



SAR COMPLIANCE EVALUATION REPORT

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

Date of Testing:
12/06/11 - 12/19/11
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Test Report Serial No.:
0Y1111151972.A3L-R1

FCC ID: A3LSHVE150S

APPLICANT: SAMSUNG ELECTRONICS, CO. LTD.

EUT Type: Portable Tablet Device
Application Type: Certification
FCC Rule Part(s): CFR §2.1093; FCC/OET Bulletin 65 Supplement C [June 2001]
Model(s): SHV-E150S

Band & Mode	Tx Frequency	Conducted Power [dBm]	SAR	
			1 gm Head (W/kg)	1 gm Body (W/kg)
GSM/GPRS 1900	1850.20 - 1909.80 MHz	29.05	0.03	0.51
2.4 GHz WLAN	2412 - 2462 MHz	14.45	0.13	0.39
5.8 GHz WLAN	5745 - 5825 MHz	12.30	0.10	0.25
5.2 GHz WLAN	5180 - 5240 MHz	11.90	0.18	0.56
5.3 GHz WLAN	5260 - 5320 MHz	12.36	0.16	0.51
5.5 GHz WLAN	5500 - 5700 MHz	12.80	0.10	0.37
Bluetooth	2402 - 2480 MHz	8.76	N/A	
Simultaneous SAR per KDB 690783 D01:			0.21	1.07

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. This revised Test Report (S/N: 0Y1111151972.A3L-R1) supersedes and replaces any previously issued test reports on the same subject EUT for the same type of testing as indicated. Please discard and destroy any previously issued test reports and dispose of them accordingly.

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


Randy Ortanez
President



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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Tx Frequency
GSM/GPRS 1900	1850.20 - 1909.80 MHz
2.4 GHz WLAN	2412 - 2462 MHz
5.8 GHz WLAN	5745 - 5825 MHz
5.2 GHz WLAN	5180 - 5240 MHz
5.3 GHz WLAN	5260 - 5320 MHz
5.5 GHz WLAN	5500 - 5700 MHz
Bluetooth	2402 - 2480 MHz

1.2 DUT Antenna Locations

Antenna and Key Feature Information for SHV-E150S

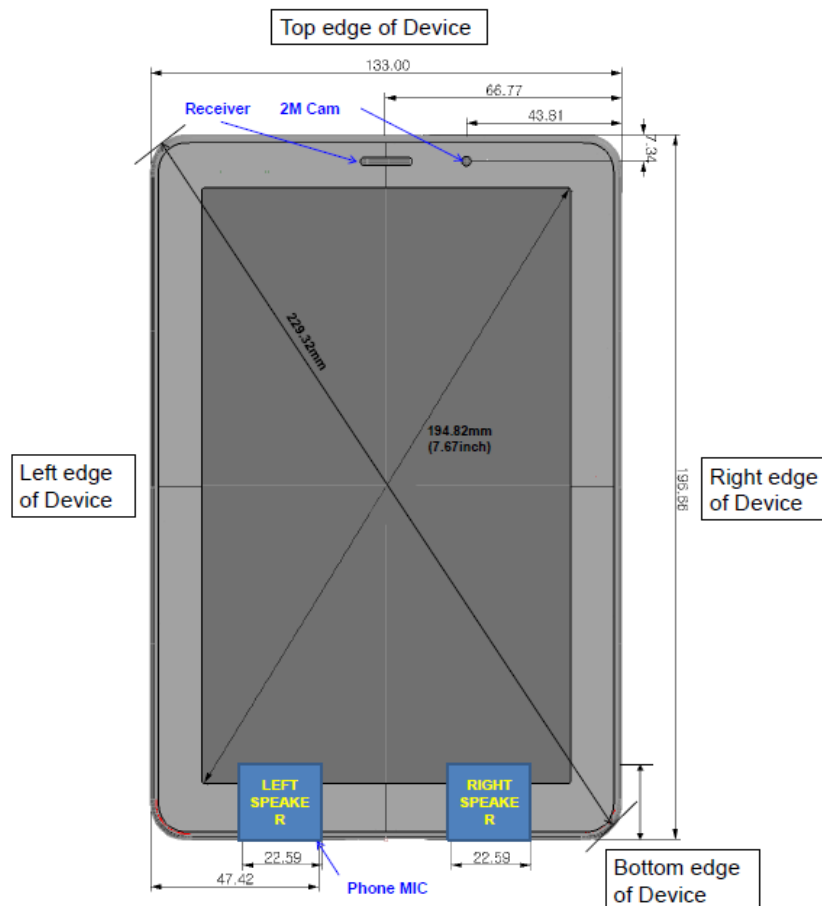


Figure 1-1
Front View of Device

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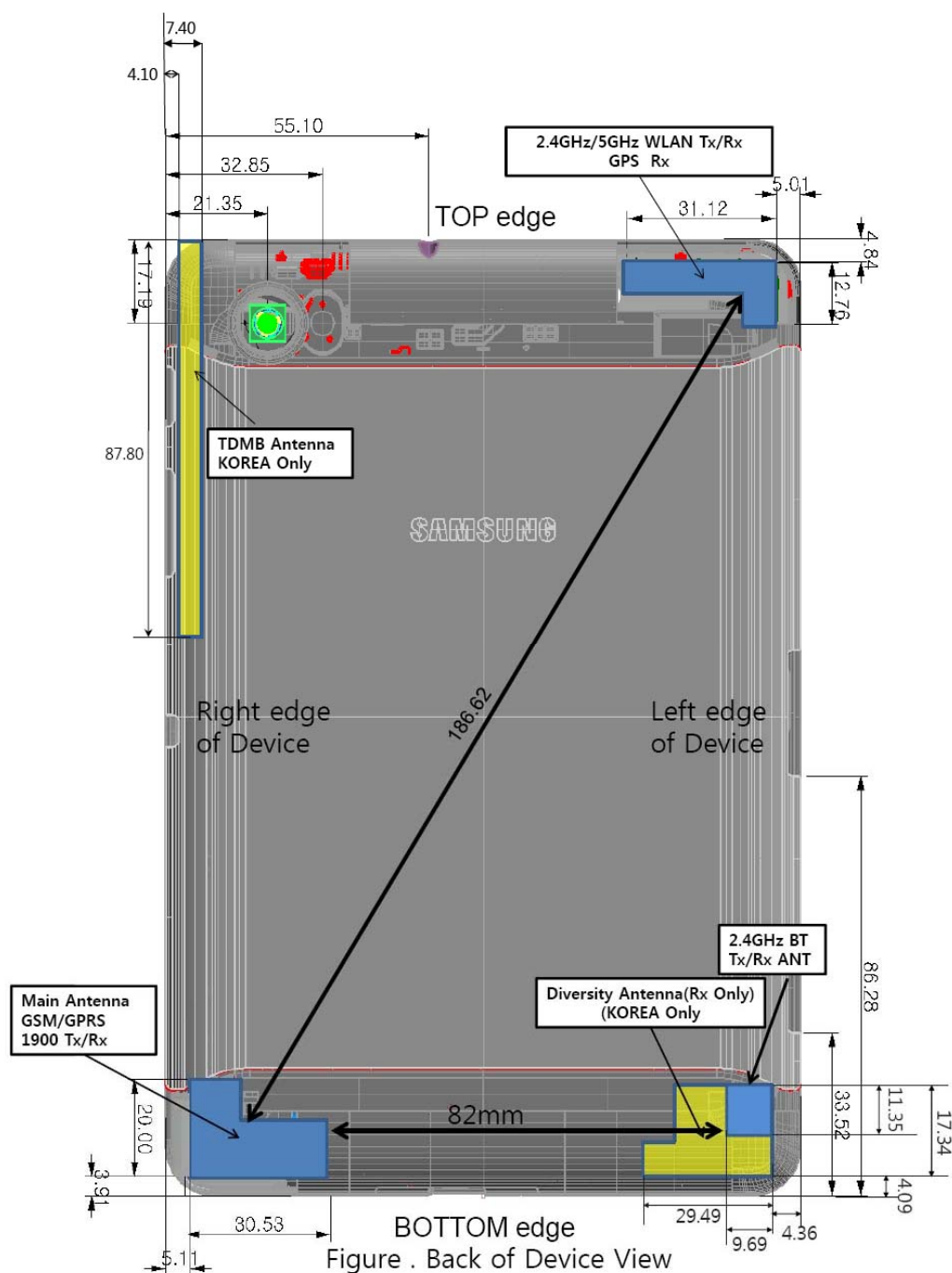


Figure 1-2
Back View of the Device

Notes:

1. Rear camera is not for video calls but for standard digital functions.
2. The operational description contains information about designs including sensor sizes and locations.

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1.3 Device Exclusions Applicable for SAR Testing

(A) WIFI/BT Testing

Per KDB publication 447498 3) b) ii):

- Since the output power of the Bluetooth antenna is 7.523 mW and the BT/WIFI and licensed transmitter antenna separation distance is 82 mm, SAR Testing for Bluetooth is not required for both back side and edge exposure conditions.
- Since the output power of the WLAN (IEEE 802.11b) antenna is 28.31 mW and the BT/WIFI and licensed transmitter antenna separation distance is 186.62 mm SAR Testing for WLAN (IEEE 802.11b) is required.
- Since the output power of the WLAN (IEEE 802.11a) antenna is 19.45 mW the BT/WIFI and licensed transmitter antenna separation distance is 186.62 mm, SAR Testing for WLAN (IEEE 802.11a) is required

2.4 GHz and 5 GHz WIFI cannot transmit simultaneously since it shares the same circuit path and are switched by the radio.

When Hotspot is enabled, all 5 GHz bands are disabled, as reflected in Table 1-1.

(B) GSM Testing

Justification for reduced test configurations per KDB Publication 941225 D03: The source-based time-averaged output power was evaluated for all multi-slot operations. In addition to the worst-case reported on mid channel, all source-based time-averaged powers within 10% of the worst-case were additionally included in the evaluation for mid channel data modes.

DTM is not supported in this EUT.

1.4 Head SAR Testing

Head SAR testing was required for this tablet because it has a speaker/receiver and a microphone positioned in a way that allows for a held-to-ear configuration usage. Body-worn accessories are not applicable for this device. Per KDB Publication 447498 4)c)i), head SAR was tested according to the device procedures in the IEEE Std 1528-2003 and OET Bulletin 65 Supplement C 01-01.

1.5 Simultaneous Transmission Capabilities

Simultaneous transmissions according to KDB Publication 447498, except for transmissions during network hand-offs, with maximum hand-off duration less than 30 seconds, transmitters are considered to be transmitting simultaneously when there is overlapping transmission. The tablet procedures required by KDB Publication 447498 generally do not require separate hotspot mode testing.

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Table 1-1
Simultaneous Transmission Scenarios

No	Simultaneous Transmission Scenarios	Head SAR	Body SAR	Note
1	1900 MHz GSM Voice + 2.4 GHz WIFI	Yes	Yes	Voice and WIFI Data
2	1900 MHz GSM Voice + 5 GHz WIFI	Yes	Yes	Voice and WIFI Data
3	1900 MHz GPRS Data + 2.4 GHz WIFI	No	Yes	GPRS Data and WIFI Hotspot
4	1900 MHz GPRS Data + 2 GHz WIFI Voice*	No	No	
5	1900 MHz GPRS Data + 5 GHz WIFI Voice*	No	No	
6	1900 MHz GPRS Data + 5 GHz WIFI Data	No	No	Not Supported by S/W

*Note: Detailed information about EUT Simultaneous Transmission Capabilities is contained in the operational description.

1.6 Power Reduction for SAR

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

Based on the power-reduction activation vs. distance results for the sensors, the samples representative of the device with the sensors activated (reduced power) was tested for SAR at 0 mm. For the additional SAR measurements with the sensors de-activated (max power, no power reduction) when the device is positioned away from the user, SAR evaluation is required at 10 mm (from the back) and 5mm (from the bottom and right edges) distances from the phantom. Since the device sensor detection mechanism is active at these distances, the power reduction was disabled via manufacturer test software, and the device was placed in maximum power transmit mode with a base station simulator under the tissue equivalent liquid- filled flat phantom at the required distances for testing.

1.7 Samples Used for SAR Testing

Four samples with identical hardware were used to facilitate SAR testing only. For maximum power samples, power reduction was disabled via software (only available from the manufacturer) to ensure the device was always transmitting at maximum power when testing at a conservative distance. All reduced power samples were tuned to the reduced power levels. Power reduction was disabled via software (only available from the manufacturer) on this device to ensure the device was always transmitting at reduced power and to confirm reduced power levels. Two additional samples were used for WIFI:

Table 1-2
SAR Test Sample Serial Numbers

	GPRS	2.4 GHz WIFI	5 GHz WIFI
Maximum Power	FCC#1	FCC#2	FI-295-H
Reduced Power	FI-295-F		

1.8 FCC Guidance Applied

- FCC OET Supplement C
- IEEE 1528-2003
- FCC KDB 447498 Section 4 (Tablet SAR Considerations)
- April/Oct 2011 TCB Workshop Notes for RF Exposure and Sensors with Power Reduction
- FCC KDB 248227 (802.11)
- FCC KDB 865664 (5-6 GHz techniques)
- FCC KDB 941225

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2 INTRODUCTION

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

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

2.1 SAR Definition

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

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

Figure 2-1
SAR Mathematical Equation

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

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

where:

- σ = conductivity of the tissue-simulating material (S/m)
- ρ = 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]

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3 TEST SITE LOCATION

3.1 INTRODUCTION

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

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

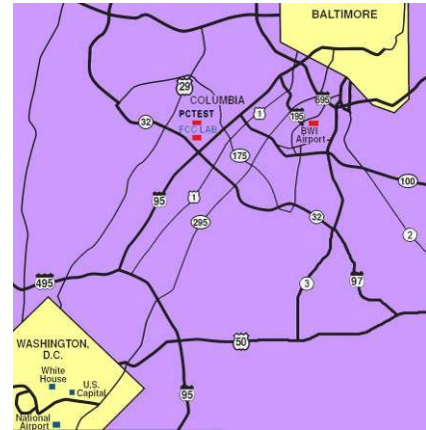
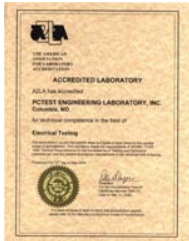


Figure 3-1

Map of the Greater Baltimore and Metropolitan Washington, D.C. area

3.2 Test Facility / Accreditations:

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



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

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4 SAR MEASUREMENT SETUP

4.1 Robotic System

Measurements are performed using the DASY4 automated dosimetric assessment system. The DASY4 is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland and consists of a high precision robotics system (Staubli), robot controller, desktop computer, near-field probe, probe alignment sensor, and the SAM phantom containing the head or body equivalent material. The robot is a six-axis industrial robot, performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Figure 4-1).

4.2 System Hardware

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

4.3 System Electronics

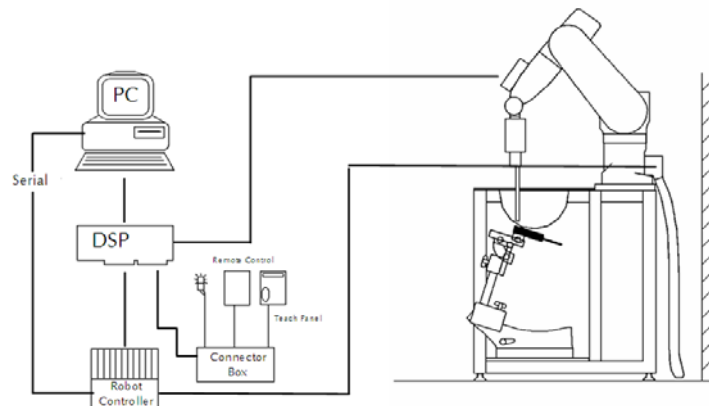


Figure 4-1
SAR Measurement System Setup

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

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4.4 Automated Test System Specifications

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

Data Acquisition Electronic System (DAE)

Data Converter

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

PC Interface Card

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

Phantom

Type: SAM Twin Phantom (V4.0 and V5.0)
Shell Material: Composite
Thickness: 2.0 ± 0.2 mm



Figure 4-2
SAR Measurement System

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5 DASY E-FIELD PROBE SYSTEM

5.1 Probe Measurement System



**Figure 5-1
SAR System**

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

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

5.2 Probe Specifications

Model(s):	ES3DV2, ES3DV3, EX3DV4
Frequency Range:	10 MHz – 6.0 GHz (EX3DV4) 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 ± 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 Compliance tests of mobile phones Dosimetry in strong gradient fields



**Figure 5-2
Near-Field Probe**



**Figure 5-3
Triangular Probe Configuration**

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6 PROBE CALIBRATION PROCESS

6.1 Dosimetric Assessment Procedure

Each E-Probe/Probe Amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm²) using an RF Signal generator, TEM cell, and RF Power Meter.

6.2 Free Space Assessment

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and in a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1 mW/cm².

6.3 Temperature Assessment

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

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

where:

Δt = exposure time (30 seconds),
 C = heat capacity of tissue (brain or muscle),
 ΔT = temperature increase due to RF exposure.

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

where:

σ = simulated tissue conductivity,
 ρ = Tissue density (1.25 g/cm³ for brain tissue)

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

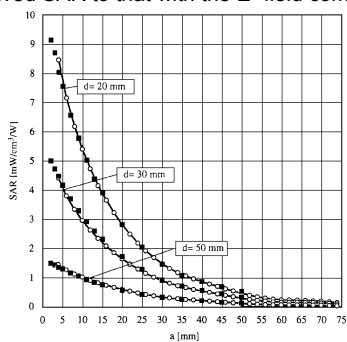


Figure 6-1 E-Field and Temperature measurements at 900MHz [9]

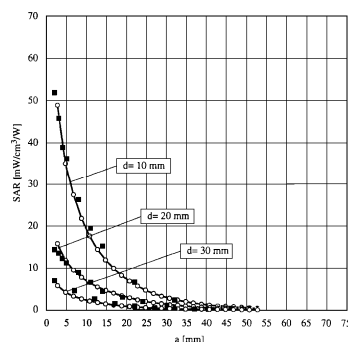


Figure 6-2 E-Field and temperature measurements at 1.9GHz [9]

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7 PHANTOM AND EQUIVALENT TISSUES

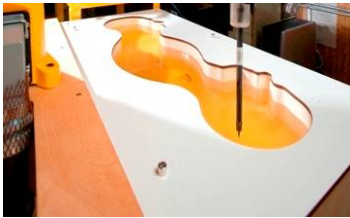
7.1 SAM Phantoms



**Figure 7-1
SAM Phantoms**

The SAM Twin Phantom V4.0 and V5.0 are 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 90th percentile of the population [12][13]. The phantom enables the dosimetric evaluation of SAR for both left and right handed device 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)	1900	1900	2450	2450	5200-5800	5200-5800
Tissue	Head	Body	Head	Body	Head	Body
Ingredients (% by weight)						
DGBE	44.92	29.44	7.99	26.7		
NaCl	0.18	0.39	0.16	0.1		
Triton X-100			19.97		17.24	10.67
Diethyleneglycol monohexylether					17.24	10.67
Water	54.9	70.17	71.88	73.2	65.52	78.66

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8.1 Measurement Procedure

The evaluation was performed using the following procedure:

1. The SAR distribution at the exposed side of the head was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 15mm x 15mm.
2. The SAR distribution area was ensured to cover the entire dimension of the body phantom area with the DUT positioned against the phantom. The horizontal grid resolution was 15 mm x 15 mm for up to 3 GHz frequencies. The horizontal grid resolution was 10mm x 10 mm for 5-6 GHz frequencies per KDB Publication 865664
3. The point SAR measurement was taken at the maximum SAR region determined from Step 1 or Step 2 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.
4. 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.
5. The SAR reference value, at the same location as step 3, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.
6. 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 8-1
Sample SAR Area Scan

8.2 Specific Anthropomorphic Mannequin (SAM) Specifications

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



Figure 8-2
SAM Twin Phantom Shell

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9

DEFINITION OF REFERENCE POINTS

9.1 EAR REFERENCE POINT

Figure 8-1 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 8-1. 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 device positioning [5].

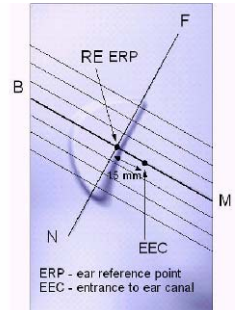


Figure 9-1
Close-Up Side view
of ERP

9.2 DEVICE REFERENCE POINTS

Two imaginary lines on the device 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 then located at the same level as the center of the ear reference point. The test device was positioned so that the “vertical centerline” was bisecting the front surface of the device 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

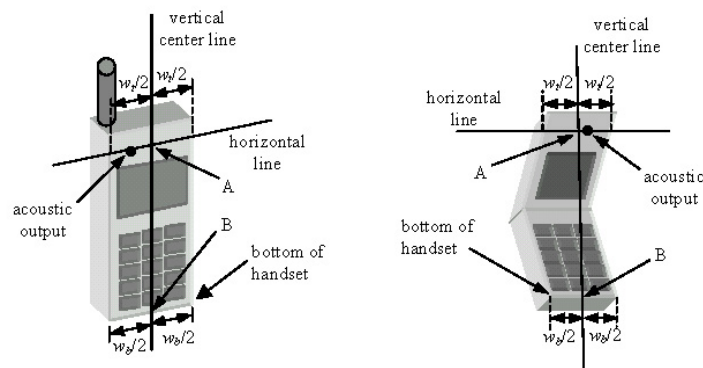


Figure 9-3
Device Vertical Center & Horizontal Line Reference Points

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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 $\epsilon = 3$ and loss tangent $\delta = 0.02$.

10.2 Positioning for Cheek/Touch

1. The test device was positioned with the device 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.

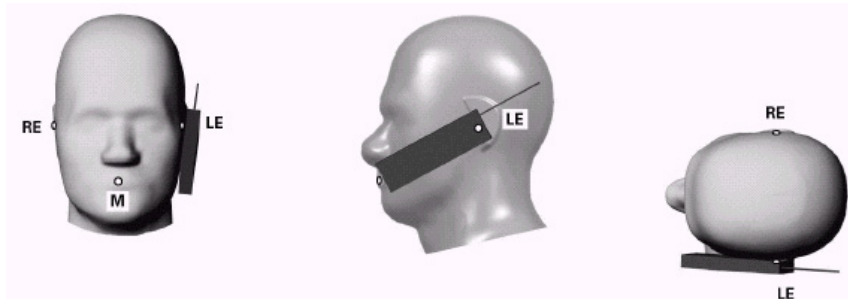


Figure 10-1 Front, Side and Top View of Cheek/Touch Position

2. The device was translated towards the phantom along the line passing through RE & LE until the device touches the ear.
3. While maintaining the device in this plane, the device 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 then rotated around the vertical centerline until the phone (horizontal line) was symmetrical with 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 device was rotated about the line NF until any point on the device made contact with a phantom point below the ear (cheek) (See Figure 10-2).

10.3 Positioning for Ear / 15° 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 15 degree.
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).

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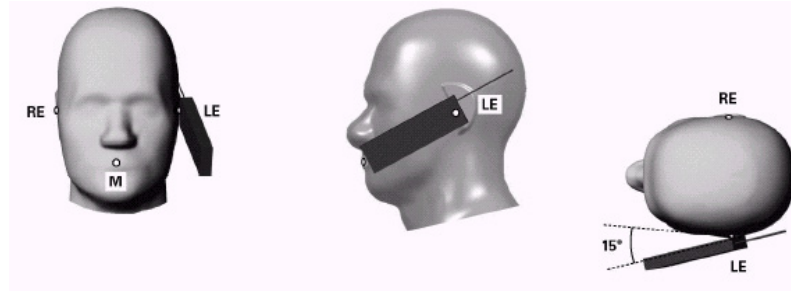
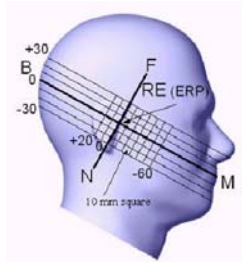


Figure 10-2 Front, Side and Top View of Ear/15° Tilt Position



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



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

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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 <i>General Population</i> (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT <i>Occupational</i> (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.

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12 SAR TABLET TESTING

12.1 SAR Testing for Tablet per KDB Publication 447498 Section 4

Lap-touching devices that have transmitting antennas located less than 20 cm from the body of the user require routine SAR evaluation. Such devices are considered portable, and are capable of being held to the body. Devices are to be setup according to KDB publication 447498 requirements and are configured with maximum output power during SAR assessment for a worst-case SAR evaluation.

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

Per KDB Publication 447498 4) b) ii) (2), SAR testing applies for the tablet edges with antennas located within 5 cm of each tablet edge closest to the user. According to KDB Publication 447498 4) b) ii) (2), for each antenna, SAR is only required for the edge with the most conservative exposure condition. Since the diagonal dimension of the device is more than 20 cm (22.9 cm), this device is a tablet (not a mini-tablet).

Head SAR testing was required for this tablet because it has a speaker/receiver and a microphone positioned in a way that allows for a held-to-ear configuration usage. Body-worn accessories are not applicable for this device. Per KDB Publication 447498 4)c)i), head SAR was tested according to the device procedures in the IEEE Std 1528-2003 and OET Bulletin 65 Supplement C 01-01.

12.2 Proximity Sensor Information

The sensor pad is located near the bottom half of the device to cover exposure conditions to the main antenna. The technical description contains information about sensor size and location. Power reduction levels are provided in Table 13-3.

12.3 Display Orientation Capabilities

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

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12.4 Additional SAR Testing for the Back Side and Bottom Edge of the Device

Based on the type and implementation of the sensor, April 2011 FCC-TCB conference notes requires sensor information regarding: (1) additional SAR evaluation at a conservative distance from the device where power reduction is de-activated and (2) reliability sensor activation data. Reliability sensor activation data is provided for both the back side and bottom edge of the tablet at 0° to cover direct usage and also at 45° to cover angled usage (See Table 12-3).

Since the back-off sensor activation distance for back is 11 mm, a conservative distance of 10 mm was tested for the back side at maximum power. Since the back-off sensor activation distance was 6 mm for the bottom edge, a conservative distance of 5 mm was tested at maximum power. Details about sensing mechanism and sensor pad location are included in the technical description.

12.5 Method of SAR measurement with Power Reduction

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

Based on the power-reduction activation vs. distance results for the sensors, the device was tested with a sample tuned to the output powers when the sensors activated (reduced power) at 0mm distance from the phantom according to KDB 447498 Section 4 requirements for tablets.

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Table 12-1
Distance from Back of Tablet

distance in mm	9	10	11	12	13	14
Condition of Sensor with respect to the back of the device	on	on	on	Off	off	off

Please see Figure 12-1 for power vs. Back-off distance plots for each GSM/GPRS multi-slot mode.

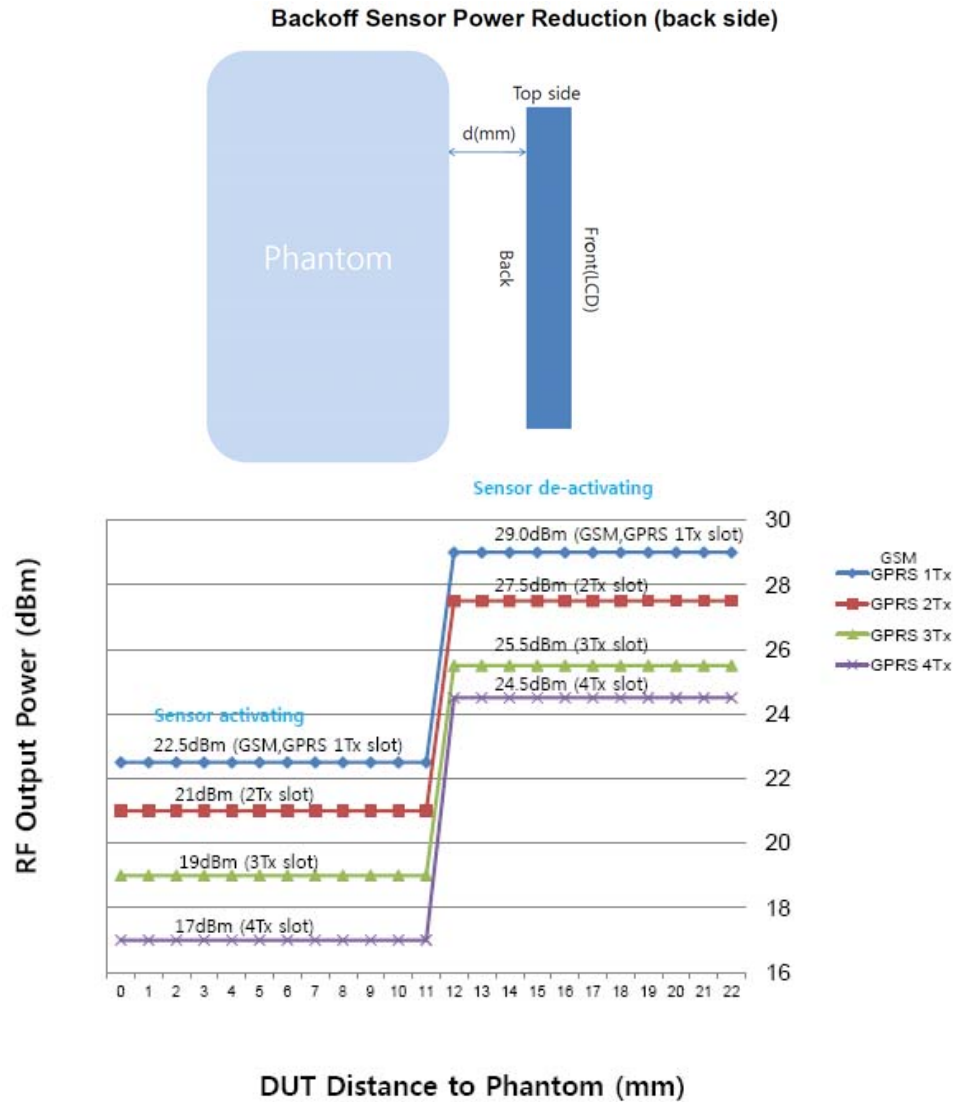


Figure 12-1
GSM/GPRS 1900 Back off Power Reduction Graph - Back side

Data in Figure 12-1 demonstrates reduced fixed power levels for GSM/GPRS 1900 at a distance of 11 mm and less from the back, as shown in Table 12-1.

Table 12-2
Distance from Bottom Edge of Tablet - 0° Angle

distance in mm	5	6	7	8	9	10
Condition of Sensor in the bottom edge of the device	on	on	off	off	off	off

Please see Figure 12-2 for power vs. Back-off distance plots for each GSM/GPRS multi-slot mode.

Backoff Sensor Power Reduction (bottom side, 0° tilted)

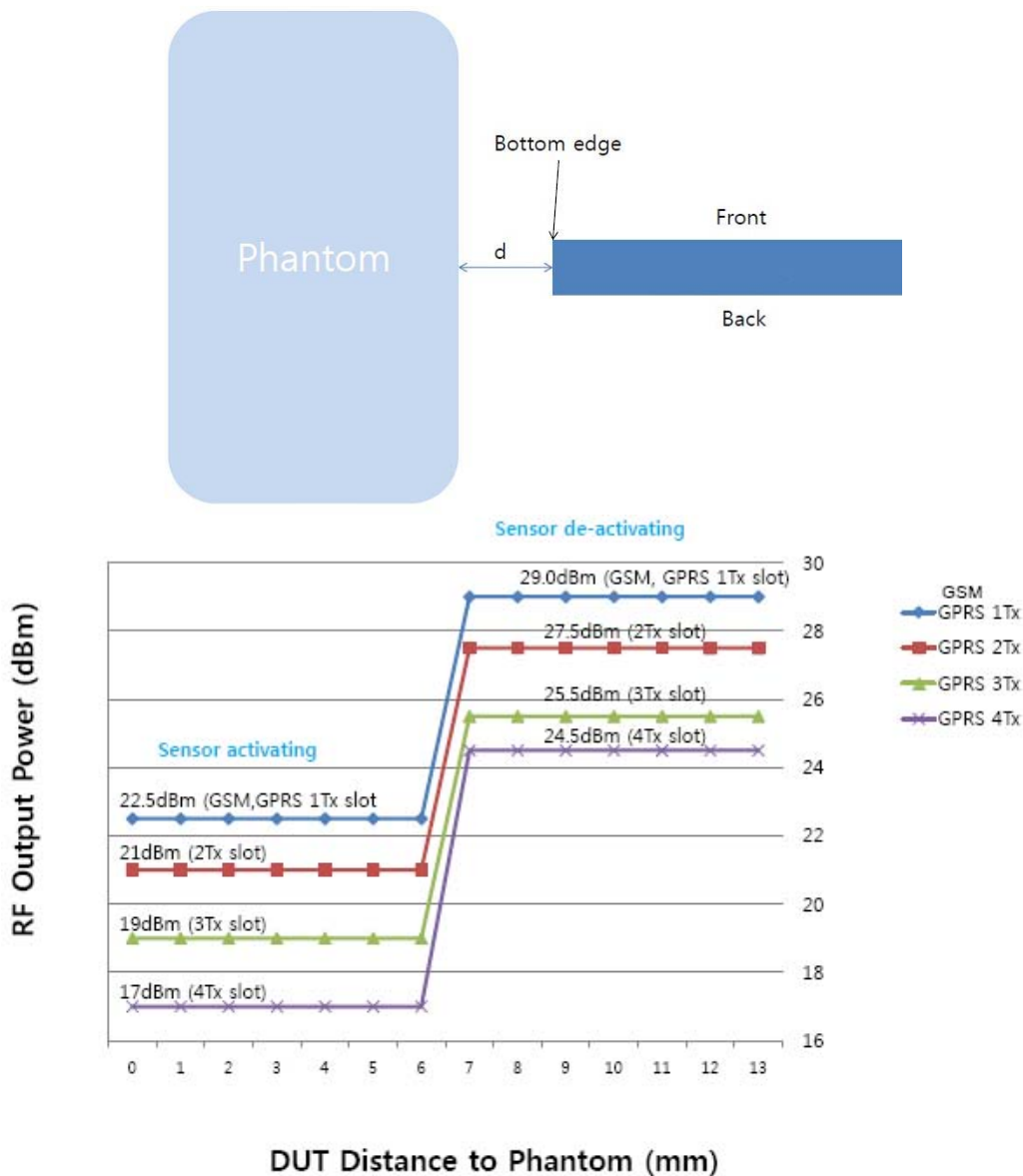


Figure 12-2

GSM/GPRS 1900 Back off Power Reduction Graph - Bottom Edge at 0° Angle

Data in Figure 12-2 demonstrates reduced fixed power levels for GSM1900 at a distance of 6 mm and less, as shown in Table 12-2.

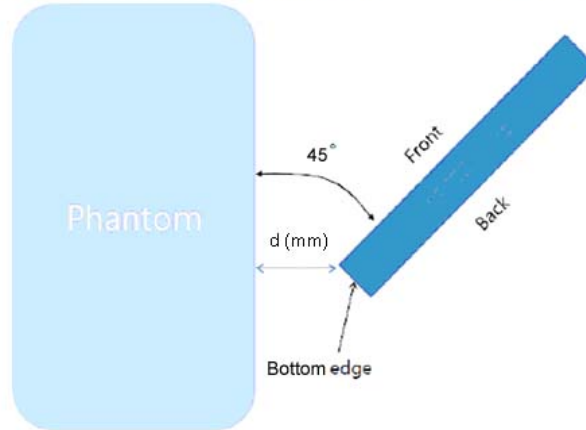
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Table 12-3
Distance from Bottom Edge of Tablet - 45° Angle

distance in mm	5	6	7	8	9	10
Condition of Sensor in the bottom edge of the device	on	on	off	off	off	off

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

Backoff Sensor Power Reduction (bottom, 45° tilted)



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

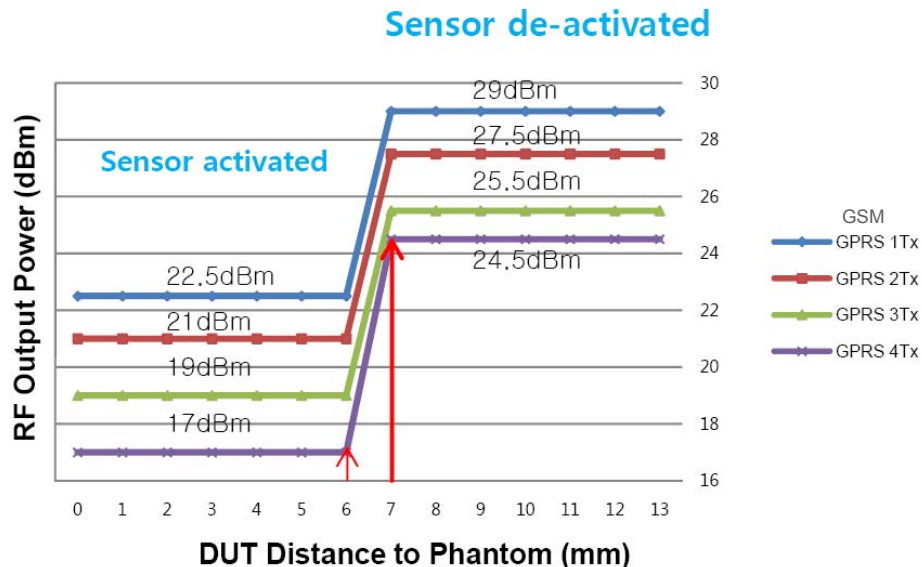


Figure 12-3

GSM/GPRS 1900 Back off Power Reduction Graph - Bottom Edge at 45° Angle

Data in Figure 12-3 demonstrates reduced fixed power levels for GSM1900 at a distance of 6 mm and less, as shown in Table 12-3.

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13 FCC MEASUREMENT PROCEDURES

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

13.1 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 drift deviated by more than 5%, the SAR test and drift measurements were repeated.

13.2 RF Conducted Powers

13.2.1 GSM Conducted Powers

Table 13-1
Maximum GSM/GPRS Powers (Representing Proximity Sensor Inactive)

		Maximum Burst-Averaged Output Power				
		Voice	GPRS Data			
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot
PCS	512	28.92	28.98	27.54	25.46	24.61
	661	29.05	29.19	27.62	25.44	24.64
	810	29.16	29.22	27.51	25.45	24.50
		Calculated Frame-Averaged Output Power				
		Voice	GPRS Data			
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot
PCS	512	19.89	19.95	21.52	21.20	21.60
	661	20.02	20.16	21.60	21.18	21.63
	810	20.13	20.19	21.49	21.19	21.49

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Table 13-2
Reduced GSM/GPRS Powers (Representing Proximity Sensor Active)

		Maximum Burst-Averaged Output Power				
		Voice	GPRS Data			
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot
PCS	512	22.79	22.73	20.92	19.02	16.52
	661	22.99	22.98	21.20	19.01	17.15
	810	22.50	22.38	20.80	18.79	16.83
		Calculated Maximum Frame-Averaged Output Power				
		Voice	GPRS Data			
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot
PCS	512	13.76	13.70	14.90	14.76	13.51
	661	14.12	14.08	15.18	14.75	14.14
	810	13.47	13.35	14.78	14.53	13.82

Notes:

- Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
- The bolded GPRS modes were selected according to the highest frame-averaged output power table according to KDB 941225 D03.
- GPRS output powers were measured with CS1 on the parameters on the Base Station Simulator.

GSM Class: B
GPRS Multislot class: 12 (max 4 Tx Uplink slots)
EDGE Multislot class: N/A
DTM Multislot Class: N/A

GSM/GPRS Summary of Power Reduction due to Proximity Sensor

Table 13-3
Power Targets Summary

Burst-Averaged Output Target Power							
			Voice	GPRS Data			
Band	Proximity Sensor State	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot
PCS	Inactive	128	29.00	29.00	27.50	25.50	24.50
		190					
		251					
PCS	Active	512	22.50	22.50	21.00	19.00	17.00
		661					
		810					

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Figure 13-1
Power Measurement Setup

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14 SAR TESTING WITH IEEE 802.11 TRANSMITTERS

Per FCC 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.

14.1 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.

14.2 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/n 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, 124 and 136 in the 5.470-5.725 GHz band; and channels 149 and 161 in the 5.8 GHz band. When 5.8 GHz §15.247 is also available, channels 149, 157 and 165 should be tested instead of the UNII channels. These are referred to as the “default test channels”. For 2.4 GHz, 802.11g/n modes were evaluated only if the output power was 0.25 dB higher than the 802.11b mode. For 5 GHz, 802.11n modes were evaluated only if the output power was 0.25 dB higher than the 802.11a mode.

Table 14-1
802.11 Test Channels per FCC Requirements

Mode	GHz	Channel	Turbo Channel	“Default Test Channels”		
				§15.247 802.11b	802.11g	UNII
802.11 b/g	2.412	1		✓	▽	
	2.437	6	6	✓	▽	
	2.462	11		✓	▽	
802.11a	5.18	36				✓
	5.20	40	42 (5.21 GHz)			*
	5.22	44				*
	5.24	48				✓
	5.26	52	50 (5.25 GHz)			✓
	5.28	56				*
	5.30	60	58 (5.29 GHz)			*
	5.32	64				✓
	5.500	100				*
	5.520	104				✓
	5.540	108				*
	5.560	112				*
	5.580	116				✓
	5.600	120	Unknown			*
	5.620	124				✓
	5.640	128				*
	5.660	132				*
	5.680	136				✓
	5.700	140				*
	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	✓		

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Table 14-2
IEEE 802.11b Average RF Power

Mode	Freq [MHz]	Channel	Conducted Power [dBm]			
			Data Rate [Mbps]			
			1	2	5.5	11
802.11b	2412	1	14.45	14.52	14.44	14.50
802.11b	2437	6	14.00	14.27	14.12	14.10
802.11b	2462	11	13.50	13.48	13.57	13.58

Table 14-3
IEEE 802.11g Average RF Power

Mode	Freq [MHz]	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11g	2412	1	12.85	12.60	12.62	13.07	12.82	12.45	12.52	12.40
802.11g	2437	6	12.22	12.15	12.15	12.15	12.11	11.92	11.92	12.07
802.11g	2462	11	12.12	12.15	12.32	12.10	12.81	12.07	12.10	11.98

Table 14-4
IEEE 802.11n Average RF Power

Mode	Freq [MHz]	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
			6.5	13	20	26	39	52	58	65
802.11n	2412	1	11.56	11.44	11.39	11.05	11.04	10.96	10.96	9.78
802.11n	2437	6	10.84	10.84	10.83	10.66	10.70	1.70	10.80	9.30
802.11n	2462	11	10.40	10.61	10.70	10.48	10.40	10.55	10.92	9.51

Table 14-5
IEEE 802.11a Average RF Power

Mode	Freq [MHz]	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11a	5180	36	11.90	11.90	12.02	11.67	11.50	11.90	10.95	9.55
802.11a	5200	40	11.42	11.40	11.45	11.45	11.29	11.25	10.12	9.35
802.11a	5220	44	11.48	11.55	11.35	11.55	11.47	11.45	10.67	9.43
802.11a	5240	48	11.37	11.45	11.60	11.60	11.47	11.49	10.35	9.43
802.11a	5260	52	11.40	11.65	11.32	11.26	11.20	11.20	10.34	9.18
802.11a	5280	56	11.35	11.45	11.33	11.40	11.50	11.46	10.60	9.62
802.11a	5300	60	11.92	11.87	11.79	11.72	11.82	11.72	11.10	10.05
802.11a	5320	64	12.36	12.22	12.15	12.15	12.00	11.95	11.15	10.15
802.11a	5500	100	12.10	11.95	11.91	12.00	11.80	11.85	10.80	9.95
802.11a	5520	104	12.68	12.28	12.72	12.62	12.62	12.50	11.33	10.30
802.11a	5540	108	12.60	12.53	12.45	12.70	12.30	12.30	11.10	10.12
802.11a	5560	112	12.80	12.66	12.88	12.89	12.70	12.64	11.70	10.40
802.11a	5580	116	12.71	12.73	12.80	12.81	12.66	12.60	11.85	10.50
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	12.05	11.75	11.67	11.81	11.85	11.62	11.95	10.09
802.11a	5680	136	11.55	11.60	11.66	11.69	11.61	11.40	10.85	9.80
802.11a	5700	140	11.77	11.75	11.63	11.73	11.66	11.58	11.67	9.85
802.11a	5745	149	11.75	11.66	12.00	11.99	11.98	11.90	10.91	9.90
802.11a	5765	153	12.00	12.00	11.95	11.91	12.20	12.00	11.00	9.50
802.11a	5785	157	12.30	12.20	12.05	12.40	12.00	11.92	10.25	9.30
802.11a	5805	161	12.00	12.25	12.10	12.20	12.10	12.00	10.50	10.00
802.11a	5825	165	12.15	12.10	12.00	12.20	11.90	12.00	11.00	10.20

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

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Table 14-6
IEEE 802.11n Average RF Power

Mode	Freq [MHz]	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
			6.5	13	20	26	39	52	58	65
802.11n	5180	36	11.30	11.30	12.00	11.40	11.32	10.35	9.45	5.90
802.11n	5200	40	11.25	11.00	11.35	11.07	11.10	10.32	9.33	5.85
802.11n	5220	44	10.75	10.83	10.80	10.80	10.82	10.13	9.00	5.70
802.11n	5240	48	10.96	10.80	11.05	10.92	10.80	9.83	8.75	5.65
802.11n	5260	52	11.02	10.88	11.00	10.92	10.75	9.75	8.30	5.50
802.11n	5280	56	11.20	11.05	11.25	11.12	11.00	10.20	8.50	5.82
802.11n	5300	60	11.22	11.20	11.31	11.20	11.10	10.17	8.65	5.92
802.11n	5320	64	11.30	11.01	11.32	11.30	11.23	9.76	8.90	5.80
802.11n	5500	100	11.11	11.00	11.25	11.32	11.37	9.75	8.85	5.90
802.11n	5520	104	11.20	11.25	11.33	11.45	11.32	10.39	9.00	5.85
802.11n	5540	108	11.35	11.50	11.40	11.55	11.55	10.51	9.30	6.10
802.11n	5560	112	11.42	11.55	11.49	11.50	11.62	10.61	9.40	6.34
802.11n	5580	116	11.44	11.50	11.51	11.44	11.50	10.60	9.70	6.44
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	11.02	10.95	11.15	11.27	11.11	11.16	9.15	5.88
802.11n	5680	136	11.50	11.62	11.32	11.50	11.85	11.10	9.50	6.23
802.11n	5700	140	11.60	11.64	11.72	11.95	11.90	10.80	9.70	6.60
802.11n	5745	149	11.95	11.85	12.17	12.20	12.12	12.00	9.95	6.75
802.11n	5765	153	11.76	11.75	12.00	12.00	12.04	11.07	9.80	6.65
802.11n	5785	157	11.65	11.50	11.85	11.82	11.80	10.87	9.75	6.60
802.11n	5805	161	11.62	11.62	11.80	11.81	11.75	10.81	9.70	6.40
802.11n	5825	165	11.70	11.65	11.73	11.80	11.70	10.55	9.65	6.36

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

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. 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.
- For 5 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11a were selected for SAR evaluation. 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.
- Per FCC Publication 248227 D01 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 14-1
Power Measurement Setup

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15 SYSTEM VERIFICATION

15.1 Tissue Verification

Table 15-1
Measured Tissue Properties

Tissue Type	Calibrated for Tests Performed on:	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
1900H	12/16/2011	22.7	1850	1.370	40.32	1.400	40.000	-2.14%	0.80%
			1880	1.394	40.25	1.400	40.000	-0.43%	0.63%
			1910	1.428	39.98	1.400	40.000	2.00%	-0.05%
2450H	12/16/2011	22.7	2401	1.754	39.24	1.758	39.298	-0.23%	-0.15%
			2450	1.800	39.01	1.800	39.200	0.00%	-0.48%
			2499	1.867	38.87	1.852	39.135	0.81%	-0.68%
5200H-5800H	12/06/2011	22.0	5180	4.747	35.77	4.639	36.020	2.33%	-0.69%
			5200	4.740	35.69	4.660	36.000	1.72%	-0.86%
			5320	4.872	35.51	4.780	35.880	1.92%	-1.03%
			5500	5.078	35.25	4.965	35.650	2.28%	-1.12%
			5560	5.165	35.19	5.028	35.560	2.72%	-1.04%
			5785	5.403	34.77	5.255	35.315	2.82%	-1.54%
			5800	5.442	34.72	5.270	35.300	3.26%	-1.64%
5200H-5800H	12/19/2011	24.7	5180	4.591	35.72	4.639	36.020	-1.03%	-0.83%
			5200	4.608	35.59	4.660	36.000	-1.12%	-1.14%
			5320	4.735	35.34	4.780	35.880	-0.94%	-1.51%
			5500	4.955	35.09	4.965	35.650	-0.20%	-1.57%
			5560	4.977	34.99	5.028	35.560	-1.01%	-1.60%
			5785	5.245	34.71	5.255	35.315	-0.19%	-1.71%
			5800	5.247	34.53	5.270	35.300	-0.44%	-2.18%
1900B	12/15/2011	22.5	1850	1.505	51.40	1.520	53.300	-0.99%	-3.56%
			1880	1.541	51.30	1.520	53.300	1.38%	-3.75%
			1910	1.568	51.16	1.520	53.300	3.16%	-4.02%
1900B	12/17/2011	22.7	1850	1.458	51.49	1.520	53.300	-4.08%	-3.40%
			1880	1.496	51.50	1.520	53.300	-1.58%	-3.38%
			1910	1.526	51.38	1.520	53.300	0.39%	-3.60%
2450B	12/12/2011	21.2	2401	1.958	50.49	1.903	52.765	2.89%	-4.31%
			2450	2.028	50.31	1.950	52.700	4.00%	-4.54%
			2499	2.096	50.19	2.019	52.638	3.81%	-4.65%
5200B-5800B	12/08/2011	22.8	5180	5.315	47.43	5.276	49.041	0.74%	-3.29%
			5200	5.354	47.43	5.299	49.014	1.04%	-3.23%
			5220	5.375	47.30	5.323	48.987	0.98%	-3.44%
			5260	5.422	47.36	5.369	48.906	0.99%	-3.16%
			5320	5.507	47.19	5.439	48.607	1.25%	-2.92%
			5500	5.792	46.74	5.650	48.580	2.51%	-3.79%
			5560	5.837	46.74	5.720	48.499	2.05%	-3.63%
			5785	6.181	46.38	5.982	48.242	3.33%	-3.86%
			5800	6.173	46.21	6.000	48.200	2.88%	-4.13%

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

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.

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.

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):

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

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

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15.3 Test System Verification

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

Table 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 (%)
1900	Head	12/16/2011	22.1	20.8	0.100	502	3209	3.99	40.200	39.900	-0.75%
2450	Head	12/16/2011	24.0	22.1	0.040	719	3258	2.04	53.800	51.000	-5.20%
5200	Head	12/06/2011	23.4	21.8	0.100	1057	3561	8.82	83.100	88.200	6.14%
5500	Head	12/06/2011	23.6	21.9	0.100	1057	3561	9.17	90.100	91.700	1.78%
5800	Head	12/06/2011	23.8	22.1	0.100	1057	3561	8.8	82.900	88.000	6.15%
5200	Head	12/19/2011	21.3	23.2	0.100	1057	3561	8.32	83.100	83.200	0.12%
5500	Head	12/19/2011	21.4	23.3	0.100	1057	3561	8.47	90.100	84.700	-5.99%
5800	Head	12/19/2011	21.6	23.5	0.100	1057	3561	8.45	82.900	84.500	1.93%
1900	Body	12/15/2011	21.4	21.3	0.100	502	3209	4.38	41.100	43.800	6.57%
1900	Body	12/17/2011	21.7	20.9	0.100	502	3209	4.12	41.100	41.200	0.24%
2450	Body	12/12/2011	23.4	22.1	0.040	719	3258	2.12	51.300	53.000	3.31%
5200	Body	12/08/2011	23.2	21.3	0.100	1057	3561	8.29	77.700	82.900	6.69%
5500	Body	12/08/2011	23.4	21.5	0.100	1057	3561	8.84	84.400	88.400	4.74%
5800	Body	12/08/2011	23.6	21.7	0.100	1057	3561	7.84	75.000	78.400	4.53%

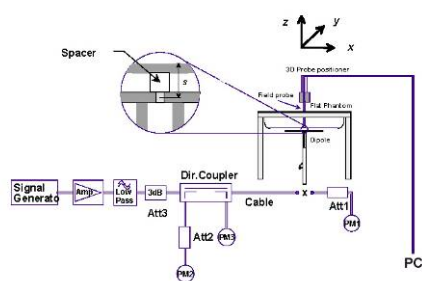


Figure 15-1
System Verification Setup Diagram



Figure 15-2
System Verification Setup Photo

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16 SAR DATA SUMMARY

16.1 Head SAR Data

Table 16-1
GSM 1900 Head SAR Results

MEASUREMENT RESULTS									
FREQUENCY		Mode/Band	Conducted Power [dBm]	Power Drift [dB]	Target Conducted Power (dBm)	Side	Test Position	Serial Number	SAR (1g)
MHz	Ch.								(W/kg)
1880.00	661	GSM 1900	29.05	-0.02	29.00	Right	Touch	FCC#1	0.025
1880.00	661	GSM 1900	29.05	0.03	29.00	Right	Tilt	FCC#1	0.023
1880.00	661	GSM 1900	29.05	-0.08	29.00	Left	Touch	FCC#1	0.022
1880.00	661	GSM 1900	29.05	-0.06	29.00	Left	Tilt	FCC#1	0.028
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Head 1.6 W/kg (mW/g) averaged over 1 gram			

Table 16-2
2.4 GHz WLAN Head SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Serial Number	Data Rate (Mbps)	SAR (1g)
MHz	Ch.									(W/kg)
2412	1	IEEE 802.11b	DSSS	14.45	0.08	Right	Touch	FCC#2	1	0.133
2412	1	IEEE 802.11b	DSSS	14.45	-0.07	Right	Tilt	FCC#2	1	0.079
2412	1	IEEE 802.11b	DSSS	14.45	0.11	Left	Touch	FCC#2	1	0.030
2412	1	IEEE 802.11b	DSSS	14.45	0.12	Left	Tilt	FCC#2	1	0.017
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Head 1.6 W/kg (mW/g) averaged over 1 gram				

Table 16-3
5.8 GHz WLAN Head SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Serial Number	Data Rate (Mbps)	SAR (1g)
MHz	Ch.									(W/kg)
5785	157	IEEE 802.11a	OFDM	12.30	0.18	Right	Touch	FI-295-H	6	0.089
5785	157	IEEE 802.11a	OFDM	12.30	-0.16	Right	Tilt	FI-295-H	6	0.039
5785	157	IEEE 802.11a	OFDM	12.30	0.10	Left	Touch	FI-295-H	6	0.095
5785	157	IEEE 802.11a	OFDM	12.30	0.15	Left	Tilt	FI-295-H	6	0.041
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Head 1.6 W/kg (mW/g) averaged over 1 gram				

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Table 16-4
5.2 GHz WLAN Head SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Serial Number	Data Rate (Mbps)	SAR (1g)
MHz	Ch.									(W/kg)
5180	36	IEEE 802.11a	OFDM	11.90	0.15	Right	Touch	FI-295-H	6	0.183
5180	36	IEEE 802.11a	OFDM	11.90	0.10	Right	Tilt	FI-295-H	6	0.095
5180	36	IEEE 802.11a	OFDM	11.90	0.15	Left	Touch	FI-295-H	6	0.095
5180	36	IEEE 802.11a	OFDM	11.90	0.04	Left	Tilt	FI-295-H	6	0.021
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Head 1.6 W/kg (mW/g) averaged over 1 gram				

Table 16-5
5.3 GHz WLAN Head SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Serial Number	Data Rate (Mbps)	SAR (1g)
MHz	Ch.									(W/kg)
5320	64	IEEE 802.11a	OFDM	12.36	0.11	Right	Touch	FI-295-H	6	0.163
5320	64	IEEE 802.11a	OFDM	12.36	0.11	Right	Tilt	FI-295-H	6	0.085
5320	64	IEEE 802.11a	OFDM	12.36	-0.15	Left	Touch	FI-295-H	6	0.101
5320	64	IEEE 802.11a	OFDM	12.36	0.03	Left	Tilt	FI-295-H	6	0.027
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Head 1.6 W/kg (mW/g) averaged over 1 gram				

Table 16-6
5.5 GHz WLAN Head SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Serial Number	Data Rate (Mbps)	SAR (1g)
MHz	Ch.									(W/kg)
5560	112	IEEE 802.11a	OFDM	12.80	-0.20	Right	Touch	FI-295-H	6	0.103
5560	112	IEEE 802.11a	OFDM	12.80	0.19	Right	Tilt	FI-295-H	6	0.038
5560	112	IEEE 802.11a	OFDM	12.80	-0.12	Left	Touch	FI-295-H	6	0.082
5560	112	IEEE 802.11a	OFDM	12.80	0.14	Left	Tilt	FI-295-H	6	0.023
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Head 1.6 W/kg (mW/g) averaged over 1 gram				

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16.2 Body SAR Data

Table 16-7
GSM 1900 Body SAR Results

MEASUREMENT RESULTS											
FREQUENCY		Mode	Service	Measured Conducted Power [dBm]	Power Drift [dB]	Target Conducted Power [dBm]	Spacing	Serial Number	# of GSM slots	Side	SAR (1g)
MHz	Ch.										(W/kg)
1880.00	661	GSM 1900	GSM	22.99	-0.03	22.5	0.0 cm	FI-295-F	1	back*	0.506
1880.00	661	GSM 1900	GSM	29.05	-0.03	29.0	1.0 cm	FCC#1	1	back	0.209
1880.00	661	GSM 1900	GSM	22.99	-0.01	22.5	0.0 cm	FI-295-F	1	bottom*	0.105
1880.00	661	GSM 1900	GSM	29.05	0.00	29.0	0.5 cm	FCC#1	1	bottom	0.216
1880.00	661	GSM 1900	GSM	29.05	0.10	29.0	0.0 cm	FCC#1	1	right	0.208
1880.00	661	GSM 1900	GSM	29.05	0.01	29.0	0.0 cm	FCC#1	1	vertex, 45°	0.211
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram				

Table 16-8
GPRS 1900 Body SAR Results

MEASUREMENT RESULTS											
FREQUENCY		Mode	Service	Measured Conducted Power [dBm]	Power Drift [dB]	Target Conducted Power [dBm]	Spacing	Serial Number	# of GPRS Slots	Side	SAR (1g)
MHz	Ch.										(W/kg)
1880.00	661	GSM 1900	GPRS	21.20	0.15	21.0	0.0 cm	FI-295-F	2	back*	0.432
1880.00	661	GSM 1900	GPRS	19.01	0.15	19.0	0.0 cm	FI-295-F	3	back*	0.451
1880.00	661	GSM 1900	GPRS	24.64	-0.11	24.5	1.0 cm	FCC#1	4	back	0.307
1880.00	661	GSM 1900	GPRS	19.01	-0.01	19.0	0.0 cm	FI-295-F	3	bottom*	0.130
1880.00	661	GSM 1900	GPRS	24.64	-0.15	24.5	0.5 cm	FCC#1	4	bottom	0.290
1880.00	661	GSM 1900	GPRS	27.62	0.11	27.5	0.0 cm	FCC#1	2	right	0.313
1880.00	661	GSM 1900	GPRS	25.44	-0.06	25.5	0.0 cm	FCC#1	3	right	0.316
1880.00	661	GSM 1900	GPRS	24.64	0.04	24.5	0.0 cm	FCC#1	4	right	0.344
1880.00	661	GSM 1900	GPRS	24.64	-0.10	24.5	0.0 cm	FCC#1	4	vertex, 45°	0.355
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram				

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Table 16-9
2.4 and 5 GHz WLAN Body SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Serial Number	Data Rate (Mbps)	Side	SAR (1g)
MHz	Ch.									(W/kg)
2412	1	IEEE 802.11b	DSSS	14.45	0.06	0.0 cm	FCC#2	1	back	0.392
2412	1	IEEE 802.11b	DSSS	14.45	-0.03	0.0 cm	FCC#2	1	top	0.027
2412	1	IEEE 802.11b	DSSS	14.45	0.21	0.0 cm	FCC#2	1	left	0.180
5785	157	IEEE 802.11a	OFDM	12.30	0.18	0.0 cm	FI-295-H	6	back	0.245
5785	157	IEEE 802.11a	OFDM	12.30	-0.14	0.0 cm	FI-295-H	6	top	0.058
5785	157	IEEE 802.11a	OFDM	12.30	-0.02	0.0 cm	FI-295-H	6	left	0.059
5180	36	IEEE 802.11a	OFDM	11.90	0.02	0.0 cm	FI-295-H	6	back	0.560
5220	44	IEEE 802.11a	OFDM	11.48	-0.12	0.0 cm	FI-295-H	6	back	0.319
5180	36	IEEE 802.11a	OFDM	11.90	0.10	0.0 cm	FI-295-H	6	top	0.185
5180	36	IEEE 802.11a	OFDM	11.90	-0.13	0.0 cm	FI-295-H	6	left	0.150
5260	52	IEEE 802.11a	OFDM	11.40	0.00	0.0 cm	FI-295-H	6	back	0.329
5320	64	IEEE 802.11a	OFDM	12.36	0.12	0.0 cm	FI-295-H	6	back	0.505
5320	64	IEEE 802.11a	OFDM	12.36	0.13	0.0 cm	FI-295-H	6	top	0.207
5320	64	IEEE 802.11a	OFDM	12.36	-0.12	0.0 cm	FI-295-H	6	left	0.144
5560	112	IEEE 802.11a	OFDM	12.80	-0.14	0.0 cm	FI-295-H	6	back	0.374
5560	112	IEEE 802.11a	OFDM	12.80	0.11	0.0 cm	FI-295-H	6	top	0.088
5560	112	IEEE 802.11a	OFDM	12.80	0.09	0.0 cm	FI-295-H	6	left	0.060
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Body 1.6 W/kg (mW/g) averaged over 1 gram				

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16.3 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. Per KDB publication 447498 4) b) i) the back side is required to be tested touching the flat phantom.
3. This device is capable of multiple display orientations supporting both portrait and landscape positions. Therefore per KDB publication 447498 4) b) ii) (2), SAR testing applies for the tablet edges with antennas located within 5 cm of each tablet edge closest to the user. According to KDB publication 447498 4) b) ii) (2), for each antenna, SAR is only required for the edge with the most conservative exposure condition.
4. Batteries are fully charged for all readings.
5. Tissue parameters and temperatures are listed on the SAR plots.
6. Liquid tissue depth was at least 15.0 cm.
7. 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 probe, DAE, and liquid as the SAR tests in the same time period.
8. Head SAR testing was required for this tablet because it has a speaker/receiver and a microphone positioned in a way that allows for a held-to-ear configuration usage.
9. Mouth – Jaw SAR tests were not required for this tablet because the radiation pattern of this device was fully captured when using the standard touch positioning described in Section 9.
10. Head SAR was evaluated at maximum power to represent the most conservative scenario.

GSM Notes:

1. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (June 2001) and Public Notice DA-02-1438, if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
2. Justification for reduced test configurations per KDB Publication 941225 D03: The source-based time-averaged output power was evaluated for all multi-slot operations. In addition to the worst-case reported, all source-based time-averaged powers within 10% of the worst-case were additionally included in the evaluation for data modes.
3. Asterisk (*) denotes power reduction activated.
4. Per April 2011 TCB-FCC Workshop Notes, in addition to the 0 mm test distance required for tablet devices under KDB 447498, a conservative additional test distance of 10 mm from the back and 5 mm from the bottom edge were tested for SAR at maximum output power with the sensor deactivated. See Section 12.4 for more details.
5. In accordance with recent instructions received from the FCC regarding similar corner antenna configurations, the SAR for the bottom-right corner of the tablet was assessed for compliance. To represent a conservative scenario, vertex testing was performed at 45 degrees with sample FCC #1, which had power reduction disabled via software, to ensure the device was always transmitting at maximum power (regardless of the angle between the EUT and the user).

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WLAN Notes:

1. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Meeting Notes: Highest average RF output power channel for the lowest data rate were selected for SAR evaluation (as the default channel). Other IEEE 802.11 modes (including 802.11g/n and higher data rates) were not investigated since the average output powers were not greater than 0.25 dB than that of the corresponding channel in the lowest data rate IEEE 802.11b modes.
2. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Meeting Notes: Highest average RF output power channel for the lowest data rate were selected for SAR evaluation as the default channel. Other IEEE 802.11 modes (including 802.11n and higher data rates) were not investigated since the average output powers were not greater than 0.25 dB than that of the corresponding channel in the lowest data rate IEEE 802.11a modes.
3. There is no power reduction for WIFI.
4. Per FCC Publication 248227 D01 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 (see Table 16-9 for channels additionally tested for 5.2 and 5.3 GHz WIFI).

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17 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

17.1 Multiple Antenna/Transmission Information

The separation between the main antenna and the Bluetooth antenna is 82 mm. The separation between the main antenna and the WLAN antenna is 186.62 mm.

RF Conducted Power of Bluetooth Tx is 7.523 mW. RF Conducted Power of WLAN is 28.31 mW.

17.2 Simultaneous Transmission Analysis

This device contains multiple transmitters that may operate simultaneously and therefore, require a simultaneous transmission analysis according to KDB Publication 447498 4) b) iii) procedures. The tablet procedures required by KDB Publication 447498 generally do not require separate hotspot mode testing.

2.4 GHz and 5 GHz WIFI cannot transmit simultaneously since it shares the same circuit path and are switched by the radio.

The RF conducted power of Bluetooth is 7.523 mW. Per KDB Publication 447498, SAR tests are not required for Bluetooth and are 0 W/kg for summation purposes.

When Hotspot is enabled, all 5 GHz bands are disabled. Therefore there is no simultaneous transmission with 5 GHz WIFI for data modes.

Table 17-1
Simultaneous Transmission Scenario with Voice and 2.4 GHz WIFI (Held to Ear)

Simult Tx	Configuration	GSM 1900 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.025	0.133	0.158
	Right Tilt	0.023	0.079	0.102
	Left Cheek	0.022	0.030	0.052
	Left Tilt	0.028	0.017	0.045

The above table represents a held to ear voice call potentially simultaneously operating with 2.4 GHz WLAN.

Table 17-2
Simultaneous Transmission Scenario with Voice and 5 GHz WIFI (Held to Ear)

Simult Tx	Configuration	GSM 1900 SAR (W/kg)	5 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.025	0.183	0.208
	Right Tilt	0.023	0.095	0.118
	Left Cheek	0.022	0.101	0.123
	Left Tilt	0.028	0.041	0.069

The above table represents a held to ear voice call potentially simultaneously operating with 5 GHz WLAN.

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Table 17-3
Simultaneous Transmission Scenarios with Voice and 2.4 GHz WIFI at 0.0 cm

Simult Tx	Configuration	GSM 1900 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.506	0.392	0.898
	Front	-	-	0.000
	Top	-	0.027	0.027
	Bottom	0.105	-	0.105
	Right	0.208	-	0.208
	Left	-	0.180	0.180

Notes:

1. The above table represents a voice call potentially simultaneously operating with 2.4 GHz WLAN.
2. “-” SAR results shown in the tables are zero for summation purposes. SAR was not required to be measured due to exclusions mentioned in Section 1.3.

Table 17-4
Simultaneous Transmission Scenarios with Voice and 2.4 GHz WIFI at 1.0 cm

Configuration	Mode	GSM 1900 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Back Side at 1.0 cm	GSM 1900	0.209	< 0.392	< 0.601

Notes:

1. The above table represents a voice call potentially simultaneously operating with 2.4 GHz WLAN.
2. SAR was additionally evaluated at 1.0 cm from the back side due to proximity sensor (see Section 12.4).
3. For SAR calculations at 1.0 cm, WLAN SAR values for 0.0 cm were used since the 0.0 cm test distance for WLAN was more conservative. “<” denotes the 0.0 cm WLAN SAR values used for summation purposes.

Table 17-5
Simultaneous Transmission Scenarios with Voice and 2.4 GHz WIFI at 0.5 cm

Configuration	Mode	GSM 1900 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Bottom Edge at 0.5 cm	GSM 1900	0.216	-	0.216

Notes:

1. The above table represents a voice call potentially simultaneously operating with 2.4 GHz WLAN.
2. SAR was additionally evaluated at 0.5 cm from the bottom edge due to proximity sensors (see Section 12.4). “-” SAR results shown in the tables are zero for summation purposes. SAR was not required to be measured due to exclusions mentioned in Section 1.3.

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Table 17-6
Simultaneous Transmission Scenarios with Voice and 5 GHz WIFI at 0.0 cm

Simult Tx	Configuration	GSM 1900 SAR (W/kg)	5 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.506	0.560	1.066
	Front	-	-	0.000
	Top	-	0.207	0.207
	Bottom	0.105	-	0.105
	Right	0.208	-	0.208
	Left	-	0.150	0.150

Notes:

1. The above table represents a voice call potentially simultaneously operating with 5 GHz WLAN.
2. "-" SAR results shown in the tables are zero for summation purposes. SAR was not required to be measured due to exclusions mentioned in Section 1.3.

Table 17-7
Simultaneous Transmission Scenarios with Voice and 5 GHz WIFI at 1.0 cm

Configuration	Mode	GSM 1900 SAR (W/kg)	5 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Back Side at 1.0 cm	GSM 1900	0.209	< 0.56	< 0.769

Notes:

1. The above table represents a voice call potentially simultaneously operating with 5 GHz WLAN.
2. SAR was additionally evaluated at 1.0 cm from the back side due to proximity sensors (see Section 12.4).
3. For SAR calculations at 1.0 cm, WLAN SAR values for 0.0 cm were used since the 0.0 cm test distance for WLAN was more conservative. "<" denotes the 0.0 cm WLAN SAR values used for summation purposes.

Table 17-8
Simultaneous Transmission Scenarios with Voice and 5 GHz WIFI at 0.5 cm

Configuration	Mode	GSM 1900 SAR (W/kg)	5 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Bottom Edge at 0.5 cm	GSM 1900	0.216	-	0.216

Notes:

1. The above tables represent a voice call potentially simultaneously operating with 5 GHz WLAN.
2. SAR was additionally evaluated at 0.5 cm from the bottom edge due to proximity sensors (see Section 12.4). "-" SAR results shown in the tables are zero for summation purposes. SAR was not required to be measured due to exclusions mentioned in Section 1.3.

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Table 17-9
Simultaneous Transmission Scenarios with Portable Hotspot at 0.0 cm

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.451	0.392	0.843
	Front	-	-	0.000
	Top	-	0.027	0.027
	Bottom	0.130	-	0.130
	Right	0.344	-	0.344
	Left	-	0.180	0.180

Notes:

1. The above table represents a portable hotspot scenario.
2. “-” SAR results shown in the tables are zero for summation purposes. SAR was not required to be measured due to exclusions mentioned in Section 1.3.
3. When Hotspot mode is active, all 5 GHz WIFI bands are disabled by manufacturer software. Therefore, the 5 GHz operations are not considered for Hotspot SAR and hence also in the above tables.

Table 17-10
Simultaneous Transmission Scenarios with Portable Hotspot at 1.0 cm

Configuration	Mode	GPRS 1900 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Back Side at 1.0 cm	GPRS 1900	0.307	< 0.392	< 0.699

Notes:

1. The above table represents a portable hotspot scenario.
2. SAR was additionally evaluated at 1.0 cm from the back side due to proximity sensors (see Section 12.4).
3. For SAR calculations at 1.0 cm, WLAN SAR values for 0.0 cm were used since the 0.0 cm test distance for WLAN was more conservative. “<” denotes the 0.0 cm WLAN SAR values used for summation purposes.
4. When Hotspot mode is active, all 5 GHz WIFI bands are disabled by manufacturer software. Therefore, the 5 GHz operations are not considered for Hotspot SAR and hence also in the above table.

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Table 17-11
Simultaneous Transmission Scenarios with Portable Hotspot at 0.5 cm

Configuration	Mode	GPRS 1900 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Bottom Edge at 0.5 cm	GPRS 1900	0.290	-	0.290

Notes:

1. The above tables represent a portable hotspot scenario.
2. SAR was additionally evaluated at 0.5 cm from the bottom side due to proximity sensors (see Section 11.6).
3. “-” SAR results shown in the tables are zero for summation purposes. SAR was not required to be measured due to exclusions mentioned in Section 1.3.
4. When Hotspot mode is active, all 5 GHz WIFI bands are disabled by manufacturer software. Therefore, the 5 GHz operations are not considered for Hotspot SAR and hence also in the above table.

17.3 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 447498.

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18 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	8753E	(30kHz-6GHz) Network Analyzer	4/21/2011	Annual	4/21/2012	JP38020182
Agilent	E5515C	Wireless Communications Test Set	10/10/2011	Annual	10/10/2012	GB46110872
Agilent	E5515C	Wireless Communications Test Set	7/6/2011	Annual	7/6/2012	GB41450275
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/8/2011	Annual	4/8/2012	MY45470194
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
Pasternack	PE2208-6	Bidirectional Coupler	N/A		N/A	N/A
Pasternack	PE2209-10	Bidirectional Coupler	N/A		N/A	N/A
Rohde & Schwarz	CMU200	Base Station Simulator	6/1/2011	Annual	6/1/2012	833855/0010
Rohde & Schwarz	CMU200	Base Station Simulator	4/19/2011	Annual	4/19/2012	107826
Rohde & Schwarz	NRVD	Dual Channel Power Meter	4/8/2011	Biennial	4/8/2013	101695
SPEAG	D1900V2	1900 MHz SAR Dipole	2/17/2011	Annual	2/17/2012	502
SPEAG	D2450V2	2450 MHz SAR Dipole	8/19/2011	Annual	8/19/2012	719
SPEAG	D5GHzV2	5 GHz SAR Dipole	2/11/2011	Annual	2/11/2012	1057
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/20/2011	Annual	4/20/2012	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/21/2011	Annual	2/21/2012	649
SPEAG	EX3DV4	SAR Probe	7/27/2011	Annual	7/27/2012	3561
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/19/2011	Annual	5/19/2012	859
SPEAG	ES3DV3	SAR Probe	4/18/2011	Annual	4/18/2012	3209
Rohde & Schwarz	SMIQ03B	Signal Generator	4/6/2011	Annual	4/6/2012	DE27259
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/25/2011	Annual	8/25/2012	100976
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	5318
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	5442
Anritsu	ML2438A	Power Meter	2/7/2011	Annual	2/7/2012	1190013
Anritsu	ML2438A	Power Meter	2/7/2011	Annual	2/7/2012	98150041
Agilent	8648D	Signal Generator	4/5/2011	Annual	4/5/2012	3629U00687
Anritsu	ML2438A	Power Meter	2/7/2011	Annual	2/7/2012	1070030
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	5821
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	8013
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	5605
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	2400
Agilent	E5515C	Wireless Communications Test Set	7/6/2011	Annual	7/6/2012	GB43304447
Agilent	E5515C	Wireless Communications Tester	4/21/2011	Annual	4/21/2012	US41140256
Amplifier Research	5S1G4	5W, 800MHz-4.2GHz	N/A		N/A	21910
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	N/A		N/A	N/A
Agilent	E5515C	Wireless Communications Test Set	2/8/2011	Annual	2/8/2012	GB45360985
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	10/7/2011	Annual	10/7/2012	103962
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331322
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331323
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331330
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331332
Control Company	61220-416	Long-Stem Thermometer	3/16/2011	Biennial	3/16/2013	111391601
VWR	36934-158	Wall-Mounted Thermometer	1/21/2011	Biennial	1/21/2013	111286445
VWR	36934-158	Wall-Mounted Thermometer	1/21/2011	Biennial	1/21/2013	111286460
VWR	36934-158	Wall-Mounted Thermometer	5/26/2010	Biennial	5/26/2012	101718589
VWR	36934-158	Wall-Mounted Thermometer	1/21/2011	Biennial	1/21/2013	111286454
VWR	36934-158	Wall-Mounted Thermometer	2/26/2010	Biennial	2/26/2012	101536273
SPEAG	ES3DV3	SAR Probe	4/8/2011	Annual	4/8/2012	3258
MiniCircuits	SLP-2400+	Low Pass Filter	N/A		N/A	R8979500903
Narda	4772-3	Attenuator (3dB)	N/A		N/A	9406
Narda	BW-S3W2	Attenuator (3dB)	N/A		N/A	120
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/5/2011	Annual	8/5/2012	112347
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	N/A		N/A	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	N/A		N/A	N/A
Anritsu	MT8820C	Radio Communication Tester	11/11/2011	Annual	11/11/2012	6200901190
MiniCircuits	VLF-6000+	Low Pass Filter	N/A			N/A
MiniCircuits	VLF-6000+	Low Pass Filter	N/A			N/A

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19 MEASUREMENT UNCERTAINTIES

Applicable for up to 3GHz.

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
Expanded Uncertainty (95% CONFIDENCE LEVEL)							k=2	24.2	23.5
									299

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

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Applicable for less than 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
Expanded Uncertainty (95% CONFIDENCE LEVEL)							k=2	24.7	24.0

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

FCC ID: A3LSHVE150S		SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
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20.1 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]

FCC ID: A3LSHVE150S		SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
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APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#1

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900 Head; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 40.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 12-16-2011; Ambient Temp: 22.1°C; Tissue Temp: 20.8° C

Probe: ES3DV3 - SN3209; ConvF(5.11, 5.11, 5.11); Calibrated: 4/18/2011

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: GSM 1900, Right Head, Touch, Mid.ch

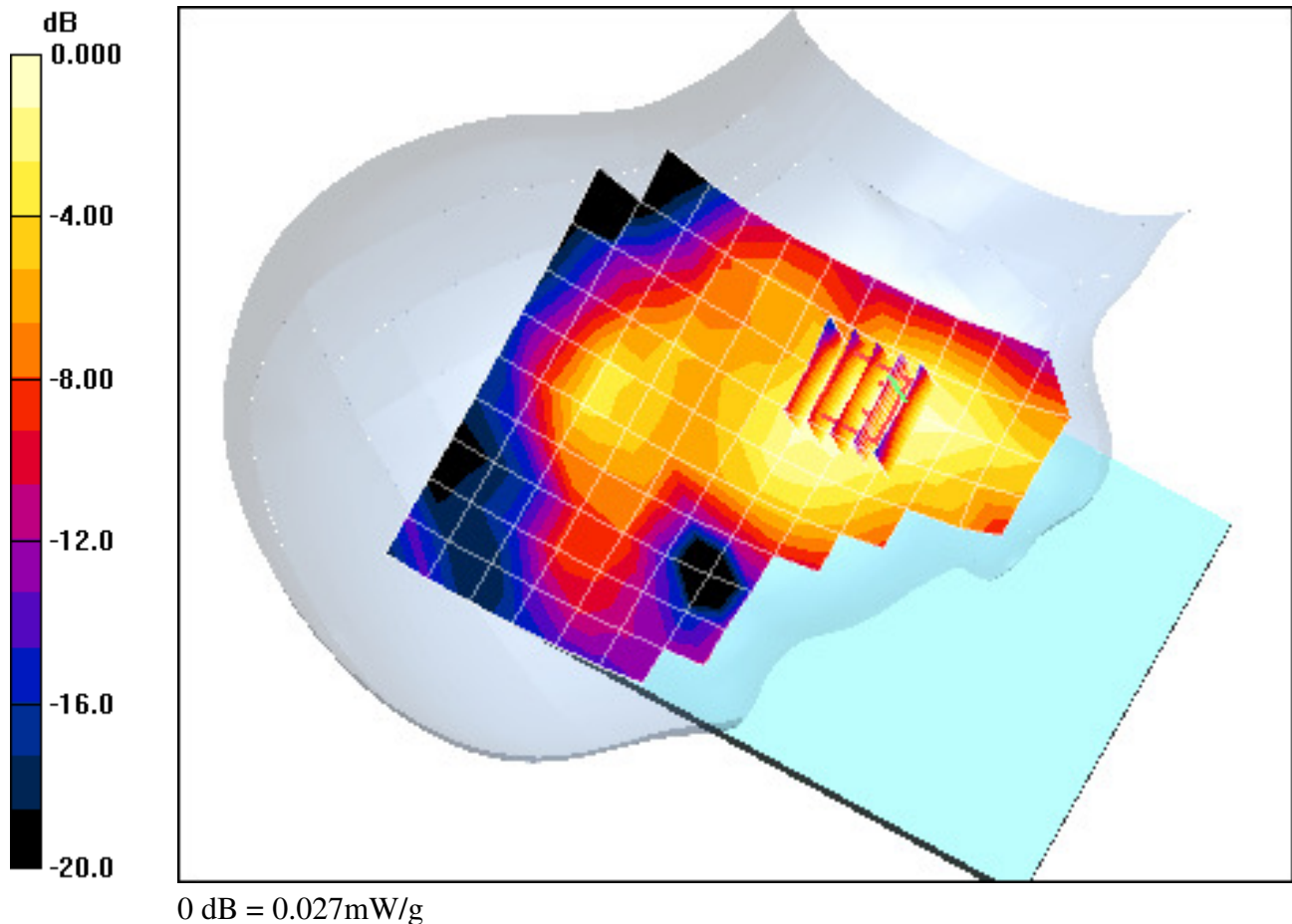
Area Scan (11x16x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 4.44 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 0.035 W/kg

SAR(1 g) = 0.025 mW/g; SAR(10 g) = 0.017 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#1

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900 Head; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 40.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 12-16-2011; Ambient Temp: 22.1°C; Tissue Temp: 20.8° C

Probe: ES3DV3 - SN3209; ConvF(5.11, 5.11, 5.11); Calibrated: 4/18/2011

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: GSM 1900, Right Head, Tilt, Mid.ch

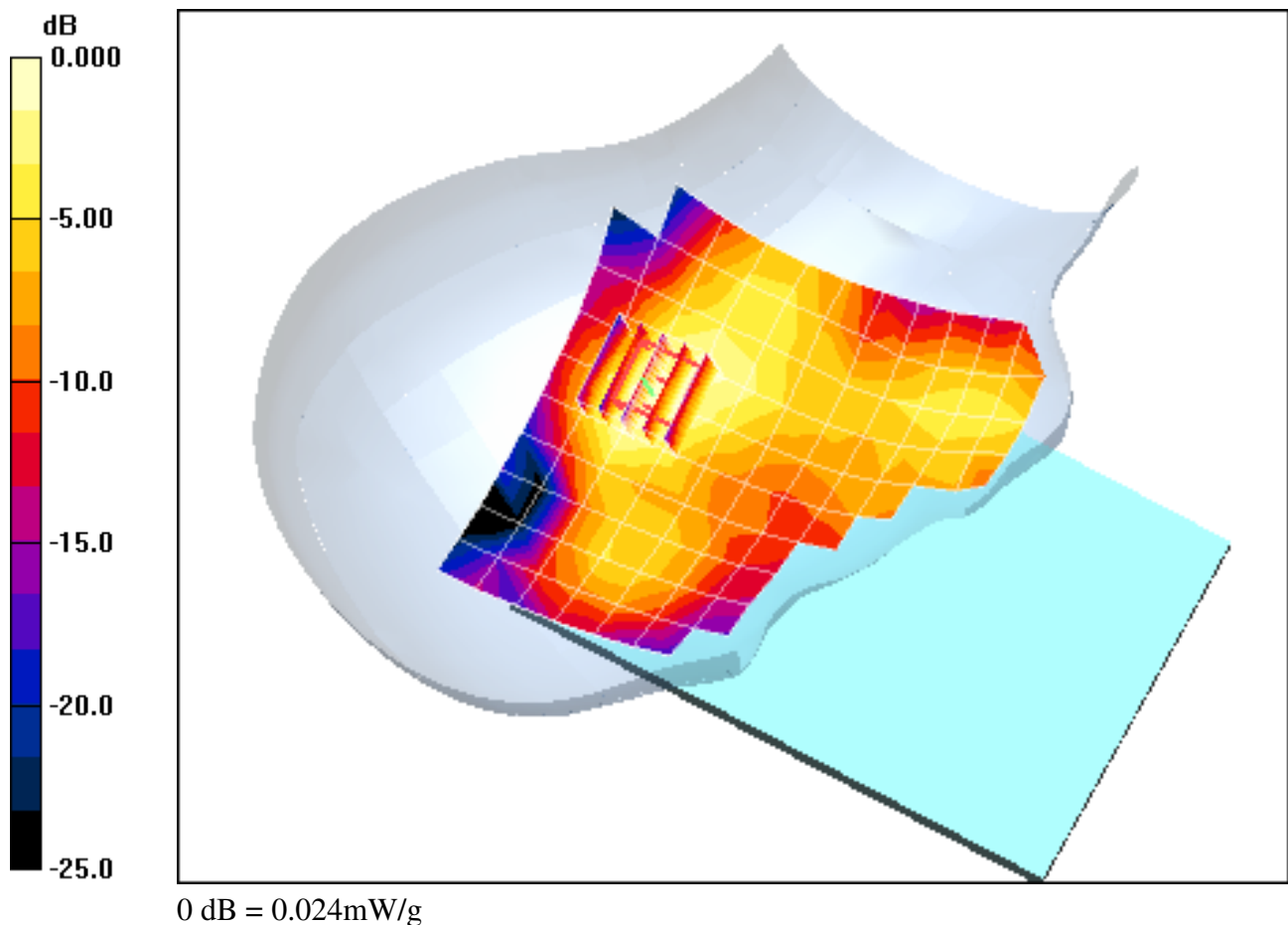
Area Scan (11x16x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 4.14 V/m; Power Drift = 0.026 dB

Peak SAR (extrapolated) = 0.038 W/kg

SAR(1 g) = 0.023 mW/g; SAR(10 g) = 0.013 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#1

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900 Head; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 40.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 12-16-2011; Ambient Temp: 22.1°C; Tissue Temp: 20.8° C

Probe: ES3DV3 - SN3209; ConvF(5.11, 5.11, 5.11); Calibrated: 4/18/2011

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: GSM 1900, Left Head, Touch, Mid.ch

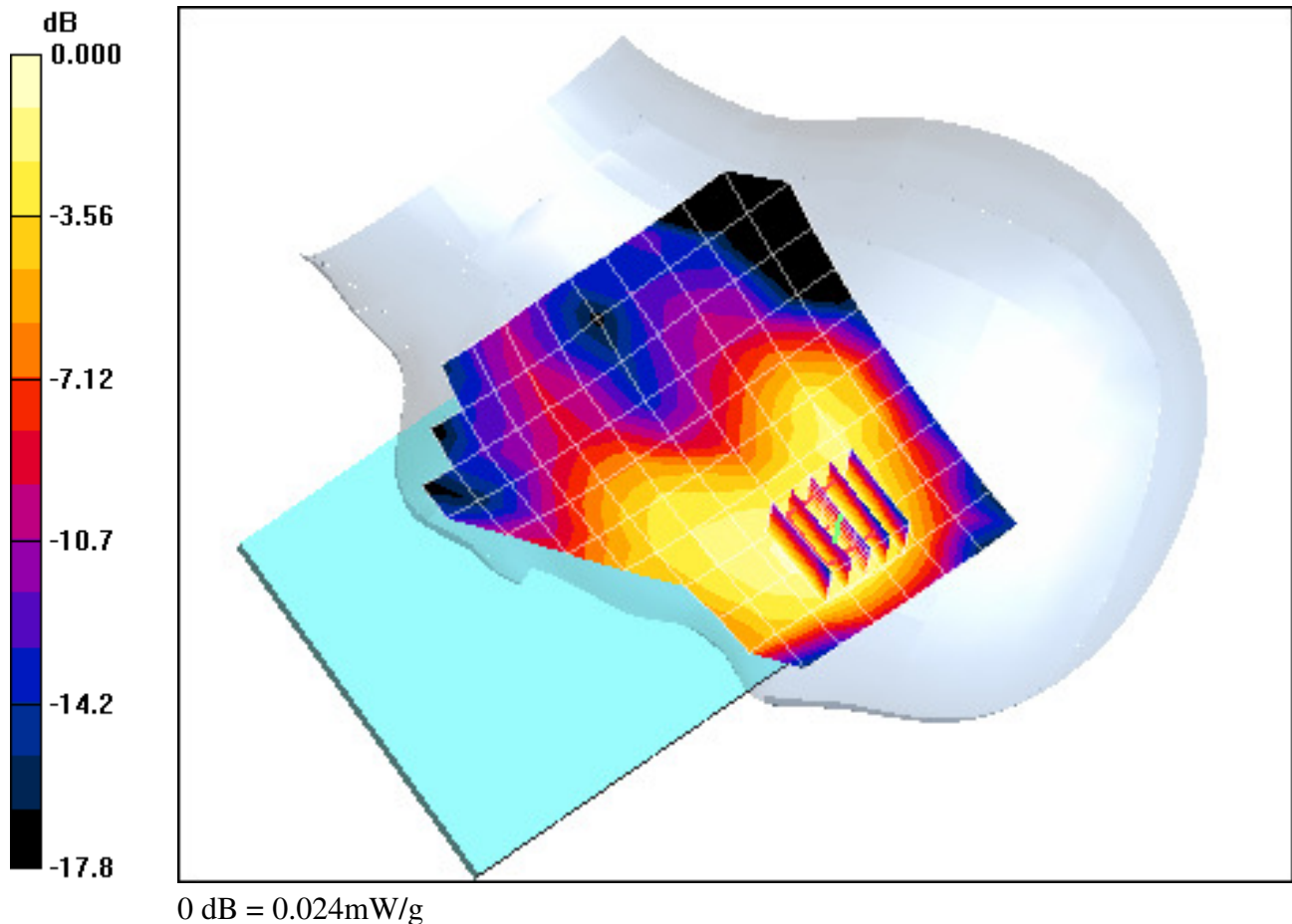
Area Scan (11x16x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 4.09 V/m; Power Drift = -0.080 dB

Peak SAR (extrapolated) = 0.034 W/kg

SAR(1 g) = 0.022 mW/g; SAR(10 g) = 0.014 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#1

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900 Head; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 40.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 12-16-2011; Ambient Temp: 22.1°C; Tissue Temp: 20.8° C

Probe: ES3DV3 - SN3209; ConvF(5.11, 5.11, 5.11); Calibrated: 4/18/2011

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: GSM 1900, Left Head, Tilt, Mid.ch

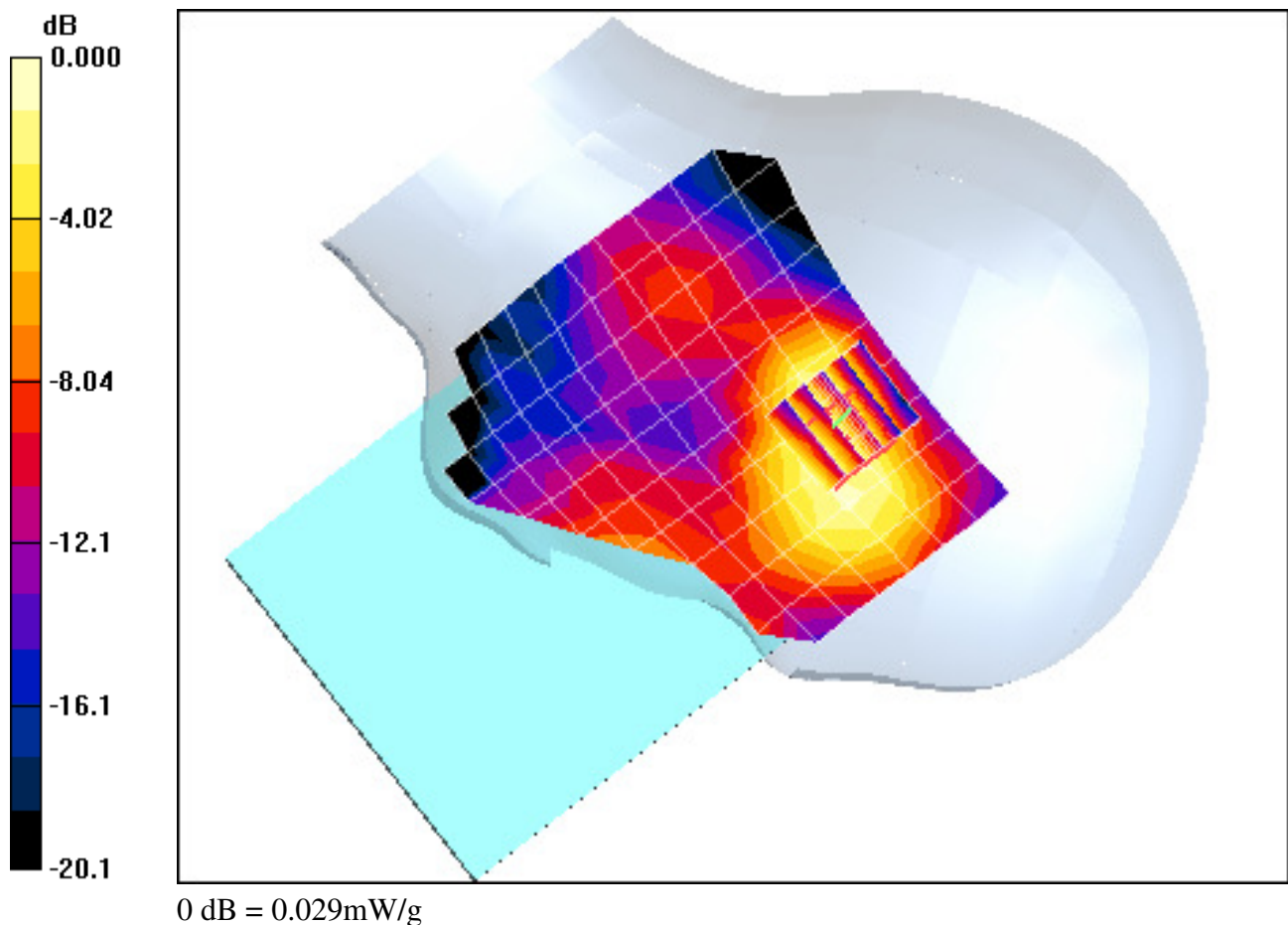
Area Scan (11x16x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 4.59 V/m; Power Drift = -0.056 dB

Peak SAR (extrapolated) = 0.049 W/kg

SAR(1 g) = 0.028 mW/g; SAR(10 g) = 0.017 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#2

Communication System: IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Head; Medium parameters used (interpolated):

$f = 2412 \text{ MHz}$; $\sigma = 1.76 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 12-16-2011; Ambient Temp: 24.0°C; Tissue Temp: 22.1°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, Right Head, Touch, Ch 01, 1 Mbps

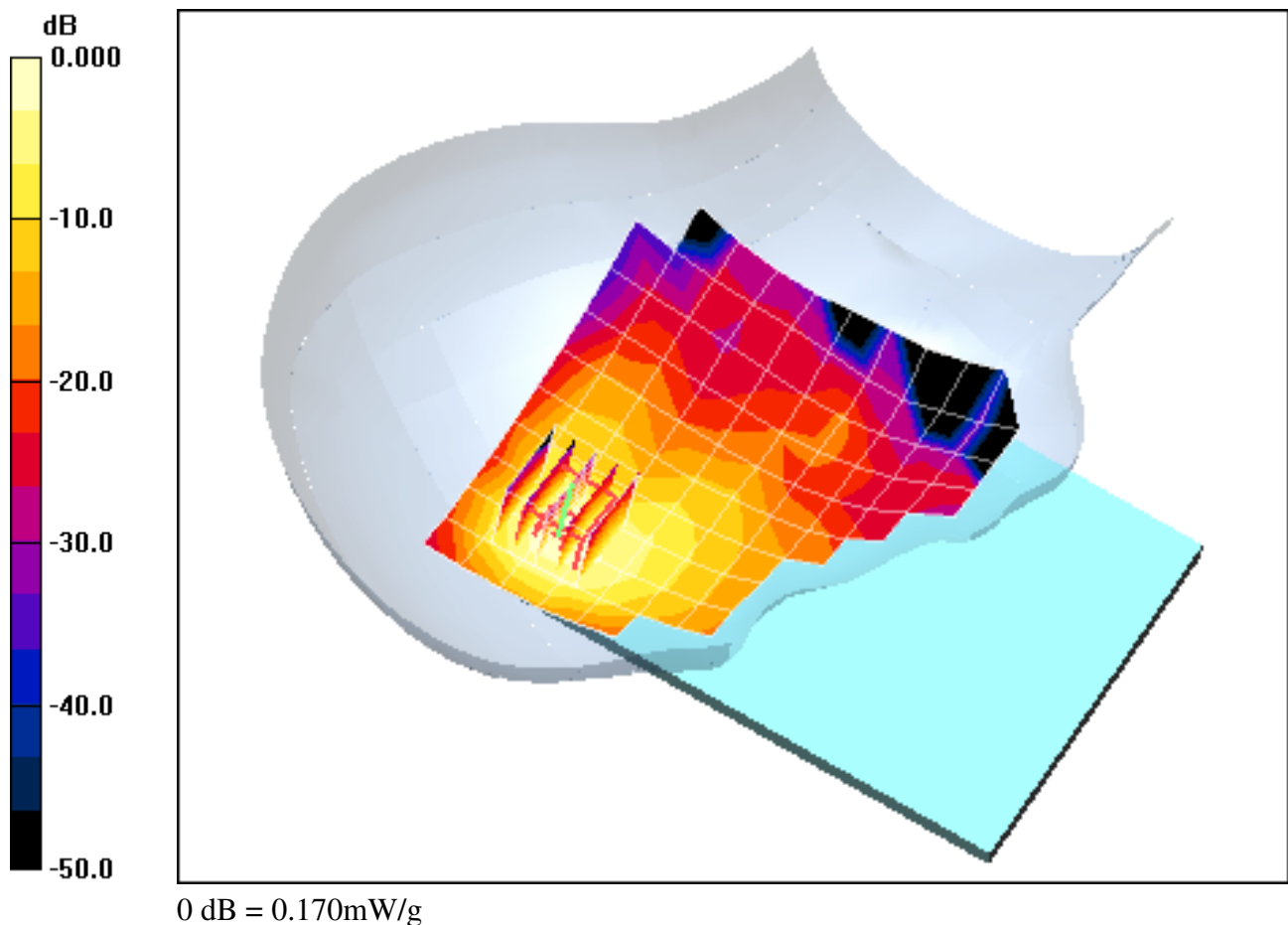
Area Scan (11x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 9.10 V/m; Power Drift = 0.080 dB

Peak SAR (extrapolated) = 0.261 W/kg

SAR(1 g) = 0.133 mW/g; SAR(10 g) = 0.066 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#2

Communication System: IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Head; Medium parameters used (interpolated):

$f = 2412 \text{ MHz}$; $\sigma = 1.76 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 12-16-2011; Ambient Temp: 24.0°C; Tissue Temp: 22.1°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, Right Head, Tilt, Ch 01, 1 Mbps

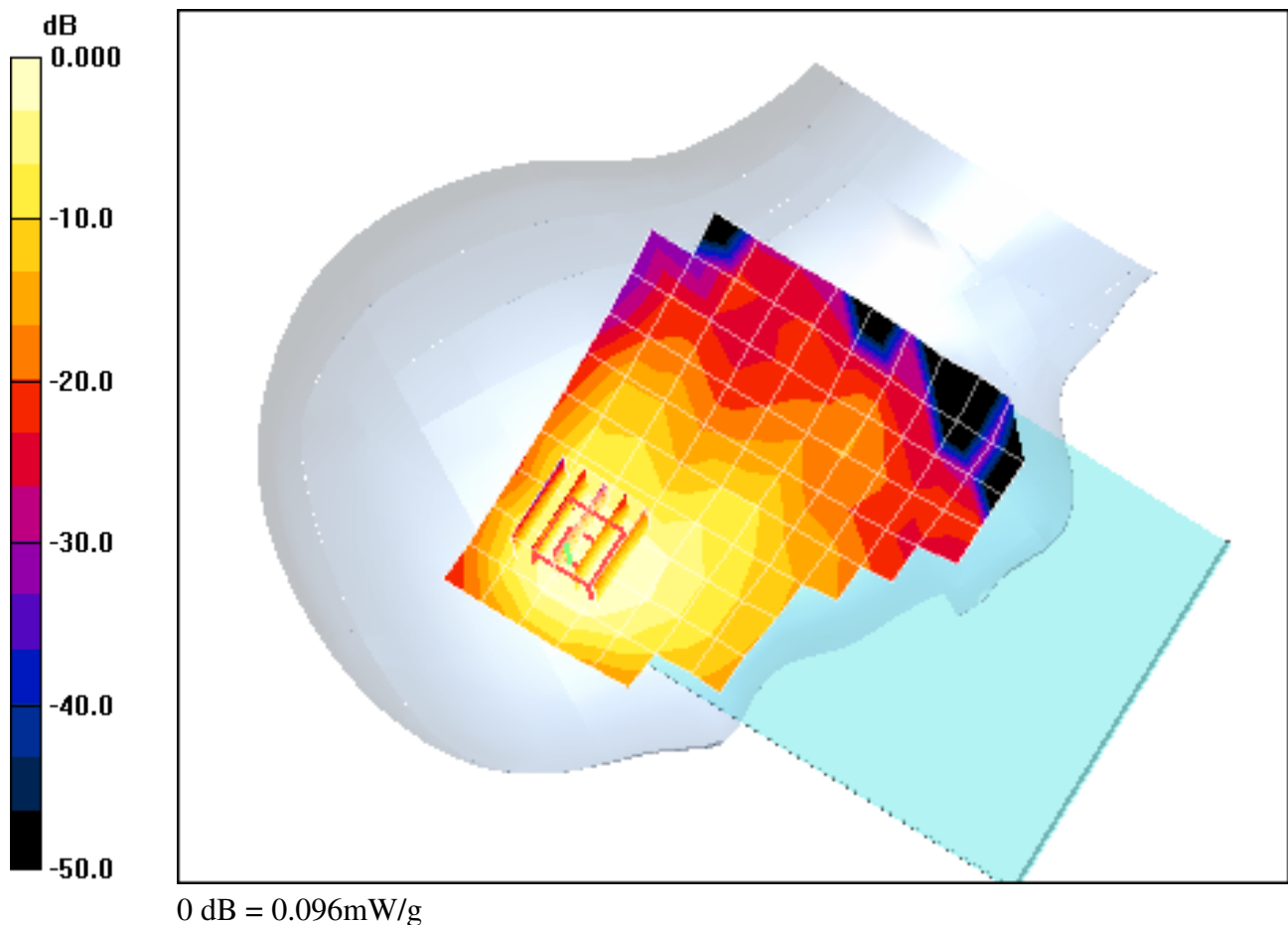
Area Scan (11x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 6.91 V/m; Power Drift = -0.072 dB

Peak SAR (extrapolated) = 0.155 W/kg

SAR(1 g) = 0.079 mW/g; SAR(10 g) = 0.039 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#2

Communication System: IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Head; Medium parameters used (interpolated):

$f = 2412 \text{ MHz}$; $\sigma = 1.76 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 12-16-2011; Ambient Temp: 24.0°C; Tissue Temp: 22.1°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, Left Head, Touch, Ch 01, 1 Mbps

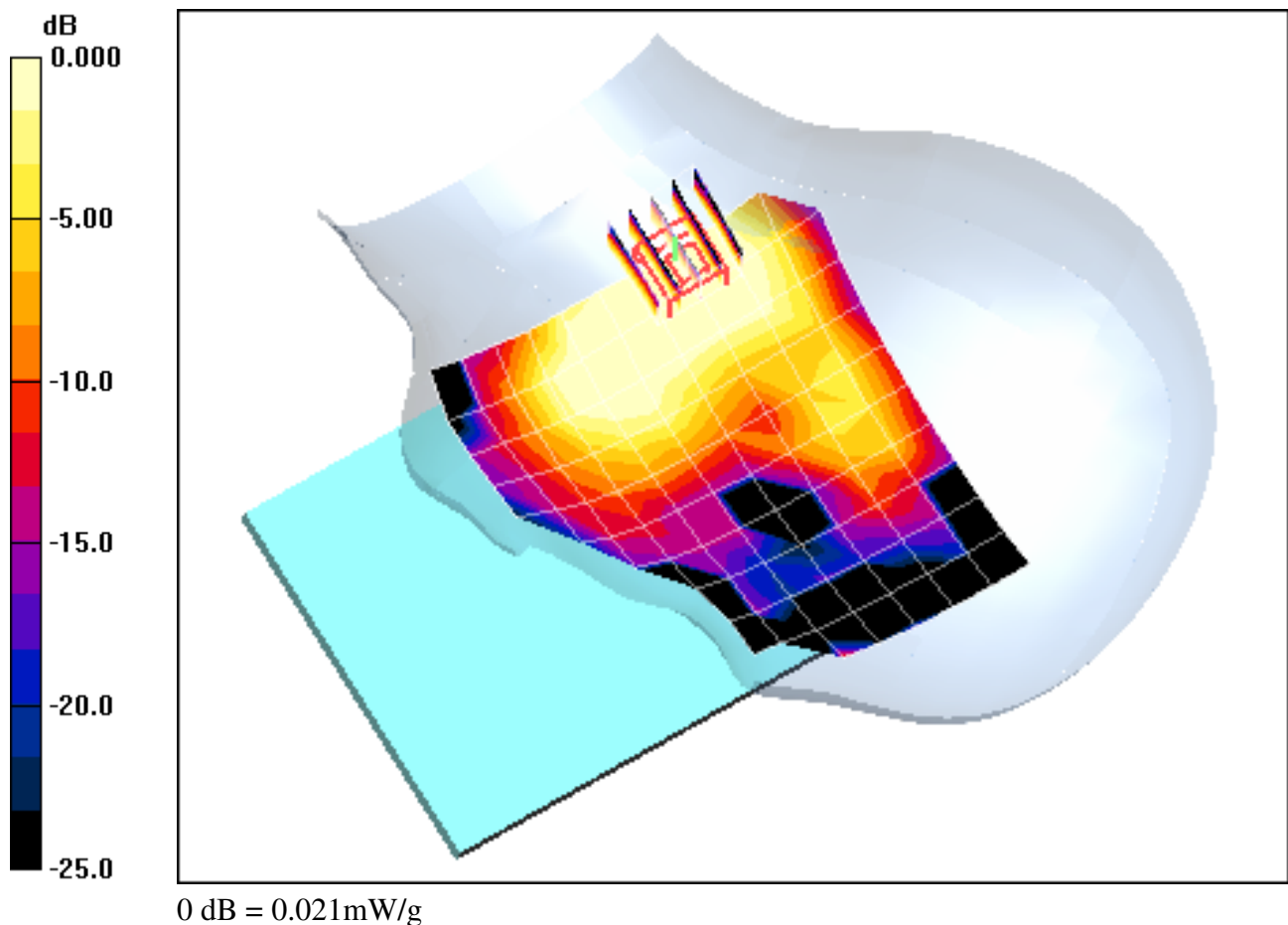
Area Scan (11x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 4.37 V/m; Power Drift = 0.107 dB

Peak SAR (extrapolated) = 0.055 W/kg

SAR(1 g) = 0.030 mW/g; SAR(10 g) = 0.016 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#2

Communication System: IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Head; Medium parameters used (interpolated):

$f = 2412 \text{ MHz}$; $\sigma = 1.76 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 12-16-2011; Ambient Temp: 24.0°C; Tissue Temp: 22.1°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, Left Head, Tilt, Ch 01, 1 Mbps

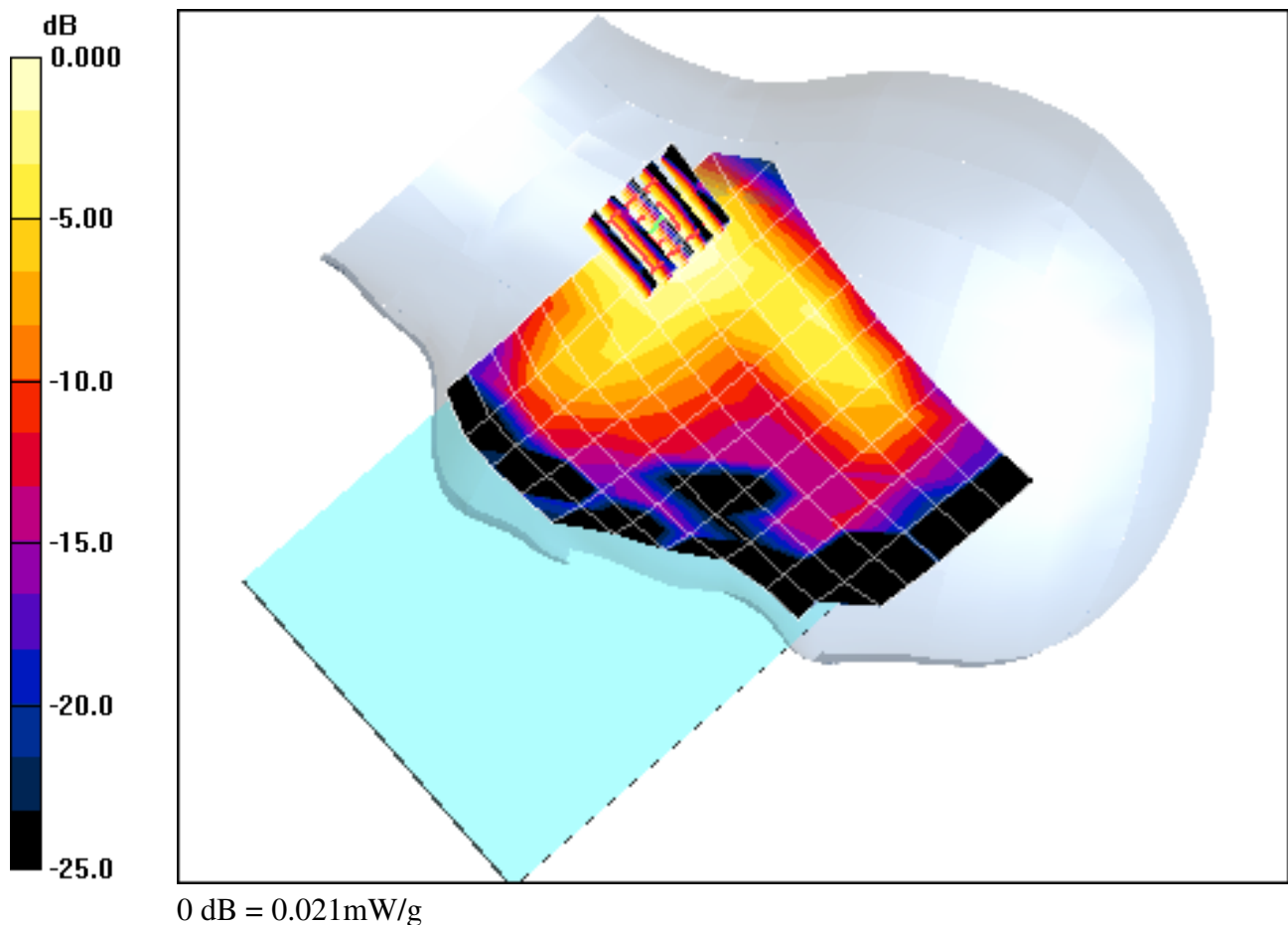
Area Scan (11x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 3.32 V/m; Power Drift = 0.115 dB

Peak SAR (extrapolated) = 0.062 W/kg

SAR(1 g) = 0.017 mW/g; SAR(10 g) = 0.00875 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FI-295-H

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5180 MHz; Duty Cycle: 1:1

Medium: 5GHz Head; Medium parameters used:

$f = 5180 \text{ MHz}$; $\sigma = 4.747 \text{ mho/m}$; $\epsilon_r = 35.77$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 12-06-2011; Ambient Temp: 23.4°C; Tissue Temp: 21.8°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 5.2 GHz, Right Head, Touch, Ch 36, 6 Mbps

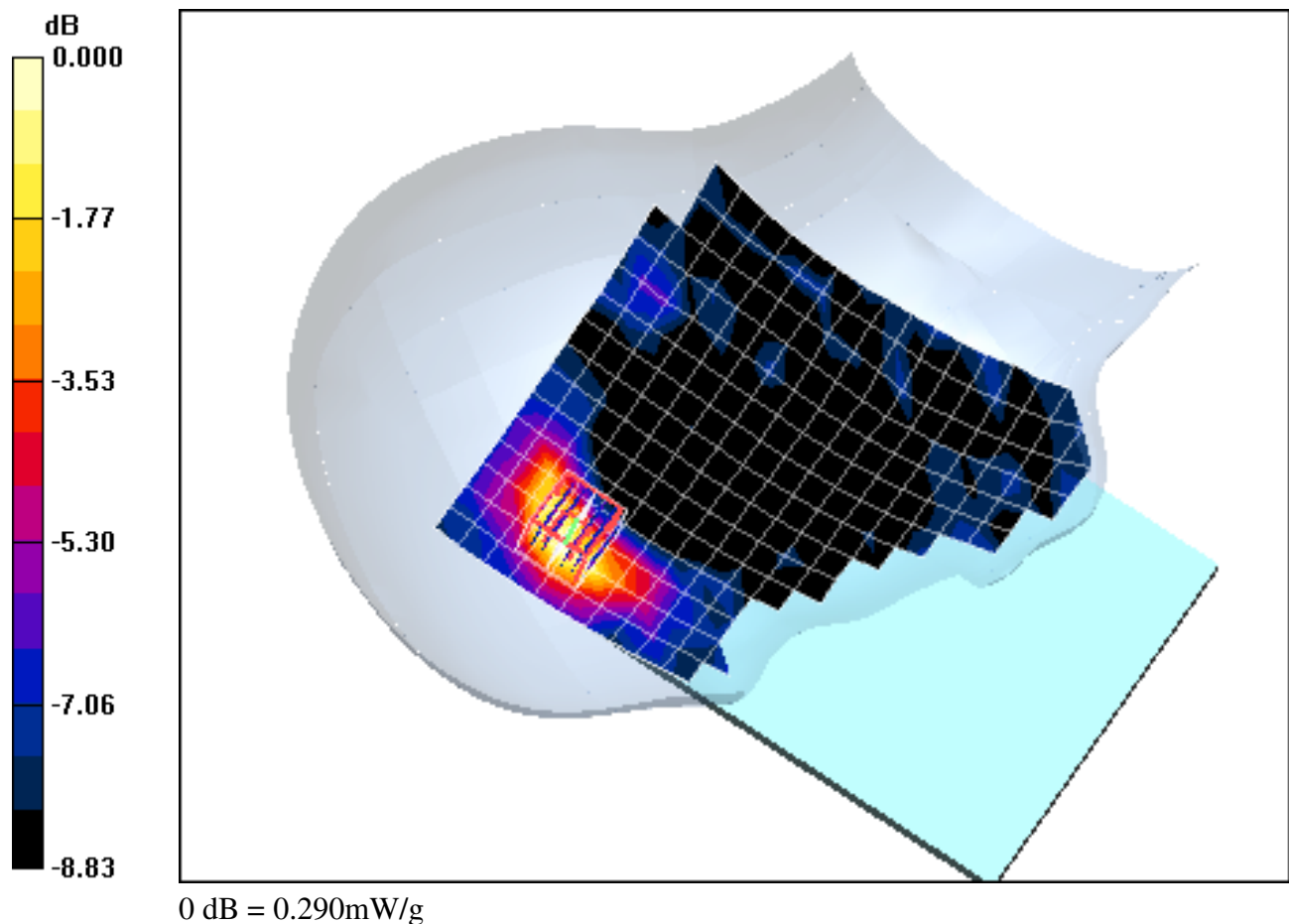
Area Scan (16x22x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

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

Reference Value = 6.54 V/m; Power Drift = 0.149 dB

Peak SAR (extrapolated) = 0.735 W/kg

SAR(1 g) = 0.183 mW/g; SAR(10 g) = 0.104 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FI-295-H

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5180 MHz; Duty Cycle: 1:1

Medium: 5GHz Head; Medium parameters used:

$f = 5180 \text{ MHz}$; $\sigma = 4.747 \text{ mho/m}$; $\epsilon_r = 35.77$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 12-06-2011; Ambient Temp: 23.4°C; Tissue Temp: 21.8°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 5.2 GHz, Right Head, Tilt, Ch 36, 6 Mbps

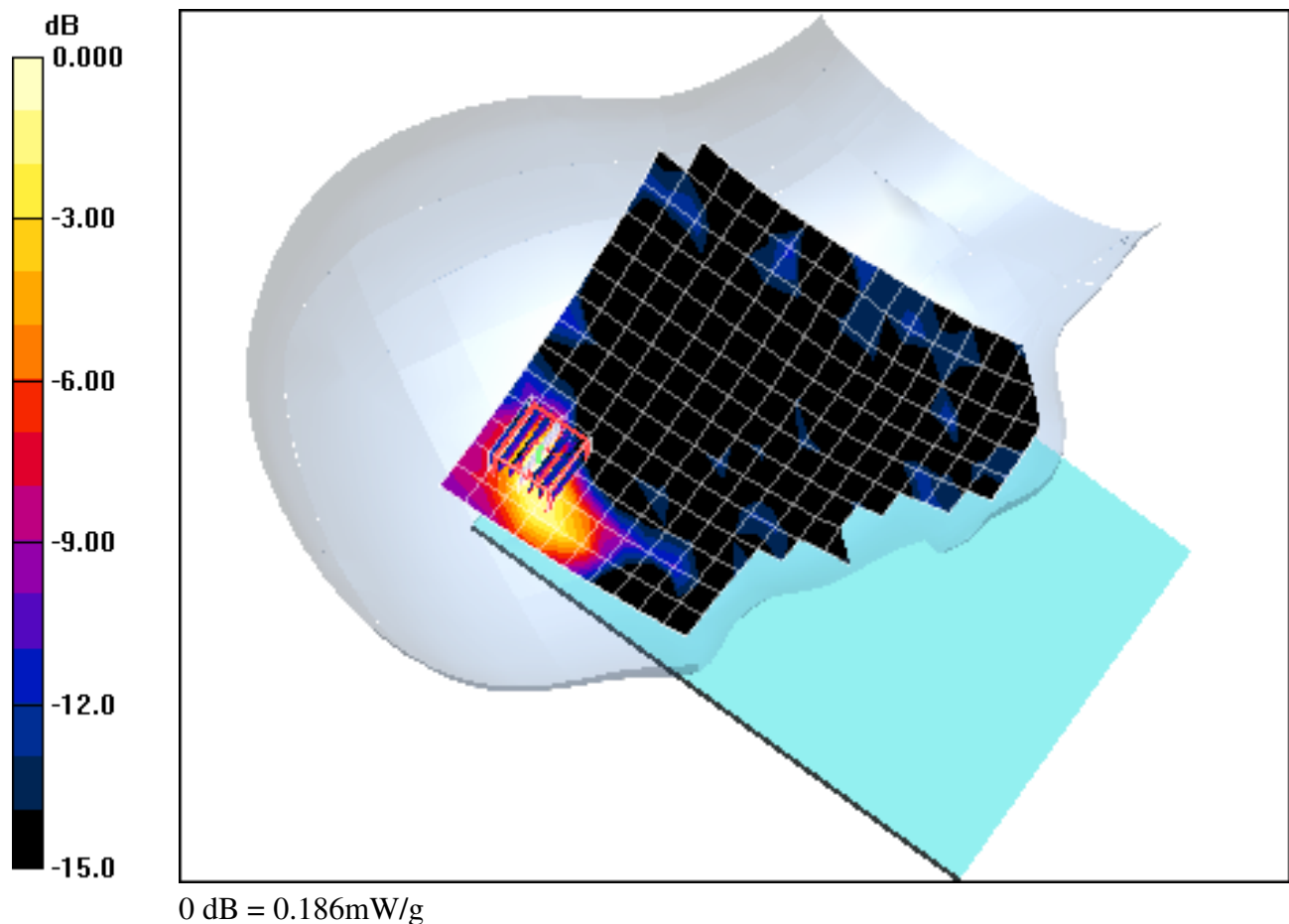
Area Scan (15x17x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

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

Reference Value = 4.80 V/m; Power Drift = 0.104 dB

Peak SAR (extrapolated) = 0.339 W/kg

SAR(1 g) = 0.095 mW/g; SAR(10 g) = 0.030 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FI-295-H

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5320 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head; Medium parameters used:

$f = 5320 \text{ MHz}$; $\sigma = 4.735 \text{ mho/m}$; $\epsilon_r = 35.34$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 12-19-2011; Ambient Temp: 21.3 °C; Tissue Temp: 23.2 °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, 5.3 GHz Left Head, Touch, Ch 64, 6 Mbps

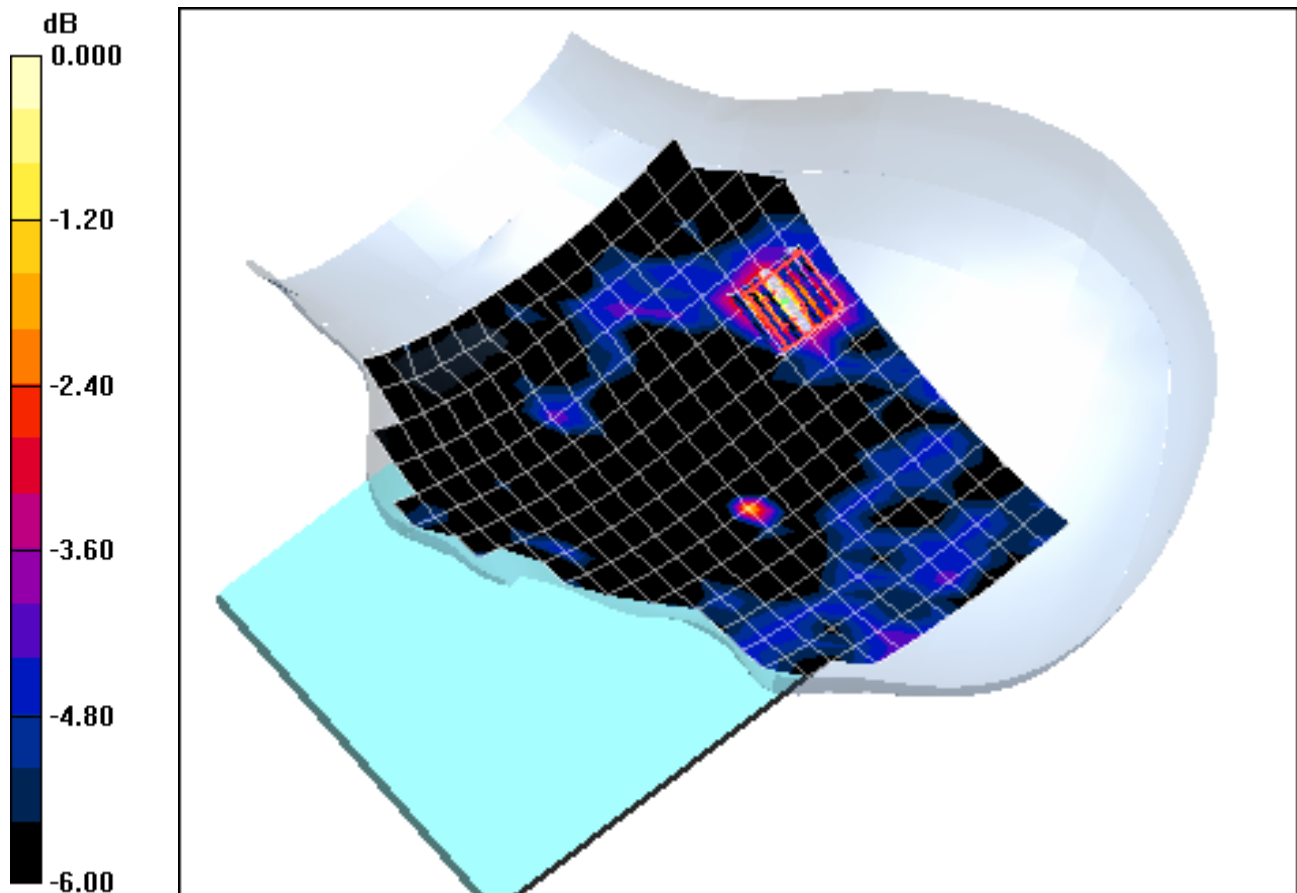
Area Scan (18x23x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

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

Reference Value = 5.08 V/m; Power Drift = -0.152 dB

Peak SAR (extrapolated) = 0.251 W/kg

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



0 dB = 0.158mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FI-295-H

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz; Duty Cycle: 1:1

Medium: 5GHz Head; Medium parameters used:

$f = 5785 \text{ MHz}$; $\sigma = 5.403 \text{ mho/m}$; $\epsilon_r = 34.77$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 12-06-2011; Ambient Temp: 23.8°C; Tissue Temp: 22.1°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

Mode: IEEE 802.11a, 5.8 GHz Left Head, Tilt, Ch 157, 6 Mbps

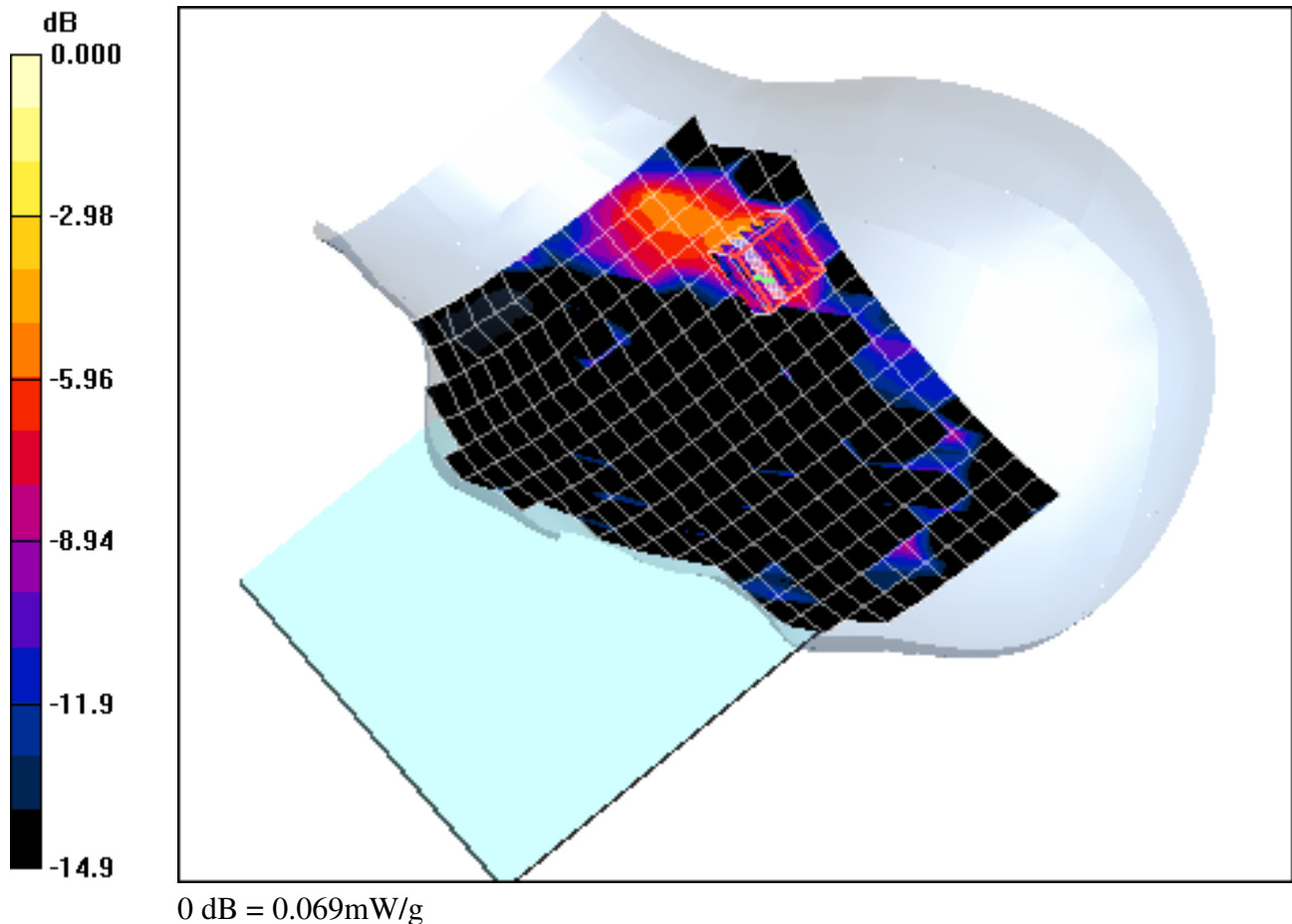
Area Scan (18x23x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

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

Reference Value = 2.36 V/m; Power Drift = 0.150 dB

Peak SAR (extrapolated) = 0.130 W/kg

SAR(1 g) = 0.041 mW/g; SAR(10 g) = 0.022 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FI-295-F

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900 Body; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-15-2011; Ambient Temp: 21.4°C; Tissue Temp: 21.3°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

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

Mode: GSM 1900, Body SAR, Back Side, Mid.ch

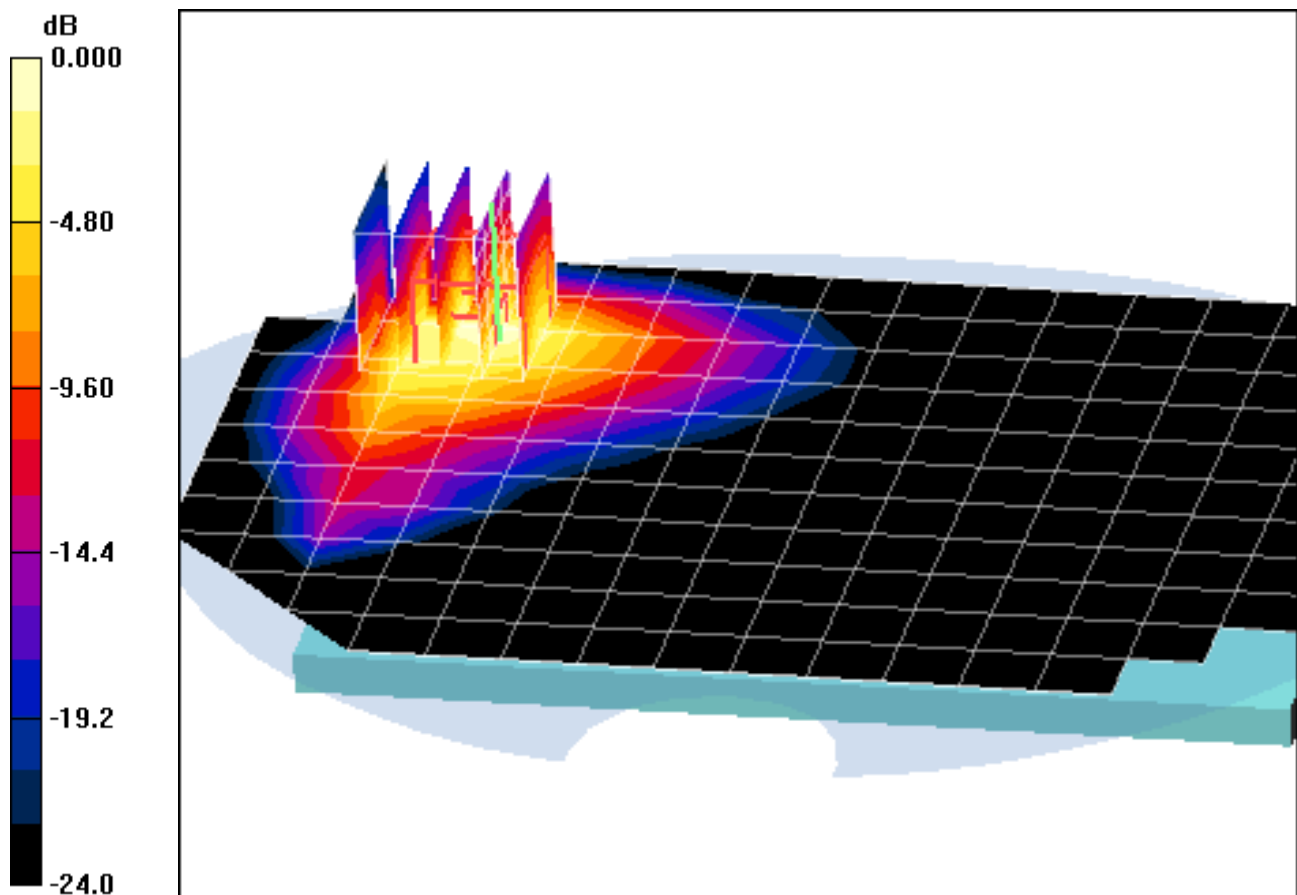
Area Scan (12x17x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 19.2 V/m; Power Drift = -0.025 dB

Peak SAR (extrapolated) = 1.10 W/kg

SAR(1 g) = 0.506 mW/g; SAR(10 g) = 0.227 mW/g



0 dB = 0.519mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#1

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900 Body; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 51.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-17-2011; Ambient Temp: 21.7°C; Tissue Temp: 20.9°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

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

Mode: GSM 1900, Body SAR, Back side, Mid.ch

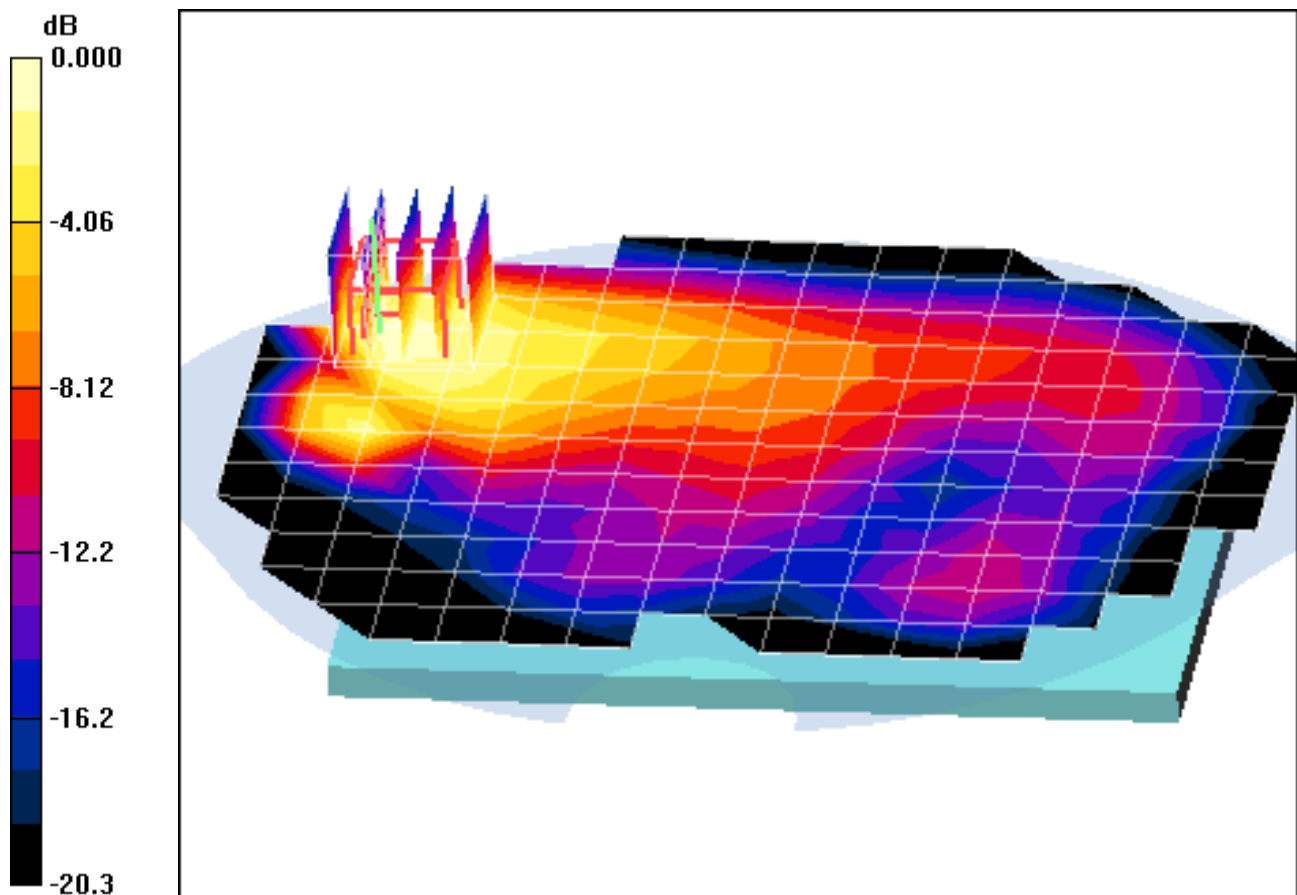
Area Scan (13x17x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 12.4 V/m; Power Drift = -0.034 dB

Peak SAR (extrapolated) = 0.406 W/kg

SAR(1 g) = 0.209 mW/g; SAR(10 g) = 0.112 mW/g



0 dB = 0.232mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FI-295-F

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900 Body; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-15-2011; Ambient Temp: 21.4°C; Tissue Temp: 21.3°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

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

Mode: GSM 1900, Body SAR, Bottom Edge, Mid.ch

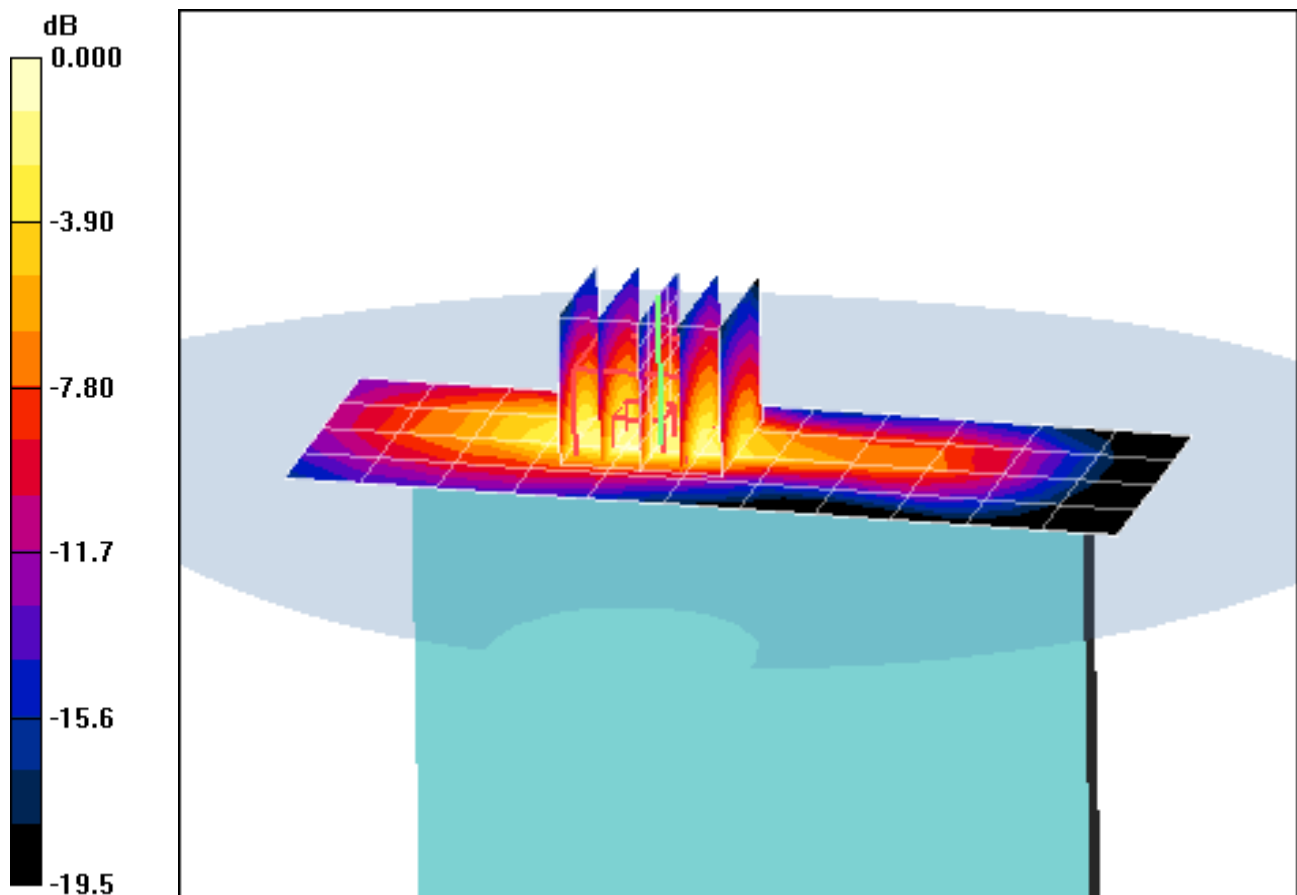
Area Scan (5x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 7.82 V/m; Power Drift = -0.010 dB

Peak SAR (extrapolated) = 0.197 W/kg

SAR(1 g) = 0.105 mW/g; SAR(10 g) = 0.054 mW/g



0 dB = 0.117mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#1

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900 Body; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 51.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.5 cm

Test Date: 12-17-2011; Ambient Temp: 21.7°C; Tissue Temp: 20.9°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

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

Mode: GSM 1900, Body SAR, Bottom Edge, Mid.ch

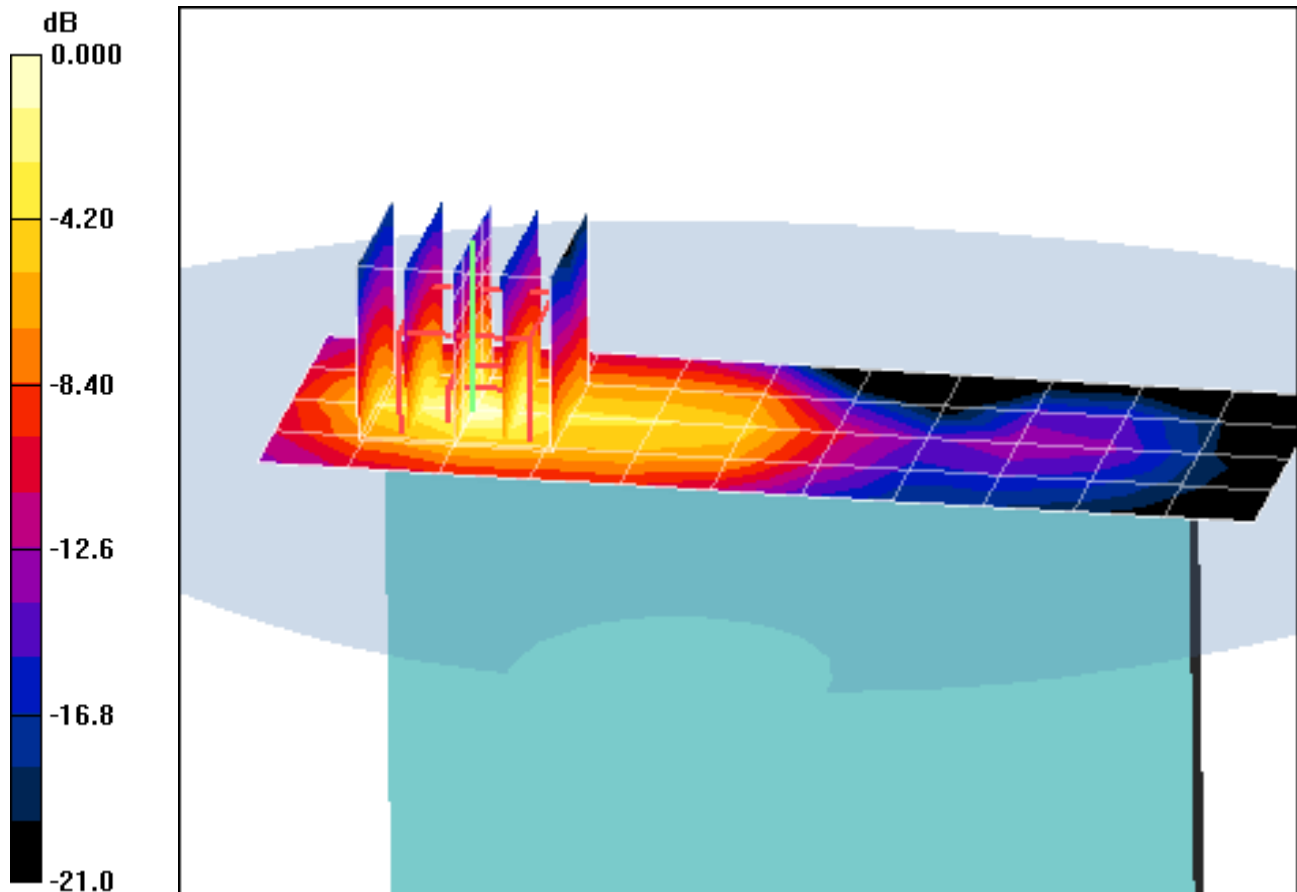
Area Scan (5x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 13.1 V/m; Power Drift = 0.000 dB

Peak SAR (extrapolated) = 0.447 W/kg

SAR(1 g) = 0.216 mW/g; SAR(10 g) = 0.101 mW/g



0 dB = 0.244mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#1

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900 Body; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 51.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-17-2011; Ambient Temp: 21.7°C; Tissue Temp: 20.9°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

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

Mode: GSM 1900, Body SAR, Right Edge, Mid.ch

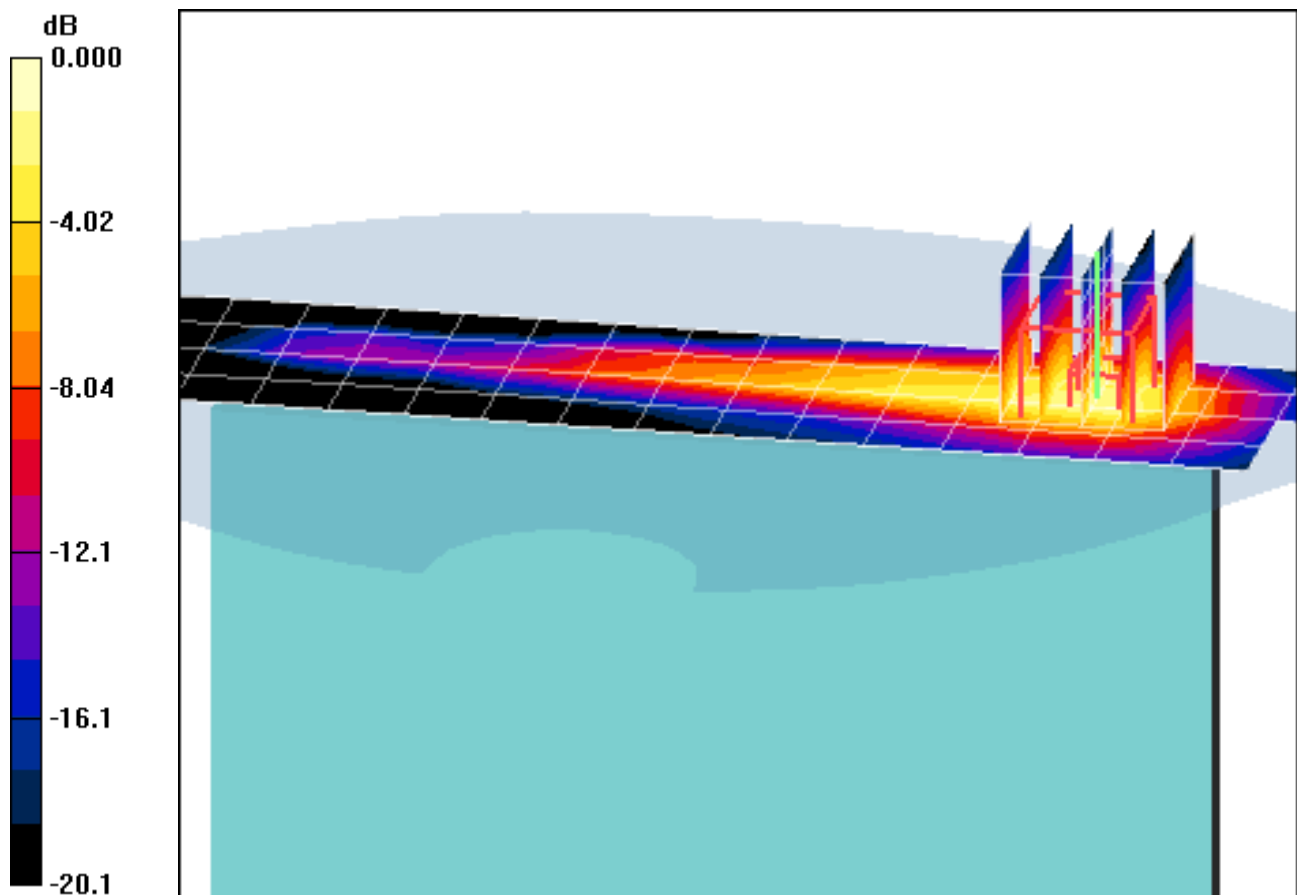
Area Scan (5x17x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 11.3 V/m; Power Drift = 0.099 dB

Peak SAR (extrapolated) = 0.495 W/kg

SAR(1 g) = 0.208 mW/g; SAR(10 g) = 0.096 mW/g



0 dB = 0.240mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#1

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 51.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-17-2011; Ambient Temp: 21.7°C; Tissue Temp: 20.9°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

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

Mode: GSM 1900, Body SAR, Vertex, Mid.ch

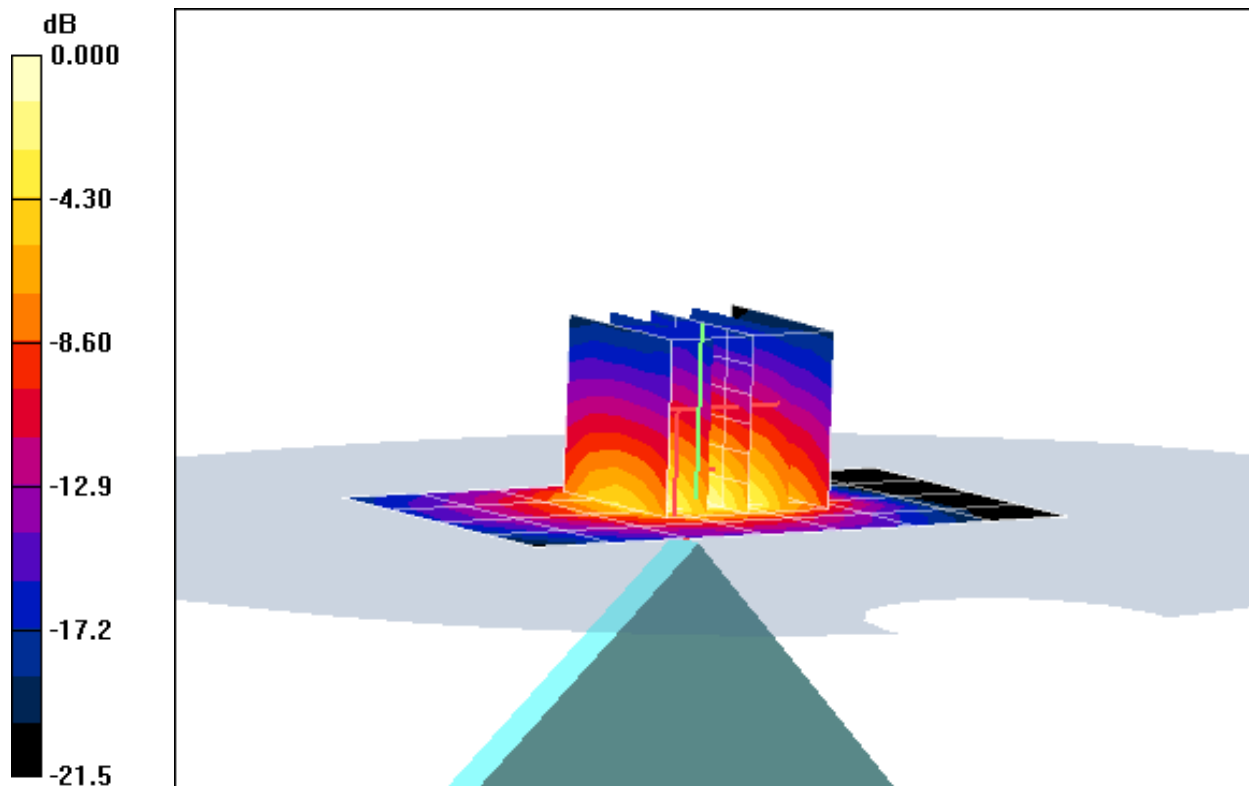
Area Scan (5x8x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 10.7 V/m; Power Drift = 0.010 dB

Peak SAR (extrapolated) = 0.478 W/kg

SAR(1 g) = 0.211 mW/g; SAR(10 g) = 0.094 mW/g



0 dB = 0.253mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FI-295-F

Communication System: GSM1900 GPRS; 3 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.76

Medium: 1900 Body; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-15-2011; Ambient Temp: 21.4°C; Tissue Temp: 21.3°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

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

Mode: GPRS 1900, Body SAR, Back side, Mid.ch, 3 Tx Slots

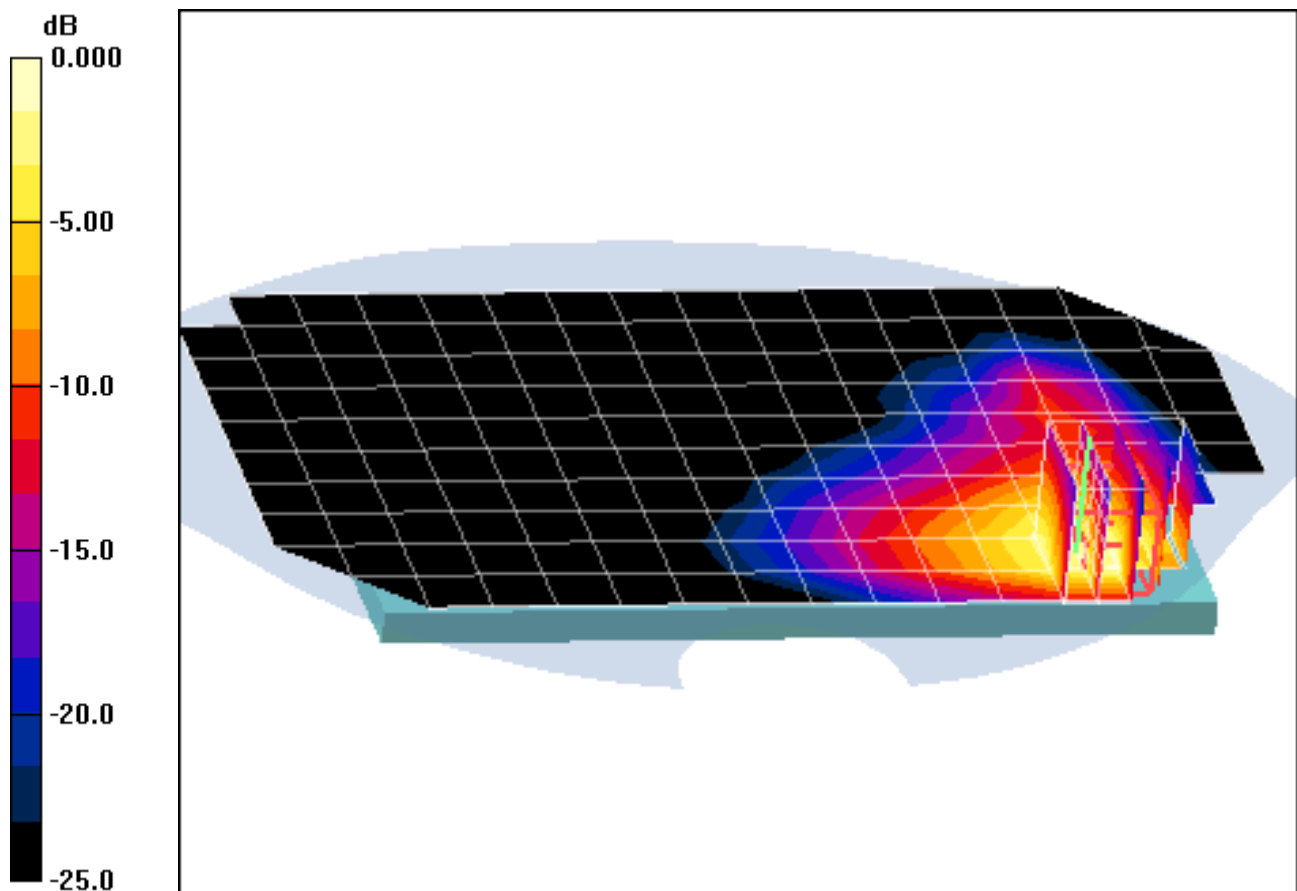
Area Scan (11x17x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 16.0 V/m; Power Drift = 0.145 dB

Peak SAR (extrapolated) = 0.957 W/kg

SAR(1 g) = 0.451 mW/g; SAR(10 g) = 0.208 mW/g



0 dB = 0.458mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#1

Communication System: GSM1900 GPRS; 4 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.076

Medium: 1900 Body; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 51.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-17-2011; Ambient Temp: 21.7°C; Tissue Temp: 20.9°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

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

Mode: GPRS 1900, Body SAR, Back side, Mid.ch, 4 Tx Slots

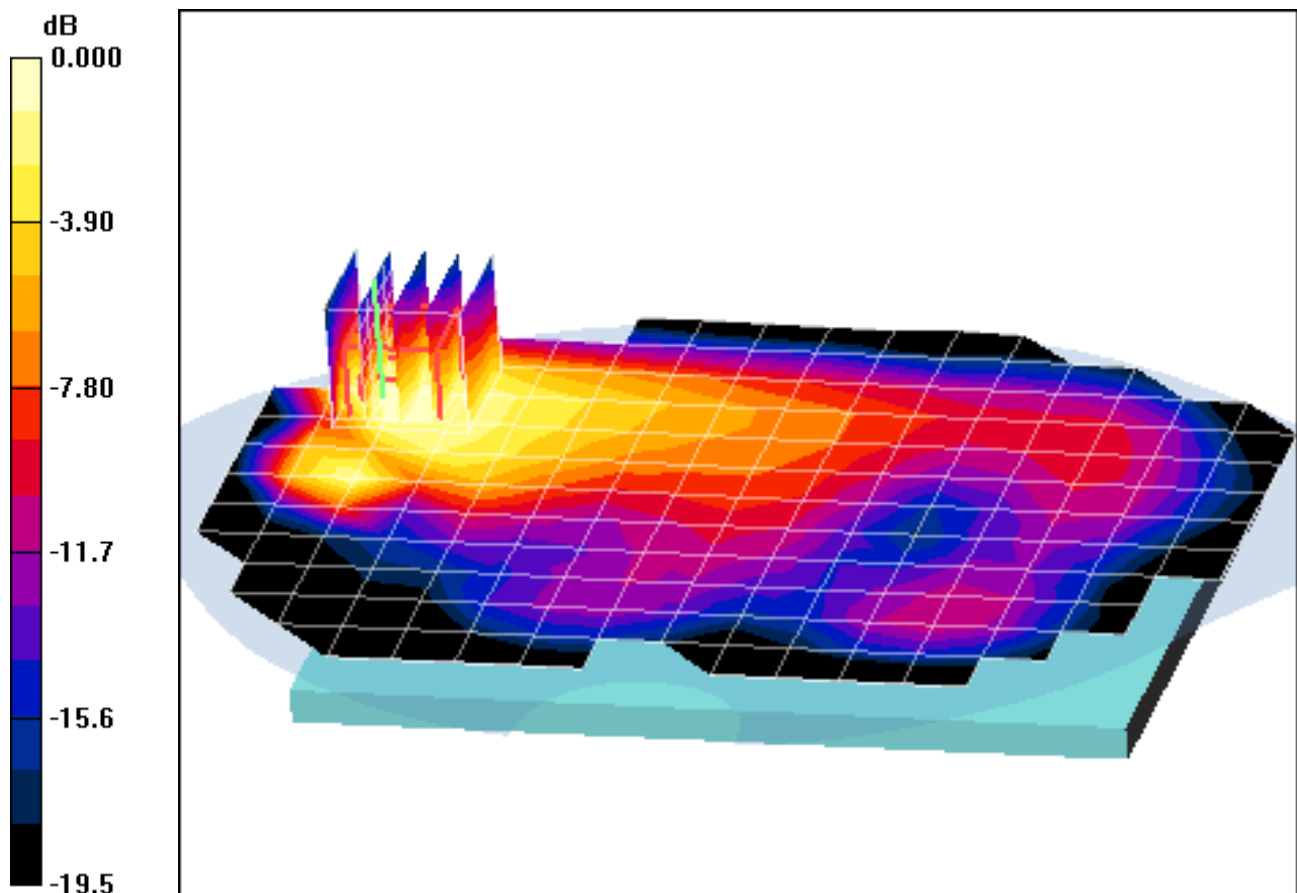
Area Scan (13x17x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 15.2 V/m; Power Drift = -0.112 dB

Peak SAR (extrapolated) = 0.581 W/kg

SAR(1 g) = 0.307 mW/g; SAR(10 g) = 0.166 mW/g



0 dB = 0.341mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FI-295-F

Communication System: GSM1900 GPRS; 3 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.76

Medium: 1900 Body; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-15-2011; Ambient Temp: 21.4°C; Tissue Temp: 21.3°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

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

Mode: GPRS 1900, Body SAR, Bottom Edge, Mid.ch, 3 Tx Slots

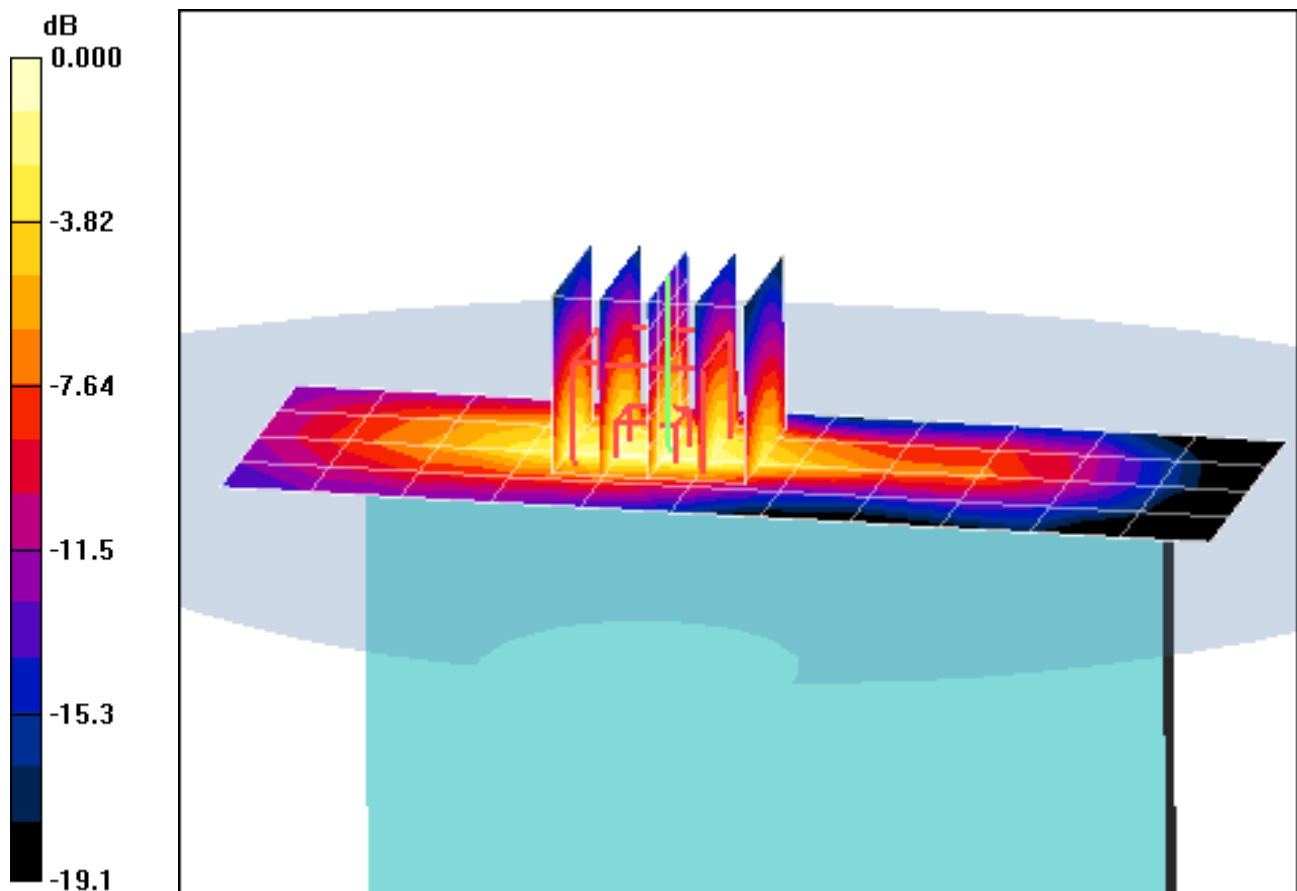
Area Scan (5x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 8.94 V/m; Power Drift = -0.009 dB

Peak SAR (extrapolated) = 0.241 W/kg

SAR(1 g) = 0.130 mW/g; SAR(10 g) = 0.067 mW/g



0 dB = 0.147mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#1

Communication System: GSM1900 GPRS; 4 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.076

Medium: 1900 Body; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 51.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.5 cm

Test Date: 12-17-2011; Ambient Temp: 21.7°C; Tissue Temp: 20.9°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

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

Mode: GPRS 1900, Body SAR, Bottom Edge, Mid.ch, 4 Tx Slots

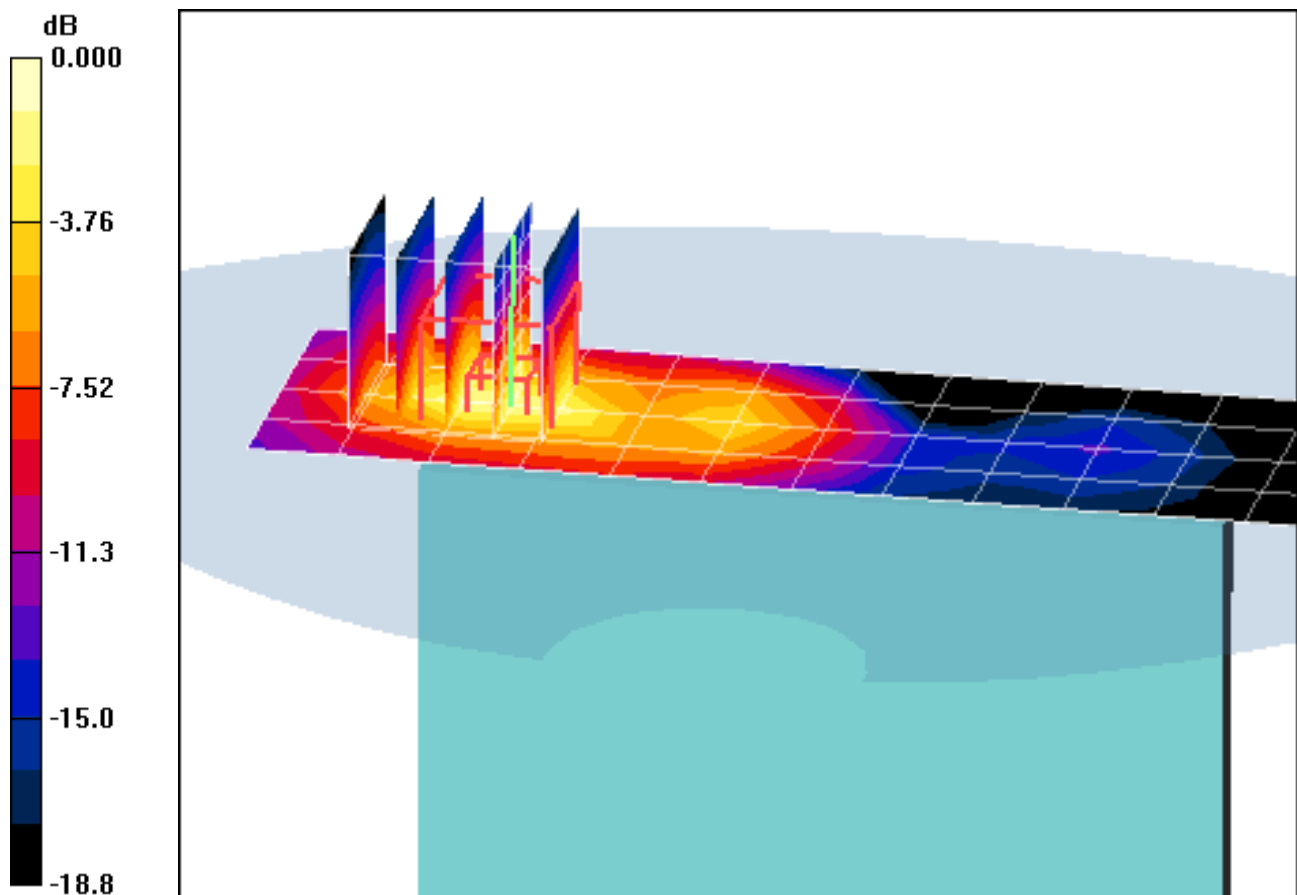
Area Scan (5x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 13.7 V/m; Power Drift = -0.146 dB

Peak SAR (extrapolated) = 0.604 W/kg

SAR(1 g) = 0.290 mW/g; SAR(10 g) = 0.138 mW/g



0 dB = 0.327mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#1

Communication System: GSM1900 GPRS; 4 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.076

Medium: 1900 Body; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 51.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-17-2011; Ambient Temp: 21.7°C; Tissue Temp: 20.9°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

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

Mode: GPRS 1900, Body SAR, Right Edge, Mid.ch, 4 Tx Slots

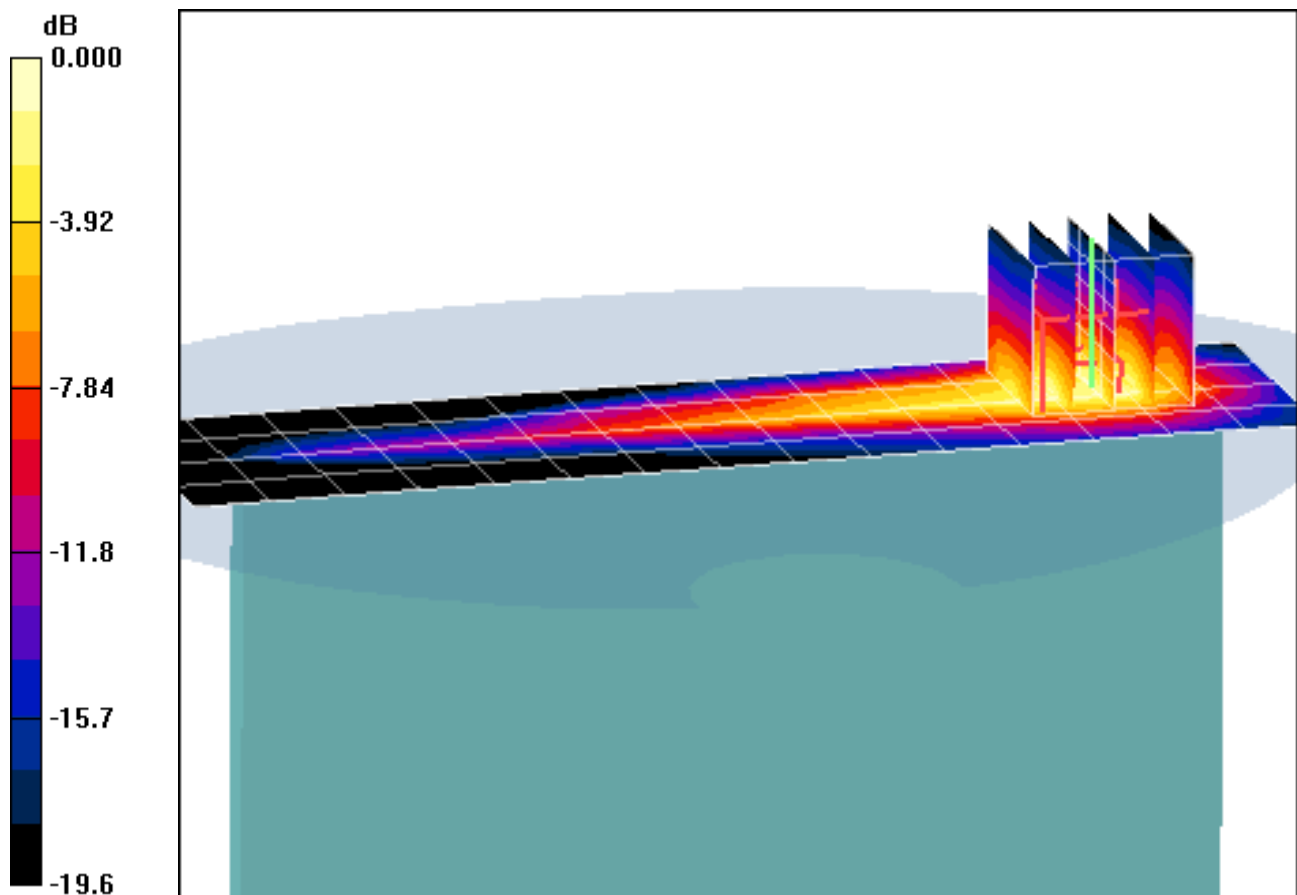
Area Scan (5x16x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 13.9 V/m; Power Drift = 0.042 dB

Peak SAR (extrapolated) = 0.835 W/kg

SAR(1 g) = 0.344 mW/g; SAR(10 g) = 0.155 mW/g



0 dB = 0.398mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#1

Communication System: GSM1900 GPRS; 4 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.076

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 51.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-17-2011; Ambient Temp: 21.7°C; Tissue Temp: 20.9°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

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

Mode: GPRS 1900, Body SAR, Vertex, Mid.ch, 4 Tx Slots

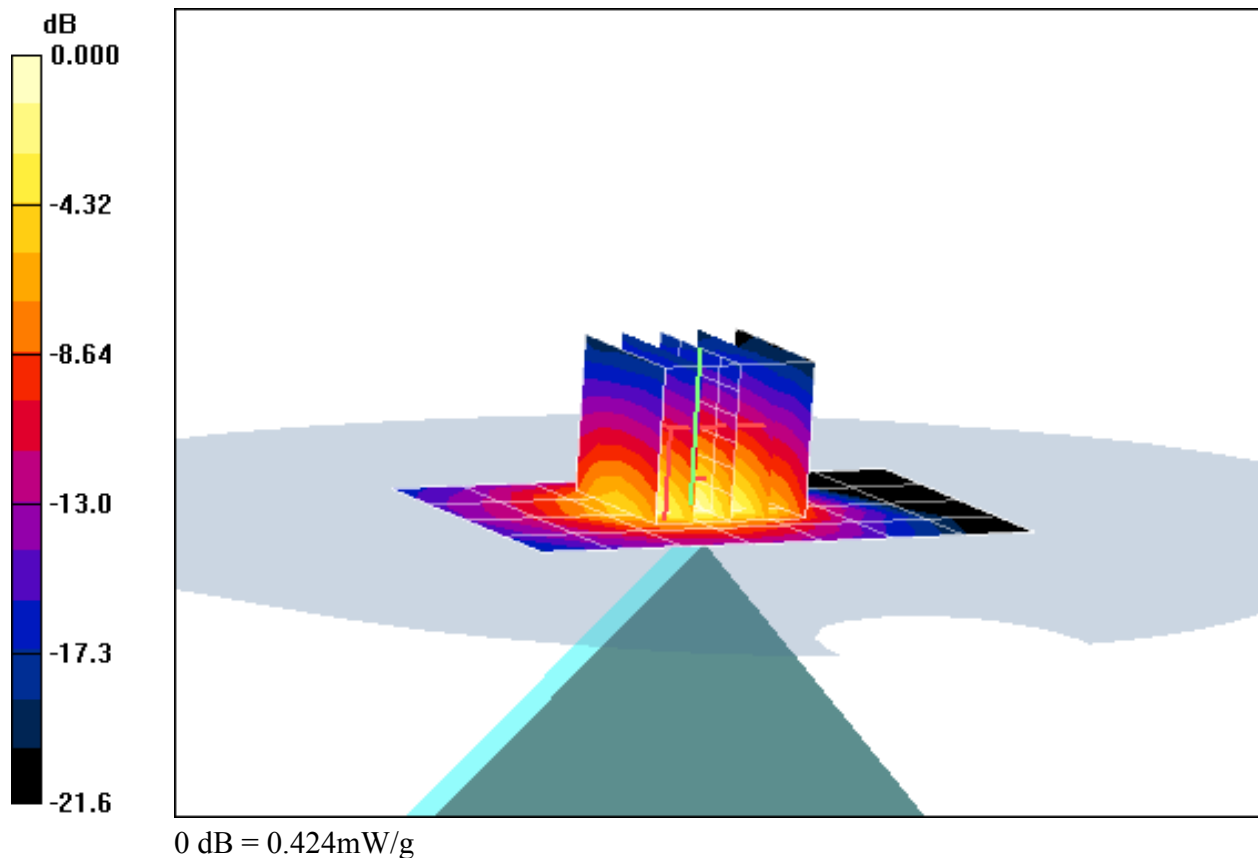
Area Scan (5x8x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 13.9 V/m; Power Drift = -0.104 dB

Peak SAR (extrapolated) = 0.817 W/kg

SAR(1 g) = 0.355 mW/g; SAR(10 g) = 0.157 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#2

Communication System: IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2412 \text{ MHz}$; $\sigma = 1.97 \text{ mho/m}$; $\epsilon_r = 50.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-12-2011; Ambient Temp: 23.4 °C; Tissue Temp: 22.1 °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, Body SAR, Ch 01, 1 Mbps, Back Side

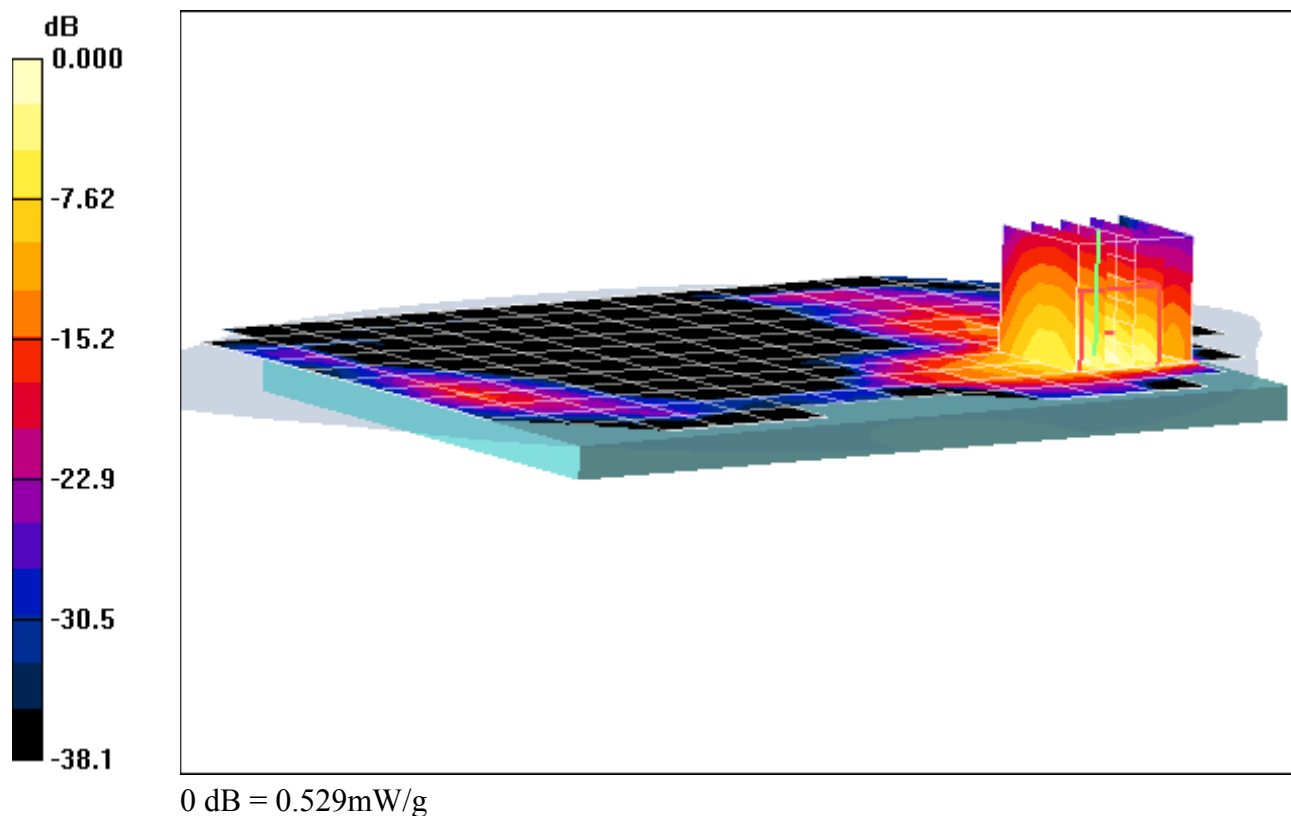
Area Scan (12x16x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 4.10 V/m; Power Drift = 0.057 dB

Peak SAR (extrapolated) = 0.969 W/kg

SAR(1 g) = 0.392 mW/g; SAR(10 g) = 0.168 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#2

Communication System: IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2412 \text{ MHz}$; $\sigma = 1.97 \text{ mho/m}$; $\epsilon_r = 50.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-12-2011; Ambient Temp: 23.4 °C; Tissue Temp: 22.1 °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, Body SAR, Ch 01, 1 Mbps, Top Side

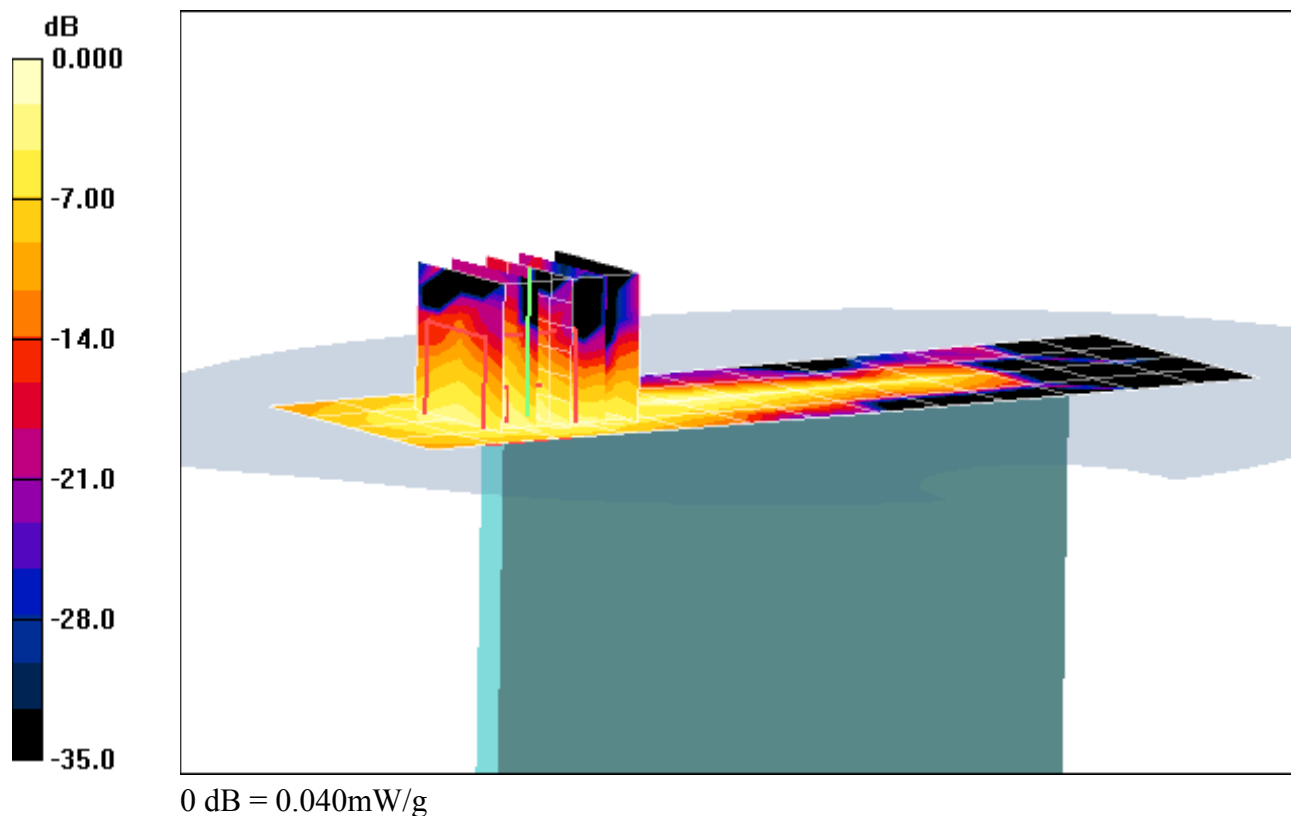
Area Scan (5x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 3.81 V/m; Power Drift = -0.032 dB

Peak SAR (extrapolated) = 0.058 W/kg

SAR(1 g) = 0.027 mW/g; SAR(10 g) = 0.012 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FCC#2

Communication System: IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2412 \text{ MHz}$; $\sigma = 1.97 \text{ mho/m}$; $\epsilon_r = 50.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-12-2011; Ambient Temp: 23.4 °C; Tissue Temp: 22.1 °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, Body SAR, Ch 01, 1 Mbps, Left Side

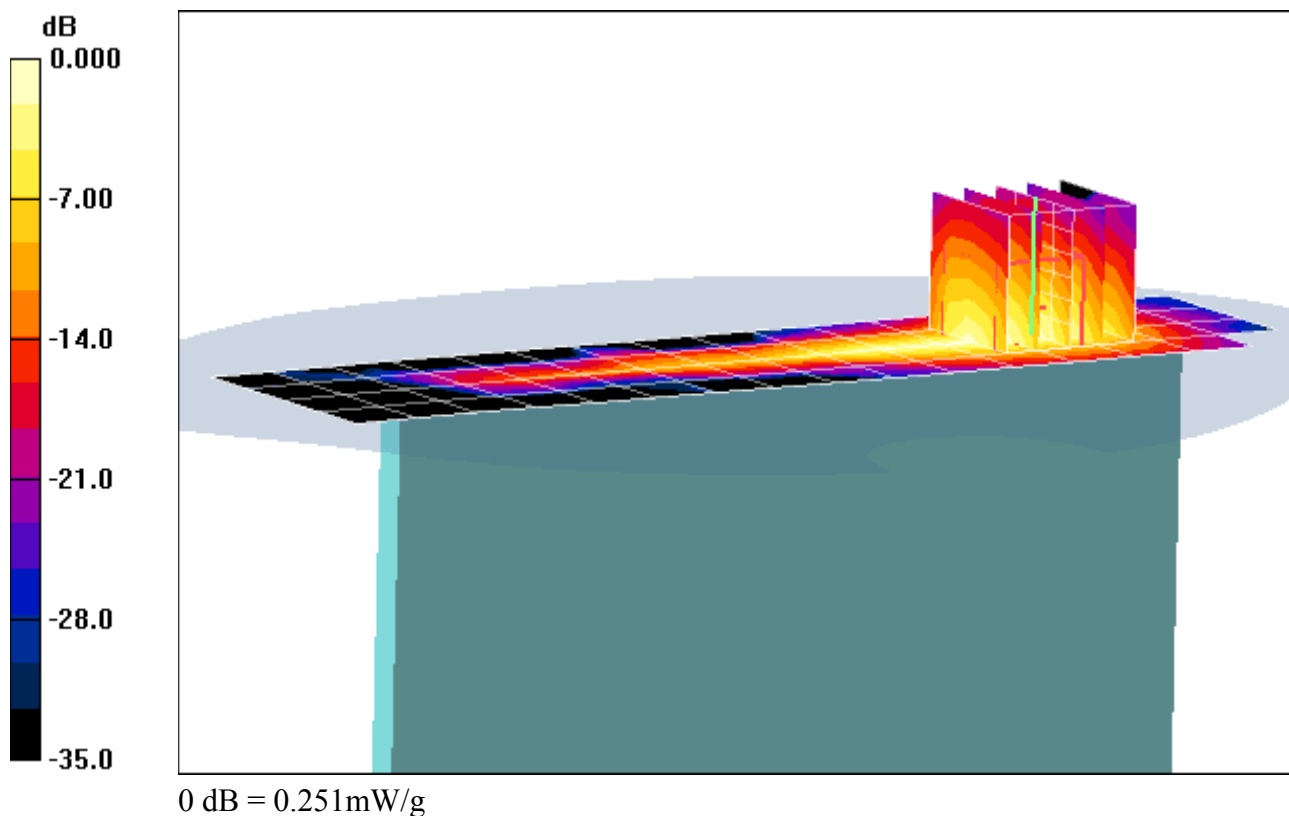
Area Scan (5x17x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 2.35 V/m; Power Drift = 0.210 dB

Peak SAR (extrapolated) = 0.381 W/kg

SAR(1 g) = 0.180 mW/g; SAR(10 g) = 0.081 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FI-295-H

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5180 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body; Medium parameters used:

$f = 5180 \text{ MHz}$; $\sigma = 5.315 \text{ mho/m}$; $\epsilon_r = 47.43$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-08-2011; Ambient Temp: 23.2°C; Tissue Temp: 21.3°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

Mode: IEEE 802.11a, 5.2 GHz, Body SAR, Ch 36, 6 Mbps, Back Side

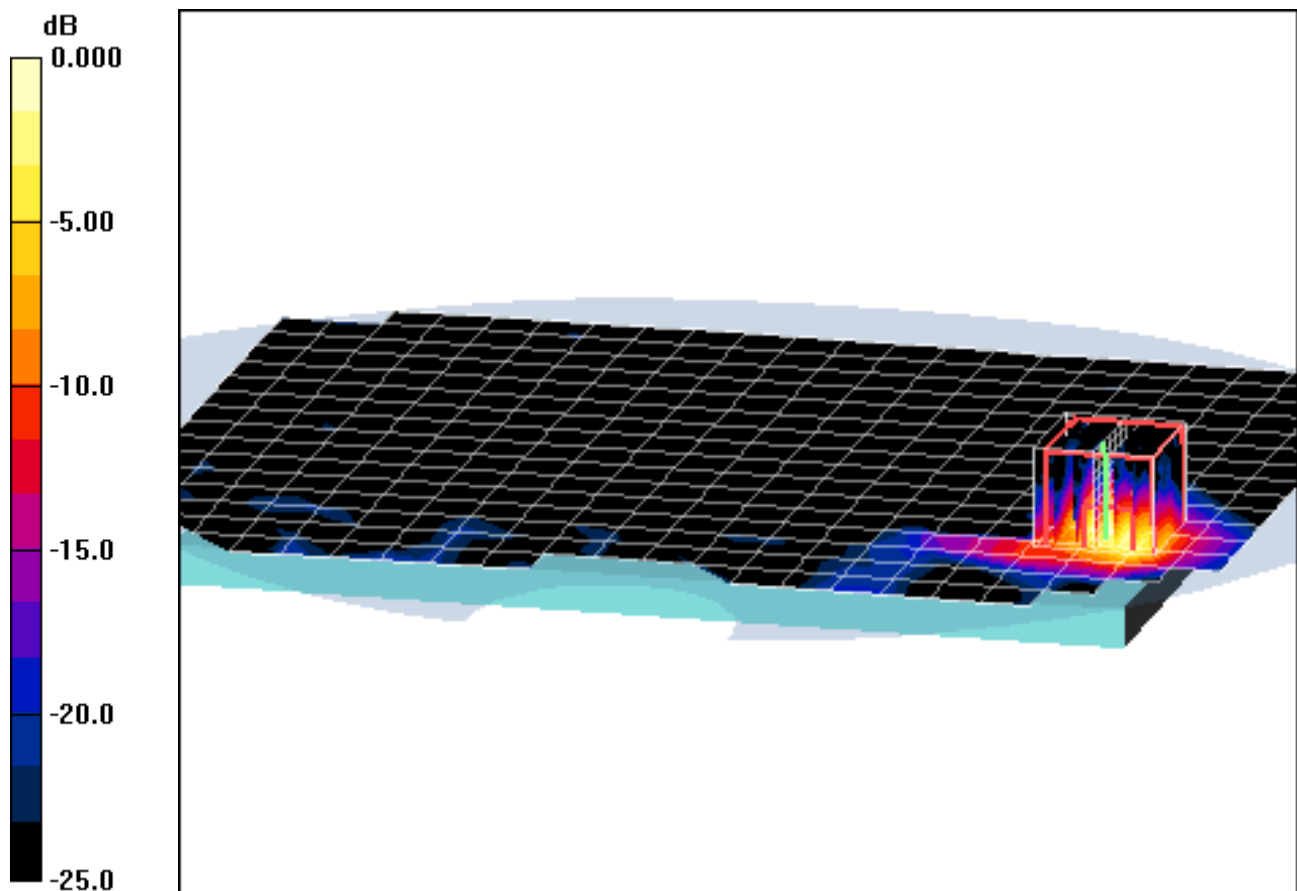
Area Scan (17x23x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

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

Reference Value = 10.5 V/m; Power Drift = 0.024 dB

Peak SAR (extrapolated) = 2.82 W/kg

SAR(1 g) = 0.560 mW/g; SAR(10 g) = 0.155 mW/g



0 dB = 1.24mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FI-295-H

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5320 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body; Medium parameters used:

$f = 5320 \text{ MHz}$; $\sigma = 5.507 \text{ mho/m}$; $\epsilon_r = 47.19$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-08-2011; Ambient Temp: 23.2°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3561; ConvF(3.49, 3.49, 3.49); 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, 5.3 GHz, Body SAR, Ch 64, 6 Mbps, Top Side

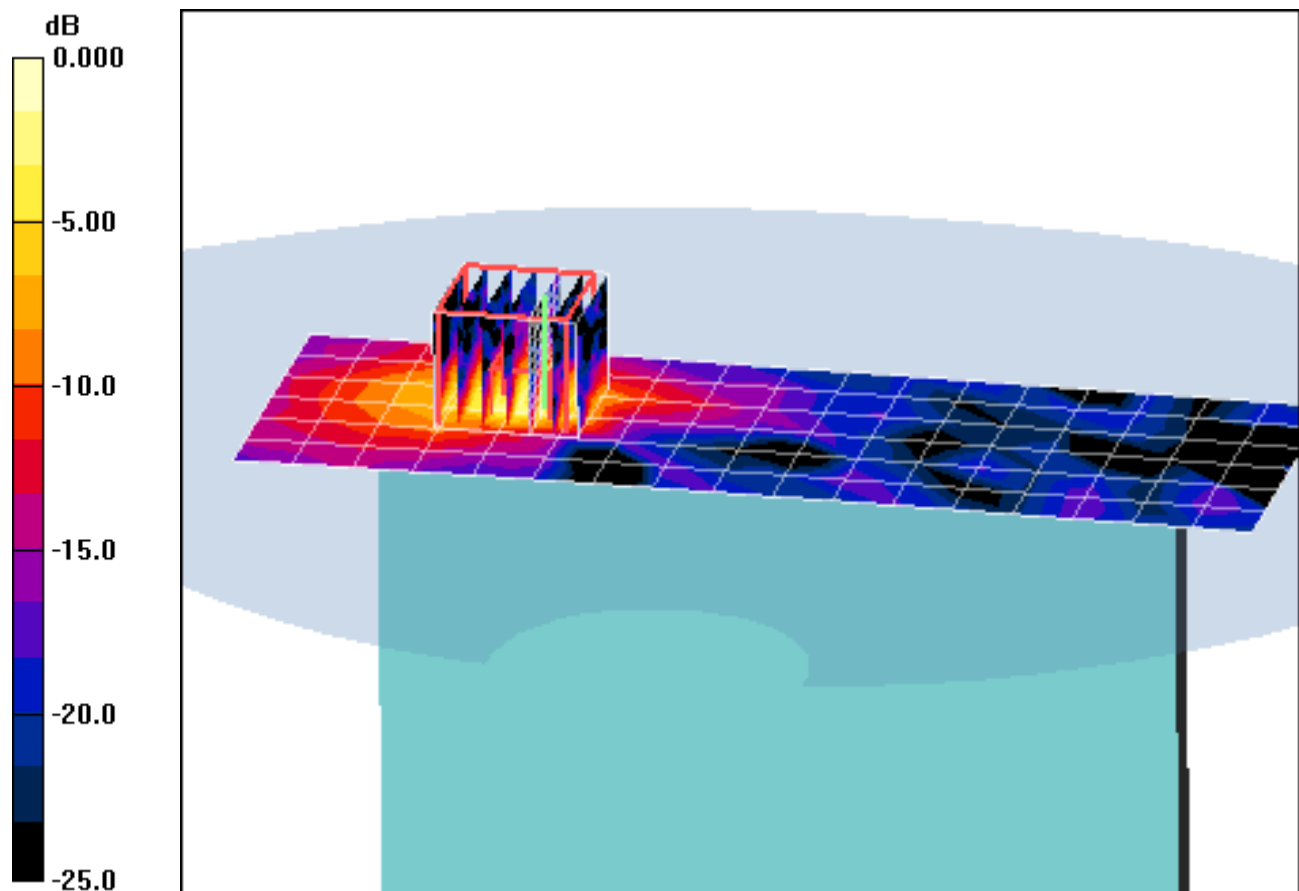
Area Scan (7x18x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

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

Reference Value = 7.04 V/m; Power Drift = 0.134 dB

Peak SAR (extrapolated) = 1.30 W/kg

SAR(1 g) = 0.207 mW/g; SAR(10 g) = 0.052 mW/g



0 dB = 0.452mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE150S; Type: Portable Tablet Computer; Serial: FI-295-H

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5180 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body; Medium parameters used:

$f = 5180 \text{ MHz}$; $\sigma = 5.315 \text{ mho/m}$; $\epsilon_r = 47.43$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-08-2011; Ambient Temp: 23.2°C; Tissue Temp: 21.3°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

Mode: IEEE 802.11a, 5.2 GHz, Body SAR, Ch 36, 6 Mbps, Left Side

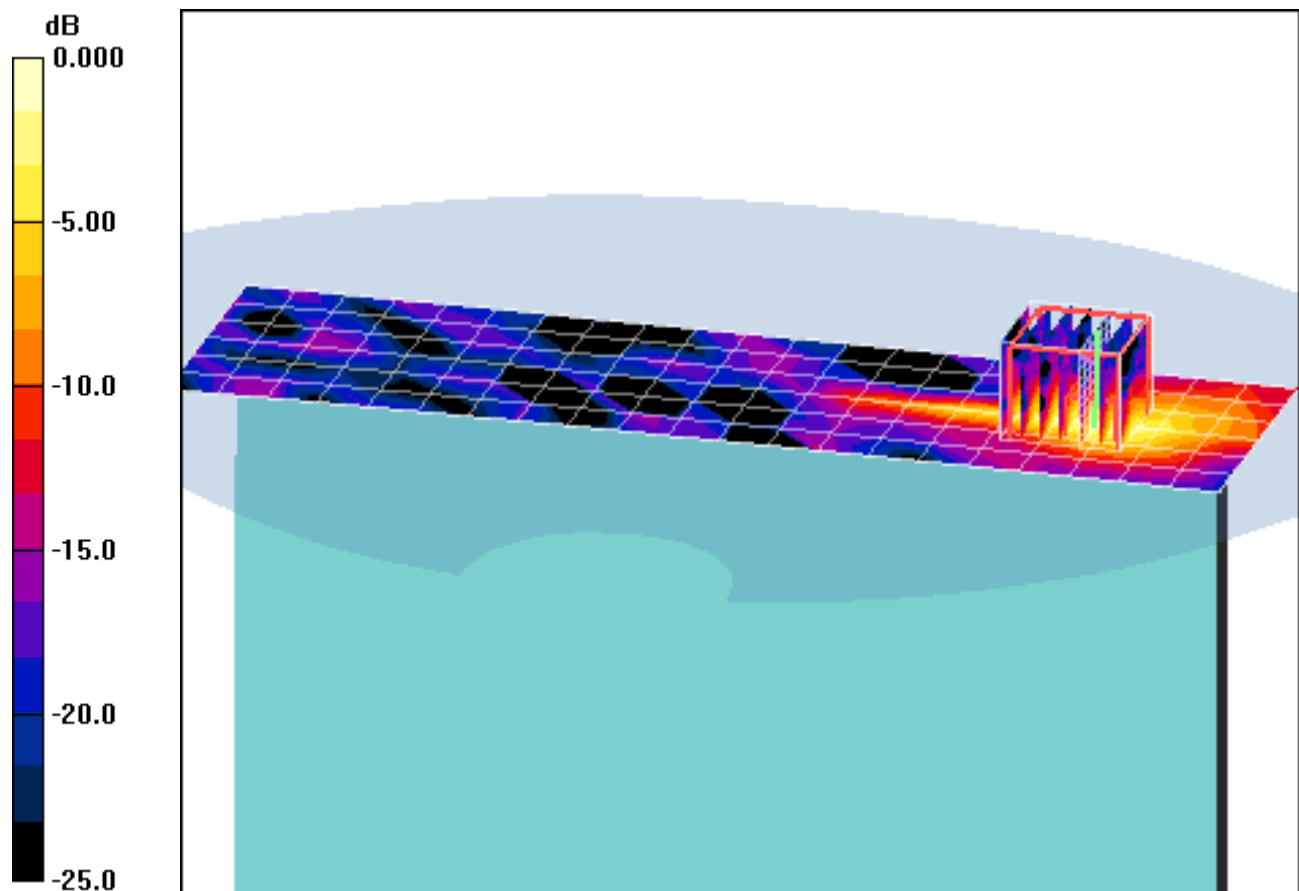
Area Scan 2 (7x22x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

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

Reference Value = 5.84 V/m; Power Drift = -0.125 dB

Peak SAR (extrapolated) = 1.13 W/kg

SAR(1 g) = 0.150 mW/g; SAR(10 g) = 0.039 mW/g



0 dB = 0.320mW/g

APPENDIX B: DIPOLE VALIDATION

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):

$f = 1900 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 40.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-16-2011; Ambient Temp: 22.1°C; Tissue Temp: 20.8° C

Probe: ES3DV3 - SN3209; ConvF(5.11, 5.11, 5.11); Calibrated: 4/18/2011

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

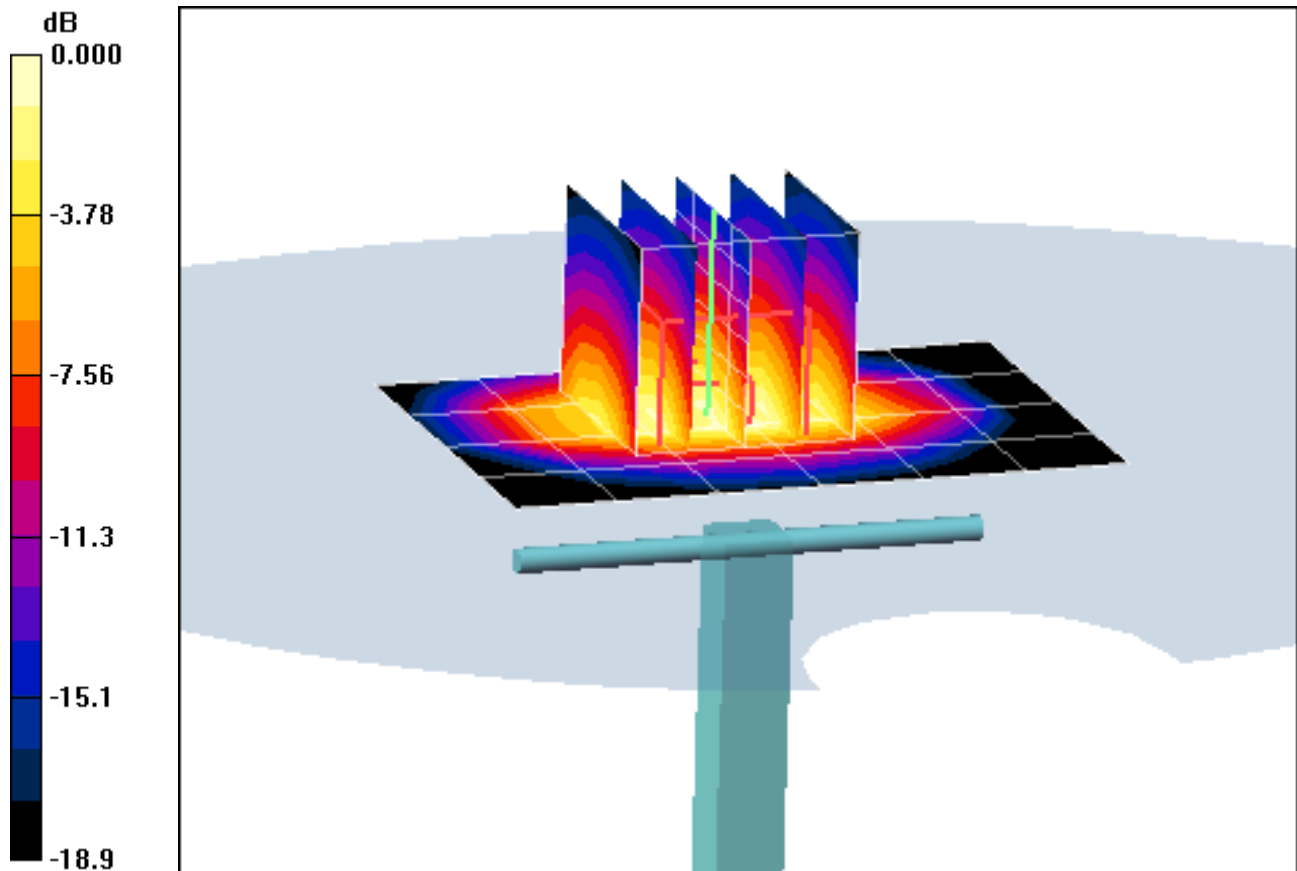
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 3.99 mW/g; SAR(10 g) = 2.03 mW/g

Deviation = -0.75%



0 dB = 4.51mW/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):

$f = 1900 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 40.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-16-2011; Ambient Temp: 22.1°C; Tissue Temp: 20.8° C

Probe: ES3DV3 - SN3209; ConvF(5.11, 5.11, 5.11); Calibrated: 4/18/2011

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

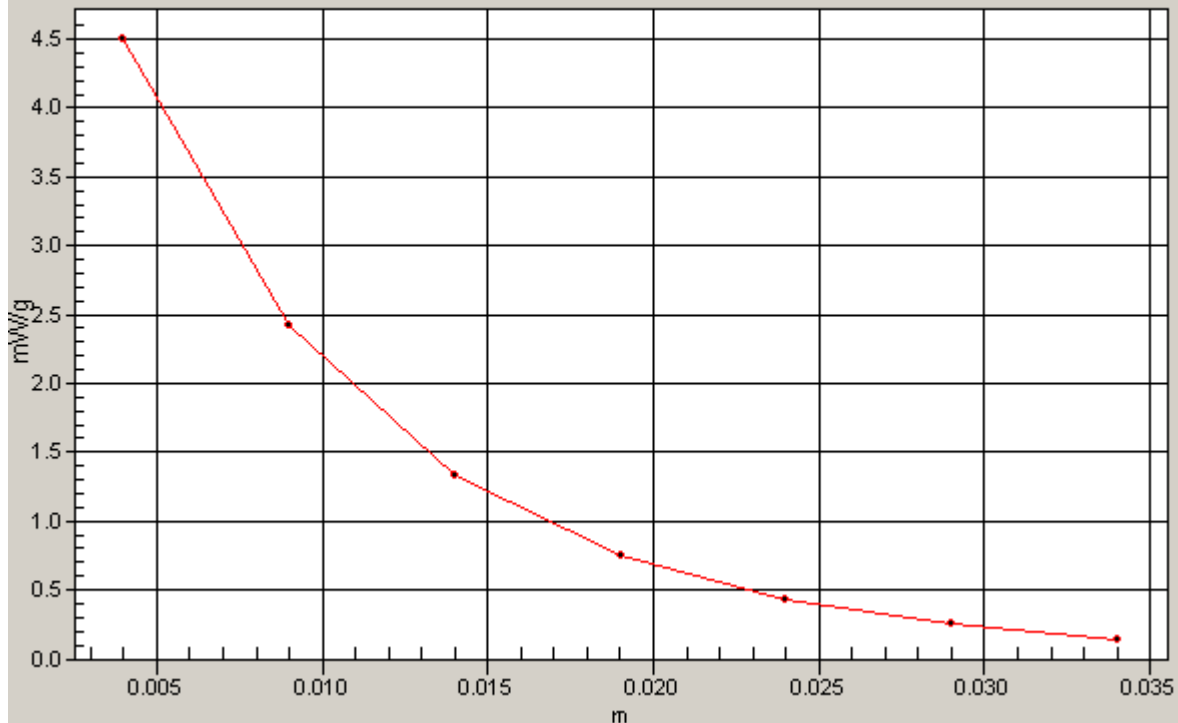
Input Power = 20 dBm (100 mW)

SAR(1 g) = 3.99 mW/g; SAR(10 g) = 2.03 mW/g

Deviation = -0.75%

1g/10g Averaged SAR

SAR; Zoom Scan: Value Along Z, X=2, Y=2



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:

$f = 2450 \text{ MHz}$; $\sigma = 1.8 \text{ mho/m}$; $\epsilon_r = 39.01$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-16-2011; Ambient Temp: 24.0°C; Tissue Temp: 22.1°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

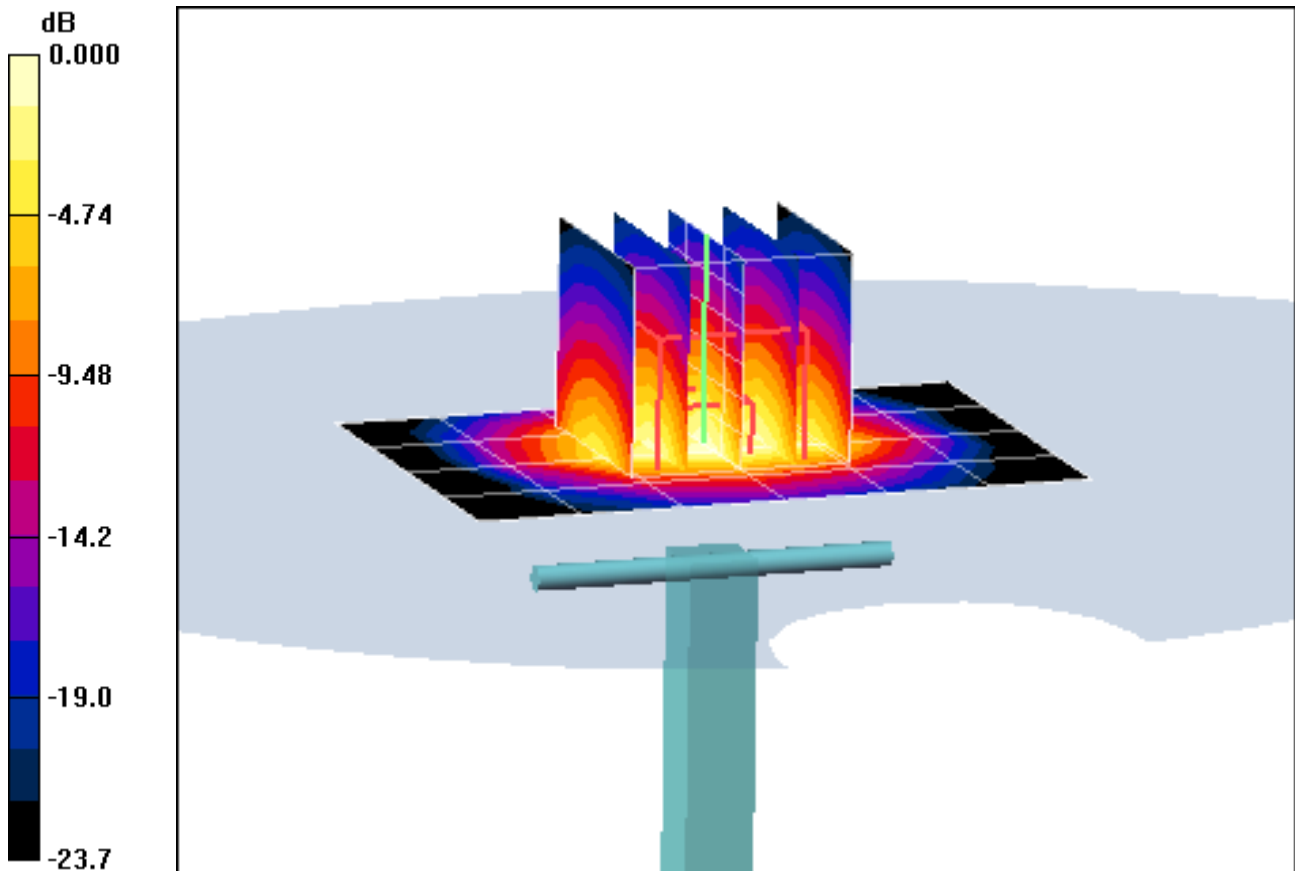
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 16 dBm (40 mW)

SAR(1 g) = 2.04 mW/g; SAR(10 g) = 0.938 mW/g

Deviation = -5.20%



0 dB = 2.68mW/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:

$f = 2450 \text{ MHz}$; $\sigma = 1.8 \text{ mho/m}$; $\epsilon_r = 39.01$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-16-2011; Ambient Temp: 24.0°C; Tissue Temp: 22.1°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

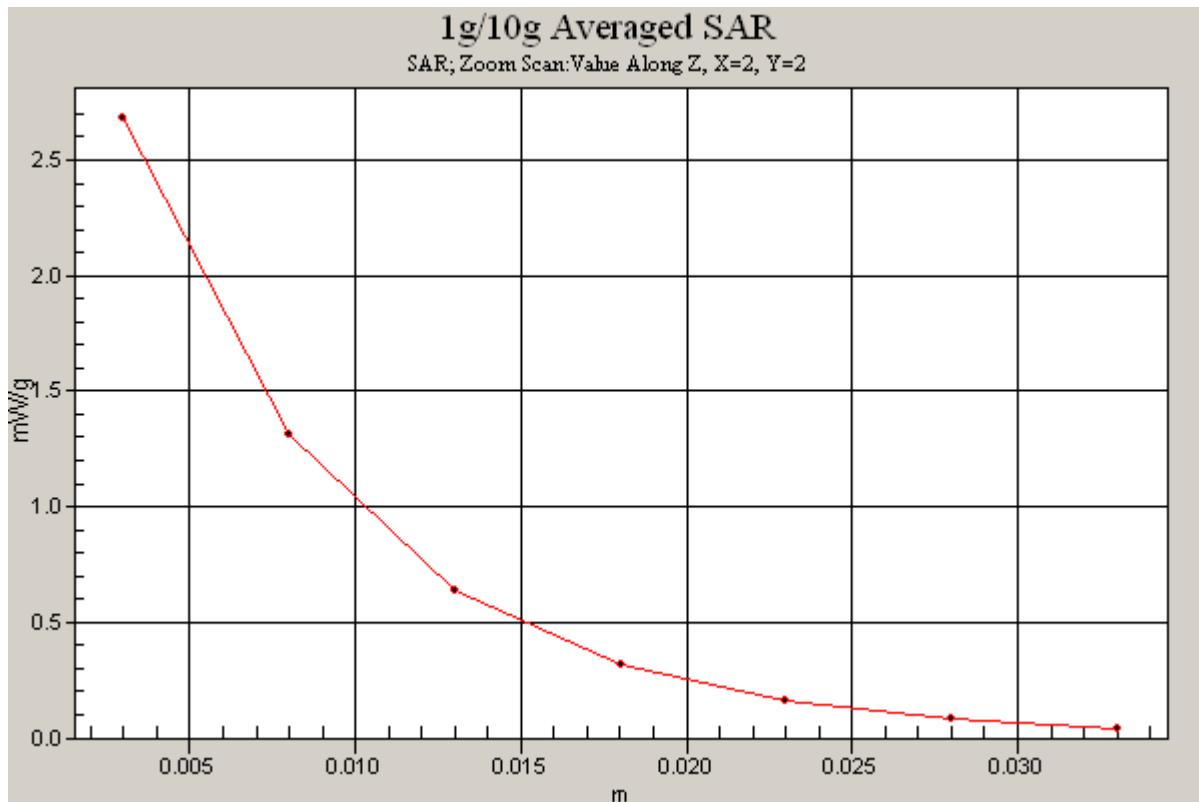
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 16 dBm (40 mW)

SAR(1 g) = 2.04 mW/g; SAR(10 g) = 0.938 mW/g

Deviation = -5.20%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5200 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5200 \text{ MHz}$; $\sigma = 4.74 \text{ mho/m}$; $\epsilon_r = 35.69$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-06-2011; Ambient Temp: 23.4°C; Tissue Temp: 21.8°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

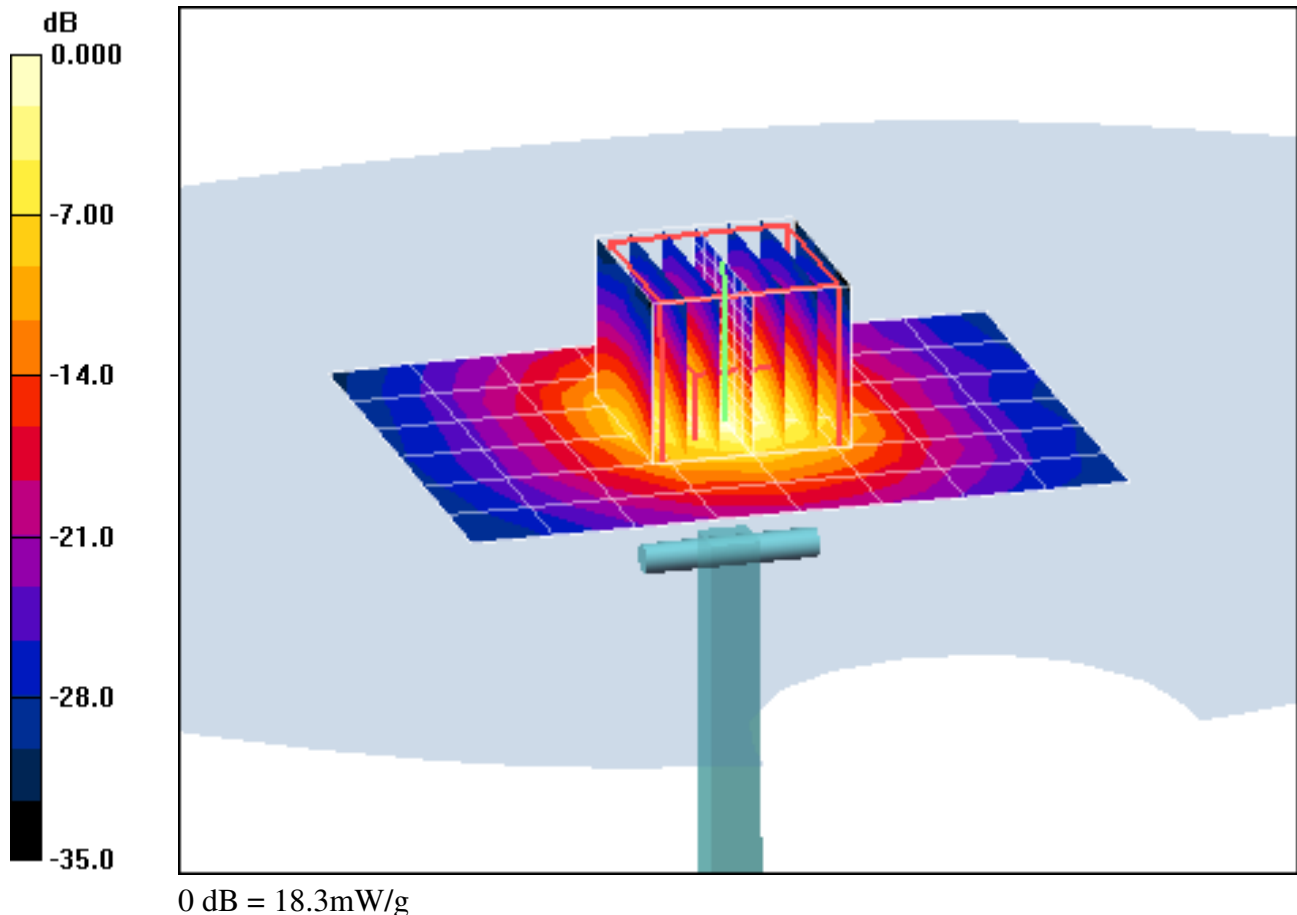
Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Input Power = 20 dBm (100 mW)

SAR(1 g) = 8.82 mW/g; SAR(10 g) = 2.51 mW/g

Deviation = 6.14%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5200 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5200 \text{ MHz}$; $\sigma = 4.74 \text{ mho/m}$; $\epsilon_r = 35.69$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-06-2011; Ambient Temp: 23.4°C; Tissue Temp: 21.8°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

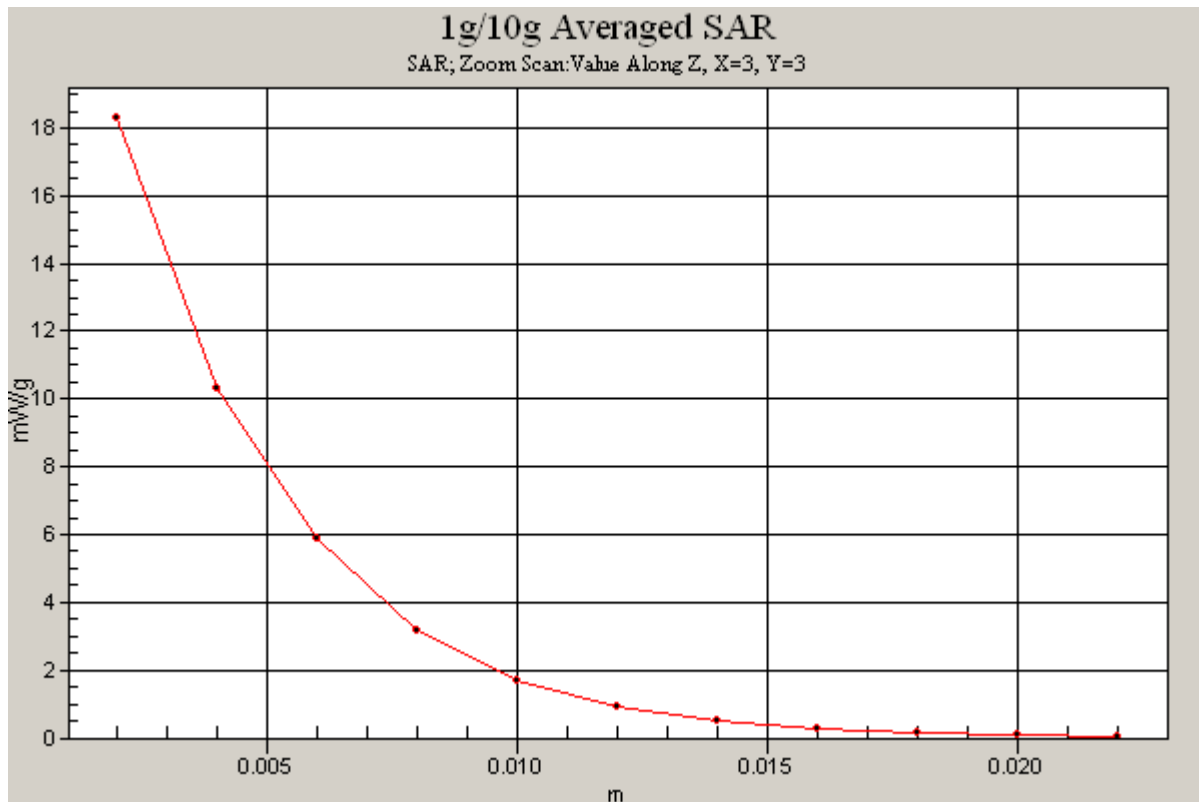
Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Input Power = 20 dBm (100 mW)

SAR(1 g) = 8.82 mW/g; SAR(10 g) = 2.51 mW/g

Deviation = 6.14%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5500 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5500 \text{ MHz}$; $\sigma = 5.078 \text{ mho/m}$; $\epsilon_r = 35.25$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-06-2011; Ambient Temp: 23.6°C; Tissue Temp: 21.9°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

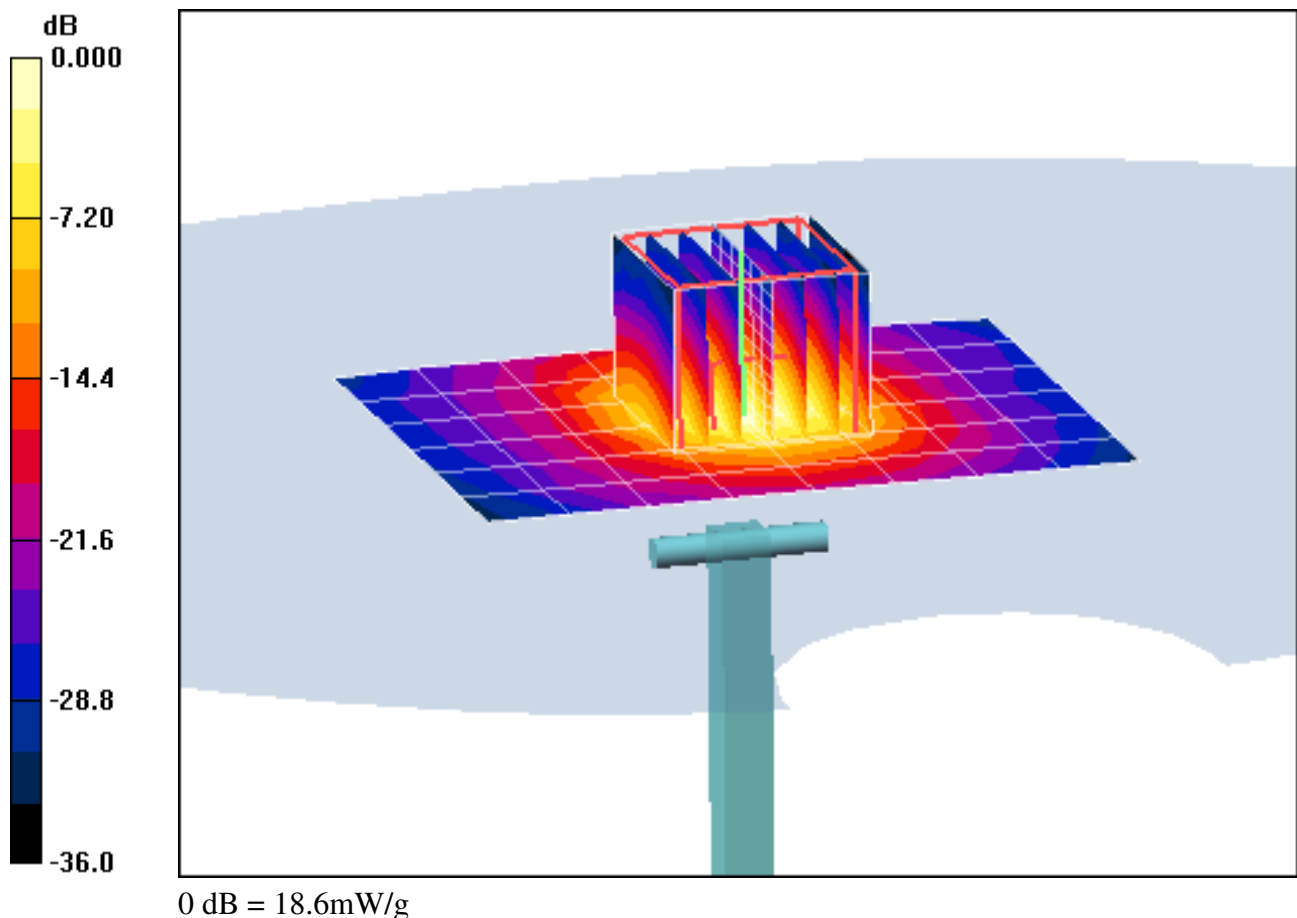
Area Scan (7x9x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 9.17 mW/g; SAR(10 g) = 2.57 mW/g

Deviation = 1.78%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5500 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5500 \text{ MHz}$; $\sigma = 5.078 \text{ mho/m}$; $\epsilon_r = 35.25$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-06-2011; Ambient Temp: 23.6°C; Tissue Temp: 21.9°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

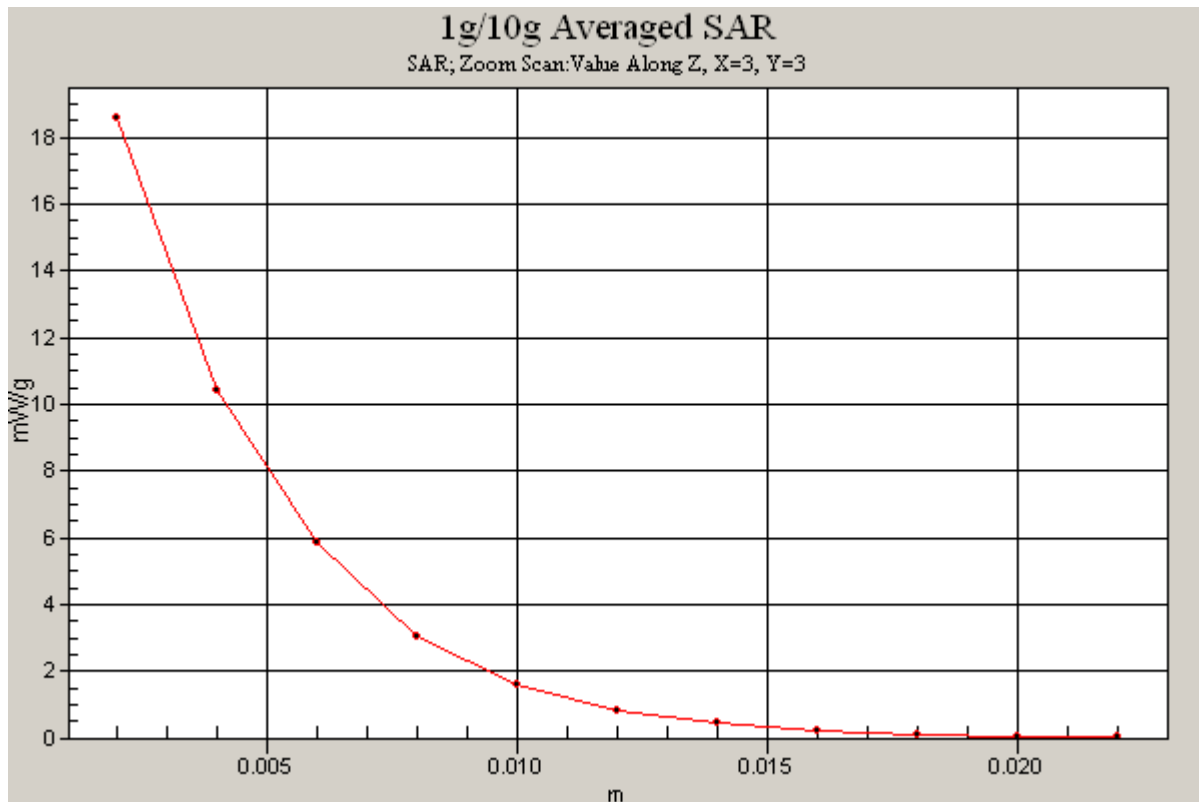
Area Scan (7x9x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 9.17 mW/g; SAR(10 g) = 2.57 mW/g

Deviation = 1.78%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5800 \text{ MHz}$; $\sigma = 5.442 \text{ mho/m}$; $\epsilon_r = 34.72$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-06-2011; Ambient Temp: 23.8°C; Tissue Temp: 22.1°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

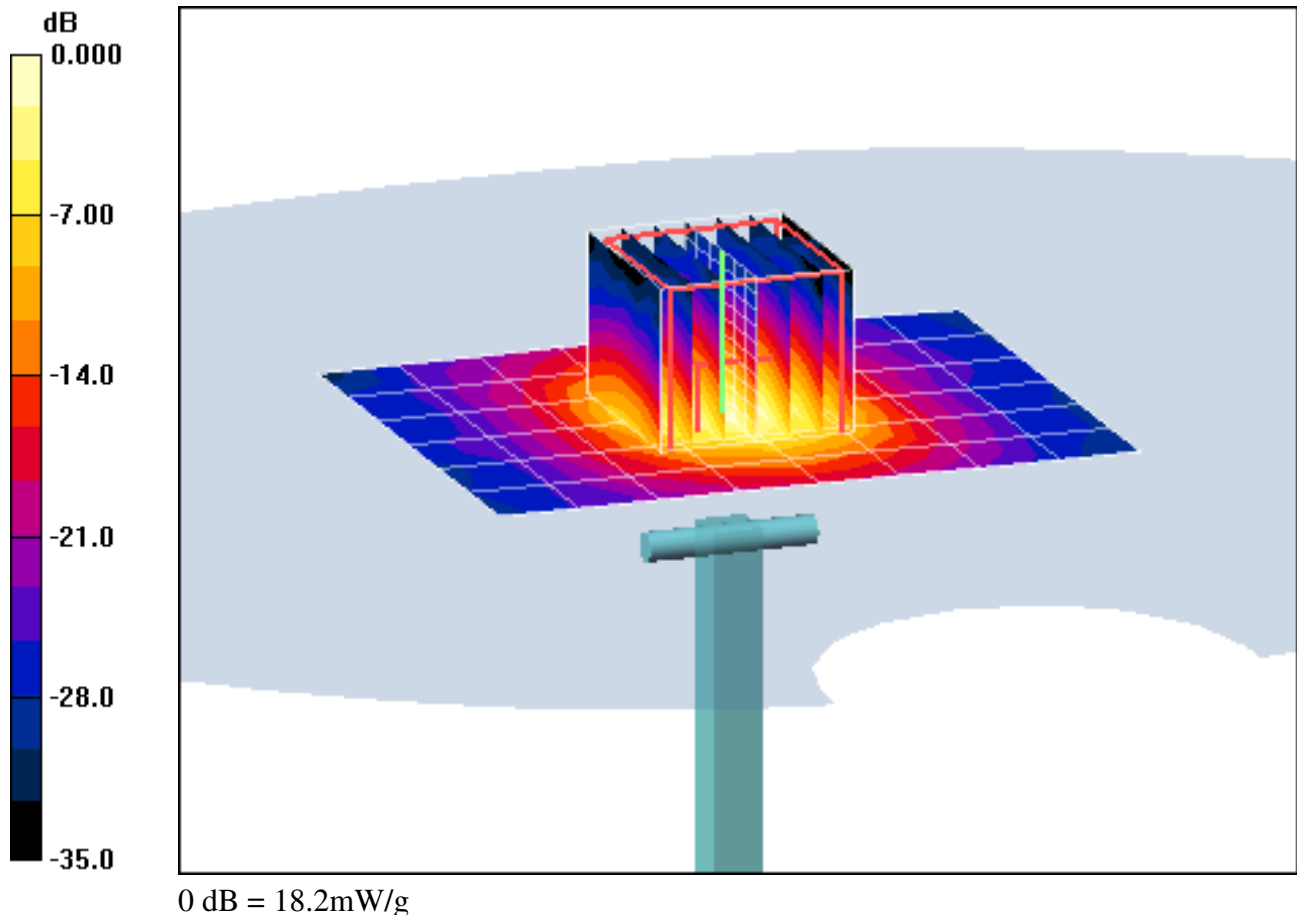
Area Scan (7x9x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 8.8 mW/g; SAR(10 g) = 2.47 mW/g

Deviation = 6.15%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5800 \text{ MHz}$; $\sigma = 5.442 \text{ mho/m}$; $\epsilon_r = 34.72$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-06-2011; Ambient Temp: 23.8°C; Tissue Temp: 22.1°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

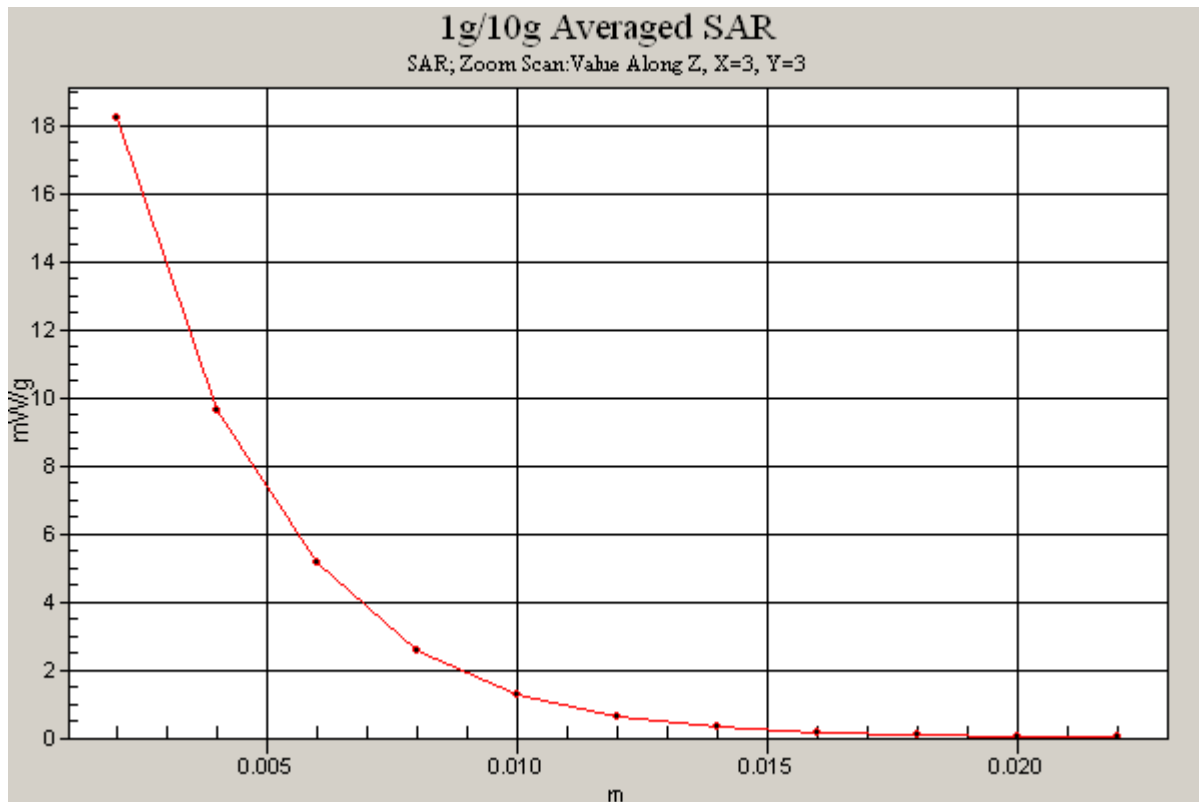
Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Input Power = 20 dBm (100 mW)

SAR(1 g) = 8.8 mW/g; SAR(10 g) = 2.47 mW/g

Deviation = 6.15%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5200 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5200 \text{ MHz}$; $\sigma = 4.608 \text{ mho/m}$; $\epsilon_r = 35.59$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-19-2011; Ambient Temp: 21.3°C; Tissue Temp: 23.2° 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

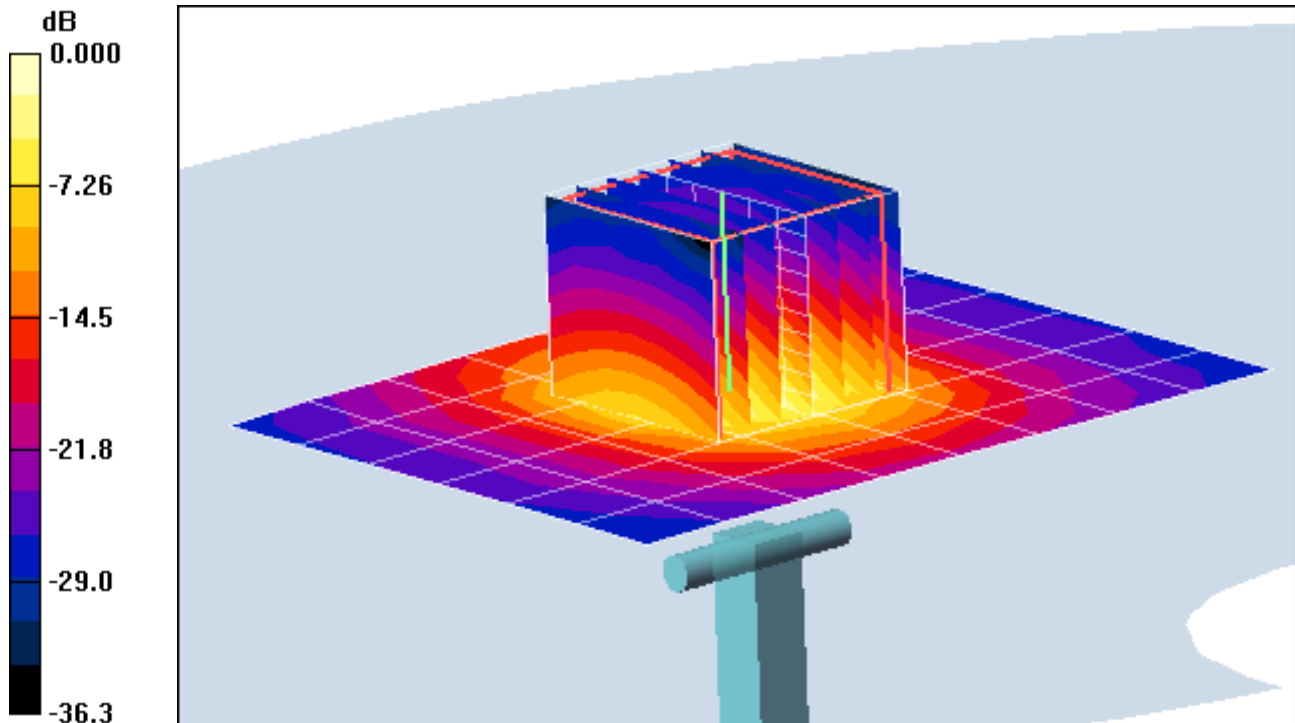
Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 8.32 mW/g; SAR(10 g) = 2.35 mW/g

Deviation = 0.12 %



0 dB = 17.6mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5200 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5200 \text{ MHz}$; $\sigma = 4.608 \text{ mho/m}$; $\epsilon_r = 35.59$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-19-2011; Ambient Temp: 21.3°C; Tissue Temp: 23.2° 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

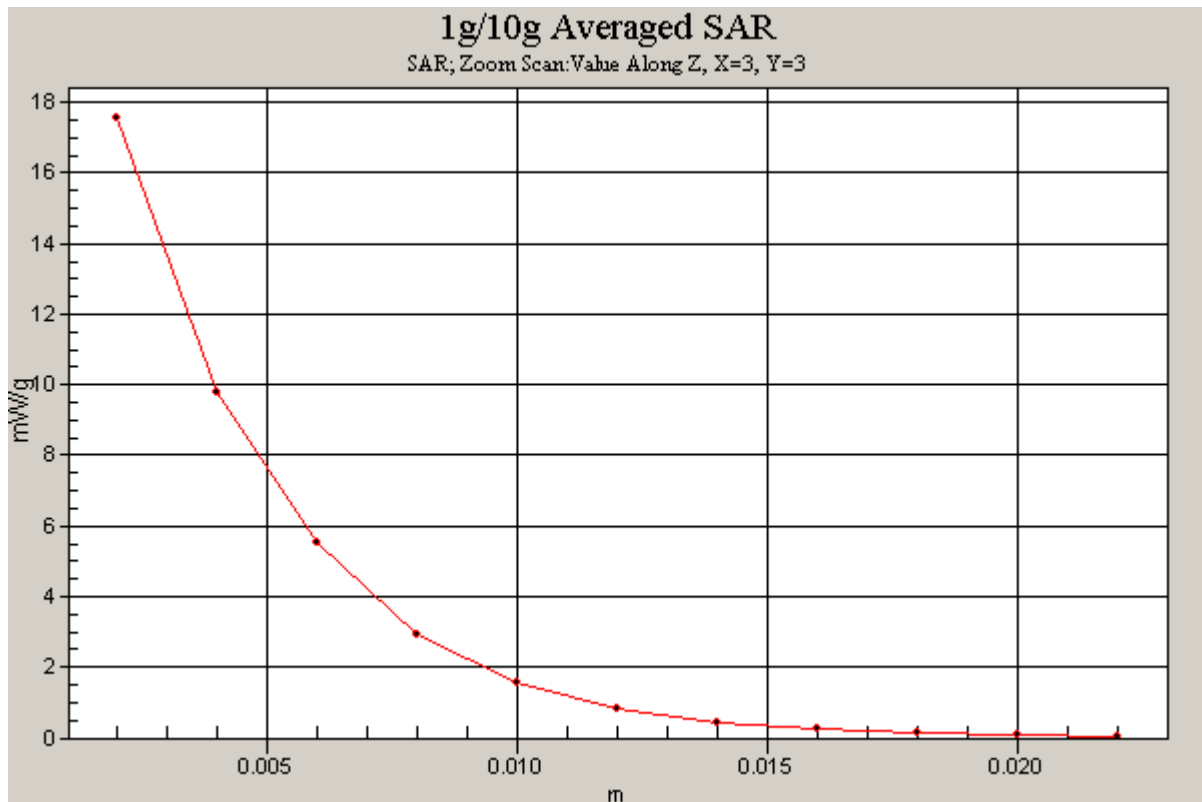
Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 8.32 mW/g; SAR(10 g) = 2.35 mW/g

Deviation = 0.12 %



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5500 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5500 \text{ MHz}$; $\sigma = 4.955 \text{ mho/m}$; $\epsilon_r = 35.09$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-19-2011; Ambient Temp: 21.4°C; Tissue Temp: 23.3° 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

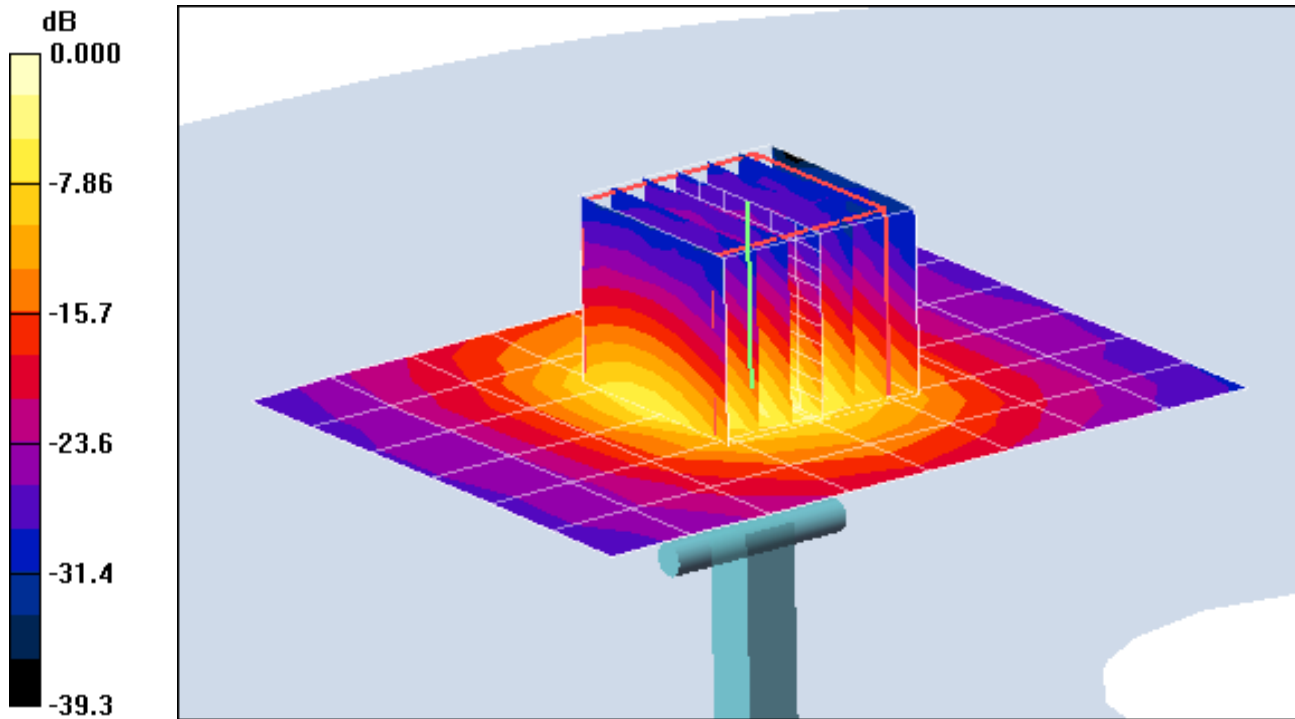
Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 8.47 mW/g; SAR(10 g) = 2.36 mW/g

Deviation = -5.99 %



0 dB = 16.6mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5500 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5500 \text{ MHz}$; $\sigma = 4.955 \text{ mho/m}$; $\epsilon_r = 35.09$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-19-2011; Ambient Temp: 21.4°C; Tissue Temp: 23.3° 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

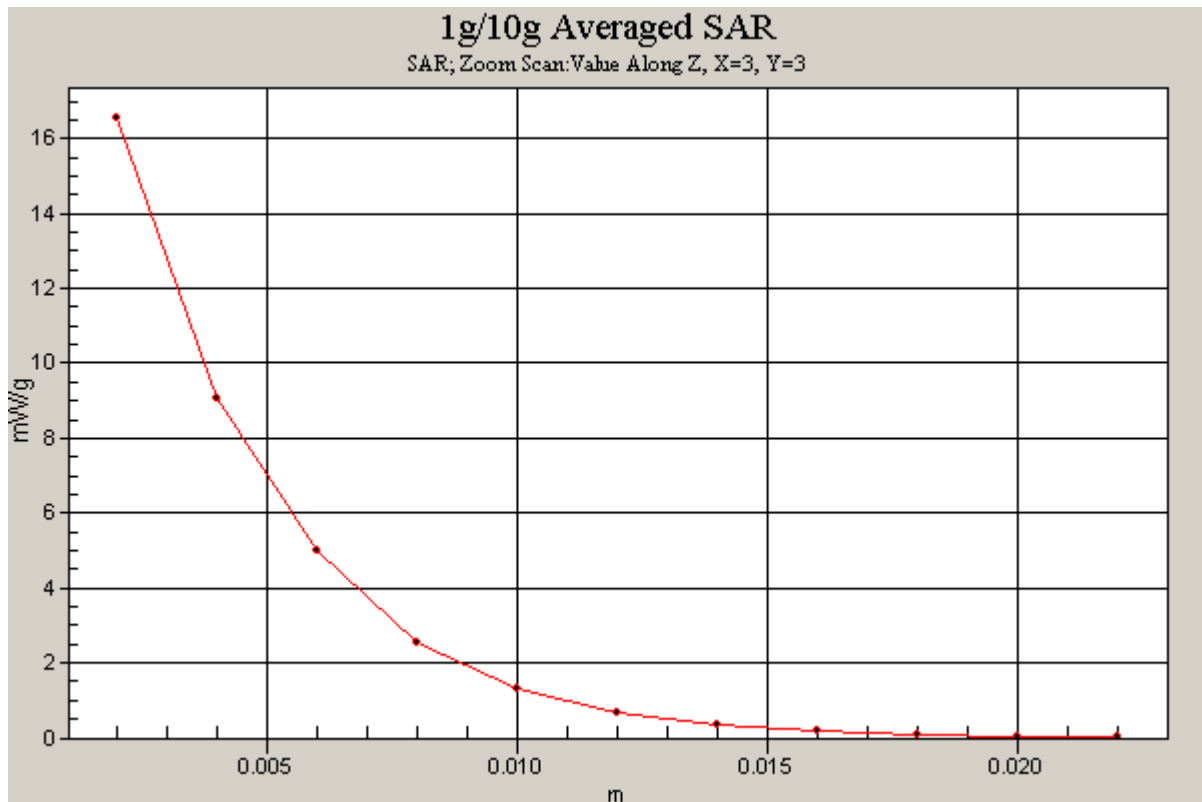
Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 8.47 mW/g; SAR(10 g) = 2.36 mW/g

Deviation = -5.99 %



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5800 \text{ MHz}$; $\sigma = 5.247 \text{ mho/m}$; $\epsilon_r = 34.53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-19-2011; Ambient Temp: 21.6°C; Tissue Temp: 23.5° 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

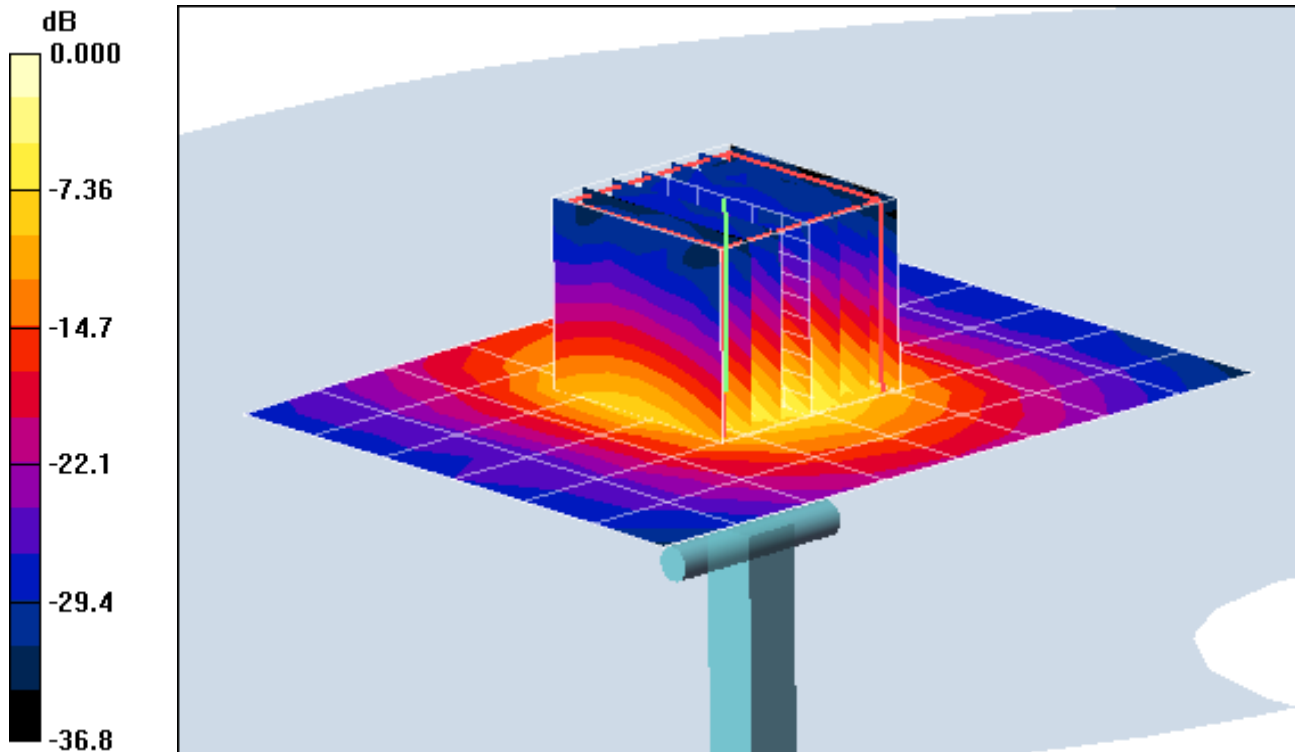
Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 8.45 mW/g; SAR(10 g) = 2.36 mW/g

Deviation = 1.93 %



0 dB = 18.3mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5800 \text{ MHz}$; $\sigma = 5.247 \text{ mho/m}$; $\epsilon_r = 34.53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-19-2011; Ambient Temp: 21.6°C; Tissue Temp: 23.5° 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

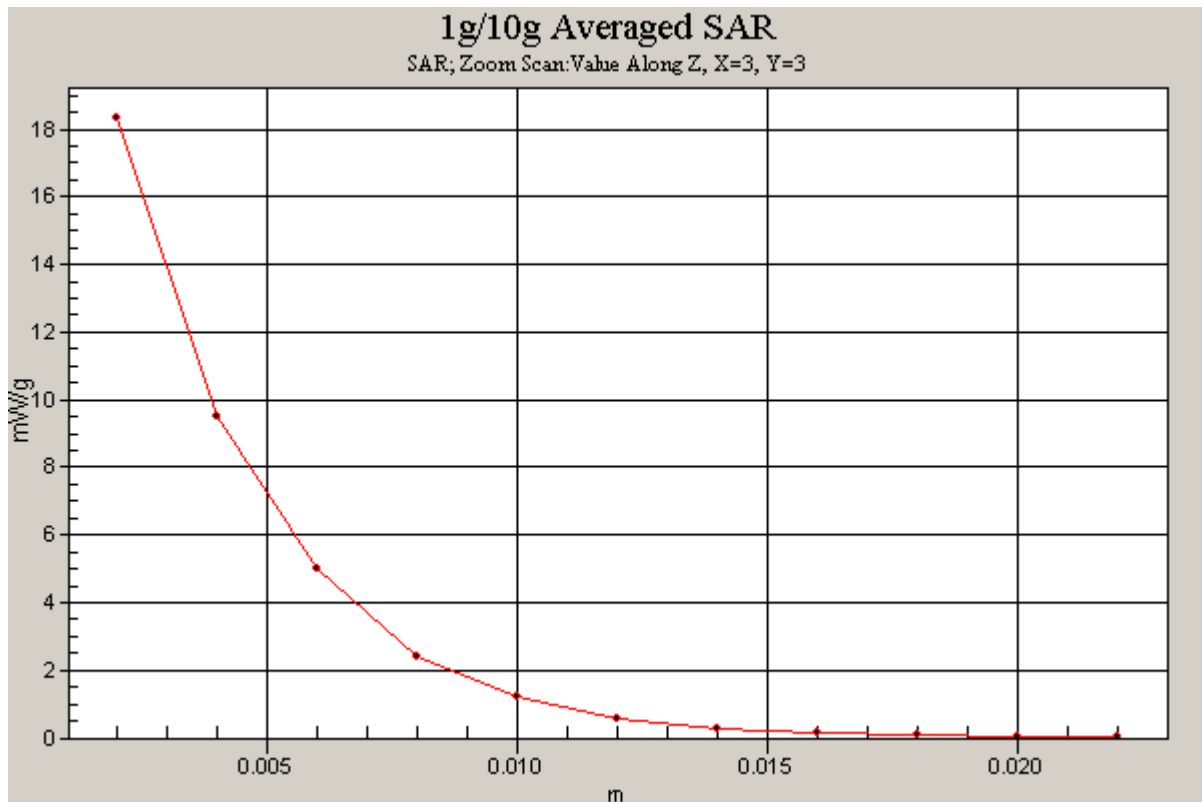
Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 8.45 mW/g; SAR(10 g) = 2.36 mW/g

Deviation = 1.93 %



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.56 \text{ mho/m}$; $\epsilon_r = 51.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-15-2011; Ambient Temp: 21.4°C; Tissue Temp: 21.3°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

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

1900MHz System Verification

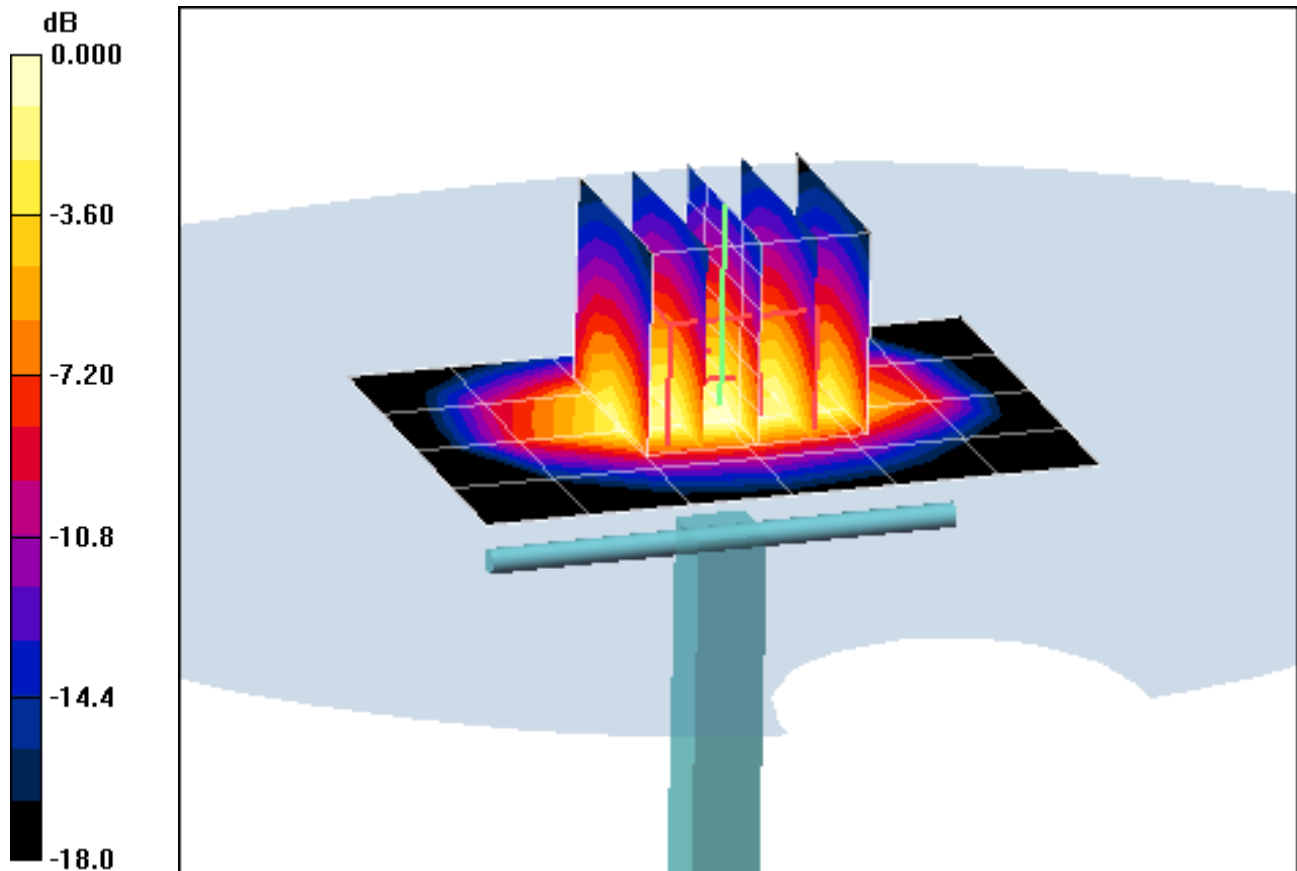
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 4.38 mW/g; SAR(10 g) = 2.29 mW/g

Deviation = 6.57%



0 dB = 4.91mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.56 \text{ mho/m}$; $\epsilon_r = 51.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-15-2011; Ambient Temp: 21.4°C; Tissue Temp: 21.3°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

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

1900MHz System Verification

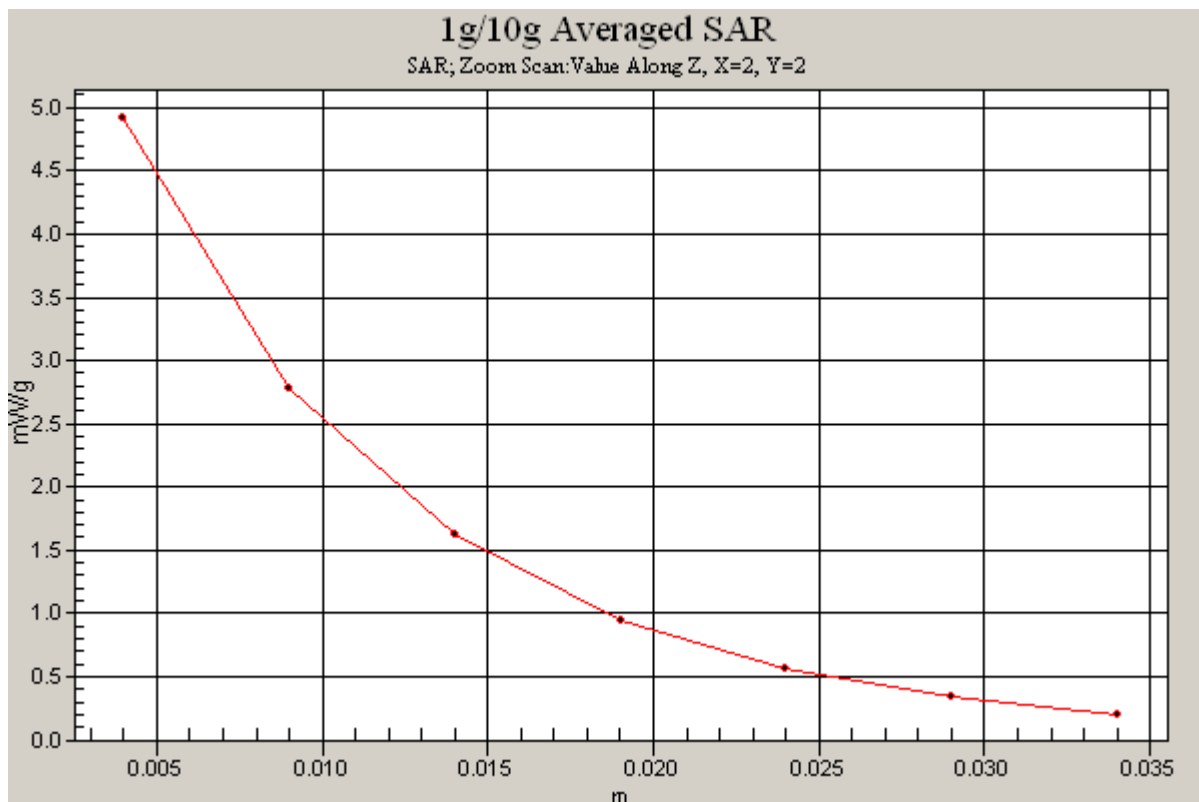
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 4.38 mW/g; SAR(10 g) = 2.29 mW/g

Deviation = 6.57%



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1900 Body; Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.52 \text{ mho/m}$; $\epsilon_r = 51.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-17-2011; Ambient Temp: 21.7°C; Tissue Temp: 20.9°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

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

1900MHz System Verification

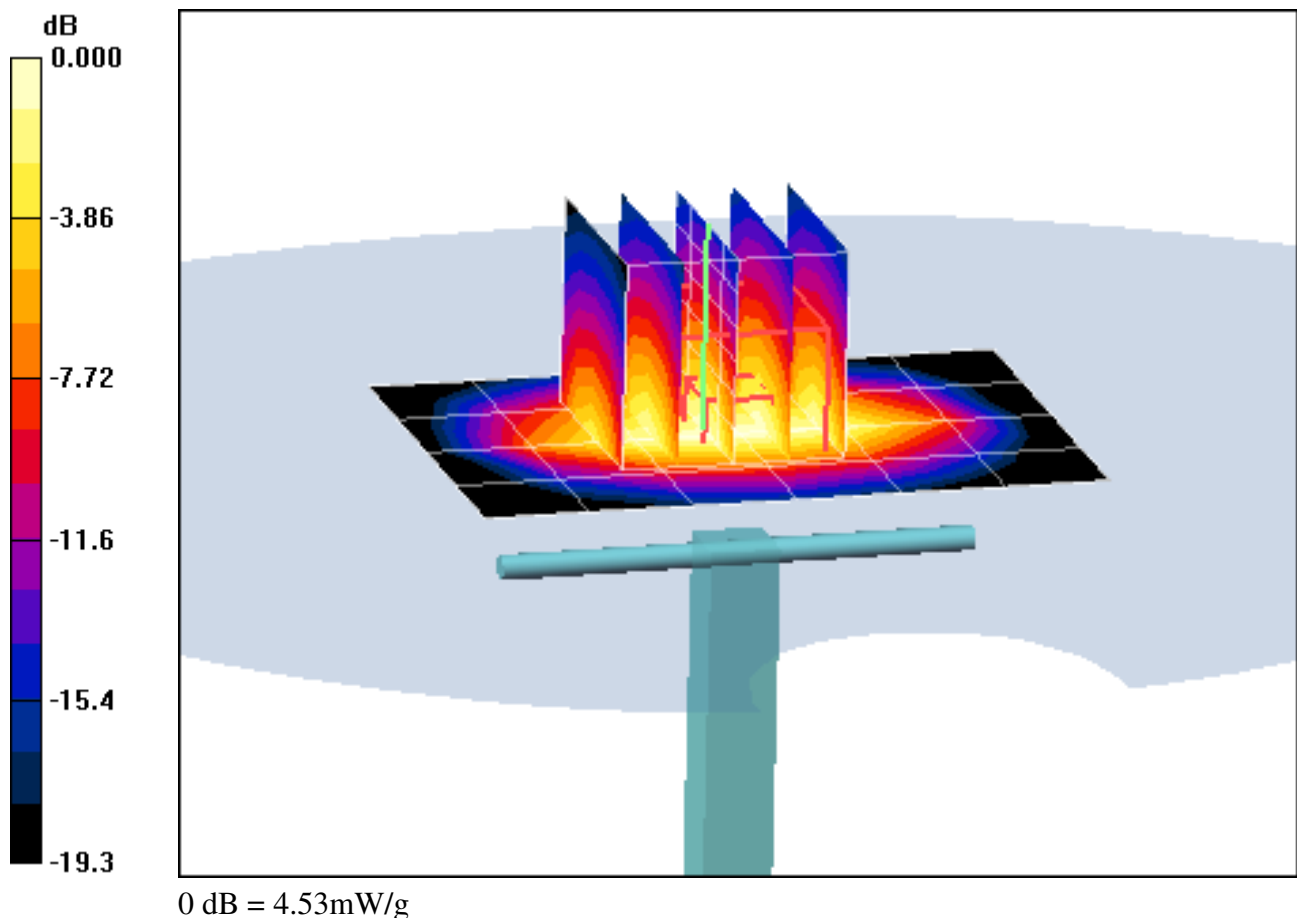
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 4.12 mW/g; SAR(10 g) = 2.12 mW/g

Deviation = 0.24%



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1900 Body; Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.52 \text{ mho/m}$; $\epsilon_r = 51.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-17-2011; Ambient Temp: 21.7°C; Tissue Temp: 20.9°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626

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

1900MHz System Verification

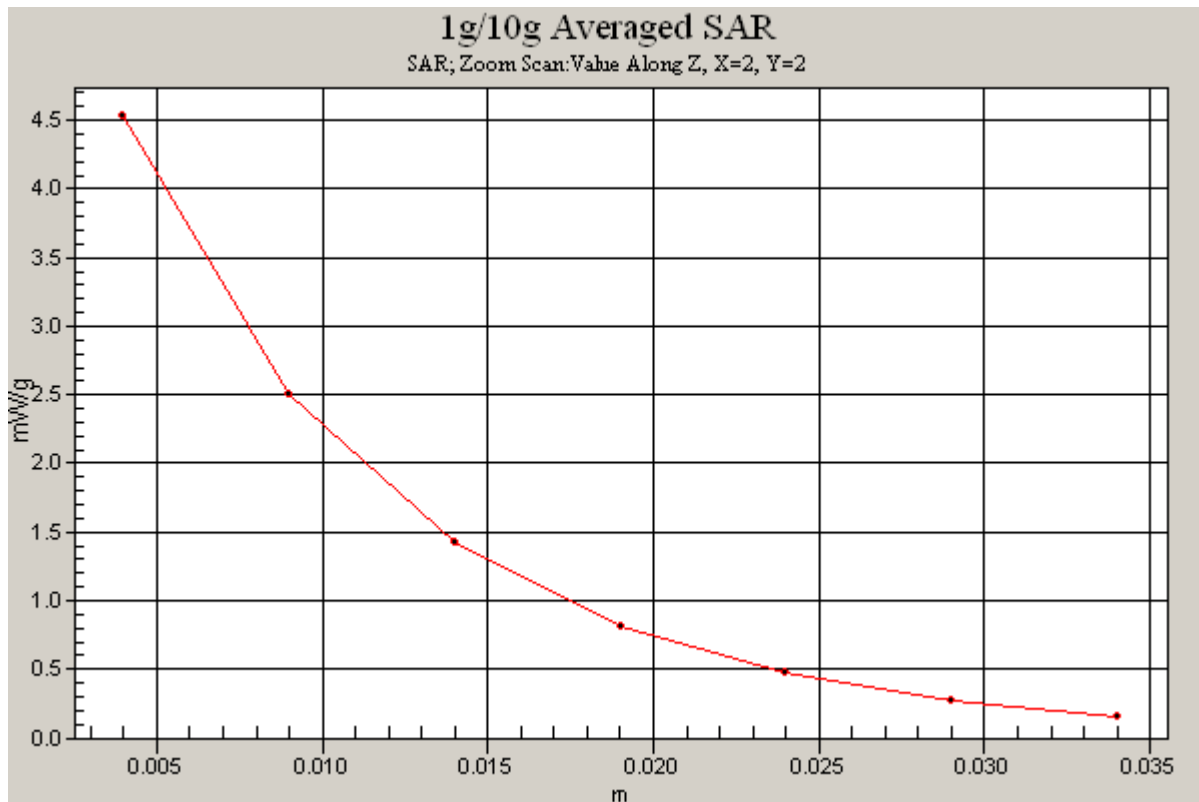
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 4.12 mW/g; SAR(10 g) = 2.12 mW/g

Deviation = 0.24%



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:

$f = 2450 \text{ MHz}$; $\sigma = 2.03 \text{ mho/m}$; $\epsilon_r = 50.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-12-2011 ; Ambient Temp: 23.4° C; Tissue Temp: 22.1°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

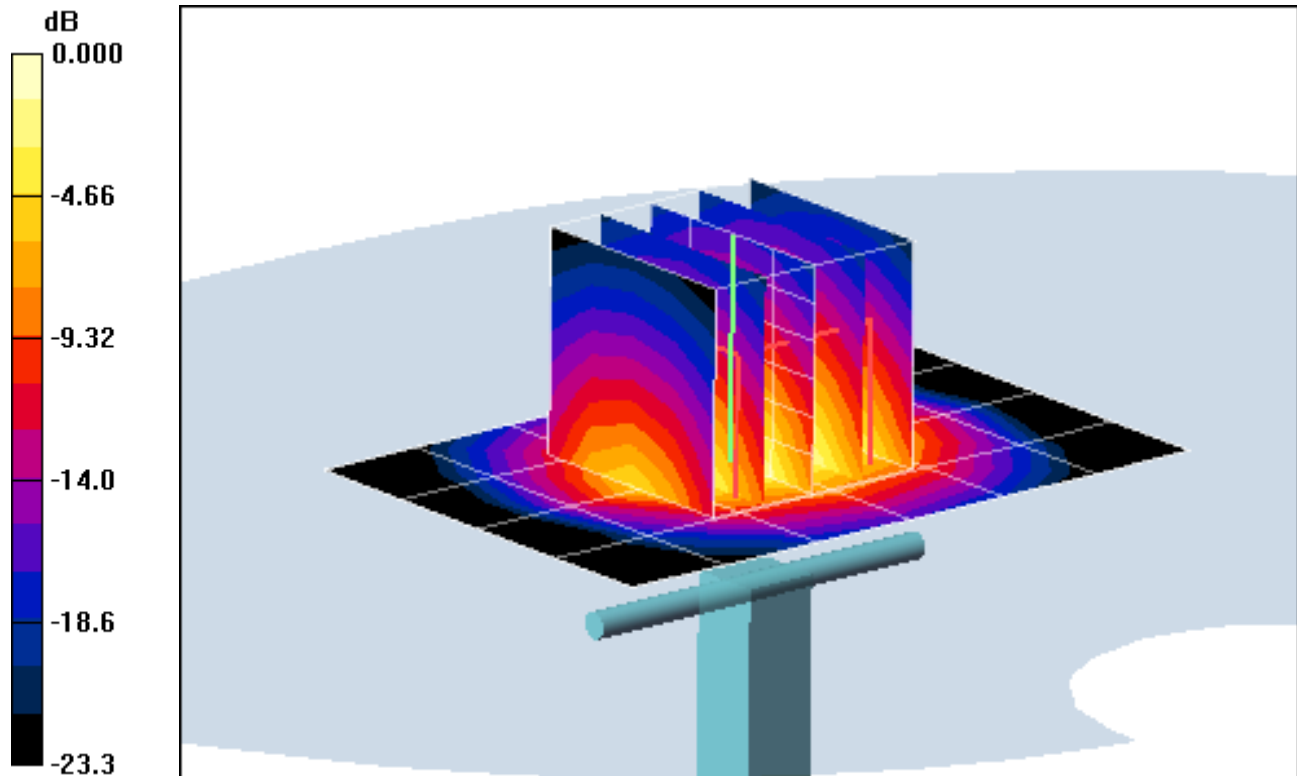
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 16.0 dBm (40 mW)

SAR(1 g) = 2.12 mW/g; SAR(10 g) = 0.970 mW/g

Deviation = 3.31 %



0 dB = 2.78mW/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:

$f = 2450 \text{ MHz}$; $\sigma = 2.03 \text{ mho/m}$; $\epsilon_r = 50.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-12-2011 ; Ambient Temp: 23.4° C; Tissue Temp: 22.1°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

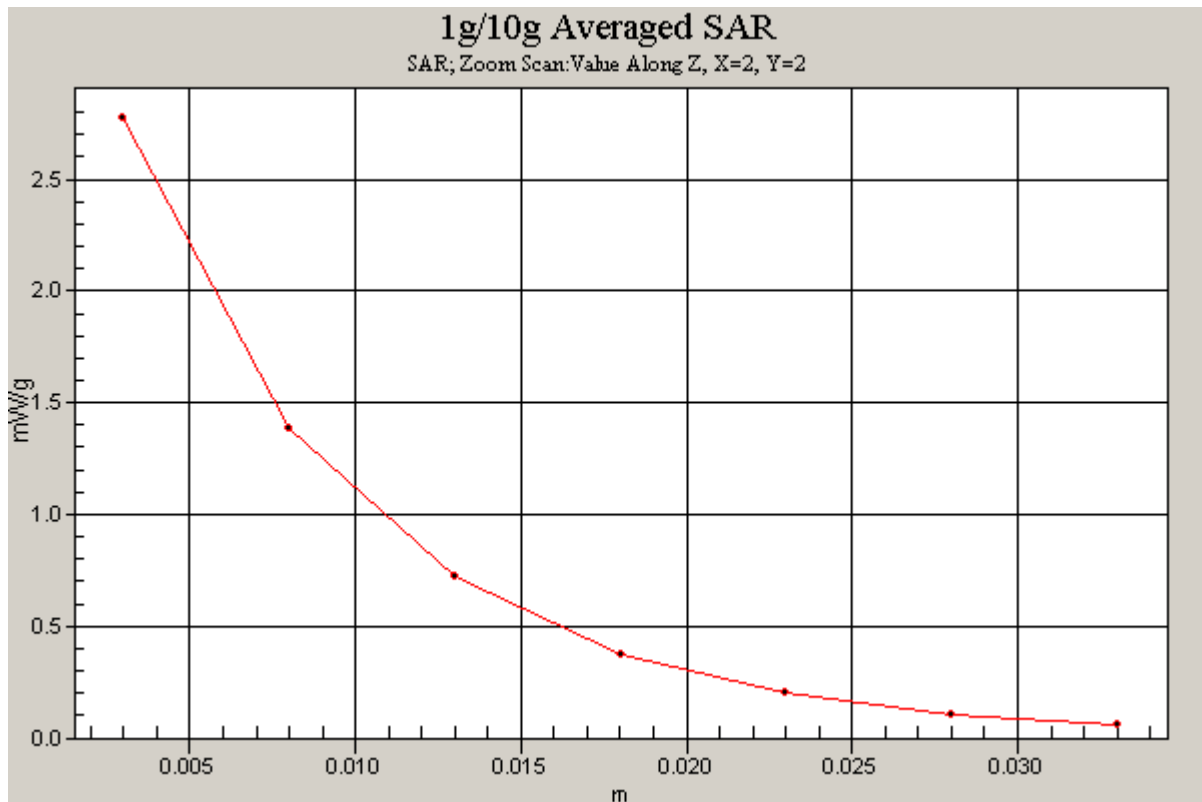
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 16.0 dBm (40 mW)

SAR(1 g) = 2.12 mW/g; SAR(10 g) = 0.970 mW/g

Deviation = 3.31 %



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5200 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Body Medium parameters used:

$f = 5200 \text{ MHz}$; $\sigma = 5.354 \text{ mho/m}$; $\epsilon_r = 47.43$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-08-2011; Ambient Temp: 23.2°C; Tissue Temp: 21.3°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

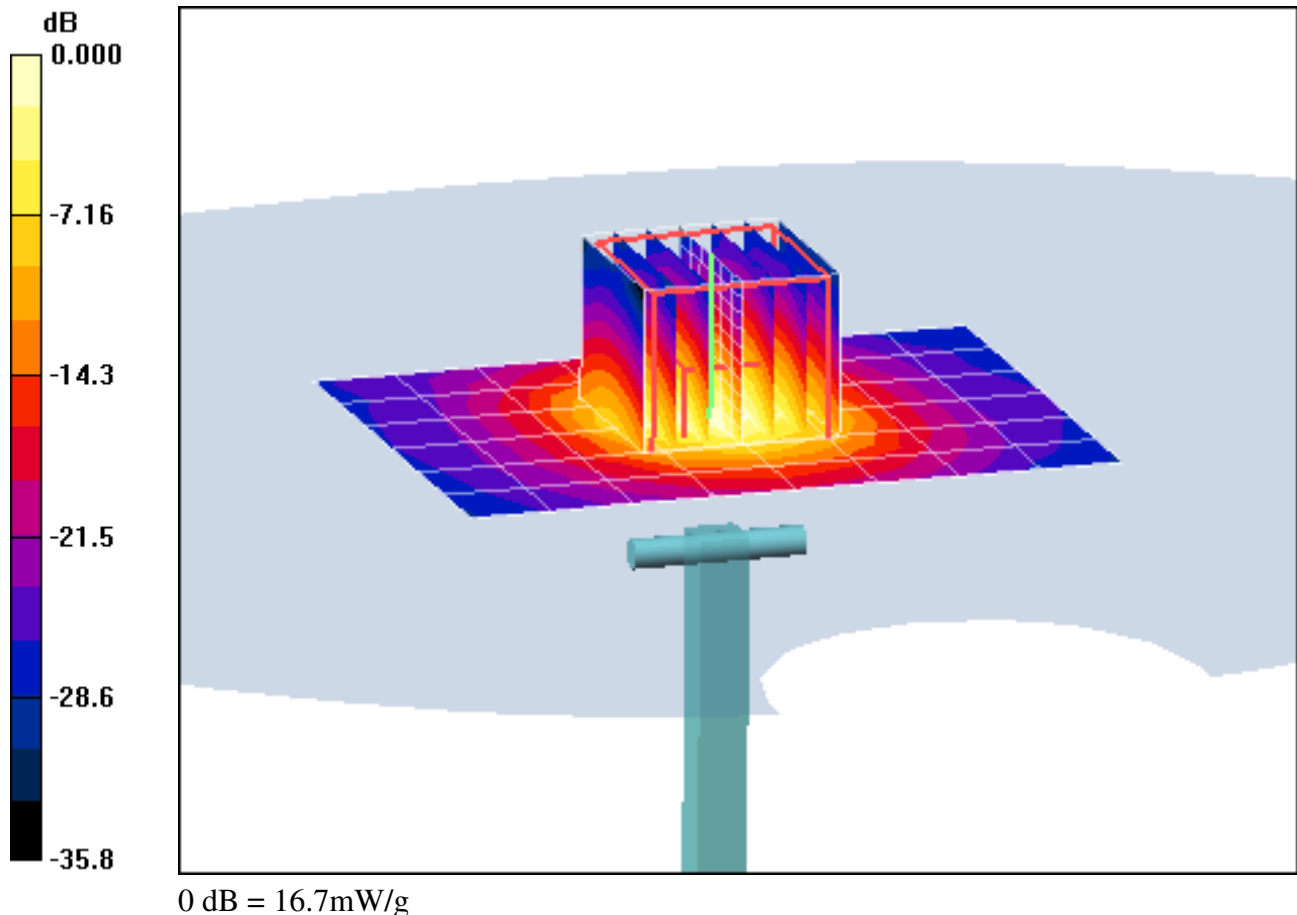
Area Scan (7x9x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 8.29 mW/g; SAR(10 g) = 2.32 mW/g

Deviation = 6.69%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5200 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Body Medium parameters used:

$f = 5200 \text{ MHz}$; $\sigma = 5.354 \text{ mho/m}$; $\epsilon_r = 47.43$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-08-2011; Ambient Temp: 23.2°C; Tissue Temp: 21.3°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

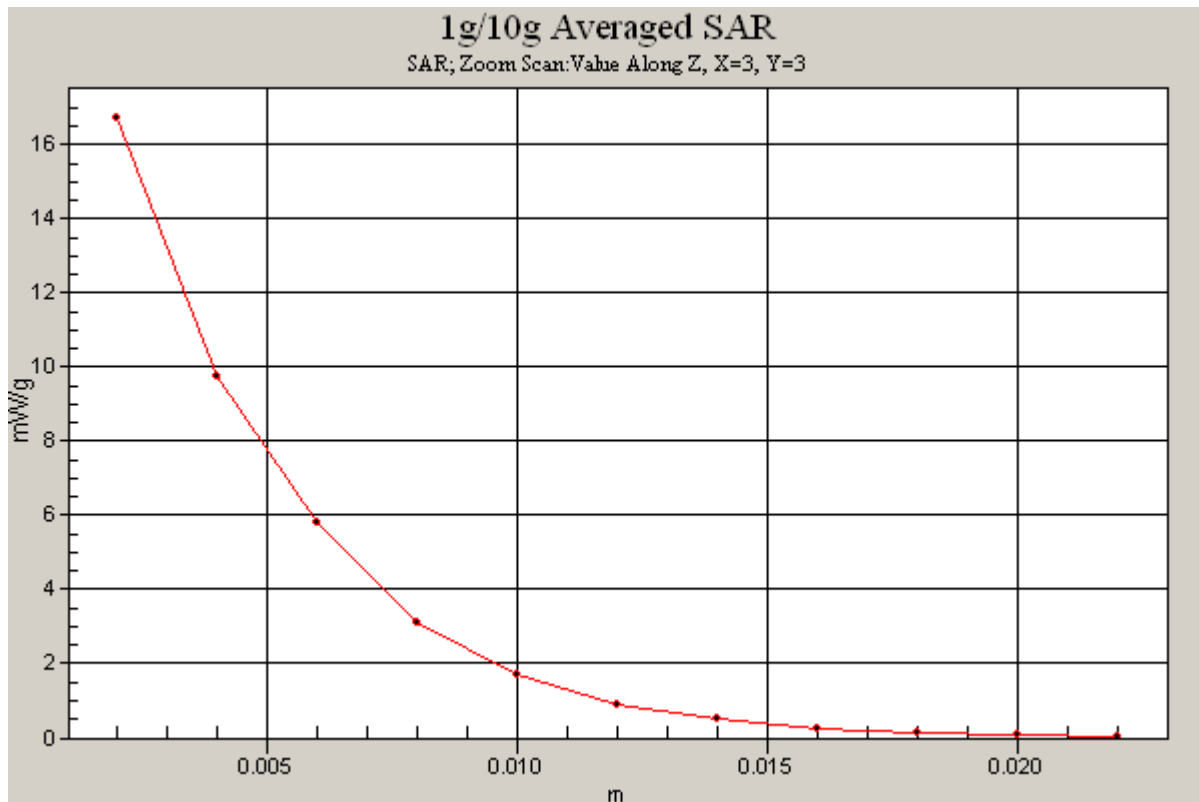
Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Input Power = 20 dBm (100 mW)

SAR(1 g) = 8.29 mW/g; SAR(10 g) = 2.32 mW/g

Deviation = 6.69%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5500 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Body; Medium parameters used:

$f = 5500 \text{ MHz}$; $\sigma = 5.792 \text{ mho/m}$; $\epsilon_r = 46.74$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-08-2011; Ambient Temp: 23.4°C; Tissue Temp: 21.5°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

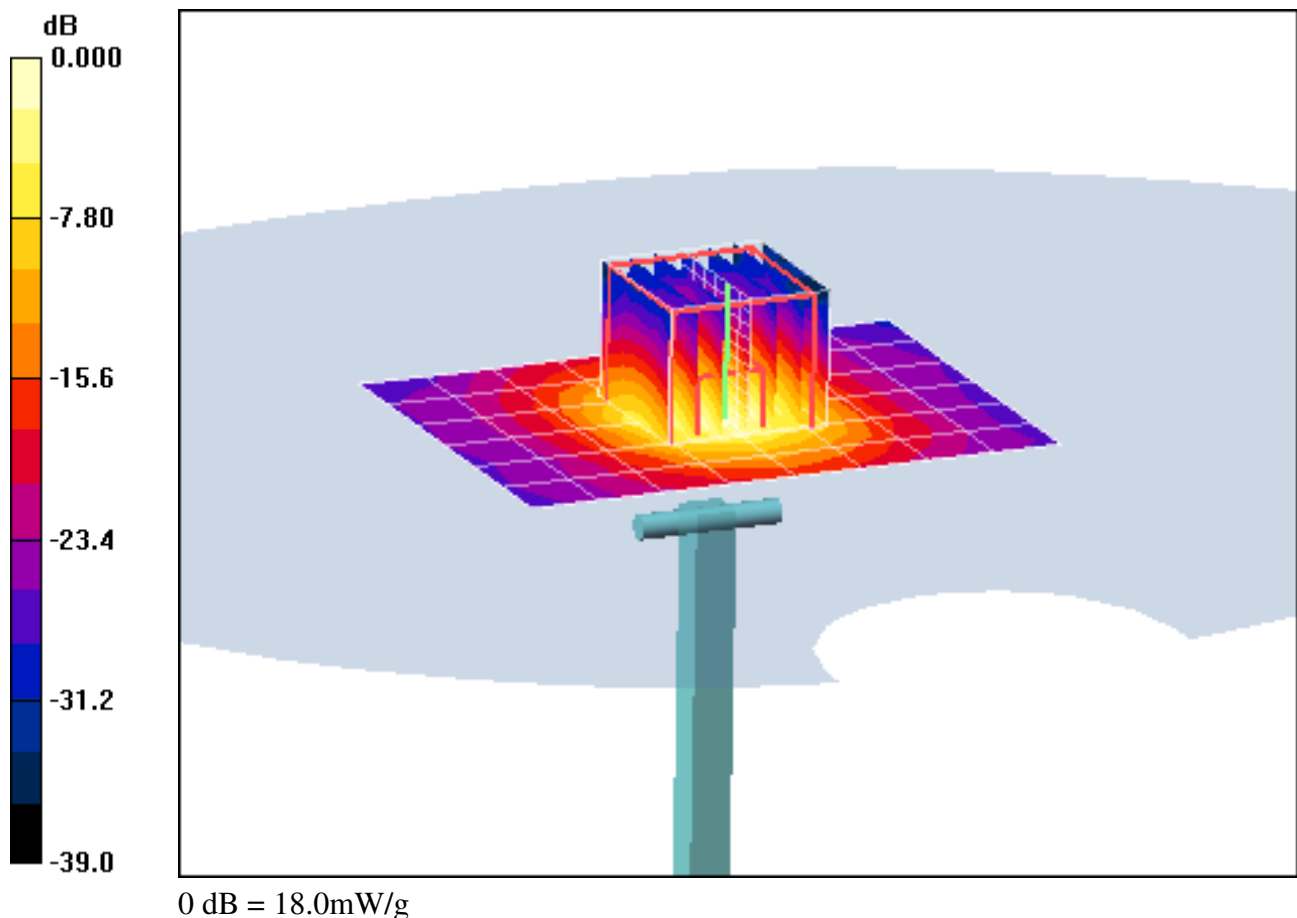
Area Scan (7x9x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 8.84 mW/g; SAR(10 g) = 2.42 mW/g

Deviation = 4.74%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5500 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Body; Medium parameters used:

$f = 5500 \text{ MHz}$; $\sigma = 5.792 \text{ mho/m}$; $\epsilon_r = 46.74$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-08-2011; Ambient Temp: 23.4°C; Tissue Temp: 21.5°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

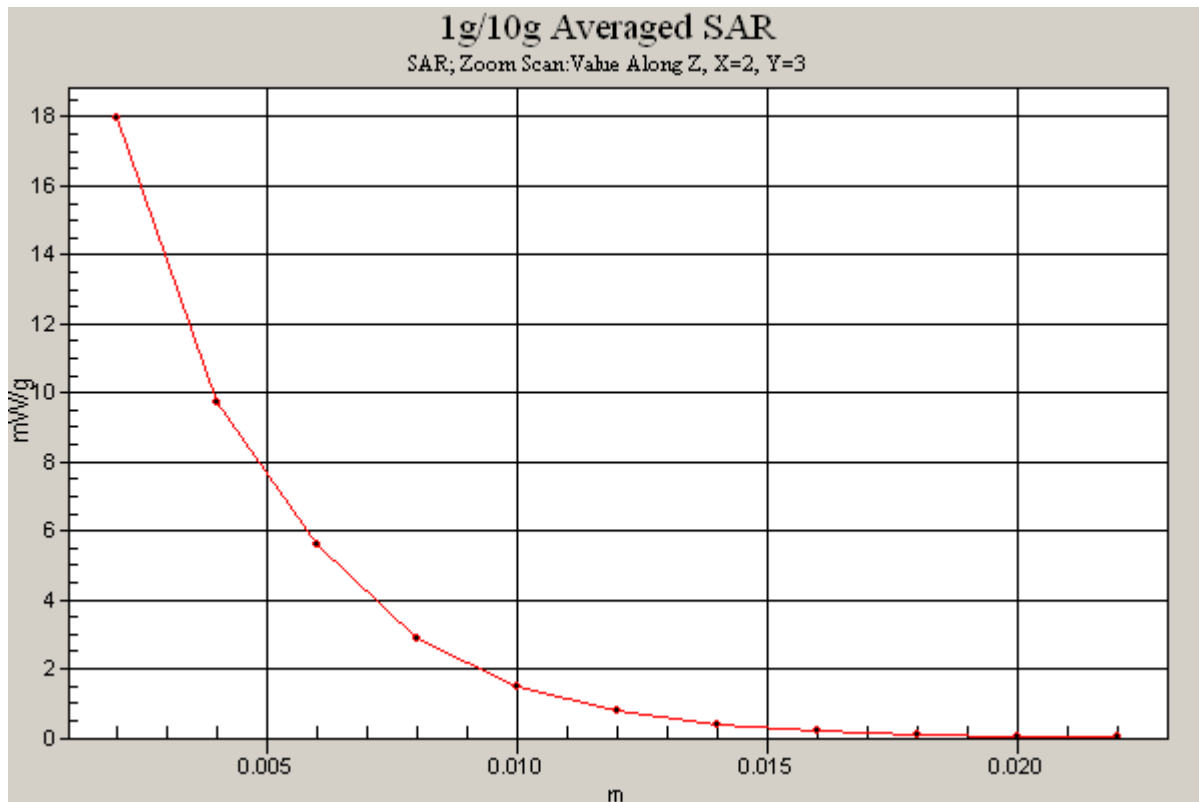
Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Input Power = 20 dBm (100 mW)

SAR(1 g) = 8.84 mW/g; SAR(10 g) = 2.42 mW/g

Deviation = 4.74%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Body; Medium parameters used:

$f = 5800 \text{ MHz}$; $\sigma = 6.173 \text{ mho/m}$; $\epsilon_r = 46.21$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-08-2011; Ambient Temp: 23.6°C; Tissue Temp: 21.7°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

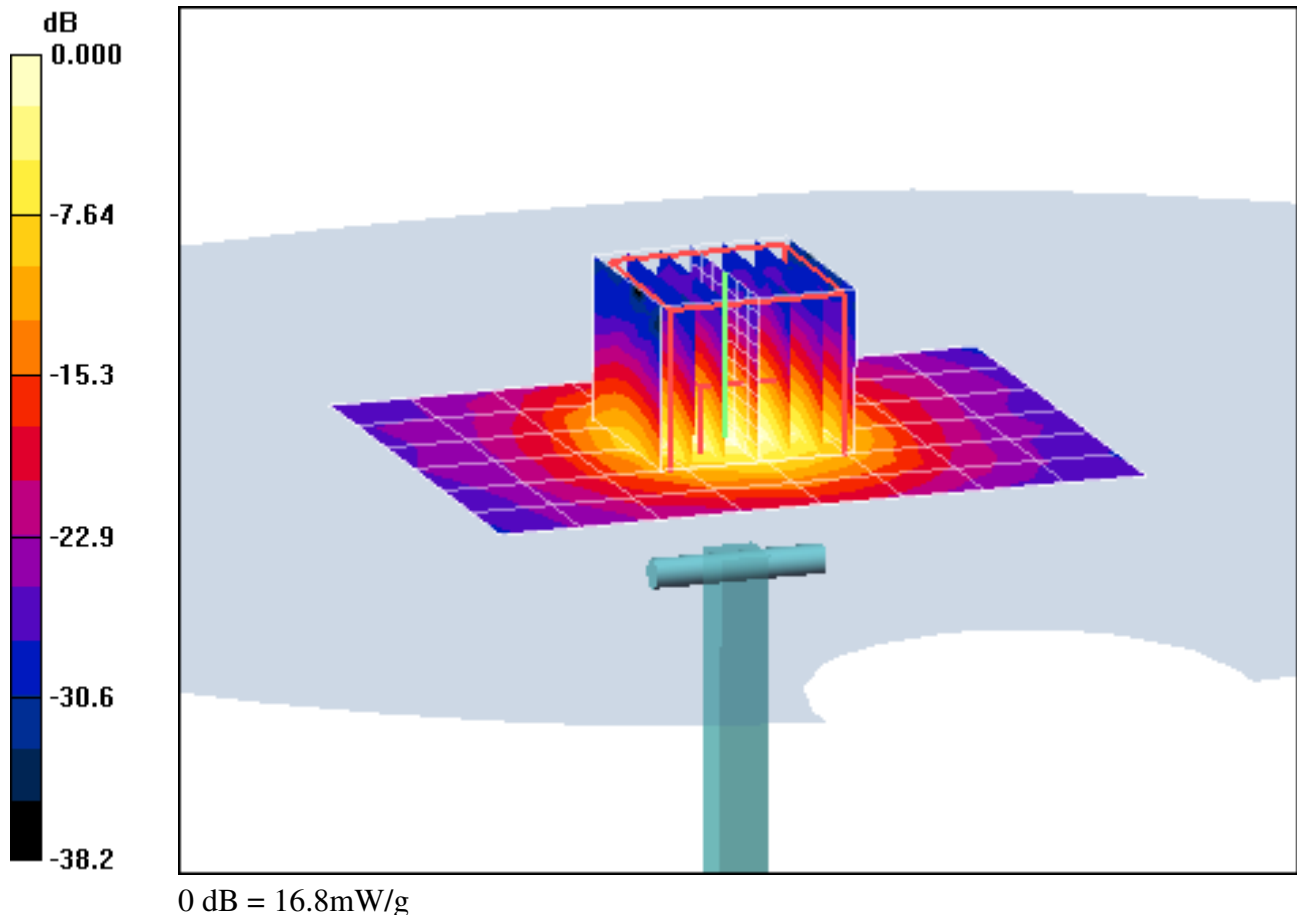
Area Scan (7x9x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 7.84 mW/g; SAR(10 g) = 2.15 mW/g

Deviation = 4.53%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Body; Medium parameters used:

$f = 5800 \text{ MHz}$; $\sigma = 6.173 \text{ mho/m}$; $\epsilon_r = 46.21$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-08-2011; Ambient Temp: 23.6°C; Tissue Temp: 21.7°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 (100 mW)

SAR(1 g) = 7.84 mW/g; SAR(10 g) = 2.15 mW/g

Deviation = 4.53%

