



SAR COMPLIANCE EVALUATION REPORT

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

Date of Testing:
10/20/11 - 11/04/11
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Test Report Serial No.:
0Y1110251875.A3L

FCC ID: A3LSCHR930

APPLICANT: SAMSUNG ELECTRONICS, CO. LTD.

EUT Type: Portable Handset
Application Type: Certification
FCC Rule Part(s): CFR §2.1093; FCC/OET Bulletin 65 Supplement C [June 2001]
Model(s): SCH-R930
Test Device Serial No.: Pre-Production [S/N: 2, 4, 5, 7, 9]

Technology	Band & Mode	Tx Frequency	Conducted Power [dBm]	1 gram SAR (W/kg)		
				Head	Body-Worn	Wireless Router
CDMA/EVDO	Cell. CDMA/EVDO	824.70 - 848.31 MHz	24.75	0.23	0.63	0.58
	PCS CDMA/EVDO	1851.25 - 1908.75 MHz	24.85	0.35	0.57	0.58
LTE	LTE Band 12	701.5 - 713.5 MHz	22.76	0.20	0.27	0.27
	LTE Band 5 (Cell.)	824.7 - 848.3 MHz	22.95	0.40	0.33	0.33
	LTE Band 4 (AWS)	1712.5 - 1752.5 MHz	22.92	0.89	0.49	0.49
	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	22.95	0.55	0.24	0.24
WIFI	2.4 GHz WLAN	2412 - 2462 MHz	16.78	0.05	0.26	0.26
Bluetooth	Bluetooth	2402 - 2480 MHz	8.01	N/A		
Simultaneous SAR per KDB 690783:				1.12		

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.

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 LTE INFORMATION PER KDB 941225 D05

KDB 941225 Pub LTE Information				
KDB 941225 Section	FCC ID	A3LSCHR930		
	Form Factor	Handset		
1)	Frequency Range of each LTE transmission band	Band 2: Tx (1850.7 - 1909.3 MHz) Band 4: Tx (1712.5 - 1752.5 MHz) Band 5: Tx (824.7 - 848.3 MHz) Band 12: Tx (701.5 - 713.5 MHz)		
2)	Channel Bandwidths	Band 2: 1.4 MHz, 3 MHz, 5 MHz Band 4: 5 MHz, 10 MHz Band 5: 1.4 MHz, 3 MHz, 5 MHz Band 12: 5 MHz, 10 MHz		
3)	Channel Numbers and Frequencies (MHz)	Low	Mid	High
	LTE Band 2 and BW 1.4 MHz	1850.7 MHz (18607)	1880 MHz (18900)	1909.3 MHz (19193)
	LTE Band 2 and BW 3 MHz	1851.5 MHz (18615)	1880 MHz (18900)	1908.5 MHz (19185)
	LTE Band 2 and BW 5 MHz	1852.5 MHz (18625)	1880 MHz (18900)	1907.5 MHz (19175)
	LTE Band 4 and BW 5 MHz	1712.5 MHz (19975)	1732.5 MHz (20175)	1752.5 MHz (20375)
	LTE Band 4 and BW 10 MHz	1715 MHz (20000)	1732.5 MHz (20175)	1750 MHz (20350)
	LTE Band 5 and BW 1.4 MHz	824.7 MHz (20407)	836.5 MHz (20525)	848.3 MHz (20643)
	LTE Band 5 and BW 3 MHz	825.5 (20415)	836.5 MHz (20525)	847.5 MHz (20635)
	LTE Band 5 and BW 5 MHz	826.5 MHz(20425)	836.5 MHz (20525)	846.5 MHz (20625)
	LTE Band 12 and BW 5 MHz	701.5 MHz (23035)	707.5 MHz (23095)	713.5 MHz (23155)
	LTE Band 12 and BW 10 MHz	704 MHz (23060)	707.5 Mhz (23095)	711 MHz (23130)
4)(a)	UE Category	3		
(b)	Modulations Supported in UL	QPSK, 16QAM		
	LTE Transmitter and Antenna Implementation	Operational Description		
5)	Description of LTE Tx and Ant. Implementation	1 TX/RX Ant; 2 Rx Ant		
6)	LTE Voice available?	Yes		
	Hotspot with LTE+WIFI	Yes		
	Hotspot with LTE+WIFI active with 1XVoice sessions?	No		
7)	LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3-6.2.5? (manufacturer attestation to be provided)	Yes		
	A-MPR (Additional MPR) disabled for SAR Testing?	Yes		
8)	Conducted power Table provided for 1RB (low and high offset), 50% RB (centered), 100% RB	Yes		
9-10)	Non-LTE US Wireless Operating Modes/Band	RF Output Power	RF Exposure Configurations	
	835 MHz CDMA	see page 1	Head, Body and Hotspot	
	1900 MHz CDMA		Head, Body and Hotspot	
	2.4 GHz Bluetooth		Body	
	2.4 GHz WI-FI		Head, Body and Hotspot	
11)	Simultaneous Tx Conditions (Voice and Data Configurations)	See SAR report		
12)	Power Reduction used for SAR Compliance?	No		
13)	Describe Power Reduction (LTE Modes)	N/A		
14)	SAR Test Plan	N/A		
15)	SAR test data, preliminary	N/A		

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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/m³)
- 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.

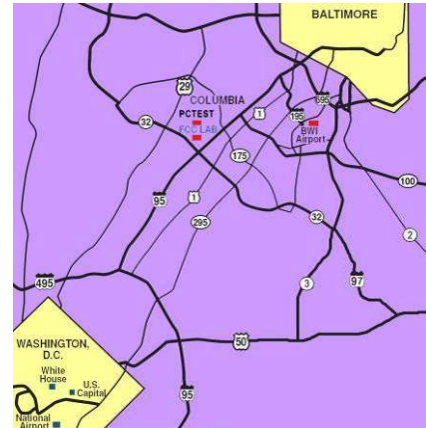
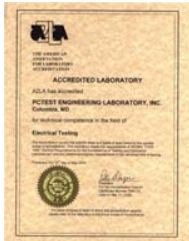


Figure 3-1
Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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

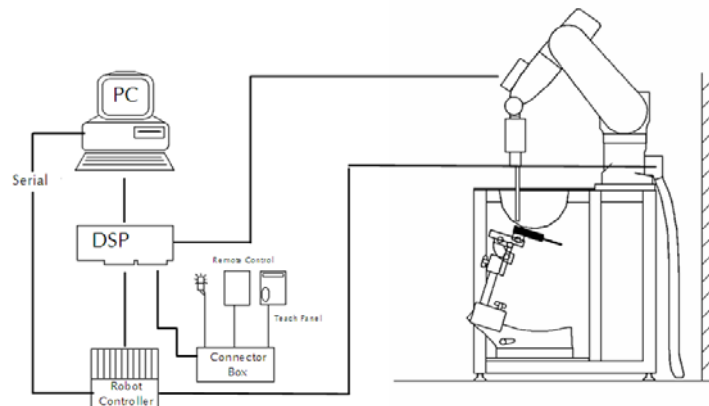


Figure 4-1
SAR Measurement System Setup

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)
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)
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
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.

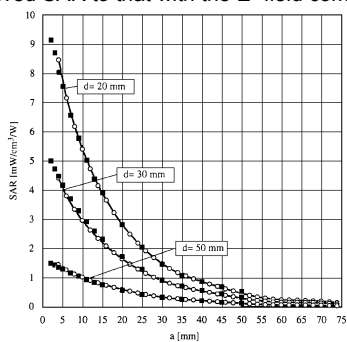


Figure 6-1 E-Field and Temperature measurements at 900MHz [9]

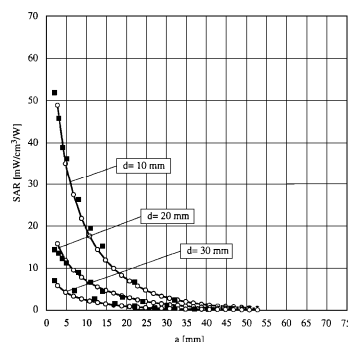


Figure 6-2 E-Field and temperature measurements at 1.9GHz [9]

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7 PHANTOM AND EQUIVALENT TISSUES

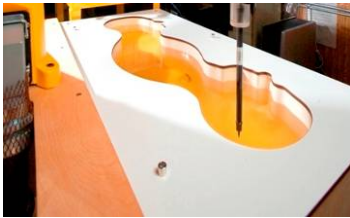
7.1 SAM Phantoms



**Figure 7-1
SAM Phantoms**

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

7.2 Tissue Simulating Mixture Characterization



**Figure 7-2
SAM Phantom with
Simulating Tissue**

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

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

Frequency (MHz)	835	835	1750	1750	1900	1900	2450	2450
Tissue	Head	Body	Head	Body	Head	Body	Head	Body
Ingredients (% by weight)								
Bactericide	0.1	0.1						
DGBE			47	31	44.92	29.44	7.99	26.7
HEC	1	1						
NaCl	1.45	0.94	0.4	0.2	0.18	0.39	0.16	0.1
Sucrose	57	44.9						
Triton X-100							19.97	
Water	40.45	53.06	52.6	68.8	54.9	70.17	71.88	73.2

See next page for 750 MHz Tissue Composition

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Table 7-2
Composition of 750 MHz Head and Body Tissue Equivalent Matter

2 Composition / Information on ingredients	
The Item is composed of the following ingredients:	
H ₂ O	Water, 35 – 58%
Sucrose	Sugar, white, refined, 40 – 60%
NaCl	Sodium Chloride, 0 – 6%
Hydroxyethyl-cellulose	Medium Viscosity (CAS# 9004-82-0), <0.3%
Preventol-D7	Preservative: aqueous preparation, (CAS# 55965-84-9), containing 5-chloro-2-methyl-3(2H)-isothiazolone and 2-methyl-3(2H)-isothiazolone, 0.1 – 0.7%
Relevant for safety; Refer to the respective Safety Data Sheet*.	

Note: 750MHz liquid recipes are proprietary SPEAG. The composition is approximate to the actual liquids utilized. Thus the manufacturer production sheets are provided below.

Measurement Certificate / Material Test

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

Measurement Method

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

Target Parameters

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

Test Condition

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

Additional Information

TSL Density 1.212 g/cm³
TSL Heat-capacity 3.006 kJ/(kg*K)

Results

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

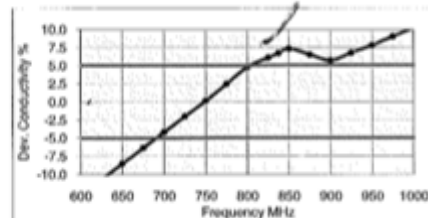
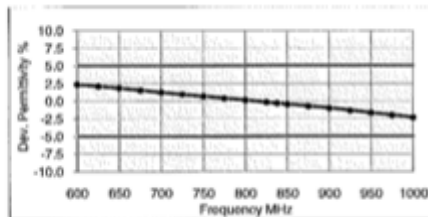


Figure 7-1
750MHz Body Tissue Equivalent Matter

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Measurement Certificate / Material Test

Item Name **Head Tissue Simulating Liquid (HSL 750)**
 Product No. SL AAH 075 (Charge: 110601-1)
 Manufacturer SPEAG

Measurement Method

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

Target Parameters

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

Test Condition

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

Additional Information

TSL Density 1.284 g/cm³
 TSL Heat-capacity 2.701 kJ/(kg*K)

Results

f (MHz)	Measured			Target		Diff. to Target [%]	
	HP-e'	HP-e''	sigma	eps	sigma	Δ-eps	Δ-sigma
600	43.9	23.01	0.77	42.7	0.88	2.7	-12.9
625	43.5	22.75	0.79	42.6	0.88	2.1	-10.5
650	43.1	22.49	0.81	42.5	0.89	1.5	-8.2
675	42.7	22.26	0.84	42.3	0.89	1.0	-5.9
700	42.4	22.03	0.86	42.2	0.89	0.4	-3.5
725	42.0	21.84	0.88	42.1	0.89	-0.1	-1.2
750	41.7	21.65	0.90	41.9	0.89	-0.6	1.1
775	41.4	21.50	0.93	41.8	0.90	-1.1	3.5
800	41.0	21.34	0.95	41.7	0.90	-1.6	5.9
825	40.7	21.19	0.97	41.6	0.91	-2.1	7.3
850	40.5	21.12	0.98	41.5	0.91	-2.4	8.0
875	40.4	21.05	1.00	41.5	0.92	-2.7	8.6
900	40.1	20.91	1.02	41.5	0.94	-3.3	7.9
925	39.8	20.77	1.04	41.5	0.97	-4.0	7.2
950	39.6	20.66	1.06	41.5	0.98	-4.6	8.2
975	39.3	20.55	1.09	41.4	0.99	-5.2	9.2
1000	39.0	20.44	1.11	41.4	1.00	-5.8	10.3
1000	38.7	20.32	1.13	41.3	1.01	-6.4	11.4

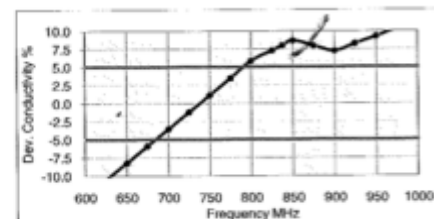
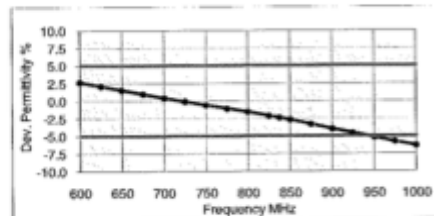


Figure 7-2
750MHz Head Tissue Equivalent Matter

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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 point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during testing the 1 gram cube. This fixed point was measured and used as a reference value.
3. Based on the area scan data, the area of the maximum absorption was determined by spline interpolation. Around this point, a volume of 32mm x 32mm x 30mm (fine resolution volume scan, zoom scan) was assessed by measuring 5 x 5 x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual for more details):
 - a. The data was extrapolated to the surface of the outer-shell of the phantom. The combined distance extrapolated was the combined distance from the center of the dipoles 2.7mm away from the tip of the probe housing plus the 1.2 mm distance between the surface and the lowest measuring point. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).
 - b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.
 - c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete. If the value deviated by more than 5%, the evaluation was repeated.

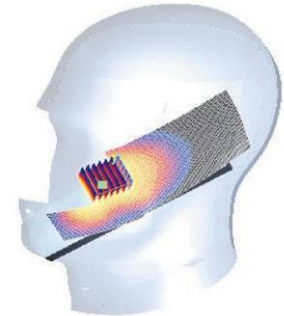


Figure 8-1
Sample SAR Area Scan

8.2 Specific Anthropomorphic Mannequin (SAM) Specifications

The phantom for handset SAR assessment testing is a low-loss dielectric shell, with shape and dimensions derived from the anthropometric data of the 90th percentile adult male head dimensions as tabulated by the US Army. The SAM Twin Phantom shell is bisected along the mid-sagittal plane into right and left halves (see 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 handset positioning [5].

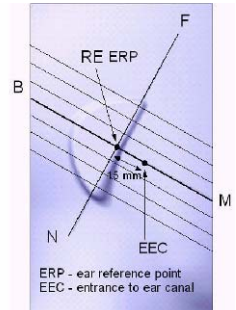


Figure 9-1
Close-Up Side view
of ERP

9.2 HANDSET REFERENCE POINTS

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



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

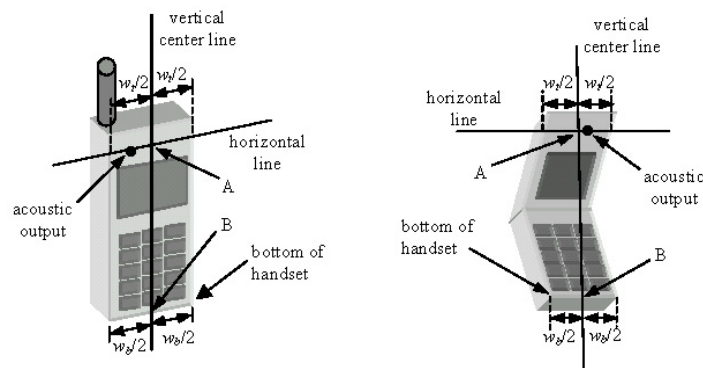


Figure 9-3
Handset Vertical Center & Horizontal Line Reference Points

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

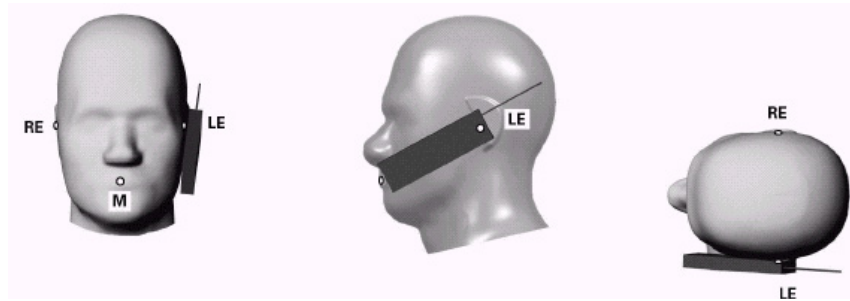


Figure 10-1 Front, Side and Top View of Cheek/Touch Position

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

10.3 Positioning for Ear / 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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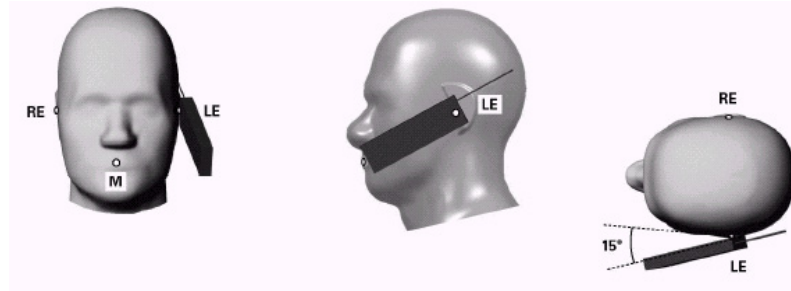
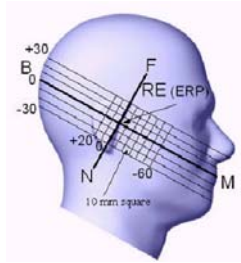


Figure 10-2 Front, Side and Top View of Ear/15° Tilt Position



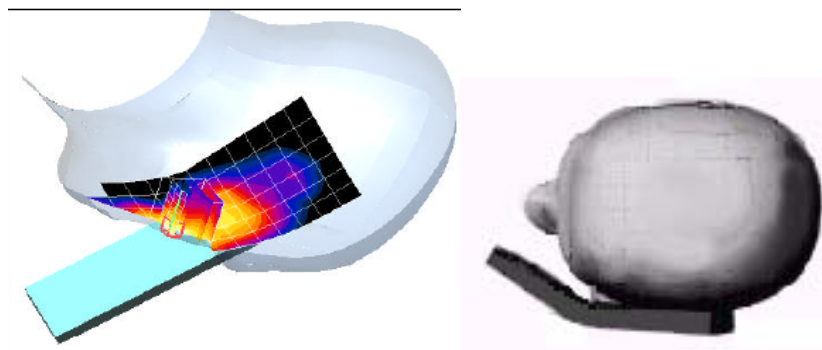
**Figure 10-3
Side view w/ relevant markings**



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

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

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



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

In order to ensure there is sufficient conservativeness for ensuring compliance until practical solutions are available, additional measurement considerations are necessary to address these technical difficulties.

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

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

10.5 Body Holster /Belt Clip Configurations

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

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

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

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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 FCC 3G MEASUREMENT PROCEDURES

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

12.1 Procedures Used to Establish RF Signal for SAR

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

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

12.2 SAR Measurement Conditions for LTE

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

12.2.1 MPR

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

12.2.2 A-MPR

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

12.2.3 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05:

- Per KDB Publication 941225 D05 Page 4, 3) A), QPSK with 50% RB is required for the highest bandwidth.
- Per KDB Publication 941225 D05 Page 4, footnote 2, when the maximum output power across high, mid., and low channels is < 0.5 dB, mid channel is tested. Low and high channel SAR tests are not required for QPSK, 50% RB allocation because the SAR is < 0.8 W/kg.
- Per KDB Publication 941225 D05 Page 4, 3) B), QPSK with 1 RB for both channel edges are required for the highest bandwidth.
- Per KDB Publication 941225 D05 Page 4, footnote 6, QPSK 1 RB allocation SAR tests were performed on the highest output power channel for the RB allocation since the average output power of the 1 RB allocation was > 0.5 dB higher than the 50% RB

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allocation for QPSK. 1 RB low and high offset configurations are considered together for a single channel selection.

- e. Per KDB Publication 941225 D05 Page 4, 4) A), 16QAM with 50% RB is required for the highest bandwidth on the channel with the highest measured SAR for QPSK with 50% RB allocation.
- f. Per KDB Publication 941225 D05 4) B) and Page 5 footnote 9, 16QAM with 1RB for both channel edges are required for the highest bandwidth on the highest output power channel for the 1 RB allocation since the average output power of the 1 RB allocation is >0.5 dB higher than the 50% allocation for 16 QAM. 1 RB low and high offset configurations are considered together for a single channel selection.
- g. Per KDB Publication 941225 D05 Page 4, A) I), 100% RB Allocation is not required to be tested since SAR is not > 1.45 W/kg for the highest bandwidth are not required to be tested since SAR is not > 1.45 W/kg for the highest bandwidth and conducted powers of the smaller bandwidths were not more than 0.5 dB higher than the larger bandwidth.
- h. Per KDB Publication 941225 D05 Page 5, 5) B) I), smaller bandwidths are not required to be tested since SAR is not > 1.45 W/kg for the highest bandwidth.

12.3 SAR Measurement Conditions for CDMA2000

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

12.3.1 Output Power Verification

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

1. If the mobile station (MS) supports Reverse TCH RC 1 and Forward TCH RC 1, set up a call using Fundamental Channel Test Mode 1 (RC=1/1) with 9600 bps data rate only.
2. Under RC1, C.S0011 Table 4.4.5.2-1, Table 12-1 parameters were applied.
3. If the MS supports the RC 3 Reverse FCH, RC3 Reverse SCH₀ and demodulation of RC 3,4, or 5, set up a call using Supplemental Channel Test Mode 3 (RC 3/3) with 9600 bps Fundamental Channel and 9600 bps SCH₀ data rate.
4. Under RC3, C.S0011 Table 4.4.5.2-2, Table 13-2 was applied.
5. FCHs were configured at full rate for maximum SAR with "All Up" power control bits.

Table 12-1
Parameters for Max. Power for RC1

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

Table 12-2
Parameters for Max. Power for RC3

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

12.3.2 Head SAR Measurements

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

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SAR is measured on the maximum output channel in RC1 using the exposure configuration that results in the highest SAR for that channel in RC3.

12.3.3 Body SAR Measurements

SAR for body exposure configurations is measured in RC3 with the DUT configured to transmit at full rate on FCH with all other code channels disabled using TDSO / SO32. SAR for multiple code channels (FCH + SCH_n) is not required when the maximum average output of each RF channel is less than ¼ dB higher than that measured with FCH only. Otherwise, SAR is measured on the maximum output channel (FCH + SCH_n) with FCH at full rate and SCH₀ enabled at 9600 bps using the exposure configuration that results in the highest SAR for that channel with FCH only. When multiple code channels are enabled, the DUT output may shift by more than 0.5 dB and lead to higher SAR drifts and SCH dropouts. Body SAR was measured using TDSO / SO32 with power control bits in the “All Up”

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

12.3.4 Handsets with EVDO

For handsets with Ev-Do capabilities, when the maximum average output of each channel in Rev. 0 is less than ¼ dB higher than that measured in RC3 (1x RTT), body SAR for EV-DO is not required. Otherwise, SAR for Rev. 0 is measured on the maximum output channel at 153.6 kbps using the body exposure configuration that results in the highest SAR for that channel in RC3. SAR for Rev. A is not required when the maximum average output of each channel is less than that measured in Rev. 0 or less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel for Rev. A using a Reverse Data Channel payload size of 4096 bits and a Termination Target of 16 slots defined for Subtype 2 Physical Layer configurations. A Forward Traffic Channel data rate corresponding to the 2-slot version of 307.2 kbps with the ACK Channel transmitting in all slots would be configured in the downlink for both Rev. 0 and Rev. A.

12.3.5 Body SAR Measurements for EVDO Hotspot

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

12.4 SAR Measurements for 802.11 modes

The SAR test procedures for devices with 802.11 modes are adopted from FCC KDB 248227 publication.

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

12.4.1 General Device Setup

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

12.4.2 Frequency Channel Configurations [27]

802.11 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. 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.

Table 12-3 IEEE 802.11 Default Test Channels

Mode	GHz	Channel	Turbo Channel	“Default Test Channels”			
				§15.247		UNII	
				802.11b	802.11g		
802.11 b/g/n	2.412	1		✓	▽		
	2.437	6	6	✓	▽		
	2.462	11		✓	▽		

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13 OUTPUT POWER MEASUREMENTS

13.1 CDMA Conducted Powers

Band	Channel	Frequency	SO55 [dBm]	SO55 [dBm]	TDSO SO32 [dBm]	TDSO SO32 [dBm]	1x EvDO Rev. 0 [dBm]	1x EvDO Rev. A [dBm]
	F-RC	MHz	RC1	RC3	FCH+SCH	FCH	(RTAP)	(RETAP)
Cellular	1013	824.7	24.50	24.50	24.57	24.50	24.66	24.43
	384	835.52	24.57	24.63	24.82	24.60	24.75	24.60
	777	848.31	24.64	24.50	24.65	24.65	24.85	24.60
PCS	25	1851.25	24.40	24.60	24.40	24.57	24.35	24.15
	600	1880	24.75	24.83	24.82	24.85	24.75	24.60
	1175	1908.75	24.65	24.70	24.54	24.70	24.58	24.45

Notes:

1. RC1 is only applicable for IS-95 compatibility.
2. Per KDB Publication 941225 D01:
 - a. Head SAR was tested with SO55 RC3. SO55 RC1 was not required since the average output power was not more than 0.25 dB than the SO55 RC3 powers.
 - b. Body-Worn SAR was tested with TDSO32 FCH. EVDO and TDSO32 FCH+SCH SAR tests were not required since the average output power was not more than 0.25 dB higher than the TDSO32 FCH powers.
 - c. Hotspot SAR was tested with EVDO Rev 0. TDSO32 SAR tests were not required since the average output power was not more than 0.25 dB higher than the EVDO Rev. 0 powers. EVDO Rev A SAR tests were not required since the average output power was not higher than the EVDO Rev. 0 powers.



Figure 13-1
Power Measurement Setup

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13.2 WLAN Conducted Powers

Table 13-1
IEEE 802.11b Average RF Power

Freq [MHz]	Channel	Data Rate [Mbps]	Average Power (dBm)
2412	1	1	15.30
		2	15.38
		5.5	15.31
		11	15.62
2437	6	1	16.04
		2	16.09
		5.5	16.15
		11	16.08
2462	11	1	16.78
		2	16.88
		5.5	16.85
		11	16.86

Table 13-2
IEEE 802.11g Average RF Power

Freq [MHz]	Channel	Data Rate [Mbps]	Average Power (dBm)
2412	1	6	10.15
		9	10.23
		12	10.26
		18	10.09
		24	10.10
		36	9.89
		48	10.15
		54	10.07
2437	6	6	10.96
		9	10.70
		12	10.53
		18	10.56
		24	10.58
		36	10.57
		48	10.51
		54	10.43
2462	11	6	11.76
		9	11.49
		12	11.31
		18	11.33
		24	11.39
		36	11.49
		48	11.37
		54	11.65

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Table 13-3
IEEE 802.11n Average RF Power

Freq [MHz]	Channel	Data Rate [Mbps]	Average Power (dBm)
2412	1	6.5/7.2	9.42
		13/14.40	9.03
		19.5/21.70	9.09
		26/28.90	9.12
		29/43.3	8.87
		52/57.80	8.91
		58.50/65	8.82
		65/72.2	8.75
2437	6	6.5/7.2	9.69
		13/14.40	9.72
		19.5/21.70	9.79
		26/28.90	9.57
		29/43.3	9.61
		52/57.80	9.67
		58.50/65	9.42
		65/72.2	9.50
2462	11	6.5/7.2	10.54
		13/14.40	10.43
		19.5/21.70	10.44
		26/28.90	10.39
		29/43.3	10.27
		52/57.80	10.32
		58.50/65	10.32
		65/72.2	10.36

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. IEEE 802.11 g/n modes 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 mode.
- The bolded data rate and channel above were tested for SAR.



Figure 13-2
Power Measurement Setup

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13.3 LTE Conducted Powers

13.3.1 LTE Band 12

Table 13-4
LTE Band 12 - 5 MHz Bandwidth Average RF Power

Freq. (MHz)	Channel	Modulation	Bandwidth [MHz]	# of Resource Blocks	RB Offset	Maximum Average Power [dBm]	Allowed MPR [dB]	Target MPR [dB]
701.5	23035	QPSK	5	1	0	22.55	0	0
701.5	23035	QSPK	5	1	24	21.63	0	0
701.5	23035	QPSK	5	12	6	21.46	0-1	1
701.5	23035	QSPK	5	25	0	20.47	0-1	1
701.5	23035	16QAM	5	1	0	22.40	0-1	0
701.5	23035	16QAM	5	1	24	21.50	0-1	1
701.5	23035	16QAM	5	12	6	21.66	0-2	1
701.5	23035	16QAM	5	25	0	20.61	0-2	2
713.5	23155	QPSK	5	1	0	22.34	0	0
713.5	23155	QPSK	5	1	24	21.52	0	0
713.5	23155	QPSK	5	12	6	21.58	0-1	1
713.5	23155	QPSK	5	25	0	20.35	0-1	1
713.5	23155	16QAM	5	1	0	22.54	0-1	0
713.5	23155	16QAM	5	1	24	21.34	0-1	1
713.5	23155	16QAM	5	12	6	21.52	0-2	1
713.5	23155	16QAM	5	25	0	20.58	0-2	2

Table 13-5
LTE Band 12 - 10 MHz Bandwidth Average RF Power

Freq. (MHz)	Channel	Modulation	Bandwidth [MHz]	# of Resource Blocks	RB Offset	Maximum Average Power [dBm]	Allowed MPR [dB]	Target MPR [dB]
707.5	23095	QPSK	10	1	0	22.60	0	0
707.5	23095	QPSK	10	1	49	21.67	0	0
707.5	23095	QPSK	10	25	12	21.87	0-1	1
707.5	23095	QPSK	10	50	0	20.67	0-1	1
707.5	23095	16QAM	10	1	0	22.76	0-1	0
707.5	23095	16QAM	10	1	49	21.73	0-1	1
707.5	23095	16QAM	10	25	12	21.46	0-2	1
707.5	23095	16QAM	10	50	0	20.45	0-2	2

Per FCC KDB Publication 447498, 6)c), for the 5 MHz bandwidth in LTE Band 12, two channels are required to ensure sufficient frequency channels have been tested. For the 10 MHz bandwidth, only one channel is required.

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13.3.2 LTE Band 5 (Cell)

Table 13-6
LTE Band 5 (Cell) - 1.4 MHz Bandwidth Average RF Power

Frequency [MHz]	Channel	Bandwidth [MHz]	# of Resource Blocks	RB Offset	Modulation	Maximum Average Power [dBm]	Allowed MPR [dB]	Target MPR [dB]
824.7	20407	1.4	1	0	QPSK	22.51	0	0
824.7	20407	1.4	1	5	QPSK	22.48	0	0
824.7	20407	1.4	3	2	QPSK	22.42	0	0
824.7	20407	1.4	6	0	QPSK	21.59	0-1	1
824.7	20407	1.4	1	0	16-QAM	21.67	0-1	1
824.7	20407	1.4	1	5	16-QAM	21.91	0-1	1
824.7	20407	1.4	3	2	16-QAM	21.77	0-1	1
824.7	20407	1.4	6	0	16-QAM	20.38	0-2	2
836.5	20525	1.4	1	0	QPSK	22.59	0	0
836.5	20525	1.4	1	5	QPSK	22.42	0	0
836.5	20525	1.4	3	2	QPSK	22.30	0	0
836.5	20525	1.4	6	0	QPSK	21.44	0-1	1
836.5	20525	1.4	1	0	16-QAM	21.41	0-1	1
836.5	20525	1.4	1	5	16-QAM	21.45	0-1	1
836.5	20525	1.4	3	2	16-QAM	21.27	0-1	1
836.5	20525	1.4	6	0	16-QAM	20.50	0-2	2
848.3	20643	1.4	1	0	QPSK	22.66	0	0
848.3	20643	1.4	1	5	QPSK	22.81	0	0
848.3	20643	1.4	3	2	QPSK	22.52	0	0
848.3	20643	1.4	6	0	QPSK	21.72	0-1	1
848.3	20643	1.4	1	0	16-QAM	21.80	0-1	1
848.3	20643	1.4	1	5	16-QAM	21.85	0-1	1
848.3	20643	1.4	3	2	16-QAM	21.78	0-1	1
848.3	20643	1.4	6	0	16-QAM	20.70	0-2	2

Table 13-7
LTE Band 5 (Cell) - 3 MHz Bandwidth Average RF Power

Frequency [MHz]	Channel	Bandwidth [MHz]	# of Resource Blocks	RB Offset	Modulation	Maximum Average Power [dBm]	Allowed MPR [dB]	Target MPR [dB]
825.5	20415	3	1	0	QPSK	22.67	0	0
825.5	20415	3	1	14	QPSK	22.66	0	0
825.5	20415	3	8	4	QPSK	21.56	0-1	1
825.5	20415	3	15	0	QPSK	21.64	0-1	1
825.5	20415	3	1	0	16-QAM	21.70	0-1	1
825.5	20415	3	1	14	16-QAM	21.45	0-1	1
825.5	20415	3	8	4	16-QAM	20.53	0-2	2
825.5	20415	3	15	0	16-QAM	20.59	0-2	2
836.5	20525	3	1	0	QPSK	22.44	0	0
836.5	20525	3	1	14	QPSK	22.68	0	0
836.5	20525	3	8	4	QPSK	21.61	0-1	1
836.5	20525	3	15	0	QPSK	21.77	0-1	1
836.5	20525	3	1	0	16-QAM	21.60	0-1	1
836.5	20525	3	1	14	16-QAM	21.81	0-1	1
836.5	20525	3	8	4	16-QAM	20.53	0-2	2
836.5	20525	3	15	0	16-QAM	20.60	0-2	2
847.5	20635	3	1	0	QPSK	22.47	0	0
847.5	20635	3	1	14	QPSK	22.33	0	0
847.5	20635	3	8	4	QPSK	21.51	0-1	0
847.5	20635	3	15	0	QPSK	21.70	0-1	1
847.5	20635	3	1	0	16-QAM	21.40	0-1	1
847.5	20635	3	1	14	16-QAM	21.52	0-1	1
847.5	20635	3	8	4	16-QAM	20.53	0-2	1
847.5	20635	3	15	0	16-QAM	20.73	0-2	2

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Table 13-8
LTE Band 5 (Cell) - 5 MHz Bandwidth Average RF Power

Frequency [MHz]	Channel	Bandwidth [MHz]	# of Resource Blocks	RB Offset	Modulation	Maximum Average Power [dBm]	Allowed MPR [dB]	Target MPR [dB]
826.5	20425	5	1	0	QPSK	22.56	0	0
826.5	20425	5	1	24	QPSK	22.95	0	0
826.5	20425	5	12	6	QPSK	21.86	0-1	1
826.5	20425	5	25	0	QPSK	21.80	0-1	1
826.5	20425	5	1	0	16-QAM	21.61	0-1	1
826.5	20425	5	1	24	16-QAM	21.79	0-1	1
826.5	20425	5	12	6	16-QAM	20.73	0-2	2
826.5	20425	5	25	0	16-QAM	20.74	0-2	2
836.5	20525	5	1	0	QPSK	22.74	0	0
836.5	20525	5	1	24	QPSK	22.83	0	0
836.5	20525	5	12	6	QPSK	21.91	0-1	1
836.5	20525	5	25	0	QPSK	21.81	0-1	1
836.5	20525	5	1	0	16-QAM	21.59	0-1	1
836.5	20525	5	1	24	16-QAM	21.92	0-1	1
836.5	20525	5	12	6	16-QAM	20.98	0-2	2
836.5	20525	5	25	0	16-QAM	20.97	0-2	2
846.5	20625	5	1	0	QPSK	22.69	0	0
846.5	20625	5	1	24	QPSK	22.90	0	0
846.5	20625	5	12	6	QPSK	21.66	0-1	1
846.5	20625	5	25	0	QPSK	21.60	0-1	1
846.5	20625	5	1	0	16-QAM	21.67	0-1	1
846.5	20625	5	1	24	16-QAM	22.00	0-1	1
846.5	20625	5	12	6	16-QAM	20.66	0-2	2
846.5	20625	5	25	0	16-QAM	20.90	0-2	2

13.3.3 LTE Band 4 (AWS)

Table 13-9
LTE Band 4 (AWS) – 5 MHz Bandwidth Average RF Power

Freq. (MHz)	Channel	Modulation	Bandwidth [MHz]	# of Resource Blocks	RB Offset	Maximum Average Power [dBm]	Allowed MPR [dB]	Target MPR [dB]
1712.5	19975	QPSK	5	1	0	22.62	0	0
1712.5	19975	QSPK	5	1	24	22.30	0	0
1712.5	19975	QPSK	5	12	6	21.40	0-1	1
1712.5	19975	QSPK	5	25	0	20.10	0-1	1
1712.5	19975	16QAM	5	1	0	22.47	0-1	0
1712.5	19975	16QAM	5	1	24	21.28	0-1	1
1712.5	19975	16QAM	5	12	6	21.20	0-2	1
1712.5	19975	16QAM	5	25	0	20.40	0-2	2
1732.5	20175	QPSK	5	1	0	22.42	0	0
1732.5	20175	QPSK	5	1	24	22.76	0	0
1732.5	20175	QPSK	5	12	6	21.57	0-1	1
1732.5	20175	QPSK	5	25	0	20.81	0-1	1
1732.5	20175	16QAM	5	1	0	22.05	0-1	0
1732.5	20175	16QAM	5	1	24	21.68	0-1	1
1732.5	20175	16QAM	5	12	6	21.50	0-2	1
1732.5	20175	16QAM	5	25	0	20.72	0-2	2
1752.5	20375	QPSK	5	1	0	22.48	0	0
1752.5	20375	QPSK	5	1	24	22.43	0	0
1752.5	20375	QPSK	5	12	6	21.43	0-1	1
1752.5	20375	QPSK	5	25	0	20.35	0-1	1
1752.5	20375	16QAM	5	1	0	22.61	0-1	0
1752.5	20375	16QAM	5	1	24	21.35	0-1	1
1752.5	20375	16QAM	5	12	6	21.58	0-2	1
1752.5	20375	16QAM	5	25	0	20.95	0-2	2

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Table 13-10
LTE Band 4 (AWS) - 10 MHz Bandwidth Average RF Power

Freq. (MHz)	Channel	Modulation	Bandwidth [MHz]	# of Resource Blocks	RB Offset	Maximum Average Power [dBm]	Allowed MPR [dB]	Target MPR [dB]
1715	20000	QPSK	10	1	0	22.84	0	0
1715	20000	QPSK	10	1	49	22.79	0	0
1715	20000	QPSK	10	25	12	21.79	0-1	1
1715	20000	QPSK	10	50	0	20.75	0-1	1
1715	20000	16QAM	10	1	0	22.89	0-1	0
1715	20000	16QAM	10	1	49	21.94	0-1	1
1715	20000	16QAM	10	25	12	21.80	0-2	1
1715	20000	16QAM	10	50	0	20.84	0-2	2
1732.5	20175	QPSK	10	1	0	22.52	0	0
1732.5	20175	QPSK	10	1	49	22.53	0	0
1732.5	20175	QPSK	10	25	12	21.55	0-1	1
1732.5	20175	QPSK	10	50	0	20.63	0-1	1
1732.5	20175	16QAM	10	1	0	22.72	0-1	0
1732.5	20175	16QAM	10	1	49	21.56	0-1	1
1732.5	20175	16QAM	10	25	12	21.58	0-2	1
1732.5	20175	16QAM	10	50	0	20.93	0-2	2
1750	20350	QPSK	10	1	0	22.90	0	0
1750	20350	QPSK	10	1	49	22.92	0	0
1750	20350	QPSK	10	25	12	21.83	0-1	1
1750	20350	QPSK	10	50	0	20.55	0-1	1
1750	20350	16QAM	10	1	0	22.92	0-1	0
1750	20350	16QAM	10	1	49	21.91	0-1	1
1750	20350	16QAM	10	25	12	21.75	0-2	1
1750	20350	16QAM	10	50	0	20.67	0-2	2

13.3.4 LTE Band 2 (PCS)

Table 13-11
LTE Band 2 (PCS) - 1.4 MHz Bandwidth Average RF Power

Frequency [MHz]	Channel	Bandwidth [MHz]	# of Resource Blocks	RB Offset	Modulation	Maximum Average Power [dBm]	Allowed MPR [dB]	Target MPR [dB]
1850.7	18607	1.4	1	0	QPSK	22.57	0	0
1850.7	18607	1.4	1	5	QPSK	22.35	0	0
1850.7	18607	1.4	3	2	QPSK	22.31	0	0
1850.7	18607	1.4	6	0	QPSK	21.50	0-1	1
1850.7	18607	1.4	1	0	16-QAM	21.50	0-1	1
1850.7	18607	1.4	1	5	16-QAM	21.55	0-1	1
1850.7	18607	1.4	3	2	16-QAM	21.51	0-1	1
1850.7	18607	1.4	6	0	16-QAM	20.73	0-2	2
1880	18900	1.4	1	0	QPSK	22.62	0	0
1880	18900	1.4	1	5	QPSK	22.53	0	0
1880	18900	1.4	3	2	QPSK	22.31	0	0
1880	18900	1.4	6	0	QPSK	21.48	0-1	1
1880	18900	1.4	1	0	16-QAM	21.41	0-1	1
1880	18900	1.4	1	5	16-QAM	21.70	0-1	1
1880	18900	1.4	3	2	16-QAM	21.35	0-1	1
1880	18900	1.4	6	0	16-QAM	20.89	0-2	2
1909.3	19193	1.4	1	0	QPSK	22.47	0	0
1909.3	19193	1.4	1	5	QPSK	22.54	0	0
1909.3	19193	1.4	3	2	QPSK	22.20	0	0
1909.3	19193	1.4	6	0	QPSK	21.72	0-1	1
1909.3	19193	1.4	1	0	16-QAM	21.65	0-1	1
1909.3	19193	1.4	1	5	16-QAM	21.66	0-1	1
1909.3	19193	1.4	3	2	16-QAM	21.41	0-1	1
1909.3	19193	1.4	6	0	16-QAM	20.57	0-2	2

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Table 13-12
LTE Band 2 (PCS) - 3 MHz Bandwidth Average RF Power

Frequency [MHz]	Channel	Bandwidth [MHz]	# of Resource Blocks	RB Offset	Modulation	Maximum Average Power [dBm]	Allowed MPR [dB]	Target MPR [dB]
1851.5	18615	3	1	0	QPSK	22.57	0	0
1851.5	18615	3	1	14	QPSK	22.66	0	0
1851.5	18615	3	8	4	QPSK	21.41	0-1	1
1851.5	18615	3	15	0	QPSK	21.53	0-1	1
1851.5	18615	3	1	0	16-QAM	21.53	0-1	1
1851.5	18615	3	1	14	16-QAM	21.41	0-1	1
1851.5	18615	3	8	4	16-QAM	20.51	0-2	2
1851.5	18615	3	15	0	16-QAM	20.53	0-2	2
1880	18900	3	1	0	QPSK	22.56	0	0
1880	18900	3	1	14	QPSK	22.52	0	0
1880	18900	3	8	4	QPSK	21.70	0-1	1
1880	18900	3	15	0	QPSK	21.45	0-1	1
1880	18900	3	1	0	16-QAM	21.37	0-1	1
1880	18900	3	1	14	16-QAM	21.51	0-1	1
1880	18900	3	8	4	16-QAM	20.56	0-2	2
1880	18900	3	15	0	16-QAM	20.56	0-2	2
1908.5	19185	3	1	0	QPSK	22.81	0	0
1908.5	19185	3	1	14	QPSK	22.61	0	0
1908.5	19185	3	8	4	QPSK	21.66	0-1	1
1908.5	19185	3	15	0	QPSK	21.62	0-1	1
1908.5	19185	3	1	0	16-QAM	21.85	0-1	1
1908.5	19185	3	1	14	16-QAM	21.91	0-1	1
1908.5	19185	3	8	4	16-QAM	20.75	0-2	2
1908.5	19185	3	15	0	16-QAM	20.70	0-2	2

Table 13-13
LTE Band 2 (PCS) - 5 MHz Bandwidth Average RF Power

Frequency [MHz]	Channel	Bandwidth [MHz]	# of Resource Blocks	RB Offset	Modulation	Maximum Average Power [dBm]	Allowed MPR [dB]	Target MPR [dB]
1852.5	18625	5	1	0	QPSK	22.88	0	0
1852.5	18625	5	1	24	QPSK	22.87	0	0
1852.5	18625	5	12	6	QPSK	21.70	0-1	1
1852.5	18625	5	25	0	QPSK	21.52	0-1	1
1852.5	18625	5	1	0	16-QAM	21.73	0-1	1
1852.5	18625	5	1	24	16-QAM	21.70	0-1	1
1852.5	18625	5	12	6	16-QAM	20.72	0-2	2
1852.5	18625	5	25	0	16-QAM	20.59	0-2	2
1880	18900	5	1	0	QPSK	22.85	0	0
1880	18900	5	1	24	QPSK	22.95	0	0
1880	18900	5	12	6	QPSK	21.78	0-1	1
1880	18900	5	25	0	QPSK	21.81	0-1	1
1880	18900	5	1	0	16-QAM	21.60	0-1	1
1880	18900	5	1	24	16-QAM	21.70	0-1	1
1880	18900	5	12	6	16-QAM	20.90	0-2	2
1880	18900	5	25	0	16-QAM	20.80	0-2	2
1907.5	19175	5	1	0	QPSK	22.80	0	0
1907.5	19175	5	1	24	QPSK	22.83	0	0
1907.5	19175	5	12	6	QPSK	21.63	0-1	1
1907.5	19175	5	25	0	QPSK	21.58	0-1	1
1907.5	19175	5	1	0	16-QAM	21.81	0-1	1
1907.5	19175	5	1	24	16-QAM	21.66	0-1	1
1907.5	19175	5	12	6	16-QAM	20.86	0-2	2
1907.5	19175	5	25	0	16-QAM	20.91	0-2	2

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13.3.5 LTE Conducted Power Considerations

- LTE SAR test configurations are determined according to SAR Test Considerations for LTE handsets and Data Modems KDB 941225 D05 Publication:
 - a. Per KDB Publication 941225 D05 Page 4, 3) A), QPSK with 50% RB is required for the highest bandwidth.
 - b. Per KDB Publication 941225 D05 Page 4, footnote 2, when the maximum output power across high, mid., and low channels is < 0.5 dB, mid channel is tested. Low and high channel SAR tests are not required for QPSK, 50% RB allocation because the SAR is < 0.8 W/kg.
 - c. Per KDB Publication 941225 D05 Page 4, 3) B), QPSK with 1 RB for both channel edges are required for the highest bandwidth.
 - d. Per KDB Publication 941225 D05 Page 4, footnote 6, QPSK 1 RB allocation SAR tests were performed on the highest output power channel for the RB allocation since the average output power of the 1 RB allocation was > 0.5 dB higher than the 50% RB allocation for QPSK. 1 RB low and high offset configurations are considered together for a single channel selection.
 - e. Per KDB Publication 941225 D05 Page 4, 4) A), 16QAM with 50% RB is required for the highest bandwidth on the channel with the highest measured SAR for QPSK with 50% RB allocation.
 - f. Per KDB Publication 941225 D05 4) B) and Page 5 footnote 9, 16QAM with 1RB for both channel edges are required for the highest bandwidth on the highest output power channel for the 1 RB allocation since the average output power of the 1 RB allocation is >0.5 dB higher than the 50% allocation for 16 QAM. 1 RB low and high offset configurations are considered together for a single channel selection.
 - g. Per KDB Publication 941225 D05 Page 4, A) I), 100% RB Allocation is not required to be tested since SAR is not > 1.45 W/kg for the highest bandwidth.
 - h. Per KDB Publication 941225 D05 Page 5, 5) B) I), smaller bandwidths are not required to be tested since SAR is not > 1.45 W/kg for the highest bandwidth and conducted powers of the smaller bandwidths were not more than 0.5 dB higher than the larger bandwidth.
- Differences from expected MPR levels are a result of measurement uncertainty.
- The bolded channels and configurations above were tested for SAR.



Figure 13-3
Power Measurement Setup

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14 FCC PERSONAL WIRELESS ROUTER CONFIGURATIONS

14.1 Personal Wireless Router Considerations

The FCC has provided guidance in KDB Publication 941225 D06 for battery-operated handsets that have the capability to transmit and receive Internet connectivity through simultaneous transmission of WIFI in conjunction with another transmitter. SAR test considerations are based on a standard composite test separation distance of 10 mm from the edges, front and back of the device ($L \times W \geq 9\text{cm} \times 5\text{cm}$) with antennas 2.5 cm or closer to the edge of the device. This has been determined by the FCC from general mixed use conditions for this type of devices. If the device is smaller, then a 5mm distance is required.

14.2 SAR Test Setup for Personal Wireless Router Features

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

The standalone head and body-worn accessory SAR data for the applicable voice and data configurations in each wireless mode and frequency band is analyzed separately to determine simultaneous transmission SAR test exclusion according to the procedures in KDB 648474 publication.

14.3 Head and Body-Worn Accessory SAR with Hotspot Mode

When hotspot mode use is not restricted during voice calls, SAR compliance is addressed for the simultaneous voice and hotspot data configurations in both head and body-worn accessory use conditions.

14.4 Power Reduction for Portable Hotspot Mode

There is no power reduction scheme for SAR purposes implemented for this device.

14.5 Applicable Router Modes

This device supports router operations for CDMA/EVDO and LTE modes. In addition to these standard wireless router modes, CDMA 1X-RTT voice may operate in conjunction with LTE WIFI Hotspot. Therefore, CDMA 1X-RTT was tested for hotspot SAR test conditions per 941225 D06 for simultaneous SAR summation purposes.

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14.6 SAR Test Configurations

Table 14-1
Mobile Hotspot Sides for SAR Testing

Mobile Hotspot Sides for SAR Testing						
Mode	Back	Front	Top	Bottom	Right	Left
Cell. CDMA	Yes	Yes	No	Yes	Yes	No
PCS CDMA	Yes	Yes	No	Yes	Yes	No
LTE Band 12	Yes	Yes	Yes	No	Yes	No
LTE Band 5 (Cell.)	Yes	Yes	Yes	No	Yes	No
LTE Band 4 (AWS)	Yes	Yes	Yes	No	Yes	No
LTE Band 2 (PCS)	Yes	Yes	Yes	No	Yes	No
2.4 GHz WLAN	Yes	Yes	No	No	No	Yes

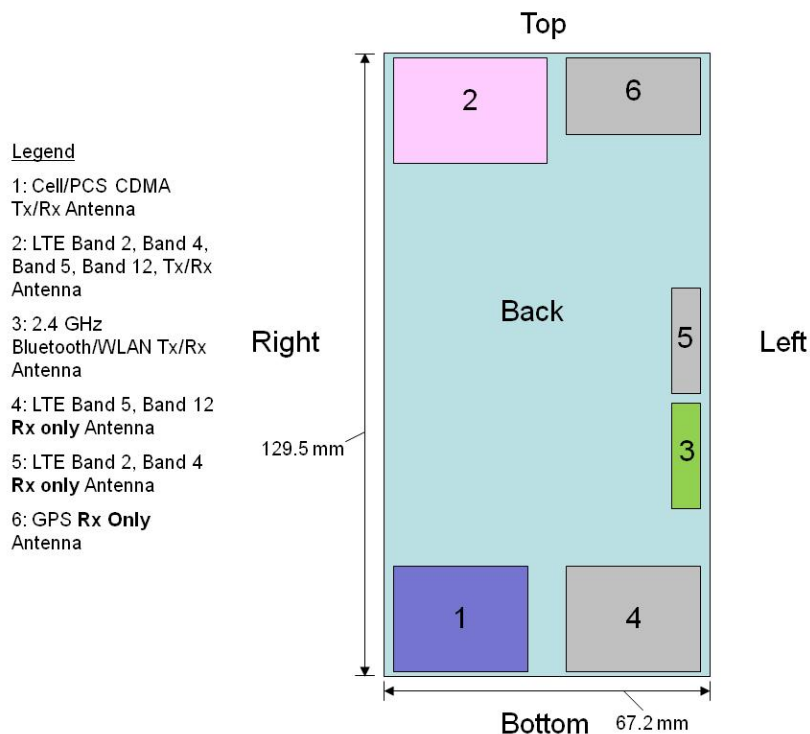


Figure 14-1 Identification of Sides for SAR Testing

Note: According to KDB Publication 941225 D06 guidance page 2, it was not necessary to evaluate particular DUT edges for Wireless Router SAR if those edges were greater than 2.5 cm from the transmitting antenna, the antenna distance documents show the distances from antennas to the edges of the device.

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15 SYSTEM VERIFICATION

15.1 Tissue Verification

Table 15-1
Measured Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (C°)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ϵ	% dev σ	% dev ϵ
11/04/2011	750H	22.2	680	0.842	42.77	0.885	42.273	-4.86%	1.18%
			695	0.844	42.56	0.886	42.193	-4.74%	0.87%
			710	0.867	42.40	0.887	42.113	-2.25%	0.68%
			725	0.852	41.61	0.888	42.033	-4.05%	-2.01%
			740	0.873	41.36	0.889	41.953	-1.80%	-1.41%
10/20/2011	835H	22.3	755	0.883	41.31	0.891	41.876	-0.90%	-1.35%
			820	0.874	41.84	0.898	41.571	-2.67%	0.65%
			835	0.887	41.55	0.900	41.500	-1.44%	0.12%
10/25/2011	835H	22.5	850	0.902	41.44	0.916	41.500	-1.53%	-0.14%
			820	0.855	40.96	0.898	41.571	-4.79%	-1.47%
			835	0.873	40.87	0.900	41.500	-3.00%	-1.52%
10/31/2011	1750H	22.9	850	0.889	40.64	0.916	41.500	-2.95%	-2.07%
			1710	1.373	39.63	1.348	40.136	1.85%	-1.26%
			1750	1.424	39.49	1.370	40.100	3.94%	-1.52%
10/25/2011	1900H	22.9	1790	1.444	39.30	1.394	40.020	3.59%	-1.80%
			1850	1.406	41.67	1.400	40.000	0.43%	4.18%
			1880	1.439	41.56	1.400	40.000	2.79%	3.90%
10/31/2011	1900H	23.0	1910	1.461	41.44	1.400	40.000	4.36%	3.60%
			1850	1.399	39.96	1.400	40.000	-0.07%	-0.10%
			1880	1.424	39.94	1.400	40.000	1.71%	-0.15%
10/24/2011	2450H	22.0	1910	1.451	39.75	1.400	40.000	3.64%	-0.63%
			2401	1.813	37.52	1.758	39.298	3.13%	-4.52%
			2450	1.865	37.34	1.800	39.200	3.61%	-4.74%
11/02/2011	750B	22.6	2499	1.926	37.24	1.852	39.135	4.00%	-4.84%
			680	0.911	55.71	0.956	56.069	-4.71%	-0.64%
			695	0.921	55.70	0.957	55.985	-3.76%	-0.51%
			710	0.927	55.66	0.958	55.901	-3.24%	-0.43%
			725	0.928	54.86	0.960	55.817	-3.33%	-1.71%
10/20/2011	835B	22.3	740	0.945	54.94	0.961	55.733	-1.66%	-1.42%
			755	0.949	54.53	0.963	55.649	-1.45%	-2.01%
			820	0.953	52.90	0.969	55.284	-1.65%	-4.31%
10/31/2011	835B	23.2	835	0.977	52.82	0.970	55.200	0.72%	-4.31%
			850	0.986	52.67	0.988	55.154	-0.20%	-4.50%
			820	0.961	54.19	0.969	55.284	-0.83%	-1.98%
11/01/2011	1750B	23.4	835	0.967	54.09	0.970	55.200	-0.31%	-2.01%
			850	0.979	53.70	0.988	55.154	-0.91%	-2.64%
			1710	1.478	53.09	1.460	53.540	1.23%	-0.84%
10/24/2011	1900B	22.8	1750	1.527	53.05	1.490	53.430	2.48%	-0.71%
			1790	1.551	52.79	1.510	53.330	2.72%	-1.01%
			1850	1.519	51.36	1.520	53.300	-0.07%	-3.64%
11/03/2011	1900B	23.4	1880	1.552	51.33	1.520	53.300	2.11%	-3.70%
			1910	1.587	51.18	1.520	53.300	4.41%	-3.98%
			1850	1.513	53.13	1.520	53.300	-0.46%	-0.32%
10/24/2011	2450B	22.0	1880	1.548	52.99	1.520	53.300	1.84%	-0.58%
			1910	1.583	52.93	1.520	53.300	4.14%	-0.69%
			2401	1.870	51.47	1.903	52.765	-1.73%	-2.45%
			2450	1.935	51.30	1.950	52.700	-0.77%	-2.66%
			2499	2.011	51.14	2.019	52.638	-0.40%	-2.85%

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

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

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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											
Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Tissue Frequency (MHz)	Dipole SN	Probe SN	Tissue Type	Measured SAR _{1g} (W/kg)	1 W Target SAR _{1g} (W/kg)	1 W Normalized SAR _{1g} (W/kg)	Deviation (%)
11/04/2011	24.0	22.1	0.100	750	1003	3022	Head	0.768	8.370	7.680	-8.24%
10/20/2011	24.2	22.4	0.100	835	4d047	3258	Head	0.935	9.530	9.350	-1.89%
10/25/2011	23.5	21.8	0.100	835	4d047	3258	Head	0.907	9.530	9.070	-4.83%
10/31/2011	23.8	21.9	0.040	1750	1051	3561	Head	1.4	37.000	35.000	-5.41%
10/25/2011	23.0	22.4	0.100	1900	502	3209	Head	4.19	40.200	41.900	4.23%
10/31/2011	23.8	22.3	0.100	1900	502	3209	Head	4.16	40.200	41.600	3.48%
10/24/2011	24.5	22.8	0.025	2450	797	3561	Head	1.36	53.300	54.400	2.06%
11/02/2011	23.6	22.0	0.100	750	1003	3209	Body	0.845	8.850	8.450	-4.52%
10/20/2011	24.3	22.5	0.100	835	4d047	3258	Body	0.964	9.850	9.640	-2.13%
10/31/2011	24.4	22.5	0.100	835	4d047	3258	Body	1.01	9.850	10.100	2.54%
11/01/2011	23.9	22.3	0.040	1750	1051	3561	Body	1.51	37.000	37.750	2.03%
10/24/2011	23.1	21.8	0.100	1900	502	3209	Body	4.36	41.100	43.600	6.08%
11/03/2011	24.6	22.8	0.040	1900	502	3561	Body	1.68	41.100	42.000	2.19%
10/24/2011	24.3	22.5	0.025	2450	797	3561	Body	1.3	52.300	52.000	-0.57%

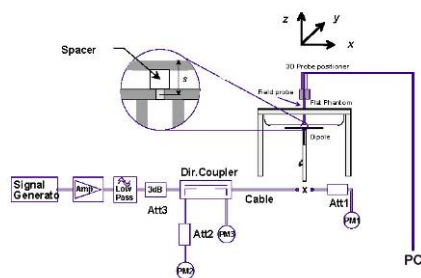


Figure 15-1
System Verification Setup Diagram



Figure 15-2
System Verification Setup Photo

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16 SAR DATA SUMMARY

16.1 Head SAR Data

Table 16-1
Cell. CDMA Head SAR Results

MEASUREMENT RESULTS								
FREQUENCY		Mode/Band	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Serial Number	SAR (1g)
MHz	Ch.							(W/kg)
836.52	384	Cell. CDMA	24.63	-0.03	Right	Touch	7	0.226
836.52	384	Cell. CDMA	24.63	-0.04	Right	Tilt	7	0.152
836.52	384	Cell. CDMA	24.63	0.17	Left	Touch	7	0.185
836.52	384	Cell. CDMA	24.63	0.04	Left	Tilt	7	0.132
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
PCS CDMA Head SAR Results

MEASUREMENT RESULTS								
FREQUENCY		Mode	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Serial Number	SAR (1g)
MHz	Ch.							(W/kg)
1880.00	600	PCS CDMA	24.83	-0.12	Right	Touch	7	0.346
1880.00	600	PCS CDMA	24.83	0.15	Right	Tilt	7	0.107
1880.00	600	PCS CDMA	24.83	-0.14	Left	Touch	7	0.333
1880.00	600	PCS CDMA	24.83	0.14	Left	Tilt	7	0.111
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 16-3
LTE Band 12 Head SAR Results

MEASUREMENT RESULTS													
FREQUENCY		Mode/Band	Modulation	Conducted Power [dBm]	Power Drift [dB]	Target MPR [dB]	Side	Test Position	Bandwidth (MHz)	Serial Number	Number of Resource Blocks	RB Offset	SAR (1g)
MHz	Ch.												(W/kg)
707.50	23095	LTE Band 12	QPSK	21.87	-0.10	1	Right	Touch	10	4	25	12	0.113
707.50	23095	LTE Band 12	QPSK	22.60	0.17	0	Right	Touch	10	4	1	0	0.144
707.50	23095	LTE Band 12	QPSK	21.67	-0.07	0	Right	Touch	10	4	1	49	0.120
707.50	23095	LTE Band 12	16QAM	21.46	0.16	1	Right	Touch	10	4	25	12	0.081
707.50	23095	LTE Band 12	16QAM	22.76	0.13	0	Right	Touch	10	4	1	0	0.111
707.50	23095	LTE Band 12	16QAM	21.73	0.17	1	Right	Touch	10	4	1	49	0.097
707.50	23095	LTE Band 12	QPSK	21.87	-0.01	1	Right	Tilt	10	4	25	12	0.082
707.50	23095	LTE Band 12	QPSK	22.60	0.13	0	Right	Tilt	10	4	1	0	0.109
707.50	23095	LTE Band 12	QPSK	21.67	-0.08	0	Right	Tilt	10	4	1	49	0.092
707.50	23095	LTE Band 12	16QAM	21.46	0.14	1	Right	Tilt	10	4	25	12	0.062
707.50	23095	LTE Band 12	16QAM	22.76	0.14	0	Right	Tilt	10	4	1	0	0.085
707.50	23095	LTE Band 12	16QAM	21.73	-0.04	1	Right	Tilt	10	4	1	49	0.073
707.50	23095	LTE Band 12	QPSK	21.87	0.15	1	Left	Touch	10	4	25	12	0.154
707.50	23095	LTE Band 12	QPSK	22.60	-0.06	0	Left	Touch	10	4	1	0	0.204
707.50	23095	LTE Band 12	QPSK	21.67	-0.01	0	Left	Touch	10	4	1	49	0.162
707.50	23095	LTE Band 12	16QAM	21.46	-0.02	1	Left	Touch	10	4	25	12	0.122
707.50	23095	LTE Band 12	16QAM	22.76	0.09	0	Left	Touch	10	4	1	0	0.161
707.50	23095	LTE Band 12	16QAM	21.73	-0.07	1	Left	Touch	10	4	1	49	0.140
707.50	23095	LTE Band 12	QPSK	21.87	0.03	1	Left	Tilt	10	4	25	12	0.128
707.50	23095	LTE Band 12	QPSK	22.60	0.14	0	Left	Tilt	10	4	1	0	0.162
707.50	23095	LTE Band 12	QPSK	21.67	-0.08	0	Left	Tilt	10	4	1	49	0.129
707.50	23095	LTE Band 12	16QAM	21.46	0.16	1	Left	Tilt	10	4	25	12	0.101
707.50	23095	LTE Band 12	16QAM	22.76	0.09	0	Left	Tilt	10	4	1	0	0.091
707.50	23095	LTE Band 12	16QAM	21.73	-0.11	1	Left	Tilt	10	4	1	49	0.089
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
LTE Band 5 (Cell.) Head SAR Results

MEASUREMENT RESULTS													
FREQUENCY		Mode/Band	Modulation	Conducted Power [dBm]	Power Drift [dB]	Target MPR [dB]	Side	Test Position	Bandwidth (MHz)	Serial Number	Number of Resource Blocks	RB Offset	SAR (1g)
MHz	Ch.												(W/kg)
836.50	20525	LTE Band 5 (Cell.)	QPSK	21.91	-0.05	1	Right	Touch	5	2	12	6	0.228
826.50	20425	LTE Band 5 (Cell.)	QPSK	22.56	-0.03	0	Right	Touch	5	2	1	0	0.328
826.50	20425	LTE Band 5 (Cell.)	QPSK	22.95	0.10	0	Right	Touch	5	2	1	24	0.315
836.50	20525	LTE Band 5 (Cell.)	16QAM	20.98	0.11	2	Right	Touch	5	2	12	6	0.185
846.50	20625	LTE Band 5 (Cell.)	16QAM	21.67	0.10	1	Right	Touch	5	2	1	0	0.251
846.50	20625	LTE Band 5 (Cell.)	16QAM	22.00	0.09	1	Right	Touch	5	2	1	24	0.253
836.50	20525	LTE Band 5 (Cell.)	QPSK	21.91	0.17	1	Right	Tilt	5	2	12	6	0.160
826.50	20425	LTE Band 5 (Cell.)	QPSK	22.56	0.05	0	Right	Tilt	5	2	1	0	0.172
826.50	20425	LTE Band 5 (Cell.)	QPSK	22.95	-0.10	0	Right	Tilt	5	2	1	24	0.215
836.50	20525	LTE Band 5 (Cell.)	16QAM	20.98	0.06	2	Right	Tilt	5	2	12	6	0.135
846.50	20625	LTE Band 5 (Cell.)	16QAM	21.67	-0.05	1	Right	Tilt	5	2	1	0	0.171
846.50	20625	LTE Band 5 (Cell.)	16QAM	22.00	0.08	1	Right	Tilt	5	2	1	24	0.170
836.50	20525	LTE Band 5 (Cell.)	QPSK	21.91	0.04	1	Left	Touch	5	2	12	6	0.306
826.50	20425	LTE Band 5 (Cell.)	QPSK	22.56	-0.09	0	Left	Touch	5	2	1	0	0.399
826.50	20425	LTE Band 5 (Cell.)	QPSK	22.95	0.05	0	Left	Touch	5	2	1	24	0.355
836.50	20525	LTE Band 5 (Cell.)	16QAM	20.98	0.03	2	Left	Touch	5	2	12	6	0.231
846.50	20625	LTE Band 5 (Cell.)	16QAM	21.67	0.07	1	Left	Touch	5	2	1	0	0.297
846.50	20625	LTE Band 5 (Cell.)	16QAM	22.00	-0.02	1	Left	Touch	5	2	1	24	0.277
836.50	20525	LTE Band 5 (Cell.)	QPSK	21.91	0.08	1	Left	Tilt	5	2	12	6	0.202
826.50	20425	LTE Band 5 (Cell.)	QPSK	22.56	0.01	0	Left	Tilt	5	2	1	0	0.265
826.50	20425	LTE Band 5 (Cell.)	QPSK	22.95	-0.02	0	Left	Tilt	5	2	1	24	0.257
836.50	20525	LTE Band 5 (Cell.)	16QAM	20.98	-0.01	2	Left	Tilt	5	2	12	6	0.195
846.50	20625	LTE Band 5 (Cell.)	16QAM	21.67	-0.05	1	Left	Tilt	5	2	1	0	0.199
846.50	20625	LTE Band 5 (Cell.)	16QAM	22.00	0.05	1	Left	Tilt	5	2	1	24	0.161
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 16-5
LTE Band 4 (AWS) Head SAR Results

MEASUREMENT RESULTS													
FREQUENCY		Mode	Modulation	Conducted Power [dBm]	Power Drift [dB]	Target MPR [dB]	Side	Test Position	Bandwidth (MHz)	Serial Number	Number of Resource Blocks	RB Offset	SAR (1g)
MHz	Ch.												(W/kg)
1732.50	20175	LTE Band 4 (AWS)	QPSK	21.55	0.01	1	Right	Touch	10	9	25	12	0.356
1750.00	20350	LTE Band 4 (AWS)	QPSK	22.90	0.07	0	Right	Touch	10	9	1	0	0.487
1750.00	20350	LTE Band 4 (AWS)	QPSK	22.92	0.12	0	Right	Touch	10	9	1	49	0.416
1732.50	20175	LTE Band 4 (AWS)	16QAM	21.58	0.05	1	Right	Touch	10	9	25	12	0.377
1750.00	20350	LTE Band 4 (AWS)	16QAM	22.92	-0.07	0	Right	Touch	10	9	1	0	0.520
1750.00	20350	LTE Band 4 (AWS)	16QAM	21.91	-0.02	1	Right	Touch	10	9	1	49	0.340
1732.50	20175	LTE Band 4 (AWS)	QPSK	21.55	0.16	1	Right	Tilt	10	9	25	12	0.488
1750.00	20350	LTE Band 4 (AWS)	QPSK	22.90	-0.08	0	Right	Tilt	10	9	1	0	0.682
1750.00	20350	LTE Band 4 (AWS)	QPSK	22.92	0.04	0	Right	Tilt	10	9	1	49	0.593
1732.50	20175	LTE Band 4 (AWS)	16QAM	21.58	0.16	1	Right	Tilt	10	9	25	12	0.495
1750.00	20350	LTE Band 4 (AWS)	16QAM	22.92	-0.12	0	Right	Tilt	10	9	1	0	0.712
1750.00	20350	LTE Band 4 (AWS)	16QAM	21.91	-0.02	1	Right	Tilt	10	9	1	49	0.461
1732.50	20175	LTE Band 4 (AWS)	QPSK	21.55	0.08	1	Left	Touch	10	9	25	12	0.516
1750.00	20350	LTE Band 4 (AWS)	QPSK	22.90	0.03	0	Left	Touch	10	9	1	0	0.712
1750.00	20350	LTE Band 4 (AWS)	QPSK	22.92	0.06	0	Left	Touch	10	9	1	49	0.582
1732.50	20175	LTE Band 4 (AWS)	16QAM	21.58	0.18	1	Left	Touch	10	9	25	12	0.525
1750.00	20350	LTE Band 4 (AWS)	16QAM	22.92	0.09	0	Left	Touch	10	9	1	0	0.728
1750.00	20350	LTE Band 4 (AWS)	16QAM	21.91	0.20	1	Left	Touch	10	9	1	49	0.465
1732.50	20175	LTE Band 4 (AWS)	QPSK	21.55	-0.15	1	Left	Tilt	10	9	25	12	0.631
1750.00	20350	LTE Band 4 (AWS)	QPSK	22.90	-0.17	0	Left	Tilt	10	9	1	0	0.864
1750.00	20350	LTE Band 4 (AWS)	QPSK	22.92	0.15	0	Left	Tilt	10	9	1	49	0.693
1732.50	20175	LTE Band 4 (AWS)	16QAM	21.58	0.05	1	Left	Tilt	10	9	25	12	0.629
1750.00	20350	LTE Band 4 (AWS)	16QAM	22.92	-0.03	0	Left	Tilt	10	9	1	0	0.894
1750.00	20350	LTE Band 4 (AWS)	16QAM	21.92	0.01	1	Left	Tilt	10	9	1	49	0.565
ANSI / IEEE C95.1 1992 - SAFETY LIMIT							Head						
Spatial Peak							1.6 W/kg (mW/g)						
Uncontrolled Exposure/General Population							averaged over 1 gram						

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Table 16-6
LTE Band 2 (PCS) Head SAR Results

MEASUREMENT RESULTS													
FREQUENCY		Mode	Modulation	Conducted Power [dBm]	Power Drift [dB]	Target MPR [dB]	Side	Test Position	Bandwidth (MHz)	Serial Number	Number of Resource Blocks	RB Offset	SAR (1g) (W/kg)
MHz	Ch.												
1880.00	18900	LTE Band 2 (PCS)	QPSK	21.78	0.10	1	Right	Touch	5	2	12	6	0.265
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.85	-0.09	0	Right	Touch	5	2	1	0	0.292
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.95	0.10	0	Right	Touch	5	2	1	24	0.405
1880.00	18900	LTE Band 2 (PCS)	16QAM	20.90	0.06	2	Right	Touch	5	2	12	6	0.212
1907.50	19175	LTE Band 2 (PCS)	16QAM	21.81	-0.01	1	Right	Touch	5	2	1	0	0.243
1907.50	19175	LTE Band 2 (PCS)	16QAM	21.66	0.03	1	Right	Touch	5	2	1	24	0.291
1880.00	18900	LTE Band 2 (PCS)	QPSK	21.78	-0.04	1	Right	Tilt	5	2	12	6	0.316
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.85	0.14	0	Right	Tilt	5	2	1	0	0.319
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.95	0.16	0	Right	Tilt	5	2	1	24	0.412
1880.00	18900	LTE Band 2 (PCS)	16QAM	20.90	-0.03	2	Right	Tilt	5	2	12	6	0.232
1907.50	19175	LTE Band 2 (PCS)	16QAM	21.81	0.09	1	Right	Tilt	5	2	1	0	0.277
1907.50	19175	LTE Band 2 (PCS)	16QAM	21.66	-0.01	1	Right	Tilt	5	2	1	24	0.325
1880.00	18900	LTE Band 2 (PCS)	QPSK	21.78	0.05	1	Left	Touch	5	2	12	6	0.409
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.85	0.14	0	Left	Touch	5	2	1	0	0.421
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.95	0.13	0	Left	Touch	5	2	1	24	0.529
1880.00	18900	LTE Band 2 (PCS)	16QAM	20.90	0.08	2	Left	Touch	5	2	12	6	0.295
1907.50	19175	LTE Band 2 (PCS)	16QAM	21.81	-0.03	1	Left	Touch	5	2	1	0	0.337
1907.50	19175	LTE Band 2 (PCS)	16QAM	21.66	-0.05	1	Left	Touch	5	2	1	24	0.432
1880.00	18900	LTE Band 2 (PCS)	QPSK	21.78	0.14	1	Left	Tilt	5	2	12	6	0.426
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.85	0.11	0	Left	Tilt	5	2	1	0	0.455
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.95	0.00	0	Left	Tilt	5	2	1	24	0.551
1880.00	18900	LTE Band 2 (PCS)	16QAM	20.90	-0.20	2	Left	Tilt	5	2	12	6	0.304
1907.50	19175	LTE Band 2 (PCS)	16QAM	21.81	0.11	1	Left	Tilt	5	2	1	0	0.360
1907.50	19175	LTE Band 2 (PCS)	16QAM	21.66	0.10	1	Left	Tilt	5	2	1	24	0.428
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 16-7
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) (W/kg)
MHz	Ch.									
2462	11	IEEE 802.11b	DSSS	16.78	0.14	Right	Touch	5	1	0.024
2462	11	IEEE 802.11b	DSSS	16.78	0.14	Right	Tilt	5	1	0.013
2462	11	IEEE 802.11b	DSSS	16.78	-0.14	Left	Touch	5	1	0.045
2462	11	IEEE 802.11b	DSSS	16.78	-0.09	Left	Tilt	5	1	0.012
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-Worn SAR Data

Table 16-8
CDMA Body-Worn SAR Results

MEASUREMENT RESULTS									
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Serial Number	Side	SAR (1g)
MHz	Ch.								(W/kg)
836.52	384	Cell. CDMA	TDSO32	24.60	-0.13	1.0 cm	7	back	0.633
1880.00	600	PCS CDMA	TDSO32	24.85	-0.04	1.0 cm	5	back	0.568
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 16-9
2.4 GHz WLAN Body-Worn 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)
2462	11	IEEE 802.11b	DSSS	16.78	0.09	1.0 cm	5	1	back	0.261
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 16-10
LTE Body-Worn SAR Results

MEASUREMENT RESULTS													
FREQUENCY		Mode	Modulation	Conducted Power [dBm]	Power Drift [dB]	Target MPR [dB]	Spacing	Bandwidth (MHz)	Serial Number	Number of Resource Blocks	RB Offset	Side	SAR (1g)
MHz	Ch.												(W/kg)
707.50	23095	LTE Band 12	QPSK	21.87	0.19	1	1.0 cm	10	4	25	12	back	0.228
707.50	23095	LTE Band 12	QPSK	22.60	0.15	0	1.0 cm	10	4	1	0	back	0.268
707.50	23095	LTE Band 12	QPSK	21.67	0.01	0	1.0 cm	10	4	1	49	back	0.218
707.50	23095	LTE Band 12	16QAM	21.46	-0.09	1	1.0 cm	10	4	25	12	back	0.177
707.50	23095	LTE Band 12	16QAM	22.76	-0.05	0	1.0 cm	10	4	1	0	back	0.254
707.50	23095	LTE Band 12	16QAM	21.73	-0.14	1	1.0 cm	10	4	1	49	back	0.205
836.50	20525	LTE Band 5 (Cell.)	QPSK	21.91	0.12	1	1.0 cm	5	2	12	6	back	0.216
826.50	20425	LTE Band 5 (Cell.)	QPSK	22.56	0.02	0	1.0 cm	5	2	1	0	back	0.331
826.50	20425	LTE Band 5 (Cell.)	QPSK	22.95	-0.11	0	1.0 cm	5	2	1	24	back	0.239
836.50	20525	LTE Band 5 (Cell.)	16QAM	20.98	0.08	2	1.0 cm	5	2	12	6	back	0.171
846.50	20625	LTE Band 5 (Cell.)	16QAM	21.67	-0.08	1	1.0 cm	5	2	1	0	back	0.246
846.50	20625	LTE Band 5 (Cell.)	16QAM	22.00	-0.07	1	1.0 cm	5	2	1	24	back	0.169
1732.50	20175	LTE Band 4 (AWS)	QPSK	21.55	-0.14	1	1.0 cm	10	9	25	12	back	0.343
1750.00	20375	LTE Band 4 (AWS)	QPSK	22.90	-0.18	0	1.0 cm	10	9	1	0	back	0.471
1750.00	20375	LTE Band 4 (AWS)	QPSK	22.92	-0.18	0	1.0 cm	10	9	1	49	back	0.389
1732.50	20175	LTE Band 4 (AWS)	16QAM	21.58	-0.15	1	1.0 cm	10	9	25	12	back	0.328
1750.00	20375	LTE Band 4 (AWS)	16QAM	22.92	-0.01	0	1.0 cm	10	9	1	0	back	0.486
1750.00	20375	LTE Band 4 (AWS)	16QAM	21.91	-0.20	1	1.0 cm	10	9	1	49	back	0.301
1880.00	18900	LTE Band 2 (PCS)	QPSK	21.78	0.19	1	1.0 cm	5	2	12	6	back	0.209
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.85	0.00	0	1.0 cm	5	2	1	0	back	0.197
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.95	0.02	0	1.0 cm	5	2	1	24	back	0.239
1880.00	18900	LTE Band 2 (PCS)	16QAM	20.90	0.01	2	1.0 cm	5	2	12	6	back	0.149
1907.50	19175	LTE Band 2 (PCS)	16QAM	21.81	-0.12	1	1.0 cm	5	2	1	0	back	0.182
1907.50	19175	LTE Band 2 (PCS)	16QAM	21.66	0.02	1	1.0 cm	5	2	1	24	back	0.218
ANSI / IEEE C95.1 1992 - SAFETY LIMIT							Body						
Spatial Peak							1.6 W/kg (mW/g)						
Uncontrolled Exposure/General Population							averaged over 1 gram						

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16.3 Hotspot SAR Data

Table 16-11
CDMA Hotspot Body SAR Results

MEASUREMENT RESULTS									
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Serial Number	Side	SAR (1g)
MHz	Ch.								(W/kg)
836.52	384	Cell. CDMA	EVDO	24.75	-0.08	1.0 cm	7	back	0.582
836.52	384	Cell. CDMA	EVDO	24.75	-0.05	1.0 cm	7	front	0.278
836.52	384	Cell. CDMA	EVDO	24.75	0.03	1.0 cm	7	bottom	0.108
836.52	384	Cell. CDMA	EVDO	24.75	-0.07	1.0 cm	7	right	0.457
1880.00	600	PCS CDMA	EVDO	24.75	-0.09	1.0 cm	5	back	0.584
1880.00	600	PCS CDMA	EVDO	24.75	0.01	1.0 cm	5	front	0.385
1880.00	600	PCS CDMA	EVDO	24.75	-0.01	1.0 cm	5	bottom	0.456
1880.00	600	PCS CDMA	EVDO	24.75	-0.09	1.0 cm	5	right	0.227
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 16-12
2.4 GHz WLAN Hotspot 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)
2462	11	IEEE 802.11b	DSSS	16.78	0.09	1.0 cm	5	1	back	0.261
2462	11	IEEE 802.11b	DSSS	16.78	0.10	1.0 cm	5	1	front	0.037
2462	11	IEEE 802.11b	DSSS	16.78	0.05	1.0 cm	5	1	left	0.134
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 16-13
LTE Band 12 Hotspot SAR Results

MEASUREMENT RESULTS													
FREQUENCY		Mode	Modulation	Conducted Power [dBm]	Power Drift [dB]	Target MPR [dB]	Spacing	Bandwidth (MHz)	Serial Number	Number of Resource Blocks	RB Offset	Side	SAR (1g)
MHz	Ch.												(W/kg)
707.50	23095	LTE Band 12	QPSK	21.87	0.19	1	1.0 cm	10	4	25	12	back	0.228
707.50	23095	LTE Band 12	QPSK	22.60	0.15	0	1.0 cm	10	4	1	0	back	0.268
707.50	23095	LTE Band 12	QPSK	21.67	0.01	0	1.0 cm	10	4	1	49	back	0.218
707.50	23095	LTE Band 12	16QAM	21.46	-0.09	1	1.0 cm	10	4	25	12	back	0.177
707.50	23095	LTE Band 12	16QAM	22.76	-0.05	0	1.0 cm	10	4	1	0	back	0.254
707.50	23095	LTE Band 12	16QAM	21.73	-0.14	1	1.0 cm	10	4	1	49	back	0.205
707.50	23095	LTE Band 12	QPSK	21.87	0.05	1	1.0 cm	10	4	25	12	front	0.077
707.50	23095	LTE Band 12	QPSK	22.60	-0.06	0	1.0 cm	10	4	1	0	front	0.088
707.50	23095	LTE Band 12	QPSK	21.67	-0.11	0	1.0 cm	10	4	1	49	front	0.072
707.50	23095	LTE Band 12	16QAM	21.46	0.18	1	1.0 cm	10	4	25	12	front	0.058
707.50	23095	LTE Band 12	16QAM	22.76	-0.12	0	1.0 cm	10	4	1	0	front	0.074
707.50	23095	LTE Band 12	16QAM	21.73	0.02	1	1.0 cm	10	4	1	49	front	0.072
707.50	23095	LTE Band 12	QPSK	21.87	-0.12	1	1.0 cm	10	4	25	12	top	0.037
707.50	23095	LTE Band 12	QPSK	22.60	-0.06	0	1.0 cm	10	4	1	0	top	0.040
707.50	23095	LTE Band 12	QPSK	21.67	-0.02	0	1.0 cm	10	4	1	49	top	0.037
707.50	23095	LTE Band 12	16QAM	21.46	-0.06	1	1.0 cm	10	4	25	12	top	0.027
707.50	23095	LTE Band 12	16QAM	22.76	0.13	0	1.0 cm	10	4	1	0	top	0.037
707.50	23095	LTE Band 12	16QAM	21.73	-0.02	1	1.0 cm	10	4	1	49	top	0.035
707.50	23095	LTE Band 12	QPSK	21.87	-0.02	1	1.0 cm	10	4	25	12	right	0.095
707.50	23095	LTE Band 12	QPSK	22.60	-0.11	0	1.0 cm	10	4	1	0	right	0.107
707.50	23095	LTE Band 12	QPSK	21.67	-0.15	0	1.0 cm	10	4	1	49	right	0.106
707.50	23095	LTE Band 12	16QAM	21.46	-0.03	1	1.0 cm	10	4	25	12	right	0.080
707.50	23095	LTE Band 12	16QAM	22.76	-0.05	0	1.0 cm	10	4	1	0	right	0.116
707.50	23095	LTE Band 12	16QAM	21.73	-0.15	1	1.0 cm	10	4	1	49	right	0.092
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 16-14
LTE Band 5 (Cell.) Hotspot SAR Results

MEASUREMENT RESULTS													
FREQUENCY		Mode	Modulation	Conducted Power [dBm]	Power Drift [dB]	Target MPR [dB]	Spacing	Bandwidth (MHz)	Serial Number	Number of Resource Blocks	RB Offset	Side	SAR (1g)
MHz	Ch.												(W/kg)
836.50	20525	LTE Band 5 (Cell.)	QPSK	21.91	0.12	1	1.0 cm	5	2	12	6	back	0.216
826.50	20425	LTE Band 5 (Cell.)	QPSK	22.56	0.02	0	1.0 cm	5	2	1	0	back	0.331
826.50	20425	LTE Band 5 (Cell.)	QPSK	22.95	-0.11	0	1.0 cm	5	2	1	24	back	0.239
836.50	20525	LTE Band 5 (Cell.)	16QAM	20.98	0.08	2	1.0 cm	5	2	12	6	back	0.171
846.50	20625	LTE Band 5 (Cell.)	16QAM	21.67	-0.08	1	1.0 cm	5	2	1	0	back	0.246
846.50	20625	LTE Band 5 (Cell.)	16QAM	22.00	-0.07	1	1.0 cm	5	2	1	24	back	0.169
836.50	20525	LTE Band 5 (Cell.)	QPSK	21.91	0.18	1	1.0 cm	5	2	12	6	front	0.131
826.50	20425	LTE Band 5 (Cell.)	QPSK	22.56	-0.12	0	1.0 cm	5	2	1	0	front	0.190
826.50	20425	LTE Band 5 (Cell.)	QPSK	22.95	0.05	0	1.0 cm	5	2	1	24	front	0.169
836.50	20525	LTE Band 5 (Cell.)	16QAM	20.98	-0.16	2	1.0 cm	5	2	12	6	front	0.117
846.50	20625	LTE Band 5 (Cell.)	16QAM	21.67	-0.13	1	1.0 cm	5	2	1	0	front	0.158
846.50	20625	LTE Band 5 (Cell.)	16QAM	22.00	0.00	1	1.0 cm	5	2	1	24	front	0.131
836.50	20525	LTE Band 5 (Cell.)	QPSK	21.91	-0.01	1	1.0 cm	5	2	12	6	top	0.061
826.50	20425	LTE Band 5 (Cell.)	QPSK	22.56	0.03	0	1.0 cm	5	2	1	0	top	0.082
826.50	20425	LTE Band 5 (Cell.)	QPSK	22.95	0.19	0	1.0 cm	5	2	1	24	top	0.074
836.50	20525	LTE Band 5 (Cell.)	16QAM	20.98	0.13	2	1.0 cm	5	2	12	6	top	0.048
846.50	20625	LTE Band 5 (Cell.)	16QAM	21.67	0.05	1	1.0 cm	5	2	1	0	top	0.062
846.50	20625	LTE Band 5 (Cell.)	16QAM	22.00	-0.09	1	1.0 cm	5	2	1	24	top	0.056
836.50	20525	LTE Band 5 (Cell.)	QPSK	21.91	0.19	1	1.0 cm	5	2	12	6	right	0.185
826.50	20425	LTE Band 5 (Cell.)	QPSK	22.56	-0.02	0	1.0 cm	5	2	1	0	right	0.271
826.50	20425	LTE Band 5 (Cell.)	QPSK	22.95	-0.05	0	1.0 cm	5	2	1	24	right	0.158
836.50	20525	LTE Band 5 (Cell.)	16QAM	20.98	0.12	2	1.0 cm	5	2	12	6	right	0.142
846.50	20625	LTE Band 5 (Cell.)	16QAM	21.67	-0.11	1	1.0 cm	5	2	1	0	right	0.204
846.50	20625	LTE Band 5 (Cell.)	16QAM	22.00	0.14	1	1.0 cm	5	2	1	24	right	0.124
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 16-15
LTE Band 4 (AWS) Hotspot SAR Results

MEASUREMENT RESULTS													
FREQUENCY		Mode	Modulation	Conducted Power [dBm]	Power Drift [dB]	Target MPR [dB]	Spacing	Bandwidth (MHz)	Serial Number	Number of Resource Blocks	RB Offset	Side	SAR (1g)
MHz	Ch.												(W/kg)
1732.50	20175	LTE Band 4 (AWS)	QPSK	21.55	-0.14	1	1.0 cm	10	9	25	12	back	0.343
1750.00	20375	LTE Band 4 (AWS)	QPSK	22.90	-0.18	0	1.0 cm	10	9	1	0	back	0.471
1750.00	20375	LTE Band 4 (AWS)	QPSK	22.92	-0.18	0	1.0 cm	10	9	1	49	back	0.389
1732.50	20175	LTE Band 4 (AWS)	16QAM	21.58	-0.15	1	1.0 cm	10	9	25	12	back	0.328
1750.00	20375	LTE Band 4 (AWS)	16QAM	22.92	-0.01	0	1.0 cm	10	9	1	0	back	0.486
1750.00	20375	LTE Band 4 (AWS)	16QAM	21.91	-0.20	1	1.0 cm	10	9	1	49	back	0.301
1732.50	20175	LTE Band 4 (AWS)	QPSK	21.55	-0.06	1	1.0 cm	10	9	25	12	front	0.190
1750.00	20375	LTE Band 4 (AWS)	QPSK	22.90	-0.13	0	1.0 cm	10	9	1	0	front	0.267
1750.00	20375	LTE Band 4 (AWS)	QPSK	22.92	0.11	0	1.0 cm	10	9	1	49	front	0.225
1732.50	20175	LTE Band 4 (AWS)	16QAM	21.58	-0.02	1	1.0 cm	10	9	25	12	front	0.193
1750.00	20375	LTE Band 4 (AWS)	16QAM	22.92	-0.05	0	1.0 cm	10	9	1	0	front	0.270
1750.00	20375	LTE Band 4 (AWS)	16QAM	21.91	-0.08	1	1.0 cm	10	9	1	49	front	0.178
1732.50	20175	LTE Band 4 (AWS)	QPSK	21.55	-0.13	1	1.0 cm	10	9	25	12	top	0.316
1750.00	20375	LTE Band 4 (AWS)	QPSK	22.90	-0.05	0	1.0 cm	10	9	1	0	top	0.440
1750.00	20375	LTE Band 4 (AWS)	QPSK	22.92	-0.12	0	1.0 cm	10	9	1	49	top	0.348
1732.50	20175	LTE Band 4 (AWS)	16QAM	21.58	-0.12	1	1.0 cm	10	9	25	12	top	0.312
1750.00	20375	LTE Band 4 (AWS)	16QAM	22.92	-0.11	0	1.0 cm	10	9	1	0	top	0.436
1750.00	20375	LTE Band 4 (AWS)	16QAM	21.91	-0.13	1	1.0 cm	10	9	1	49	top	0.277
1732.50	20175	LTE Band 4 (AWS)	QPSK	21.55	0.05	1	1.0 cm	10	9	25	12	right	0.039
1750.00	20375	LTE Band 4 (AWS)	QPSK	22.90	-0.14	0	1.0 cm	10	9	1	0	right	0.052
1750.00	20375	LTE Band 4 (AWS)	QPSK	22.92	-0.08	0	1.0 cm	10	9	1	49	right	0.043
1732.50	20175	LTE Band 4 (AWS)	16QAM	21.58	0.14	1	1.0 cm	10	9	25	12	right	0.038
1750.00	20000	LTE Band 4 (AWS)	16QAM	22.92	-0.20	0	1.0 cm	10	9	1	0	right	0.051
1750.00	20000	LTE Band 4 (AWS)	16QAM	21.91	0.01	1	1.0 cm	10	9	1	49	right	0.035
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 16-16
LTE Band 2 (PCS) Hotspot SAR Results

MEASUREMENT RESULTS													
FREQUENCY		Mode	Modulation	Conducted Power [dBm]	Power Drift [dB]	Target MPR [dB]	Spacing	Bandwidth (MHz)	Serial Number	Number of Resource Blocks	RB Offset	Side	SAR (1g)
MHz	Ch.												(W/kg)
1880.00	18900	LTE Band 2 (PCS)	QPSK	21.78	0.19	1	1.0 cm	5	2	12	6	back	0.209
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.85	0.00	0	1.0 cm	5	2	1	0	back	0.197
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.95	0.02	0	1.0 cm	5	2	1	24	back	0.239
1880.00	18900	LTE Band 2 (PCS)	16QAM	20.90	0.01	2	1.0 cm	5	2	12	6	back	0.149
1907.50	19175	LTE Band 2 (PCS)	16QAM	21.81	-0.12	1	1.0 cm	5	2	1	0	back	0.182
1907.50	19175	LTE Band 2 (PCS)	16QAM	21.66	0.02	1	1.0 cm	5	2	1	24	back	0.218
1880.00	18900	LTE Band 2 (PCS)	QPSK	21.78	0.03	1	1.0 cm	5	2	12	6	front	0.115
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.85	-0.16	0	1.0 cm	5	2	1	0	front	0.103
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.95	-0.03	0	1.0 cm	5	2	1	24	front	0.135
1880.00	18900	LTE Band 2 (PCS)	16QAM	20.90	-0.19	2	1.0 cm	5	2	12	6	front	0.090
1907.50	19175	LTE Band 2 (PCS)	16QAM	21.81	-0.12	1	1.0 cm	5	2	1	0	front	0.102
1907.50	19175	LTE Band 2 (PCS)	16QAM	21.66	-0.20	1	1.0 cm	5	2	1	24	front	0.116
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.85	-0.11	1	1.0 cm	5	2	12	6	top	0.157
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.88	-0.20	0	1.0 cm	5	2	1	0	top	0.147
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.95	-0.18	0	1.0 cm	5	2	1	24	top	0.187
1880.00	18900	LTE Band 2 (PCS)	16QAM	20.90	-0.20	2	1.0 cm	5	2	12	6	top	0.117
1907.50	19175	LTE Band 2 (PCS)	16QAM	21.81	-0.18	1	1.0 cm	5	2	1	0	top	0.139
1907.50	19175	LTE Band 2 (PCS)	16QAM	21.66	-0.14	1	1.0 cm	5	2	1	24	top	0.176
1880.00	18900	LTE Band 2 (PCS)	QPSK	21.78	-0.12	1	1.0 cm	5	2	12	6	right	0.032
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.85	-0.05	0	1.0 cm	5	2	1	0	right	0.031
1880.00	18900	LTE Band 2 (PCS)	QPSK	22.95	-0.18	0	1.0 cm	5	2	1	24	right	0.044
1880.00	18900	LTE Band 2 (PCS)	16QAM	20.90	0.16	2	1.0 cm	5	2	12	6	right	0.021
1907.50	19175	LTE Band 2 (PCS)	16QAM	21.81	0.19	1	1.0 cm	5	2	1	0	right	0.024
1907.50	19175	LTE Band 2 (PCS)	16QAM	21.66	-0.06	1	1.0 cm	5	2	1	24	right	0.033
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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16.4 SAR Testing Notes

General Notes

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used were according to FCC/OET Bulletin 65, Supplement C [June 2001].
2. Batteries are fully charged for all readings. Standard battery was used.
3. Liquid tissue depth was at least 15.0 cm.
4. Tissue parameters and temperatures are listed on the SAR plots.
5. Device was tested using a fixed spacing for body-worn testing. A separation distance of 10 mm was tested because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
6. All samples tested were electrically identical per the applicant.
7. LTE Band 4 (AWS) SAR was measured with a probe calibrated at 1750 MHz and is valid for measuring SAR from ± 50 MHz. The 1750MHz specific head liquid was verified with specific probe calibration factors as required per FCC KDB Publication 450824 D01.
8. 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.
9. Per FCC KDB Publication 941225 D06, when the same wireless modes and device transmission configurations are required for body-worn accessories and hotspot mode, it is not necessary to additionally test body-worn accessory SAR for the same device orientation. Therefore for CDMA, 2.4 GHz WLAN, and LTE the hotspot data for the back side configuration additionally shows body-worn compliance at the same distance.

CDMA/EVDO 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. Head SAR was tested with SO55 RC3. SO55 RC1 was not required since the average output power was not more than 0.25 dB than the SO55 RC3 powers.
3. Body-Worn SAR was tested with TDSO32 FCH. EVDO and TDSO32. FCH+SCH SAR tests were not required since the average output power was not more than 0.25 dB higher than the TDSO32 FCH powers.
4. Per FCC KDB Publication 941225 D01, CDMA Hotspot Body SAR was tested under EVDO Rev. 0 per FCC 3G Guidance (See Section 12.3.5). TDSO32 RC3 tests were not required since the maximum average output of each channel in RC3 (1x RTT) was not more than $\frac{1}{4}$ dB higher than that measured Rev 0. EVDO Rev A SAR tests were not required since the average output power was not higher than the EVDO Rev. 0 powers.

LTE Notes:

1. Considerations: LTE test configurations are determined according to SAR Test Considerations for LTE handsets and Data Modems KDB 941225 D05 Publication:
 - a. Per KDB Publication 941225 D05 Page 4, 3) A), QPSK with 50% RB is required for the highest bandwidth.
 - b. Per KDB Publication 941225 D05 Page 4, footnote 2, when the maximum output power across high, mid., and low channels is < 0.5 dB, mid channel is tested. Low and high channel SAR tests are not required for QPSK, 50% RB allocation because the SAR is < 0.8 W/kg.

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- c. Per KDB Publication 941225 D05 Page 4, 3) B), QPSK with 1 RB for both channel edges are required for the highest bandwidth.
 - d. Per KDB Publication 941225 D05 Page 4, footnote 6, QPSK 1 RB allocation SAR tests were performed on the highest output power channel for the RB allocation since the average output power of the 1 RB allocation was > 0.5 dB higher than the 50% RB allocation for QPSK. 1 RB low and high offset configurations are considered together for a single channel selection.
 - e. Per KDB Publication 941225 D05 Page 4, 4) A), 16QAM with 50% RB is required for the highest bandwidth on the channel with the highest measured SAR for QPSK with 50% RB allocation.
 - f. Per KDB Publication 941225 D05 4) B) and Page 5 footnote 9, 16QAM with 1RB for both channel edges are required for the highest bandwidth on the highest output power channel for the 1 RB allocation since the average output power of the 1 RB allocation is >0.5 dB higher than the 50% allocation for 16 QAM. 1 RB low and high offset configurations are considered together for a single channel selection.
 - g. Per KDB Publication 941225 D05 Page 4, A) I), 100% RB Allocation is not required to be tested since SAR is not > 1.45 W/kg for the highest bandwidth.
 - h. Per KDB Publication 941225 D05 Page 5, 5) B) I), smaller bandwidths are not required to be tested since SAR is not > 1.45 W/kg for the highest bandwidth are not required to be tested since SAR is not > 1.45 W/kg for the highest bandwidth and conducted powers of the smaller bandwidths were not more than 0.5 dB higher than the larger bandwidth.
2. There is a permanently applied MPR implemented by the manufacturer. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1. The differences noted are not cases of implemented MPR but rather associated with measurement uncertainty and allowable tolerances per 3GPP standard and the manufacturer.
 3. A-MPR was disabled for all SAR tests.
 4. Only the primary Tx/Rx LTE antenna was transmitting during testing. The secondary LTE antennas are for receive-only and were not transmitting during testing.

Bluetooth/WLAN Notes:

1. WLAN transmission was verified using a spectrum analyzer.
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. Other IEEE 802.11 modes (including 802.11g/n) 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 mode.

Hotspot notes:

1. For LTE Hotspot testing, Bottom and Left Edges were not tested since the antenna distance from the edge was greater than 2.5 cm per FCC KDB Publication 941225 D06 guidance (see Section 14.6).
2. For CDMA Hotspot testing, Top and Left Edges were not tested since the antenna distance from the edge was greater than 2.5 cm per FCC KDB Publication 941225 D06 guidance (see Section 14.6).
3. For WLAN Hotspot testing, Top, Bottom, and Right Edges were not tested since the antenna distance from the edge was greater than 2.5 cm per FCC KDB Publication 941225 D06 guidance (see Section 14.6).
4. During SAR Testing for the Wireless Router conditions per KDB 941225 D06, the actual Portable Hotspot operation (with actual simultaneous transmission with WIFI) was not activated (See Section 14.2).

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17 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

17.1 Introduction

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

17.2 FCC Power Tables & Conditions

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

Figure 17-1
Output Power Thresholds for Unlicensed Transmitters

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

Figure 17-2
SAR Evaluation Requirements for Multiple Transmitter Handsets

17.3 Multiple Antenna/Transmission Information

RF Conducted Power of Bluetooth Tx is 6.324 mW. RF Conducted Power of WLAN is 48.75 mW.

17.4 Simultaneous Transmission Analysis

Per KDB Publications 447498 and 648474 and RSS 102 Section 2.5.1, based on the output power, antenna separation distance and the Body SAR of the dominant transmitter, a stand-alone Bluetooth SAR test is not required while for WLAN it is required.

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18 SIMULTANEOUS TRANSMISSION ANALYSIS

18.1 Simultaneous Transmission Scenarios

The following table shows exposure conditions for all transmitters operation in the DUT:

No.	Capable Transmit Configurations	Head	Body-Worn Accessory	Hot Spot	Note
		IEEE 1528, Supp C	Supplement C	FCC KDB 941225 D06 edges/sides	
1	1X CDMA 850 Voice + LTE 700 MHz Data	✓	✓		SVLTE
2	1X CDMA 1900 Voice + LTE 700 MHz Data	✓	✓		SVLTE
3	1X CDMA 850 Voice + LTE 800 MHz Data	✓	✓		SVLTE
4	1X CDMA 1900 Voice + LTE 800 MHz Data	✓	✓		SVLTE
5	1X CDMA 850 Voice + LTE 1700 MHz Data	✓	✓		SVLTE
6	1X CDMA 1900 Voice + LTE 1700 MHz Data	✓	✓		SVLTE
7	1X CDMA 850 Voice + LTE 1900 MHz Data	✓	✓		SVLTE
8	1X CDMA 1900 Voice + LTE 1900 MHz Data	✓	✓		SVLTE
9	1X CDMA 850 Voice + 2.4 GHz WIFI	✓	✓		1X voice and WIFI Data
10	1X CDMA 1900 Voice + 2.4 GHz WIFI	✓	✓		1X voice and WIFI Data
11	1X/EVDO 850 Data + 2.4 GHz WIFI			✓	EVDO+WIFI Hotspot
12	1X/EVDO 1900 Data + 2.4 GHz WIFI			✓	EVDO+WIFI Hotspot
13	LTE 700 MHz Data + 2.4 GHz WIFI			✓	LTE+WIFI Hotspot
14	LTE 800 MHz Data + 2.4 GHz WIFI			✓	LTE+WIFI Hotspot
15	LTE 1700 MHz Data + 2.4 GHz WIFI			✓	LTE+WIFI Hotspot
16	LTE 1900 MHz Data + 2.4 GHz WIFI			✓	LTE+WIFI Hotspot

Notes:

1. CDMA and EVDO share the same antenna path and cannot transmit simultaneously.
2. Bluetooth and 2.4 GHz WLAN share the same antenna path and cannot transmit simultaneously.
3. 1x Voice + LTE Data is sometimes referred to as 'SVLTE' which are CDMA voice services provided through the CDMA network, with simultaneous LTE data services operating simultaneously.
4. All other scenarios are not supported.

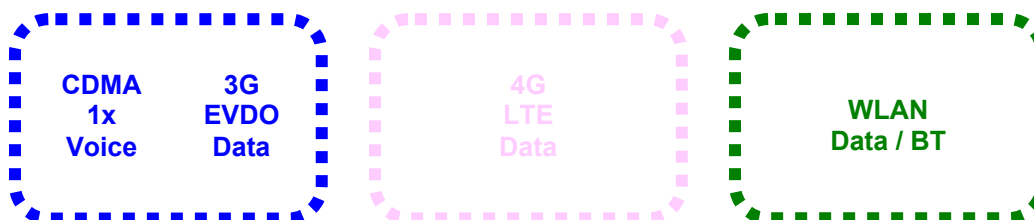


Figure 18-1
Simultaneous Transmission Paths

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18.2 Held to Ear Simultaneous Transmission Scenarios

Table 18-1
Held to Ear Simultaneous Transmission Scenarios (CDMA, 2.4 GHz WLAN, LTE)

Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 12 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Head SAR	Right Cheek	0.226	0.144	0.024	0.370	0.250
	Right Tilt	0.152	0.109	0.013	0.261	0.165
	Left Cheek	0.185	0.204	0.045	0.389	0.230
	Left Tilt	0.132	0.162	0.012	0.294	0.144

Simult Tx	Configuration	PCS CDMA SAR (W/kg)	LTE Band 12 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Head SAR	Right Cheek	0.346	0.144	0.024	0.490	0.370
	Right Tilt	0.107	0.109	0.013	0.216	0.120
	Left Cheek	0.333	0.204	0.045	0.537	0.378
	Left Tilt	0.111	0.162	0.012	0.273	0.123

Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 5 (Cell.) SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Head SAR	Right Cheek	0.226	0.328	0.024	0.554	0.250
	Right Tilt	0.152	0.215	0.013	0.367	0.165
	Left Cheek	0.185	0.399	0.045	0.584	0.230
	Left Tilt	0.132	0.265	0.012	0.397	0.144

Simult Tx	Configuration	PCS CDMA SAR (W/kg)	LTE Band 5 (Cell.) SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Head SAR	Right Cheek	0.346	0.328	0.024	0.674	0.370
	Right Tilt	0.107	0.215	0.013	0.322	0.120
	Left Cheek	0.333	0.399	0.045	0.732	0.378
	Left Tilt	0.111	0.265	0.012	0.376	0.123

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Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Head SAR	Right Cheek	0.226	0.520	0.024	0.746	0.250
	Right Tilt	0.152	0.712	0.013	0.864	0.165
	Left Cheek	0.185	0.728	0.045	0.913	0.230
	Left Tilt	0.132	0.894	0.012	1.026	0.144

Simult Tx	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Head SAR	Right Cheek	0.346	0.520	0.024	0.866	0.370
	Right Tilt	0.107	0.712	0.013	0.819	0.120
	Left Cheek	0.333	0.728	0.045	1.061	0.378
	Left Tilt	0.111	0.894	0.012	1.005	0.123

Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 2 (PCS) SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Head SAR	Right Cheek	0.226	0.405	0.024	0.631	0.250
	Right Tilt	0.152	0.412	0.013	0.564	0.165
	Left Cheek	0.185	0.529	0.045	0.714	0.230
	Left Tilt	0.132	0.551	0.012	0.683	0.144

Simult Tx	Configuration	PCS CDMA SAR (W/kg)	LTE Band 2 (PCS) SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Head SAR	Right Cheek	0.346	0.405	0.024	0.751	0.370
	Right Tilt	0.107	0.412	0.013	0.519	0.120
	Left Cheek	0.333	0.529	0.045	0.862	0.378
	Left Tilt	0.111	0.551	0.012	0.662	0.123

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18.3 Body Worn Accessory Simultaneous Transmission Scenarios

Table 18-2
Body-Worn Simultaneous Transmission Scenarios (CDMA, 2.4 GHz WLAN, LTE) at 1.0 cm

Simult Tx	Configuration	CDMA SAR (W/kg)	LTE Band 12 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Back Side	Cell. CDMA	0.633	0.268	0.261	0.901	0.894
Back Side	PCS CDMA	0.568	0.268	0.261	0.836	0.829

Simult Tx	Configuration	CDMA SAR (W/kg)	LTE Band 5 (Cell.) SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Back Side	Cell. CDMA	0.633	0.331	0.261	0.964	0.894
Back Side	PCS CDMA	0.568	0.331	0.261	0.899	0.829

Simult Tx	Configuration	CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Back Side	Cell. CDMA	0.633	0.486	0.261	1.119	0.894
Back Side	PCS CDMA	0.568	0.486	0.261	1.054	0.829

Simult Tx	Configuration	CDMA SAR (W/kg)	LTE Band 2 (PCS) SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Back Side	Cell. CDMA	0.633	0.239	0.261	0.872	0.894
Back Side	PCS CDMA	0.568	0.239	0.261	0.807	0.829

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18.4 Hotspot Simultaneous Transmission Scenarios

Table 18-3
Hotspot Simultaneous Transmission Scenarios (LTE, 2.4 GHz WLAN)

Simult Tx	Configuration	LTE Band 12 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.268	0.261	0.529
	Front	0.088	0.037	0.125
	Top	0.040	-	0.040
	Bottom	-	-	0.000
	Right	0.116	-	0.116
	Left	-	0.134	0.134

Simult Tx	Configuration	LTE Band 5 (Cell.) SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.331	0.261	0.592
	Front	0.190	0.037	0.227
	Top	0.082	-	0.082
	Bottom	-	-	0.000
	Right	0.271	-	0.271
	Left	-	0.134	0.134

Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.486	0.261	0.747
	Front	0.270	0.037	0.307
	Top	0.440	-	0.440
	Bottom	-	-	0.000
	Right	0.052	-	0.052
	Left	-	0.134	0.134

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Simult Tx	Configuration	LTE Band 2 (PCS) SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.239	0.261	0.500
	Front	0.135	0.037	0.172
	Top	0.187	-	0.187
	Bottom	-	-	0.000
	Right	0.044	-	0.044
	Left	-	0.134	0.134

Table 18-4
Hotspot Simultaneous Transmission Scenarios (CDMA, 2.4 GHz WLAN)

Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.582	0.261	0.843
	Front	0.278	0.037	0.315
	Top	-	-	0.000
	Bottom	0.108	-	0.108
	Right	0.457	-	0.457
	Left	-	0.134	0.134

Simult Tx	Configuration	PCS EVDO SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.584	0.261	0.845
	Front	0.385	0.037	0.422
	Top	-	-	0.000
	Bottom	0.456	-	0.456
	Right	0.227	-	0.227
	Left	-	0.134	0.134

Note: Per FCC KDB Publication 941225 D06, the edges with antennas more than 2.5 cm are not required to be evaluated for SAR ("").

18.5 Simultaneous Transmission Conclusion

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

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19 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8648D	(9kHz-4GHz) Signal Generator	10/10/2011	Annual	10/10/2012	3613A00315
Agilent	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
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	2/8/2011	Annual	2/8/2012	797
SPEAG	D835V2	835 MHz SAR Dipole	2/9/2011	Annual	2/9/2012	40407
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	ES3DV2	SAR Probe	8/25/2011	Annual	8/25/2012	3022
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	D750V3	750 MHz Dipole	2/14/2011	Annual	2/14/2012	1003
SPEAG	ES3DV3	SAR Probe	4/18/2011	Annual	4/18/2012	3209
Rohde & Schwarz	SMI003B	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
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
SPEAG	D1750V2	1750 MHz SAR Dipole	5/24/2011	Annual	5/24/2012	1051
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/5/2011	Annual	8/5/2012	112347
MiniCircuits	VLF-6000+	Low Pass Filter	N/A			N/A
MiniCircuits	VLF-6000+	Low Pass Filter	N/A			N/A
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
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
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
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

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20 MEASUREMENT UNCERTAINTIES

Applicable for SAR Tests < 3000 MHz.

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

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

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21 CONCLUSION

21.1 Measurement Conclusion

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

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables. [3]

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FCC ID: A3LSCHR930	 SAR COMPLIANCE REPORT 		Reviewed by: Quality Manager
Filename: 0Y1110251875.A3L	Test Dates: 10/20/11 - 11/04/11	EUT Type: Portable Handset	Page 61 of 62

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FCC ID: A3LSCHR930	 SAR COMPLIANCE REPORT 		Reviewed by: Quality Manager
Filename: 0Y1110251875.A3L	Test Dates: 10/20/11 - 11/04/11	EUT Type: Portable Handset	Page 62 of 62

APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 4

Communication System: LTE RF; Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium: 700 Head Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.863 \text{ mho/m}$; $\epsilon_r = 42.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 11-04-2011; Ambient Temp: 24.0°C; Tissue Temp: 22.1°C

Probe: ES3DV2 - SN3022; ConvF(6.27, 6.27, 6.27); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

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

Mode: LTE Band 12, Right Head, Touch, Mid. ch, QPSK, 10 MHz, 1 RB, 0 RB Offset

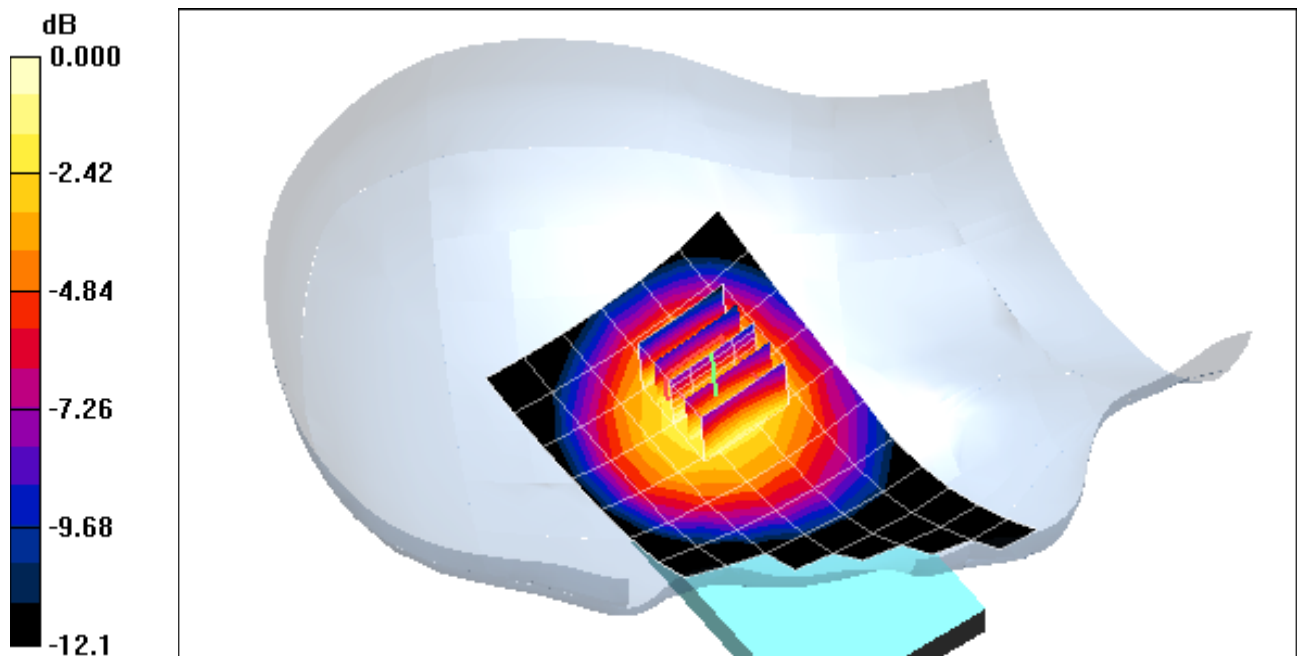
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 13.94 V/m; Power Drift = 0.169 dB

Peak SAR (extrapolated) = 0.196 W/kg

SAR(1 g) = 0.144 mW/g; SAR(10 g) = 0.102 mW/g



0 dB = 0.153mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 4

Communication System: LTE RF; Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium: 700 Head Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.863 \text{ mho/m}$; $\epsilon_r = 42.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 11-04-2011; Ambient Temp: 24.0°C; Tissue Temp: 22.1°C

Probe: ES3DV2 - SN3022; ConvF(6.27, 6.27, 6.27); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

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

Mode: LTE Band 12, Right Head, Tilt, Mid. ch, QPSK, 10 MHz, 1 RB, 0 RB Offset

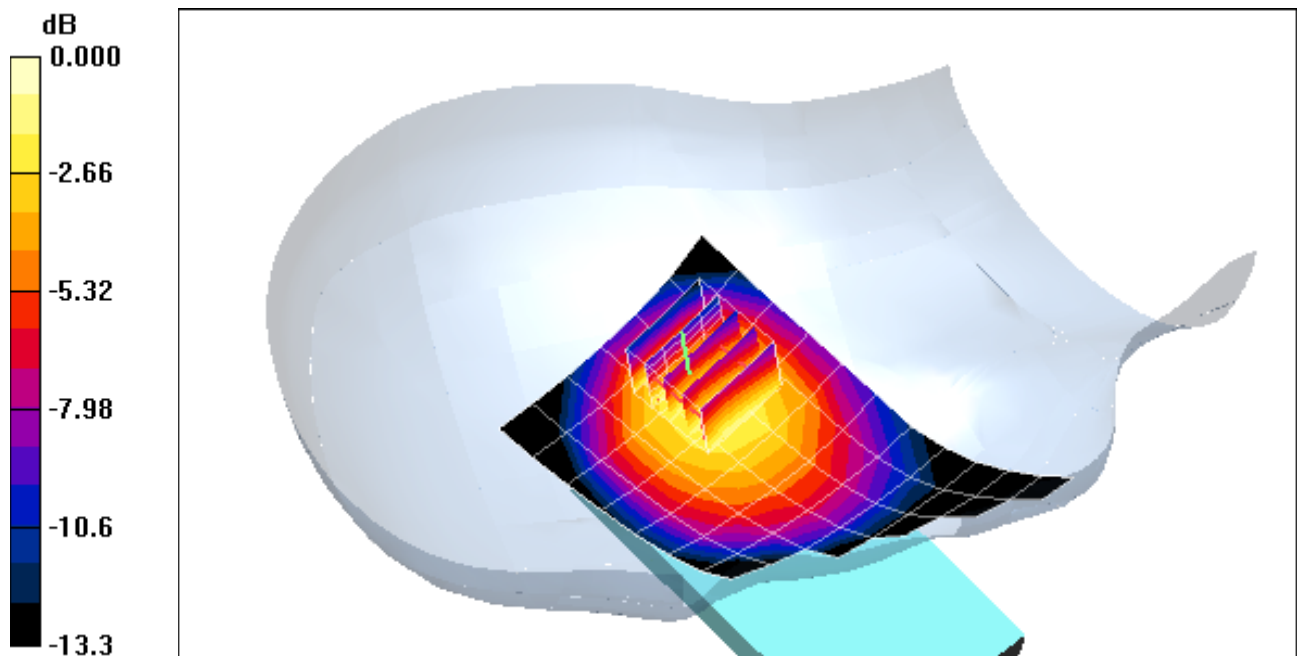
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 11.9 V/m; Power Drift = 0.133 dB

Peak SAR (extrapolated) = 0.172 W/kg

SAR(1 g) = 0.109 mW/g; SAR(10 g) = 0.076 mW/g



0 dB = 0.117mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 4

Communication System: LTE RF; Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium: 700 Head Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.863 \text{ mho/m}$; $\epsilon_r = 42.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 11-04-2011; Ambient Temp: 24.0°C; Tissue Temp: 22.1°C

Probe: ES3DV2 - SN3022; ConvF(6.27, 6.27, 6.27); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

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

Mode: LTE Band 12, Left Head, Touch, Mid. Ch, QPSK, 10 MHz, 1 RBs, 0 RB Offset

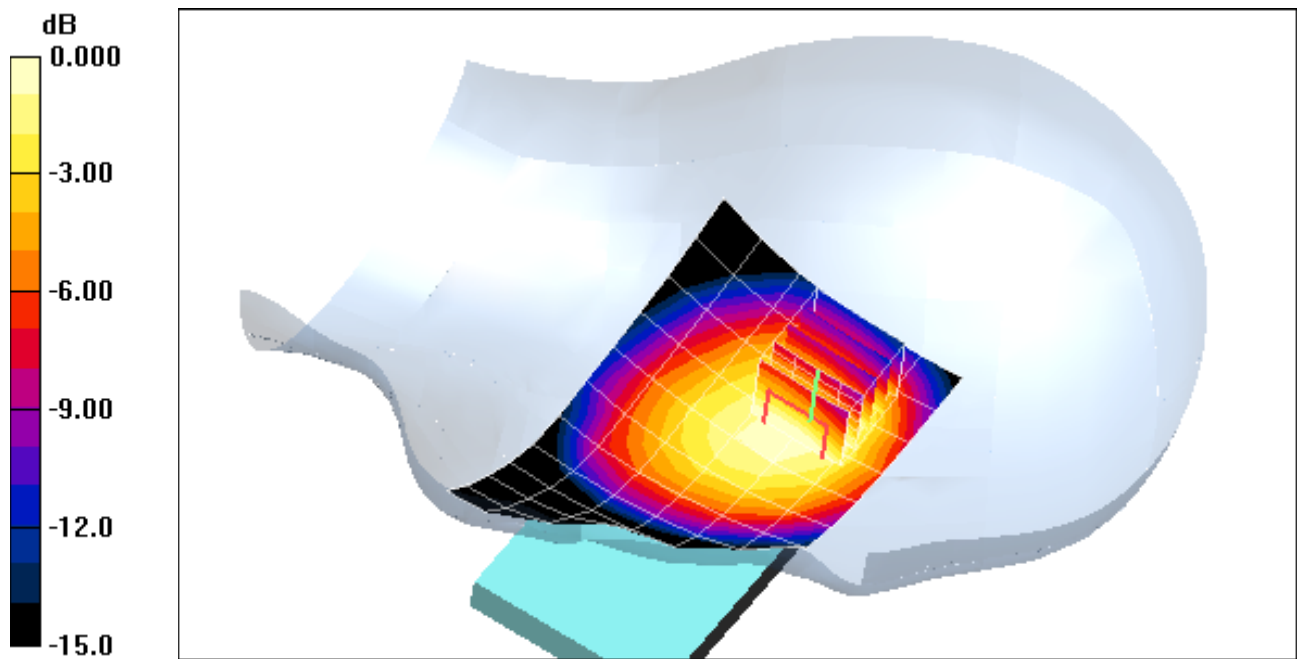
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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 = -0.058 dB

Peak SAR (extrapolated) = 0.315 W/kg

SAR(1 g) = 0.204 mW/g; SAR(10 g) = 0.134 mW/g



0 dB = 0.165mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 4

Communication System: LTE RF; Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium: 700 Head Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.863 \text{ mho/m}$; $\epsilon_r = 42.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 11-04-2011; Ambient Temp: 24.0°C; Tissue Temp: 22.1°C

Probe: ES3DV2 - SN3022; ConvF(6.27, 6.27, 6.27); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

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

Mode: LTE Band 12, Left Head, Tilt, Mid.ch, QPSK, 10 MHz, 1 RBs, 0 RB Offset

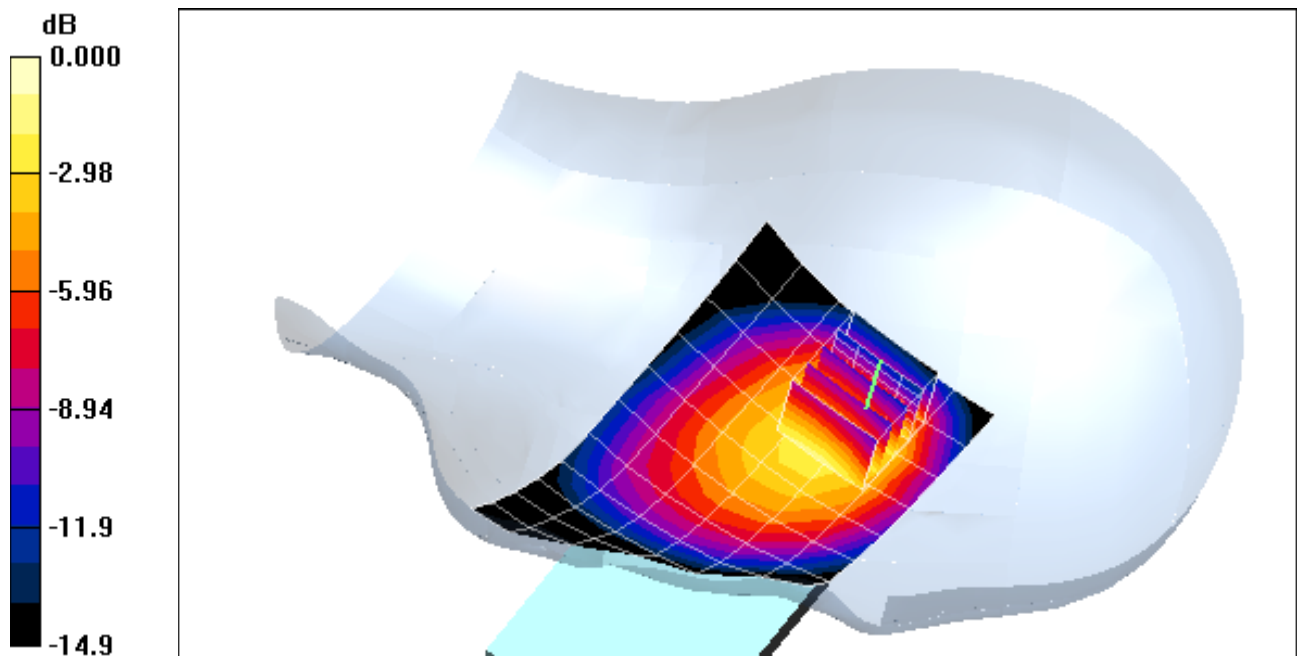
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 12.3 V/m; Power Drift = 0.136 dB

Peak SAR (extrapolated) = 0.302 W/kg

SAR(1 g) = 0.162 mW/g; SAR(10 g) = 0.100 mW/g



0 dB = 0.178mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 7

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

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.889 \text{ mho/m}$; $\epsilon_r = 41.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-20-2011; Ambient Temp: 24.2 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

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

Mode: Cellular CDMA, Right Head, Touch, Mid.ch

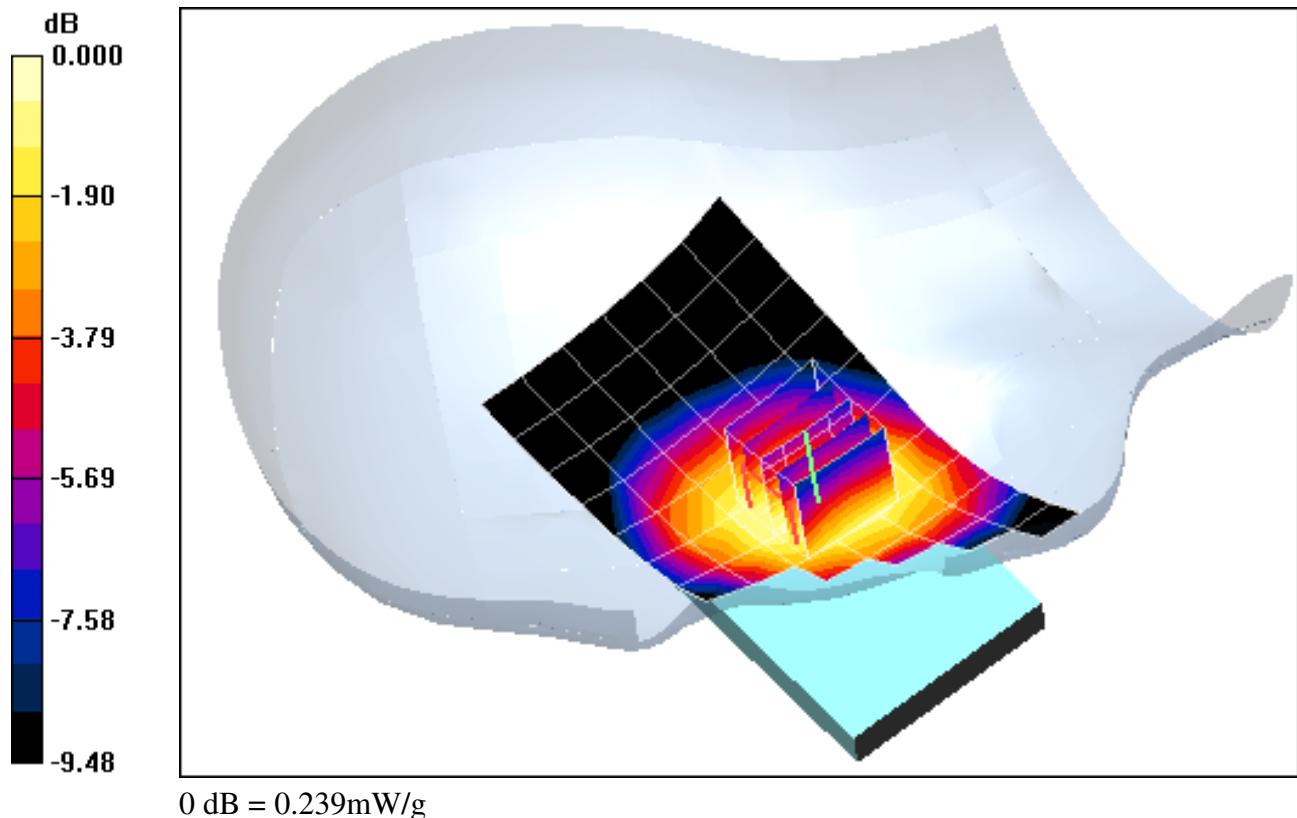
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 16.9 V/m; Power Drift = -0.034 dB

Peak SAR (extrapolated) = 0.282 W/kg

SAR(1 g) = 0.226 mW/g; SAR(10 g) = 0.173 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 7

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

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.889 \text{ mho/m}$; $\epsilon_r = 41.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-20-2011; Ambient Temp: 24.2 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

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

Mode: Cellular CDMA, Right Head, Tilt, Mid.ch

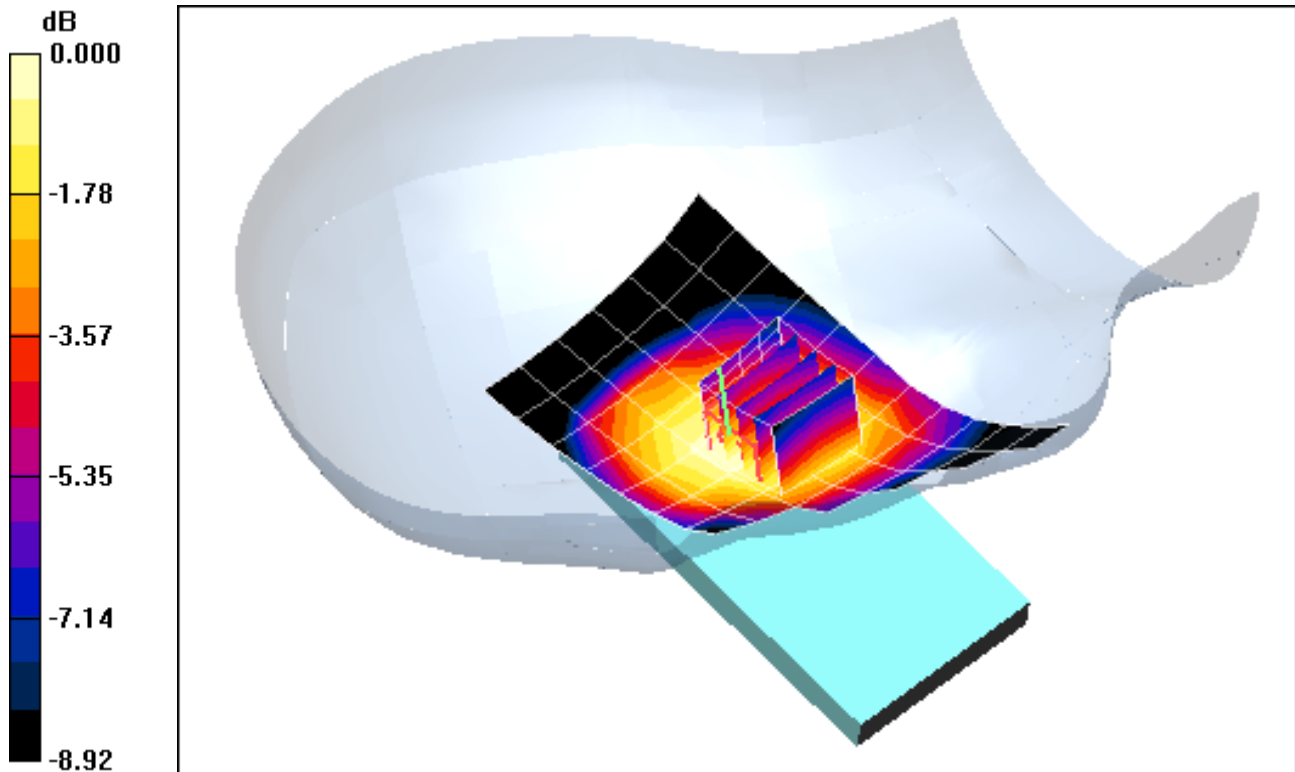
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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 = -0.036 dB

Peak SAR (extrapolated) = 0.190 W/kg

SAR(1 g) = 0.152 mW/g; SAR(10 g) = 0.115 mW/g



0 dB = 0.159mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 7

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

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.889 \text{ mho/m}$; $\epsilon_r = 41.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 10-20-2011; Ambient Temp: 24.2 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

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

Mode: Cellular CDMA, Left Head, Touch, Mid.ch

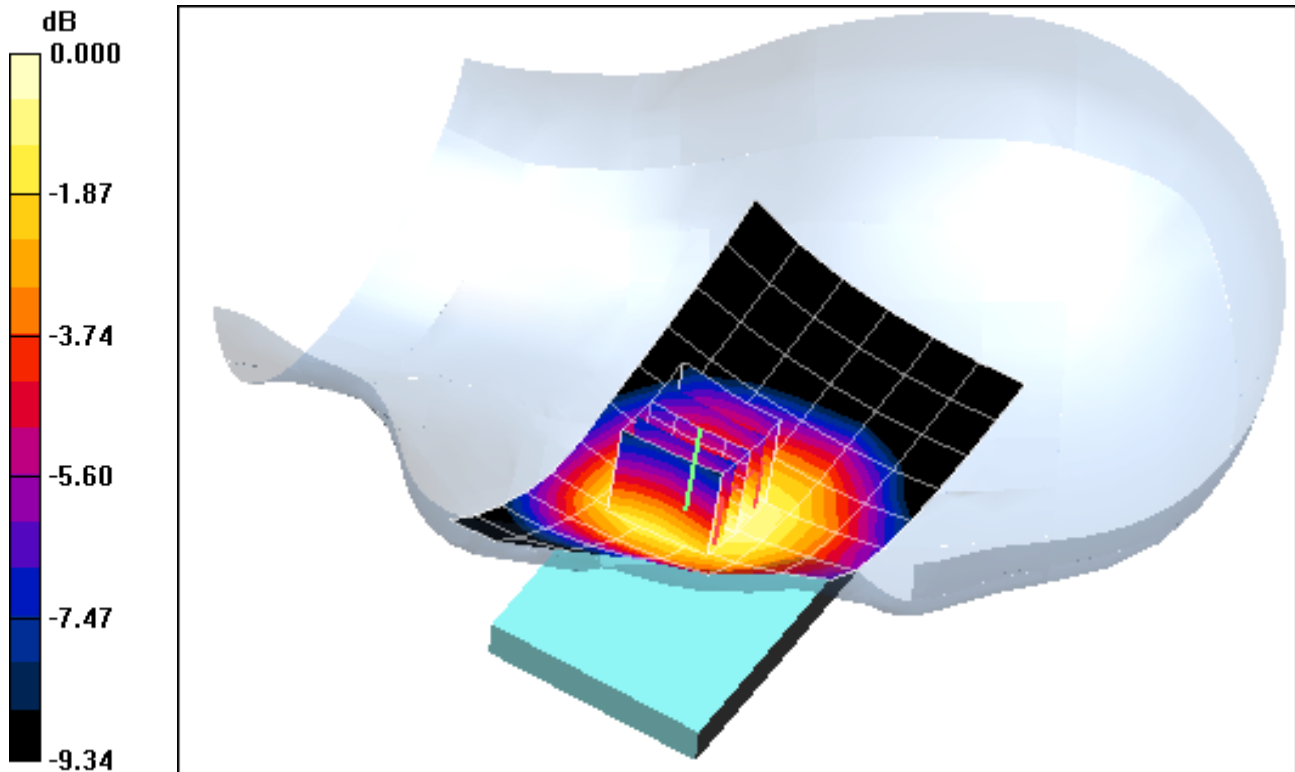
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 4.23 V/m; Power Drift = 0.171 dB

Peak SAR (extrapolated) = 0.229 W/kg

SAR(1 g) = 0.185 mW/g; SAR(10 g) = 0.141 mW/g



0 dB = 0.194mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 7

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

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.889 \text{ mho/m}$; $\epsilon_r = 41.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 10-20-2011; Ambient Temp: 24.2 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

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

Mode: Cellular CDMA, Left Head, Tilt, Mid.ch

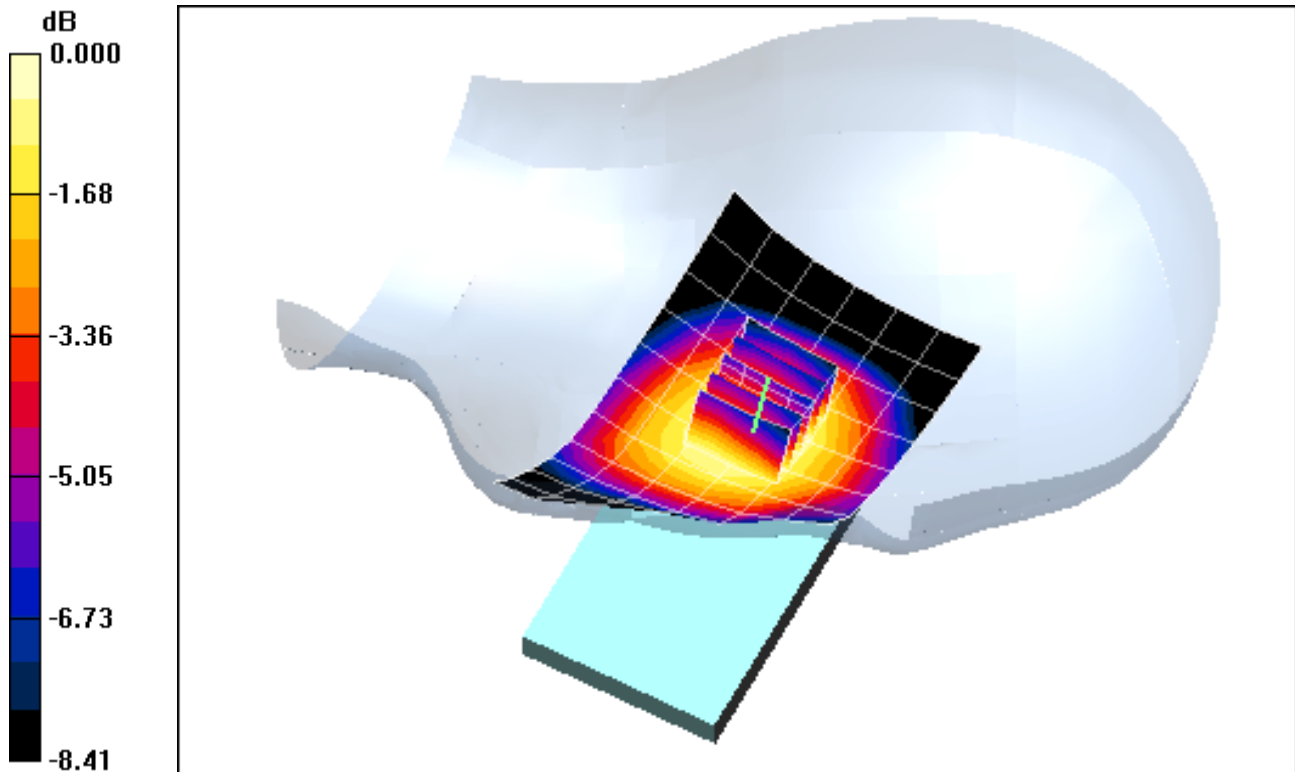
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 8.52 V/m; Power Drift = 0.044 dB

Peak SAR (extrapolated) = 0.164 W/kg

SAR(1 g) = 0.132 mW/g; SAR(10 g) = 0.102 mW/g



0 dB = 0.137mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 2

Communication System: LTE BAND 5; Frequency: 826.5 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 826.5 \text{ MHz}$; $\sigma = 0.861 \text{ mho/m}$; $\epsilon_r = 40.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-25-2011; Ambient Temp: 23.5°C; Tissue Temp: 21.8°C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

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

Mode: LTE Band 5 (Cell), Right Head, Touch, Low ch, QPSK, 5 MHz, 1 RB, 0 RB Offset

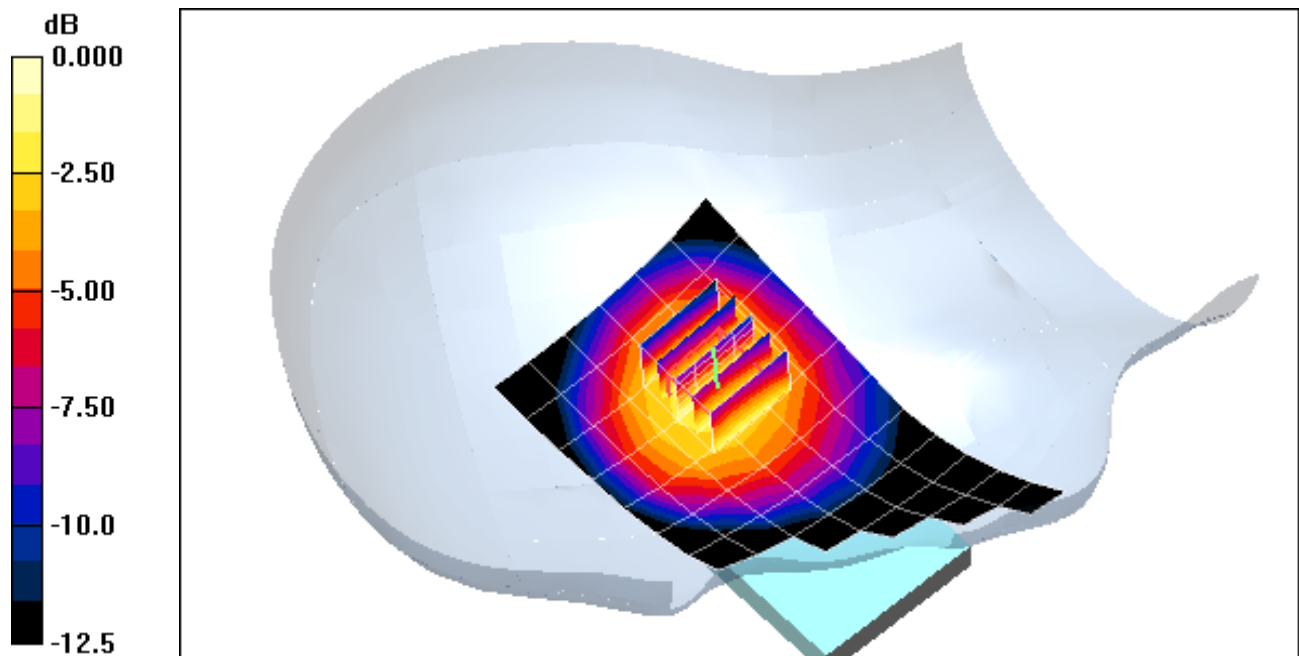
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 17.8 V/m; Power Drift = -0.034 dB

Peak SAR (extrapolated) = 0.480 W/kg

SAR(1 g) = 0.328 mW/g; SAR(10 g) = 0.229 mW/g



0 dB = 0.348mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 2

Communication System: LTE BAND 5; Frequency: 826.5 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 826.5 \text{ MHz}$; $\sigma = 0.861 \text{ mho/m}$; $\epsilon_r = 40.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-25-2011; Ambient Temp: 23.5°C; Tissue Temp: 21.8°C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

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

Mode: LTE Band 5 (Cell), Right Head, Tilt, Low ch, QPSK, 5MHz, 1 RB, 24 RB Offset

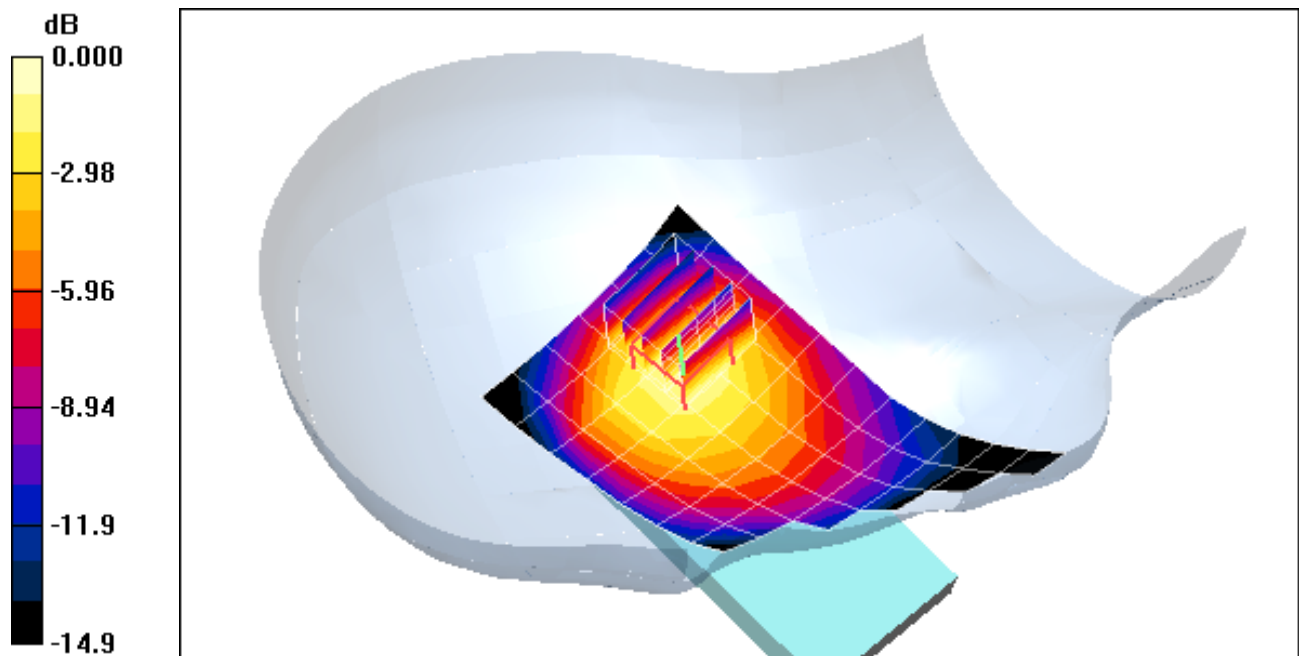
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 17.5 V/m; Power Drift = -0.098 dB

Peak SAR (extrapolated) = 0.342 W/kg

SAR(1 g) = 0.215 mW/g; SAR(10 g) = 0.145 mW/g



0 dB = 0.228mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 2

Communication System: LTE BAND 5; Frequency: 826.5 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 826.5 \text{ MHz}$; $\sigma = 0.861 \text{ mho/m}$; $\epsilon_r = 40.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 10-25-2011; Ambient Temp: 23.5°C; Tissue Temp: 21.8°C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

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

Mode: LTE Band 5 (Cell), Left Head, Touch, Low ch, QPSK, 5 MHz, 1 RB, 0 RB Offset

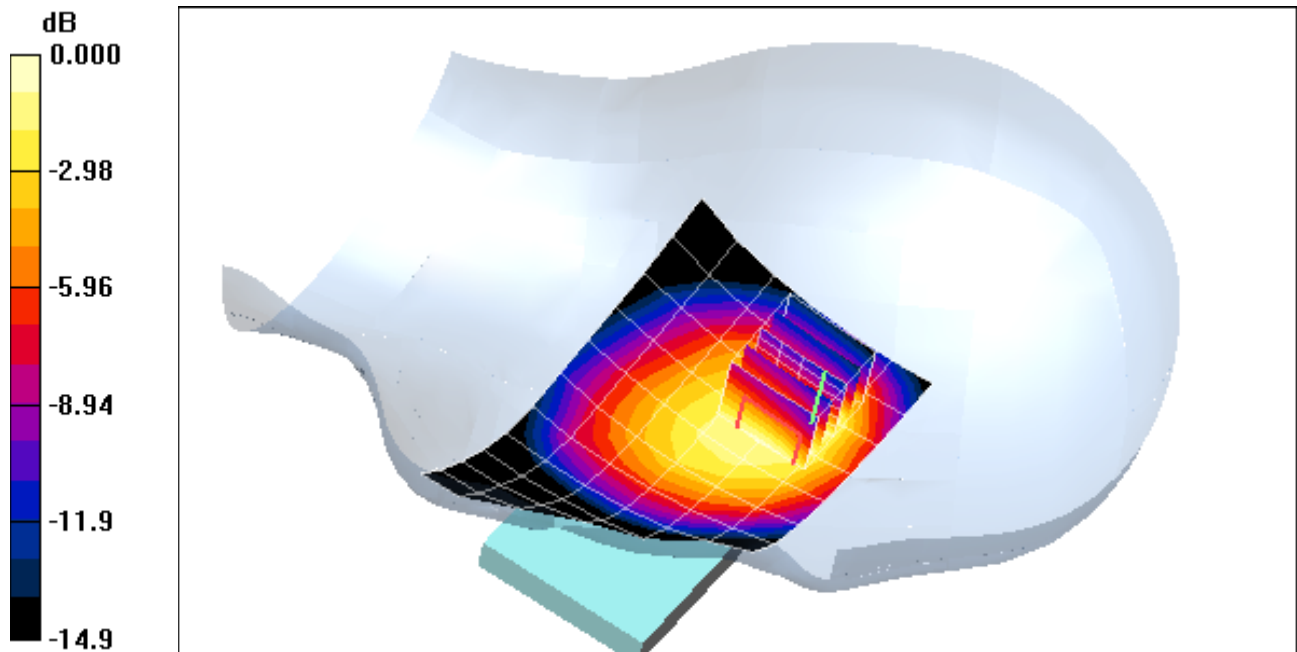
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 16.6 V/m; Power Drift = -0.091 dB

Peak SAR (extrapolated) = 0.697 W/kg

SAR(1 g) = 0.399 mW/g; SAR(10 g) = 0.249 mW/g



0 dB = 0.424mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 2

Communication System: LTE BAND 5; Frequency: 826.5 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 826.5 \text{ MHz}$; $\sigma = 0.861 \text{ mho/m}$; $\epsilon_r = 40.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 10-25-2011; Ambient Temp: 23.5°C; Tissue Temp: 21.8°C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

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

Mode: LTE Band 5 (Cell), Left Head, Tilt, Low ch, QPSK, 5 MHz, 1 RBs, 0 RB Offset

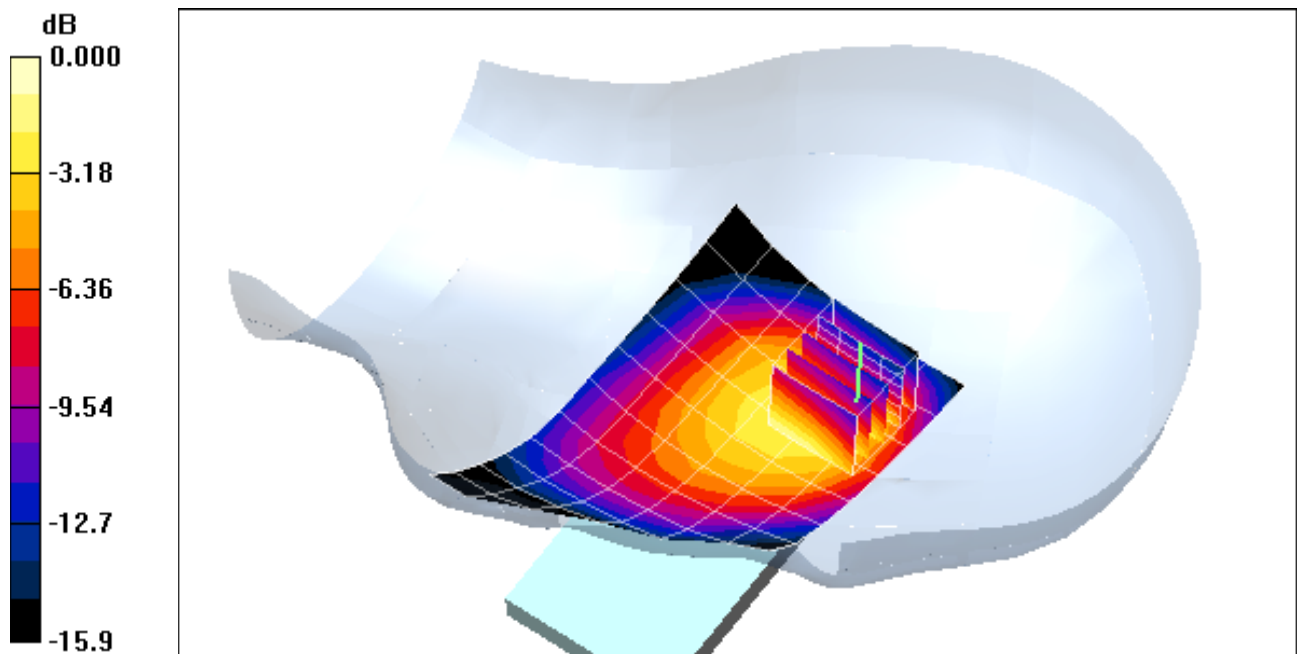
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 15.3 V/m; Power Drift = 0.005 dB

Peak SAR (extrapolated) = 0.498 W/kg

SAR(1 g) = 0.265 mW/g; SAR(10 g) = 0.162 mW/g



0 dB = 0.280mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 9

Communication System: LTE RF; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 39.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-31-2011; Ambient Temp: 23.8°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN3561; ConvF(7.37, 7.37, 7.37); Calibrated: 7/27/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 4 (AWS), Right Head, Touch, High ch, 16 QAM, 10 MHz, 1 RB, 0 RB Offset

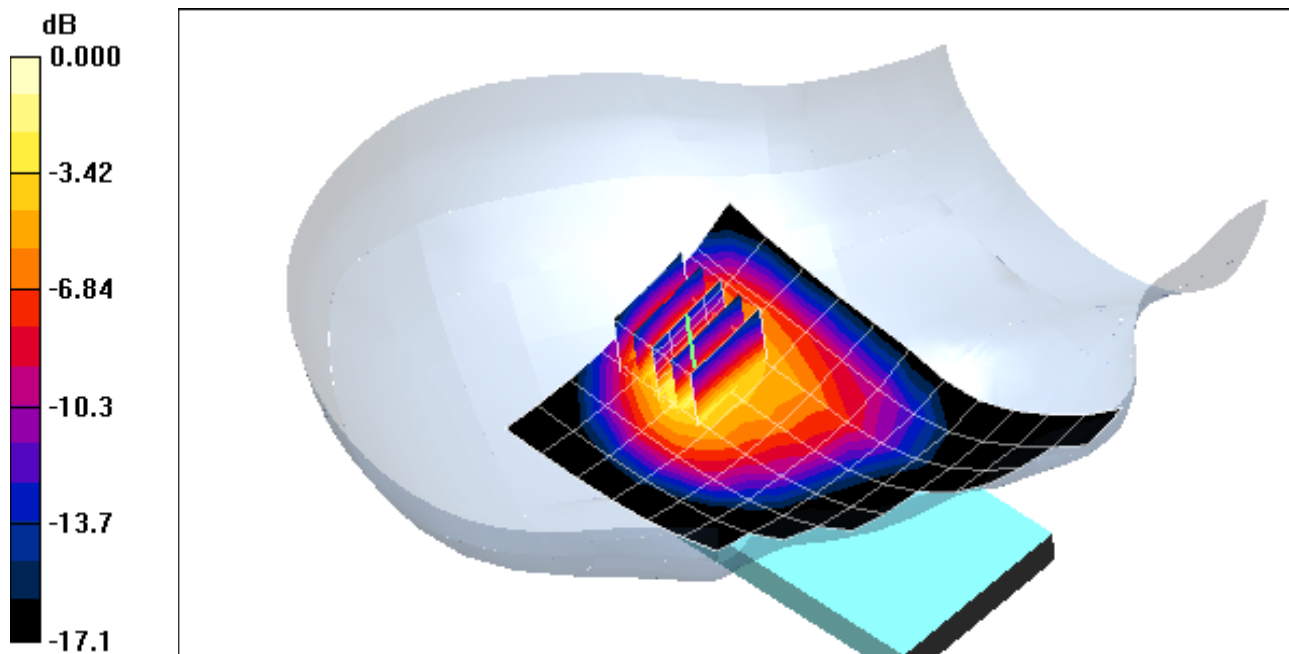
Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 21.5 V/m; Power Drift = -0.066 dB

Peak SAR (extrapolated) = 0.891 W/kg

SAR(1 g) = 0.520 mW/g; SAR(10 g) = 0.291 mW/g



0 dB = 0.584mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 9

Communication System: LTE RF; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 39.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-31-2011; Ambient Temp: 23.8°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN3561; ConvF(7.37, 7.37, 7.37); Calibrated: 7/27/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 4 (AWS), Right Head, Tilt, High ch, 16 QAM, 10 MHz, 1 RB, 0 RB Offset

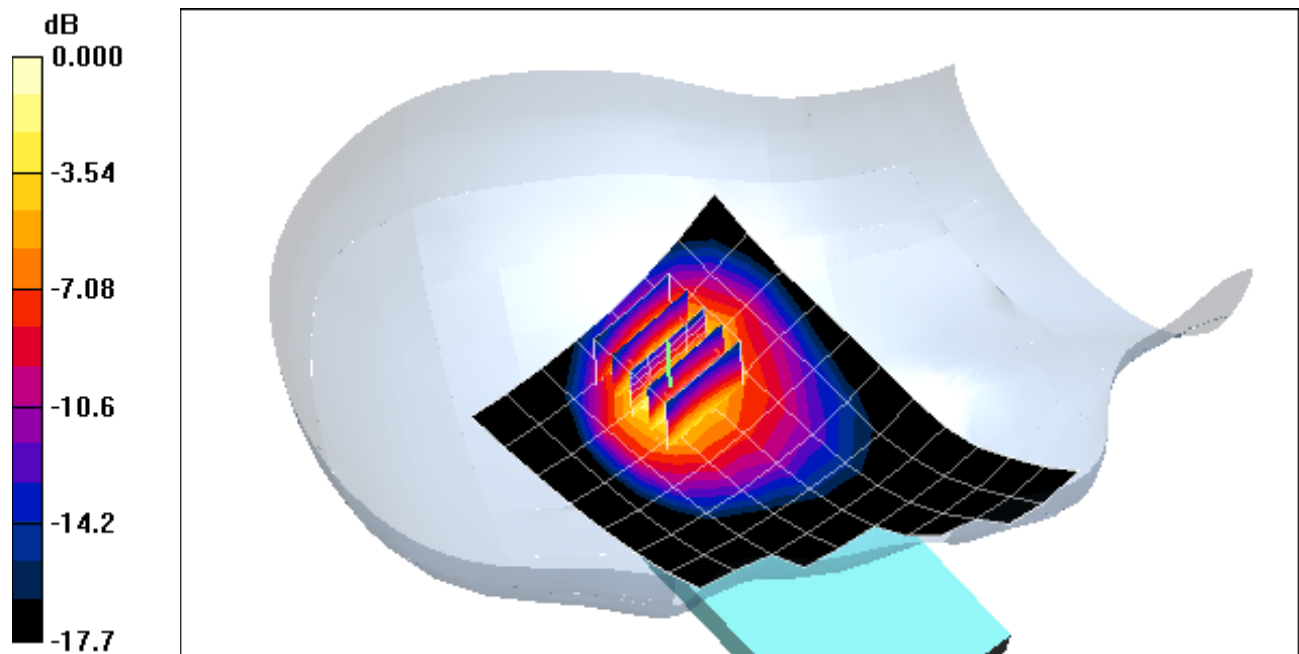
Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 25.1 V/m; Power Drift = -0.124 dB

Peak SAR (extrapolated) = 1.20 W/kg

SAR(1 g) = 0.712 mW/g; SAR(10 g) = 0.403 mW/g



0 dB = 0.784mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 9

Communication System: LTE RF; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1750 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 39.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 10-31-2011; Ambient Temp: 23.8 °C; Tissue Temp: 21.9 °C

Probe: EX3DV4 - SN3561; ConvF(7.37, 7.37, 7.37); Calibrated: 7/27/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 4 (AWS), Left Head, Touch, High Ch, 16QAM, 10 MHz, 1 RB, 0 RB Offset

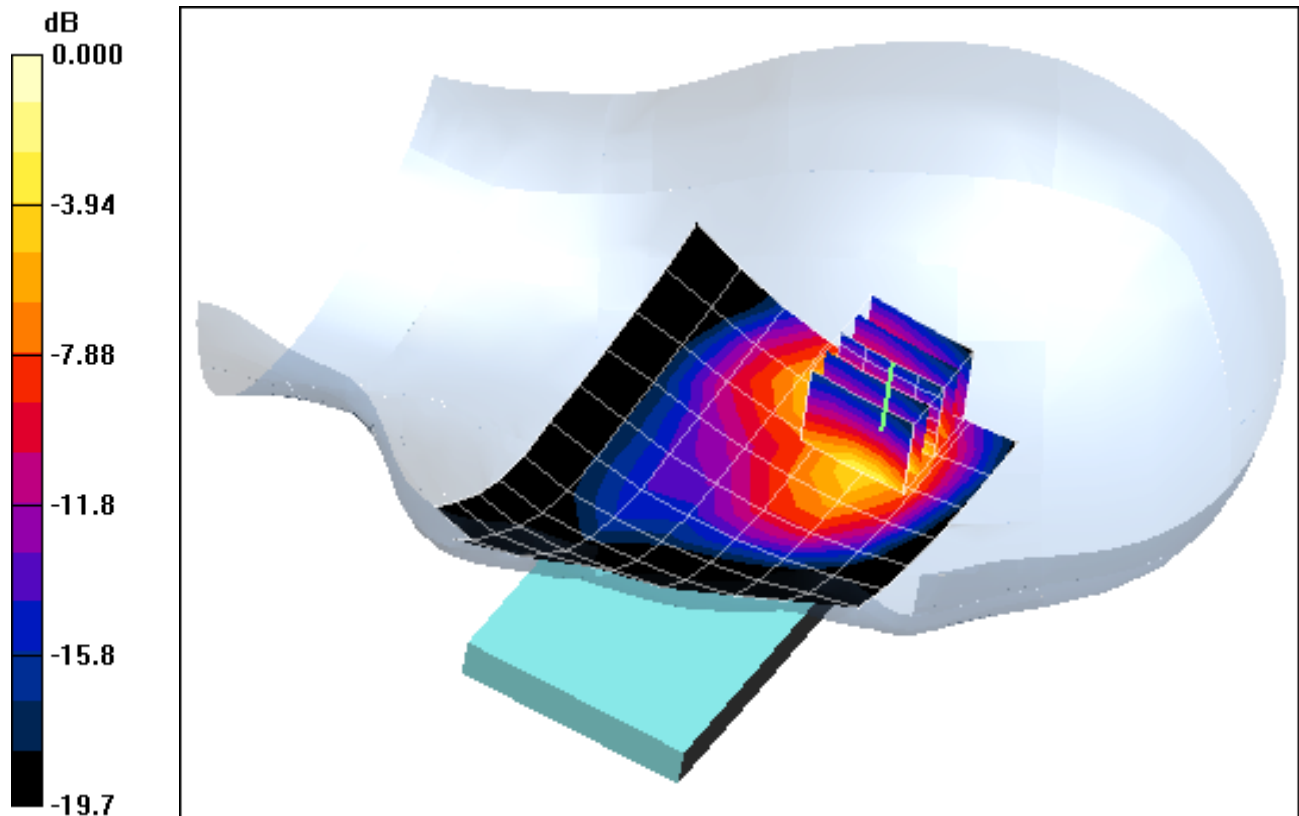
Area Scan (8x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 25.8 V/m; Power Drift = 0.086 dB

Peak SAR (extrapolated) = 1.51 W/kg

SAR(1 g) = 0.728 mW/g; SAR(10 g) = 0.361 mW/g



0 dB = 0.825mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 9

Communication System: LTE RF; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1750 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 39.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 10-31-2011; Ambient Temp: 23.8 °C; Tissue Temp: 21.9 °C

Probe: EX3DV4 - SN3561; ConvF(7.37, 7.37, 7.37); Calibrated: 7/27/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 4 (AWS), Left Head, Tilt, High ch, 16QAM, 10 MHz, 1 RB, 0 RB Offset

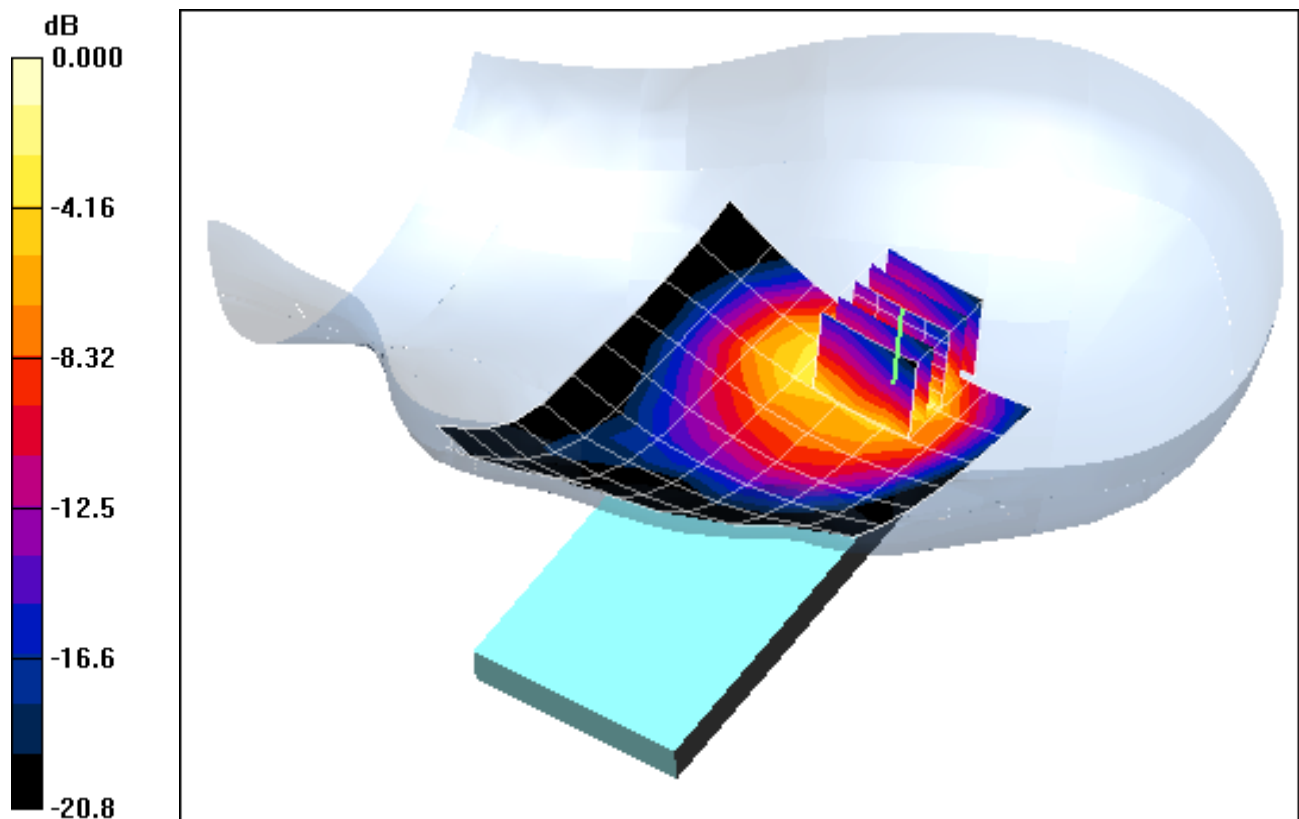
Area Scan (8x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 28.7 V/m; Power Drift = -0.027 dB

Peak SAR (extrapolated) = 1.73 W/kg

SAR(1 g) = 0.894 mW/g; SAR(10 g) = 0.451 mW/g



0 dB = 1.01mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 7

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

$f = 1880 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 41.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-25-2011; Ambient Temp: 23.0 °C; Tissue Temp: 22.4 °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 with CRP; Type: SAM; Serial: TP1375

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

Mode: PCS CDMA, Right Head, Touch, Mid.ch

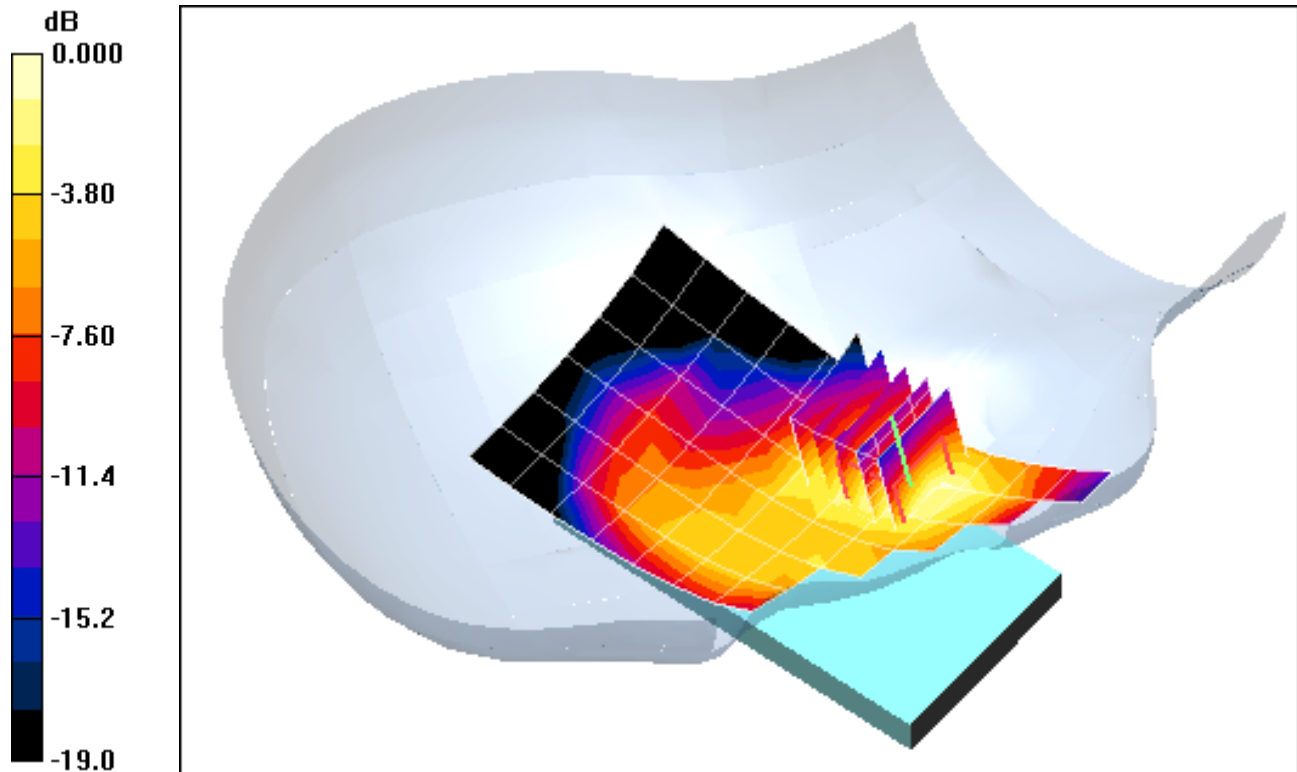
Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 16.6 V/m; Power Drift = -0.119 dB

Peak SAR (extrapolated) = 0.586 W/kg

SAR(1 g) = 0.346 mW/g; SAR(10 g) = 0.204 mW/g



0 dB = 0.383mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 7

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

$f = 1880 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 41.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-25-2011; Ambient Temp: 23.0 °C; Tissue Temp: 22.4 °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 with CRP; Type: SAM; Serial: TP1375

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

Mode: PCS CDMA, Right Head, Tilt, Mid.ch

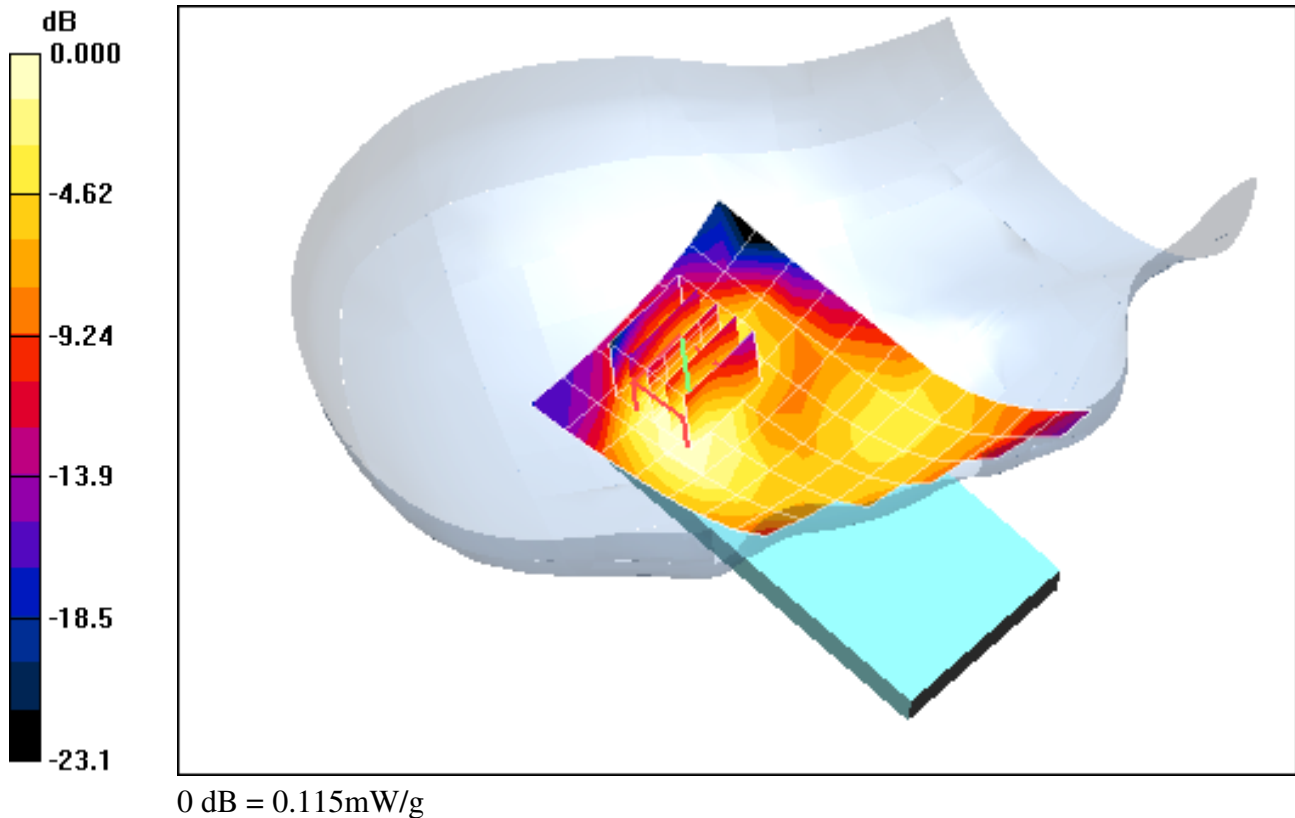
Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 9.31 V/m; Power Drift = 0.148 dB

Peak SAR (extrapolated) = 0.175 W/kg

SAR(1 g) = 0.107 mW/g; SAR(10 g) = 0.067 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 7

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

$f = 1880 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 41.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 10-25-2011; Ambient Temp: 23.0 °C; Tissue Temp: 22.4 °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 with CRP; Type: SAM; Serial: TP1375

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

Mode: PCS CDMA, Left Head, Touch, Mid.ch

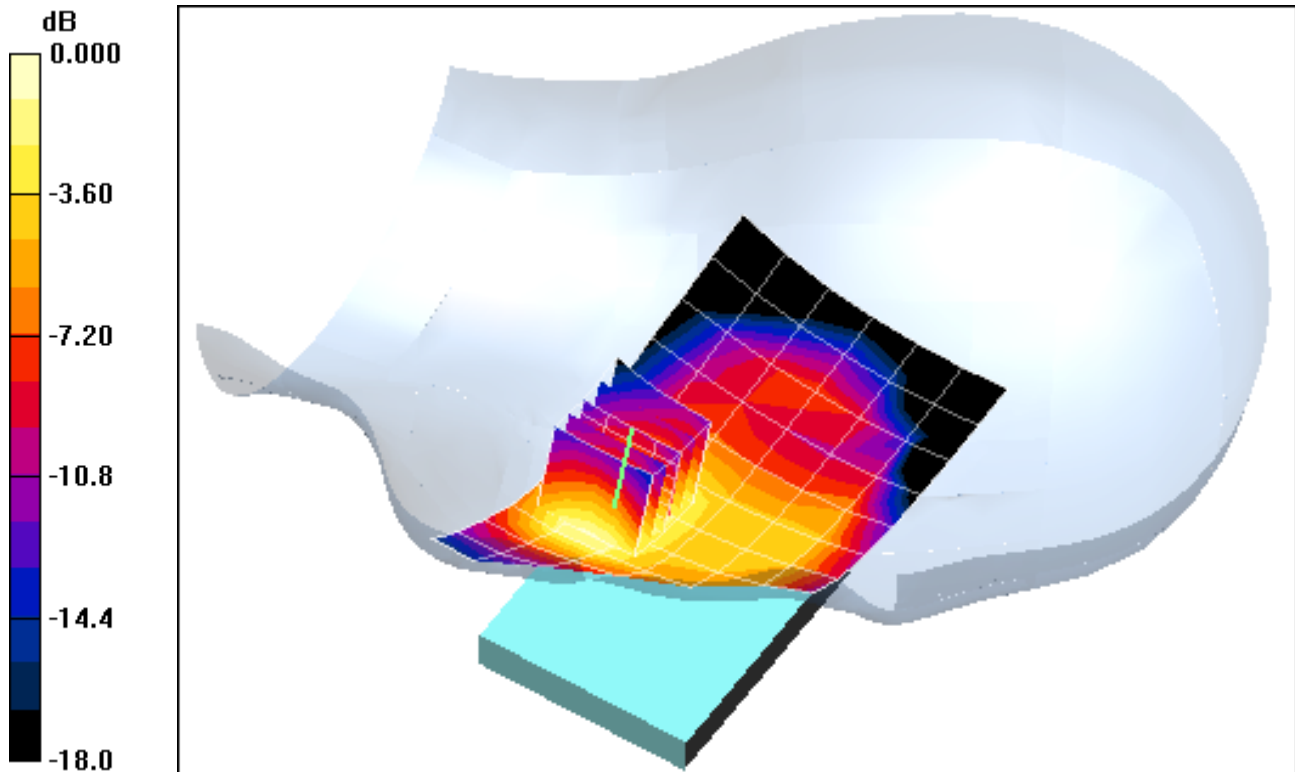
Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 16.1 V/m; Power Drift = -0.139 dB

Peak SAR (extrapolated) = 0.503 W/kg

SAR(1 g) = 0.333 mW/g; SAR(10 g) = 0.207 mW/g



0 dB = 0.362mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 7

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

$f = 1880 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 41.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 10-25-2011; Ambient Temp: 23.0 °C; Tissue Temp: 22.4 °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 with CRP; Type: SAM; Serial: TP1375

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

Mode: PCS CDMA, Left Head, Tilt, Mid.ch

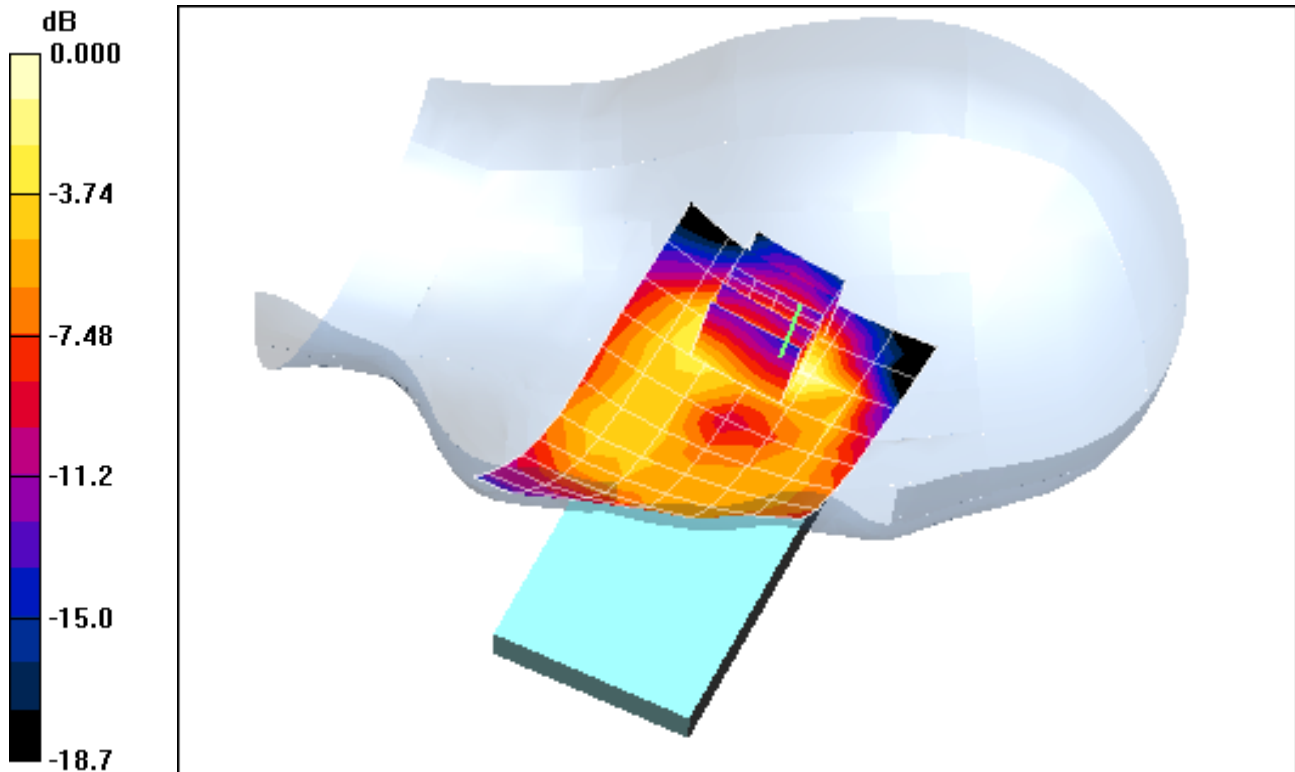
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 9.65 V/m; Power Drift = 0.144 dB

Peak SAR (extrapolated) = 0.185 W/kg

SAR(1 g) = 0.111 mW/g; SAR(10 g) = 0.063 mW/g



0 dB = 0.122mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 2

Communication System: LTE PCS 5 Mhz; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 39.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-31-2011; Ambient Temp: 23.8°C; Tissue Temp: 22.3°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 with CRP; Type: SAM; Serial: TP1375

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

Mode: LTE Band 2 (PCS), Right Head, Touch, Mid.ch, QPSK, 5 MHz, 1 RB, 24 RB Offset

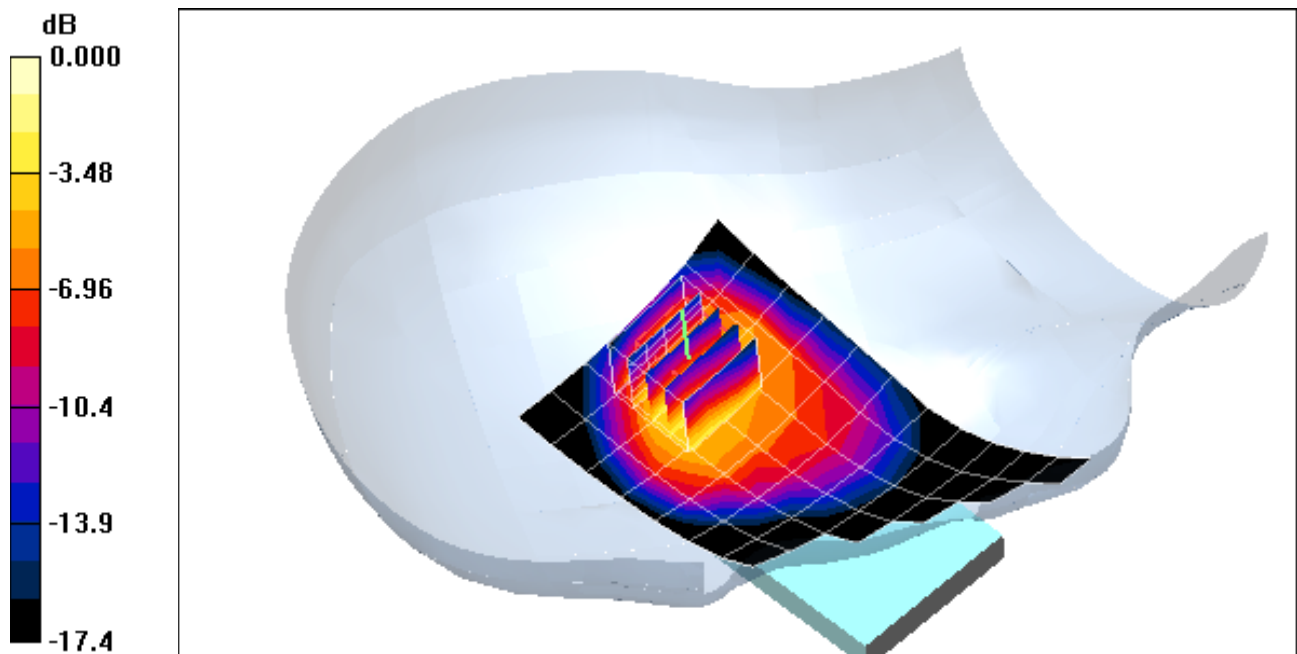
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 18.0 V/m; Power Drift = 0.102 dB

Peak SAR (extrapolated) = 0.729 W/kg

SAR(1 g) = 0.405 mW/g; SAR(10 g) = 0.222 mW/g



0 dB = 0.458mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 2

Communication System: LTE PCS 5 Mhz; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 39.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-31-2011; Ambient Temp: 23.8°C; Tissue Temp: 22.3°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 with CRP; Type: SAM; Serial: TP1375

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

Mode: LTE Band 2 (PCS), Right Head, Tilt, Mid.ch, QPSK, 5MHz, 1 RB, 24 RB Offset

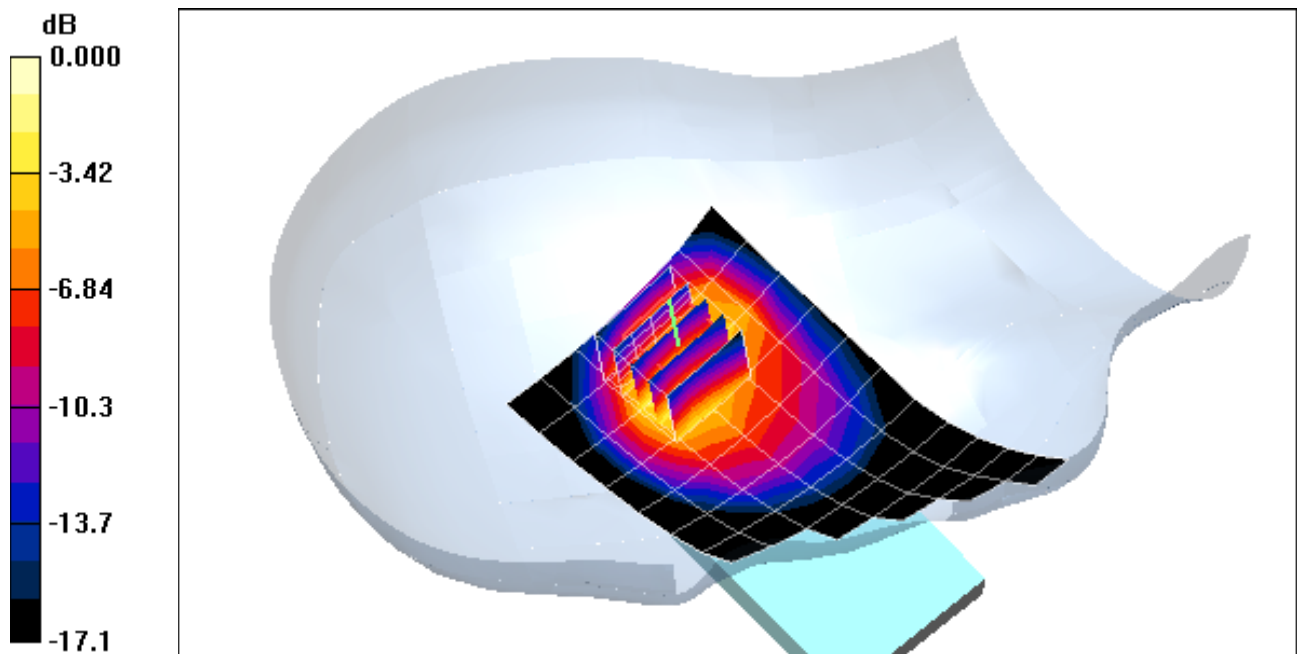
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 18.8 V/m; Power Drift = 0.156 dB

Peak SAR (extrapolated) = 0.720 W/kg

SAR(1 g) = 0.412 mW/g; SAR(10 g) = 0.234 mW/g



0 dB = 0.451mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 2

Communication System: LTE PCS 5 Mhz; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 39.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 10-31-2011; Ambient Temp: 23.8°C; Tissue Temp: 22.3°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 with CRP; Type: SAM; Serial: TP1375

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

Mode: LTE Band 2 (PCS), Left Head, Touch, Mid.ch, QPSK, 5 MHz, 1 RB, 24 RB Offset

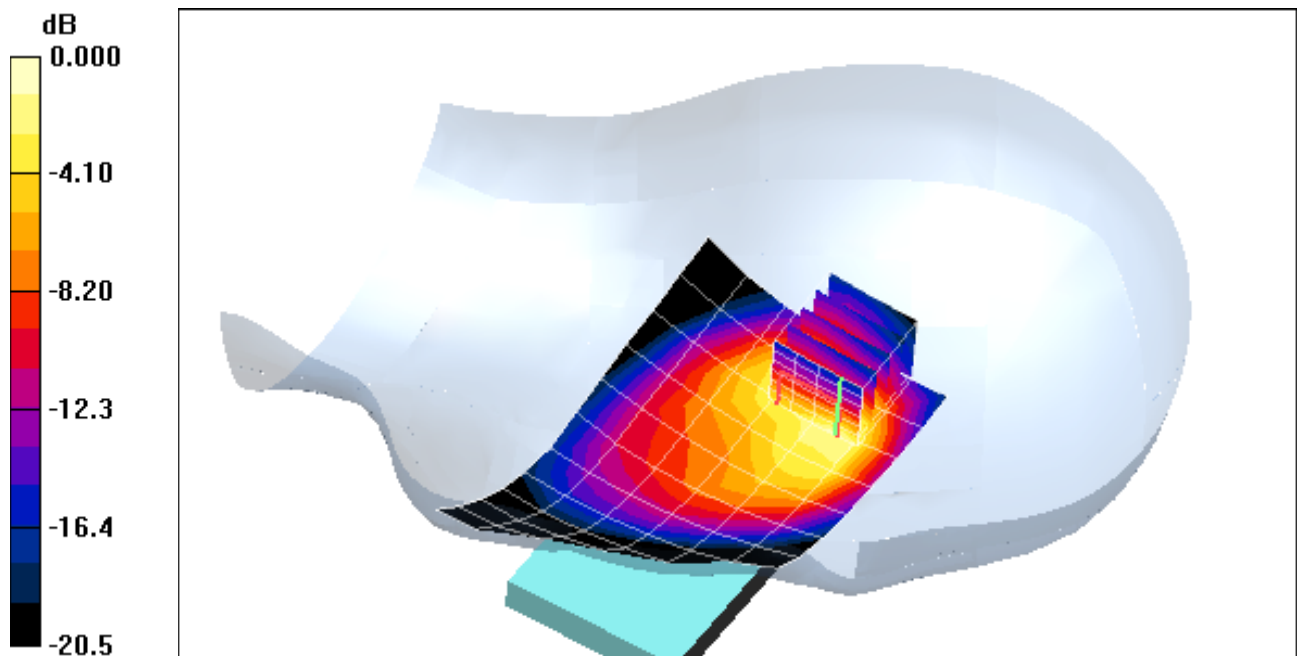
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 19.0 V/m; Power Drift = 0.127 dB

Peak SAR (extrapolated) = 1.14 W/kg

SAR(1 g) = 0.529 mW/g; SAR(10 g) = 0.267 mW/g



0 dB = 0.594mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 2

Communication System: LTE PCS 5 Mhz; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 39.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 10-31-2011; Ambient Temp: 23.8°C; Tissue Temp: 22.3°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 with CRP; Type: SAM; Serial: TP1375

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

Mode: LTE Band 2 (PCS), Left Head, Tilt, Mid.ch, QPSK, 5 MHz, 1 RB, 24 RB Offset

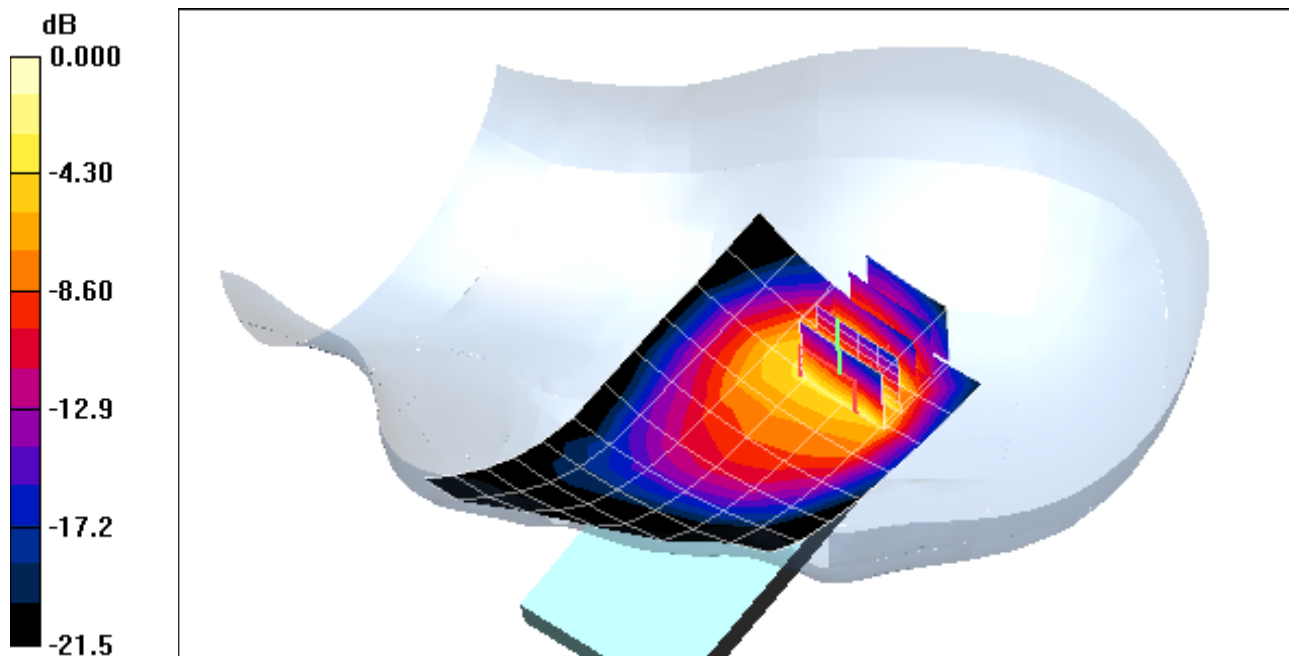
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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 = 0.004 dB

Peak SAR (extrapolated) = 1.08 W/kg

SAR(1 g) = 0.551 mW/g; SAR(10 g) = 0.276 mW/g



0 dB = 0.591mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 5

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.88 \text{ mho/m}$; $\epsilon_r = 37.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-24-2011; Ambient Temp: 24.5 °C; Tissue Temp: 22.8 °C

Probe: EX3DV4 - SN3561; ConvF(6.42, 6.42, 6.42); Calibrated: 7/27/2011

Sensor-Surface: 3mm (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 802.11b, Right Head, Touch, Ch 11, 1 Mbps

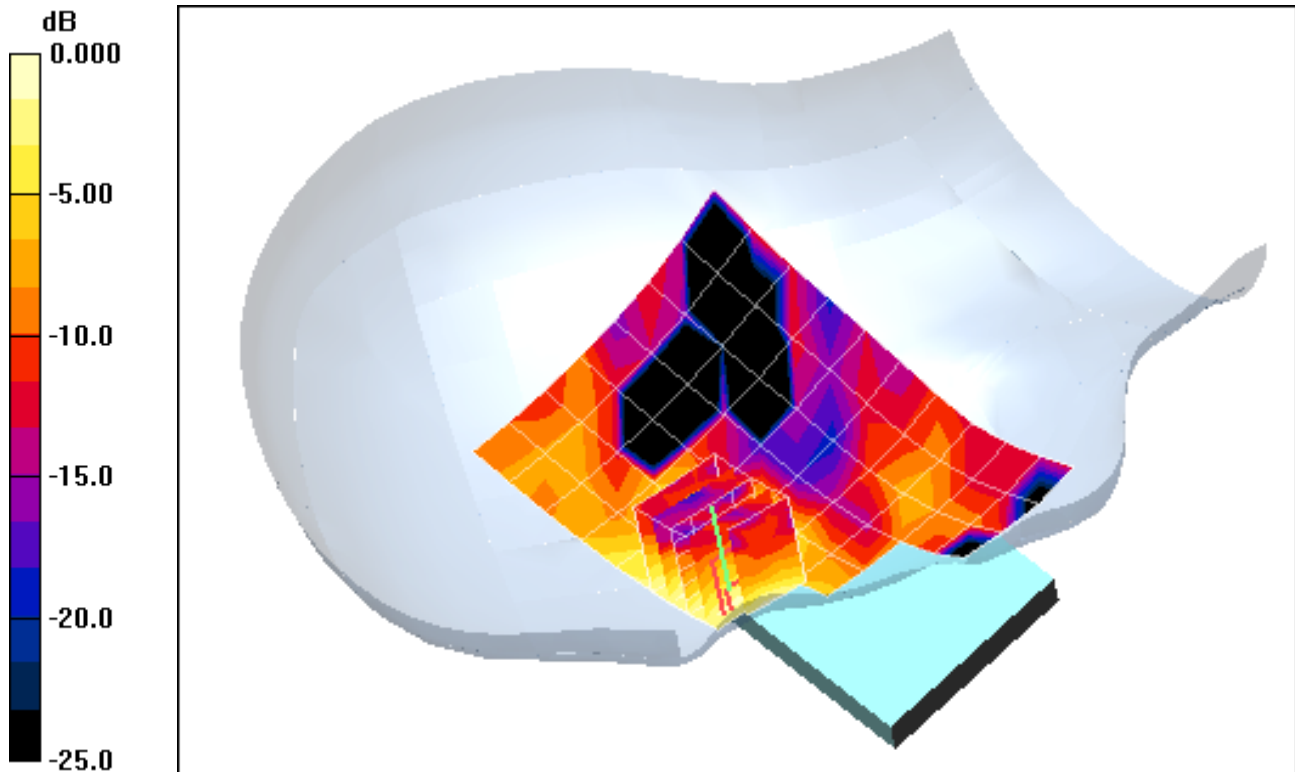
Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 0.451 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.049 W/kg

SAR(1 g) = 0.024 mW/g; SAR(10 g) = 0.013 mW/g



0 dB = 0.029mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 5

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.88 \text{ mho/m}$; $\epsilon_r = 37.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 10-24-2011; Ambient Temp: 24.5 °C; Tissue Temp: 22.8 °C

Probe: EX3DV4 - SN3561; ConvF(6.42, 6.42, 6.42); Calibrated: 7/27/2011

Sensor-Surface: 3mm (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 802.11b, Right Head, Tilt, Ch 11, 1 Mbps

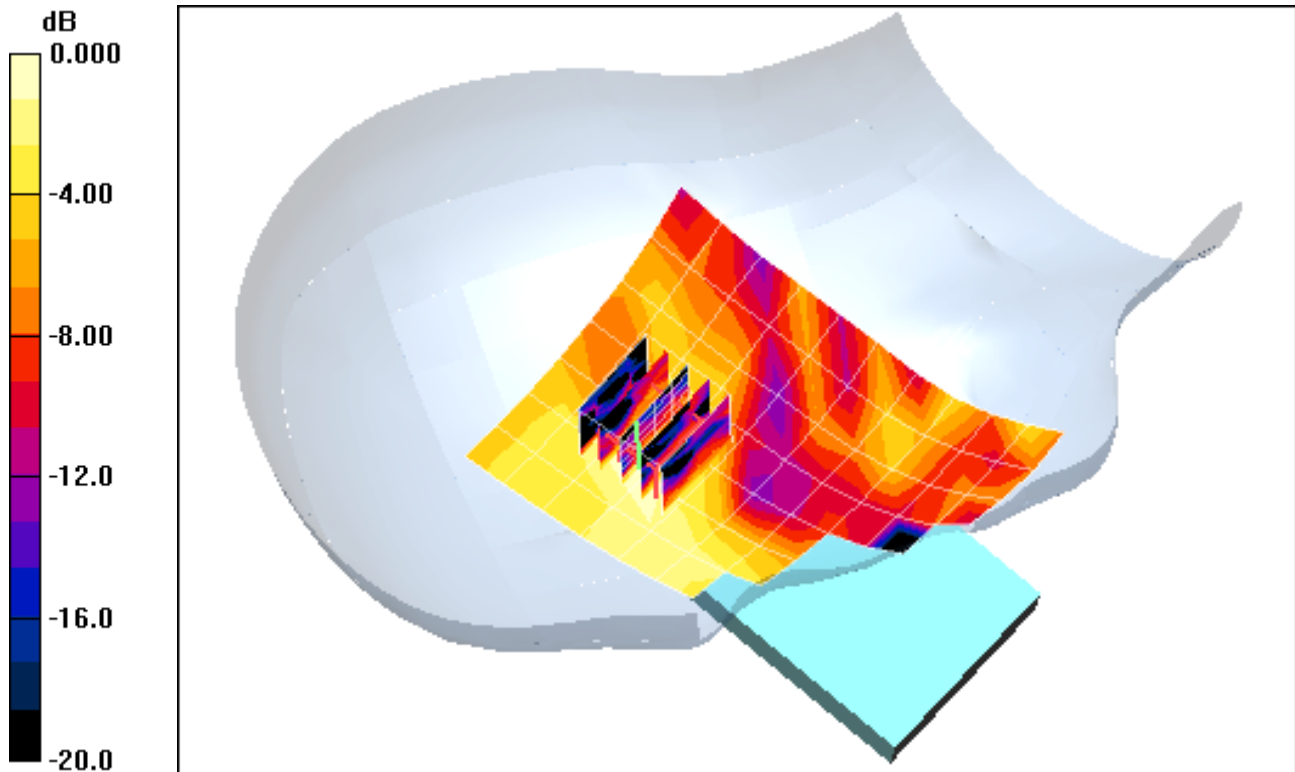
Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 1.47 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.026 W/kg

SAR(1 g) = 0.013 mW/g; SAR(10 g) = 0.00587 mW/g



0 dB = 0.017mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 5

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.88 \text{ mho/m}$; $\epsilon_r = 37.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 10-24-2011; Ambient Temp: 24.5 °C; Tissue Temp: 22.8 °C

Probe: EX3DV4 - SN3561; ConvF(6.42, 6.42, 6.42); Calibrated: 7/27/2011

Sensor-Surface: 3mm (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 802.11b, Left Head, Touch, Ch 11, 1 Mbps

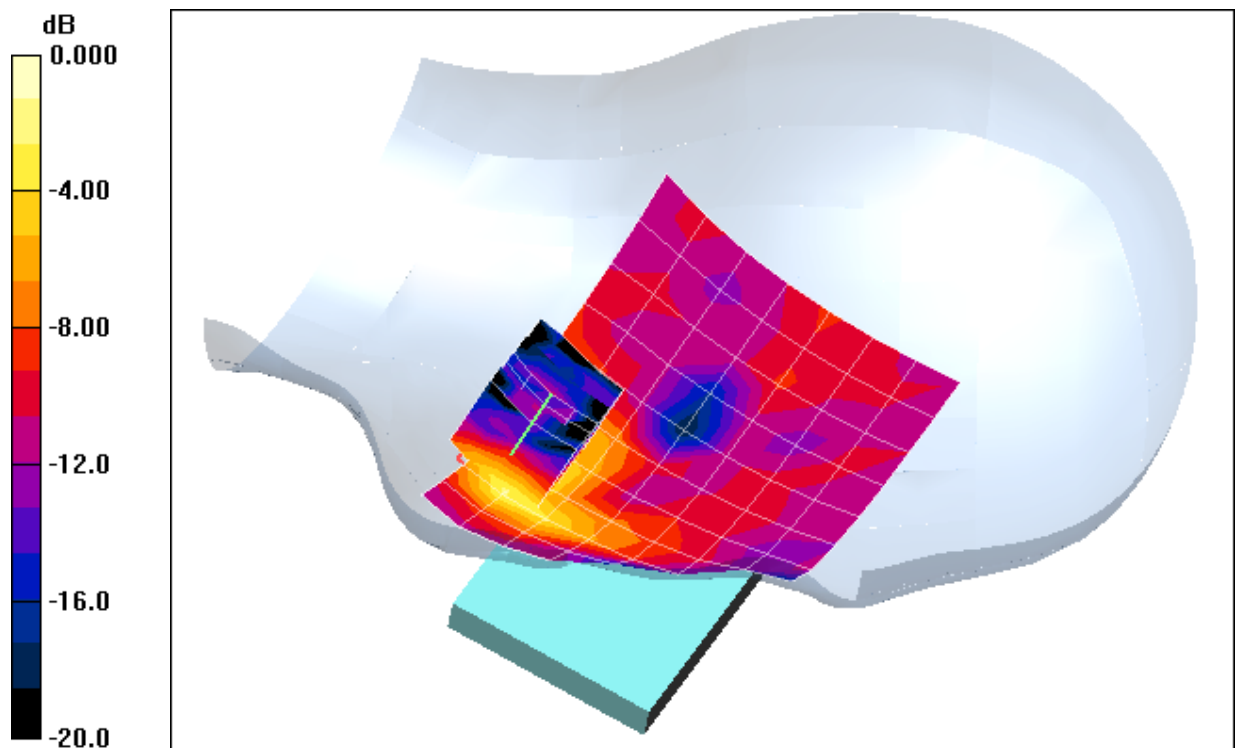
Area Scan (8x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 2.22 V/m; Power Drift = -0.137 dB

Peak SAR (extrapolated) = 0.087 W/kg

SAR(1 g) = 0.045 mW/g; SAR(10 g) = 0.022 mW/g



0 dB = 0.060mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 5

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.88 \text{ mho/m}$; $\epsilon_r = 37.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 10-24-2011; Ambient Temp: 24.5 °C; Tissue Temp: 22.8 °C

Probe: EX3DV4 - SN3561; ConvF(6.42, 6.42, 6.42); Calibrated: 7/27/2011

Sensor-Surface: 3mm (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 802.11b, Left Head, Tilt, Ch 11, 1 Mbps

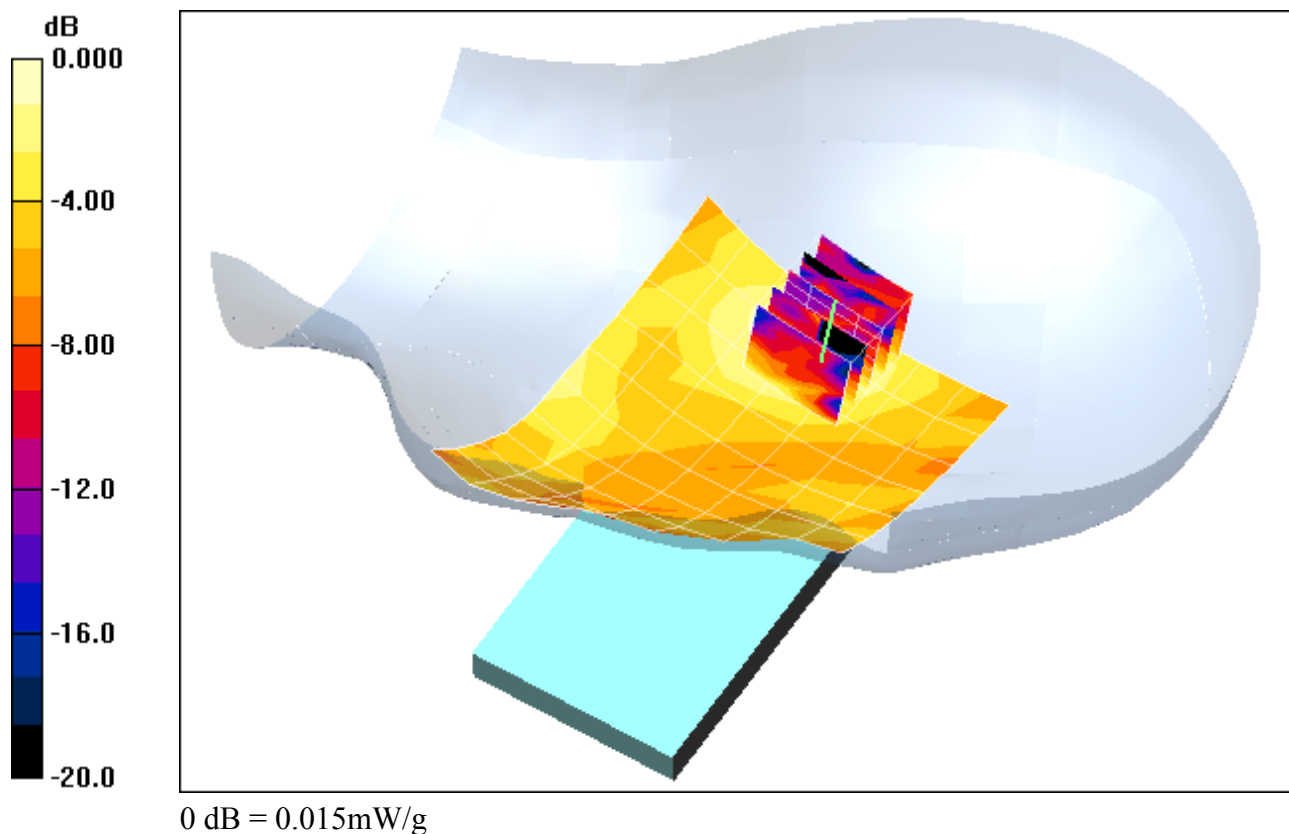
Area Scan (8x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 2.70 V/m; Power Drift = -0.086 dB

Peak SAR (extrapolated) = 0.021 W/kg

SAR(1 g) = 0.012 mW/g; SAR(10 g) = 0.00549 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 4

Communication System: LTE RF; Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium: 695 Body Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.926 \text{ mho/m}$; $\epsilon_r = 55.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-02-2011; Ambient Temp: 23.6°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3209; ConvF(6.18, 6.18, 6.18); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 12, Body SAR, Back side, Mid.ch, QPSK, 10 MHz, 1 RB, 0 RB Offset

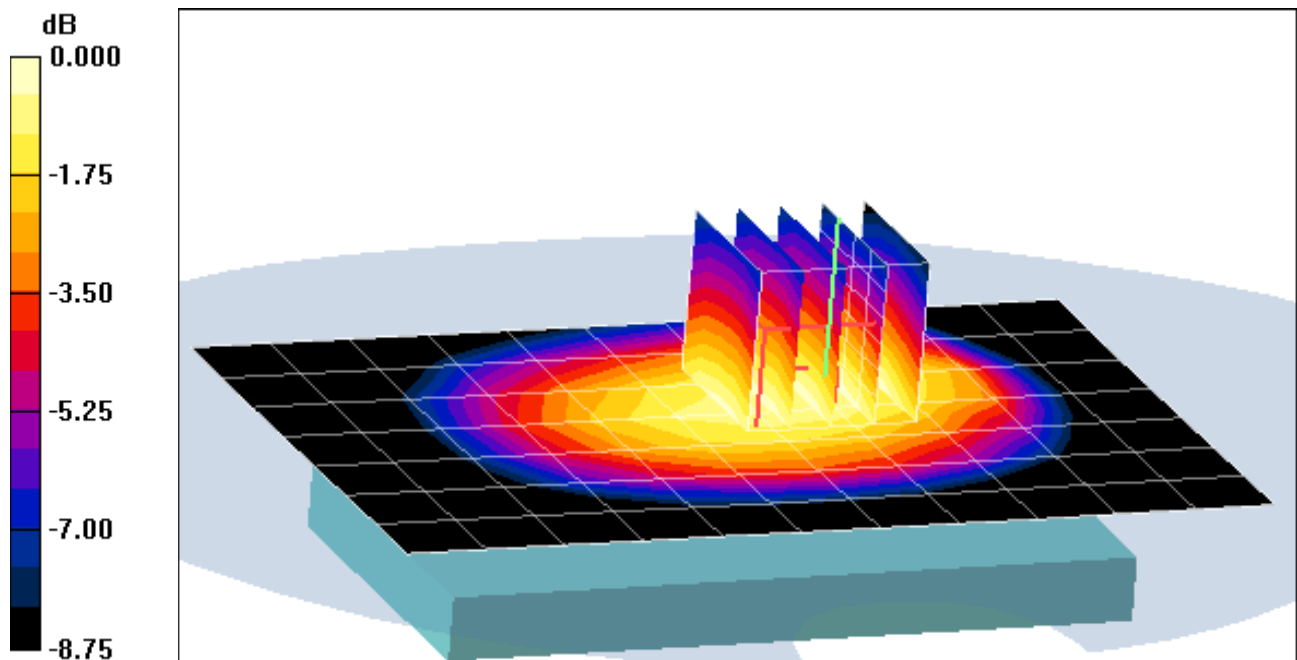
Area Scan (8x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 17.5 V/m; Power Drift = 0.151 dB

Peak SAR (extrapolated) = 0.344 W/kg

SAR(1 g) = 0.268 mW/g; SAR(10 g) = 0.203 mW/g



0 dB = 0.281mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 4

Communication System: LTE RF; Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium: 695 Body Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.926 \text{ mho/m}$; $\epsilon_r = 55.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-02-2011; Ambient Temp: 23.6°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3209; ConvF(6.18, 6.18, 6.18); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 12, Body SAR, Front side, Mid. ch, QPSK, 10 MHz, 1 RB, 0 RB Offset

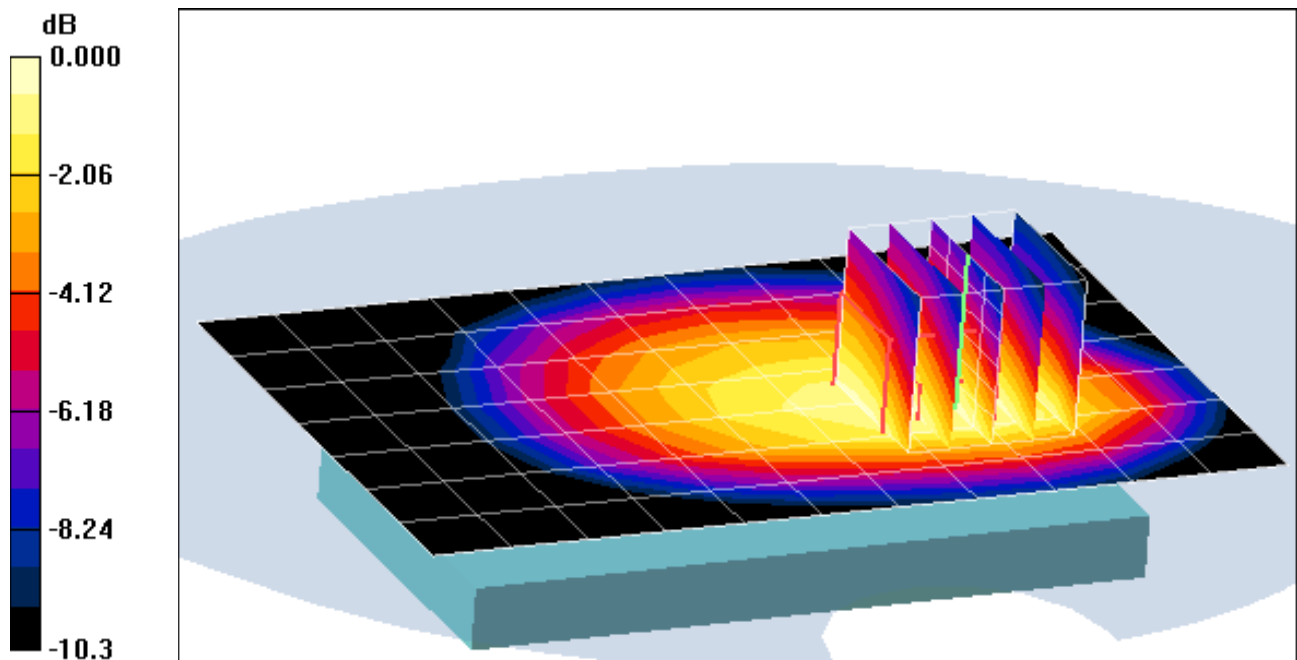
Area Scan (8x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 10.2 V/m; Power Drift = -0.056 dB

Peak SAR (extrapolated) = 0.117 W/kg

SAR(1 g) = 0.088 mW/g; SAR(10 g) = 0.065 mW/g



0 dB = 0.093mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 4

Communication System: LTE RF; Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium: 695 Body Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.926 \text{ mho/m}$; $\epsilon_r = 55.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-02-2011; Ambient Temp: 23.6°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3209; ConvF(6.18, 6.18, 6.18); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 12, Body SAR, Top Edge, Mid.ch, QPSK, 10 MHz, 1 RB, 0 RB Offset

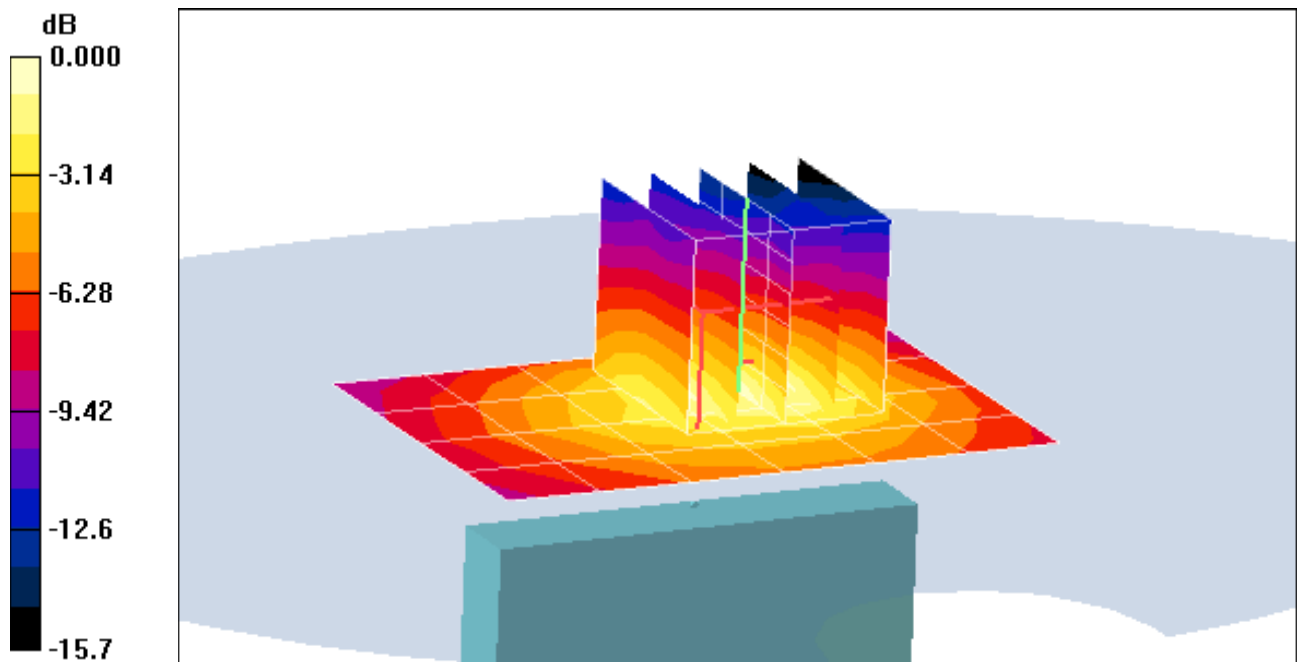
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 7.07 V/m; Power Drift = -0.060 dB

Peak SAR (extrapolated) = 0.082 W/kg

SAR(1 g) = 0.040 mW/g; SAR(10 g) = 0.023 mW/g



0 dB = 0.045mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 4

Communication System: LTE RF; Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium: 695 Body Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.926 \text{ mho/m}$; $\epsilon_r = 55.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-02-2011; Ambient Temp: 23.6°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3209; ConvF(6.18, 6.18, 6.18); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 12, Body SAR, Right Edge, Mid.ch, 16 QAM, 10 MHz, 1 RB, 0 RB Offset

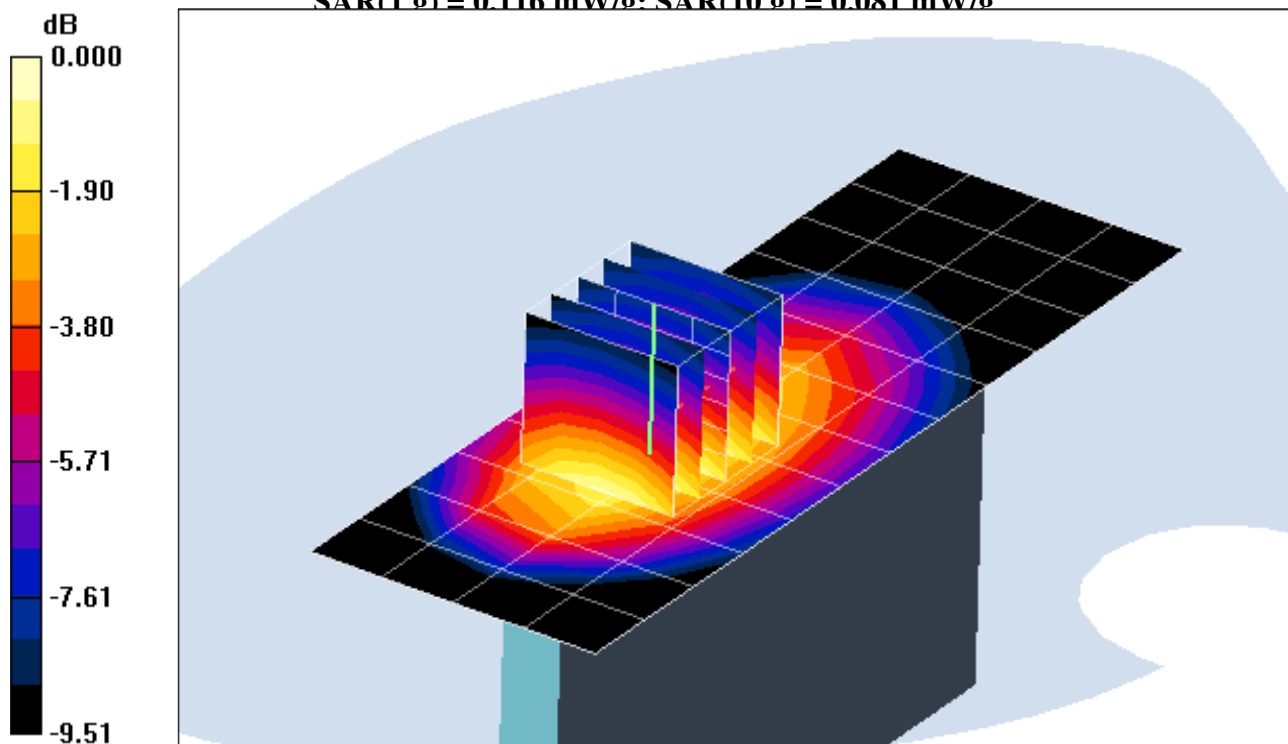
Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 11.6 V/m; Power Drift = -0.049 dB

Peak SAR (extrapolated) = 0.164 W/kg

SAR(1 σ) = 0.116 mW/ σ ; SAR(10 σ) = 0.081 mW/ σ



0 dB = 0.124mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 7

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.978 \text{ mho/m}$; $\epsilon_r = 52.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space 1.0 cm

Test Date: 10-20-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.5 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: Cellular TDSO32 CDMA, Body-worn SAR, Back side, Mid.ch

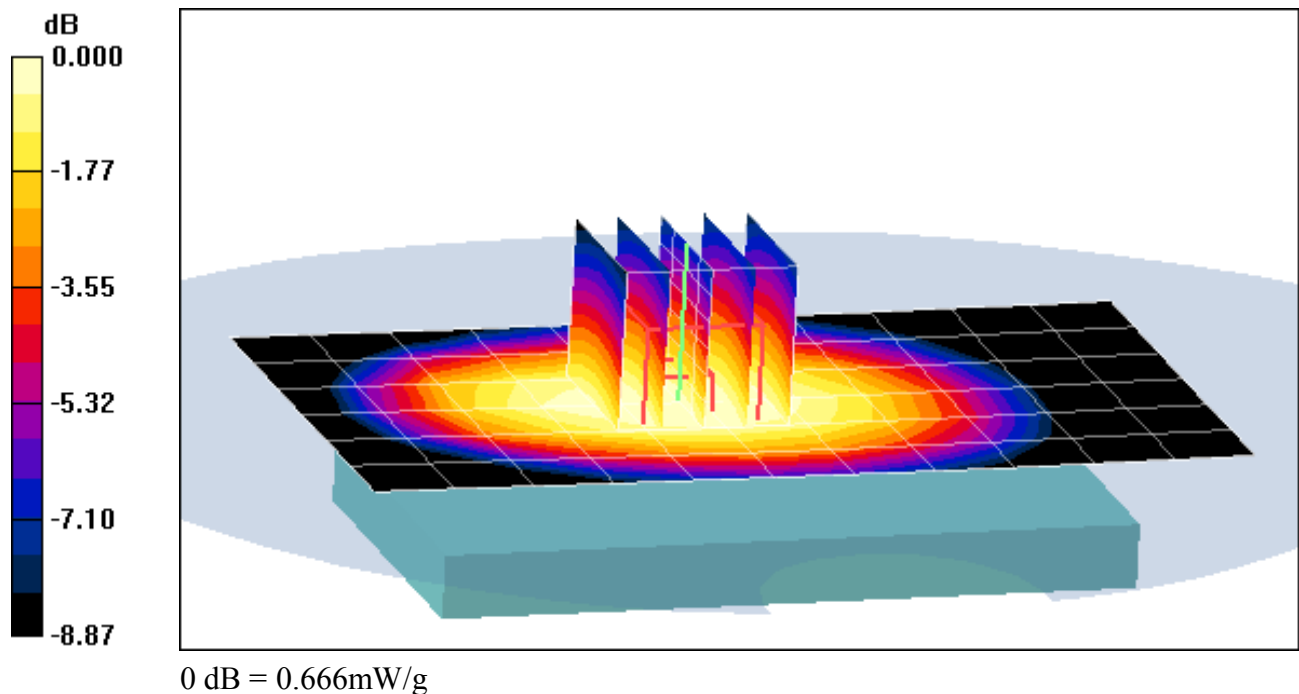
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 27.3 V/m; Power Drift = -0.130 dB

Peak SAR (extrapolated) = 0.815 W/kg

SAR(1 g) = 0.633 mW/g; SAR(10 g) = 0.471 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 7

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.978 \text{ mho/m}$; $\epsilon_r = 52.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-20-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.5 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

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

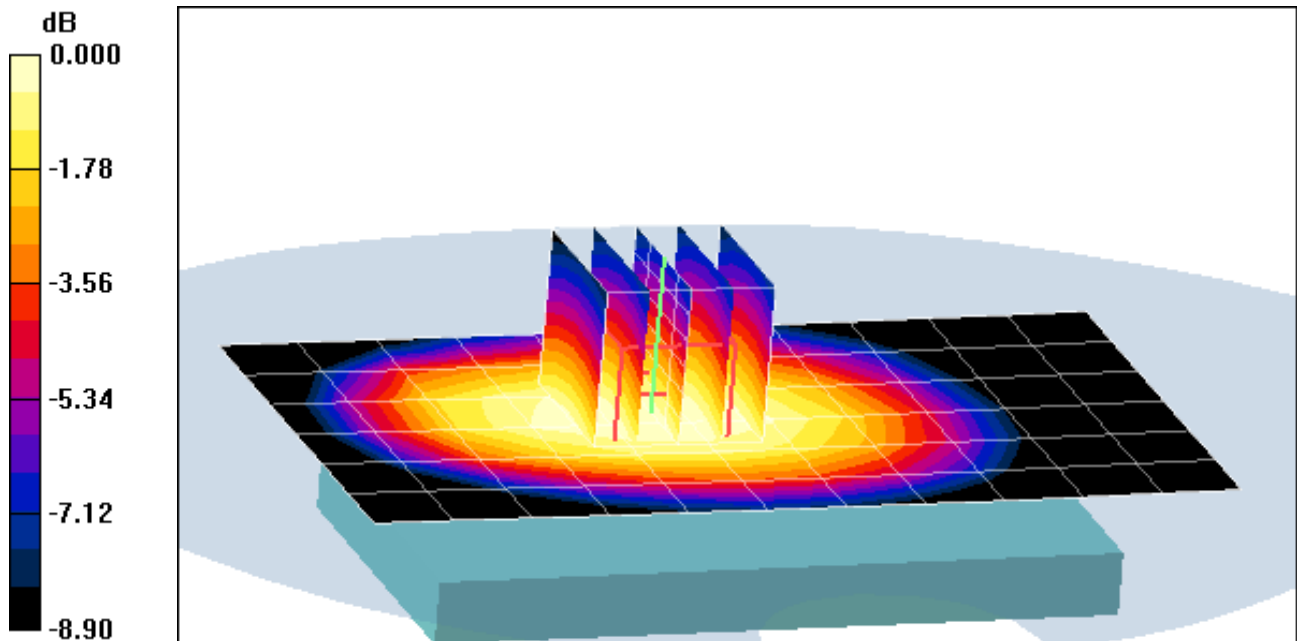
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 26.2 V/m; Power Drift = -0.078 dB

Peak SAR (extrapolated) = 0.751 W/kg

SAR(1 g) = 0.582 mW/g; SAR(10 g) = 0.434 mW/g



0 dB = 0.611mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 7

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.978 \text{ mho/m}$; $\epsilon_r = 52.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space 1.0 cm

Test Date: 10-20-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.5 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: Cellular EVDO, Body SAR, Front side, Mid.ch

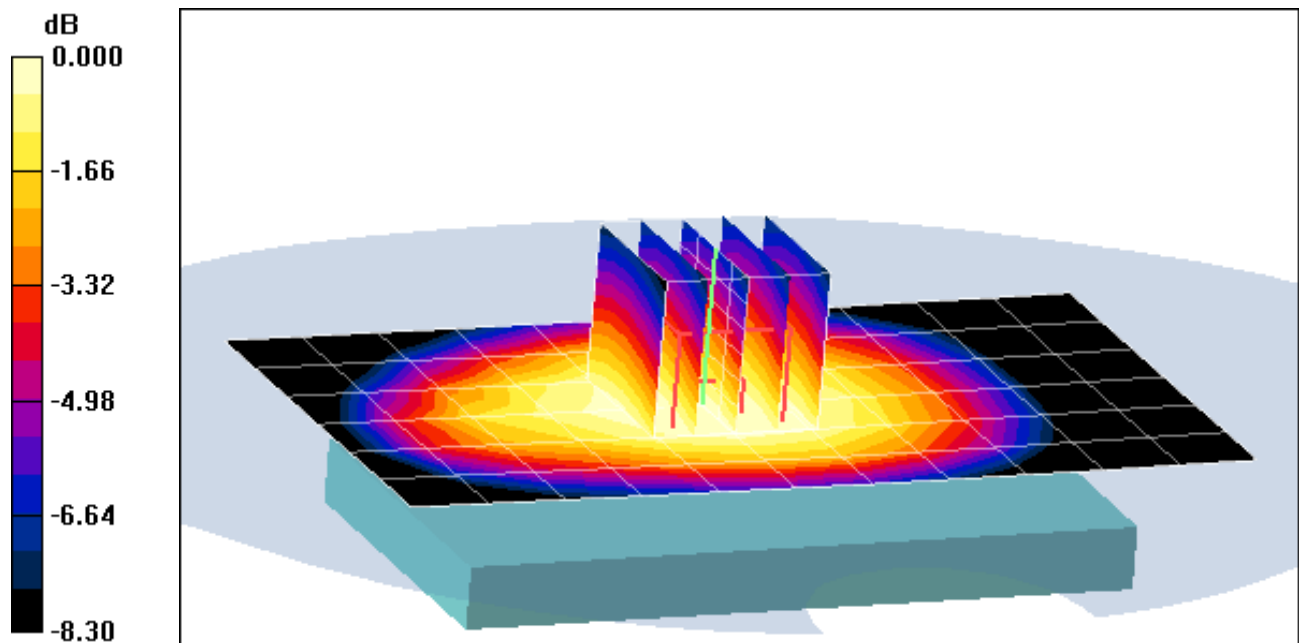
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 18.2 V/m; Power Drift = -0.050 dB

Peak SAR (extrapolated) = 0.346 W/kg

SAR(1 g) = 0.278 mW/g; SAR(10 g) = 0.214 mW/g



0 dB = 0.291mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 7

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.978 \text{ mho/m}$; $\epsilon_r = 52.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space 1.0 cm

Test Date: 10-20-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.5 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: Cellular EVDO, Body SAR, Bottom Edge, Mid.ch

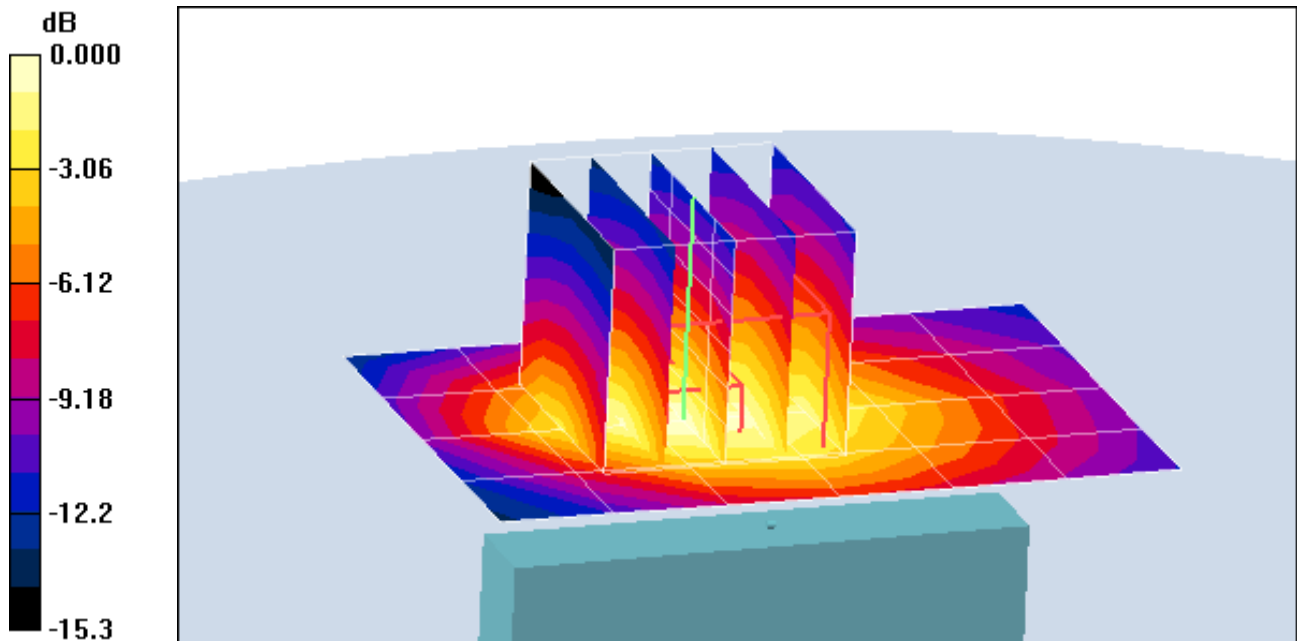
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 11.9 V/m; Power Drift = 0.027 dB

Peak SAR (extrapolated) = 0.194 W/kg

SAR(1 g) = 0.108 mW/g; SAR(10 g) = 0.062 mW/g



0 dB = 0.119mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 7

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.978 \text{ mho/m}$; $\epsilon_r = 52.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space 1.0 cm

Test Date: 10-20-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.5 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: Cellular EVDO, Body SAR, Right Edge, Mid.ch

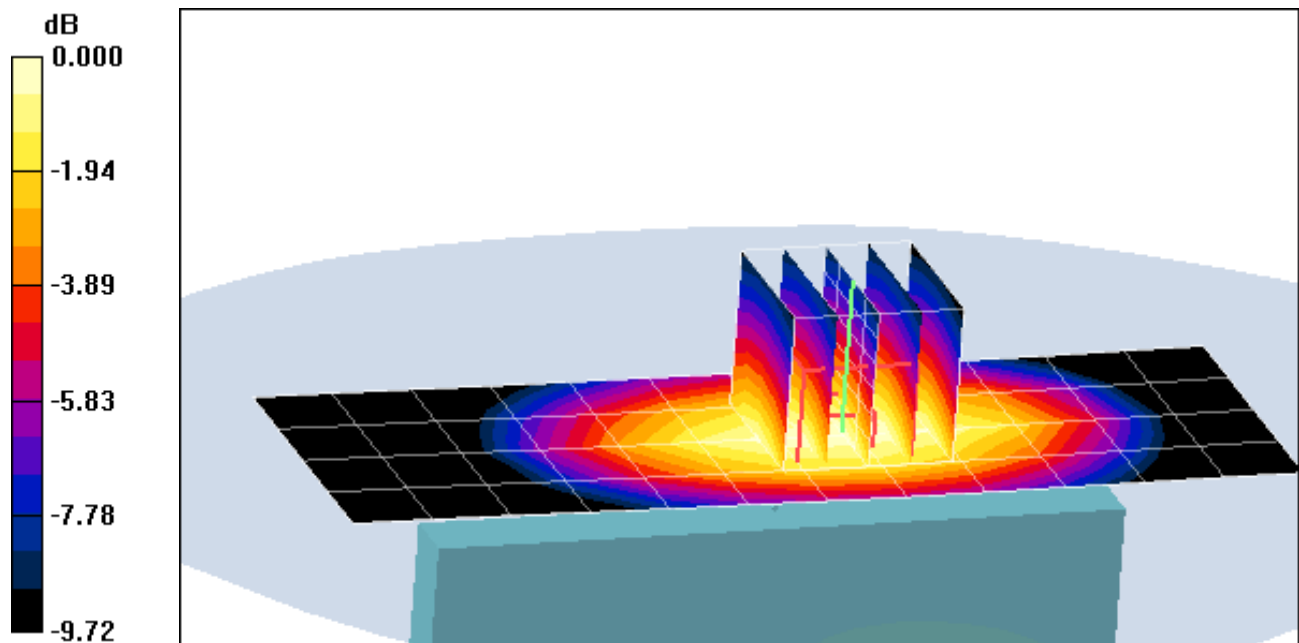
Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 23.8 V/m; Power Drift = -0.073 dB

Peak SAR (extrapolated) = 0.654 W/kg

SAR(1 g) = 0.457 mW/g; SAR(10 g) = 0.313 mW/g



0 dB = 0.489mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 2

Communication System: LTE BAND 5; Frequency: 826.5 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 826.5 \text{ MHz}$; $\sigma = 0.964 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-31-2011; Ambient Temp: 24.4°C; Tissue Temp: 22.5°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 5 (Cell.), Body SAR, Back side, Low ch, QPSK, 5 MHz, 1 RB, 0 RB Offset

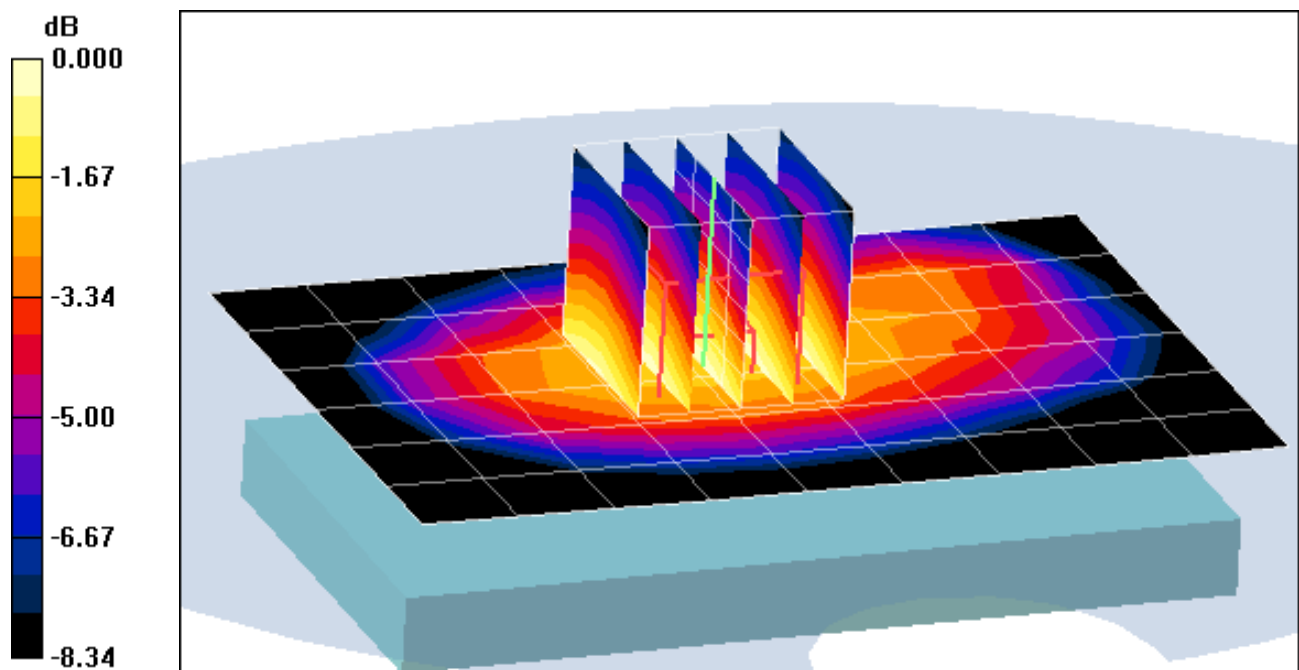
Area Scan (7x10x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 19.0 V/m; Power Drift = 0.023 dB

Peak SAR (extrapolated) = 0.424 W/kg

SAR(1 g) = 0.331 mW/g; SAR(10 g) = 0.247 mW/g



0 dB = 0.347mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 2

Communication System: LTE BAND 5; Frequency: 826.5 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 826.5 \text{ MHz}$; $\sigma = 0.964 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space 1.0 cm

Test Date: 10-31-2011; Ambient Temp: 24.4°C; Tissue Temp: 22.5°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 5 (Cell.), Body SAR, Front side, Low ch, QPSK, 5 MHz, 1 RB, 0 RB Offset

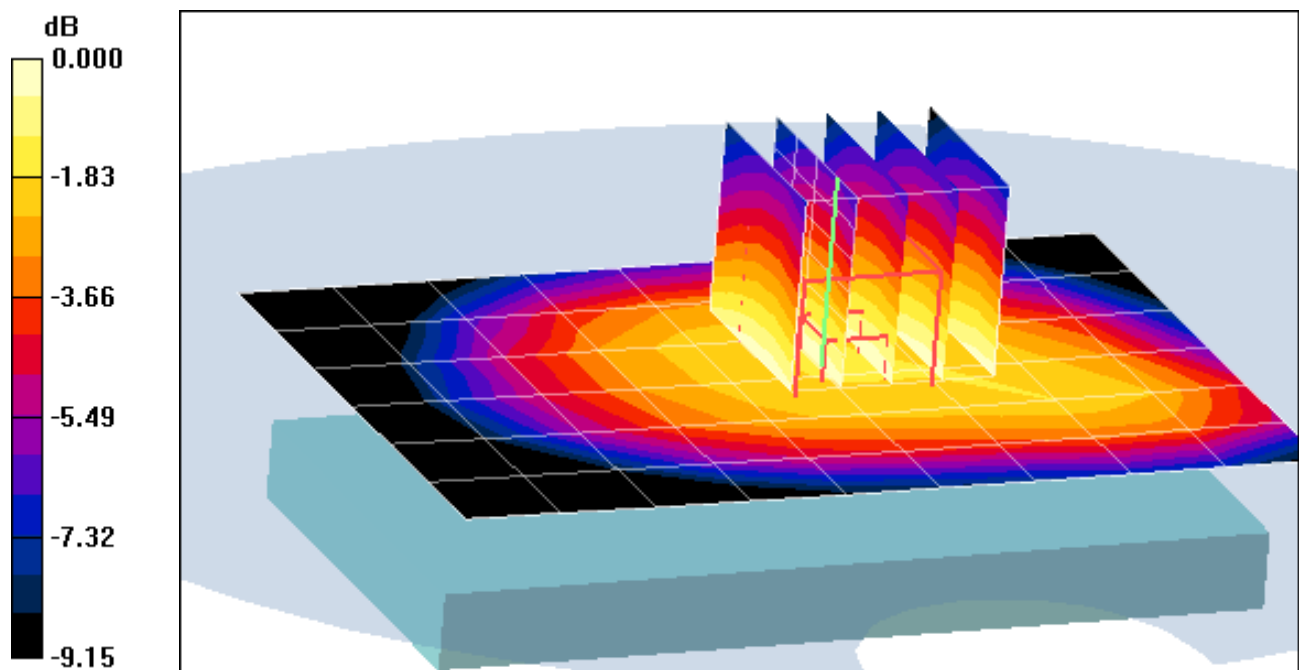
Area Scan (7x10x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 14.4 V/m; Power Drift = -0.118 dB

Peak SAR (extrapolated) = 0.238 W/kg

SAR(1 g) = 0.190 mW/g; SAR(10 g) = 0.146 mW/g



0 dB = 0.198mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 2

Communication System: LTE BAND 5; Frequency: 826.5 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 826.5 \text{ MHz}$; $\sigma = 0.964 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-31-2011; Ambient Temp: 24.4°C; Tissue Temp: 22.5°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 5 (Cell.), Body SAR, Top Edge, Low ch, QPSK, 5 MHz, 1 RB, 0 RB Offset

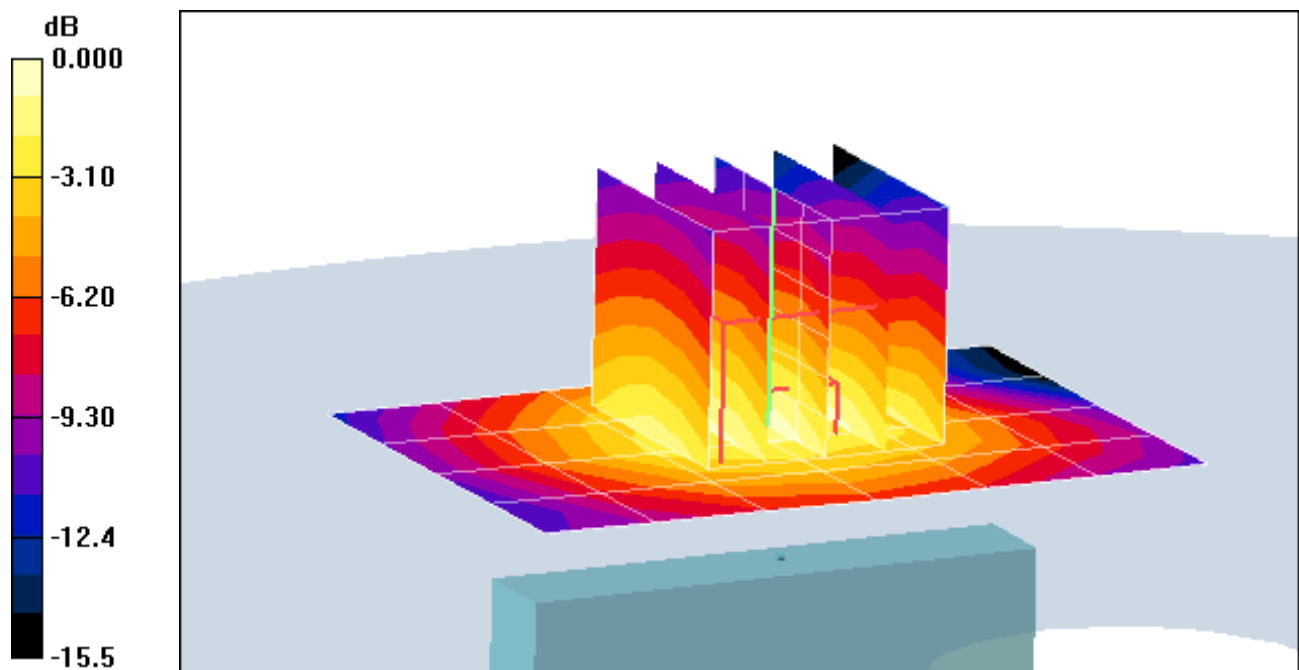
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 9.76 V/m; Power Drift = 0.025 dB

Peak SAR (extrapolated) = 0.136 W/kg

SAR(1 g) = 0.082 mW/g; SAR(10 g) = 0.051 mW/g



0 dB = 0.089mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 2

Communication System: LTE BAND 5; Frequency: 826.5 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 826.5 \text{ MHz}$; $\sigma = 0.964 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-31-2011; Ambient Temp: 24.4°C; Tissue Temp: 22.5°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 5 (Cell.), Body SAR, Right Edge, Low ch, QPSK, 5 MHz, 1 RB, 0 RB Offset

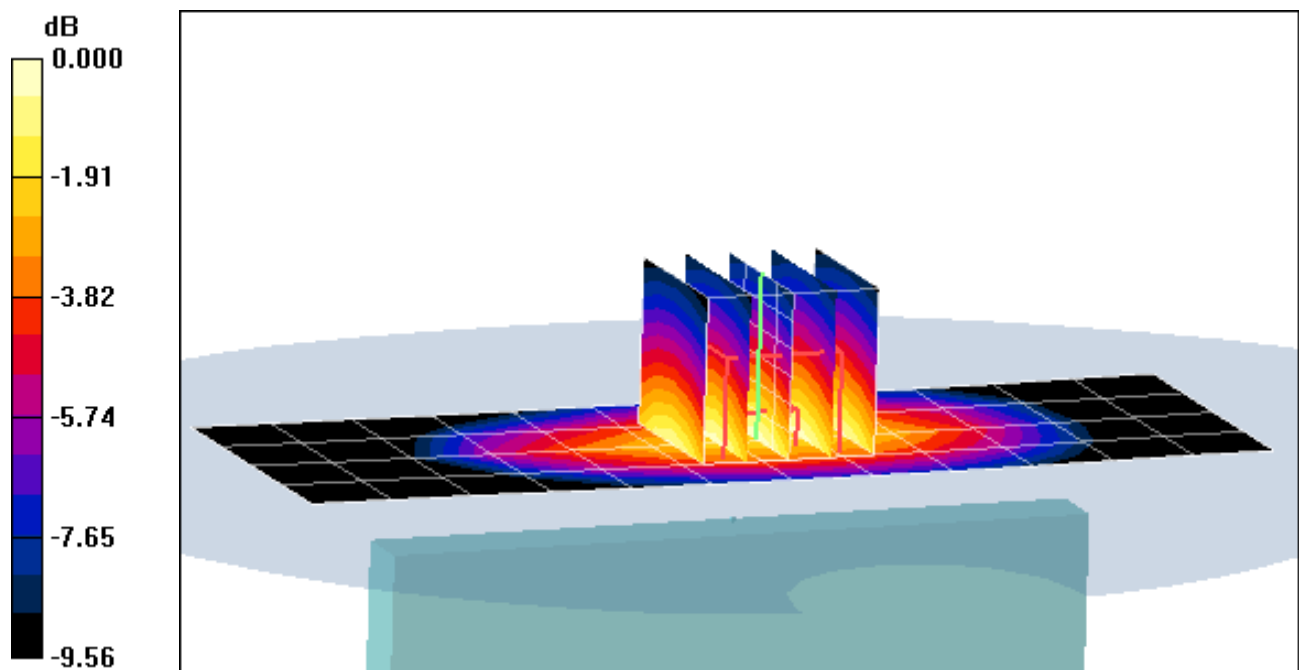
Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 17.3 V/m; Power Drift = -0.023 dB

Peak SAR (extrapolated) = 0.382 W/kg

SAR(1 g) = 0.271 mW/g; SAR(10 g) = 0.186 mW/g



0 dB = 0.290mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 9

Communication System: LTE RF; Frequency: 1750.0 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1750.0 \text{ MHz}$; $\sigma = 1.53 \text{ mho/m}$; $\epsilon_r = 53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-01-2011; Ambient Temp: 23.9°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN3561; ConvF(7.14, 7.14, 7.14); Calibrated: 7/27/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 4 (AWS), Body SAR, Back side, High ch, 16 QAM, 10 MHz, 1 RB, 0 RB Offset

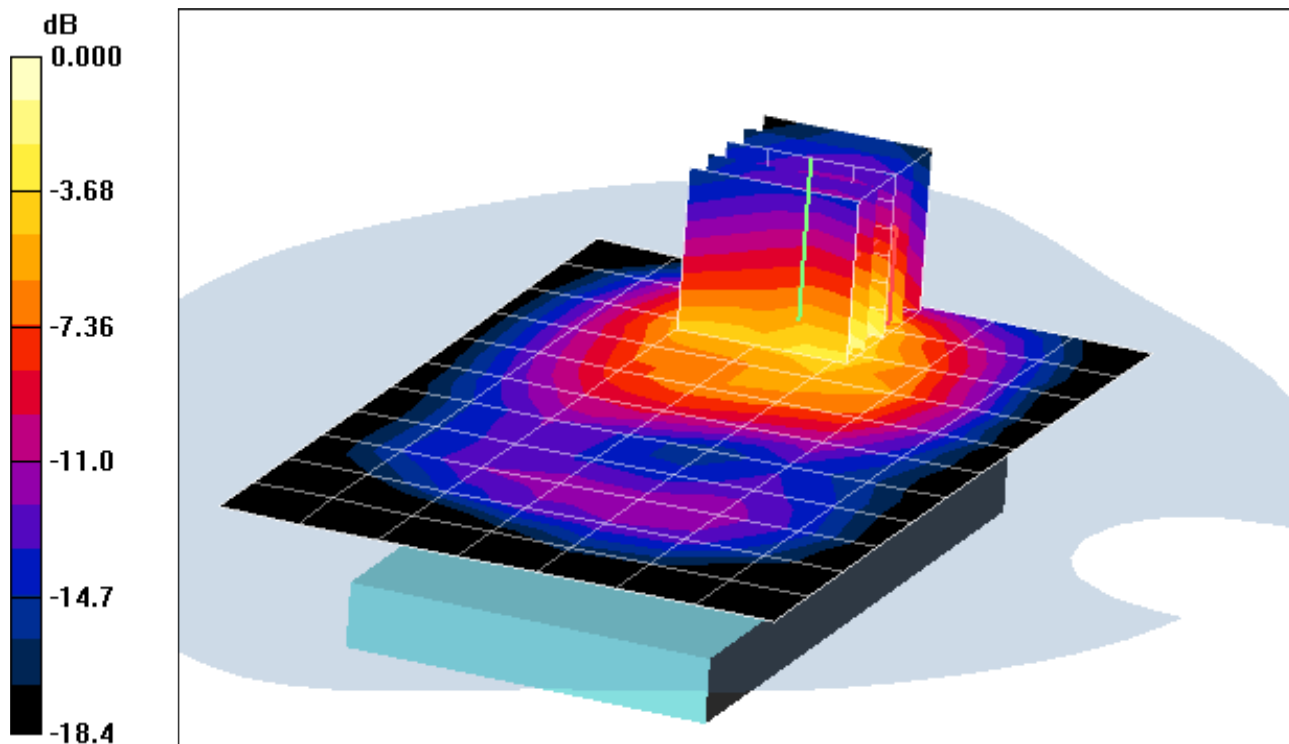
Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 18.6 V/m; Power Drift = -0.014 dB

Peak SAR (extrapolated) = 0.849 W/kg

SAR(1 g) = 0.486 mW/g; SAR(10 g) = 0.263 mW/g



0 dB = 0.548mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 9

Communication System: LTE RF; Frequency: 1750.0 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1750.0 \text{ MHz}$; $\sigma = 1.53 \text{ mho/m}$; $\epsilon_r = 53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-01-2011; Ambient Temp: 23.9°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN3561; ConvF(7.14, 7.14, 7.14); Calibrated: 7/27/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 4 (AWS), Body SAR, Front side, High ch, 16 QAM, 10 MHz, 1 RB, 0 RB Offset

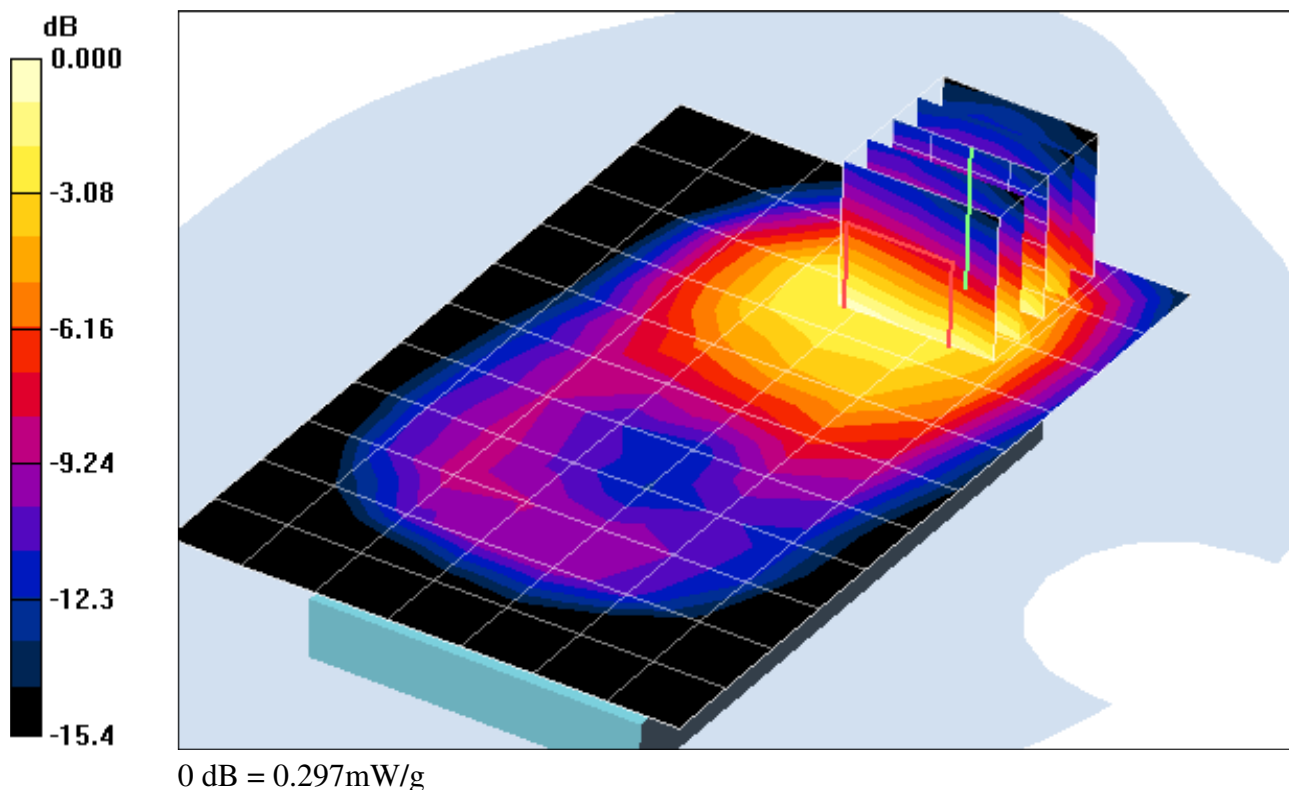
Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 13.9 V/m; Power Drift = -0.051 dB

Peak SAR (extrapolated) = 0.448 W/kg

SAR(1 g) = 0.270 mW/g; SAR(10 g) = 0.167 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 9

Communication System: LTE RF; Frequency: 1750.0 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1750.0 \text{ MHz}$; $\sigma = 1.53 \text{ mho/m}$; $\epsilon_r = 53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-01-2011; Ambient Temp: 23.9°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN3561; ConvF(7.14, 7.14, 7.14); Calibrated: 7/27/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 4 (AWS), Body SAR, Top Edge, High ch, QPSK, 10 MHz, 1 RB, 0 RB Offset

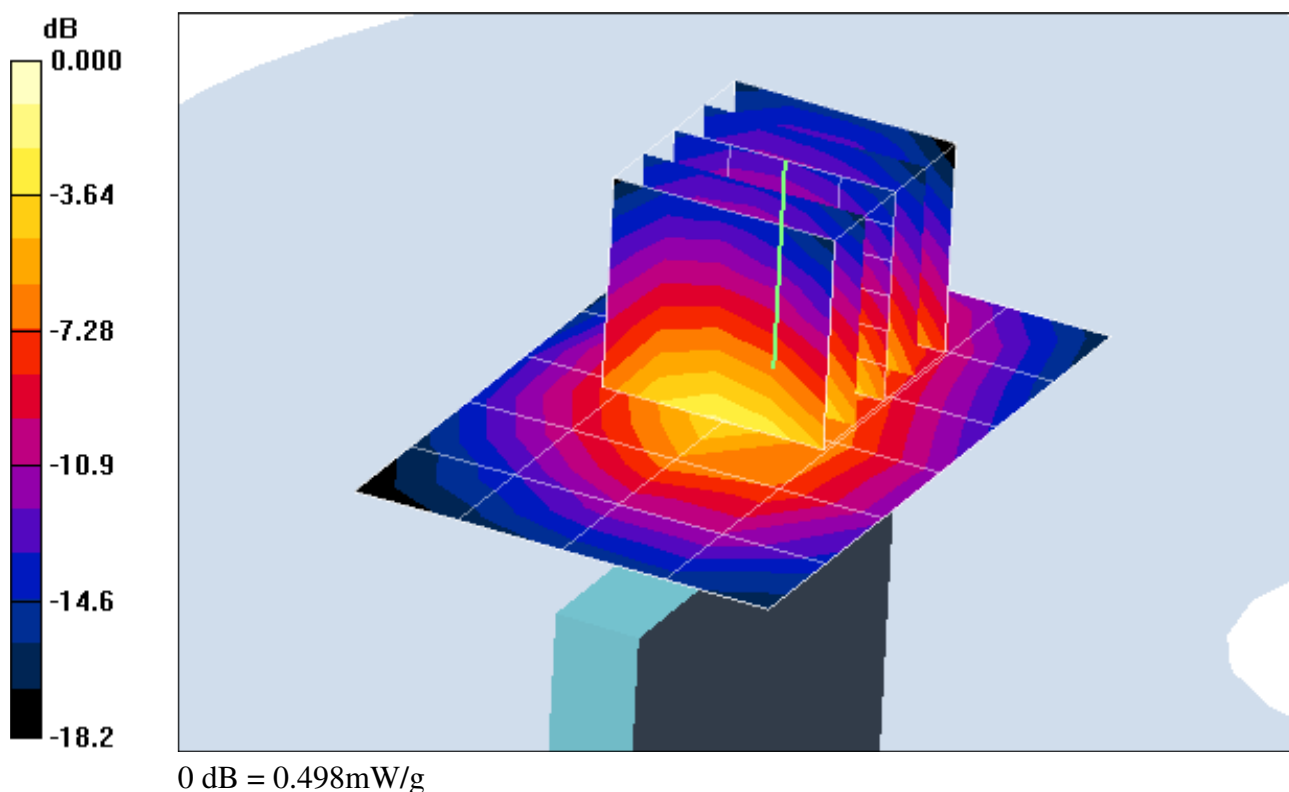
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 18.3 V/m; Power Drift = -0.051 dB

Peak SAR (extrapolated) = 0.771 W/kg

SAR(1 g) = 0.440 mW/g; SAR(10 g) = 0.231 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 9

Communication System: LTE RF; Frequency: 1750.0 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1750.0 \text{ MHz}$; $\sigma = 1.53 \text{ mho/m}$; $\epsilon_r = 53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-01-2011; Ambient Temp: 23.9°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN3561; ConvF(7.14, 7.14, 7.14); Calibrated: 7/27/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 4 (AWS), Body SAR, Right Edge, High ch, QPSK, 10 MHz, 1 RB, 0 RB Offset

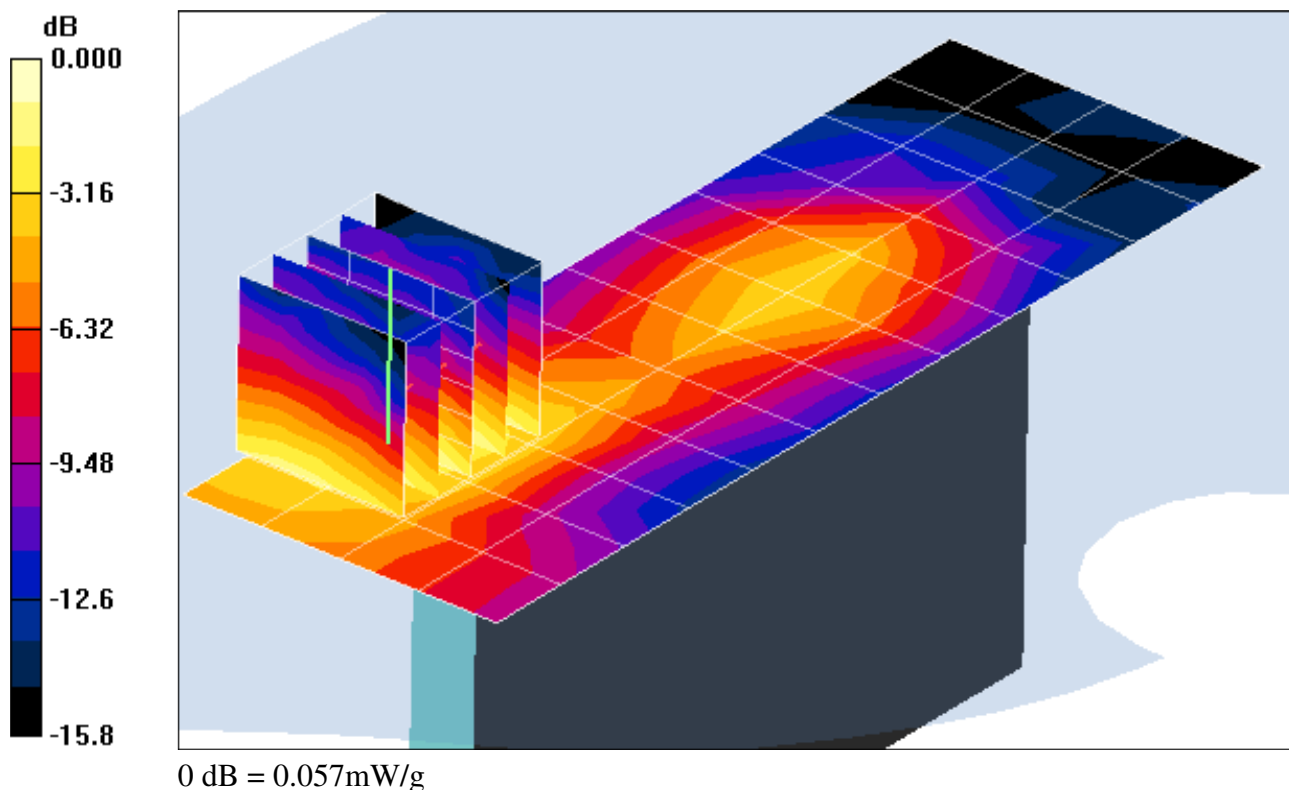
Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 5.96 V/m; Power Drift = -0.139 dB

Peak SAR (extrapolated) = 0.088 W/kg

SAR(1 g) = 0.052 mW/g; SAR(10 g) = 0.031 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 5

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.55 \text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; ; Space 1.0 cm

Test Date: 10-24-2011; Ambient Temp: 23.1 °C; Tissue Temp: 21.8 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: PCS TDSO32 CDMA, Body-worn SAR, Back side, Mid.ch

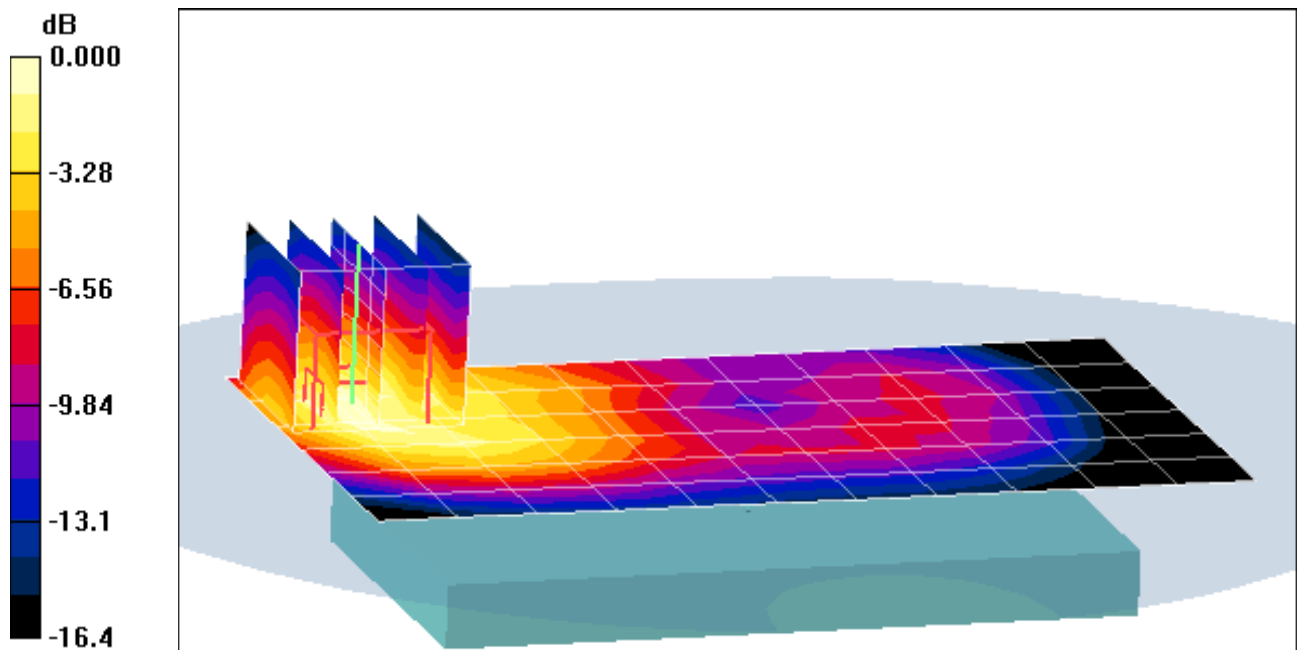
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 21.7 V/m; Power Drift = -0.041 dB

Peak SAR (extrapolated) = 0.999 W/kg

SAR(1 g) = 0.568 mW/g; SAR(10 g) = 0.321 mW/g



0 dB = 0.620mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 5

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.55 \text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space 1.0 cm

Test Date: 10-24-2011; Ambient Temp: 23.1 °C; Tissue Temp: 21.8 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

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

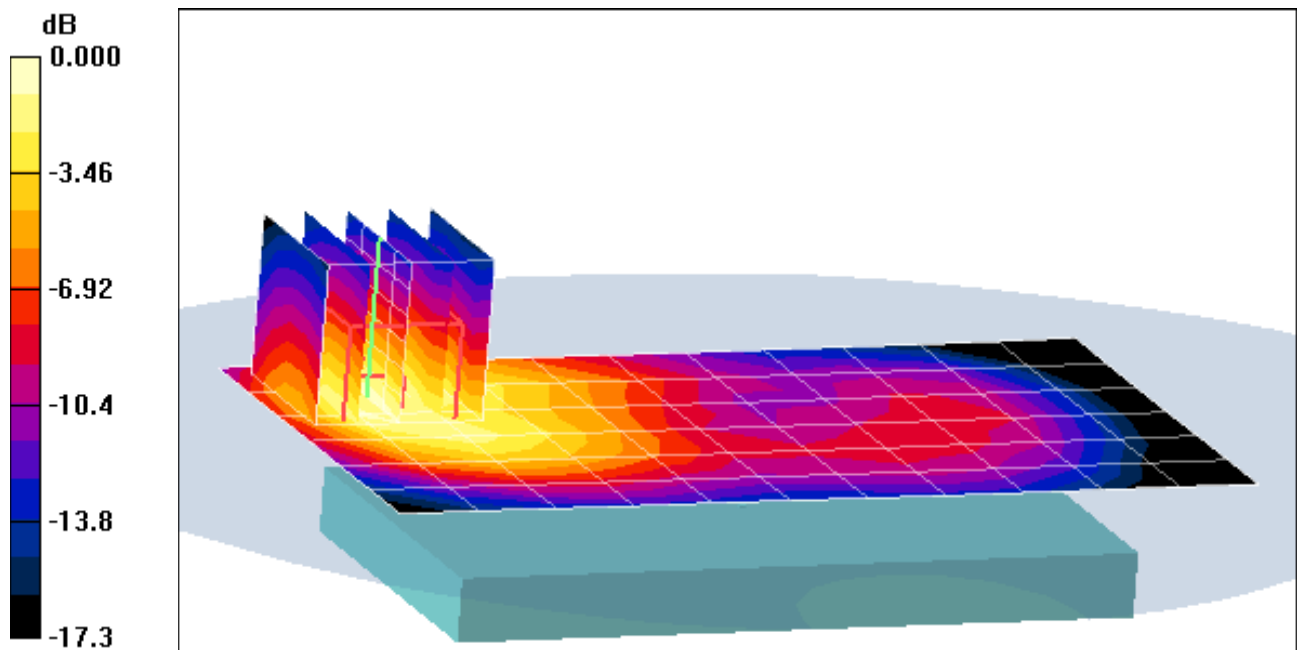
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 20.1 V/m; Power Drift = -0.090 dB

Peak SAR (extrapolated) = 1.02 W/kg

SAR(1 g) = 0.584 mW/g; SAR(10 g) = 0.327 mW/g



0 dB = 0.653mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 5

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.55 \text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space 1.0 cm

Test Date: 10-24-2011; Ambient Temp: 23.1 °C; Tissue Temp: 21.8 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: PCS EVDO CDMA, Body SAR, Front side, Mid.ch

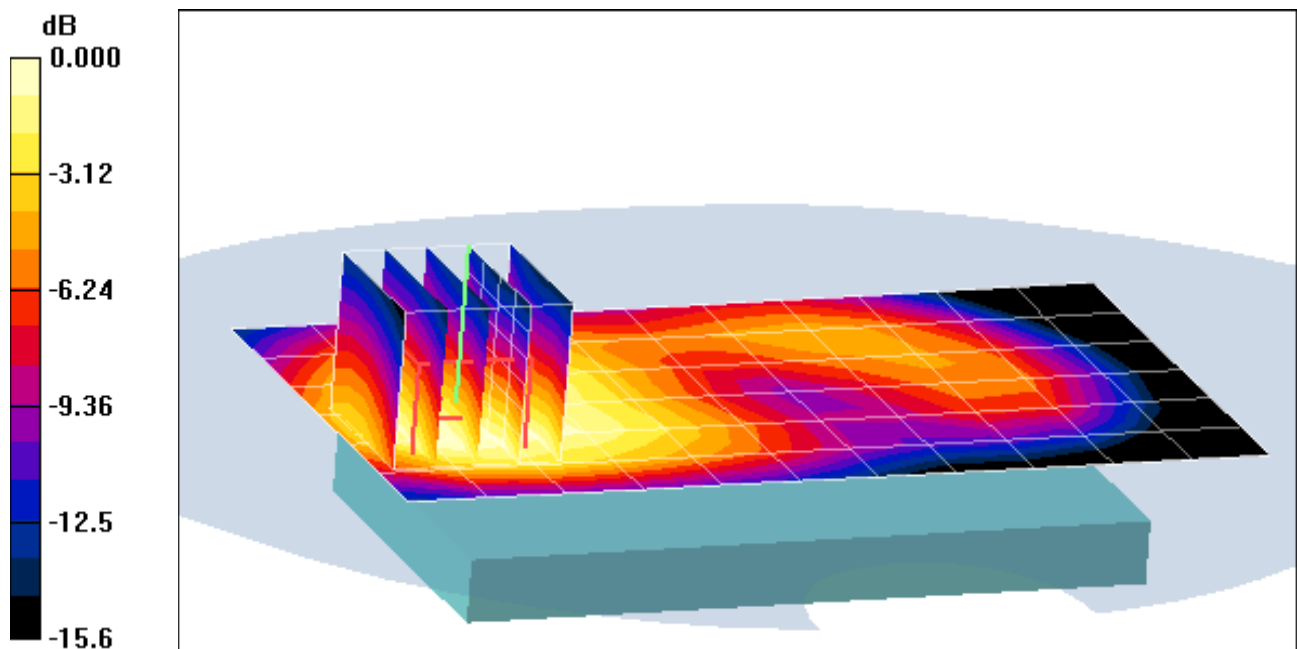
Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 17.8 V/m; Power Drift = 0.009 dB

Peak SAR (extrapolated) = 0.661 W/kg

SAR(1 g) = 0.385 mW/g; SAR(10 g) = 0.225 mW/g



0 dB = 0.412mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 5

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.55 \text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space 1.0 cm

Test Date: 10-24-2011; Ambient Temp: 23.1 °C; Tissue Temp: 21.8 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: PCS EVDO, Body SAR, Bottom Edge, Mid.ch

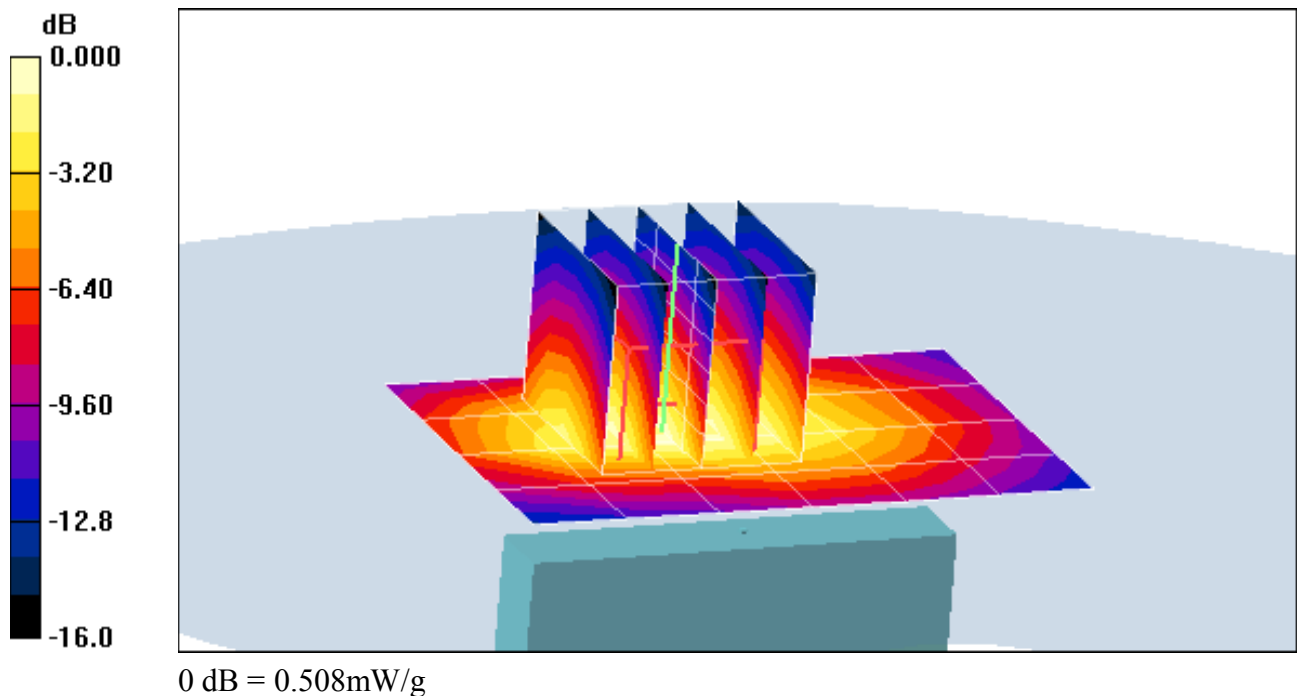
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 18.1 V/m; Power Drift = -0.005 dB

Peak SAR (extrapolated) = 0.780 W/kg

SAR(1 g) = 0.456 mW/g; SAR(10 g) = 0.254 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 5

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

$f = 1880 \text{ MHz}$; $\sigma = 1.55 \text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-24-2011; Ambient Temp: 23.1°C; Tissue Temp: 21.8°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: PCS EVDO, Body SAR, Right Edge, Mid.ch

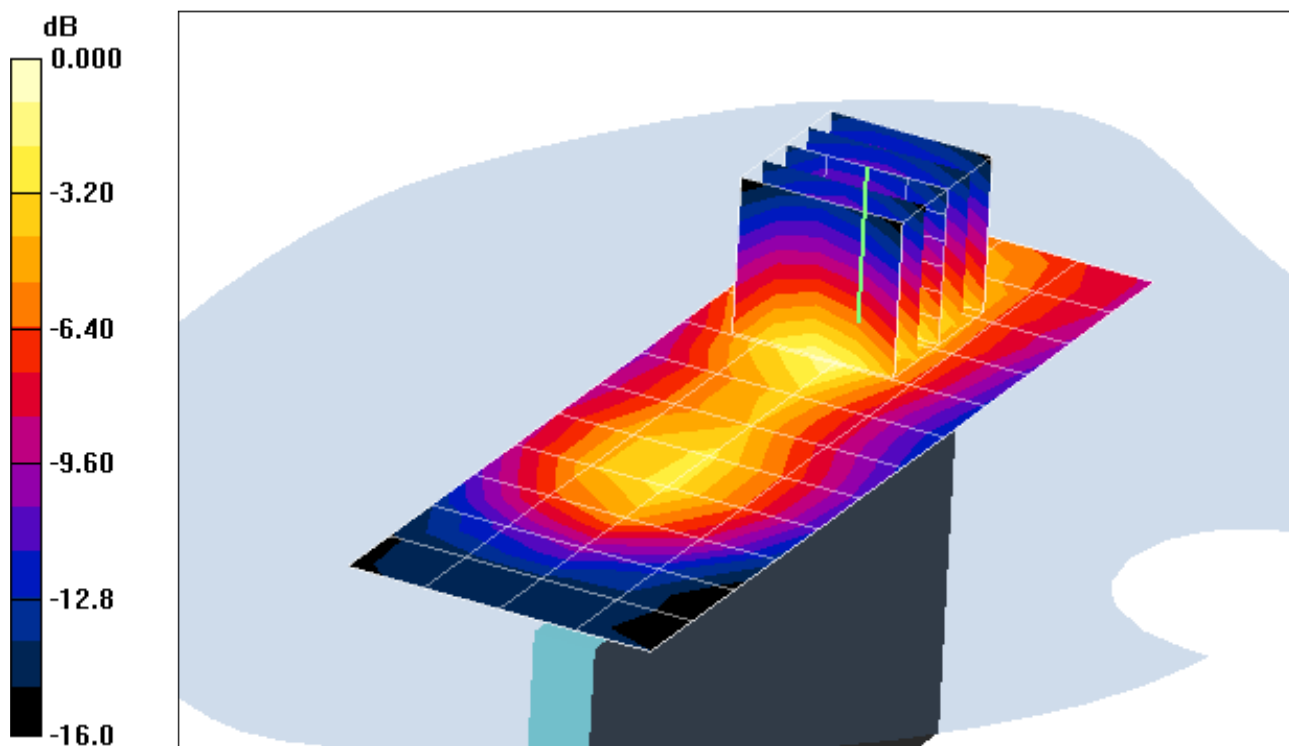
Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 13.4 V/m; Power Drift = -0.094 dB

Peak SAR (extrapolated) = 0.383 W/kg

SAR(1 g) = 0.227 mW/g; SAR(10 g) = 0.129 mW/g



0 dB = 0.249mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 2

Communication System: LTE RF; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.55 \text{ mho/m}$; $\epsilon_r = 53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-03-2011; Ambient Temp: 24.6°C; Tissue Temp: 22.8°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 2 (PCS), Body SAR, Back side, Mid.ch, QPSK, 5 MHz BW, 1 RB, 24 RB Offset

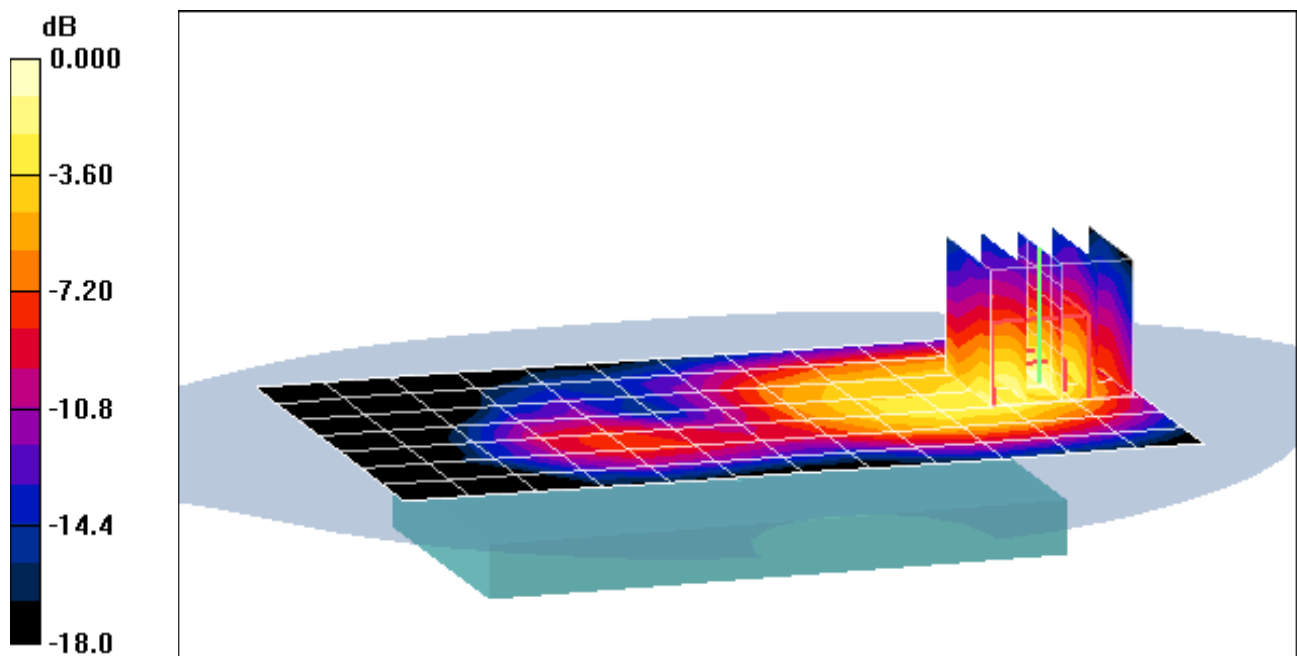
Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 13.3 V/m; Power Drift = 0.024 dB

Peak SAR (extrapolated) = 0.421 W/kg

SAR(1 g) = 0.239 mW/g; SAR(10 g) = 0.129 mW/g



0 dB = 0.276mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 2

Communication System: LTE RF; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.55 \text{ mho/m}$; $\epsilon_r = 53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-03-2011; Ambient Temp: 24.6°C; Tissue Temp: 22.8°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 2 (PCS), Body SAR, Front side, Mid.ch, QPSK, 5 MHz BW, 1 RB, 24 RB Offset

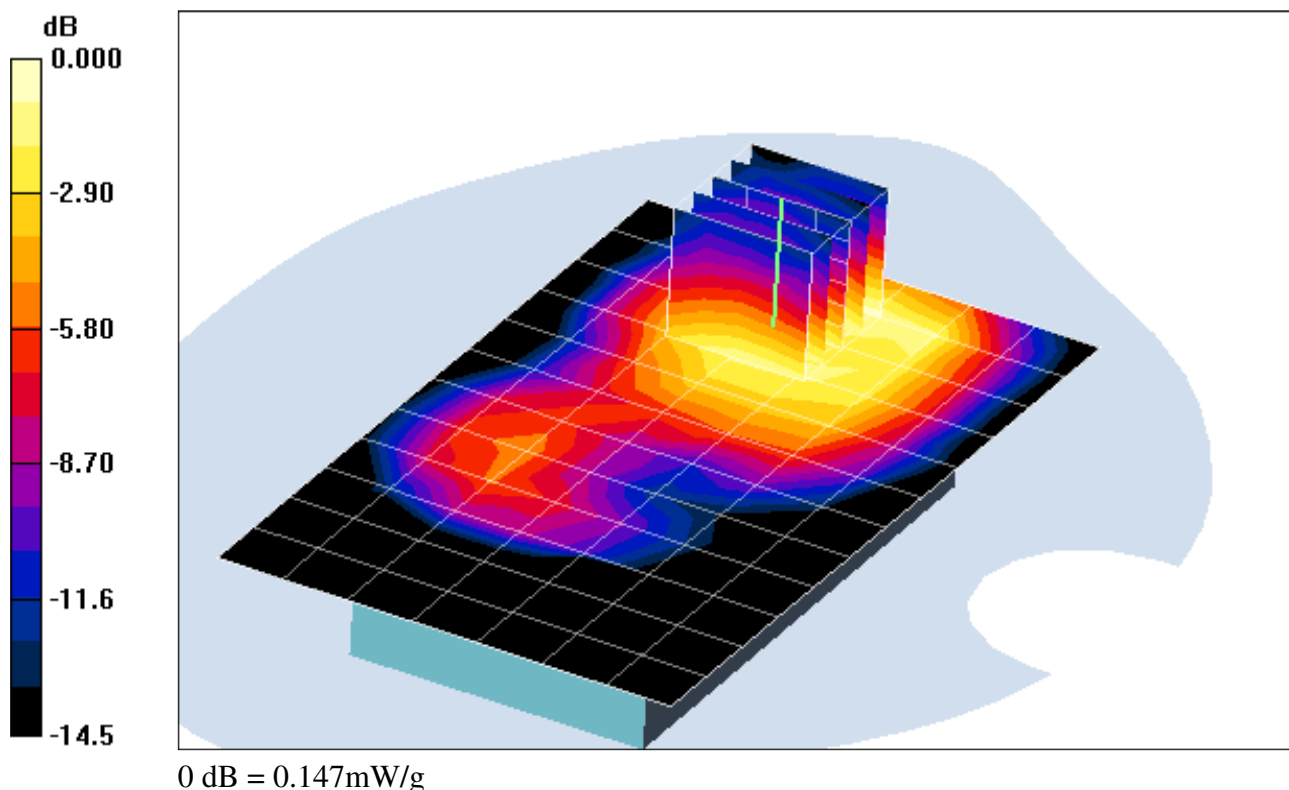
Area Scan (8x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 9.71 V/m; Power Drift = -0.031 dB

Peak SAR (extrapolated) = 0.213 W/kg

SAR(1 g) = 0.135 mW/g; SAR(10 g) = 0.084 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 2

Communication System: LTE RF; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.55 \text{ mho/m}$; $\epsilon_r = 53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-03-2011; Ambient Temp: 24.6°C; Tissue Temp: 22.8°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 2 (PCS), Body SAR, Top Edge, Mid.ch, QPSK, 5 MHz BW, 1 RB, 24 RB Offset

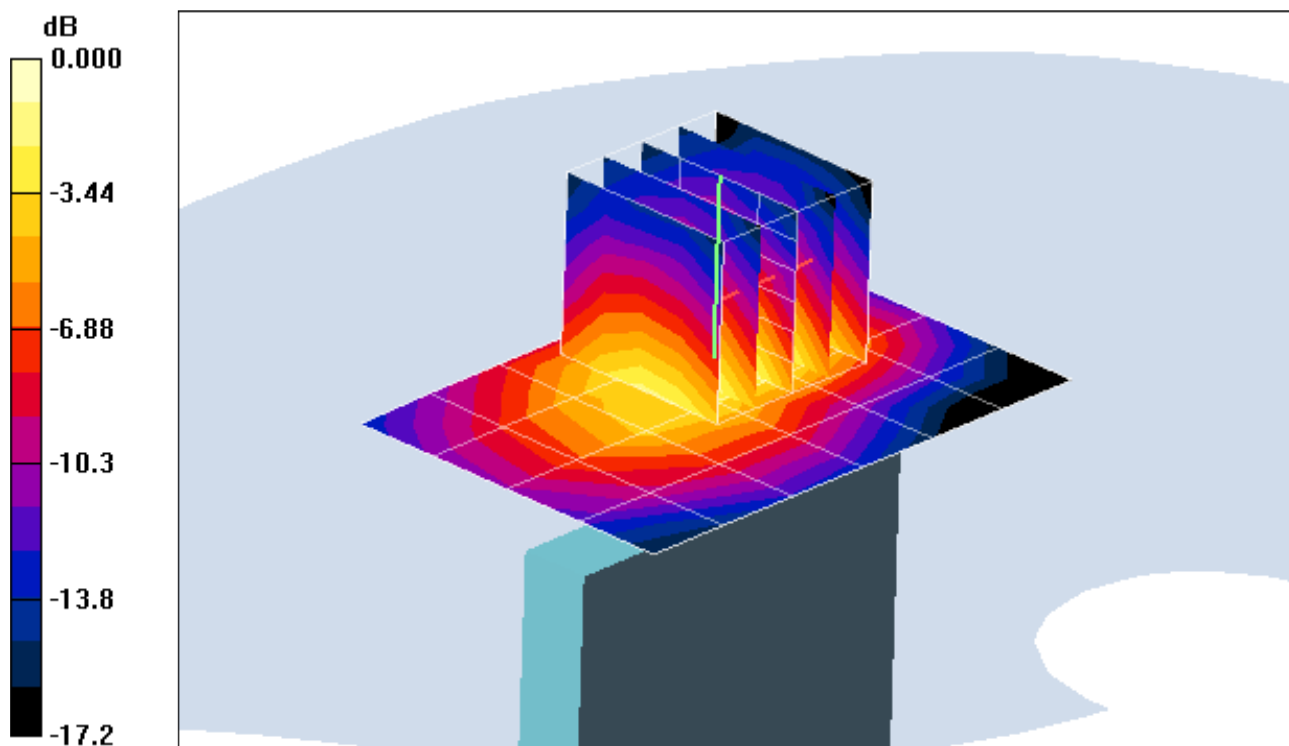
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 11.9 V/m; Power Drift = -0.184 dB

Peak SAR (extrapolated) = 0.323 W/kg

SAR(1 g) = 0.187 mW/g; SAR(10 g) = 0.099 mW/g



0 dB = 0.214mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 2

Communication System: LTE RF; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.55 \text{ mho/m}$; $\epsilon_r = 53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-03-2011; Ambient Temp: 24.6°C; Tissue Temp: 22.8°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 2 (PCS), Body SAR, Right Edge, Mid.ch, QPSK, 5 MHz BW, 1 RB, 24 RB Offset

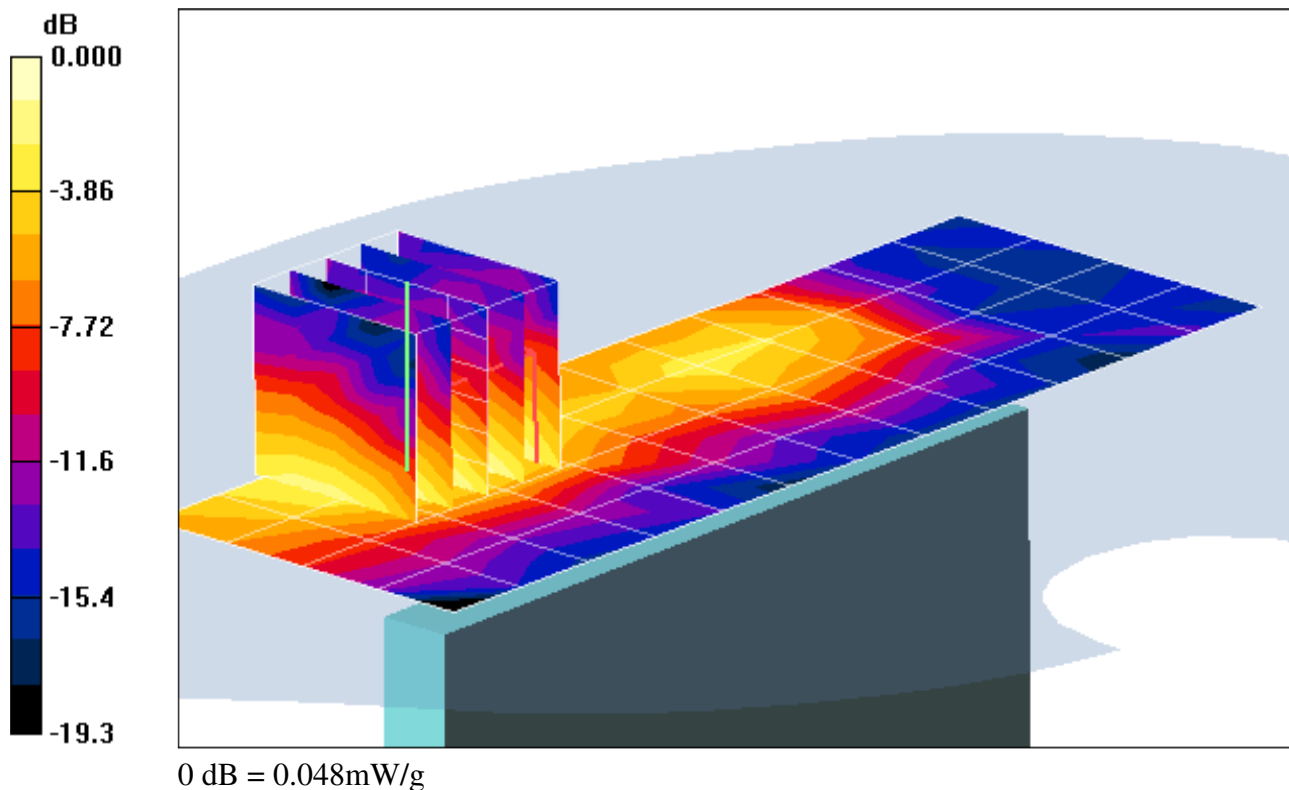
Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 5.63 V/m; Power Drift = -0.178 dB

Peak SAR (extrapolated) = 0.076 W/kg

SAR(1 g) = 0.044 mW/g; SAR(10 g) = 0.025 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 5

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.95 \text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space 1.0 cm

Test Date: 10-24-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.5 °C

Probe: EX3DV4 - SN3561; ConvF(6.26, 6.26, 6.26); Calibrated: 7/27/2011

Sensor-Surface: 3mm (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 802.11b, Body SAR, Ch 11, 1 Mbps, Back Side

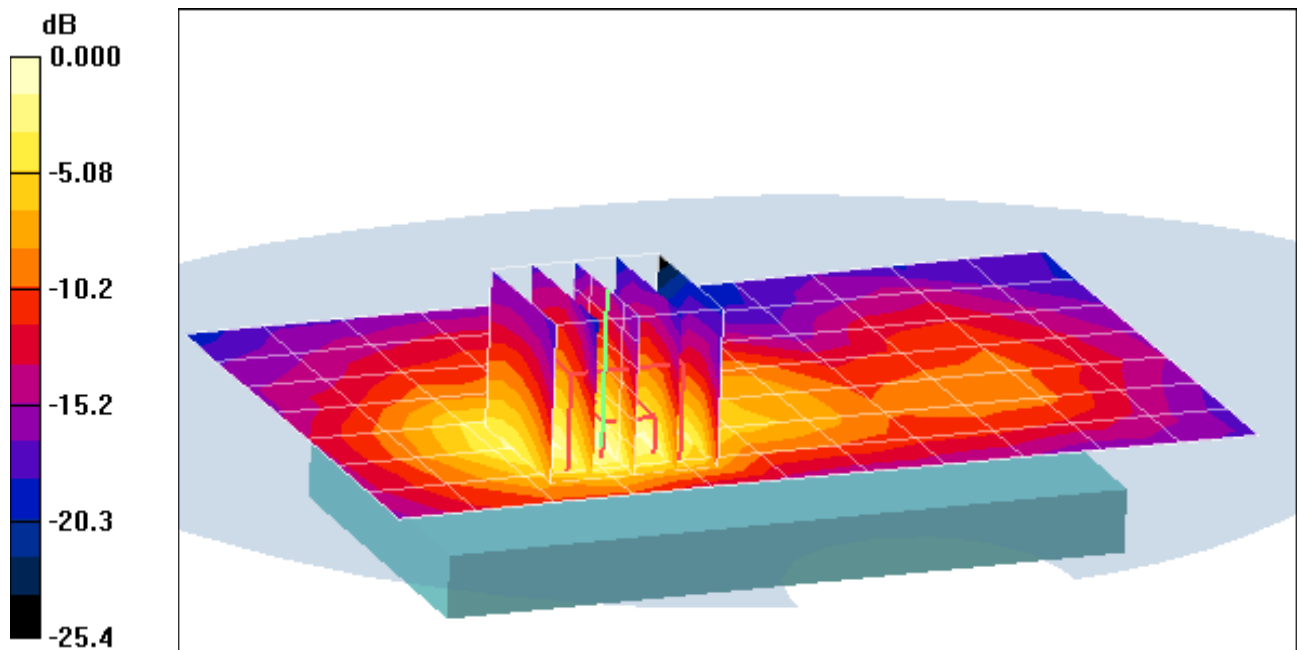
Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 11.4 V/m; Power Drift = 0.089 dB

Peak SAR (extrapolated) = 0.543 W/kg

SAR(1 g) = 0.261 mW/g; SAR(10 g) = 0.126 mW/g



0 dB = 0.330mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 5

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.95 \text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space 1.0 cm

Test Date: 10-24-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.5 °C

Probe: EX3DV4 - SN3561; ConvF(6.26, 6.26, 6.26); Calibrated: 7/27/2011

Sensor-Surface: 3mm (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 802.11b, Body SAR, Ch 11, 1 Mbps, Front Side

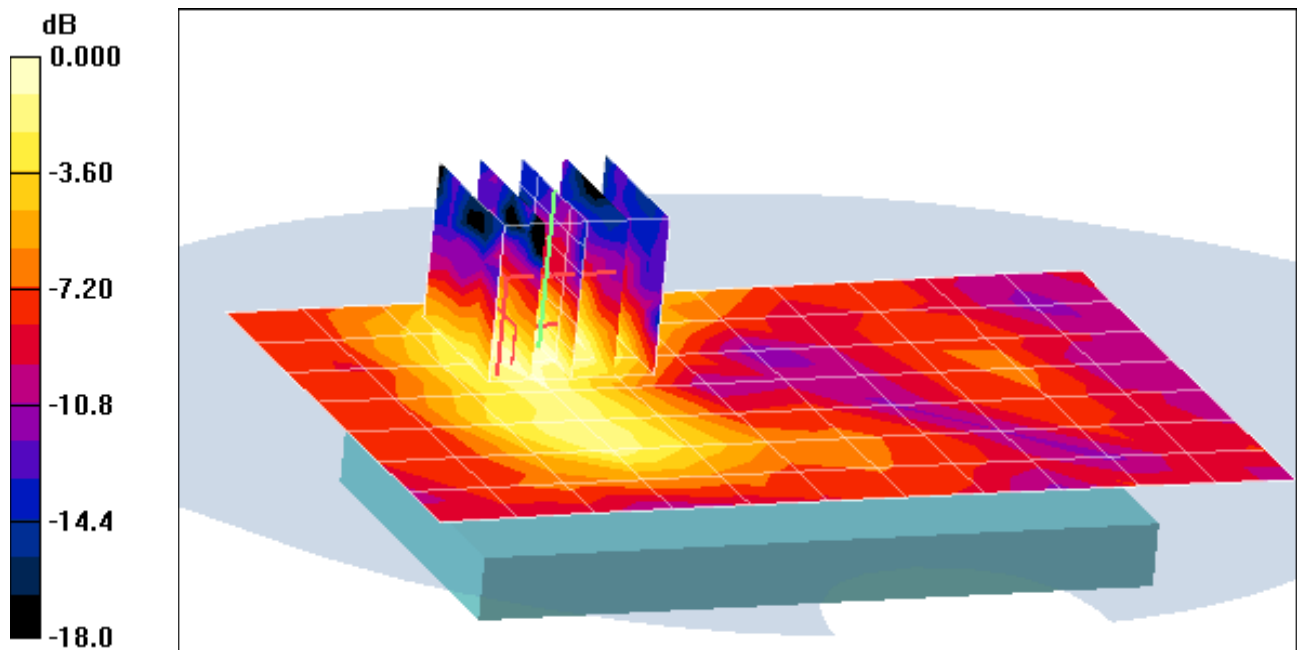
Area Scan (8x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 4.34 V/m; Power Drift = 0.096 dB

Peak SAR (extrapolated) = 0.067 W/kg

SAR(1 g) = 0.037 mW/g; SAR(10 g) = 0.020 mW/g



0 dB = 0.044mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR930; Type: Portable Handset; Serial: 5

Communication System: IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.95 \text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space 1.0 cm

Test Date: 10-24-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.5 °C

Probe: EX3DV4 - SN3561; ConvF(6.26, 6.26, 6.26); Calibrated: 7/27/2011

Sensor-Surface: 3mm (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 802.11b, Body SAR, Ch 11, 1 Mbps, Left Edge

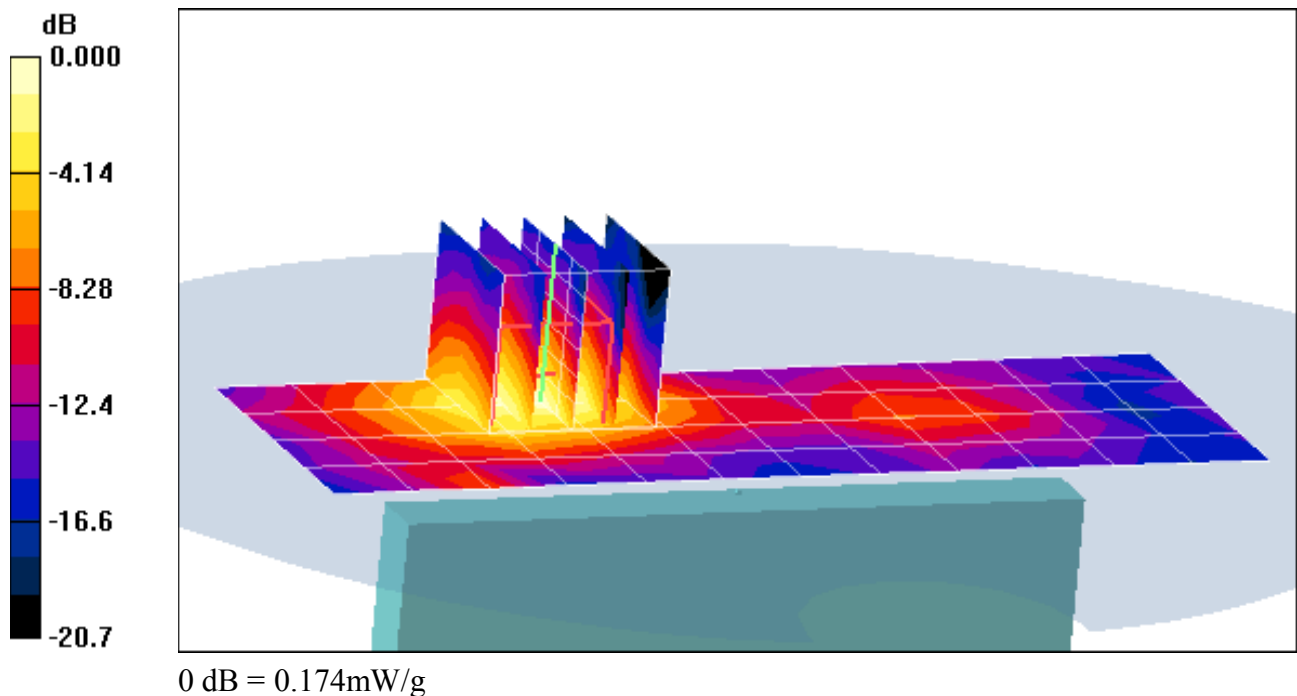
Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 8.56 V/m; Power Drift = 0.050 dB

Peak SAR (extrapolated) = 0.269 W/kg

SAR(1 g) = 0.134 mW/g; SAR(10 g) = 0.066 mW/g



APPENDIX B: DIPOLE VALIDATION

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 740 Head Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.88 \text{ mho/m}$; $\epsilon_r = 41.33$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-04-2011; Ambient Temp: 24.0°C; Tissue Temp: 22.1°C

Probe: ES3DV2 - SN3022; ConvF(6.27, 6.27, 6.27); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

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

750MHz System Verification

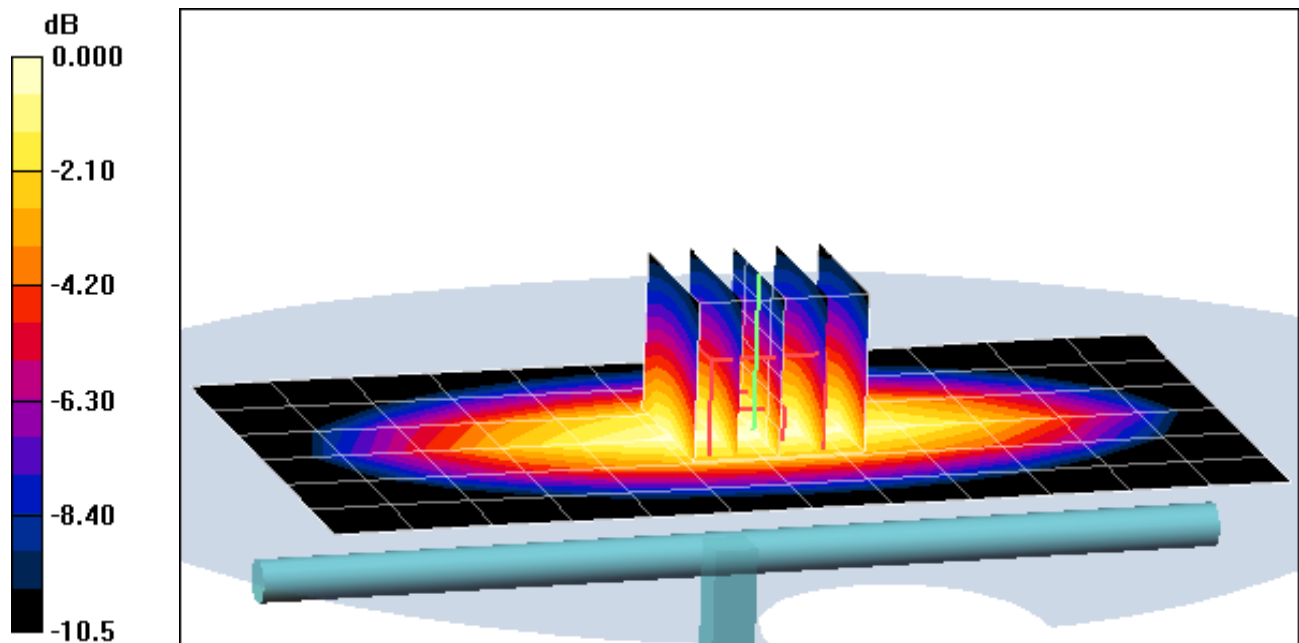
Area Scan (7x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 0.768 mW/g; SAR(10 g) = 0.503 mW/g

Deviation = -8.24 %



0 dB = 0.830mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 740 Head Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.88 \text{ mho/m}$; $\epsilon_r = 41.33$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-04-2011; Ambient Temp: 24.0°C; Tissue Temp: 22.1°C

Probe: ES3DV2 - SN3022; ConvF(6.27, 6.27, 6.27); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

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

750MHz System Verification

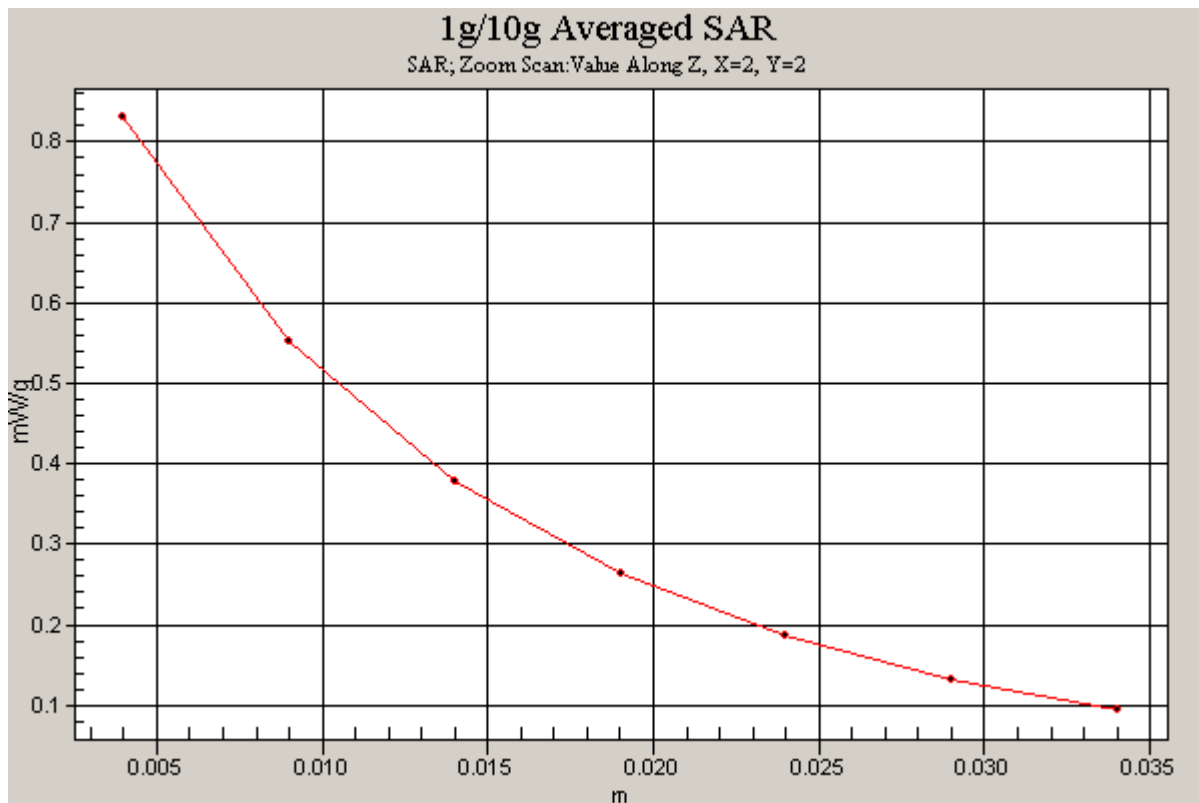
Area Scan (7x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 0.768 mW/g; SAR(10 g) = 0.503 mW/g

Deviation = -8.24 %



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.887 \text{ mho/m}$; $\epsilon_r = 41.55$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-20-2011; Ambient Temp: 24.2 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

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

835MHz System Verification

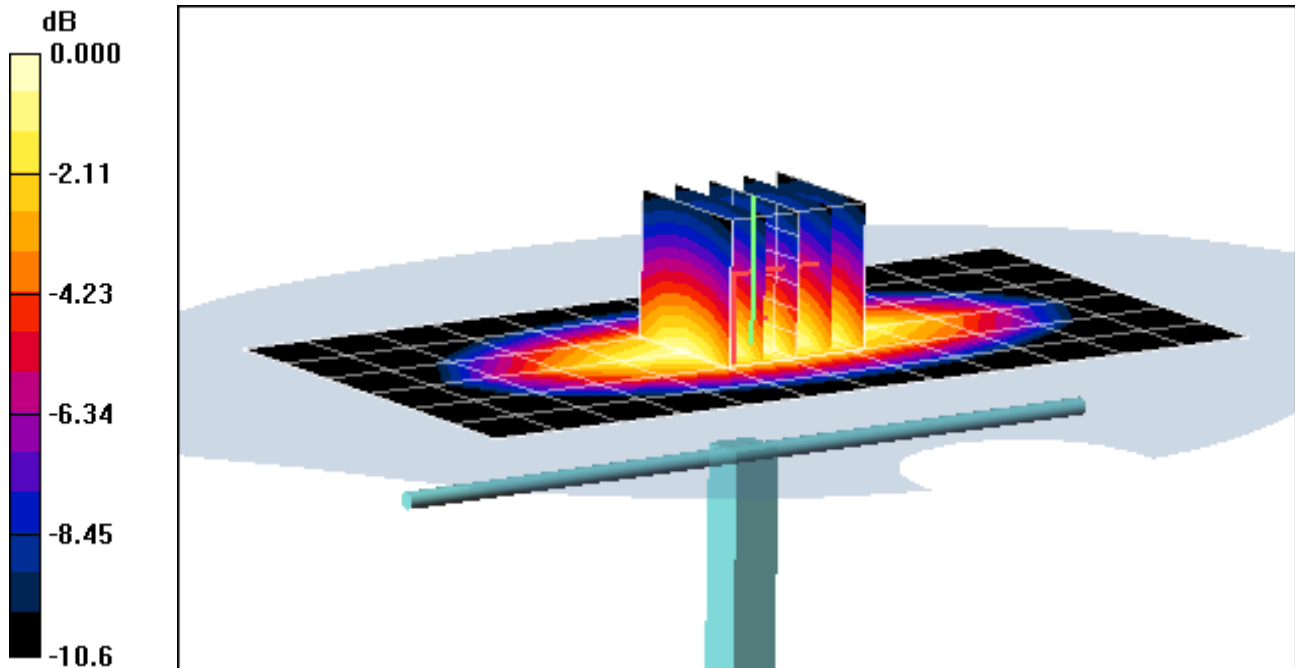
Area Scan (7x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 0.935 mW/g; SAR(10 g) = 0.610 mW/g

Deviation = -1.89 %



0 dB = 1.01mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.887 \text{ mho/m}$; $\epsilon_r = 41.55$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-20-2011; Ambient Temp: 24.2 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

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

835MHz System Verification

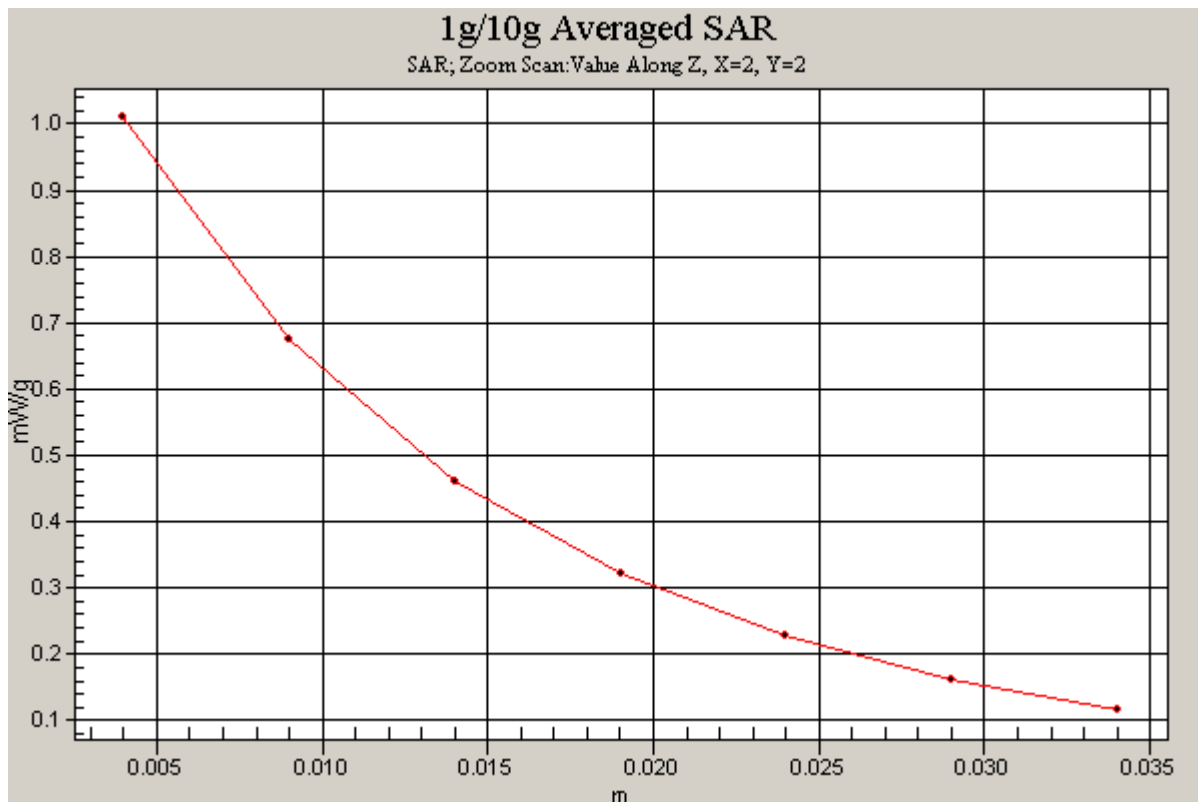
Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 0.935 mW/g; SAR(10 g) = 0.610 mW/g

Deviation = -1.89 %



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.873 \text{ mho/m}$; $\epsilon_r = 40.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-25-2011; Ambient Temp: 23.5 °C; Tissue Temp: 21.8 °C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

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

835MHz System Verification

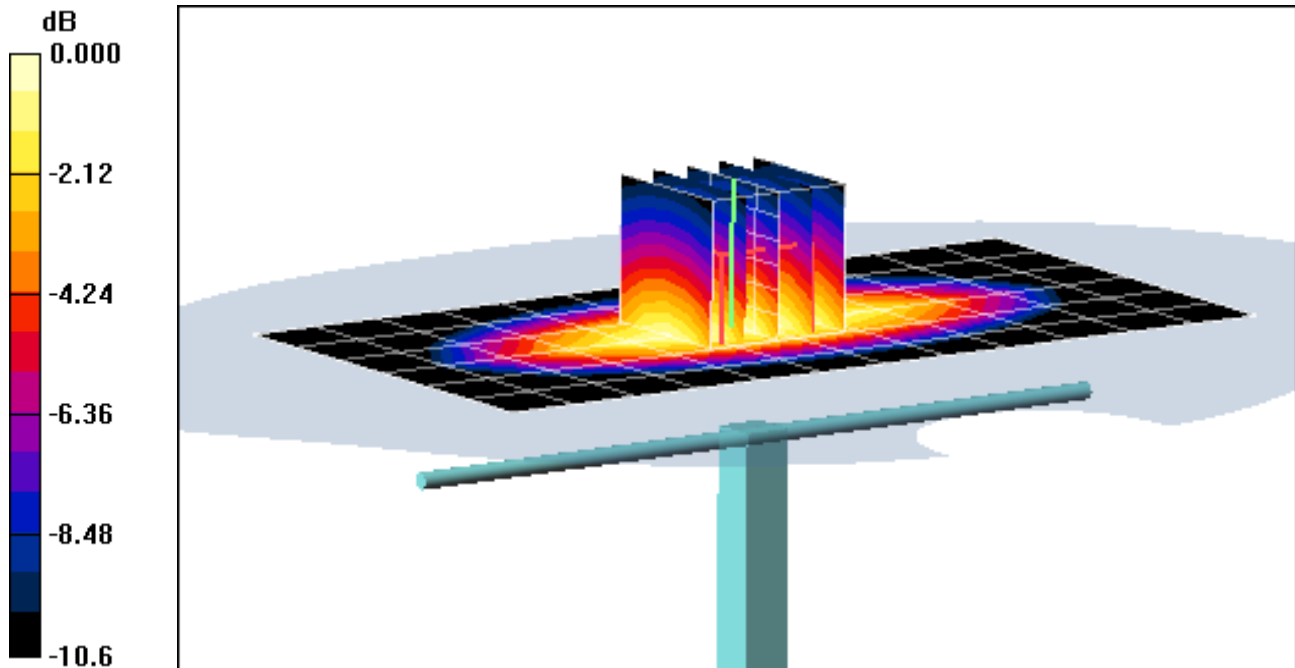
Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 0.907 mW/g; SAR(10 g) = 0.590 mW/g

Deviation = -4.83 %



0 dB = 0.984mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.873 \text{ mho/m}$; $\epsilon_r = 40.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-25-2011; Ambient Temp: 23.5 °C; Tissue Temp: 21.8 °C

Probe: ES3DV3 - SN3258; ConvF(6.18, 6.18, 6.18); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

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

835MHz System Verification

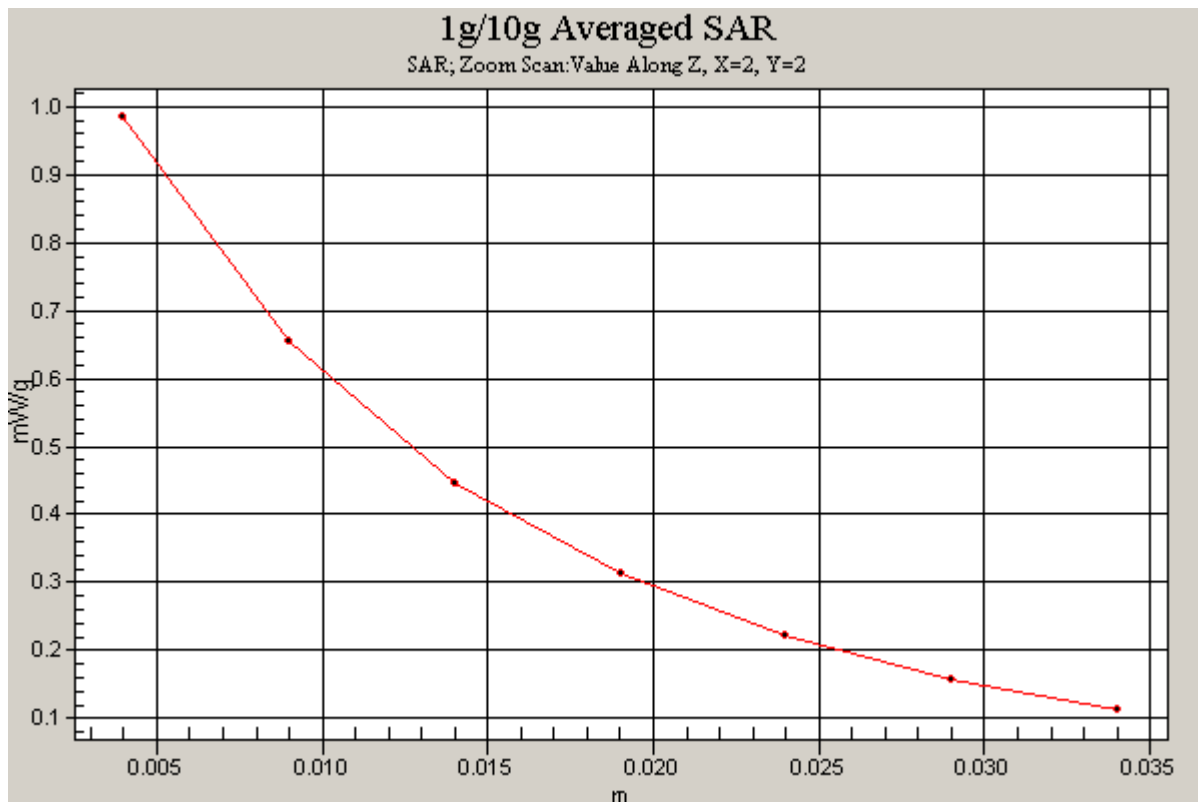
Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 0.907 mW/g; SAR(10 g) = 0.590 mW/g

Deviation = -4.83 %



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1051

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 39.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-31-2011; Ambient Temp: 23.8 °C; Tissue Temp: 21.9 °C

Probe: EX3DV4 - SN3561; ConvF(7.37, 7.37, 7.37); Calibrated: 7/27/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

1750 MHz System Verification

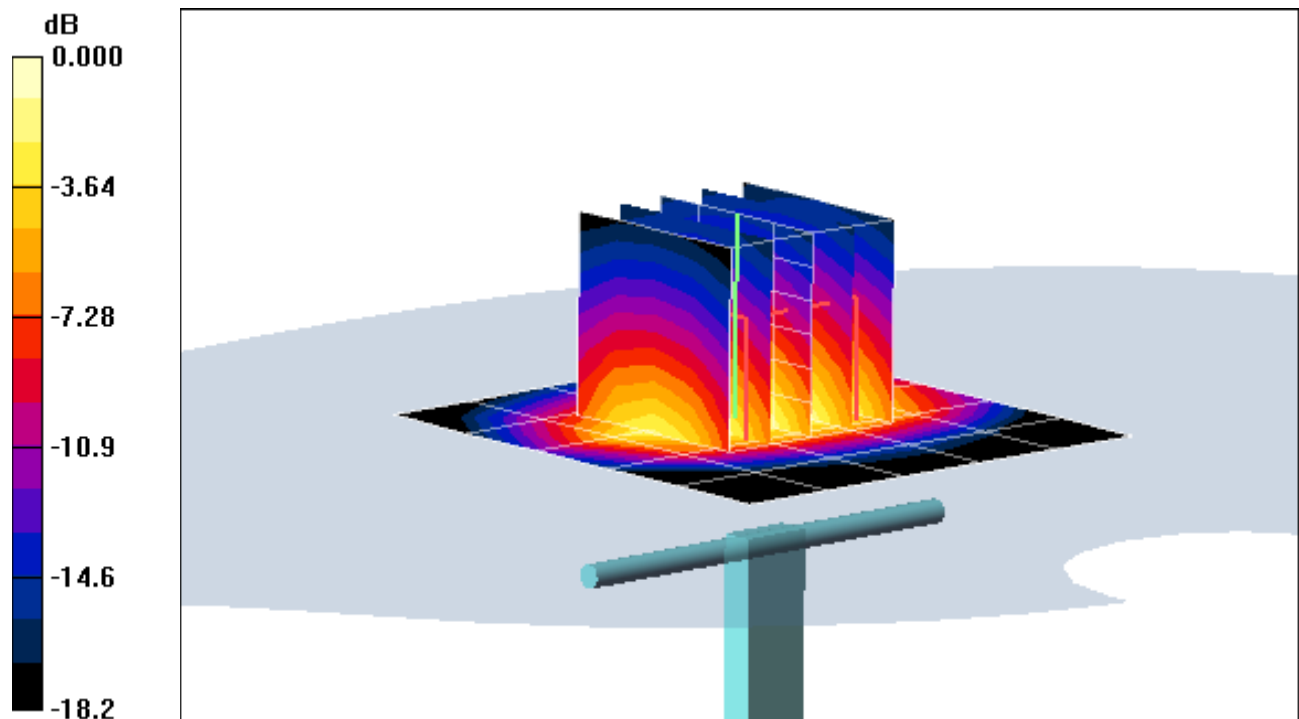
Area Scan (6x6x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 16.0 dBm (40 mW)

SAR(1 g) = 1.4 mW/g; SAR(10 g) = 0.719 mW/g

Deviation = -5.41 %



0 dB = 1.56mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1051

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 39.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-31-2011; Ambient Temp: 23.8 °C; Tissue Temp: 21.9 °C

Probe: EX3DV4 - SN3561; ConvF(7.37, 7.37, 7.37); Calibrated: 7/27/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

1750 MHz System Verification

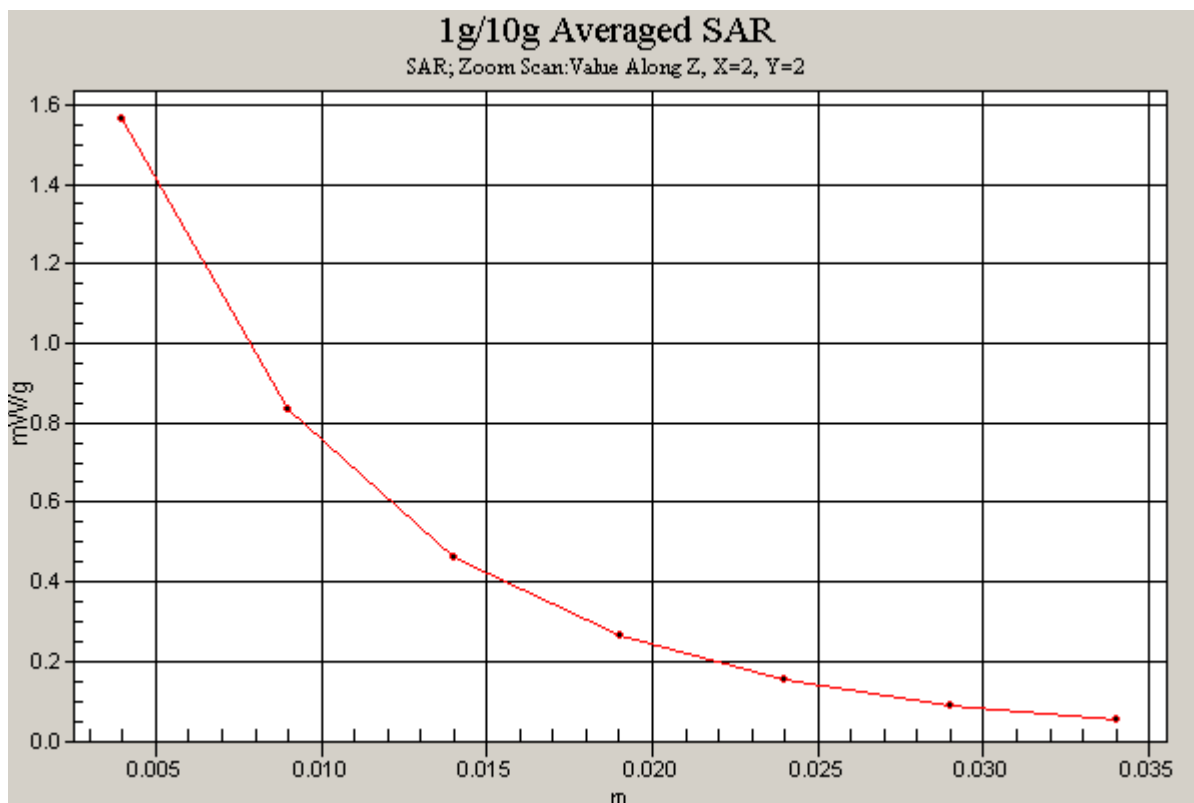
Area Scan (6x6x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 16.0 dBm (40 mW)

SAR(1 g) = 1.4 mW/g; SAR(10 g) = 0.719 mW/g

Deviation = -5.41 %



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):

$f = 1900 \text{ MHz}$; $\sigma = 1.45 \text{ mho/m}$; $\epsilon_r = 41.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-25-2011; Ambient Temp: 23.0 °C; Tissue Temp: 22.4 °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 with CRP; Type: SAM; Serial: TP1375

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

1900MHz System Verification

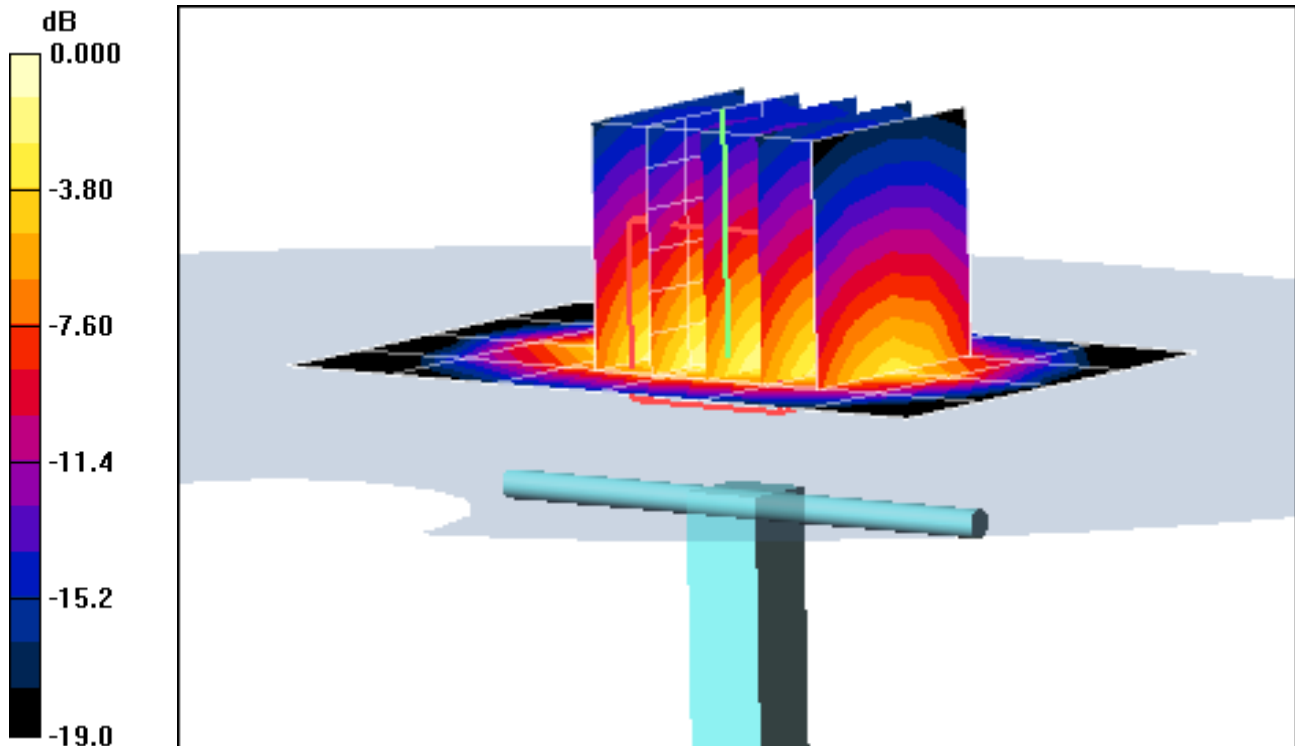
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 4.19 mW/g; SAR(10 g) = 2.14 mW/g

Deviation = 4.23 %



0 dB = 4.61mW/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):

$f = 1900 \text{ MHz}$; $\sigma = 1.45 \text{ mho/m}$; $\epsilon_r = 41.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-25-2011; Ambient Temp: 23.0 °C; Tissue Temp: 22.4 °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 with CRP; Type: SAM; Serial: TP1375

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

1900MHz System Verification

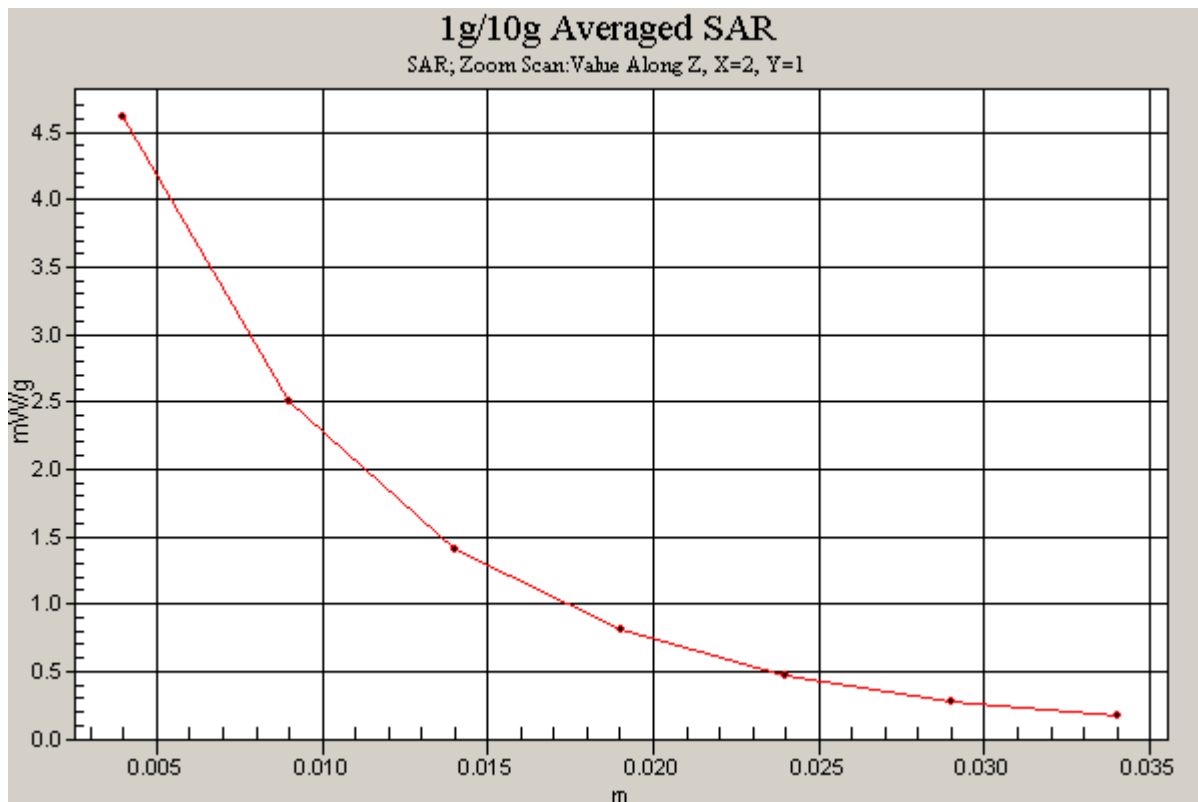
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm 100 mW

SAR(1 g) = 4.19 mW/g; SAR(10 g) = 2.14 mW/g

Deviation = 4.23 %



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):

$f = 1900 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 39.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-31-2011; Ambient Temp: 23.8°C; Tissue Temp: 22.3°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 with CRP; Type: SAM; Serial: TP1375

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

1900MHz System Verification

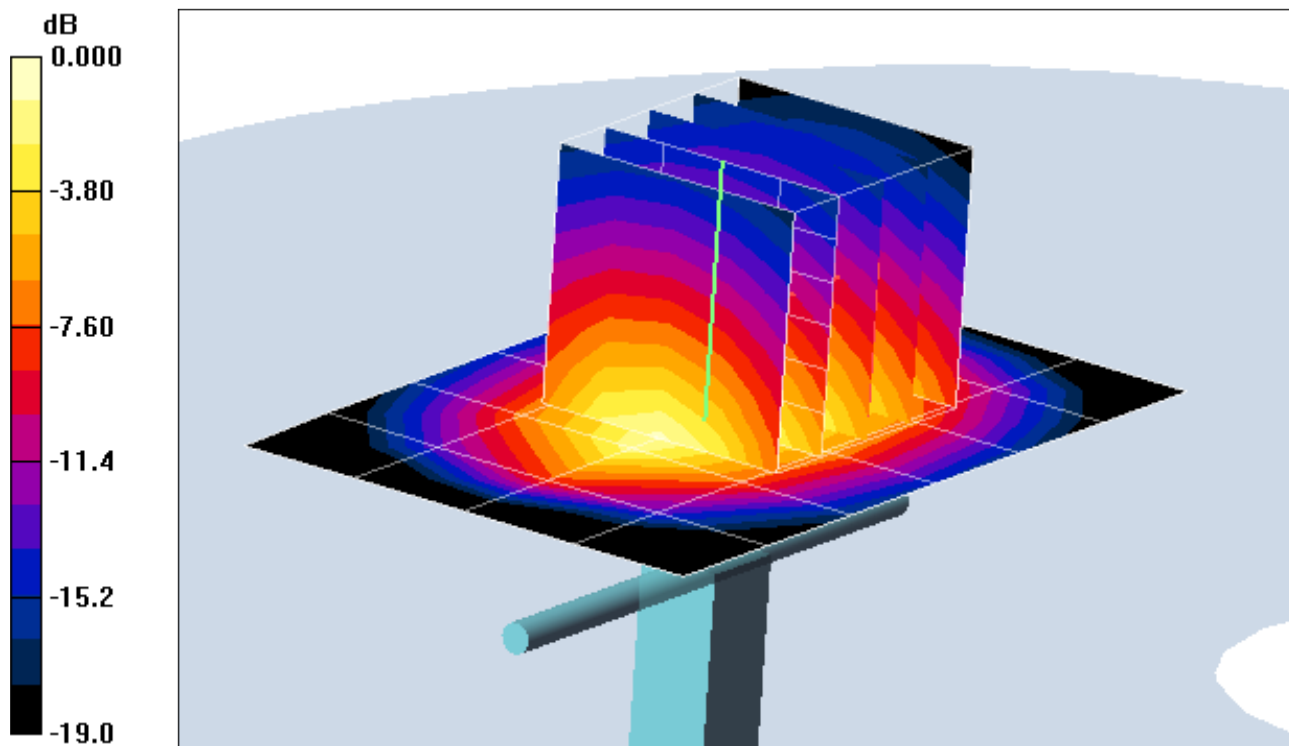
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 4.16 mW/g; SAR(10 g) = 2.13 mW/g

Deviation = 3.48 %



0 dB = 4.57mW/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):

$f = 1900 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 39.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-31-2011; Ambient Temp: 23.8°C; Tissue Temp: 22.3°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 with CRP; Type: SAM; Serial: TP1375

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

1900MHz System Verification

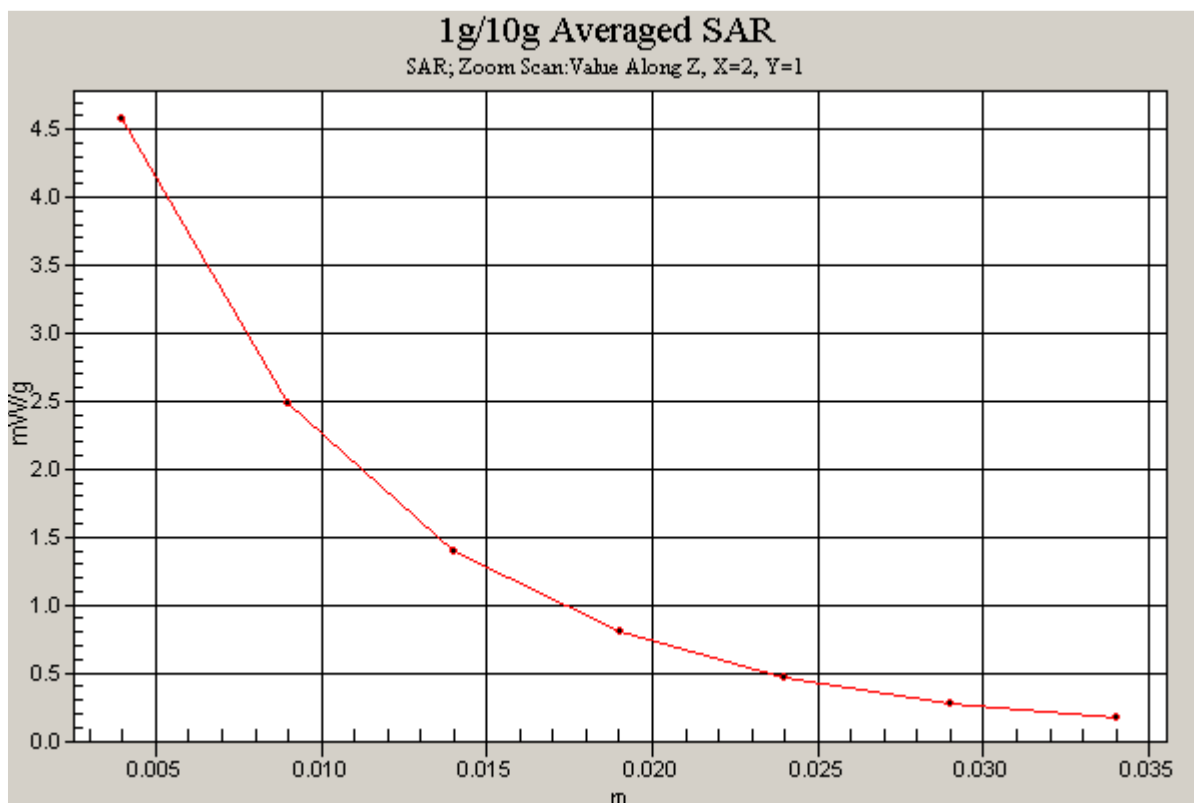
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 4.16 mW/g; SAR(10 g) = 2.13 mW/g

Deviation = 3.48 %



PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 2450 MHz; Type: D2450V2; Serial: 797

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

Medium: 2450 Head Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.87 \text{ mho/m}$; $\epsilon_r = 37.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-24-2011; Ambient Temp: 24.5°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN3561; ConvF(6.42, 6.42, 6.42); Calibrated: 7/27/2011

Sensor-Surface: 3mm (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

2450MHz System Verification

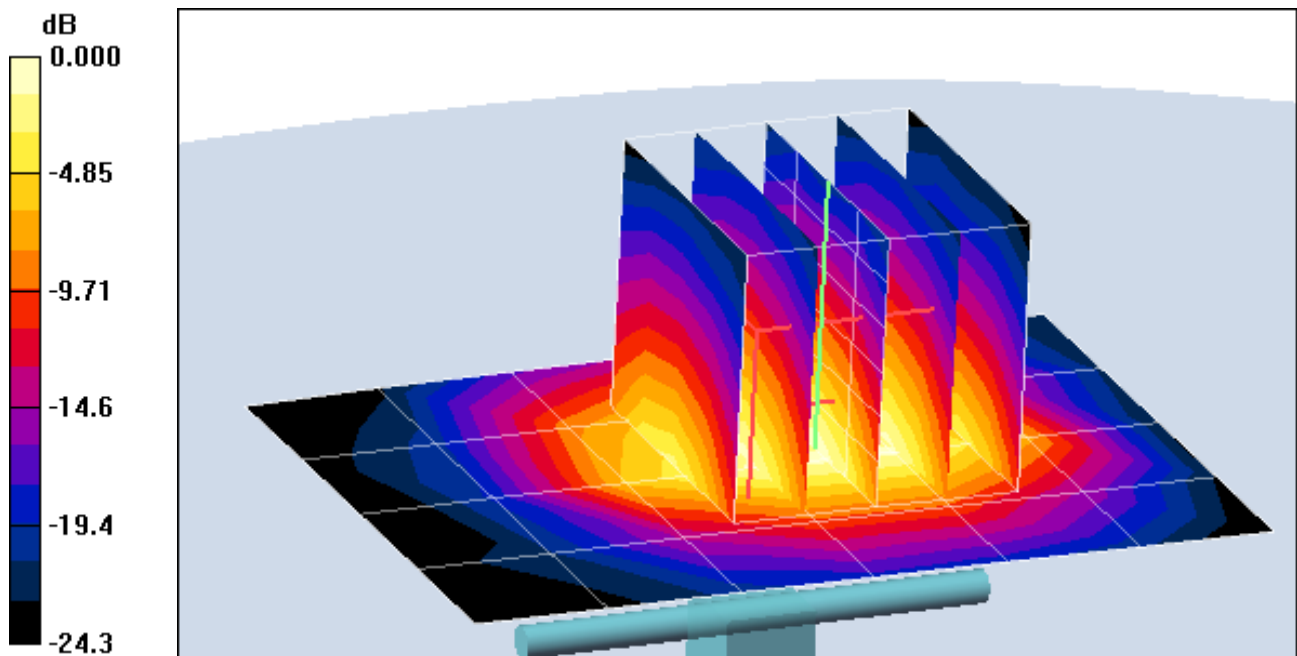
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 14.0 dBm (25 mW)

SAR(1 g) = 1.36 mW/g; SAR(10 g) = 0.605 mW/g

Deviation = 2.06 %



0 dB = 1.82mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 2450 MHz; Type: D2450V2; Serial: 797

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

Medium: 2450 Head Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.87 \text{ mho/m}$; $\epsilon_r = 37.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-24-2011; Ambient Temp: 24.5°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN3561; ConvF(6.42, 6.42, 6.42); Calibrated: 7/27/2011

Sensor-Surface: 3mm (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

2450MHz System Verification

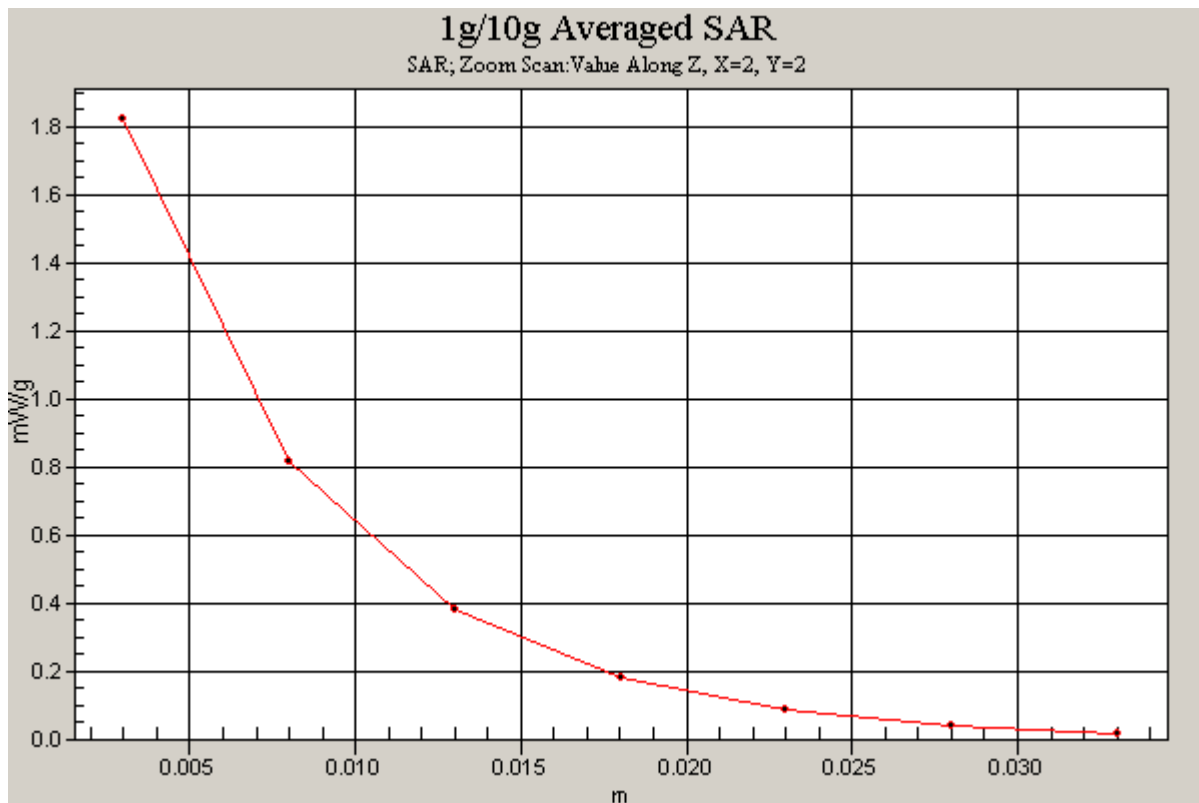
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 14.0 dBm (25 mW)

SAR(1 g) = 1.36 mW/g; SAR(10 g) = 0.605 mW/g

Deviation = 2.06 %



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 740 Body Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.948 \text{ mho/m}$; $\epsilon_r = 54.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-02-2011; Ambient Temp: 23.6°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3209; ConvF(6.18, 6.18, 6.18); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

750MHz System Verification

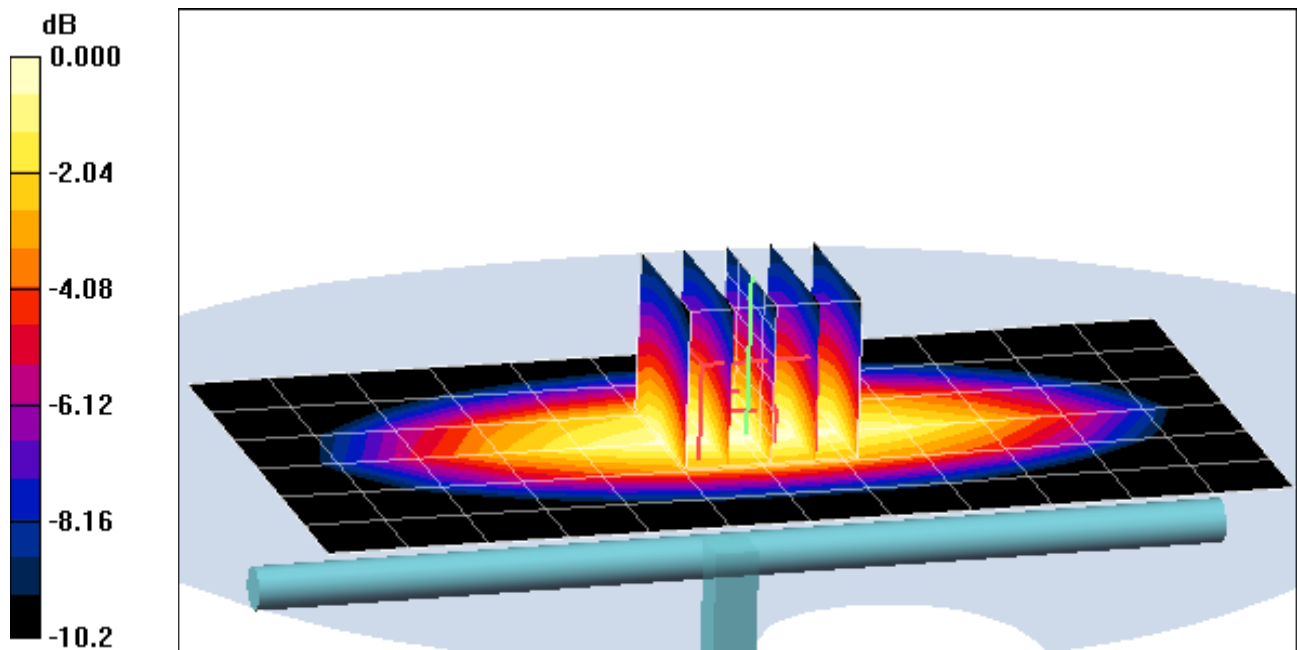
Area Scan (7x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 20.0 dBm (100mW)

SAR(1 g) = 0.845 mW/g; SAR(10 g) = 0.557 mW/g

Deviation = -4.52 %



0 dB = 0.913mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 740 Body Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.948 \text{ mho/m}$; $\epsilon_r = 54.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-02-2011; Ambient Temp: 23.6°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3209; ConvF(6.18, 6.18, 6.18); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

750MHz System Verification

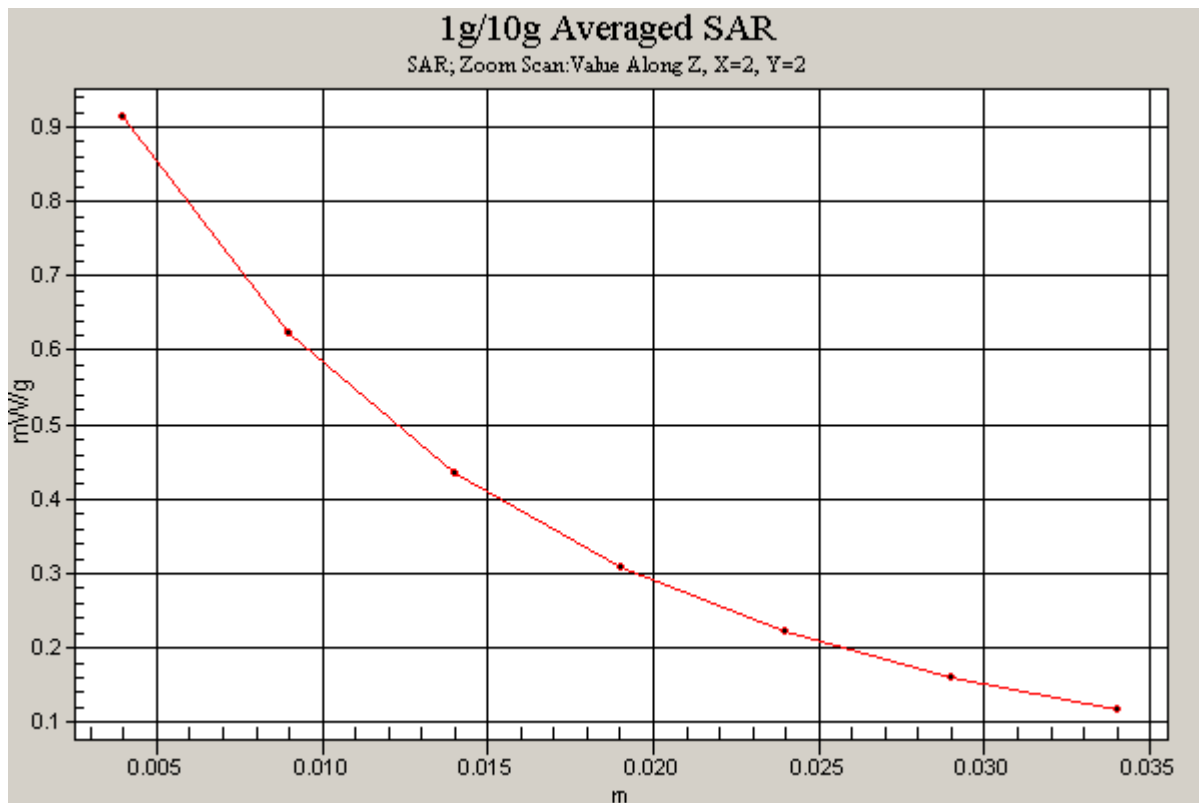
Area Scan (7x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 20.0 dBm (100mW)

SAR(1 g) = 0.845 mW/g; SAR(10 g) = 0.557 mW/g

Deviation = -4.52 %



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.977 \text{ mho/m}$; $\epsilon_r = 52.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-20-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.5 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

835MHz System Verification

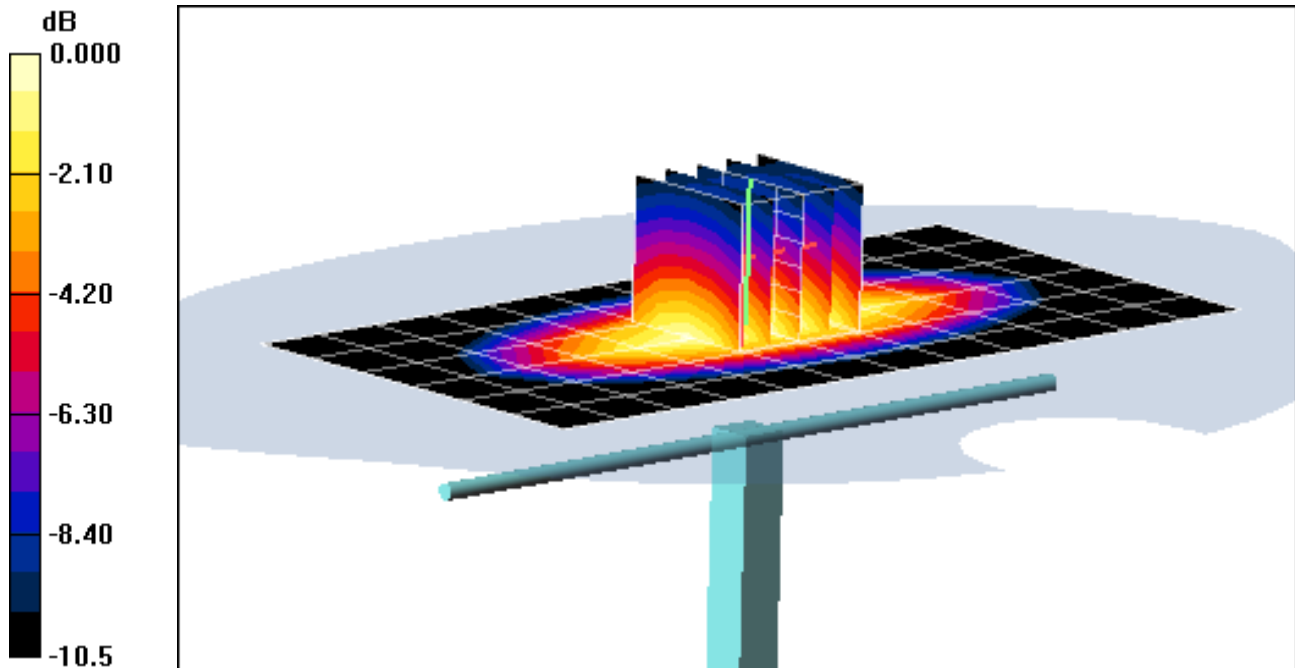
Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 0.964 mW/g; SAR(10 g) = 0.629 mW/g

Deviation = -2.13 %



0 dB = 1.04mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.977 \text{ mho/m}$; $\epsilon_r = 52.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-20-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.5 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

835MHz System Verification

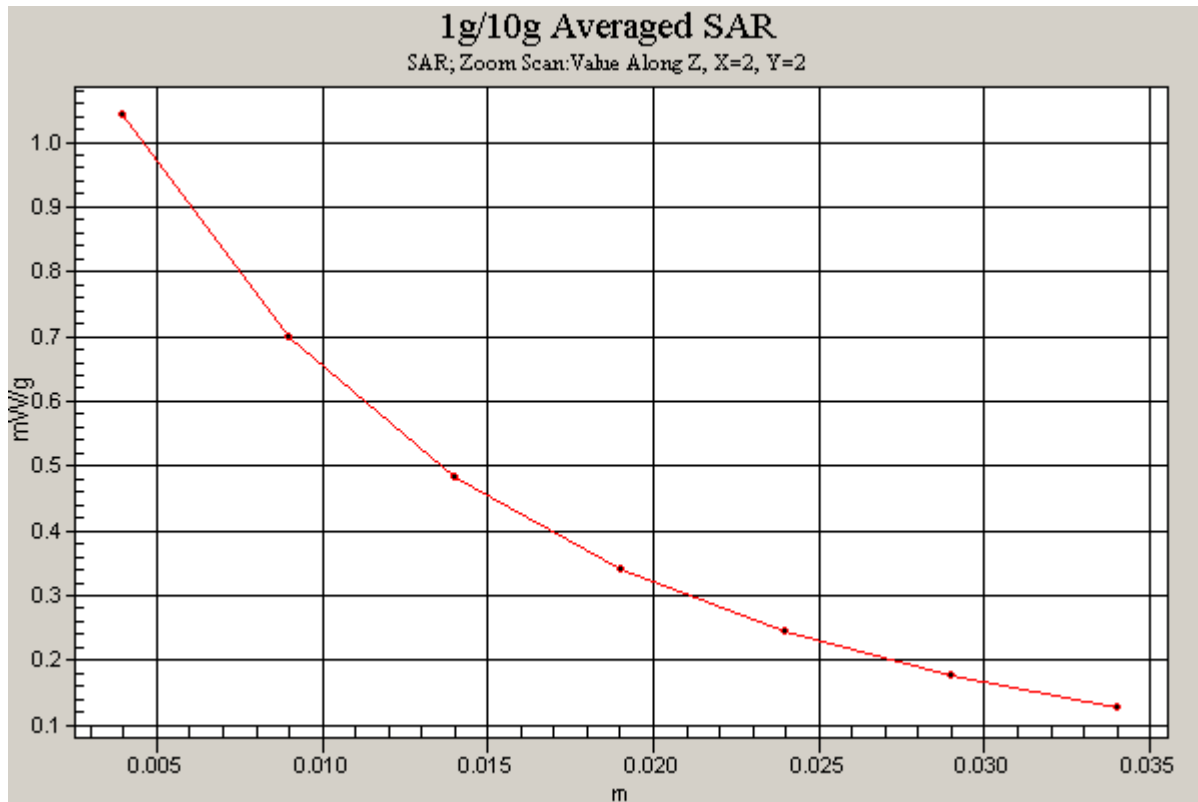
Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 0.964 mW/g; SAR(10 g) = 0.629 mW/g

Deviation = -2.13 %



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.967 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-31-2011; Ambient Temp: 24.4 °C; Tissue Temp: 22.5 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

835MHz System Verification

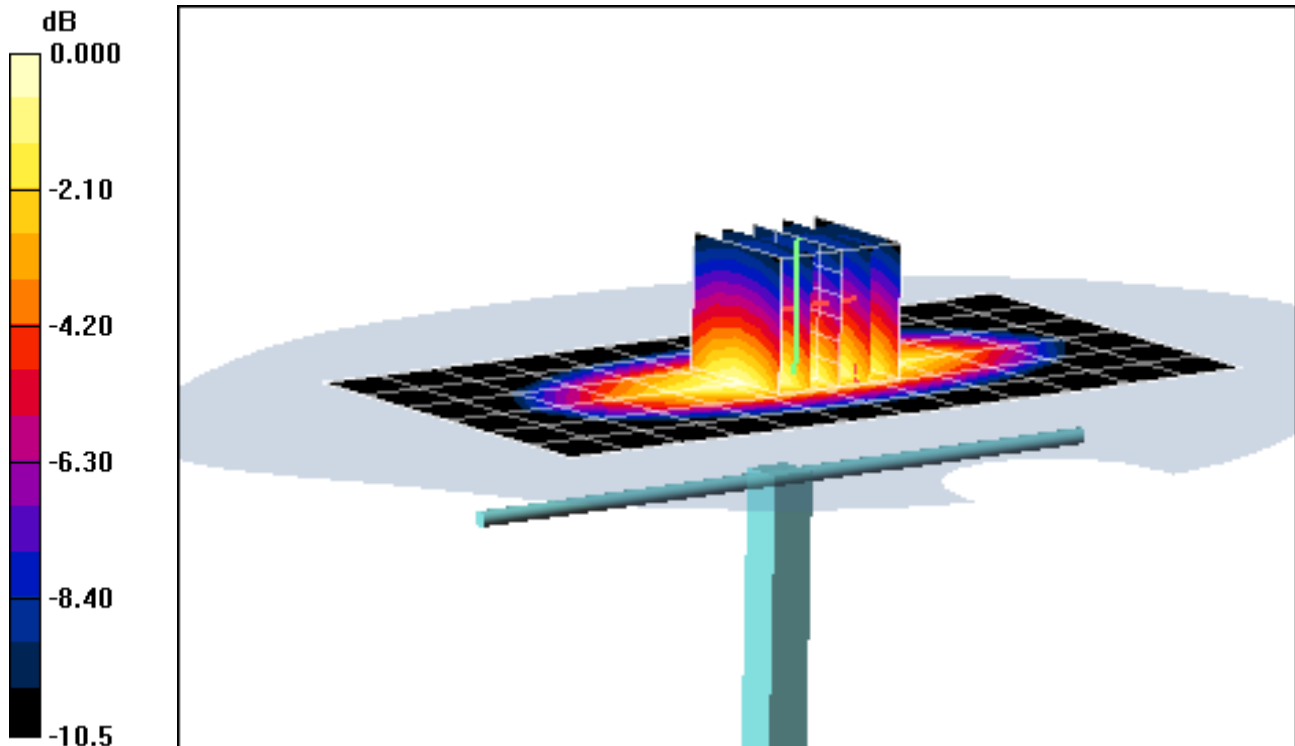
Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.656 mW/g

Deviation = 2.54 %



0 dB = 1.09mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.967 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-31-2011; Ambient Temp: 24.4 °C; Tissue Temp: 22.5 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

835MHz System Verification

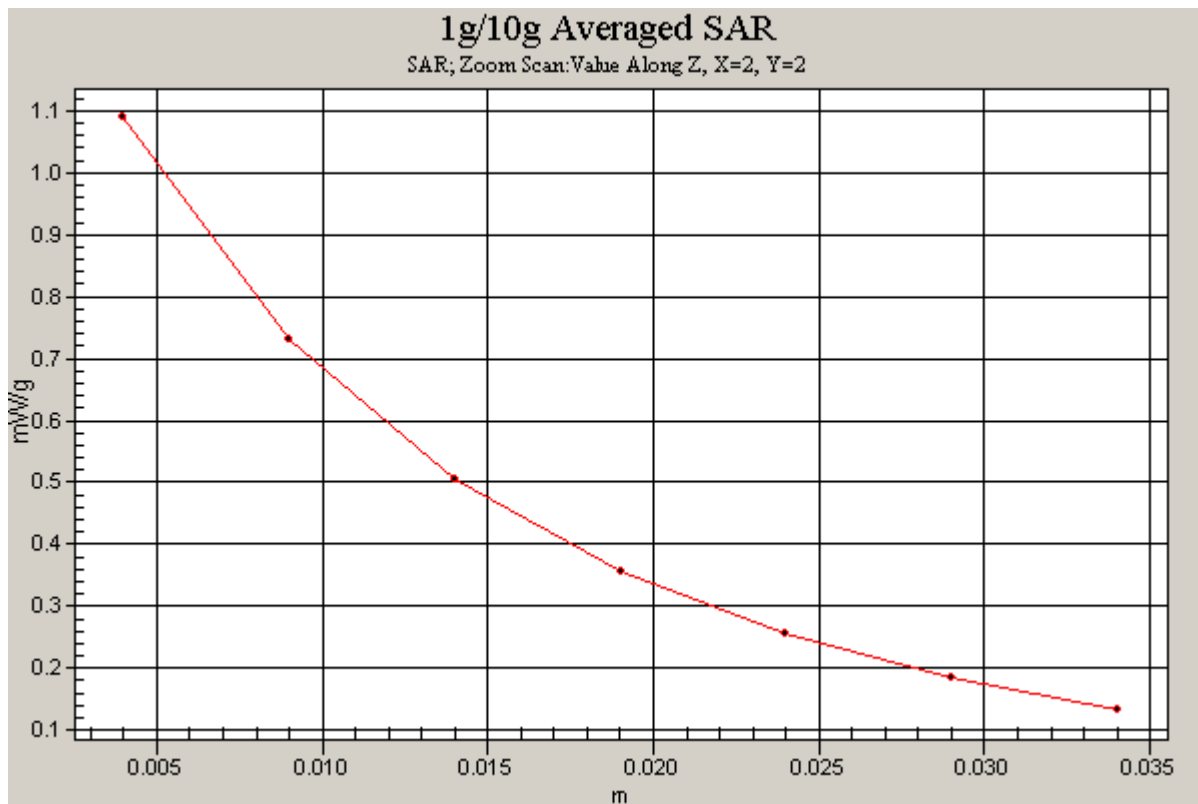
Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.656 mW/g

Deviation = 2.54 %



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1051

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.527 \text{ mho/m}$; $\epsilon_r = 53.05$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-01-2011; Ambient Temp: 23.9 °C; Tissue Temp: 22.3 °C

Probe: EX3DV4 - SN3561; ConvF(7.14, 7.14, 7.14); Calibrated: 7/27/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

1750 MHz System Verification

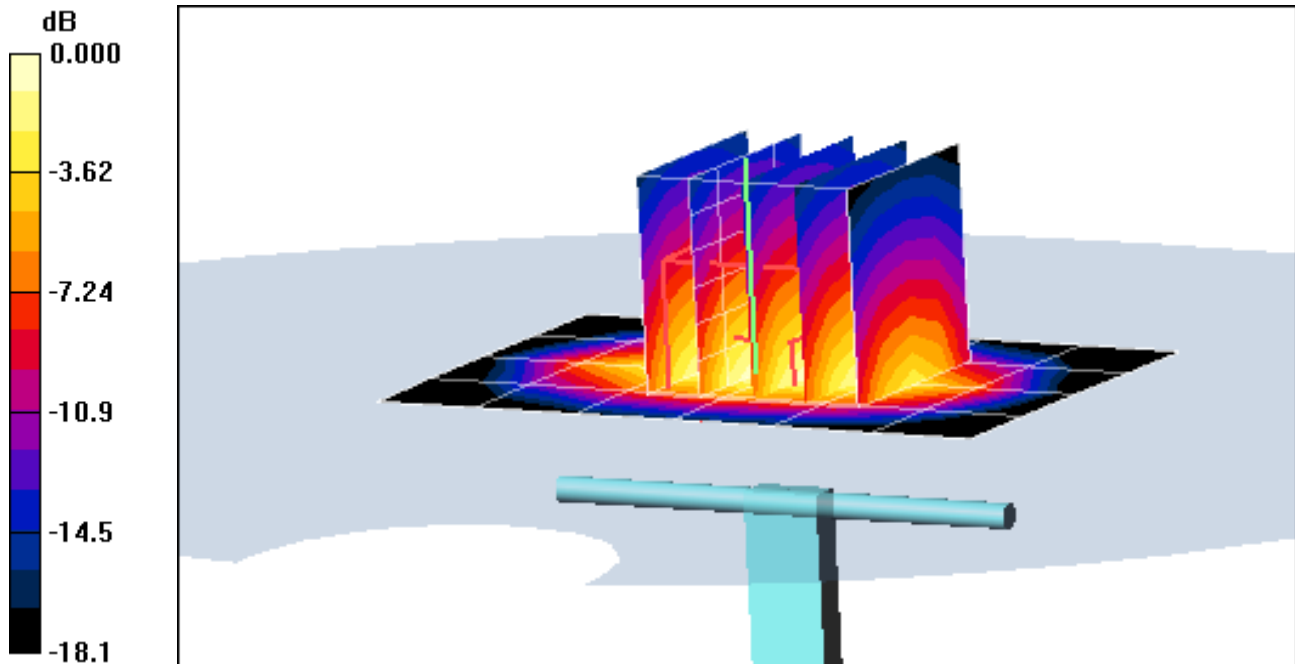
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 16.0 dBm (40 mW)

SAR(1 g) = 1.51 mW/g; SAR(10 g) = 0.782 mW/g

Deviation = 2.03 %



0 dB = 1.68mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1051

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.527 \text{ mho/m}$; $\epsilon_r = 53.05$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-01-2011; Ambient Temp: 23.9 °C; Tissue Temp: 22.3 °C

Probe: EX3DV4 - SN3561; ConvF(7.14, 7.14, 7.14); Calibrated: 7/27/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

1750 MHz System Verification

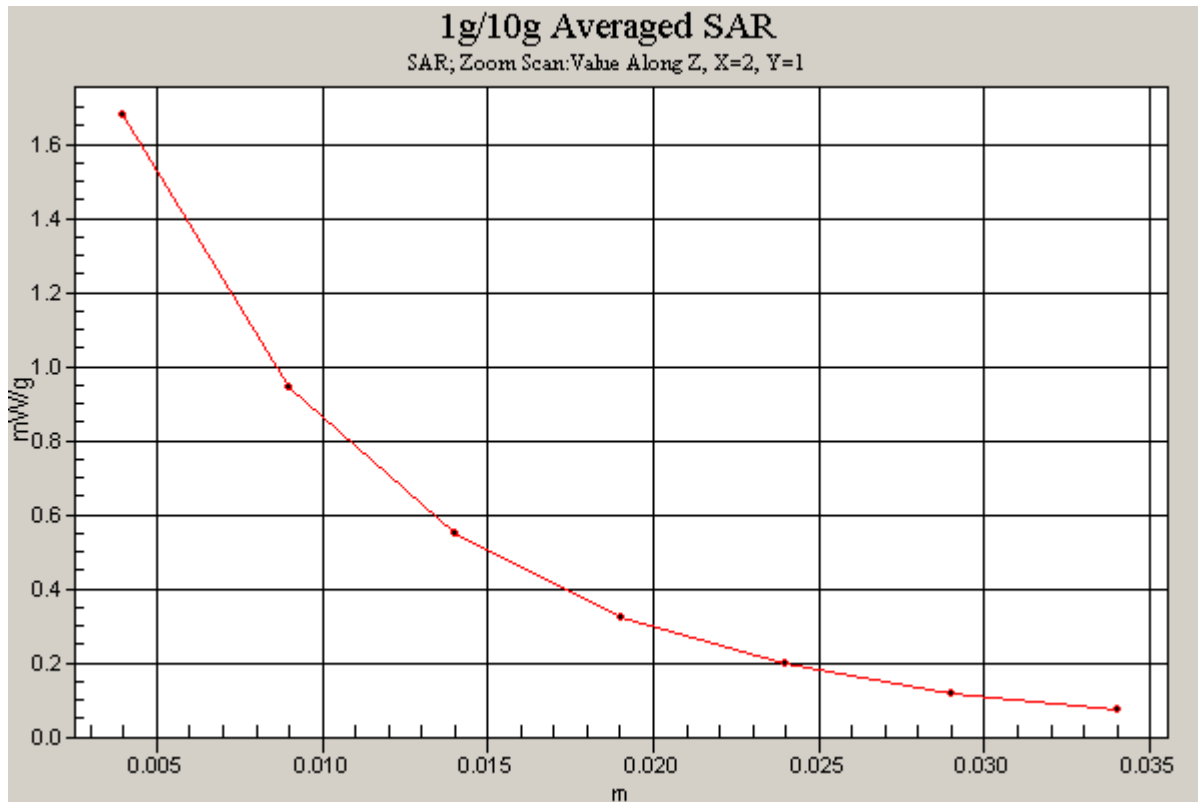
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 16.0 dBm (40 mW)

SAR(1 g) = 1.51 mW/g; SAR(10 g) = 0.782 mW/g

Deviation = 2.03 %



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):

$f = 1900 \text{ MHz}$; $\sigma = 1.58 \text{ mho/m}$; $\epsilon_r = 51.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-24-2011; Ambient Temp: 23.1°C; Tissue Temp: 21.8°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

1900MHz System Verification

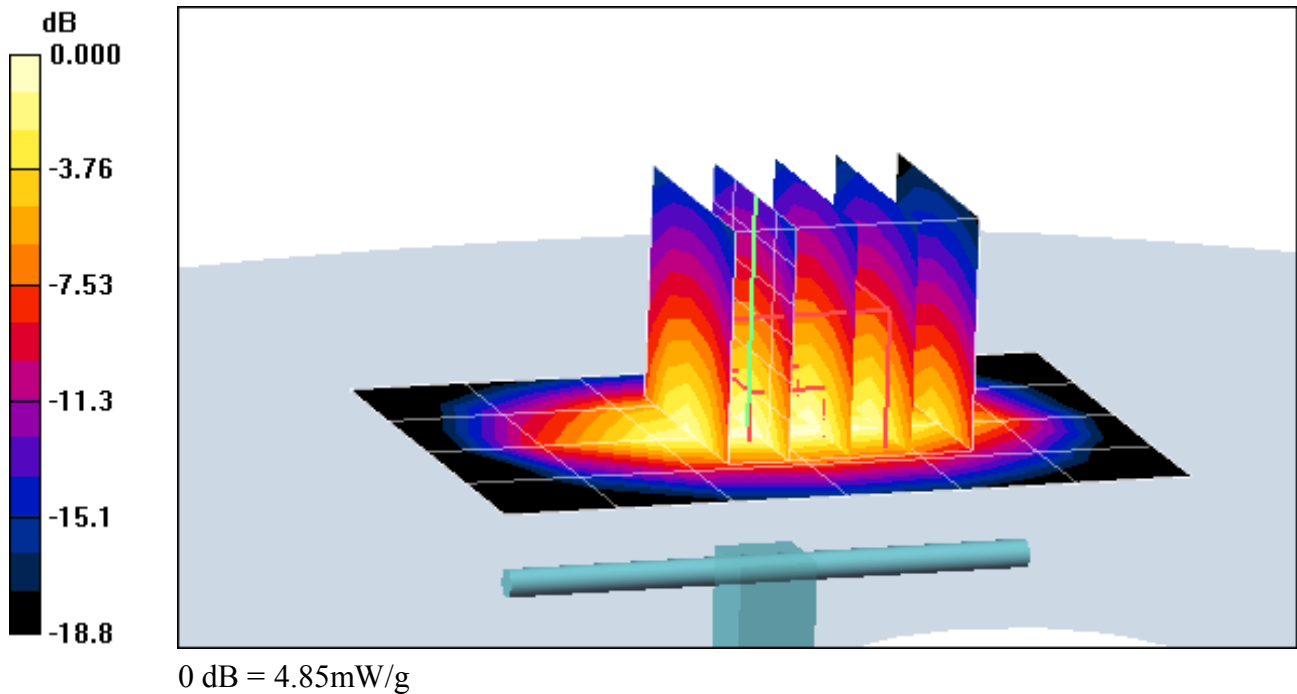
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 4.36 mW/g; SAR(10 g) = 2.3 mW/g

Deviation = 6.08 %



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):

$f = 1900 \text{ MHz}$; $\sigma = 1.58 \text{ mho/m}$; $\epsilon_r = 51.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-24-2011; Ambient Temp: 23.1°C; Tissue Temp: 21.8°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

1900MHz System Verification

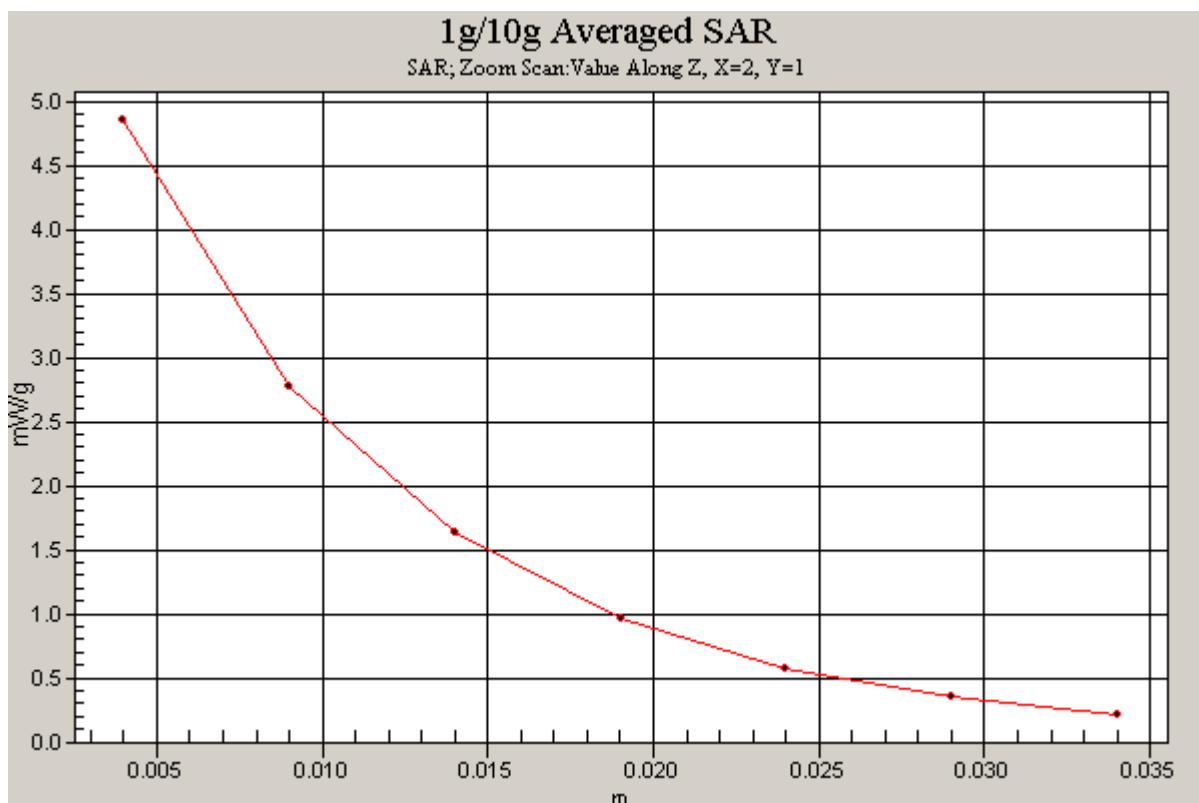
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 4.36 mW/g; SAR(10 g) = 2.3 mW/g

Deviation = 6.08 %



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):

$f = 1900 \text{ MHz}$; $\sigma = 1.57 \text{ mho/m}$; $\epsilon_r = 53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-03-2011; Ambient Temp: 24.6 °C; Tissue Temp: 22.8 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

1900MHz System Verification

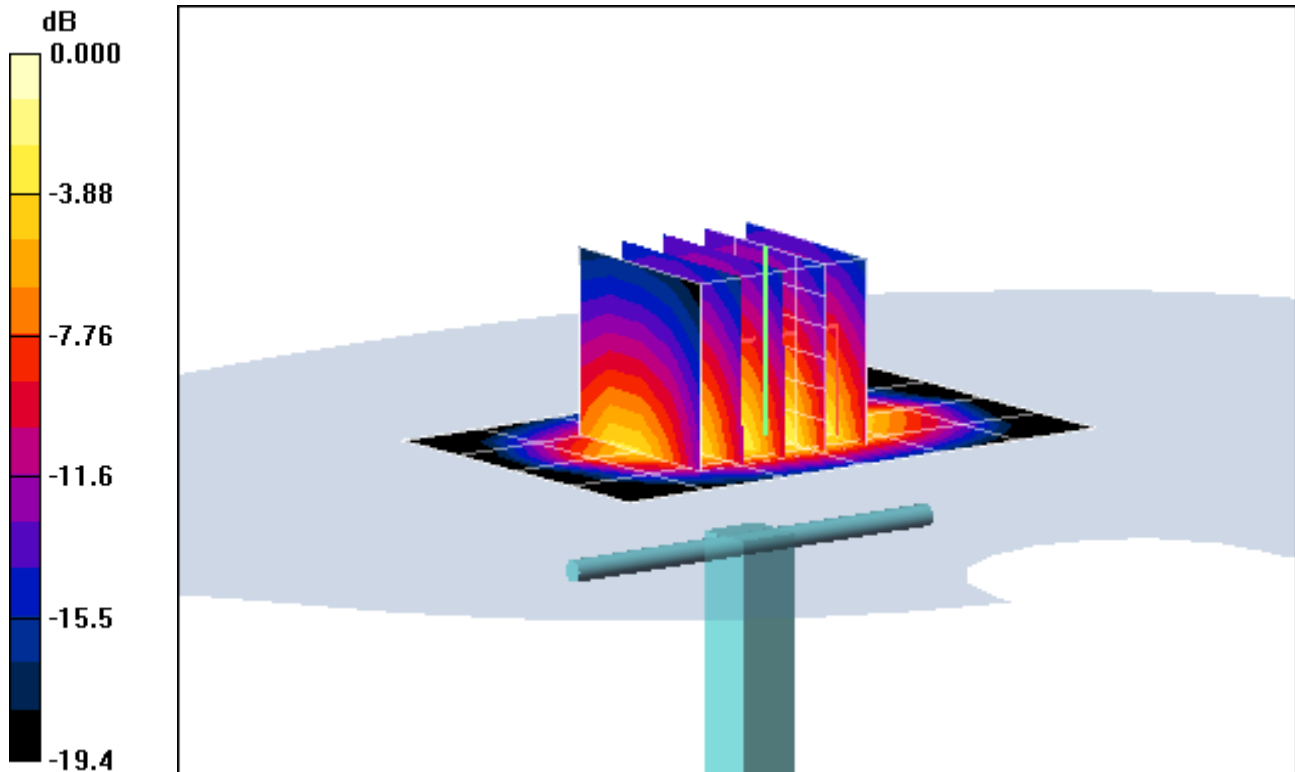
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 16.0 dBm (40 mW)

SAR(1 g) = 1.68 mW/g; SAR(10 g) = 0.868 mW/g

Deviation = 2.19 %



0 dB = 1.76mW/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):

$f = 1900 \text{ MHz}$; $\sigma = 1.57 \text{ mho/m}$; $\epsilon_r = 53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-03-2011; Ambient Temp: 24.6 °C; Tissue Temp: 22.8 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

1900MHz System Verification

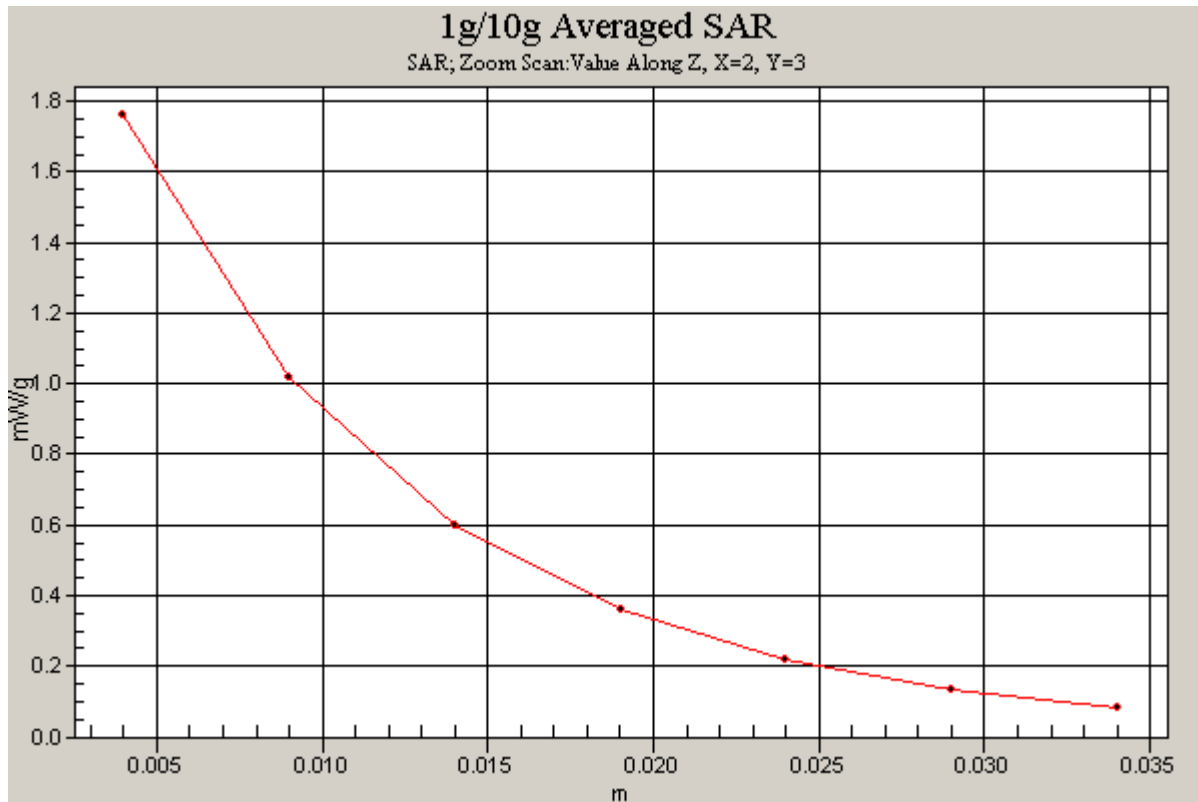
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 16.0 dBm (40 mW)

SAR(1 g) = 1.68 mW/g; SAR(10 g) = 0.868 mW/g

Deviation = 2.19 %



PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 2450 MHz; Type: D2450V2; Serial: 797

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

Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.94 \text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-24-2011; Ambient Temp: 24.3°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3561; ConvF(6.26, 6.26, 6.26); Calibrated: 7/27/2011

Sensor-Surface: 3mm (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

2450MHz System Verification

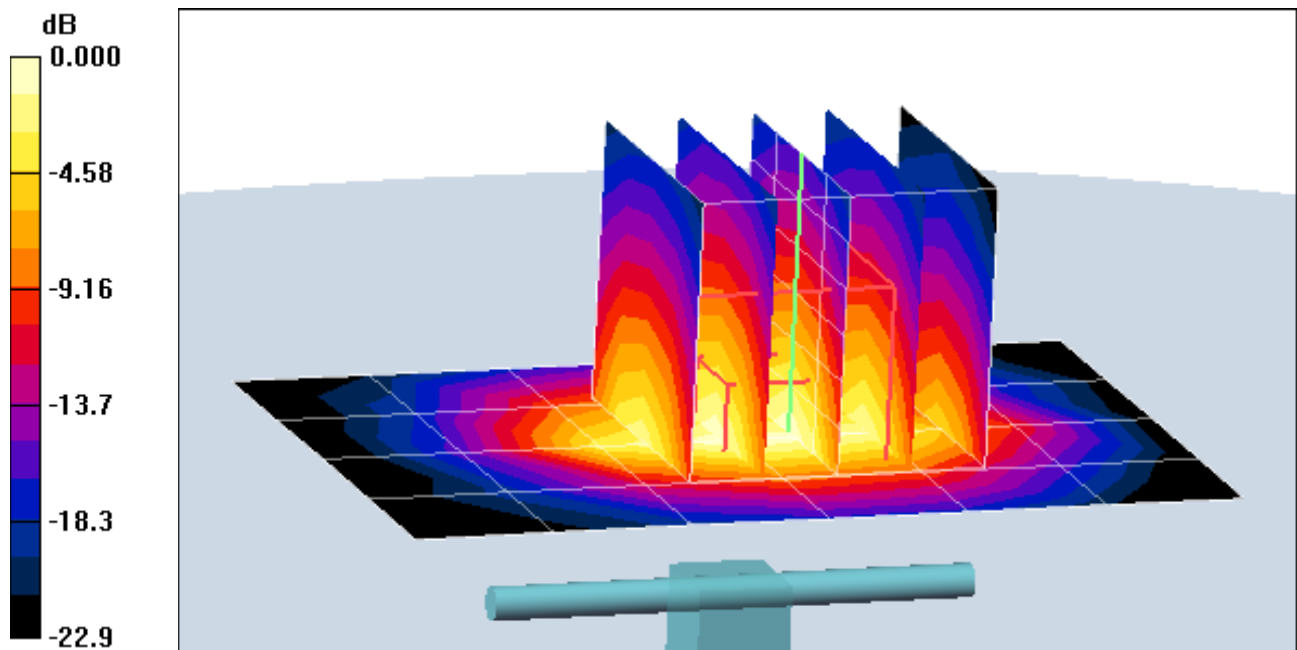
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 14 dBm (25 mW)

SAR(1 g) = 1.3 mW/g; SAR(10 g) = 0.595 mW/g

Deviation = -0.57 %



0 dB = 1.68mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 2450 MHz; Type: D2450V2; Serial: 797

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

Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.94 \text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-24-2011; Ambient Temp: 24.3°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3561; ConvF(6.26, 6.26, 6.26); Calibrated: 7/27/2011

Sensor-Surface: 3mm (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

2450MHz System Verification

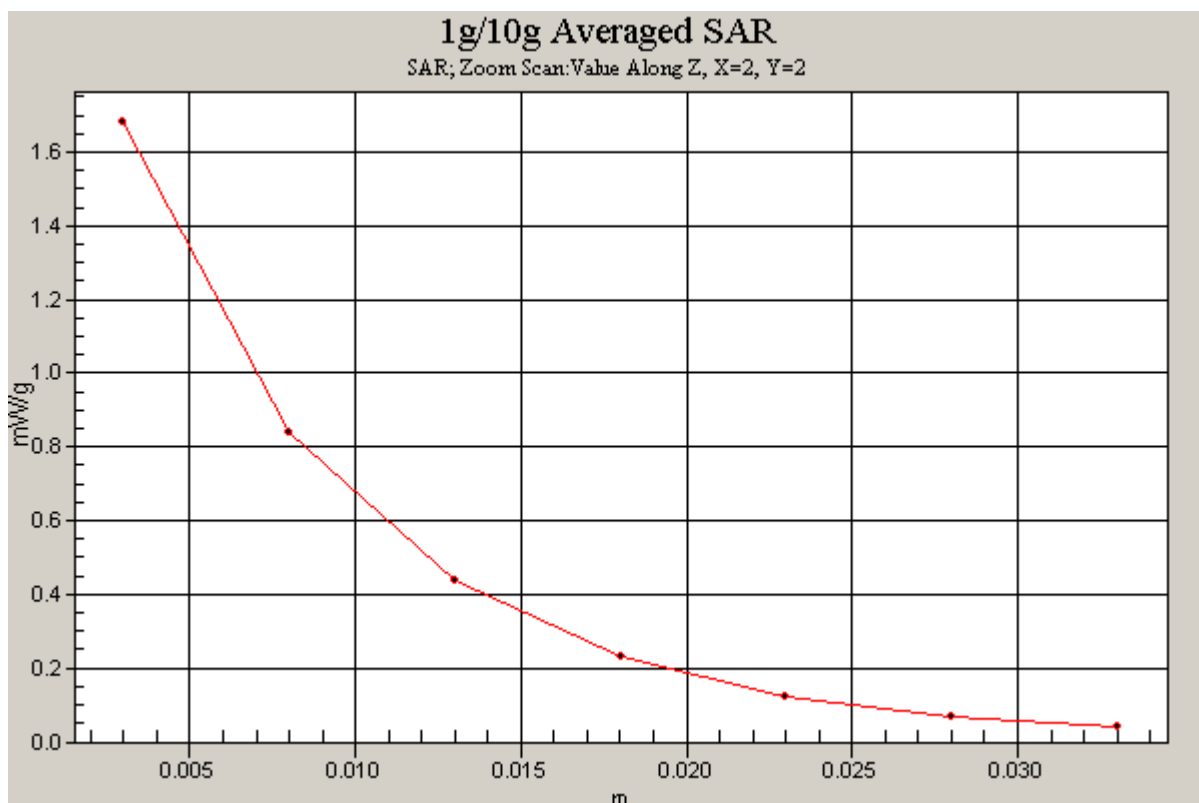
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 14 dBm (25 mW)

SAR(1 g) = 1.3 mW/g; SAR(10 g) = 0.595 mW/g

Deviation = -0.57 %



APPENDIX C: PROBE CALIBRATION



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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

Client **PC Test**

Certificate No: **ES3-3209_Apr11**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3209**

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

Calibration date: **April 18, 2011**

✓ KOK
4/12/11

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

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

Calibration Equipment used (M&TE critical for calibration)

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

Calibrated by:	Name Jeton Kastrati	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature

Issued: April 18, 2011

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



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below **ConvF**).
- NORM(f)_{x,y,z}** = NORM_{x,y,z} * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of **ConvF**.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}** are numerical linearization parameters in dB assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media.
- VR**: VR is the validity range of the calibration related to the average diode voltage or DAE voltage in mV.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * ConvF whereby the uncertainty corresponds to that given for **ConvF**. A frequency dependent **ConvF** is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV3

SN:3209

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

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

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

Basic Calibration Parameters

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

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc ^E (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	116.0	$\pm 3.0 \%$
			Y	0.00	0.00	1.00	118.9	
			Z	0.00	0.00	1.00	103.8	

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

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

^B Numerical linearization parameter: uncertainty not required.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.42	6.42	6.42	0.99	1.10	± 12.0 %
835	41.5	0.90	6.17	6.17	6.17	0.99	1.10	± 12.0 %
1750	40.1	1.37	5.33	5.33	5.33	0.99	1.12	± 12.0 %
1900	40.0	1.40	5.11	5.11	5.11	0.99	1.09	± 12.0 %
2450	39.2	1.80	4.52	4.52	4.52	0.84	1.21	± 12.0 %
2600	39.0	1.96	4.35	4.35	4.35	0.74	1.32	± 12.0 %

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

^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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

Calibration Parameter Determined in Body Tissue Simulating Media

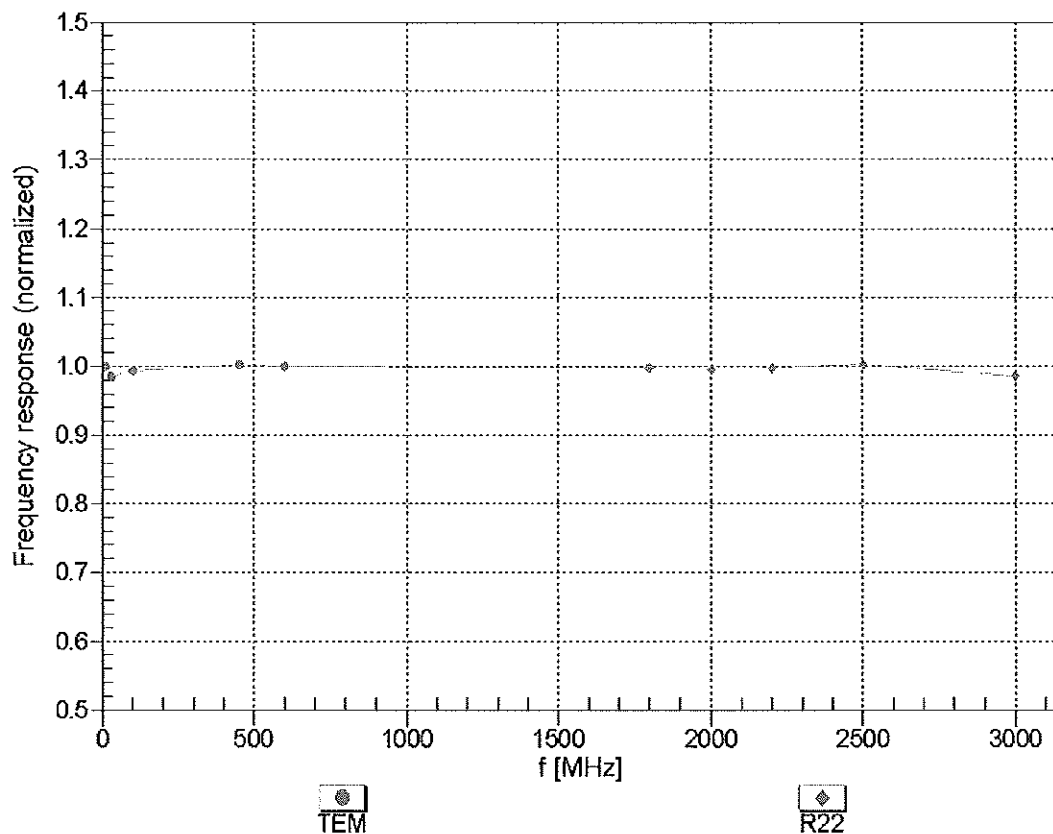
f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	7.06	7.06	7.06	0.11	1.00	± 13.4 %
750	55.5	0.96	6.18	6.18	6.18	0.99	1.15	± 12.0 %
835	55.2	0.97	6.15	6.15	6.15	0.99	1.12	± 12.0 %
1640	53.8	1.40	5.18	5.18	5.18	0.89	1.25	± 12.0 %
1750	53.4	1.49	4.75	4.75	4.75	0.81	1.31	± 12.0 %
1900	53.3	1.52	4.48	4.48	4.48	0.95	1.19	± 12.0 %
2450	52.7	1.95	4.15	4.15	4.15	0.99	1.04	± 12.0 %
2600	52.5	2.16	4.00	4.00	4.00	0.88	1.15	± 12.0 %

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

^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

Frequency Response of E-Field

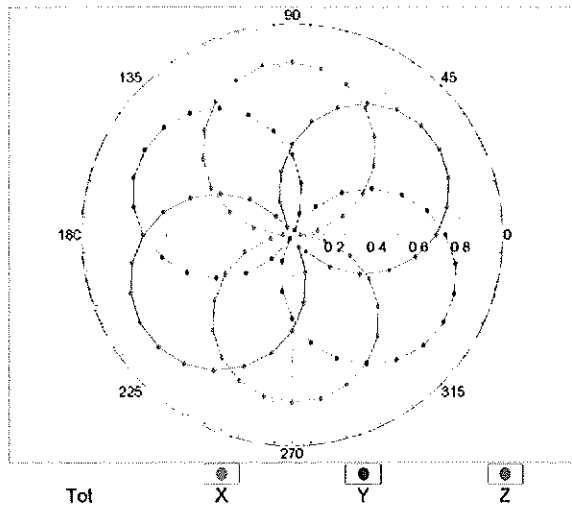
(TEM-Cell:ifi110 EXX, Waveguide: R22)



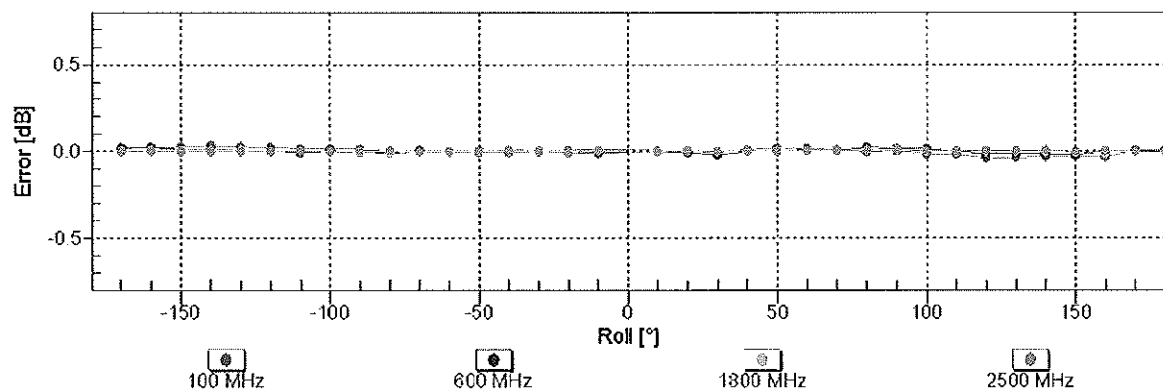
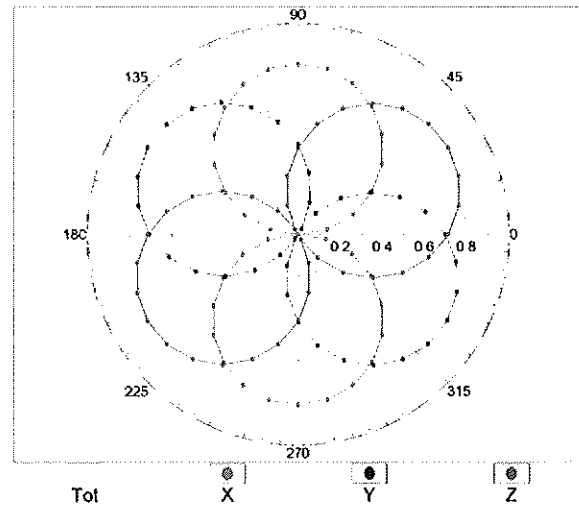
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

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

f=600 MHz,TEM

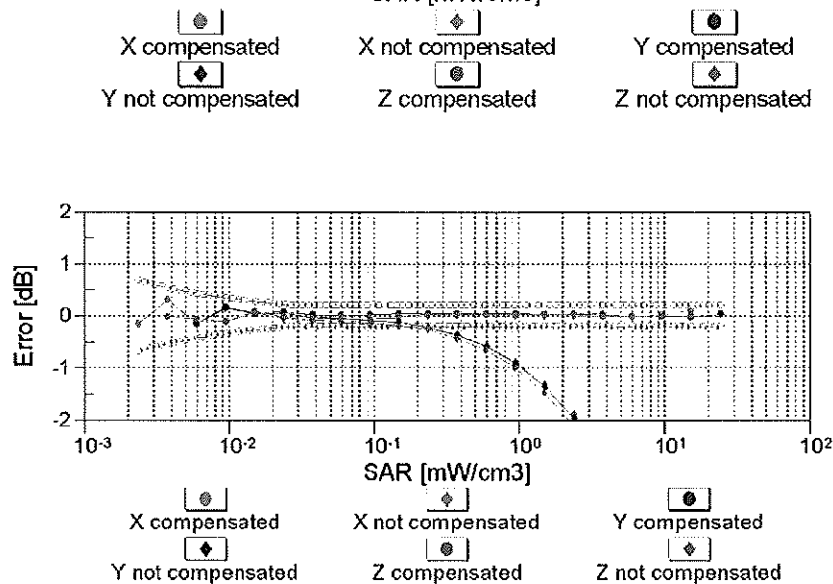
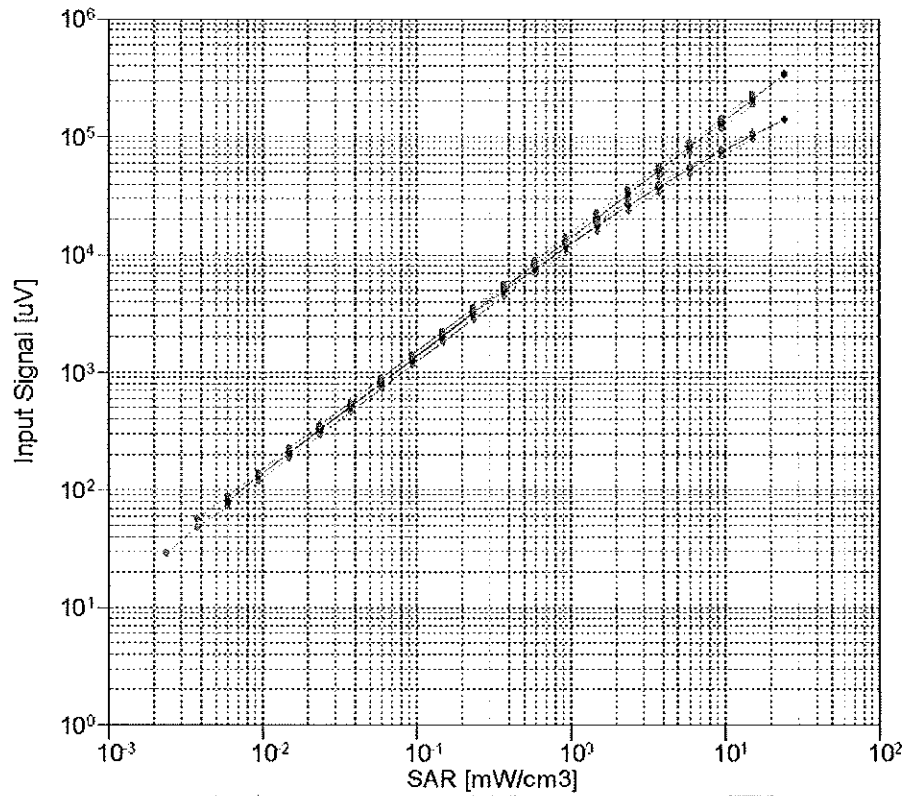


f=1800 MHz,R22



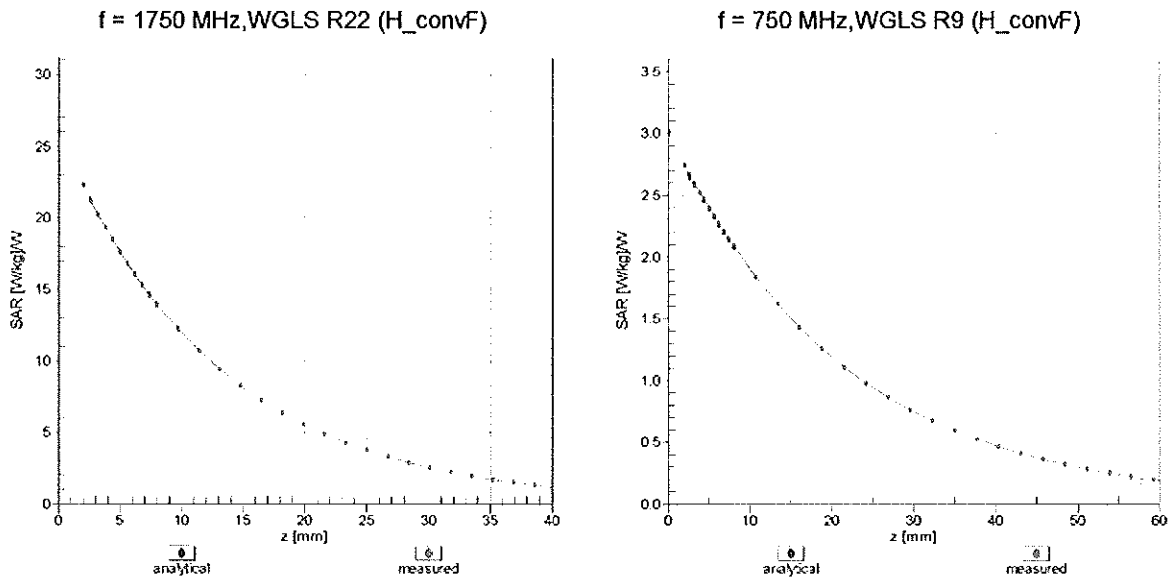
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range $f(\text{SAR}_{\text{head}})$ (TEM cell , $f = 900 \text{ MHz}$)



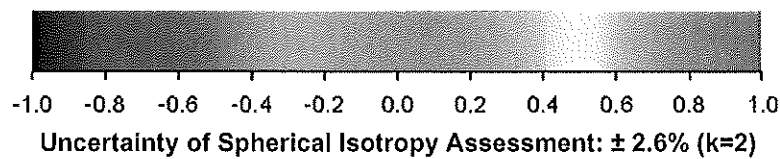
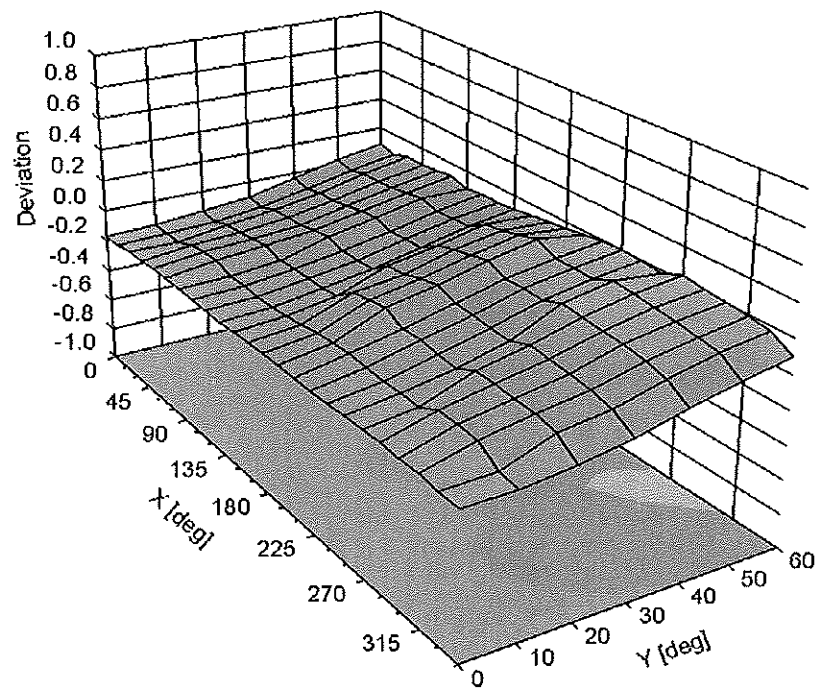
Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, θ), $f = 900 \text{ MHz}$



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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

Additional Conversion Factors

for Dosimetric E-Field Probe

Type:

ES3DV3

Serial Number:

3209

Place of Assessment:

Zurich

Date of Assessment:

April 20, 2011

Probe Calibration Date:

April 18, 2011

Schmid & Partner Engineering AG hereby certifies that conversion factor(s) of this probe have been evaluated on the date indicated above. The assessment was performed using the FDTD numerical code SEMCAD of Schmid & Partner Engineering AG. The evaluation is coupled with measured conversion factors (probe calibration date indicated above). The uncertainty of the numerical assessment is based on the extrapolation from measured value at 835 MHz or at 1750 MHz.

Assessed by:



Dosimetric E-Field Probe ES3DV3 SN:3209

Conversion factor ($\pm$ standard deviation)

550 $\pm$ 50 MHz *ConvF* 6.7 $\pm$ 7%

$\epsilon_r = 56.3 \pm 5\%$
 $\sigma = 0.95 \pm 5\%$ mho/m
(body tissue)

650 $\pm$ 50 MHz *ConvF* 6.3 $\pm$ 7%

$\epsilon_r = 55.9 \pm 5\%$
 $\sigma = 0.95 \pm 5\%$ mho/m
(body tissue)

Important Note:

For numerically assessed probe conversion factors, parameters Alpha and Delta in the DASY software must have the following entries: Alpha = 0 and Delta = 1.

Please see also DASY Manual.