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# SAR COMPLIANCE EVALUATION REPORT

**Applicant Name:**
Samsung Electronics, Co. Ltd.
18600 Broadwick St.
Rancho Dominguez, CA 90220
United States

**Date of Testing:**
01/23/12- 02/17/12
**Test Site/Location:**
PCTEST Lab, Columbia, MD, USA
**Test Report Serial No.:**
0Y1201230108.A3L

| | |
|---|---|
| **FCC ID:** | **A3LSPHL700** |
| **APPLICANT:** | **SAMSUNG ELECTRONICS, CO. LTD.** |

| | |
|---|---|
| **EUT Type:** | Portable Handset |
| **Application Type:** | Certification |
| **FCC Rule Part(s):** | CFR §2.1093 |
| **Model(s):** | SPH-L700 |

| Band & Mode | Tx Frequency | Conducted Power [dBm] | SAR | | |
|---|---|---|---|---|---|
| | | | 1 gm Head (W/kg) | 1 gm Body-Worn (W/kg) | 1 gm Hotspot (W/kg) |
| Cell. CDMA/EVDO - FCC Rule Part 90S | 817.90 - 823.10 MHz | 24.75 | 0.53 | 0.83 | 0.97 |
| Cell. CDMA/EVDO - FCC Rule Part 22H | 824.70 - 848.31 MHz | 24.97 | 0.59 | 0.84 | 0.97 |
| PCS CDMA/EVDO - FCC Rule Part 24E | 1851.25 - 1908.75 MHz | 24.91 | 0.43 | 0.70 | 0.76 |
| LTE Band 25 (PCS) - FCC Rule Part 24E | 1852.5 - 1912.5 MHz | 22.56 | 0.48 | 0.48 | 0.48 |
| 2.4 GHz WLAN - FCC Rule Part 15C | 2412 - 2462 MHz | 16.20 | 0.02 | 0.08 | 0.08 |
| 5.8 GHz WLAN - FCC Rule Part 15C | 5745 - 5825 MHz | 13.76 | 0.00 | 0.02 | N/A |
| 5.2 GHz WLAN - FCC Rule Part 15E | 5180 - 5240 MHz | 14.06 | 0.00 | 0.01 | N/A |
| 5.3 GHz WLAN - FCC Rule Part 15E | 5260 - 5320 MHz | 14.06 | 0.00 | 0.03 | N/A |
| 5.5 GHz WLAN - FCC Rule Part 15E | 5500 - 5700 MHz | 13.87 | 0.00 | 0.03 | N/A |
| Bluetooth - FCC Rule Part 15C | 2402 - 2480 MHz | 10.89 | N/A | | |
| **Simultaneous SAR per KDB 690783 D01:** | | | 1.04 | 1.41 | 1.41 |

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.

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.

Randy Ortanez
President

ACCREDITED
TESTING LABORATORY
CERTIFICATE #2041.01

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# 1 EQUIPMENT UNDER TEST

## 1.1 Device Overview

| Band & Mode | Tx Frequency |
|---|---|
| Cell. CDMA/EVDO - FCC Rule Part 22H | 824.70 - 848.31 MHz |
| Cell. CDMA/EVDO - FCC Rule Part 90S | 817.90 - 823.10 MHz |
| PCS CDMA/EVDO - FCC Rule Part 24E | 1851.25 - 1908.75 MHz |
| LTE Band 25 (PCS) - FCC Rule Part 24E | 1852.5 - 1912.5 MHz |
| 2.4 GHz WLAN - FCC Rule Part 15C | 2412 - 2462 MHz |
| 5.8 GHz WLAN - FCC Rule Part 15C | 5745 - 5825 MHz |
| 5.2 GHz WLAN - FCC Rule Part 15E | 5180 - 5240 MHz |
| 5.3 GHz WLAN - FCC Rule Part 15E | 5260 - 5320 MHz |
| 5.5 GHz WLAN - FCC Rule Part 15E | 5500 - 5700 MHz |
| Bluetooth - FCC Rule Part 15C | 2402 - 2480 MHz |
| NFC - FCC Rule Part 15C | 13.56 MHz |

## 1.2 Near Field Communications (NFC) Antenna

This EUT has NFC operations. The NFC antenna is integrated into the standard battery and will be the only battery available from the manufacturer for this model. Therefore, all SAR tests were performed with the standard battery including the NFC antenna. The technical description contains detailed information about the near field communications antenna. As described in Operational Description, the device does not allow any other battery other than model: EB-L1D7IBA.

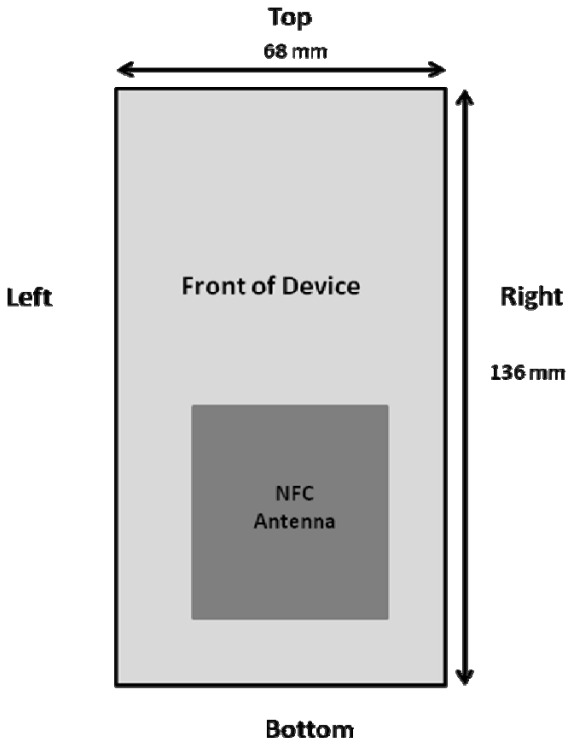


**Figure 1-1**
**NFC Antenna Location on the Battery**

## 1.3 EUT Antenna Locations

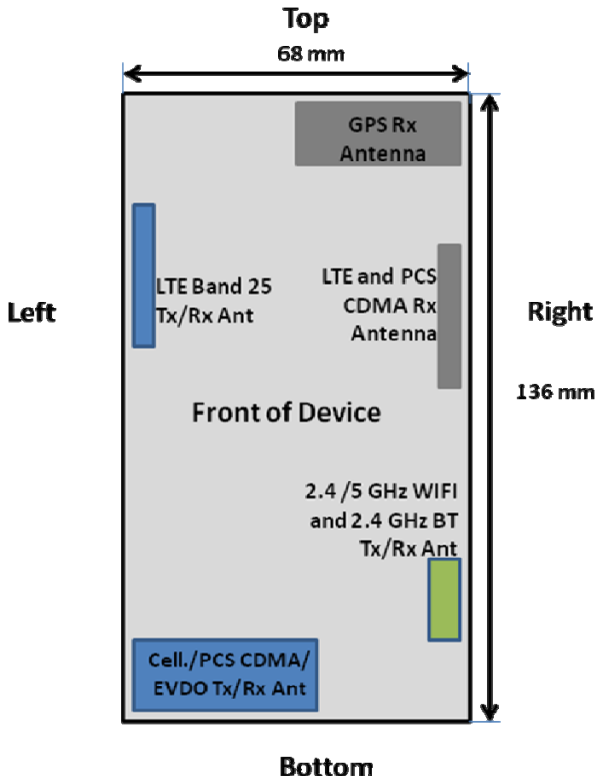


**Figure 1-2**
**EUT Antenna Locations**

## 1.4 SAR Test Configurations

See Figure 1-2 for EUT antenna locations to determine the wireless router edges required for SAR testing based on FCC KDB 941225 D06. Certain EUT edges were not required to be evaluated for Wireless Router SAR if the transmitting antenna was greater than 2.5 cm from the edge of the device to be considered for RF exposure evaluation.

**Table 1-1**
**Mobile Hotspot Sides for SAR Testing**

| Mobile Hotspot Sides for SAR Testing | | | | | | |
|---|---|---|---|---|---|---|
| Mode | Back | Front | Top | Bottom | Right | Left |
| Cell. CDMA – FCC Rule Part 22H | Yes | Yes | No | Yes | No | Yes |
| Cell. CDMA – FCC Rule Part 90S | Yes | Yes | No | Yes | No | Yes |
| PCS CDMA – FCC Rule Part 24E | Yes | Yes | No | Yes | No | Yes |
| LTE Band 25 (PCS) – FCC Rule Part 24 E | Yes | Yes | Yes | No | No | Yes |
| 2.4 GHz WLAN – FCC Rule Part 15C | Yes | Yes | No | Yes | Yes | No |

When hotspot is enabled, all 5 GHz bands are disabled.

## 1.5 Simultaneous Transmission Capabilities

According to KDB 648474, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the DUT are shown in Figure 1-3 and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another for example Bluetooth and WLAN cannot transmit simultaneously.


**Figure 1-3**
**Simultaneous Transmission Paths**

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according per KDB 447498 3) b) procedures.

**Table 1-2**
**Possible Simultaneous Transmission Scenarios Transmission Supported by EUT**

| No. | Simultasneous Transmit Configurations | Head | Body-Worn Accessory | Hot Spot | Note | Scenario Possible? |
|---|---|---|---|---|---|---|
| | | IEEE 1528, Supp C | Supp C | FCC KDB 941225 D06 edges/sides | | |
| 1 | 1X CDMA BC0/BC1/BC10 Voice + LTE B25 Data | Yes | 10mm | N/A | SVLTE | Yes |
| 2 | 1X CDMA BC0/BC1/BC10 Voice + LTE B25 Data + 2.4GHz WIFI | Yes | 10mm | Yes | Voice and LTE+WIFI Hotspot | Yes |
| 3 | 1X CDMA BC0/BC1/BC10 Voice + 2.4GHz WIFI | Yes | 10mm | N/A | 1X Voice and WIFI Data | Yes |
| 4 | 1X CDMA BC0/BC1/BC10 Voice + 5GHz WIFI | Yes | 10mm | N/A | 1X Voice and WIFI Data | Yes |
| 5 | 1X/EVDO BC0/BC1/BC10 Data + 2.4GHz WIFI | N/A | N/A | Yes | 1x/EVDO+WIFI Hotspot | Yes |
| 6 | LTE B25 Data + 2.4GHz WIFI | Yes* | 10mm | Yes | LTE+WIFI Hotspot | Yes |
| 7 | LTE B25 Data + 5GHz WIFI | N/A | N/A | N/A | Not available by SW | No |
| 8 | 1X/EVDO BC0/BC1/BC10 Data + 5GHz WIFI | N/A | N/A | N/A | Not available by SW | No |
| 9 | 1X CDMA BC0/BC1/BC10 Voice + LTE B25 Data + 5GHz WIFI | N/A | N/A | N/A | Not available by SW | No |
| 10 | 1X CDMA BC0/BC1/BC10 Voice + EVDO | N/A | N/A | N/A | Not available by HW | No |
| 11 | 1X/EVDO BC0/BC1/BC10 Data + LTE B25 Data | N/A | N/A | N/A | Not available by SW | No |

Notes:

1.SPH-L700 does not support EVDO+WIFI Voice simultaneously
2.This model cannot act as a master device in 5GHz WiFi, so this model is not capable of 5GHz WiFi hotspot. This cannot be changedby any S/W modification by any party after it is manufactured.
3. * = for VoIP 3rd party apps possibly installed by end-user.

## 1.6 SAR Test Exclusions Applied

### (A) WIFI/BT Testing

Since Wireless Router operations are not allowed by the chipset firmware using 5 GHz WIFI, only 2.4 GHz WIFI Hotspot SAR tests and combinations are considered for SAR with respect to Wireless Router configurations in KDB 941225 D06.

5 GHz WIFI may act as a client to transmitting simultaneously with CDMA circuit switched voice modes. These possible combinations are reflected in Table **1-2**.

Per KDB Publication 648474, **2.4 and 5 GHz SAR is required** since:
The maximum average conducted power of 2.4 GHz WIFI is 42.27 mW.
The maximum average conducted power of 5 GHz WIFI is 26.73 mW.
The Bluetooth/WLAN to main antenna (Cellular/PCS CDMA/EVDO) separation distance is 37 mm.
The Bluetooth/WLAN to LTE Band 25 antenna separation distance is 72 mm.

Per April 2011 TCB Workshop Slides, Bluetooth SAR was not required based on the following:

1. The maximum peak RF conducted power for Bluetooth, 12.260 mW, is less than 60/f (please reference the DSS EMC report filed for this EUT for a complete set of Bluetooth powers) .
2. Bluetooth and 2.4 GHz WLAN share the same antenna path and cannot transmit simultaneously.
3. The maximum peak Bluetooth power is less than the respective peak and average output powers in all WLAN modes.
4. The measured WLAN SAR is < 0.4 W/kg for all applicable Bluetooth configurations (Body-Worn).
5. Simultaneous transmission SAR exclusion applies to all applicable configurations involving WLAN or Bluetooth since all simultaneous sums for WLAN are less than 1.6 W/kg.

**(B) CDMA/EVDO Testing**

CDMA and EVDO share the same antenna path and cannot transmit simultaneously. Therefore this model does not support Simultaneous Voice and Data for the licensed CDMA antenna in any modes.

## 1.7 Power Reduction for SAR

No power reduction is applied for SAR compliance.

## 1.8 Additional Power Reduction Applied

Power Reduction is applied for SVLTE for non-SAR purposes, please see Section 18 for more details.

## 1.9 Additional FCC Guidance Applied

- FCC/OET Bulletin 65 Supplement C [June 2001]
- IEEE 1528-2003
- April 2011 TCB Workshop Notes: RF Exposure Procedures Update FCC/OET Laboratory Division April 2011 TCB Workshop (Bluetooth Exclusion)
- October 2010 TCB Workshop (Channel Selection for SAR Testing)
- FCC KDB Publication 941225 (2G/3G/4G) and hotspot
- FCC KDB Publication 248227 (802.11)
- FCC KDB Publication 648474 (Simultaneous Transmission)
- FCC KDB Publication 865664 (802.11a)
- FCC KDB Inquiry 366281 (SVLTE)

## 1.10 Samples Used for SAR Testing

Several samples with identical hardware were used to facilitate SAR testing only.

**Table 1-3**
**SAR Test Sample Serial Numbers**

| Band | LTE Band 25 | CDMA/EVDO | 2.4 GHz WIFI | 5 GHz WIFI | SVLTE |
|---|---|---|---|---|---|
| Serial Number | 1 | 2 | 1 | 3 | 2 |

# 2 LTE CHECKLIST PER FCC KDB 941225 D05

| KDB 941225 Pub LTE Information | | | | |
|---|---|---|---|---|
| KDB 941225 Section | FCC ID | A3LSPHL700 | | |
| | Form Factor | Handset | | |
| 1) | Frequency Range of each LTE transmission band | 1852.5 - 1912.5MHz | | |
| 2) | Channel Bandwidths | 5MHz BW | | |
| 3) | Channel Numbers and Frequencies (MHz) | Low | Mid | High |
| | Band25, 5MHz BW | 26065 (1852.5MHz) | 26365 (1882.5MHz) | 26665 (1912.5MHz) |
| 4)(a) | UE Category | UE category 3 | | |
| (b) | Modulations Supported in UL | QPSK, 16QAM | | |
| | LTE Transmitter and Antenna Implementation | CDMA and LTE utilize separate antenna paths | | |
| 5) | Description of LTE Tx and Ant. Implementation | 1 TX/RX Ant, 1 RX Ant | | |
| 6) | LTE Voice available? | No | | |
| | Hotspot with LTE+WIFI | Yes | | |
| | Hotspot with LTE+WIFI active with 1XVoice sessions? | Yes | | |
| 7) | LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided) | Yes | | |
| | 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/Band | RF Output Power | RF Exposure Configurations | |
| | Cell. CDMA - FCC Rule Part 22H | See Page 1 | Head, Body-Worn, and Hotspot | |
| | Cell. CDMA - FCC Rule Part 90S | | Head, Body-Worn, and Hotspot | |
| | PCS CDMA - FCC Rule Part 24E | | Head, Body-Worn, and Hotspot | |
| | Bluetooth - FCC Rule Part 15C | | Body-Worn | |
| | 2.4 GHz WLAN - FCC Rule Part 15C | | Head, Body-Worn, and Hotspot | |
| | 5 GHz WLAN - FCC Rule Part 15C/E | | Head and Body-Worn | |
| 11) | Simultaneous Tx Conditions (Voice and Data Configurations) | See section 1.4 | | |
| 12) | Power Reduction used for SAR Compliance? | No, non-SAR power reduction | | |
| 13) | Describe Power Reduction (LTE Modes) | N/A | | |
| 14) | SAR Test Plan | N/A | | |
| 15) | SAR test data, preliminary | N/A | | |

# 3 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.

## 3.1 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. 3-1).

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

**Figure 3-1**
**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$^3$)
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]

# 4 TEST SITE LOCATION

## 4.1 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.

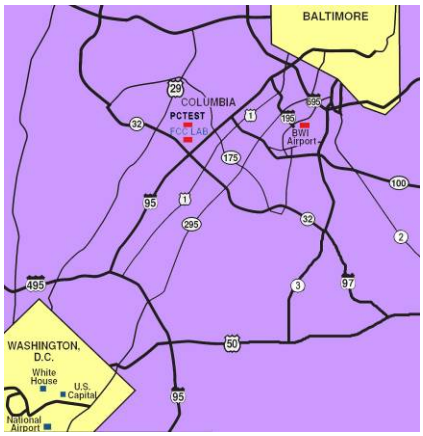


**Figure 4-1**
Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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.

## 4.2 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

# 5 SAR MEASUREMENT SETUP

## 5.1 Robotic System

Measurements are performed using the DASY4 and DASY5 automated dosimetric assessment system. The DASY4 and DASY5 are 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 Figure 5-1).

## 5.2 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 or DASY5, 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.

## 5.3 System Electronics

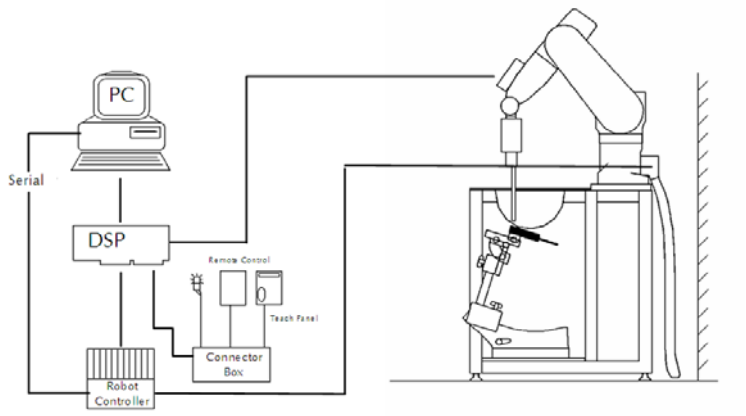


**Figure 5-1**
**SAR Measurement System Setup**

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.

## 5.4 Automated Test System Specifications

| | |
|---|---|
| Test Software: | SPEAG DASY4 version 4.7 Measurement Software |
| | SPEAG DASY52 version 52.6 (2) Measurement Software |
| Robot: | Stäubli Unimation Corp. Robot RX60L and Robot TX0XL |
| 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 and SEMCAD X |
| 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 and V5.0) |
| Shell Material: | Composite |
| Thickness: | 2.0 ± 0.2 mm |

**Figure 5-2**
**SAR Measurement System**

# 6 DASY E-FIELD PROBE SYSTEM

## 6.1 Probe Measurement System

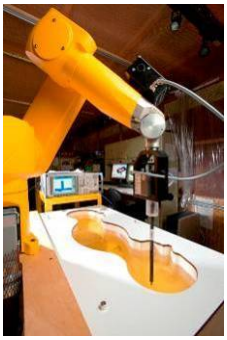

**Figure 6-1**
**SAR System**

The SAR measurements were conducted with the dosimetric probe designed in the classical triangular configuration (see Figure 6-3) 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 and DASY5 software reads the reflection during a software approach and looks for the maximum using a 2nd order curve fitting. The approach is stopped at reaching the maximum.

## 6.2 Probe Specifications

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

**Figure 6-2**
**Near-Field Probe**

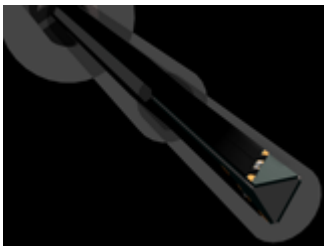

**Figure 6-3**
**Triangular Probe Configuration**

# 7 PHANTOM AND EQUIVALENT TISSUES

## 7.1 SAM Phantoms

**Figure 7-1**
**SAM Phantoms**

The SAM Twin Phantom V4.0 and V5.0 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$^{th}$ 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 7-2**
**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 | 835 | 1900 | 1900 | 2450 | 2450 | 5200-5800 | 5200-5800 |
|---|---|---|---|---|---|---|---|---|
| Tissue | Head | Body | Head | Body | Head | Body | Head | Body |
| Ingredients (% by weight) | | | | | | | | |
| Bactericide | 0.1 | 0.1 | | | | | | |
| DGBE | | | 44.92 | 29.44 | 7.99 | 26.7 | | |
| HEC | 1 | 1 | | | | | | |
| NaCl | 1.45 | 0.94 | 0.18 | 0.39 | 0.16 | 0.1 | | |
| Sucrose | 57 | 44.9 | | | | | | |
| Triton X-100 | | | | | 19.97 | | 17.24 | |
| Diethylenglycol monohexylether | | | | | | | 17.24 | |
| Polysorbate (Tween) 80 | | | | | | | | 20 |
| Water | 40.45 | 53.06 | 54.9 | 70.17 | 71.88 | 73.2 | 65.52 | 80 |

# 8 DOSIMETRIC ASSESSMENT & PHANTOM SPECS

## 8.1 Measurement Procedure

The evaluation was performed using the following procedure:

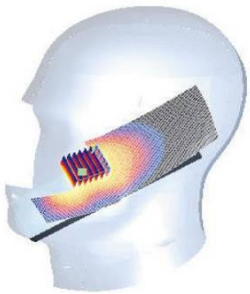

**Figure 8-1**
**Sample SAR Area Scan**

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 for up to 3 GHz frequencies. The horizontal grid spacing was 10mm x 10mm for 5-6 GHz frequencies per KDB pub 865664.
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 value deviated by more than 5%, the SAR evaluation was repeated.

## 8.2 5 GHz SAR Measurements

1. For 5 GHz testing, finer resolution Area scans were performed as specified by FCC SAR Measurement Requirements for 3 – 6 GHz, KDB pub 865664. The 5 GHz Area Scan requires a minimum resolution of 10mm on the x and y axis for each grid measurement point.
2. 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.

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

# 9 DEFINITION OF REFERENCE POINTS

## 9.1 EAR REFERENCE POINT

Figure 9-1 shows the front, back and side views of the SAM Twin Phantom. The point "M" is the reference point for the center of the mouth, "LE" is the left ear reference point (ERP), and "RE" is the right ERP. The ERP is 15mm posterior to the entrance to the ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 9-1. The plane passing through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck-Front) is perpendicular to the reference plane and passing through the RE (or LE) is called the Reference Pivoting Line (see Figure 9-2). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning [5].

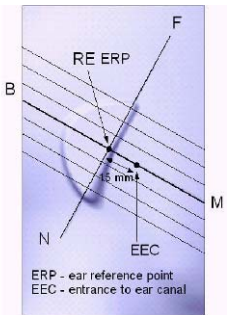


**Figure 9-1**
**Close-Up Side view of ERP**

## 9.2 HANDSET REFERENCE POINTS

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The test device was placed in a normal operating position with the "test device reference point" located along the "vertical centerline" on the front of the device aligned to the "ear reference point" (See Figure 9-3). The "test device reference point" was than located at the same level as the center of the ear reference point. The test device was positioned so that the "vertical centerline" was bisecting the front surface of the handset at it's top and bottom edges, positioning the "ear reference point" on the outer surface of the both the left and right head phantoms on the ear reference point.

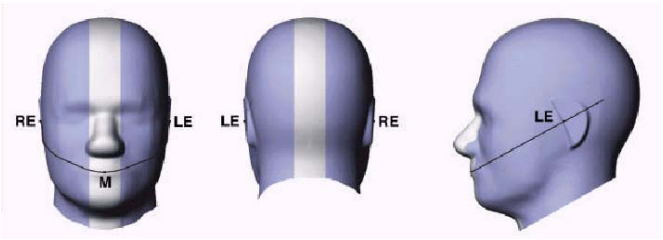


**Figure 9-2**
**Front, back and side view of SAM Twin Phantom**

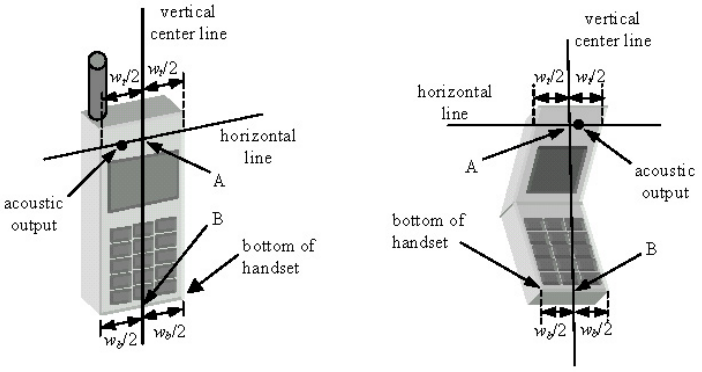


**Figure 9-3**
**Handset Vertical Center & Horizontal Line Reference Points**

# 10 TEST CONFIGURATION POSITIONS

## 10.1 Device Holder

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

## 10.2 Positioning for Cheek/Touch

1. The test device was positioned with the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 10-1), such that the plane defined by the vertical center line and the horizontal line of the phone is approximately parallel to the sagittal plane of the phantom.

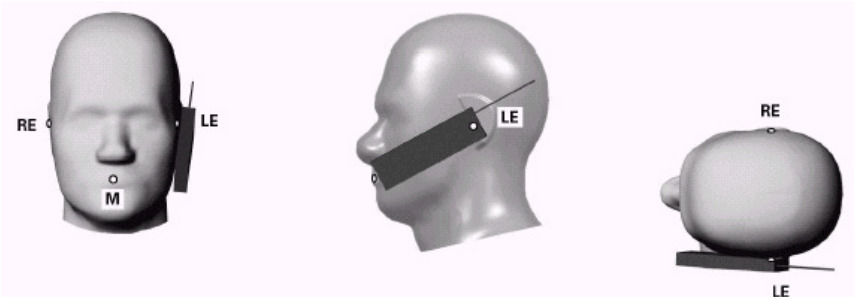


**Figure 10-1 Front, Side and Top View of Cheek/Touch Position**

2. The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the ear.
3. While maintaining the handset in this plane, the handset was rotated around the LE-RE line until the vertical centerline was in the plane normal to MB-NF including the line MB (reference plane).
4. The phone was hen rotated around the vertical centerline until the phone (horizontal line) was symmetrical was respect to the line NF.
5. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the phone contact with the ear, the handset was rotated about the line NF until any point on the handset made contact with a phantom point below the ear (cheek) (See Figure 10-2).

## 10.3 Positioning for Ear / 15º Tilt

With the test device aligned in the “Cheek/Touch Position”:

1. While maintaining the orientation of the phone, the phone was retracted parallel to the reference plane far enough to enable a rotation of the phone by 15degree.
2. The phone was then rotated around the horizontal line by 15 degree.
3. While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the phone touches the head. (In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced. The tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head (see Figure 10-2).

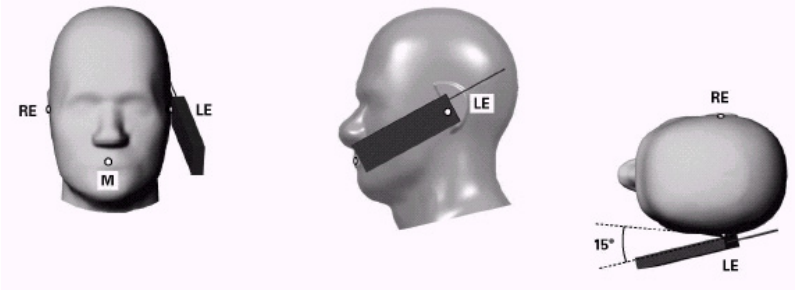


**Figure 10-2 Front, Side and Top View of Ear/15º Tilt Position**

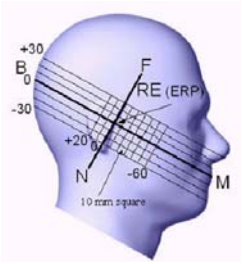


**Figure 10-3**
**Side view w/ relevant markings**

**Figure 10-4 Body SAR Sample Photo**
**(Not Actual EUT)**

## 10.4 SAR Evaluations near the Mouth/Jaw Regions of the SAM Phantom

Antennas located near the bottom of a phone may require SAR measurements around the mouth and jaw regions of the SAM head phantom. This typically applies to clam-shell style phones that are generally longer in the unfolded normal use positions or to certain older style long rectangular phones. It has been known for some time that there are SAR measurement difficulties in these regions of the SAM phantom. SAR probes are calibrated in tissue equivalent liquids with sufficient separation between the probe sensors and nearby physical boundaries to ensure scattering does not affect probe calibration. When the probe tip is moved into tight regions with multiple boundaries surrounding its sensors, probe calibration and measurement accuracy can become questionable. In addition, these measurement locations often require a probe to be tilted at steep angles, where it may no longer comply with calibration requirements and measurement protocols, or satisfy the required measurement uncertainty. In some situations it is not feasible to tilt the probe or rotate the phantom, as suggested by measurement standards, to conduct these measurements.

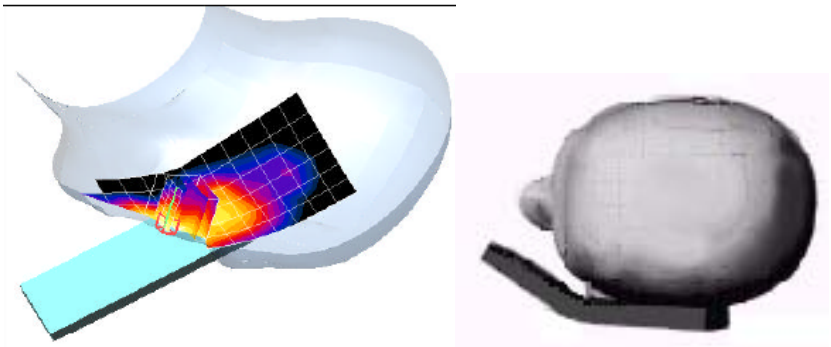

**Figure 10-5**
**SAR Scans near the Jaw/Mouth**

In order to ensure there is sufficient conservativeness for ensuring compliance until practical solutions are available, additional measurement considerations are necessary to address these technical difficulties. When measurements are required near the mouth, nose, jaw or similar tight regions of the SAM phantom,

area or zoom scans are often unable to fully enclose the peak SAR location as required by IEEE 1528 and Supplement C, due to probe orientation and positioning difficulties. Even when limited measurements are possible, the test results could be questionable due to probe calibration and measurement uncertainty issues. Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document publication 648474. The SAR required in these regions of SAM should be measured using a flat phantom. **Rectangular shaped phones** should be positioned with its bottom edge positioned from the flat phantom with the same distance provided by the cheek touching position using SAM. The ear reference point (ERP, as defined for SAM) of the phone should be positioned ½ cm from the flat phantom shell. **Clam-shell phones** should be positioned with the hinge against a smooth edge of the flat phantom where the upper half of the phone is unfolded and extended beyond the phantom side wall. The lower half of the phone is secured in the test device holder at a fixed distance below the flat phantom determined by the minimum separation along the lower edge of the phone in the cheek touching position using SAM. Any case with substantial variation in separation distance along the lower edge of a clam shell is discussed with the FCC for best-to-use methodology.

The flat phantom data should allow test results to be compared uniformly across measurement systems, until suitable solutions are available in measurement standards to address certain probe calibration and positioning issues, due to implementation differences between horizontal and upright SAM configurations. These flat phantom procedures are only applicable for stand-alone SAR evaluation in tight regions of the SAM phantom, where measurement is not feasible or test results can be questionable due to probe calibration and accessibility issues. Details on device positioning and photos showing how separation distances are determined are included in the SAR report Photographs. SAR for other regions of the head must be evaluated using SAM; therefore, a phone with antennas at different locations may require flat and SAM phantom evaluation for the different antennas.

## 10.5 Body Holster /Belt Clip Configurations

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 10-4). A device with a headset output is tested with a headset connected to the device.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented. Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

# 11 FCC RF EXPOSURE LIMITS

## 11.1 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.

## 11.2 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 11-1**
**SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6**

| HUMAN EXPOSURE LIMITS | | |
|---|---|---|
| | UNCONTROLLED ENVIRONMENT *General Population* (W/kg) or (mW/g) | CONTROLLED ENVIRONMENT *Occupational* (W/kg) or (mW/g) |
| SPATIAL PEAK SAR Brain | 1.6 | 8.0 |
| SPATIAL AVERAGE SAR Whole Body | 0.08 | 0.4 |
| SPATIAL PEAK SAR 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.

# 12 FCC MEASUREMENT PROCEDURES

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

## 12.1 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. If the power drift deviated by more than 5%, the SAR test and drift measurements were repeated.

## 12.2 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.

### 12.2.1 MPR

MPR is permanently implemented for this device. The specific manufacturer target MPR is indicated alongside the SAR results. With the MPR permanently implemented, this device will never operate at higher power levels. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

### 12.2.2 A-MPR

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

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

According to FCC KDB 941225 D05:

a. Per Page 4, 3) A), QPSK with 50% RB is required for the highest bandwidth.
b. Per Page 4, footnote 2, when the maximum output power across high, mid., and low channels is < 0.5 dB, mid channel is tested. Low and high channel SAR tests are not required for QPSK, 50% RB allocation because the SAR is < 0.8 W/kg.
c. Per Page 4, 3) B), QPSK with 1 RB for both channel edges are required for the highest bandwidth.
d. Per Page 4, footnote 6, QPSK 1 RB allocation SAR tests were performed on the highest output power channel for the RB allocation since the average output power of the 1 RB allocation was > 0.5 dB higher than the 50% RB allocation for QPSK. 1 RB low and high offset configurations are considered together for a single channel selection.
e. Per Page 4, 3) B), I), when the SAR for QPSK 1 RB allocation tests is <1.45 W/kg, testing on the other channels is not required.
f. Per Page 4, 4) A), 16QAM with 50% RB is required for the highest bandwidth on the channel with the highest measured SAR for QPSK with 50% RB allocation.

g. Per Page 4, 4) A), I), when the SAR for 16 QAM, 50 % allocation tests is <1.45 W/kg, testing on the other channels is not required.
h. Per Page 4, 4) B) and Page 5 footnote 9, 16QAM with 1RB for both channel edges are required for the highest bandwidth on the highest output power channel for the 1 RB allocation when the average output power of the 1 RB allocation is >0.5 dB higher than the 50% allocation for 16 QAM. 1 RB low and high offset configurations are considered together for a single channel selection. Otherwise, SAR tests are performed on the channel that produced the highest SAR for 16QAM with 50% RB.
i. Per Page 5, 4) B), I), when the SAR for 16QAM 1 RB allocation tests is <1.45 W/kg, testing on the other channels is not required.
j. Per Page 4, 4), A) I) and Page 5, 4), A) I, 100% RB Allocation is not required to be tested when the SAR is not > 1.45 W/kg for the highest bandwidth.
k. Per Page 5, 5) B) I), LTE SAR for the lower bandwidths are not required to be tested when the SAR is not >1.45 W/kg for the highest bandwidth and the maximum average output power over all channels and configurations is not more than 0.5 dB higher then the higher bandwidths.

## 12.3 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.

### 12.3.1 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 12-1 parameters were applied.
3. If the MS supports the RC 3 Reverse FCH, RC3 Reverse $SCH_0$ 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 SCH0 data rate.
4. Under RC3, C.S0011 Table 4.4.5.2-2, Table 12-2 was applied.
5. FCHs were configured at full rate for maximum SAR with "All Up" power control bits.

**Table 12-1**
**Parameters for Max. Power for RC1**

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

**Table 12-2**
**Parameters for Max. Power for RC3**

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

### 12.3.2 Head SAR Measurements

SAR for head exposure configurations is measured in RC3 with the EUT configured to transmit at full rate using Loopback Service Option SO55. SAR for RC1 is not required when the maximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1 using the exposure configuration that results in the highest SAR for that channel in RC3.

### 12.3.3 Body SAR Measurements

SAR for body exposure configurations is measured in RC3 with the EUT configured to transmit at full rate on FCH with all other code channels disabled using TDSO / SO32. SAR for multiple code channels (FCH + $SCH_n$) is not required when the maximum average output of each RF channel is less than ¼ dB higher than that measured with FCH only. Otherwise, SAR is measured on the maximum output channel (FCH + $SCH_n$) with FCH at full rate and $SCH_0$ enabled at 9600 bps using the exposure configuration that results in the highest SAR for that channel with FCH only. When multiple code channels are enabled, the EUT output may shift by more than 0.5 dB and lead to higher SAR drifts and SCH dropouts. Body SAR was measured using TDSO / SO32 with power control bits in the "All Up"

Body SAR in RC1 is not required when the maximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1; with Loopback Service Option SO55, at full rate, using the body exposure configuration that results in the highest SAR for that channel in RC3.

## 12.4 SAR Testing with 802.11 Transmitters

Per KDB publication 248227, 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. See KDB Publication 248227 for more details.

### 12.4.1 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.

### 12.4.2 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. When the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the 1g averaged SAR is <0.8 W/kg, SAR testing on other channels is not required. Otherwise, the other default (or corresponding required) test channels were additionally tested using the lowest data rate.

## Table 12-3
## 802.11 Test Channels per FCC KDB Publication 248227

| Mode | | GHz | Channel | Turbo Channel | "Default Test Channels" §15.247 802.11b | §15.247 802.11g | UNII | |
|---|---|---|---|---|---|---|---|---|
| 802.11 b/g | | 2.412 | 1 | | √ | ∇ | | |
| | | 2.437 | 6 | 6 | √ | ∇ | | |
| | | 2.462 | 11 | | √ | ∇ | | |
| 802.11a | UNII | 5.18 | 36 | | | | √ | |
| | | 5.20 | 40 | 42 (5.21 GHz) | | | | * |
| | | 5.22 | 44 | | | | | * |
| | | 5.24 | 48 | 50 (5.25 GHz) | | | √ | |
| | | 5.26 | 52 | | | | √ | |
| | | 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 or §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 and RSS-210 A9.2(3), transmission on channels which overlap the 5600-5650 MHz is prohibited as a client. This device does not transmit any beacons or initiate any transmissions in 5.3 GHz and 5.5 GHz Bands.

# 13 RF CONDUCTED POWERS

## 13.1 LTE Conducted Powers

| Frequency [MHz] | Channel | Bandwidth [MHz] | Modulation | RB Size | RB Offset | Conducted Power [dBm] | Target MPR [dB] | Allowed per 3GPP [dB] |
|---|---|---|---|---|---|---|---|---|
| 1852.5 | 26065 | 5 | QPSK | 1 | 0 | 22.20 | 0 | 0 |
| 1852.5 | 26065 | 5 | QPSK | 1 | 24 | 22.59 | 0 | 0 |
| 1852.5 | 26065 | 5 | QPSK | 12 | 6 | 22.60 | 0 | 0-1 |
| 1852.5 | 26065 | 5 | QPSK | 25 | 0 | 22.32 | 0 | 0-1 |
| 1852.5 | 26065 | 5 | 16-QAM | 1 | 0 | 21.51 | 1 | 0-1 |
| 1852.5 | 26065 | 5 | 16-QAM | 1 | 24 | 21.91 | 1 | 0-1 |
| 1852.5 | 26065 | 5 | 16-QAM | 12 | 6 | 21.78 | 1 | 0-2 |
| 1852.5 | 26065 | 5 | 16-QAM | 25 | 0 | 21.39 | 1 | 0-2 |
| 1882.5 | 26365 | 5 | QPSK | 1 | 0 | **22.37** | 0 | 0 |
| 1882.5 | 26365 | 5 | QPSK | 1 | 24 | **22.33** | 0 | 0 |
| 1882.5 | 26365 | 5 | QPSK | 12 | 6 | **22.56** | 0 | 0-1 |
| 1882.5 | 26365 | 5 | QPSK | 25 | 0 | 22.46 | 0 | 0-1 |
| 1882.5 | 26365 | 5 | 16-QAM | 1 | 0 | **21.76** | 1 | 0-1 |
| 1882.5 | 26365 | 5 | 16-QAM | 1 | 24 | **21.71** | 1 | 0-1 |
| 1882.5 | 26365 | 5 | 16-QAM | 12 | 6 | **21.68** | 1 | 0-2 |
| 1882.5 | 26365 | 5 | 16-QAM | 25 | 0 | 21.40 | 1 | 0-2 |
| 1912.5 | 26665 | 5 | QPSK | 1 | 0 | 22.56 | 0 | 0 |
| 1912.5 | 26665 | 5 | QPSK | 1 | 24 | 22.07 | 0 | 0 |
| 1912.5 | 26665 | 5 | QPSK | 12 | 6 | 22.90 | 0 | 0-1 |
| 1912.5 | 26665 | 5 | QPSK | 25 | 0 | 22.84 | 0 | 0-1 |
| 1912.5 | 26665 | 5 | 16-QAM | 1 | 0 | 21.95 | 1 | 0-1 |
| 1912.5 | 26665 | 5 | 16-QAM | 1 | 24 | 21.67 | 1 | 0-1 |
| 1912.5 | 26665 | 5 | 16-QAM | 12 | 6 | 22.00 | 1 | 0-2 |
| 1912.5 | 26665 | 5 | 16-QAM | 25 | 0 | 21.95 | 1 | 0-2 |

### 13.1.1 LTE SAR Test Requirements

According to FCC KDB 941225 D05:

1) Per Page 4, 3) A), QPSK with 50% RB is required for the highest bandwidth.
2) Per Page 4, footnote 2, when the maximum output power across high, mid., and low channels is < 0.5 dB, mid channel is tested. Low and high channel SAR tests are not required for QPSK, 50% RB allocation because the SAR is < 0.8 W/kg.
3) Per Page 4, 3) B), QPSK with 1 RB for both channel edges are required for the highest bandwidth.
4) Per Page 4, footnote 6, QPSK 1 RB allocation SAR tests were performed on the highest SAR channel for the 50% allocation since the average output power of the 1 RB allocation was < 0.5 dB higher than the 50% RB allocation for QPSK. 1 RB low and high offset configurations are considered together for a single channel selection.
5) Per Page 4, 3) B), I), when the SAR for QPSK 1 RB allocation tests is <1.45 W/kg, testing on the other channels is not required.
6) Per Page 4, 4) A), 16QAM with 50% RB is required for the highest bandwidth on the channel with the highest measured SAR for QPSK with 50% RB allocation.
7) Per Page 4, 4) A), I), when the SAR for 16 QAM, 50 % allocation tests is <1.45 W/kg, testing on the other channels is not required.
8) Per Page 4, 4) B) and Page 5 footnote 9, 16QAM with 1RB for both channel edges are required for the highest bandwidth on the highest SAR channel for the 50% allocation since the average output power of the 1 RB allocation is < 0.5 dB higher than the 50% allocation for 16 QAM. 1 RB low and high offset configurations are considered together for a single channel selection.
9) Per Page 5, 4) B), I), when the SAR for 16QAM 1 RB allocation tests is <1.45 W/kg, testing on the other channels is not required.

10) Per Page 4, 4), A) I) and Page 5, 4), A) I, 100% RB Allocation is not required to be tested when the SAR is not > 1.45 W/kg for the highest bandwidth.
11) Per Page 5, 5) B) I), LTE SAR for the lower bandwidths are not required to be tested when the SAR is not >1.45 W/kg for the highest bandwidth and the maximum average output power over all channels and configurations is not more than 0.5 dB higher than the higher bandwidths
12) The bold powers in section 13.1 were evaluated for SAR

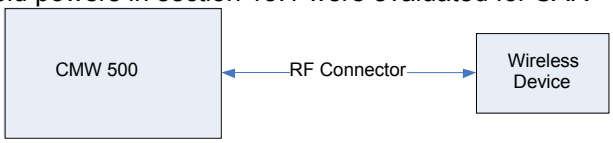


**Figure 13-1**
**Power Measurement Setup**

## 13.2 CDMA Conducted Powers

| | | | Loopback | | Data | | | |
|---|---|---|---|---|---|---|---|---|
| **Band** | **Channel** | **Frequency** | **SO55 [dBm]** | **SO55 [dBm]** | **TDSO SO32 [dBm]** | **TDSO SO32 [dBm]** | **1x EvDO Rev. 0 [dBm]** | **1x EvDO Rev. A [dBm]** |
| | F-RC | MHz | RC1 | RC3 | FCH+SCH | FCH | (RTAP) | (RETAP) |
| Cellular | 564 | 820.1 | 24.71 | 24.75 | 24.68 | 24.65 | 24.70 | 24.65 |
| | 1013 | 824.7 | 24.86 | 24.91 | 24.88 | 24.83 | 24.88 | 24.74 |
| | 384 | 836.52 | 24.93 | 24.95 | 24.91 | 24.96 | 24.89 | 24.83 |
| | 777 | 848.31 | 24.95 | 24.96 | 24.96 | 24.97 | 24.96 | 24.94 |
| PCS | 25 | 1851.25 | 24.96 | 24.98 | 25.00 | 24.99 | 24.30 | 24.27 |
| | 600 | 1880 | 24.80 | 24.85 | 24.84 | 24.91 | 24.58 | 24.48 |
| | 1175 | 1908.75 | 24.87 | 24.88 | 24.93 | 24.90 | 24.89 | 24.19 |

Note: RC1 is only applicable for IS-95 compatibility.

Per KDB Publication 941225 D01:
1. Head SAR was tested with SO55 RC3. SO55 RC1 was not required since the average output power was not more than 0.25 dB than the SO55 RC3 powers.
2. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. Ev-Do and TDSO / SO32 FCH+SCH SAR tests were not required since the average output power was not more than 0.25 dB higher than the TDSO / SO32 FCH only powers.
3. Hotspot SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0. If the average output power of Subtype 2 for Rev. A is less than the Rev. 0 power levels, then Rev. A SAR is not required. Otherwise, SAR is measured on the maximum output channel for Rev. A using the exposure configuration that results in the highest SAR for that RF channel in Rev. 0. SAR. SAR was additionally tested for 1x RTT hotspot using TDSO / SO32 FCH to address the CDMA Voice + LTE WIFI Hotspot simultaneous transmission scenario.

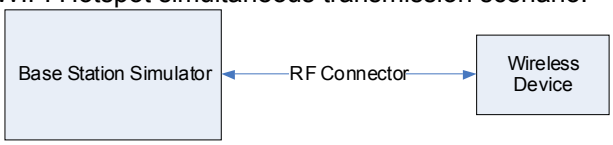


**Figure 13-2**
**Power Measurement Setup**

## 13.3 WLAN Conducted Powers

**Table 13-1**
**IEEE 802.11b Average RF Power**

| Mode | Freq | Channel | Conducted Power [dBm] | | | |
|---|---|---|---|---|---|---|
| | | | Data Rate [Mbps] | | | |
| | [MHz] | | 1 | 2 | 5.5 | 11 |
| 802.11b | 2412 | 1 | 15.85 | 15.78 | 15.77 | 15.80 |
| 802.11b | 2437 | 6 | 16.01 | 16.01 | 16.07 | 16.03 |
| 802.11b | 2462 | 11 | 16.20 | 16.22 | 16.26 | 16.14 |

**Table 13-2**
**IEEE 802.11g Average RF Power**

| Mode | Freq | Channel | Conducted Power [dBm] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Data Rate [Mbps] | | | | | | | |
| | [MHz] | | 6 | 9 | 12 | 18 | 24 | 36 | 48 | 54 |
| 802.11g | 2412 | 1 | 12.89 | 12.92 | 12.99 | 12.92 | 12.88 | 12.83 | 12.83 | 12.86 |
| 802.11g | 2437 | 6 | 13.04 | 13.12 | 13.10 | 13.11 | 13.15 | 13.02 | 13.01 | 13.06 |
| 802.11g | 2462 | 11 | 13.40 | 13.36 | 13.35 | 13.32 | 13.39 | 13.31 | 13.27 | 13.25 |

**Table 13-3**
**IEEE 802.11n Average RF Power**

| Mode | Freq | Channel | Conducted Power [dBm] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Data Rate [Mbps] | | | | | | | |
| | [MHz] | | 6.5 | 13 | 20 | 26 | 39 | 52 | 58 | 65 |
| 802.11n | 2412 | 1 | 11.75 | 11.79 | 11.66 | 11.77 | 11.74 | 11.72 | 11.83 | 11.65 |
| 802.11n | 2437 | 6 | 12.00 | 11.96 | 11.89 | 12.05 | 12.04 | 12.06 | 12.10 | 12.05 |
| 802.11n | 2462 | 11 | 12.33 | 12.37 | 12.28 | 12.29 | 12.33 | 12.27 | 12.29 | 12.27 |

**Table 13-4**
**IEEE 802.11a Average RF Power**

| Mode | Freq | Channel | Conducted Power [dBm] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Data Rate [Mbps] | | | | | | | |
| | [MHz] | | 6 | 9 | 12 | 18 | 24 | 36 | 48 | 54 |
| 802.11a | **5180** | **36** | 14.06 | 14.15 | 14.01 | 14.07 | 14.18 | 14.15 | 14.13 | 14.26 |
| 802.11a | 5200 | 40 | 14.03 | 14.16 | 14.08 | 14.03 | 14.07 | 14.16 | 14.22 | 14.23 |
| 802.11a | 5220 | 44 | 14.03 | 14.06 | 13.98 | 14.17 | 14.04 | 14.17 | 14.27 | 14.08 |
| 802.11a | **5240** | **48** | 14.04 | 14.06 | 14.07 | 14.08 | 14.16 | 14.17 | 14.17 | 14.21 |
| 802.11a | **5260** | **52** | 14.06 | 14.05 | 14.10 | 14.14 | 14.13 | 14.15 | 14.21 | 14.16 |
| 802.11a | 5280 | 56 | 14.03 | 14.10 | 14.05 | 14.18 | 14.11 | 14.06 | 14.20 | 14.14 |
| 802.11a | 5300 | 60 | 14.01 | 14.07 | 14.02 | 14.08 | 14.13 | 14.11 | 14.16 | 14.15 |
| 802.11a | **5320** | **64** | 14.06 | 13.96 | 14.01 | 14.07 | 14.14 | 14.20 | 14.19 | 14.17 |
| 802.11a | 5500 | 100 | 13.87 | 13.91 | 13.73 | 13.85 | 13.77 | 13.82 | 13.82 | 13.96 |
| 802.11a | **5520** | **104** | 13.75 | 13.79 | 13.74 | 13.84 | 13.73 | 14.00 | 13.95 | 14.00 |
| 802.11a | 5540 | 108 | 13.84 | 13.85 | 13.72 | 13.80 | 13.72 | 13.94 | 13.97 | 13.91 |
| 802.11a | 5560 | 112 | 13.78 | 13.81 | 13.95 | 13.89 | 13.93 | 13.97 | 14.02 | 14.03 |
| 802.11a | **5580** | **116** | 13.79 | 13.76 | 13.86 | 13.91 | 13.91 | 13.87 | 13.91 | 13.85 |
| 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 | 13.78 | 13.73 | 13.80 | 13.82 | 13.84 | 13.71 | 13.79 | 13.79 |
| 802.11a | **5680** | **136** | 13.83 | 13.88 | 13.78 | 13.77 | 13.82 | 13.90 | 13.91 | 13.82 |
| 802.11a | 5700 | 140 | 13.84 | 13.80 | 13.76 | 13.83 | 13.85 | 13.84 | 13.88 | 13.91 |
| 802.11a | **5745** | **149** | 13.76 | 13.79 | 13.77 | 13.80 | 13.83 | 13.90 | 13.85 | 13.90 |
| 802.11a | 5765 | 153 | 13.70 | 13.77 | 13.79 | 13.76 | 13.82 | 13.87 | 13.88 | 13.89 |
| 802.11a | **5785** | **157** | 13.72 | 13.74 | 13.77 | 13.78 | 13.75 | 13.86 | 13.85 | 13.90 |
| 802.11a | **5805** | **161** | 13.73 | 13.76 | 13.73 | 13.79 | 13.79 | 13.85 | 13.88 | 13.85 |
| 802.11a | 5825 | 165 | 13.64 | 13.77 | 13.75 | 13.79 | 13.83 | 13.81 | 13.89 | 13.85 |

Per FCC KDB Publication 443999 and RSS-210 A9.2(3), transmission on channels which overlap the 5600-5650 MHz is prohibited as a client. This device does not transmit any beacons or initiate any transmissions in 5.3 GHz and 5.5 GHz Band.

**Table 13-5**
**IEEE 802.11n Average RF Power**

| Mode | Freq | Channel | Conducted Power [dBm] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Data Rate [Mbps] | | | | | | | |
| | [MHz] | | 6.5 | 13 | 20 | 26 | 39 | 52 | 58 | 65 |
| 802.11n | **5180** | **36** | 12.81 | 12.85 | 12.90 | 12.89 | 12.94 | 12.97 | 13.02 | 13.01 |
| 802.11n | 5200 | 40 | 12.92 | 12.80 | 12.85 | 12.96 | 12.91 | 13.00 | 12.84 | 13.01 |
| 802.11n | 5220 | 44 | 12.84 | 12.85 | 12.90 | 12.85 | 12.96 | 12.96 | 12.88 | 12.98 |
| 802.11n | **5240** | **48** | 12.81 | 12.89 | 12.91 | 12.94 | 12.95 | 13.01 | 13.07 | 13.10 |
| 802.11n | **5260** | **52** | 12.86 | 12.86 | 12.95 | 13.00 | 12.89 | 13.00 | 13.00 | 13.09 |
| 802.11n | 5280 | 56 | 12.81 | 12.73 | 12.94 | 13.01 | 13.02 | 13.04 | 12.99 | 13.01 |
| 802.11n | 5300 | 60 | 12.93 | 12.92 | 12.83 | 12.84 | 12.94 | 12.94 | 12.98 | 12.91 |
| 802.11n | **5320** | **64** | 12.82 | 12.87 | 12.80 | 12.81 | 13.00 | 12.87 | 13.00 | 12.97 |
| 802.11n | 5500 | 100 | 12.77 | 12.76 | 12.70 | 12.74 | 12.67 | 12.68 | 12.79 | 12.75 |
| 802.11n | **5520** | **104** | 12.68 | 12.64 | 12.64 | 12.69 | 12.73 | 12.80 | 12.68 | 12.68 |
| 802.11n | 5540 | 108 | 12.59 | 12.59 | 12.66 | 12.71 | 12.72 | 12.79 | 12.80 | 12.74 |
| 802.11n | 5560 | 112 | 12.66 | 12.64 | 12.71 | 12.70 | 12.75 | 12.74 | 12.73 | 12.75 |
| 802.11n | **5580** | **116** | 12.57 | 12.61 | 12.62 | 12.65 | 12.63 | 12.70 | 12.75 | 12.71 |
| 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 | 12.52 | 12.63 | 12.57 | 12.54 | 12.66 | 12.70 | 12.69 | 12.64 |
| 802.11n | **5680** | **136** | 12.56 | 12.46 | 12.57 | 12.55 | 12.69 | 12.74 | 12.74 | 12.72 |
| 802.11n | 5700 | 140 | 12.55 | 12.53 | 12.60 | 12.66 | 12.63 | 12.64 | 12.72 | 12.73 |
| 802.11n | **5745** | **149** | 12.61 | 12.63 | 12.72 | 12.71 | 12.69 | 12.79 | 12.77 | 12.79 |
| 802.11n | 5765 | 153 | 12.66 | 12.58 | 12.67 | 12.64 | 12.69 | 12.68 | 12.80 | 12.79 |
| 802.11n | **5785** | **157** | 12.62 | 12.56 | 12.69 | 12.70 | 12.66 | 12.60 | 12.67 | 12.65 |
| 802.11n | **5805** | **161** | 12.59 | 12.60 | 12.49 | 12.59 | 12.72 | 12.77 | 12.69 | 12.79 |
| 802.11n | 5825 | 165 | 12.62 | 12.55 | 12.55 | 12.48 | 12.67 | 12.64 | 12.72 | 12.89 |

Per FCC KDB Publication 443999 and RSS-210 A9.2(3), transmission on channels which overlap the 5600-5650 MHz is prohibited as a client. This device does not transmit any beacons or initiate any transmissions in 5.3 GHz and 5.5 GHz Bands.

Justification for reduced test configurations for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Meeting Notes:

- For 2.4 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11b were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
- For 5 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11a were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
- When the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the 1g averaged SAR is <0.8 W/kg, SAR testing on other channels is not required. Otherwise, the other default (or corresponding required) test channels were additionally tested using the lowest data rate.
- The underlined data rate and channel above were tested for SAR.


**Figure 13-3**
**Power Measurement Setup**

# 14 FCC PERSONAL WIRELESS ROUTER CONFIGURATIONS

## 14.1 Personal Wireless Router Considerations

Some battery-operated handsets have the capability to transmit and receive internet connectivity through simultaneous transmission of WIFI in conjunction with a separate licensed transmitter. The FCC has provided guidance in KDB Publication 941225 D06 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, back and edges of the device with antennas 2.5 cm or closer to the edge of the device, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

## 14.2 SAR Test Setup for Personal Wireless Router Features

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions. Therefore, SAR must be evaluated for each frequency transmission and mode separately and summed with the WIFI transmitter according to KDB 648474 publication procedures. The “Portable Hotspot” feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.

# 15 SYSTEM VERIFICATION

## 15.1 Tissue Verification

**Table 15-1**
**Measured Tissue Properties**

| Calibrated for Tests Performed on: | Tissue Type | Tissue Temp During Calibration (C°) | Measured Frequency (MHz) | Measured Conductivity, σ (S/m) | Measured Dielectric Constant, ε | TARGET Conductivity, σ (S/m) | TARGET Dielectric Constant, ε | % dev σ | % dev ε |
|---|---|---|---|---|---|---|---|---|---|
| 01/25/2012 | 835H | 20.5 | 820 | 0.881 | 42.42 | 0.898 | 41.571 | -1.89% | 2.04% |
| | | | 835 | 0.893 | 42.16 | 0.900 | 41.500 | -0.78% | 1.59% |
| | | | 850 | 0.906 | 41.93 | 0.916 | 41.500 | -1.09% | 1.04% |
| 01/25/2012 | 1900H | 24.1 | 1850 | 1.337 | 39.74 | 1.400 | 40.000 | -4.50% | -0.65% |
| | | | 1880 | 1.374 | 39.61 | 1.400 | 40.000 | -1.86% | -0.98% |
| | | | 1910 | 1.401 | 39.50 | 1.400 | 40.000 | 0.07% | -1.25% |
| | | | 1920 | 1.405 | 39.33 | 1.400 | 40.000 | 0.36% | -1.68% |
| 01/30/2012 | 1900H | 21.5 | 1850 | 1.382 | 38.30 | 1.400 | 40.000 | -1.29% | -4.25% |
| | | | 1880 | 1.415 | 38.26 | 1.400 | 40.000 | 1.07% | -4.35% |
| | | | 1910 | 1.436 | 38.11 | 1.400 | 40.000 | 2.57% | -4.73% |
| 02/14/2012 | 1900H | 20.9 | 1850 | 1.397 | 39.44 | 1.400 | 40.000 | -0.21% | -1.40% |
| | | | 1880 | 1.431 | 39.36 | 1.400 | 40.000 | 2.21% | -1.60% |
| | | | 1910 | 1.469 | 39.22 | 1.400 | 40.000 | 4.93% | -1.95% |
| 02/17/2012 | 1900H | 23.3 | 1850 | 1.394 | 39.32 | 1.400 | 40.000 | -0.43% | -1.70% |
| | | | 1880 | 1.426 | 39.18 | 1.400 | 40.000 | 1.86% | -2.05% |
| | | | 1910 | 1.457 | 39.09 | 1.400 | 40.000 | 4.07% | -2.27% |
| 01/25/2012 | 2450H | 21.5 | 2401 | 1.812 | 38.44 | 1.758 | 39.298 | 3.07% | -2.18% |
| | | | 2450 | 1.871 | 38.18 | 1.800 | 39.200 | 3.94% | -2.60% |
| | | | 2499 | 1.936 | 38.02 | 1.852 | 39.135 | 4.54% | -2.85% |
| 01/26/2012 | 5200H-5800H | 24.4 | 5180 | 4.782 | 35.40 | 4.639 | 36.020 | 3.08% | -1.72% |
| | | | 5200 | 4.795 | 35.43 | 4.660 | 36.000 | 2.90% | -1.58% |
| | | | 5260 | 4.889 | 35.38 | 4.720 | 35.940 | 3.58% | -1.56% |
| | | | 5500 | 5.181 | 34.95 | 4.965 | 35.650 | 4.35% | -1.96% |
| | | | 5745 | 5.429 | 34.43 | 5.215 | 35.355 | 4.10% | -2.62% |
| | | | 5800 | 5.526 | 34.21 | 5.270 | 35.300 | 4.86% | -3.09% |
| 01/23/2012 | 835B | 20.2 | 820 | 0.945 | 53.08 | 0.969 | 55.284 | -2.48% | -3.99% |
| | | | 835 | 0.958 | 52.90 | 0.970 | 55.200 | -1.24% | -4.17% |
| | | | 850 | 0.977 | 52.65 | 0.988 | 55.154 | -1.11% | -4.54% |
| 01/25/2012 | 1900B | 23.4 | 1850 | 1.448 | 51.34 | 1.520 | 53.300 | -4.74% | -3.68% |
| | | | 1880 | 1.485 | 51.32 | 1.520 | 53.300 | -2.30% | -3.71% |
| | | | 1910 | 1.502 | 51.32 | 1.520 | 53.300 | -1.18% | -3.71% |
| | | | 1920 | 1.526 | 51.22 | 1.520 | 53.300 | 0.39% | -3.90% |
| 01/30/2012 | 1900B | 21.9 | 1850 | 1.531 | 51.74 | 1.520 | 53.300 | 0.72% | -2.93% |
| | | | 1880 | 1.559 | 51.73 | 1.520 | 53.300 | 2.57% | -2.95% |
| | | | 1910 | 1.582 | 51.66 | 1.520 | 53.300 | 4.08% | -3.08% |
| 02/15/2012 | 1900B | 21.2 | 1850 | 1.521 | 52.08 | 1.520 | 53.300 | 0.07% | -2.29% |
| | | | 1880 | 1.566 | 52.01 | 1.520 | 53.300 | 3.03% | -2.42% |
| | | | 1910 | 1.589 | 51.91 | 1.520 | 53.300 | 4.54% | -2.61% |
| 02/17/2012 | 1900B | 22.8 | 1850 | 1.516 | 51.84 | 1.520 | 53.300 | -0.26% | -2.74% |
| | | | 1880 | 1.549 | 51.75 | 1.520 | 53.300 | 1.91% | -2.91% |
| | | | 1910 | 1.587 | 51.65 | 1.520 | 53.300 | 4.41% | -3.10% |
| 01/25/2012 | 2450B | 21.3 | 2401 | 1.945 | 50.44 | 1.903 | 52.765 | 2.21% | -4.41% |
| | | | 2450 | 2.012 | 50.29 | 1.950 | 52.700 | 3.18% | -4.57% |
| | | | 2499 | 2.079 | 50.08 | 2.019 | 52.638 | 2.97% | -4.86% |
| 01/26/2012 | 5200B-5800B | 24.4 | 5180 | 5.284 | 47.75 | 5.276 | 49.041 | 0.15% | -2.63% |
| | | | 5200 | 5.347 | 47.71 | 5.299 | 49.014 | 0.91% | -2.66% |
| | | | 5260 | 5.467 | 47.32 | 5.369 | 48.906 | 1.83% | -3.24% |
| | | | 5500 | 5.771 | 46.64 | 5.650 | 48.580 | 2.14% | -3.99% |
| | | | 5745 | 6.205 | 45.92 | 5.936 | 48.248 | 4.53% | -4.83% |
| | | | 5800 | 6.257 | 45.96 | 6.000 | 48.200 | 4.28% | -4.65% |

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

Probe calibration used within ±100 MHz of the test frequency in either 5.725 - 5.85 or 5.47-5.725 GHz is acceptable per KDB Publication 865664 since the design of the SAR probe supports the extended frequency, provided the DASY software version recommended is used for the tests, and the expanded calibration uncertainty (k=2) is less than or equal to 15% (See SAR probe calibration certificate for this information). The dielectric and conductivities measured are within 10% and 5% respectively of the target parameters specified in Supplement C 01-01.

## 15.2 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):

$$Y = \frac{j2\omega\varepsilon_r\varepsilon_0}{\left[\ln(b/a)\right]^2}\int_a^b\int_a^b\int_0^\pi \cos\phi' \frac{\exp\left[-j\omega r(\mu_0\varepsilon_r^{'}\varepsilon_0)^{1/2}\right]}{r} d\phi' d\rho' d\rho$$

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 $j = \sqrt{-1}$ .

## 15.3 Test System Verification

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

**Table 15-2**
**System Verification Results**

| System Verification TARGET & MEASURED | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tissue Frequency (MHz) | Tissue Type | Date: | Amb. Temp (°C) | Liquid Temp (°C) | Input Power (W) | Dipole SN | Probe SN | Measured $SAR_{1g}$ (W/kg) | 1 W Target $SAR_{1g}$ (W/kg) | 1 W Normalized $SAR_{1g}$ (W/kg) | Deviation (%) |
| 835 | Head | 01/25/2012 | 24.4 | 22.4 | 0.100 | 4d026 | 3258 | 0.964 | 9.460 | 9.640 | 1.90% |
| 1900 | Head | 01/25/2012 | 24.3 | 22.9 | 0.040 | 5d141 | 3561 | 1.510 | 39.500 | 37.750 | -4.43% |
| 1900 | Head | 01/30/2012 | 20.7 | 19.7 | 0.040 | 502 | 3561 | 1.490 | 40.200 | 37.250 | -7.34% |
| 1900 | Head | 02/14/2012 | 21.7 | 19.8 | 0.100 | 5d141 | 3022 | 4.160 | 39.500 | 41.600 | 5.32% |
| 1900 | Head | 02/17/2012 | 21.8 | 21.4 | 0.040 | 5d141 | 3022 | 1.620 | 39.500 | 40.500 | 2.53% |
| 2450 | Head | 01/25/2012 | 24.9 | 23.4 | 0.040 | 719 | 3258 | 2.170 | 53.800 | 54.250 | 0.84% |
| 5200 | Head | 01/26/2012 | 23.2 | 22.5 | 0.100 | 1007 | 3561 | 8.090 | 79.800 | 80.900 | 1.38% |
| 5500 | Head | 01/26/2012 | 23.3 | 22.6 | 0.100 | 1007 | 3561 | 8.540 | 86.300 | 85.400 | -1.04% |
| 5800 | Head | 01/26/2012 | 23.5 | 22.8 | 0.100 | 1007 | 3561 | 8.330 | 79.400 | 83.300 | 4.91% |
| 835 | Body | 01/23/2012 | 23.5 | 21.5 | 0.100 | 4d119 | 3258 | 0.983 | 9.540 | 9.830 | 3.04% |
| 1900 | Body | 01/25/2012 | 22.1 | 21.5 | 0.100 | 5d141 | 3213 | 4.000 | 41.400 | 40.000 | -3.38% |
| 1900 | Body | 01/30/2012 | 21.0 | 20.5 | 0.040 | 502 | 3561 | 1.650 | 41.100 | 41.250 | 0.36% |
| 1900 | Body | 02/15/2012 | 23.1 | 21.2 | 0.040 | 5d080 | 3022 | 1.700 | 40.900 | 42.500 | 3.91% |
| 1900 | Body | 02/17/2012 | 24.3 | 22.0 | 0.040 | 5d141 | 3022 | 1.580 | 41.400 | 39.500 | -4.59% |
| 2450 | Body | 01/25/2012 | 22.4 | 20.6 | 0.040 | 719 | 3258 | 2.190 | 51.300 | 54.750 | 6.73% |
| 5200 | Body | 01/26/2012 | 23.6 | 22.4 | 0.100 | 1007 | 3561 | 7.900 | 75.500 | 79.000 | 4.64% |
| 5500 | Body | 01/26/2012 | 23.7 | 22.5 | 0.100 | 1007 | 3561 | 8.210 | 81.300 | 82.100 | 0.98% |
| 5800 | Body | 01/26/2012 | 23.2 | 22.5 | 0.100 | 1007 | 3561 | 7.720 | 75.300 | 77.200 | 2.52% |

Note: Per KDB Publication 865664, when a reference dipole is not defined within ±100MHz of the test frequency, the system verification may be conducted within ± 200 MHz of the center frequency of the measurement frequencies if the SAR probe calibration is valid and the same tissue-equivalent matter is used for verification and test measurements.

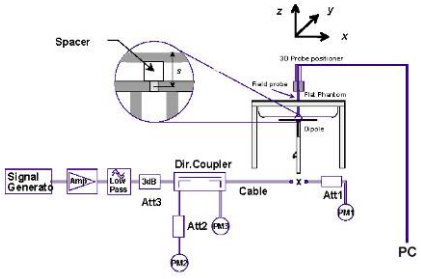


**Figure 15-1**
**System Verification Setup Diagram**

**Figure 15-2**
**System Verification Setup Photo**

# 16 SAR DATA SUMMARY

## 16.1 Head SAR Data

**Table 16-1**
**CDMA Head SAR Results**

| MEASUREMENT RESULTS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode/Band | Conducted Power [dBm] | Power Drift [dB] | Side | Test Position | Phone Serial Number | SAR (1g) |
| MHz | Ch. | | | | | | | (W/kg) |
| 820.10 | 564 | Cell. CDMA - FCC Rule Part 90S | 24.75 | 0.02 | Right | Touch | 2 | 0.489 |
| 820.10 | 564 | Cell. CDMA - FCC Rule Part 90S | 24.75 | 0.02 | Right | Tilt | 2 | 0.329 |
| 820.10 | 564 | Cell. CDMA - FCC Rule Part 90S | 24.75 | -0.04 | Left | Touch | 2 | **0.530** |
| 820.10 | 564 | Cell. CDMA - FCC Rule Part 90S | 24.75 | -0.04 | Left | Tilt | 2 | 0.328 |
| 836.52 | 384 | Cell. CDMA - FCC Rule Part 22H | 24.95 | -0.21 | Right | Touch | 2 | 0.543 |
| 836.52 | 384 | Cell. CDMA - FCC Rule Part 22H | 24.95 | 0.02 | Right | Tilt | 2 | 0.369 |
| 836.52 | 384 | Cell. CDMA - FCC Rule Part 22H | 24.95 | 0.02 | Left | Touch | 2 | **0.594** |
| 836.52 | 384 | Cell. CDMA - FCC Rule Part 22H | 24.95 | -0.17 | Left | Tilt | 2 | 0.356 |
| 1880.00 | 600 | PCS CDMA - FCC Rule Part 24E | 24.85 | 0.08 | Right | Touch | 2 | 0.299 |
| 1880.00 | 600 | PCS CDMA - FCC Rule Part 24E | 24.85 | 0.11 | Right | Tilt | 2 | 0.129 |
| 1880.00 | 600 | PCS CDMA - FCC Rule Part 24E | 24.85 | 0.04 | Left | Touch | 2 | **0.431** |
| 1880.00 | 600 | PCS CDMA - FCC Rule Part 24E | 24.85 | -0.03 | Left | Tilt | 2 | 0.104 |
| **ANSI / IEEE C95.1 1992 - SAFETY LIMIT**<br>**Spatial Peak**<br>**Uncontrolled Exposure/General Population** | | | | | **Head**<br>**1.6 W/kg (mW/g)**<br>averaged over 1 gram | | | |

## Table 16-2
## LTE Band 25 (PCS) Head SAR Results

| MEASUREMENT RESULTS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Modulation | Conducted Power [dBm] | Power Drift [dB] | Target MPR [dB] | Side | Test Position | Phone Serial Number | Bandwidth [MHz] | RB Size | RB Offset | SAR (1g) |
| MHz | Ch. | | | | | | | | | | | | (W/kg) |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.56 | -0.11 | 0 | Right | Touch | 1 | 5 | 12 | 6 | **0.481** |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.37 | 0.03 | 0 | Right | Touch | 1 | 5 | 1 | 0 | 0.427 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.33 | 0.07 | 0 | Right | Touch | 1 | 5 | 1 | 24 | 0.439 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16QAM | 21.68 | 0.16 | 1 | Right | Touch | 1 | 5 | 12 | 6 | 0.365 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16QAM | 21.76 | 0.10 | 1 | Right | Touch | 1 | 5 | 1 | 0 | 0.352 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16QAM | 21.71 | 0.05 | 1 | Right | Touch | 1 | 5 | 1 | 24 | 0.360 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.56 | 0.22 | 0 | Right | Tilt | 1 | 5 | 12 | 6 | **0.362** |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.37 | 0.03 | 0 | Right | Tilt | 1 | 5 | 1 | 0 | 0.328 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.33 | 0.04 | 0 | Right | Tilt | 1 | 5 | 1 | 24 | 0.324 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16QAM | 21.68 | 0.16 | 1 | Right | Tilt | 1 | 5 | 12 | 6 | 0.277 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16QAM | 21.76 | -0.02 | 1 | Right | Tilt | 1 | 5 | 1 | 0 | 0.264 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16QAM | 21.71 | -0.02 | 1 | Right | Tilt | 1 | 5 | 1 | 24 | 0.259 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.56 | -0.17 | 0 | Left | Touch | 1 | 5 | 12 | 6 | **0.278** |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.37 | 0.06 | 0 | Left | Touch | 1 | 5 | 1 | 0 | 0.244 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.33 | -0.07 | 0 | Left | Touch | 1 | 5 | 1 | 24 | 0.250 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16QAM | 21.68 | 0.12 | 1 | Left | Touch | 1 | 5 | 12 | 6 | 0.219 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16QAM | 21.76 | 0.17 | 1 | Left | Touch | 1 | 5 | 1 | 0 | 0.208 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16QAM | 21.71 | 0.03 | 1 | Left | Touch | 1 | 5 | 1 | 24 | 0.217 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.56 | -0.11 | 0 | Left | Tilt | 1 | 5 | 12 | 6 | **0.325** |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.37 | 0.09 | 0 | Left | Tilt | 1 | 5 | 1 | 0 | 0.301 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.33 | 0.00 | 0 | Left | Tilt | 1 | 5 | 1 | 24 | 0.306 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16QAM | 21.68 | 0.07 | 1 | Left | Tilt | 1 | 5 | 12 | 6 | 0.273 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16QAM | 21.76 | 0.01 | 1 | Left | Tilt | 1 | 5 | 1 | 0 | 0.259 |
| 1882.50 | 236365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16QAM | 21.71 | 0.00 | 1 | Left | Tilt | 1 | 5 | 1 | 24 | 0.259 |
| ANSI / IEEE C95.1 1992 - SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population | | | | | | | Head<br>1.6 W/kg (mW/g)<br>averaged over 1 gram | | | | | | |

## Table 16-3
## 2.4 and 5 GHz WLAN Head SAR Results

| MEASUREMENT RESULTS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Service | Conducted Power [dBm] | Power Drift [dB] | Side | Test Position | Phone Serial Number | Data Rate (Mbps) | SAR (1g) |
| MHz | Ch. | | | | | | | | | (W/kg) |
| 2462 | 11 | IEEE 802.11b - FCC Rule Part 15C | DSSS | 16.20 | 0.01 | Right | Touch | 1 | 1 | **0.015** |
| 2462 | 11 | IEEE 802.11b - FCC Rule Part 15C | DSSS | 16.20 | 0.11 | Right | Tilt | 1 | 1 | 0.006 |
| 2462 | 11 | IEEE 802.11b - FCC Rule Part 15C | DSSS | 16.20 | 0.11 | Left | Touch | 1 | 1 | 0.008 |
| 2462 | 11 | IEEE 802.11b - FCC Rule Part 15C | DSSS | 16.20 | 0.12 | Left | Tilt | 1 | 1 | 0.011 |
| 5745 | 149 | IEEE 802.11a - FCC Rule Part 15C | OFDM | 13.76 | 0.12 | Right | Touch | 3 | 6 | 0.001 |
| 5745 | 149 | IEEE 802.11a - FCC Rule Part 15C | OFDM | 13.76 | 0.00 | Right | Tilt | 3 | 6 | 0.000 |
| 5745 | 149 | IEEE 802.11a - FCC Rule Part 15C | OFDM | 13.76 | 0.21 | Left | Touch | 3 | 6 | 0.001 |
| 5745 | 149 | IEEE 802.11a - FCC Rule Part 15C | OFDM | 13.76 | 0.15 | Left | Tilt | 3 | 6 | 0.000 |
| 5180 | 36 | IEEE 802.11a - FCC Rule Part 15E | OFDM | 14.06 | -0.18 | Right | Touch | 3 | 6 | **0.004** |
| 5180 | 36 | IEEE 802.11a - FCC Rule Part 15E | OFDM | 14.06 | 0.17 | Right | Tilt | 3 | 6 | 0.000 |
| 5180 | 36 | IEEE 802.11a - FCC Rule Part 15E | OFDM | 14.06 | -0.14 | Left | Touch | 3 | 6 | 0.000 |
| 5180 | 36 | IEEE 802.11a - FCC Rule Part 15E | OFDM | 14.06 | 0.17 | Left | Tilt | 3 | 6 | 0.000 |
| 5260 | 52 | IEEE 802.11a - FCC Rule Part 15E | OFDM | 14.06 | 0.10 | Right | Touch | 3 | 6 | 0.001 |
| 5260 | 52 | IEEE 802.11a - FCC Rule Part 15E | OFDM | 14.06 | 0.00 | Right | Tilt | 3 | 6 | 0.000 |
| 5260 | 52 | IEEE 802.11a - FCC Rule Part 15E | OFDM | 14.06 | -0.19 | Left | Touch | 3 | 6 | 0.003 |
| 5260 | 52 | IEEE 802.11a - FCC Rule Part 15E | OFDM | 14.06 | -0.15 | Left | Tilt | 3 | 6 | 0.000 |
| 5500 | 100 | IEEE 802.11a - FCC Rule Part 15E | OFDM | 13.87 | 0.14 | Right | Touch | 3 | 6 | 0.003 |
| 5500 | 100 | IEEE 802.11a - FCC Rule Part 15E | OFDM | 13.87 | 0.00 | Right | Tilt | 3 | 6 | 0.000 |
| 5500 | 100 | IEEE 802.11a - FCC Rule Part 15E | OFDM | 13.87 | -0.16 | Left | Touch | 3 | 6 | 0.000 |
| 5500 | 100 | IEEE 802.11a - FCC Rule Part 15E | OFDM | 13.87 | 0.20 | Left | Tilt | 3 | 6 | 0.001 |
| **ANSI / IEEE C95.1 1992 - SAFETY LIMIT**<br>**Spatial Peak**<br>**Uncontrolled Exposure/General Population** | | | | | | **Head**<br>**1.6 W/kg (mW/g)**<br>averaged over 1 gram | | | | |

## 16.2 Body-Worn SAR Data

**Table 16-4**
**CDMA Body-Worn SAR Results**

| MEASUREMENT RESULTS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Service | Conducted Power [dBm] | Power Drift [dB] | Spacing | Phone Serial Number | Side | SAR (1g) |
| MHz | Ch. | | | | | | | | (W/kg) |
| 820.10 | 564 | Cell. CDMA - FCC Rule Part 90S | TDSO32 | 24.65 | -0.01 | 1.0 cm | 2 | back | **0.827** |
| 824.70 | 1013 | Cell. CDMA - FCC Rule Part 22H | TDSO32 | 24.83 | 0.04 | 1.0 cm | 2 | back | 0.838 |
| 836.52 | 384 | Cell. CDMA - FCC Rule Part 22H | TDSO32 | 24.96 | -0.12 | 1.0 cm | 2 | back | **0.844** |
| 848.31 | 777 | Cell. CDMA - FCC Rule Part 22H | TDSO32 | 24.97 | -0.06 | 1.0 cm | 2 | back | 0.726 |
| 1880.00 | 600 | PCS CDMA - FCC Rule Part 24E | TDSO32 | 24.91 | -0.15 | 1.0 cm | 2 | back | **0.696** |
| **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 16-5**
**LTE Body-Worn SAR Results**

| MEASUREMENT RESULTS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Modulation | Conducted Power [dBm] | Power Drift [dB] | Target MPR [dB] | Spacing | Phone Serial Number | Bandwidth [MHz] | RB Size | RB Offset | Side | SAR (1g) |
| MHz | Ch. | | | | | | | | | | | | (W/kg) |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.56 | -0.04 | 0 | 1.0 cm | 1 | 5 | 12 | 6 | back | **0.479** |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.37 | -0.01 | 0 | 1.0 cm | 1 | 5 | 1 | 0 | back | 0.448 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.33 | -0.01 | 0 | 1.0 cm | 1 | 5 | 1 | 24 | back | 0.438 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16 QAM | 21.68 | 0.07 | 1 | 1.0 cm | 1 | 5 | 12 | 6 | back | 0.399 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16 QAM | 21.76 | -0.01 | 1 | 1.0 cm | 1 | 5 | 1 | 0 | back | 0.375 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16 QAM | 21.71 | -0.01 | 1 | 1.0 cm | 1 | 5 | 1 | 24 | back | 0.369 |
| **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 16-6**
**2.4 and 5 GHz WLAN Body-Worn SAR Results**

| MEASUREMENT RESULTS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Service | Conducted Power [dBm] | Power Drift [dB] | Spacing | Phone Serial Number | Data Rate (Mbps) | Side | SAR (1g) |
| MHz | Ch. | | | | | | | | | (W/kg) |
| 2462 | 11 | IEEE 802.11b - FCC Rule Part 15C | DSSS | 16.20 | 0.01 | 1.0 cm | 1 | 1 | back | **0.082** |
| 5745 | 149 | IEEE 802.11a - FCC Rule Part 15C | OFDM | 13.76 | 0.17 | 1.0 cm | 3 | 6 | back | 0.016 |
| 5180 | 36 | IEEE 802.11a - FCC Rule Part 15E | OFDM | 14.06 | 0.17 | 1.0 cm | 3 | 6 | back | 0.013 |
| 5260 | 52 | IEEE 802.11a - FCC Rule Part 15E | OFDM | 14.06 | 0.14 | 1.0 cm | 3 | 6 | back | 0.028 |
| 5500 | 100 | IEEE 802.11a - FCC Rule Part 15E | OFDM | 13.87 | 0.17 | 1.0 cm | 3 | 6 | back | **0.032** |
| **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 | | | |

## 16.3 Hotspot SAR Data

**Table 16-7**
**CDMA/EVDO Hotspot SAR Data**

| MEASUREMENT RESULTS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Service | Conducted Power [dBm] | Power Drift [dB] | Spacing | Phone Serial Number | Side | SAR (1g) |
| MHz | Ch. | | | | | | | | (W/kg) |
| 820.10 | 564 | Cell. CDMA - FCC Rule Part 90S | EVDO Rev. 0 | 24.70 | 0.15 | 1.0 cm | 2 | back | 0.835 |
| 820.10 | 564 | Cell. CDMA - FCC Rule Part 90S | EVDO Rev. 0 | 24.70 | 0.03 | 1.0 cm | 2 | front | 0.748 |
| 820.10 | 564 | Cell. CDMA - FCC Rule Part 90S | EVDO Rev. 0 | 24.70 | -0.06 | 1.0 cm | 2 | bottom | 0.296 |
| 820.10 | 564 | Cell. CDMA - FCC Rule Part 90S | EVDO Rev. 0 | 24.70 | -0.02 | 1.0 cm | 2 | left | **0.929** |
| 820.10 | 564 | Cell. CDMA - FCC Rule Part 90S | TDSO32 | 24.65 | -0.01 | 1.0 cm | 2 | back | 0.827 |
| 820.10 | 564 | Cell. CDMA - FCC Rule Part 90S | TDSO32 | 24.65 | 0.13 | 1.0 cm | 2 | front | 0.730 |
| 820.10 | 564 | Cell. CDMA - FCC Rule Part 90S | TDSO32 | 24.65 | -0.14 | 1.0 cm | 2 | bottom | 0.300 |
| 820.10 | 564 | Cell. CDMA - FCC Rule Part 90S | TDSO32 | 24.65 | 0.04 | 1.0 cm | 2 | left | **0.971** |
| 824.70 | 1013 | Cell. CDMA - FCC Rule Part 22H | EVDO Rev. 0 | 24.88 | -0.15 | 1.0 cm | 2 | back | 0.822 |
| 836.52 | 384 | Cell. CDMA - FCC Rule Part 22H | EVDO Rev. 0 | 24.89 | 0.01 | 1.0 cm | 2 | back | 0.804 |
| 848.31 | 777 | Cell. CDMA - FCC Rule Part 22H | EVDO Rev. 0 | 24.96 | -0.02 | 1.0 cm | 2 | back | 0.693 |
| 836.52 | 384 | Cell. CDMA - FCC Rule Part 22H | EVDO Rev. 0 | 24.89 | 0.08 | 1.0 cm | 2 | front | 0.792 |
| 836.52 | 384 | Cell. CDMA - FCC Rule Part 22H | EVDO Rev. 0 | 24.89 | -0.04 | 1.0 cm | 2 | bottom | 0.372 |
| 824.70 | 1013 | Cell. CDMA - FCC Rule Part 22H | EVDO Rev. 0 | 24.88 | 0.11 | 1.0 cm | 2 | left | 0.864 |
| 836.52 | 384 | Cell. CDMA - FCC Rule Part 22H | EVDO Rev. 0 | 24.89 | -0.06 | 1.0 cm | 2 | left | **0.949** |
| 848.31 | 777 | Cell. CDMA - FCC Rule Part 22H | EVDO Rev. 0 | 24.96 | -0.02 | 1.0 cm | 2 | left | 0.848 |
| 824.70 | 1013 | Cell. CDMA - FCC Rule Part 22H | TDSO32 | 24.83 | 0.04 | 1.0 cm | 2 | back | 0.838 |
| 836.52 | 384 | Cell. CDMA - FCC Rule Part 22H | TDSO32 | 24.96 | -0.12 | 1.0 cm | 2 | back | 0.844 |
| 848.31 | 777 | Cell. CDMA - FCC Rule Part 22H | TDSO32 | 24.97 | -0.06 | 1.0 cm | 2 | back | 0.726 |
| 836.52 | 384 | Cell. CDMA - FCC Rule Part 22H | TDSO32 | 24.96 | -0.03 | 1.0 cm | 2 | front | 0.780 |
| 836.52 | 384 | Cell. CDMA - FCC Rule Part 22H | TDSO32 | 24.96 | -0.05 | 1.0 cm | 2 | bottom | 0.357 |
| 824.70 | 1013 | Cell. CDMA - FCC Rule Part 22H | TDSO32 | 24.83 | 0.03 | 1.0 cm | 2 | left | 0.869 |
| 836.52 | 384 | Cell. CDMA - FCC Rule Part 22H | TDSO32 | 24.96 | 0.03 | 1.0 cm | 2 | left | **0.969** |
| 848.31 | 777 | Cell. CDMA - FCC Rule Part 22H | TDSO32 | 24.97 | -0.16 | 1.0 cm | 2 | left | 0.935 |
| 1908.75 | 1175 | PCS CDMA - FCC Rule Part 24E | EVDO Rev. 0 | 24.89 | -0.06 | 1.0 cm | 2 | back | **0.764** |
| 1908.75 | 1175 | PCS CDMA - FCC Rule Part 24E | EVDO Rev. 0 | 24.89 | -0.02 | 1.0 cm | 2 | front | 0.622 |
| 1908.75 | 1175 | PCS CDMA - FCC Rule Part 24E | EVDO Rev. 0 | 24.89 | 0.22 | 1.0 cm | 2 | bottom | 0.694 |
| 1908.75 | 1175 | PCS CDMA - FCC Rule Part 24E | EVDO Rev. 0 | 24.89 | 0.02 | 1.0 cm | 2 | left | 0.377 |
| 1880.00 | 600 | PCS CDMA - FCC Rule Part 24E | TDSO32 | 24.91 | -0.15 | 1.0 cm | 2 | back | 0.696 |
| 1880.00 | 600 | PCS CDMA - FCC Rule Part 24E | TDSO32 | 24.91 | 0.02 | 1.0 cm | 2 | front | 0.662 |
| 1880.00 | 600 | PCS CDMA - FCC Rule Part 24E | TDSO32 | 24.91 | 0.15 | 1.0 cm | 2 | bottom | **0.729** |
| 1880.00 | 600 | PCS CDMA - FCC Rule Part 24E | TDSO32 | 24.91 | 0.04 | 1.0 cm | 2 | left | 0.426 |
| **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 | | | |

Note: High channel (Ch.1175) was tested for PCS EVDO SAR since output power deviation across the channels is > 0.5 dB for PCS EVDO, per October 2010 TCB Workshop.

## Table 16-8
## LTE Band 25 (PCS) Hotspot SAR Data

| MEASUREMENT RESULTS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Modulation | Conducted Power [dBm] | Power Drift [dB] | Target MPR [dB] | Spacing | Phone Serial Number | Bandwidth [MHz] | RB Size | RB Offset | Side | SAR (1g) |
| MHz | Ch. | | | | | | | | | | | | (W/kg) |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.56 | -0.04 | 0 | 1.0 cm | 1 | 5 | 12 | 6 | back | **0.479** |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.37 | -0.01 | 0 | 1.0 cm | 1 | 5 | 1 | 0 | back | 0.448 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.33 | -0.01 | 0 | 1.0 cm | 1 | 5 | 1 | 24 | back | 0.438 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16 QAM | 21.68 | 0.07 | 1 | 1.0 cm | 1 | 5 | 12 | 6 | back | 0.399 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16 QAM | 21.76 | -0.01 | 1 | 1.0 cm | 1 | 5 | 1 | 0 | back | 0.375 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16 QAM | 21.71 | -0.01 | 1 | 1.0 cm | 1 | 5 | 1 | 24 | back | 0.369 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.56 | -0.02 | 0 | 1.0 cm | 1 | 5 | 12 | 6 | front | **0.231** |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.37 | 0.11 | 0 | 1.0 cm | 1 | 5 | 1 | 0 | front | 0.208 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.33 | 0.15 | 0 | 1.0 cm | 1 | 5 | 1 | 24 | front | 0.228 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16 QAM | 21.68 | 0.05 | 1 | 1.0 cm | 1 | 5 | 12 | 6 | front | 0.200 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16 QAM | 21.76 | 0.03 | 1 | 1.0 cm | 1 | 5 | 1 | 0 | front | 0.182 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16 QAM | 21.71 | 0.00 | 1 | 1.0 cm | 1 | 5 | 1 | 24 | front | 0.188 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.56 | -0.01 | 0 | 1.0 cm | 1 | 5 | 12 | 6 | top | **0.148** |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.37 | 0.03 | 0 | 1.0 cm | 1 | 5 | 1 | 0 | top | 0.137 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.33 | -0.02 | 0 | 1.0 cm | 1 | 5 | 1 | 24 | top | 0.132 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16 QAM | 21.68 | -0.19 | 1 | 1.0 cm | 1 | 5 | 12 | 6 | top | 0.119 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16 QAM | 21.76 | 0.08 | 1 | 1.0 cm | 1 | 5 | 1 | 0 | top | 0.106 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16 QAM | 21.71 | 0.08 | 1 | 1.0 cm | 1 | 5 | 1 | 24 | top | 0.106 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.56 | 0.08 | 0 | 1.0 cm | 1 | 5 | 12 | 6 | left | **0.325** |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.37 | -0.02 | 0 | 1.0 cm | 1 | 5 | 1 | 0 | left | 0.294 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | QPSK | 22.33 | -0.06 | 0 | 1.0 cm | 1 | 5 | 1 | 24 | left | 0.292 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16 QAM | 21.68 | -0.16 | 1 | 1.0 cm | 1 | 5 | 12 | 6 | left | 0.254 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16 QAM | 21.76 | -0.20 | 1 | 1.0 cm | 1 | 5 | 1 | 0 | left | 0.256 |
| 1882.50 | 26365 | LTE Band 25 (PCS) - FCC Rule Part 24E | 16 QAM | 21.71 | -0.11 | 1 | 1.0 cm | 1 | 5 | 1 | 24 | left | 0.265 |
| **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 16-9
## 2.4 GHz WLAN Hotspot SAR Data

| MEASUREMENT RESULTS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Service | Conducted Power [dBm] | Power Drift [dB] | Spacing | Phone Serial Number | Data Rate (Mbps) | Side | SAR (1g) |
| MHz | Ch. | | | | | | | | | (W/kg) |
| 2462 | 11 | IEEE 802.11b - FCC Rule Part 15C | DSSS | 16.20 | 0.01 | 1.0 cm | 1 | 1 | back | **0.082** |
| 2462 | 11 | IEEE 802.11b - FCC Rule Part 15C | DSSS | 16.20 | 0.17 | 1.0 cm | 1 | 1 | front | 0.013 |
| 2462 | 11 | IEEE 802.11b - FCC Rule Part 15C | DSSS | 16.20 | 0.14 | 1.0 cm | 1 | 1 | bottom | 0.009 |
| 2462 | 11 | IEEE 802.11b - FCC Rule Part 15C | DSSS | 16.20 | 0.13 | 1.0 cm | 1 | 1 | right | 0.066 |
| **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 | | | | |

## 16.4 SAR Test Notes

General Notes:

1. 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].
2. Batteries are fully charged for all readings. Standard battery was used.
3. Tissue parameters and temperatures are listed on the SAR plots.
4. Liquid tissue depth was at least 15.0 cm.
5. Device was tested using a fixed spacing for body-worn testing. A separation distance of 10 mm was tested because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
6. To confirm the proper SAR liquid depth, the z-axis plots from the system verifications were included since the system verifications were performed using the same liquid, probe and DAE as the SAR tests in the same time period.
7. Only the primary Tx/Rx antennas were transmitting during testing. The secondary antennas were for receive-only and were not transmitting during testing.
8. The standard battery contains a near field communications (NFC) antenna, and is the only battery that comes with the device. All tests were performed using the standard NFC battery. The technical description contains detailed information about the near field communications antenna. As described in Operational Description, the device does not allow any other battery than model: EB-L1D7IBA.

CDMA Notes:

1. Per FCC KDB Publication 447498 6)c) there is only one channel for cellular CDMA - FCC Rule Part 90S.
2. Per October 2010 TCB Workshop, the mid. channel may be used as a default test channel when the output power deviation across the channels is <0.5 dB, otherwise the maximum output power must be used. If the SAR measured at for each test configuration for the default channel is at least 3.0 dB lower than the SAR limit, testing at the other channels is optional for such test configuration(s). High channel (Ch.1175) was tested for PCS EVDO SAR since output power deviation across the channels is > 0.5 dB for PCS EVDO.
3. Head SAR for CDMA2000 mode was tested under RC3/SO55 per KDB Publication 941225 D01.
4. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. TDSO / SO32 FCH+SCH SAR tests were not required since the average output power was not more than 0.25 dB higher than the TDSO / SO32 FCH only powers.
5. Per FCC KDB Publication 941225 D01, CDMA Hotspot SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0. If the average output power of Subtype 2 for Rev. A is less than the Rev. 0 power levels, then Rev. A SAR is not required. Otherwise, SAR is measured on the maximum output channel for Rev. A using the exposure configuration that results in the highest SAR for that RF channel in Rev. 0.
6. **SAR was additionally tested for 1x RTT hotspot using TDSO / FCH to address the CDMA Voice + LTE WIFI Hotspot (or SVLTE + 4G Hotspot) simultaneous transmission scenario.**

LTE Notes:

1. Considerations: LTE test configurations are determined according to SAR Test Considerations for LTE handsets and Data Modems KDB 941225 D05 Publication. General test procedures can be found in Section 13.1.1.
2. There is a permanently applied MPR implemented by the manufacturer. 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.
3. A-MPR was disabled for all SAR tests.

4. LTE Head was evaluated to cover third-party VOIP applications that may result in LTE being used held to the ear.
5. Per FCC KDB Publication 941225 D06, when the same wireless modes and device transmission configurations are required for body-worn accessories and hotspot mode, it is not necessary to additionally test body-worn accessory SAR for the same device orientation. Therefore, the hotspot data for the back side configuration additionally shows body-worn compliance at the same distance.

WLAN Notes:

1. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Meeting Notes for 2.4 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11b. Other IEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
2. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Meeting Notes for 5 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11a. Other IEEE 802.11 modes (including 802.11n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
3. When Hotspot is enabled, all 5 GHz bands are disabled.
4. WLAN transmission was verified using an uncalibrated spectrum analyzer
5. When the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the 1g averaged SAR is <0.8 W/kg, SAR testing on other channels is not required. Otherwise, the other default (or corresponding required) test channels were additionally tested using the lowest data rate. .
6. Per FCC KDB Publication 941225 D06, when the same wireless modes and device transmission configurations are required for body-worn accessories and hotspot mode, it is not necessary to additionally test body-worn accessory SAR for the same device orientation. Therefore, the hotspot data for the back side configuration additionally shows body-worn compliance at the same distance.

Hotspot Notes:

1. Top and Right Edges for the CDMA/EVDO antenna were not tested since the antenna distance from the edge was greater than 2.5 cm per FCC KDB Publication 941225 D06 guidance (see Section 1.4).
2. Bottom and Right Edges for the LTE antenna were not tested since the antenna distance from the edge was greater than 2.5 cm per FCC KDB Publication 941225 D06 guidance (see Section 1.4).
3. Top and Left Edges for the WLAN transmitter were not tested since the antenna distance from the edge was greater than 2.5 cm per FCC KDB Publication 941225 D06 (see Section 1.4).
4. During SAR Testing for the Wireless Router conditions per KDB 941225 D06, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 14.2).
5. For Hotspot SAR testing, transmission modes were evaluated separately for SAR. SAR evaluation requires a single frequency of measurement for valid measurements using the SAR probe and tissue which are calibrated for specific limited frequency ranges. Therefore, during SAR evaluation it was ensured that the WLAN transmission was disabled by the manufacturer to assess the standalone SAR. WLAN SAR was separately evaluated to account for the WLAN SAR for portable hotspot exposure conditions (see Section 14).

# 17 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

## 17.1 Introduction

The following procedures adopted from "FCC SAR Considerations for Cell Phones with Multiple Transmitters" FCC KDB Publication 648474 are applicable to handsets with built-in unlicensed transmitters such as 802.11a/b/g/n and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

## 17.2 FCC Power Tables & Conditions

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

**Figure 17-1**
**Output Power Thresholds for Unlicensed Transmitters**

| | Individual Transmitter | Simultaneous Transmission |
|---|---|---|
| **Licensed Transmitters** | Routine evaluation required | SAR not required:<br>Unlicensed only<br>○ when stand-alone 1-g SAR is not required and antenna is ≥ 5 cm from other antennas<br>Licensed & Unlicensed<br>○ when the sum of the 1-g SAR is < 1.6 W/kg for all simultaneous transmitting antennas<br>○ when SAR to peak location separation ratio of simultaneous transmitting antenna pair is < 0.3<br>SAR required:<br>Licensed & Unlicensed<br>antenna pairs with SAR to peak location separation ratio ≥ 0.3; test is only required for the configuration that results in the highest SAR in stand-alone configuration for each wireless mode and exposure condition<br>Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply |
| **Unlicensed Transmitters** | When there is no simultaneous transmission –<br>○ output ≤ 60/f: SAR not required<br>○ output > 60/f: stand-alone SAR required<br>When there is simultaneous transmission –<br>Stand-alone SAR not required when<br>○ output ≤ 2·$P_{Ref}$ and antenna is ≥ 5.0 cm from other antennas<br>○ output ≤ $P_{Ref}$ and antenna is ≥ 2.5 cm from other antennas<br>○ output ≤ $P_{Ref}$ and antenna is < 2.5 cm from other antennas, each with either output power ≤ $P_{Ref}$ or 1-g SAR < 1.2 W/kg<br>Otherwise stand-alone SAR is required<br>When stand-alone SAR is required<br>○ test SAR on highest output channel for each wireless mode and exposure condition<br>○ if SAR for highest output channel is > 50% of SAR limit, evaluate all channels according to normal procedures | |

**Figure 17-2**
**SAR Evaluation Requirements for Multiple Transmitter Handsets**

## 17.3 Head SAR Simultaneous Transmission Analysis

**Table 17-1**
**Simultaneous Transmission Scenario ( CDMA, LTE, 2.4 GHz WIFI Held to Ear)**

| Simult Tx | Configuration | Cell. CDMA - FCC Rule Part 22H SAR (W/kg) | LTE Band 25 (PCS) SAR (W/kg) | 2.4 GHz WIFI SAR (W/kg) | Σ SAR (W/kg) | | | |
|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 1+2 | 2+3 | 1+3 | 1+2+3 |
| Head SAR | Right Cheek | 0.543 | 0.481 | 0.015 | 1.024 | 0.496 | 0.558 | **1.039** |
| | Right Tilt | 0.369 | 0.362 | 0.006 | 0.731 | 0.368 | 0.375 | 0.737 |
| | Left Cheek | 0.594 | 0.278 | 0.008 | 0.872 | 0.286 | 0.602 | 0.880 |
| | Left Tilt | 0.356 | 0.325 | 0.011 | 0.681 | 0.336 | 0.367 | 0.692 |
| Simult Tx | Configuration | Cell. CDMA - FCC Rule Part 90S SAR (W/kg) | LTE Band 25 (PCS) SAR (W/kg) | 2.4 GHz WIFI SAR (W/kg) | Σ SAR (W/kg) | | | |
| | | 1 | 2 | 3 | 1+2 | 2+3 | 1+3 | 1+2+3 |
| Head SAR | Right Cheek | 0.489 | 0.481 | 0.015 | 0.970 | 0.496 | 0.504 | **0.985** |
| | Right Tilt | 0.329 | 0.362 | 0.006 | 0.691 | 0.368 | 0.335 | 0.697 |
| | Left Cheek | 0.530 | 0.278 | 0.008 | 0.808 | 0.286 | 0.538 | 0.816 |
| | Left Tilt | 0.328 | 0.325 | 0.011 | 0.653 | 0.336 | 0.339 | 0.664 |
| Simult Tx | Configuration | PCS CDMA - FCC Rule Part 24E SAR (W/kg) | LTE Band 25 (PCS) SAR (W/kg) | 2.4 GHz WIFI SAR (W/kg) | Σ SAR (W/kg) | | | |
| | | 1 | 2 | 3 | 1+2 | 2+3 | 1+3 | 1+2+3 |
| Head SAR | Right Cheek | 0.299 | 0.481 | 0.015 | 0.780 | 0.496 | 0.314 | **0.795** |
| | Right Tilt | 0.129 | 0.362 | 0.006 | 0.491 | 0.368 | 0.135 | 0.497 |
| | Left Cheek | 0.431 | 0.278 | 0.008 | 0.709 | 0.286 | 0.439 | 0.717 |
| | Left Tilt | 0.104 | 0.325 | 0.011 | 0.429 | 0.336 | 0.115 | 0.440 |

**Table 17-2**
**5 GHz Simultaneous Transmission Scenario (Held to Ear)**

| Simult Tx | Configuration | Cell. CDMA - FCC Rule Part 22H SAR (W/kg) | 5 GHz WIFI SAR (W/kg) | Σ SAR (W/kg) |
|---|---|---|---|---|
| Head SAR | Right Cheek | 0.543 | 0.004 | 0.547 |
| | Right Tilt | 0.369 | 0.000 | 0.369 |
| | Left Cheek | 0.594 | 0.003 | **0.597** |
| | Left Tilt | 0.356 | 0.001 | 0.357 |

| Simult Tx | Configuration | Cell. CDMA - FCC Rule Part 90S SAR (W/kg) | 5 GHz WIFI SAR (W/kg) | Σ SAR (W/kg) |
|---|---|---|---|---|
| Head SAR | Right Cheek | 0.489 | 0.004 | 0.493 |
| | Right Tilt | 0.329 | 0.000 | 0.329 |
| | Left Cheek | 0.530 | 0.003 | **0.533** |
| | Left Tilt | 0.328 | 0.001 | 0.329 |

| Simult Tx | Configuration | PCS CDMA - FCC Rule Part 24E SAR (W/kg) | 5 GHz WIFI SAR (W/kg) | Σ SAR (W/kg) |
|---|---|---|---|---|
| Head SAR | Right Cheek | 0.299 | 0.004 | 0.303 |
| | Right Tilt | 0.129 | 0.000 | 0.129 |
| | Left Cheek | 0.431 | 0.003 | **0.434** |
| | Left Tilt | 0.104 | 0.001 | 0.105 |

## 17.4 Body-Worn Simultaneous Transmission Analysis

**Table 17-3**
**Simultaneous Transmission Scenario (2.4 GHz WIFI Body-Worn) at 1.0 cm**

| Configuration | Mode | CDMA SAR (W/kg) | 2.4 GHz WIFI SAR (W/kg) | LTE Band 25 (PCS) SAR (W/kg) | Σ SAR (W/kg) | | | |
|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 1+2 | 2+3 | 1+3 | 1+2+3 |
| Back Side | Cell. CDMA - FCC Rule Part 22H | 0.844 | 0.082 | 0.479 | 0.926 | 0.561 | 1.323 | **1.405** |
| Back Side | Cell. CDMA - FCC Rule Part 90S | 0.827 | 0.082 | 0.479 | 0.909 | 0.561 | 1.306 | 1.388 |
| Back Side | PCS CDMA - FCC Rule Part 24E | 0.696 | 0.082 | 0.479 | 0.778 | 0.561 | 1.175 | 1.257 |

**Table 17-4**
**Simultaneous Transmission Scenario (5 GHz WIFI Body-Worn) at 1.0 cm**

| Configuration | Mode | CDMA SAR (W/kg) | 5 GHz WIFI SAR (W/kg) | Σ SAR (W/kg) |
|---|---|---|---|---|
| Back Side | Cell. CDMA - FCC Rule Part 22H | 0.844 | 0.032 | **0.876** |
| Back Side | Cell. CDMA - FCC Rule Part 90S | 0.827 | 0.032 | 0.859 |
| Back Side | PCS CDMA - FCC Rule Part 24E | 0.696 | 0.032 | 0.728 |

## 17.5 Hotspot SAR Simultaneous Transmission Analysis

**Table 17-5**
**Simultaneous Transmission Scenario (Hotspot)**

| Simult Tx | Configuration | Cell. 1x Voice CDMA - FCC Rule Part 22H SAR (W/kg) | Cell. EVDO CDMA - FCC Rule Part 22H SAR (W/kg) | LTE Band 25 (PCS) SAR (W/kg) | 2.4 GHz WIFI SAR (W/kg) | Σ SAR (W/kg) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1a | 1b | 2 | 3 | 1a +1b | 1b+3 | 2+3 | 1a+2+3 |
| Body SAR | Back | 0.844 | 0.822 | 0.479 | 0.082 | N/A | 0.904 | 0.561 | **1.405** |
| | Front | 0.780 | 0.792 | 0.231 | 0.013 | N/A | 0.805 | 0.244 | 1.024 |
| | Top | - | - | 0.148 | - | N/A | 0.000 | 0.148 | 0.148 |
| | Bottom | 0.357 | 0.372 | - | 0.009 | N/A | 0.381 | 0.009 | 0.366 |
| | Right | - | - | - | 0.066 | N/A | 0.066 | 0.066 | 0.066 |
| | Left | 0.969 | 0.949 | 0.325 | - | N/A | 0.949 | 0.325 | 1.294 |

| Simult Tx | Configuration | Cell. 1x Voice CDMA - FCC Rule Part 90S SAR (W/kg) | Cell. EVDO CDMA - FCC Rule Part 90S SAR (W/kg) | LTE Band 25 (PCS) SAR (W/kg) | 2.4 GHz WIFI SAR (W/kg) | Σ SAR (W/kg) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1a | 1b | 2 | 3 | 1a +1b | 1b+3 | 2+3 | 1a+2+3 |
| Body SAR | Back | 0.827 | 0.835 | 0.479 | 0.082 | N/A | 0.917 | 0.561 | **1.388** |
| | Front | 0.730 | 0.748 | 0.231 | 0.013 | N/A | 0.761 | 0.244 | 0.974 |
| | Top | - | - | 0.148 | - | N/A | 0.000 | 0.148 | 0.148 |
| | Bottom | 0.300 | 0.296 | - | 0.009 | N/A | 0.305 | 0.009 | 0.309 |
| | Right | - | - | - | 0.066 | N/A | 0.066 | 0.066 | 0.066 |
| | Left | 0.971 | 0.929 | 0.325 | - | N/A | 0.929 | 0.325 | 1.296 |

| Simult Tx | Configuration | PCS 1x Voice CDMA - FCC Rule Part 24E SAR (W/kg) | PCS EVDO CDMA - FCC Rule Part 24E SAR (W/kg) | LTE Band 25 (PCS) SAR (W/kg) | 2.4 GHz WIFI SAR (W/kg) | Σ SAR (W/kg) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1a | 1b | 2 | 3 | 1a +1b | 1b+3 | 2+3 | 1a+2+3 |
| Body SAR | Back | 0.696 | 0.764 | 0.479 | 0.082 | N/A | 0.846 | 0.561 | **1.257** |
| | Front | 0.662 | 0.622 | 0.231 | 0.013 | N/A | 0.635 | 0.244 | 0.906 |
| | Top | - | - | 0.148 | - | N/A | 0.000 | 0.148 | 0.148 |
| | Bottom | 0.729 | 0.694 | - | 0.009 | N/A | 0.703 | 0.009 | 0.738 |
| | Right | - | - | - | 0.066 | N/A | 0.066 | 0.066 | 0.066 |
| | Left | 0.426 | 0.377 | 0.325 | - | N/A | 0.377 | 0.325 | 0.751 |

Note: Per FCC KDB Publication 941225 D06, the edges with antennas more than 2.5 cm are not required to be evaluated for SAR ("-"). The above tables represent a portable hotspot condition.

## 17.6 Simultaneous Transmission Conclusion

The above numerical summed SAR was below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit. No volumetric SAR summation is required per FCC KDB Publication 648474.

# 18 SVLTE POWER REDUCTION CONSIDERATIONS

## 18.1 Introduction

This EUT is capable of Simultaneous Voice and LTE (SVLTE) calls, with the voice call supported by a CDMA 1xRTT transmitter and the data connection supported by a LTE transmitter. The transmitters have separate transmit antennas and RF circuitry (PA, RF filtering), however a dynamic LTE power reduction scheme is applied during a SVLTE call with the 1xRTT voice call in the PCS band for any channel between 25 and 550 (Tx 1851.25 – 1877.50 MHz). All other PCS channels (Ch. 575-1175) and cellular band channels will not apply this power reduction scheme to LTE. This LTE power reduction can be controlled by CDMA Received Signal Strength Indicator (RSSI) and Ec/Io levels. RSSI is a relative indicator of the power level being received by the antenna. Ec/Io is a ratio of signal power to total power, demonstrating the level of signal quality. Power reduction is only applicable for LTE modes and not for CDMA modes during SVLTE calls. LTE does not operate simultaneously with EVDO in both cell and PCS bands. LTE power reduction is not implemented for SAR compliance.

## 18.2 LTE Power Reduction and SVLTE Test and Setup Configuration

The LTE power reduction was investigated by simultaneously connecting the EUT to both LTE and CDMA base station simulators. LTE output powers were measured through conducted RF connections by first placing the LTE data call and then the PCS band 1xRTT call. CDMA RSSI and Ec/Io levels were controlled using the E5515C base station simulator and verified on the EUT with a monitoring mode while conducted powers were measured. SVLTE SAR was evaluated with maximum output power for the 1x-RTT CDMA voice mode and LTE powers both at 22.5 dBm and 18 dBm to verify that there are no noticeable changes in the SAR distribution characteristics due to conditions that require LTE power reduction. Since CDMA RSSI and Ec/Io cannot be maintained in a radiated environment, LTE power was fixed during SAR tests to ensure a constant power throughout the evaluation.

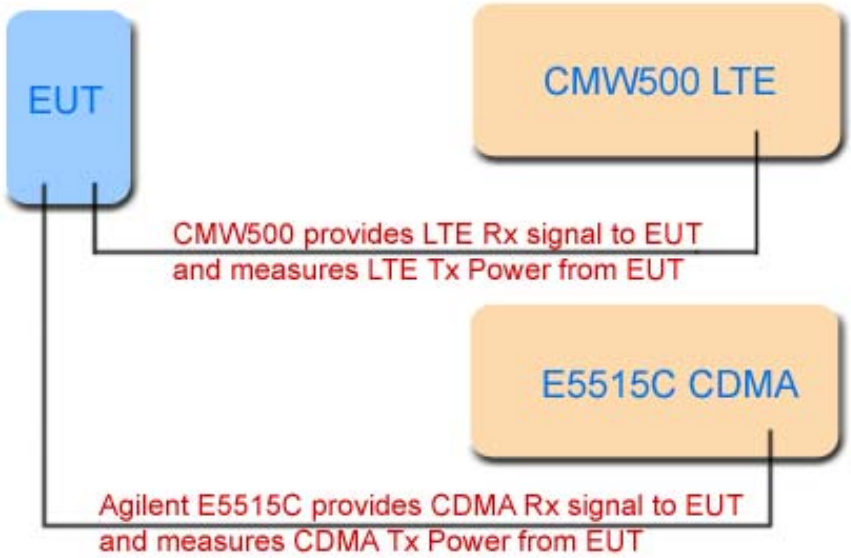


**Figure 18-1**
**SVLTE Conducted Test Setup Diagram**

## 18.3 LTE Power Reduction

### 18.3.1 LTE Power Reduction Data

**Table 18-1**
**Allowed Maximum LTE Powers during SVLTE mode (dBm)**

| RSSI (USPCS Cell power in dBm) | EC/IO (dB) | | | |
|---|---|---|---|---|
| | ≥ -9 | -10, -11 | -12, -13 | ≤ -14 |
| RSSI > -90 | 22.5 dBm (LTE max power) | 22.5 dBm (LTE max power) | 22.5 dBm (LTE max power) | 22.5 dBm (LTE max power) |
| -95 < RSSI ≤ -90 | | 18 dBm (LTE max power) | 13 dBm (LTE max power) | 4 dBm (LTE max power) |
| RSSI ≤ -95 | 4 dBm (LTE max power) | 4 dBm (LTE max power) | 4 dBm (LTE max power) | |

Tolerance (-1.5, + 0.5 dB)

**Table 18-2**
**Highest Measured LTE Powers during SVLTE mode (dBm)**

| RSSI (USPCS Cell power in dBm) | EC/IO (dB) | | | |
|---|---|---|---|---|
| | ≥ -9 | -10, -11 | -12, -13 | ≤ -14 |
| RSSI > -90 | 22.3 dBm | 22.3 dBm | 22.2 dBm | 22.2 dBm |
| -95 < RSSI ≤ -90 | | 18.4 dBm | 13.2 dBm | 3.8 dBm |
| RSSI ≤ -95 | 3.6 dBm | 3.6 dBm | 3.7 dBm | |

With a CDMA Voice call and LTE Data session active, CDMA RSSI and Ec/Io levels were configured using the Agilent E5515C base station simulator through a EUT monitoring mode while LTE conducted powers were measured and verified at the various RSSI and Ec/Io levels.

There are 4 conditions of RSSI and Ec/Io combinations that can trigger the 22.5 dBm LTE output. The evaluation of SVLTE at 22.5 and 18 dBm are based on conditions that would result in worst-case SAR to verify that there is no noticeable change in the SAR distribution characteristics due to the conditions that require LTE power reduction.

## 18.4 SVLTE SAR Test Data

| Test Config | Mode | PCS CDMA Channel | PCS CDMA Freq [MHz] | CDMA RC/SO | LTE Channel | LTE Freq [MHz] | LTE Config | SAR (W/kg) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 18 dBm LTE | 22.5 dBm LTE |
| Right Touch | SVLTE | 25 | 1851.25 | RC3/SO55 | 26453 | 1891.30 | QPSK, RB 12, RB Offset 6 | 0.290 | 0.644 |
| Left Touch | SVLTE | 25 | 1851.25 | RC3/SO55 | 26453 | 1891.30 | QPSK, RB 12, RB Offset 6 | 0.349 | 0.415 |
| Body-worn, Back | SVLTE | 25 | 1851.25 | RC3/SO32 | 26453 | 1891.30 | QPSK, RB 12, RB Offset 6 | 0.547 | 0.653 |

SVLTE SAR Notes:

1. SVLTE was evaluated with a 1xRTT voice call on PCS CDMA channel 25 at maximum output conditions with LTE transmitting for left and right touch and body-worn positions.
2. The LTE configuration of QPSK, RB12, RB Offset 6 represented the worst case condition according to the standalone SAR results for each particular test configuration (Left Touch, Right Touch, and Body-worn Back).
3. SVLTE was tested with LTE in QPSK mode since maximum output powers for 16QAM were not more than 0.25 dB greater than QPSK powers.
4. The same tissue-equivalent liquid and probe calibration factors for PCS band 1xRTT standalone tests were used for simultaneous 1xRTT and LTE (SVLTE) SAR tests.
5. See Figure 1-2 (p.4) for antenna locations and SAR Plots on pp. A9-A16, A45, A53 for standalone 1xRTT and LTE SAR distribution plots. See SAR plots pp. A25-A28, A62-A63 for SVLTE head and body plots.
6. SVLTE SAR was investigated at LTE powers of 22.5 dBm and 18 dBm. The sample was modified by a non-volatile (NV) software change to fix the EUT at these power levels.
7. The evaluation of SVLTE at 22.5 and 18 dBm are based on conditions that would result in worst-case SAR to verify that there is no noticeable change in the SAR distribution characteristics due to the conditions that require the non-SAR related LTE power reduction.

## 18.5 Conclusions for the SVLTE Power Reduction

The evaluation of SVLTE at 22.5 and 18 dBm are based on conditions that would result in worst-case SAR to verify that there is no noticeable change in the SAR distribution characteristics due to the conditions that require LTE power reduction.

# 19 EQUIPMENT LIST

| Manufacturer | Model | Description | Cal Date | Cal Interval | Cal Due | Serial Number |
|---|---|---|---|---|---|---|
| Agilent | 8648D | (9kHz-4GHz) Signal Generator | 10/10/2011 | Annual | 10/10/2012 | 3613A00315 |
| Agilent | 8648D | Signal Generator | 4/5/2011 | Annual | 4/5/2012 | 3629U00687 |
| Agilent | E5515C | Wireless Communications Test Set | 10/14/2011 | Annual | 10/14/2012 | GB41450275 |
| Agilent | E5515C | Wireless Communications Test Set | 10/14/2011 | Annual | 10/14/2012 | GB43304447 |
| Agilent | E5515C | Wireless Communications Test Set | 10/10/2011 | Annual | 10/10/2012 | GB46110872 |
| Agilent | E5515C | Wireless Communications Test Set | 10/20/2011 | Annual | 10/20/2012 | GB46310798 |
| Agilent | 8753E | (30kHz-6GHz) Network Analyzer | 4/21/2011 | Annual | 4/21/2012 | JP38020182 |
| Agilent | E8257D | (250kHz-20GHz) Signal Generator | 4/8/2011 | Annual | 4/8/2012 | MY45470194 |
| 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 |
| Anritsu | MA2411B | Pulse Sensor | 10/13/2011 | Annual | 10/13/2012 | 1027293 |
| Anritsu | ML2495A | Power Meter | 10/13/2011 | Annual | 10/13/2012 | 1039008 |
| Anritsu | ML2438A | Power Meter | 10/13/2011 | Annual | 10/13/2012 | 1070030 |
| Anritsu | MT8820C | Radio Communication Tester | 11/11/2011 | Annual | 11/11/2012 | 6200901190 |
| Control Company | 61220-416 | Long-Stem Thermometer | 3/16/2011 | Biennial | 3/16/2013 | 111391601 |
| Gigatronics | 80701A | (0.05-18GHz) Power Sensor | 10/12/2011 | Annual | 10/12/2012 | 1833460 |
| Gigatronics | 8651A | Universal Power Meter | 10/12/2011 | Annual | 10/12/2012 | 8650319 |
| 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 |
| MiniCircuits | VLF-6000+ | Low Pass Filter | CBT | N/A | N/A | N/A |
| MiniCircuits | VLF-6000+ | Low Pass Filter | CBT | N/A | N/A | N/A |
| MiniCircuits | SLP-2400+ | Low Pass Filter | CBT | N/A | N/A | R8979500903 |
| Mini-Circuits | BW-N20W5+ | DC to 18 GHz Precision Fixed 20 dB Attenuator | CBT | N/A | N/A | N/A |
| Mini-Circuits | NLP-2950+ | Low Pass Filter DC to 2700 MHz | CBT | N/A | N/A | N/A |
| Mini-Circuits | NLP-1200+ | Low Pass Filter DC to 1000 MHz | CBT | N/A | N/A | N/A |
| Narda | BW-S3W2 | Attenuator (3dB) | CBT | N/A | N/A | 120 |
| Narda | 4772-3 | Attenuator (3dB) | CBT | N/A | N/A | 9406 |
| Pasternack | PE2208-6 | Bidirectional Coupler | 6/3/2011 | Annual | 6/3/2012 | N/A |
| Pasternack | PE2209-10 | Bidirectional Coupler | 6/3/2011 | Annual | 6/3/2012 | N/A |
| Rohde & Schwarz | CMW500 | LTE Radio Communication Tester | 8/25/2011 | Annual | 8/25/2012 | 100976 |
| Rohde & Schwarz | NRVD | Dual Channel Power Meter | 4/8/2011 | Biennial | 4/8/2013 | 101695 |
| Rohde & Schwarz | CMW500 | LTE Radio Communication Tester | 11/30/2011 | Annual | 11/30/2012 | 101699 |
| Rohde & Schwarz | CMW500 | LTE Radio Communication Tester | 10/7/2011 | Annual | 10/7/2012 | 103962 |
| Rohde & Schwarz | CMU200 | Base Station Simulator | 4/19/2011 | Annual | 4/19/2012 | 107826 |
| Rohde & Schwarz | CMW500 | LTE Radio Communication Tester | 8/5/2011 | Annual | 8/5/2012 | 112347 |
| Rohde & Schwarz | CMU200 | Base Station Simulator | 6/1/2011 | Annual | 6/1/2012 | 833855/0010 |
| Rohde & Schwarz | SMIQ03B | Signal Generator | 4/6/2011 | Annual | 4/6/2012 | DE27259 |
| SPEAG | D1900V2 | 1900 MHz SAR Dipole | 2/17/2011 | Annual | 2/17/2012 | 502 |
| SPEAG | DAE4 | Dasy Data Acquisition Electronics | 2/21/2011 | Annual | 2/21/2012 | 649 |
| SPEAG | DAE4 | Dasy Data Acquisition Electronics | 4/20/2011 | Annual | 4/20/2012 | 665 |
| SPEAG | D2450V2 | 2450 MHz SAR Dipole | 8/19/2011 | Annual | 8/19/2012 | 719 |
| SPEAG | D5GHzV2 | 5 GHz SAR Dipole | 7/26/2011 | Annual | 7/26/2012 | 1007 |
| SPEAG | ES3DV3 | SAR Probe | 3/24/2011 | Annual | 3/24/2012 | 3213 |
| SPEAG | ES3DV3 | SAR Probe | 4/8/2011 | Annual | 4/8/2012 | 3258 |
| SPEAG | EX3DV4 | SAR Probe | 7/27/2011 | Annual | 7/27/2012 | 3561 |
| SPEAG | D835V2 | 835 MHz SAR Dipole | 8/15/2011 | Annual | 8/15/2012 | 4d026 |
| SPEAG | D835V2 | 835 MHz SAR Dipole | 12/21/2011 | Annual | 12/21/2012 | 4d119 |
| SPEAG | D1900V2 | 1900 MHz SAR Dipole | 7/11/2011 | Annual | 7/11/2012 | 5d141 |
| VWR | 36934-158 | Wall-Mounted Thermometer | 2/26/2010 | Biennial | 2/26/2012 | 101536273 |
| 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 | 111286445 |
| VWR | 36934-158 | Wall-Mounted Thermometer | 1/21/2011 | Biennial | 1/21/2013 | 111286454 |
| VWR | 36934-158 | Wall-Mounted Thermometer | 1/21/2011 | Biennial | 1/21/2013 | 111286460 |
| VWR | 61220-416 | Long Stem Thermometer | 7/1/2011 | Biennial | 7/1/2013 | 111642834 |
| VWR | 61220-416 | Long stem thermometer | 7/1/2011 | Biennial | 7/1/2013 | 111642916 |
| VWR | 61220-416 | Long Stem Thermometer | 7/1/2011 | Biennial | 7/1/2013 | 111642941 |
| VWR | 36934-158 | Wall Thermometer | 9/30/2011 | Biennial | 9/30/2013 | 111859323 |
| VWR | 36934-158 | Wall Thermometer | 9/30/2011 | Biennial | 9/30/2013 | 111859332 |

Note: CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

# 20 MEASUREMENT UNCERTAINTIES

Applicable for frequencies less than 3000 MHz.

| a | b | c | d | e= f(d,k) | f | g | h = c x f/e | i = c x g/e | k |
|---|---|---|---|---|---|---|---|---|---|
| **Uncertainty Component** | **IEEE 1528 Sec.** | **Tol. (± %)** | **Prob. Dist.** | **Div.** | **$c_i$ 1gm** | **$c_i$ 10 gms** | **1gm $u_i$ (± %)** | **10gms $u_i$ (± %)** | **$v_i$** |
| **Measurement System** | | | | | | | | | |
| 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 | ∞ |
| **Test Sample Related** | | | | | | | | | |
| 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 | ∞ |
| **Phantom & Tissue Parameters** | | | | | | | | | |
| 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 |
| **Combined Standard Uncertainty (k=1)** | | | RSS | | | | 12.1 | 11.7 | 299 |
| **Expanded Uncertainty** (95% CONFIDENCE LEVEL) | | | k=2 | | | | 24.2 | 23.5 | |

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

Applicable for frequencies up to 6 GHz.

| a | b | c | d | e= f(d,k) | f | g | h = c x f/e | i = c x g/e | k |
|---|---|---|---|---|---|---|---|---|---|
| **Uncertainty Component** | **IEEE 1528 Sec.** | **Tol. (± %)** | **Prob. Dist.** | **Div.** | **$c_i$ 1gm** | **$c_i$ 10 gms** | **1gm $u_i$ (± %)** | **10gms $u_i$ (± %)** | **$v_i$** |
| **Measurement System** | | | | | | | | | |
| Probe Calibration | E.2.1 | 6.55 | N | 1 | 1.0 | 1.0 | 6.6 | 6.6 | ∞ |
| 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 | ∞ |
| **Test Sample Related** | | | | | | | | | |
| 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 | ∞ |
| **Phantom & Tissue Parameters** | | | | | | | | | |
| 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 |
| **Combined Standard Uncertainty (k=1)** | | | RSS | | | | 12.4 | 12.0 | 299 |
| **Expanded Uncertainty** (95% CONFIDENCE LEVEL) | | | k=2 | | | | 24.7 | 24.0 | |

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

# 21 CONCLUSION

## 21.1 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]

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[27] SAR Measurement procedures for IEEE 802.11a/b/g KDB Publication 248227

[28] FCC SAR Considerations for Handsets with Multiple Transmitters and Antennas, KDB Publication 648474

[29] FCC Application Note for SAR Probe Calibration and System Verification Consideration for Measurements at 150 MHz – 3 GHz, KDB Publication 450824

[30] FCC SAR Evaluation Considerations for Laptop Computers with Antennas Built-in on Display Screens, KDB Publication 616217

[31] FCC SAR Measurement Requirements for 3 – 6 GHz, KDB Publication 865664

[32] FCC Mobile Portable RF Exposure Procedure, KDB Publication 447498

[33] FCC SAR Procedures for Dongle Transmitters, KDB Publication 447498

[34] Anexo à Resolução No. 533, de 10 de Septembro de 2009.

[35] FCC SAR Test Considerations for LTE Handsets and Data Modems, KDB Publication 941225.

[36] IEC 62209-2, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz), Mar. 2010.

[37] FCC Hot Spot SAR v01, KDB Publication 941225 D06.

# APPENDIX A: SAR TEST DATA

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

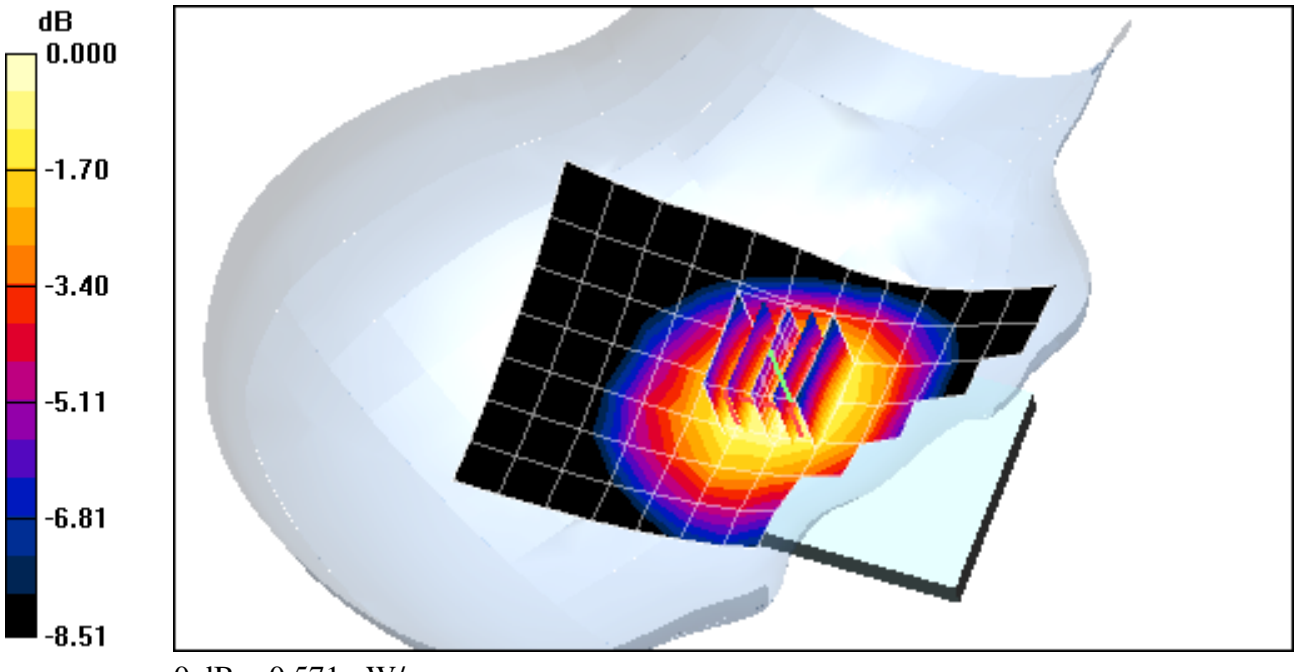
Communication System: Cellular CDMA; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
$f = 836.52$ MHz; $\sigma = 0.894$ mho/m; $\varepsilon_r = 42.1$; $\rho = 1000$ kg/m$^3$
Phantom section: Right Section

Test Date: 01-25-2012; Ambient Temp: 24.4 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## Mode: Cellular CDMA - FCC Rule Part 22H, Right Head, Touch, Mid.ch

**Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.5 V/m; Power Drift = -0.207 dB
Peak SAR (extrapolated) = 0.694 W/kg
**SAR(1 g) = 0.543 mW/g; SAR(10 g) = 0.416 mW/g**




0 dB = 0.571mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

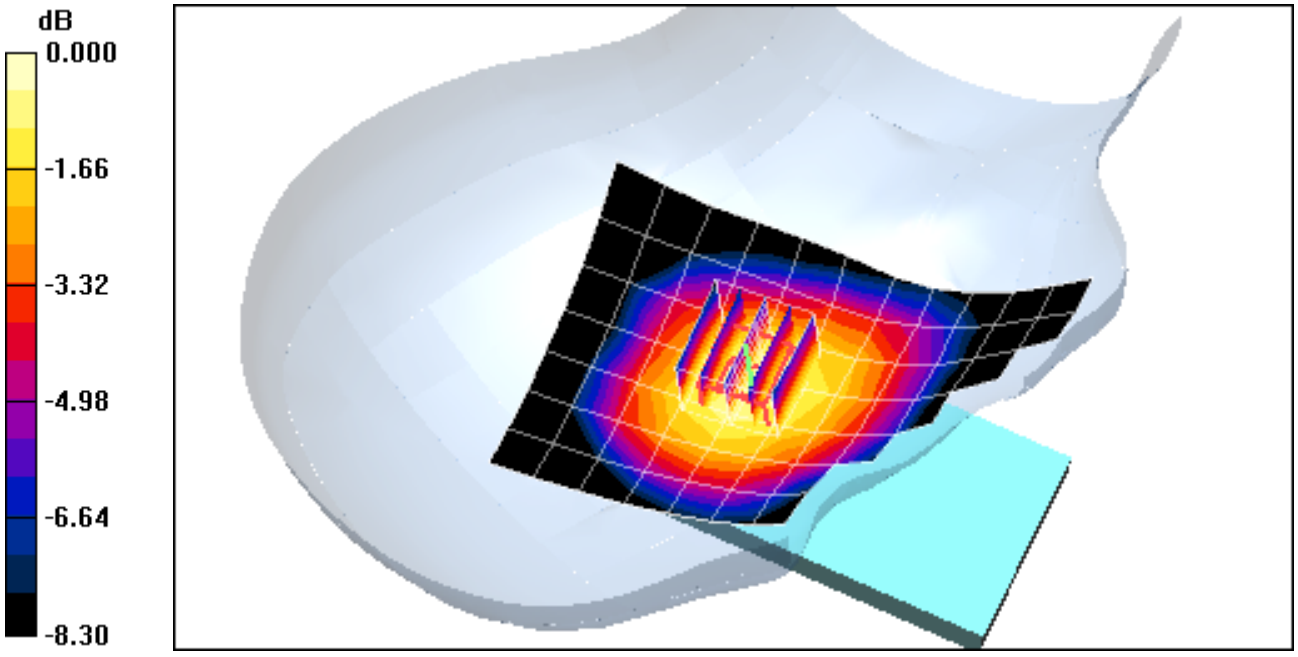
Communication System: Cellular CDMA; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 836.52 MHz; $\sigma$ = 0.894 mho/m; $\varepsilon_r$ = 42.1; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

Test Date: 01-25-2012; Ambient Temp: 24.4 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## Mode: Cellular CDMA - FCC Rule Part 22H, Right Head, Tilt, Mid.ch

**Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.7 V/m; Power Drift = 0.023 dB
Peak SAR (extrapolated) = 0.456 W/kg
**SAR(1 g) = 0.369 mW/g; SAR(10 g) = 0.283 mW/g**




0 dB = 0.385mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

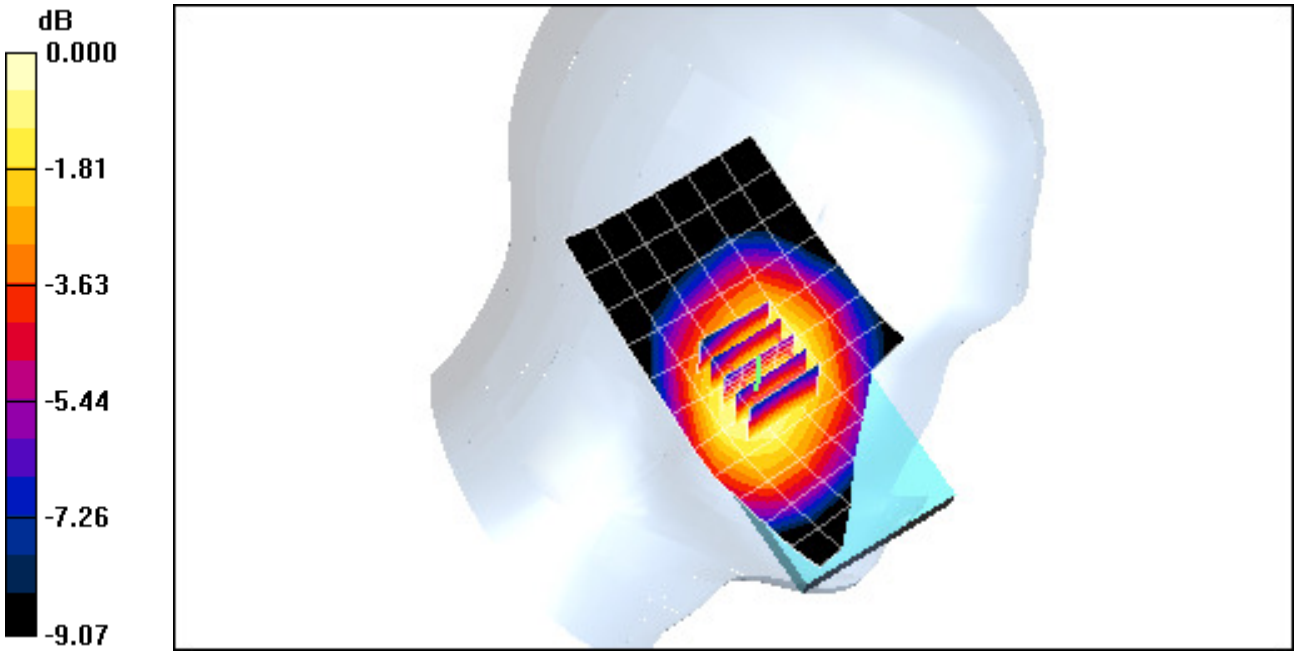
Communication System: Cellular CDMA; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
$f = 836.52$ MHz; $\sigma = 0.894$ mho/m; $\varepsilon_r = 42.1$; $\rho = 1000$ kg/m$^3$
Phantom section: Left Section

Test Date: 01-25-2012; Ambient Temp: 24.4 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## Mode: Cellular CDMA - FCC Rule Part 22H, Left Head, Touch, Mid.ch

**Area Scan (7x14x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.8 V/m; Power Drift = 0.024 dB
Peak SAR (extrapolated) = 0.773 W/kg
**SAR(1 g) = 0.594 mW/g; SAR(10 g) = 0.453 mW/g**




0 dB = 0.623mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

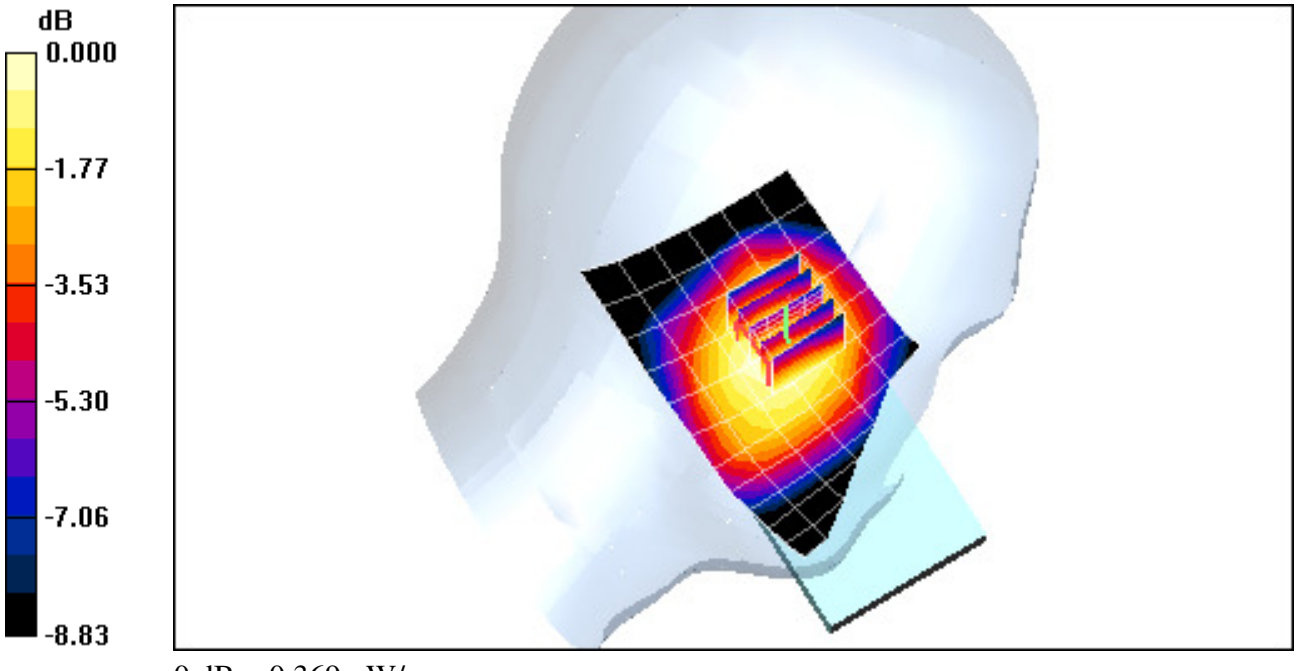
Communication System: Cellular CDMA; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
$f = 836.52$ MHz; $\sigma = 0.894$ mho/m; $\varepsilon_r = 42.1$; $\rho = 1000$ kg/m$^3$
Phantom section: Left Section

Test Date: 01-25-2012; Ambient Temp: 24.4 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## Mode: Cellular CDMA - FCC Rule Part 22H, Left Head, Tilt, Mid.ch

**Area Scan (7x14x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.5 V/m; Power Drift = -0.171 dB
Peak SAR (extrapolated) = 0.444 W/kg
**SAR(1 g) = 0.356 mW/g; SAR(10 g) = 0.276 mW/g**




0 dB = 0.369mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

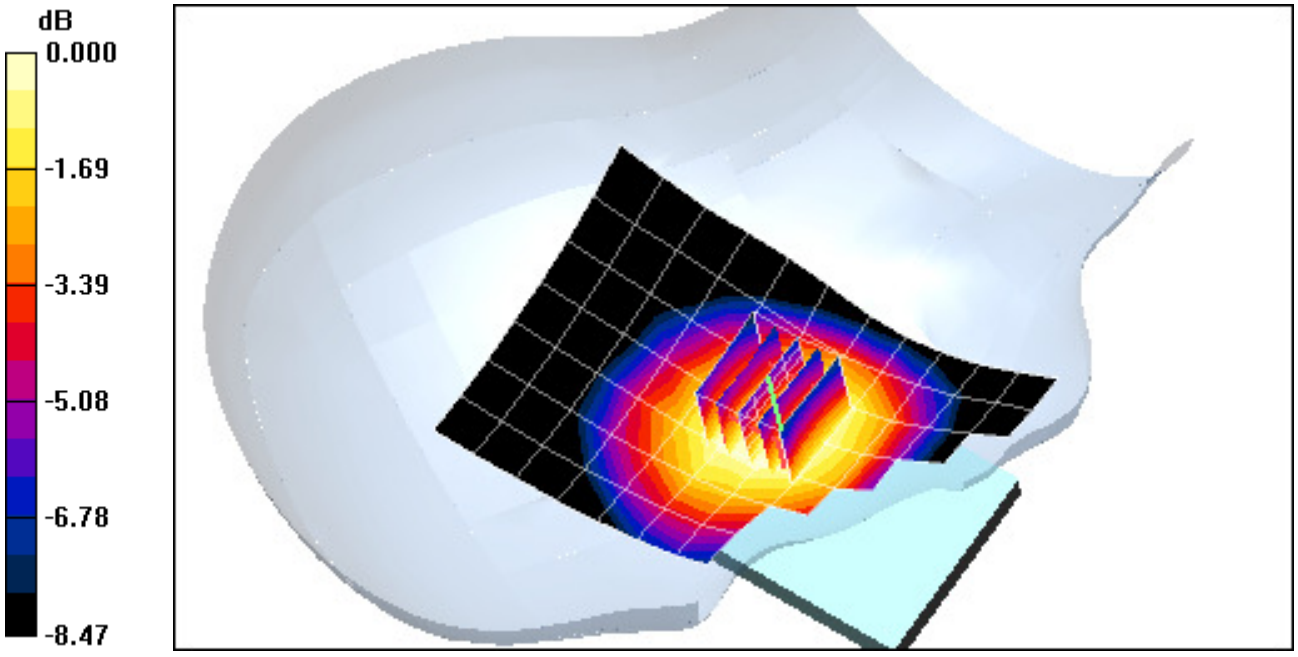
Communication System: Cellular CDMA; Frequency: 820.1 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 820.1 MHz; $\sigma$ = 0.881 mho/m; $\varepsilon_r$ = 42.4; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

Test Date: 01-25-2012; Ambient Temp: 24.4 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## Mode: Cellular CDMA - FCC Rule Part 90S, Right Head, Touch, Mid.ch

**Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.3 V/m; Power Drift = 0.024 dB
Peak SAR (extrapolated) = 0.595 W/kg
**SAR(1 g) = 0.489 mW/g; SAR(10 g) = 0.374 mW/g**




0 dB = 0.519mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

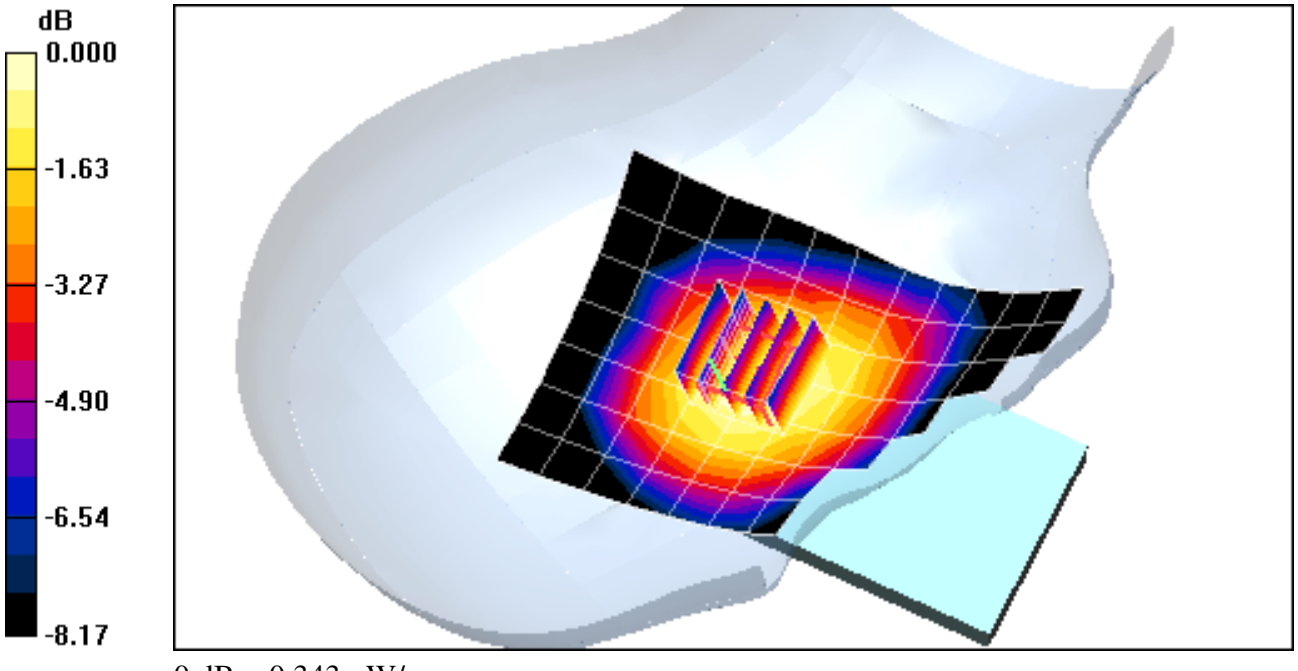
Communication System: Cellular CDMA; Frequency: 820.1 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 820.1 MHz; $\sigma$ = 0.881 mho/m; $\varepsilon_r$ = 42.4; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

Test Date: 01-25-2012; Ambient Temp: 24.4 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## Mode: Cellular CDMA - FCC Rule Part 90S, Tilt, Mid.ch

**Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.6 V/m; Power Drift = 0.018 dB
Peak SAR (extrapolated) = 0.412 W/kg
**SAR(1 g) = 0.329 mW/g; SAR(10 g) = 0.254 mW/g**




0 dB = 0.343mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

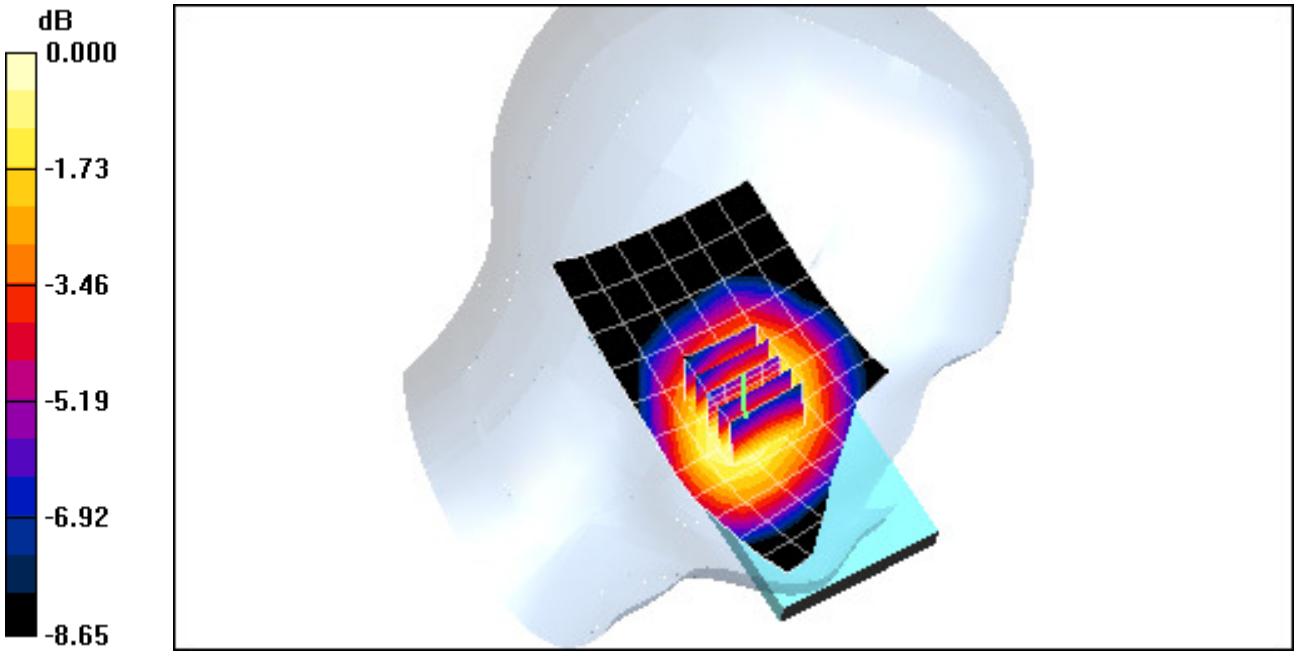
Communication System: Cellular CDMA; Frequency: 820.1 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 820.1 MHz; $\sigma$ = 0.881 mho/m; $\varepsilon_r$ = 42.4; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

Test Date: 01-25-2012; Ambient Temp: 24.4 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## Mode: Cellular CDMA - FCC Rule Part 90S, Left Head, Touch, Mid.ch

**Area Scan (7x14x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.1 V/m; Power Drift = -0.039 dB
Peak SAR (extrapolated) = 0.668 W/kg
**SAR(1 g) = 0.530 mW/g; SAR(10 g) = 0.404 mW/g**




0 dB = 0.557mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

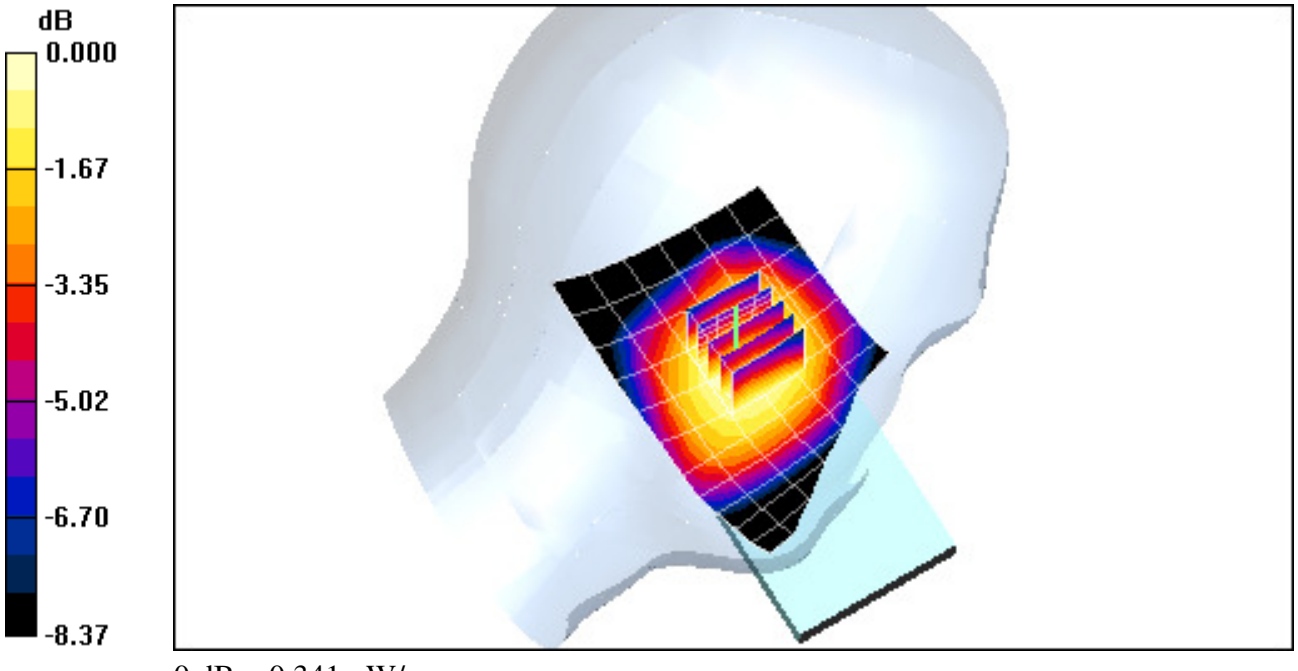
Communication System: Cellular CDMA; Frequency: 820.1 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 820.1 MHz; $\sigma$ = 0.881 mho/m; $\varepsilon_r$ = 42.4; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

Test Date: 01-25-2012; Ambient Temp: 24.4 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## Mode: Cellular CDMA - FCC Rule Part 90S, Left Head, Tilt, Mid.ch

**Area Scan (7x14x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.0 V/m; Power Drift = -0.040 dB
Peak SAR (extrapolated) = 0.396 W/kg
**SAR(1 g) = 0.328 mW/g; SAR(10 g) = 0.258 mW/g**




0 dB = 0.341mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

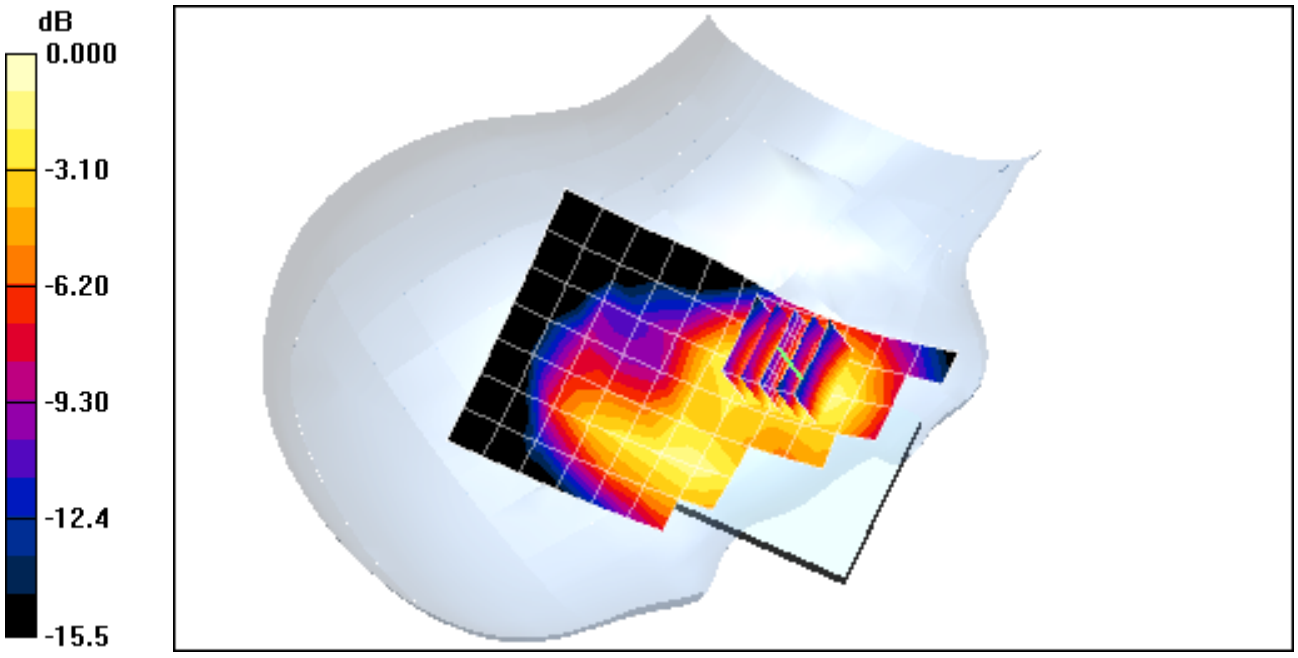
Communication System: PCS CDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; $\sigma$ = 1.42 mho/m; $\varepsilon_r$ = 38.3; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

Test Date: 01-30-2012; Ambient Temp: 20.7 °C; Tissue Temp: 19.7 °C

Probe: EX3DV4 - SN3561; ConvF(7.16, 7.16, 7.16); Calibrated: 7/27/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/20/2011
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: PCS CDMA - FCC Rule Part 24E, Right Head, Touch, Mid.ch

**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.9 V/m; Power Drift = 0.077 dB
Peak SAR (extrapolated) = 0.478 W/kg
**SAR(1 g) = 0.299 mW/g; SAR(10 g) = 0.184 mW/g**




0 dB = 0.322mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

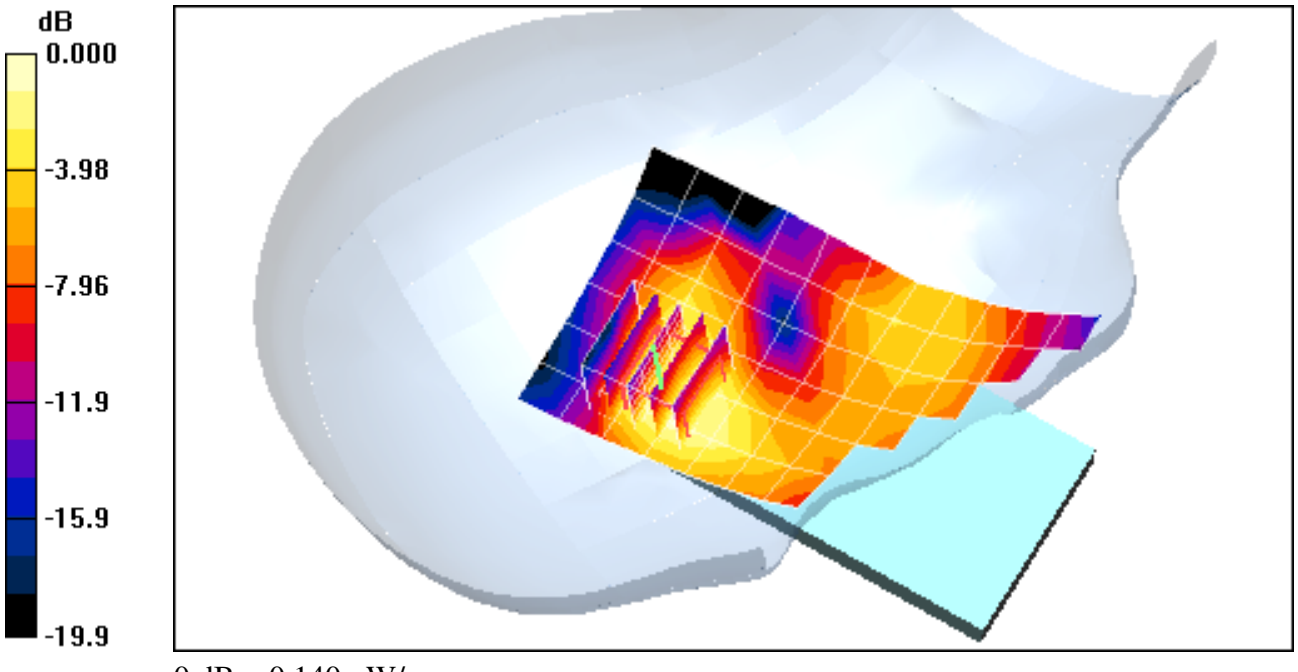
Communication System: PCS CDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; $\sigma$ = 1.42 mho/m; $\varepsilon_r$ = 38.3; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

Test Date: 01-30-2012; Ambient Temp: 20.7 °C; Tissue Temp: 19.7 °C

Probe: EX3DV4 - SN3561; ConvF(7.16, 7.16, 7.16); Calibrated: 7/27/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/20/2011
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: PCS CDMA - FCC Rule Part 24E, Right Head, Tilt, Mid.ch

**Area Scan (7x14x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.63 V/m; Power Drift = 0.114 dB
Peak SAR (extrapolated) = 0.219 W/kg
**SAR(1 g) = 0.129 mW/g; SAR(10 g) = 0.077 mW/g**




0 dB = 0.140mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

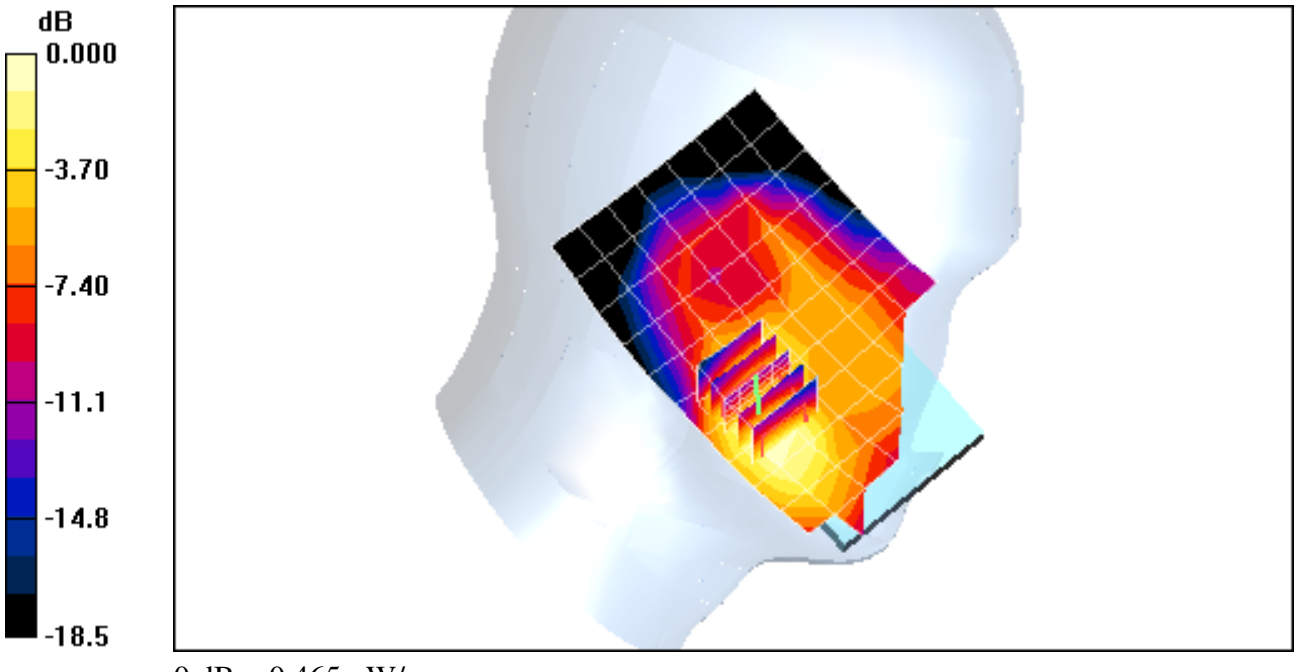
Communication System: PCS CDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; $\sigma$ = 1.42 mho/m; $\varepsilon_r$ = 38.3; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

Test Date: 01-30-2012; Ambient Temp: 20.7 °C; Tissue Temp: 19.7 °C

Probe: EX3DV4 - SN3561; ConvF(7.16, 7.16, 7.16); Calibrated: 7/27/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/20/2011
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: PCS CDMA - FCC Rule Part 24E, Left Head, Touch, Mid.ch

**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.5 V/m; Power Drift = 0.040 dB
Peak SAR (extrapolated) = 0.745 W/kg
**SAR(1 g) = 0.431 mW/g; SAR(10 g) = 0.257 mW/g**




0 dB = 0.465mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

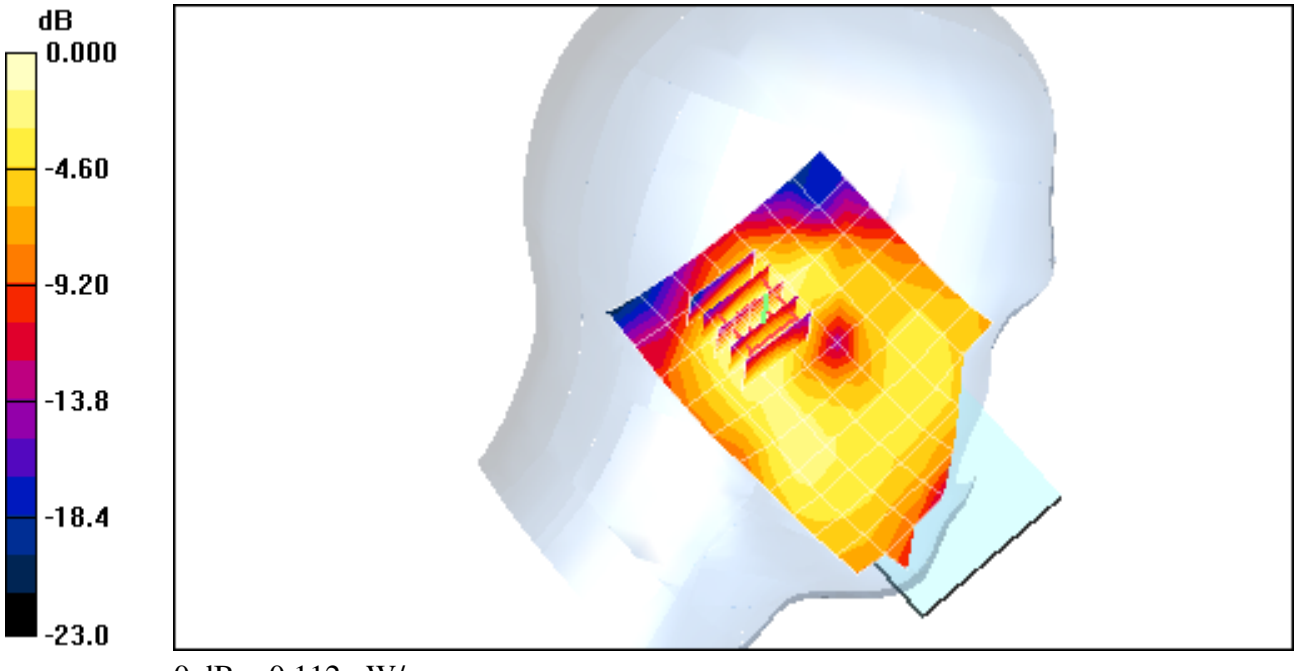
Communication System: PCS CDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; $\sigma$ = 1.42 mho/m; $\varepsilon_r$ = 38.3; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

Test Date: 01-30-2012; Ambient Temp: 20.7 °C; Tissue Temp: 19.7 °C

Probe: EX3DV4 - SN3561; ConvF(7.16, 7.16, 7.16); Calibrated: 7/27/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/20/2011
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: PCS CDMA - FCC Rule Part 24E, Left Head, Tilt, Mid.ch

**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.17 V/m; Power Drift = -0.028 dB
Peak SAR (extrapolated) = 0.177 W/kg
**SAR(1 g) = 0.104 mW/g; SAR(10 g) = 0.061 mW/g**




0 dB = 0.112mW/g

**DUT: A3LSPHL700; Type: Portable Handst; Serial: 1**

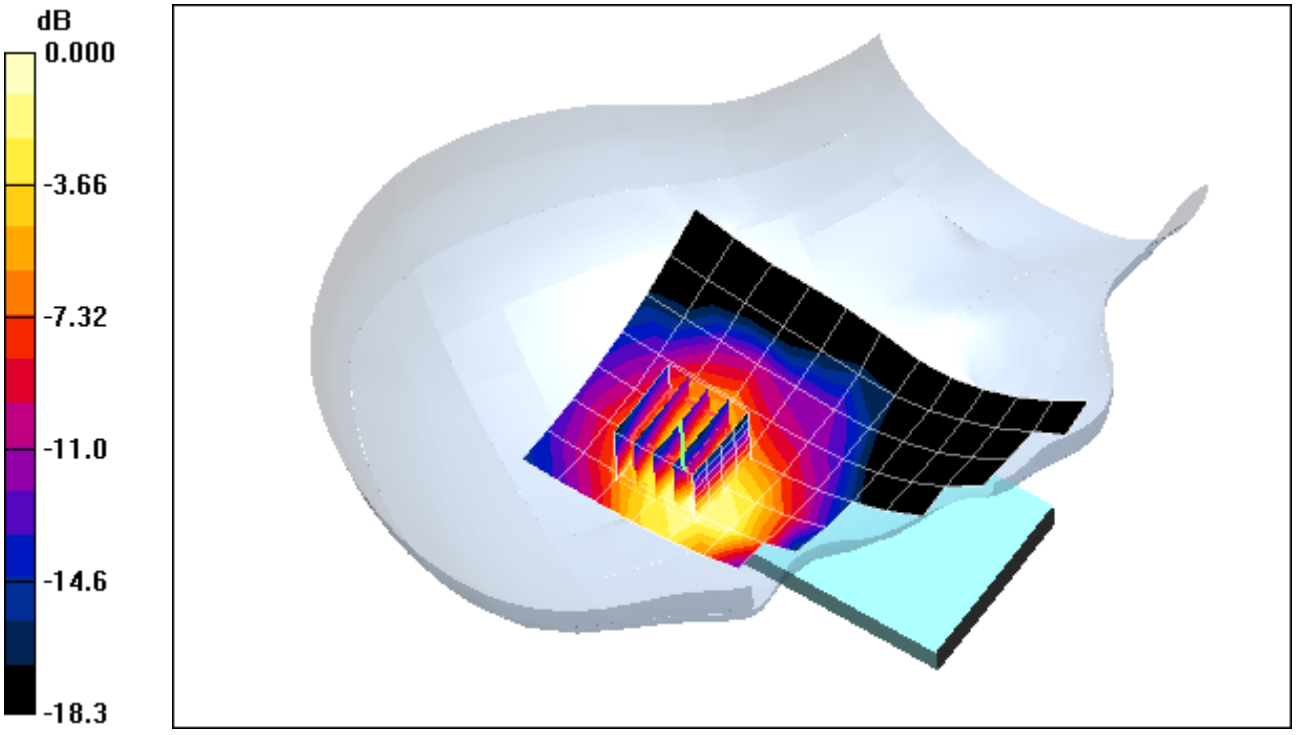
Communication System: LTE PCS 5 Mhz; Frequency: 1882.5 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1882.5 MHz; $\sigma$ = 1.38 mho/m; $\varepsilon_r$ = 39.6; $\rho$ = 1000 kg/$m^3$
Phantom section: Right Section

Test Date: 01-25-2012; Ambient Temp: 24.3°C; Tissue Temp: 22.9°C

Probe: EX3DV4 - SN3561; ConvF(7.16, 7.16, 7.16); Calibrated: 7/27/2011
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 Band 25 (PCS) - FCC Rule Part 24E, Right Head, Touch, 5 MHz BW,Mid.ch, QPSK, 12 RB, 6 RB Offset**

**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.5 V/m; Power Drift = -0.107 dB
Peak SAR (extrapolated) = 1.01 W/kg
**SAR(1 g) = 0.481 mW/g; SAR(10 g) = 0.257 mW/g**




0 dB = 0.534mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 1**

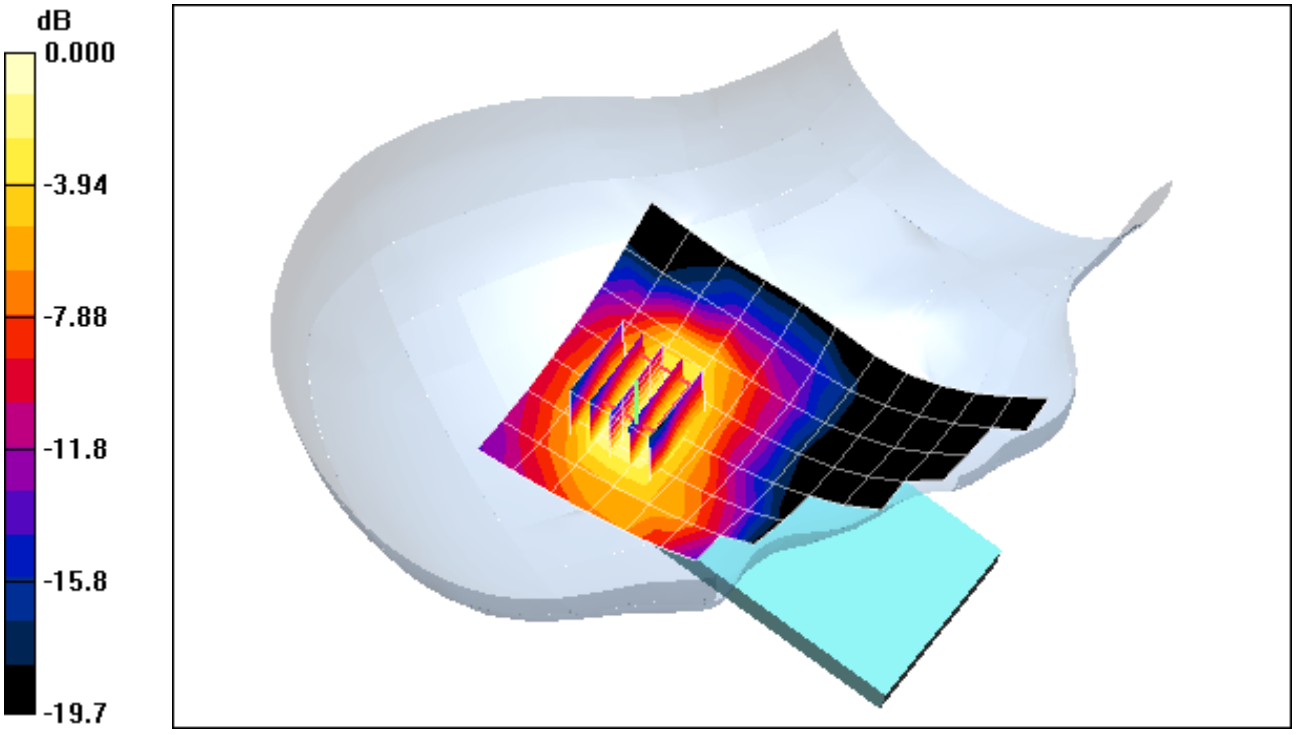
Communication System: LTE PCS 5 Mhz; Frequency: 1882.5 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1882.5 MHz; $\sigma$ = 1.38 mho/m; $\varepsilon_r$ = 39.6; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

Test Date: 01-25-2012; Ambient Temp: 24.3°C; Tissue Temp: 22.9°C

Probe: EX3DV4 - SN3561; ConvF(7.16, 7.16, 7.16); Calibrated: 7/27/2011
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 Band 25 (PCS) - FCC Rule Part 24E, Right Head, Tilt, 5 MHz BW, Mid.ch, QPSK, 12 RB, 6 RB Offset**

**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.6 V/m; Power Drift = 0.214 dB
Peak SAR (extrapolated) = 0.564 W/kg
**SAR(1 g) = 0.362 mW/g; SAR(10 g) = 0.213 mW/g**




0 dB = 0.392mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 1**

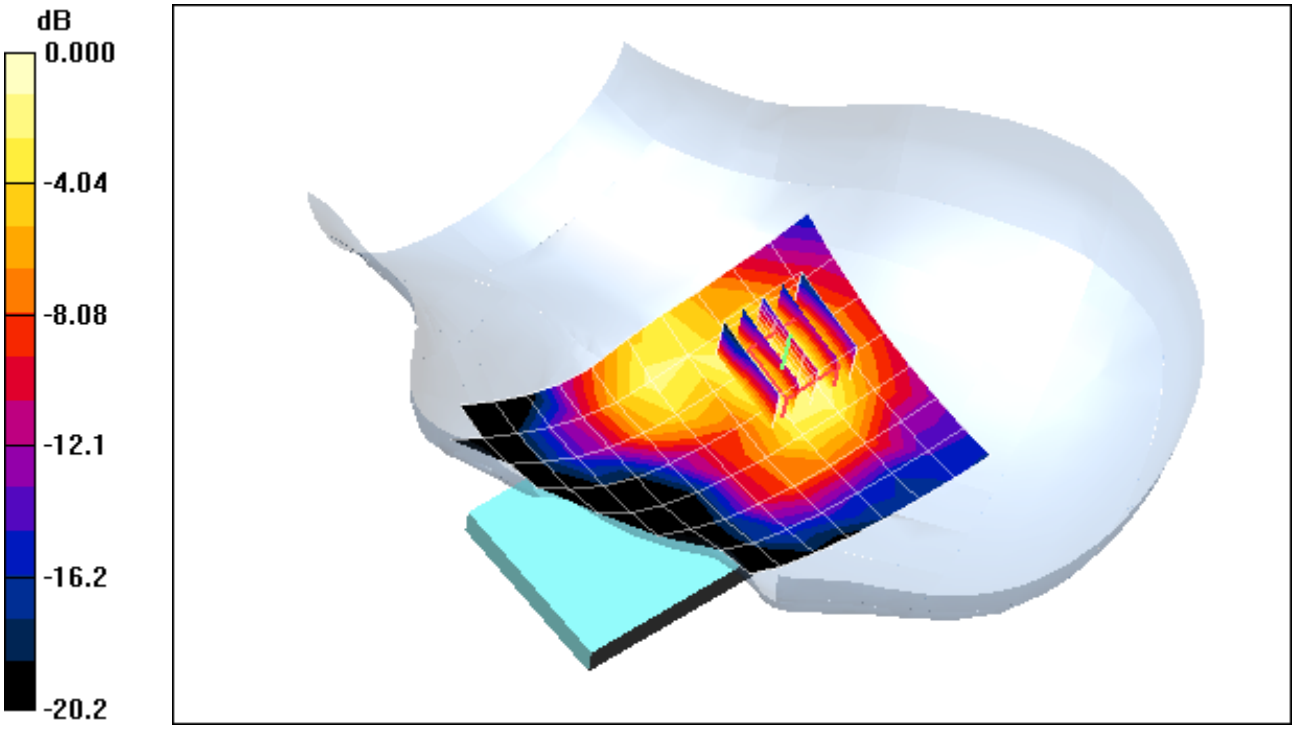
Communication System: LTE PCS 5 Mhz; Frequency: 1880.2 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1882.5 MHz; $\sigma$ = 1.38 mho/m; $\varepsilon_r$ = 39.6; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

Test Date: 01-25-2012; Ambient Temp: 24.3°C; Tissue Temp: 22.9°C

Probe: EX3DV4 - SN3561; ConvF(7.16, 7.16, 7.16); Calibrated: 7/27/2011
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 Band 25 (PCS) - FCC Rule Part 24E, Left Head, Touch, 5 MHz BW, Mid. Ch, QPSK,12 RB, 6 RB Offset**

**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.3 V/m; Power Drift = -0.174 dB
Peak SAR (extrapolated) = 0.402 W/kg
**SAR(1 g) = 0.278 mW/g; SAR(10 g) = 0.164 mW/g**




0 dB = 0.300mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 1**

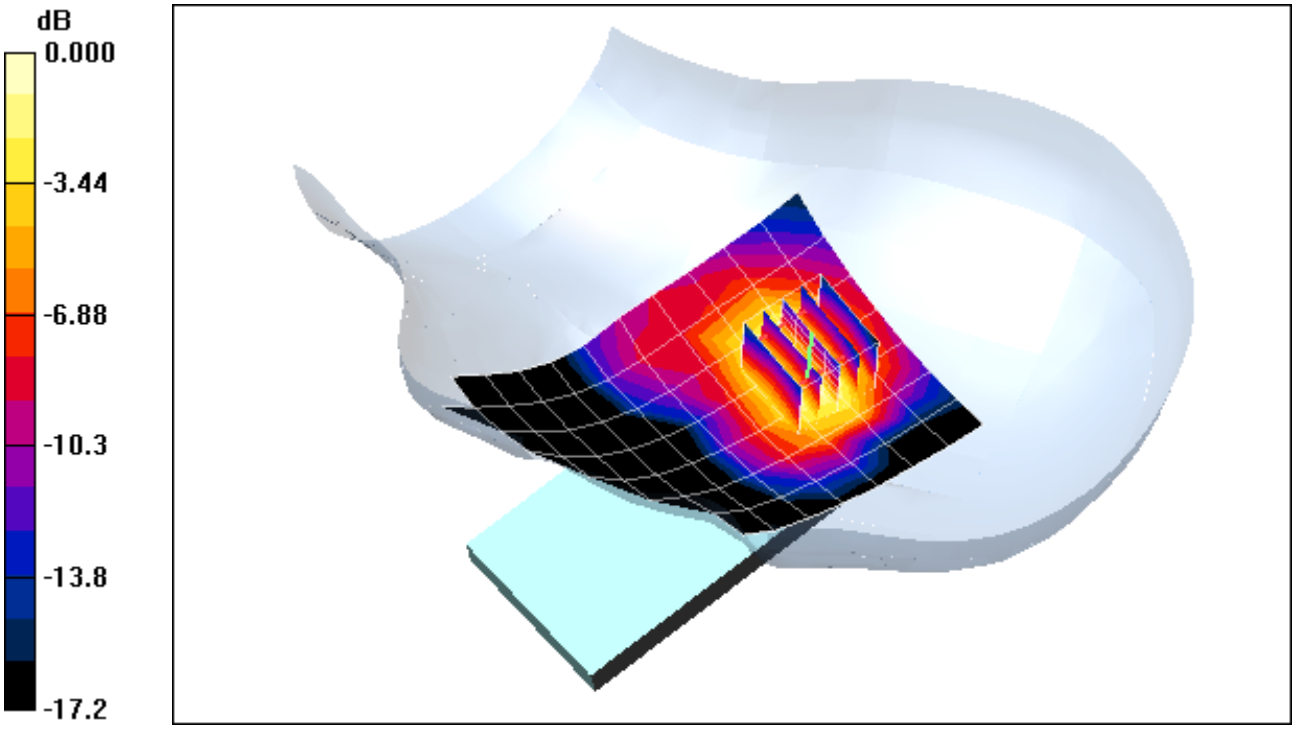
Communication System: LTE PCS 5 Mhz; Frequency: 1880.2 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1882.5 MHz; $\sigma$ = 1.38 mho/m; $\varepsilon_r$ = 39.6; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

Test Date: 01-25-2012; Ambient Temp: 24.3°C; Tissue Temp: 22.9°C

Probe: EX3DV4 - SN3561; ConvF(7.16, 7.16, 7.16); Calibrated: 7/27/2011
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 Band 25 (PCS) - FCC Rule Part 24E, Left Head, Tilt, 5 MHz BW, Mid.ch, QPSK, 12 RB, 6 RB Offset**

**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.0 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.521 W/kg
**SAR(1 g) = 0.325 mW/g; SAR(10 g) = 0.191 mW/g**




0 dB = 0.355mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 1**

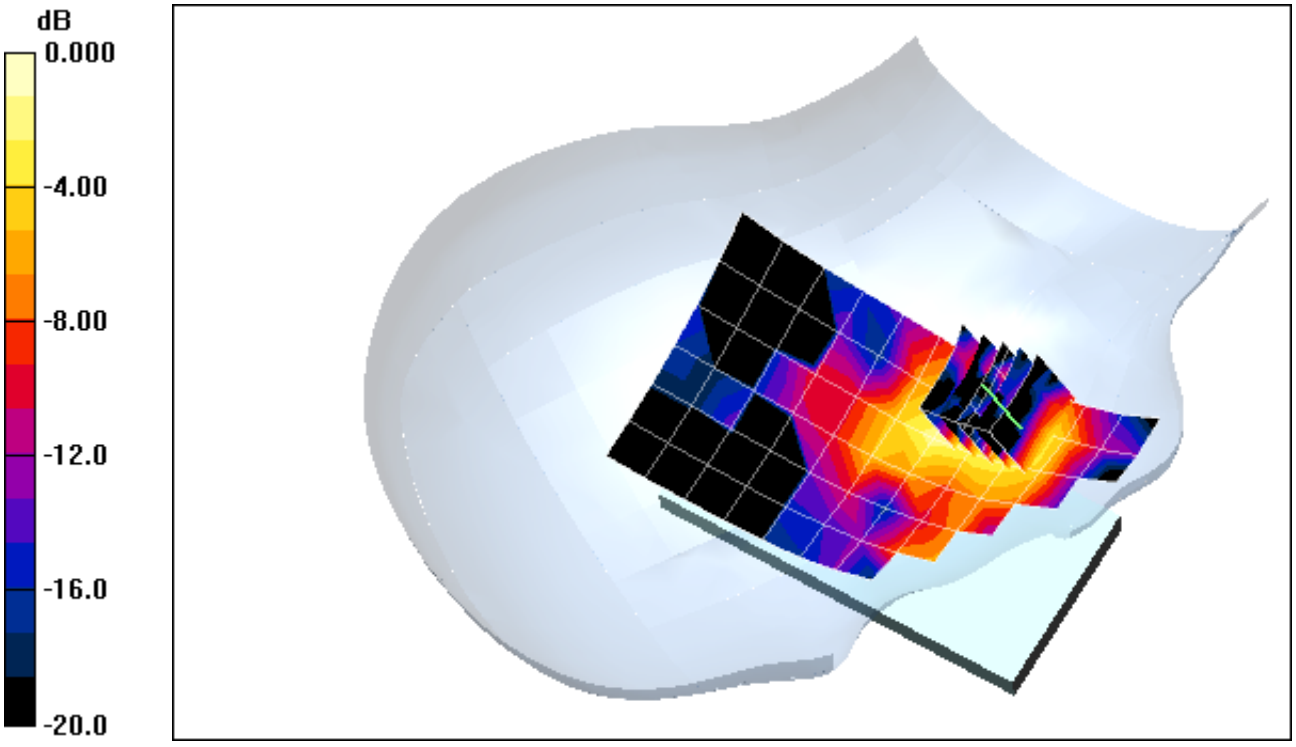
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
f = 2462 MHz; $\sigma$ = 1.89 mho/m; $\varepsilon_r$ = 38.1; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

Test Date: 01-25-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.4°C

Probe: ES3DV3 - SN3258; ConvF(4.5, 4.5, 4.5); Calibrated: 4/8/2011
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## Mode: IEEE 802.11b - FCC Rule Part 15C, Right Head, Touch, Ch 11, 1 Mbps

**Area Scan (7x14x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.99 V/m; Power Drift = 0.014 dB
Peak SAR (extrapolated) = 0.026 W/kg
**SAR(1 g) = 0.015 mW/g; SAR(10 g) = 0.007 mW/g**




0 dB = 0.019mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 1**

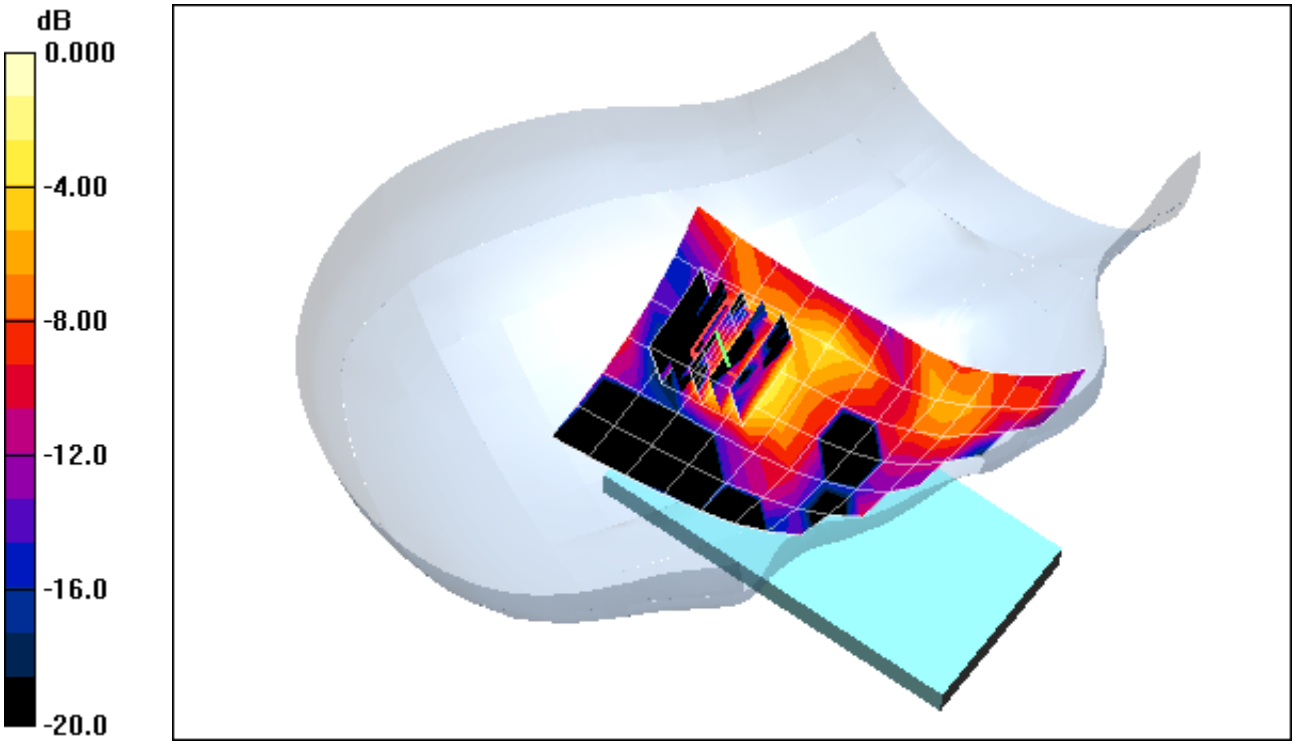
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
f = 2462 MHz; $\sigma$ = 1.89 mho/m; $\varepsilon_r$ = 38.1; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

Test Date: 01-25-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.4°C

Probe: ES3DV3 - SN3258; ConvF(4.5, 4.5, 4.5); Calibrated: 4/8/2011
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## Mode: IEEE 802.11b - FCC Rule Part 15C, Right Head, Tilt, Ch 11, 1 Mbps

**Area Scan (7x14x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.92 V/m; Power Drift = 0.114 dB
Peak SAR (extrapolated) = 0.012 W/kg
**SAR(1 g) = 0.00643 mW/g; SAR(10 g) = 0.00256 mW/g**




0 dB = 0.008mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 1**

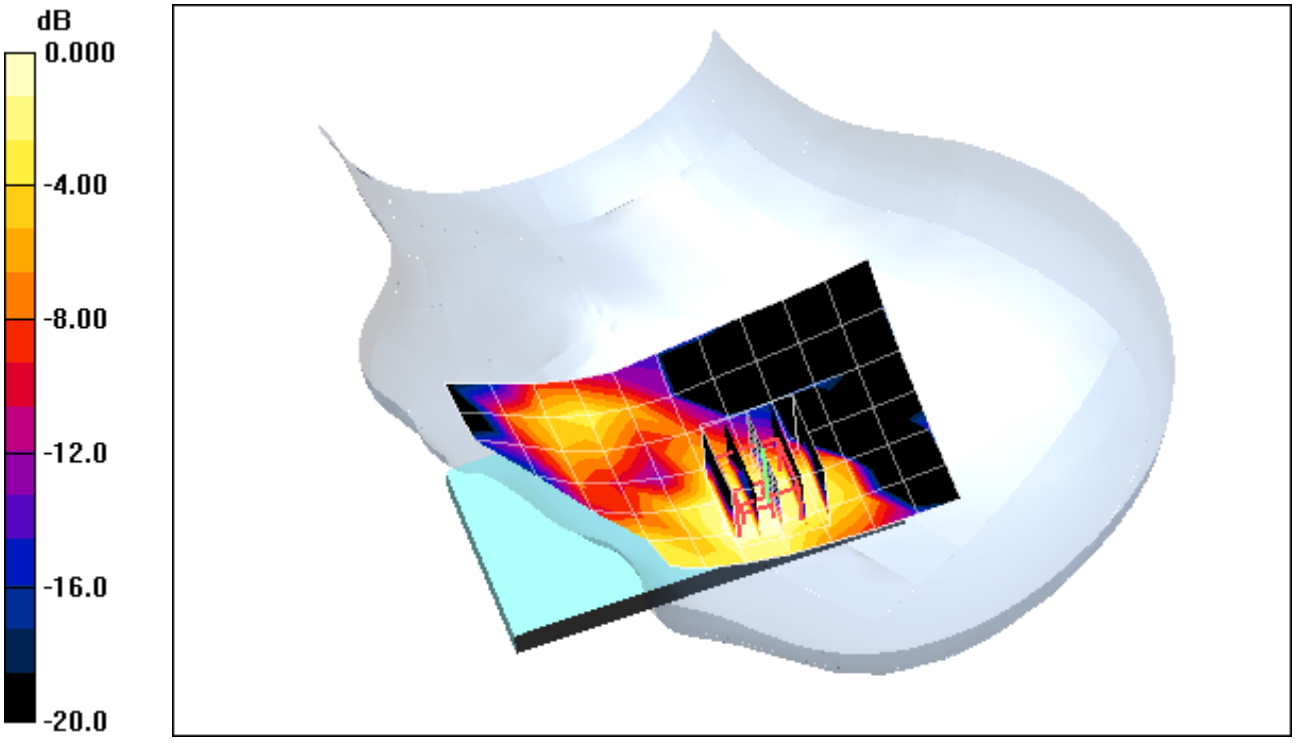
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
f = 2462 MHz; $\sigma$ = 1.89 mho/m; $\varepsilon_r$ = 38.1; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

Test Date: 01-25-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.4°C

Probe: ES3DV3 - SN3258; ConvF(4.5, 4.5, 4.5); Calibrated: 4/8/2011
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## Mode: IEEE 802.11b - FCC Rule Part 15C, Left Head, Touch, Ch 11, 1 Mbps

**Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.12 V/m; Power Drift = 0.112 dB
Peak SAR (extrapolated) = 0.013 W/kg
**SAR(1 g) = 0.00777 mW/g; SAR(10 g) = 0.0035 mW/g**




0 dB = 0.010mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 1**

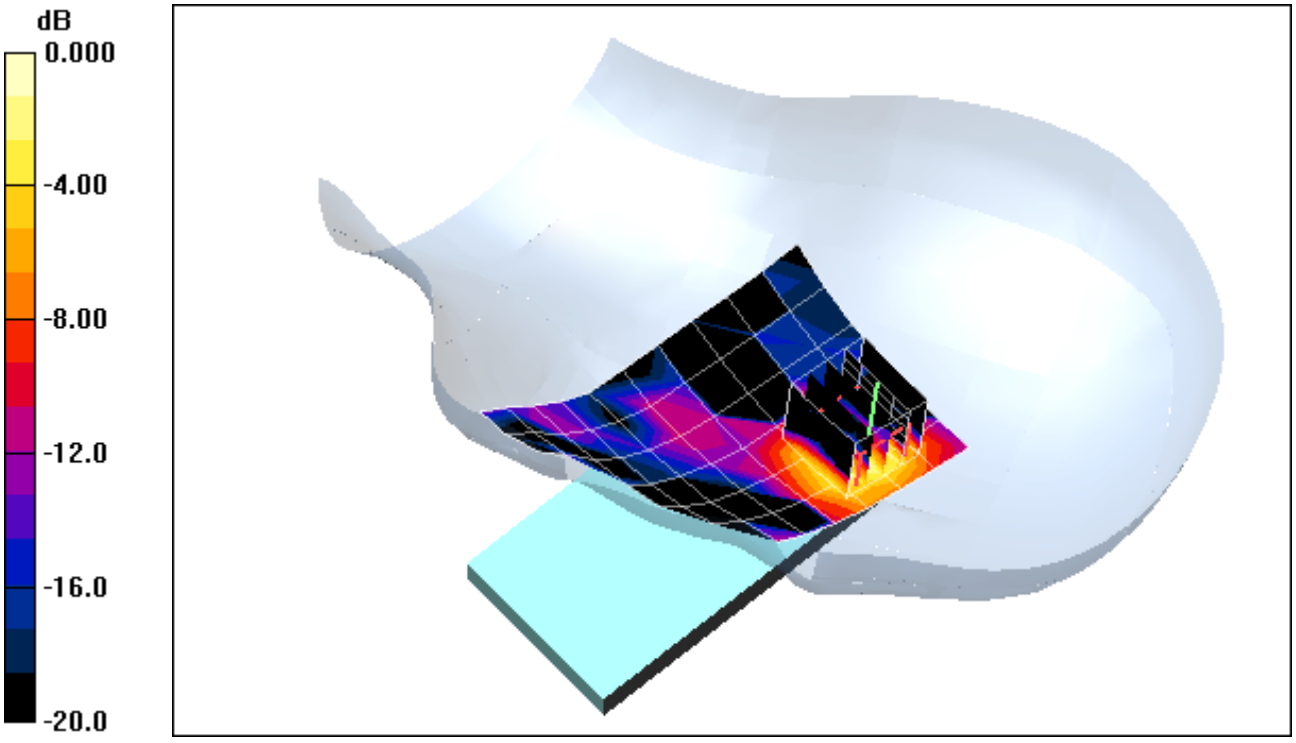
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
f = 2462 MHz; $\sigma$ = 1.89 mho/m; $\varepsilon_r$ = 38.1; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

Test Date: 01-25-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.4°C

Probe: ES3DV3 - SN3258; ConvF(4.5, 4.5, 4.5); Calibrated: 4/8/2011
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## Mode: IEEE 802.11b - FCC Rule Part 15C, Left Head, Tilt, Ch 11, 1 Mbps

**Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.32 V/m; Power Drift = 0.117 dB
Peak SAR (extrapolated) = 0.020 W/kg
**SAR(1 g) = 0.011 mW/g; SAR(10 g) = 0.00441 mW/g**




0 dB = 0.013mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 3**

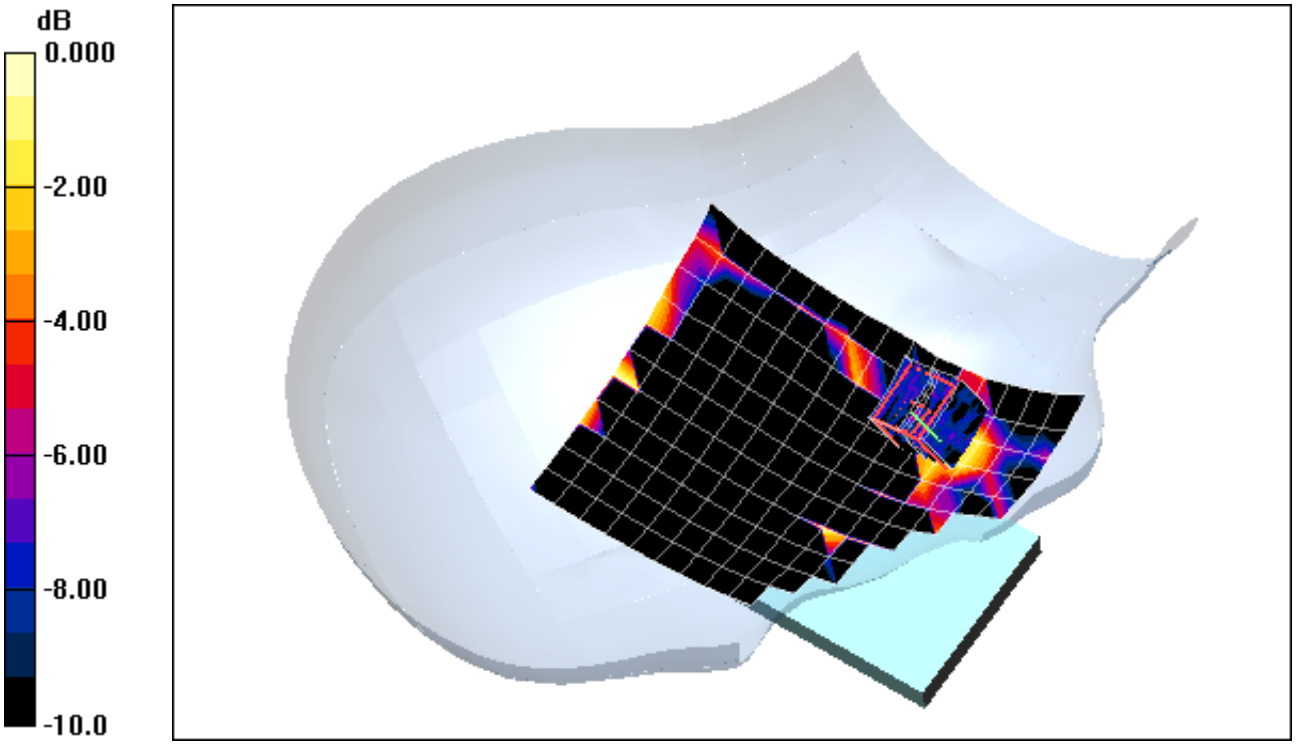
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5180 MHz;Duty Cycle: 1:1
Medium: 5 GHz Head Medium parameters used:
f = 5180 MHz; $\sigma$ = 4.782 mho/m; $\varepsilon_r$ = 35.4; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

Test Date: 01-26-2012; Ambient Temp: 23.2°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3561; ConvF(4.27, 4.27, 4.27); Calibrated: 7/27/2011
Sensor-Surface: 2mm (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: IEEE 802.11a - FCC Rule Part 15E, 5.2 GHz,**
**Right Head, Touch, Ch 36, 6 Mbps**

**Area Scan (12x16x1):** Measurement grid: dx=10mm, dy=10mm
**Zoom Scan (7x7x11)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.02 V/m; Power Drift = -0.176 dB
Peak SAR (extrapolated) = 0.917 W/kg
**SAR(1 g) = 0.0037 mW/g; SAR(10 g) = 0.000332 mW/g**




0 dB = 0.013mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 3**

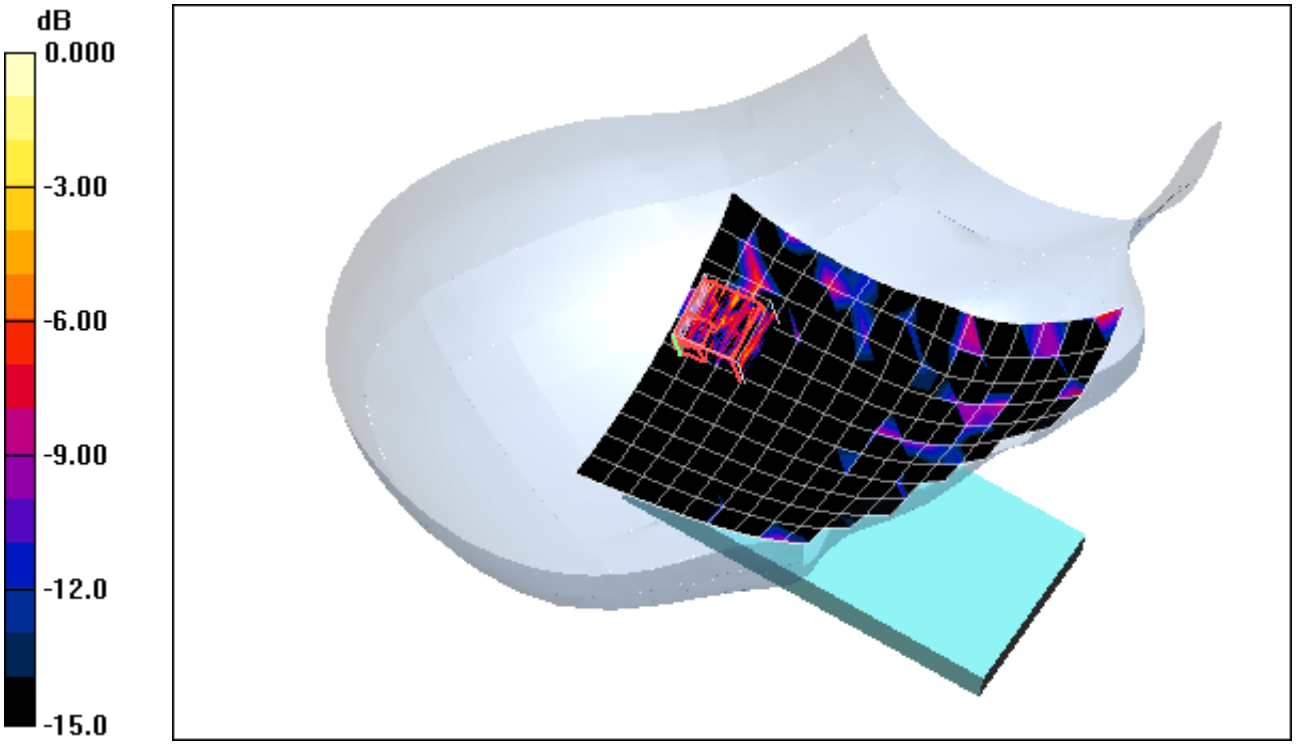
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5180 MHz;Duty Cycle: 1:1
Medium: 5 GHz Head Medium parameters used:
f = 5180 MHz; $\sigma$ = 4.782 mho/m; $\varepsilon_r$ = 35.4; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

Test Date: 01-26-2012; Ambient Temp: 23.2°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3561; ConvF(4.27, 4.27, 4.27); Calibrated: 7/27/2011
Sensor-Surface: 2mm (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: IEEE 802.11a - FCC Rule Part 15E, 5.2 GHz,**
**Right Head, Tilt, Ch 36, 6 Mbps**

**Area Scan (12x16x1):** Measurement grid: dx=10mm, dy=10mm
**Zoom Scan (7x7x11)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.433 V/m; Power Drift = 0.173 dB
Peak SAR (extrapolated) = 0.026 W/kg
**SAR(1 g) = 2.54e-005 mW/g; SAR(10 g) = 4.43e-007 mW/g**




0 dB = 0.026mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 3**

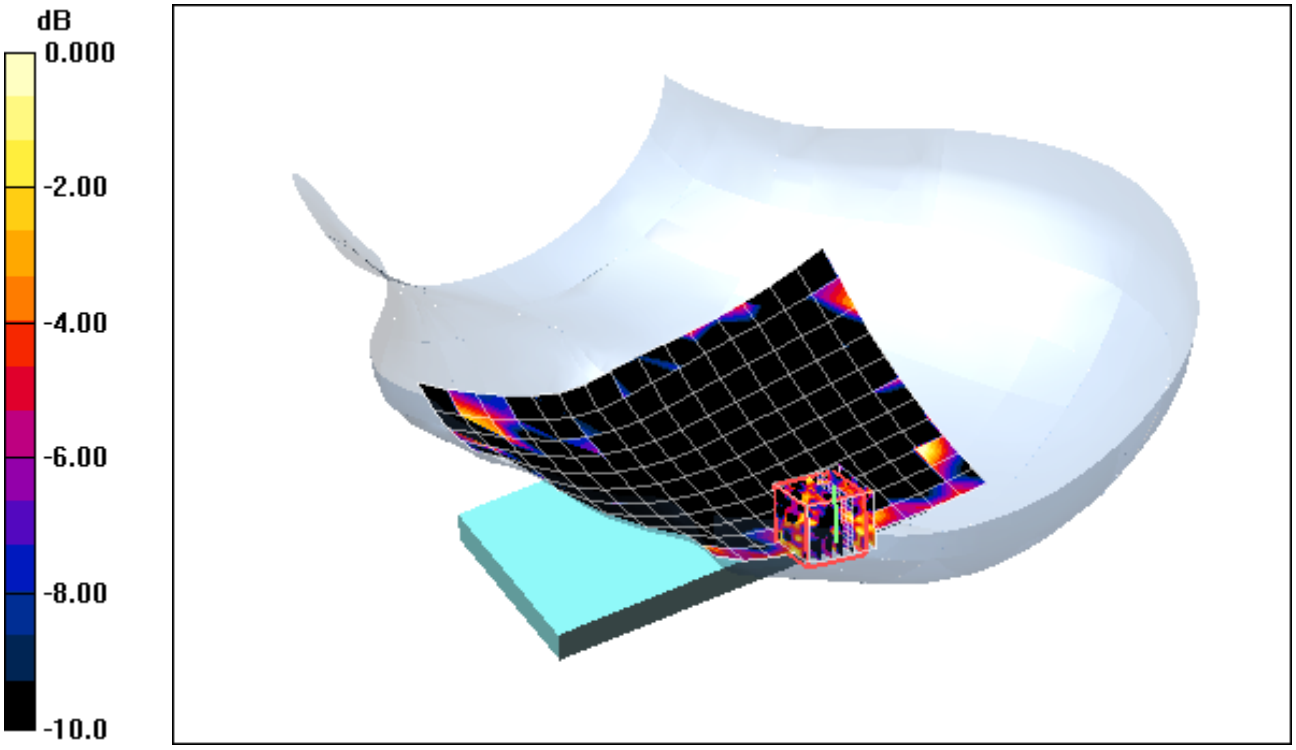
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: 5 GHz Head Medium parameters used:
f = 5260 MHz; $\sigma$ = 4.889 mho/m; $\varepsilon_r$ = 35.38; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

Test Date: 01-26-2012; Ambient Temp: 23.2°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3561; ConvF(4.03, 4.03, 4.03); Calibrated: 7/27/2011
Sensor-Surface: 2mm (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: IEEE 802.11a - FCC Rule Part 15E, 5.2 GHz,**
**Left Head, Touch, Ch 52, 6 Mbps**

**Area Scan (12x16x1):** Measurement grid: dx=10mm, dy=10mm
**Zoom Scan (7x7x11)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.831 V/m; Power Drift = -0.190 dB
Peak SAR (extrapolated) = 0.071 W/kg
**SAR(1 g) = 0.00332 mW/g; SAR(10 g) = 0.000628 mW/g**




0 dB = 0.013mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 3**

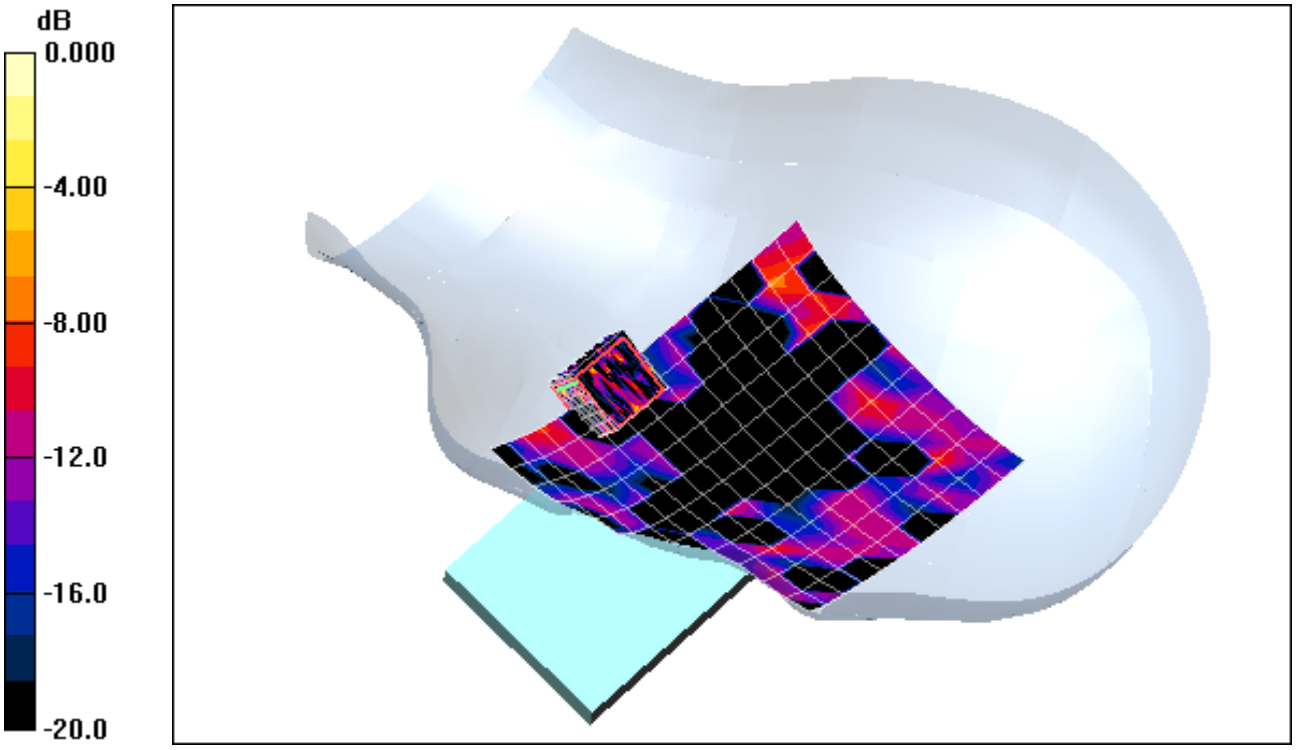
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium: 5 GHz Head Medium parameters used:
f = 5500 MHz; $\sigma$ = 5.181 mho/m; $\varepsilon_r$ = 34.95; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

Test Date: 01-26-2012; Ambient Temp: 23.3°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN3561; ConvF(4.04, 4.04, 4.04); Calibrated: 7/27/2011
Sensor-Surface: 2mm (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: IEEE 802.11a - FCC Rule Part 15E, 5.5 GHz**
**Left Head, Tilt, Ch 100, 6 Mbps**

**Area Scan (12x16x1):** Measurement grid: dx=10mm, dy=10mm
**Zoom Scan (7x7x11)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.230 V/m; Power Drift = 0.199 dB
Peak SAR (extrapolated) = 0.032 W/kg
**SAR(1 g) = 0.000784 mW/g; SAR(10 g) = 7.89e-005 mW/g**




0 dB = 0.065mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

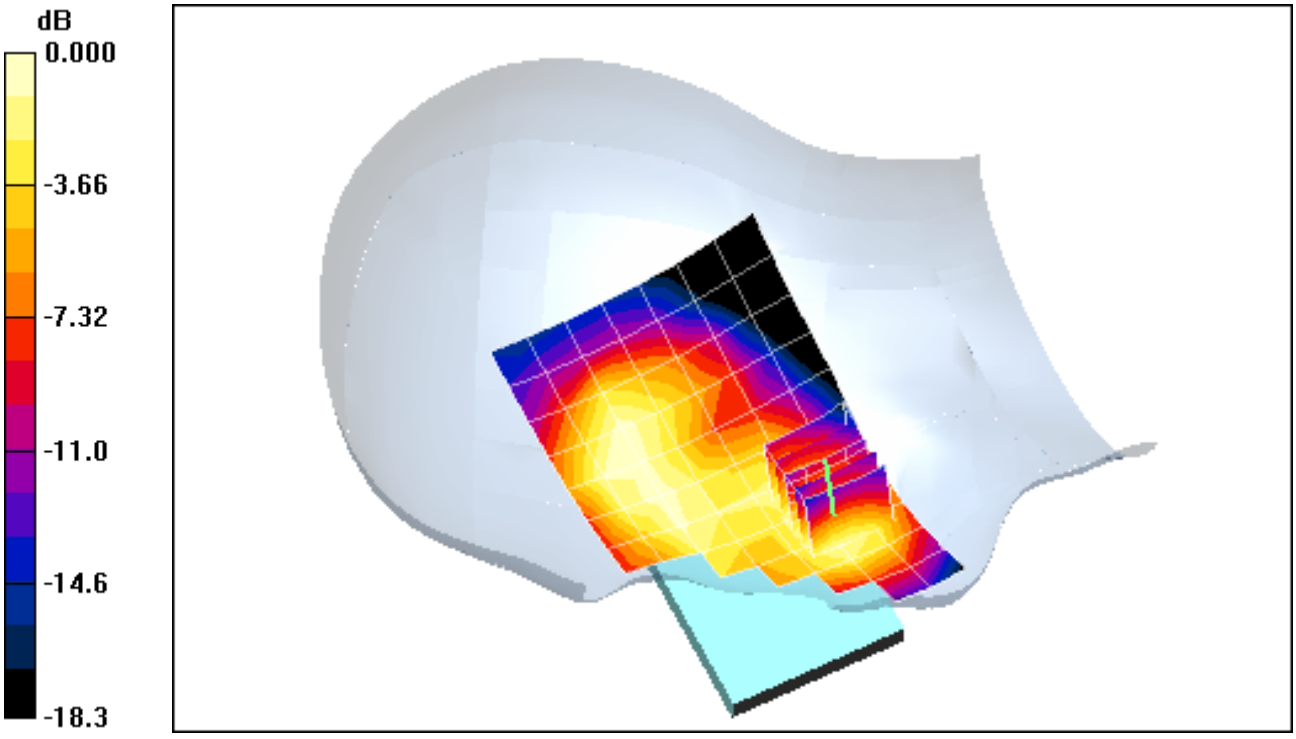
Communication System: PCS CDMA; Frequency: 1851.25 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1851.25 MHz; $\sigma$ = 1.4 mho/m; $\varepsilon_r$ = 39.3; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

Test Date: 02-17-2012; Ambient Temp: 21.8°C; Tissue Temp: 21.4° C

Probe: ES3DV2 - SN3022; ConvF(4.98, 4.98, 4.98); Calibrated: 8/25/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Mode: SVLTE, Right Head, Touch, PCS CDMA Ch.25,**
**LTE Ch.26453, QPSK, 5 MHz BW, 12 RB, 6 RB Offset, 18 dBm**

**Area Scan (8x12x1):** 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; Power Drift = 0.066 dB
Peak SAR (extrapolated) = 0.429 W/kg
**SAR(1 g) = 0.290 mW/g; SAR(10 g) = 0.186 mW/g**




0 dB = 0.309mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

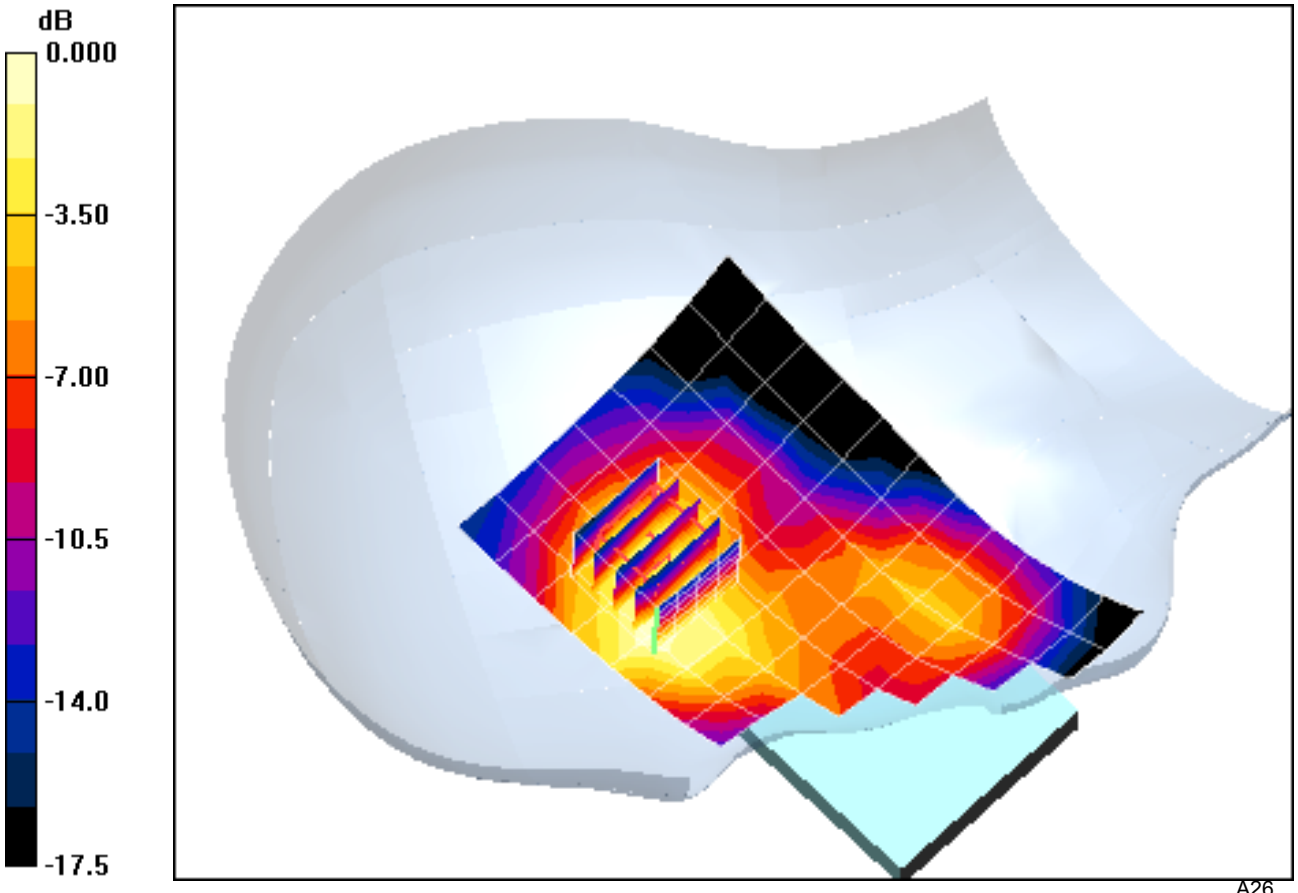
Communication System: PCS CDMA; Frequency: 1851.25 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1851.25 MHz; $\sigma$ = 1.4 mho/m; $\varepsilon_r$ = 39.4; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

Test Date: 02-14-2012; Ambient Temp: 21.7 °C; Tissue Temp: 19.8 °C

Probe: ES3DV2 - SN3022; ConvF(4.98, 4.98, 4.98); Calibrated: 8/25/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Mode: SVLTE, Right Head, Touch, PCS CDMA Ch.25,**
**LTE Ch.26453, QPSK, 5 MHz BW, 12 RB, 6 RB Offset, 22.5 dBm**

**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.4 V/m; Power Drift = -0.081 dB
Peak SAR (extrapolated) = 1.33 W/kg
**SAR(1 g) = 0.644 mW/g; SAR(10 g) = 0.354 mW/g**




0 dB = 0.705mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

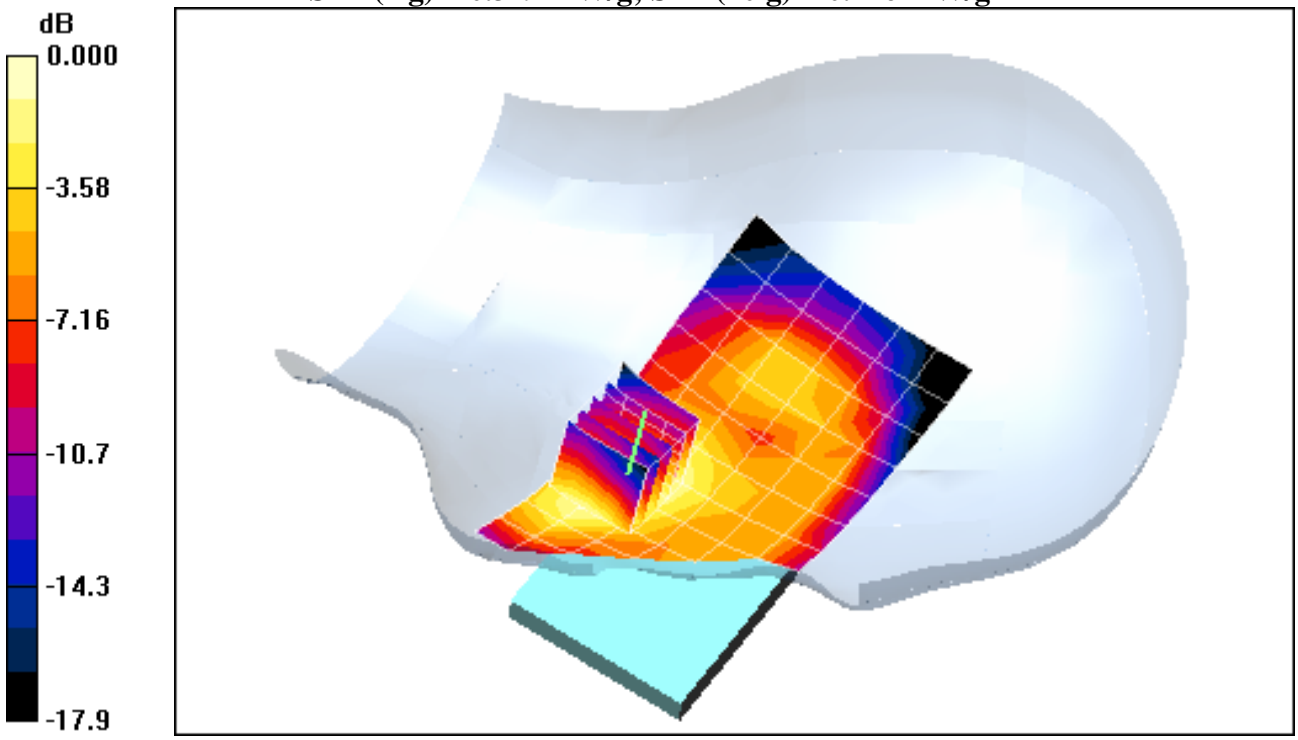
Communication System: PCS CDMA; Frequency: 1851.25 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1851.25 MHz; $\sigma$ = 1.4 mho/m; $\varepsilon_r$ = 39.3; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

Test Date: 02-17-2012; Ambient Temp: 21.8°C; Tissue Temp: 21.4° C

Probe: ES3DV2 - SN3022; ConvF(4.98, 4.98, 4.98); Calibrated: 8/25/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## Mode: SVLTE, Left Head, Touch, PCS CDMA Ch.25
## LTE Ch.26453, QPSK, 5 MHz BW, 12 RB, 6 RB Offset, 18 dBm

**Area Scan (7x14x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.9 V/m; Power Drift = 0.069 dB
Peak SAR (extrapolated) = 0.539 W/kg
**SAR(1 g) = 0.349 mW/g; SAR(10 g) = 0.216 mW/g**




0 dB = 0.375mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

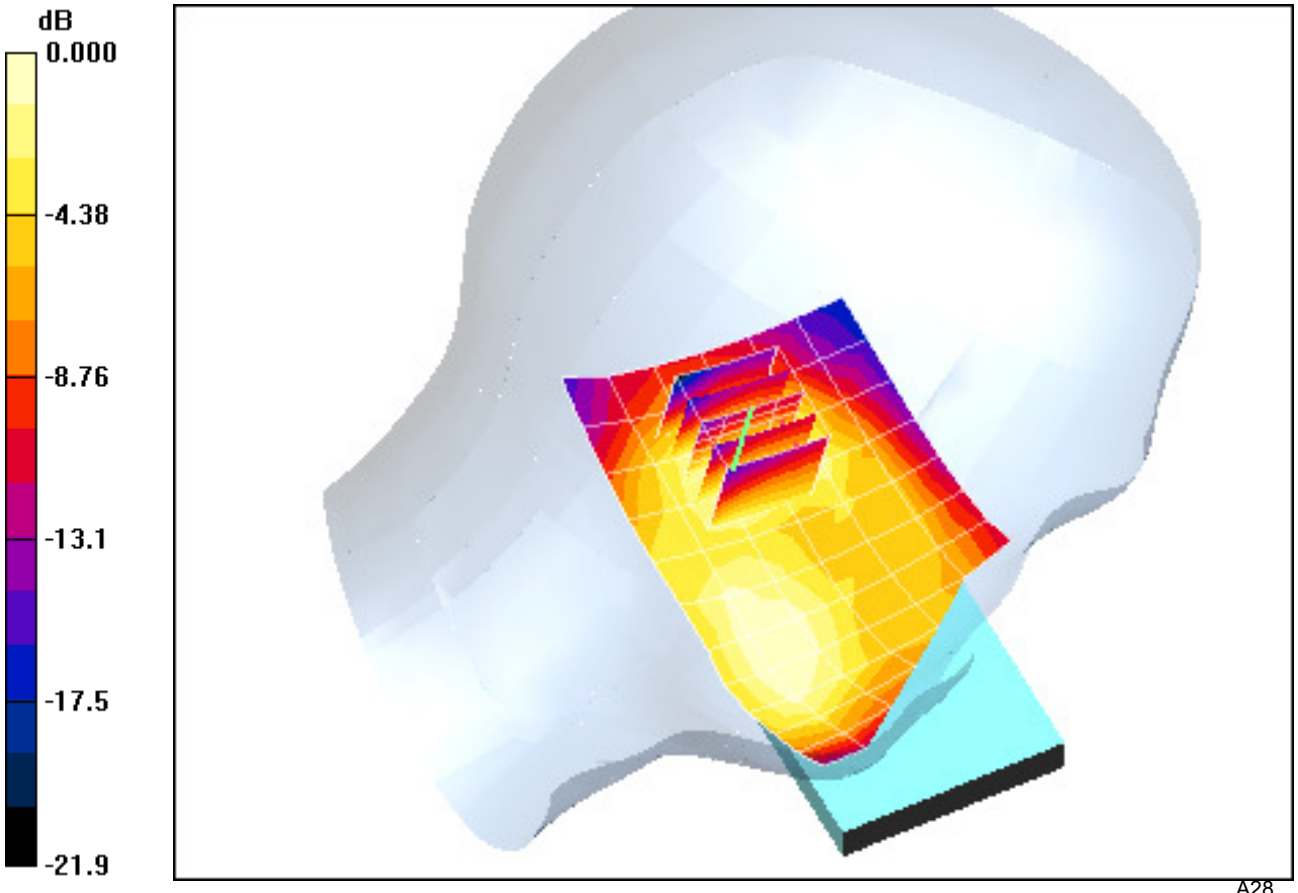
Communication System: PCS CDMA; Frequency: 1851.25 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1851.25 MHz; $\sigma$ = 1.4 mho/m; $\varepsilon_r$ = 39.4; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

Test Date: 02-14-2012; Ambient Temp: 21.7 °C; Tissue Temp: 19.8 °C

Probe: ES3DV2 - SN3022; ConvF(4.98, 4.98, 4.98); Calibrated: 8/25/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Mode: SVLTE, Left Head, Touch, PCS CDMA Ch.25,**
**LTE Ch.26453, QPSK, 5 MHz BW, 12 RB, 6 RB Offset, 22.5 dBm**

**Area Scan (7x14x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.2 V/m; Power Drift = -0.148 dB
Peak SAR (extrapolated) = 0.626 W/kg
**SAR(1 g) = 0.415 mW/g; SAR(10 g) = 0.251 mW/g**




0 dB = 0.450mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

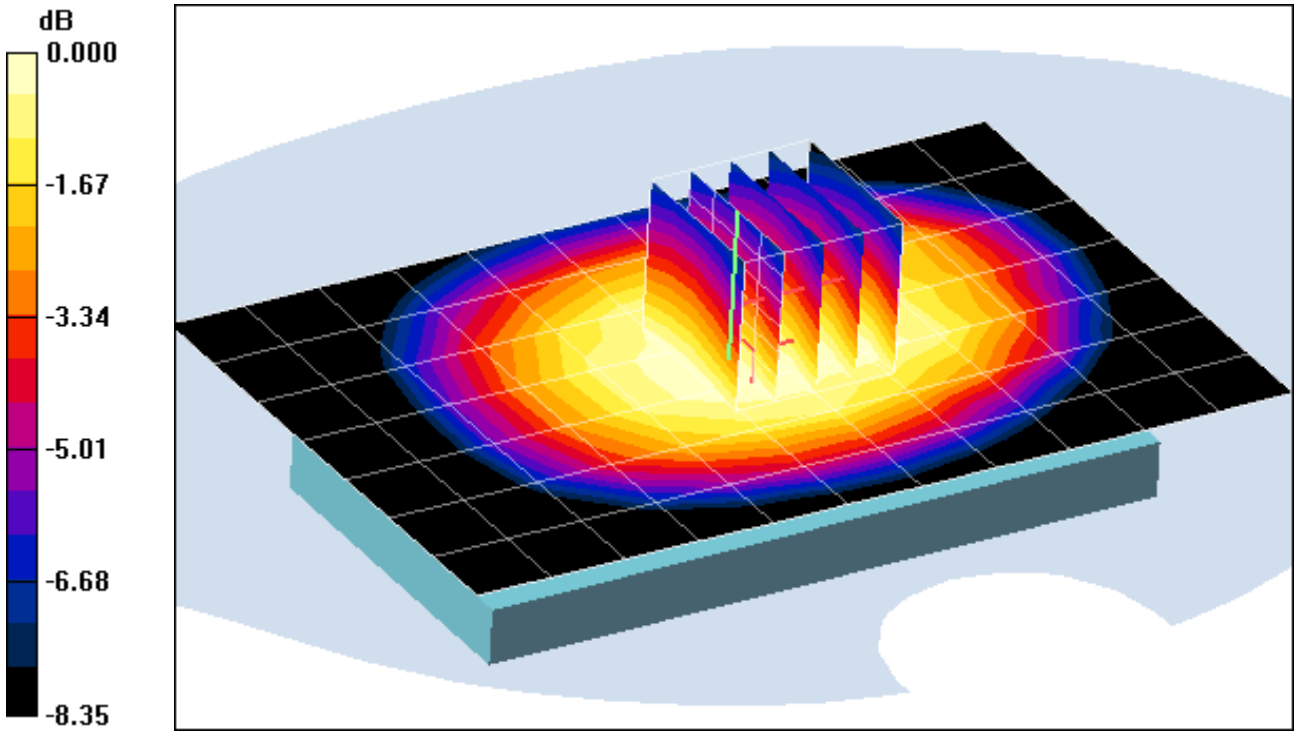
Communication System: Cellular CDMA; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.52$ MHz; $\sigma = 0.96$ mho/m; $\varepsilon_r = 52.9$; $\rho = 1000$ kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2012; Ambient Temp: 23.5°C; Tissue Temp: 20.4°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 TDSO32 - FCC Rule Part 22H, Body SAR, Back side, Mid.ch

**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.8 V/m; Power Drift = -0.118 dB
Peak SAR (extrapolated) = 1.07 W/kg
**SAR(1 g) = 0.844 mW/g; SAR(10 g) = 0.654 mW/g**




0 dB = 0.877mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHL700; Type: Prortable Handset; Serial: 2**

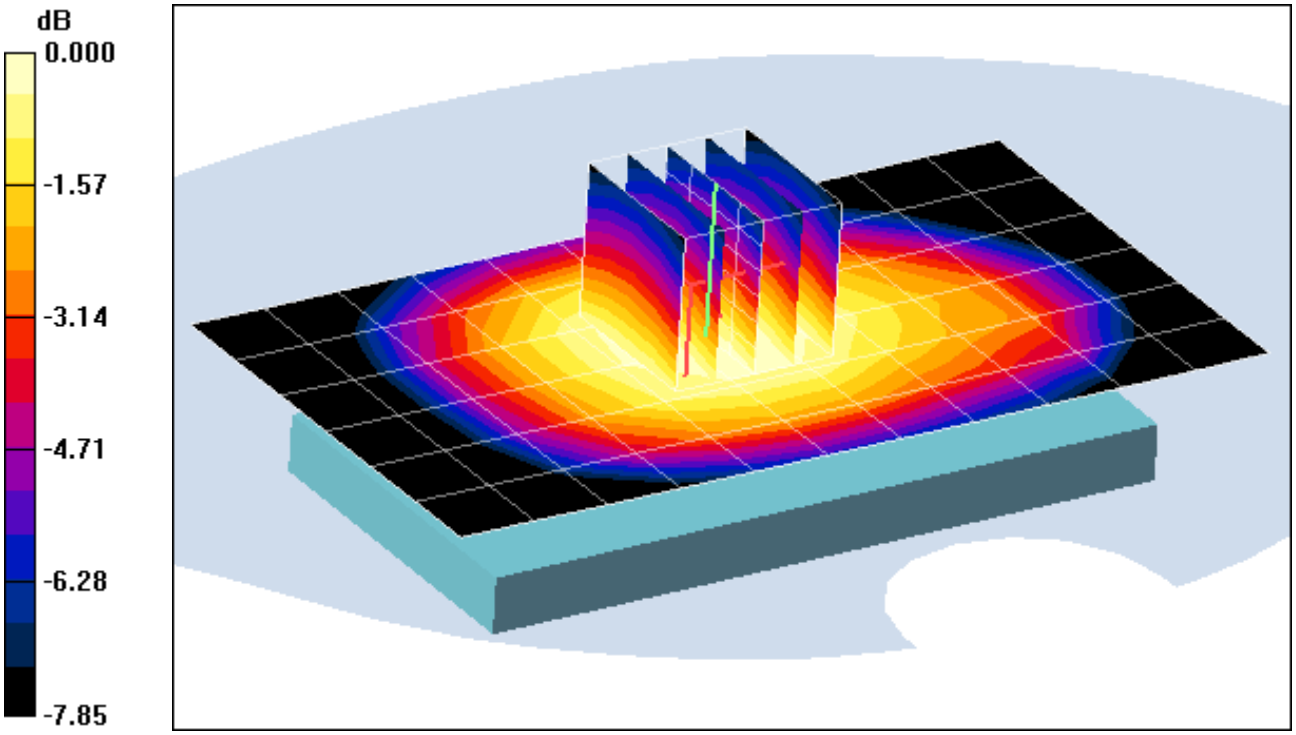
Communication System: Cellular CDMA; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.52 MHz; $\sigma$ = 0.96 mho/m; $\varepsilon_r$ = 52.9; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2012; Ambient Temp: 23.5°C; Tissue Temp: 20.4°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 TDSO32 - FCC Rule Part 22H, Body SAR, Front side, Mid.ch

**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.7 V/m; Power Drift = -0.028 dB
Peak SAR (extrapolated) = 0.981 W/kg
**SAR(1 g) = 0.780 mW/g; SAR(10 g) = 0.598 mW/g**




0 dB = 0.814mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

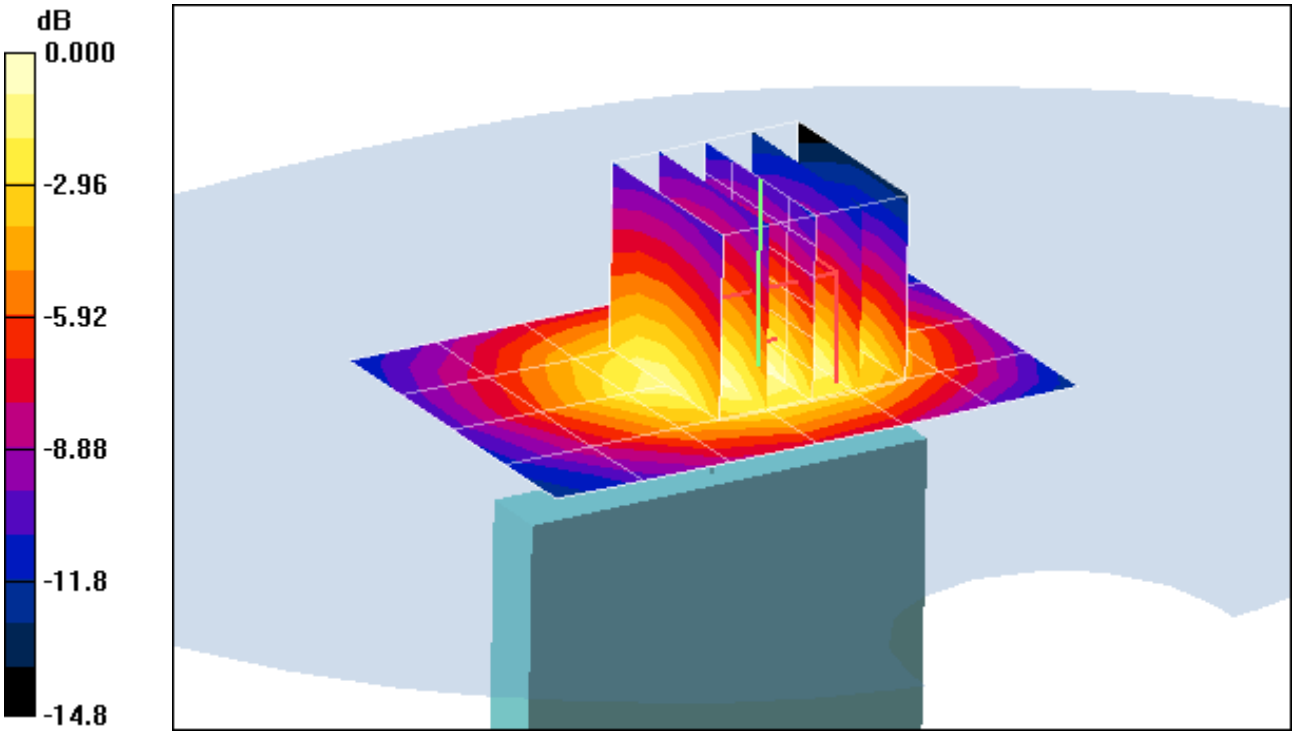
Communication System: Cellular CDMA; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.52$ MHz; $\sigma = 0.96$ mho/m; $\varepsilon_r = 52.9$; $\rho = 1000$ kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2012; Ambient Temp: 23.5°C; Tissue Temp: 20.4°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 TDSO32 - FCC Rule Part 22H, Body SAR, Bottom Edge, Mid.ch

**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.2 V/m; Power Drift = -0.053 dB
Peak SAR (extrapolated) = 0.588 W/kg
**SAR(1 g) = 0.357 mW/g; SAR(10 g) = 0.220 mW/g**




0 dB = 0.389mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

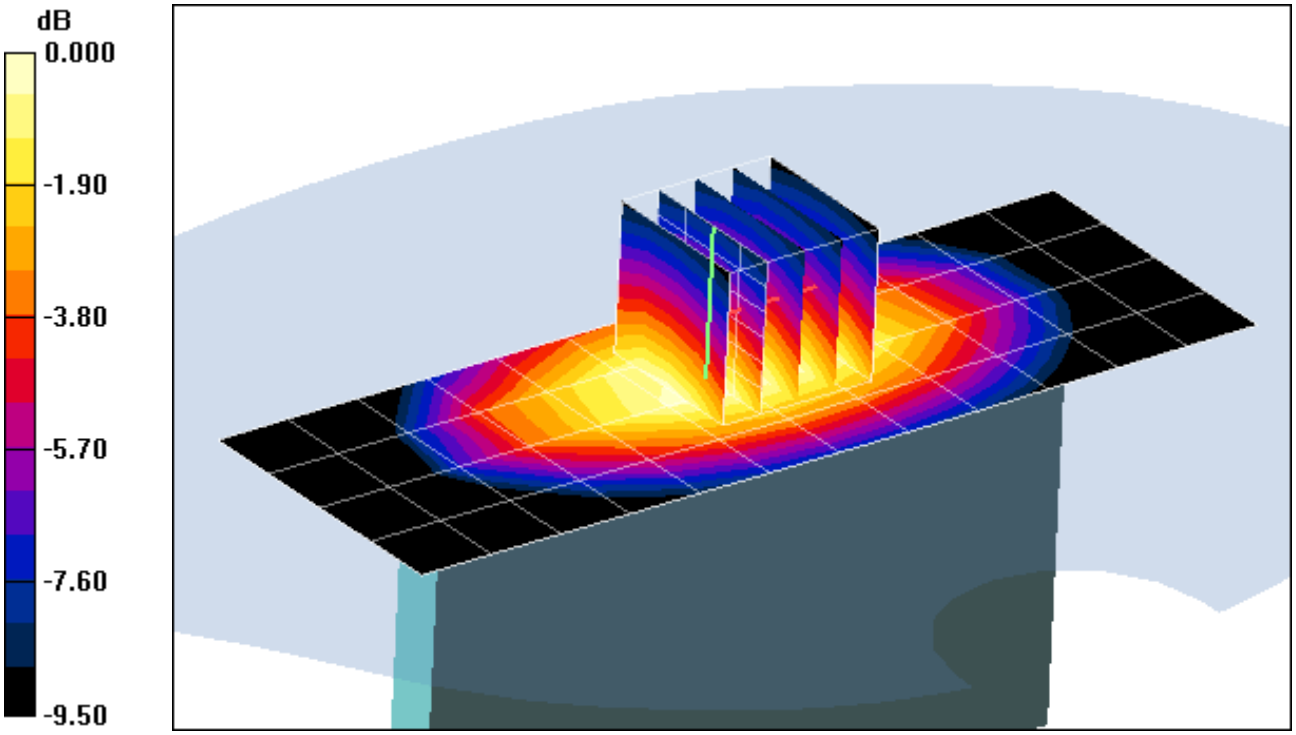
Communication System: Cellular CDMA; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.52$ MHz; $\sigma = 0.96$ mho/m; $\varepsilon_r = 52.9$; $\rho = 1000$ kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2012; Ambient Temp: 23.5°C; Tissue Temp: 20.4°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 TDSO32 - FCC Rule Part 22H, Body SAR, Left 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 = 34.2 V/m; Power Drift = 0.034 dB
Peak SAR (extrapolated) = 1.37 W/kg
**SAR(1 g) = 0.969 mW/g; SAR(10 g) = 0.670 mW/g**




0 dB = 1.02mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

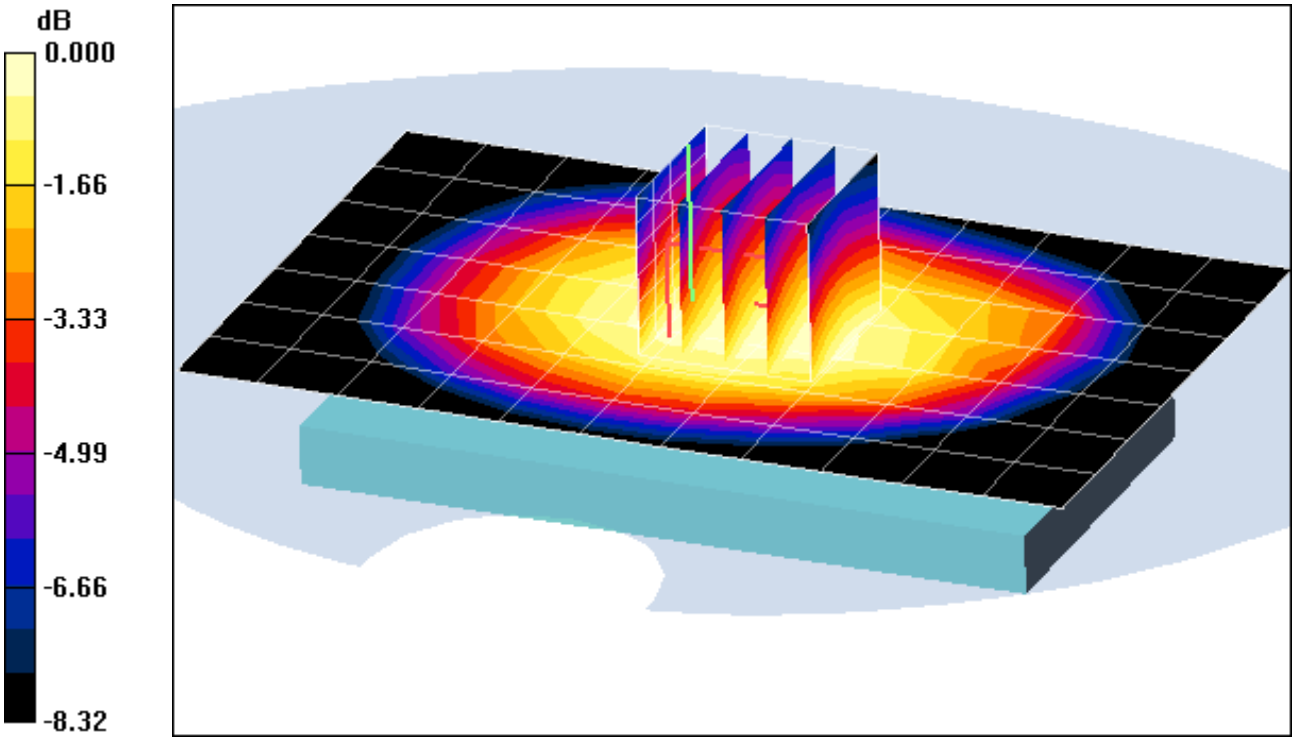
Communication System: Cellular CDMA; Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 824.7 MHz; $\sigma$ = 0.949 mho/m; $\varepsilon_r$ = 53; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2012; Ambient Temp: 23.5°C; Tissue Temp: 20.4°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 - FCC Rule Part 22H, Body SAR, Back side, Low.ch**

**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.4 V/m; Power Drift = -0.147 dB
Peak SAR (extrapolated) = 1.06 W/kg
**SAR(1 g) = 0.822 mW/g; SAR(10 g) = 0.644 mW/g**




0 dB = 0.858mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

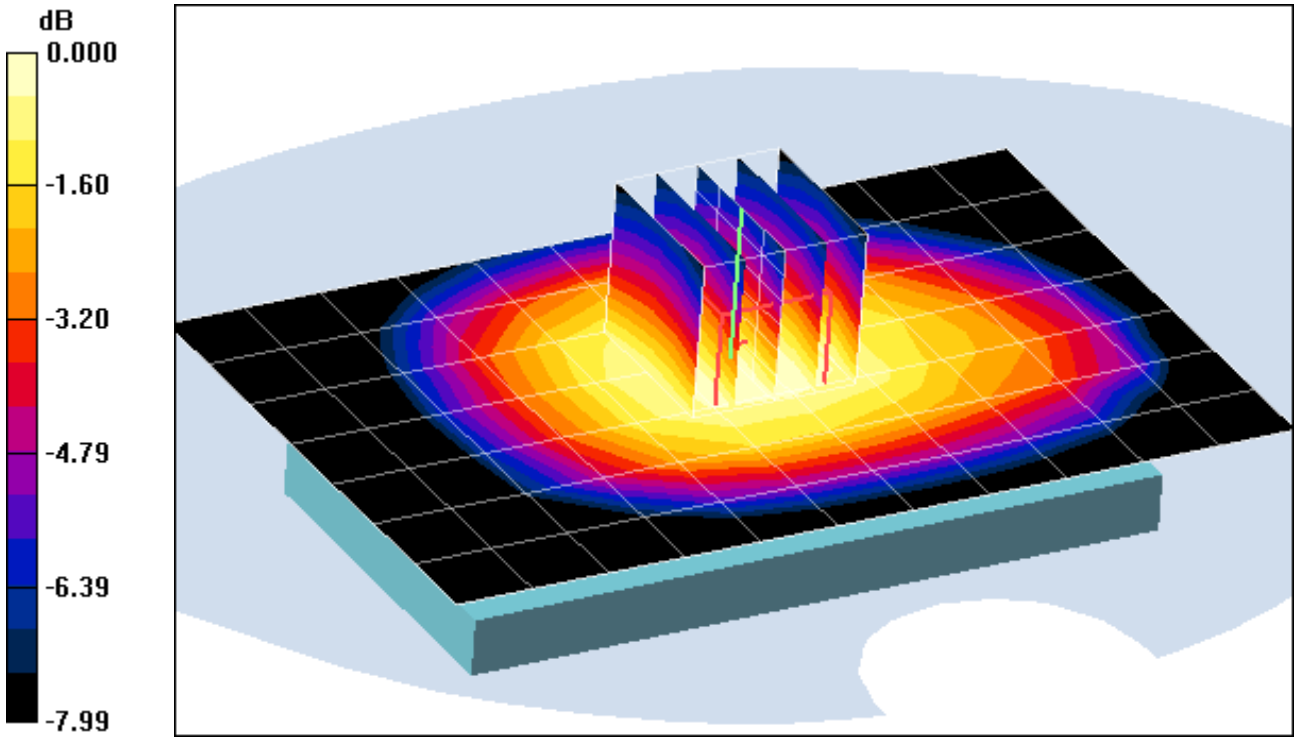
Communication System: Cellular CDMA; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.52 MHz; $\sigma$ = 0.96 mho/m; $\varepsilon_r$ = 52.9; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2012; Ambient Temp: 23.5°C; Tissue Temp: 20.4°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 - FCC Rule Part 22H, Body SAR, Front side, Mid.ch**

**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.8 V/m; Power Drift = 0.082 dB
Peak SAR (extrapolated) = 1.01 W/kg
**SAR(1 g) = 0.792 mW/g; SAR(10 g) = 0.602 mW/g**




0 dB = 0.834mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

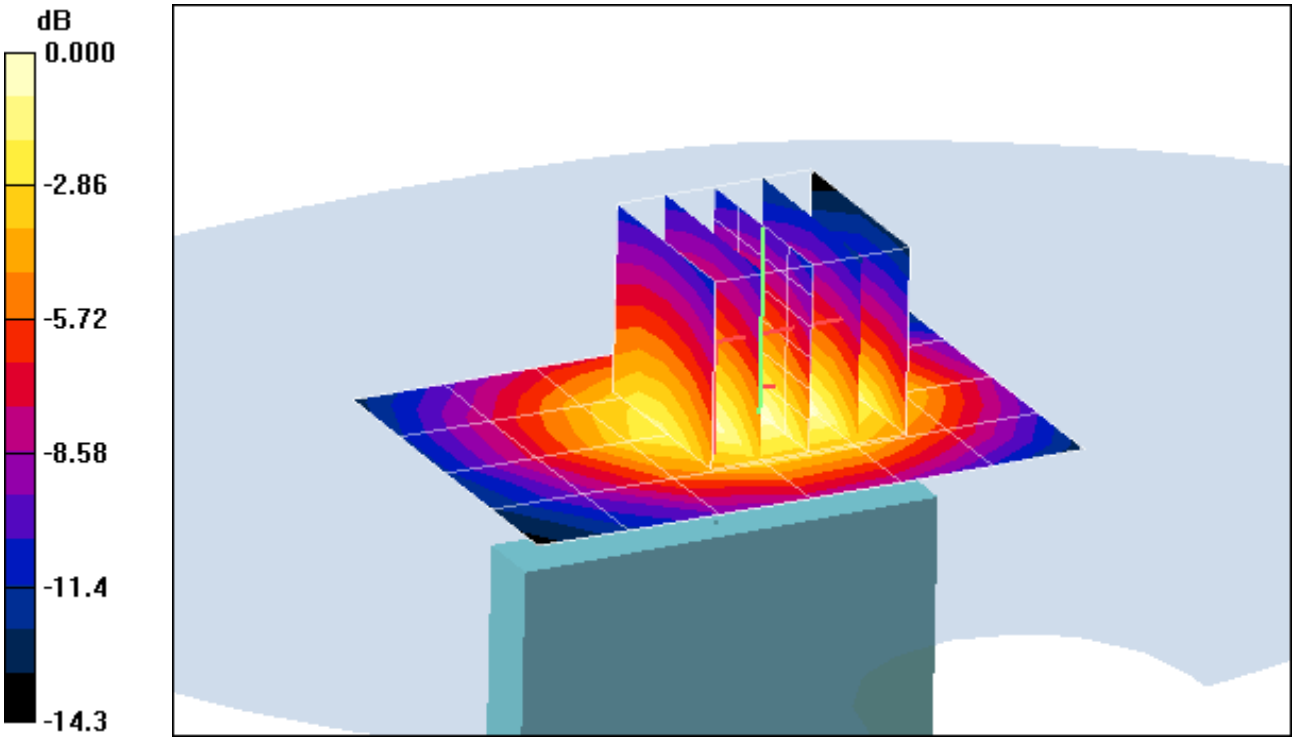
Communication System: Cellular CDMA; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.52$ MHz; $\sigma = 0.96$ mho/m; $\varepsilon_r = 52.9$; $\rho = 1000$ kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2012; Ambient Temp: 23.5°C; Tissue Temp: 20.4°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 - FCC Rule Part 22H, Body SAR, Bottom Edge, Mid.ch

**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.3 V/m; Power Drift = -0.039 dB
Peak SAR (extrapolated) = 0.600 W/kg
**SAR(1 g) = 0.372 mW/g; SAR(10 g) = 0.228 mW/g**




0 dB = 0.408mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

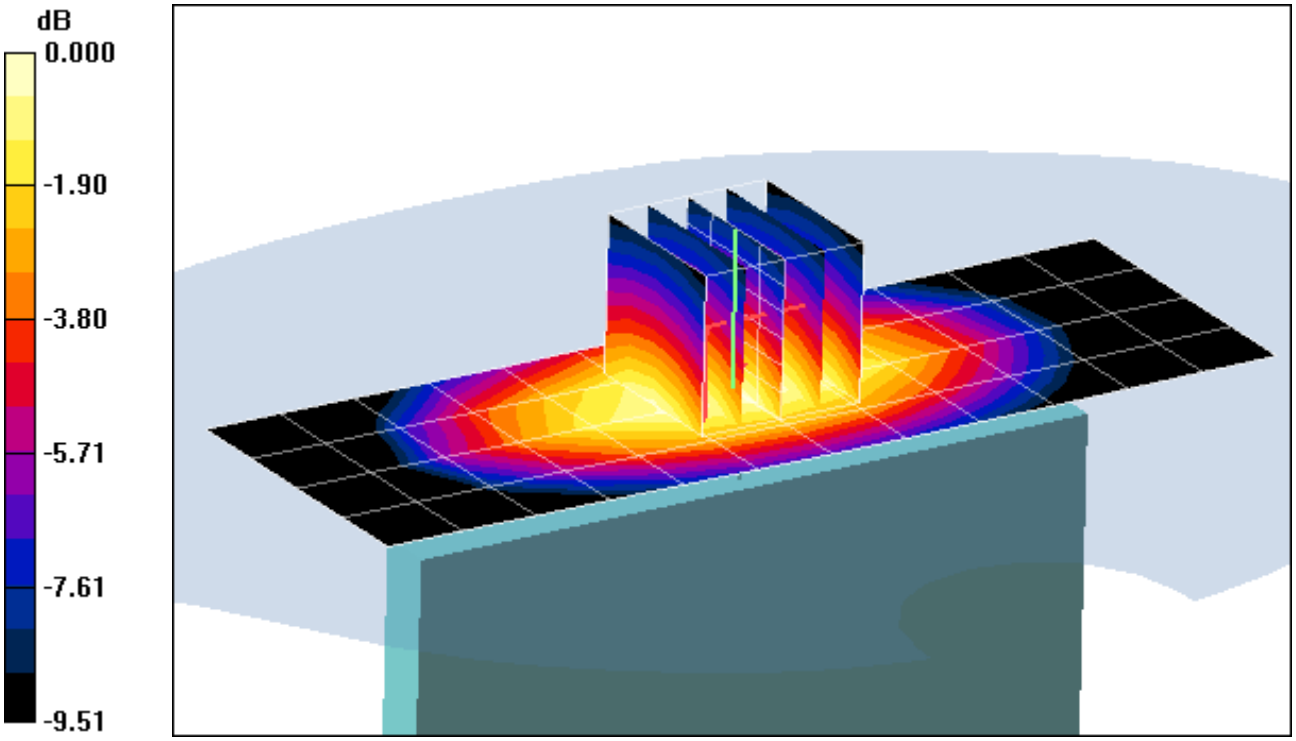
Communication System: Cellular CDMA; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.52$ MHz; $\sigma = 0.96$ mho/m; $\varepsilon_r = 52.9$; $\rho = 1000$ kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2012; Ambient Temp: 23.5°C; Tissue Temp: 20.4°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 - FCC Rule Part 22H, Body SAR, Left 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 = 34.3 V/m; Power Drift = -0.064 dB
Peak SAR (extrapolated) = 1.34 W/kg
**SAR(1 g) = 0.949 mW/g; SAR(10 g) = 0.651 mW/g**




0 dB = 1.02mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

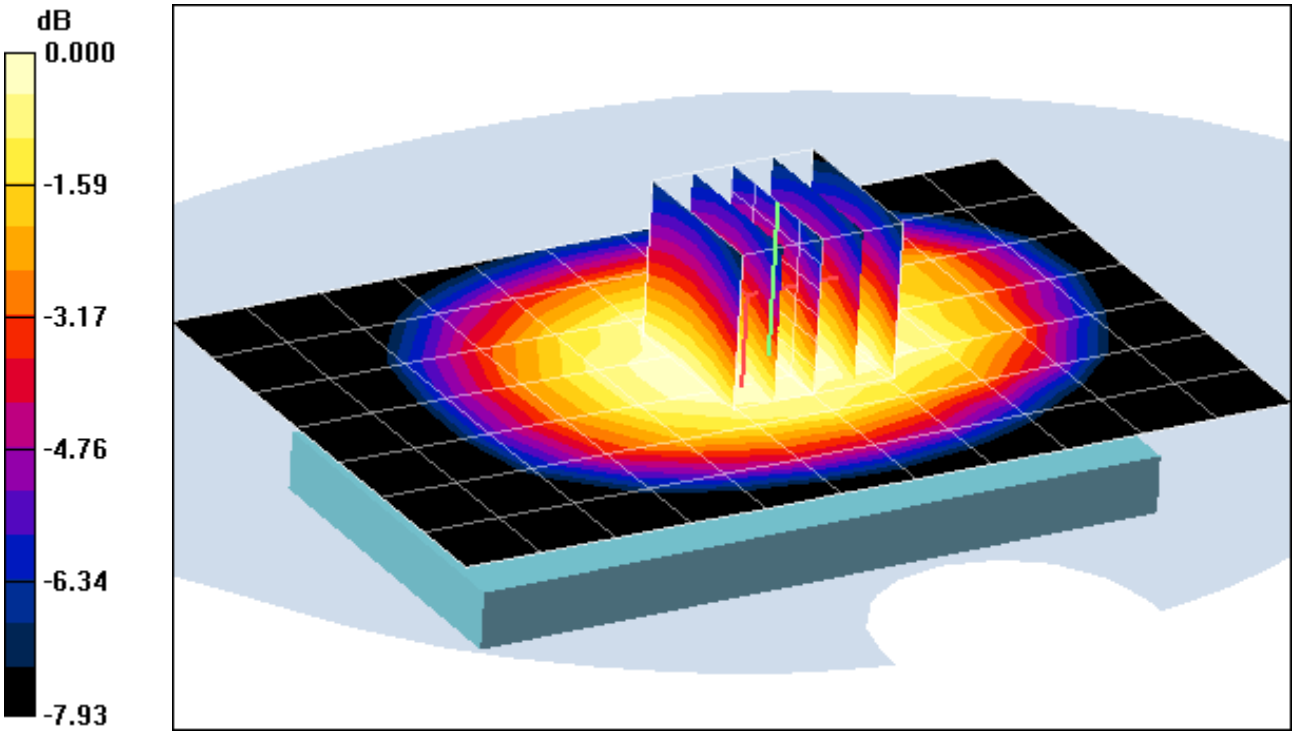
Communication System: Cellular CDMA; Frequency: 820.1 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 820.1$ MHz; $\sigma = 0.945$ mho/m; $\varepsilon_r = 53.08$; $\rho = 1000$ kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2012; Ambient Temp: 23.5°C; Tissue Temp: 20.4°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 TDSO32 - FCC Rule Part 90S, Body SAR, Back side, Mid.ch

**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.6 V/m; Power Drift = -0.005 dB
Peak SAR (extrapolated) = 1.04 W/kg
**SAR(1 g) = 0.827 mW/g; SAR(10 g) = 0.647 mW/g**




0 dB = 0.860mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

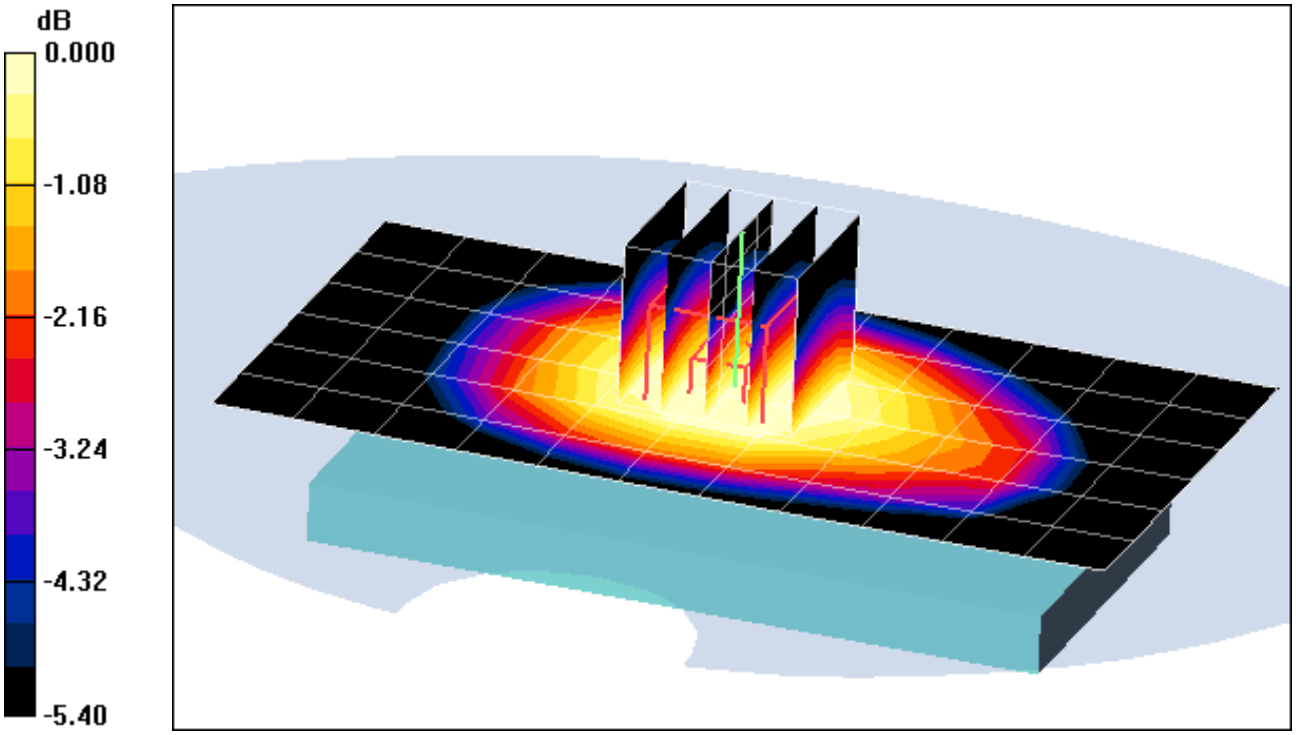
Communication System: Cellular CDMA; Frequency: 820.1 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 820.1$ MHz; $\sigma = 0.945$ mho/m; $\varepsilon_r = 53.08$; $\rho = 1000$ kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2012; Ambient Temp: 23.5°C; Tissue Temp: 20.4°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 TDSO32 - FCC Rule Part 90S, Body SAR, Front side, Mid.ch

**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.5 V/m; Power Drift = 0.127 dB
Peak SAR (extrapolated) = 0.917 W/kg
**SAR(1 g) = 0.730 mW/g; SAR(10 g) = 0.562 mW/g**




0 dB = 0.758mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

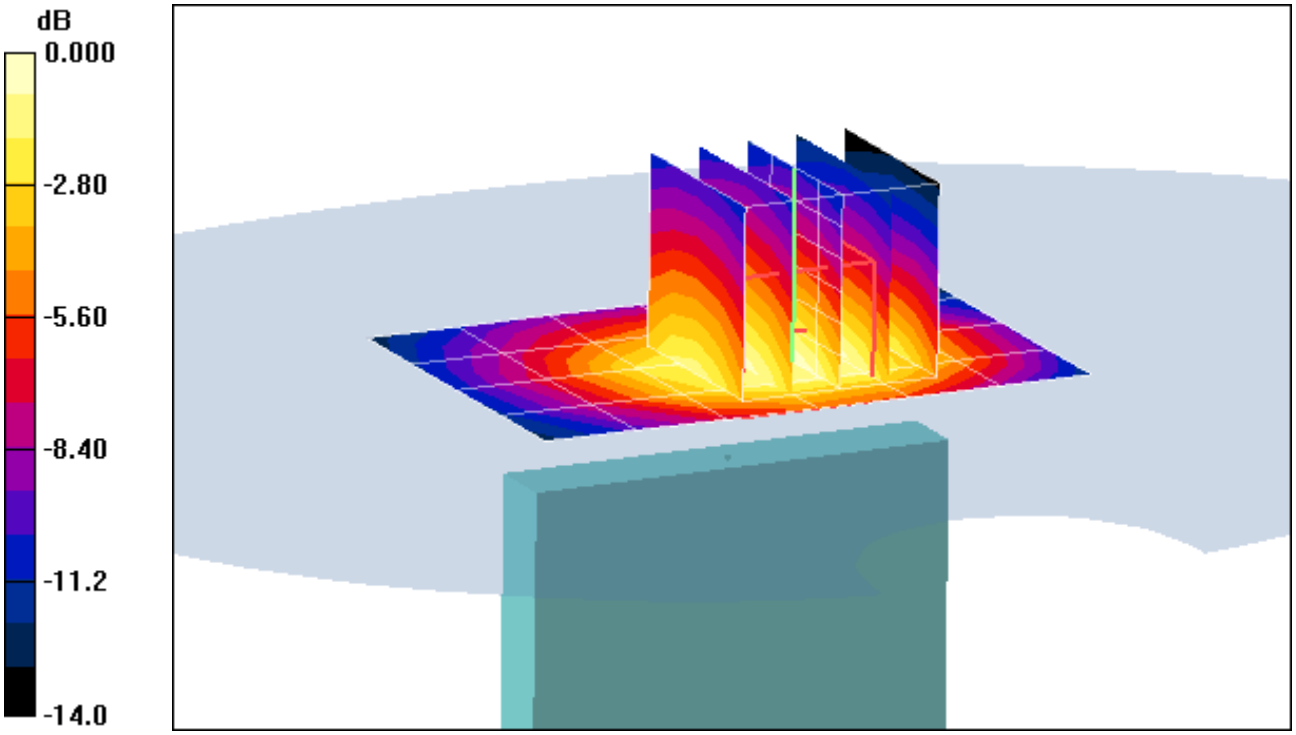
Communication System: Cellular CDMA; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 820.1$ MHz; $\sigma = 0.945$ mho/m; $\varepsilon_r = 53.08$; $\rho = 1000$ kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2012; Ambient Temp: 23.5°C; Tissue Temp: 20.4°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 TDSO32 - FCC Rule Part 90S, Body SAR, Bottom Edge, Mid.ch

**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.6 V/m; Power Drift = -0.140 dB
Peak SAR (extrapolated) = 0.489 W/kg
**SAR(1 g) = 0.300 mW/g; SAR(10 g) = 0.185 mW/g**




0 dB = 0.329mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

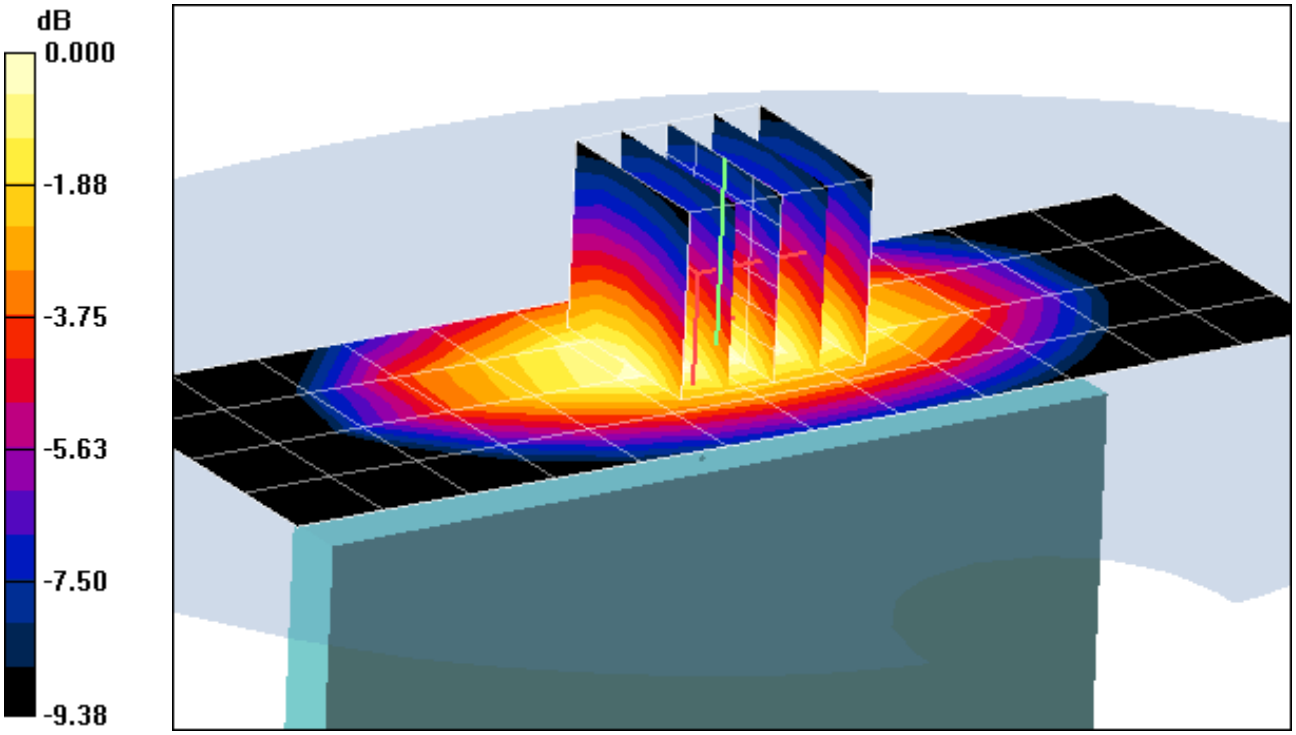
Communication System: Cellular CDMA; MHzFrequency: 820.1 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 820.1$ MHz; $\sigma = 0.945$ mho/m; $\varepsilon_r = 53.08$; $\rho = 1000$ kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2012; Ambient Temp: 23.5°C; Tissue Temp: 20.4°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 TDSO32 - FCC Rule Part 90S, Body SAR, Left 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 = 35.4 V/m; Power Drift = 0.044 dB
Peak SAR (extrapolated) = 1.42 W/kg
**SAR(1 g) = 0.971 mW/g; SAR(10 g) = 0.666 mW/g**




0 dB = 1.03mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

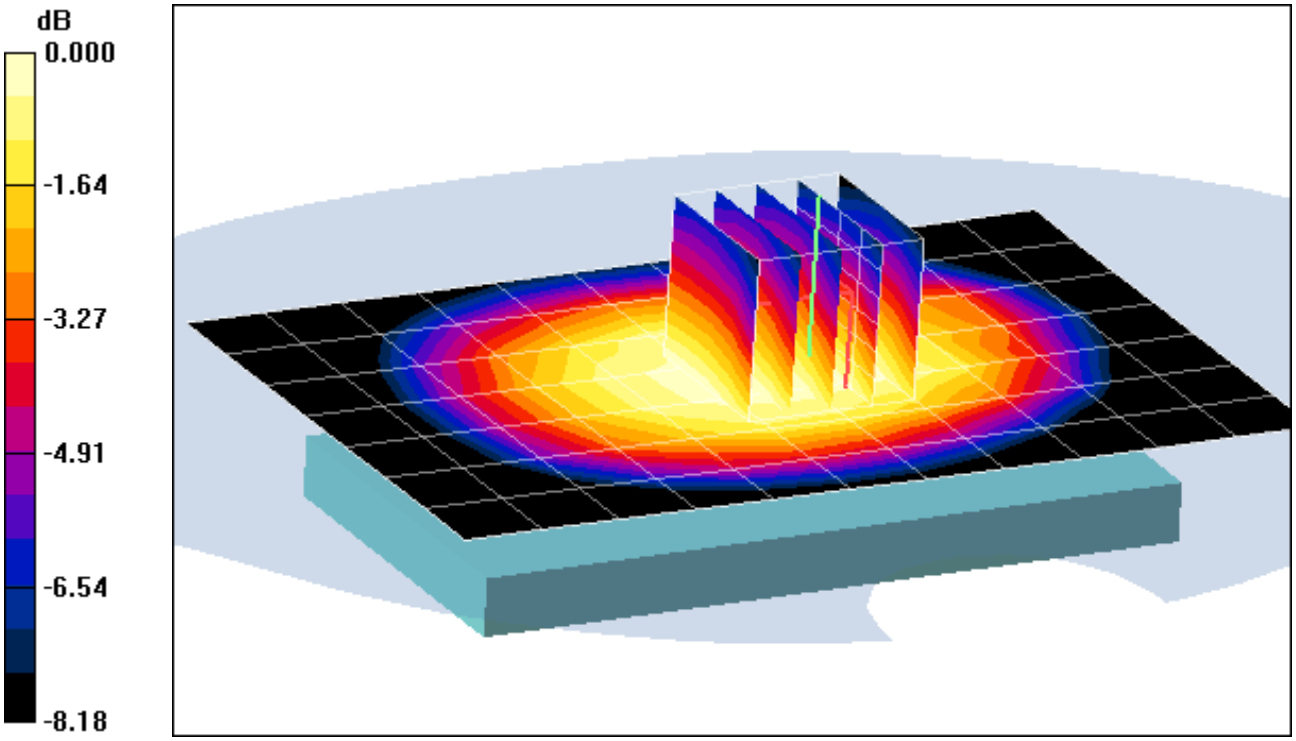
Communication System: Cellular CDMA; Frequency: 820.1 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 820.1$ MHz; $\sigma = 0.945$ mho/m; $\varepsilon_r = 53.08$; $\rho = 1000$ kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2012; Ambient Temp: 23.5°C; Tissue Temp: 20.4°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 - FCC Rule Part 90S, Body SAR, Back side, Mid.ch**

**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.0 V/m; Power Drift = 0.146 dB
Peak SAR (extrapolated) = 1.05 W/kg
**SAR(1 g) = 0.835 mW/g; SAR(10 g) = 0.650 mW/g**




0 dB = 0.870mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

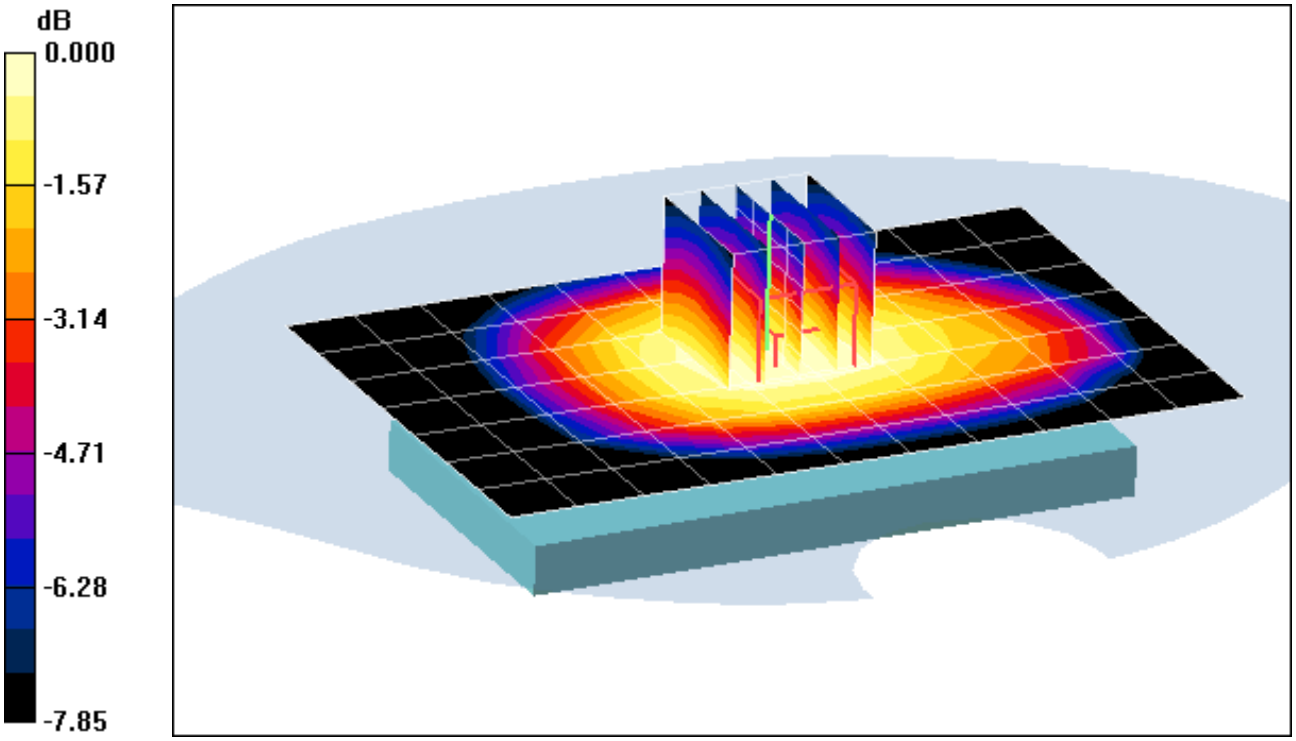
Communication System: Cellular CDMA; Frequency: 820.1 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 820.1$ MHz; $\sigma = 0.945$ mho/m; $\varepsilon_r = 53.08$; $\rho = 1000$ kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2012; Ambient Temp: 23.5°C; Tissue Temp: 20.4°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 - FCC Rule Part 90S, Body SAR, Front side, Mid.ch

**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.0 V/m; Power Drift = 0.034 dB
Peak SAR (extrapolated) = 0.936 W/kg
**SAR(1 g) = 0.748 mW/g; SAR(10 g) = 0.571 mW/g**




0 dB = 0.782mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

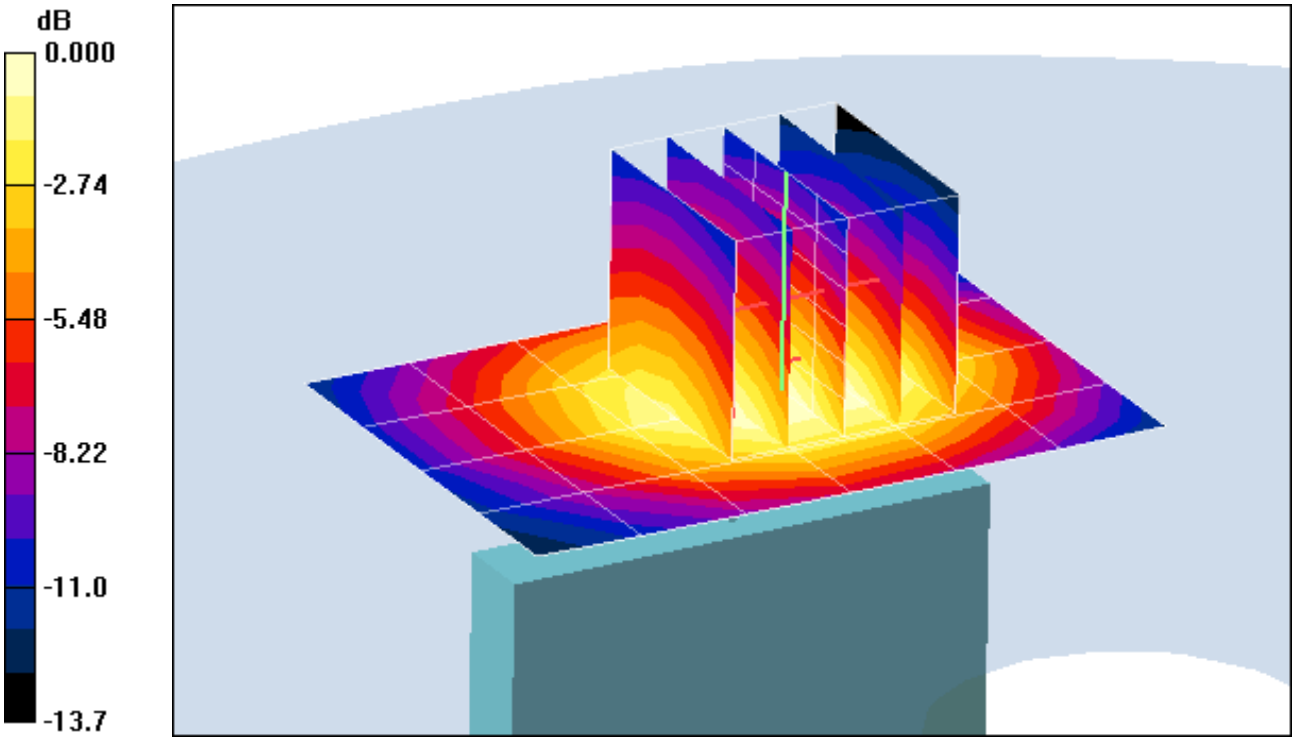
Communication System: Cellular CDMA; Frequency: 820.1 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 820.1 MHz; $\sigma$ = 0.945 mho/m; $\varepsilon_r$ = 53.08; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2012; Ambient Temp: 23.5°C; Tissue Temp: 20.4°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 - FCC Rule Part 90S, Body SAR, Bottom Edge, Mid.ch**

**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.1 V/m; Power Drift = -0.064 dB
Peak SAR (extrapolated) = 0.468 W/kg
**SAR(1 g) = 0.296 mW/g; SAR(10 g) = 0.184 mW/g**




0 dB = 0.319mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

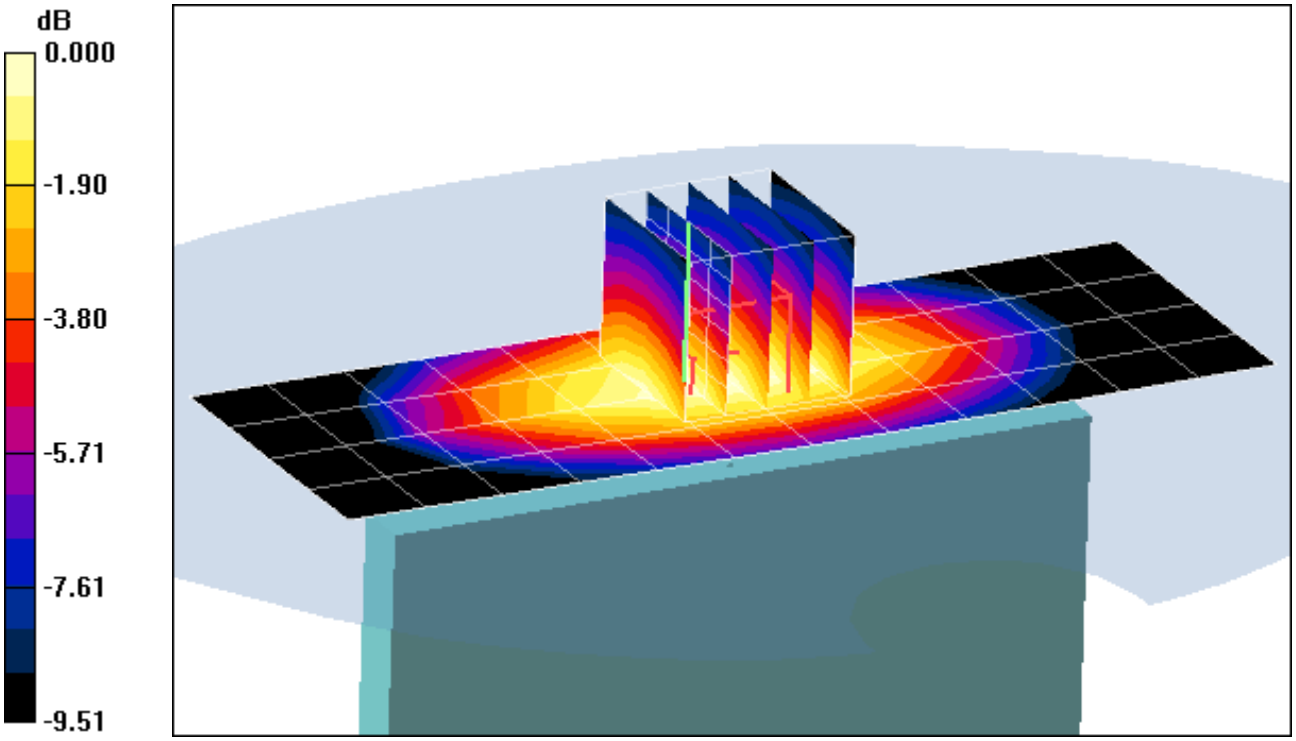
Communication System: Cellular CDMA; Frequency: 820.1 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 820.1$ MHz; $\sigma = 0.945$ mho/m; $\varepsilon_r = 53.08$; $\rho = 1000$ kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2012; Ambient Temp: 23.5°C; Tissue Temp: 20.4°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 - FCC Rule Part 90S, Body SAR, Left 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 = 34.4 V/m; Power Drift = -0.020 dB
Peak SAR (extrapolated) = 1.32 W/kg
**SAR(1 g) = 0.929 mW/g; SAR(10 g) = 0.638 mW/g**




0 dB = 0.993mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

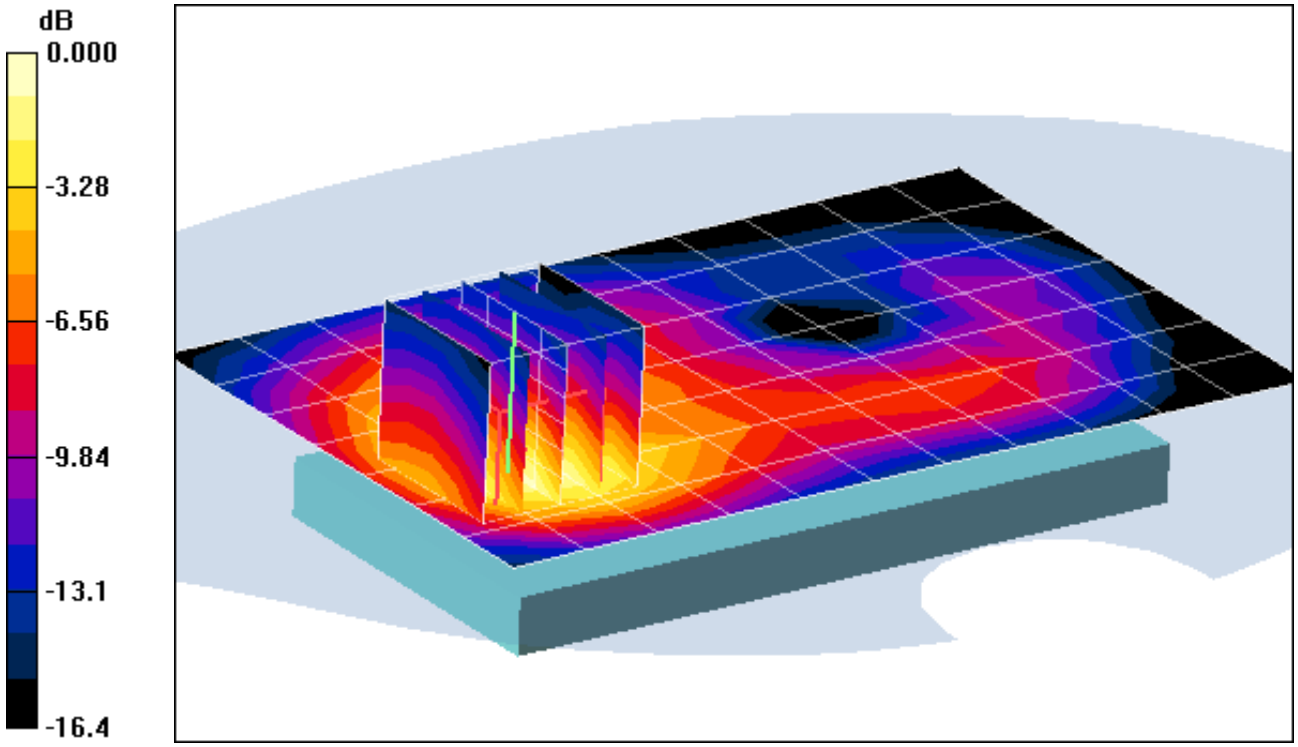
Communication System: PCS CDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; $\sigma$ = 1.56 mho/m; $\varepsilon_r$ = 51.7; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2012; Ambient Temp: 21.0 °C; Tissue Temp: 20.5 °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-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Mode: PCS TDSO32 - FCC Rule Part 24E, Body SAR, Back side, Mid.ch**

**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.8 V/m; Power Drift = -0.154 dB
Peak SAR (extrapolated) = 1.13 W/kg
**SAR(1 g) = 0.696 mW/g; SAR(10 g) = 0.386 mW/g**




0 dB = 0.767mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

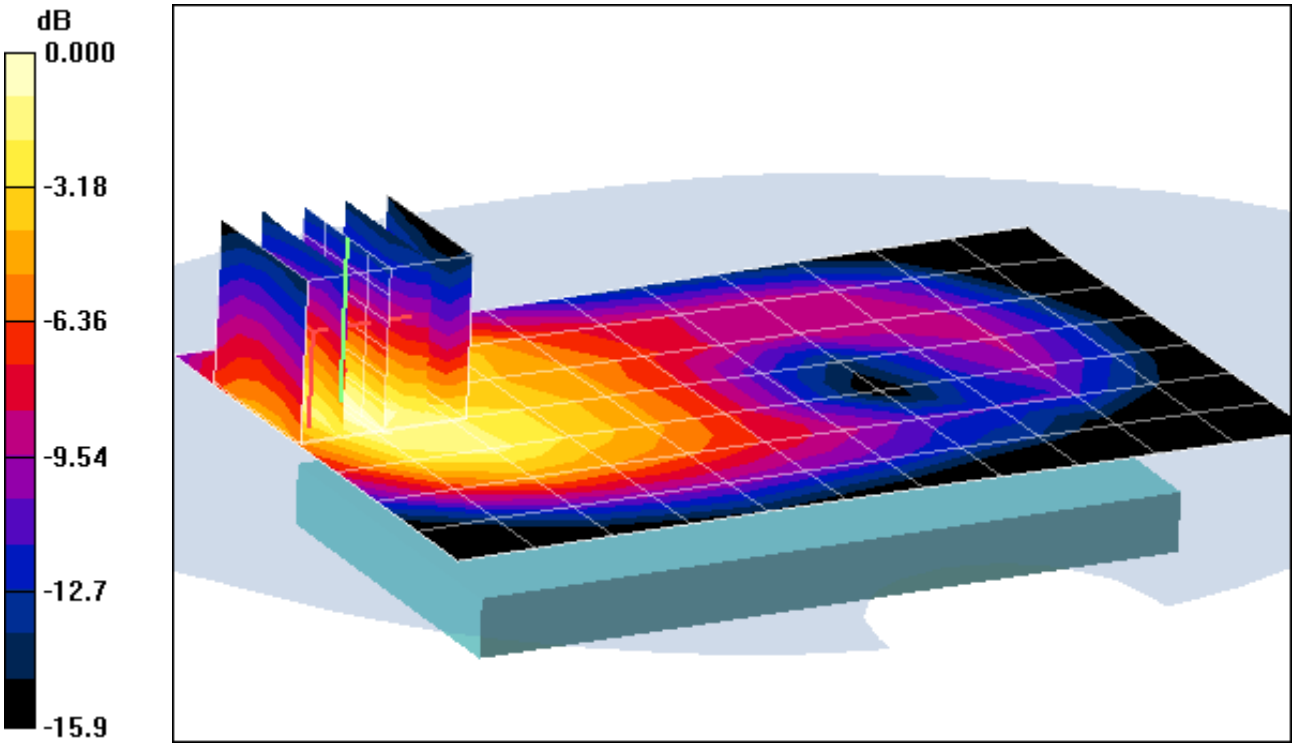
Communication System: PCS CDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; $\sigma$ = 1.56 mho/m; $\varepsilon_r$ = 51.7; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2012; Ambient Temp: 21.0 °C; Tissue Temp: 20.5 °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-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Mode: PCS TDSO32 - FCC Rule Part 24E, Body SAR, Front side, Mid.ch**

**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.2 V/m; Power Drift = 0.019 dB
Peak SAR (extrapolated) = 1.15 W/kg
**SAR(1 g) = 0.662 mW/g; SAR(10 g) = 0.369 mW/g**




0 dB = 0.747mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

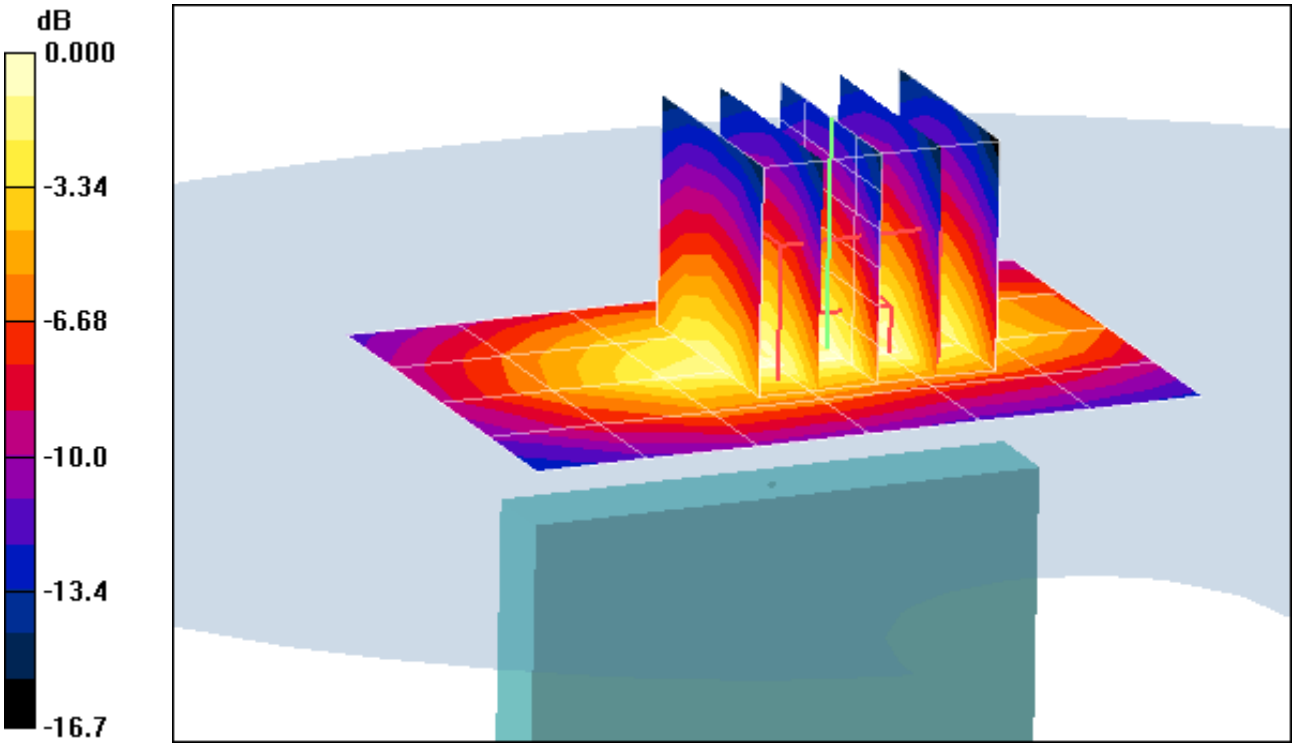
Communication System: PCS CDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; $\sigma$ = 1.56 mho/m; $\varepsilon_r$ = 51.7; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2012; Ambient Temp: 21.0 °C; Tissue Temp: 20.5 °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-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Mode: PCS TDSO32 - FCC Rule Part 24E, Body SAR, Bottom Edge, Mid.ch**

**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.0 V/m; Power Drift = 0.151 dB
Peak SAR (extrapolated) = 1.24 W/kg
**SAR(1 g) = 0.729 mW/g; SAR(10 g) = 0.405 mW/g**




0 dB = 0.797mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

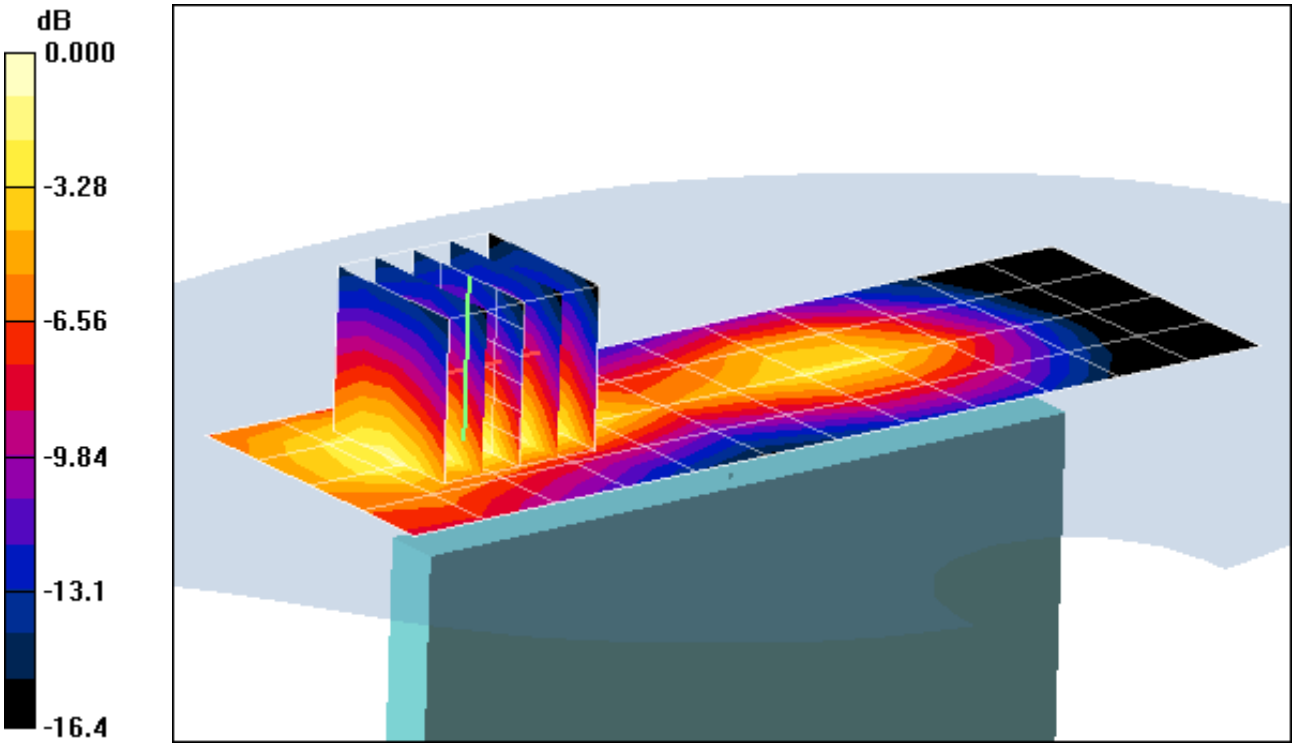
Communication System: PCS CDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; $\sigma$ = 1.56 mho/m; $\varepsilon_r$ = 51.7; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2012; Ambient Temp: 21.0 °C; Tissue Temp: 20.5 °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-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Mode: PCS TDSO32 - FCC Rule Part 24E, Body SAR, Left 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 = 17.0 V/m; Power Drift = 0.041 dB
Peak SAR (extrapolated) = 0.742 W/kg
**SAR(1 g) = 0.426 mW/g; SAR(10 g) = 0.231 mW/g**




0 dB = 0.475mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

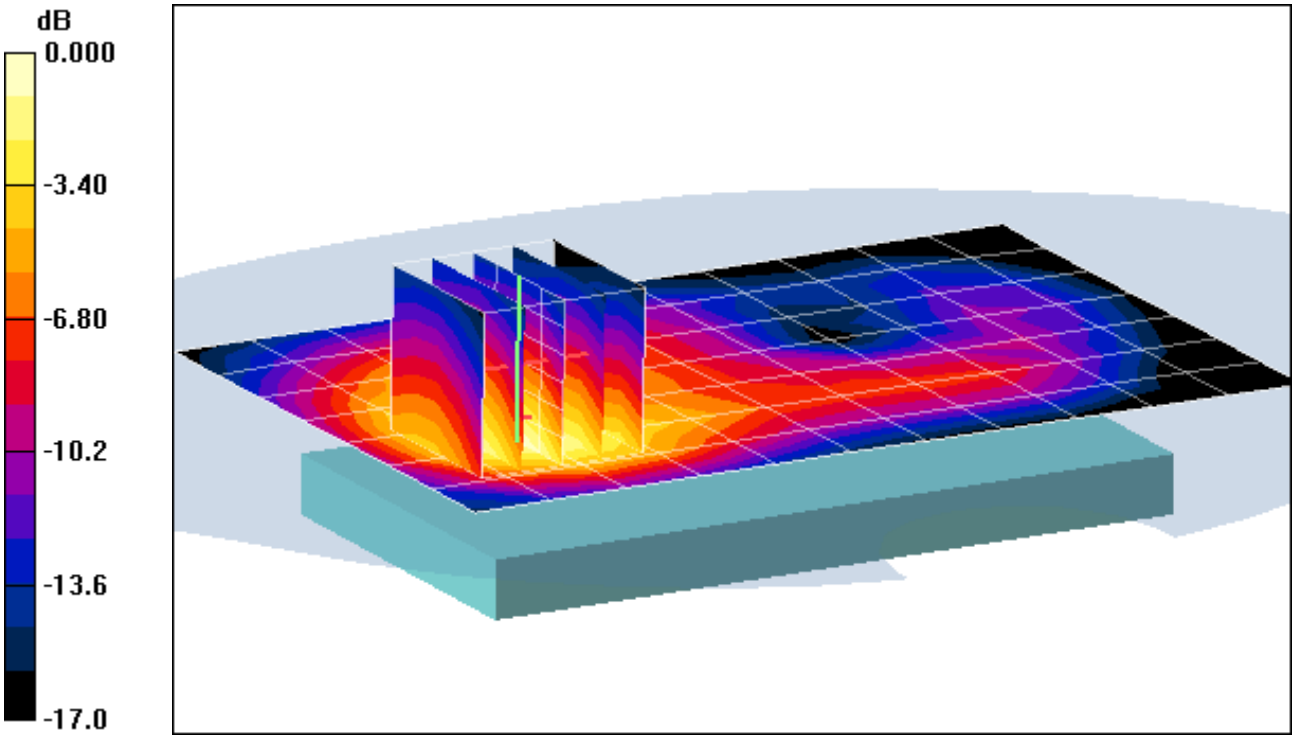
Communication System: PCS CDMA; Frequency: 1908.75 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1908.75 MHz; $\sigma$ = 1.581 mho/m; $\varepsilon_r$ = 51.7; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2012; Ambient Temp: 21.0 °C; Tissue Temp: 20.5 °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-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Mode: PCS EVDO - FCC Rule Part 24E, Body SAR, Back side, High.ch**

**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.7 V/m; Power Drift = -0.061 dB
Peak SAR (extrapolated) = 1.31 W/kg
**SAR(1 g) = 0.764 mW/g; SAR(10 g) = 0.409 mW/g**




0 dB = 0.850mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

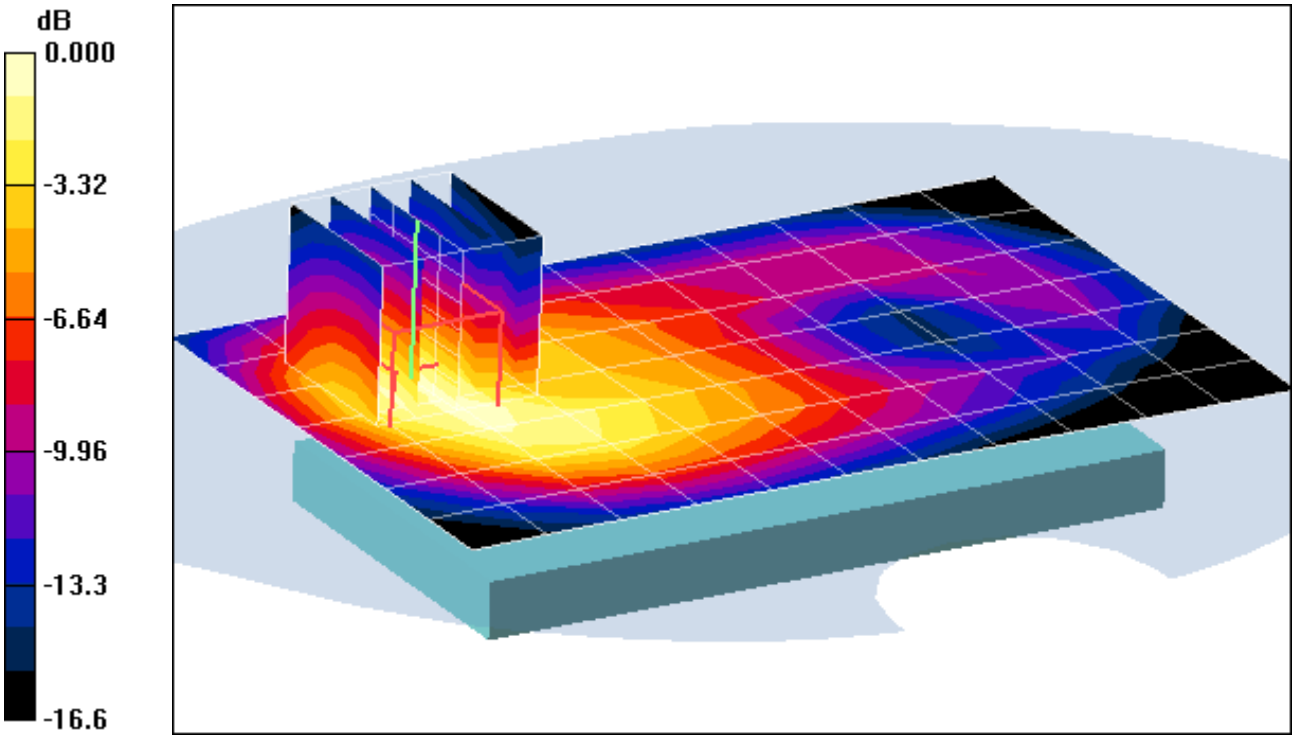
Communication System: PCS CDMA; Frequency: 1908.75 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1908.75 MHz; $\sigma$ = 1.581 mho/m; $\varepsilon_r$ = 51.7; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2012; Ambient Temp: 21.0 °C; Tissue Temp: 20.5 °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-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## Mode: PCS EVDO - FCC Rule Part 24E, Body SAR, Front side, High.ch

**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.4 V/m; Power Drift = -0.016 dB
Peak SAR (extrapolated) = 1.08 W/kg
**SAR(1 g) = 0.622 mW/g; SAR(10 g) = 0.340 mW/g**




0 dB = 0.676mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

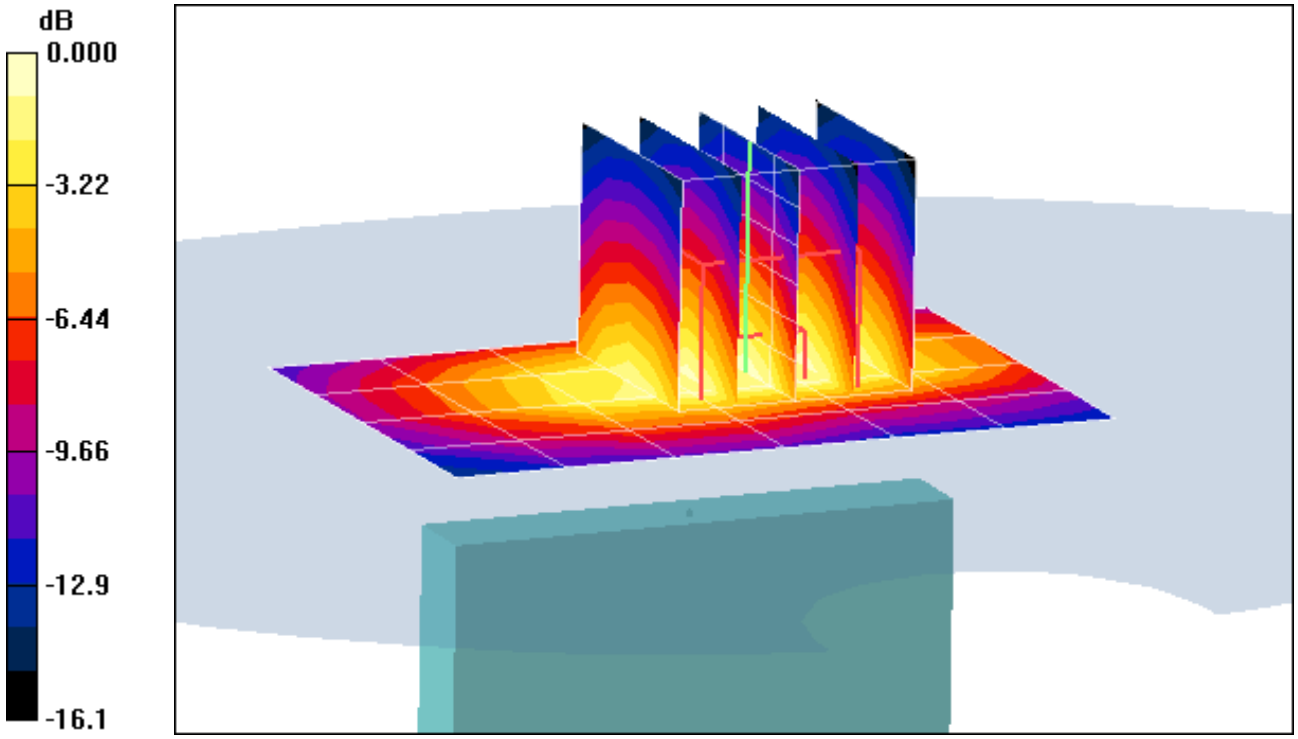
Communication System: PCS CDMA; Frequency: 1908.75 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1908.75 MHz; $\sigma$ = 1.581 mho/m; $\varepsilon_r$ = 51.7; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2012; Ambient Temp: 21.0 °C; Tissue Temp: 20.5 °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-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## Mode: PCS EVDO - FCC Rule Part 24E, Body SAR, Bottom Edge, High.ch

**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.3 V/m; Power Drift = 0.218 dB
Peak SAR (extrapolated) = 1.19 W/kg
**SAR(1 g) = 0.694 mW/g; SAR(10 g) = 0.387 mW/g**




0 dB = 0.774mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

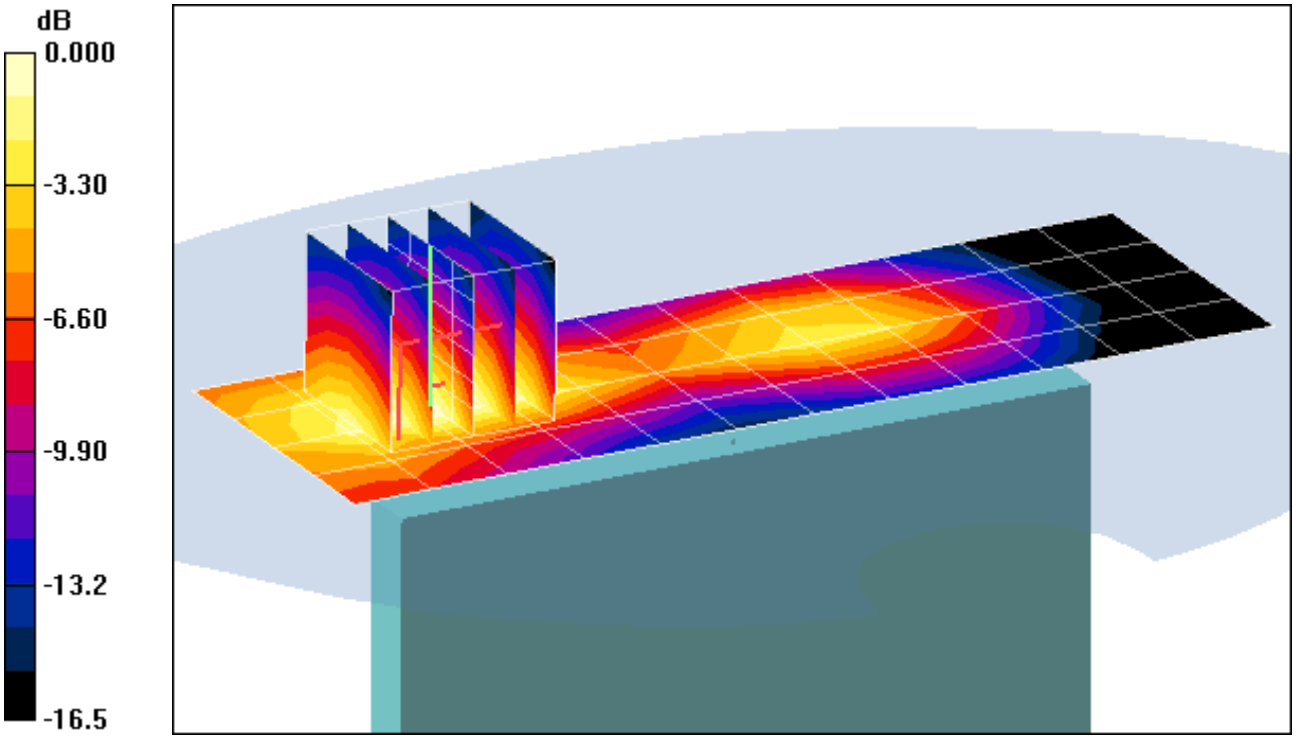
Communication System: PCS CDMA; Frequency: 1908.75 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1908.75 MHz; $\sigma$ = 1.581 mho/m; $\varepsilon_r$ = 51.7; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2012; Ambient Temp: 21.0 °C; Tissue Temp: 20.5 °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-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Mode: PCS EVDO - FCC Rule Part 24E, Body SAR, Left Edge, High.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 = 16.5 V/m; Power Drift = 0.017 dB
Peak SAR (extrapolated) = 0.659 W/kg
**SAR(1 g) = 0.377 mW/g; SAR(10 g) = 0.208 mW/g**




0 dB = 0.423mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 1**

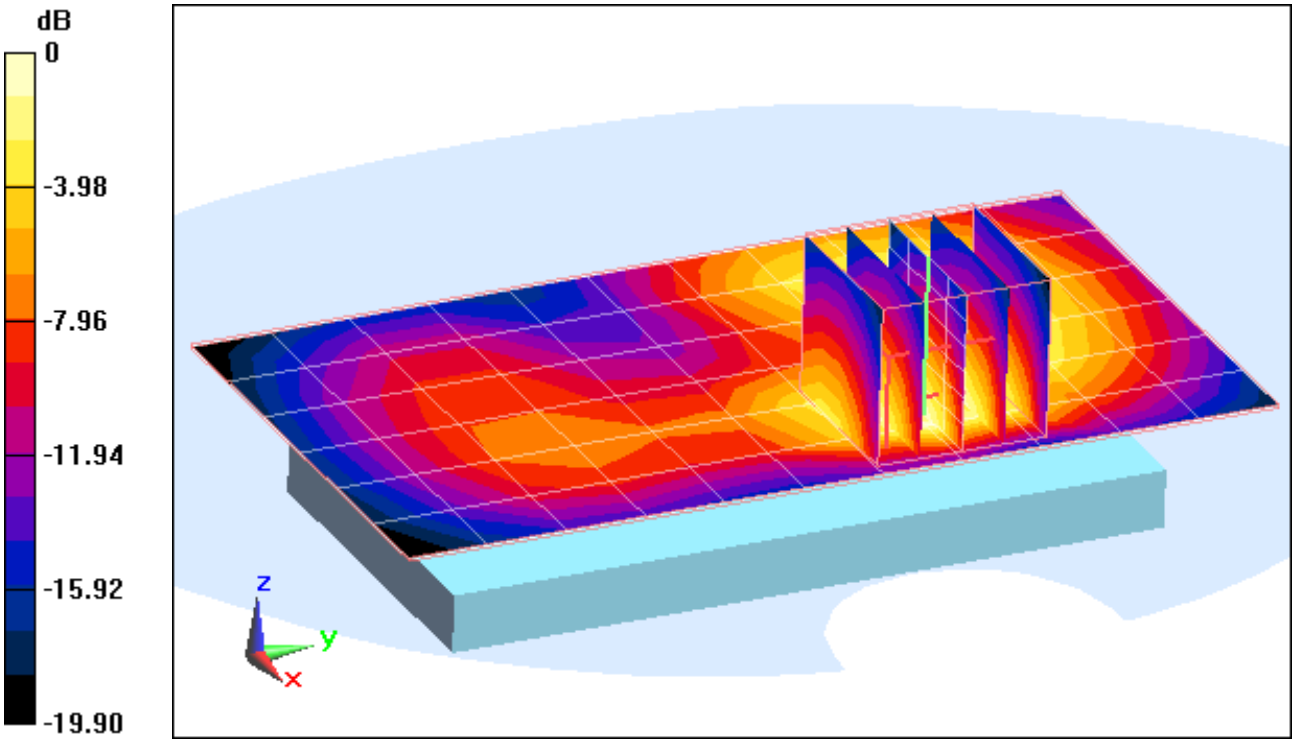
Communication System: LTE Band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
$f = 1882.5$ MHz; $\sigma = 1.486$ mho/m; $\varepsilon_r = 51.32$; $\rho = 1000$ kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2012; Ambient Temp: 22.1°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3213; ConvF(4.58, 4.58, 4.58); Calibrated: 3/24/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn455; Calibrated: 11/9/2011
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW:DASY52, Version 52.6 (2); ; SEMCAD X Version 14.4.5 (3634)

**Mode: LTE Band 25 - FCC Rule Part 24E, Body SAR, Back Side**
**5 MHz BW, Mid. Channel, QPSK, 12 RB, 6 RB Offset**

**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.613 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.927 W/kg
**SAR(1 g) = 0.479 mW/g; SAR(10 g) = 0.232 mW/g**




0 dB = 0.570mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 1**

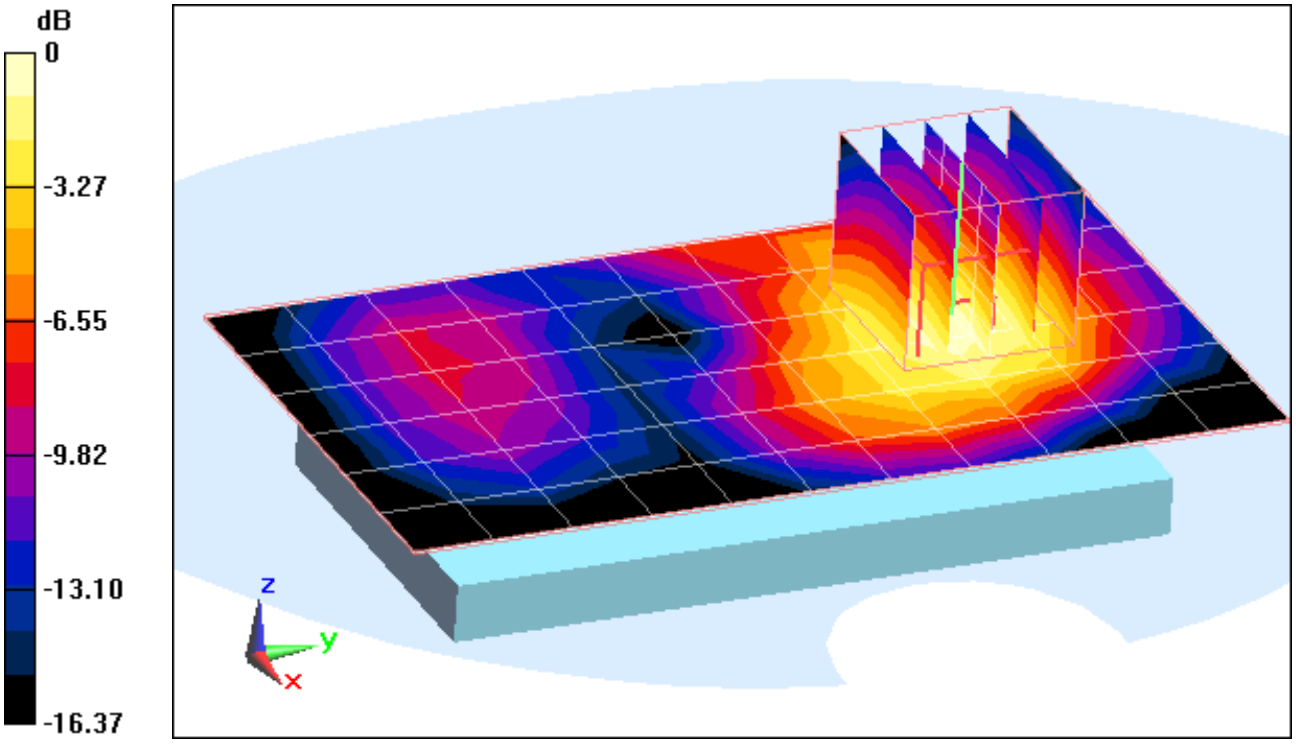
Communication System: LTE Band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
$f = 1882.5$ MHz; $\sigma = 1.486$ mho/m; $\varepsilon_r = 51.32$; $\rho = 1000$ kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2012; Ambient Temp: 22.1°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3213; ConvF(4.58, 4.58, 4.58); Calibrated: 3/24/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn455; Calibrated: 11/9/2011
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

**Mode: LTE Band 25 - FCC Rule Part 24, Body SAR, Front Side**
**5 MHz BW, Mid. Channel, QPSK, 12 RB, 6 RB Offset**

**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.742 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.355 W/kg
**SAR(1 g) = 0.231 mW/g; SAR(10 g) = 0.143 mW/g**




0 dB = 0.250mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 1**

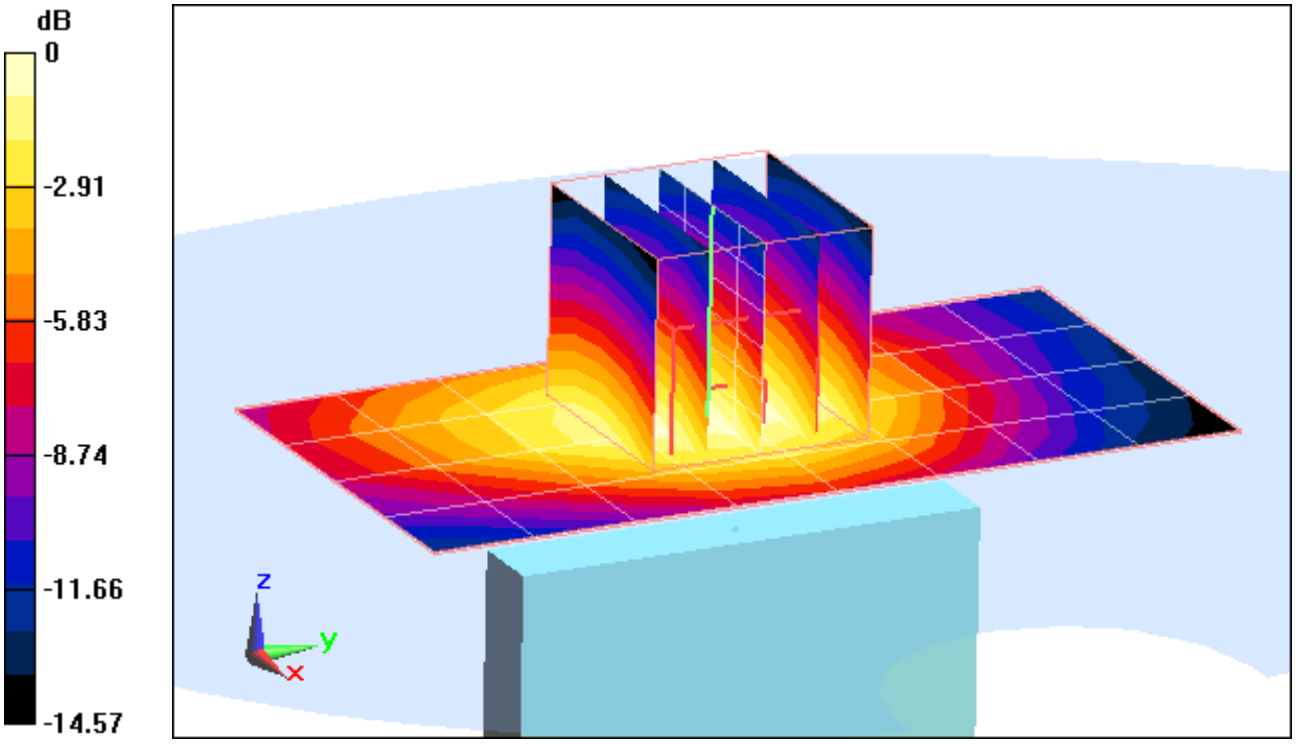
Communication System: LTE Band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
$f = 1882.5$ MHz; $\sigma = 1.486$ mho/m; $\varepsilon_r = 51.32$; $\rho = 1000$ kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2012; Ambient Temp: 22.1°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3213; ConvF(4.58, 4.58, 4.58); Calibrated: 3/24/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn455; Calibrated: 11/9/2011
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

**Mode: LTE Band 25 - FCC Rule Part 24E, Body SAR, Top Edge**
**5 MHz BW, Mid. Channel, QPSK, 12 RB, 6 RB Offset**

**Area Scan (5x9x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.494 V/m; Power Drift = -0.0094 dB
Peak SAR (extrapolated) = 0.230 W/kg
**SAR(1 g) = 0.148 mW/g; SAR(10 g) = 0.092 mW/g**




0 dB = 0.160mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 1**

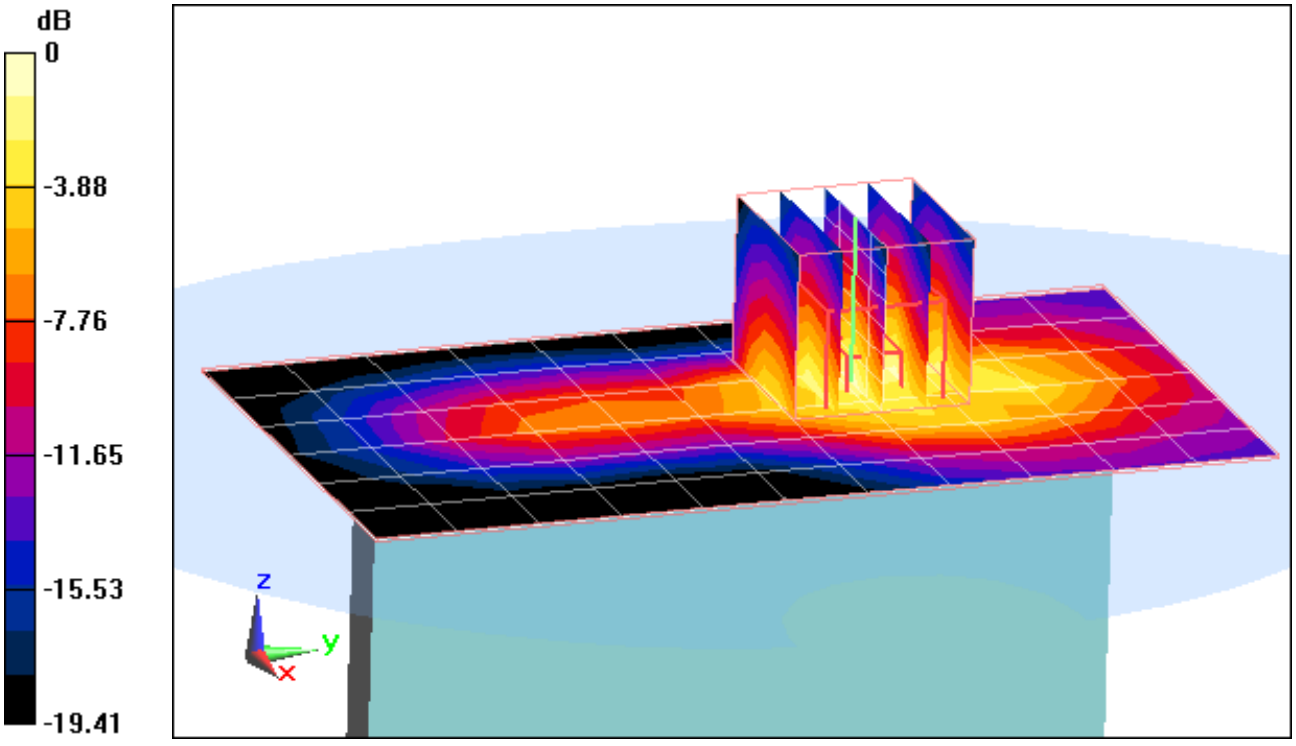
Communication System: LTE Band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
$f = 1882.5$ MHz; $\sigma = 1.486$ mho/m; $\varepsilon_r = 51.32$; $\rho = 1000$ kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2012; Ambient Temp: 22.1°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3213; ConvF(4.58, 4.58, 4.58); Calibrated: 3/24/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn455; Calibrated: 11/9/2011
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

**Mode: LTE Band 25 - FCC Rule Part 24E, Body SAR, Left Edge**
**5 MHz BW, Mid. Channel, QPSK, 12 RB, 6 RB Offset**

**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.369 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.600 W/kg
**SAR(1 g) = 0.325 mW/g; SAR(10 g) = 0.161 mW/g**




0 dB = 0.380mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 1**

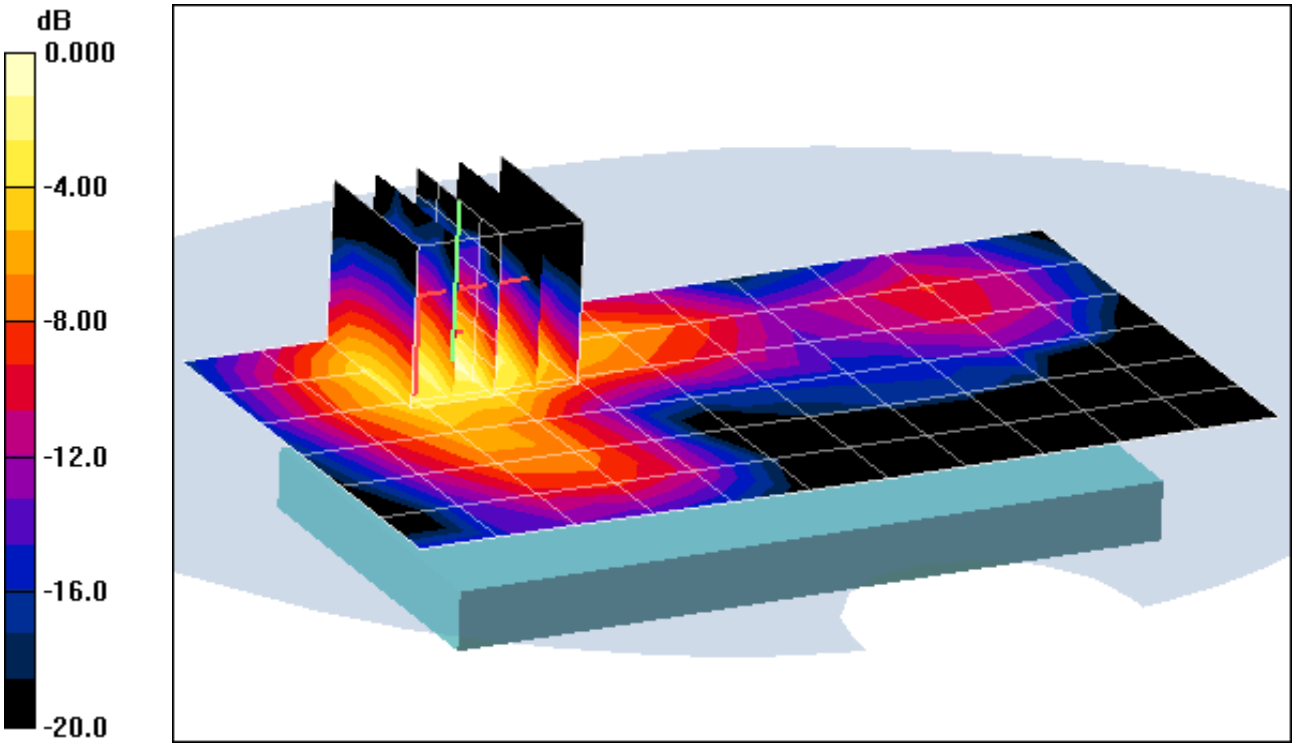
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2462 MHz; $\sigma$ = 2.03 mho/m; $\varepsilon_r$ = 50.2; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2012; Ambient Temp: 22.4°C; Tissue Temp: 20.6°C

Probe: ES3DV3 - SN3258; ConvF(4.34, 4.34, 4.34); Calibrated: 4/8/2011
Sensor-Surface: 3mm (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: IEEE 802.11b - FCC Rule Part 15C, Body SAR, Ch 11, 1 Mbps, Back Side

**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.88 V/m; Power Drift = 0.010 dB
Peak SAR (extrapolated) = 0.175 W/kg
**SAR(1 g) = 0.082 mW/g; SAR(10 g) = 0.038 mW/g**




0 dB = 0.106mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 1**

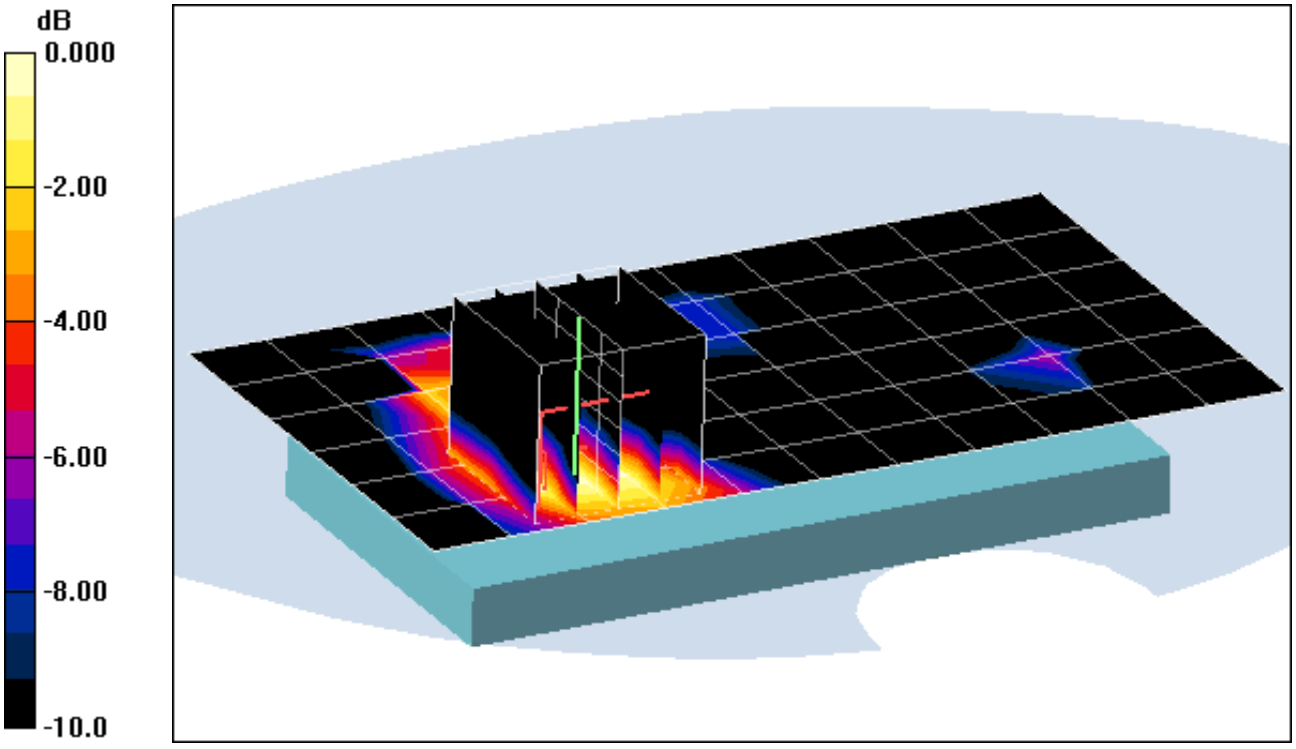
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2462 MHz; $\sigma$ = 2.03 mho/m; $\varepsilon_r$ = 50.2; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2012; Ambient Temp: 22.4°C; Tissue Temp: 20.6°C

Probe: ES3DV3 - SN3258; ConvF(4.34, 4.34, 4.34); Calibrated: 4/8/2011
Sensor-Surface: 3mm (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: IEEE 802.11b - FCC Rule Part 15C, Body SAR, Ch 11, 1 Mbps, Front Side

**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.56 V/m; Power Drift = 0.165 dB
Peak SAR (extrapolated) = 0.025 W/kg
**SAR(1 g) = 0.013 mW/g; SAR(10 g) = 0.00634 mW/g**




0 dB = 0.017mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 1**

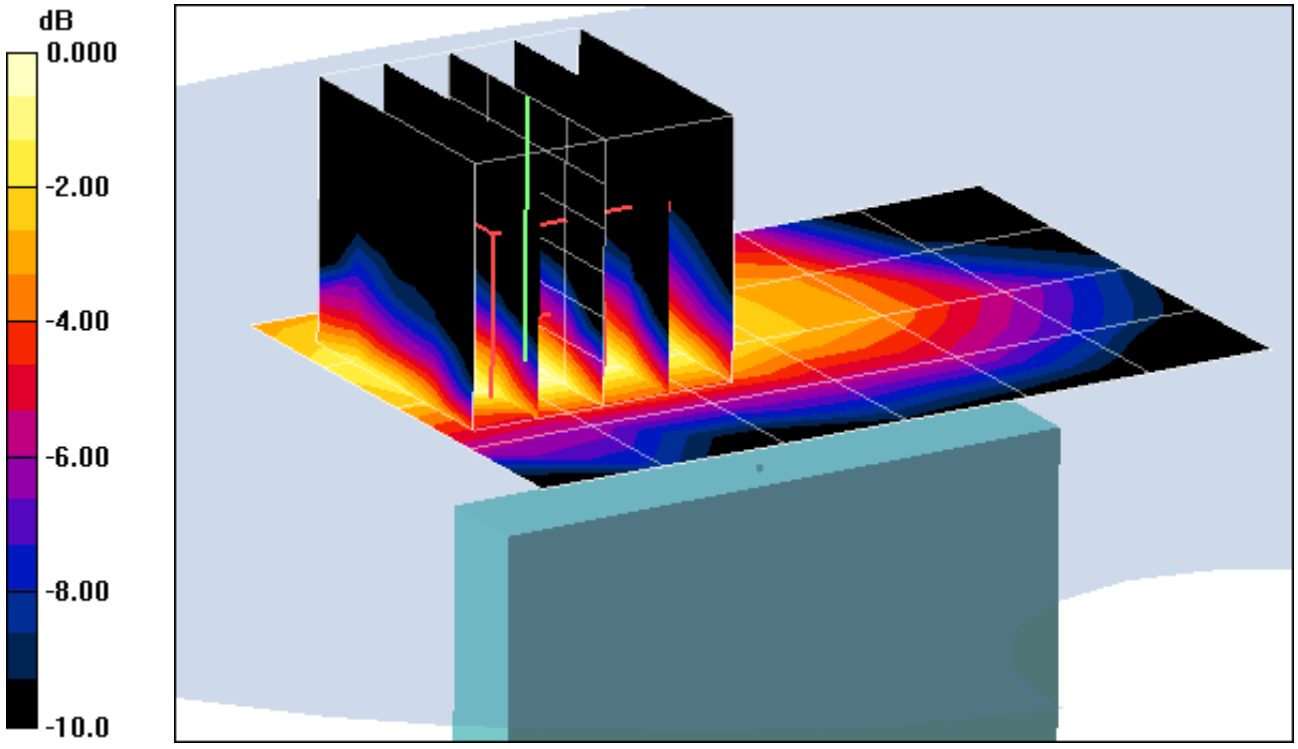
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2462 MHz; $\sigma$ = 2.03 mho/m; $\varepsilon_r$ = 50.2; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2012; Ambient Temp: 22.4°C; Tissue Temp: 20.6°C

Probe: ES3DV3 - SN3258; ConvF(4.34, 4.34, 4.34); Calibrated: 4/8/2011
Sensor-Surface: 3mm (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: IEEE 802.11b - FCC Rule Part 15C, Body SAR, Ch 11, 1 Mbps, Bottom Edge

**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.20 V/m; Power Drift = 0.135 dB
Peak SAR (extrapolated) = 0.021 W/kg
**SAR(1 g) = 0.00925 mW/g; SAR(10 g) = 0.00486 mW/g**




0 dB = 0.012mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 1**

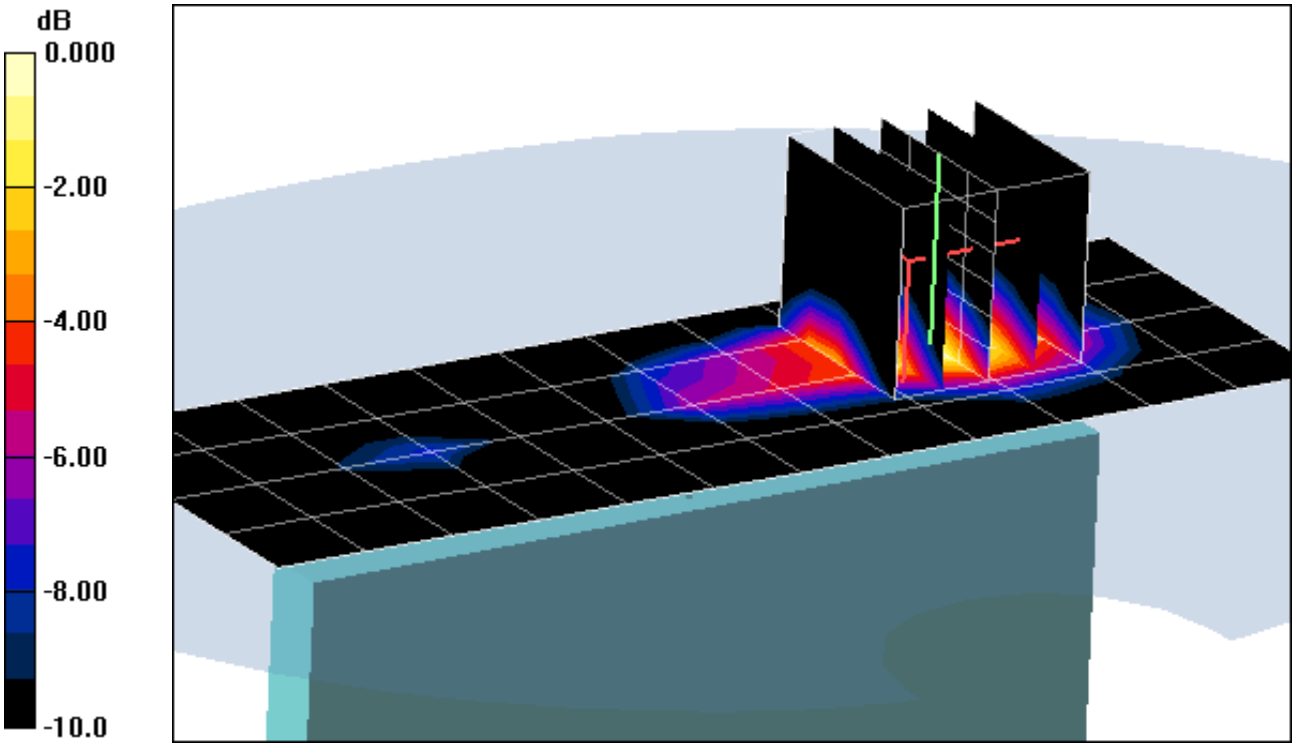
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2462 MHz; $\sigma$ = 2.03 mho/m; $\varepsilon_r$ = 50.2; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2012; Ambient Temp: 22.4°C; Tissue Temp: 20.6°C

Probe: ES3DV3 - SN3258; ConvF(4.34, 4.34, 4.34); Calibrated: 4/8/2011
Sensor-Surface: 3mm (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: IEEE 802.11b - FCC Rule Part 15C, Body SAR, Ch 11, 1 Mbps, Right Edge

**Area Scan (5x13x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.76 V/m; Power Drift = 0.134 dB
Peak SAR (extrapolated) = 0.141 W/kg
**SAR(1 g) = 0.066 mW/g; SAR(10 g) = 0.030 mW/g**




0 dB = 0.087mW/g

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 3**

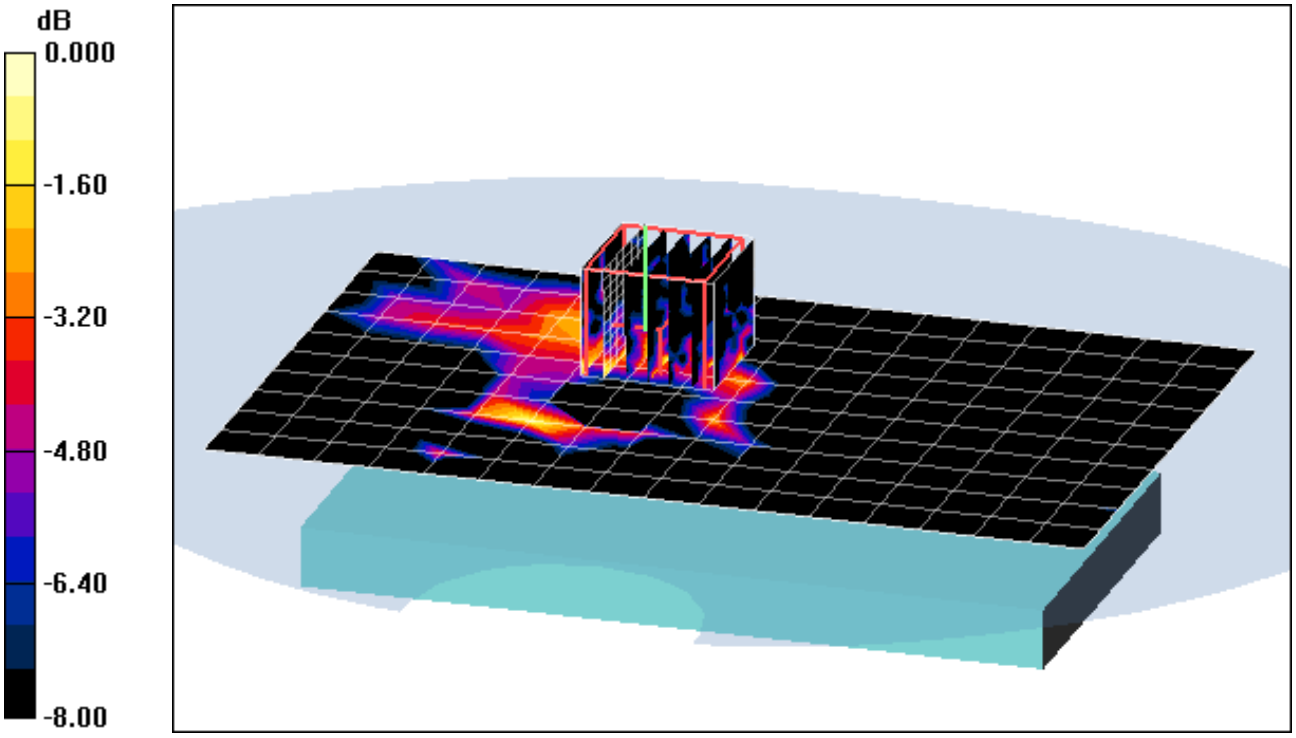
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5500 MHz; $\sigma$ = 5.771 mho/m; $\varepsilon_r$ = 46.64; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3561; ConvF(3.28, 3.28, 3.28); Calibrated: 7/27/2011
Sensor-Surface: 2mm (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: IEEE 802.11a - FCC Rule Part 15 E, 5.5 GHz,**
**Body SAR, Ch 100, 6 Mbps**

**Area Scan (11x17x1):** Measurement grid: dx=10mm, dy=10mm
**Zoom Scan (7x7x11)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.77 V/m; Power Drift = 0.168 dB
Peak SAR (extrapolated) = 0.114 W/kg
**SAR(1 g) = 0.032 mW/g; SAR(10 g) = 0.014 mW/g**




0 dB = 0.069mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

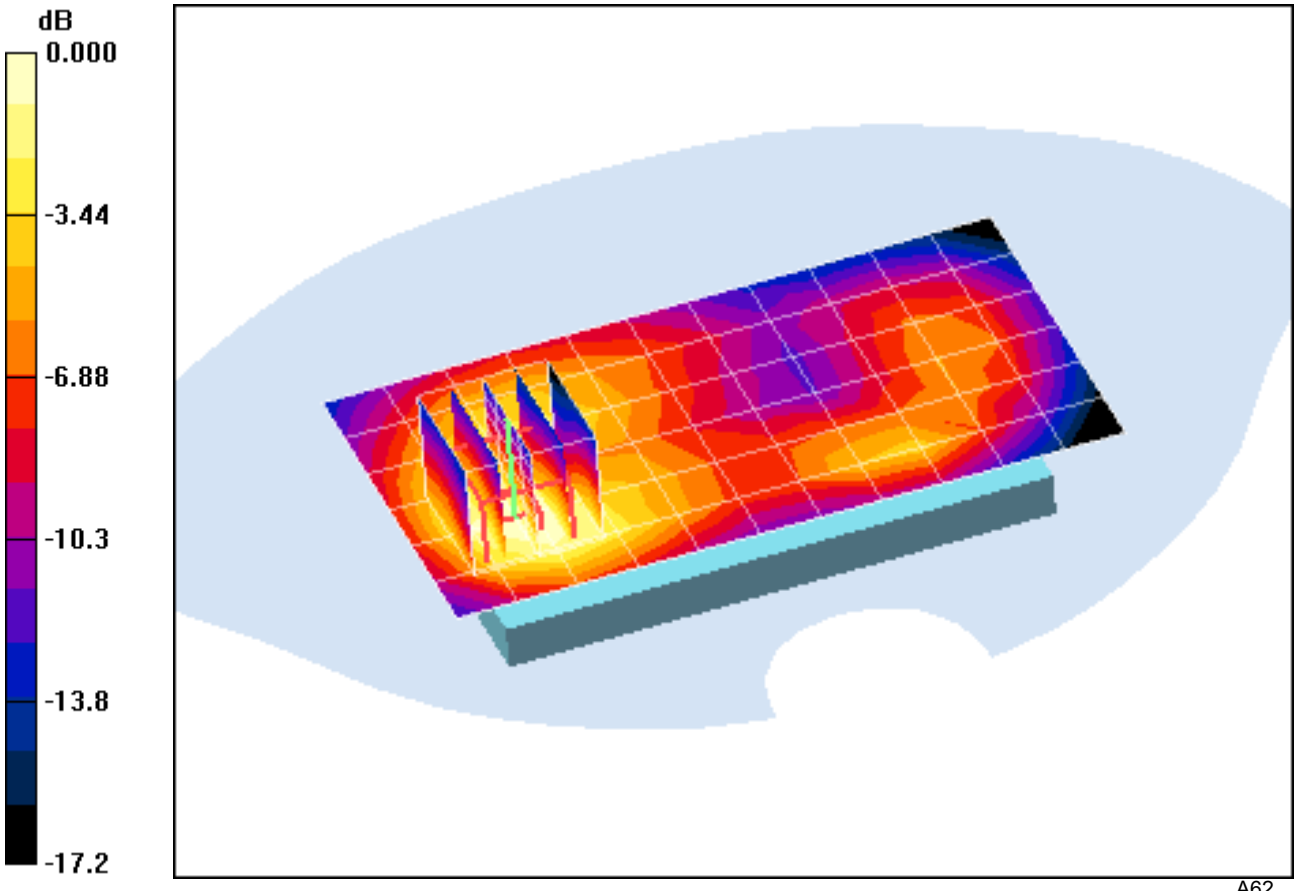
Communication System: PCS CDMA; Frequency: 1851.25 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1851.25 MHz; $\sigma$ = 1.52 mho/m; $\varepsilon_r$ = 51.8; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-17-2012; Ambient Temp: 24.3 °C; Tissue Temp: 22.0 °C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Mode: SVLTE, Body SAR, Back side, PCS CDMA Ch.25,**
**LTE Ch.26453, QPSK, 5 MHz BW, 12 RB, 6 RB Offset, 18 dBm**

**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.7 V/m; Power Drift = -0.169 dB
Peak SAR (extrapolated) = 0.939 W/kg
**SAR(1 g) = 0.547 mW/g; SAR(10 g) = 0.305 mW/g**




0 dB = 0.607mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHL700; Type: Portable Handset; Serial: 2**

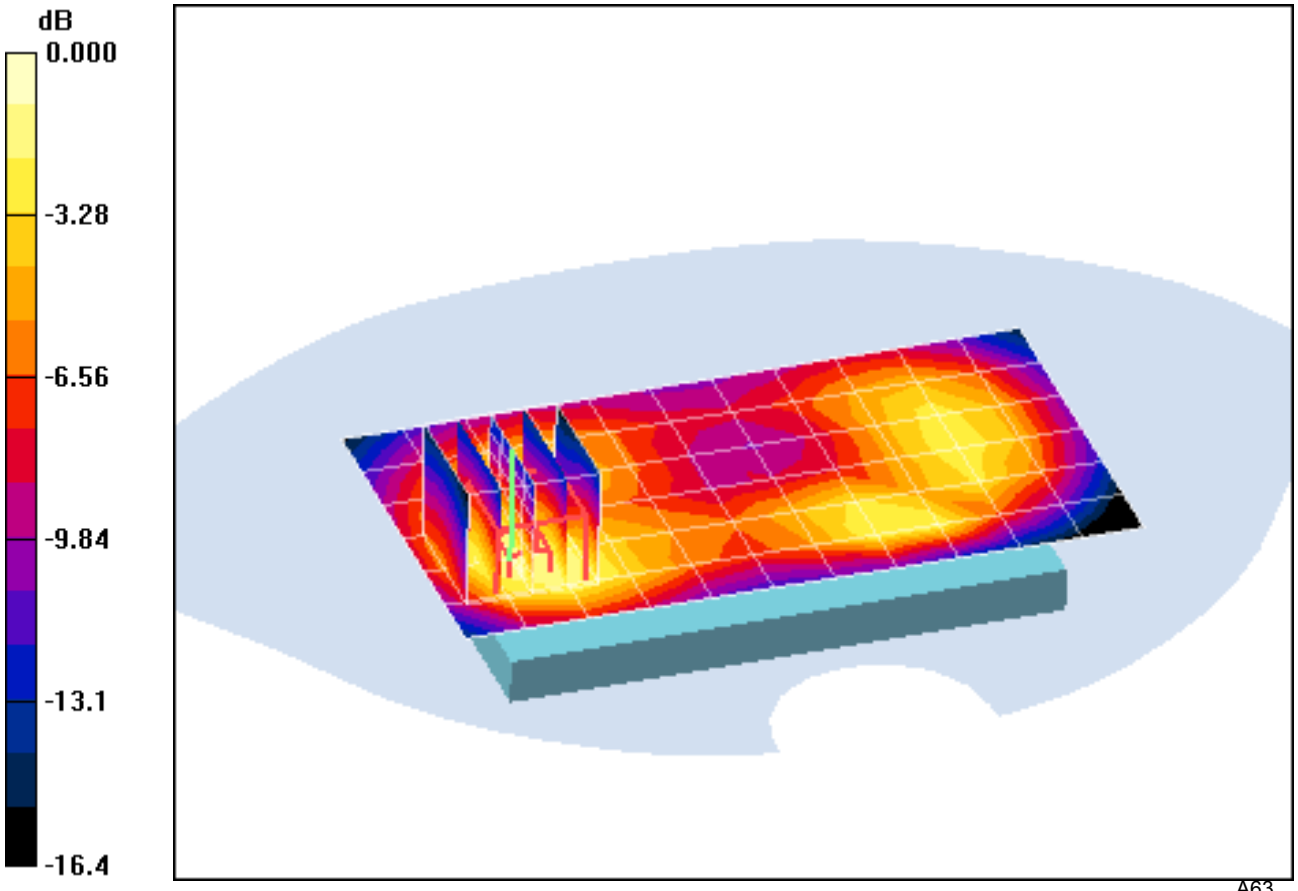
Communication System: PCS CDMA; Frequency: 1851.25 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1851.25 MHz; $\sigma$ = 1.523 mho/m; $\varepsilon_r$ = 52.08; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-15-2012; Ambient Temp: 23.1 °C; Tissue Temp: 21.2 °C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Mode: SVLTE, Body SAR, Back side, PCS CDMA Ch.25,**
**LTE Ch.26453, QPSK, 5 MHz BW, 12 RB, 6 RB Offset, 22.5 dBm**

**Area Scan (7x12x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.5 V/m; Power Drift = -0.016 dB
Peak SAR (extrapolated) = 1.07 W/kg
**SAR(1 g) = 0.653 mW/g; SAR(10 g) = 0.363 mW/g**




0 dB = 0.724mW/g

# APPENDIX B: DIPOLE VALIDATION

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d026**

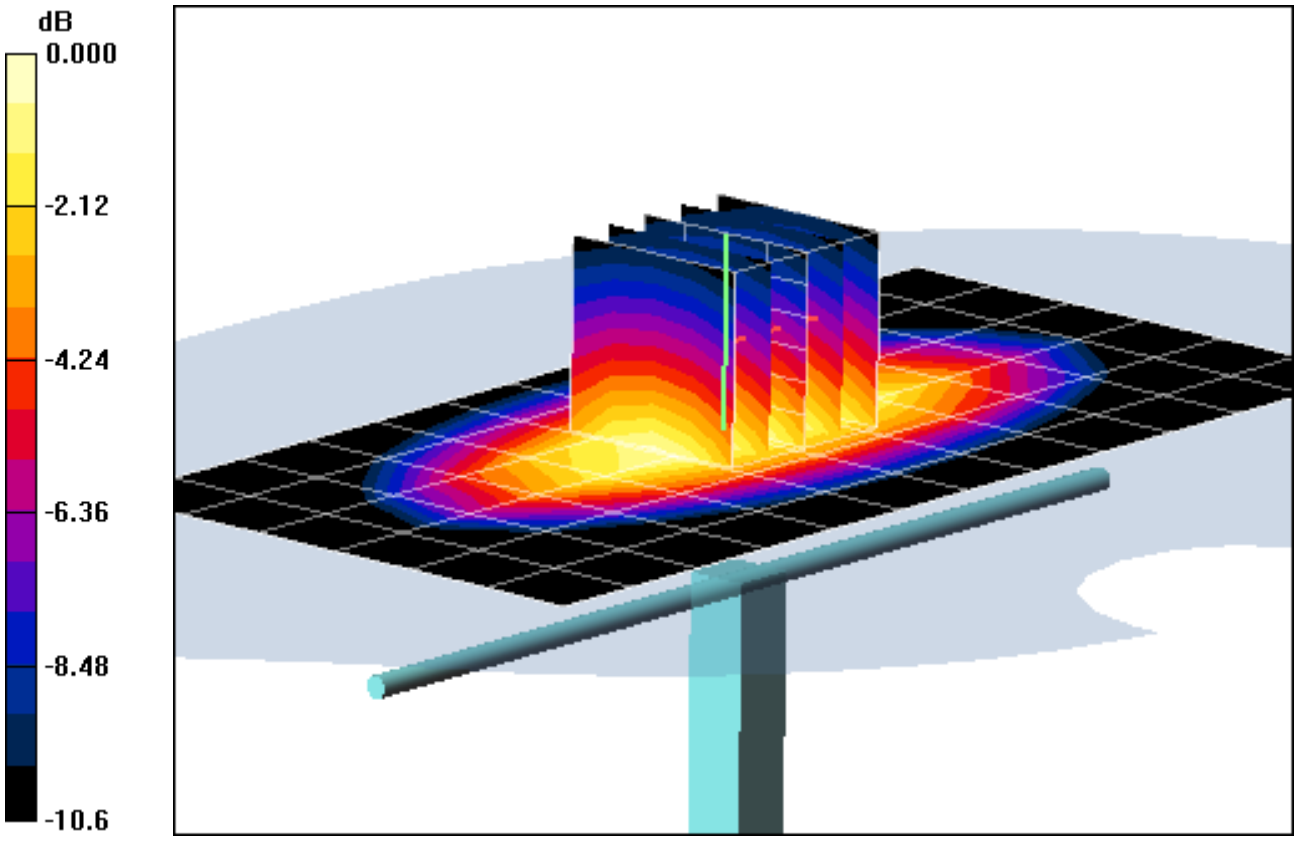
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used:
f = 835 MHz; $\sigma$ = 0.893 mho/m; $\varepsilon_r$ = 42.2; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-25-2012; Ambient Temp: 24.4°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
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) = 0.964 mW/g; SAR(10 g) = 0.626 mW/g**
Deviation = 1.90 %




0 dB = 1.05mW/g

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d026**

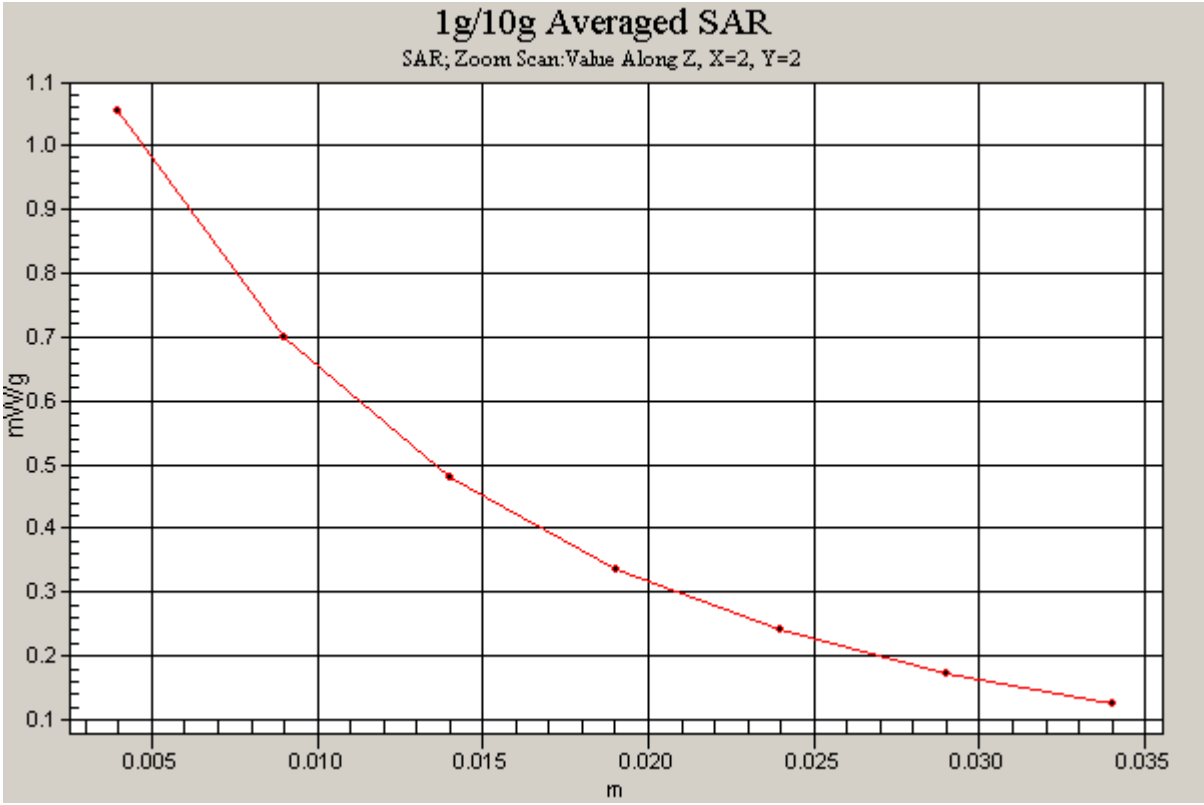
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used:
f = 835 MHz; $\sigma$ = 0.893 mho/m; $\varepsilon_r$ = 42.2; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-25-2012; Ambient Temp: 24.4°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
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) = 0.964 mW/g; SAR(10 g) = 0.626 mW/g**
Deviation = 1.90 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d141**

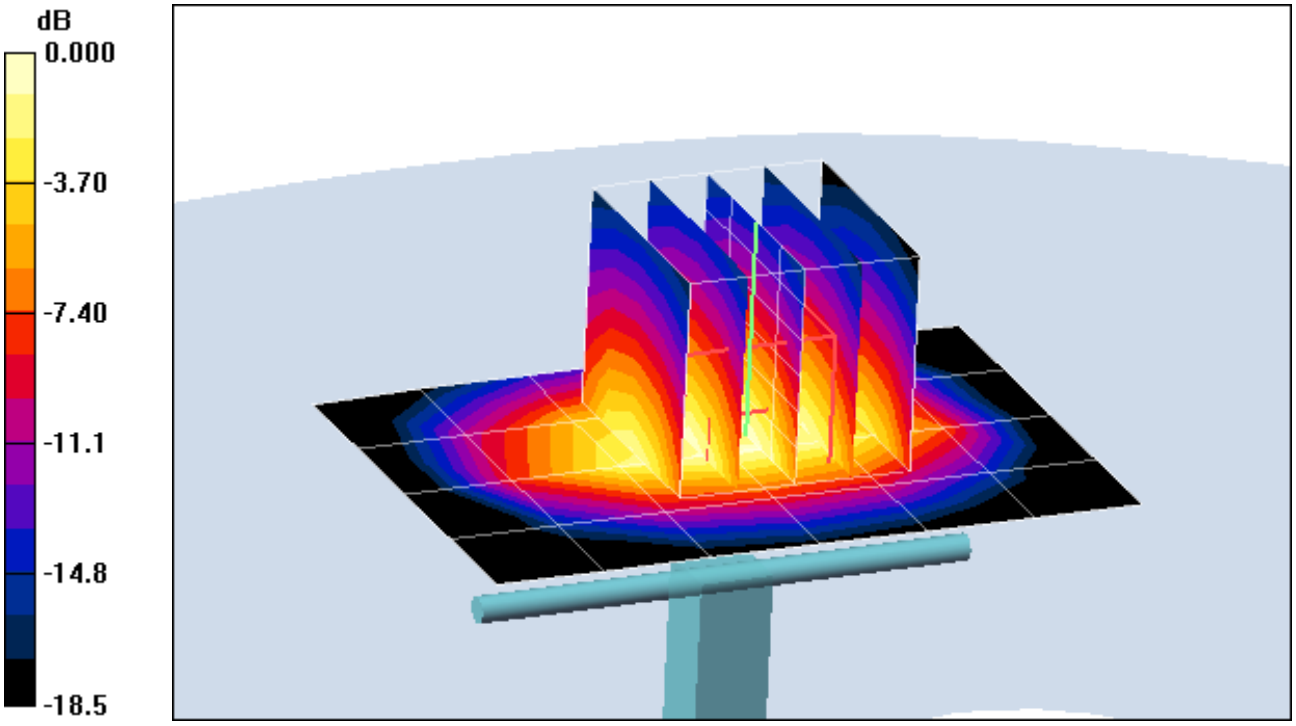
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; $\sigma$ = 1.39 mho/m; $\varepsilon_r$ = 39.5; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2012; Ambient Temp: 24.3°C; Tissue Temp: 22.9°C

Probe: EX3DV4 - SN3561; ConvF(7.16, 7.16, 7.16); Calibrated: 7/27/2011
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

## 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) = 1.51 mW/g; SAR(10 g) = 0.770 mW/g**
Deviation = -4.43%




0 dB = 1.67mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d141**

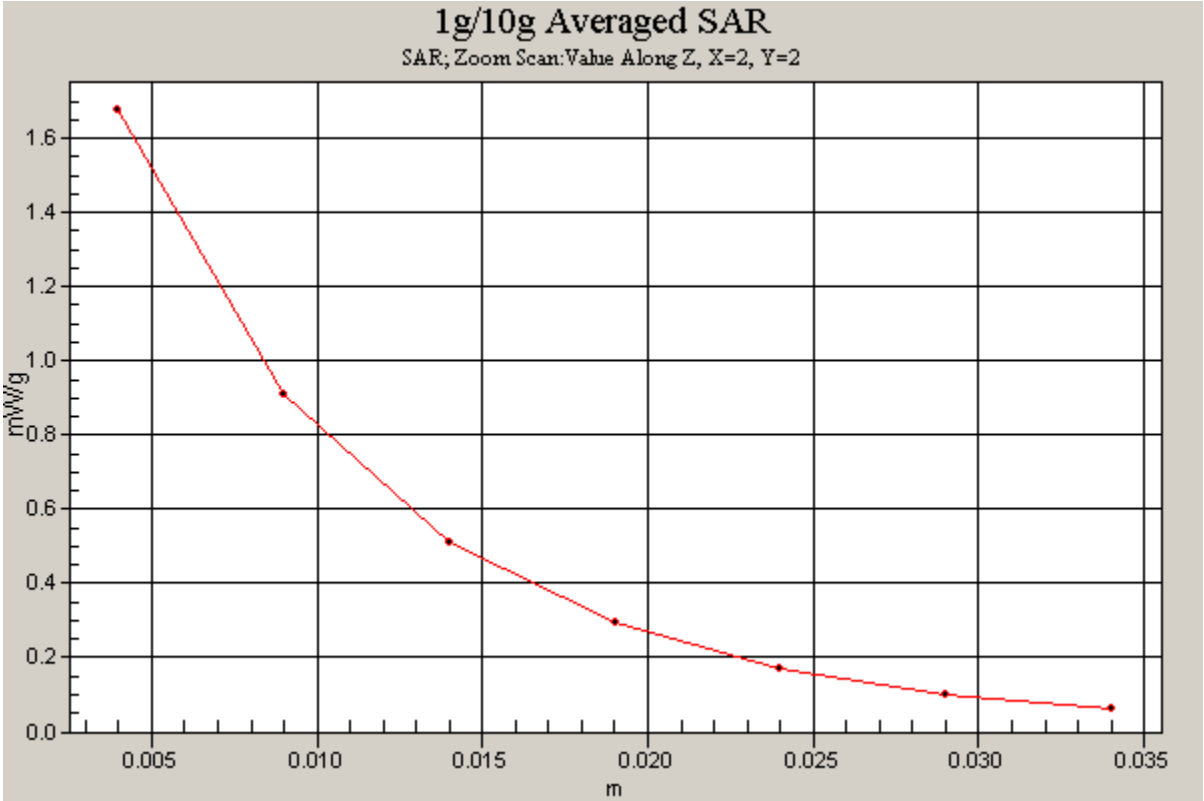
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; $\sigma$ = 1.39 mho/m; $\varepsilon_r$ = 39.5; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2012; Ambient Temp: 24.3°C; Tissue Temp: 22.9°C

Probe: EX3DV4 - SN3561; ConvF(7.16, 7.16, 7.16); Calibrated: 7/27/2011
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

## 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) = 1.51 mW/g; SAR(10 g) = 0.770 mW/g**
Deviation = -4.43%



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

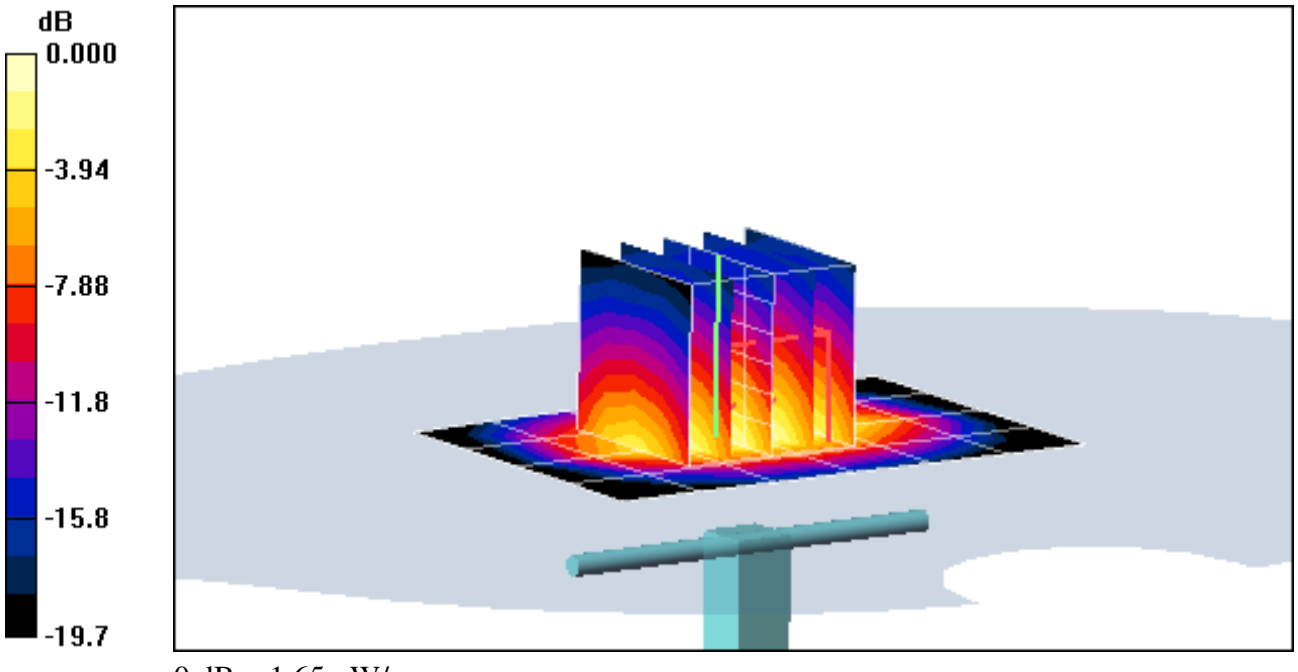
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; $\sigma$ = 1.43 mho/m; $\varepsilon_r$ = 38.2; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2012; Ambient Temp: 20.7 °C; Tissue Temp: 19.7 °C

Probe: EX3DV4 - SN3561; ConvF(7.16, 7.16, 7.16); Calibrated: 7/27/2011
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

## 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) = 1.49 mW/g; SAR(10 g) = 0.743 mW/g**
Deviation = -7.34 %




0 dB = 1.65mW/g

# PCTEST ENGINEERING LABORATORY, INC.

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

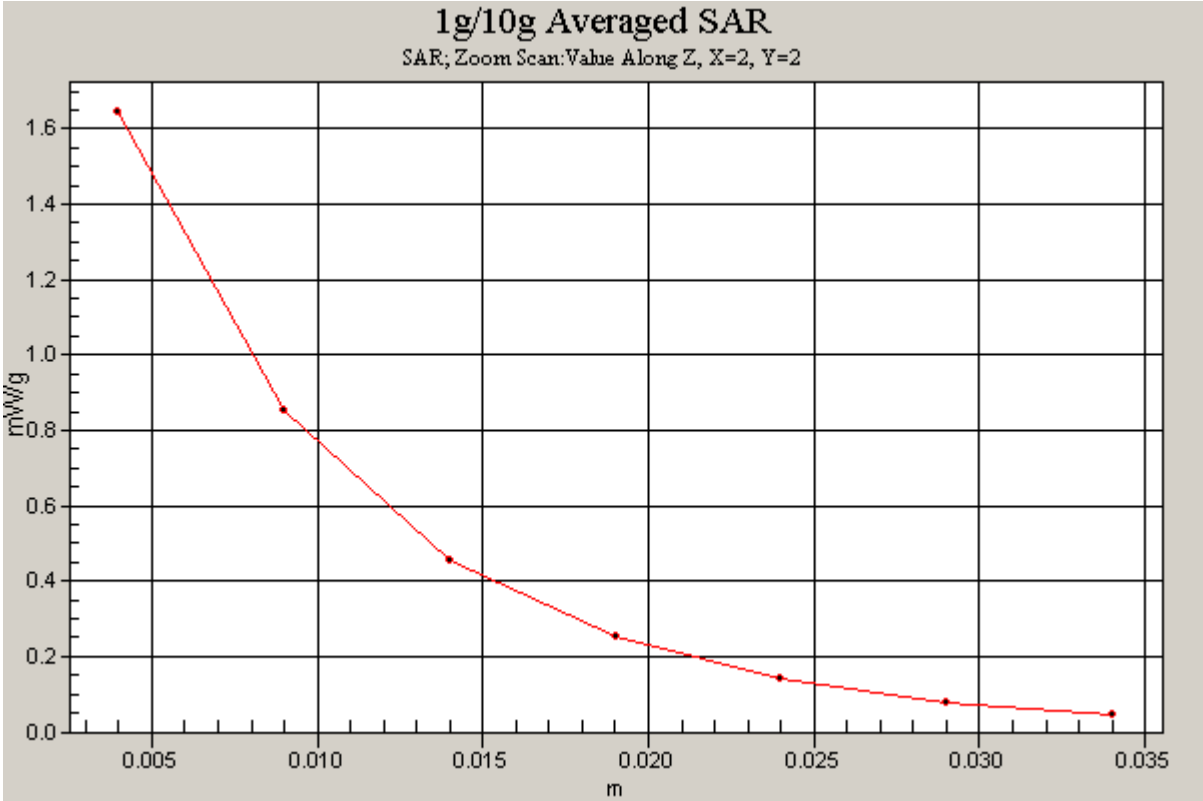
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; $\sigma$ = 1.43 mho/m; $\varepsilon_r$ = 38.2; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2012; Ambient Temp: 20.7 °C; Tissue Temp: 19.7 °C

Probe: EX3DV4 - SN3561; ConvF(7.16, 7.16, 7.16); Calibrated: 7/27/2011
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

## 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) = 1.49 mW/g; SAR(10 g) = 0.743 mW/g**
Deviation = -7.34 %



**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d141**

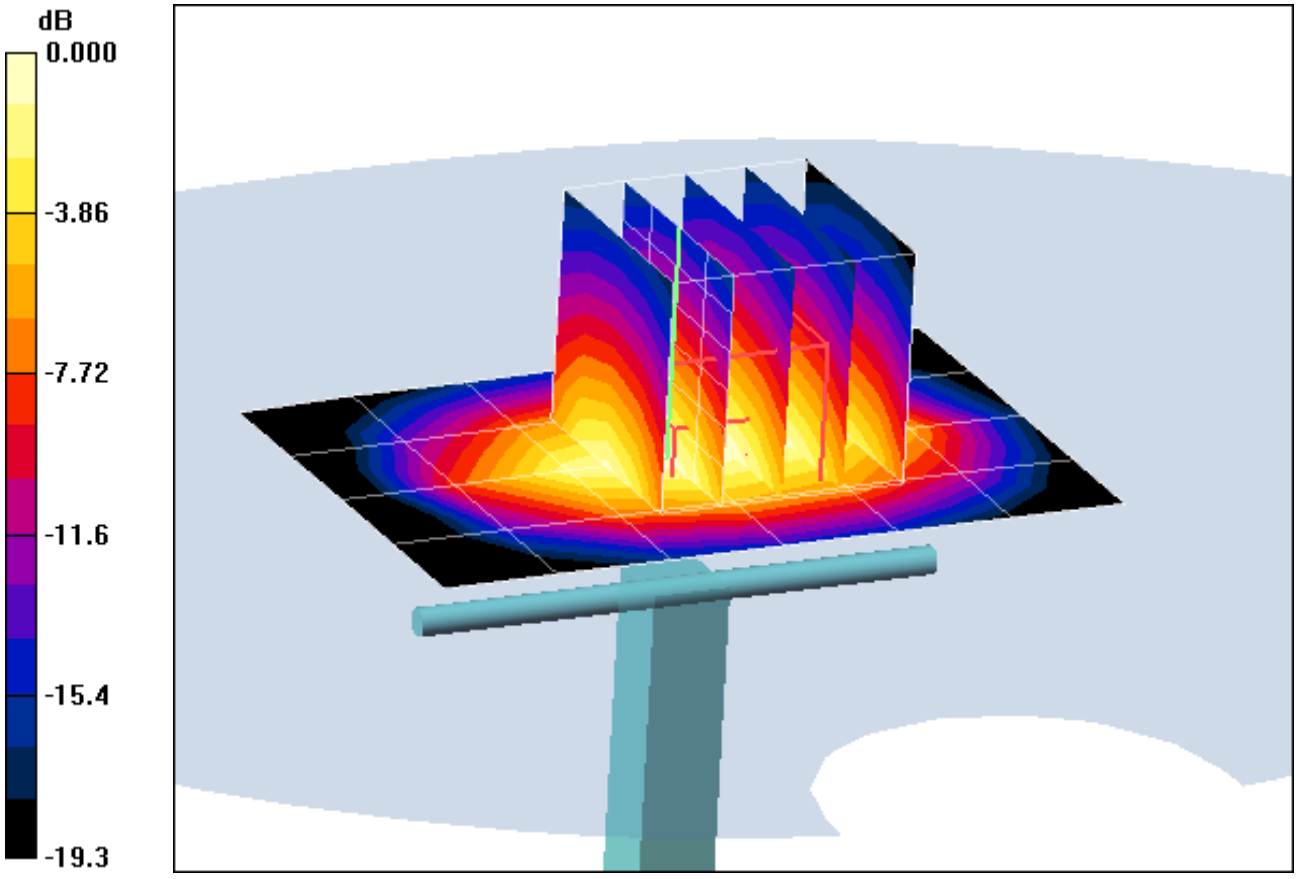
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; $\sigma$ = 1.46 mho/m; $\varepsilon_r$ = 39.3; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-14-2012; Ambient Temp: 21.7°C; Tissue Temp: 19.8°C

Probe: ES3DV2 - SN3022; ConvF(4.98, 4.98, 4.98); Calibrated: 8/25/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
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) = 4.16 mW/g; SAR(10 g) = 2.13 mW/g**
Deviation = 5.32 %




0 dB = 4.58mW/g

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d141**

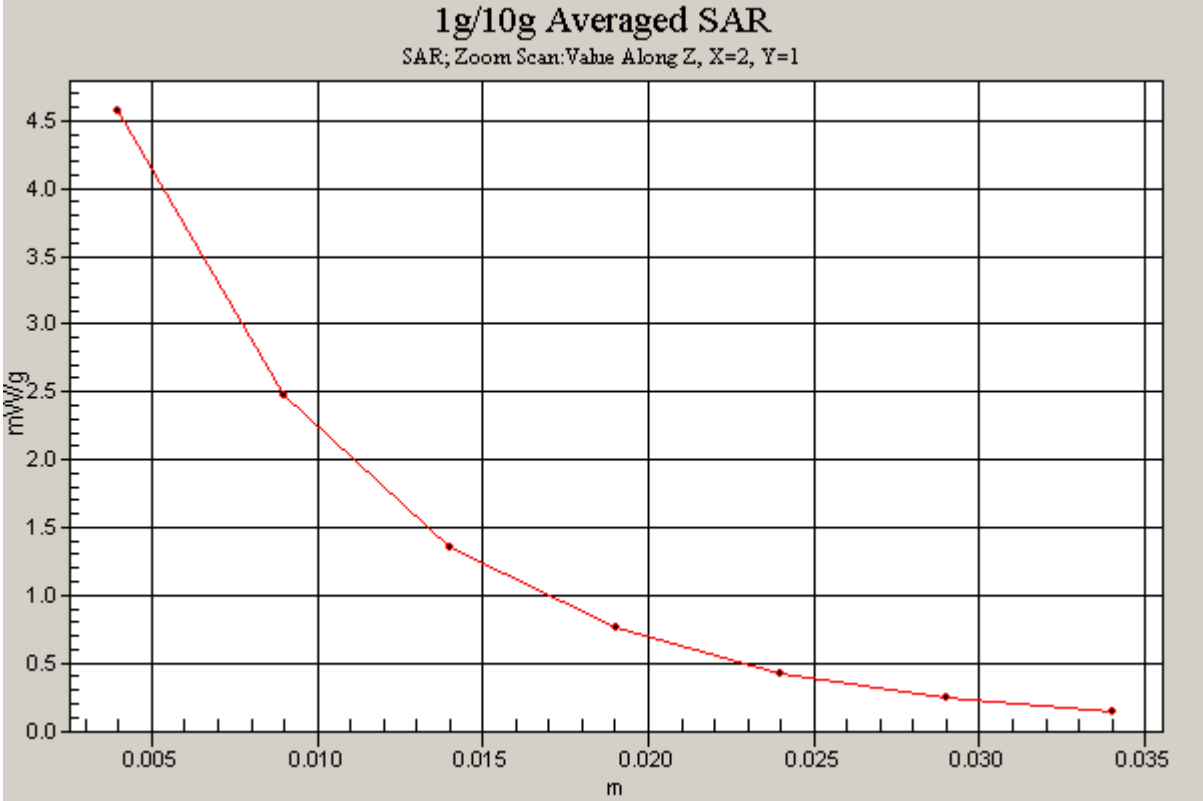
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; $\sigma$ = 1.46 mho/m; $\varepsilon_r$ = 39.3; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-14-2012; Ambient Temp: 21.7°C; Tissue Temp: 19.8°C

Probe: ES3DV2 - SN3022; ConvF(4.98, 4.98, 4.98); Calibrated: 8/25/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
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) = 4.16 mW/g; SAR(10 g) = 2.13 mW/g**
Deviation = 5.32 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d141**

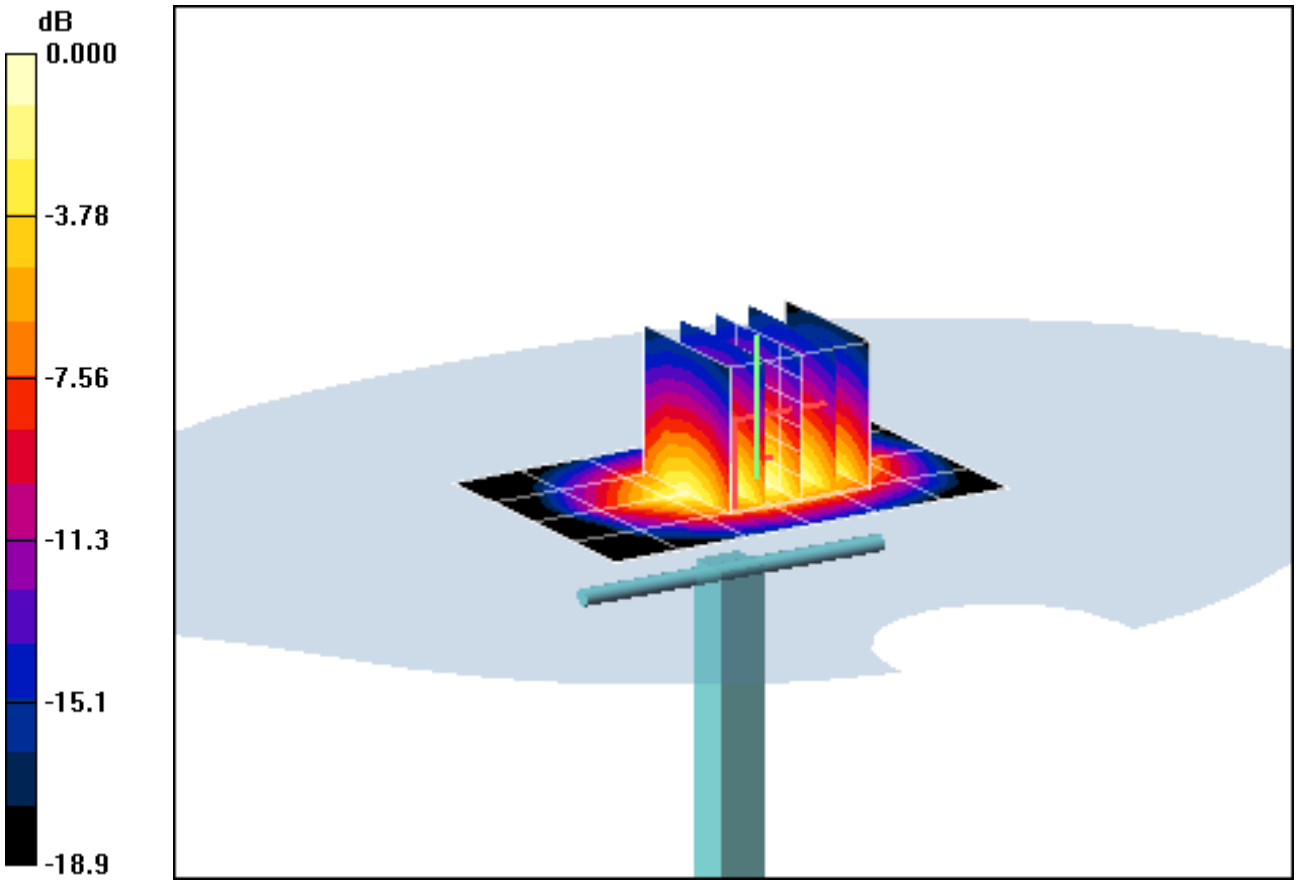
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; $\sigma$ = 1.45 mho/m; $\varepsilon_r$ = 39.1; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-17-2012; Ambient Temp: 21.8 °C; Tissue Temp: 21.4 °  C

Probe: ES3DV2 - SN3022; ConvF(4.98, 4.98, 4.98); Calibrated: 8/25/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
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) = 0.835 mW/g**
Deviation = 2.53 %




0 dB = 1.80mW/g

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d141**

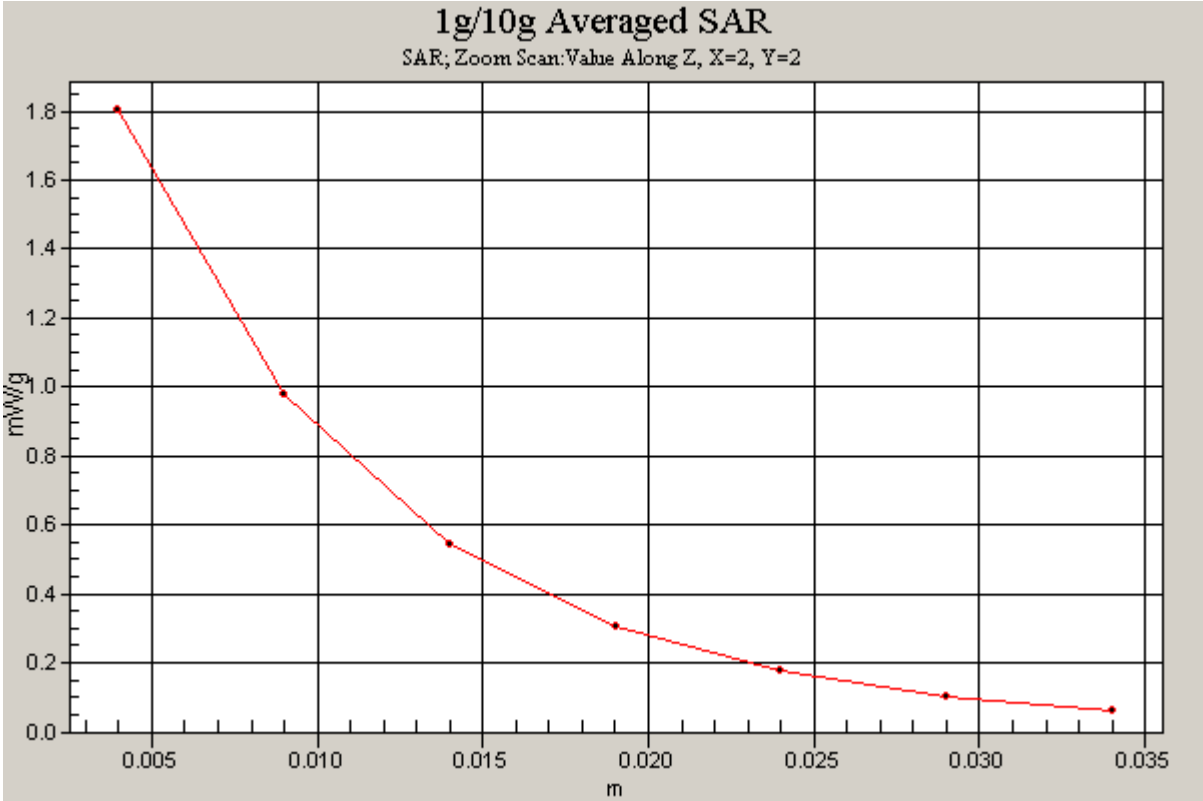
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; $\sigma$ = 1.45 mho/m; $\varepsilon_r$ = 39.1; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-17-2012; Ambient Temp: 21.8 °C; Tissue Temp: 21.4 ° C

Probe: ES3DV2 - SN3022; ConvF(4.98, 4.98, 4.98); Calibrated: 8/25/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
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) = 0.835 mW/g**
Deviation = 2.53 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 2450 MHz; Type: D2450V2; Serial: 719**

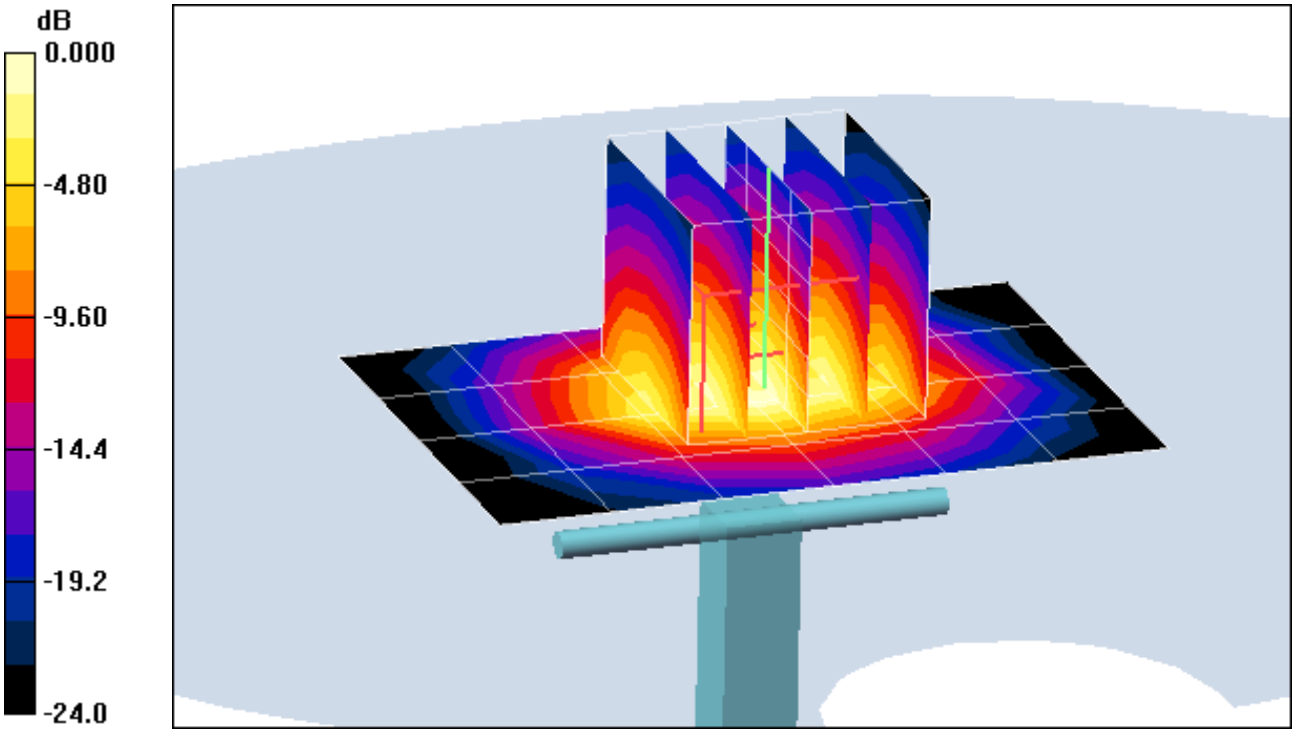
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; $\sigma$ = 1.87 mho/m; $\varepsilon_r$ = 38.2; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.4°C

Probe: ES3DV3 - SN3258; ConvF(4.5, 4.5, 4.5); Calibrated: 4/8/2011
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## 2450MHz 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) = 2.17 mW/g; SAR(10 g) = 0.990 mW/g**
Deviation = 0.84%




0 dB = 2.85mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 2450 MHz; Type: D2450V2; Serial: 719**

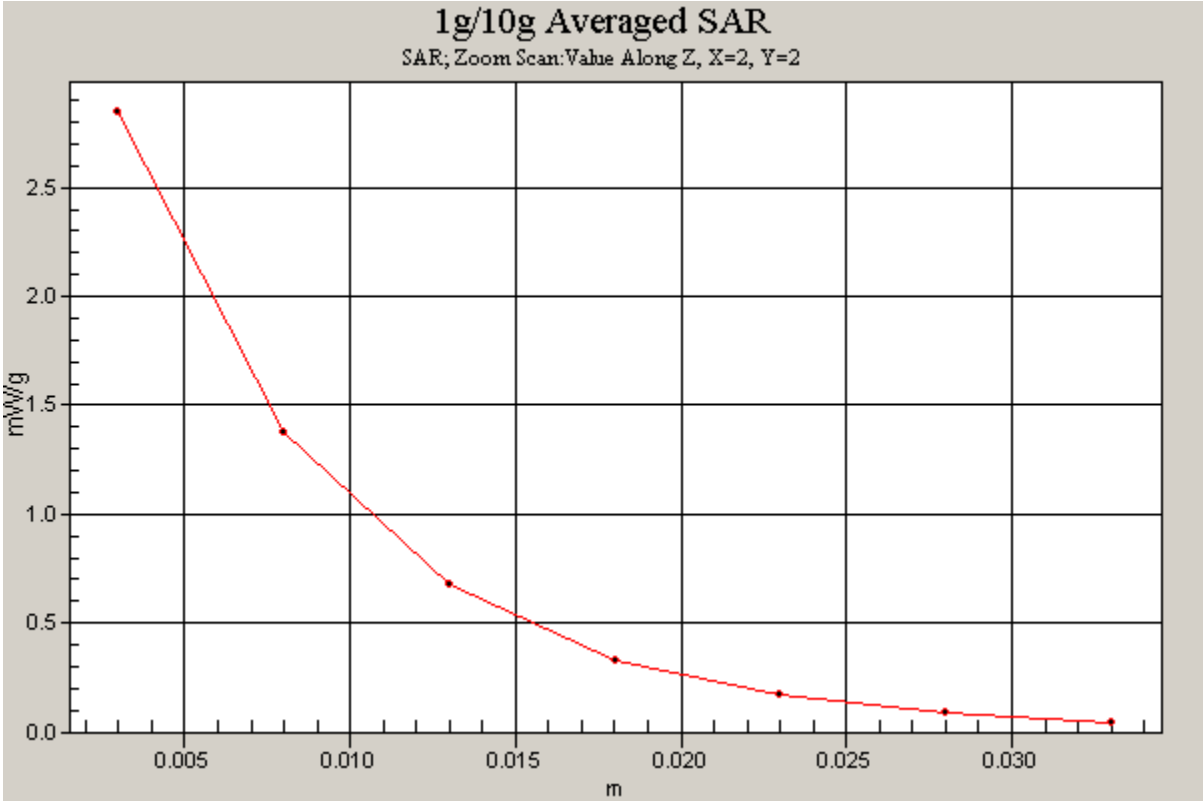
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; $\sigma$ = 1.87 mho/m; $\varepsilon_r$ = 38.2; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.4°C

Probe: ES3DV3 - SN3258; ConvF(4.5, 4.5, 4.5); Calibrated: 4/8/2011
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

## 2450MHz 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) = 2.17 mW/g; SAR(10 g) = 0.990 mW/g**
Deviation = 0.84%



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 5200 MHz; Type: D5GHzV2; Serial: 1007**

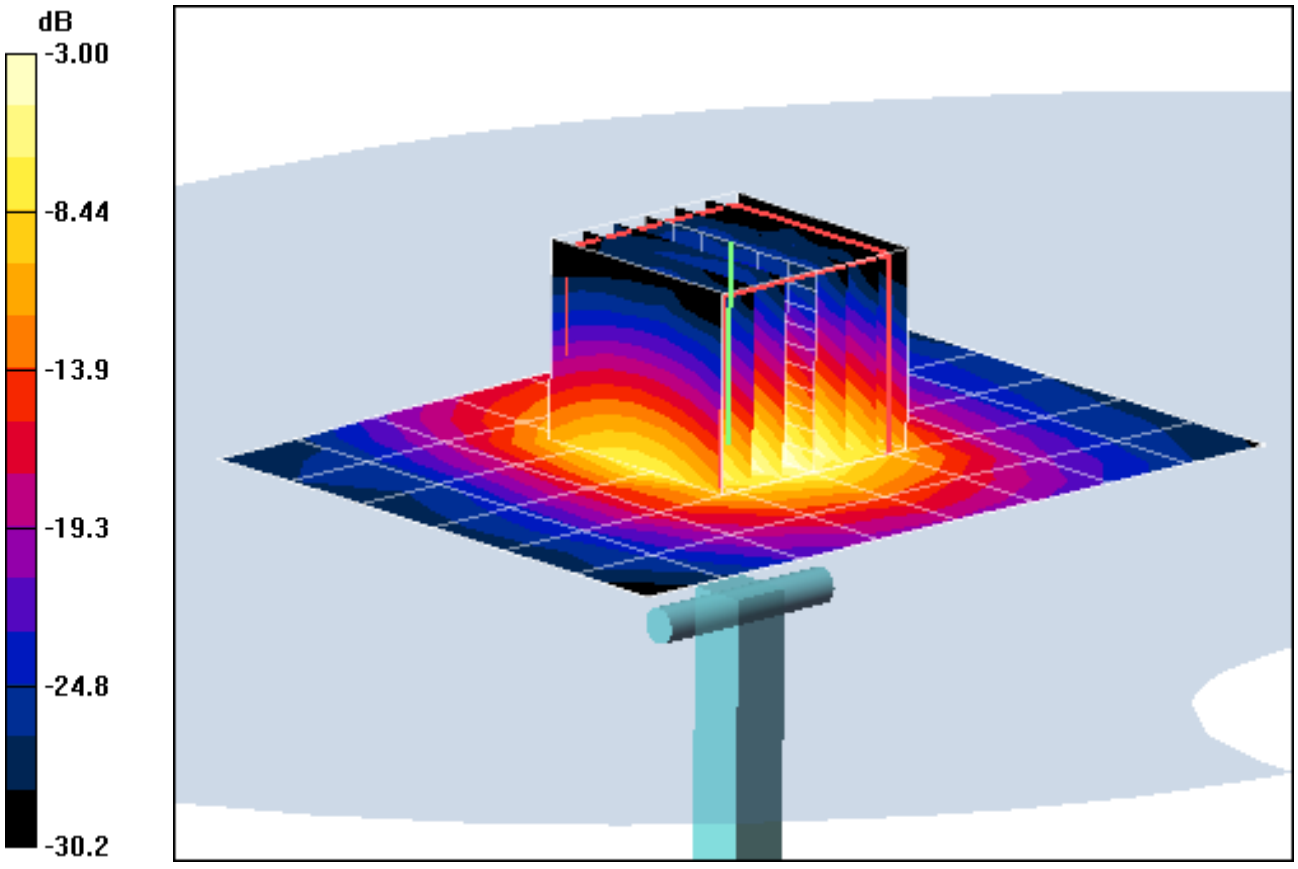
Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5 GHz Head; Medium parameters used:
f = 5200 MHz; $\sigma$ = 4.795 mho/m; $\varepsilon_r$ = 35.43; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2012; Ambient Temp: 23.2°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3561; ConvF(4.27, 4.27, 4.27); Calibrated: 7/27/2011
Sensor-Surface: 2mm (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

## 5200MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm
**Zoom Scan (7x7x11)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
**SAR(1 g) = 8.09 mW/g; SAR(10 g) = 2.3 mW/g**
Deviation = 1.38 %




0 dB = 16.6mW/g

**DUT: Dipole 5200 MHz; Type: D5GHzV2; Serial: 1007**

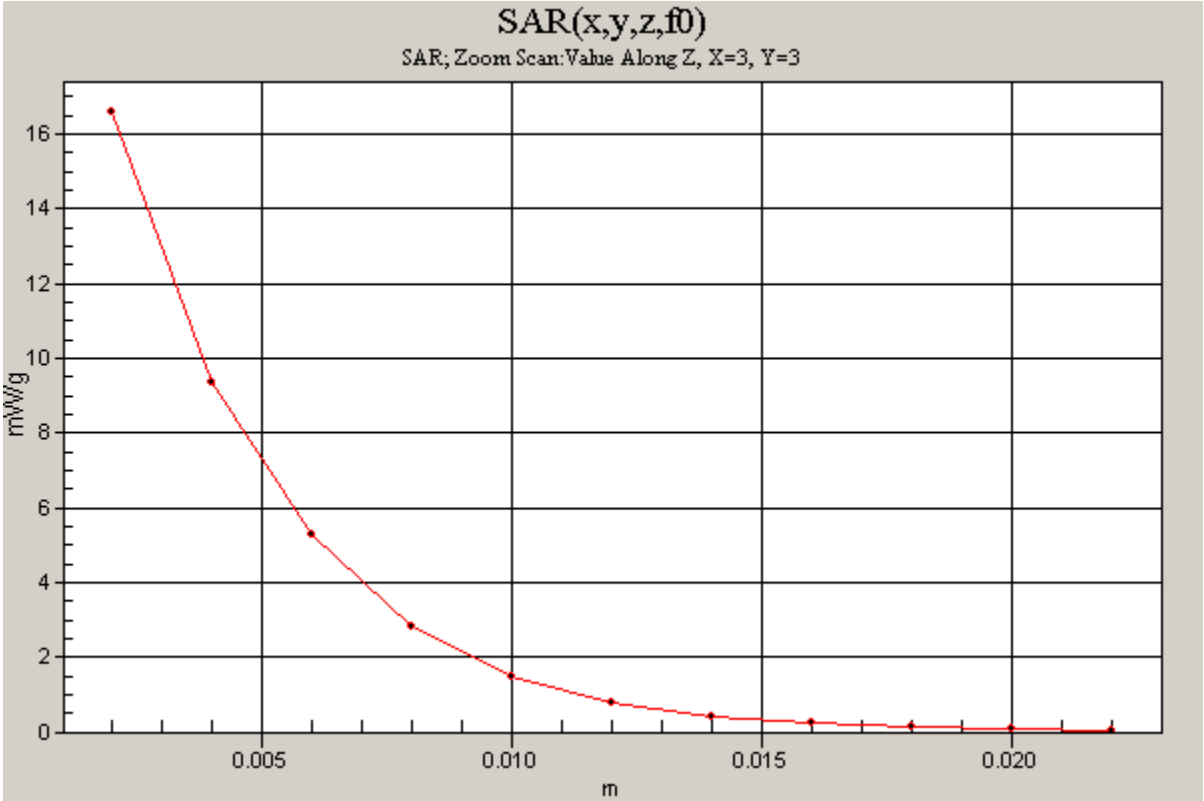
Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5 GHz Head Medium parameters used:
f = 5200 MHz; $\sigma$ = 4.795 mho/m; $\varepsilon_r$ = 35.43; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2012; Ambient Temp: 23.2°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3561; ConvF(4.27, 4.27, 4.27); Calibrated: 7/27/2011
Sensor-Surface: 2mm (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

## 5200MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm
**Zoom Scan (7x7x11)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
**SAR(1 g) = 8.09 mW/g; SAR(10 g) = 2.3 mW/g**
Deviation = 1.38%



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 5500 MHz; Type: D5GHzV2; Serial: 1007**

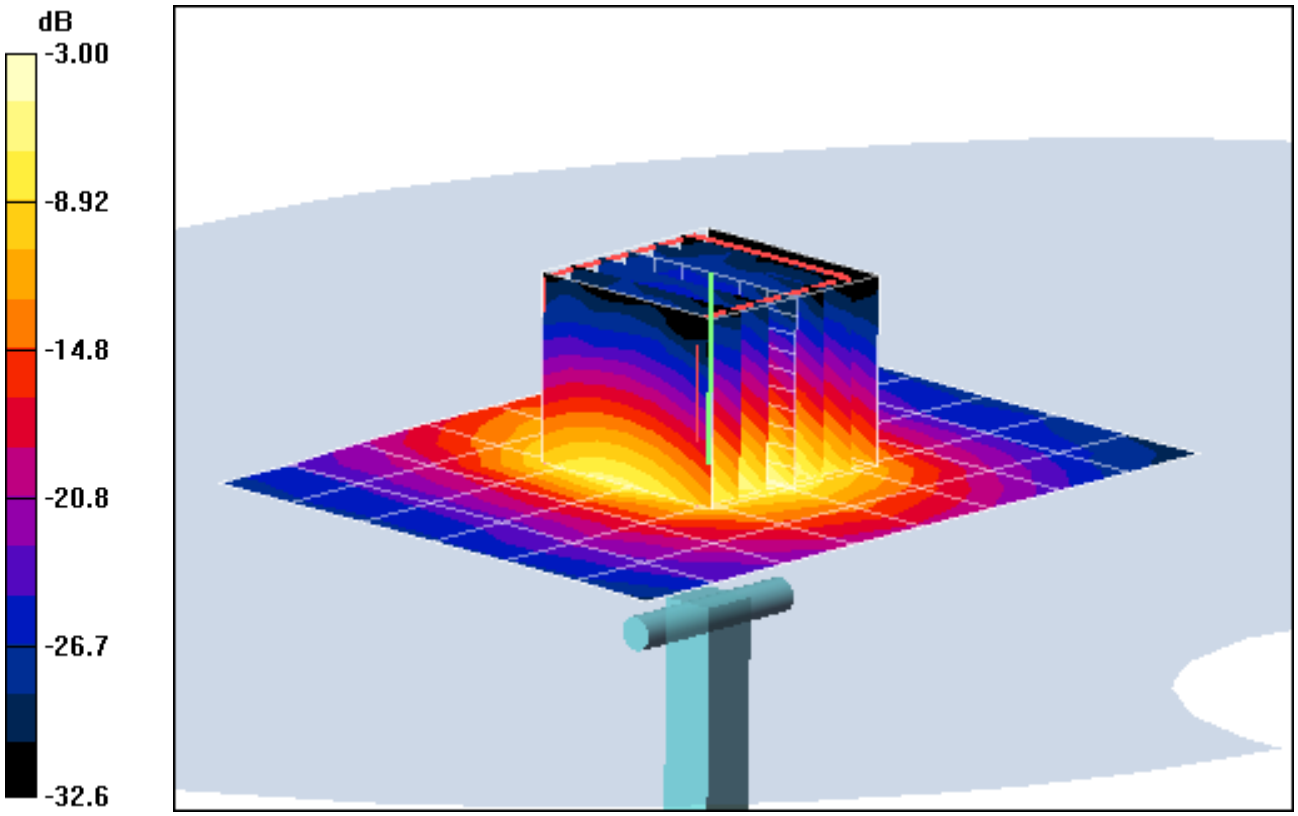
Communication System: CW; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium: 5 GHz Head; Medium parameters used:
f = 5500 MHz; $\sigma$ = 5.181 mho/m; $\varepsilon_r$ = 34.95; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2012; Ambient Temp: 23.3°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN3561; ConvF(4.04, 4.04, 4.04); Calibrated: 7/27/2011
Sensor-Surface: 2mm (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

## 5500MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm
**Zoom Scan (7x7x11)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
**SAR(1 g) = 8.54 mW/g; SAR(10 g) = 2.41 mW/g**
Deviation = -1.04 %




0 dB = 17.1mW/g

**DUT: Dipole 5500 MHz; Type: D5GHzV2; Serial: 1007**

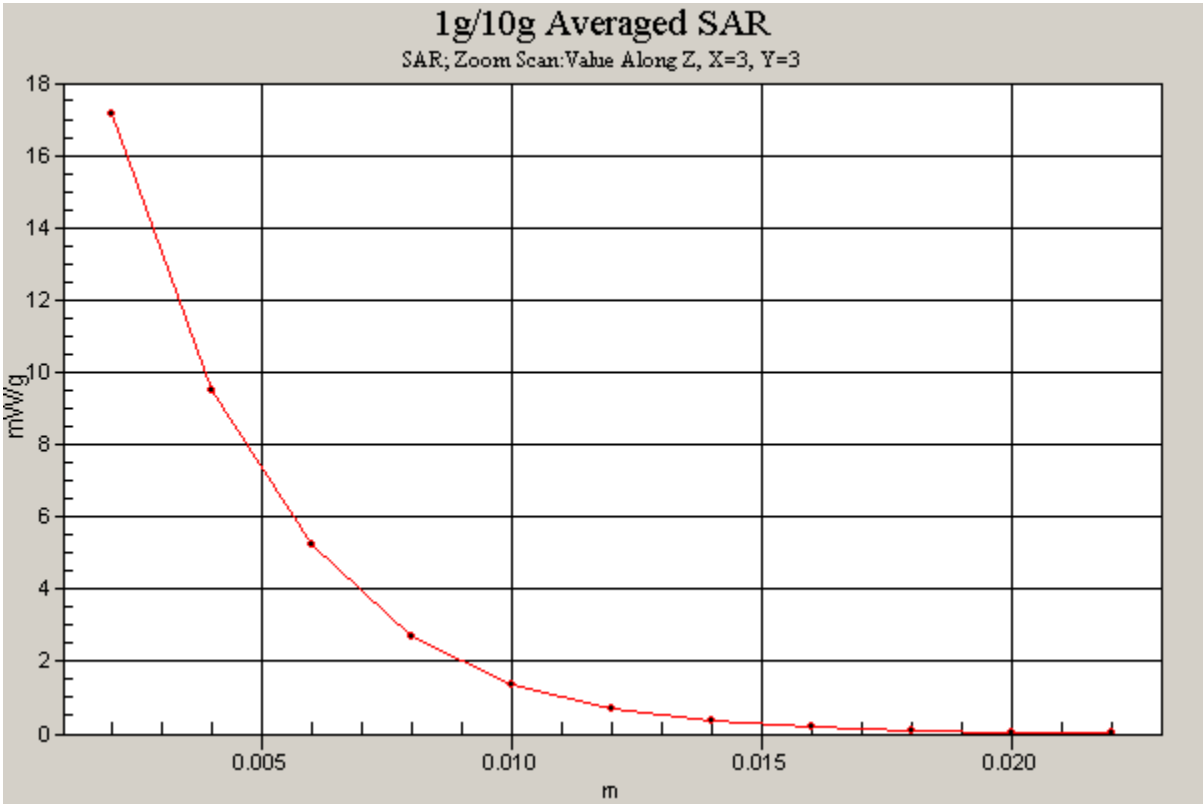
Communication System: CW; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium: 5 GHz Head Medium parameters used:
f = 5500 MHz; $\sigma$ = 5.181 mho/m; $\varepsilon_r$ = 34.95; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2012; Ambient Temp: 23.3°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN3561; ConvF(4.04, 4.04, 4.04); Calibrated: 7/27/2011
Sensor-Surface: 2mm (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

## 5500MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm
**Zoom Scan (7x7x11)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
**SAR(1 g) = 8.54 mW/g; SAR(10 g) = 2.41 mW/g**
Deviation = -1.04 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1007**

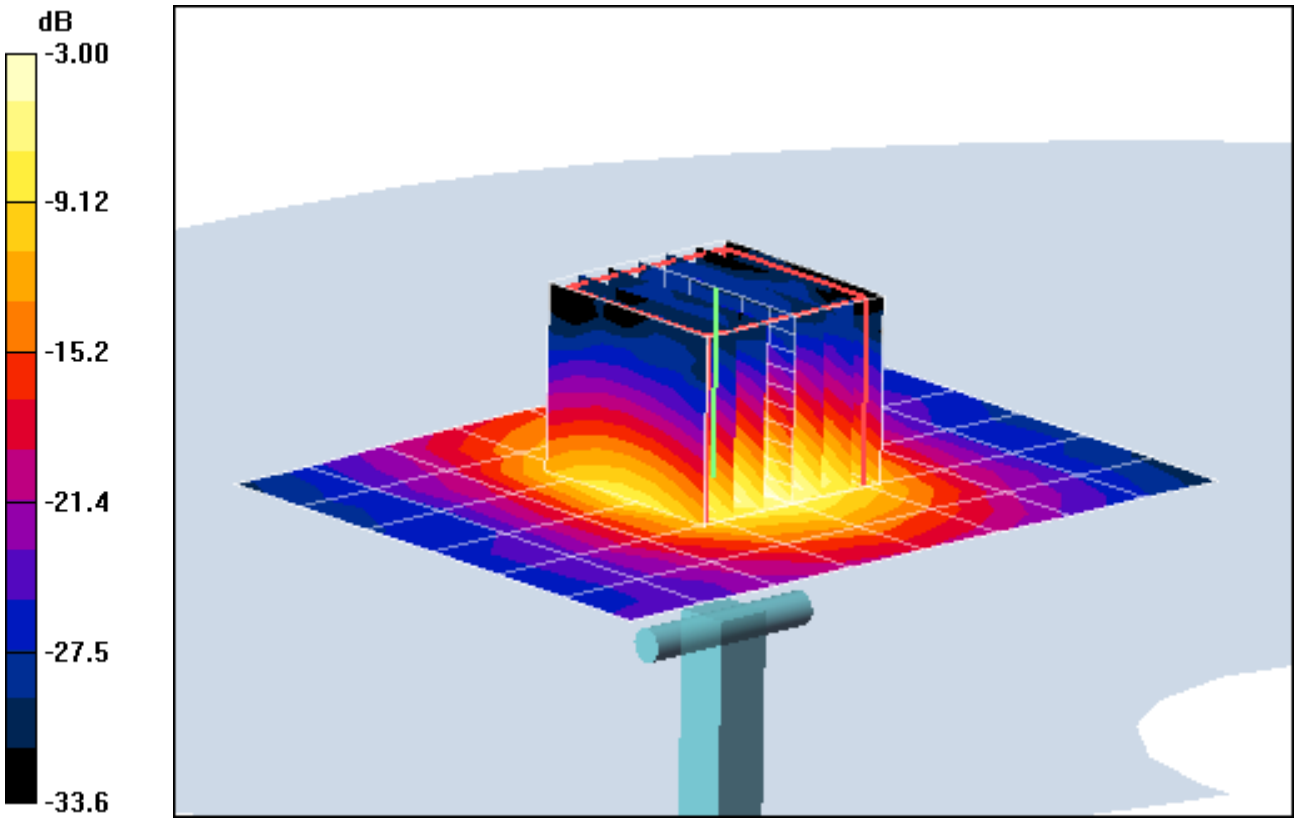
Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5 GHz Head; Medium parameters used:
f = 5800 MHz; $\sigma$ = 5.526 mho/m; $\varepsilon_r$ = 34.21; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2012; Ambient Temp: 23.5°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN3561; ConvF(3.88, 3.88, 3.88); Calibrated: 7/27/2011
Sensor-Surface: 2mm (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

## 5800MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm
**Zoom Scan (7x7x11)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
**SAR(1 g) = 8.33 mW/g; SAR(10 g) = 2.33 mW/g**
Deviation = 4.91 %**g**




0 dB = 17.9mW/g

**DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1007**

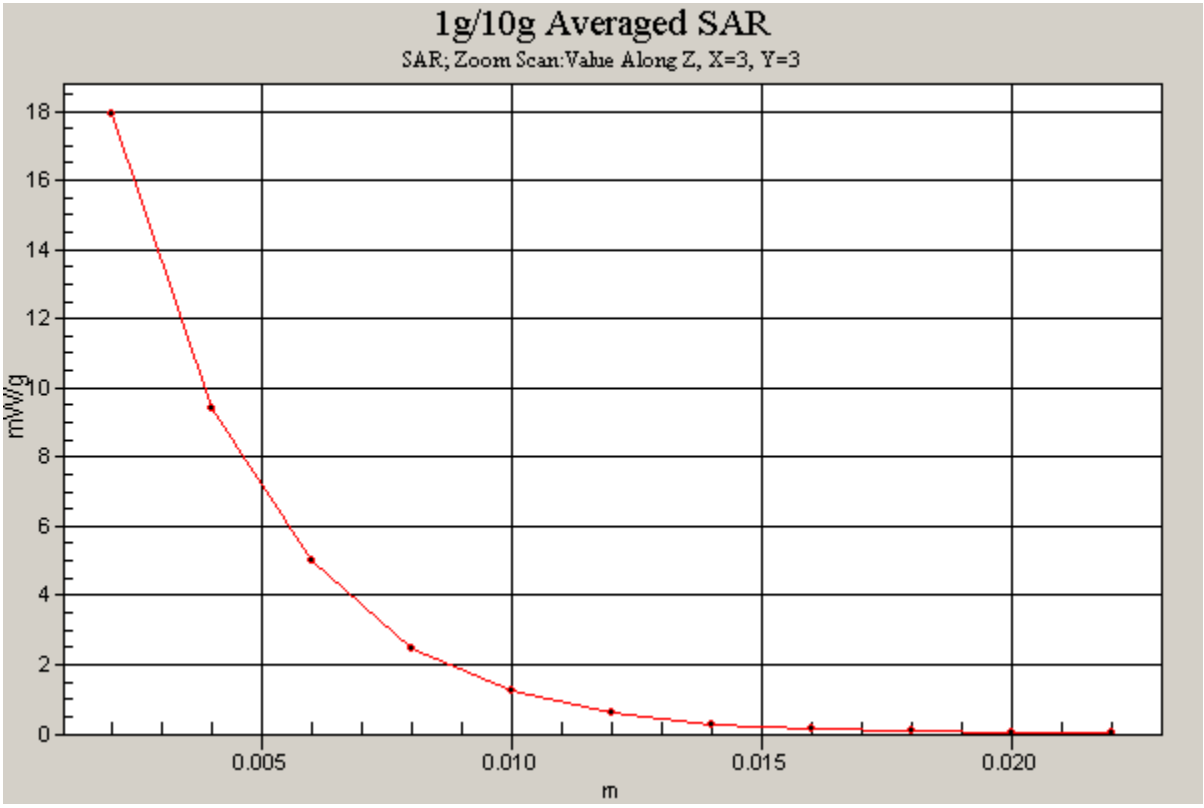
Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5 GHz Head Medium parameters used:
f = 5800 MHz; $\sigma$ = 5.526 mho/m; $\varepsilon_r$ = 34.21; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2012; Ambient Temp: 23.5°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN3561; ConvF(3.88, 3.88, 3.88); Calibrated: 7/27/2011
Sensor-Surface: 2mm (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

## 5800MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm
**Zoom Scan (7x7x11)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
**SAR(1 g) = 8.33 mW/g; SAR(10 g) = 2.33 mW/g**
Deviation = 4.91%



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d119**

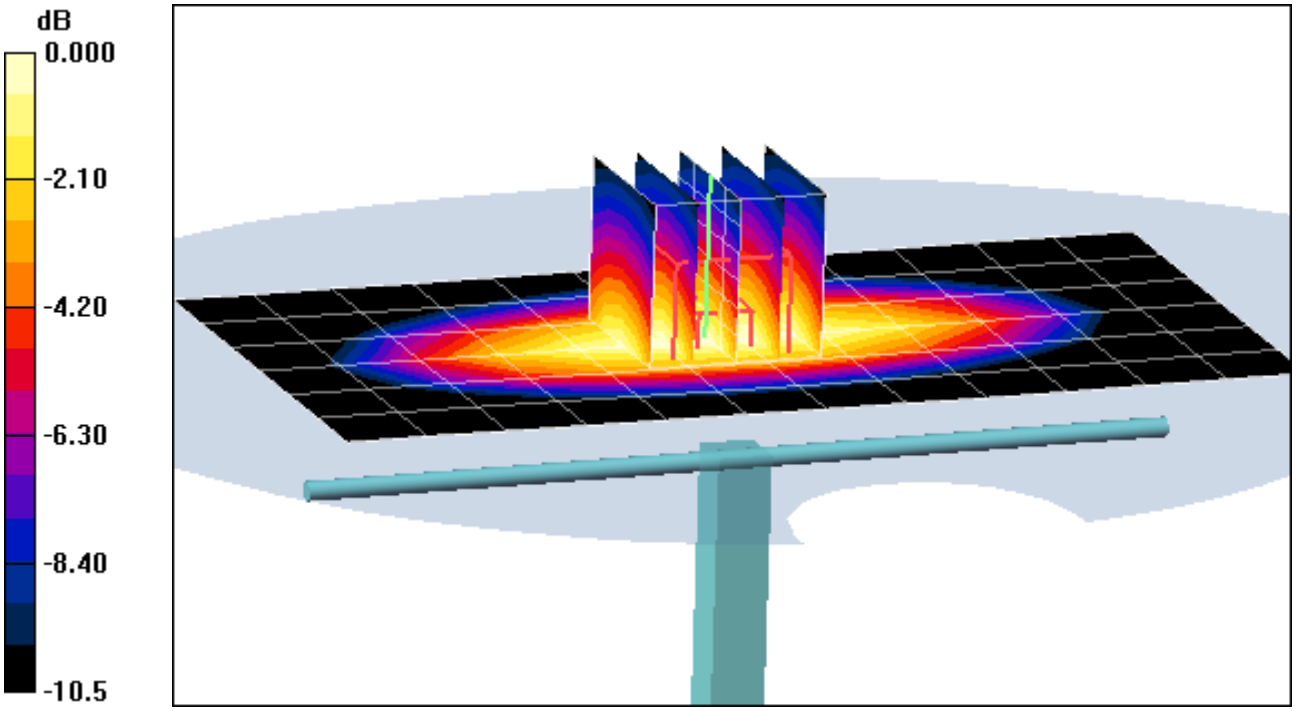
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; $\sigma$ = 0.958 mho/m; $\varepsilon_r$ = 52.9; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-23-2012; Ambient Temp: 23.5°C; Tissue Temp: 20.4°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) = 0.983 mW/g; SAR(10 g) = 0.641 mW/g**
Deviation = 3.04 %




0 dB = 1.06mW/g

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d119**

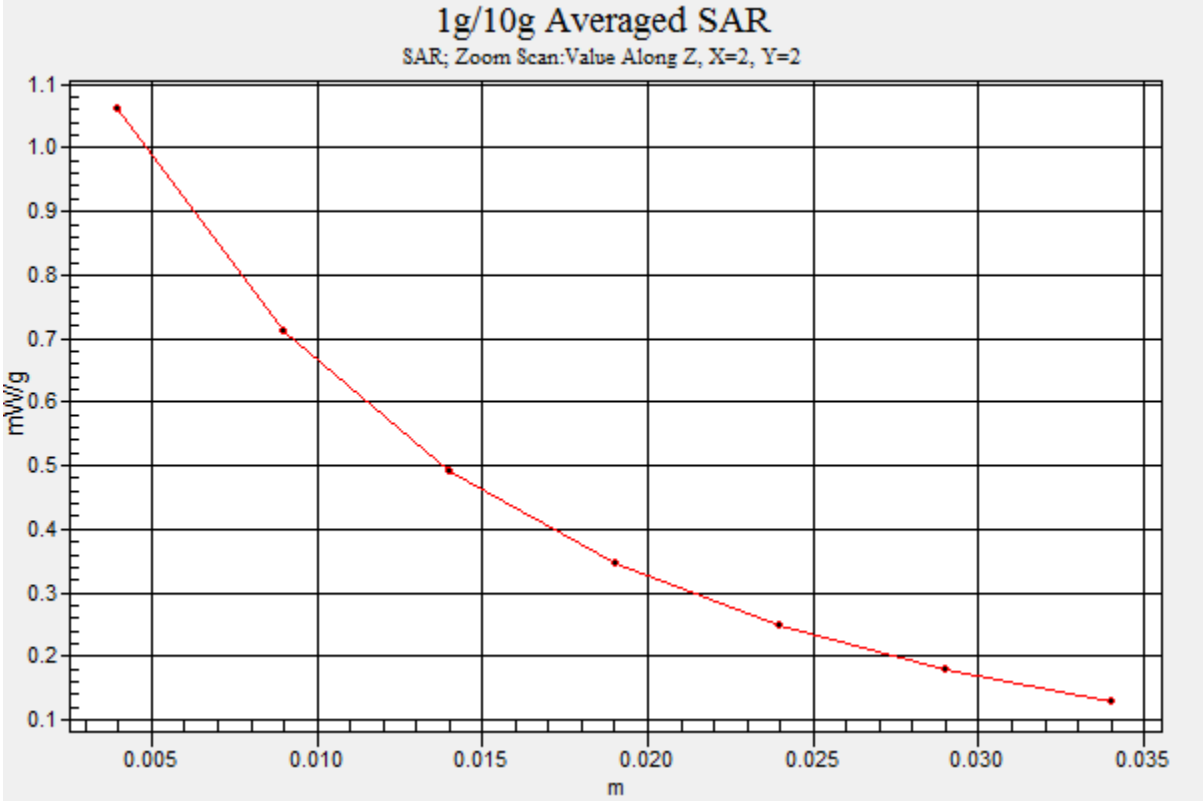
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; $\sigma$ = 0.958 mho/m; $\varepsilon_r$ = 52.9; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-23-2012; Ambient Temp: 23.5°C; Tissue Temp: 20.4°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) = 0.983 mW/g; SAR(10 g) = 0.641 mW/g**
Deviation = 3.04 %



**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d141**

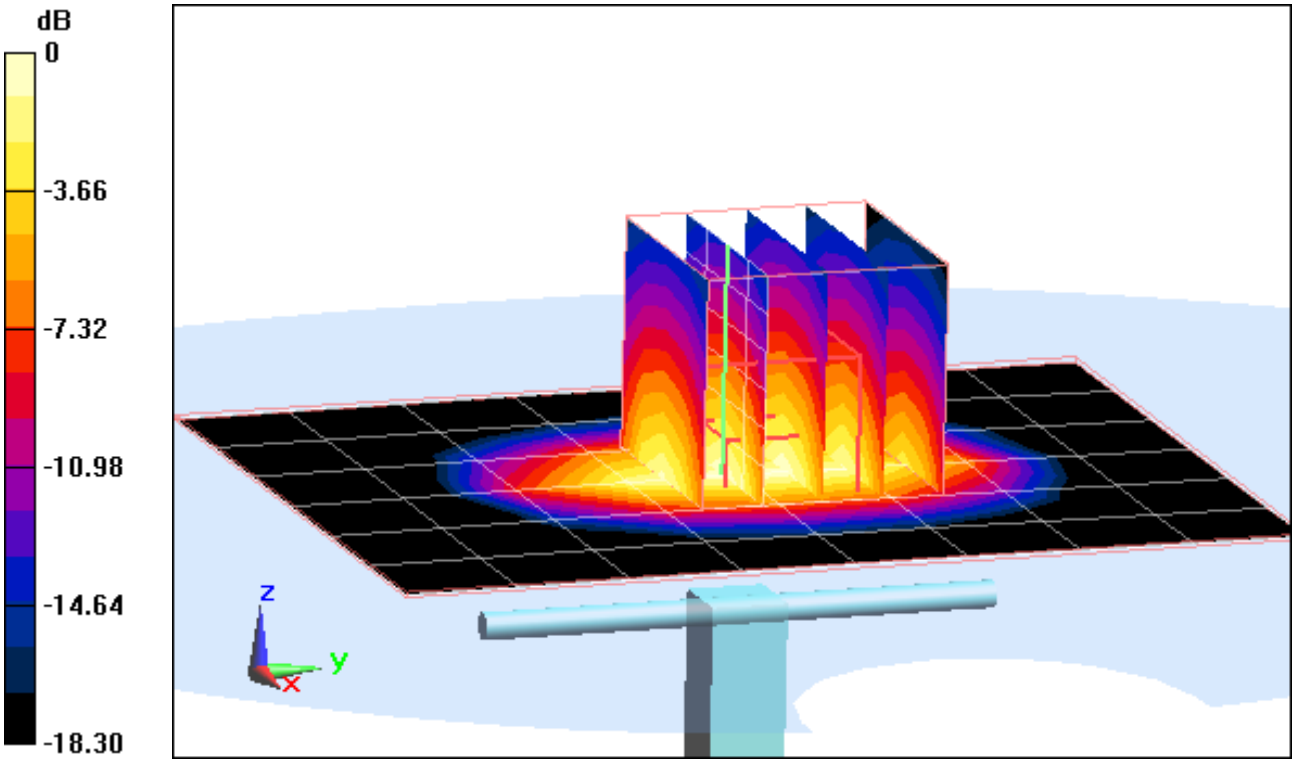
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; $\sigma$ = 1.496 mho/m; $\varepsilon_r$ = 51.32; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2012; Ambient Temp: 22.1°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3213; ConvF(4.58, 4.58, 4.58); Calibrated: 3/24/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn455; Calibrated: 11/9/2011
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

## 1900 MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20 dBm (100 MW)
**SAR(1 g) = 4 mW/g; SAR(10 g) = 2.09 mW/g**
Deviation = -3.38%




0 dB = 4.440mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d141**

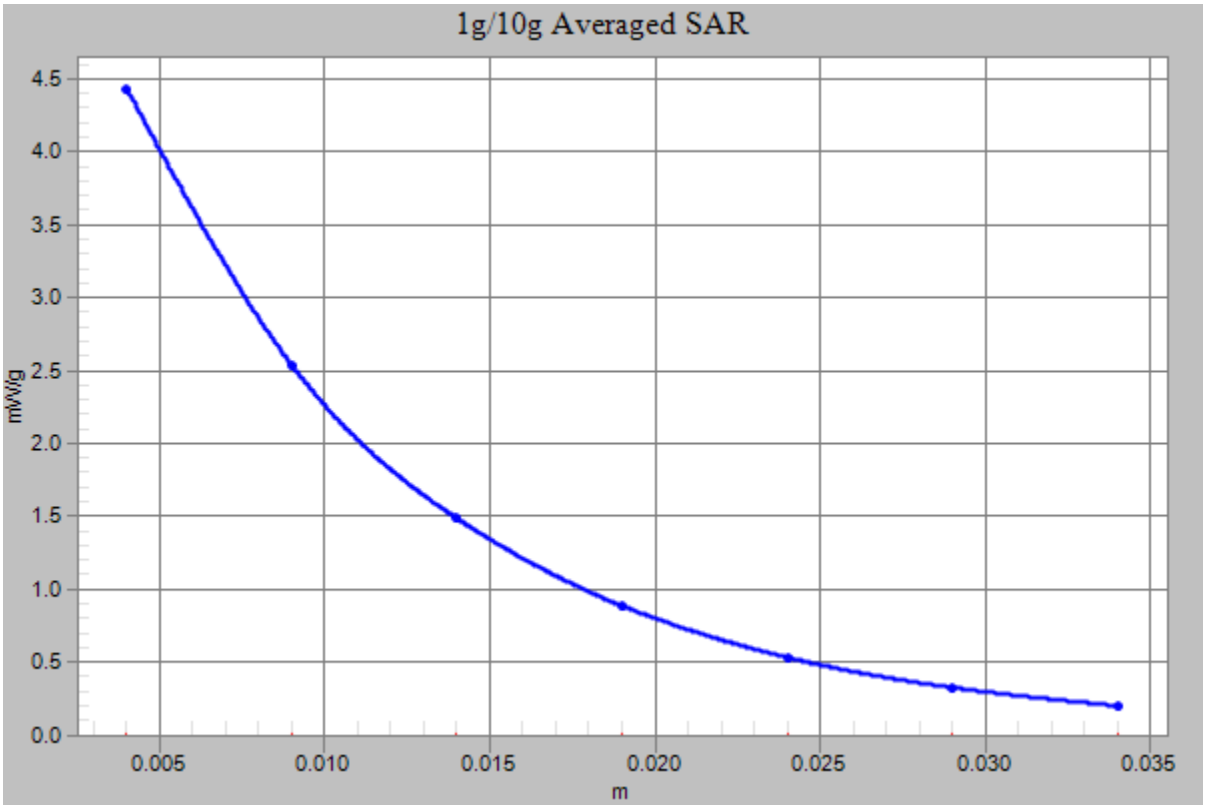
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; $\sigma$ = 1.496 mho/m; $\varepsilon_r$ = 51.32; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2012; Ambient Temp: 22.1°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3213; ConvF(4.58, 4.58, 4.58); Calibrated: 3/24/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn455; Calibrated: 11/9/2011
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

## 1900 MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20 dBm (100 MW)
**SAR(1 g) = 4 mW/g; SAR(10 g) = 2.09 mW/g**
Deviation = -3.38%



# PCTEST ENGINEERING LABORATORY, INC.

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

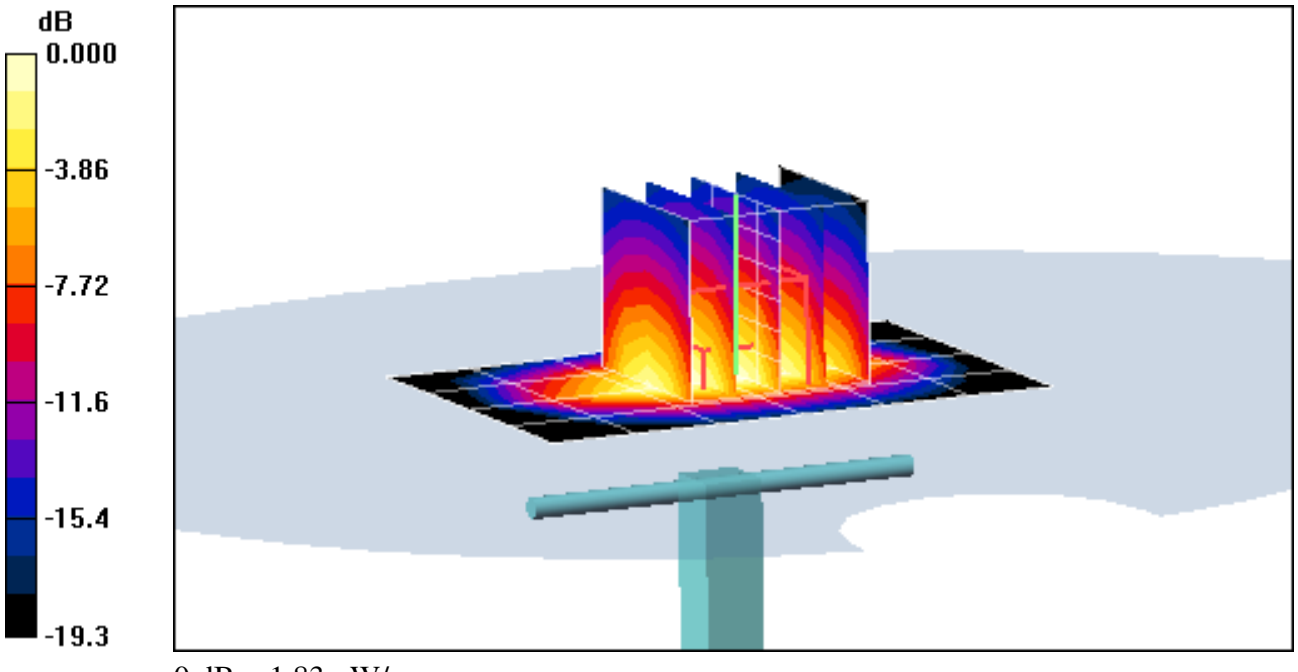
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; $\sigma$ = 1.57 mho/m; $\varepsilon_r$ = 51.7; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2012; Ambient Temp: 21.0 °C; Tissue Temp: 20.5 °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) = 1.65 mW/g; SAR(10 g) = 0.829 mW/g**
Deviation = 0.36 %




0 dB = 1.83mW/g

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

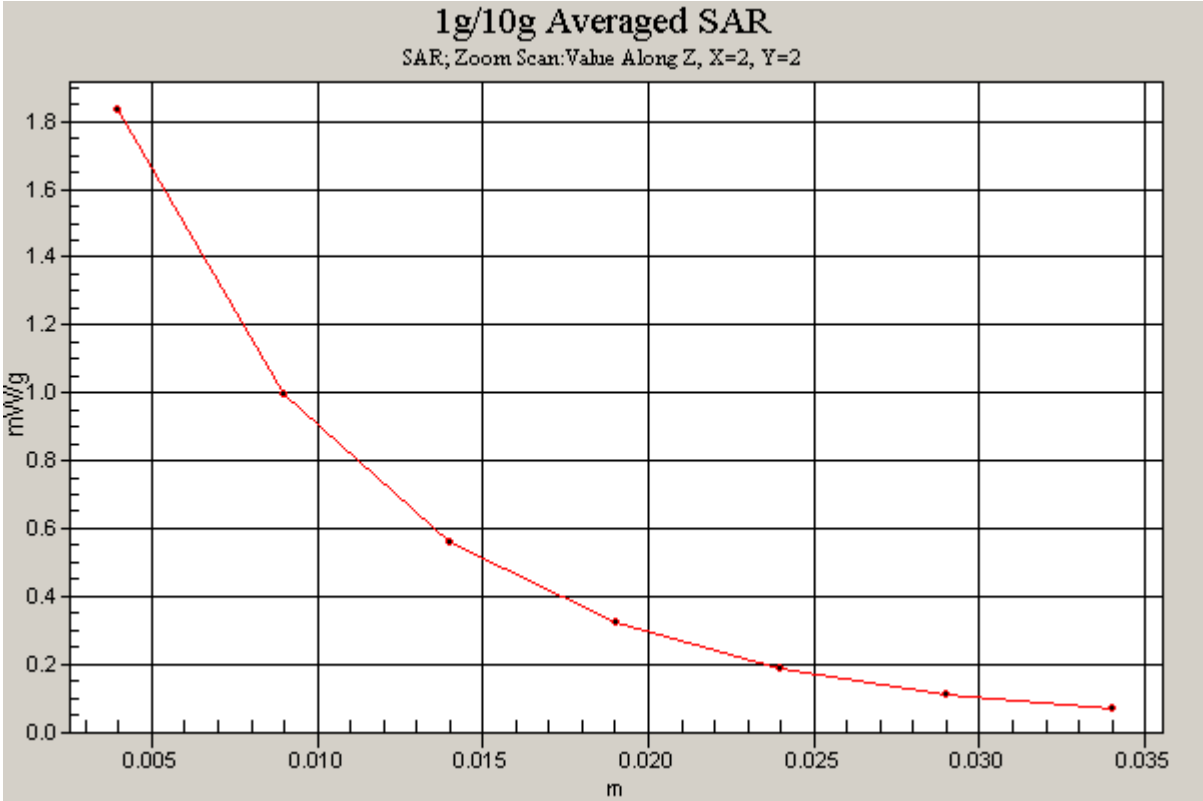
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; $\sigma$ = 1.57 mho/m; $\varepsilon_r$ = 51.7; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2012; Ambient Temp: 21.0 °C; Tissue Temp: 20.5 °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) = 1.65 mW/g; SAR(10 g) = 0.829 mW/g**
Deviation = 0.36 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d080**

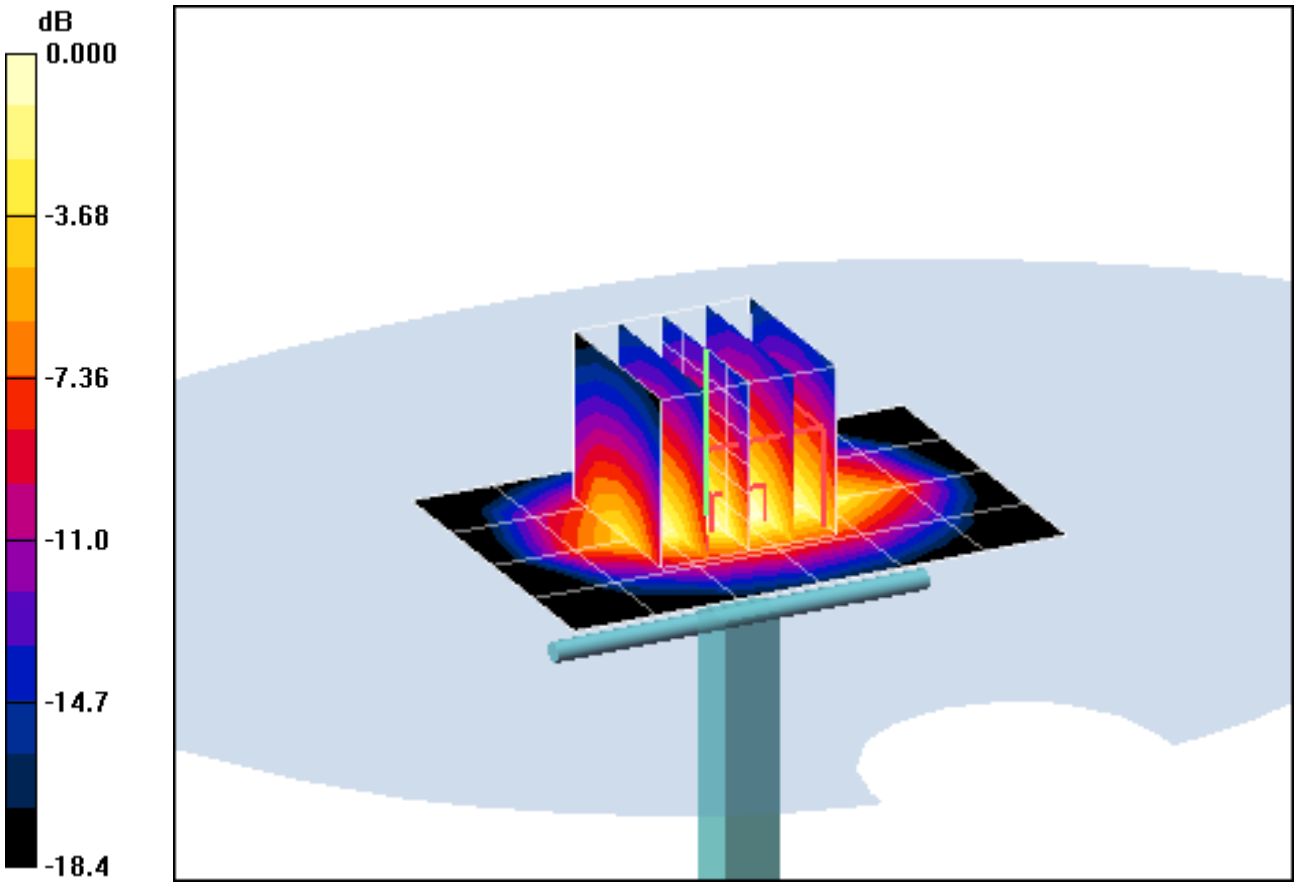
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; $\sigma$ = 1.58 mho/m; $\varepsilon_r$ = 51.94; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-15-2012; Ambient Temp: 23.1 °C; Tissue Temp: 21.2 °C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 5.0; 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 = 16.0 dBm (40 mW)
**SAR(1 g) = 1.7 mW/g; SAR(10 g) = 0.896 mW/g**
Deviation = 3.91 %




0 dB = 1.88mW/g

**DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d080**

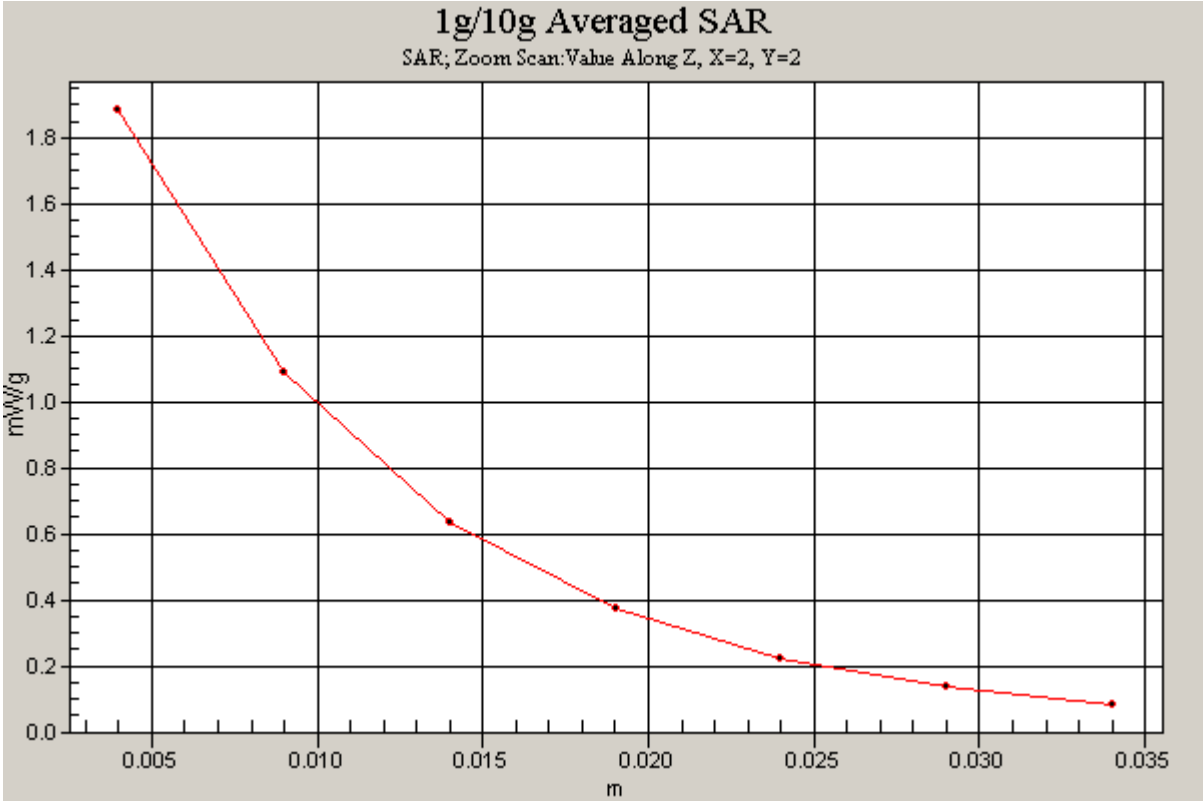
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; $\sigma$ = 1.58 mho/m; $\varepsilon_r$ = 51.94; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-15-2012; Ambient Temp: 23.1 °C; Tissue Temp: 21.2 °C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 5.0; 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 = 16.0 dBm (40 mW)
**SAR(1 g) = 1.7 mW/g; SAR(10 g) = 0.896 mW/g**
Deviation = 3.91 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d141**

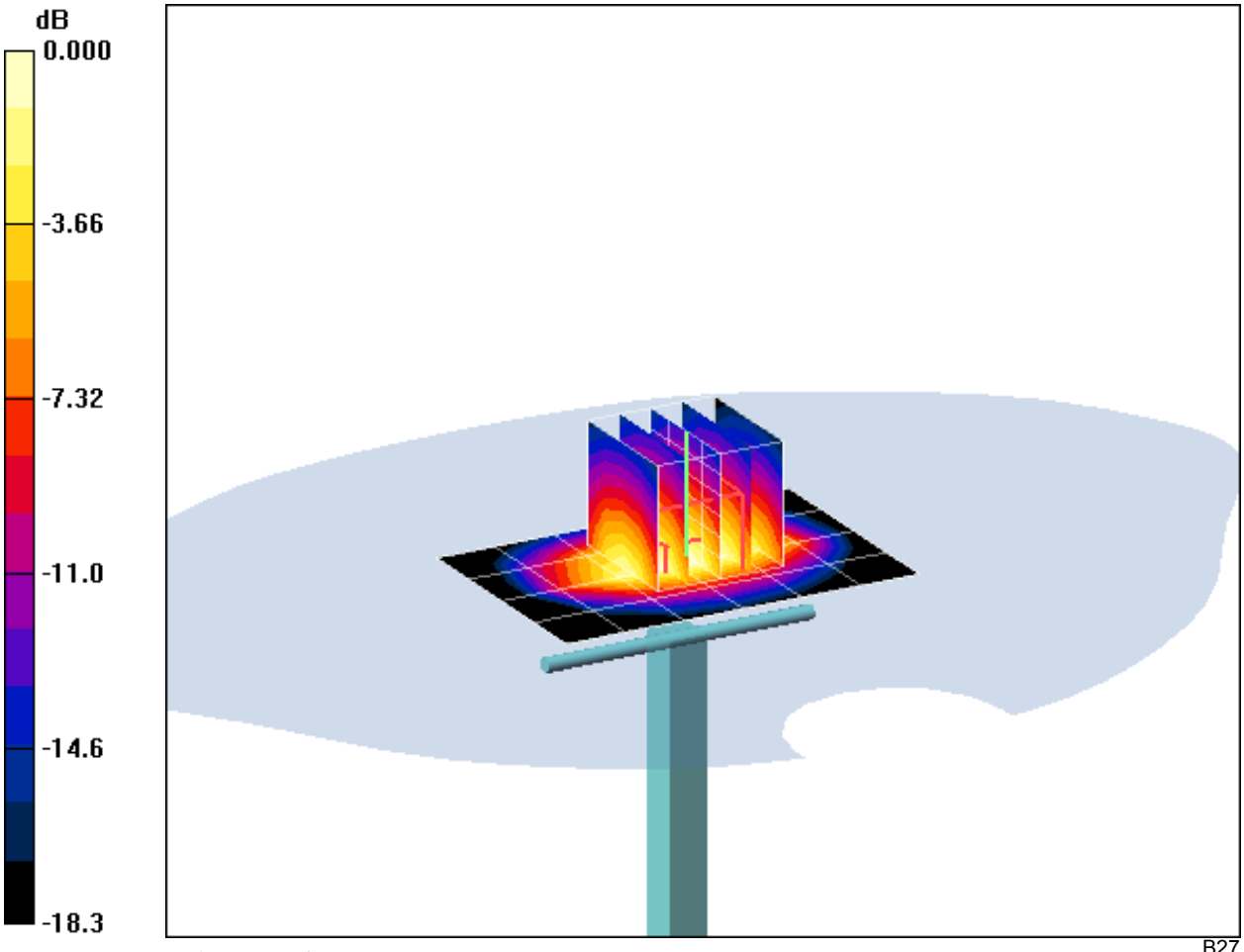
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; $\sigma$ = 1.57 mho/m; $\varepsilon_r$ = 51.7; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-17-2012; Ambient Temp: 24.3 °C; Tissue Temp: 22.0 °C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011
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 = 16.0 dBm (40 mW)
**SAR(1 g) = 1.58 mW/g; SAR(10 g) = 0.844 mW/g**
Deviation = -4.59 %




0 dB = 1.76mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d141**

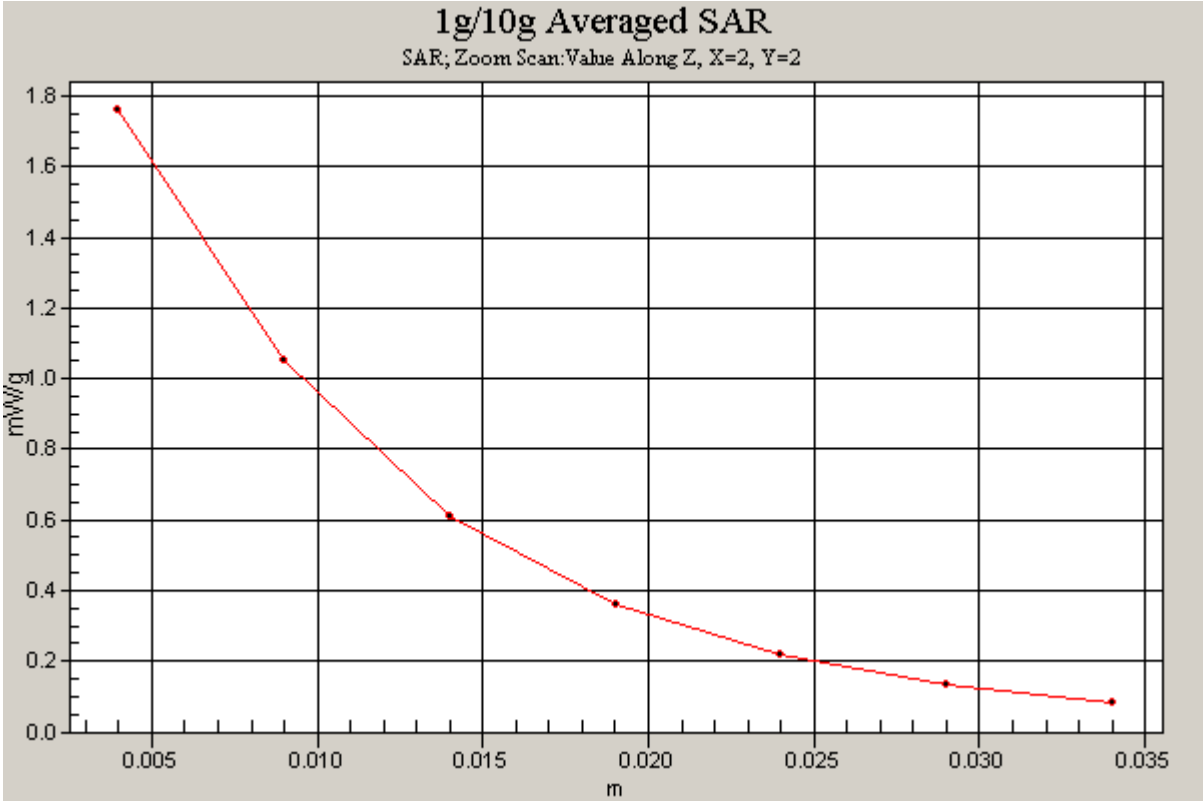
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; $\sigma$ = 1.57 mho/m; $\varepsilon_r$ = 51.7; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-17-2012; Ambient Temp: 24.3 °C; Tissue Temp: 22.0 °C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011
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 = 16.0 dBm (40 mW)
**SAR(1 g) = 1.58 mW/g; SAR(10 g) = 0.844 mW/g**
Deviation = -4.59 %



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 2450 MHz; Type: D2450V2; Serial: 719**

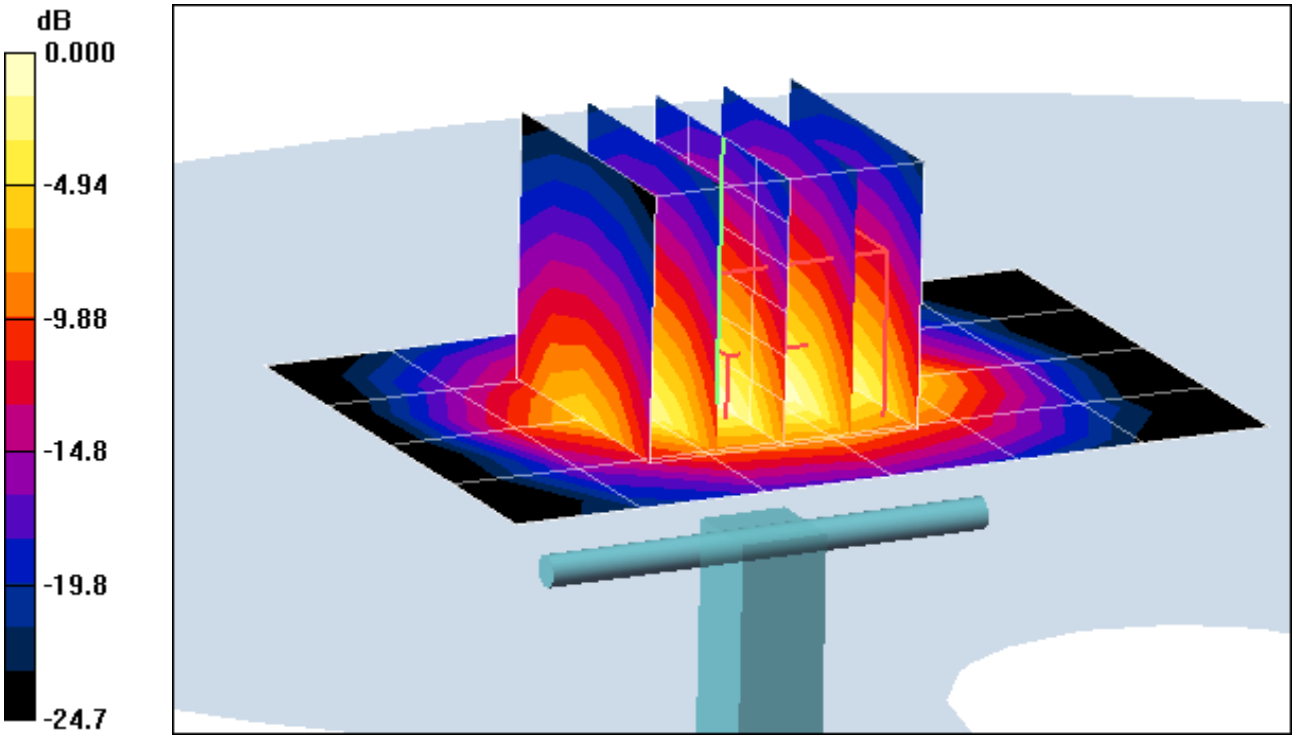
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; $\sigma$ = 2.01 mho/m; $\varepsilon_r$ = 50.3; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2012; Ambient Temp: 22.4°C; Tissue Temp: 20.6°C

Probe: ES3DV3 - SN3258; ConvF(4.34, 4.34, 4.34); Calibrated: 4/8/2011
Sensor-Surface: 3mm (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

## 2450MHz 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) = 2.19 mW/g; SAR(10 g) = 0.980 mW/g**
Deviation = 6.73%




0 dB = 2.85mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: SAR Dipole 2450 MHz; Type: D2450V2; Serial: 719**

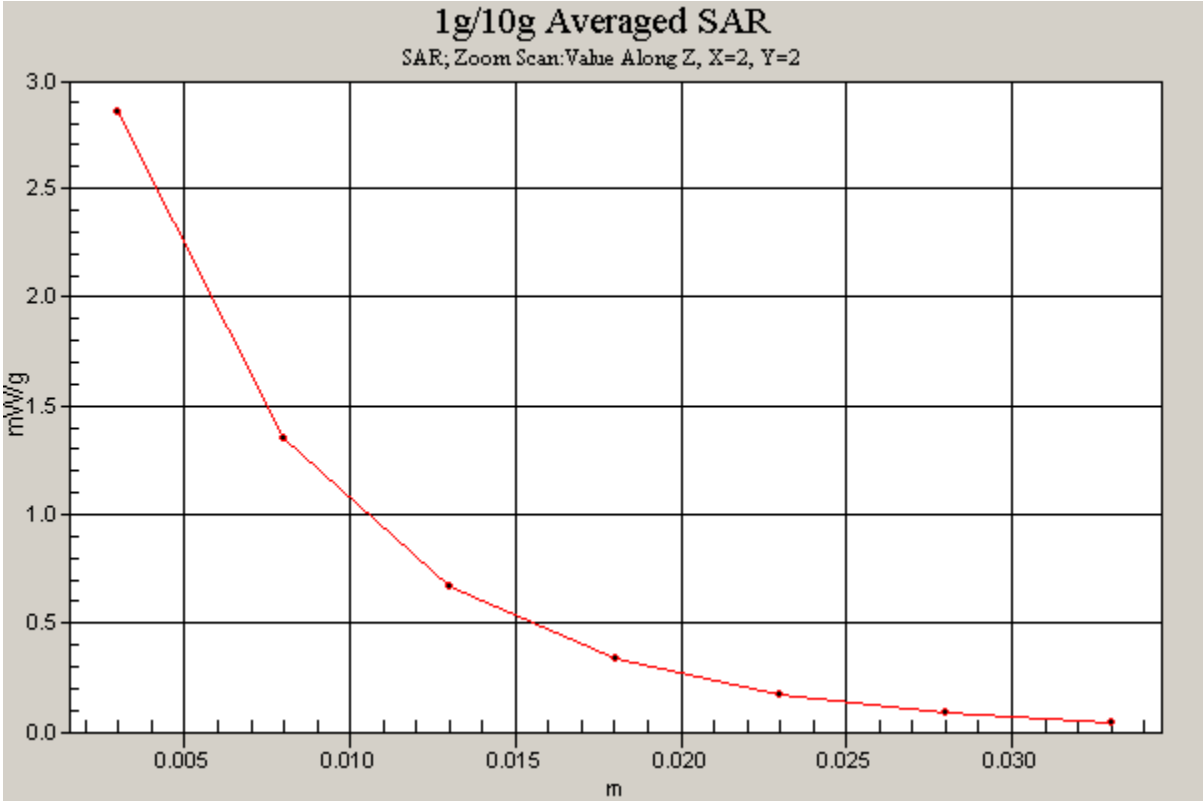
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; $\sigma$ = 2.01 mho/m; $\varepsilon_r$ = 50.3; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2012; Ambient Temp: 22.4°C; Tissue Temp: 20.6°C

Probe: ES3DV3 - SN3258; ConvF(4.34, 4.34, 4.34); Calibrated: 4/8/2011
Sensor-Surface: 3mm (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

## 2450MHz 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 = 60 dBm (40 mW)
**SAR(1 g) = 2.19 mW/g; SAR(10 g) = 0.980 mW/g**
Deviation = 6.73%



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 5200 MHz; Type: D5GHzV2; Serial: 1007**

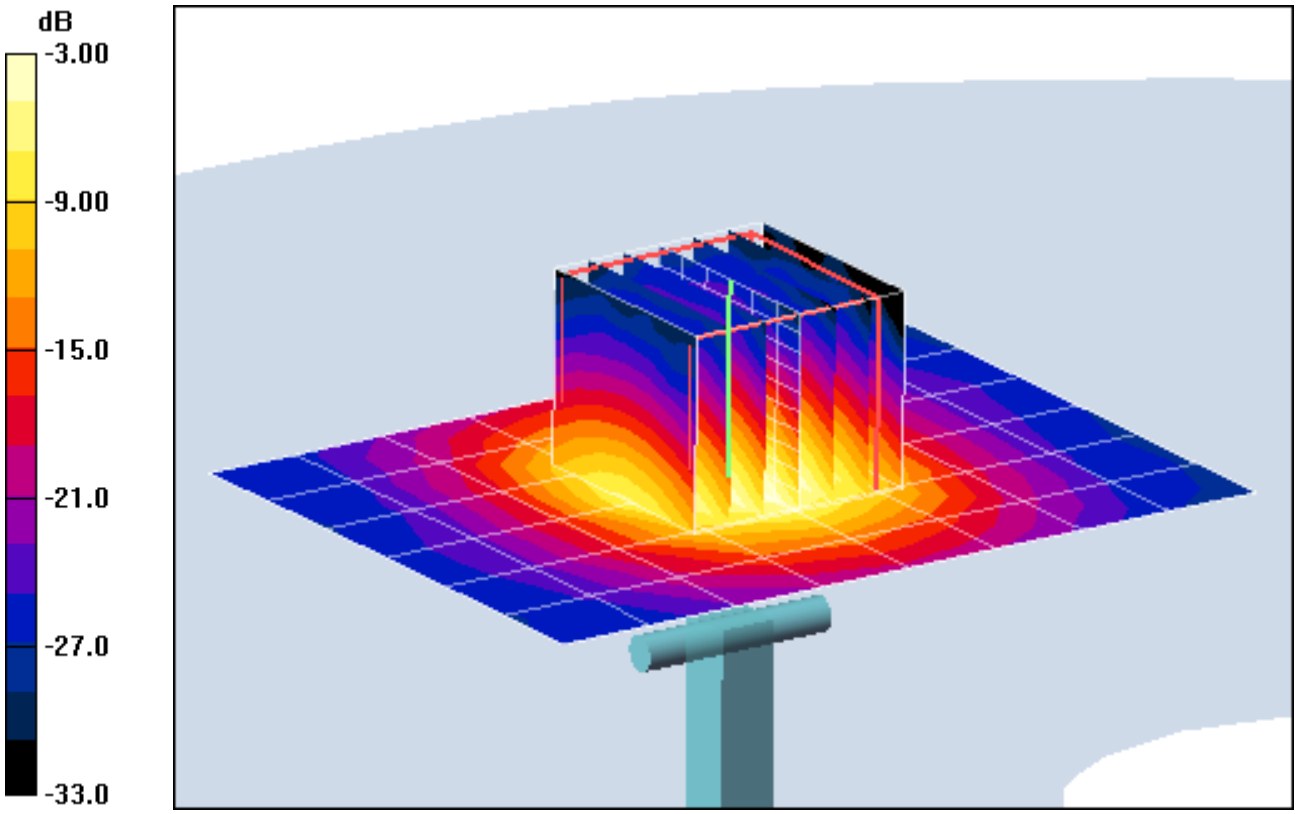
Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used:
f = 5200 MHz; $\sigma$ = 5.347 mho/m; $\varepsilon_r$ = 47.71; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2012; Ambient Temp: 23.6°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN3561; ConvF(3.7, 3.7, 3.7); Calibrated: 7/27/2011
Sensor-Surface: 2mm (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

## 5200MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm
**Zoom Scan (7x7x11)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
**SAR(1 g) = 7.9 mW/g; SAR(10 g) = 2.18 mW/g**
Deviation = 4.64 %




0 dB = 16.5mW/g

**DUT: Dipole 5200 MHz; Type: D5GHzV2; Serial: 1007**

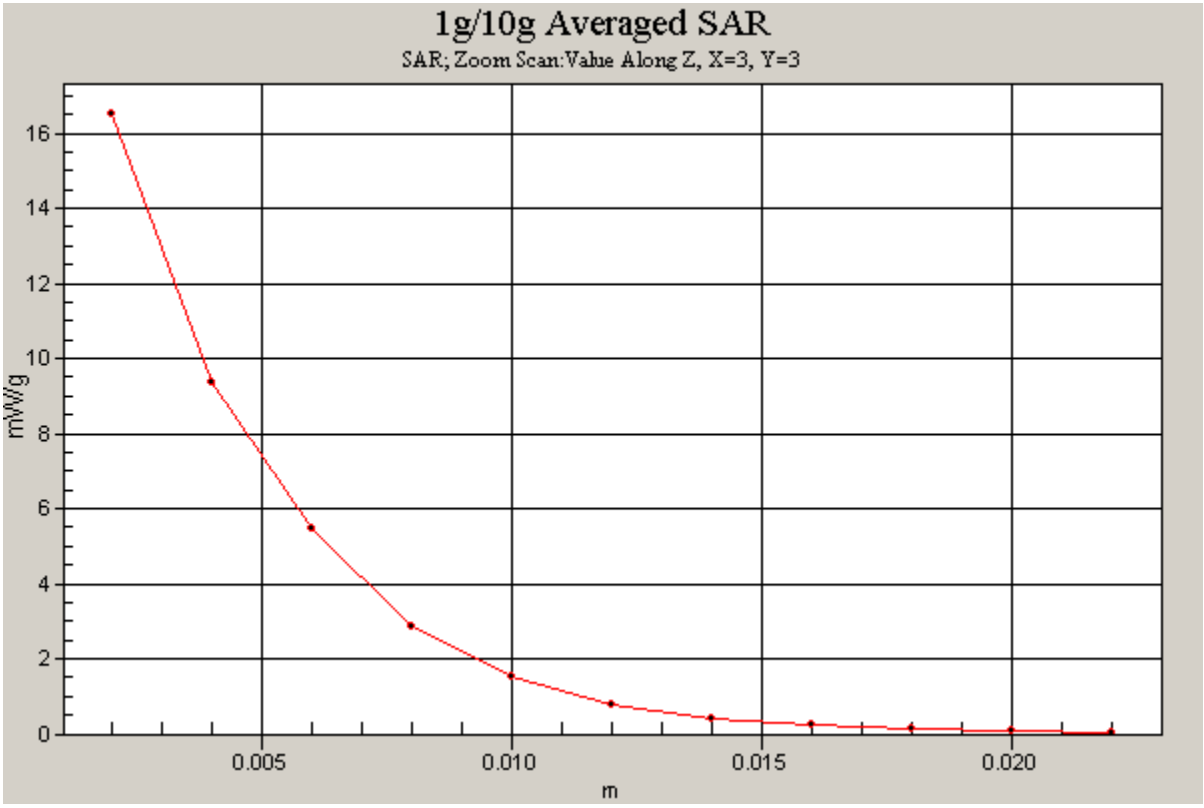
Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5200 MHz; $\sigma$ = 5.347 mho/m; $\varepsilon_r$ = 47.71; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2012; Ambient Temp: 23.6°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN3561; ConvF(3.7, 3.7, 3.7); Calibrated: 7/27/2011
Sensor-Surface: 2mm (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

## 5200MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm
**Zoom Scan (7x7x11)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)dB
**SAR(1 g) = 7.9 mW/g; SAR(10 g) = 2.18 mW/g**
Deviation = 4.64%



**DUT: Dipole 5500 MHz; Type: D5GHzV2; Serial: 1007**

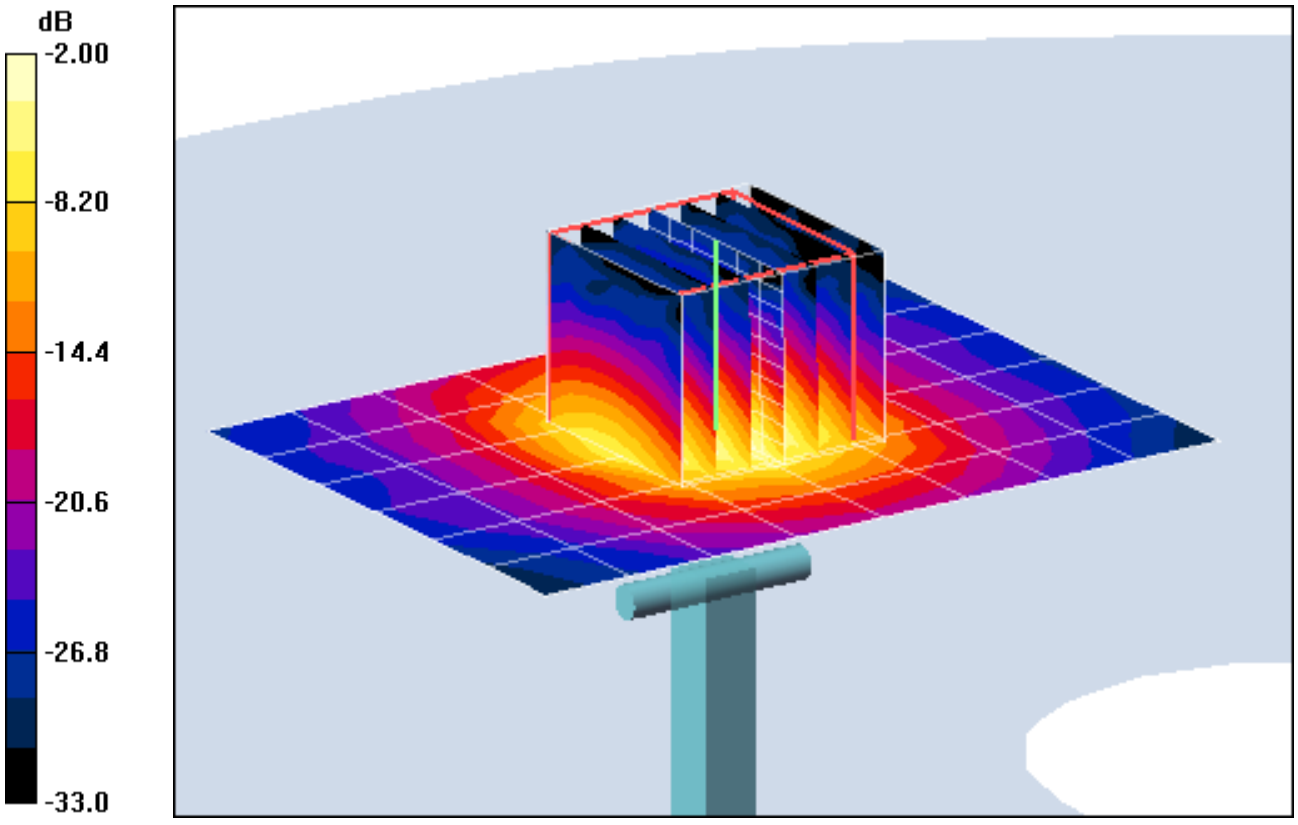
Communication System: CW; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used:
f = 5500 MHz; $\sigma$ = 5.771 mho/m; $\varepsilon_r$ = 46.64; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3561; ConvF(3.28, 3.28, 3.28); Calibrated: 7/27/2011
Sensor-Surface: 2mm (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

## 5500MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm
**Zoom Scan (7x7x11)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
**SAR(1 g) = 8.21 mW/g; SAR(10 g) = 2.27 mW/g**
Deviation = 0.98 %




0 dB = 16.9mW/g

**DUT: Dipole 5500 MHz; Type: D5GHzV2; Serial: 1007**

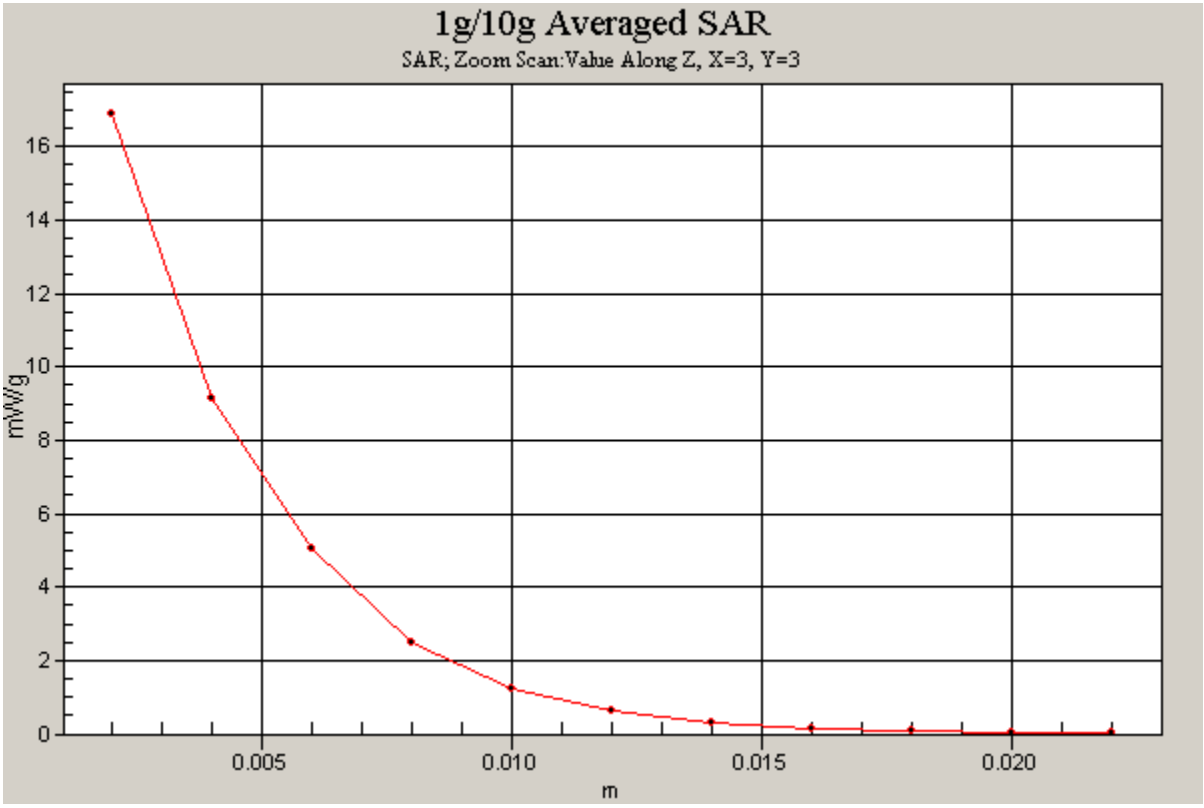
Communication System: CW; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5500 MHz; $\sigma$ = 5.771 mho/m; $\varepsilon_r$ = 46.64; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3561; ConvF(3.28, 3.28, 3.28); Calibrated: 7/27/2011
Sensor-Surface: 2mm (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

## 5500MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm
**Zoom Scan (7x7x11)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20 dBm (100 mW)
**SAR(1 g) = 8.21 mW/g; SAR(10 g) = 2.27 mW/g**
Deviation = 0.98%



**DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1007**

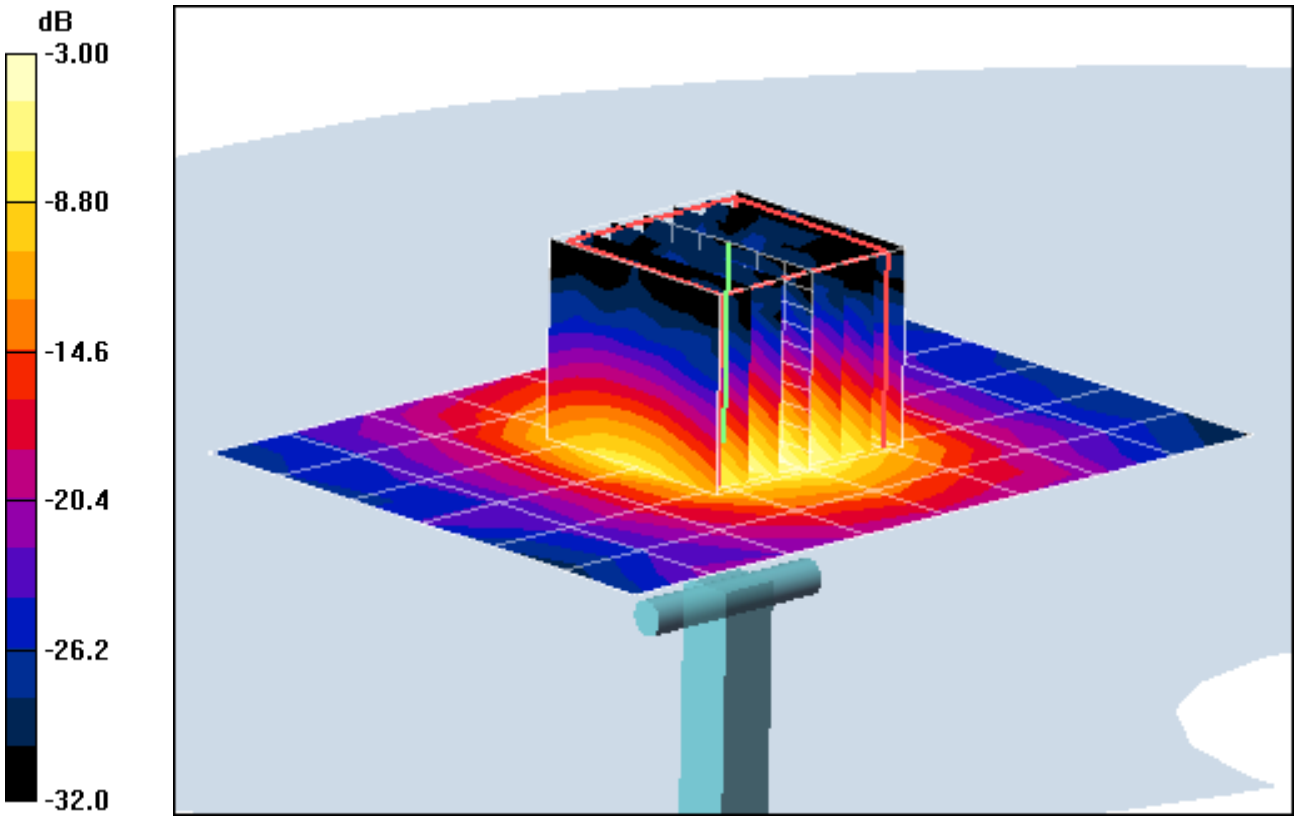
Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used:
f = 5800 MHz; $\sigma$ = 6.257 mho/m; $\varepsilon_r$ = 45.96; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2012; Ambient Temp: 23.2°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3561; ConvF(3.34, 3.34, 3.34); Calibrated: 7/27/2011
Sensor-Surface: 2mm (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

## 5800MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm
**Zoom Scan (7x7x11)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
**SAR(1 g) = 7.72 mW/g; SAR(10 g) = 2.1 mW/g**
Deviation = 2.52 %**g**




0 dB = 16.3mW/g

**DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1007**

Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5800 MHz; $\sigma$ = 6.257 mho/m; $\varepsilon_r$ = 45.96; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2012; Ambient Temp: 23.2°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3561; ConvF(3.34, 3.34, 3.34); Calibrated: 7/27/2011
Sensor-Surface: 2mm (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

## 5800MHz System Verification

**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm
**Zoom Scan (7x7x11)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20 dBm (100mW)
**SAR(1 g) = 7.72 mW/g; SAR(10 g) = 2.1 mW/g**
Deviation = 2.52%