) b) ii) (2), SAR testing applies for the tablet edges with antennas located within 5 cm of each tablet edge closest to the user (with KDB 616217 applied to edges with antennas located  $\geq 5$  cm from the user). According to KDB 447498 4) b) ii) (2), for each antenna, SAR is only required for the edge with the most conservative exposure condition.

## 10.5 Additional SAR Testing for the Back and Top of the Device

Based on the type and implementation of the sensors, April 2011 FCC-TCB conference notes requires sensor information regarding: (1) additional SAR evaluation at a conservative distance from the device where power reduction is de-activated and (2) reliability sensor activation data. Reliability sensor activation data is provided for both the back and top edges of the tablet at  $0^\circ$  to cover direct usage and also at an angle to cover angled usage (See Table 10-14).

|                                         |                                                                                                                                   |                                     |                                                                                       |                                        |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
| FCC ID: A3LSCHI815                      |  <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | <b>SAR COMPLIANCE REPORT</b>        |  | <b>Reviewed by:</b><br>Quality Manager |
| <b>Filename:</b><br>0Y1109221681-R1.A3L | <b>Test Dates:</b><br>09/23/11 - 10/05/11 & 11/11/11                                                                              | <b>EUT Type:</b><br>Portable Tablet |                                                                                       | Page 16 of 43                          |

Since the back-off sensors activation distances for back was 11 mm for CDMA, a conservative distance of 10 mm was tested for the back side. Since the back-off sensor activation distance was 4 mm for the top edge, a conservative distance of 3 mm was tested. Since the back-off sensors activation distances for back was 6 mm for LTE, a conservative distance of 5 mm was tested for the back side. Details about sensing mechanism and sensor pad locations are included in the technical description.

The sensors are designed to support sufficient detection range and sensitivity to cover regions of the sensors in all applicable directions.

**Table 10-6**  
**Distance from Back of Tablet for CDMA**

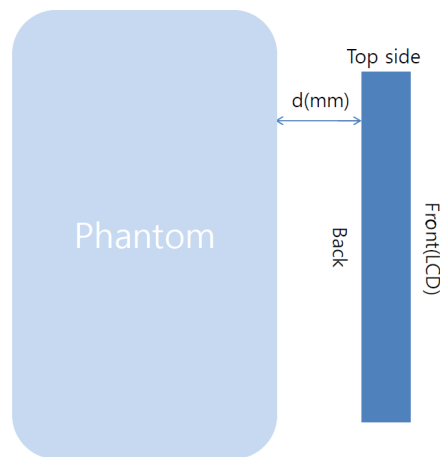
| distance in mm                                              | 9  | 10 | 11 | 12  | 13  | 14  |
|-------------------------------------------------------------|----|----|----|-----|-----|-----|
| Condition of Sensors with respect to the back of the device | on | on | on | off | off | off |

**Table 10-7**  
**Distance from Back of Tablet for LTE**

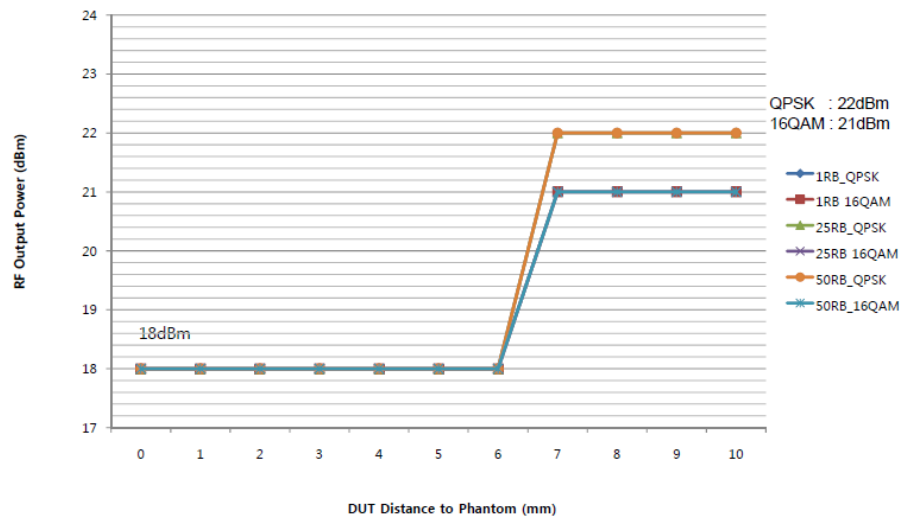
| distance in mm                                              | 4  | 5  | 6  | 7   | 8   | 9   |
|-------------------------------------------------------------|----|----|----|-----|-----|-----|
| Condition of Sensors with respect to the back of the device | on | on | on | off | off | off |

Please see Table 10-8 through Table 10-10 for Target Power vs. Back-off distance plots for each LTE and CDMA mode.

**Backoff Sensor Power Reduction (back side)**

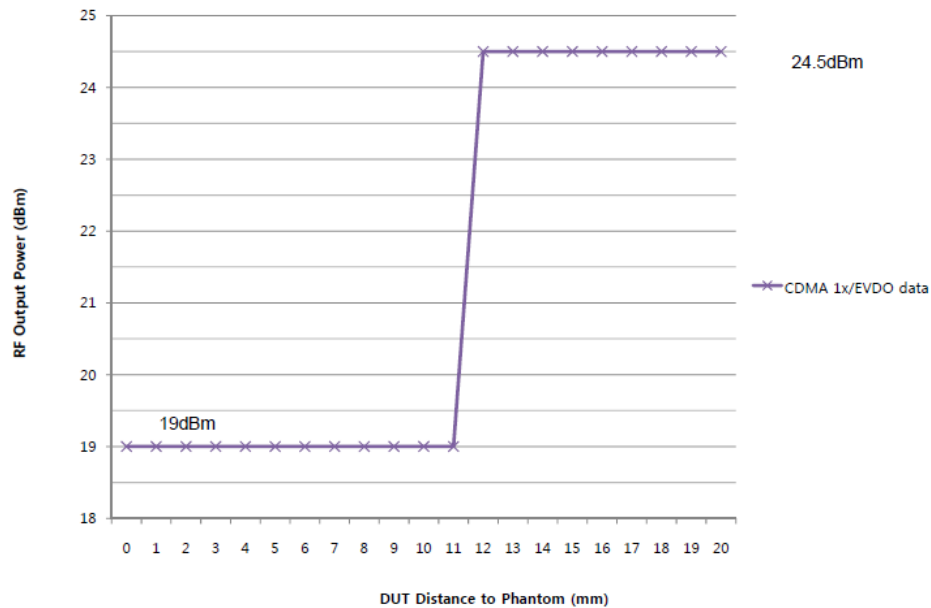


|                                         |                                                                                     |                                     |                                                                                       |                                        |
|-----------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
| <b>FCC ID:</b> A3LSCHI815               |  | <b>SAR COMPLIANCE REPORT</b>        |  | <b>Reviewed by:</b><br>Quality Manager |
| <b>Filename:</b><br>0Y1109221681-R1.A3L | <b>Test Dates:</b><br>09/23/11 - 10/05/11 & 11/11/11                                | <b>EUT Type:</b><br>Portable Tablet |                                                                                       | Page 17 of 43                          |



**Table 10-8**  
**LTE Bands 13 Back off Power Reduction Graph - Back Side**

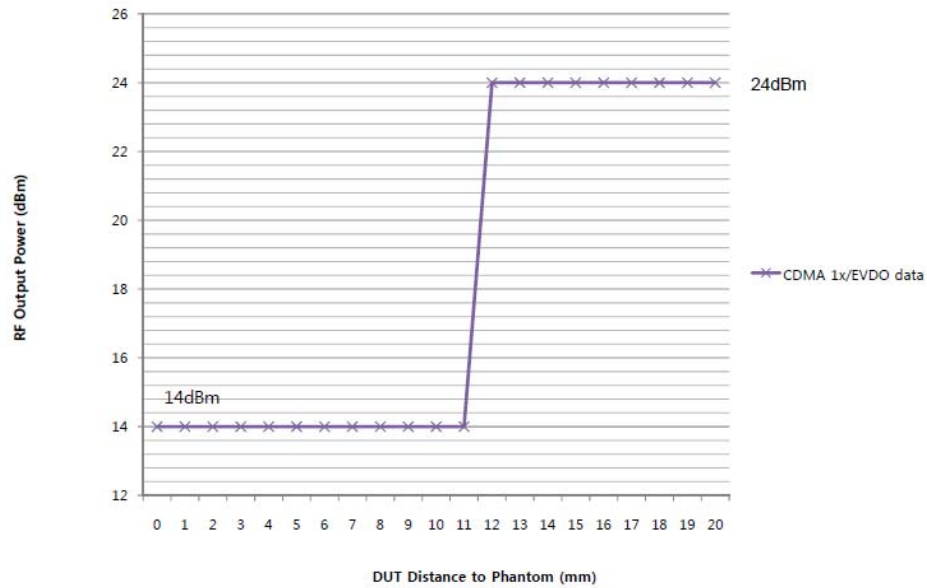
Data in Table 10-8 demonstrates reduced fixed LTE power levels at a distance of 6 mm and less, from the back



**Table 10-9**  
**Cell. CDMA Back off Power Reduction Graph - Back side**

Data in Table 10-9 demonstrates reduced fixed Cell. CDMA power levels at a distance of 11 mm and less from the back

|                                  |                                                                                     |                              |                                                                                       |                                 |
|----------------------------------|-------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LSCHI815               |  | SAR COMPLIANCE REPORT        |  | Reviewed by:<br>Quality Manager |
| Filename:<br>0Y1109221681-R1.A3L | Test Dates:<br>09/23/11 - 10/05/11 & 11/11/11                                       | EUT Type:<br>Portable Tablet |                                                                                       | Page 18 of 43                   |



**Table 10-10**  
**PCS CDMA Back off Power Reduction Graph - Back side**

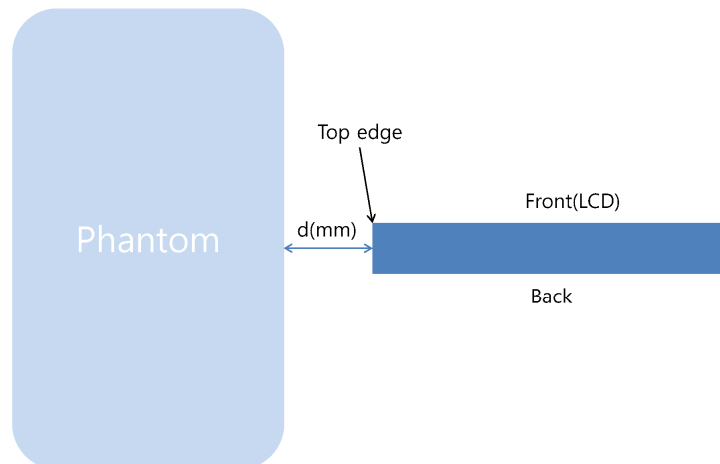
Data in Table 10-10 demonstrates reduced fixed power levels for PCS CDMA at a distance of 11 mm and closer, from the back.

**Table 10-11**  
**Distance from Top Edge of Tablet for CDMA - 0° Angle**

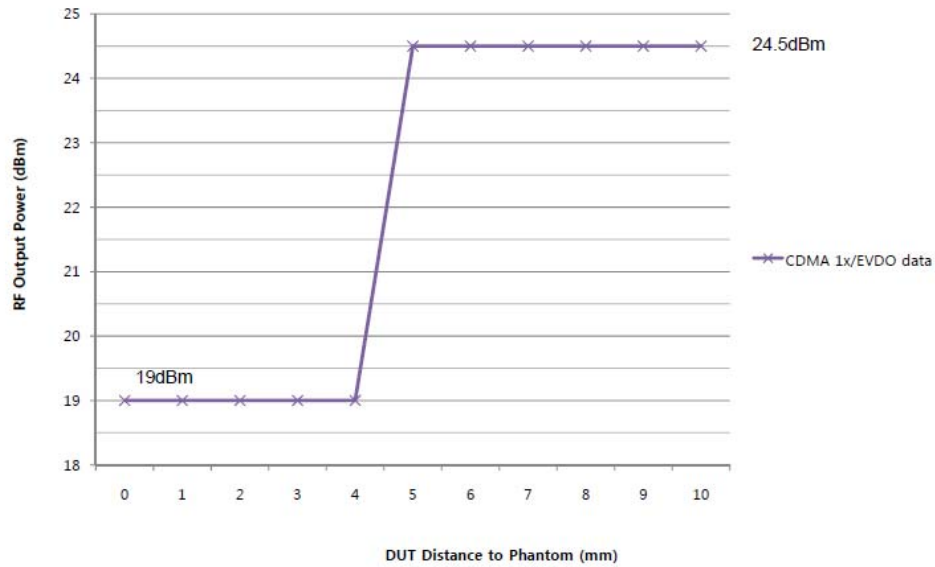
| distance in mm                                    | 3  | 4  | 5   | 6   | 7   | 8   |
|---------------------------------------------------|----|----|-----|-----|-----|-----|
| Condition of Sensor in the top edge of the device | on | on | off | off | off | off |

Please see Table 10-12 through Table 10-13 target power vs. back-off distance plots for CDMA.

**Backoff Sensor Power Reduction (Top side, 0° tilted)**

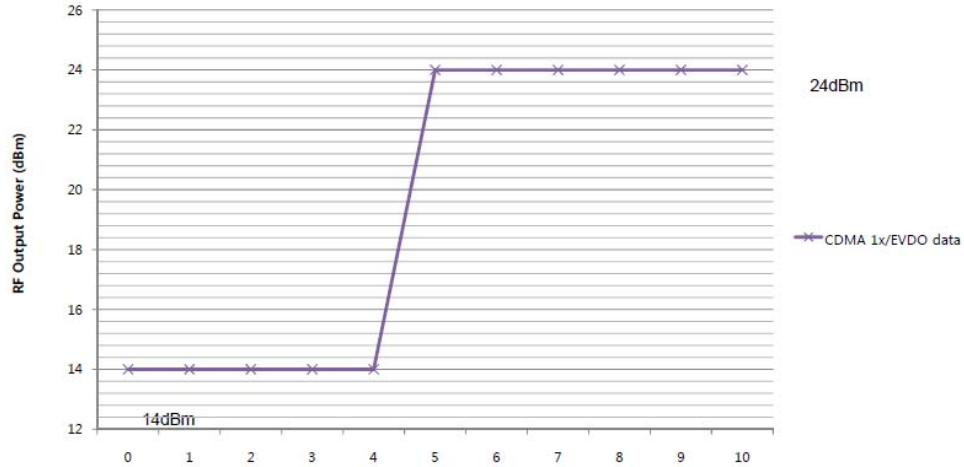


|                                         |                                                                                     |                                     |                                                                                       |                                        |
|-----------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
| <b>FCC ID:</b> A3LSCHI815               |  | <b>SAR COMPLIANCE REPORT</b>        |  | <b>Reviewed by:</b><br>Quality Manager |
| <b>Filename:</b><br>0Y1109221681-R1.A3L | <b>Test Dates:</b><br>09/23/11 - 10/05/11 & 11/11/11                                | <b>EUT Type:</b><br>Portable Tablet |                                                                                       | Page 19 of 43                          |



**Table 10-12**  
**Cell. CDMA Back off Power Reduction Graph - Top Edge at 0° Angle**

Data in Table 10-12 demonstrates reduced fixed Cell. CDMA power levels at a distance of 4 mm and less, from the top edge of the device.



**Table 10-13**  
**PCS CDMA Back off Power Reduction Graph - Top Edge at 0° Angle**

Data in Table 10-13 demonstrates reduced fixed PCS CDMA power levels at a distance of 4 mm and less, from the top edge.

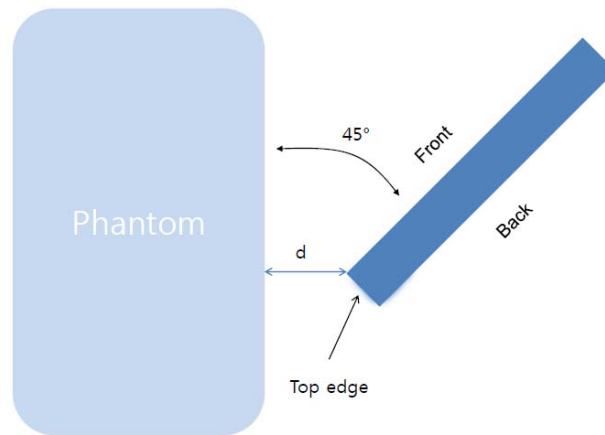
|                                  |                                                                                     |                              |                                                                                       |                                 |
|----------------------------------|-------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LSCH1815               |  | SAR COMPLIANCE REPORT        |  | Reviewed by:<br>Quality Manager |
| Filename:<br>0Y1109221681-R1.A3L | Test Dates:<br>09/23/11 - 10/05/11 & 11/11/11                                       | EUT Type:<br>Portable Tablet |                                                                                       | Page 20 of 43                   |

**Table 10-14**  
**Distance from Top Edge of Tablet - 45° Angle**

| distance in mm                                    | 3  | 4  | 5   | 6   | 7   | 8   |
|---------------------------------------------------|----|----|-----|-----|-----|-----|
| Condition of Sensor in the top edge of the device | on | on | off | off | off | off |

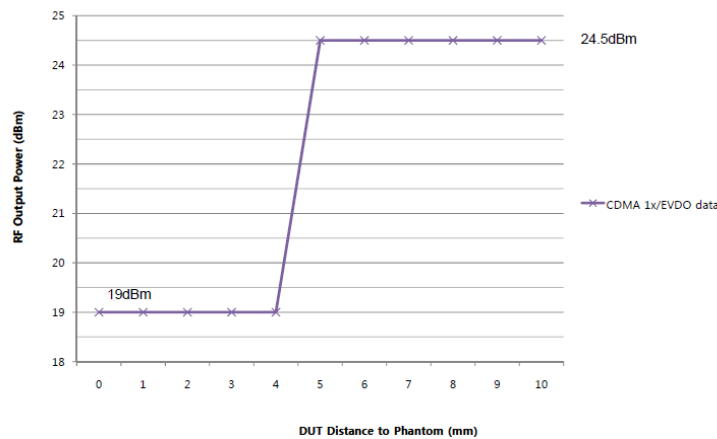
Please see Table 10-15 through Table 10-16 for target power vs. backoff distance plots for each CDMA mode.

**Backoff Sensor Power Reduction (45° tilted)**



Note: Angle mentioned for top edge description is the perpendicular angle.

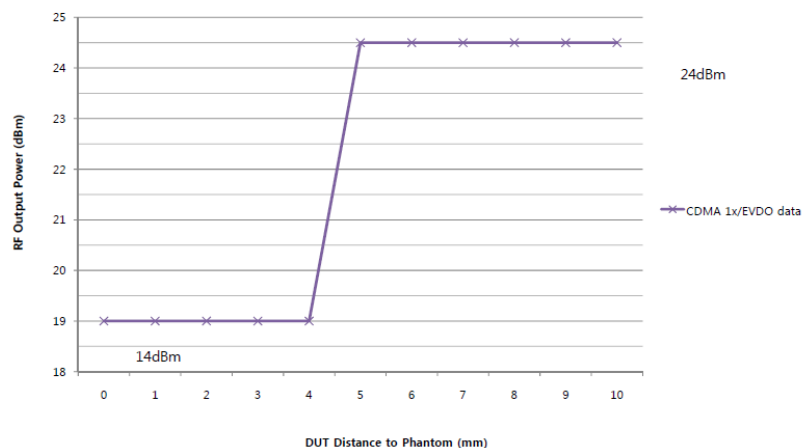
Above figure represents “45 degrees” between the screen face and phantom face. Please note that the 45 degree angle tilt has been used to identify proximity sensor coverage for the top edge, since this angle is consistent with device use conditions and sensor implementation according to the manufacturer. All relevant directions of coverage, as described in the April 2011 TCB workshop slides, have been considered in order to determine the worst case activation and deactivation test distances.



**Table 10-15**  
**Cell. CDMA Back off Power Reduction Graph - Top Edge at 45° Angle**

Data in Table 10-15 demonstrates a reduced fixed Cell. CDMA power level at a distance of 4 mm and less, from the top edge at a 45 degree angle from the screen face to the phantom face.

|                                         |                                                                                     |                                     |                                                                                       |                                        |
|-----------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
| <b>FCC ID:</b> A3LSCHI815               |  | <b>SAR COMPLIANCE REPORT</b>        |  | <b>Reviewed by:</b><br>Quality Manager |
| <b>Filename:</b><br>0Y1109221681-R1.A3L | <b>Test Dates:</b><br>09/23/11 - 10/05/11 & 11/11/11                                | <b>EUT Type:</b><br>Portable Tablet |                                                                                       | Page 21 of 43                          |



**Table 10-16**

**PCS CDMA Back off Power Reduction Graph - Top Edge at 45° Angle**

Data in Table 10-16 demonstrates a reduced fixed PCS CDMA power level at a distance of 4 mm and less, from the top edge at a 45 degree angle from the screen face to the phantom face.

## 10.6 Method of SAR measurement with Power Reduction

This tablet was tested in accordance with April 2011 TCB workshop notes for proximity sensor and power reduction.

Based on the power-reduction activation vs. distance results for the sensors, the device was tested at 0mm distance from the phantom with the sensor activated for CDMA and LTE. CDMA was additionally tested at a conservative 10 mm distance with the sensor de-activated (max power, no power reduction) from the back side; and 3 mm from the top edge with the sensor de-activated (max power, no power reduction). LTE was additionally tested at a conservative 5 mm distance with the sensor de-activated (max power, not power reduction) from the back side.

To test SAR with power back-off sensor active while touching (using S/N: 0815-0385), the device was placed in maximum power transmit mode with a base station simulator. The device was then positioned to touching position under the tissue equivalent liquid-filled flat phantom so that the proximity sensor was activated, reducing the power level.

For the additional SAR measurements with the sensors de-activated when the device is positioned away from the user (using S/N: 0815-0384), SAR is needed to be evaluated without power back-off at 10 mm (from the back) and 3mm (from the top edge) for CDMA and 5 mm (from the back) for LTE. Since the device sensor detection mechanism is active at these distances, the sensor had to be disabled via manufacturer test software for SAR test purposes. The device was then placed in maximum power transmit mode with a base station simulator under the tissue equivalent liquid-filled flat phantom at a distance of 10 mm from the back and 3 mm for the top edge for CDMA and 5 mm from the back for LTE with the sensor deactivated (via manufacturer test software) and then tested at maximum power.

## 10.7 Samples for SAR Testing

Two samples with identical hardware were used to facilitate SAR testing.

- S/N: 0815-0384– This sample was used for maximum power SAR testing. Power reduction was disabled via software on this device to ensure the device was always transmitting at maximum power.
- S/N: 0815-0385– This sample was used for reduced power SAR testing and was tuned to the reduced power levels. Power reduction was disabled via software on this device to ensure the device was always transmitting at reduced power

|                                         |                                                                                                                                   |                                     |                                                                                       |                                        |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
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| <b>Filename:</b><br>0Y1109221681-R1.A3L | <b>Test Dates:</b><br>09/23/11 - 10/05/11 & 11/11/11                                                                              | <b>EUT Type:</b><br>Portable Tablet |                                                                                       | Page 22 of 43                          |

## 11 FCC MEASUREMENT PROCEDURES

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

### 11.1 Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB Publication 941225 D01 "SAR Measurement Procedures for 3G Devices" v02, October 2007.

The device was placed into a simulated call using a base station simulator in a RF shielded chamber. Establishing connections in this manner ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. Devices under test were evaluated prior to testing, with a fully charged battery and were configured to operate at maximum output power. In order to verify that the device was tested throughout the SAR test at maximum output power, the SAR measurement system measures a "point SAR" at an arbitrary reference point at the start and end of the 1 gram SAR evaluation, to assess for any power drifts during the evaluation. When the power drift was greater than 5%, the SAR test was repeated.

### 11.2 SAR Measurement Conditions for LTE

LTE modes were tested according to FCC KDB 941225 D05 publication. Please see notes following SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The R&S CMW500 was used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing.

#### 11.2.1 MPR

There is an applied MPR implemented by the manufacturer when the proximity sensor is not active (maximum power scenarios). MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1. The differences noted are not cases of implemented MPR but rather associated with measurement uncertainty and allowable tolerances per 3GPP standard and the manufacturer. There is no MPR applied when the proximity sensor is active (reduced power scenarios). See Section 11.4.1 for MPR targets.

#### 11.2.2 A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests

#### 11.2.3 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05:

1. Per KDB Publication 941225 D05 Page 4, 3) A), QPSK with 50% RB is required.
2. Per KDB Publication 941225 D05 Page 4, 3) B), QPSK with 1 RB for both channel edges are required.
3. Per KDB Publication 941225 D05 Page 4, 4) A), 16QAM with 50% RB is required.
4. Per KDB Publication 941225 D05 Page 4, 4) B), 16QAM with 1RB for both channel edges are required.
5. Per KDB Publication 941225 D05 Page 4, A) I), 100% RB Allocation is not required to be tested since SAR is not > 1.45 W/kg.

|                                  |                                                                                                                                   |                              |                                                                                       |                                 |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
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| Filename:<br>0Y1109221681-R1.A3L | Test Dates:<br>09/23/11 - 10/05/11 & 11/11/11                                                                                     | EUT Type:<br>Portable Tablet |                                                                                       | Page 23 of 43                   |

### 11.3 SAR Measurement Conditions for CDMA2000

The following procedures were performed according to FCC KDB Publication 941225 D01 "SAR Measurement Procedures for 3G Devices" v02, October 2007.

#### 11.3.1 Output Power Verification

See 3GPP2 C.S0011/TIA-98-E as recommended by "SAR Measurement Procedures for 3G Devices" v02, October 2007. Maximum output power is verified on the High, Middle and Low channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E. SO55 tests were measured with power control bits in the "All Up" condition.

1. If the mobile station (MS) supports Reverse TCH RC 1 and Forward TCH RC 1, set up a call using Fundamental Channel Test Mode 1 (RC=1/1) with 9600 bps data rate only.
2. Under RC1, C.S0011 Table 4.4.5.2-1, Table 11-1 parameters were applied.
3. If the MS supports the RC 3 Reverse FCH, RC3 Reverse SCH<sub>0</sub> and demodulation of RC 3,4, or 5, set up a call using Supplemental Channel Test Mode 3 (RC 3/3) with 9600 bps Fundamental Channel and 9600 bps SCH<sub>0</sub> data rate.
4. Under RC3, C.S0011 Table 4.4.5.2-2, Table 13-2 was applied.
5. FCHs were configured at full rate for maximum SAR with "All Up" power control bits.

**Table 11-1**  
**Parameters for Max. Power for RC1**

| Parameter                    | Units        | Value |
|------------------------------|--------------|-------|
| $I_{or}$                     | dBm/1.23 MHz | -104  |
| $\frac{Pilot E_c}{I_{or}}$   | dB           | -7    |
| $\frac{Traffic E_c}{I_{or}}$ | dB           | -7.4  |

**Table 11-2**  
**Parameters for Max. Power for RC3**

| Parameter                    | Units        | Value |
|------------------------------|--------------|-------|
| $I_{or}$                     | dBm/1.23 MHz | -86   |
| $\frac{Pilot E_c}{I_{or}}$   | dB           | -7    |
| $\frac{Traffic E_c}{I_{or}}$ | dB           | -7.4  |

#### 11.3.2 Body SAR Measurements for EVDO Data Devices

Hotspot Body SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0. SAR for Subtype 2 Physical layer configurations is not required for Rev. A when the maximum average output of each RF channels is less than that measured in Subtype 0/1 Physical layer configurations. Otherwise, SAR is measured on the maximum output channel for Rev. A using the exposure configuration that results in the highest SAR for the RF channels in Rev. 0. The AT is tested with a Reverse Data Channel rate of 153.6 kbps in Subtype 0/1 Physical Layer configurations; and a Reverse Data Channel payload size of 4096 bits and Termination Target of 16 slots in Subtype 2 Physical Layer configurations. Both FTAP and FETAP are configured with a Forward Traffic Channel data rate corresponding to the 2-slot version of 307.2 kbps with the ACK Channel transmitting in all slots. AT power control should be in "All Bits Up" conditions for TAP/ETAP.

SAR is not required for EVDO Rev. A when the maximum average output of each channel is less than 0.25 dB higher than output level tested with EVDO Rev.0.

|                                         |                                                                                     |                                     |                                                                                       |                                        |
|-----------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
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| <b>Filename:</b><br>0Y1109221681-R1.A3L | <b>Test Dates:</b><br>09/23/11 - 10/05/11 & 11/11/11                                | <b>EUT Type:</b><br>Portable Tablet |                                                                                       | Page 24 of 43                          |

## 11.4 RF Conducted Powers

### 11.4.1 LTE Mode

Table 11-3 LTE Band 13, 10 MHz, Max Power

| Frequency | BW     | Modulation | RB Size | RB Offset | Maximum Average Power [dBm] | Target MPR [dB] | MPR Allowed per 3GPP [dB] |
|-----------|--------|------------|---------|-----------|-----------------------------|-----------------|---------------------------|
| 782 MHz   | 10 MHz | QPSK       | 1       | 0         | <b>22.05</b>                | 0               | 0                         |
|           |        | 16QAM      | 1       | 0         | <b>21.20</b>                | 1               | 0-1                       |
|           |        | QPSK       | 1       | 49        | <b>22.03</b>                | 0               | 0                         |
|           |        | 16QAM      | 1       | 49        | <b>21.10</b>                | 1               | 0-1                       |
|           |        | QPSK       | 25      | 12        | <b>21.95</b>                | 0               | 0-1                       |
|           |        | 16QAM      | 25      | 12        | <b>20.85</b>                | 1               | 0-2                       |
|           |        | QPSK       | 50      | 0         | 21.51                       | 0               | 0-1                       |
|           |        | 16QAM      | 50      | 0         | 20.55                       | 1               | 0-2                       |

**Note:**

Differences from expected MPR levels are a result of measurement uncertainty. Per the manufacturer, the measured powers are acceptable for use within the intended network infrastructure. Powers measured below the expected levels on the devices were extrapolated to ensure compliance for SAR.

|                                  |                                                                                     |                              |                                                                                       |                                 |
|----------------------------------|-------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
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| Filename:<br>0Y1109221681-R1.A3L | Test Dates:<br>09/23/11 - 10/05/11 & 11/11/11                                       | EUT Type:<br>Portable Tablet |                                                                                       | Page 25 of 43                   |

Table 11-4 LTE Band 13, 10 MHz, **Reduced Power**

| Frequency | BW     | Modulation | RB Size | RB Offset | Maximum Average Power [dBm] | Target MPR [dB] | MPR Allowed per 3GPP [dB] |
|-----------|--------|------------|---------|-----------|-----------------------------|-----------------|---------------------------|
| 782 MHz   | 10 MHz | QPSK       | 1       | 0         | <b>18.10</b>                | 0               | 0                         |
|           |        | 16QAM      | 1       | 0         | <b>18.20</b>                | 0               | 0-1                       |
|           |        | QPSK       | 1       | 49        | <b>17.92</b>                | 0               | 0                         |
|           |        | 16QAM      | 1       | 49        | <b>18.00</b>                | 0               | 0-1                       |
|           |        | QPSK       | 25      | 12        | <b>18.19</b>                | 0               | 0-1                       |
|           |        | 16QAM      | 25      | 12        | <b>18.50</b>                | 0               | 0-2                       |
|           |        | QPSK       | 50      | 0         | 18.40                       | 0               | 0-1                       |
|           |        | 16QAM      | 50      | 0         | 18.50                       | 0               | 0-2                       |

Per the manufacturer, there no MPR is applied in reduced power conditions.

LTE test configurations are determined according to SAR Test Considerations for LTE handsets and Data Modems KDB 941225 D05 Publication:

- Per KDB Publication 941225 D05 Page 4, 3) A), QPSK with 50% RB is required for the highest bandwidth (10 MHz).
- Per KDB Publication 941225 D05 Page 4, 3) B), QPSK with 1 RB for both channel edges are required for the highest bandwidth (10 MHz).
- Per KDB Publication 941225 D05 Page 4, 4) A), 16QAM with 50% RB is required for the highest bandwidth (10 MHz).
- Per KDB Publication 941225 D05 Page 4, 4) B), 16QAM with 1RB for both channel edges are required for the highest bandwidth (10 MHz).
- Per KDB Publication 941225 D05 Page 4, A) I), 100% RB Allocation is not required to be tested since SAR is not > 1.45 W/kg for the highest bandwidth (10 MHz).
- Bolded configurations in the above tables were tested for SAR.

## LTE Summary of Power Reduction due to Proximity Sensor

Table 11-5  
Power Reduction Summary

| Band       | Reduced Power Target [dBm] |
|------------|----------------------------|
| <b>LTE</b> | <b>18</b>                  |

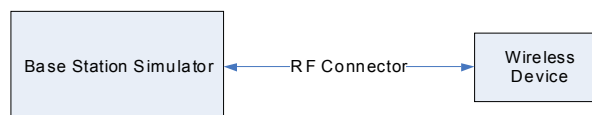


Table 11-6  
Power Measurement Setup

|                                  |                                                                                                                                   |                              |                                                                                       |                                 |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LSCH1815               |  <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | SAR COMPLIANCE REPORT        |  | Reviewed by:<br>Quality Manager |
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## 11.4.2 CDMA Mode

**Table 11-7**  
**Maximum CDMA Powers (Proximity Sensor Inactive)**

| Band     | Channel | Frequency | TDSO S032 [dBm] | TDSO S032 [dBm] | 1x EvDO Rev. 0 [dBm] | 1x EvDO Rev. A [dBm] |
|----------|---------|-----------|-----------------|-----------------|----------------------|----------------------|
|          | F-RC    | MHz       | FCH+SCH         | FCH             | (RTAP)               | (RETAP)              |
| Cellular | 1013    | 824.7     | 24.38           | 24.59           | 24.50                | 24.45                |
|          | 384     | 835.52    | 24.50           | 24.65           | <b>24.54</b>         | 24.44                |
|          | 777     | 848.31    | 24.64           | 24.60           | 24.45                | 24.48                |
| PCS      | 25      | 1851.25   | 23.65           | 24.14           | 23.95                | 24.00                |
|          | 600     | 1880      | 24.10           | 24.25           | <b>24.15</b>         | 24.12                |
|          | 1175    | 1908.75   | 23.65           | 24.00           | 23.80                | 23.85                |

Per KDB Publication 941225 D01, Maximum Power CDMA SAR was tested with EVDO Rev 0. TDSO32 (FCH and FCH+SCH) and EVDO Rev. A SAR tests were not required since the average output power was not more than 0.25 dB higher than the EVDO Rev. 0 powers.

|                                  |                                                                                     |                              |                                                                                       |                                 |
|----------------------------------|-------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LSCHI815               |  | SAR COMPLIANCE REPORT        |  | Reviewed by:<br>Quality Manager |
| Filename:<br>0Y1109221681-R1.A3L | Test Dates:<br>09/23/11 - 10/05/11 & 11/11/11                                       | EUT Type:<br>Portable Tablet |                                                                                       | Page 27 of 43                   |

**Table 11-8**  
**Reduced CDMA Powers (Proximity Sensor Active)**

| Band     | Channel | Frequency | TDSO SO32 [dBm] | TDSO SO32 [dBm] | 1x EvDO Rev. 0 [dBm] | 1x EvDO Rev. A [dBm] |
|----------|---------|-----------|-----------------|-----------------|----------------------|----------------------|
|          | F-RC    | MHz       | FCH+SCH         | FCH             | (RTAP)               | (RETAP)              |
| Cellular | 1013    | 824.7     | 19.20           | 18.25           | 18.90                | 19.04                |
|          | 384     | 835.52    | 18.51           | 18.60           | 18.29                | 18.60                |
|          | 777     | 848.31    | 19.34           | 18.27           | 18.60                | 18.65                |
| PCS      | 25      | 1851.25   | 13.81           | 13.60           | 13.45                | 13.58                |
|          | 600     | 1880      | 14.00           | 13.75           | 13.55                | 13.80                |
|          | 1175    | 1908.75   | 14.15           | 13.90           | 13.72                | 13.90                |

Notes:

1. Per KDB Publication 941225 D01, Reduced Power CDMA SAR was tested with EVDO Rev 0. TDSO32 FCH+SCH SAR tests were additionally required since the average output power was more than 0.25 dB higher than EVDO Rev. 0 powers. EVDO Rev A and TDSO32 FCH SAR tests were not required since the average output power per channel was not more than 0.25 dB higher than the corresponding EVDO Rev. 0 power level.
2. Per October 2010 TCB Workshop notes, Cell CDMA Reduced Power SAR was tested at the highest output power per mode since the deviation across channels was more than 0.5 dB.

### CDMA Summary of Power Reduction due to Proximity Sensor

**Table 11-9**  
**Power Reduction Summary**

| Band     | Reduced Power Target [dBm] |
|----------|----------------------------|
| Cellular | 19.00                      |
| PCS      | 14.00                      |



**Table 11-10**  
**Power Measurement Setup**

|                                  |                                                                                                                                                  |                              |                                                                                       |                                 |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
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## 12 SAR TESTING WITH IEEE 802.11 TRANSMITTERS

Normal network operating configurations are not suitable for measuring the SAR of 802.11 a/b/g/n transmitters. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable.

### 12.1 General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

### 12.2 Frequency Channel Configurations [27]

802.11 a/b/g/n operating modes are tested independently according to the service requirements in each frequency band. 802.11 b/g/n modes are tested on channels 1, 6 and 11. 802.11a is tested for UNII operations on channels 36 and 48 in the 5.15-5.25 GHz band; channels 52 and 64 in the 5.25-5.35 GHz band; channels 104, 116 and 136 in the 5.470-5.725 GHz band; and channels 149 and 161 in the 5.8 GHz band. When 5.8 GHz §15.247 is also available, channels 149, 157 and 165 should be tested instead of the UNII channels. These are referred to as the “default test channels”. For 2.4 GHz, 802.11g/n modes were evaluated only if the output power was 0.25 dB higher than the 802.11b mode. For 5 GHz, 802.11n modes were evaluated only if the output power was 0.25 dB higher than the 802.11a mode.

**Table 12-1**  
**802.11 Test Channels per FCC Requirements**

| Mode                  | GHz     | Channel | Turbo Channel  | “Default Test Channels” |         |      |
|-----------------------|---------|---------|----------------|-------------------------|---------|------|
|                       |         |         |                | §15.247<br>802.11b      | 802.11g | UNII |
| 802.11 b/g            | 2.412   | 1       |                | ✓                       | ▽       |      |
|                       | 2.437   | 6       | 6              | ✓                       | ▽       |      |
|                       | 2.462   | 11      |                | ✓                       | ▽       |      |
| 802.11a               | 5.18    | 36      |                |                         |         | ✓    |
|                       | 5.20    | 40      | 42 (5.21 GHz)  |                         |         | *    |
|                       | 5.22    | 44      |                |                         |         | *    |
|                       | 5.24    | 48      |                |                         |         | ✓    |
|                       | 5.26    | 52      | 50 (5.25 GHz)  |                         |         | ✓    |
|                       | 5.28    | 56      | 58 (5.29 GHz)  |                         |         | *    |
|                       | 5.30    | 60      |                |                         |         | *    |
|                       | 5.32    | 64      |                |                         |         | ✓    |
|                       | 5.500   | 100     | Unknown        |                         |         | *    |
|                       | 5.520   | 104     |                |                         |         | ✓    |
|                       | 5.540   | 108     |                |                         |         | *    |
|                       | 5.560   | 112     |                |                         |         | *    |
|                       | 5.580   | 116     |                |                         |         | ✓    |
|                       | 5.600   | 120     |                |                         |         | *    |
|                       | 5.620   | 124     |                |                         |         | ✓    |
|                       | 5.640   | 128     |                |                         |         | *    |
|                       | 5.660   | 132     |                |                         |         | *    |
|                       | 5.680   | 136     |                |                         |         | ✓    |
|                       | 5.700   | 140     |                |                         |         | *    |
| UNII<br>or<br>§15.247 | 5.745   | 149     |                | ✓                       |         | ✓    |
|                       | 5.765   | 153     | 152 (5.76 GHz) |                         | *       | *    |
|                       | 5.785   | 157     |                | ✓                       |         | *    |
|                       | 5.805   | 161     | 160 (5.80 GHz) |                         | *       | ✓    |
|                       | §15.247 | 5.825   | 165            | ✓                       |         |      |

Per FCC KDB Publication 443999, transmission on channels which overlap the 5600-5650 MHz is not allowed.

|                                         |                                                                                     |                                     |                                                                                       |                                        |
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| <b>Filename:</b><br>0Y1109221681-R1.A3L | <b>Test Dates:</b><br>09/23/11 - 10/05/11 & 11/11/11                                | <b>EUT Type:</b><br>Portable Tablet |                                                                                       | Page 29 of 43                          |

**Table 12-2**  
**IEEE 802.11b Average RF Power**

| Mode    | Freq<br>[MHz] | Channel | Conducted Power [dBm] |       |       |       |
|---------|---------------|---------|-----------------------|-------|-------|-------|
|         |               |         | Data Rate [Mbps]      |       |       |       |
|         |               |         | 1                     | 2     | 5.5   | 11    |
| 802.11b | 2412          | 1       | 11.54                 | 11.58 | 11.59 | 11.50 |
| 802.11b | 2437          | 6       | 11.41                 | 11.68 | 11.23 | 11.74 |
| 802.11b | 2462          | 11      | 11.44                 | 11.68 | 11.69 | 11.61 |

**Table 12-3**  
**IEEE 802.11g Average RF Power**

| Mode    | Freq<br>[MHz] | Channel | Conducted Power [dBm] |       |       |       |       |       |       |       |
|---------|---------------|---------|-----------------------|-------|-------|-------|-------|-------|-------|-------|
|         |               |         | Data Rate [Mbps]      |       |       |       |       |       |       |       |
|         |               |         | 6                     | 9     | 12    | 18    | 24    | 36    | 48    | 54    |
| 802.11g | 2412          | 1       | 11.43                 | 11.46 | 11.38 | 11.49 | 11.11 | 11.37 | 11.50 | 11.42 |
| 802.11g | 2437          | 6       | 11.43                 | 11.45 | 11.47 | 11.45 | 11.36 | 11.38 | 11.07 | 10.75 |
| 802.11g | 2462          | 11      | 11.04                 | 11.05 | 11.08 | 11.07 | 10.93 | 11.09 | 11.05 | 11.02 |

**Table 12-4**  
**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 | 2412          | 1       | 11.35                 | 11.12 | 11.28 | 11.31 | 11.34 | 11.32 | 11.40 | 11.32 |
| 802.11n | 2437          | 6       | 11.37                 | 11.35 | 11.42 | 11.02 | 10.93 | 10.97 | 11.05 | 10.91 |
| 802.11n | 2462          | 11      | 11.01                 | 10.96 | 11.12 | 11.08 | 11.04 | 11.04 | 11.05 | 11.04 |

**Table 12-5**  
**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      | 9.42                  | 8.70  | 9.39  | 8.98  | 9.34  | 8.62 | 8.70 | 8.76 |
| 802.11a | 5200          | 40      | 9.46                  | 8.84  | 9.01  | 9.05  | 9.65  | 8.93 | 9.12 | 8.90 |
| 802.11a | 5220          | 44      | 9.73                  | 8.78  | 9.21  | 9.09  | 9.70  | 8.95 | 9.11 | 8.92 |
| 802.11a | 5240          | 48      | 9.57                  | 8.95  | 9.30  | 9.33  | 9.57  | 9.24 | 9.35 | 9.04 |
| 802.11a | 5260          | 52      | 9.82                  | 9.62  | 9.67  | 9.54  | 10.02 | 9.29 | 9.72 | 9.63 |
| 802.11a | 5280          | 56      | 10.07                 | 9.63  | 9.82  | 9.52  | 9.49  | 9.50 | 9.05 | 8.65 |
| 802.11a | 5300          | 60      | 10.16                 | 9.91  | 10.11 | 9.89  | 10.07 | 9.98 | 9.29 | 9.18 |
| 802.11a | 5320          | 64      | 10.04                 | 9.62  | 9.62  | 9.50  | 9.65  | 9.50 | 9.34 | 9.14 |
| 802.11a | 5500          | 100     | 9.35                  | 8.63  | 9.23  | 9.28  | 9.40  | 8.92 | 9.10 | 8.90 |
| 802.11a | 5520          | 104     | 9.65                  | 8.91  | 9.46  | 9.61  | 9.24  | 9.10 | 9.25 | 9.25 |
| 802.11a | 5540          | 108     | 9.64                  | 8.85  | 9.39  | 9.49  | 9.04  | 8.92 | 9.13 | 9.08 |
| 802.11a | 5560          | 112     | 9.90                  | 9.53  | 9.94  | 9.70  | 9.54  | 9.29 | 9.33 | 9.40 |
| 802.11a | 5580          | 116     | 9.78                  | 8.96  | 9.95  | 9.54  | 9.07  | 8.84 | 9.12 | 9.11 |
| 802.11a | 5600          | 120     | N/A                   | N/A   | N/A   | N/A   | N/A   | N/A  | N/A  | N/A  |
| 802.11a | 5620          | 124     | N/A                   | N/A   | N/A   | N/A   | N/A   | N/A  | N/A  | N/A  |
| 802.11a | 5640          | 128     | N/A                   | N/A   | N/A   | N/A   | N/A   | N/A  | N/A  | N/A  |
| 802.11a | 5660          | 132     | 9.73                  | 9.46  | 9.33  | 9.72  | 9.78  | 8.81 | 9.08 | 8.85 |
| 802.11a | 5680          | 136     | 9.84                  | 9.81  | 9.73  | 9.85  | 9.63  | 9.16 | 9.04 | 8.82 |
| 802.11a | 5700          | 140     | 9.88                  | 9.75  | 9.68  | 9.91  | 9.56  | 9.00 | 9.34 | 8.91 |
| 802.11a | 5745          | 149     | 9.35                  | 9.59  | 9.37  | 9.57  | 9.33  | 8.80 | 8.99 | 8.84 |
| 802.11a | 5765          | 153     | 9.25                  | 9.33  | 9.31  | 9.48  | 9.59  | 8.78 | 8.95 | 9.05 |
| 802.11a | 5785          | 157     | 9.47                  | 9.41  | 9.52  | 9.50  | 9.39  | 8.94 | 8.84 | 9.14 |
| 802.11a | 5805          | 161     | 10.10                 | 9.99  | 9.84  | 9.88  | 9.88  | 9.61 | 9.76 | 9.83 |
| 802.11a | 5825          | 165     | 10.12                 | 10.04 | 9.80  | 10.03 | 9.45  | 9.17 | 9.35 | 9.23 |

Note: This device does not transmit any beacons or initiate any transmissions in 5.3 and 5.5 GHz Bands. Per FCC KDB Publication 443999, transmission on channels which overlap the 5600-5650 MHz is not allowed.

|                                         |                                                                                     |                                     |                                                                                       |                                        |
|-----------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
| <b>FCC ID:</b> A3LSCHI815               |  | <b>SAR COMPLIANCE REPORT</b>        |  | <b>Reviewed by:</b><br>Quality Manager |
| <b>Filename:</b><br>0Y1109221681-R1.A3L | <b>Test Dates:</b><br>09/23/11 - 10/05/11 & 11/11/11                                | <b>EUT Type:</b><br>Portable Tablet | Page 30 of 43                                                                         |                                        |

**Table 12-6**  
**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      | 8.44                  | 8.12 | 8.32 | 8.45 | 8.32  | 8.40 | 8.41 | 7.41 |
| 802.11n | 5200          | 40      | 8.75                  | 8.64 | 8.70 | 8.46 | 8.63  | 8.90 | 8.72 | 7.51 |
| 802.11n | 5220          | 44      | 8.65                  | 8.25 | 8.31 | 8.30 | 8.60  | 8.82 | 8.56 | 7.14 |
| 802.11n | 5240          | 48      | 8.66                  | 8.26 | 8.39 | 8.50 | 8.75  | 8.85 | 8.67 | 6.98 |
| 802.11n | 5260          | 52      | 9.03                  | 9.05 | 9.05 | 9.03 | 9.33  | 9.40 | 9.26 | 7.83 |
| 802.11n | 5280          | 56      | 8.20                  | 7.85 | 7.90 | 7.90 | 8.26  | 8.39 | 8.01 | 7.29 |
| 802.11n | 5300          | 60      | 8.49                  | 8.56 | 8.54 | 8.60 | 8.90  | 9.07 | 8.84 | 7.98 |
| 802.11n | 5320          | 64      | 7.72                  | 8.31 | 8.37 | 8.22 | 8.77  | 8.78 | 8.64 | 8.00 |
| 802.11n | 5500          | 100     | 7.87                  | 8.45 | 8.33 | 8.09 | 8.86  | 8.87 | 8.44 | 7.93 |
| 802.11n | 5520          | 104     | 8.30                  | 8.86 | 8.70 | 8.48 | 9.09  | 9.20 | 8.71 | 8.36 |
| 802.11n | 5540          | 108     | 8.30                  | 8.91 | 8.45 | 8.82 | 8.91  | 9.10 | 8.53 | 8.14 |
| 802.11n | 5560          | 112     | 8.61                  | 9.00 | 8.91 | 9.21 | 9.25  | 9.34 | 8.82 | 8.34 |
| 802.11n | 5580          | 116     | 8.26                  | 8.93 | 8.60 | 9.01 | 8.96  | 9.08 | 8.50 | 8.01 |
| 802.11n | 5600          | 120     | N/A                   | N/A  | N/A  | N/A  | N/A   | N/A  | N/A  | N/A  |
| 802.11n | 5620          | 124     | N/A                   | N/A  | N/A  | N/A  | N/A   | N/A  | N/A  | N/A  |
| 802.11n | 5640          | 128     | N/A                   | N/A  | N/A  | N/A  | N/A   | N/A  | N/A  | N/A  |
| 802.11n | 5660          | 132     | 8.20                  | 8.90 | 8.34 | 9.06 | 9.00  | 9.05 | 8.36 | 7.80 |
| 802.11n | 5680          | 136     | 8.38                  | 9.12 | 8.50 | 9.25 | 9.03  | 8.31 | 8.52 | 7.83 |
| 802.11n | 5700          | 140     | 8.32                  | 8.47 | 8.65 | 9.25 | 9.40  | 8.81 | 8.56 | 8.08 |
| 802.11n | 5745          | 149     | 8.24                  | 8.54 | 8.40 | 9.10 | 9.04  | 8.53 | 8.71 | 7.81 |
| 802.11n | 5765          | 153     | 8.24                  | 8.51 | 8.31 | 9.14 | 9.14  | 8.97 | 8.90 | 8.05 |
| 802.11n | 5785          | 157     | 8.92                  | 8.97 | 8.70 | 9.65 | 9.63  | 9.14 | 8.78 | 8.34 |
| 802.11n | 5805          | 161     | 9.19                  | 9.35 | 9.26 | 9.90 | 10.04 | 9.40 | 9.58 | 8.25 |
| 802.11n | 5825          | 165     | 9.38                  | 9.58 | 9.32 | 9.38 | 9.65  | 9.10 | 9.15 | 7.89 |

Note: This device does not transmit any beacons or initiate any transmissions in 5.3 and 5.5 GHz Bands. Per FCC KDB Publication 443999, transmission on channels which overlap the 5600-5650 MHz is not allowed.

Per KDB Publication 447498, WIFI SAR was not required for any mode or band since the output power was less than 60/f(GHz) for all modes.

**Table 12-7**  
**WIFI SAR Threshold Power Levels**

| Frequency (GHz) | 60/f(GHz) (mW) | Power (dBm) | Power (mW) | P < 60/f(GHz)? | SAR Required? |
|-----------------|----------------|-------------|------------|----------------|---------------|
| 2.462           | 24.37          | 11.74       | 14.93      | Yes            | No            |
| 5.240           | 11.45          | 9.73        | 9.40       | Yes            | No            |
| 5.320           | 11.28          | 10.16       | 10.38      | Yes            | No            |
| 5.700           | 10.53          | 10.09       | 10.21      | Yes            | No            |
| 5.825           | 10.30          | 10.12       | 10.28      | Yes            | No            |

Note: Per band, the highest measured power was compared against the lowest threshold representing the most conservative scenario.



**Table 12-8**  
**Power Measurement Setup**

|                                  |                                               |                              |  |                                 |
|----------------------------------|-----------------------------------------------|------------------------------|--|---------------------------------|
| FCC ID: A3LSCHI815               | PCTEST<br>ENGINEERING LABORATORY, INC.        | <b>SAR COMPLIANCE REPORT</b> |  | Reviewed by:<br>Quality Manager |
| Filename:<br>0Y1109221681-R1.A3L | Test Dates:<br>09/23/11 - 10/05/11 & 11/11/11 | EUT Type:<br>Portable Tablet |  | Page 31 of 43                   |

## 13 SYSTEM VERIFICATION

### 13.1 Tissue Verification

**Table 13-1**  
**Measured Tissue Properties**

| Calibrated for Tests Performed on: | Tissue Type | Tissue Temp During Calibration (C°) | Measured Frequency (MHz) | Measured Conductivity, $\sigma$ (S/m) | Measured Dielectric Constant, $\epsilon$ | TARGET Conductivity, $\sigma$ (S/m) | TARGET Dielectric Constant, $\epsilon$ | % dev $\sigma$ | % dev $\epsilon$ |
|------------------------------------|-------------|-------------------------------------|--------------------------|---------------------------------------|------------------------------------------|-------------------------------------|----------------------------------------|----------------|------------------|
| 10/05/2011                         | 750B        | 21.9                                | 725                      | 0.933                                 | 55.07                                    | 0.960                               | 55.817                                 | -2.81%         | -1.34%           |
|                                    |             |                                     | 740                      | 0.940                                 | 54.89                                    | 0.961                               | 55.733                                 | -2.19%         | -1.51%           |
|                                    |             |                                     | 755                      | 0.954                                 | 54.81                                    | 0.963                               | 55.649                                 | -0.93%         | -1.51%           |
|                                    |             |                                     | 770                      | 0.971                                 | 54.67                                    | 0.964                               | 55.564                                 | 0.73%          | -1.61%           |
|                                    |             |                                     | 785                      | 0.981                                 | 54.52                                    | 0.965                               | 55.480                                 | 1.66%          | -1.73%           |
|                                    |             |                                     | 800                      | 0.996                                 | 54.39                                    | 0.967                               | 55.396                                 | 3.00%          | -1.82%           |
| 09/23/2011                         | 835B        | 22.5                                | 820                      | 0.950                                 | 53.32                                    | 0.969                               | 55.284                                 | -1.96%         | -3.55%           |
|                                    |             |                                     | 835                      | 0.958                                 | 53.05                                    | 0.970                               | 55.200                                 | -1.24%         | -3.89%           |
|                                    |             |                                     | 850                      | 0.973                                 | 53.05                                    | 0.988                               | 55.154                                 | -1.52%         | -3.81%           |
| 09/23/2011                         | 1900B       | 23.2                                | 1850                     | 1.480                                 | 51.24                                    | 1.520                               | 53.300                                 | -2.63%         | -3.86%           |
|                                    |             |                                     | 1880                     | 1.507                                 | 51.12                                    | 1.520                               | 53.300                                 | -0.86%         | -4.09%           |
|                                    |             |                                     | 1910                     | 1.535                                 | 51.08                                    | 1.520                               | 53.300                                 | 0.99%          | -4.17%           |
| 09/26/2011                         | 1900B       | 22.8                                | 1850                     | 1.478                                 | 54.56                                    | 1.520                               | 53.300                                 | -2.76%         | 2.36%            |
|                                    |             |                                     | 1880                     | 1.493                                 | 54.43                                    | 1.520                               | 53.300                                 | -1.78%         | 2.12%            |
|                                    |             |                                     | 1910                     | 1.526                                 | 54.26                                    | 1.520                               | 53.300                                 | 0.39%          | 1.80%            |

**Table 13-2**  
**Measured Tissue Properties for Vertex Testing**

| Calibrated for Tests Performed on: | Tissue Type | Tissue Temp During Calibration (C°) | Measured Frequency (MHz) | Measured Conductivity, $\sigma$ (S/m) | Measured Dielectric Constant, $\epsilon$ | TARGET Conductivity, $\sigma$ (S/m) | TARGET Dielectric Constant, $\epsilon$ | % dev $\sigma$ | % dev $\epsilon$ |
|------------------------------------|-------------|-------------------------------------|--------------------------|---------------------------------------|------------------------------------------|-------------------------------------|----------------------------------------|----------------|------------------|
| 11/11/2011                         | 835B        | 23.5                                | 820                      | 0.958                                 | 54.30                                    | 0.969                               | 55.284                                 | -1.14%         | -1.78%           |
|                                    |             |                                     | 835                      | 0.978                                 | 54.22                                    | 0.970                               | 55.200                                 | 0.82%          | -1.78%           |
|                                    |             |                                     | 850                      | 0.996                                 | 53.96                                    | 0.988                               | 55.154                                 | 0.81%          | -2.16%           |
| 11/11/2011                         | 1900B       | 23.8                                | 1850                     | 1.452                                 | 52.73                                    | 1.520                               | 53.300                                 | -4.47%         | -1.07%           |
|                                    |             |                                     | 1880                     | 1.486                                 | 52.66                                    | 1.520                               | 53.300                                 | -2.24%         | -1.20%           |
|                                    |             |                                     | 1910                     | 1.516                                 | 52.56                                    | 1.520                               | 53.300                                 | -0.26%         | -1.39%           |

Note: KDB Publication 450824 was ensured to be applied for probe calibration frequencies greater than or equal to 50 MHz of the DUT frequencies.

The above measured tissue parameters were used in the DASY software to perform interpolation via the DASY software to determine actual dielectric parameters at the test frequencies (per IEEE 1528 6.6.1.2). The SAR test plots may slightly differ from the table above since the DASY software rounds to three significant digits.

### 13.2 Measurement Procedure for Tissue verification

- 1) The network analyzer and probe system was configured and calibrated.
- 2) The probe was immersed in the sample which was placed in a nonmetallic container. Trapped air bubbles beneath the flange were minimized by placing the probe at a slight angle.
- 3) The complex admittance with respect to the probe aperture was measured
- 4) The complex relative permittivity, for example from the below equation (Pournaropoulos and Misra):

$$Y = \frac{j2\omega\epsilon_r\epsilon_0}{[\ln(b/a)]^2} \int_a^b \int_a^b \int_0^\pi \cos\phi' \frac{\exp[-j\omega r(\mu_0\epsilon_r'\epsilon_0)^{1/2}]}{r} d\phi' d\rho' d\rho$$

where Y is the admittance of the probe in contact with the sample, the primed and unprimed coordinates refer to source and observation points, respectively,  $r^2 = \rho^2 + \rho'^2 - 2\rho\rho'\cos\phi'$ ,  $\omega$  is the angular frequency, and  $j = \sqrt{-1}$ .

|                                  |                                                                                     |                              |                                                                                       |                                 |
|----------------------------------|-------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LSCH1815               |  | SAR COMPLIANCE REPORT        |  | Reviewed by:<br>Quality Manager |
| Filename:<br>0Y1109221681-R1.A3L | Test Dates:<br>09/23/11 - 10/05/11 & 11/11/11                                       | EUT Type:<br>Portable Tablet |                                                                                       | Page 32 of 43                   |

### 13.3 Test System Verification

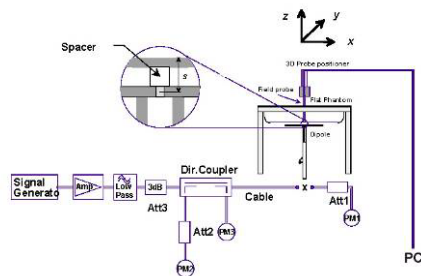
Prior to assessment, the system is verified to  $\pm 10\%$  of the manufacturer SAR measurement on the reference dipole at the time of calibration.

**Table 13-3**  
**System Verification Results**

| System Verification<br>TARGET & MEASURED |                |                  |                 |                        |           |          |             |                                   |                                     |                                         |               |
|------------------------------------------|----------------|------------------|-----------------|------------------------|-----------|----------|-------------|-----------------------------------|-------------------------------------|-----------------------------------------|---------------|
| Date:                                    | Amb. Temp (°C) | Liquid Temp (°C) | Input Power (W) | Tissue Frequency (MHz) | Dipole SN | Probe SN | Tissue Type | Measured SAR <sub>1g</sub> (W/kg) | 1 W Target SAR <sub>1g</sub> (W/kg) | 1 W Normalized SAR <sub>1g</sub> (W/kg) | Deviation (%) |
| 10/05/2011                               | 25.0           | 23.2             | 0.100           | 750                    | 1003      | 3550     | Body        | 0.898                             | 8.850                               | 8.980                                   | 1.47%         |
| 09/23/2011                               | 23.7           | 22.4             | 0.100           | 835                    | 4d047     | 3258     | Body        | 0.981                             | 9.850                               | 9.810                                   | -0.41%        |
| 09/23/2011                               | 23.9           | 22.6             | 0.100           | 1900                   | 502       | 3209     | Body        | 4.39                              | 41.100                              | 43.900                                  | 6.81%         |
| 09/26/2011                               | 24.9           | 23.1             | 0.040           | 1900                   | 502       | 3550     | Body        | 1.61                              | 41.100                              | 40.250                                  | -2.07%        |

**Table 13-4**  
**System Verification Results for Vertex SAR Tests**

| System Verification<br>TARGET & MEASURED |                |                  |                 |                        |           |          |             |                                   |                                     |                                         |               |
|------------------------------------------|----------------|------------------|-----------------|------------------------|-----------|----------|-------------|-----------------------------------|-------------------------------------|-----------------------------------------|---------------|
| Date:                                    | Amb. Temp (°C) | Liquid Temp (°C) | Input Power (W) | Tissue Frequency (MHz) | Dipole SN | Probe SN | Tissue Type | Measured SAR <sub>1g</sub> (W/kg) | 1 W Target SAR <sub>1g</sub> (W/kg) | 1 W Normalized SAR <sub>1g</sub> (W/kg) | Deviation (%) |
| 11/11/2011                               | 23.6           | 22.0             | 0.100           | 835                    | 4d047     | 3258     | Body        | 0.979                             | 9.850                               | 9.790                                   | -0.61%        |
| 11/11/2011                               | 24.3           | 22.8             | 0.040           | 1900                   | 502       | 3561     | Body        | 1.62                              | 41.100                              | 40.500                                  | -1.46%        |



**Table 13-5**  
**System Verification Setup Diagram**



**Table 13-6**  
**System Verification Setup Photo**

|                                  |                                                                                     |                              |                                                                                       |                                 |
|----------------------------------|-------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LSCH1815               |  | SAR COMPLIANCE REPORT        |  | Reviewed by:<br>Quality Manager |
| Filename:<br>0Y1109221681-R1.A3L | Test Dates:<br>09/23/11 - 10/05/11 & 11/11/11                                       | EUT Type:<br>Portable Tablet |                                                                                       | Page 33 of 43                   |

# 14 SAR DATA SUMMARY

## 14.1 SAR Test Data

**Table 14-1**  
**Cell. CDMA Body SAR Results**

| MEASUREMENT RESULTS                                                                               |      |            |                |                       |                  |                    |                                                 |               |       |          |
|---------------------------------------------------------------------------------------------------|------|------------|----------------|-----------------------|------------------|--------------------|-------------------------------------------------|---------------|-------|----------|
| FREQUENCY                                                                                         |      | Mode       | Service        | Conducted Power [dBm] | Power Drift [dB] | Target Power [dBm] | Spacing                                         | Serial Number | Side  | SAR (1g) |
| MHz                                                                                               | Ch.  |            |                |                       |                  |                    |                                                 |               |       | (W/kg)   |
| 824.70                                                                                            | 1013 | Cell. CDMA | EVDO           | 18.90                 | -0.02            | 19.0               | 0.0 cm                                          | 0815-0385     | back* | 0.322    |
| 848.31                                                                                            | 777  | Cell. CDMA | TDSO32 FCH+SCH | 19.34                 | -0.07            | 19.0               | 0.0 cm                                          | 0815-0385     | back* | 0.686    |
| 836.52                                                                                            | 384  | Cell. CDMA | EVDO           | 24.54                 | 0.01             | 24.5               | 1.0 cm                                          | 0815-0384     | back  | 0.387    |
| 824.70                                                                                            | 1013 | Cell. CDMA | EVDO           | 18.90                 | -0.05            | 19.0               | 0.0 cm                                          | 0815-0385     | top*  | 0.101    |
| 848.31                                                                                            | 777  | Cell. CDMA | TDSO32 FCH+SCH | 19.34                 | -0.05            | 19.0               | 0.0 cm                                          | 0815-0385     | top*  | 0.171    |
| 836.52                                                                                            | 384  | Cell. CDMA | EVDO           | 24.54                 | 0.05             | 24.5               | 0.3 cm                                          | 0815-0384     | top   | 0.422    |
| 836.52                                                                                            | 384  | Cell. CDMA | EVDO           | 24.54                 | 0.04             | 24.5               | 0.0 cm                                          | 0815-0384     | left  | 0.437    |
| ANSI / IEEE C95.1 1992 - SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population |      |            |                |                       |                  |                    | Body<br>1.6 W/kg (mW/g)<br>averaged over 1 gram |               |       |          |

**Table 14-2**  
**PCS CDMA Body SAR Results**

| MEASUREMENT RESULTS                                                                               |      |          |                |                       |                  |                    |                                                 |               |       |          |
|---------------------------------------------------------------------------------------------------|------|----------|----------------|-----------------------|------------------|--------------------|-------------------------------------------------|---------------|-------|----------|
| FREQUENCY                                                                                         |      | Mode     | Service        | Conducted Power [dBm] | Power Drift [dB] | Target Power [dBm] | Spacing                                         | Serial Number | Side  | SAR (1g) |
| MHz                                                                                               | Ch.  |          |                |                       |                  |                    |                                                 |               |       | (W/kg)   |
| 1851.25                                                                                           | 25   | PCS CDMA | EVDO           | 13.45                 | -0.02            | 14.0               | 0.0 cm                                          | 0815-0385     | back* | 1.090    |
| 1880.00                                                                                           | 600  | PCS CDMA | EVDO           | 13.55                 | -0.01            | 14.0               | 0.0 cm                                          | 0815-0385     | back* | 0.866    |
| 1908.75                                                                                           | 1175 | PCS CDMA | EVDO           | 13.72                 | -0.03            | 14.0               | 0.0 cm                                          | 0815-0385     | back* | 0.902    |
| 1851.25                                                                                           | 25   | PCS CDMA | TDSO32 FCH+SCH | 13.81                 | 0.00             | 14.0               | 0.0 cm                                          | 0815-0385     | back* | 0.599    |
| 1880.00                                                                                           | 600  | PCS CDMA | TDSO32 FCH+SCH | 14.00                 | 0.05             | 14.0               | 0.0 cm                                          | 0815-0385     | back* | 0.925    |
| 1908.75                                                                                           | 1175 | PCS CDMA | TDSO32 FCH+SCH | 14.15                 | -0.07            | 14.0               | 0.0 cm                                          | 0815-0385     | back* | 0.964    |
| 1880.00                                                                                           | 600  | PCS CDMA | EVDO           | 24.15                 | -0.01            | 24.0               | 1.0 cm                                          | 0815-0384     | back  | 0.227    |
| 1880.00                                                                                           | 600  | PCS CDMA | EVDO           | 13.55                 | -0.01            | 14.0               | 0.0 cm                                          | 0815-0385     | top*  | 0.276    |
| 1880.00                                                                                           | 600  | PCS CDMA | TDSO32 FCH+SCH | 14.00                 | 0.00             | 14.0               | 0.0 cm                                          | 0815-0385     | top*  | 0.299    |
| 1880.00                                                                                           | 600  | PCS CDMA | EVDO           | 24.15                 | -0.09            | 24.0               | 0.3 cm                                          | 0815-0384     | top   | 0.262    |
| 1851.25                                                                                           | 25   | PCS CDMA | EVDO           | 23.95                 | 0.03             | 24.0               | 0.0 cm                                          | 0815-0384     | left  | 0.677    |
| 1880.00                                                                                           | 600  | PCS CDMA | EVDO           | 24.15                 | 0.04             | 24.0               | 0.0 cm                                          | 0815-0384     | left  | 1.020    |
| 1908.75                                                                                           | 1175 | PCS CDMA | EVDO           | 23.80                 | 0.05             | 24.0               | 0.0 cm                                          | 0815-0384     | left  | 0.838    |
| ANSI / IEEE C95.1 1992 - SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population |      |          |                |                       |                  |                    | Body<br>1.6 W/kg (mW/g)<br>averaged over 1 gram |               |       |          |

|                                  |                                                                                                                                   |                              |                                                                                       |                                 |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LSCHI815               |  <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | <b>SAR COMPLIANCE REPORT</b> |  | Reviewed by:<br>Quality Manager |
| Filename:<br>0Y1109221681-R1.A3L | Test Dates:<br>09/23/11 - 10/05/11 & 11/11/11                                                                                     | EUT Type:<br>Portable Tablet |                                                                                       | Page 34 of 43                   |

**Table 14-3**  
**LTE Body SAR Results**

| MEASUREMENT RESULTS                                                                               |       |      |                       |                  |                 |                    |                                                 |            |               |                      |           |        |          |
|---------------------------------------------------------------------------------------------------|-------|------|-----------------------|------------------|-----------------|--------------------|-------------------------------------------------|------------|---------------|----------------------|-----------|--------|----------|
| FREQUENCY                                                                                         |       | Mode | Conducted Power [dBm] | Power Drift [dB] | Target MPR [dB] | Target Power [dBm] | Spacing                                         | Modulation | Serial Number | # of Resource Blocks | RB Offset | Side   | SAR (1g) |
| MHz                                                                                               | Ch.   |      |                       |                  |                 |                    |                                                 |            |               |                      |           |        | (W/kg)   |
| 782.00                                                                                            | 23230 | LTE  | 18.19                 | -0.02            | 0               | 18.0               | 0.0 cm                                          | QPSK       | 0815-0385     | 25                   | 12        | back*  | 0.693    |
| 782.00                                                                                            | 23230 | LTE  | 18.10                 | 0.01             | 0               | 18.0               | 0.0 cm                                          | QPSK       | 0815-0385     | 1                    | 0         | back*  | 0.461    |
| 782.00                                                                                            | 23230 | LTE  | 17.92                 | 0.03             | 0               | 18.0               | 0.0 cm                                          | QPSK       | 0815-0385     | 1                    | 49        | back*  | 0.451    |
| 782.00                                                                                            | 23230 | LTE  | 18.50                 | -0.02            | 0               | 18.0               | 0.0 cm                                          | 16QAM      | 0815-0385     | 25                   | 12        | back*  | 0.731    |
| 782.00                                                                                            | 23230 | LTE  | 18.20                 | -0.02            | 0               | 18.0               | 0.0 cm                                          | 16QAM      | 0815-0385     | 1                    | 0         | back*  | 0.497    |
| 782.00                                                                                            | 23230 | LTE  | 18.00                 | 0.03             | 0               | 18.0               | 0.0 cm                                          | 16QAM      | 0815-0385     | 1                    | 49        | back*  | 0.483    |
| 782.00                                                                                            | 23230 | LTE  | 21.95                 | 0.08             | 0               | 22.0               | 0.5 cm                                          | QPSK       | 0815-0384     | 25                   | 12        | back   | 0.772    |
| 782.00                                                                                            | 23230 | LTE  | 22.05                 | 0.00             | 0               | 22.0               | 0.5 cm                                          | QPSK       | 0815-0384     | 1                    | 0         | back   | 0.808    |
| 782.00                                                                                            | 23230 | LTE  | 22.03                 | 0.05             | 0               | 22.0               | 0.5 cm                                          | QPSK       | 0815-0384     | 1                    | 49        | back   | 0.739    |
| 782.00                                                                                            | 23230 | LTE  | 20.85                 | -0.01            | 1               | 21.0               | 0.5 cm                                          | 16QAM      | 0815-0384     | 25                   | 12        | back   | 0.646    |
| 782.00                                                                                            | 23230 | LTE  | 21.20                 | -0.02            | 1               | 21.0               | 0.5 cm                                          | 16QAM      | 0815-0384     | 1                    | 0         | back   | 0.708    |
| 782.00                                                                                            | 23230 | LTE  | 21.10                 | -0.09            | 1               | 21.0               | 0.5 cm                                          | 16QAM      | 0815-0384     | 1                    | 49        | back   | 0.648    |
| 782.00                                                                                            | 23230 | LTE  | 21.95                 | -0.09            | 0               | 22.0               | 0.0 cm                                          | QPSK       | 0815-0384     | 25                   | 12        | bottom | 0.568    |
| 782.00                                                                                            | 23230 | LTE  | 22.05                 | -0.09            | 0               | 22.0               | 0.0 cm                                          | QPSK       | 0815-0384     | 1                    | 0         | bottom | 0.611    |
| 782.00                                                                                            | 23230 | LTE  | 22.03                 | -0.05            | 0               | 22.0               | 0.0 cm                                          | QPSK       | 0815-0384     | 1                    | 49        | bottom | 0.493    |
| 782.00                                                                                            | 23230 | LTE  | 20.85                 | 0.00             | 1               | 21.0               | 0.0 cm                                          | 16QAM      | 0815-0384     | 25                   | 12        | bottom | 0.439    |
| 782.00                                                                                            | 23230 | LTE  | 21.20                 | -0.09            | 1               | 21.0               | 0.0 cm                                          | 16QAM      | 0815-0384     | 1                    | 0         | bottom | 0.514    |
| 782.00                                                                                            | 23230 | LTE  | 21.10                 | -0.09            | 1               | 21.0               | 0.0 cm                                          | 16QAM      | 0815-0384     | 1                    | 49        | bottom | 0.424    |
| 782.00                                                                                            | 23230 | LTE  | 21.95                 | 0.00             | 0               | 22.0               | 0.0 cm                                          | QPSK       | 0815-0384     | 25                   | 12        | left   | 0.707    |
| 782.00                                                                                            | 23230 | LTE  | 22.05                 | -0.07            | 0               | 22.0               | 0.0 cm                                          | QPSK       | 0815-0384     | 1                    | 0         | left   | 0.648    |
| 782.00                                                                                            | 23230 | LTE  | 22.03                 | 0.04             | 0               | 22.0               | 0.0 cm                                          | QPSK       | 0815-0384     | 1                    | 49        | left   | 0.644    |
| 782.00                                                                                            | 23230 | LTE  | 20.85                 | -0.08            | 1               | 21.0               | 0.0 cm                                          | 16QAM      | 0815-0384     | 25                   | 12        | left   | 0.550    |
| 782.00                                                                                            | 23230 | LTE  | 21.20                 | -0.06            | 1               | 21.0               | 0.0 cm                                          | 16QAM      | 0815-0384     | 1                    | 0         | left   | 0.607    |
| 782.00                                                                                            | 23230 | LTE  | 21.10                 | 0.06             | 1               | 21.0               | 0.0 cm                                          | 16QAM      | 0815-0384     | 1                    | 49        | left   | 0.623    |
| ANSI / IEEE C95.1 1992 - SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population |       |      |                       |                  |                 |                    | Body<br>1.6 W/kg (mW/g)<br>averaged over 1 gram |            |               |                      |           |        |          |

## 14.2 SAR Testing Notes

### General Notes:

- The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used were according to FCC/OET Bulletin 65, Supplement C [June 2001]
- Per KDB publication 447498 4) b) i) the back side is required to be tested touching the flat phantom.
- This device is capable of multiple display orientations supporting both portrait and landscape positions. Therefore per KDB publication 447498 4) b) ii) (2), SAR testing applies for the tablet edges with antennas located within 5 cm of each tablet edge closest to the user. According to KDB publication 447498 4) b) ii) (2), for each antenna, SAR is only required for the edge with the most conservative exposure condition.
- Tissue parameters and temperatures are listed on the SAR plots.
- Batteries are fully charged for all readings.
- Liquid tissue depth was at least 15.0 cm.
- Asterisk (\*) denotes power reduction activated.

|                                         |                                                                                                                                   |                                     |                                                                                       |                                        |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
| FCC ID: A3LSCH1815                      |  <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | <b>SAR COMPLIANCE REPORT</b>        |  | <b>Reviewed by:</b><br>Quality Manager |
| <b>Filename:</b><br>0Y1109221681-R1.A3L | <b>Test Dates:</b><br>09/23/11 - 10/05/11 & 11/11/11                                                                              | <b>EUT Type:</b><br>Portable Tablet | Page 35 of 43                                                                         |                                        |

CDMA/EVDO Notes:

1. Per FCC KDB Publication 941225 D01, CDMA Body SAR was tested under EVDO Rev. 0 per FCC 3G Guidance (See Section 11.3.2).
2. For maximum power conditions, Rev. A and TDSO32 RC3 tests were not required since the maximum average output of each channel in Rev. A and RC3 (1x RTT) was not more than ¼ dB higher than the corresponding channel measured Rev 0.
3. For reduced power conditions, TDSO32 FCH+SCH tests were required since the maximum average output of each channel in TDSO32 FCH+SCH was more than ¼ dB higher than that measured Rev 0. Rev. A and TDSO32 FCH tests were not required since the maximum average output of each channel in Rev. A and FCH was not more than ¼ dB higher than the corresponding channel with Rev 0.
4. Per October 2010 TCB Workshop Notes, when the average output power varies across the channels by more than 0.5 dB, the highest output channel must be tested. Therefore, the highest output channel per mode was tested for reduced power with Cell. CDMA.
5. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (June 2001) and Public Notice DA-02-1438, if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
6. Per April 2011 TCB-FCC Workshop Notes, in addition to the 0 mm test distance required for tablet devices under KDB 447498, a conservative additional test distance of 10 mm from the back and 3 mm from the top were tested for SAR at maximum output power with the sensors deactivated. See Section 10.5 for more details.

LTE Notes:

1. Considerations: LTE test configurations are determined according to SAR Test Considerations for LTE handsets and Data Modems KDB 941225 D05 Publication:
  - a. Per KDB Publication 941225 D05 Page 4, 3) A), QPSK with 50% RB is required for the highest bandwidth (10 MHz).
  - b. Per KDB Publication 941225 D05 Page 4, 3) B), QPSK with 1 RB for both channel edges are required for the highest bandwidth (10 MHz).
  - c. Per KDB Publication 941225 D05 Page 4, 4) A), 16QAM with 50% RB is required for the highest bandwidth (10 MHz).
  - d. Per KDB Publication 941225 D05 Page 4, 4) B), 16QAM with 1RB for both channel edges are required for the highest bandwidth (10 MHz).
  - e. Per KDB Publication 941225 D05 Page 4, A) I), 100% RB Allocation is not required to be tested since SAR is not > 1.45 W/kg for the highest bandwidth (10 MHz).
  - f. Per KDB 947498 6c) there is 1 channel for LTE Band 13 (10 MHz).
2. There is an applied MPR implemented by the manufacturer when the proximity sensor is not active (maximum power scenarios). MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1. The differences noted are not cases of implemented MPR but rather associated with measurement uncertainty and allowable tolerances per 3GPP standard and the manufacturer. There is no MPR applied when the proximity sensor is active (reduced power scenarios).
3. Per April 2011 TCB-FCC Workshop Notes, in addition to the 0 mm test distance required for tablet devices under KDB 447498, a conservative additional test distance of 5 mm from the back was tested for SAR at maximum output power with the sensors deactivated. See Section 10.5 for more details.

|                                         |                                                                                     |                                     |                                                                                       |                                        |
|-----------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
| <b>FCC ID:</b> A3LSCH1815               |  | <b>SAR COMPLIANCE REPORT</b>        |  | <b>Reviewed by:</b><br>Quality Manager |
| <b>Filename:</b><br>0Y1109221681-R1.A3L | <b>Test Dates:</b><br>09/23/11 - 10/05/11 & 11/11/11                                | <b>EUT Type:</b><br>Portable Tablet |                                                                                       | Page 36 of 43                          |

## 15 SIMULTANEOUS TRANSMISSION ANALYSIS

This device supports hotspot for 2.4 GHz WIFI with LTE and CDMA. The 5 GHz WIFI will not transmit simultaneously with the licensed transmitter according to the manufacturer's operational description of the device.

Bluetooth can transmit simultaneously with all transmitters.

**Table 15-1**  
**Simultaneous Transmission Scenarios**

| No. | Simultaneous Transmit Scenarios             | Body SAR                                                           | Note                 | Possibility |
|-----|---------------------------------------------|--------------------------------------------------------------------|----------------------|-------------|
|     |                                             | Tablet Configurations per April 2011<br>TCB Workshop and KDB447498 |                      |             |
| 1   | 850/1900 MHz CDMA 1x data + WiFi 2.4GHz     | Tablet Back & Edges per April 2011 Workshop                        | 2G Hotspot only      | Yes         |
| 2   | 850/1900 MHz EVDO Data + WiFi 2.4GHz        | Tablet Back & Edges per April 2011 Workshop                        | 3G Hotspot only      | Yes         |
| 3   | 700 MHz Band13 LTE Data + WiFi 2.4 GHz      | Tablet Back & Edges per April 2011 Workshop                        | 4G Hotspot only      | Yes         |
| 4   | 850/1900 MHz CDMA 1x data + WiFi 5 GHz      |                                                                    | Not supported by S/W | No          |
| 5   | 850/1900 MHz EVDO Data + WiFi 5 GHz         |                                                                    | Not supported by S/W | No          |
| 6   | 700 MHz Band13 LTE Data + WiFi 5 GHz        |                                                                    | Not supported by S/W | No          |
| 7   | 1x voice, VoLTE and SVLTE                   |                                                                    | Not supported by S/W | No          |
| 8   | 850/1900 MHz CDMA 1x/EVDO Data + LTE        |                                                                    | Not supported by S/W | No          |
| 9   | 850/1900 MHz CDMA 1x/EVDO Data + LTE + WIFI |                                                                    | Not supported by S/W | No          |

VOIP operations are allowed through standalone transmissions. However, under Hotspot conditions above, the VOIP operations will be prohibited via WIFI and will operate via the licensed service. The operational description contains more information about the device's simultaneous transmission scenarios.

Please see standalone SAR Test Data (Section 14) which covers the possibility of VOIP communications through third party applications. The SAR for 2.4 GHz is 0 W/kg for simultaneous summation purposes (please see Section 12) since the power is < 60/f per KDB Publication 447498 D01.

### 15.1 Simultaneous Transmission Conclusion

Per KDB publication 447498 4) c) since the output power of the antenna is  $\leq 60/f$  (GHz), **Bluetooth SAR tests, 2.4 GHz & 5 GHz WIFI SAR tests are not required** for both back side and edge exposure conditions. No further analysis was necessary to determine if simultaneous transmission cases would exceed the SAR limit.

|                                  |                                                                                     |                              |                                                                                       |                                 |
|----------------------------------|-------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LSCHI815               |  | SAR COMPLIANCE REPORT        |  | Reviewed by:<br>Quality Manager |
| Filename:<br>0Y1109221681-R1.A3L | Test Dates:<br>09/23/11 - 10/05/11 & 11/11/11                                       | EUT Type:<br>Portable Tablet |                                                                                       | Page 37 of 43                   |

## 16 VERTEX SAR TESTS

In accordance with recent instructions received from the FCC regarding similar antenna configurations, the proximity sensor coverage, the proximity sensor coverage for the top-left corner of the tablet was assessed for appropriate coverage and SAR. Please find below SAR results with the tablet touching at the top-left corner vertex at maximum output powers.

**Table 16-1**  
**Main Antenna Vertex SAR Results**

| MEASUREMENT RESULTS                                                                               |     |            |         |                       |                  |                    |                                                 |               |             |          |
|---------------------------------------------------------------------------------------------------|-----|------------|---------|-----------------------|------------------|--------------------|-------------------------------------------------|---------------|-------------|----------|
| FREQUENCY                                                                                         |     | Mode       | Service | Conducted Power [dBm] | Power Drift [dB] | Target Power [dBm] | Spacing                                         | Serial Number | Position    | SAR (1g) |
| MHz                                                                                               | Ch. |            |         |                       |                  |                    |                                                 |               |             | (W/kg)   |
| 836.52                                                                                            | 384 | Cell. CDMA | EVDO    | 24.54                 | -0.03            | 24.5               | 0.0 cm                                          | 0815-0384     | Vertex, 45° | 0.279    |
| 1880.00                                                                                           | 600 | PCS CDMA   | EVDO    | 24.15                 | 0.02             | 24.0               | 0.0 cm                                          | 0815-0384     | Vertex, 45° | 0.225    |
| ANSI / IEEE C95.1 1992 - SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population |     |            |         |                       |                  |                    | Body<br>1.6 W/kg (mW/g)<br>averaged over 1 gram |               |             |          |

|                                  |                                                                                     |                              |                                                                                       |                                 |
|----------------------------------|-------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LSCHI815               |  | SAR COMPLIANCE REPORT        |  | Reviewed by:<br>Quality Manager |
| Filename:<br>0Y1109221681-R1.A3L | Test Dates:<br>09/23/11 - 10/05/11 & 11/11/11                                       | EUT Type:<br>Portable Tablet |                                                                                       | Page 38 of 43                   |

# 17 EQUIPMENT LIST

| Manufacturer       | Model     | Description                                   | Cal Date   | Cal Interval | Cal Due    | Serial Number |
|--------------------|-----------|-----------------------------------------------|------------|--------------|------------|---------------|
| Agilent            | 8753E     | (30kHz-6GHz) Network Analyzer                 | 4/21/2011  | Annual       | 4/21/2012  | JP38020182    |
| Agilent            | E5515C    | Wireless Communications Test Set              | 7/6/2011   | Annual       | 7/6/2012   | GB41450275    |
| Agilent            | E8257D    | (250kHz-20GHz) Signal Generator               | 4/8/2011   | Annual       | 4/8/2012   | MY45470194    |
| Index SAR          | IXTL-010  | Dielectric Measurement Kit                    | N/A        |              | N/A        | N/A           |
| Index SAR          | IXTL-030  | 30MM TEM line for 6 GHz                       | N/A        |              | N/A        | N/A           |
| Pasternack         | PE2208-6  | Bidirectional Coupler                         | N/A        |              | N/A        | N/A           |
| Pasternack         | PE2209-10 | Bidirectional Coupler                         | N/A        |              | N/A        | N/A           |
| Rohde & Schwarz    | CMU200    | Base Station Simulator                        | 11/11/2010 | Annual       | 11/11/2011 | 836371/0079   |
| Rohde & Schwarz    | CMU200    | Base Station Simulator                        | 6/1/2011   | Annual       | 6/1/2012   | 833855/0010   |
| Rohde & Schwarz    | CMU200    | Base Station Simulator                        | 4/19/2011  | Annual       | 4/19/2012  | 107826        |
| Rohde & Schwarz    | NRVD      | Dual Channel Power Meter                      | 4/8/2011   | Biennial     | 4/8/2013   | 101695        |
| SPEAG              | D1900V2   | 1900 MHz SAR Dipole                           | 2/17/2011  | Annual       | 2/17/2012  | 502           |
| SPEAG              | DB35V2    | 835 MHz SAR Dipole                            | 2/9/2011   | Annual       | 2/9/2012   | 4d047         |
| SPEAG              | DAE4      | Dasy Data Acquisition Electronics             | 4/20/2011  | Annual       | 4/20/2012  | 665           |
| SPEAG              | DAE4      | Dasy Data Acquisition Electronics             | 2/21/2011  | Annual       | 2/21/2012  | 649           |
| SPEAG              | EX3DV4    | SAR Probe                                     | 2/14/2011  | Annual       | 2/14/2012  | 3550          |
| SPEAG              | DAE4      | Dasy Data Acquisition Electronics             | 5/19/2011  | Annual       | 5/19/2012  | 859           |
| SPEAG              | D750V3    | 750 MHz Dipole                                | 2/14/2011  | Annual       | 2/14/2012  | 1003          |
| SPEAG              | ES3DV3    | SAR Probe                                     | 4/18/2011  | Annual       | 4/18/2012  | 3209          |
| Rohde & Schwarz    | SMIQ03B   | Signal Generator                              | 4/6/2011   | Annual       | 4/6/2012   | DE27259       |
| Anritsu            | MA2481A   | Power Sensor                                  | 2/7/2011   | Annual       | 2/7/2012   | 5318          |
| Anritsu            | MA2481A   | Power Sensor                                  | 2/7/2011   | Annual       | 2/7/2012   | 5442          |
| Anritsu            | ML2438A   | Power Meter                                   | 2/7/2011   | Annual       | 2/7/2012   | 1190013       |
| Anritsu            | ML2438A   | Power Meter                                   | 2/7/2011   | Annual       | 2/7/2012   | 98150041      |
| Agilent            | 8648D     | Signal Generator                              | 4/5/2011   | Annual       | 4/5/2012   | 3629U00687    |
| Anritsu            | ML2438A   | Power Meter                                   | 2/7/2011   | Annual       | 2/7/2012   | 1070030       |
| Anritsu            | MA2481A   | Power Sensor                                  | 2/7/2011   | Annual       | 2/7/2012   | 5821          |
| Anritsu            | MA2481A   | Power Sensor                                  | 2/7/2011   | Annual       | 2/7/2012   | 8013          |
| Anritsu            | MA2481A   | Power Sensor                                  | 2/7/2011   | Annual       | 2/7/2012   | 5605          |
| Anritsu            | MA2481A   | Power Sensor                                  | 2/7/2011   | Annual       | 2/7/2012   | 2400          |
| Agilent            | E5515C    | Wireless Communications Test Set              | 7/6/2011   | Annual       | 7/6/2012   | GB43304447    |
| Agilent            | E5515C    | Wireless Communications Tester                | 4/21/2011  | Annual       | 4/21/2012  | US41140256    |
| Amplifier Research | 5S1G4     | 5W, 800MHz-4.2GHz                             | N/A        |              | N/A        | 21910         |
| Mini-Circuits      | BW-N20W5+ | DC to 18 GHz Precision Fixed 20 dB Attenuator | N/A        |              | N/A        | N/A           |
| Agilent            | E5515C    | Wireless Communications Test Set              | 2/8/2011   | Annual       | 2/8/2012   | GB45360985    |
| Rohde & Schwarz    | CMW500    | LTE Radio Communication Tester                | 3/11/2011  | Annual       | 3/11/2012  | 103962        |
| Control Company    | 61220-416 | Long-Stem Thermometer                         | 2/15/2011  | Biennial     | 2/15/2013  | 111331322     |
| Control Company    | 61220-416 | Long-Stem Thermometer                         | 2/15/2011  | Biennial     | 2/15/2013  | 111331323     |
| Control Company    | 61220-416 | Long-Stem Thermometer                         | 2/15/2011  | Biennial     | 2/15/2013  | 111331330     |
| Control Company    | 61220-416 | Long-Stem Thermometer                         | 2/15/2011  | Biennial     | 2/15/2013  | 111331332     |
| Control Company    | 61220-416 | Long-Stem Thermometer                         | 3/16/2011  | Biennial     | 3/16/2013  | 111391601     |
| VWR                | 36934-158 | Wall-Mounted Thermometer                      | 1/21/2011  | Biennial     | 1/21/2013  | 111286445     |
| VWR                | 36934-158 | Wall-Mounted Thermometer                      | 1/21/2011  | Biennial     | 1/21/2013  | 111286460     |
| VWR                | 36934-158 | Wall-Mounted Thermometer                      | 5/26/2010  | Biennial     | 5/26/2012  | 101718589     |
| VWR                | 36934-158 | Wall-Mounted Thermometer                      | 1/21/2011  | Biennial     | 1/21/2013  | 111286454     |
| VWR                | 36934-158 | Wall-Mounted Thermometer                      | 2/26/2010  | Biennial     | 2/26/2012  | 101536273     |
| SPEAG              | ES3DV3    | SAR Probe                                     | 4/8/2011   | Annual       | 4/8/2012   | 3258          |
| MiniCircuits       | SLP-2400+ | Low Pass Filter                               | N/A        |              | N/A        | R8979500903   |
| Narda              | 4772-3    | Attenuator (3dB)                              | N/A        |              | N/A        | 9406          |
| Narda              | BW-S3W2   | Attenuator (3dB)                              | N/A        |              | N/A        | 120           |
| Rohde & Schwarz    | CMW500    | LTE Radio Communication Tester                | 8/5/2011   | Annual       | 8/5/2012   | 112347        |
| Mini-Circuits      | NLP-2950+ | Low Pass Filter DC to 2700 MHz                | N/A        |              | N/A        | N/A           |
| Mini-Circuits      | NLP-1200+ | Low Pass Filter DC to 1000 MHz                | N/A        |              | N/A        | N/A           |

|                                  |                                                                                     |                              |                                                                                       |                                 |
|----------------------------------|-------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LSCH1815               |  | SAR COMPLIANCE REPORT        |  | Reviewed by:<br>Quality Manager |
| Filename:<br>0Y1109221681-R1.A3L | Test Dates:<br>09/23/11 - 10/05/11 & 11/11/11                                       | EUT Type:<br>Portable Tablet |                                                                                       | Page 39 of 43                   |

## 18 MEASUREMENT UNCERTAINTIES

Applicable for 750 – 3000 MHz.

| a                                                                             | b                    | c             | d              | e=<br>f(d,k) | f                     | g                        | h =<br>c x f/e                 | i =<br>c x g/e                   | k              |
|-------------------------------------------------------------------------------|----------------------|---------------|----------------|--------------|-----------------------|--------------------------|--------------------------------|----------------------------------|----------------|
| Uncertainty<br>Component                                                      | IEEE<br>1528<br>Sec. | Tol.<br>(± %) | Prob.<br>Dist. | Div.         | c <sub>i</sub><br>1gm | c <sub>i</sub><br>10 gms | 1gm<br>u <sub>i</sub><br>(± %) | 10gms<br>u <sub>i</sub><br>(± %) | v <sub>i</sub> |
| <b>Measurement System</b>                                                     |                      |               |                |              |                       |                          |                                |                                  |                |
| Probe Calibration                                                             | E.2.1                | 6.0           | N              | 1            | 1.0                   | 1.0                      | 6.0                            | 6.0                              | ∞              |
| Axial Isotropy                                                                | E.2.2                | 0.25          | N              | 1            | 0.7                   | 0.7                      | 0.2                            | 0.2                              | ∞              |
| Hemishperical Isotropy                                                        | E.2.2                | 1.3           | N              | 1            | 1.0                   | 1.0                      | 1.3                            | 1.3                              | ∞              |
| Boundary Effect                                                               | E.2.3                | 0.4           | N              | 1            | 1.0                   | 1.0                      | 0.4                            | 0.4                              | ∞              |
| Linearity                                                                     | E.2.4                | 0.3           | N              | 1            | 1.0                   | 1.0                      | 0.3                            | 0.3                              | ∞              |
| System Detection Limits                                                       | E.2.5                | 5.1           | N              | 1            | 1.0                   | 1.0                      | 5.1                            | 5.1                              | ∞              |
| Readout Electronics                                                           | E.2.6                | 1.0           | N              | 1            | 1.0                   | 1.0                      | 1.0                            | 1.0                              | ∞              |
| Response Time                                                                 | E.2.7                | 0.8           | R              | 1.73         | 1.0                   | 1.0                      | 0.5                            | 0.5                              | ∞              |
| Integration Time                                                              | E.2.8                | 2.6           | R              | 1.73         | 1.0                   | 1.0                      | 1.5                            | 1.5                              | ∞              |
| RF Ambient Conditions                                                         | E.6.1                | 3.0           | R              | 1.73         | 1.0                   | 1.0                      | 1.7                            | 1.7                              | ∞              |
| Probe Positioner Mechanical Tolerance                                         | E.6.2                | 0.4           | R              | 1.73         | 1.0                   | 1.0                      | 0.2                            | 0.2                              | ∞              |
| Probe Positioning w/ respect to Phantom                                       | E.6.3                | 2.9           | R              | 1.73         | 1.0                   | 1.0                      | 1.7                            | 1.7                              | ∞              |
| Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation | E.5                  | 1.0           | R              | 1.73         | 1.0                   | 1.0                      | 0.6                            | 0.6                              | ∞              |
| <b>Test Sample Related</b>                                                    |                      |               |                |              |                       |                          |                                |                                  |                |
| Test Sample Positioning                                                       | E.4.2                | 6.0           | N              | 1            | 1.0                   | 1.0                      | 6.0                            | 6.0                              | 287            |
| Device Holder Uncertainty                                                     | E.4.1                | 3.32          | R              | 1.73         | 1.0                   | 1.0                      | 1.9                            | 1.9                              | ∞              |
| Output Power Variation - SAR drift measurement                                | 6.6.2                | 5.0           | R              | 1.73         | 1.0                   | 1.0                      | 2.9                            | 2.9                              | ∞              |
| <b>Phantom &amp; Tissue Parameters</b>                                        |                      |               |                |              |                       |                          |                                |                                  |                |
| Phantom Uncertainty (Shape & Thickness tolerances)                            | E.3.1                | 4.0           | R              | 1.73         | 1.0                   | 1.0                      | 2.3                            | 2.3                              | ∞              |
| Liquid Conductivity - deviation from target values                            | E.3.2                | 5.0           | R              | 1.73         | 0.64                  | 0.43                     | 1.8                            | 1.2                              | ∞              |
| Liquid Conductivity - measurement uncertainty                                 | E.3.3                | 3.8           | N              | 1            | 0.64                  | 0.43                     | 2.4                            | 1.6                              | 6              |
| Liquid Permittivity - deviation from target values                            | E.3.2                | 5.0           | R              | 1.73         | 0.60                  | 0.49                     | 1.7                            | 1.4                              | ∞              |
| Liquid Permittivity - measurement uncertainty                                 | E.3.3                | 4.5           | N              | 1            | 0.60                  | 0.49                     | 2.7                            | 2.2                              | 6              |
| <b>Combined Standard Uncertainty (k=1)</b>                                    |                      |               |                |              |                       |                          | RSS                            | 12.1                             | 11.7           |
| <b>Expanded Uncertainty</b><br>(95% CONFIDENCE LEVEL)                         |                      |               |                |              |                       |                          | k=2                            | 24.2                             | 23.5           |

The above measurement uncertainties are according to IEEE Std. 1528-2003

|                                         |                                                                                                                                   |                                     |                                                                                       |                                        |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
| FCC ID: A3LSCH1815                      |  <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | <b>SAR COMPLIANCE REPORT</b>        |  | <b>Reviewed by:</b><br>Quality Manager |
| <b>Filename:</b><br>0Y1109221681-R1.A3L | <b>Test Dates:</b><br>09/23/11 - 10/05/11 & 11/11/11                                                                              | <b>EUT Type:</b><br>Portable Tablet |                                                                                       | Page 40 of 43                          |

## 19 CONCLUSION

### 19.1 Measurement Conclusion

The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits of the FCC and Industry Canada, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The 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 various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables. [3]

|                                         |                                                                                     |                                     |                                                                                       |                                        |
|-----------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
| <b>FCC ID:</b> A3LSCHI815               |  | <b>SAR COMPLIANCE REPORT</b>        |  | <b>Reviewed by:</b><br>Quality Manager |
| <b>Filename:</b><br>0Y1109221681-R1.A3L | <b>Test Dates:</b><br>09/23/11 - 10/05/11 & 11/11/11                                | <b>EUT Type:</b><br>Portable Tablet |                                                                                       | Page 41 of 43                          |

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|                                         |                                                                                     |                                     |                                                                                       |                                        |
|-----------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
| <b>FCC ID:</b> A3LSCHI815               |  | <b>SAR COMPLIANCE REPORT</b>        |  | <b>Reviewed by:</b><br>Quality Manager |
| <b>Filename:</b><br>0Y1109221681-R1.A3L | <b>Test Dates:</b><br>09/23/11 - 10/05/11 & 11/11/11                                | <b>EUT Type:</b><br>Portable Tablet |                                                                                       | Page 42 of 43                          |

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|                                         |                                                                                     |                                     |                                                                                       |                                        |
|-----------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
| <b>FCC ID:</b> A3LSCHI815               |  | <b>SAR COMPLIANCE REPORT</b>        |  | <b>Reviewed by:</b><br>Quality Manager |
| <b>Filename:</b><br>0Y1109221681-R1.A3L | <b>Test Dates:</b><br>09/23/11 - 10/05/11 & 11/11/11                                | <b>EUT Type:</b><br>Portable Tablet |                                                                                       | Page 43 of 43                          |

## APPENDIX A: SAR TEST DATA

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0135**

Communication System: Cellular CDMA; Frequency: 824.7 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 824.7 \text{ MHz}$ ;  $\sigma = 0.953 \text{ mho/m}$ ;  $\epsilon_r = 53.2$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-23-2011; Ambient Temp: 23.7°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/21/2011

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

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

**Mode: Cellular EVDO, Body SAR, Back side, Low ch**

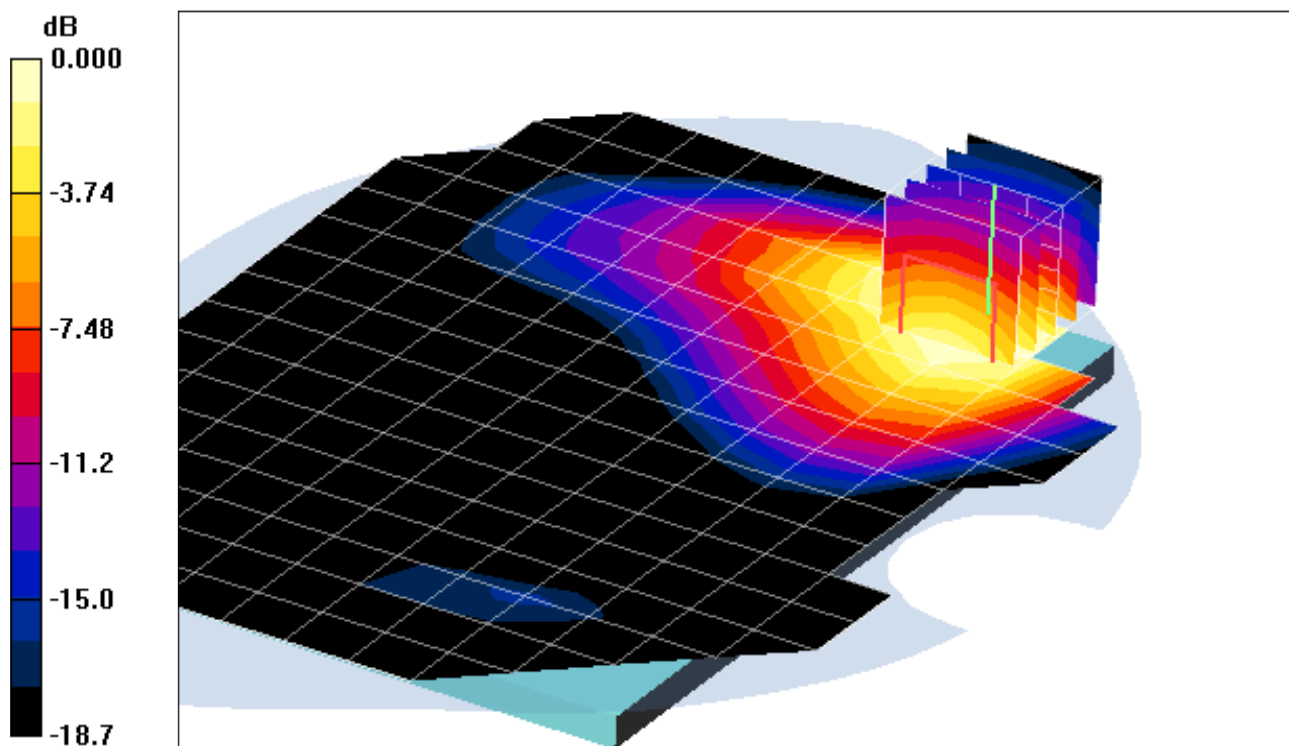
**Area Scan (13x17x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 21.4 V/m

Peak SAR (extrapolated) = 0.677 W/kg

**SAR(1 g) = 0.322 mW/g; SAR(10 g) = 0.178 mW/g**



0 dB = 0.356mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0135**

Communication System: Cellular CDMA; Frequency: 848.31 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 848.31 \text{ MHz}$ ;  $\sigma = 0.971 \text{ mho/m}$ ;  $\epsilon_r = 53.05$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-23-2011; Ambient Temp: 23.7°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/21/2011

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

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

**Mode: Cellular CDMA TDSO32+SCH, Body SAR, Back side, High ch**

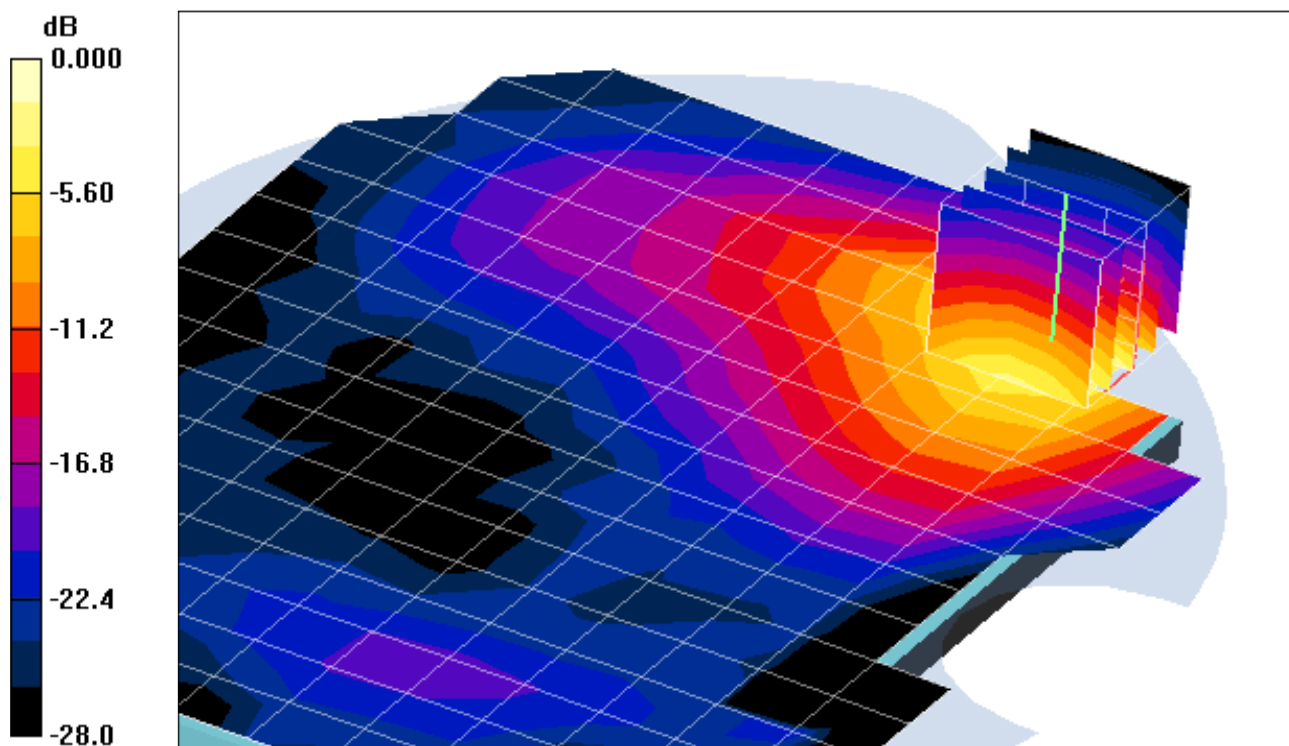
**Area Scan (13x17x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 30.8 V/m

Peak SAR (extrapolated) = 1.44 W/kg

**SAR(1 g) = 0.686 mW/g; SAR(10 g) = 0.375 mW/g**



0 dB = 0.745mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0134**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$ ;  $\sigma = 0.96 \text{ mho/m}$ ;  $\epsilon_r = 53.05$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-23-2011; Ambient Temp: 23.7°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/21/2011

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

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

**Mode: Cellular EVDO, Body SAR, Back side, Mid.ch**

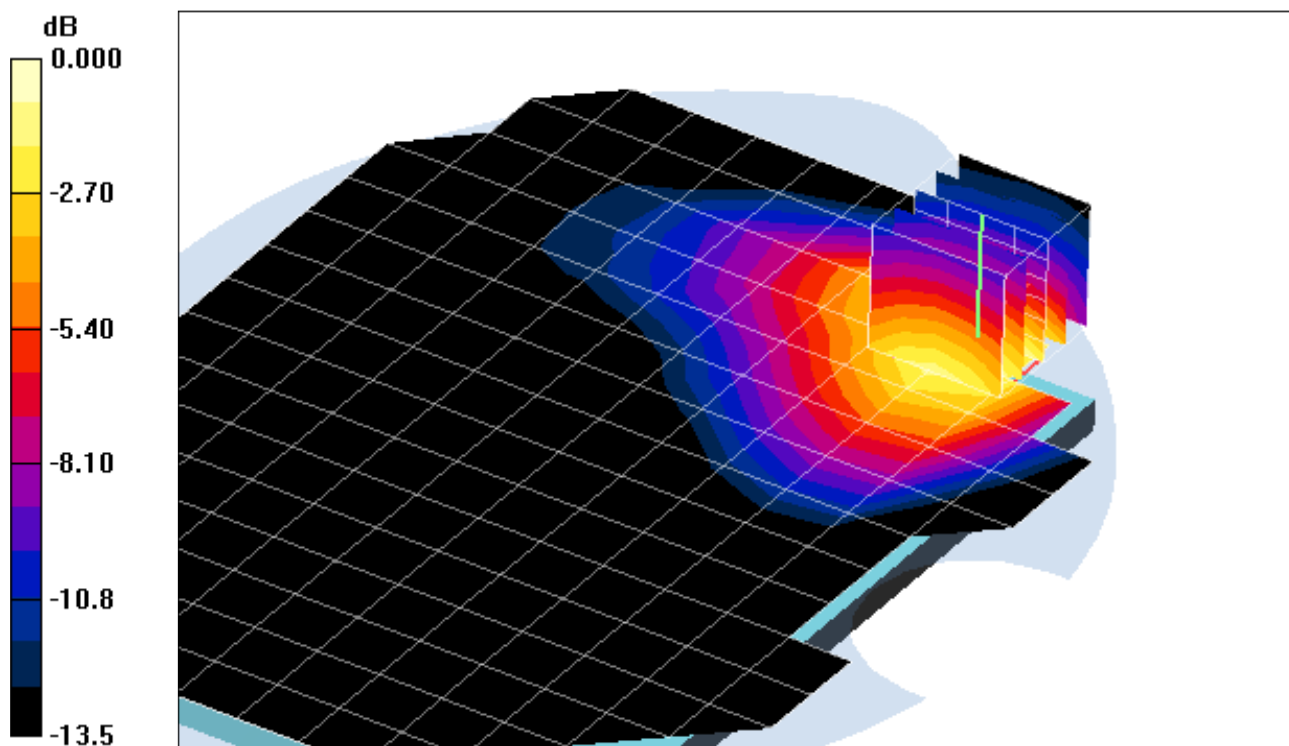
**Area Scan (5x13x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 21.5 V/m

Peak SAR (extrapolated) = 0.593 W/kg

**SAR(1 g) = 0.387 mW/g; SAR(10 g) = 0.254 mW/g**



0 dB = 0.411mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0135**

Communication System: Cellular CDMA; Frequency: 824.7 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 824.7 \text{ MHz}$ ;  $\sigma = 0.953 \text{ mho/m}$ ;  $\epsilon_r = 53.2$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-23-2011; Ambient Temp: 23.7°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/21/2011

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

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

**Mode: Cellular EVDO, Body SAR, Top Edge, Low ch**

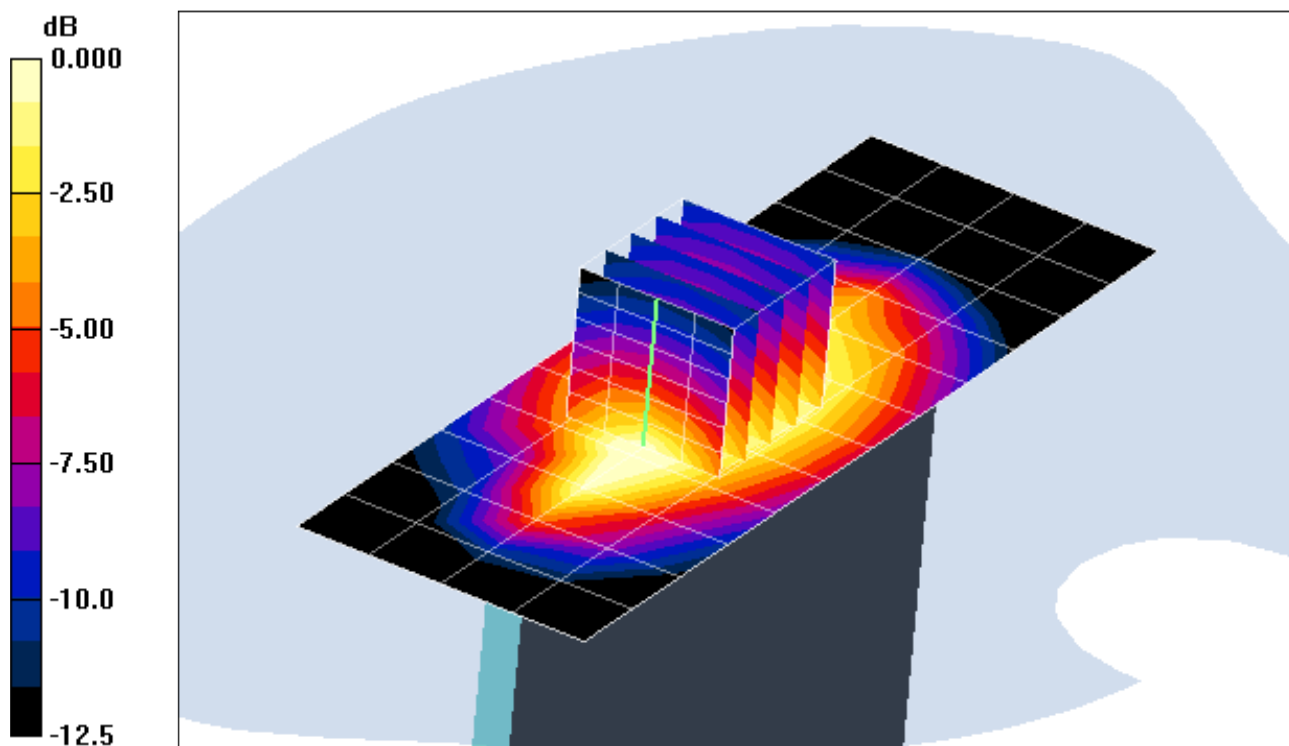
**Area Scan (5x13x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 12.1 V/m

Peak SAR (extrapolated) = 0.180 W/kg

**SAR(1 g) = 0.101 mW/g; SAR(10 g) = 0.065 mW/g**



0 dB = 0.113mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0135**

Communication System: Cellular CDMA; Frequency: 848.31 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 848.31 \text{ MHz}$ ;  $\sigma = 0.971 \text{ mho/m}$ ;  $\epsilon_r = 53.05$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-23-2011; Ambient Temp: 23.7°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/21/2011

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

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

**Mode: Cellular CDMA TDS032 FCH+SCH, Body SAR, Top Edge, High ch**

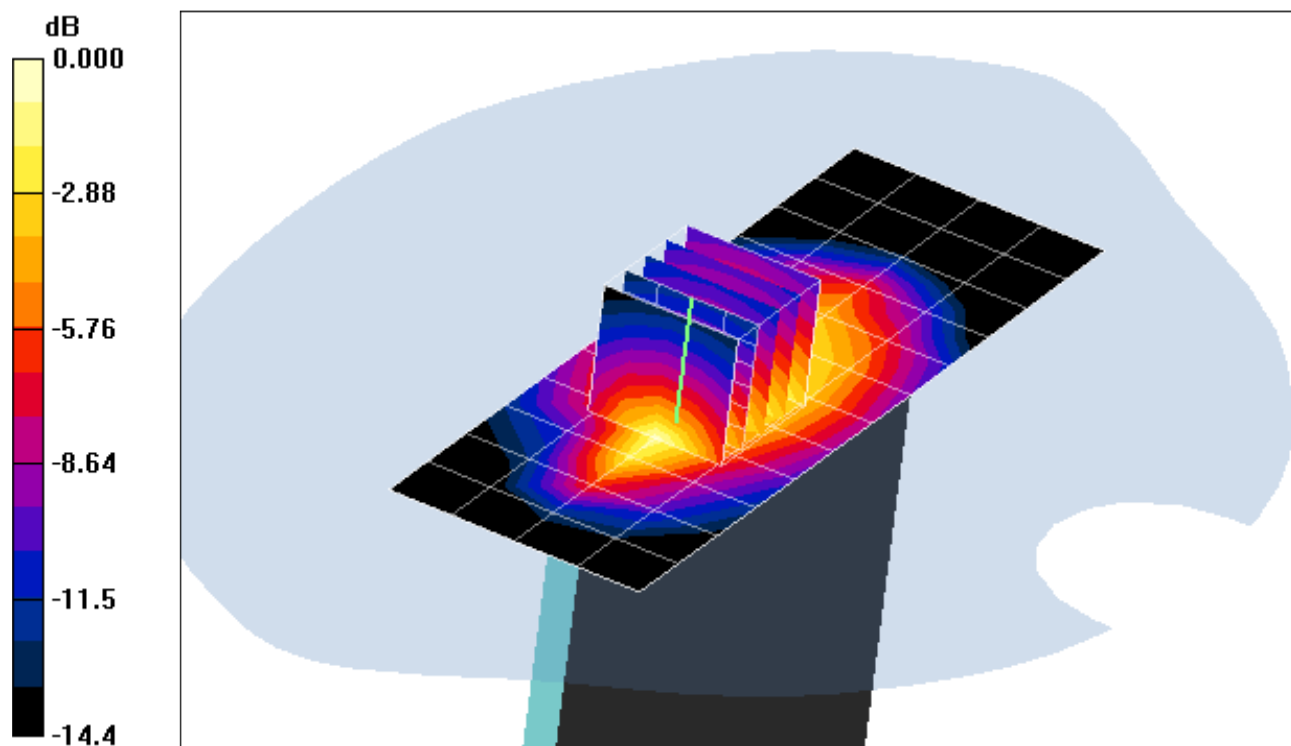
**Area Scan (5x13x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 15.9 V/m

Peak SAR (extrapolated) = 0.333 W/kg

**SAR(1 g) = 0.171 mW/g; SAR(10 g) = 0.106 mW/g**



0 dB = 0.201mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0134**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$ ;  $\sigma = 0.96 \text{ mho/m}$ ;  $\epsilon_r = 53.05$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.3 cm

Test Date: 09-23-2011; Ambient Temp: 23.7°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/21/2011

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

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

**Mode: Cellular EVDO, Body SAR, Top Edge, Mid.ch**

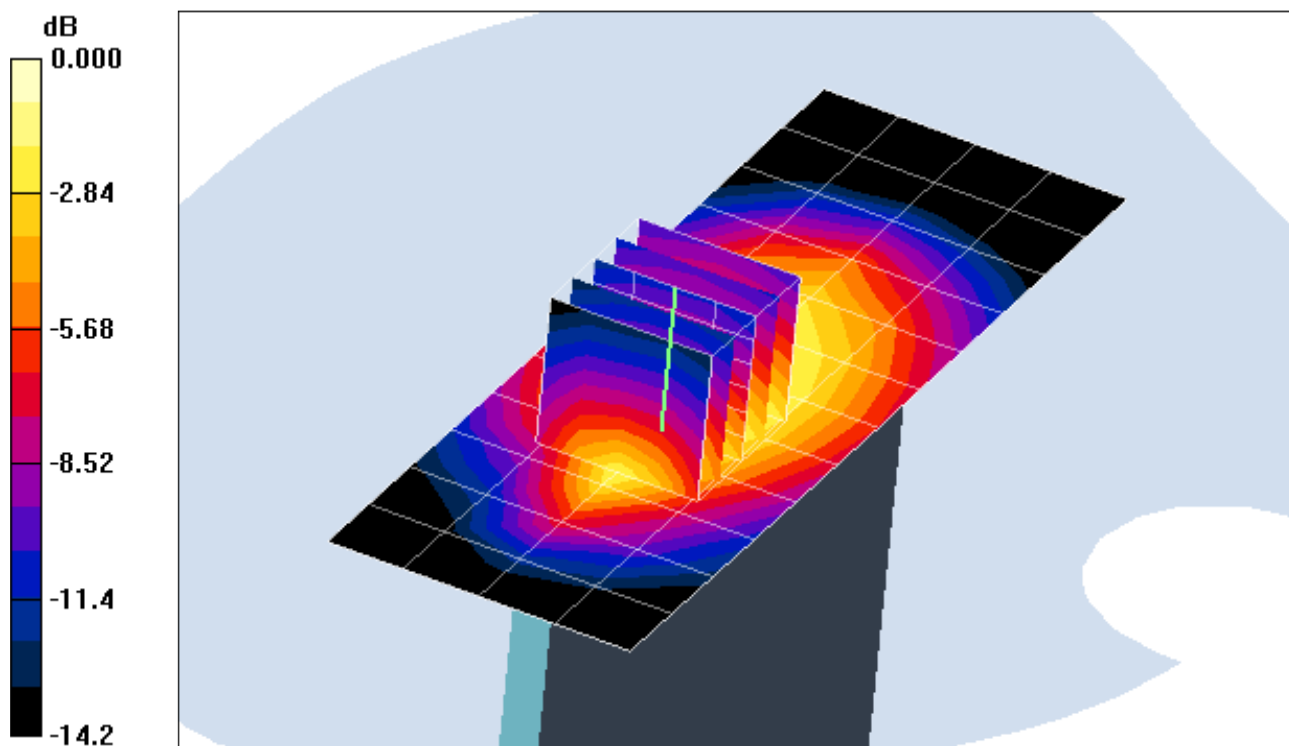
**Area Scan (5x13x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 23.4 V/m

Peak SAR (extrapolated) = 0.724 W/kg

**SAR(1 g) = 0.422 mW/g; SAR(10 g) = 0.263 mW/g**



0 dB = 0.481mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0134**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$ ;  $\sigma = 0.96 \text{ mho/m}$ ;  $\epsilon_r = 53.05$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-23-2011; Ambient Temp: 23.7°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/21/2011

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

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

**Mode: Cellular EVDO, Body SAR, Left Edge, Mid.ch**

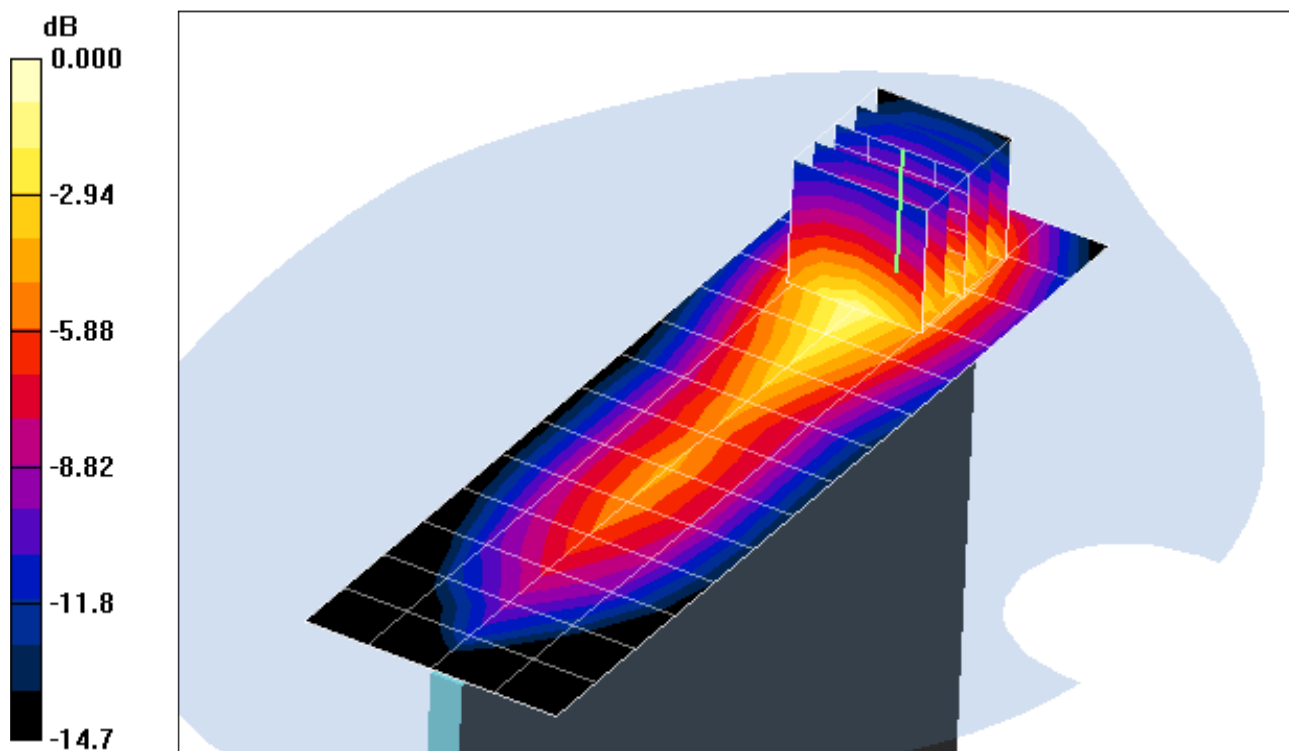
**Area Scan (5x15x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 24.7 V/m

Peak SAR (extrapolated) = 0.756 W/kg

**SAR(1 g) = 0.437 mW/g; SAR(10 g) = 0.248 mW/g**



0 dB = 0.490mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0384**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$ ;  $\sigma = 0.98 \text{ mho/m}$ ;  $\epsilon_r = 54.2$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 11-11-2011; Ambient Temp: 23.6°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/21/2011

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

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

**Mode: Cellular EVDO, Body SAR, Vertex, Mid.ch**

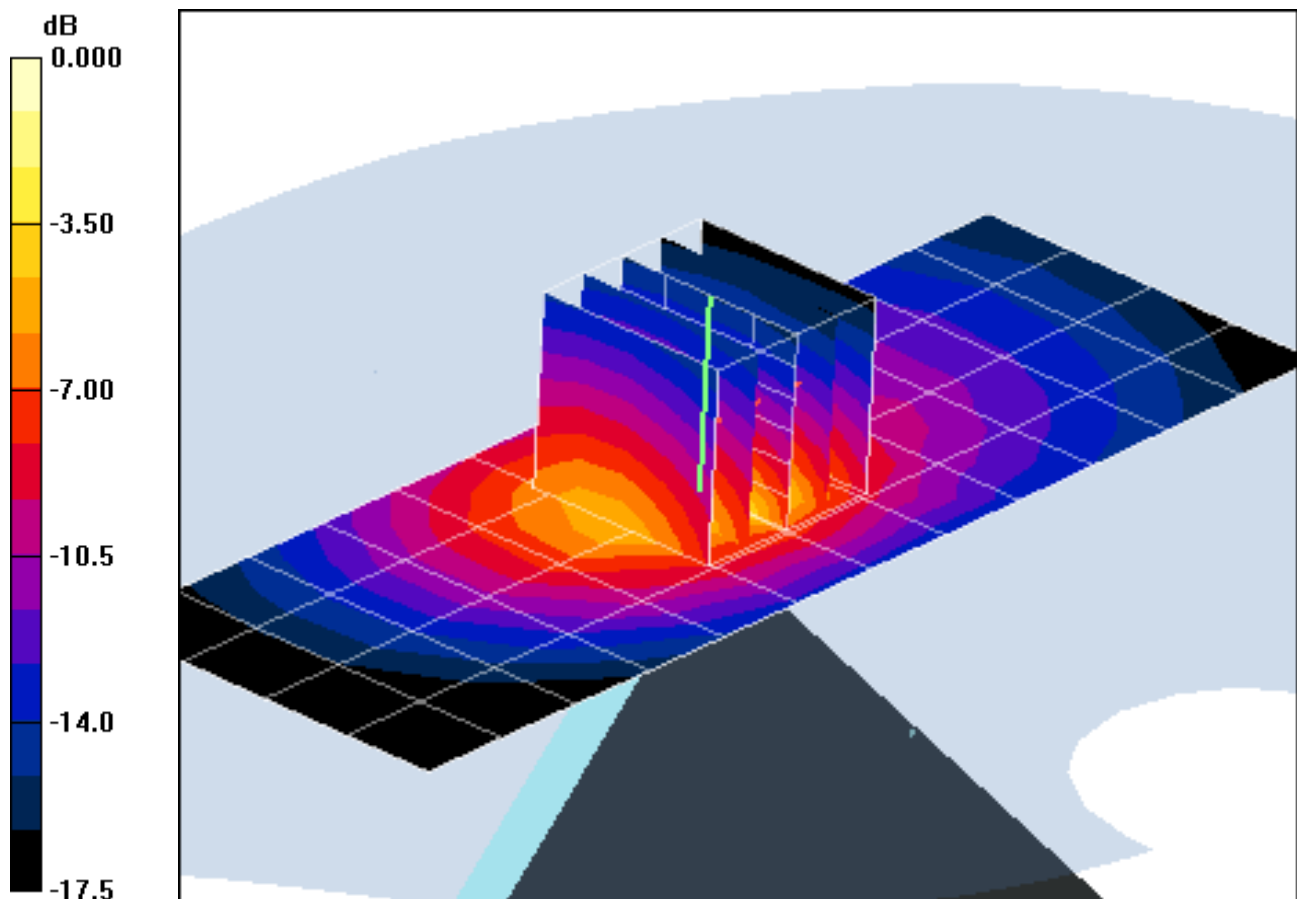
**Area Scan (5x13x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 19.6 V/m

Peak SAR (extrapolated) = 0.797 W/kg

**SAR(1 g) = 0.279 mW/g; SAR(10 g) = 0.119 mW/g**



0 dB = 0.381mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0385**

Communication System: PCS CDMA; Frequency: 1851.25 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1851.25 \text{ MHz}$ ;  $\sigma = 1.48 \text{ mho/m}$ ;  $\epsilon_r = 54.56$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-26-2011; Ambient Temp: 24.9°C; Tissue Temp: 23.1°C

Probe: EX3DV4 - SN3550; ConvF(6.77, 6.77, 6.77); Calibrated: 2/14/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/20/2011

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

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

**Mode: PCS EVDO, Body SAR, Back side, Low ch**

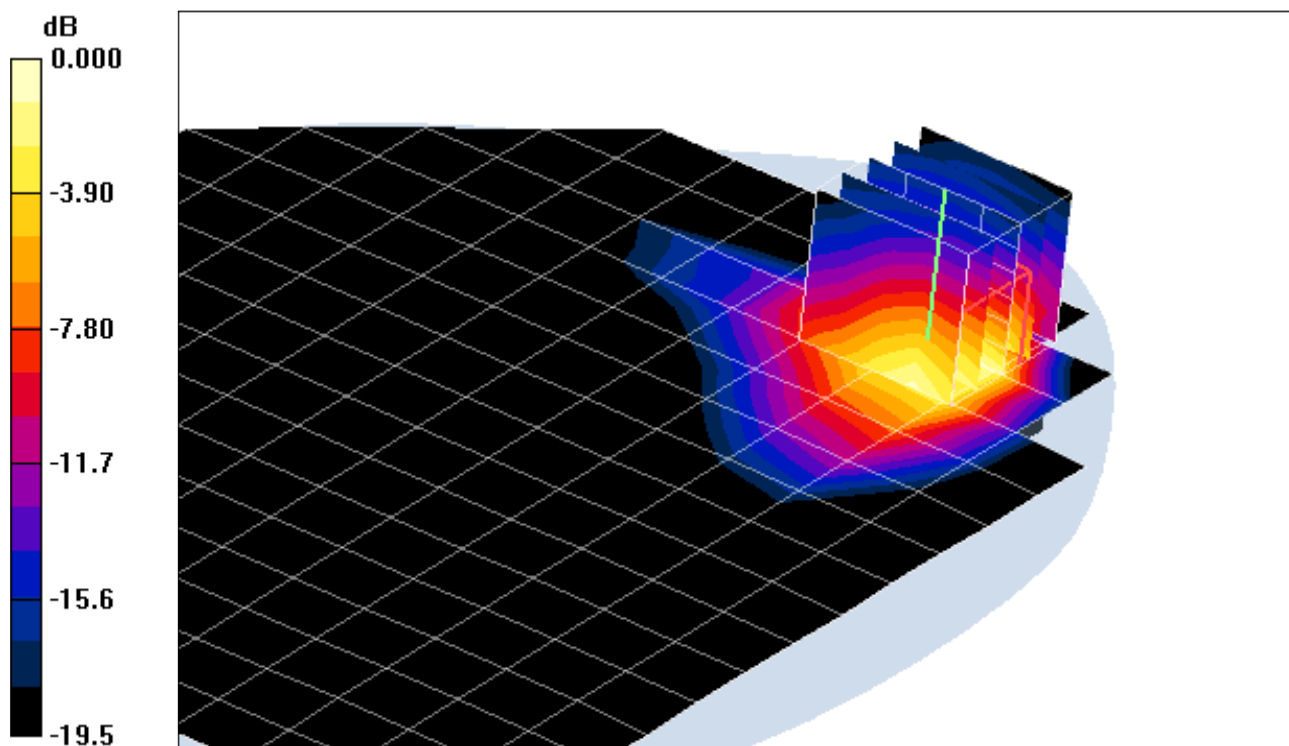
**Area Scan (13x17x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 27.9 V/m

Peak SAR (extrapolated) = 2.51 W/kg

**SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.549 mW/g**



0 dB = 1.18mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0385**

Communication System: PCS CDMA; Frequency: 1908.75 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1908.75 \text{ MHz}$ ;  $\sigma = 1.52 \text{ mho/m}$ ;  $\epsilon_r = 54.3$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-26-2011; Ambient Temp: 24.9°C; Tissue Temp: 23.1°C

Probe: EX3DV4 - SN3550; ConvF(6.77, 6.77, 6.77); Calibrated: 2/14/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/20/2011

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

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

**Mode: PCS CDMA TDS032 FCH+SCH, Body SAR, Back side, High ch**

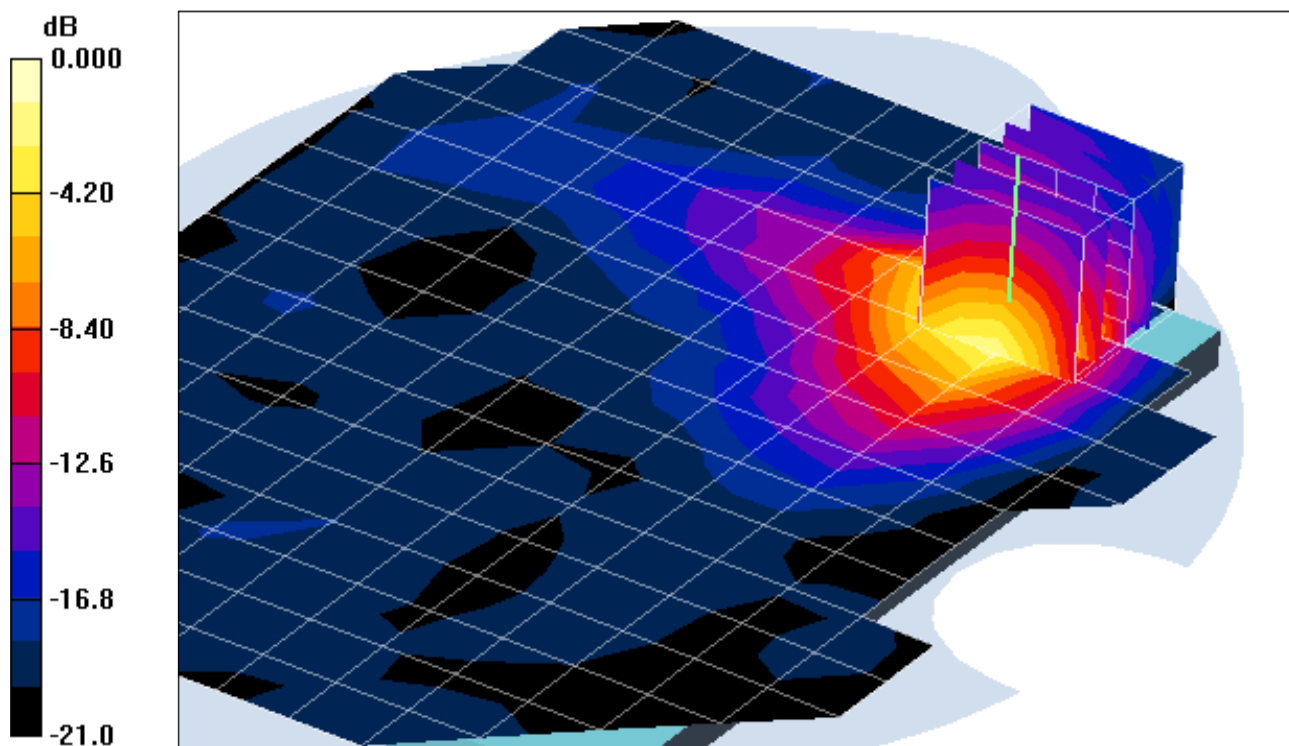
**Area Scan (13x17x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 25.5 V/m

Peak SAR (extrapolated) = 2.31 W/kg

**SAR(1 g) = 0.964 mW/g; SAR(10 g) = 0.461 mW/g**



0 dB = 1.07mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0384**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1  
Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.51 \text{ mho/m}$ ;  $\epsilon_r = 51.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-23-2011; Ambient Temp: 23.9°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/19/2011

Phantom: SAM Sub Dasy B; Type: SAM 4.0; Serial: TP-1626

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

**Mode: PCS EVDO, Body SAR, Back side, Mid.ch**

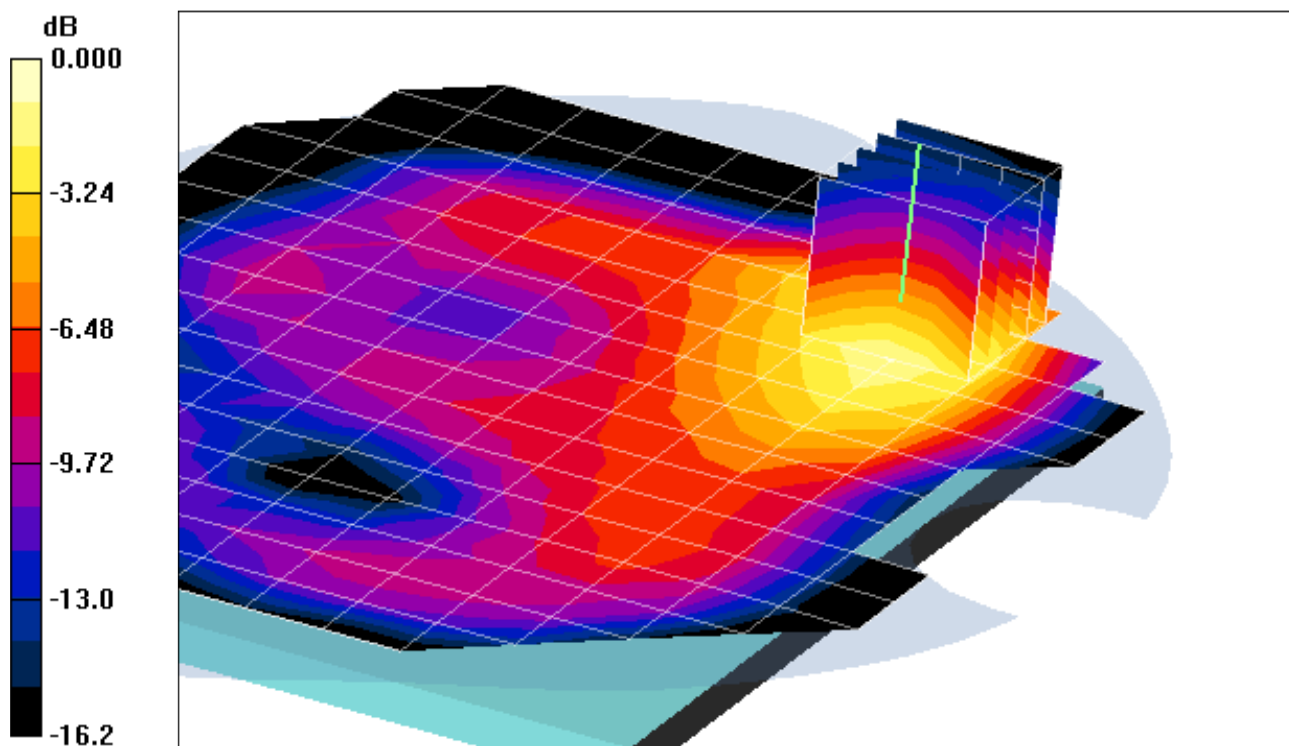
**Area Scan (13x17x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 12.6 V/m

Peak SAR (extrapolated) = 0.427 W/kg

**SAR(1 g) = 0.227 mW/g; SAR(10 g) = 0.130 mW/g**



0 dB = 0.252mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0385**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1  
Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.49 \text{ mho/m}$ ;  $\epsilon_r = 54.4$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-26-2011; Ambient Temp: 24.9°C; Tissue Temp: 23.1°C

Probe: EX3DV4 - SN3550; ConvF(6.77, 6.77, 6.77); Calibrated: 2/14/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/20/2011

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

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

**Mode: PCS EVDO, Body SAR, Top Edge, Mid.ch**

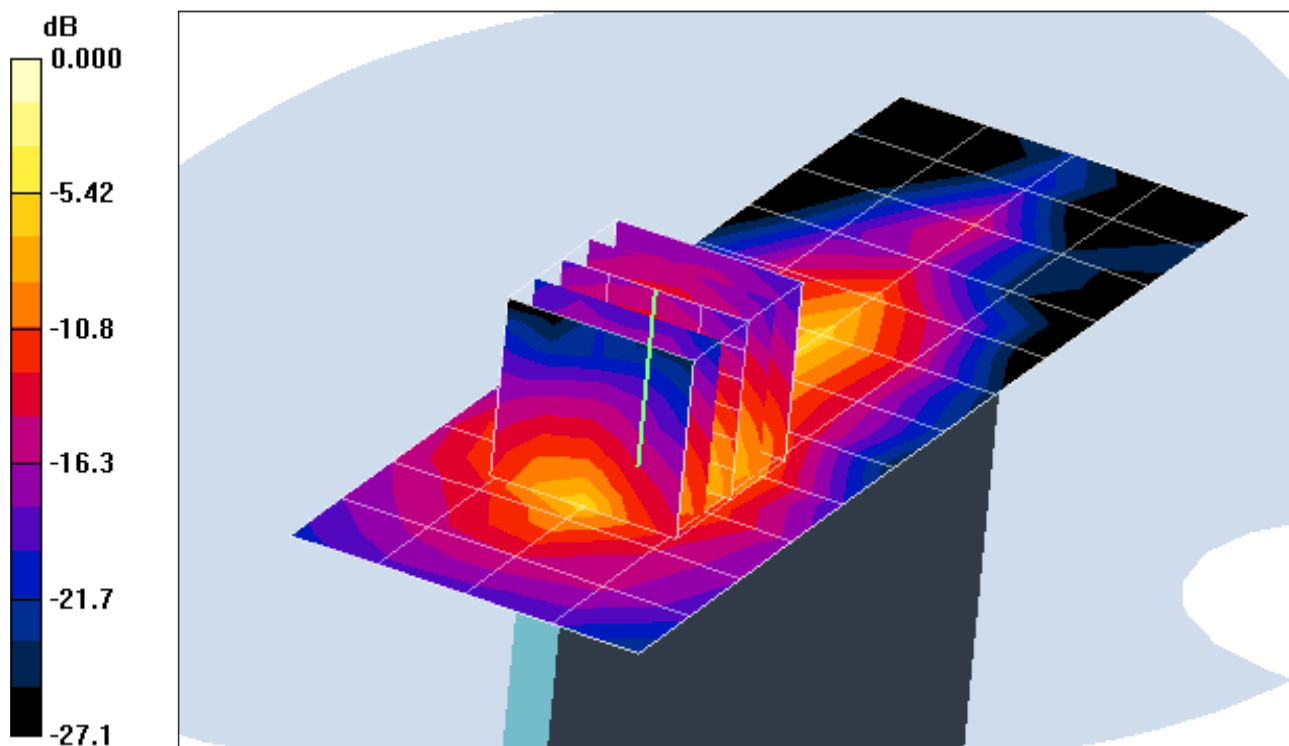
**Area Scan (5x13x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 13.7 V/m

Peak SAR (extrapolated) = 0.614 W/kg

**SAR(1 g) = 0.276 mW/g; SAR(10 g) = 0.115 mW/g**



0 dB = 0.340mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0385**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1  
Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.49 \text{ mho/m}$ ;  $\epsilon_r = 54.4$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-26-2011; Ambient Temp: 24.9°C; Tissue Temp: 23.1°C

Probe: EX3DV4 - SN3550; ConvF(6.77, 6.77, 6.77); Calibrated: 2/14/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/20/2011

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

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

**Mode: PCS CDMA TDS032 FCH+SCH, Body SAR, Top Edge, Mid. ch**

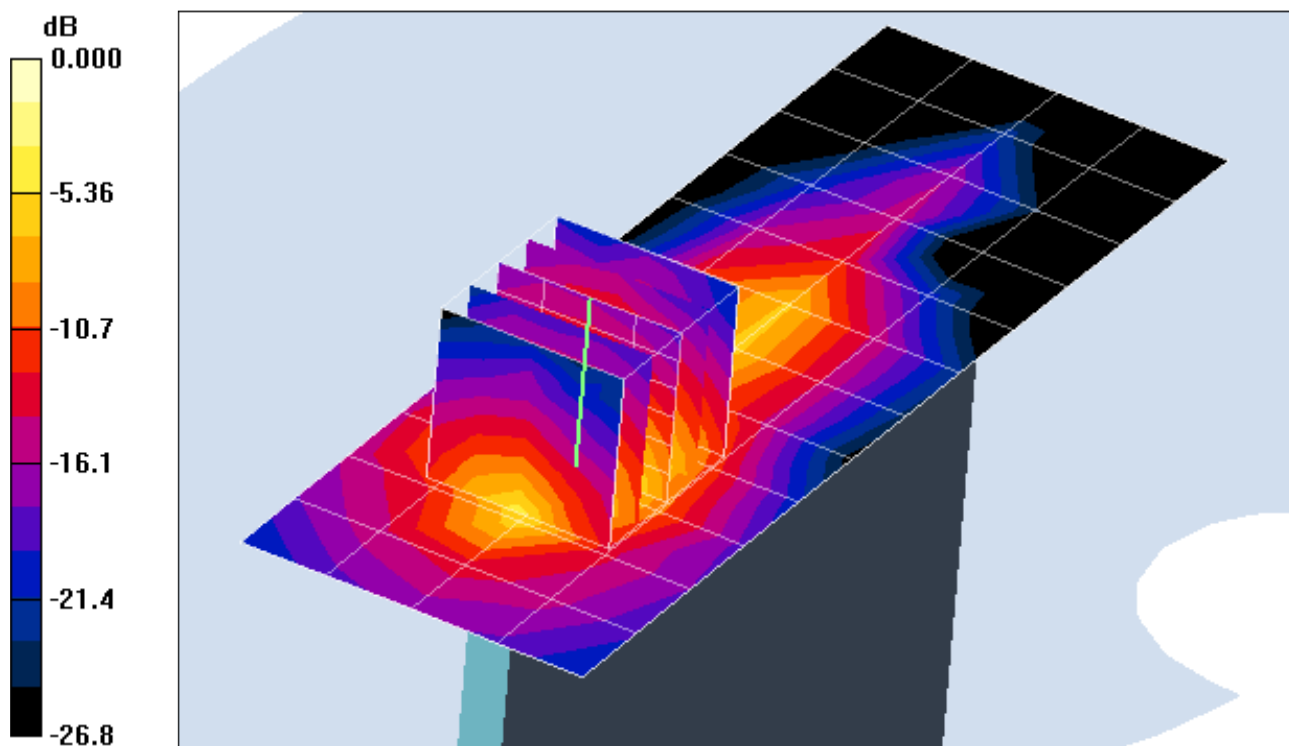
**Area Scan (5x13x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 15.2 V/m

Peak SAR (extrapolated) = 0.654 W/kg

**SAR(1 g) = 0.299 mW/g; SAR(10 g) = 0.125 mW/g**



0 dB = 0.379mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0384**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1  
Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.51 \text{ mho/m}$ ;  $\epsilon_r = 51.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.3 cm

Test Date: 09-23-2011; Ambient Temp: 23.9°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/19/2011

Phantom: SAM Sub Dasy B; Type: SAM 4.0; Serial: TP-1626

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

**Mode: PCS EVDO, Body SAR, Top Edge, Mid.ch**

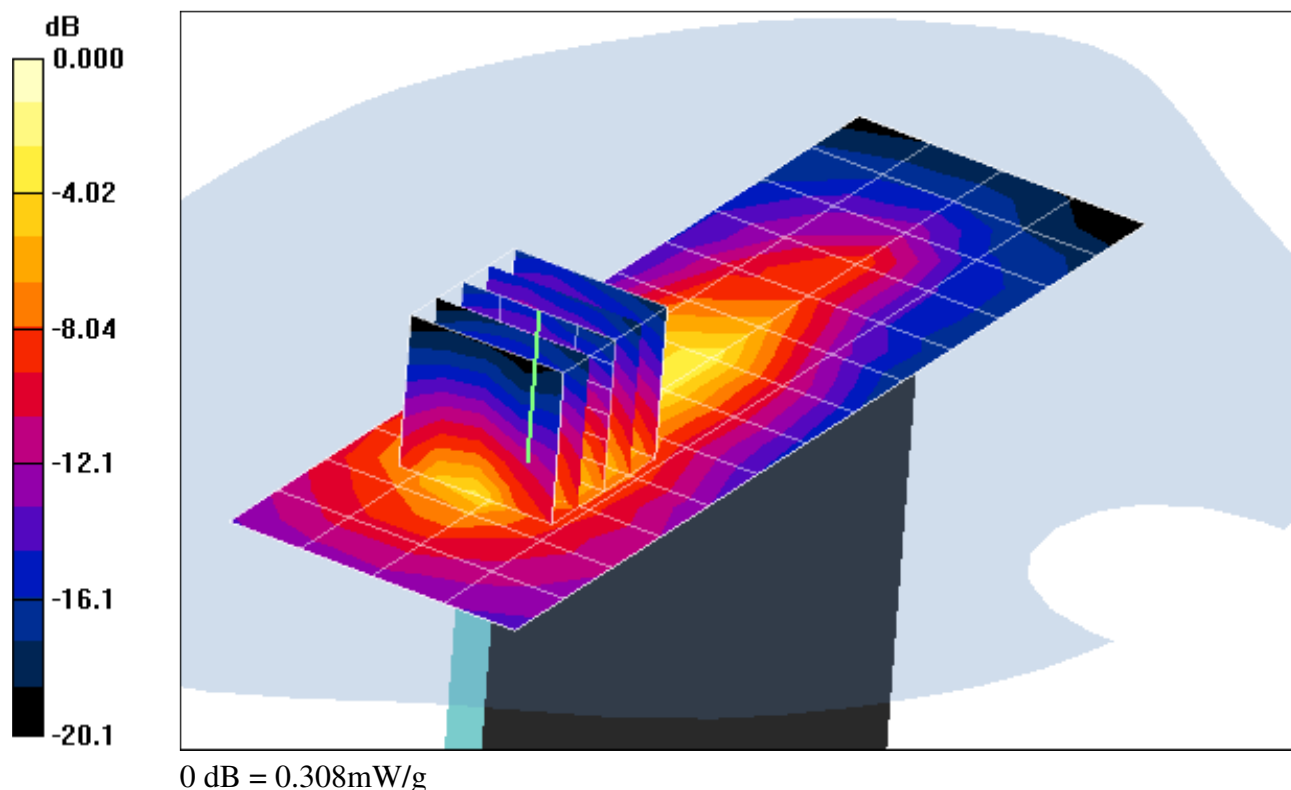
**Area Scan (5x14x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 12.4 V/m

Peak SAR (extrapolated) = 0.555 W/kg

**SAR(1 g) = 0.262 mW/g; SAR(10 g) = 0.121 mW/g**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0384**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1  
Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.51 \text{ mho/m}$ ;  $\epsilon_r = 51.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-23-2011; Ambient Temp: 23.9°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/19/2011

Phantom: SAM Sub Dasy B; Type: SAM 4.0; Serial: TP-1626

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

**Mode: PCS EVDO, Body SAR, Left Edge, Mid ch**

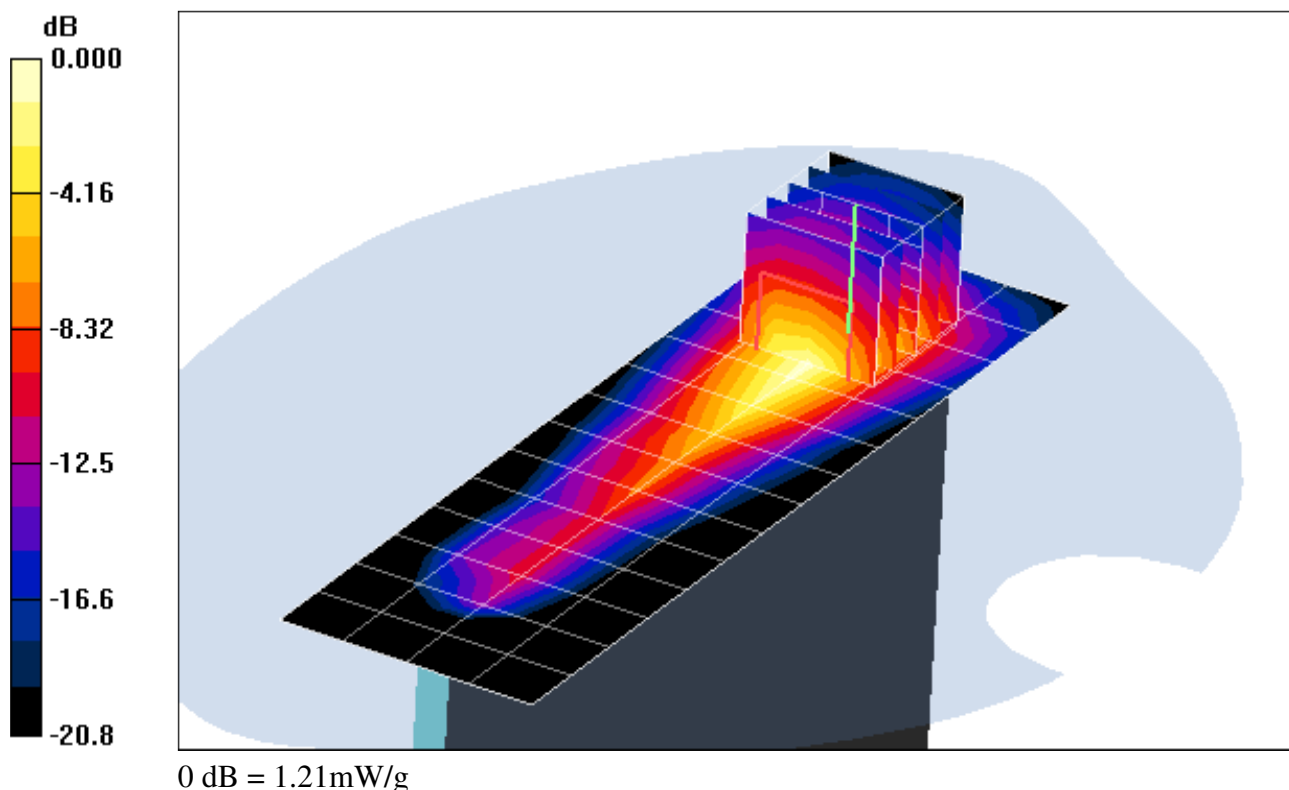
**Area Scan (5x15x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 27.7 V/m

Peak SAR (extrapolated) = 2.10 W/kg

**SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.486 mW/g**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0385**

Communication System: LTE RF; Frequency: 782 MHz; Duty Cycle: 1:1

Medium: 785 Body Medium parameters used (interpolated):

$f = 782 \text{ MHz}$ ;  $\sigma = 0.979 \text{ mho/m}$ ;  $\epsilon_r = 54.5$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-05-2011; Ambient Temp: 25.0°C; Tissue Temp: 23.2°C

Probe: EX3DV4 - SN3550; ConvF(8.18, 8.18, 8.18); Calibrated: 2/14/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/20/2011

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114

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

**Mode: LTE, Body SAR, Back side, Mid.ch, 16 QAM, 10 MHz Bandwidth  
25 Resource Blocks, 12 RB Offset**

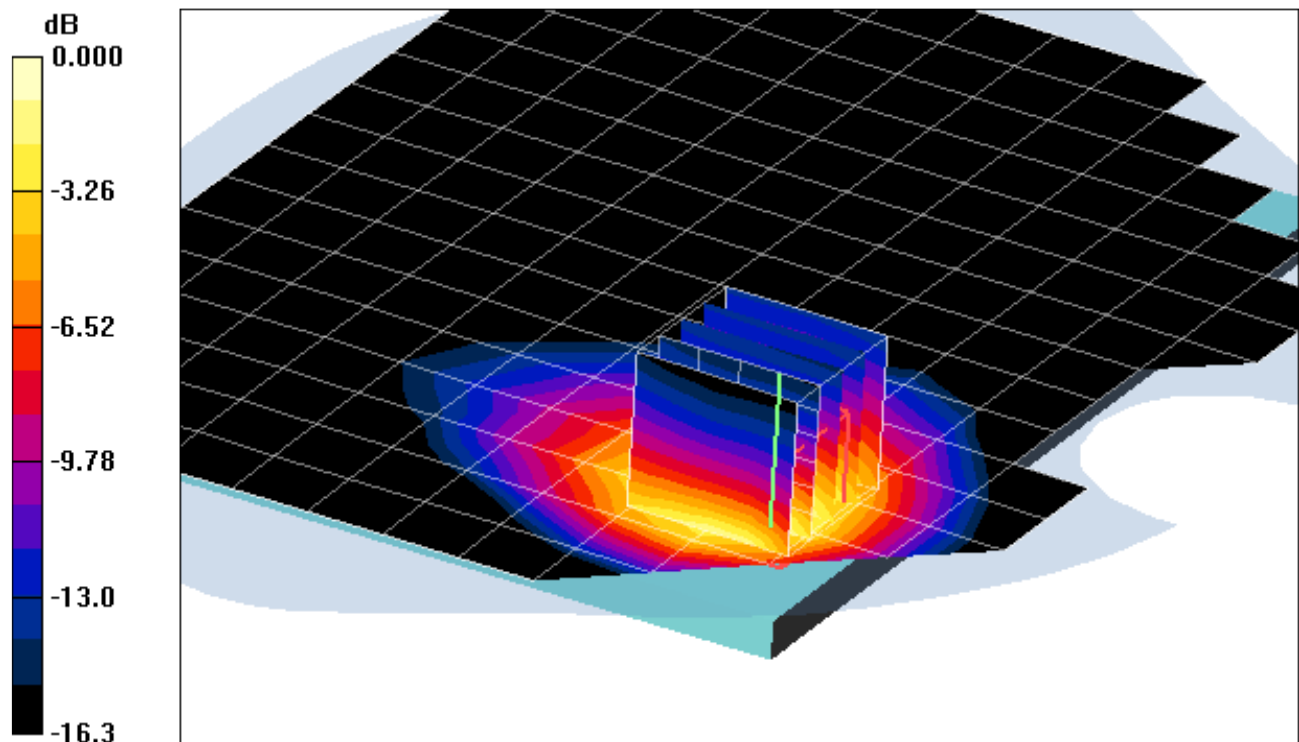
**Area Scan (13x17x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 26.3 V/m

Peak SAR (extrapolated) = 1.77 W/kg

**SAR(1 g) = 0.731 mW/g; SAR(10 g) = 0.371 mW/g**



0 dB = 0.771mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0384**

Communication System: LTE RF; Frequency: 782 MHz; Duty Cycle: 1:1

Medium: 785 Body Medium parameters used (interpolated):

$f = 782 \text{ MHz}$ ;  $\sigma = 0.979 \text{ mho/m}$ ;  $\epsilon_r = 54.5$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.5 cm

Test Date: 10-05-2011; Ambient Temp: 25.0°C; Tissue Temp: 23.2°C

Probe: EX3DV4 - SN3550; ConvF(8.18, 8.18, 8.18); Calibrated: 2/14/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/20/2011

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114

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

**Mode: LTE, Body SAR, Back side, Mid.ch, QPSK, 10 MHz Bandwidth  
1 Resource Block, 0 RB Offset**

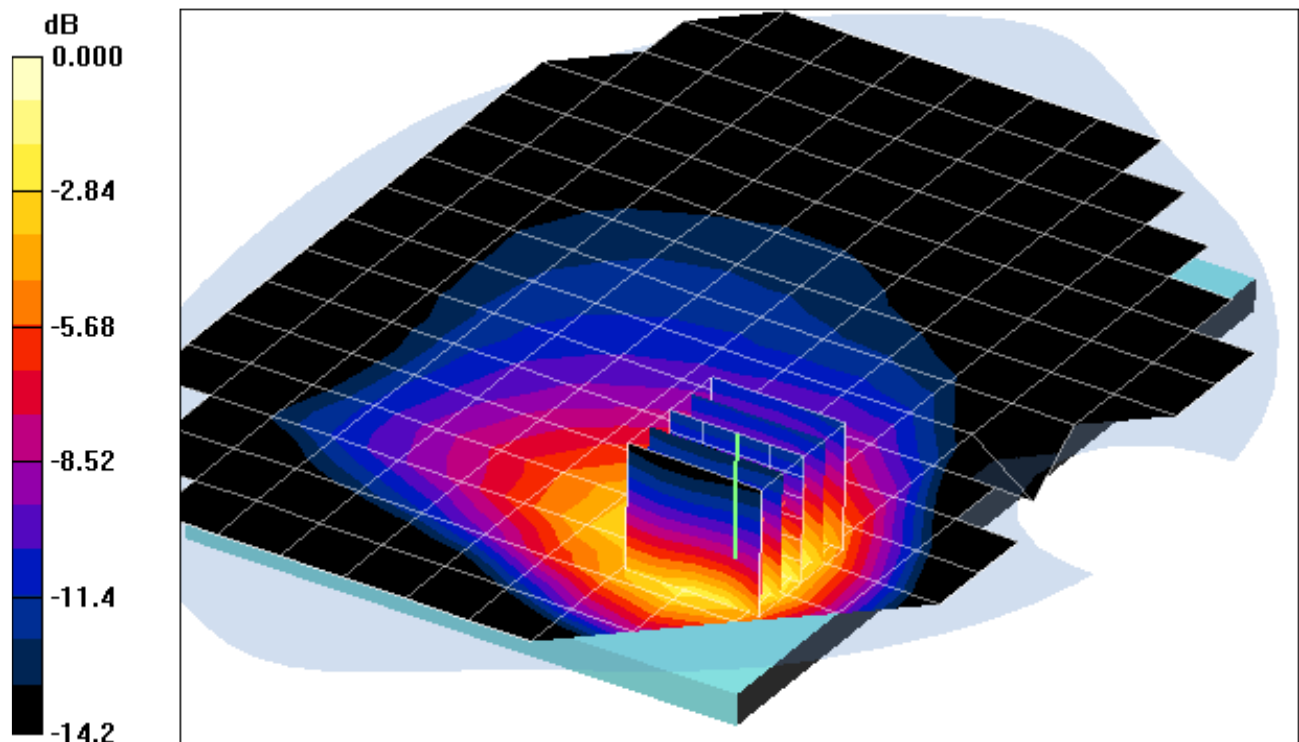
**Area Scan (13x17x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 28.5 V/m

Peak SAR (extrapolated) = 1.47 W/kg

**SAR(1 g) = 0.808 mW/g; SAR(10 g) = 0.461 mW/g**



0 dB = 0.876mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0384**

Communication System: LTE RF; Frequency: 782 MHz; Duty Cycle: 1:1

Medium: 785 Body Medium parameters used (interpolated):

$f = 782 \text{ MHz}$ ;  $\sigma = 0.979 \text{ mho/m}$ ;  $\epsilon_r = 54.5$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-05-2011; Ambient Temp: 25.0°C; Tissue Temp: 23.2°C

Probe: EX3DV4 - SN3550; ConvF(8.18, 8.18, 8.18); Calibrated: 2/14/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/20/2011

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114

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

**Mode: LTE, Body SAR, Bottom Edge, Mid.ch, QPSK, 10 MHz Bandwidth  
1 Resource Block, 0 RB Offset**

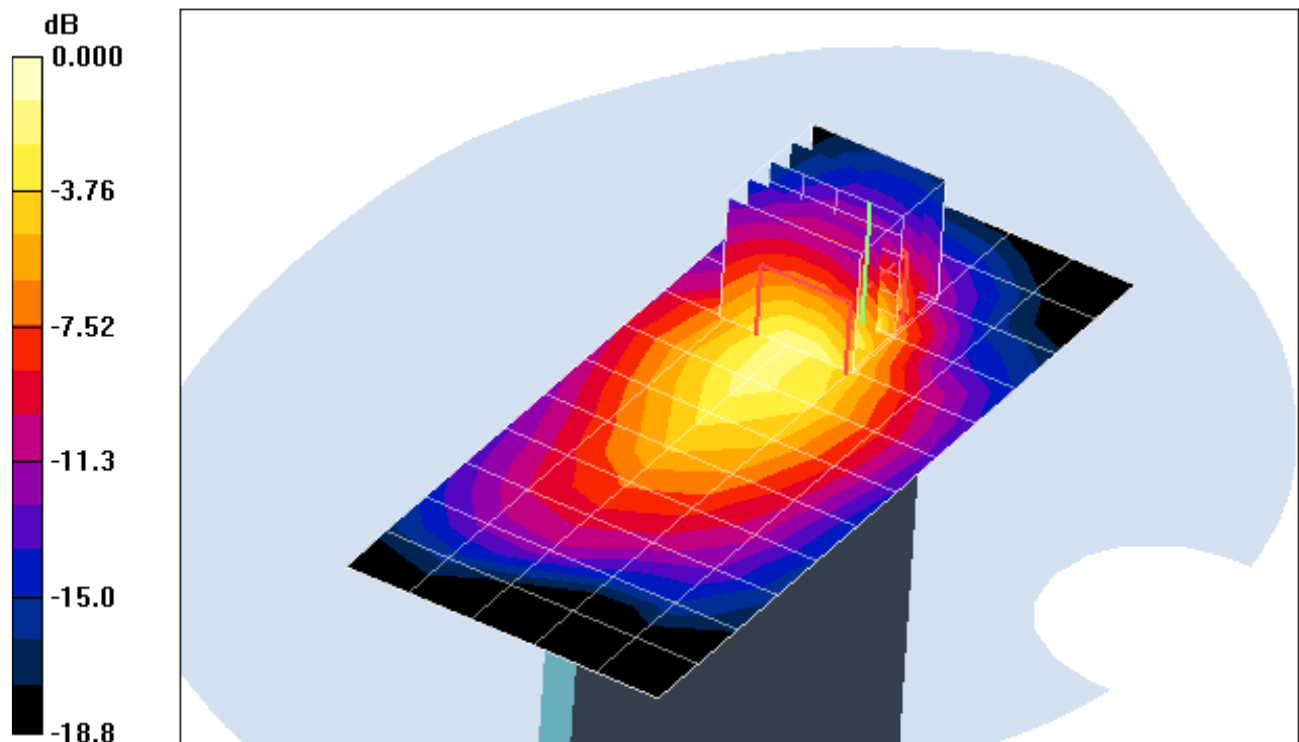
**Area Scan (6x13x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 22.9 V/m

Peak SAR (extrapolated) = 1.49 W/kg

**SAR(1 g) = 0.611 mW/g; SAR(10 g) = 0.288 mW/g**



0 dB = 0.635mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0384**

Communication System: LTE RF; Frequency: 782 MHz; Duty Cycle: 1:1

Medium: 785 Body Medium parameters used (interpolated):

$f = 782 \text{ MHz}$ ;  $\sigma = 0.979 \text{ mho/m}$ ;  $\epsilon_r = 54.5$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-05-2011; Ambient Temp: 25.0°C; Tissue Temp: 23.2°C

Probe: EX3DV4 - SN3550; ConvF(8.18, 8.18, 8.18); Calibrated: 2/14/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/20/2011

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114

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

**Mode: LTE, Body SAR, Left Edge, Mid ch, QPSK, 10 MHz Bandwidth  
25 Resource Blocks, 12 RB Offset**

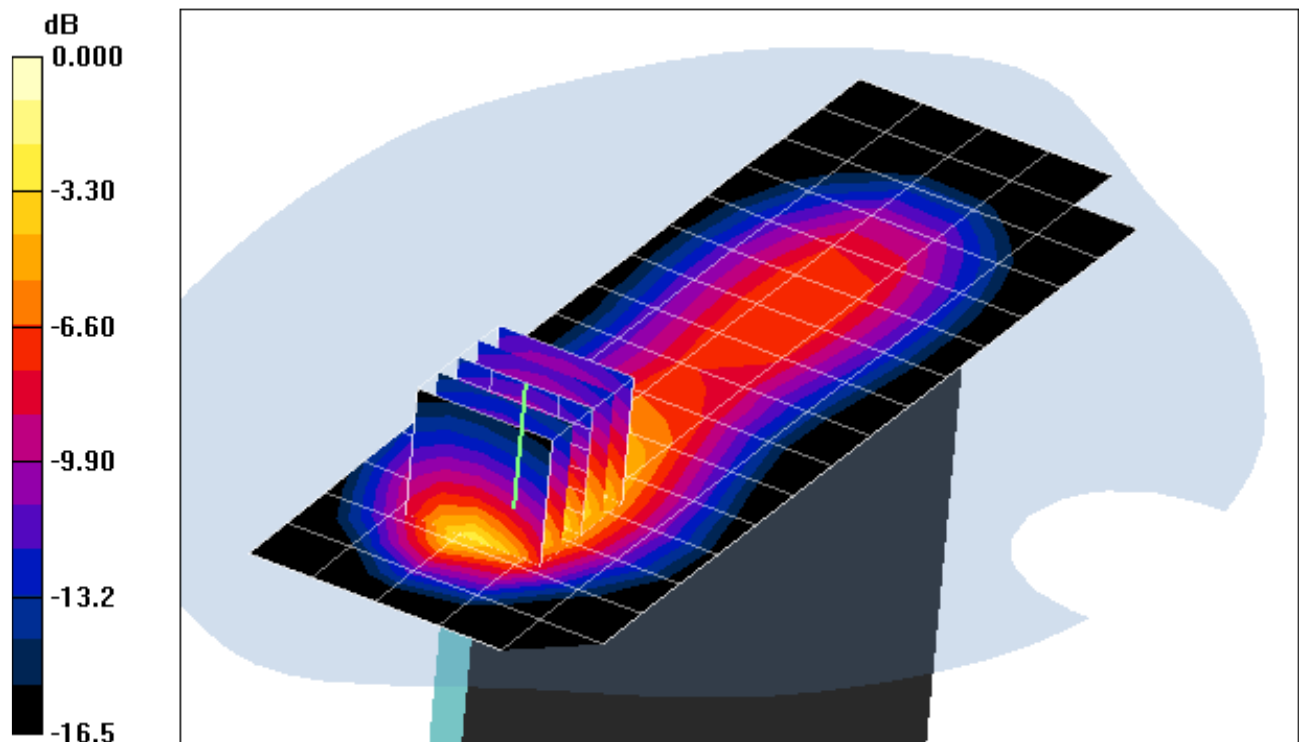
**Area Scan (6x17x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 26.6 V/m

Peak SAR (extrapolated) = 1.28 W/kg

**SAR(1 g) = 0.707 mW/g; SAR(10 g) = 0.382 mW/g**



0 dB = 0.818mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHI815; Type: Portable Tablet; Serial: 0815-0384**

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.49 \text{ mho/m}$ ;  $\epsilon_r = 52.7$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 11-11-2011; Ambient Temp: 24.3°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN3561; ConvF(6.58, 6.58, 6.58); Calibrated: 7/27/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/20/2011

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

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

**Mode: PCS EVDO, Body SAR, Vertex, Mid.ch**

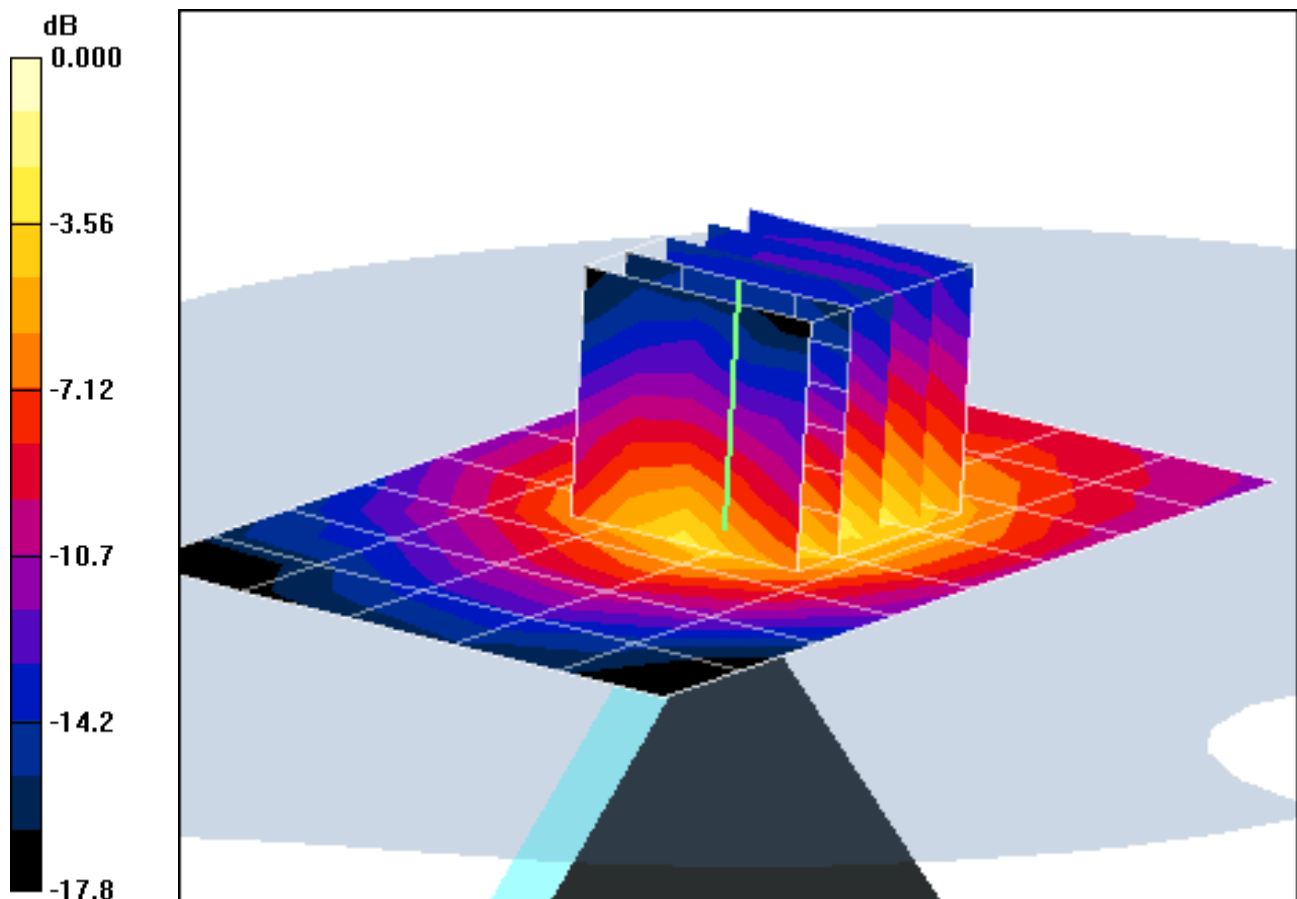
**Area Scan (6x9x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 11.0 V/m

Peak SAR (extrapolated) = 0.465 W/kg

**SAR(1 g) = 0.225 mW/g; SAR(10 g) = 0.113 mW/g**



0 dB = 0.249mW/g

## APPENDIX B: DIPOLE VALIDATION

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 750 MHz; Type: D750V3; Serial: 1003**

Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium: 785 Body Medium parameters used (interpolated):

$f = 750 \text{ MHz}$ ;  $\sigma = 0.949 \text{ mho/m}$ ;  $\epsilon_r = 54.8$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-05-2011; Ambient Temp: 25.0°C; Tissue Temp: 23.2°C

Probe: EX3DV4 - SN3550; ConvF(8.18, 8.18, 8.18); Calibrated: 2/14/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/20/2011

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114

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

## 750MHz System Verification

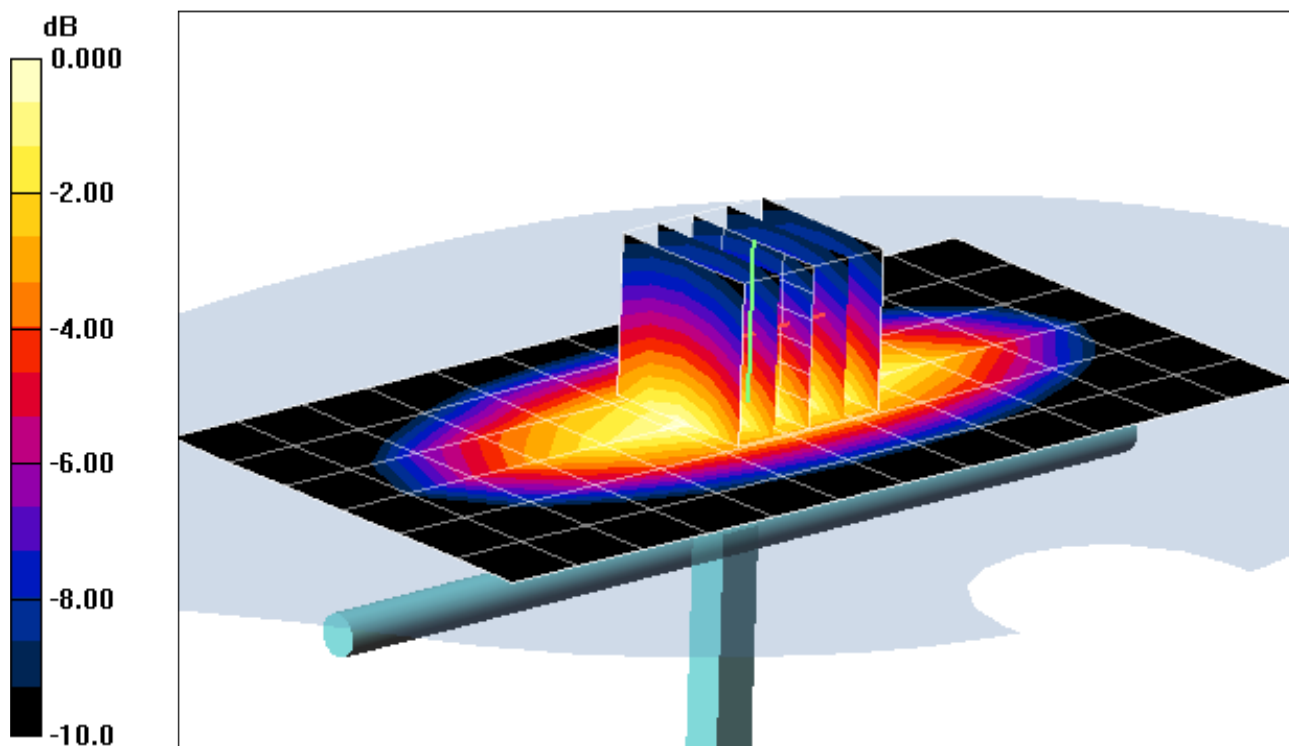
**Area Scan (7x13x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Input Power = 20.0 dBm (100 mW)

**SAR(1 g) = 0.898 mW/g; SAR(10 g) = 0.596 mW/g**

Deviation = 1.47 %



0 dB = 0.971mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 750 MHz; Type: D750V3; Serial: 1003**

Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium: 785 Body Medium parameters used (interpolated):

$f = 750 \text{ MHz}$ ;  $\sigma = 0.949 \text{ mho/m}$ ;  $\epsilon_r = 54.8$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-03-2011; Ambient Temp: 25.0°C; Tissue Temp: 23.2°C

Probe: EX3DV4 - SN3550; ConvF(8.18, 8.18, 8.18); Calibrated: 2/14/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/20/2011

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114

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

## 750MHz System Verification

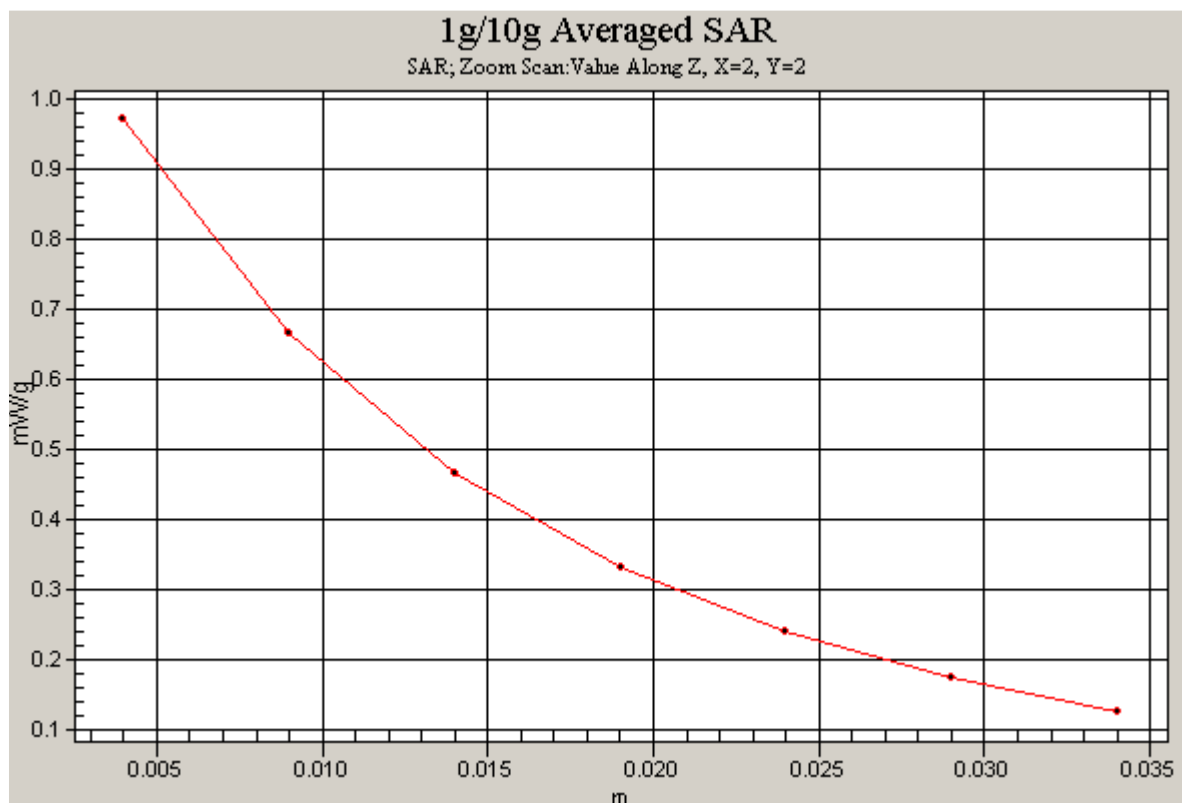
**Area Scan (7x13x1):** Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

**SAR(1 g) = 0.898 mW/g; SAR(10 g) = 0.596 mW/g**

Deviation = 1.47 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d047**

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

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.958 \text{ mho/m}$ ;  $\epsilon_r = 53.05$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-23-2011; Ambient Temp: 23.7 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/21/2011

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

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

## 835MHz System Verification

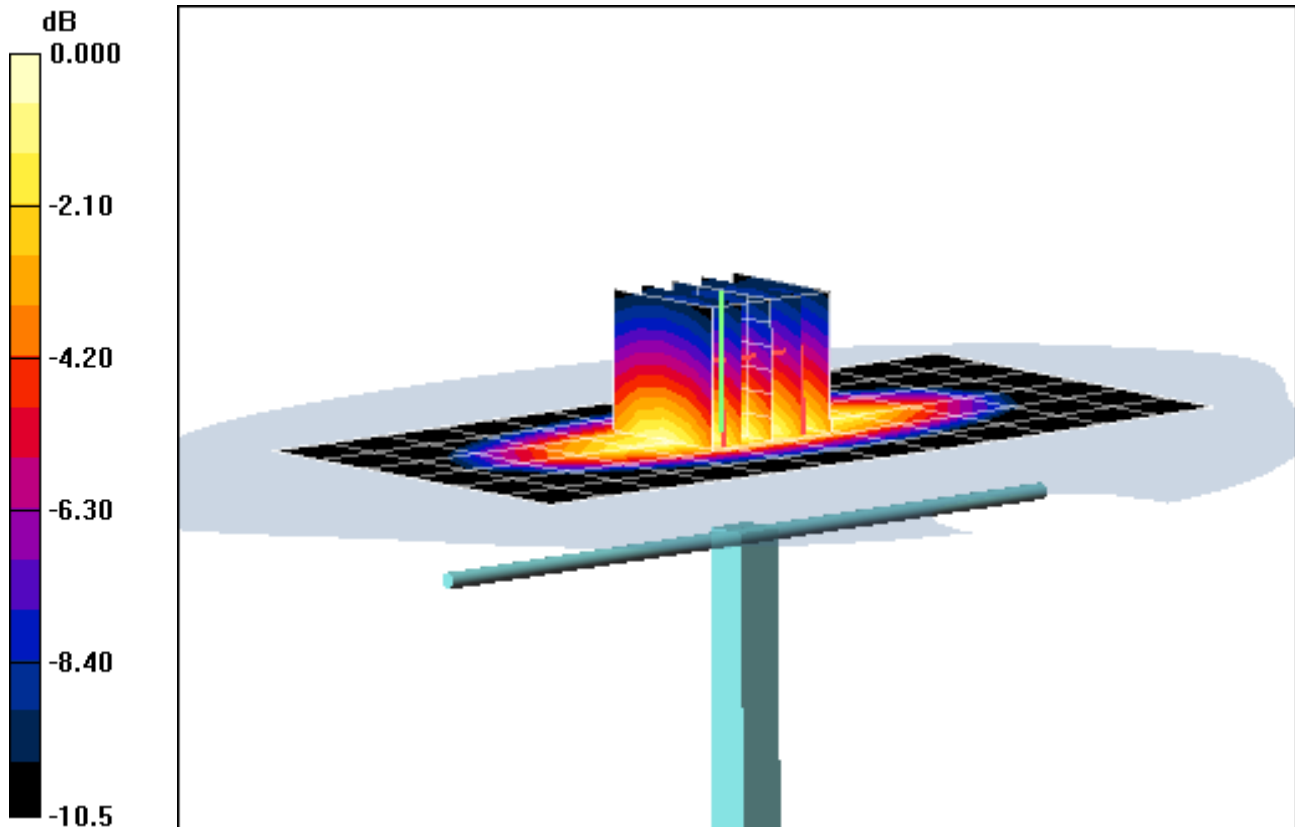
**Area Scan (7x13x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Input Power = 20.0 dBm (100 mW)

**SAR(1 g) = 0.981 mW/g; SAR(10 g) = 0.640 mW/g**

Deviation = -0.41 %



0 dB = 1.06mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d047**

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

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.958 \text{ mho/m}$ ;  $\epsilon_r = 53.05$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-23-2011; Ambient Temp: 23.7 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/21/2011

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

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

## 835MHz System Verification

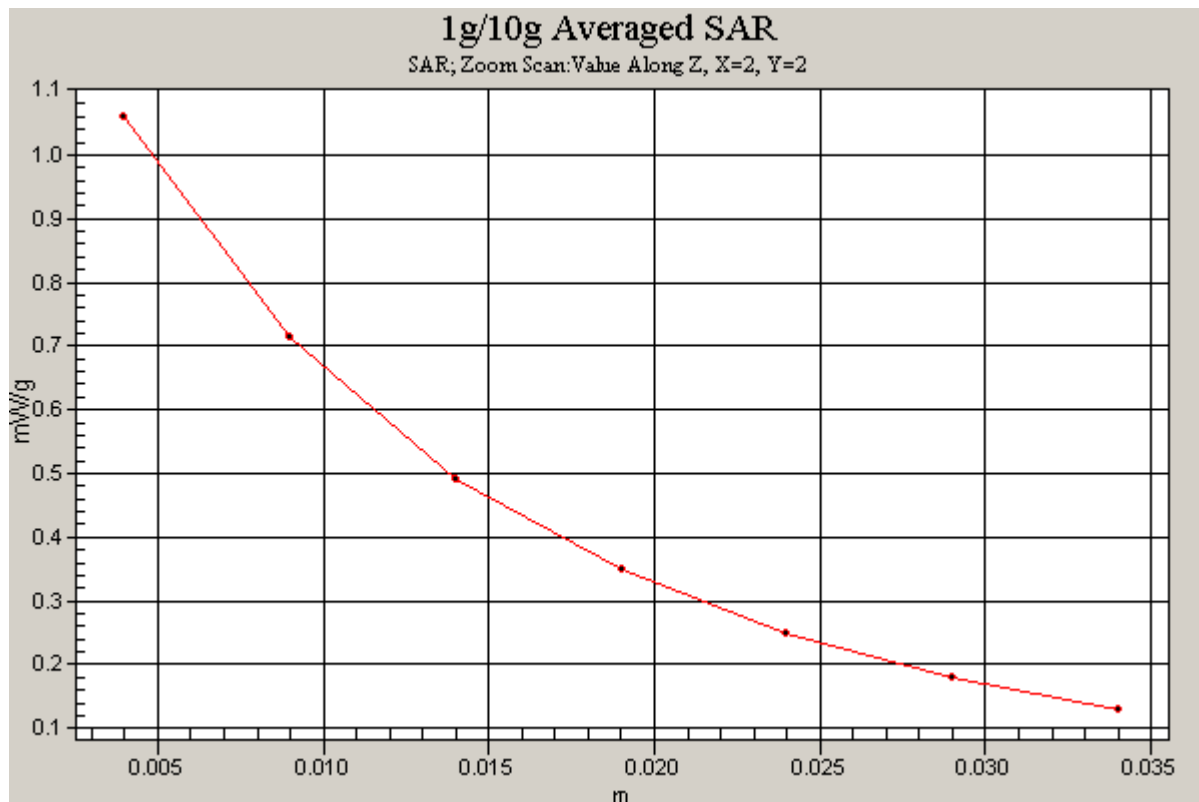
**Area Scan (7x13x1):** Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

**SAR(1 g) = 0.981 mW/g; SAR(10 g) = 0.640 mW/g**

Deviation = -0.41 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d047**

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

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.978 \text{ mho/m}$ ;  $\epsilon_r = 54.2$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-11-2011; Ambient Temp: 23.6°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/21/2011

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

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

## 835MHz System Verification

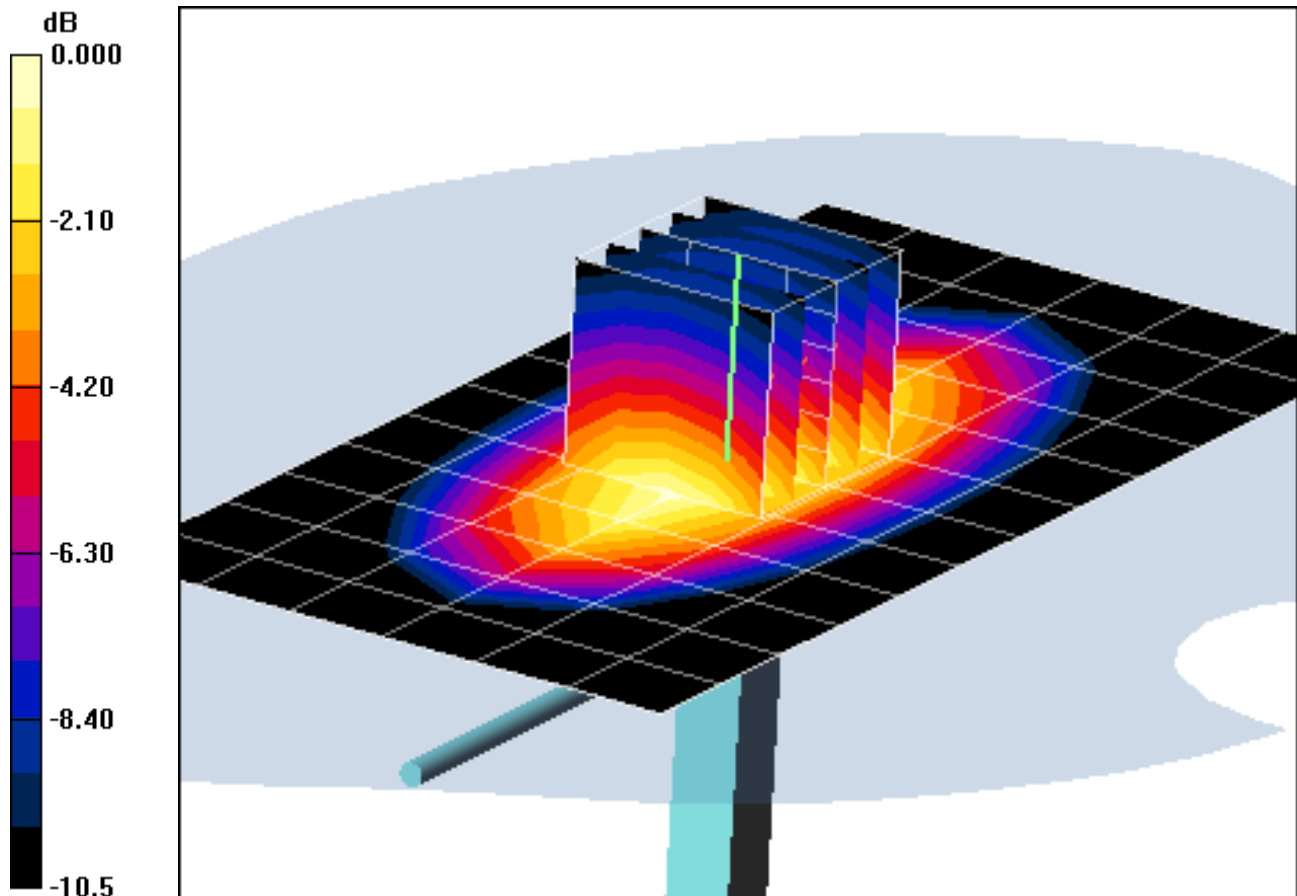
**Area Scan (7x13x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Input Power = 20.0 dBm (100 mW)

**SAR(1 g) = 0.979 mW/g; SAR(10 g) = 0.637 mW/g**

Deviation = -0.61 %



0 dB = 1.06mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d047**

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

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.978 \text{ mho/m}$ ;  $\epsilon_r = 54.2$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-11-2011; Ambient Temp: 23.6°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 2/21/2011

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

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

## 835MHz System Verification

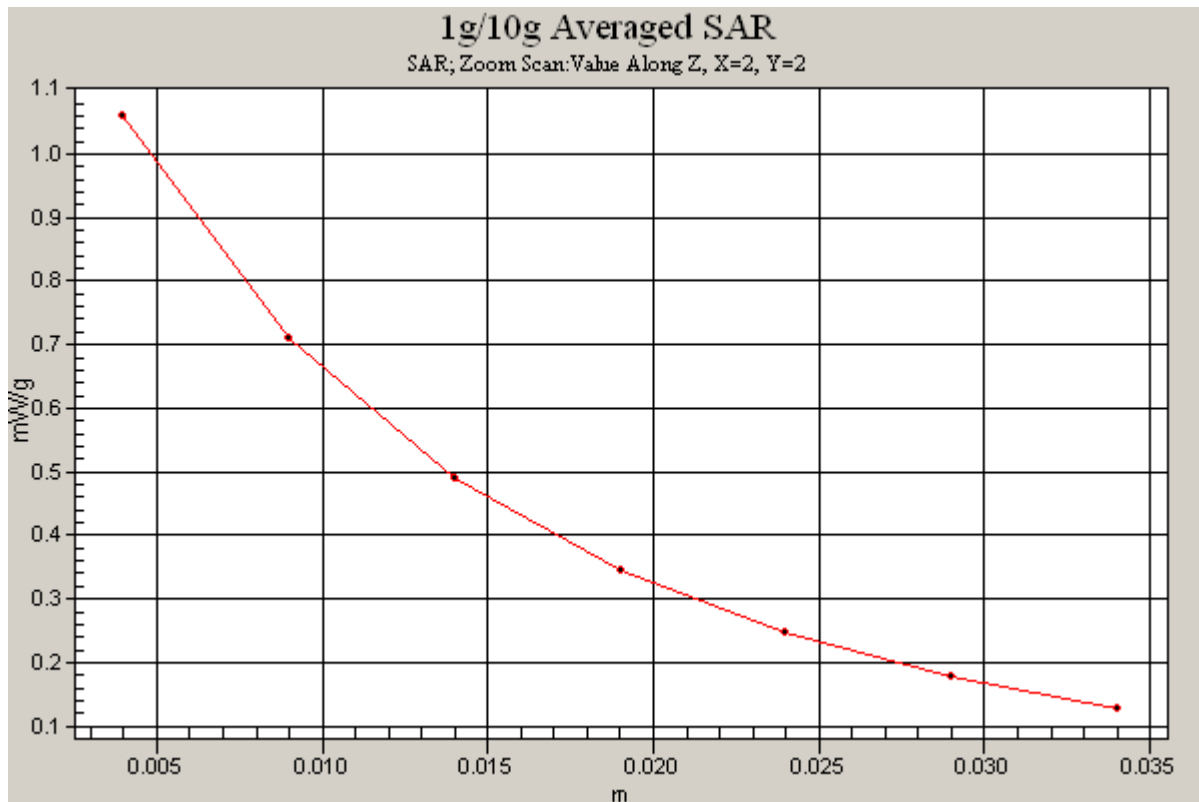
**Area Scan (7x13x1):** Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

**SAR(1 g) = 0.979 mW/g; SAR(10 g) = 0.637 mW/g**

Deviation = -0.61 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 502**

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.53 \text{ mho/m}$ ;  $\epsilon_r = 51.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-23-2011; Ambient Temp: 23.9°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/19/2011

Phantom: SAM Sub Dasy B; Type: SAM 4.0; Serial: TP-1626

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

## 1900MHz System Verification

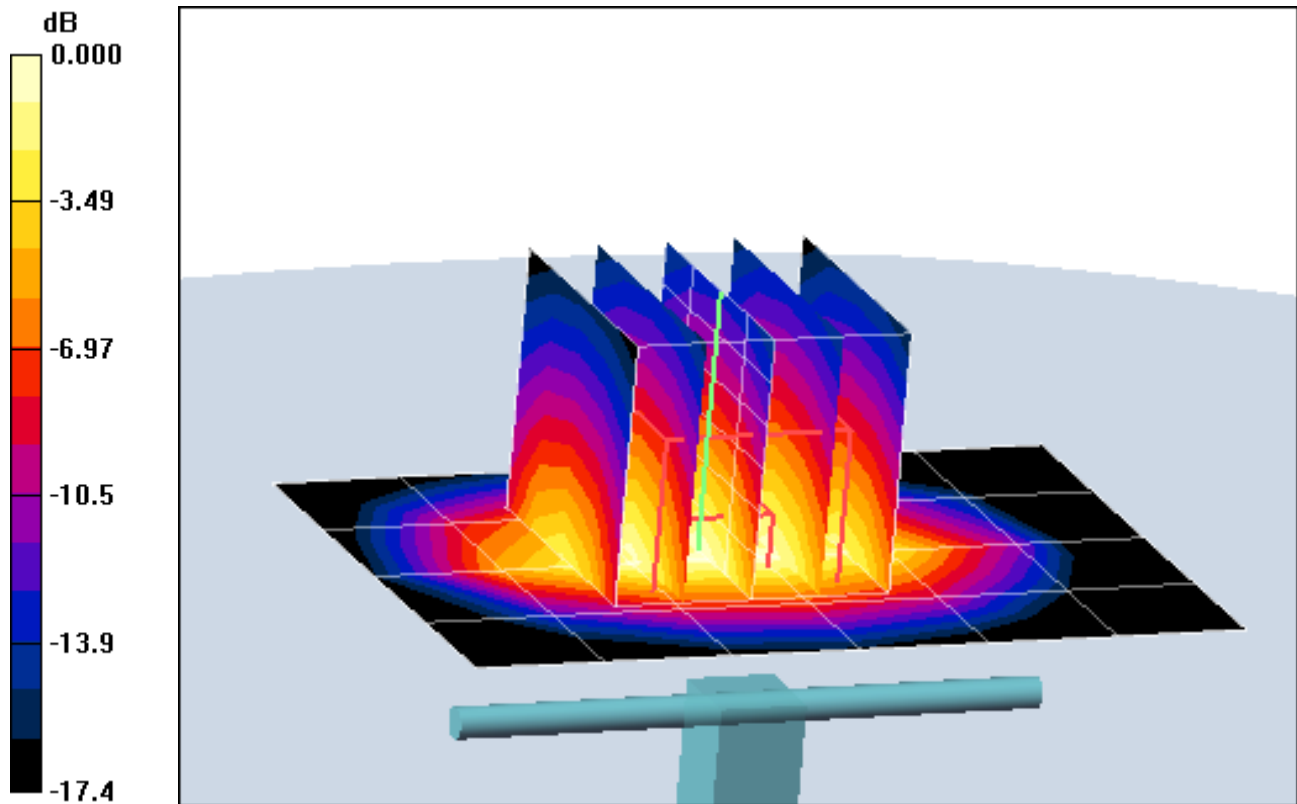
**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

**SAR(1 g) = 4.39 mW/g; SAR(10 g) = 2.31 mW/g**

Deviation = 6.81 %



0 dB = 4.97mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 502**

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.53 \text{ mho/m}$ ;  $\epsilon_r = 51.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-23-2011; Ambient Temp: 23.9°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/19/2011

Phantom: SAM Sub Dasy B; Type: SAM 4.0; Serial: TP-1626

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

## 1900MHz System Verification

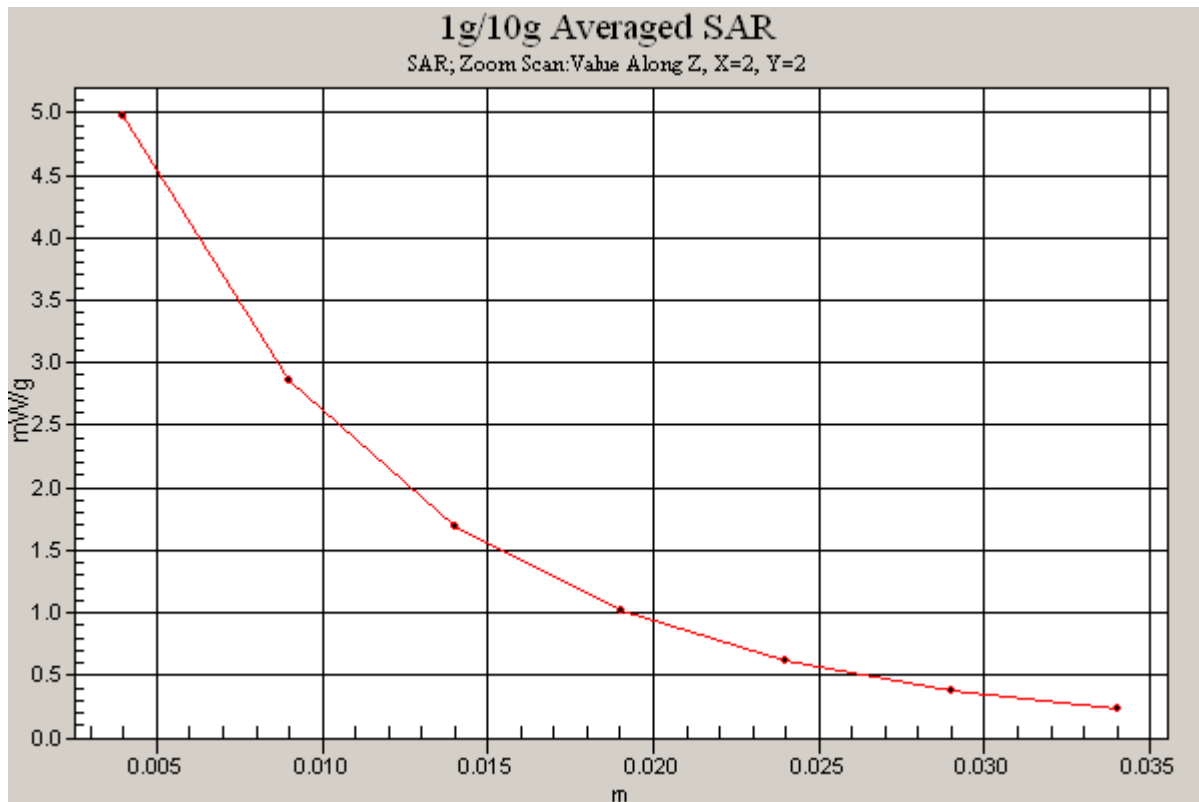
**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

**SAR(1 g) = 4.39 mW/g; SAR(10 g) = 2.31 mW/g**

Deviation = 6.81 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 502**

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.52 \text{ mho/m}$ ;  $\epsilon_r = 54.3$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-26-2011; Ambient Temp: 24.9°C; Tissue Temp: 23.1°C

Probe: EX3DV4 - SN3550; ConvF(6.77, 6.77, 6.77); Calibrated: 2/14/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/20/2011

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

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

## 1900MHz System Verification

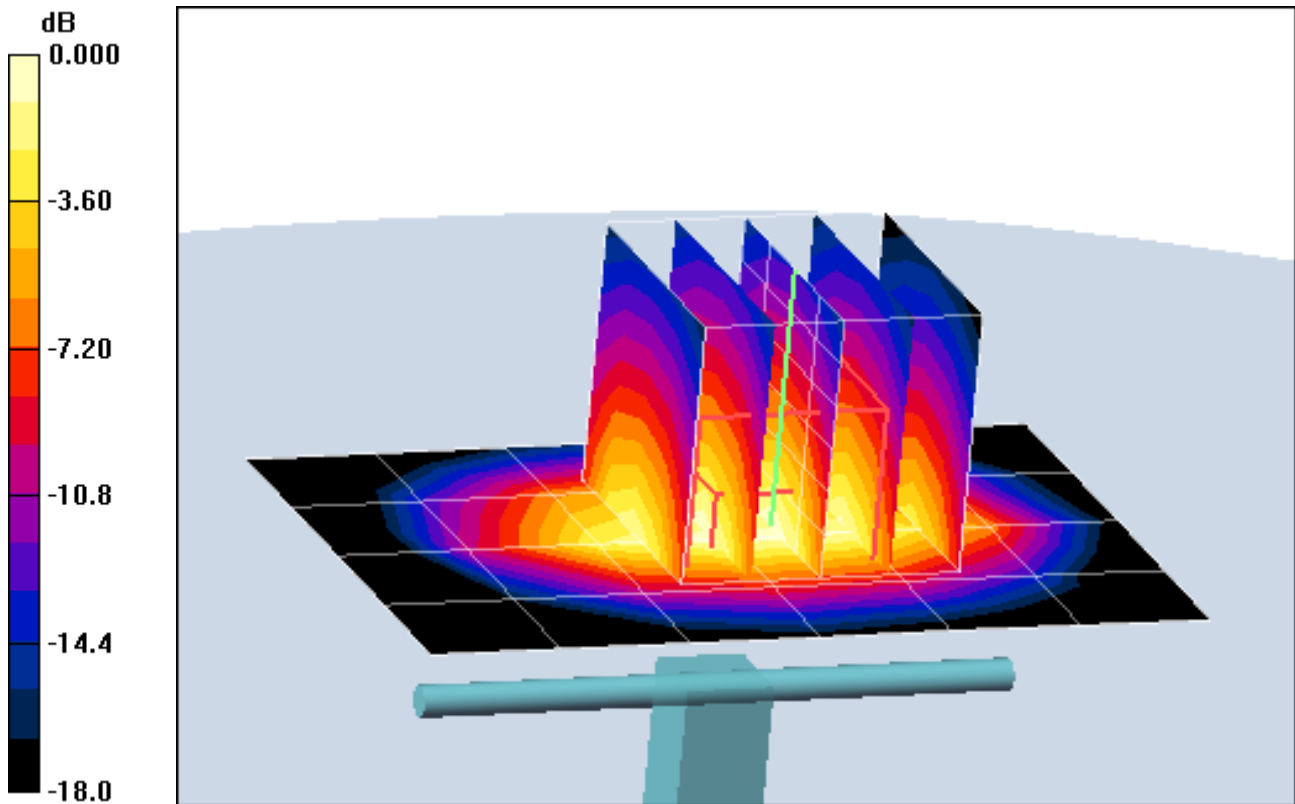
**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

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

Input Power = 16 dBm (40 mW)

**SAR(1 g) = 1.61 mW/g; SAR(10 g) = 0.831 mW/g**

Deviation = -2.07 %



0 dB = 1.79mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 502**

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.52 \text{ mho/m}$ ;  $\epsilon_r = 54.3$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-26-2011; Ambient Temp: 24.9°C; Tissue Temp: 23.1°C

Probe: EX3DV4 - SN3550; ConvF(6.77, 6.77, 6.77); Calibrated: 2/14/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/20/2011

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

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

## 1900MHz System Verification

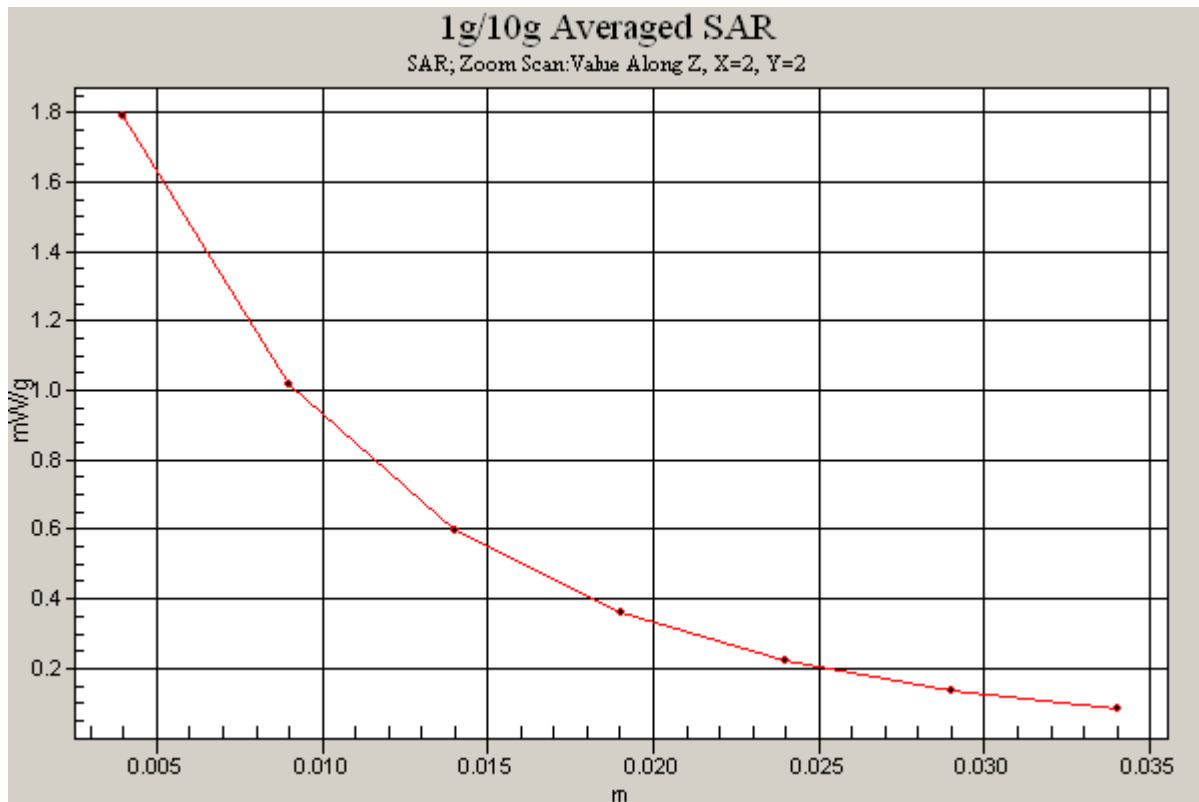
**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

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

Input Power = 16 dBm (40 mW)

**SAR(1 g) = 1.61 mW/g; SAR(10 g) = 0.831 mW/g**

Deviation = -2.07 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 502**

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.51 \text{ mho/m}$ ;  $\epsilon_r = 52.6$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-11-2011; Ambient Temp: 24.3°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN3561; ConvF(6.58, 6.58, 6.58); Calibrated: 7/27/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/20/2011

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

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

## 1900MHz System Verification

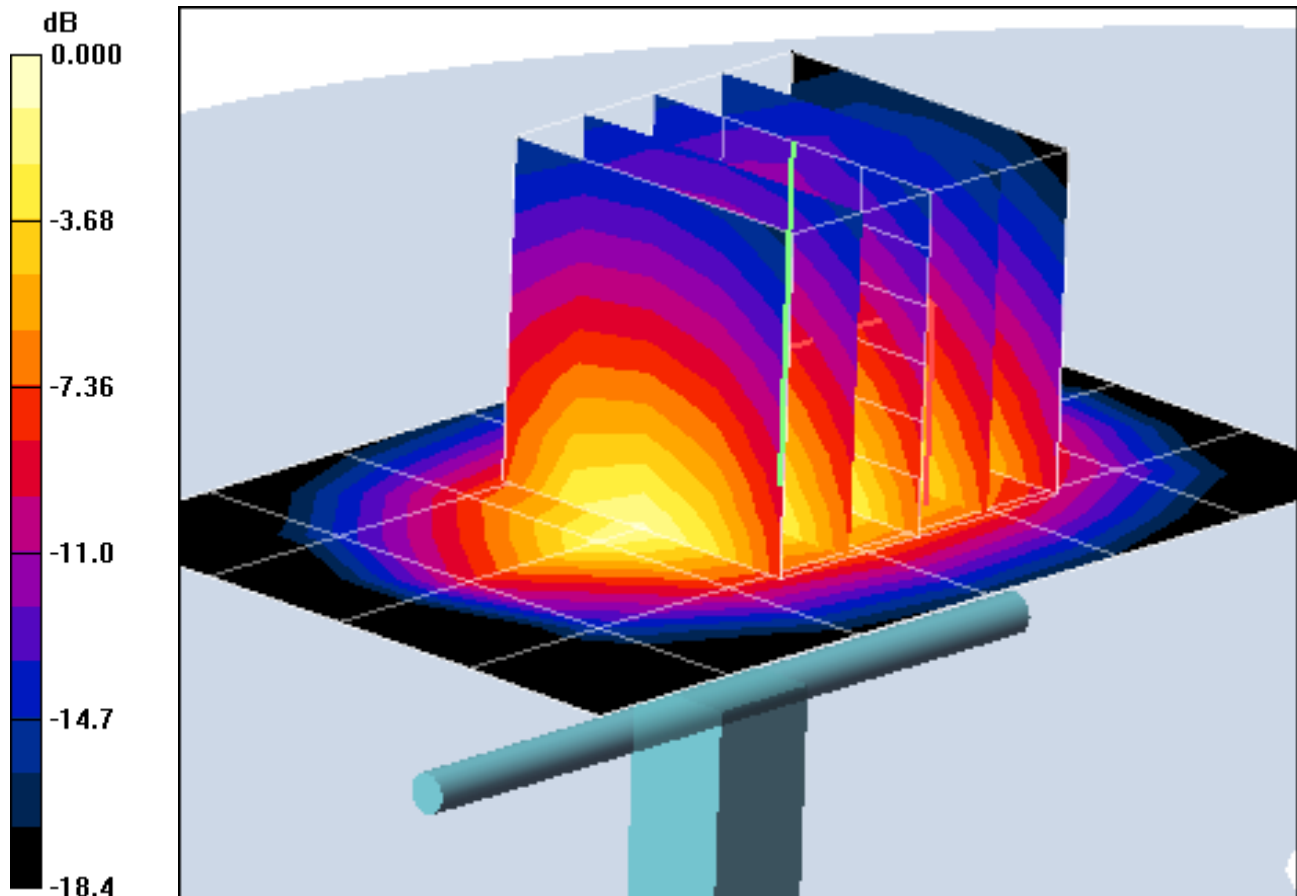
**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

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

Input Power = 16.0 dBm (40 mW)

**SAR(1 g) = 1.62 mW/g; SAR(10 g) = 0.831 mW/g**

Deviation = -1.46 %



0 dB = 1.79mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 502**

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.51 \text{ mho/m}$ ;  $\epsilon_r = 52.6$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-11-2011; Ambient Temp: 24.3°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN3561; ConvF(6.58, 6.58, 6.58); Calibrated: 7/27/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/20/2011

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

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

## 1900MHz System Verification

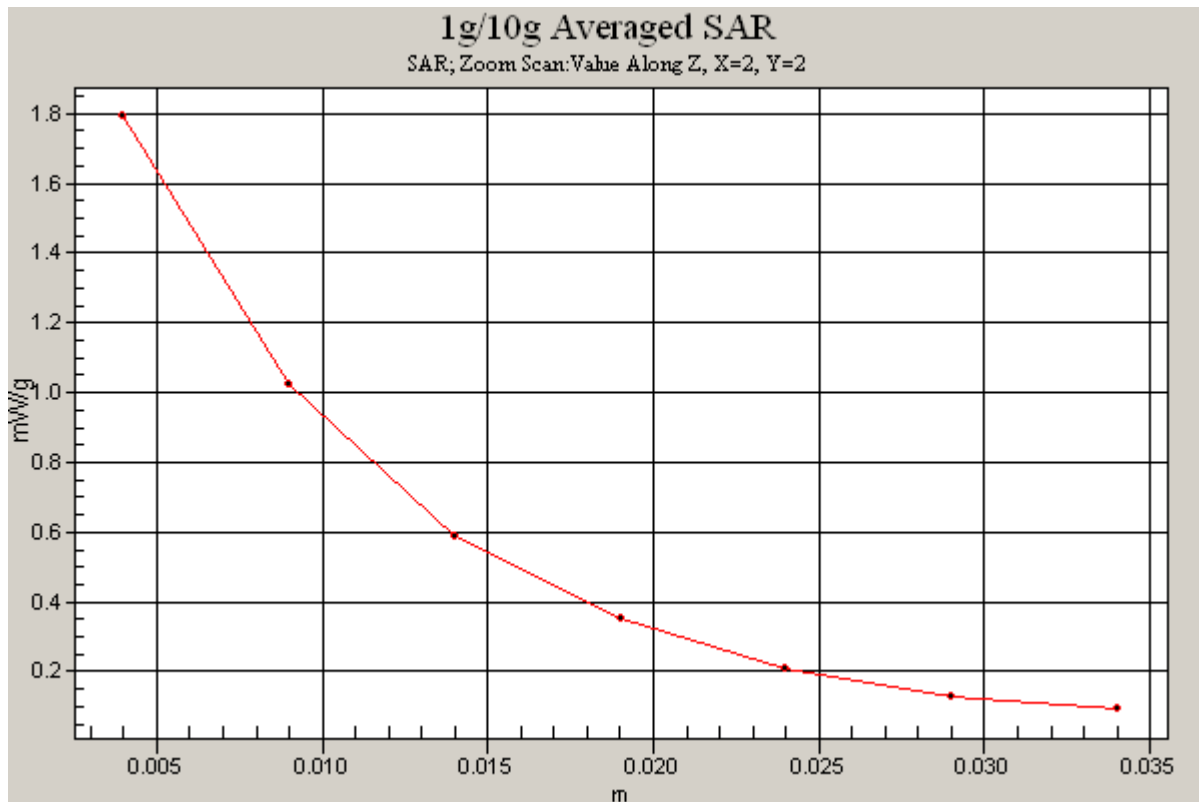
**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

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

Input Power = 16.0 dBm (40 mW)

**SAR(1 g) = 1.62 mW/g; SAR(10 g) = 0.831 mW/g**

Deviation = -1.46 %



## APPENDIX C: PROBE CALIBRATION



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

Accreditation No.: **SCS 108**

Client **PC Test**

Certificate No: **D750V3-1003\_Feb11**

## CALIBRATION CERTIFICATE

Object **D750V3 - SN: 1003**

Calibration procedure(s) **QA CAL-05.v8**  
**Calibration procedure for dipole validation kits**

Calibration date: **February 14, 2011**

✓  
 Kok  
 2/22/11

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

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

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards           | ID #               | Cal Date (Certificate No.)        | Scheduled Calibration  |
|-----------------------------|--------------------|-----------------------------------|------------------------|
| Power meter EPM-442A        | GB37480704         | 06-Oct-10 (No. 217-01266)         | Oct-11                 |
| Power sensor HP 8481A       | US37292783         | 06-Oct-10 (No. 217-01266)         | Oct-11                 |
| Reference 20 dB Attenuator  | SN: 5086 (20g)     | 30-Mar-10 (No. 217-01158)         | Mar-11                 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 30-Mar-10 (No. 217-01162)         | Mar-11                 |
| Reference Probe ES3DV3      | SN: 3205           | 30-Apr-10 (No. ES3-3205_Apr10)    | Apr-11                 |
| DAE4                        | SN: 601            | 10-Jun-10 (No. DAE4-601_Jun10)    | Jun-11                 |
| Secondary Standards         | ID #               | Check Date (in house)             | Scheduled Check        |
| Power sensor HP 8481A       | MY41092317         | 18-Oct-02 (in house check Oct-09) | In house check: Oct-11 |
| RF generator R&S SMT-06     | 100005             | 4-Aug-99 (in house check Oct-09)  | In house check: Oct-11 |
| Network Analyzer HP 8753E   | US37390585 S4206   | 18-Oct-01 (in house check Oct-10) | In house check: Oct-11 |

Calibrated by: **Dimce Iliev** **Laboratory Technician** *D. Iliev*

Approved by: **Katja Pokovic** **Technical Manager** *K. Pokovic*

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

Accreditation No.: **SCS 108**

### Glossary:

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

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

- a) 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
- b) 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
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

### Additional Documentation:

- d) DASY4/5 System Handbook

### Methods Applied and Interpretation of Parameters:

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

## Measurement Conditions

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

|                              |                           |             |
|------------------------------|---------------------------|-------------|
| DASY Version                 | DASY5                     | V52.6       |
| Extrapolation                | Advanced Extrapolation    |             |
| Phantom                      | Modular Flat Phantom V4.9 |             |
| Distance Dipole Center - TSL | 15 mm                     | with Spacer |
| Zoom Scan Resolution         | dx, dy, dz = 5 mm         |             |
| Frequency                    | 750 MHz $\pm$ 1 MHz       |             |

## Head TSL parameters

The following parameters and calculations were applied.

|                                  | Temperature         | Permittivity   | Conductivity         |
|----------------------------------|---------------------|----------------|----------------------|
| Nominal Head TSL parameters      | 22.0 °C             | 41.9           | 0.89 mho/m           |
| Measured Head TSL parameters     | (22.0 $\pm$ 0.2) °C | 42.3 $\pm$ 6 % | 0.91 mho/m $\pm$ 6 % |
| Head TSL temperature during test | (20.5 $\pm$ 0.2) °C | ----           | ----                 |

## SAR result with Head TSL

|                                                       |                    |                               |
|-------------------------------------------------------|--------------------|-------------------------------|
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                               |
| SAR measured                                          | 250 mW input power | 2.13 mW / g                   |
| SAR normalized                                        | normalized to 1W   | 8.52 mW / g                   |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | 8.37 mW /g $\pm$ 17.0 % (k=2) |

|                                                         |                    |                               |
|---------------------------------------------------------|--------------------|-------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                               |
| SAR measured                                            | 250 mW input power | 1.39 mW / g                   |
| SAR normalized                                          | normalized to 1W   | 5.56 mW / g                   |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 5.49 mW /g $\pm$ 16.5 % (k=2) |

## Body TSL parameters

The following parameters and calculations were applied.

|                                  | Temperature     | Permittivity | Conductivity     |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters      | 22.0 °C         | 55.5         | 0.96 mho/m       |
| Measured Body TSL parameters     | (22.0 ± 0.2) °C | 55.8 ± 6 %   | 0.96 mho/m ± 6 % |
| Body TSL temperature during test | (21.0 ± 0.2) °C | ----         | ----             |

## SAR result with Body TSL

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                                   |
|-------------------------------------------------------|--------------------|-----------------------------------|
| SAR measured                                          | 250 mW input power | 2.21 mW / g                       |
| SAR normalized                                        | normalized to 1W   | 8.84 mW / g                       |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | <b>8.85 mW / g ± 17.0 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                                   |
|---------------------------------------------------------|--------------------|-----------------------------------|
| SAR measured                                            | 250 mW input power | 1.46 mW / g                       |
| SAR normalized                                          | normalized to 1W   | 5.84 mW / g                       |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | <b>5.84 mW / g ± 16.5 % (k=2)</b> |

## Appendix

### Antenna Parameters with Head TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 54.7 $\Omega$ - 0.8 j $\Omega$ |
| Return Loss                          | - 26.8 dB                      |

### Antenna Parameters with Body TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 49.8 $\Omega$ - 3.6 j $\Omega$ |
| Return Loss                          | - 28.9 dB                      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.045 ns |
|----------------------------------|----------|

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

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

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

### Additional EUT Data

|                 |                  |
|-----------------|------------------|
| Manufactured by | SPEAG            |
| Manufactured on | January 21, 2009 |

## DASY5 Validation Report for Head TSL

Date/Time: 14.02.2011 10:43:27

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1003**

Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium: HSL750

Medium parameters used:  $f = 750 \text{ MHz}$ ;  $\sigma = 0.91 \text{ mho/m}$ ;  $\epsilon_r = 41.8$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.37, 6.37, 6.37); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.1 Build (408)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

**Pin=250mW; dip=15mm; dist=3.0mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid:**

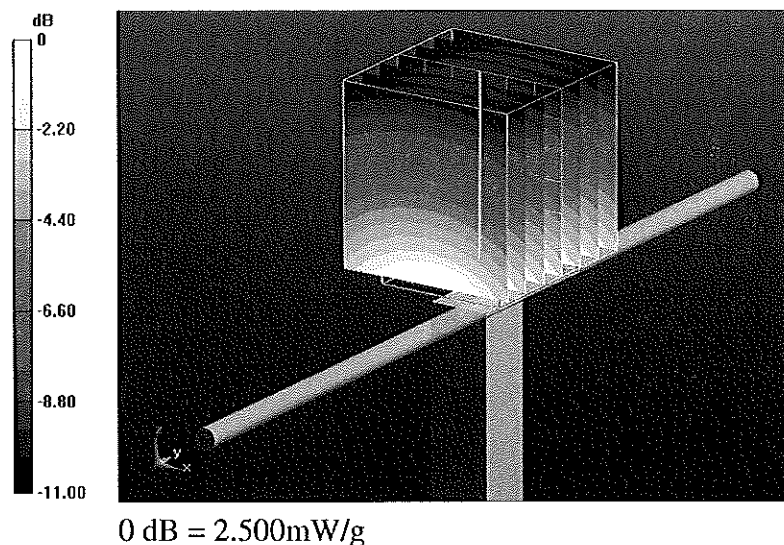
$dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 53.701 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 3.228 W/kg

**SAR(1 g) = 2.13 mW/g; SAR(10 g) = 1.39 mW/g**

Maximum value of SAR (measured) = 2.495 mW/g



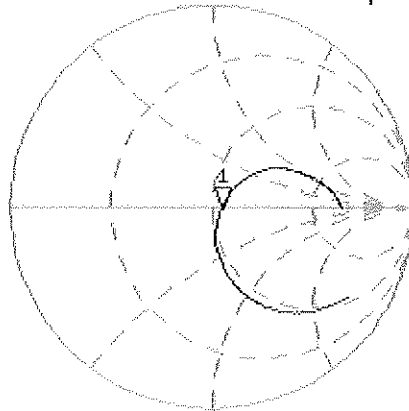
## Impedance Measurement Plot for Head TSL

14 Feb 2011 12:12:21  
 [CH1] S11 1 U FS 1: 54.693  $\Omega$  -804.69  $m\Omega$  263.71  $\mu F$  750.000 000 MHz

\*  
 Del  
 Cor

Avg  
 16

↑

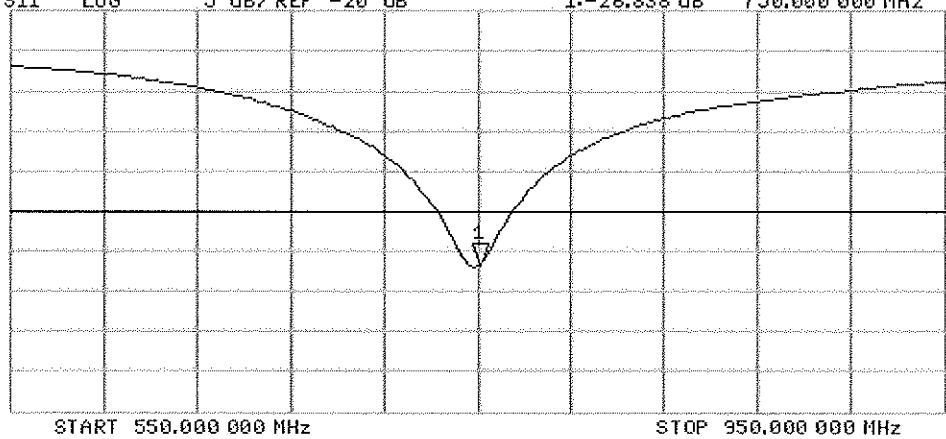


CH2 S11 LOG 5 dB/REF -20 dB 1:-26.838 dB 750.000 000 MHz

Cor

Avg  
 16

↑



## DASY5 Validation Report for Body TSL

Date/Time: 14.02.2011 12:11:08

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1003**

Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium: MSL750

Medium parameters used:  $f = 750 \text{ MHz}$ ;  $\sigma = 0.96 \text{ mho/m}$ ;  $\epsilon_r = 55.8$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.08, 6.08, 6.08); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.1 Build (408)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

**Pin=250mW; dip=15mm; dist=3.0mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid:**

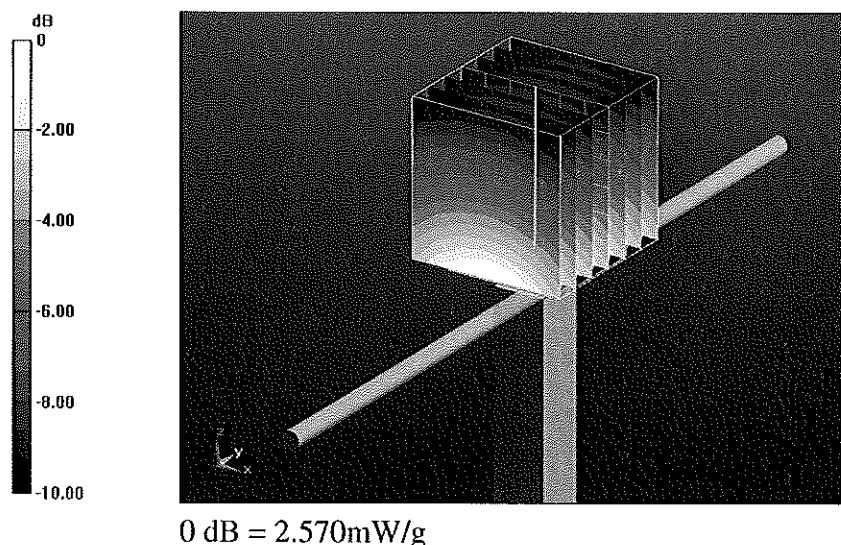
$dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 53.359 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.233 W/kg

**SAR(1 g) = 2.21 mW/g; SAR(10 g) = 1.46 mW/g**

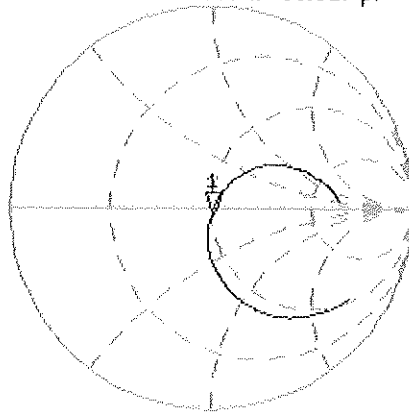
Maximum value of SAR (measured) = 2.574 mW/g



## Impedance Measurement Plot for Body TSL

[CH1] S11 1 U FS 1: 49.818  $\Omega$  -3.5957  $\Omega$  59.017 pF 14 Feb 2011 12:36:09 750.000 000 MHz

\*  
De1  
Cor



Avg  
16

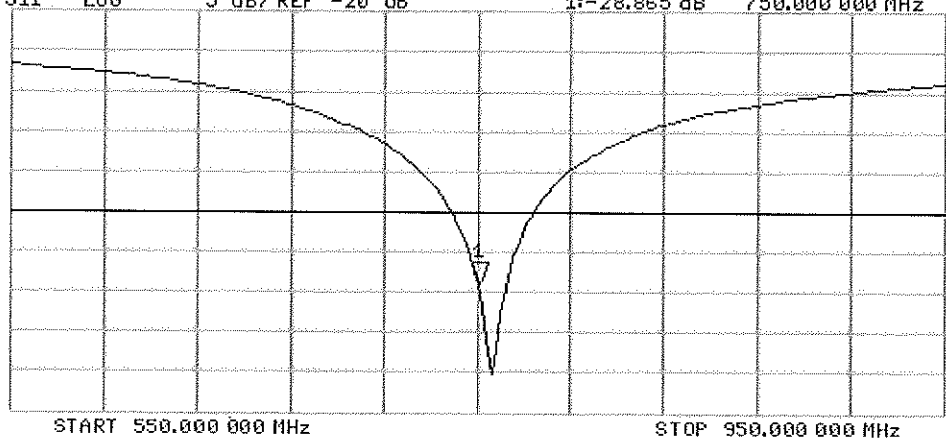
↑

CH2 S11 LOG 5 dB/REF -20 dB 1:-28.865 dB 750.000 000 MHz

Cor

Avg  
16

↑





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 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **PC Test**

Certificate No: **D835V2-4d047\_Feb11**

## CALIBRATION CERTIFICATE

Object **D835V2 - SN: 4d047**

Calibration procedure(s) **QA CAL-05.v8**  
**Calibration procedure for dipole validation kits**

Calibration date: **February 09, 2011**

✓  
2/24/11  
KOK

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

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

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards           | ID #               | Cal Date (Certificate No.)     | Scheduled Calibration |
|-----------------------------|--------------------|--------------------------------|-----------------------|
| Power meter EPM-442A        | GB37480704         | 06-Oct-10 (No. 217-01266)      | Oct-11                |
| Power sensor HP 8481A       | US37292783         | 06-Oct-10 (No. 217-01266)      | Oct-11                |
| Reference 20 dB Attenuator  | SN: 5086 (20g)     | 30-Mar-10 (No. 217-01158)      | Mar-11                |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 30-Mar-10 (No. 217-01162)      | Mar-11                |
| Reference Probe ES3DV3      | SN: 3205           | 30-Apr-10 (No. ES3-3205_Apr10) | Apr-11                |
| DAE4                        | SN: 601            | 10-Jun-10 (No. DAE4-601_Jun10) | Jun-11                |

| Secondary Standards       | ID #             | Check Date (in house)             | Scheduled Check        |
|---------------------------|------------------|-----------------------------------|------------------------|
| Power sensor HP 8481A     | MY41092317       | 18-Oct-02 (in house check Oct-09) | In house check: Oct-11 |
| RF generator R&S SMT-06   | 100005           | 4-Aug-99 (in house check Oct-09)  | In house check: Oct-11 |
| Network Analyzer HP 8753E | US37390585 S4206 | 18-Oct-01 (in house check Oct-10) | In house check: Oct-11 |

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

Issued: February 9, 2011

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Accreditation No.: **SCS 108**

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Multilateral Agreement for the recognition of calibration certificates

### Glossary:

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

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

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

### Additional Documentation:

- DASY4/5 System Handbook

### Methods Applied and Interpretation of Parameters:

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

## Measurement Conditions

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

|                                     |                           |             |
|-------------------------------------|---------------------------|-------------|
| <b>DASY Version</b>                 | DASY5                     | V52.6       |
| <b>Extrapolation</b>                | Advanced Extrapolation    |             |
| <b>Phantom</b>                      | Modular Flat Phantom V4.9 |             |
| <b>Distance Dipole Center - TSL</b> | 15 mm                     | with Spacer |
| <b>Zoom Scan Resolution</b>         | dx, dy, dz = 5 mm         |             |
| <b>Frequency</b>                    | 835 MHz $\pm$ 1 MHz       |             |

## Head TSL parameters

The following parameters and calculations were applied.

|                                         | Temperature         | Permittivity   | Conductivity         |
|-----------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Head TSL parameters</b>      | 22.0 °C             | 41.5           | 0.90 mho/m           |
| <b>Measured Head TSL parameters</b>     | (22.0 $\pm$ 0.2) °C | 41.1 $\pm$ 6 % | 0.89 mho/m $\pm$ 6 % |
| <b>Head TSL temperature during test</b> | (21.8 $\pm$ 0.2) °C | ----           | ----                 |

## SAR result with Head TSL

| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Head TSL</b> | Condition          |                                                 |
|-------------------------------------------------------------|--------------------|-------------------------------------------------|
| SAR measured                                                | 250 mW input power | 2.37 mW / g                                     |
| SAR normalized                                              | normalized to 1W   | 9.48 mW / g                                     |
| SAR for nominal Head TSL parameters                         | normalized to 1W   | <b>9.53 mW /g <math>\pm</math> 17.0 % (k=2)</b> |

| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Head TSL</b> | condition          |                                                 |
|---------------------------------------------------------------|--------------------|-------------------------------------------------|
| SAR measured                                                  | 250 mW input power | 1.54 mW / g                                     |
| SAR normalized                                                | normalized to 1W   | 6.16 mW / g                                     |
| SAR for nominal Head TSL parameters                           | normalized to 1W   | <b>6.19 mW /g <math>\pm</math> 16.5 % (k=2)</b> |

## Body TSL parameters

The following parameters and calculations were applied.

|                                  | Temperature     | Permittivity | Conductivity     |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters      | 22.0 °C         | 55.2         | 0.97 mho/m       |
| Measured Body TSL parameters     | (22.0 ± 0.2) °C | 54.2 ± 6 %   | 0.99 mho/m ± 6 % |
| Body TSL temperature during test | (22.0 ± 0.2) °C | ----         | ----             |

## SAR result with Body TSL

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                            |
|-------------------------------------------------------|--------------------|----------------------------|
| SAR measured                                          | 250 mW input power | 2.51 mW / g                |
| SAR normalized                                        | normalized to 1W   | 10.0 mW / g                |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | 9.85 mW / g ± 17.0 % (k=2) |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                            |
|---------------------------------------------------------|--------------------|----------------------------|
| SAR measured                                            | 250 mW input power | 1.64 mW / g                |
| SAR normalized                                          | normalized to 1W   | 6.56 mW / g                |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | 6.47 mW / g ± 16.5 % (k=2) |

## Appendix

### Antenna Parameters with Head TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 50.1 $\Omega$ - 6.2 j $\Omega$ |
| Return Loss                          | - 24.2 dB                      |

### Antenna Parameters with Body TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 45.9 $\Omega$ - 8.2 j $\Omega$ |
| Return Loss                          | - 20.4 dB                      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.387 ns |
|----------------------------------|----------|

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

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

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

### Additional EUT Data

|                 |                 |
|-----------------|-----------------|
| Manufactured by | SPEAG           |
| Manufactured on | August 16, 2006 |

## DASY5 Validation Report for Head TSL

Date/Time: 09.02.2011 10:54:37

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d047**

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

Medium: HSL900

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.89 \text{ mho/m}$ ;  $\epsilon_r = 41$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.1 Build (408)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

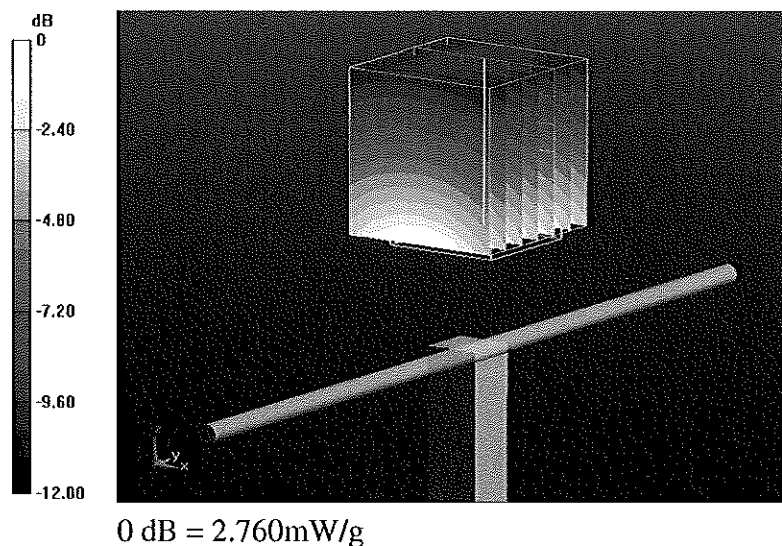
**Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement**  
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.212 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 3.567 W/kg

**SAR(1 g) = 2.37 mW/g; SAR(10 g) = 1.54 mW/g**

Maximum value of SAR (measured) = 2.763 mW/g

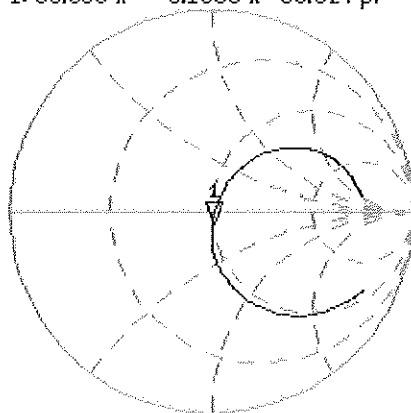


# Impedance Measurement Plot for Head TSL

9 Feb 2011 10:16:52  
 [CH1] S11 1 U FS 1: 50.000  $\Omega$  -6.1836  $\Omega$  30.824 pF 835.000 000 MHz

\*  
 Del  
 Cor

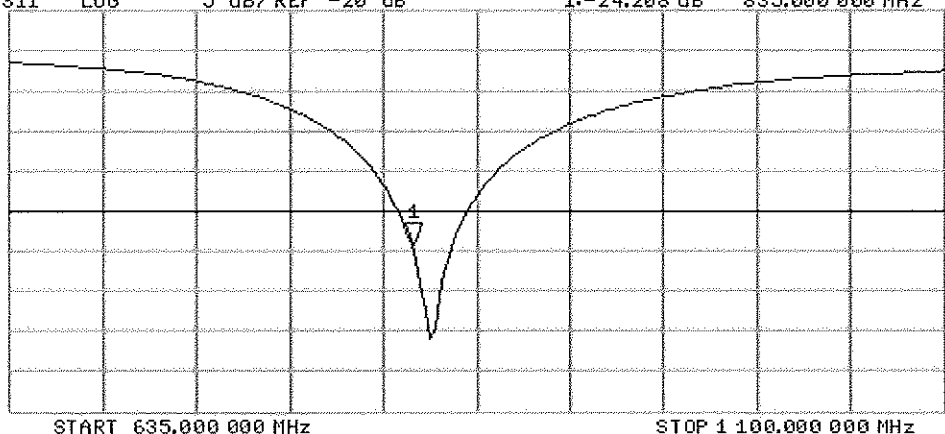
Avg  
 16



CH2 S11 LOG 5 dB/REF -20 dB 1:-24.208 dB 835.000 000 MHz

Cor

Avg  
 16



## DASY5 Validation Report for Body TSL

Date/Time: 09.02.2011 13:56:30

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d047**

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

Medium: MSL900

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.99 \text{ mho/m}$ ;  $\epsilon_r = 54.2$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.86, 5.86, 5.86); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.1 Build (408)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

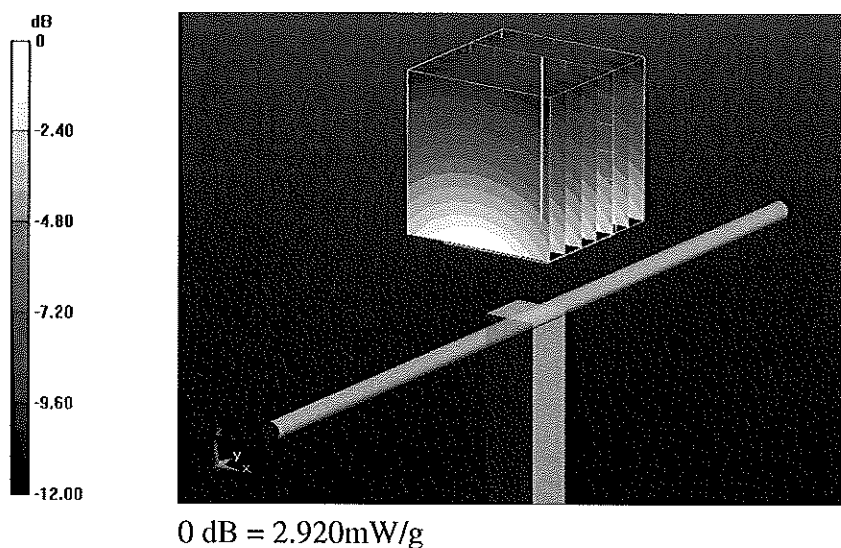
**Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement**  
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.092 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 3.714 W/kg

**SAR(1 g) = 2.51 mW/g; SAR(10 g) = 1.64 mW/g**

Maximum value of SAR (measured) = 2.921 mW/g



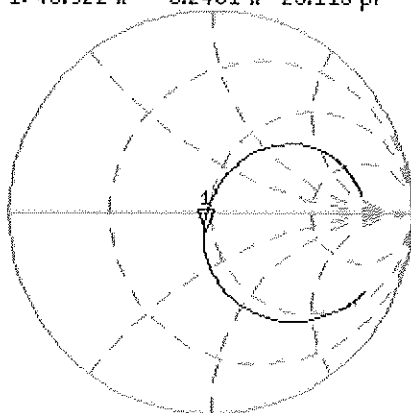
# Impedance Measurement Plot for Body TSL

9 Feb 2011 14:20:21  
 CH1 S11 1 U FS 1: 45.922  $\Omega$  -8.2461  $\Omega$  23.115 pF 835.000 000 MHz

\*  
 Del  
 Cor

Avg  
 16

↑

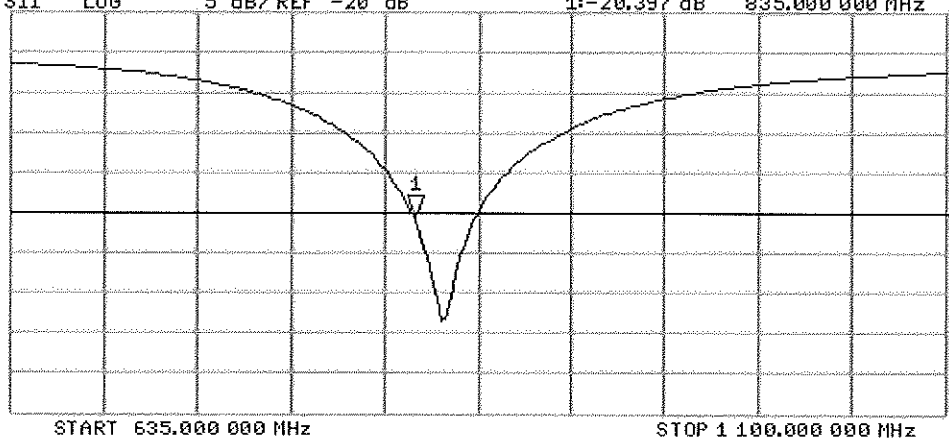


CH2 S11 LOG 5 dB/REF -20 dB 1: -20.397 dB 835.000 000 MHz

Cor

Avg  
 16

↑





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Accreditation No.: **SCS 108**

Client **PC Test**

Certificate No: **D1900V2-502\_Feb11**

## CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 502**

Calibration procedure(s) **QA CAL-05.v8**  
**Calibration procedure for dipole validation kits**

Calibration date: **February 17, 2011**

✓  
 KOK  
 2/24/11

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

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

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards           | ID #               | Cal Date (Certificate No.)        | Scheduled Calibration  |
|-----------------------------|--------------------|-----------------------------------|------------------------|
| Power meter EPM-442A        | GB37480704         | 06-Oct-10 (No. 217-01266)         | Oct-11                 |
| Power sensor HP 8481A       | US37292783         | 06-Oct-10 (No. 217-01266)         | Oct-11                 |
| Reference 20 dB Attenuator  | SN: 5086 (20g)     | 30-Mar-10 (No. 217-01158)         | Mar-11                 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 30-Mar-10 (No. 217-01162)         | Mar-11                 |
| Reference Probe ES3DV3      | SN: 3205           | 30-Apr-10 (No. ES3-3205_Apr10)    | Apr-11                 |
| DAE4                        | SN: 601            | 10-Jun-10 (No. DAE4-601_Jun10)    | Jun-11                 |
| Secondary Standards         | ID #               | Check Date (in house)             | Scheduled Check        |
| Power sensor HP 8481A       | MY41092317         | 18-Oct-02 (in house check Oct-09) | In house check: Oct-11 |
| RF generator R&S SMT-06     | 100005             | 4-Aug-99 (in house check Oct-09)  | In house check: Oct-11 |
| Network Analyzer HP 8753E   | US37390585 S4206   | 18-Oct-01 (in house check Oct-10) | In house check: Oct-11 |

Calibrated by: **Dimce Iliev** **Laboratory Technician** *D. Iliev*

Approved by: **Katja Pokovic** **Technical Manager** *K. Pokovic*

Issued: February 17, 2011

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Accreditation No.: **SCS 108**

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### Glossary:

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

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

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

### Additional Documentation:

- DASY4/5 System Handbook

### Methods Applied and Interpretation of Parameters:

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

## Measurement Conditions

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

|                              |                           |             |
|------------------------------|---------------------------|-------------|
| DASY Version                 | DASY5                     | V52.6       |
| Extrapolation                | Advanced Extrapolation    |             |
| Phantom                      | Modular Flat Phantom V5.0 |             |
| Distance Dipole Center - TSL | 10 mm                     | with Spacer |
| Zoom Scan Resolution         | dx, dy, dz = 5 mm         |             |
| Frequency                    | 1900 MHz $\pm$ 1 MHz      |             |

## Head TSL parameters

The following parameters and calculations were applied.

|                                  | Temperature         | Permittivity   | Conductivity         |
|----------------------------------|---------------------|----------------|----------------------|
| Nominal Head TSL parameters      | 22.0 °C             | 40.0           | 1.40 mho/m           |
| Measured Head TSL parameters     | (22.0 $\pm$ 0.2) °C | 39.8 $\pm$ 6 % | 1.41 mho/m $\pm$ 6 % |
| Head TSL temperature during test | (21.5 $\pm$ 0.2) °C | ----           | ----                 |

## SAR result with Head TSL

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                               |
|-------------------------------------------------------|--------------------|-------------------------------|
| SAR measured                                          | 250 mW input power | 10.1 mW / g                   |
| SAR normalized                                        | normalized to 1W   | 40.4 mW / g                   |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | 40.2 mW /g $\pm$ 17.0 % (k=2) |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                               |
|---------------------------------------------------------|--------------------|-------------------------------|
| SAR measured                                            | 250 mW input power | 5.26 mW / g                   |
| SAR normalized                                          | normalized to 1W   | 21.0 mW / g                   |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 21.0 mW /g $\pm$ 16.5 % (k=2) |

## Body TSL parameters

The following parameters and calculations were applied.

|                                  | Temperature     | Permittivity | Conductivity     |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters      | 22.0 °C         | 53.3         | 1.52 mho/m       |
| Measured Body TSL parameters     | (22.0 ± 0.2) °C | 52.8 ± 6 %   | 1.55 mho/m ± 6 % |
| Body TSL temperature during test | (21.5 ± 0.2) °C | ----         | ----             |

## SAR result with Body TSL

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                            |
|-------------------------------------------------------|--------------------|----------------------------|
| SAR measured                                          | 250 mW input power | 10.4 mW / g                |
| SAR normalized                                        | normalized to 1W   | 41.6 mW / g                |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | 41.1 mW / g ± 17.0 % (k=2) |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                            |
|---------------------------------------------------------|--------------------|----------------------------|
| SAR measured                                            | 250 mW input power | 5.48 mW / g                |
| SAR normalized                                          | normalized to 1W   | 21.9 mW / g                |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | 21.8 mW / g ± 16.5 % (k=2) |

## Appendix

### Antenna Parameters with Head TSL

|                                      |                             |
|--------------------------------------|-----------------------------|
| Impedance, transformed to feed point | $51.3 \Omega + 6.4 j\Omega$ |
| Return Loss                          | - 23.8 dB                   |

### Antenna Parameters with Body TSL

|                                      |                             |
|--------------------------------------|-----------------------------|
| Impedance, transformed to feed point | $47.3 \Omega + 6.7 j\Omega$ |
| Return Loss                          | - 22.5 dB                   |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.206 ns |
|----------------------------------|----------|

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

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

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

### Additional EUT Data

|                 |                   |
|-----------------|-------------------|
| Manufactured by | SPEAG             |
| Manufactured on | November 14, 1998 |

## DASY5 Validation Report for Head TSL

Date/Time: 17.02.2011 10:13:23

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:502**

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

Medium: HSL U12 BB

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.41$  mho/m;  $\epsilon_r = 39.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.09, 5.09, 5.09); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.6.1 Build (408)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

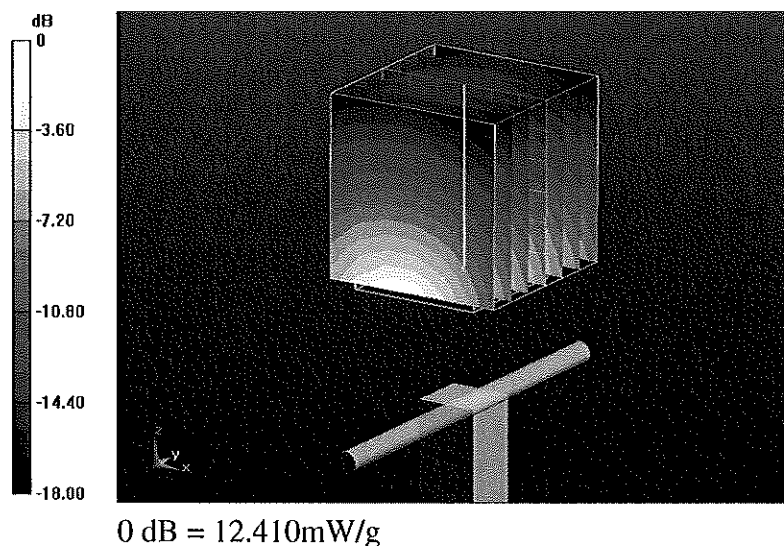
**Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement**  
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.159 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 18.519 W/kg

**SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.26 mW/g**

Maximum value of SAR (measured) = 12.407 mW/g

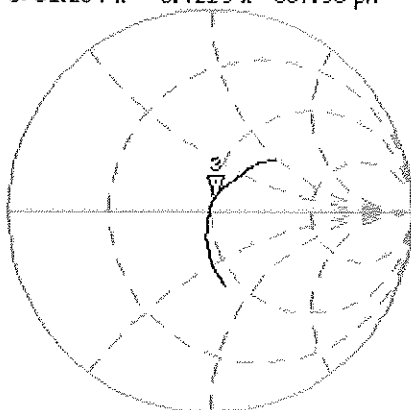


# Impedance Measurement Plot for Head TSL

17 Feb 2011 10:39:46  
 [CH1] S11 1 U FS 3: 51.264  $\Omega$  6.4219  $\Omega$  537.93  $\mu$ H 1 900.000 000 MHz

\*  
 Del  
 CA

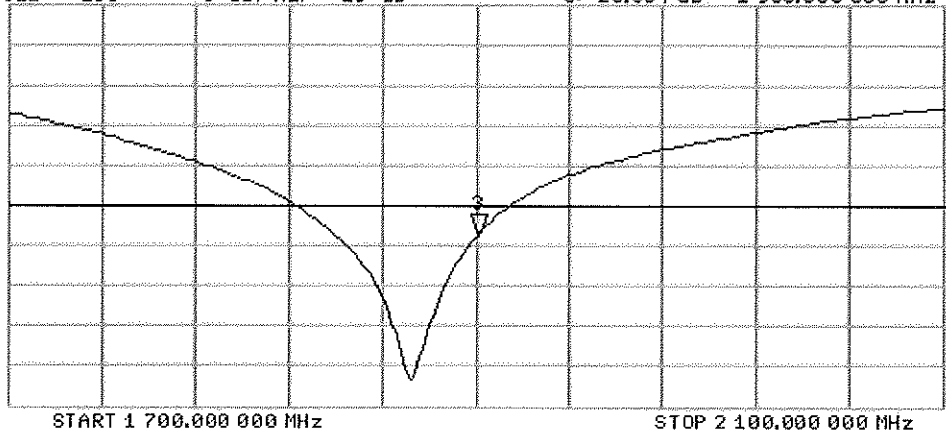
Avg  
 16



CH2 S11 LOG 5 dB/REF -20 dB 3:-23.804 dB 1 900.000 000 MHz

CA

Avg  
 16



## DASY5 Validation Report for Body TSL

Date/Time: 17.02.2011 10:55:26

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:502**

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

Medium: MSL U12 BB

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.55$  mho/m;  $\epsilon_r = 52.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.59, 4.59, 4.59); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.6.1 Build (408)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

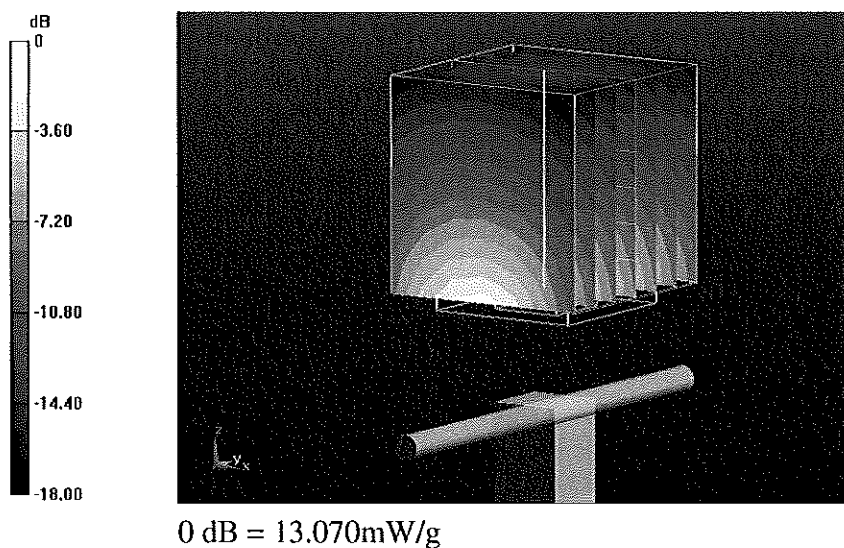
**Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement**  
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.636 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 17.829 W/kg

**SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.48 mW/g**

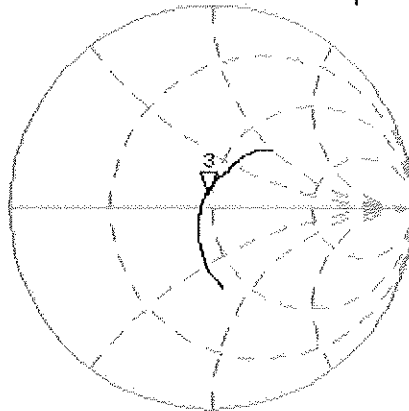
Maximum value of SAR (measured) = 13.070 mW/g



# Impedance Measurement Plot for Body TSL

17 Feb 2011 10:40:17  
 CH1 S11 1 U FS 3: 47.260  $\Omega$  6.7480  $\Omega$  565.26  $\mu$ H 1 900.000 000 MHz

\*  
 De1  
 CA



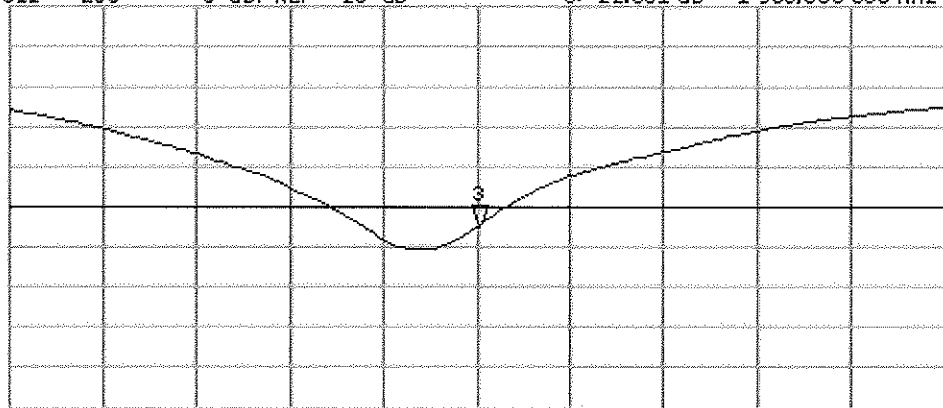
Avg  
 16  
 ↑

CH2 S11 LOG 5 dB/REF -20 dB 3: -22.531 dB 1 900.000 000 MHz

CA

Avg  
 16

↑



START 1 700.000 000 MHz

STOP 2 100.000 000 MHz



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **PC Test**

Certificate No: **ES3-3209\_Apr11**

## CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3209**

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

Calibration date: **April 18, 2011**

✓ KOK  
4/12/11

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

Issued: April 18, 2011

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Accreditation No.: **SCS 108**

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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<sup>2</sup>-field uncertainty inside TSL (see below **ConvF**).
- NORM(f)<sub>x,y,z</sub>** = NORM<sub>x,y,z</sub> \* frequency\_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of **ConvF**.
- 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 ES3DV3

## SN:3209

Manufactured: October 14, 2008  
Calibrated: April 18, 2011

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

## DASY/EASY - Parameters of Probe: ES3DV3 - SN:3209

### Basic Calibration Parameters

|                                                           | Sensor X | Sensor Y | Sensor Z | Unc (k=2)     |
|-----------------------------------------------------------|----------|----------|----------|---------------|
| Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup> | 1.37     | 1.34     | 1.15     | $\pm 10.1 \%$ |
| DCP (mV) <sup>B</sup>                                     | 97.0     | 100.4    | 100.0    |               |

### 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    | 116.0    | $\pm 3.0 \%$              |
|       |                           |      | Y | 0.00    | 0.00    | 1.00    | 118.9    |                           |
|       |                           |      | Z | 0.00    | 0.00    | 1.00    | 103.8    |                           |

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

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

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

<sup>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: ES3DV3 - SN:3209

### 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                            | 6.42    | 6.42    | 6.42    | 0.99  | 1.10       | ± 12.0 %    |
| 835                  | 41.5                               | 0.90                            | 6.17    | 6.17    | 6.17    | 0.99  | 1.10       | ± 12.0 %    |
| 1750                 | 40.1                               | 1.37                            | 5.33    | 5.33    | 5.33    | 0.99  | 1.12       | ± 12.0 %    |
| 1900                 | 40.0                               | 1.40                            | 5.11    | 5.11    | 5.11    | 0.99  | 1.09       | ± 12.0 %    |
| 2450                 | 39.2                               | 1.80                            | 4.52    | 4.52    | 4.52    | 0.84  | 1.21       | ± 12.0 %    |
| 2600                 | 39.0                               | 1.96                            | 4.35    | 4.35    | 4.35    | 0.74  | 1.32       | ± 12.0 %    |

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

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

## DASY/EASY - Parameters of Probe: ES3DV3- SN:3209

### Calibration Parameter Determined in Body Tissue Simulating Media

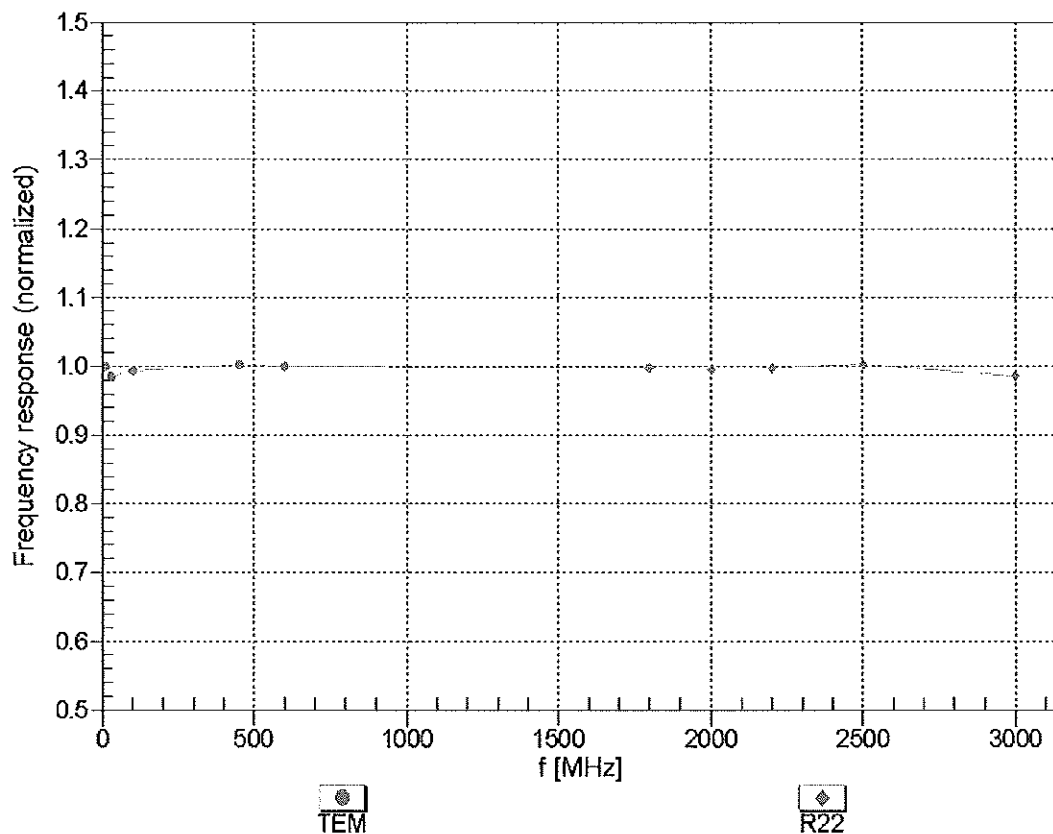
| f (MHz) <sup>C</sup> | Relative Permittivity <sup>F</sup> | Conductivity (S/m) <sup>F</sup> | ConvF X | ConvF Y | ConvF Z | Alpha | Depth (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|-------|------------|-------------|
| 450                  | 56.7                               | 0.94                            | 7.06    | 7.06    | 7.06    | 0.11  | 1.00       | ± 13.4 %    |
| 750                  | 55.5                               | 0.96                            | 6.18    | 6.18    | 6.18    | 0.99  | 1.15       | ± 12.0 %    |
| 835                  | 55.2                               | 0.97                            | 6.15    | 6.15    | 6.15    | 0.99  | 1.12       | ± 12.0 %    |
| 1640                 | 53.8                               | 1.40                            | 5.18    | 5.18    | 5.18    | 0.89  | 1.25       | ± 12.0 %    |
| 1750                 | 53.4                               | 1.49                            | 4.75    | 4.75    | 4.75    | 0.81  | 1.31       | ± 12.0 %    |
| 1900                 | 53.3                               | 1.52                            | 4.48    | 4.48    | 4.48    | 0.95  | 1.19       | ± 12.0 %    |
| 2450                 | 52.7                               | 1.95                            | 4.15    | 4.15    | 4.15    | 0.99  | 1.04       | ± 12.0 %    |
| 2600                 | 52.5                               | 2.16                            | 4.00    | 4.00    | 4.00    | 0.88  | 1.15       | ± 12.0 %    |

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

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

## Frequency Response of E-Field

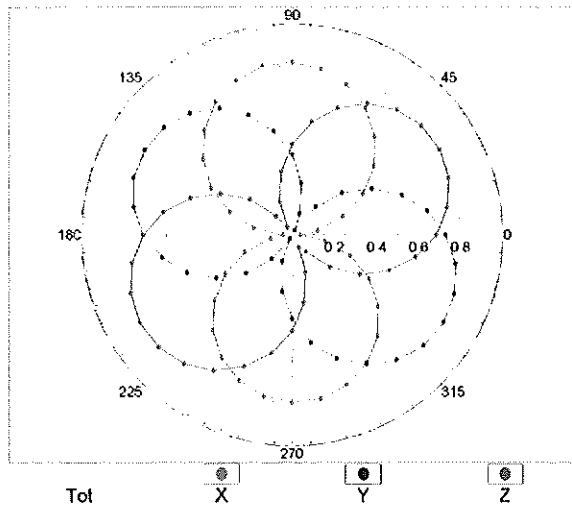
(TEM-Cell:ifi110 EXX, Waveguide: R22)



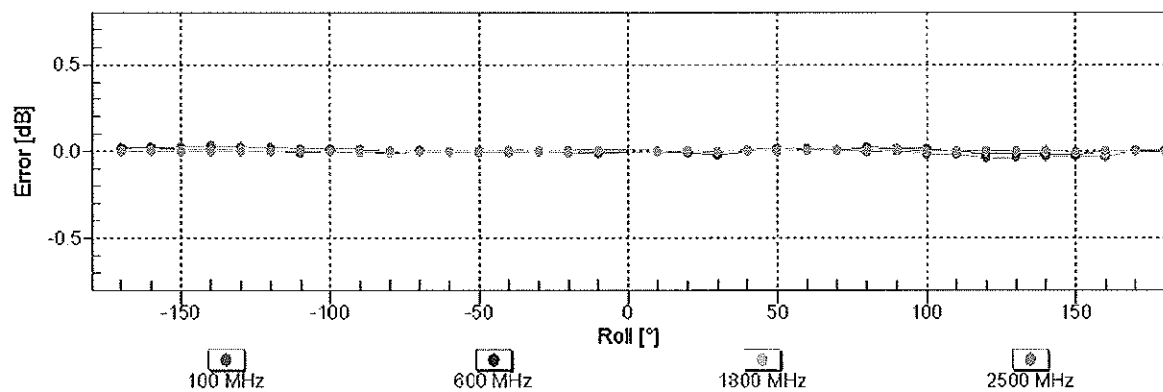
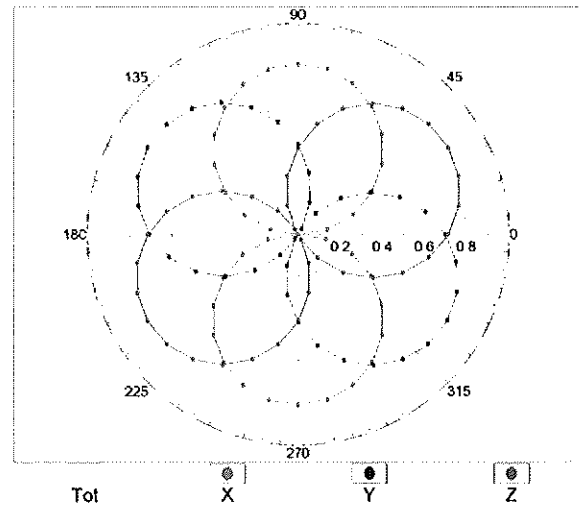
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

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

f=600 MHz,TEM

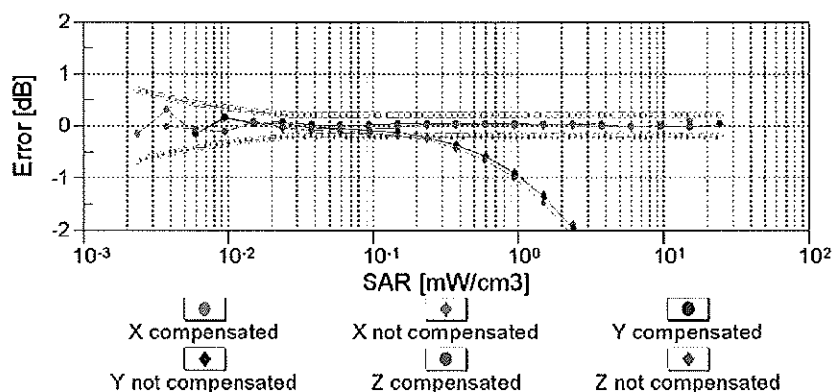
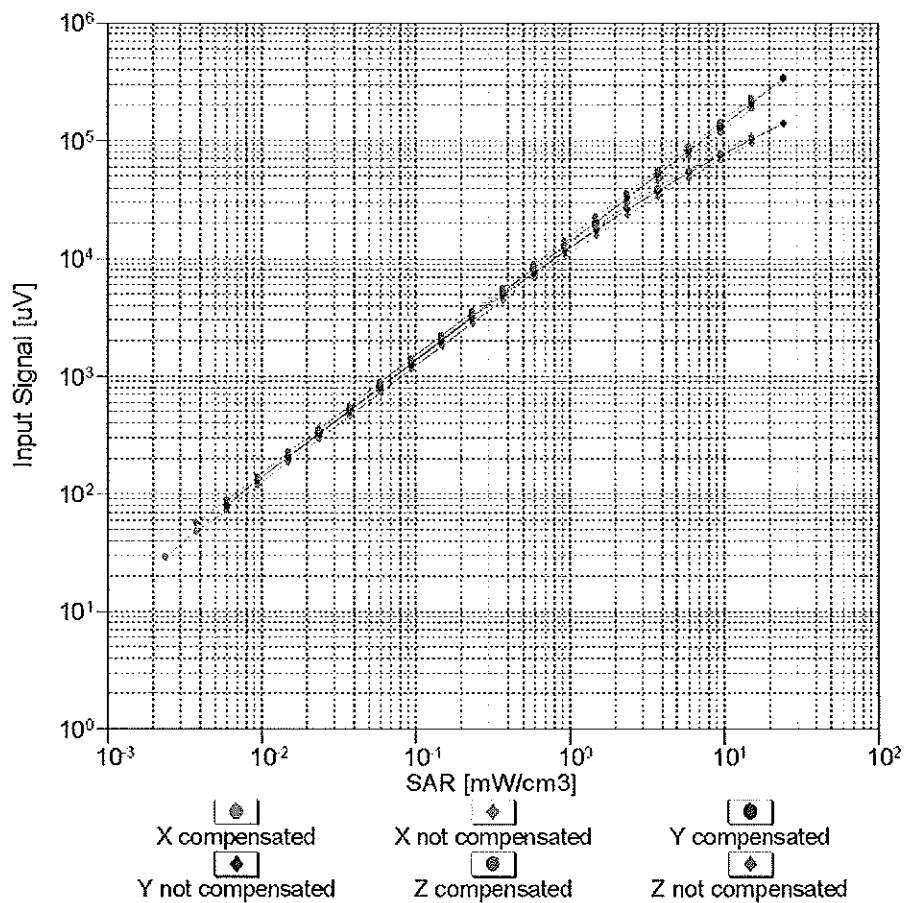


f=1800 MHz,R22



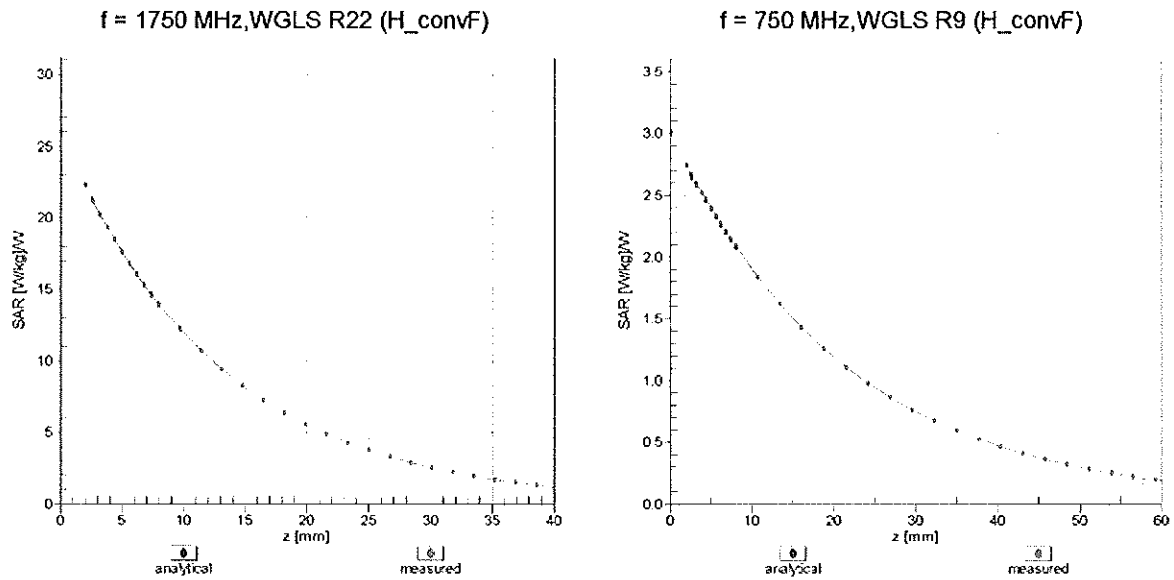
Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

## Dynamic Range $f(\text{SAR}_{\text{head}})$ (TEM cell , $f = 900 \text{ MHz}$ )



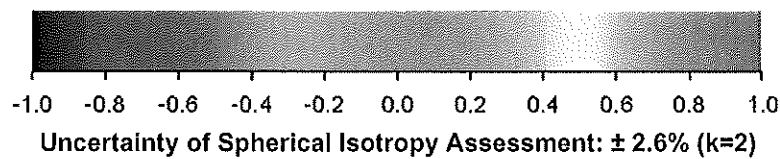
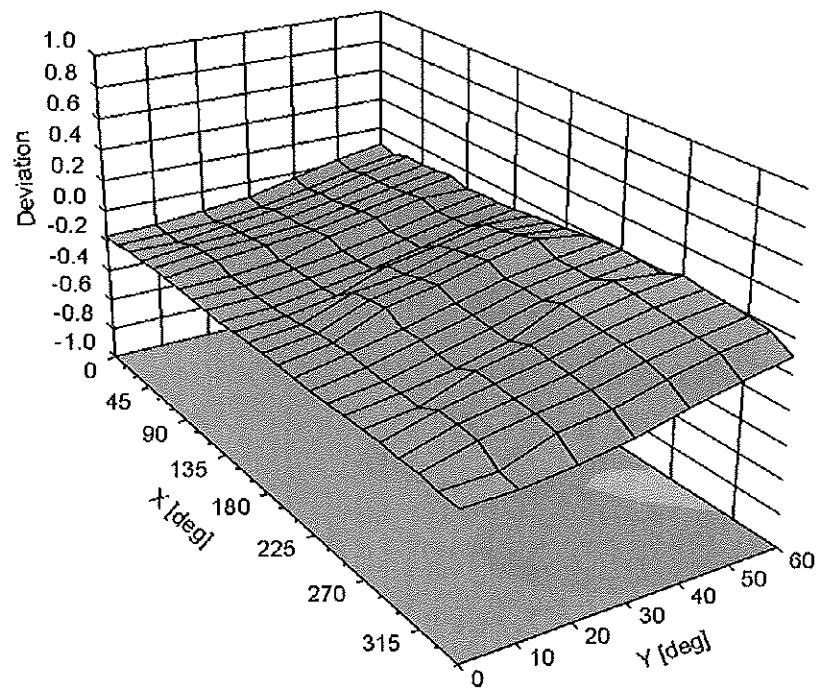
Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

## Conversion Factor Assessment



## Deviation from Isotropy in Liquid

Error ( $\phi, \theta$ ),  $f = 900 \text{ MHz}$



## DASY/EASY - Parameters of Probe: ES3DV3 - SN:3209

### Other Probe Parameters

|                                               |                |
|-----------------------------------------------|----------------|
| Sensor Arrangement                            | Triangular     |
| Connector Angle (°)                           | Not applicable |
| Mechanical Surface Detection Mode             | enabled        |
| Optical Surface Detection Mode                | disabled       |
| Probe Overall Length                          | 337 mm         |
| Probe Body Diameter                           | 10 mm          |
| Tip Length                                    | 10 mm          |
| Tip Diameter                                  | 4 mm           |
| Probe Tip to Sensor X Calibration Point       | 2 mm           |
| Probe Tip to Sensor Y Calibration Point       | 2 mm           |
| Probe Tip to Sensor Z Calibration Point       | 2 mm           |
| Recommended Measurement Distance from Surface | 3 mm           |

## **Additional Conversion Factors**

**for Dosimetric E-Field Probe**

Type:

**ES3DV3**

Serial Number:

**3209**

Place of Assessment:

**Zurich**

Date of Assessment:

**April 20, 2011**

Probe Calibration Date:

**April 18, 2011**

Schmid & Partner Engineering AG hereby certifies that conversion factor(s) of this probe have been evaluated on the date indicated above. The assessment was performed using the FDTD numerical code SEMCAD of Schmid & Partner Engineering AG. The evaluation is coupled with measured conversion factors (probe calibration date indicated above). The uncertainty of the numerical assessment is based on the extrapolation from measured value at 835 MHz or at 1750 MHz.

Assessed by:



## Dosimetric E-Field Probe ES3DV3 SN:3209

Conversion factor ( $\pm$  standard deviation)

550  $\pm$  50 MHz      *ConvF*      6.7  $\pm$  7%

$\epsilon_r = 56.3 \pm 5\%$   
 $\sigma = 0.95 \pm 5\%$  mho/m  
(body tissue)

650  $\pm$  50 MHz      *ConvF*      6.3  $\pm$  7%

$\epsilon_r = 55.9 \pm 5\%$   
 $\sigma = 0.95 \pm 5\%$  mho/m  
(body tissue)

### Important Note:

For numerically assessed probe conversion factors, parameters Alpha and Delta in the DASY software must have the following entries: Alpha = 0 and Delta = 1.

Please see also DASY Manual.



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 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **PC Test**

Certificate No: **ES3-3258\_Apr11**

## CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3258**

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

Calibration date: **April 8, 2011**

*✓ OK  
6/12/11*

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

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

Calibration Equipment used (M&TE critical for calibration)

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

|                                                                                                                 | Name          | Function              | Signature         |
|-----------------------------------------------------------------------------------------------------------------|---------------|-----------------------|-------------------|
| Calibrated by:                                                                                                  | Dimce Iliev   | Laboratory Technician | <i>D. Iliev</i>   |
| Approved by:                                                                                                    | Kalja Pokovic | Technical Manager     | <i>K. Pokovic</i> |
| Issued: April 13, 2011                                                                                          |               |                       |                   |
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### Glossary:

|                          |                                                                                                                                                         |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| TSL                      | tissue simulating liquid                                                                                                                                |
| NORM <sub>x,y,z</sub>    | sensitivity in free space                                                                                                                               |
| ConvF                    | sensitivity in TSL / NORM <sub>x,y,z</sub>                                                                                                              |
| DCP                      | diode compression point                                                                                                                                 |
| CF                       | crest factor (1/duty_cycle) of the RF signal                                                                                                            |
| A, B, C                  | modulation dependent linearization parameters                                                                                                           |
| Polarization $\varphi$   | $\varphi$ rotation around probe axis                                                                                                                    |
| Polarization $\vartheta$ | $\vartheta$ 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 ES3DV3

## SN:3258

Manufactured: January 25, 2010  
Calibrated: April 8, 2011

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

## DASY/EASY - Parameters of Probe: ES3DV3 - SN:3258

### Basic Calibration Parameters

|                                                           | Sensor X | Sensor Y | Sensor Z | Unc (k=2)     |
|-----------------------------------------------------------|----------|----------|----------|---------------|
| Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup> | 1.31     | 1.19     | 1.25     | $\pm 10.1 \%$ |
| DCP (mV) <sup>B</sup>                                     | 98.3     | 103.8    | 99.8     |               |

### 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    | 115.1    | $\pm 2.7 \%$              |
|       |                           |      | Y | 0.00    | 0.00    | 1.00    | 105.5    |                           |
|       |                           |      | Z | 0.00    | 0.00    | 1.00    | 113.5    |                           |

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

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

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

<sup>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: ES3DV3 - SN:3258

### 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                            | 6.41    | 6.41    | 6.41    | 1.00  | 1.00       | ± 12.0 %    |
| 835                  | 41.5                               | 0.90                            | 6.18    | 6.18    | 6.18    | 1.00  | 1.00       | ± 12.0 %    |
| 1750                 | 40.1                               | 1.37                            | 5.32    | 5.32    | 5.32    | 0.99  | 1.16       | ± 12.0 %    |
| 1900                 | 40.0                               | 1.40                            | 5.15    | 5.15    | 5.15    | 1.00  | 1.15       | ± 12.0 %    |
| 2450                 | 39.2                               | 1.80                            | 4.50    | 4.50    | 4.50    | 0.87  | 1.26       | ± 12.0 %    |
| 2600                 | 39.0                               | 1.96                            | 4.33    | 4.33    | 4.33    | 0.87  | 1.24       | ± 12.0 %    |

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

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

## DASY/EASY - Parameters of Probe: ES3DV3- SN:3258

### Calibration Parameter Determined in Body Tissue Simulating Media

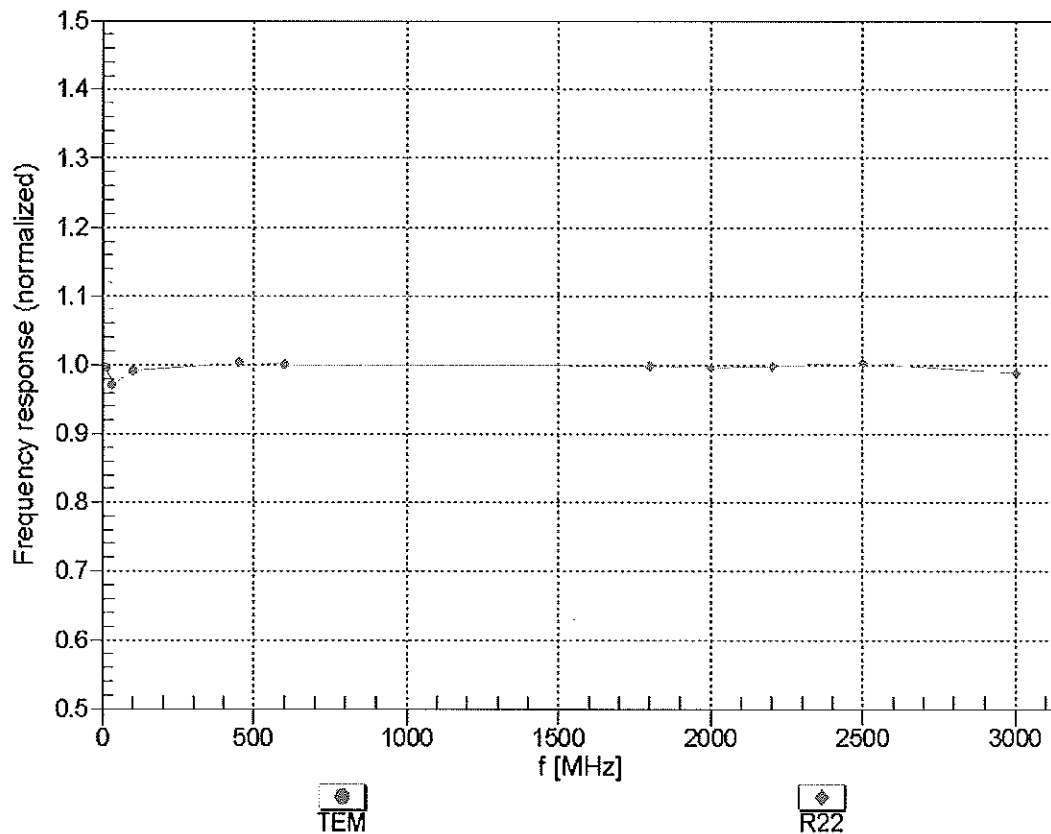
| f (MHz) <sup>C</sup> | Relative Permittivity <sup>F</sup> | Conductivity (S/m) <sup>F</sup> | ConvF X | ConvF Y | ConvF Z | Alpha | Depth (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|-------|------------|-------------|
| 750                  | 55.5                               | 0.96                            | 6.16    | 6.16    | 6.16    | 1.00  | 1.00       | ± 12.0 %    |
| 835                  | 55.2                               | 0.97                            | 6.12    | 6.12    | 6.12    | 1.00  | 1.00       | ± 12.0 %    |
| 1750                 | 53.4                               | 1.49                            | 5.00    | 5.00    | 5.00    | 0.91  | 1.28       | ± 12.0 %    |
| 1900                 | 53.3                               | 1.52                            | 4.75    | 4.75    | 4.75    | 0.90  | 1.23       | ± 12.0 %    |
| 2450                 | 52.7                               | 1.95                            | 4.34    | 4.34    | 4.34    | 1.00  | 1.00       | ± 12.0 %    |
| 2600                 | 52.5                               | 2.16                            | 4.16    | 4.16    | 4.16    | 0.94  | 1.15       | ± 12.0 %    |

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

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

## Frequency Response of E-Field

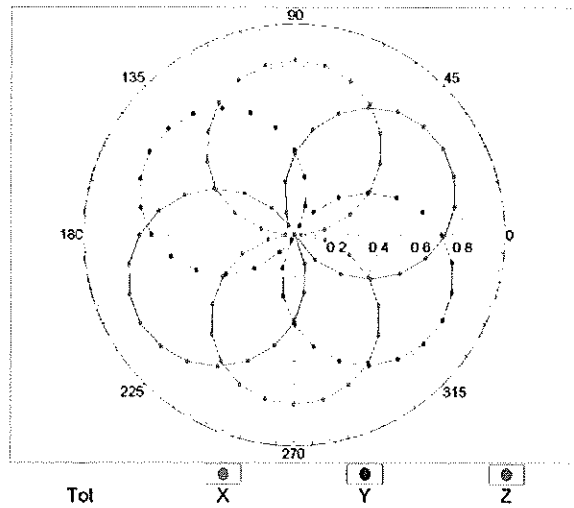
(TEM-Cell:ifi110 EXX, Waveguide: R22)



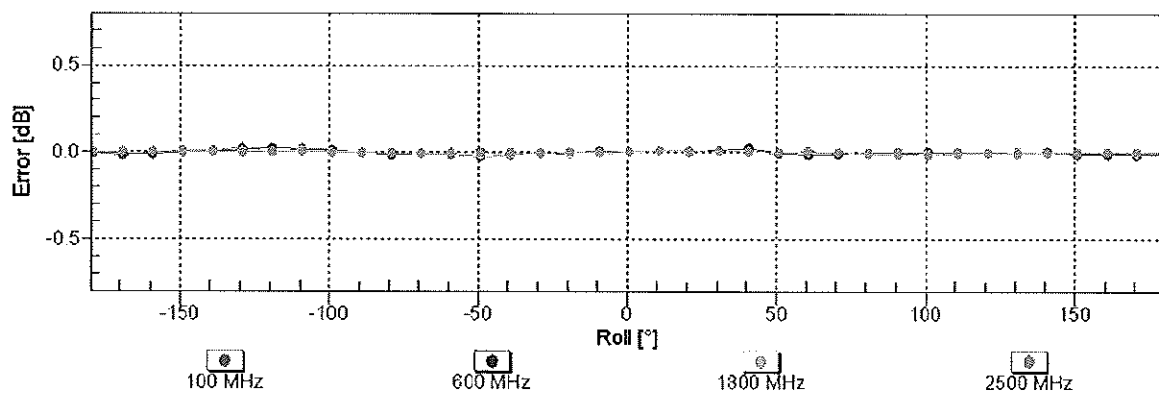
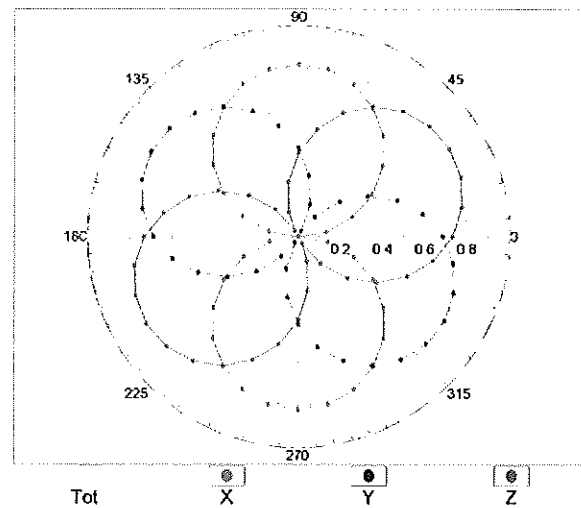
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

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

f=600 MHz,TEM

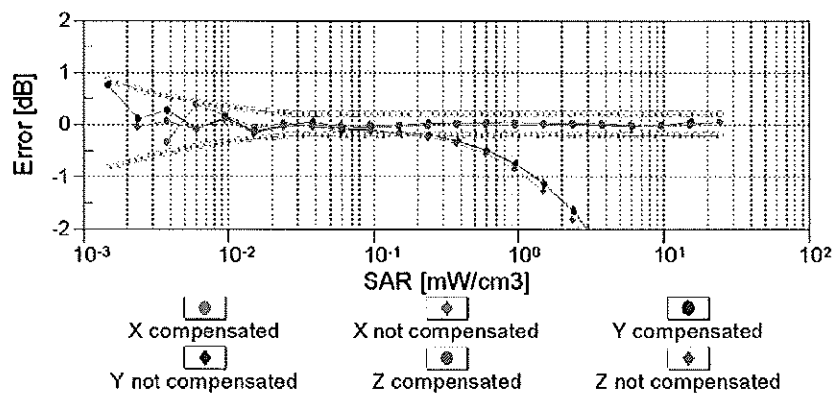
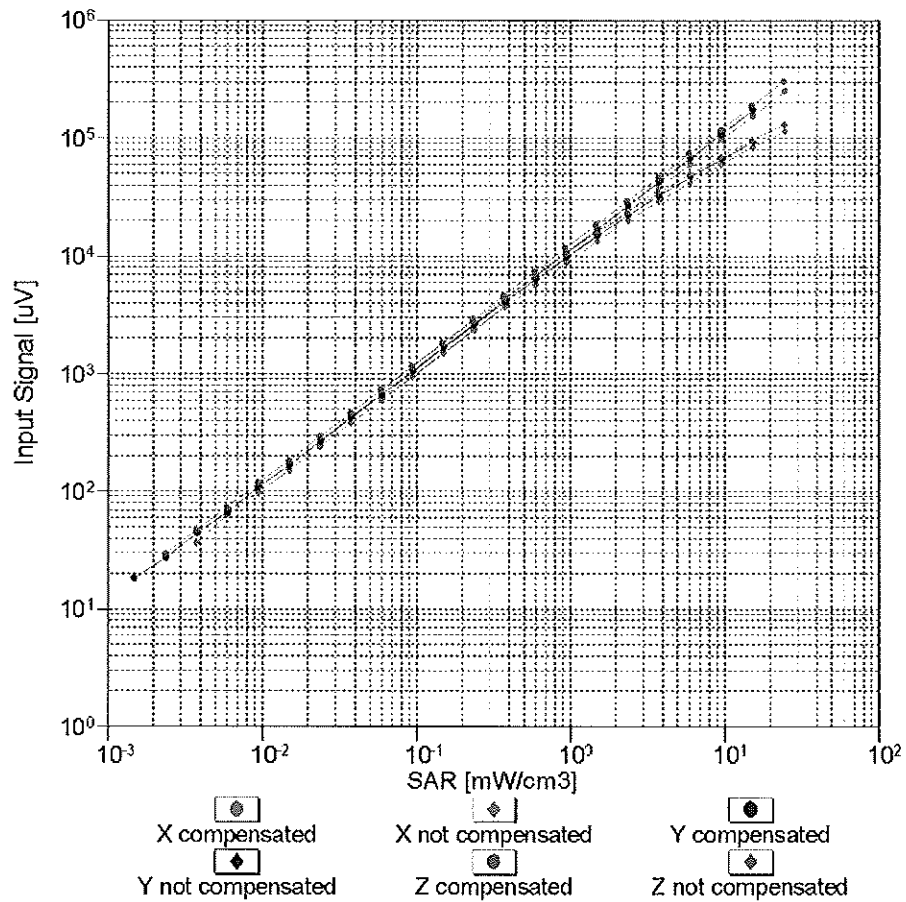


f=1800 MHz,R22



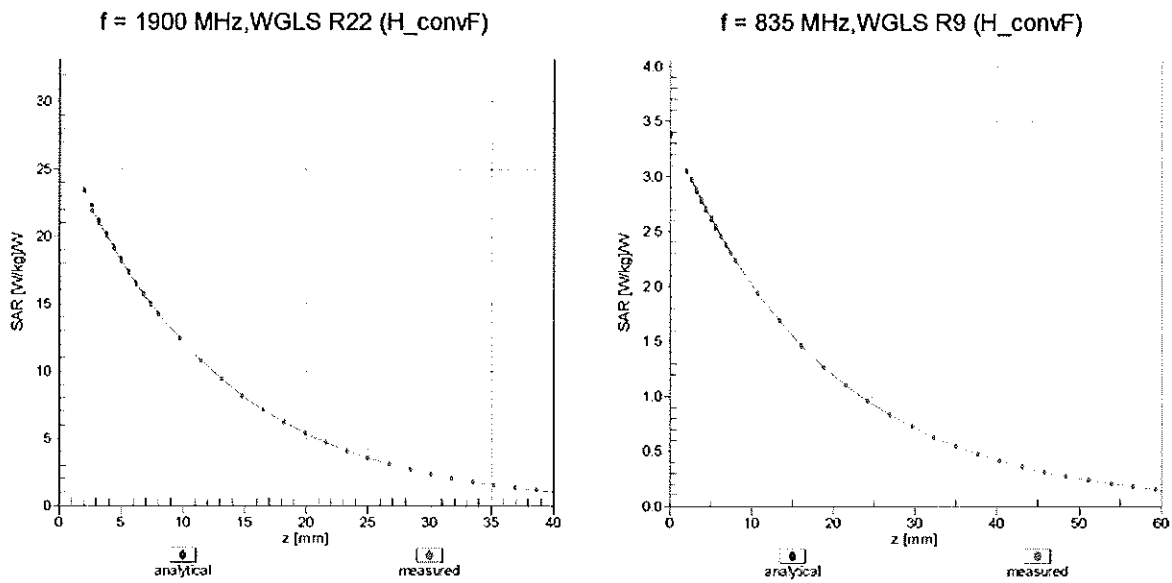
Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

# Dynamic Range $f(\text{SAR}_{\text{head}})$ (TEM cell , $f = 900 \text{ MHz}$ )



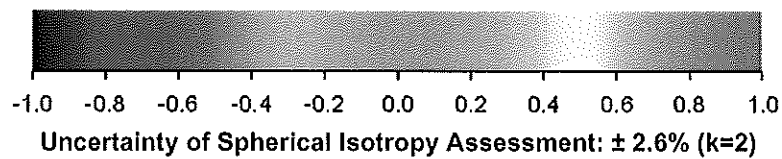
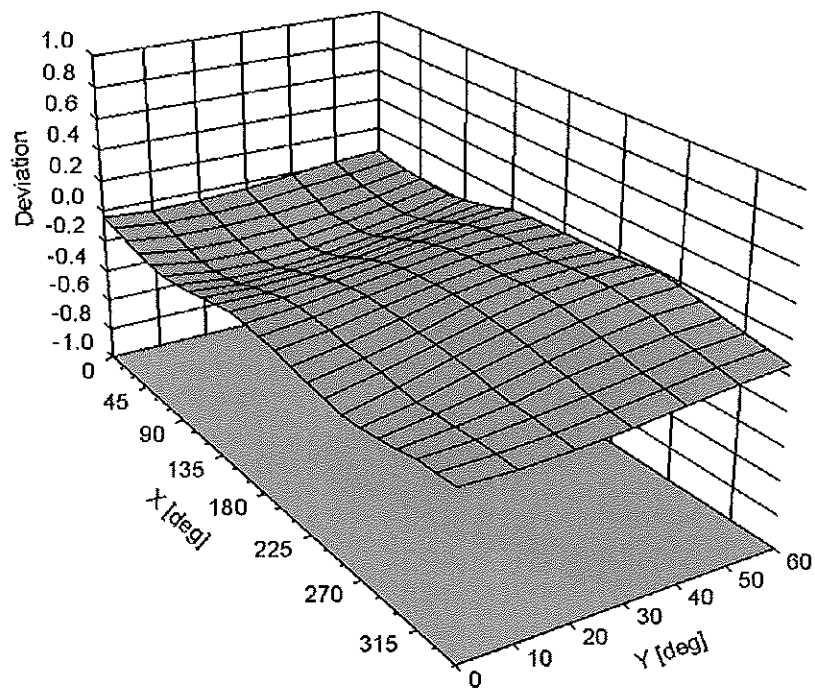
Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

## Conversion Factor Assessment



## Deviation from Isotropy in Liquid

Error ( $\phi$ ,  $\theta$ ),  $f = 900 \text{ MHz}$



## DASY/EASY - Parameters of Probe: ES3DV3 - SN:3258

### Other Probe Parameters

|                                               |                |
|-----------------------------------------------|----------------|
| Sensor Arrangement                            | Triangular     |
| Connector Angle (°)                           | Not applicable |
| Mechanical Surface Detection Mode             | enabled        |
| Optical Surface Detection Mode                | disabled       |
| Probe Overall Length                          | 337 mm         |
| Probe Body Diameter                           | 10 mm          |
| Tip Length                                    | 10 mm          |
| Tip Diameter                                  | 4 mm           |
| Probe Tip to Sensor X Calibration Point       | 2 mm           |
| Probe Tip to Sensor Y Calibration Point       | 2 mm           |
| Probe Tip to Sensor Z Calibration Point       | 2 mm           |
| Recommended Measurement Distance from Surface | 3 mm           |



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

Accreditation No.: **SCS 108**

Client **PC Test**

Certificate No: **EX-3550\_Feb11**

## CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3550**

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: **February 14, 2011**

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

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

Calibration Equipment used (M&TE critical for calibration)

✓  
KOK  
2/22/11

| Primary Standards          | ID              | Cal Date (Certificate No.)        | Scheduled Calibration  |
|----------------------------|-----------------|-----------------------------------|------------------------|
| Power meter E4419B         | GB41293874      | 01-Apr-10 (No. 217-01136)         | Apr-11                 |
| Power sensor E4412A        | MY41495277      | 01-Apr-10 (No. 217-01136)         | Apr-11                 |
| Power sensor E4412A        | MY41498087      | 01-Apr-10 (No. 217-01136)         | Apr-11                 |
| Reference 3 dB Attenuator  | SN: S5054 (3c)  | 30-Mar-10 (No. 217-01159)         | Mar-11                 |
| Reference 20 dB Attenuator | SN: S5086 (20b) | 30-Mar-10 (No. 217-01161)         | Mar-11                 |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 30-Mar-10 (No. 217-01160)         | Mar-11                 |
| 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 |

|                | Name          | Function          | Signature                 |
|----------------|---------------|-------------------|---------------------------|
| Calibrated by: | Katja Pokovic | Technical Manager |                           |
| Approved by:   | Niels Kuster  | Quality Manager   |                           |
|                |               |                   | Issued: February 14, 2011 |

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



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Accreditation No.: **SCS 108**

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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 $\alpha$    | $\alpha$ 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:3550

Manufactured: May 19, 2004  
Calibrated: February 14, 2011

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

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3550

### Basic Calibration Parameters

|                                                    | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|----------------------------------------------------|----------|----------|----------|-----------|
| Norm ( $\mu\text{V}/(\text{V/m})^2$ ) <sup>A</sup> | 0.52     | 0.45     | 0.50     | ± 10.1 %  |
| DCP (mV) <sup>B</sup>                              | 100.3    | 98.8     | 99.0     |           |

### 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    | 110.7    | ±2.2 %                    |
|       |                           |      | Y | 0.00    | 0.00    | 1.00    | 145.7    |                           |
|       |                           |      | Z | 0.00    | 0.00    | 1.00    | 148.8    |                           |

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:3550

### 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                            | 8.42    | 8.42    | 8.42    | 0.48  | 0.69       | ± 12.0 %    |
| 835                  | 41.5                               | 0.90                            | 8.04    | 8.04    | 8.04    | 0.33  | 0.84       | ± 12.0 %    |
| 1750                 | 40.1                               | 1.37                            | 7.33    | 7.33    | 7.33    | 0.46  | 0.65       | ± 12.0 %    |
| 1900                 | 40.0                               | 1.40                            | 7.01    | 7.01    | 7.01    | 0.42  | 0.72       | ± 12.0 %    |
| 2450                 | 39.2                               | 1.80                            | 6.29    | 6.29    | 6.29    | 0.13  | 1.57       | ± 12.0 %    |
| 2600                 | 39.0                               | 1.96                            | 6.13    | 6.13    | 6.13    | 0.20  | 1.32       | ± 12.0 %    |
| 4950                 | 36.3                               | 4.40                            | 4.37    | 4.37    | 4.37    | 0.35  | 1.80       | ± 13.1 %    |
| 5200                 | 36.0                               | 4.66                            | 4.06    | 4.06    | 4.06    | 0.35  | 1.80       | ± 13.1 %    |
| 5300                 | 35.9                               | 4.76                            | 3.92    | 3.92    | 3.92    | 0.35  | 1.80       | ± 13.1 %    |
| 5500                 | 35.6                               | 4.96                            | 3.77    | 3.77    | 3.77    | 0.35  | 1.80       | ± 13.1 %    |
| 5600                 | 35.5                               | 5.07                            | 3.50    | 3.50    | 3.50    | 0.40  | 1.80       | ± 13.1 %    |
| 5800                 | 35.3                               | 5.27                            | 3.64    | 3.64    | 3.64    | 0.40  | 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:3550

### Calibration Parameter Determined in Body Tissue Simulating Media

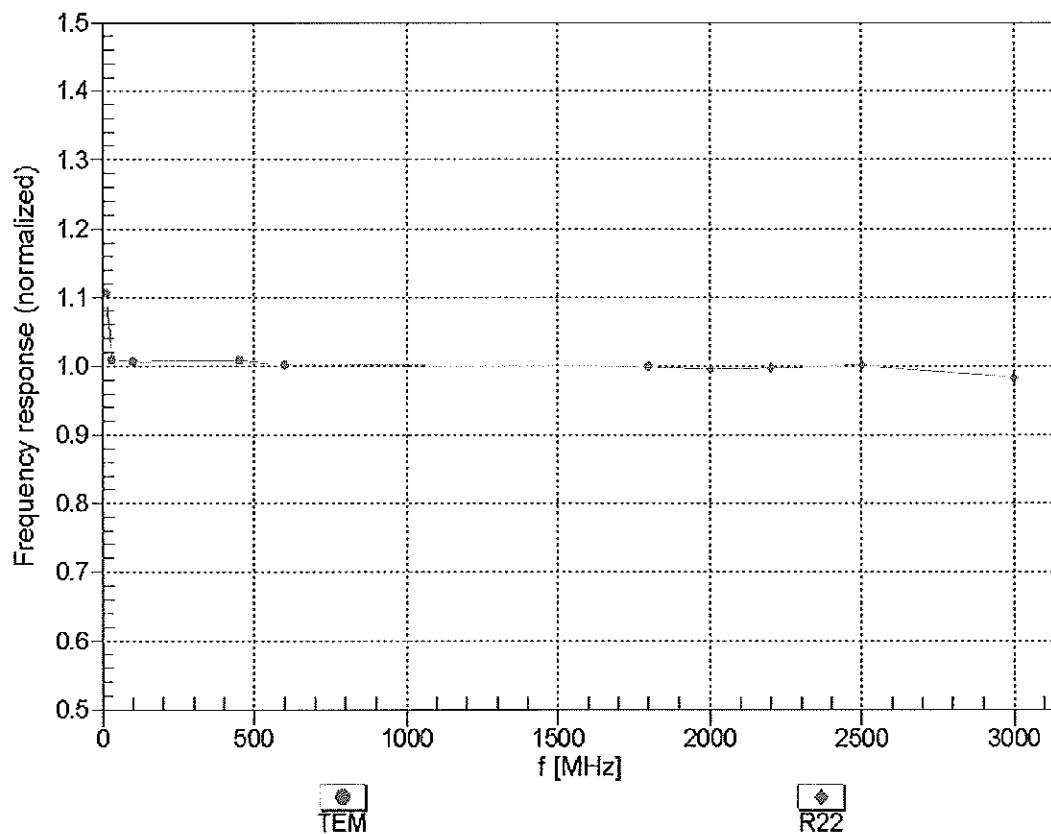
| f (MHz) <sup>C</sup> | Relative Permittivity <sup>F</sup> | Conductivity (S/m) <sup>F</sup> | ConvF X | ConvF Y | ConvF Z | Alpha | Depth (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|-------|------------|-------------|
| 750                  | 55.5                               | 0.96                            | 8.18    | 8.18    | 8.18    | 0.23  | 1.09       | ± 12.0 %    |
| 835                  | 55.2                               | 0.97                            | 8.11    | 8.11    | 8.11    | 0.25  | 1.05       | ± 12.0 %    |
| 1750                 | 53.4                               | 1.49                            | 7.21    | 7.21    | 7.21    | 0.42  | 0.89       | ± 12.0 %    |
| 1900                 | 53.3                               | 1.52                            | 6.77    | 6.77    | 6.77    | 0.35  | 0.84       | ± 12.0 %    |
| 2450                 | 52.7                               | 1.95                            | 6.25    | 6.25    | 6.25    | 0.30  | 0.86       | ± 12.0 %    |
| 2600                 | 52.5                               | 2.16                            | 5.98    | 5.98    | 5.98    | 0.21  | 1.03       | ± 12.0 %    |
| 3700                 | 51.0                               | 3.55                            | 5.42    | 5.42    | 5.42    | 0.20  | 1.95       | ± 13.1 %    |
| 4950                 | 49.4                               | 5.01                            | 3.72    | 3.72    | 3.72    | 0.45  | 1.90       | ± 13.1 %    |
| 5200                 | 49.0                               | 5.30                            | 3.58    | 3.58    | 3.58    | 0.45  | 1.90       | ± 13.1 %    |
| 5300                 | 48.9                               | 5.42                            | 3.31    | 3.31    | 3.31    | 0.48  | 1.90       | ± 13.1 %    |
| 5500                 | 48.6                               | 5.65                            | 3.21    | 3.21    | 3.21    | 0.47  | 1.90       | ± 13.1 %    |
| 5600                 | 48.5                               | 5.77                            | 3.19    | 3.19    | 3.19    | 0.45  | 1.90       | ± 13.1 %    |
| 5800                 | 48.2                               | 6.00                            | 3.29    | 3.29    | 3.29    | 0.50  | 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

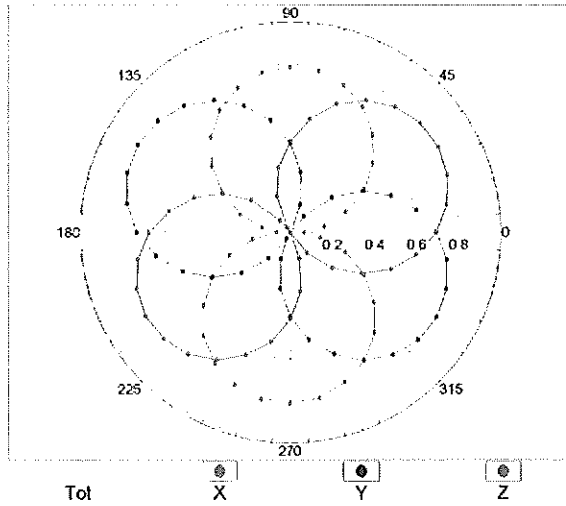
(TEM-Cell:ifi110 EXX, Waveguide: R22)



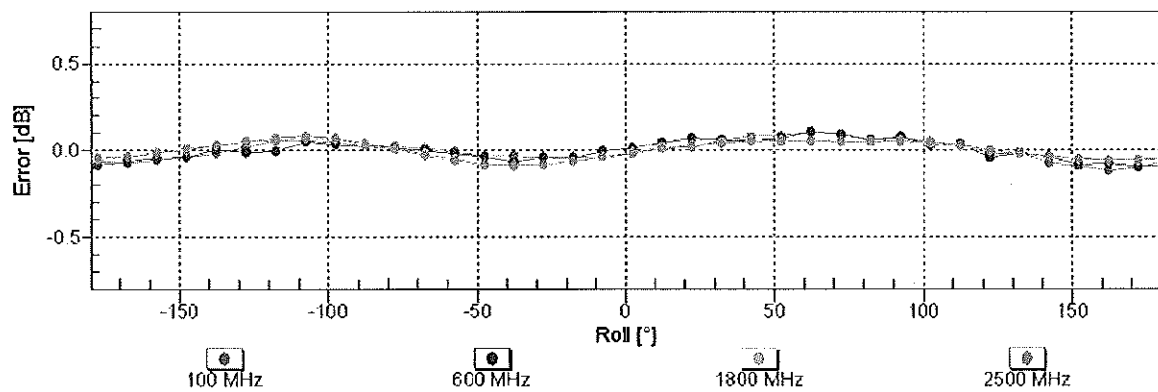
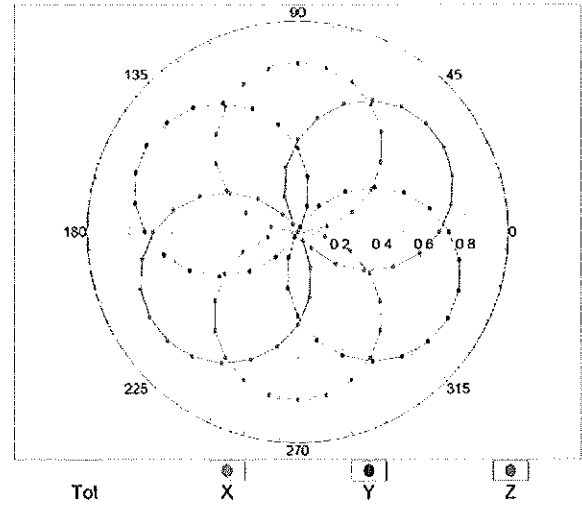
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

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

f=600 MHz,TEM



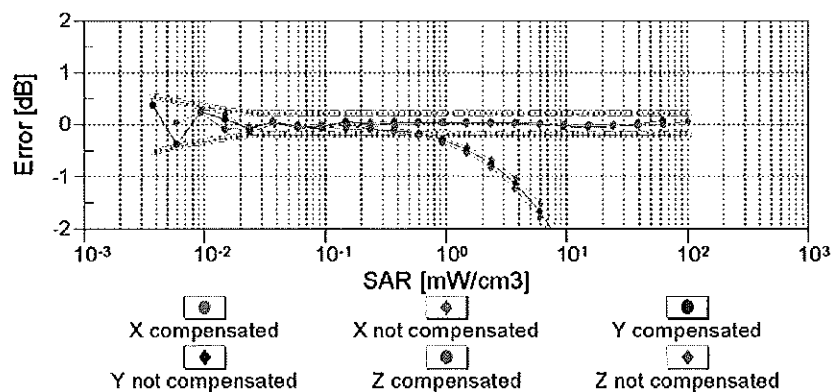
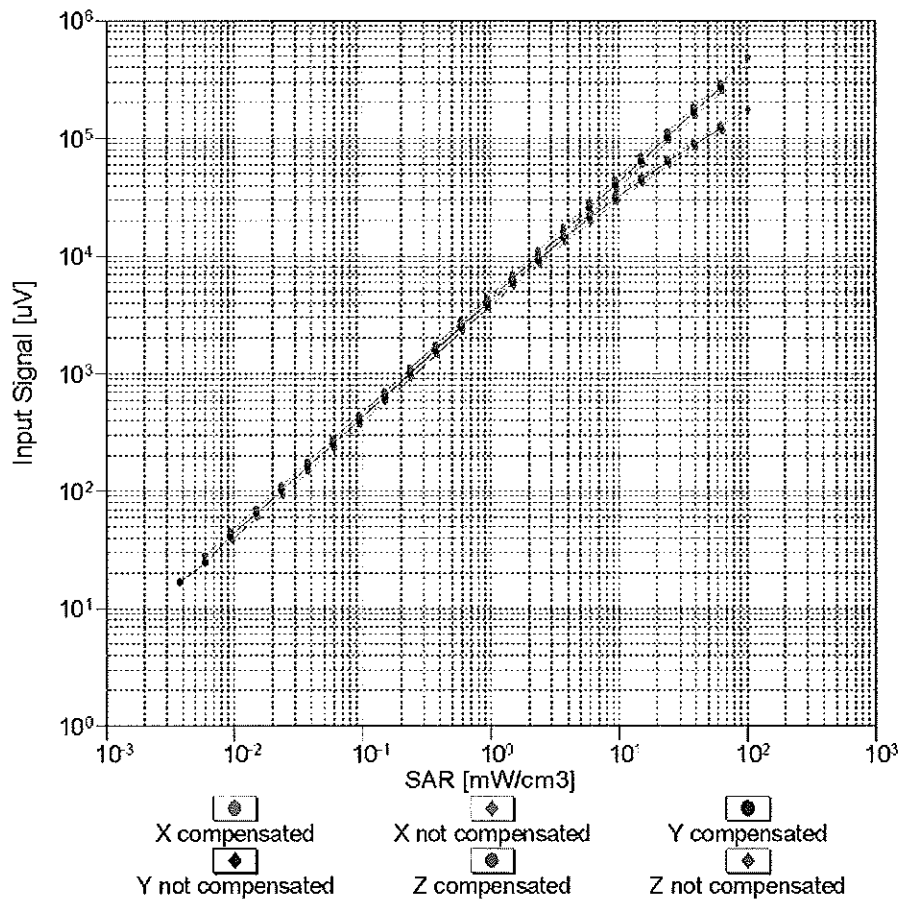
f=1800 MHz,R22



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

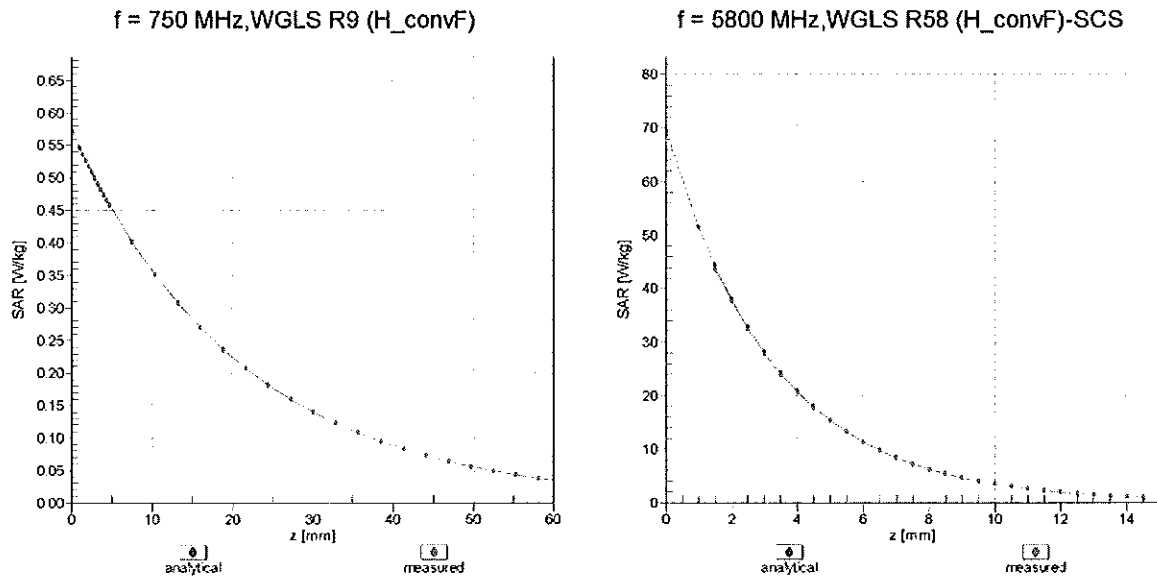
# Dynamic Range f(SAR<sub>head</sub>)

(TEM cell , f = 900 MHz)



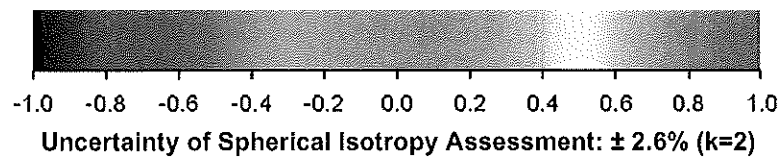
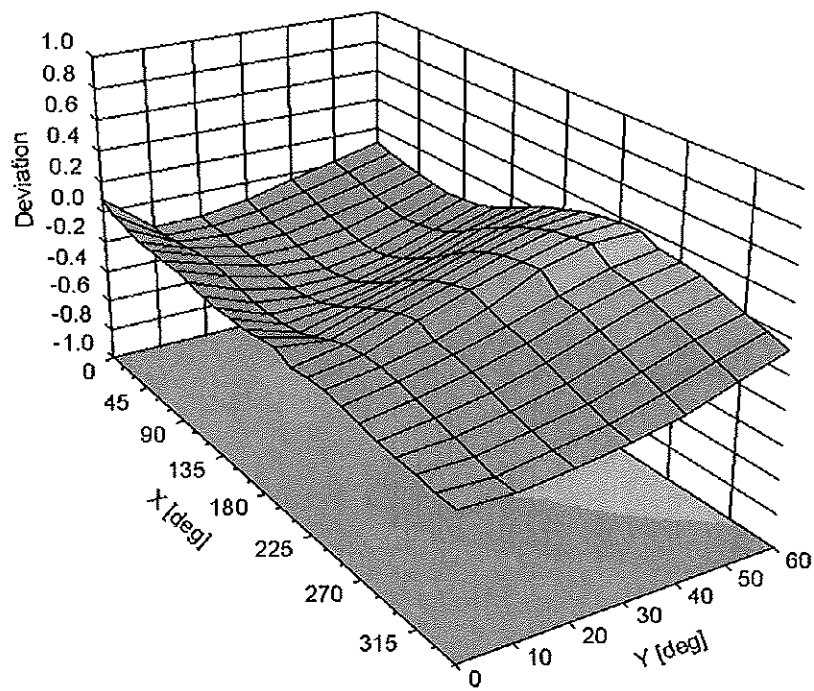
Uncertainty of Linearity Assessment:  $\pm 0.6\%$  (k=2)

## Conversion Factor Assessment



## Deviation from Isotropy in Air

Error ( $\phi, \theta$ ),  $f = 900 \text{ MHz}$



## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3550

### 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                                  | 3 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           |