



SAR EVALUATION REPORT

Applicant Name:

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

Date of Testing:

02/21/12 - 02/28/12

Test Site/Location:

PCTEST Lab, Columbia, MD, USA

Document Serial No.:

OY1202210211.A3L

FCC ID:

A3LSCHR820

APPLICANT:

SAMSUNG ELECTRONICS, CO. LTD.

DUT Type:

Portable Handset

Application Type:

Certification

FCC Rule Part(s):

CFR §2.1093

Model(s):

SCH-R820

Band & Mode	Tx Frequency	Conducted Power [dBm]	SAR		
			1 gm Head (W/kg)	1 gm Body-Worn (W/kg)	1 gm Hotspot (W/kg)
Cell. CDMA/EVDO	824.70 - 848.31 MHz	24.94	0.17	0.48	0.48
AWS CDMA/EVDO	1711.25 - 1753.75 MHz	24.74	0.43	0.68	0.68
PCS CDMA/EVDO	1851.25 - 1908.75 MHz	24.57	0.45	0.56	0.56
LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	23.50	0.78	0.62	0.62
LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	23.30	0.55	0.36	0.37
2.4 GHz WLAN	2412 - 2462 MHz	17.83	0.20	0.17	0.17
Bluetooth	2402 - 2480 MHz	12.34	N/A		
Simultaneous SAR per KDB 690783 D01:			1.27	1.47	1.47

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

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

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


Randy Ortanez
President



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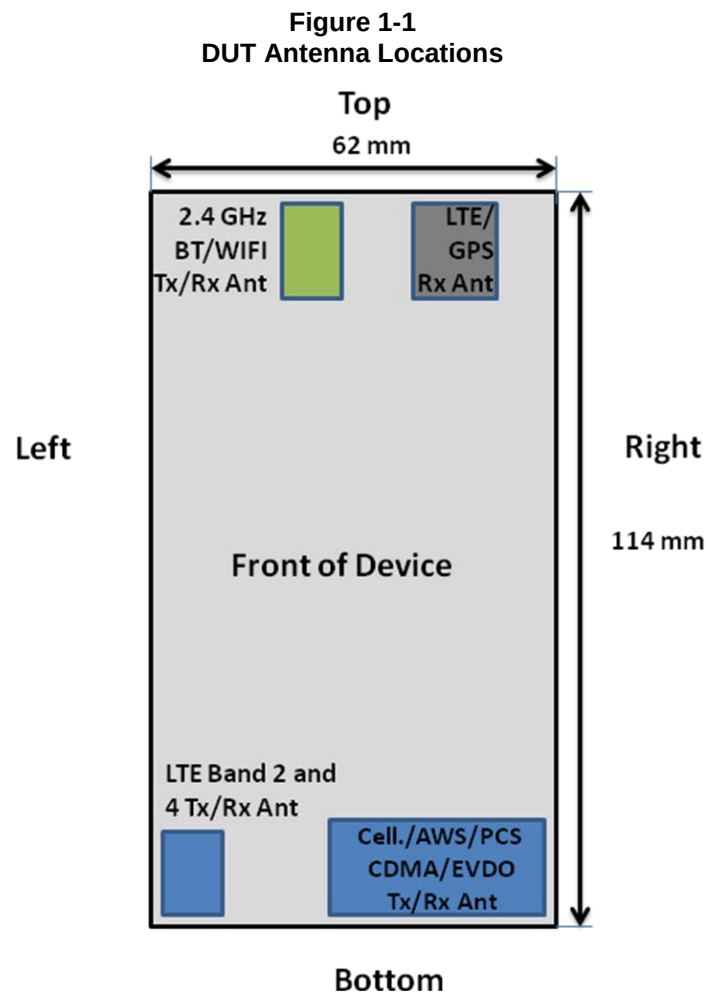
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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Tx Frequency
Cell. CDMA/EVDO	824.70 - 848.31 MHz
AWS CDMA/EVDO	1711.25 - 1753.75 MHz
PCS CDMA/EVDO	1851.25 - 1908.75 MHz
LTE Band 4 (AWS)	1710.7 - 1754.3 MHz
LTE Band 2 (PCS)	1850.7 - 1909.3 MHz
2.4 GHz WLAN	2412 - 2462 MHz
Bluetooth	2402 - 2480 MHz

1.2 DUT Antenna Locations



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Table 1-1
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
AWS CDMA	Yes	Yes	No	Yes	Yes	No
PCS CDMA	Yes	Yes	No	Yes	Yes	No
LTE Band 4 (AWS)	Yes	Yes	No	Yes	No	Yes
LTE Band 2 (PCS)	Yes	Yes	No	Yes	No	Yes
2.4 GHz WLAN	Yes	Yes	Yes	No	No	Yes

Note: Particular DUT edges were not required to be evaluated for Wireless Router SAR if the edges were

greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06 guidance, page 2. The antenna document shows the distances between the transmit antennas and the edges of the device.

1.3 Simultaneous Transmission Capabilities

According to KDB 648474, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the DUT are shown in Figure 1-2 and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another, for example Bluetooth and WIFI cannot transmit simultaneously.



Figure 1-2
Simultaneous Transmission Paths

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

Table 1-2
Simultaneous Transmission Scenarios

No.	Capable Tx Configurations	Head	Body-Worn Accessory	Hot Spot	Note
		IEEE 1528, Supp C	Supp C	FCC KDB 941225 D06	
1	850/1700/1900MHz CDMA Voice + Wi-Fi 2.4GHz	Yes	10mm	N/A	
2	850/1700/1900MHz CDMA Voice + LTE Data	Yes	10mm	N/A	
3	LTE Voice/Data + Wi-Fi 2.4GHz	Yes	10mm	Yes	VoLTE and LTE Data over a single physical channel with shared via RB allocation
4	850/1700/1900MHz CDMA Voice + Wi-Fi 2.4GHz + LTE Data	Yes	10mm	Yes	1X Voice + LTE Hotspot
5	850/1700/1900MHz CDMA Voice + EVDO Data				Not Supported by H/W
6	850/1700/1900MHz 1X RTT + Wi-Fi 2.4GHz				Not Supported by S/W (2G Hotspot)
7	850/1700/1900MHz EVDO + Wi-Fi 2.4GHz				Not Supported by S/W (3G Hotspot)

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1.4 SAR Test Exclusions Applied

(A) WIFI/BT

The separation between the CDMA antenna and the Bluetooth and WLAN antenna is 90 mm.
The separation between the LTE antenna and the Bluetooth and WLAN antenna is 91 mm.
The maximum peak RF Conducted Power of Bluetooth Tx is 17.14 mW (please reference the DSS EMC report filed for the EUT for a complete set of Bluetooth powers).
RF Conducted Power of WLAN is 60.674 mW.

2.4 GHz WIFI and Bluetooth share the same antenna path and cannot transmit simultaneously.

Per KDB Publication 648474, **Bluetooth SAR was not required** based on the maximum conducted power, the Bluetooth/WLAN to main antenna separation distance and Body-SAR of the main antenna.

(B) Licensed Transmitter(s)

LTE SAR for the lower BWs was not tested since the maximum average output power of all channels and configurations was not more than 0.5 dB higher than the highest bandwidth; and LTE SAR for the highest BW was less than 1.45 W/kg for all configurations according to FCC KDB 941225 D05.

2G/3G (1xRTT/EVDO) Hotspot is not supported but hotspot configurations were tested for 1xRTT to address the CDMA Voice + LTE WIFI Hotspot simultaneous transmission scenario.

1.5 Power Reduction for SAR

There is no power reduction for any band/mode implemented in this device for SAR purposes.

1.6 FCC Guidance Applied

- FCC OET Bulletin 65 Supplement C [June 2001]
- IEEE 1528-2003
- FCC KDB 941225 (2G/3G/4G and Hotspot)
- FCC KDB 248227 (802.11)
- FCC KDB 648474 (Simultaneous)

1.7 Samples Used for SAR Testing

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

Table 1-3
SAR Test Sample Serial Numbers

Band	LTE Band 2	LTE Band 4	CDMA/EVDO	2.4 GHz WIFI
Serial Number	LTE B2	LTE B4	1x #3	WIFI SAR 4

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KDB 941225 Pub LTE Information				
KDB 941225 Section	FCC ID	A3LSCHR820		
	Form Factor	Handset		
1)	Frequency Range of each LTE transmission band	Band 2: 1850.7 - 1909.3 MHz Band 4: 1710.7 - 1754.3 MHz		
2)	Channel Bandwidths	Band 2: 1.4 MHz, 3 MHz, 5 MHz Band 4: 1.4 MHz, 3 MHz, 5 MHz		
3)	Channel Numbers and Frequencies (MHz)	Low	Mid	High
	Band 2, 1.4 MHz BW	1850.7 MHz (18607)	1880 MHz (18900)	1909.3 MHz (19193)
	Band 2, 3 MHz BW	1851.5 MHz (18615)	1880 MHz (18900)	1908.5 MHz (19185)
	Band 2, 5 MHz BW	1852.5 MHz (18625)	1880 MHz (18900)	1907.5 MHz (19175)
	Band 4, 1.4 MHz BW	1710.7 MHz (19957)	1732.5 MHz (20175)	1754.3 MHz (20393)
	Band 4, 3 MHz BW	1711.5 MHz (19965)	1732.5 MHz (20175)	1753.5 MHz (20385)
	Band 4, 5 MHz BW	1712.5 MHz (19975)	1732.5 MHz (20175)	1752.5 MHz (20375)
4)(a)	UE Category	UE category 3		
(b)	Modulations Supported in UL	QPSK, 16QAM		
	LTE Transmitter and Antenna Implementation	CDMA and LTE have separate transmission paths		
5)	Description of LTE Tx and Ant. Implementation	1 TX/RX Ant, 1 RX Ant		
6)	LTE Voice available?	Yes		
	Hotspot with LTE+WIFI	Yes		
	Hotspot with LTE+WIFI active with 1XVoice sessions?	Yes		
7)	LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	Yes		
	A-MPR (Additional MPR) disabled for SAR Testing?	Yes		
8)	Conducted power Table provided for 1RB (low and high offset), 50% RB (centered), 100% RB	Yes		
9-10)	Non-LTE US Wireless Operating Modes/Band	RF Output Power	RF Exposure Configurations	
	Cell. CDMA	See page 1	Head, Body-Worn	
	AWS CDMA		Head, Body-Worn	
	PCS CDMA		Head, Body-Worn	
	Bluetooth		Body-Worn	
	2.4 GHz WLAN		Head, Body-Worn, and Hotspot	
11)	Simultaneous Tx Conditions (Voice and Data Configurations)	See section 1.3		
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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3

INTRODUCTION

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

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

3.1 SAR Definition

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Equation 3-1).

Equation 3-1
SAR Mathematical Equation

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

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

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

where:

- σ = conductivity of the tissue-simulating material (S/m)
- ρ = mass density of the tissue-simulating material (kg/m^3)
- E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relation to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.[6]

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4 SAR MEASUREMENT SETUP

4.1 Automated SAR Measurement System

Measurements are performed using the DASY automated dosimetric SAR assessment system. The DASY 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 www.speag.com for more information about the specification of the SAR assessment system.



Figure 4-1
SAR Measurement System



Figure 4-2
Near-Field Probe

Table 4-1
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

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5 DOSIMETRIC ASSESSMENT

5.1 Measurement Procedure

The evaluation was performed using the following procedure:

1. The SAR distribution at the exposed side of the head or body 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 device-head interface and the horizontal grid resolution was 15mm and 15mm for frequencies < 3 GHz in the x and y directions respectively. When applicable, for frequencies above 3 GHz, a 10 mm by 10 mm resolution was used.
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 the 1 gram cube evaluation. SAR at this fixed point was measured and used as a reference value.
3. Based on the area scan data, the peak 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 at least 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 online 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 to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

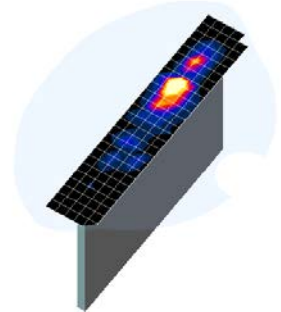


Figure 5-1
Sample SAR Area Scan

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6

DEFINITION OF REFERENCE POINTS

6.1 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 6-2). 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].

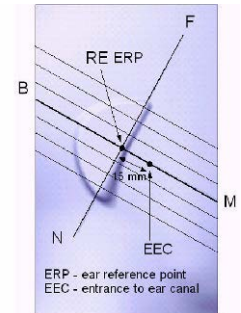


Figure 6-1
Close-Up Side view
of ERP

6.2 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 6-3). 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 it’s top and bottom edges, positioning the “ear reference point” on the outer surface of the both the left and right head phantoms on the ear reference point.



Figure 6-2
Front, back and side view of SAM Twin Phantom

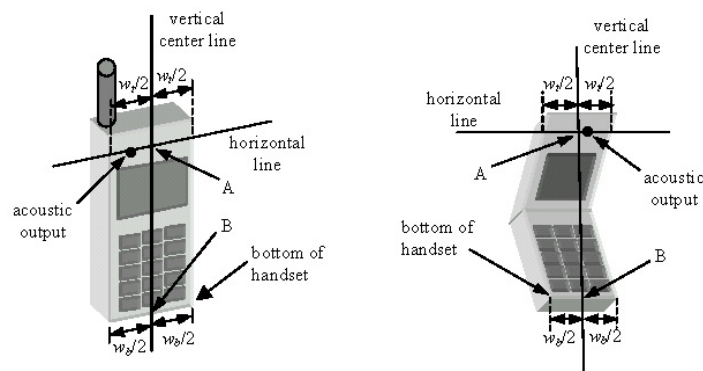


Figure 6-3
Handset Vertical Center & Horizontal Line Reference Points

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7 TEST CONFIGURATION POSITIONS FOR HANDSETS

7.1 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 $\delta = 0.02$.

7.2 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 7-1), 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.

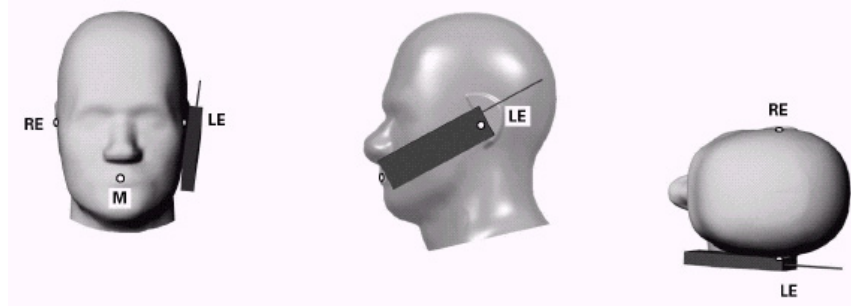


Figure 7-1 Front, Side and Top View of Cheek/Touch Position

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 7-2).

7.3 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 7-2).

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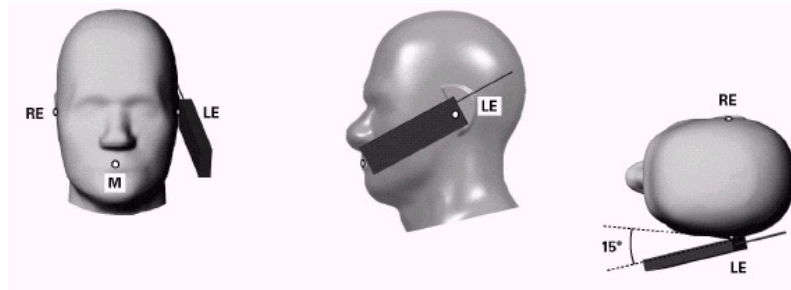


Figure 7-2 Front, Side and Top View of Ear/15° Tilt Position

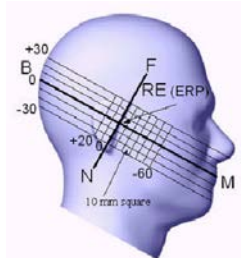


Figure 7-3
Side view w/ relevant markings



Figure 7-4 Body SAR Sample Photo
(Not Actual EUT)

7.4 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.

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 $\frac{1}{2}$ 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 latest IEEE 1528 committee developments propose the usage of a tilted phantom when the antenna of the phone is mounted at the bottom or in all cases the peak absorption is in the chin region. Both SAM heads of the TwinSAM-Chin20 are rotated 20 degrees around the NF line. Each head can be removed individually from the table for emptying and cleaning.

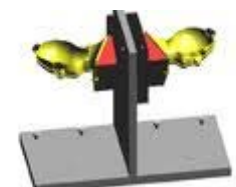


Figure 7-5 Twin SAM
Chin20

7.5 Body-Worn Accessory 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 7-4). A device with a headset output is tested with a headset connected to the device.

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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.

7.6 Wireless Router Configurations

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

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.

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8 FCC RF EXPOSURE LIMITS

8.1 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.

8.2 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 8-1
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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FCC MEASUREMENT PROCEDURES

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

9.1 Procedures Used to Establish RF Signal for SAR

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

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

9.2 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.

9.2.1 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 9-1 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 9-2 was applied.
5. FCHs were configured at full rate for maximum SAR with "All Up" power control bits.

Table 9-1
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 9-2
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

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9.2.2 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, 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.

9.2.3 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.

9.2.4 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. 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.

9.3 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.

9.3.1 MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. 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. See Section 10.2 for MPR targets.

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9.3.2 A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by setting NS=01.

9.3.3 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05:

- a. Per Page 4, 3) A), QPSK with 50% RB is required for the highest bandwidth.
- b. Per Page 4, footnote 2, when the maximum output power across high, mid., and low channels is < 0.5 dB, mid channel is tested. Low and high channel SAR tests are not required for QPSK, 50% RB allocation when the SAR is < 0.8 W/kg.
- c. Per Page 4, 3) B), QPSK with 1 RB for both channel edges are required for the highest bandwidth.
- d. Per Page 4, footnote 6, QPSK 1 RB allocation SAR tests were performed on the highest output power channel for the RB allocation when the average output power of the 1 RB allocation was > 0.5 dB higher than the 50% RB allocation for QPSK. Otherwise, SAR tests are performed on the channel that produced the highest SAR for QPSK with 50% RB. 1 RB low and high offset configurations are considered together for a single channel selection.
- e. Per Page 4, 3) B), I), when the SAR for QPSK 1 RB allocation tests is < 1.45 W/kg, testing on the other channels is not required.
- f. Per Page 4, 4) A), 16QAM with 50% RB is required for the highest bandwidth on the channel with the highest measured SAR for QPSK with 50% RB allocation.
- g. Per Page 4, 4) A), I), when the SAR for 16 QAM, 50 % allocation tests is < 1.45 W/kg, testing on the other channels is not required.
- h. Per Page 4, 4) B) and Page 5 footnote 9, 16QAM with 1RB for both channel edges are required for the highest bandwidth on the highest output power channel for the 1 RB allocation when the average output power of the 1 RB allocation is > 0.5 dB higher than the 50% allocation for 16 QAM. Otherwise, SAR tests are performed on the channel that produced the highest SAR for 16 QAM with 50% RB. 1 RB low and high offset configurations are considered together for a single channel selection.
- i. Per Page 5, 4) B), I), when the SAR for 16 QAM 1 RB allocation tests is < 1.45 W/kg, testing on the other channels is not required.
- j. Per Page 4, 4), A) I) and Page 5, 4), A)I, 100% RB Allocation is not required to be tested when the SAR is not > 1.45 W/kg for the highest bandwidth.
- k. Per Page 5, 5) B) I), smaller bandwidths are not required to be tested when SAR is not > 1.45 W/kg for the highest bandwidth and the maximum average output power of the smaller bandwidths across all channels and configurations is not more than 0.5 dB higher than the higher bandwidths.

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9.4 SAR Testing with 802.11 Transmitters

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. See KDB Publication 248227 for more details.

9.4.1 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.

9.4.2 Frequency Channel Configurations [27]

For 2.4 GHz, the highest average RF output power channel between the low, mid and high channel at the lowest data rate was selected for SAR evaluation in 802.11b mode. 802.11g/n modes and higher data rates for 802.11b were additionally evaluated for SAR if the output power of the respective mode was 0.25 dB or higher than the powers of the SAR configurations tested in the 802.11b mode.

If the maximum extrapolated peak SAR of the zoom scan for the highest output channel was less than 1.6 W/kg or if the 1g averaged SAR was less than 0.8 W/kg, SAR testing was not required for the other test channels in the band.

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10 RF CONDUCTED POWERS

10.1 CDMA Conducted Powers

Band	Channel	Frequency	SO55 [dBm]	SO55 [dBm]	TDSO SO32 [dBm]	TDSO SO32 [dBm]	1x EvDO Rev. 0 [dBm]
	F-RC	MHz	RC1	RC3	FCH+SCH	FCH	(RTAP)
Cellular	1013	824.7	24.98	24.90	24.93	24.94	24.92
	384	836.52	24.92	24.86	24.94	24.93	24.96
	777	848.31	24.27	24.26	24.29	24.33	24.30
AWS	25	1711.25	24.56	24.62	24.60	24.59	24.67
	450	1732.5	24.69	24.74	24.65	24.66	24.75
	875	1753.75	24.56	24.62	24.57	24.58	24.77
PCS	25	1851.25	24.50	24.54	24.51	24.51	24.67
	600	1880	24.51	24.56	24.56	24.57	24.56
	1175	1908.75	24.41	24.44	24.39	24.41	24.48

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

Per KDB Publication 941225 D01:

1. Head SAR was tested with SO55 RC3. SO55 RC1 was not required since the average output power was not more than 0.25 dB than the SO55 RC3 powers.
2. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. Ev-Do and TDSO / SO32 FCH+SCH SAR tests were not required since the average output power was not more than 0.25 dB higher than the TDSO / SO32 FCH only powers.
3. 2G/3G (1xRTT/EVDO) Hotspot is not supported with this device but Hotspot SAR configurations were tested for 1xRTT to address the CDMA Voice + LTE WIFI Hotspot simultaneous transmission scenario.



Figure 10-1
Power Measurement Setup

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10.2 LTE Conducted Powers

10.2.1 LTE Band 4 (AWS)

Table 10-1

LTE Band 4 (AWS) Conducted Powers - 5 MHz Bandwidth

Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	Allowed per 3GPP [dB]
1712.5	19975	5	QPSK	1	0	23.27	0	0
1712.5	19975	5	QPSK	1	24	23.17	0	0
1712.5	19975	5	QPSK	12	6	21.65	1	0-1
1712.5	19975	5	QPSK	25	0	21.92	1	0-1
1712.5	19975	5	16-QAM	1	0	21.91	1	0-1
1712.5	19975	5	16-QAM	1	24	21.97	1	0-1
1712.5	19975	5	16-QAM	12	6	20.80	2	0-2
1712.5	19975	5	16-QAM	25	0	20.64	2	0-2
1732.5	20175	5	QPSK	1	0	23.50	0	0
1732.5	20175	5	QPSK	1	24	23.24	0	0
1732.5	20175	5	QPSK	12	6	22.12	1	0-1
1732.5	20175	5	QPSK	25	0	21.83	1	0-1
1732.5	20175	5	16-QAM	1	0	22.10	1	0-1
1732.5	20175	5	16-QAM	1	24	22.21	1	0-1
1732.5	20175	5	16-QAM	12	6	20.72	2	0-2
1732.5	20175	5	16-QAM	25	0	20.91	2	0-2
1752.5	20375	5	QPSK	1	0	22.92	0	0
1752.5	20375	5	QPSK	1	24	22.76	0	0
1752.5	20375	5	QPSK	12	6	21.73	1	0-1
1752.5	20375	5	QPSK	25	0	21.86	1	0-1
1752.5	20375	5	16-QAM	1	0	21.52	1	0-1
1752.5	20375	5	16-QAM	1	24	22.18	1	0-1
1752.5	20375	5	16-QAM	12	6	20.90	2	0-2
1752.5	20375	5	16-QAM	25	0	21.02	2	0-2

Table 10-2

LTE Band 4 (AWS) Conducted Powers - 3 MHz Bandwidth

Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	Allowed per 3GPP [dB]
1711.5	19965	3	QPSK	1	0	22.71	0	0
1711.5	19965	3	QPSK	1	14	22.59	0	0
1711.5	19965	3	QPSK	8	4	21.50	1	0-1
1711.5	19965	3	QPSK	15	0	22.16	1	0-1
1711.5	19965	3	16-QAM	1	0	21.62	1	0-1
1711.5	19965	3	16-QAM	1	14	21.53	1	0-1
1711.5	19965	3	16-QAM	8	4	20.76	2	0-2
1711.5	19965	3	16-QAM	15	0	20.68	2	0-2
1732.5	20175	3	QPSK	1	0	22.77	0	0
1732.5	20175	3	QPSK	1	14	22.51	0	0
1732.5	20175	3	QPSK	8	4	21.68	1	0-1
1732.5	20175	3	QPSK	15	0	21.80	1	0-1
1732.5	20175	3	16-QAM	1	0	21.51	1	0-1
1732.5	20175	3	16-QAM	1	14	21.68	1	0-1
1732.5	20175	3	16-QAM	8	4	20.55	2	0-2
1732.5	20175	3	16-QAM	15	0	20.59	2	0-2
1753.5	20385	3	QPSK	1	0	22.73	0	0
1753.5	20385	3	QPSK	1	14	22.76	0	0
1753.5	20385	3	QPSK	8	4	21.79	1	0-1
1753.5	20385	3	QPSK	15	0	21.57	1	0-1
1753.5	20385	3	16-QAM	1	0	21.77	1	0-1
1753.5	20385	3	16-QAM	1	14	21.69	1	0-1
1753.5	20385	3	16-QAM	8	4	20.65	2	0-2
1753.5	20385	3	16-QAM	15	0	20.68	2	0-2

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Table 10-3
LTE Band 4 (AWS) Conducted Powers - 1.4 MHz Bandwidth

Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	Allowed per 3GPP [dB]
1710.7	19957	1.4	QPSK	1	0	22.65	0	0
1710.7	19957	1.4	QPSK	1	5	22.50	0	0
1710.7	19957	1.4	QPSK	3	2	22.61	0	0
1710.7	19957	1.4	QPSK	6	0	21.51	1	0-1
1710.7	19957	1.4	16-QAM	1	0	21.56	1	0-1
1710.7	19957	1.4	16-QAM	1	5	21.58	1	0-1
1710.7	19957	1.4	16-QAM	3	2	21.50	1	0-1
1710.7	19957	1.4	16-QAM	6	0	20.55	2	0-2
1732.5	20175	1.4	QPSK	1	0	22.51	0	0
1732.5	20175	1.4	QPSK	1	5	22.50	0	0
1732.5	20175	1.4	QPSK	3	2	22.61	0	0
1732.5	20175	1.4	QPSK	6	0	21.55	1	0-1
1732.5	20175	1.4	16-QAM	1	0	21.56	1	0-1
1732.5	20175	1.4	16-QAM	1	5	21.53	1	0-1
1732.5	20175	1.4	16-QAM	3	2	21.51	1	0-1
1732.5	20175	1.4	16-QAM	6	0	20.51	2	0-2
1754.3	20393	1.4	QPSK	1	0	22.63	0	0
1754.3	20393	1.4	QPSK	1	5	22.60	0	0
1754.3	20393	1.4	QPSK	3	2	22.84	0	0
1754.3	20393	1.4	QPSK	6	0	21.55	1	0-1
1754.3	20393	1.4	16-QAM	1	0	21.56	1	0-1
1754.3	20393	1.4	16-QAM	1	5	21.62	1	0-1
1754.3	20393	1.4	16-QAM	3	2	22.14	1	0-1
1754.3	20393	1.4	16-QAM	6	0	20.82	2	0-2

10.2.2 LTE Band 2 (PCS)

Table 10-4
LTE Band 2 (PCS) Conducted Powers - 5 MHz Bandwidth

Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	Allowed per 3GPP [dB]
1852.5	18625	5	QPSK	1	0	23.08	0	0
1852.5	18625	5	QPSK	1	24	22.94	0	0
1852.5	18625	5	QPSK	12	6	21.72	1	0-1
1852.5	18625	5	QPSK	25	0	22.14	1	0-1
1852.5	18625	5	16-QAM	1	0	22.41	1	0-1
1852.5	18625	5	16-QAM	1	24	22.21	1	0-1
1852.5	18625	5	16-QAM	12	6	20.91	2	0-2
1852.5	18625	5	16-QAM	25	0	21.03	2	0-2
1880.0	18900	5	QPSK	1	0	23.30	0	0
1880.0	18900	5	QPSK	1	24	22.87	0	0
1880.0	18900	5	QPSK	12	6	21.84	1	0-1
1880.0	18900	5	QPSK	25	0	22.11	1	0-1
1880.0	18900	5	16-QAM	1	0	21.99	1	0-1
1880.0	18900	5	16-QAM	1	24	22.23	1	0-1
1880.0	18900	5	16-QAM	12	6	20.89	2	0-2
1880.0	18900	5	16-QAM	25	0	21.04	2	0-2
1907.5	19175	5	QPSK	1	0	22.99	0	0
1907.5	19175	5	QPSK	1	24	22.77	0	0
1907.5	19175	5	QPSK	12	6	21.84	1	0-1
1907.5	19175	5	QPSK	25	0	22.02	1	0-1
1907.5	19175	5	16-QAM	1	0	21.74	1	0-1
1907.5	19175	5	16-QAM	1	24	21.91	1	0-1
1907.5	19175	5	16-QAM	12	6	20.73	2	0-2
1907.5	19175	5	16-QAM	25	0	20.90	2	0-2

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Table 10-5
LTE Band 2 (PCS) Conducted Powers - 3 MHz Bandwidth

Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	Allowed per 3GPP [dB]
1851.5	18615	3	QPSK	1	0	23.00	0	0
1851.5	18615	3	QPSK	1	14	22.94	0	0
1851.5	18615	3	QPSK	8	4	22.15	1	0-1
1851.5	18615	3	QPSK	15	0	22.02	1	0-1
1851.5	18615	3	16-QAM	1	0	22.08	1	0-1
1851.5	18615	3	16-QAM	1	14	22.01	1	0-1
1851.5	18615	3	16-QAM	8	4	20.81	2	0-2
1851.5	18615	3	16-QAM	15	0	21.04	2	0-2
1880.0	18900	3	QPSK	1	0	22.50	0	0
1880.0	18900	3	QPSK	1	14	22.71	0	0
1880.0	18900	3	QPSK	8	4	21.89	1	0-1
1880.0	18900	3	QPSK	15	0	21.86	1	0-1
1880.0	18900	3	16-QAM	1	0	21.62	1	0-1
1880.0	18900	3	16-QAM	1	14	21.70	1	0-1
1880.0	18900	3	16-QAM	8	4	20.84	2	0-2
1880.0	18900	3	16-QAM	15	0	21.02	2	0-2
1908.5	19185	3	QPSK	1	0	23.10	0	0
1908.5	19185	3	QPSK	1	14	23.06	0	0
1908.5	19185	3	QPSK	8	4	22.41	1	0-1
1908.5	19185	3	QPSK	15	0	22.38	1	0-1
1908.5	19185	3	16-QAM	1	0	22.25	1	0-1
1908.5	19185	3	16-QAM	1	14	22.14	1	0-1
1908.5	19185	3	16-QAM	8	4	21.24	2	0-2
1908.5	19185	3	16-QAM	15	0	21.23	2	0-2

Table 10-6
LTE Band 2 (PCS) Conducted Powers - 1.4 MHz Bandwidth

Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	Allowed per 3GPP [dB]
1850.7	18607	1.4	QPSK	1	0	22.79	0	0
1850.7	18607	1.4	QPSK	1	5	22.99	0	0
1850.7	18607	1.4	QPSK	3	2	22.88	0	0
1850.7	18607	1.4	QPSK	6	0	22.05	1	0-1
1850.7	18607	1.4	16-QAM	1	0	22.12	1	0-1
1850.7	18607	1.4	16-QAM	1	5	21.99	1	0-1
1850.7	18607	1.4	16-QAM	3	2	21.84	1	0-1
1850.7	18607	1.4	16-QAM	6	0	20.59	2	0-2
1880.0	18900	1.4	QPSK	1	0	22.50	0	0
1880.0	18900	1.4	QPSK	1	5	22.53	0	0
1880.0	18900	1.4	QPSK	3	2	22.73	0	0
1880.0	18900	1.4	QPSK	6	0	21.71	1	0-1
1880.0	18900	1.4	16-QAM	1	0	21.52	1	0-1
1880.0	18900	1.4	16-QAM	1	5	21.76	1	0-1
1880.0	18900	1.4	16-QAM	3	2	21.50	1	0-1
1880.0	18900	1.4	16-QAM	6	0	20.55	2	0-2
1909.3	19193	1.4	QPSK	1	0	22.96	0	0
1909.3	19193	1.4	QPSK	1	5	23.04	0	0
1909.3	19193	1.4	QPSK	3	2	22.93	0	0
1909.3	19193	1.4	QPSK	6	0	21.92	1	0-1
1909.3	19193	1.4	16-QAM	1	0	21.79	1	0-1
1909.3	19193	1.4	16-QAM	1	5	21.66	1	0-1
1909.3	19193	1.4	16-QAM	3	2	21.82	1	0-1
1909.3	19193	1.4	16-QAM	6	0	20.73	2	0-2

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10.2.3 Required RB Size and RB Offsets for SAR Testing

Bolded configurations were tested for SAR.

According to FCC KDB 941225 D05:

- 1) Per Page 4, 3) A), QPSK with 50% RB is required for the highest bandwidth.
- 2) Per Page 4, footnote 2, when the maximum output power across high, mid., and low channels is < 0.5 dB, mid channel is tested. Low and high channel SAR tests are not required for QPSK, 50% RB allocation when the SAR is < 0.8 W/kg.
- 3) Per Page 4, 3) B), QPSK with 1 RB for both channel edges are required for the highest bandwidth.
- 4) Per Page 4, footnote 6, QPSK 1 RB allocation SAR tests were performed on the highest output power channel for the RB allocation when the average output power of the 1 RB allocation was > 0.5 dB higher than the 50% RB allocation for QPSK. Otherwise, SAR tests are performed on the channel that produced the highest SAR for QPSK with 50% RB. 1 RB low and high offset configurations are considered together for a single channel selection.
- 5) Per Page 4, 3) B), I), when the SAR for QPSK 1 RB allocation tests is <1.45 W/kg, testing on the other channels is not required.
- 6) Per Page 4, 4) A), 16QAM with 50% RB is required for the highest bandwidth on the channel with the highest measured SAR for QPSK with 50% RB allocation.
- 7) Per Page 4, 4) A), I), when the SAR for 16 QAM, 50 % allocation tests is <1.45 W/kg, testing on the other channels is not required.
- 8) Per Page 4, 4) B) and Page 5 footnote 9, 16QAM with 1RB for both channel edges are required for the highest bandwidth on the highest output power channel for the 1 RB allocation when the average output power of the 1 RB allocation is >0.5 dB higher than the 50% allocation for 16 QAM. Otherwise, SAR tests are performed on the channel that produced the highest SAR for 16 QAM with 50% RB. 1 RB low and high offset configurations are considered together for a single channel selection.
- 9) Per Page 5, 4) B), I), when the SAR for 16 QAM 1 RB allocation tests is <1.45 W/kg, testing on the other channels is not required.
- 10) Per Page 4, 4), A) I) and Page 5, 4), A), I), 100% RB Allocation is not required to be tested when the SAR is not > 1.45 W/kg for the highest bandwidth.
- 11) Per Page 5, 5) B) I), smaller bandwidths are not required to be tested when SAR is not > 1.45 W/kg for the highest bandwidth and the maximum average output power of the smaller bandwidths across all channels and configurations is not more than 0.5 dB higher than the higher bandwidths.

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10.3 WLAN Conducted Powers

Table 10-7
IEEE 802.11b Average RF Power

Freq [MHz]	Channel	Data Rate [Mbps]	Average Power (dBm)
2412	1	1	17.00
		2	16.92
		5.5	16.96
		11	16.95
2437	6	1	17.56
		2	17.54
		5.5	17.59
		11	17.52
2462	11	1	17.83
		2	17.81
		5.5	17.77
		11	17.76

Table 10-8
IEEE 802.11g Average RF Power

Freq [MHz]	Channel	Data Rate [Mbps]	Average Power (dBm)
2412	1	6	13.74
		9	13.65
		12	13.72
		18	13.67
		24	13.71
		36	13.66
		48	13.62
		54	13.71
2437	6	6	14.36
		9	14.25
		12	14.32
		18	14.30
		24	14.26
		36	14.31
		48	14.34
		54	14.27
2462	11	6	14.62
		9	14.59
		12	14.56
		18	14.57
		24	14.47
		36	14.55
		48	14.52
		54	14.54

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Table 10-9
IEEE 802.11n Average RF Power

Freq [MHz]	Channel	Data Rate [Mbps]	Average Power (dBm)
2412	1	6.5/ 7.2	11.71
		13/ 14.40	11.61
		19.5/ 21.70	11.72
		26/ 28.90	11.59
		29/ 43.3	11.62
		52/ 57.80	11.54
		58.50/ 65	11.77
		65/ 72.2	11.70
2437	6	6.5/ 7.2	12.28
		13/ 14.40	12.20
		19.5/ 21.70	12.29
		26/ 28.90	12.21
		29/ 43.3	12.19
		52/ 57.80	12.25
		58.50/ 65	12.31
		65/ 72.2	12.24
2462	11	6.5/ 7.2	12.62
		13/ 14.40	12.48
		19.5/ 21.70	12.41
		26/ 28.90	12.46
		29/ 43.3	12.56
		52/ 57.80	12.50
		58.50/ 65	12.55
		65/ 72.2	12.54

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

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



Figure 10-2
Power Measurement Setup

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11 SYSTEM VERIFICATION

11.1 Tissue Verification

Table 11-1
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
02/23/2012	835H	21.7	820	0.911	42.84	0.898	41.571	1.45%	3.05%
			835	0.921	42.69	0.900	41.500	2.33%	2.87%
			850	0.933	42.54	0.916	41.500	1.86%	2.51%
02/21/2012	1750H	22.3	1710	1.370	40.94	1.348	40.136	1.63%	2.00%
			1750	1.405	40.75	1.370	40.100	2.55%	1.62%
			1790	1.448	40.54	1.394	40.020	3.87%	1.30%
02/28/2012	1750H	22.4	1710	1.384	38.84	1.348	40.136	2.67%	-3.23%
			1750	1.423	38.67	1.370	40.100	3.87%	-3.57%
			1790	1.462	38.46	1.394	40.020	4.88%	-3.90%
02/23/2012	1900H	23.6	1850	1.363	39.39	1.400	40.000	-2.64%	-1.53%
			1880	1.389	39.24	1.400	40.000	-0.79%	-1.90%
			1910	1.417	39.11	1.400	40.000	1.21%	-2.23%
02/22/2012	2450H	23.1	2401	1.739	40.27	1.758	39.298	-1.08%	2.47%
			2450	1.811	40.13	1.800	39.200	0.61%	2.37%
			2499	1.867	39.95	1.852	39.135	0.81%	2.08%
02/23/2012	835B	22.3	820	0.965	53.65	0.969	55.284	-0.41%	-2.96%
			835	0.972	53.60	0.970	55.200	0.21%	-2.90%
			850	0.984	53.32	0.988	55.154	-0.40%	-3.33%
02/28/2012	1750B	22.4	1710	1.459	51.71	1.460	53.540	-0.07%	-3.42%
			1750	1.501	51.57	1.490	53.430	0.74%	-3.48%
			1790	1.543	51.40	1.510	53.330	2.19%	-3.62%
02/23/2012	1900B	23.8	1850	1.446	51.73	1.520	53.300	-4.87%	-2.95%
			1880	1.467	51.58	1.520	53.300	-3.49%	-3.23%
			1910	1.508	51.50	1.520	53.300	-0.79%	-3.38%
02/27/2012	1900B	24.9	1850	1.505	51.03	1.520	53.300	-0.99%	-4.26%
			1880	1.539	50.95	1.520	53.300	1.25%	-4.41%
			1910	1.573	50.86	1.520	53.300	3.49%	-4.58%
02/22/2012	2450B	24.3	2401	1.891	50.84	1.903	52.765	-0.63%	-3.65%
			2450	1.965	50.69	1.950	52.700	0.77%	-3.81%
			2499	2.000	50.66	2.019	52.638	-0.94%	-3.76%

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.

11.2 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):

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

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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 $j = \sqrt{-1}$.

11.3 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 11-2
System Verification Results

System Verification TARGET & MEASURED											
Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Dipole SN	Probe SN	Measured SAR _{1g} (W/kg)	1 W Target SAR _{1g} (W/kg)	1 W Normalized SAR _{1g} (W/kg)	Deviation (%)
835	Head	02/23/2012	23.1	22.2	0.100	4d026	3022	1.00	9.460	10.000	5.71%
1750	Head	02/21/2012	24.7	22.5	0.100	1051	3213	3.61	37.000	36.100	-2.43%
1750	Head	02/28/2012	24.3	22.4	0.100	1051	3209	3.67	37.000	36.700	-0.81%
1900	Head	02/23/2012	24.5	22.0	0.100	5d141	3209	3.94	39.500	39.400	-0.25%
2450	Head	02/22/2012	24.5	23.3	0.040	719	3209	2.16	53.800	54.000	0.37%
835	Body	02/23/2012	23.2	22.4	0.100	4d026	3022	0.965	9.660	9.650	-0.10%
1750	Body	02/28/2012	23.9	22.5	0.100	1051	3209	3.98	37.000	39.800	7.57%
1900	Body	02/23/2012	23.3	22.0	0.100	5d141	3209	4.33	41.400	43.300	4.59%
1900	Body	02/27/2012	24.0	23.2	0.100	5d141	3209	4.45	41.400	44.500	7.49%
2450	Body	02/22/2012	24.3	23.4	0.040	719	3209	2.19	51.300	54.750	6.73%

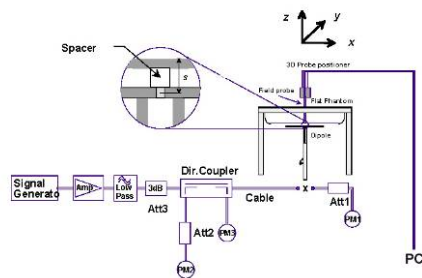


Figure 11-1
System Verification Setup Diagram



Figure 11-2
System Verification Setup Photo

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12 SAR DATA SUMMARY

12.1 Standalone Head SAR Data

Table 12-1
Cell. CDMA Head SAR Results

MEASUREMENT RESULTS								
FREQUENCY		Mode/Band	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	SAR (1g)
MHz	Ch.							(W/kg)
824.70	1013	Cell. CDMA	24.90	0.17	Right	Touch	1x#3	0.173
824.70	1013	Cell. CDMA	24.90	0.11	Right	Tilt	1x#3	0.142
824.70	1013	Cell. CDMA	24.90	-0.09	Left	Touch	1x#3	0.135
824.70	1013	Cell. CDMA	24.90	-0.02	Left	Tilt	1x#3	0.103
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					Head 1.6 W/kg (mW/g) averaged over 1 gram			

Per October 2010 TCB Workshop, when the output power deviation across the channels is >0.5 dB, the maximum output power must be used. Therefore, low channel was tested for Cell. CDMA.

Table 12-2
AWS CDMA Head SAR Results

MEASUREMENT RESULTS								
FREQUENCY		Mode/Band	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	SAR (1g)
MHz	Ch.							(W/kg)
1732.50	450	AWS CDMA	24.74	-0.08	Right	Touch	1x#3	0.434
1732.50	450	AWS CDMA	24.74	-0.01	Right	Tilt	1x#3	0.258
1732.50	450	AWS CDMA	24.74	-0.19	Left	Touch	1x#3	0.333
1732.50	450	AWS CDMA	24.74	-0.03	Left	Tilt	1x#3	0.248
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 12-3
PCS CDMA Head SAR Results

MEASUREMENT RESULTS								
FREQUENCY		Mode/Band	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	SAR (1g)
MHz	Ch.							(W/kg)
1880.00	600	PCS CDMA	24.56	0.07	Right	Touch	1x#3	0.450
1880.00	600	PCS CDMA	24.56	0.10	Right	Tilt	1x#3	0.132
1880.00	600	PCS CDMA	24.56	-0.05	Left	Touch	1x#3	0.274
1880.00	600	PCS CDMA	24.56	-0.01	Left	Tilt	1x#3	0.112
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 12-4
LTE Band 4 (AWS) Head SAR Results

MEASUREMENT RESULTS															
FREQUENCY			Mode	Bandwidth [MHz]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	# of RB	RB Offset	Device Serial Number	SAR (1g)	
MHz	Ch.													(W/kg)	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.12	0.12	1	Right	Touch	QPSK	12	6	LTE B4	0.232	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	23.50	0.04	0	Right	Touch	QPSK	1	0	LTE B4	0.358	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	23.24	0.01	0	Right	Touch	QPSK	1	24	LTE B4	0.300	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	20.72	-0.04	2	Right	Touch	16 QAM	12	6	LTE B4	0.185	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.10	0.16	1	Right	Touch	16 QAM	1	0	LTE B4	0.237	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.21	0.04	1	Right	Touch	16 QAM	1	24	LTE B4	0.209	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.12	-0.20	1	Right	Tilt	QPSK	12	6	LTE B4	0.197	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	23.50	-0.10	0	Right	Tilt	QPSK	1	0	LTE B4	0.354	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	23.24	-0.05	0	Right	Tilt	QPSK	1	24	LTE B4	0.272	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	20.72	-0.14	2	Right	Tilt	16 QAM	12	6	LTE B4	0.161	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.10	0.02	1	Right	Tilt	16 QAM	1	0	LTE B4	0.219	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.21	-0.13	1	Right	Tilt	16 QAM	1	24	LTE B4	0.196	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.12	0.13	1	Left	Touch	QPSK	12	6	LTE B4	0.525	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	23.50	-0.02	0	Left	Touch	QPSK	1	0	LTE B4	0.781	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	23.24	-0.12	0	Left	Touch	QPSK	1	24	LTE B4	0.617	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	20.72	-0.02	2	Left	Touch	16 QAM	12	6	LTE B4	0.378	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.10	-0.12	1	Left	Touch	16 QAM	1	0	LTE B4	0.518	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.21	-0.10	1	Left	Touch	16 QAM	1	24	LTE B4	0.449	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.12	-0.12	1	Left	Tilt	QPSK	12	6	LTE B4	0.213	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	23.50	-0.14	0	Left	Tilt	QPSK	1	0	LTE B4	0.315	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	23.24	-0.06	0	Left	Tilt	QPSK	1	24	LTE B4	0.255	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	20.72	-0.16	2	Left	Tilt	16 QAM	12	6	LTE B4	0.142	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.10	0.08	1	Left	Tilt	16 QAM	1	0	LTE B4	0.222	
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.21	-0.09	1	Left	Tilt	16 QAM	1	24	LTE B4	0.194	
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 12-5
LTE Band 2 (PCS) Head SAR Results

MEASUREMENT RESULTS														
FREQUENCY		Mode	Bandwidth [MHz]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	# of RB	RB Offset	Device Serial Number	SAR (1g)	
MHz	Ch.												(W/kg)	
1880.00	18900	Mid	LTE Band 2 (PCS)	5	21.84	0.06	1	Right	Touch	QPSK	12	6	LTE B2	0.146
1880.00	18900	Mid	LTE Band 2 (PCS)	5	23.30	0.13	0	Right	Touch	QPSK	1	0	LTE B2	0.185
1880.00	18900	Mid	LTE Band 2 (PCS)	5	22.87	0.02	0	Right	Touch	QPSK	1	24	LTE B2	0.218
1880.00	18900	Mid	LTE Band 2 (PCS)	5	20.89	0.12	2	Right	Touch	16 QAM	12	6	LTE B2	0.122
1852.50	18625	Low	LTE Band 2 (PCS)	5	22.41	0.20	1	Right	Touch	16 QAM	1	0	LTE B2	0.164
1852.50	18625	Low	LTE Band 2 (PCS)	5	22.21	0.02	1	Right	Touch	16 QAM	1	24	LTE B2	0.168
1880.00	18900	Mid	LTE Band 2 (PCS)	5	21.84	0.22	1	Right	Tilt	QPSK	12	6	LTE B2	0.114
1880.00	18900	Mid	LTE Band 2 (PCS)	5	23.30	-0.06	0	Right	Tilt	QPSK	1	0	LTE B2	0.164
1880.00	18900	Mid	LTE Band 2 (PCS)	5	22.87	-0.13	0	Right	Tilt	QPSK	1	24	LTE B2	0.173
1880.00	18900	Mid	LTE Band 2 (PCS)	5	20.89	0.03	2	Right	Tilt	16 QAM	12	6	LTE B2	0.094
1852.50	18625	Low	LTE Band 2 (PCS)	5	22.41	0.14	1	Right	Tilt	16 QAM	1	0	LTE B2	0.132
1852.50	18625	Low	LTE Band 2 (PCS)	5	22.21	-0.11	1	Right	Tilt	16 QAM	1	24	LTE B2	0.128
1880.00	18900	Mid	LTE Band 2 (PCS)	5	21.84	-0.01	1	Left	Touch	QPSK	12	6	LTE B2	0.361
1880.00	18900	Mid	LTE Band 2 (PCS)	5	23.30	0.18	0	Left	Touch	QPSK	1	0	LTE B2	0.506
1880.00	18900	Mid	LTE Band 2 (PCS)	5	22.87	-0.06	0	Left	Touch	QPSK	1	24	LTE B2	0.551
1880.00	18900	Mid	LTE Band 2 (PCS)	5	20.89	0.04	2	Left	Touch	16 QAM	12	6	LTE B2	0.294
1852.50	18625	Low	LTE Band 2 (PCS)	5	22.41	-0.05	1	Left	Touch	16 QAM	1	0	LTE B2	0.443
1852.50	18625	Low	LTE Band 2 (PCS)	5	22.21	0.02	1	Left	Touch	16 QAM	1	24	LTE B2	0.459
1880.00	18900	Mid	LTE Band 2 (PCS)	5	21.84	-0.06	1	Left	Tilt	QPSK	12	6	LTE B2	0.100
1880.00	18900	Mid	LTE Band 2 (PCS)	5	23.30	-0.11	0	Left	Tilt	QPSK	1	0	LTE B2	0.135
1880.00	18900	Mid	LTE Band 2 (PCS)	5	22.87	-0.14	0	Left	Tilt	QPSK	1	24	LTE B2	0.150
1880.00	18900	Mid	LTE Band 2 (PCS)	5	20.89	-0.08	2	Left	Tilt	16 QAM	12	6	LTE B2	0.077
1852.50	18625	Low	LTE Band 2 (PCS)	5	22.41	0.11	1	Left	Tilt	16 QAM	1	0	LTE B2	0.105
1852.50	18625	Low	LTE Band 2 (PCS)	5	22.21	0.00	1	Left	Tilt	16 QAM	1	24	LTE B2	0.108
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Head						
Spatial Peak								1.6 W/kg (mW/g)						
Uncontrolled Exposure/General Population								averaged over 1 gram						

Note: QPSK and 16 QAM 1 RB allocation SAR tests were performed on the highest output power channel for the RB allocation when the average output power of the 1 RB allocation was > 0.5 dB higher than the 50% RB allocation for QPSK and 16 QAM, respectively. Therefore, low channel was tested for LTE Band 2 (PCS) for 16 QAM 1 RB cases.

Table 12-6
2.4 GHz WLAN Head SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	SAR (1g)
MHz	Ch.									(W/kg)
2462	11	IEEE 802.11b	DSSS	17.83	-0.07	Right	Touch	WIFI SAR 4	1	0.134
2462	11	IEEE 802.11b	DSSS	17.83	0.15	Right	Tilt	WIFI SAR 4	1	0.172
2462	11	IEEE 802.11b	DSSS	17.83	-0.11	Left	Touch	WIFI SAR 4	1	0.156
2462	11	IEEE 802.11b	DSSS	17.83	0.09	Left	Tilt	WIFI SAR 4	1	0.201
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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12.2 Standalone Body-Worn SAR Data

Table 12-7
Licensed Transmitter Body-Worn SAR Results

MEASUREMENT RESULTS									
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Side	SAR (1g)
MHz	Ch.								(W/kg)
824.70	1013	Cell. CDMA	TDSO / SO32	24.94	0.00	1.0 cm	1x #3	back	0.481
1732.50	450	AWS CDMA	TDSO / SO32	24.66	-0.03	1.0 cm	1x #3	back	0.682
1880.00	600	PCS CDMA	TDSO / SO32	24.57	-0.13	1.0 cm	1x #3	back	0.564
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Body 1.6 W/kg (mW/g) averaged over 1 gram			

Per October 2010 TCB Workshop, when the output power deviation across the channels is >0.5 dB, the maximum output power must be used. Therefore, low channel was tested for Cell. CDMA.

Table 12-8
LTE Body-Worn SAR Results

MEASUREMENT RESULTS														
FREQUENCY			Mode	Bandwidth [MHz]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	# of RB	RB Offset	Spacing	Side	SAR (1g)
MHz	Ch.													(W/kg)
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.12	0.10	1	LTE B4	QPSK	12	6	1.0 cm	back	0.403
1732.50	20175	Mid	LTE Band 4 (AWS)	5	23.50	-0.10	0	LTE B4	QPSK	1	0	1.0 cm	back	0.618
1732.50	20175	Mid	LTE Band 4 (AWS)	5	23.24	0.14	0	LTE B4	QPSK	1	24	1.0 cm	back	0.489
1732.50	20175	Mid	LTE Band 4 (AWS)	5	20.72	0.01	2	LTE B4	16 QAM	12	6	1.0 cm	back	0.313
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.10	-0.19	1	LTE B4	16 QAM	1	0	1.0 cm	back	0.436
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.21	0.05	1	LTE B4	16 QAM	1	24	1.0 cm	back	0.371
1880.00	18900	Mid	LTE Band 2 (PCS)	5	21.84	-0.11	1	LTE B2	QPSK	12	6	1.0 cm	back	0.240
1880.00	18900	Mid	LTE Band 2 (PCS)	5	23.30	-0.10	0	LTE B2	QPSK	1	0	1.0 cm	back	0.329
1880.00	18900	Mid	LTE Band 2 (PCS)	5	22.87	0.01	0	LTE B2	QPSK	1	24	1.0 cm	back	0.355
1880.00	18900	Mid	LTE Band 2 (PCS)	5	20.89	0.08	2	LTE B2	16 QAM	12	6	1.0 cm	back	0.202
1852.50	18625	Low	LTE Band 2 (PCS)	5	22.41	0.16	1	LTE B2	16 QAM	1	0	1.0 cm	back	0.271
1852.50	18625	Low	LTE Band 2 (PCS)	5	22.21	0.05	1	LTE B2	16 QAM	1	24	1.0 cm	back	0.287
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body						
Spatial Peak								1.6 W/kg (mW/g)						
Uncontrolled Exposure/General Population								averaged over 1 gram						

Note: QPSK and 16 QAM 1 RB allocation SAR tests were performed on the highest output power channel for the RB allocation when the average output power of the 1 RB allocation was > 0.5 dB higher than the 50% RB allocation for QPSK and 16 QAM, respectively. Therefore, low channel was tested for LTE Band 2 (PCS) for 16 QAM 1 RB cases.

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Table 12-9
WLAN Body-Worn SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	SAR (1g)
MHz	Ch.									(W/kg)
2462	11	IEEE 802.11b	DSSS	17.83	-0.05	1.0 cm	WIFI SAR 4	1	back	0.170
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Body 1.6 W/kg (mW/g) averaged over 1 gram				

12.3 Standalone Wireless Router SAR Data

Table 12-10
Licensed Transmitter Hotspot SAR Data

MEASUREMENT RESULTS									
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Side	SAR (1g)
MHz	Ch.								(W/kg)
824.70	1013	Cell. CDMA	TDSO / SO32	24.94	0.00	1.0 cm	1x#3	back	0.481
824.70	1013	Cell. CDMA	TDSO / SO32	24.94	0.13	1.0 cm	1x#3	front	0.239
824.70	1013	Cell. CDMA	TDSO / SO32	24.94	0.09	1.0 cm	1x#3	bottom	0.106
824.70	1013	Cell. CDMA	TDSO / SO32	24.94	-0.04	1.0 cm	1x#3	right	0.267
1732.50	450	AWS CDMA	TDSO / SO32	24.66	-0.03	1.0 cm	1x#3	back	0.682
1732.50	450	AWS CDMA	TDSO / SO32	24.66	0.01	1.0 cm	1x#3	front	0.293
1732.50	450	AWS CDMA	TDSO / SO32	24.66	0.02	1.0 cm	1x#3	bottom	0.630
1732.50	450	AWS CDMA	TDSO / SO32	24.66	-0.19	1.0 cm	1x#3	right	0.184
1880.00	600	PCS CDMA	TDSO / SO32	24.57	-0.13	1.0 cm	1x#3	back	0.564
1880.00	600	PCS CDMA	TDSO / SO32	24.57	0.09	1.0 cm	1x#3	front	0.313
1880.00	600	PCS CDMA	TDSO / SO32	24.57	-0.10	1.0 cm	1x#3	bottom	0.549
1880.00	600	PCS CDMA	TDSO / SO32	24.57	0.02	1.0 cm	1x#3	right	0.179
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Body 1.6 W/kg (mW/g) averaged over 1 gram			

Per October 2010 TCB Workshop, when the output power deviation across the channels is >0.5 dB, the maximum output power must be used. Therefore, low channel was tested for Cell. CDMA.

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Table 12-11
LTE Band 4 (AWS) Hotspot SAR Data

MEASUREMENT RESULTS														
FREQUENCY			Mode	Bandwidth [MHz]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	# of RB	RB Offset	Spacing	Side	SAR (1g)
MHz	Ch.	High												(W/kg)
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.12	0.10	1	LTE B4	QPSK	12	6	1.0 cm	back	0.403
1732.50	20175	Mid	LTE Band 4 (AWS)	5	23.50	-0.10	0	LTE B4	QPSK	1	0	1.0 cm	back	0.618
1732.50	20175	Mid	LTE Band 4 (AWS)	5	23.24	0.14	0	LTE B4	QPSK	1	24	1.0 cm	back	0.489
1732.50	20175	Mid	LTE Band 4 (AWS)	5	20.72	0.01	2	LTE B4	16 QAM	12	6	1.0 cm	back	0.313
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.10	-0.19	1	LTE B4	16 QAM	1	0	1.0 cm	back	0.436
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.21	0.05	1	LTE B4	16 QAM	1	24	1.0 cm	back	0.371
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.12	-0.13	1	LTE B4	QPSK	12	6	1.0 cm	front	0.294
1732.50	20175	Mid	LTE Band 4 (AWS)	5	23.50	0.00	0	LTE B4	QPSK	1	0	1.0 cm	front	0.449
1732.50	20175	Mid	LTE Band 4 (AWS)	5	23.24	-0.10	0	LTE B4	QPSK	1	24	1.0 cm	front	0.362
1732.50	20175	Mid	LTE Band 4 (AWS)	5	20.72	-0.16	2	LTE B4	16 QAM	12	6	1.0 cm	front	0.222
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.10	-0.13	1	LTE B4	16 QAM	1	0	1.0 cm	front	0.295
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.21	0.13	1	LTE B4	16 QAM	1	24	1.0 cm	front	0.261
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.12	-0.09	1	LTE B4	QPSK	12	6	1.0 cm	bottom	0.160
1732.50	20175	Mid	LTE Band 4 (AWS)	5	23.50	-0.15	0	LTE B4	QPSK	1	0	1.0 cm	bottom	0.206
1732.50	20175	Mid	LTE Band 4 (AWS)	5	23.24	0.00	0	LTE B4	QPSK	1	24	1.0 cm	bottom	0.201
1732.50	20175	Mid	LTE Band 4 (AWS)	5	20.72	0.01	2	LTE B4	16 QAM	12	6	1.0 cm	bottom	0.120
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.10	-0.09	1	LTE B4	16 QAM	1	0	1.0 cm	bottom	0.157
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.21	-0.16	1	LTE B4	16 QAM	1	24	1.0 cm	bottom	0.141
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.12	0.11	1	LTE B4	QPSK	12	6	1.0 cm	left	0.216
1732.50	20175	Mid	LTE Band 4 (AWS)	5	23.50	-0.21	0	LTE B4	QPSK	1	0	1.0 cm	left	0.322
1732.50	20175	Mid	LTE Band 4 (AWS)	5	23.24	-0.05	0	LTE B4	QPSK	1	24	1.0 cm	left	0.283
1732.50	20175	Mid	LTE Band 4 (AWS)	5	20.72	-0.12	2	LTE B4	16 QAM	12	6	1.0 cm	left	0.171
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.10	0.15	1	LTE B4	16 QAM	1	0	1.0 cm	left	0.230
1732.50	20175	Mid	LTE Band 4 (AWS)	5	22.21	-0.05	1	LTE B4	16 QAM	1	24	1.0 cm	left	0.200
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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Table 12-12
LTE Band 2 (PCS) Hotspot SAR Data

MEASUREMENT RESULTS														
FREQUENCY			Mode	Bandwidth [MHz]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	# of RB	RB Offset	Spacing	Side	SAR (1g)
MHz	Ch.	(W/kg)												
1880.00	18900	Mid	LTE Band 2 (PCS)	5	21.84	-0.11	1	LTE B2	QPSK	12	6	1.0 cm	back	0.240
1880.00	18900	Mid	LTE Band 2 (PCS)	5	23.30	-0.10	0	LTE B2	QPSK	1	0	1.0 cm	back	0.329
1880.00	18900	Mid	LTE Band 2 (PCS)	5	22.87	0.01	0	LTE B2	QPSK	1	24	1.0 cm	back	0.355
1880.00	18900	Mid	LTE Band 2 (PCS)	5	20.89	0.08	2	LTE B2	16 QAM	12	6	1.0 cm	back	0.202
1852.50	18625	Low	LTE Band 2 (PCS)	5	22.41	0.16	1	LTE B2	16 QAM	1	0	1.0 cm	back	0.271
1852.50	18625	Low	LTE Band 2 (PCS)	5	22.21	0.05	1	LTE B2	16 QAM	1	24	1.0 cm	back	0.287
1880.00	18900	Mid	LTE Band 2 (PCS)	5	21.84	0.10	1	LTE B2	QPSK	12	6	1.0 cm	front	0.257
1880.00	18900	Mid	LTE Band 2 (PCS)	5	23.30	-0.06	0	LTE B2	QPSK	1	0	1.0 cm	front	0.352
1880.00	18900	Mid	LTE Band 2 (PCS)	5	22.87	-0.09	0	LTE B2	QPSK	1	24	1.0 cm	front	0.369
1880.00	18900	Mid	LTE Band 2 (PCS)	5	20.89	0.06	2	LTE B2	16 QAM	12	6	1.0 cm	front	0.210
1852.50	18625	Low	LTE Band 2 (PCS)	5	22.41	0.20	1	LTE B2	16 QAM	1	0	1.0 cm	front	0.255
1852.50	18625	Low	LTE Band 2 (PCS)	5	22.21	-0.11	1	LTE B2	16 QAM	1	24	1.0 cm	front	0.264
1880.00	18900	Mid	LTE Band 2 (PCS)	5	21.84	0.01	1	LTE B2	QPSK	12	6	1.0 cm	bottom	0.034
1880.00	18900	Mid	LTE Band 2 (PCS)	5	23.30	-0.16	0	LTE B2	QPSK	1	0	1.0 cm	bottom	0.045
1880.00	18900	Mid	LTE Band 2 (PCS)	5	22.87	-0.15	0	LTE B2	QPSK	1	24	1.0 cm	bottom	0.047
1880.00	18900	Mid	LTE Band 2 (PCS)	5	20.89	0.00	2	LTE B2	16 QAM	12	6	1.0 cm	bottom	0.026
1852.50	18625	Low	LTE Band 2 (PCS)	5	22.41	0.11	1	LTE B2	16 QAM	1	0	1.0 cm	bottom	0.050
1852.50	18625	Low	LTE Band 2 (PCS)	5	22.21	0.10	1	LTE B2	16 QAM	1	24	1.0 cm	bottom	0.043
1880.00	18900	Mid	LTE Band 2 (PCS)	5	21.84	0.06	1	LTE B2	QPSK	12	6	1.0 cm	left	0.167
1880.00	18900	Mid	LTE Band 2 (PCS)	5	23.30	-0.07	0	LTE B2	QPSK	1	0	1.0 cm	left	0.225
1880.00	18900	Mid	LTE Band 2 (PCS)	5	22.87	-0.05	0	LTE B2	QPSK	1	24	1.0 cm	left	0.253
1880.00	18900	Mid	LTE Band 2 (PCS)	5	20.89	0.11	2	LTE B2	16 QAM	12	6	1.0 cm	left	0.133
1852.50	18625	Low	LTE Band 2 (PCS)	5	22.41	-0.12	1	LTE B2	16 QAM	1	0	1.0 cm	left	0.211
1852.50	18625	Low	LTE Band 2 (PCS)	5	22.21	-0.15	1	LTE B2	16 QAM	1	24	1.0 cm	left	0.205
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body						
Spatial Peak								1.6 W/kg (mW/g)						
Uncontrolled Exposure/General Population								averaged over 1 gram						

Note: QPSK and 16 QAM 1 RB allocation SAR tests were performed on the highest output power channel for the RB allocation when the average output power of the 1 RB allocation was > 0.5 dB higher than the 50% RB allocation for QPSK and 16 QAM, respectively. Therefore, low channel was tested for LTE Band 2 (PCS) for 16 QAM 1 RB cases.

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Table 12-13
WLAN Hotspot SAR Data

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	SAR (1g)
MHz	Ch.									(W/kg)
2462	11	IEEE 802.11b	DSSS	17.83	-0.05	1.0 cm	WIFI SAR 4	1	back	0.170
2462	11	IEEE 802.11b	DSSS	17.83	0.11	1.0 cm	WIFI SAR 4	1	front	0.040
2462	11	IEEE 802.11b	DSSS	17.83	-0.08	1.0 cm	WIFI SAR 4	1	top	0.145
2462	11	IEEE 802.11b	DSSS	17.83	0.00	1.0 cm	WIFI SAR 4	1	left	0.036
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Body 1.6 W/kg (mW/g) averaged over 1 gram				

12.4 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used were according to FCC/OET Bulletin 65, Supplement C [June 2001].
2. Batteries are fully charged for all readings. The standard battery was used.
3. Tissue parameters and temperatures are listed on the SAR plots.
4. Liquid tissue depth was at least 15.0 cm. To confirm the proper SAR liquid depth, the z-axis plots from the system verifications were included since the system verifications were performed using the same liquid, probe and DAE as the SAR tests in the same time period.
5. All samples tested were electrically identical per the applicant.
6. Device was tested using a fixed spacing for body-worn accessory 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.

CDMA Notes:

1. Per October 2010 TCB Workshop, the mid. channel may be used as a default test channel when the output power deviation across the channels is <0.5 dB, otherwise the maximum output power must be used. If the SAR measured at for each test configuration for the default channel is at least 3.0 dB lower than the SAR limit, testing at the other channels is optional for such test configuration(s).
2. Head SAR for CDMA2000 mode was tested under RC3/SO55 per KDB Publication 941225 D01.
3. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. Ev-Do and TDSO / SO32 FCH+SCH SAR tests were not required since the average output power was not more than 0.25 dB higher than the TDSO / SO32 FCH only powers.
4. AWS CDMA SAR was measured with a probe calibrated at 1750 MHz and is valid for measuring SAR from ± 50 MHz. The 1750MHz specific liquid was verified with specific probe calibration factors as required per FCC KDB Publication 450824 D01.
5. SAR was additionally tested for hotspot configurations using TDSO / FCH to address the CDMA Voice + LTE WIFI Hotspot simultaneous transmission scenario.
6. Per FCC KDB Publication 941225 D06, when the same wireless modes and device transmission configurations are required for body-worn accessories and hotspot mode, it is not necessary to additionally test body-worn accessory SAR for the same device orientation. Therefore, the hotspot data for the back side configuration additionally shows body-worn compliance at the same distance.

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LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Test Considerations for LTE handsets and Data Modems KDB 941225 D05 Publication and are independent of position. General test procedures can be found in Section 9.3.3.
2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. 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. Only the primary Tx/Rx LTE antenna was transmitting during testing. The secondary LTE antenna was for receive-only and cannot transmit.
4. A-MPR was disabled for all SAR tests by setting NS =01.
5. Per FCC KDB Publication 941225 D06, when the same wireless modes and device transmission configurations are required for body-worn accessories and hotspot mode, it is not necessary to additionally test body-worn accessory SAR for the same device orientation. Therefore, the hotspot data for the back side configuration additionally shows body-worn compliance at the same distance.
6. 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 liquid was verified with specific probe calibration factors as required per FCC KDB Publication 450824 D01.

WLAN Notes:

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

Hotspot Notes:

1. Top and left edges for the CDMA transmitter were not tested since the antenna distance from the edge was greater than 2.5 cm per FCC KDB Publication 941225 D06 guidance (see Section 1.2).
2. Top and right edges for the LTE transmitter were not tested since the antenna distance from the edge was greater than 2.5 cm per FCC KDB Publication 941225 D06 guidance (see Section 1.2).
3. Bottom and right edges for the WLAN transmitter were not tested since the antenna distance from the edge was greater than 2.5 cm per FCC KDB Publication 941225 D06 guidance (see Section 1.2).
4. During SAR Testing for the Wireless Router conditions per KDB 941225 D06, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 7.6.)

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13 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

13.1 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 802.11b/g/n and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

13.2 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 13-1
Output Power Thresholds for Unlicensed Transmitters

	Individual Transmitter	Simultaneous Transmission
Licensed Transmitters	<u>Routine evaluation required</u>	SAR not required: <u>Unlicensed only</u> - 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
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	SAR required: <u>Licensed & Unlicensed</u> 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

Figure 13-2
SAR Evaluation Requirements for Multiple Transmitter Handsets

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13.3 Head SAR Simultaneous Transmission Analysis

Table 13-1
Simultaneous Transmission Scenario (Held to Ear)

Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)			
		1	2	3	1+2	1+3	2+3	1+2+3
Head SAR	Right Cheek	0.173	0.358	0.134	0.531	0.307	0.492	0.665
	Right Tilt	0.142	0.354	0.172	0.496	0.314	0.526	0.668
	Left Cheek	0.135	0.781	0.156	0.916	0.291	0.937	1.072
	Left Tilt	0.103	0.315	0.201	0.418	0.304	0.516	0.619
Simult Tx	Configuration	AWS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)			
		1	2	3	1+2	1+3	2+3	1+2+3
Head SAR	Right Cheek	0.434	0.358	0.134	0.792	0.568	0.492	0.926
	Right Tilt	0.258	0.354	0.172	0.612	0.430	0.526	0.784
	Left Cheek	0.333	0.781	0.156	1.114	0.489	0.937	1.270
	Left Tilt	0.248	0.315	0.201	0.563	0.449	0.516	0.764
Simult Tx	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)			
		1	2	3	1+2	1+3	2+3	1+2+3
Head SAR	Right Cheek	0.450	0.358	0.134	0.808	0.584	0.492	0.942
	Right Tilt	0.132	0.354	0.172	0.486	0.304	0.526	0.658
	Left Cheek	0.274	0.781	0.156	1.055	0.430	0.937	1.211
	Left Tilt	0.112	0.315	0.201	0.427	0.313	0.516	0.628
Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 2 (PCS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)			
		1	2	3	1+2	1+3	2+3	1+2+3
Head SAR	Right Cheek	0.173	0.218	0.134	0.391	0.307	0.352	0.525
	Right Tilt	0.142	0.173	0.172	0.315	0.314	0.345	0.487
	Left Cheek	0.135	0.551	0.156	0.686	0.291	0.707	0.842
	Left Tilt	0.103	0.150	0.201	0.253	0.304	0.351	0.454
Simult Tx	Configuration	AWS CDMA SAR (W/kg)	LTE Band 2 (PCS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)			
		1	2	3	1+2	1+3	2+3	1+2+3
Head SAR	Right Cheek	0.434	0.218	0.134	0.652	0.568	0.352	0.786
	Right Tilt	0.258	0.173	0.172	0.431	0.430	0.345	0.603
	Left Cheek	0.333	0.551	0.156	0.884	0.489	0.707	1.040
	Left Tilt	0.248	0.150	0.201	0.398	0.449	0.351	0.599

Simult Tx	Configuration	PCS CDMA SAR (W/kg)	LTE Band 2 (PCS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)			
		1	2	3	1+2	1+3	2+3	1+2+3
Head SAR	Right Cheek	0.450	0.218	0.134	0.668	0.584	0.352	0.802
	Right Tilt	0.132	0.173	0.172	0.305	0.304	0.345	0.477
	Left Cheek	0.274	0.551	0.156	0.825	0.430	0.707	0.981
	Left Tilt	0.112	0.150	0.201	0.262	0.313	0.351	0.463

13.4 Body-Worn Simultaneous Transmission Analysis

Table 13-2
Simultaneous Transmission Scenario (Body-Worn at 1.0 cm)

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)			
		1	2	3	1+2	1+3	2+3	1+2+3
Back Side	Cell. CDMA	0.481	0.618	0.170	1.099	0.651	0.788	1.269
Back Side	AWS CDMA	0.682	0.618	0.170	1.300	0.852	0.788	1.470
Back Side	PCS CDMA	0.564	0.618	0.170	1.182	0.734	0.788	1.352

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 2 (PCS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)			
		1	2	3	1+2	1+3	2+3	1+2+3
Back Side	Cell. CDMA	0.481	0.355	0.170	0.836	0.651	0.525	1.006
Back Side	AWS CDMA	0.682	0.355	0.170	1.037	0.852	0.525	1.207
Back Side	PCS CDMA	0.564	0.355	0.170	0.919	0.734	0.525	1.089

13.5 Hotspot SAR Simultaneous Transmission Analysis

Table 13-3
Simultaneous Transmission Scenario (Hotspot at 1.0 cm)

Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)			
		1	2	3	1+2	1+3	2+3	1+2+3
Body SAR	Back	0.481	0.618	0.170	N/A	N/A	0.788	1.269
	Front	0.239	0.449	0.040	N/A	N/A	0.489	0.728
	Top	-	-	0.145	N/A	N/A	0.145	0.145
	Bottom	0.106	0.206	-	N/A	N/A	0.206	0.312
	Right	0.267	-	-	N/A	N/A	0.000	0.267
	Left	-	0.322	0.036	N/A	N/A	0.358	0.358

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Simult Tx	Configuration	AWS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)			
		1	2	3	1+2	1+3	2+3	1+2+3
Body SAR	Back	0.682	0.618	0.170	N/A	N/A	0.788	1.470
	Front	0.293	0.449	0.040	N/A	N/A	0.489	0.782
	Top	-	-	0.145	N/A	N/A	0.145	0.145
	Bottom	0.630	0.206	-	N/A	N/A	0.206	0.836
	Right	0.184	-	-	N/A	N/A	0.000	0.184
	Left	-	0.322	0.036	N/A	N/A	0.358	0.358
Simult Tx	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)			
		1	2	3	1+2	1+3	2+3	1+2+3
Body SAR	Back	0.564	0.618	0.170	N/A	N/A	0.788	1.352
	Front	0.313	0.449	0.040	N/A	N/A	0.489	0.802
	Top	-	-	0.145	N/A	N/A	0.145	0.145
	Bottom	0.549	0.206	-	N/A	N/A	0.206	0.755
	Right	0.179	-	-	N/A	N/A	0.000	0.179
	Left	-	0.322	0.036	N/A	N/A	0.358	0.358
Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 2 (PCS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)			
		1	2	3	1+2	1+3	2+3	1+2+3
Body SAR	Back	0.481	0.355	0.170	N/A	N/A	0.525	1.006
	Front	0.239	0.369	0.040	N/A	N/A	0.409	0.648
	Top	-	-	0.145	N/A	N/A	0.145	0.145
	Bottom	0.106	0.050	-	N/A	N/A	0.050	0.156
	Right	0.267	-	-	N/A	N/A	0.000	0.267
	Left	-	0.253	0.036	N/A	N/A	0.289	0.289
Simult Tx	Configuration	AWS CDMA SAR (W/kg)	LTE Band 2 (PCS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)			
		1	2	3	1+2	1+3	2+3	1+2+3
Body SAR	Back	0.682	0.355	0.170	N/A	N/A	0.525	1.207
	Front	0.293	0.369	0.040	N/A	N/A	0.409	0.702
	Top	-	-	0.145	N/A	N/A	0.145	0.145
	Bottom	0.630	0.050	-	N/A	N/A	0.050	0.680
	Right	0.184	-	-	N/A	N/A	0.000	0.184
	Left	-	0.253	0.036	N/A	N/A	0.289	0.289
Simult Tx	Configuration	PCS CDMA SAR (W/kg)	LTE Band 2 (PCS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)			
		1	2	3	1+2	1+3	2+3	1+2+3
Body SAR	Back	0.564	0.355	0.170	N/A	N/A	0.525	1.089
	Front	0.313	0.369	0.040	N/A	N/A	0.409	0.722
	Top	-	-	0.145	N/A	N/A	0.145	0.145
	Bottom	0.549	0.050	-	N/A	N/A	0.050	0.599
	Right	0.179	-	-	N/A	N/A	0.000	0.179
	Left	-	0.253	0.036	N/A	N/A	0.289	0.289

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

13.6 Simultaneous Transmission Conclusion

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

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14 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/8/2011	Annual	4/8/2012	MY45470194
Agilent	8753E	(30kHz-6GHz) Network Analyzer	4/21/2011	Annual	4/21/2012	JP38020182
Agilent	8648D	(9kHz-4GHz) Signal Generator	10/10/2011	Annual	10/10/2012	3613A00315
Agilent	8648D	Signal Generator	4/5/2011	Annual	4/5/2012	3629U00687
Agilent	E5515C	Wireless Communications Test Set	10/10/2011	Annual	10/10/2012	GB46110872
Agilent	E5515C	Wireless Communications Test Set	10/20/2011	Annual	10/20/2012	GB46310798
Agilent	E5515C	Wireless Communications Test Set	10/14/2011	Annual	10/14/2012	GB41450275
Agilent	E5515C	Wireless Communications Test Set	2/14/2012	Annual	2/14/2013	GB43304447
Agilent	E5515C	Wireless Communications Test Set	2/12/2012	Annual	2/12/2013	GB45360985
Agilent	E5515C	Wireless Communications Test Set	2/14/2012	Annual	2/14/2013	GB43163447
Agilent	E5515C	Wireless Communications Test Set	2/9/2012	Annual	2/9/2013	GB43460554
Agilent	E5515C	Wireless Communications Tester	4/21/2011	Annual	4/21/2012	US41140256
Amplifier Research	5S1G4	5W, 800MHz-4.2GHz	N/A		N/A	21910
Anritsu	ML2438A	Power Meter	2/14/2012	Annual	2/14/2013	1190013
Anritsu	ML2438A	Power Meter	2/14/2012	Annual	2/14/2013	98150041
Anritsu	ML2438A	Power Meter	10/13/2011	Annual	10/13/2012	1070030
Anritsu	ML2495A	Power Meter	10/13/2011	Annual	10/13/2012	1039008
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	5318
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	5442
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	5821
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	8013
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	2400
Anritsu	MA2411B	Pulse Sensor	10/13/2011	Annual	10/13/2012	1027293
Anritsu	MT8820C	Radio Communication Tester	11/11/2011	Annual	11/11/2012	6200901190
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
Gigatronics	80701A	(0.05-18GHz) Power Sensor	10/12/2011	Annual	10/12/2012	1833460
Gigatronics	8651A	Universal Power Meter	10/12/2011	Annual	10/12/2012	8650319
Index SAR	IXTL-030	30MM TEM line for 6 GHz	N/A		N/A	N/A
Index SAR	IXTL-010	Dielectric Measurement Kit	N/A		N/A	N/A
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	N/A	R8979500903
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	N/A	N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	N/A	N/A
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	N/A	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	N/A	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	N/A	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	N/A	9406
Narda	BW-53W2	Attenuator (3dB)	CBT	N/A	N/A	120
Pasternack	PE2208-6	Bidirectional Coupler	6/3/2011	Annual	6/3/2012	N/A
Pasternack	PE2209-10	Bidirectional Coupler	6/3/2011	Annual	6/3/2012	N/A
Rohde & Schwarz	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
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/25/2011	Annual	8/25/2012	100976
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	10/7/2011	Annual	10/7/2012	103962
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/5/2011	Annual	8/5/2012	112347
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	11/30/2011	Annual	11/30/2012	101699
Rohde & Schwarz	SMI03B	Signal Generator	4/6/2011	Annual	4/6/2012	DE27259
SPEAG	D1750V2	1750 MHz SAR Dipole	5/24/2011	Annual	5/24/2012	1051
SPEAG	D1900V2	1900 MHz SAR Dipole	7/11/2011	Annual	7/11/2012	5d141
SPEAG	D2450V2	2450 MHz SAR Dipole	8/19/2011	Annual	8/19/2012	719
SPEAG	D835V2	835 MHz SAR Dipole	8/15/2011	Annual	8/15/2012	4d026
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/20/2011	Annual	4/20/2012	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/19/2011	Annual	5/19/2012	859
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/18/2012	Annual	1/18/2013	1272
Speag	DAK-3.5	Dielectric Assessment Kit	12/1/2011	Annual	12/1/2012	1031
SPEAG	ES3DV2	SAR Probe	8/25/2011	Annual	8/25/2012	3022
SPEAG	ES3DV3	SAR Probe	3/24/2011	Annual	3/24/2012	3213
SPEAG	ES3DV3	SAR Probe	4/18/2011	Annual	4/18/2012	3209
VWR	61220-416	Long Stem Thermometer	7/1/2011	Biennial	7/1/2013	111642834
VWR	61220-416	Long stem thermometer	7/1/2011	Biennial	7/1/2013	111642916
VWR	61220-416	Long Stem Thermometer	7/1/2011	Biennial	7/1/2013	111642941
VWR	36934-158	Wall Thermometer	9/30/2011	Biennial	9/30/2013	111859323
VWR	36934-158	Wall Thermometer	9/30/2011	Biennial	9/30/2013	111859332
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

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

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15 MEASUREMENT UNCERTAINTIES

Applicable for frequencies less than 3000 MHz.

a	b	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	IEEE 1528 Sec.	Tol. (± %)	Prob. Dist.	Div.	c _f 1gm	c _g 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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16 CONCLUSION

16.1 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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APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

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

Medium: 835 Head Medium parameters used (interpolated):

$f = 824.7 \text{ MHz}$; $\sigma = 0.914 \text{ mho/m}$; $\epsilon_r = 42.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-23-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV2 - SN3022; ConvF(6.05, 6.05, 6.05); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

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

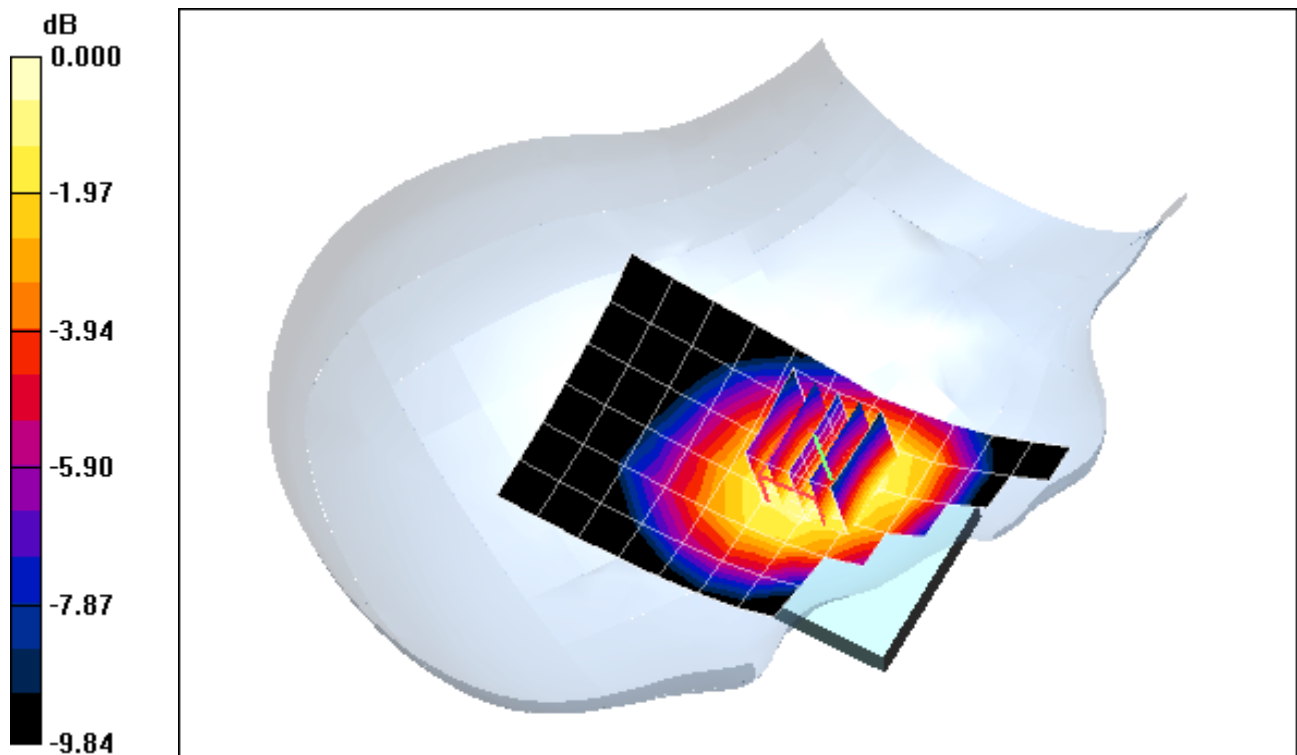
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 14.5 V/m; Power Drift = 0.174 dB

Peak SAR (extrapolated) = 0.231 W/kg

SAR(1 g) = 0.173 mW/g; SAR(10 g) = 0.130 mW/g



0 dB = 0.186mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

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

Medium: 835 Head Medium parameters used (interpolated):

$f = 824.7 \text{ MHz}$; $\sigma = 0.914 \text{ mho/m}$; $\epsilon_r = 42.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-23-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV2 - SN3022; ConvF(6.05, 6.05, 6.05); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

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

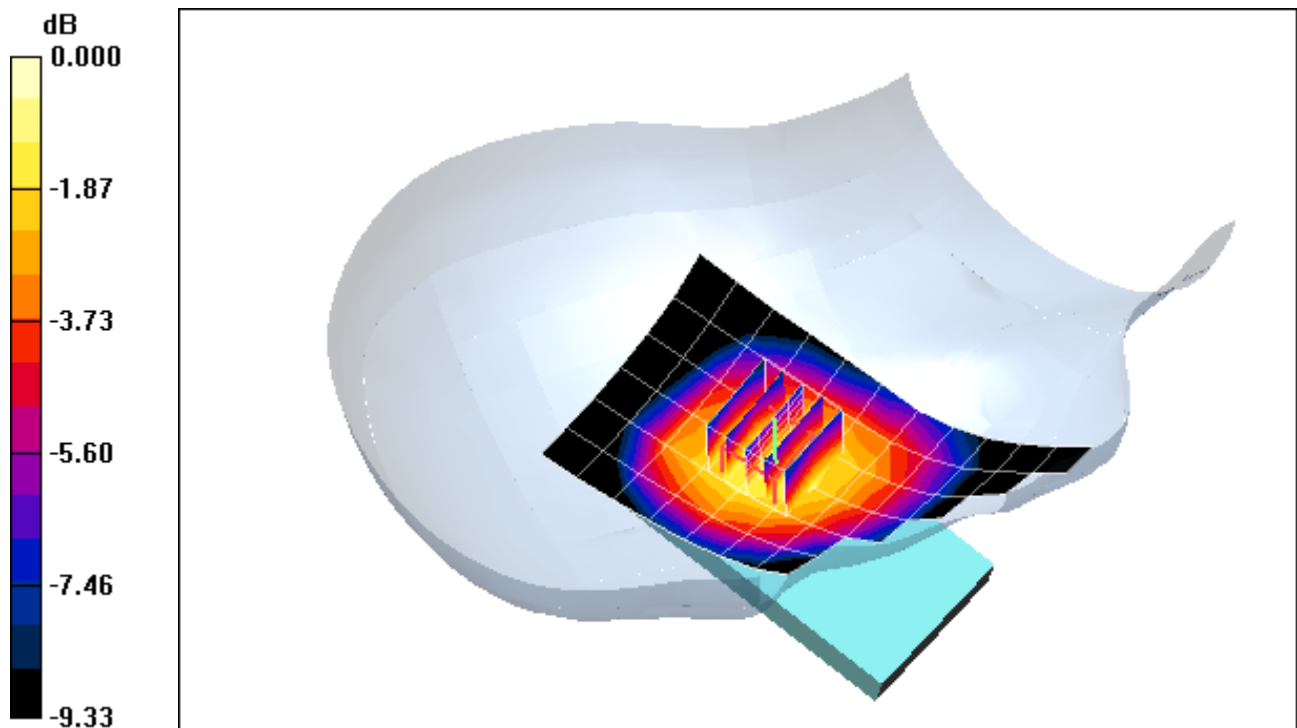
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 12.6 V/m; Power Drift = 0.111 dB

Peak SAR (extrapolated) = 0.186 W/kg

SAR(1 g) = 0.142 mW/g; SAR(10 g) = 0.105 mW/g



0 dB = 0.157mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

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

Medium: 835 Head Medium parameters used (interpolated):

$f = 824.7 \text{ MHz}$; $\sigma = 0.914 \text{ mho/m}$; $\epsilon_r = 42.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-23-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV2 - SN3022; ConvF(6.05, 6.05, 6.05); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

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

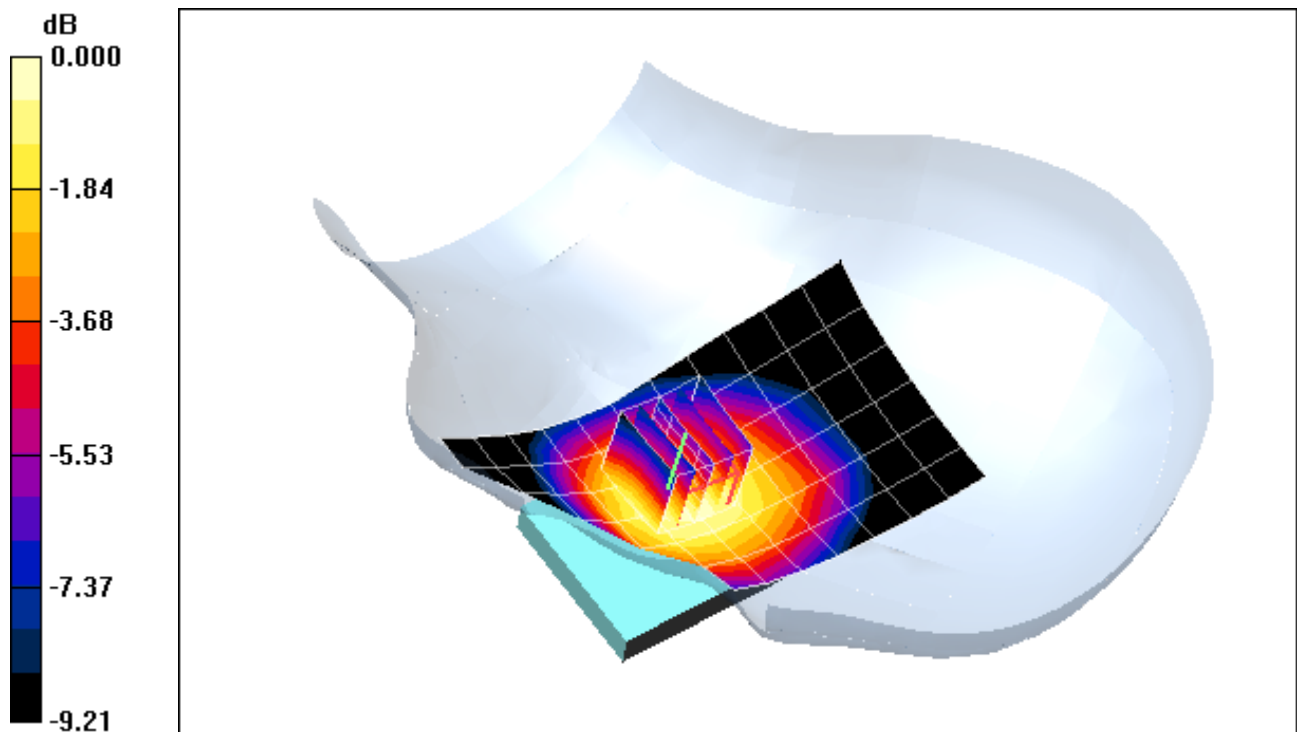
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 13.2 V/m; Power Drift = -0.087 dB

Peak SAR (extrapolated) = 0.165 W/kg

SAR(1 g) = 0.135 mW/g; SAR(10 g) = 0.104 mW/g



0 dB = 0.140mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

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

Medium: 835 Head Medium parameters used (interpolated):

$f = 824.7 \text{ MHz}$; $\sigma = 0.914 \text{ mho/m}$; $\epsilon_r = 42.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-23-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV2 - SN3022; ConvF(6.05, 6.05, 6.05); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

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

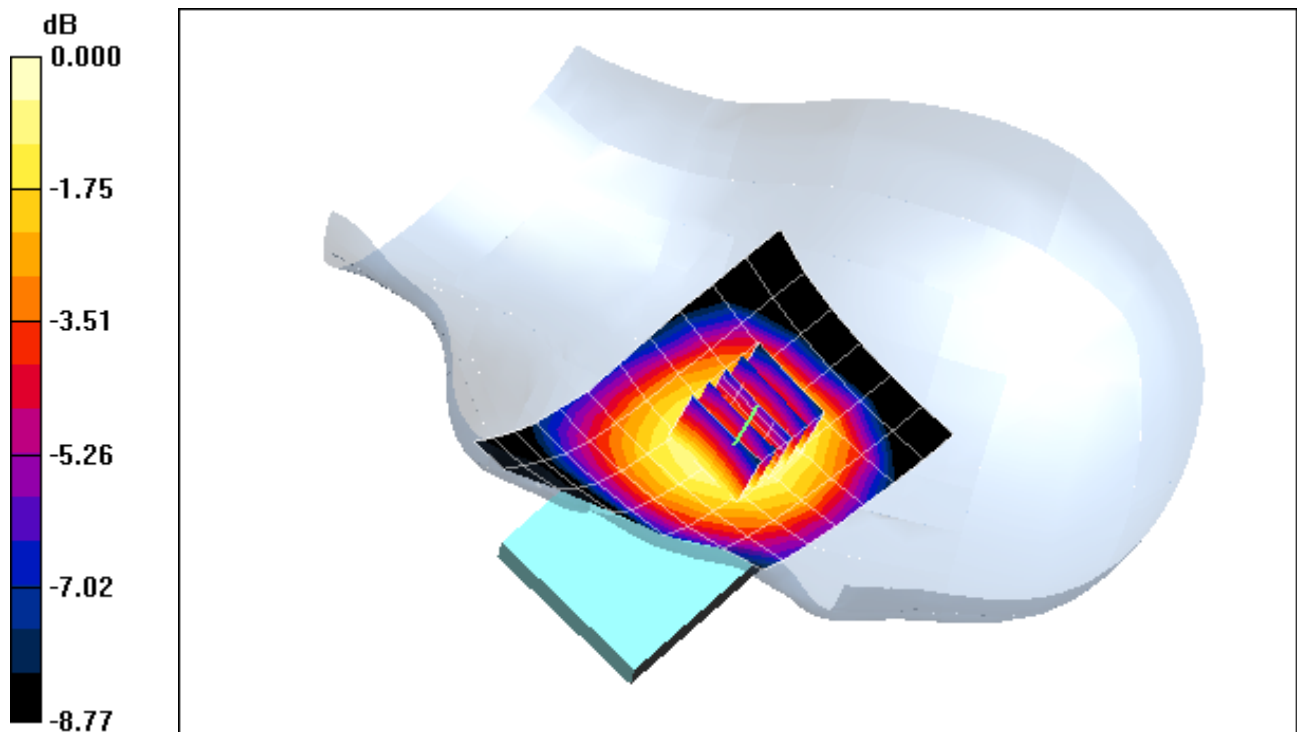
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 11.4 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 0.129 W/kg

SAR(1 g) = 0.103 mW/g; SAR(10 g) = 0.079 mW/g



0 dB = 0.109mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

Communication System: AWS CDMA; Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 40.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-21-2012; Ambient Temp: 24.7 °C; Tissue Temp: 22.5 °C

Probe: ES3DV3 - SN3213; ConvF(5.2, 5.2, 5.2); Calibrated: 3/24/2011

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: AWS CDMA, Right Head, Touch, Mid.ch

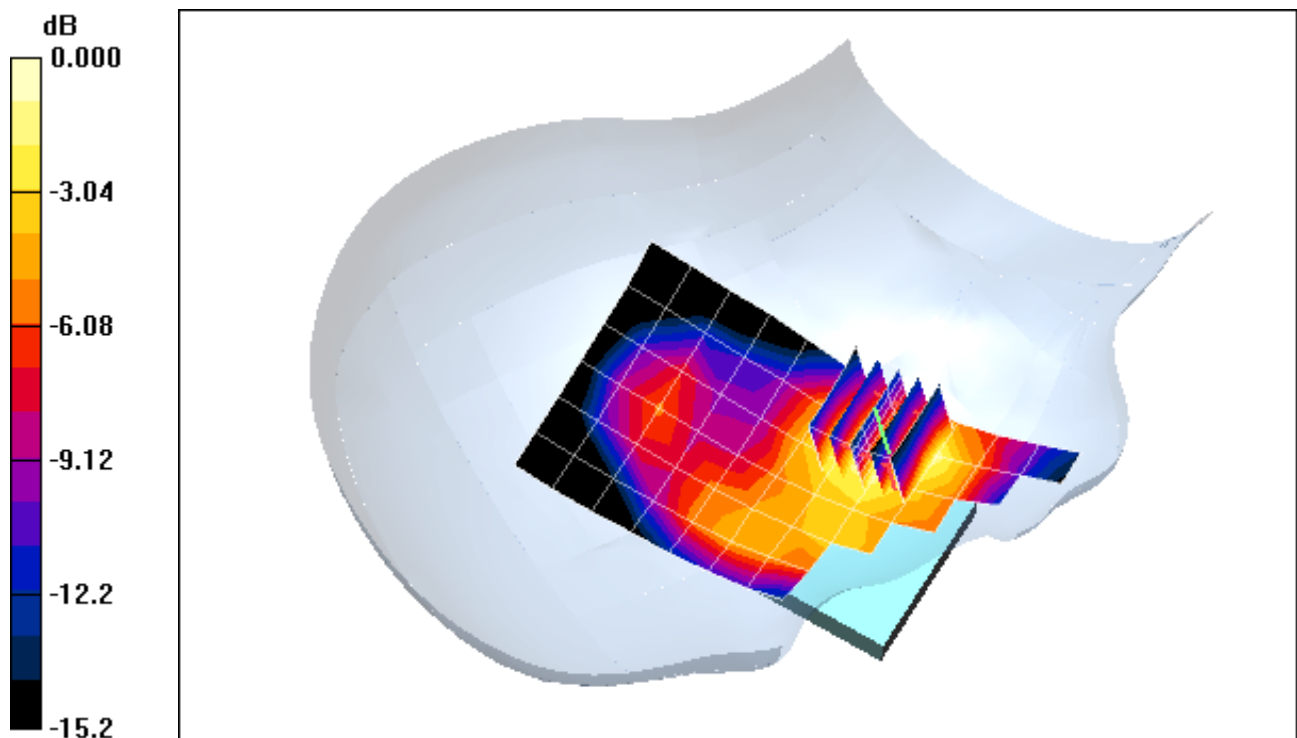
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 19.5 V/m; Power Drift = -0.081 dB

Peak SAR (extrapolated) = 0.726 W/kg

SAR(1 g) = 0.434 mW/g; SAR(10 g) = 0.249 mW/g



0 dB = 0.480mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

Communication System: AWS CDMA; Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 40.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-21-2012; Ambient Temp: 24.7 °C; Tissue Temp: 22.5 °C

Probe: ES3DV3 - SN3213; ConvF(5.2, 5.2, 5.2); Calibrated: 3/24/2011

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: AWS CDMA, Right Head, Tilt, Mid.ch

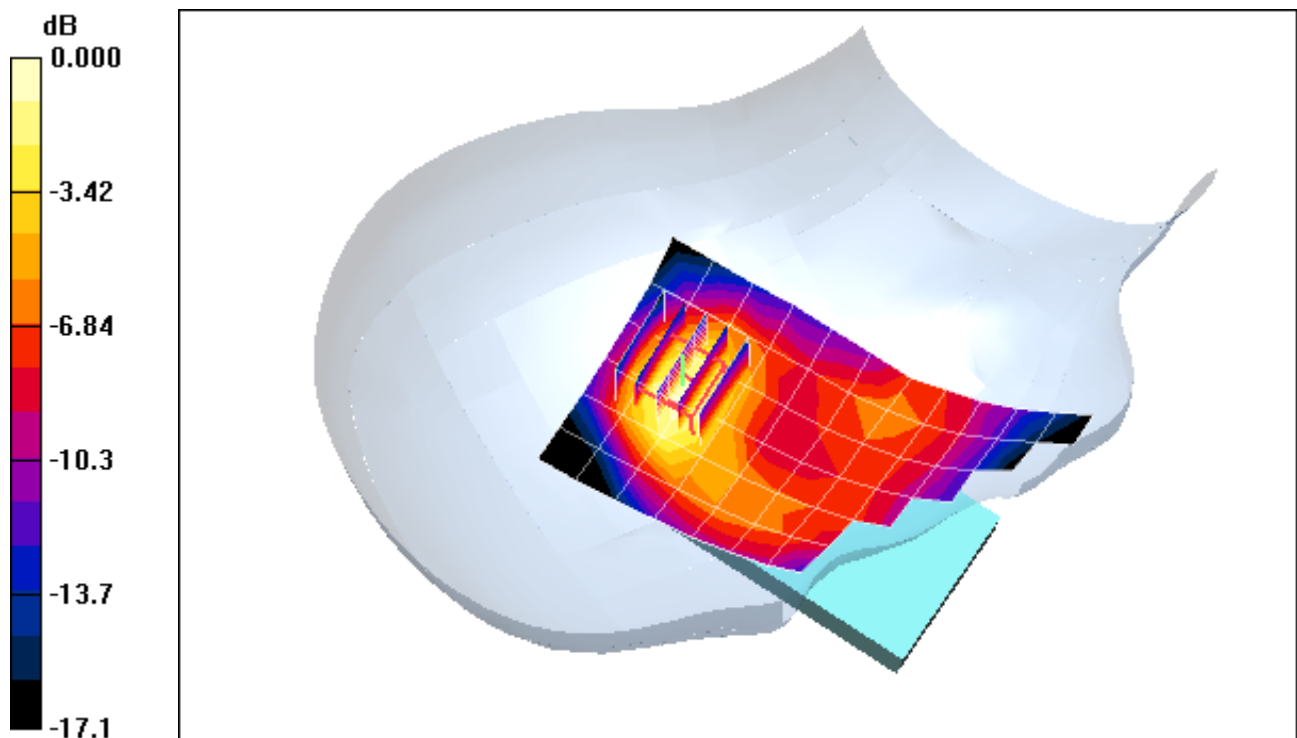
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 15.5 V/m; Power Drift = -0.006 dB

Peak SAR (extrapolated) = 0.428 W/kg

SAR(1 g) = 0.258 mW/g; SAR(10 g) = 0.145 mW/g



0 dB = 0.279mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

Communication System: AWS CDMA; Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 40.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-21-2012; Ambient Temp: 24.7 °C; Tissue Temp: 22.5 °C

Probe: ES3DV3 - SN3213; ConvF(5.2, 5.2, 5.2); Calibrated: 3/24/2011

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: AWS CDMA, Left Head, Touch, Mid.ch

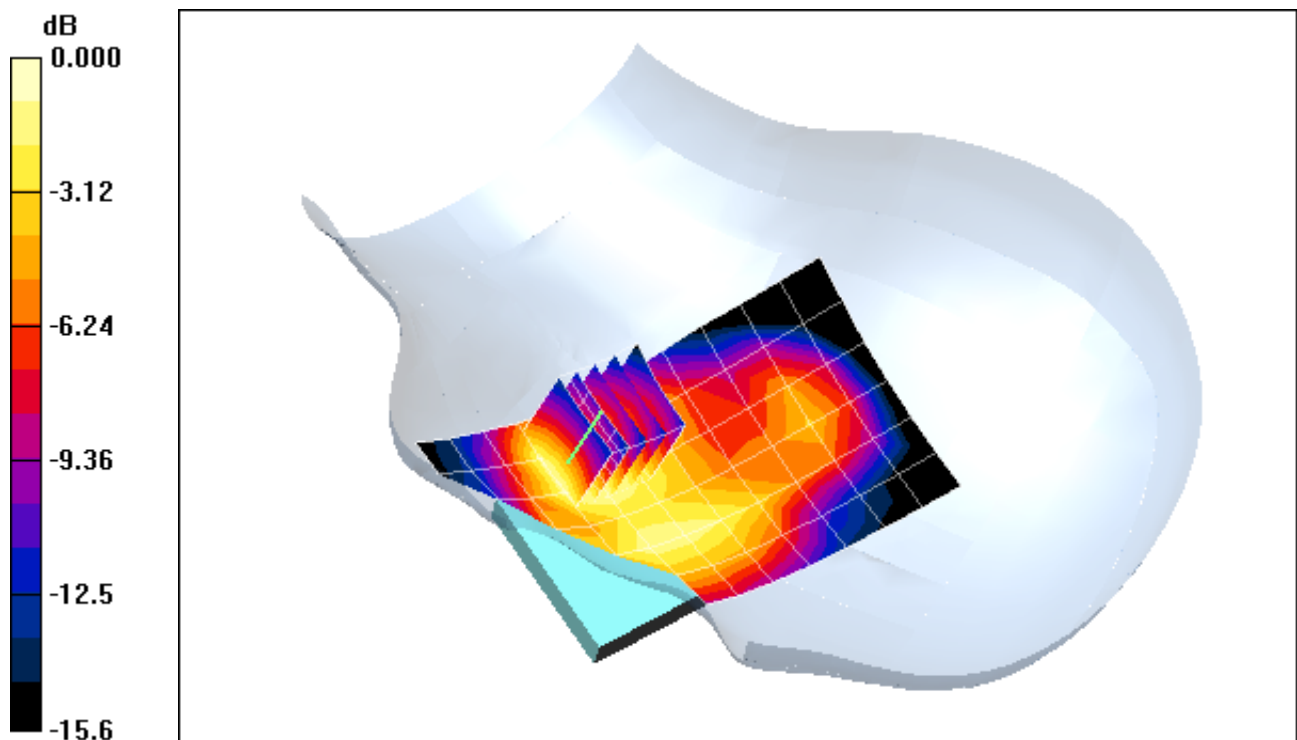
Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 16.6 V/m; Power Drift = -0.193 dB

Peak SAR (extrapolated) = 0.488 W/kg

SAR(1 g) = 0.333 mW/g; SAR(10 g) = 0.214 mW/g



0 dB = 0.354mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

Communication System: AWS CDMA; Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 40.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-21-2012; Ambient Temp: 24.7 °C; Tissue Temp: 22.5 °C

Probe: ES3DV3 - SN3213; ConvF(5.2, 5.2, 5.2); Calibrated: 3/24/2011

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: AWS CDMA, Left Head, Tilt, Mid.ch

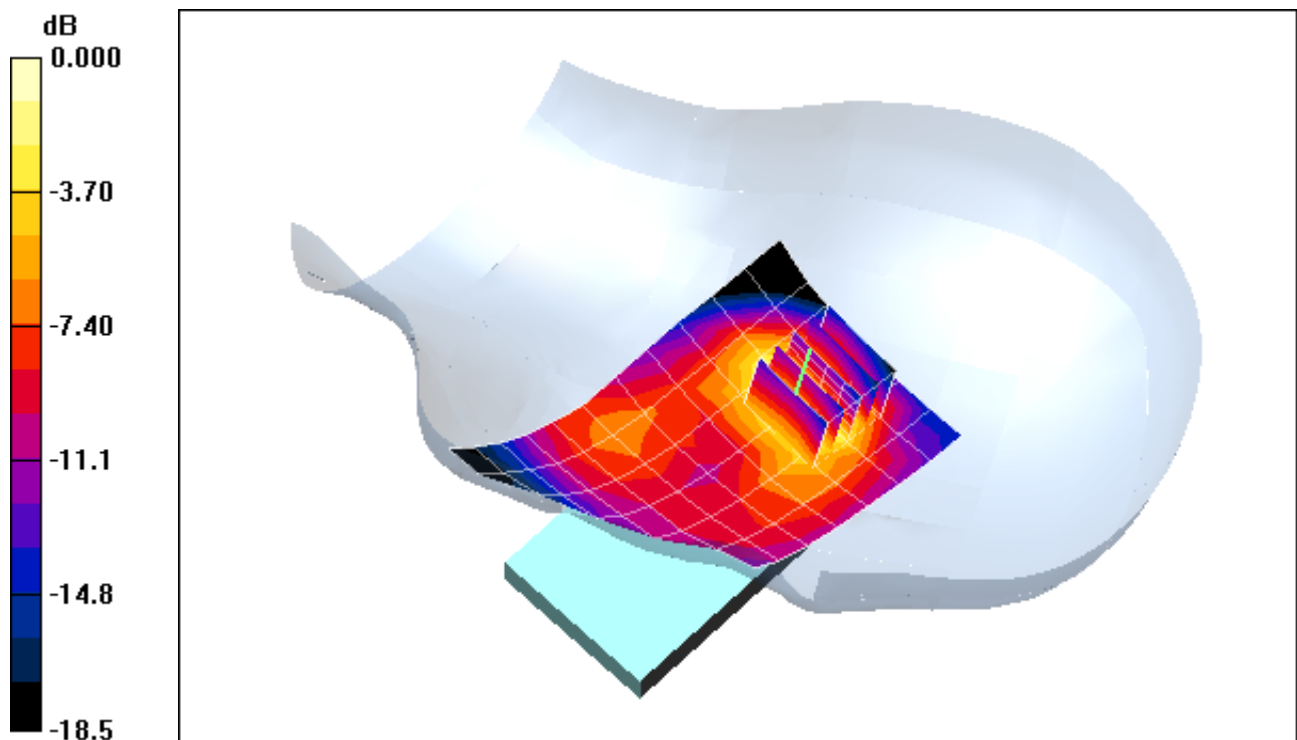
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 15.4 V/m; Power Drift = -0.027 dB

Peak SAR (extrapolated) = 0.411 W/kg

SAR(1 g) = 0.248 mW/g; SAR(10 g) = 0.139 mW/g



0 dB = 0.270mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: LTE B4

Communication System: LTE RF; Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.41 \text{ mho/m}$; $\epsilon_r = 38.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-28-2012; Ambient Temp: 24.3 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3209; ConvF(5.33, 5.33, 5.33); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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 4 (AWS), Right Head, Touch
5 MHz BW, Mid.ch, QPSK, 1 RB, 0 RB Offset

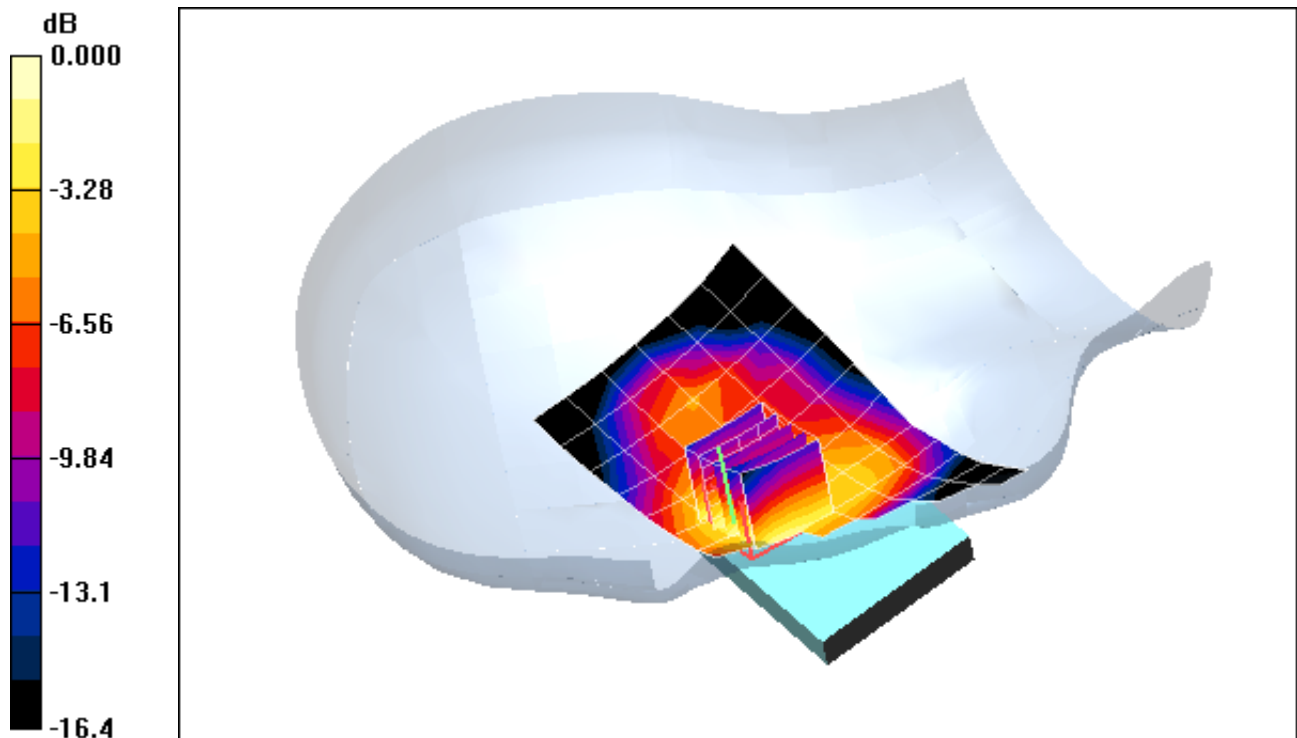
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 17.4 V/m; Power Drift = 0.043 dB

Peak SAR (extrapolated) = 0.543 W/kg

SAR(1 g) = 0.358 mW/g; SAR(10 g) = 0.226 mW/g



0 dB = 0.377mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: LTE B4

Communication System: LTE RF; Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.41 \text{ mho/m}$; $\epsilon_r = 38.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-28-2012; Ambient Temp: 24.3 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3209; ConvF(5.33, 5.33, 5.33); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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 4 (AWS), Right Head, Tilt
5 MHz BW, Mid.ch, QPSK, 1 RB, 0 RB Offset**

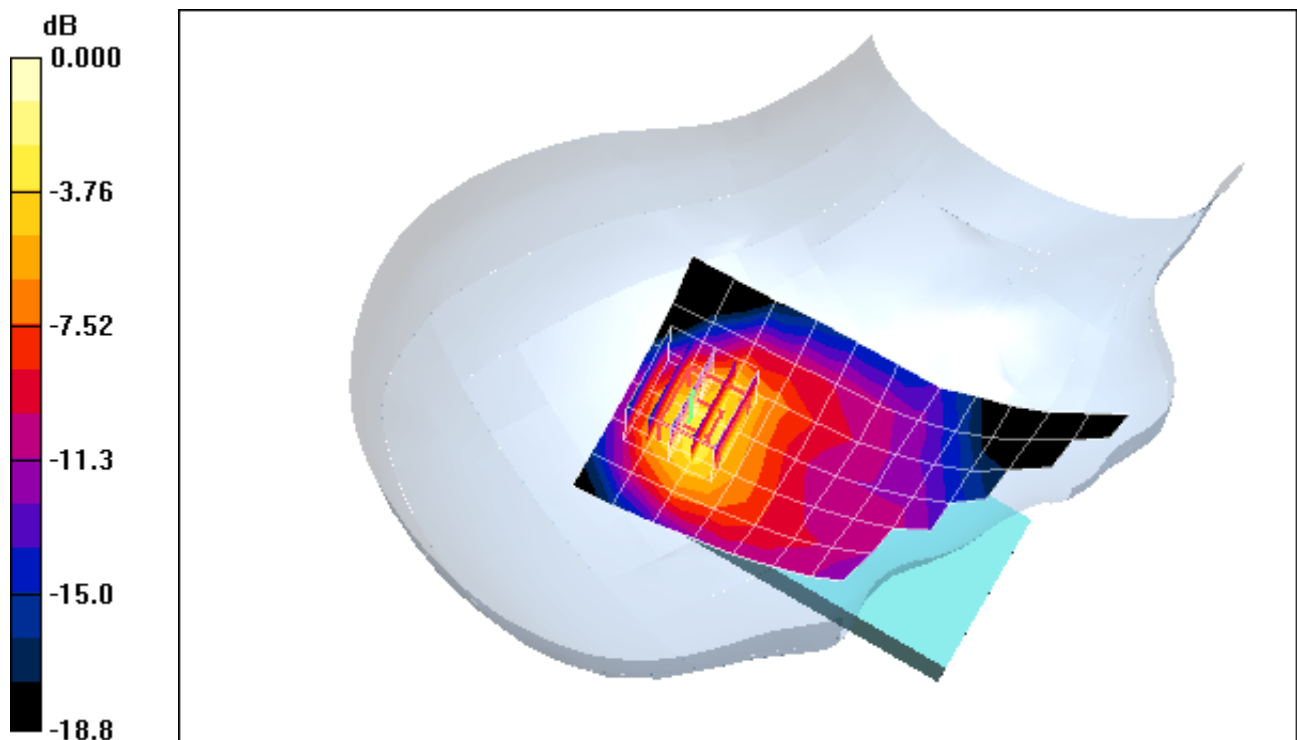
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 18.0 V/m; Power Drift = -0.101 dB

Peak SAR (extrapolated) = 0.575 W/kg

SAR(1 g) = 0.354 mW/g; SAR(10 g) = 0.205 mW/g



0 dB = 0.380mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: LTE B4

Communication System: LTE RF; Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.41 \text{ mho/m}$; $\epsilon_r = 38.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-28-2012; Ambient Temp: 24.3 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3209; ConvF(5.33, 5.33, 5.33); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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 4 (AWS), Left Head, Touch
5 MHz BW, Mid.ch, QPSK, 1 RB, 0 RB Offset

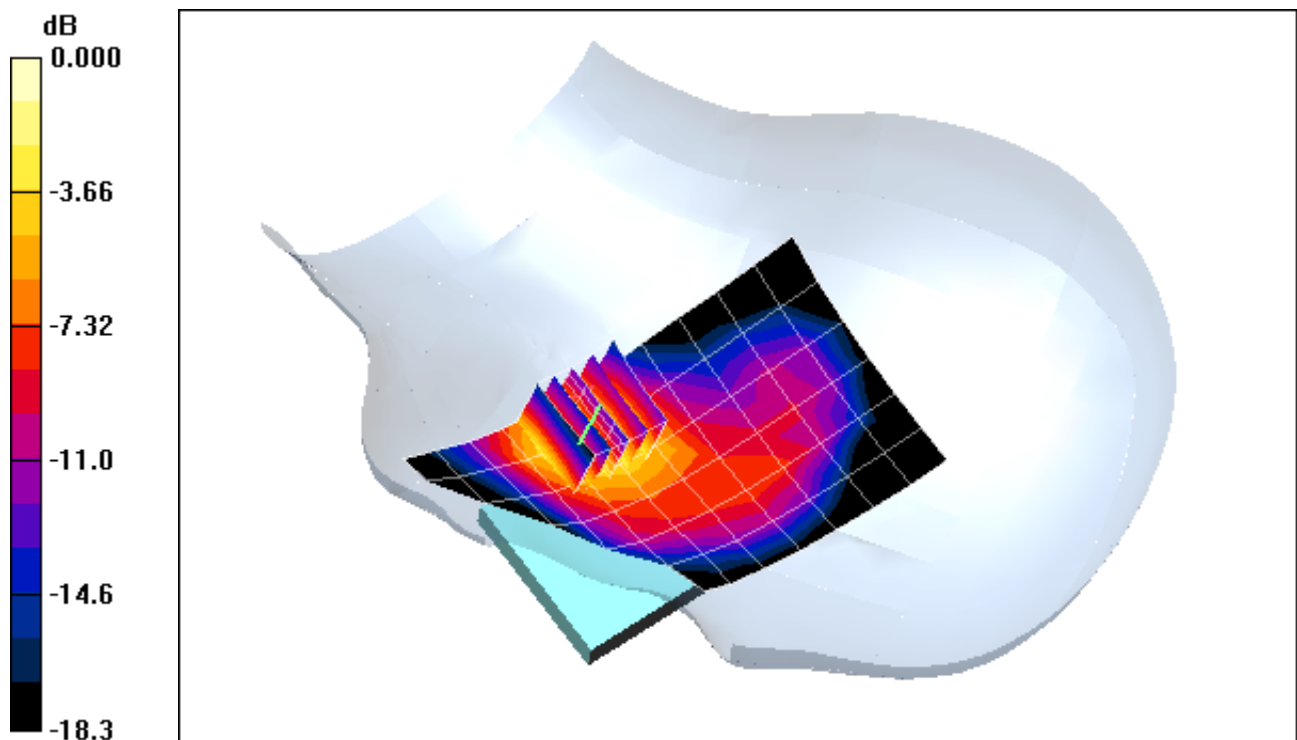
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 26.6 V/m; Power Drift = -0.019 dB

Peak SAR (extrapolated) = 1.29 W/kg

SAR(1 g) = 0.781 mW/g; SAR(10 g) = 0.447 mW/g



0 dB = 0.874mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: LTE B4

Communication System: LTE RF; Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.41 \text{ mho/m}$; $\epsilon_r = 38.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-28-2012; Ambient Temp: 24.3 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3209; ConvF(5.33, 5.33, 5.33); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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 4 (AWS), Left Head, Tilt
5 MHz BW, Mid.ch, QPSK, 1 RB, 0 RB Offset**

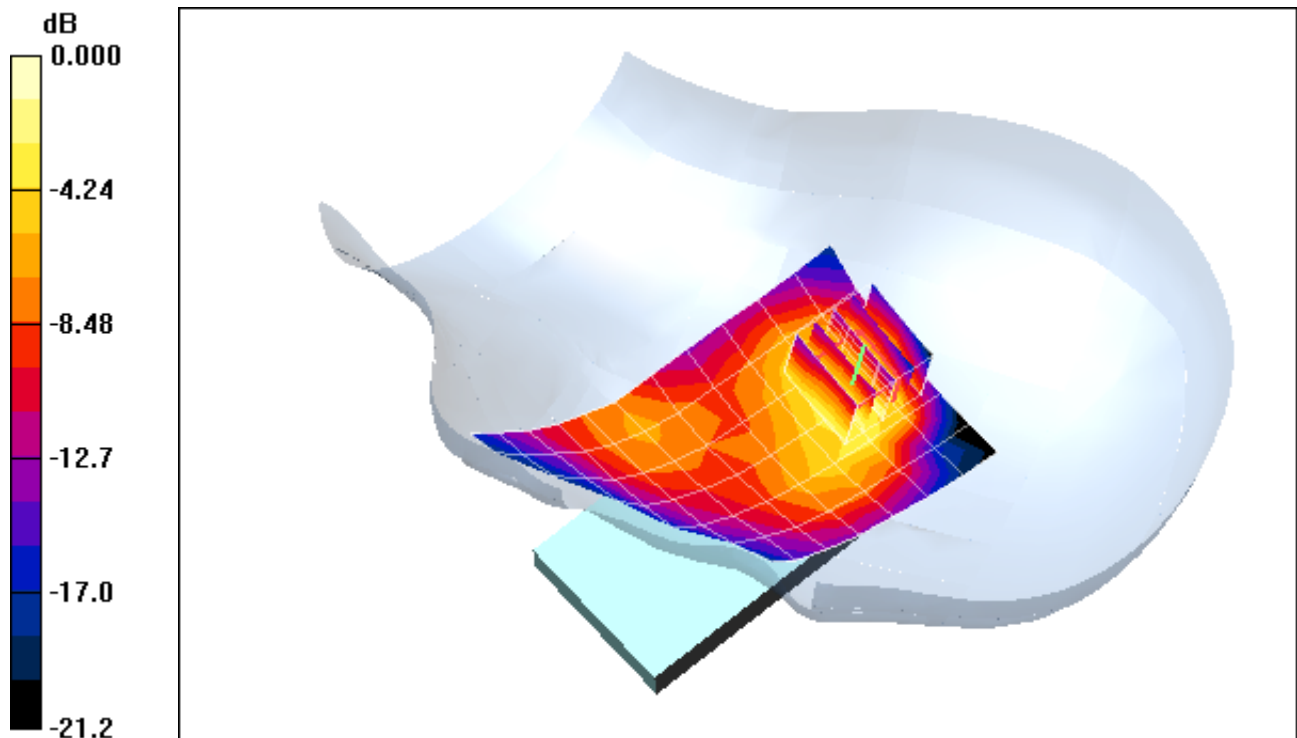
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 17.2 V/m; Power Drift = -0.141 dB

Peak SAR (extrapolated) = 0.515 W/kg

SAR(1 g) = 0.315 mW/g; SAR(10 g) = 0.184 mW/g



0 dB = 0.344mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

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

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-23-2012; Ambient Temp: 24.5 °C; Tissue Temp: 22.0 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

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

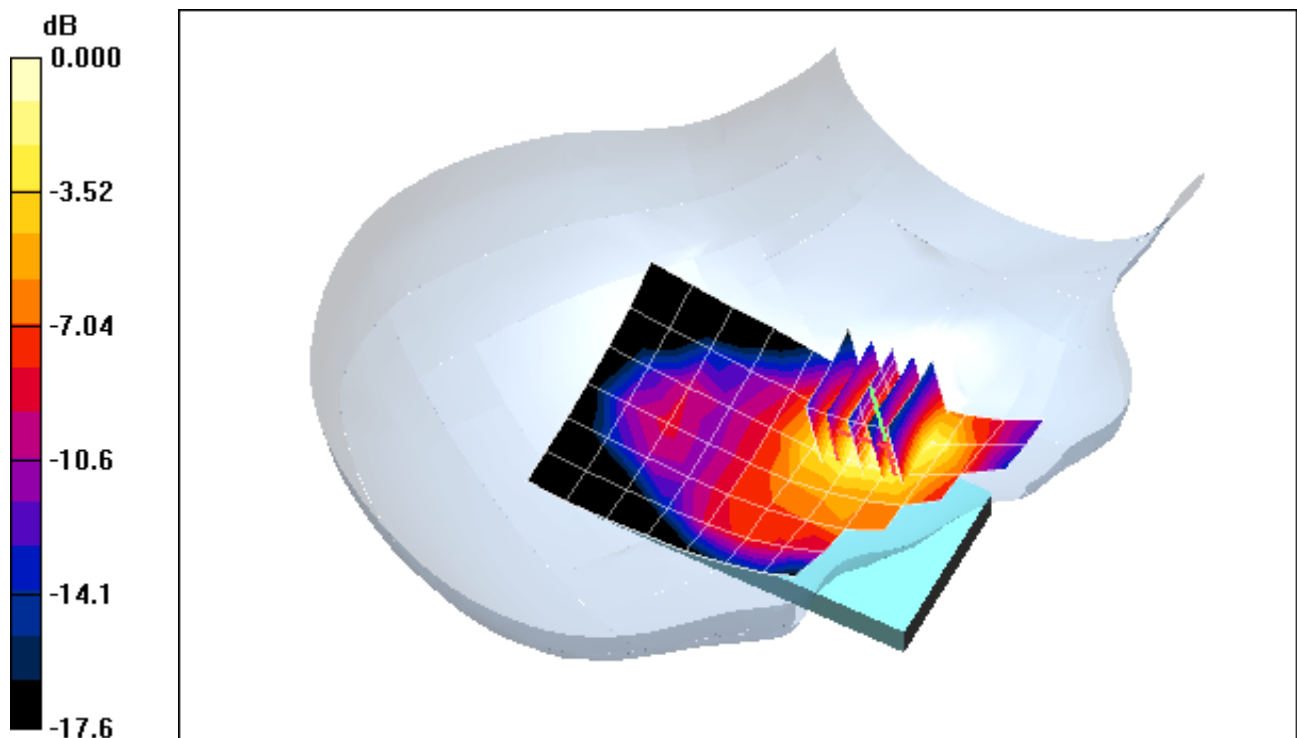
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 19.4 V/m; Power Drift = 0.074 dB

Peak SAR (extrapolated) = 0.772 W/kg

SAR(1 g) = 0.450 mW/g; SAR(10 g) = 0.253 mW/g



0 dB = 0.486mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

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

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-23-2012; Ambient Temp: 24.5 °C; Tissue Temp: 22.0 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

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

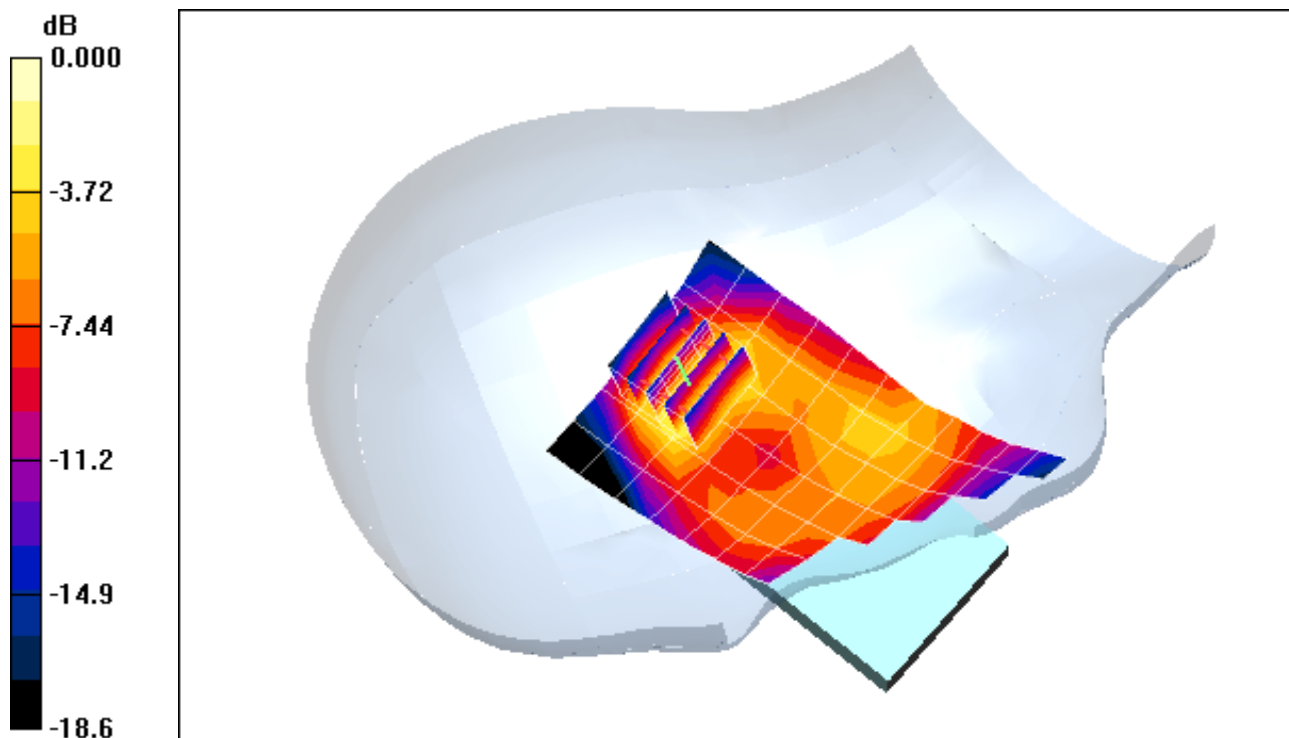
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 9.96 V/m; Power Drift = 0.100 dB

Peak SAR (extrapolated) = 0.231 W/kg

SAR(1 g) = 0.132 mW/g; SAR(10 g) = 0.072 mW/g



0 dB = 0.147mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

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

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-23-2012; Ambient Temp: 24.5 °C; Tissue Temp: 22.0 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

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

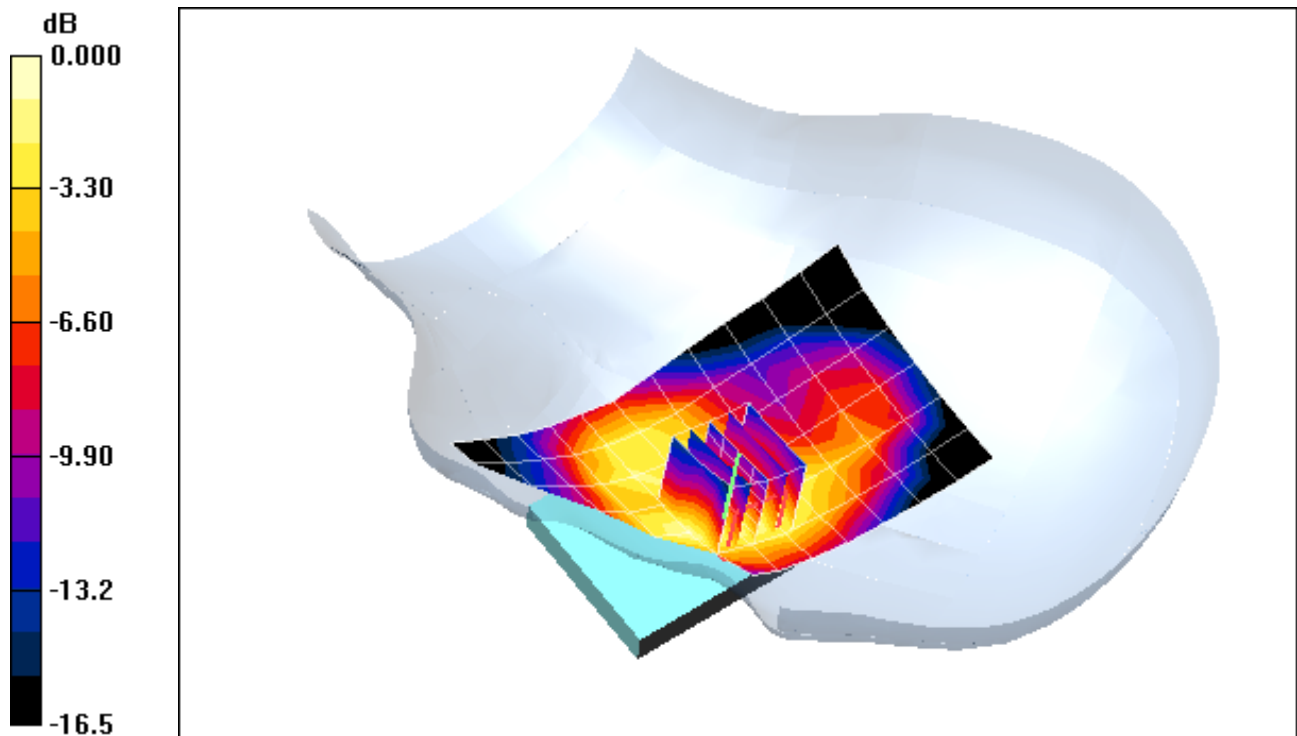
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 15.6 V/m; Power Drift = -0.050 dB

Peak SAR (extrapolated) = 0.429 W/kg

SAR(1 g) = 0.274 mW/g; SAR(10 g) = 0.166 mW/g



0 dB = 0.288mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

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

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-23-2012; Ambient Temp: 24.5 °C; Tissue Temp: 22.0 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

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

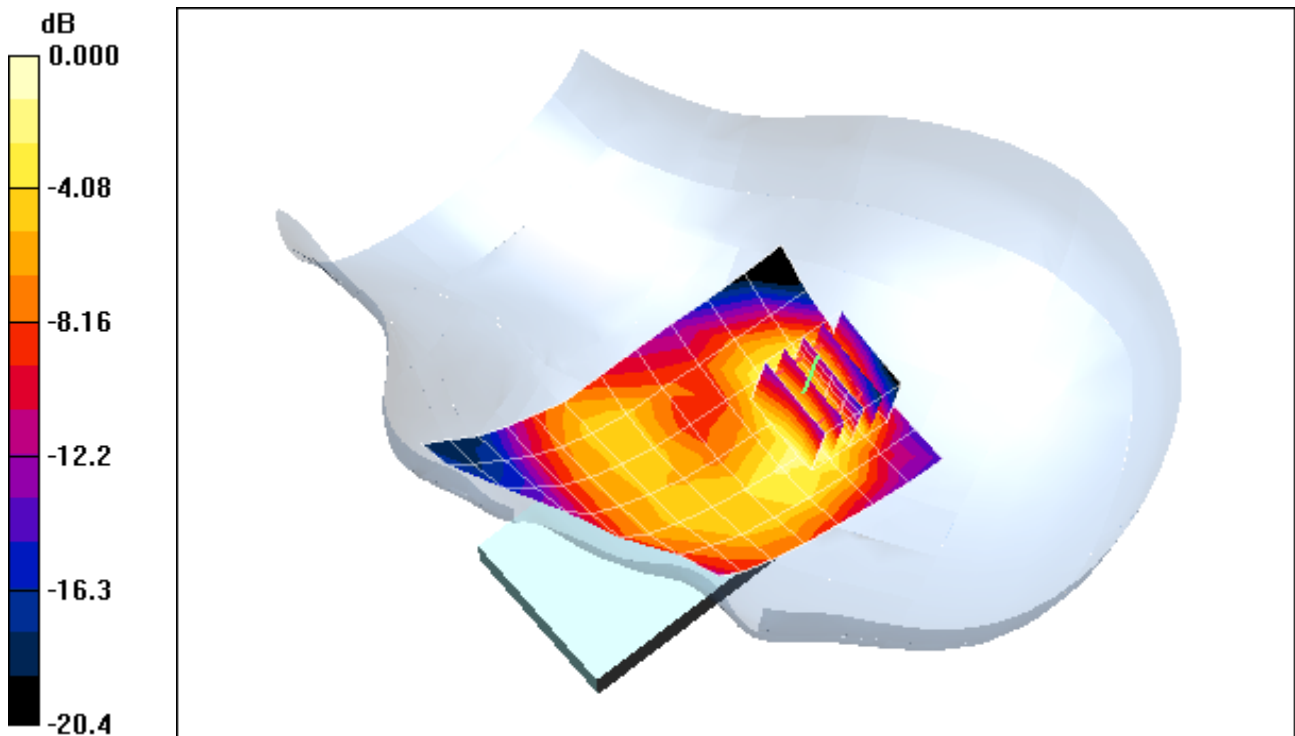
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 8.58 V/m; Power Drift = -0.009 dB

Peak SAR (extrapolated) = 0.193 W/kg

SAR(1 g) = 0.112 mW/g; SAR(10 g) = 0.064 mW/g



0 dB = 0.123mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: LTE B2

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

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-23-2012; Ambient Temp: 24.5 °C; Tissue Temp: 22.0 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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 2 (PCS), Right Head, Touch,
Mid.ch, 5 MHz BW, QPSK, 1 RB, 24 RB Offset**

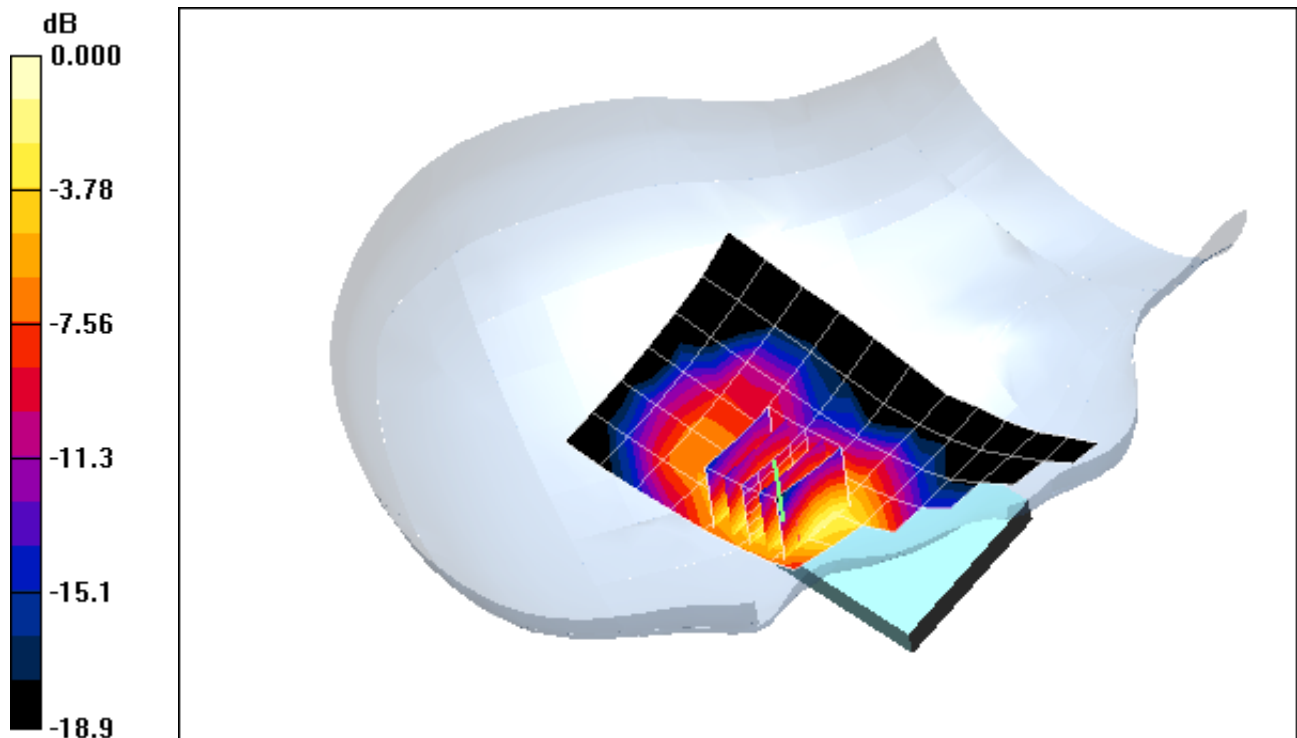
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 13.9 V/m; Power Drift = 0.021 dB

Peak SAR (extrapolated) = 0.332 W/kg

SAR(1 g) = 0.218 mW/g; SAR(10 g) = 0.135 mW/g



0 dB = 0.237mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: LTE B2

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

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-23-2012; Ambient Temp: 24.5 °C; Tissue Temp: 22.0 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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 2 (PCS), Right Head, Tilt
5 MHz BW, Mid.ch, QPSK, 1 RB, 24 RB Offset**

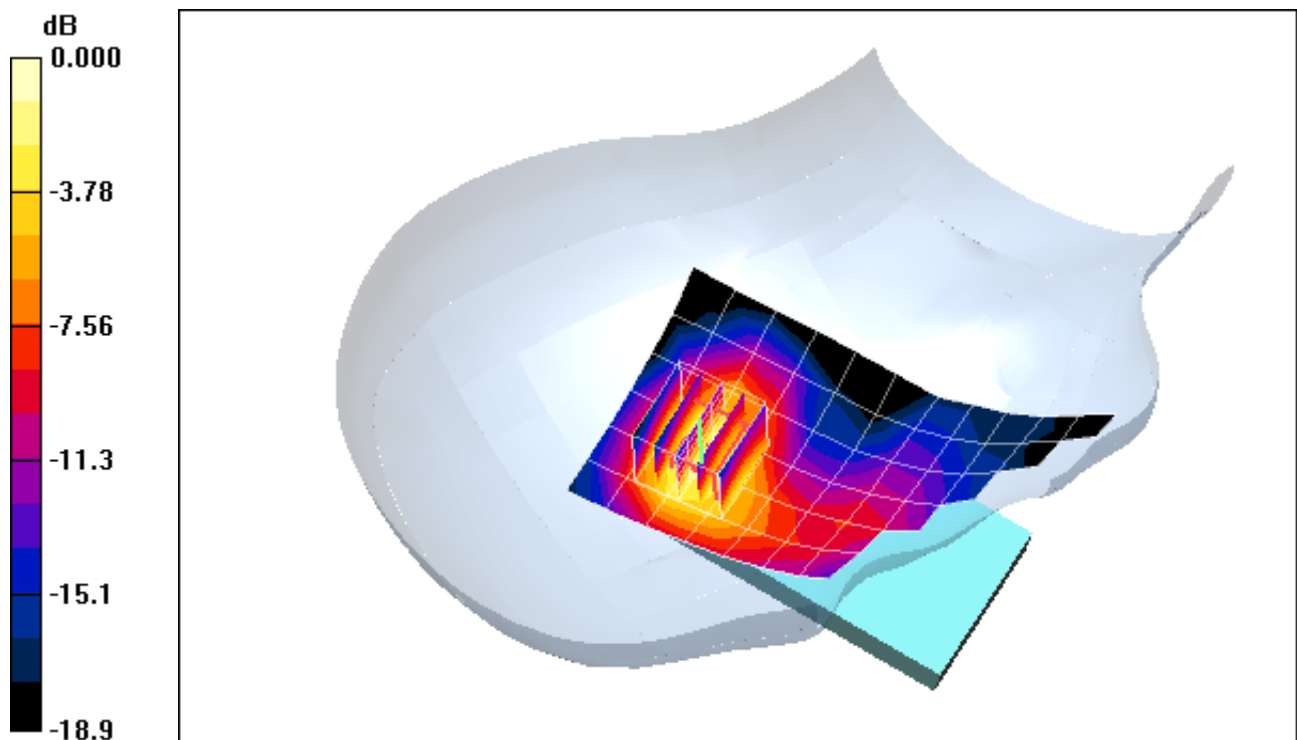
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 12.1 V/m; Power Drift = -0.127 dB

Peak SAR (extrapolated) = 0.308 W/kg

SAR(1 g) = 0.173 mW/g; SAR(10 g) = 0.098 mW/g



0 dB = 0.183mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: LTE B2

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

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-23-2012; Ambient Temp: 24.5 $^{\circ}\text{C}$; Tissue Temp: 22.0 $^{\circ}\text{C}$

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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 2 (PCS), Left Head, Touch
5 MHz BW, Mid. Ch, QPSK, 1 RB, 24RB Offset

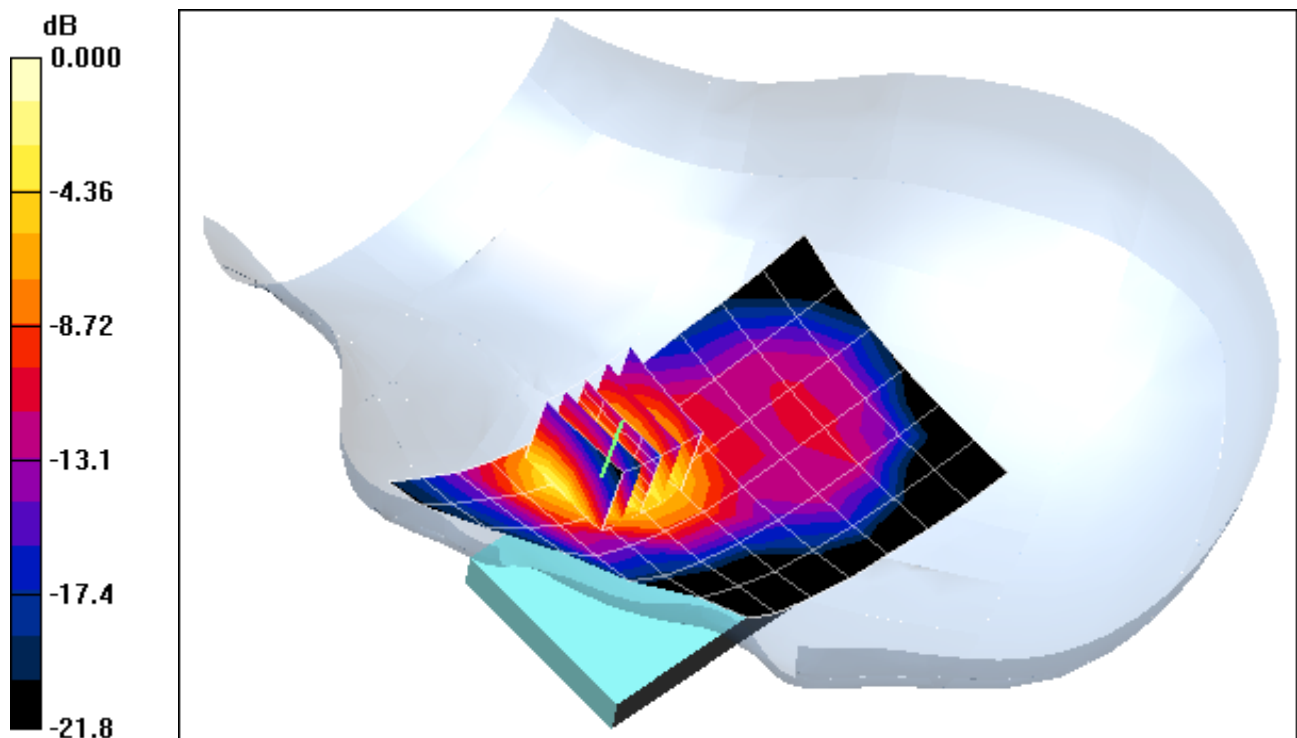
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 22.3 V/m; Power Drift = -0.056 dB

Peak SAR (extrapolated) = 0.887 W/kg

SAR(1 g) = 0.551 mW/g; SAR(10 g) = 0.311 mW/g



0 dB = 0.611mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: LTE B2

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

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-23-2012; Ambient Temp: 24.5 °C; Tissue Temp: 22.0 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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 2 (PCS), Left Head, Tilt
5 MHz BW, Mid.ch, QPSK, 1 RB, 24 RB Offset**

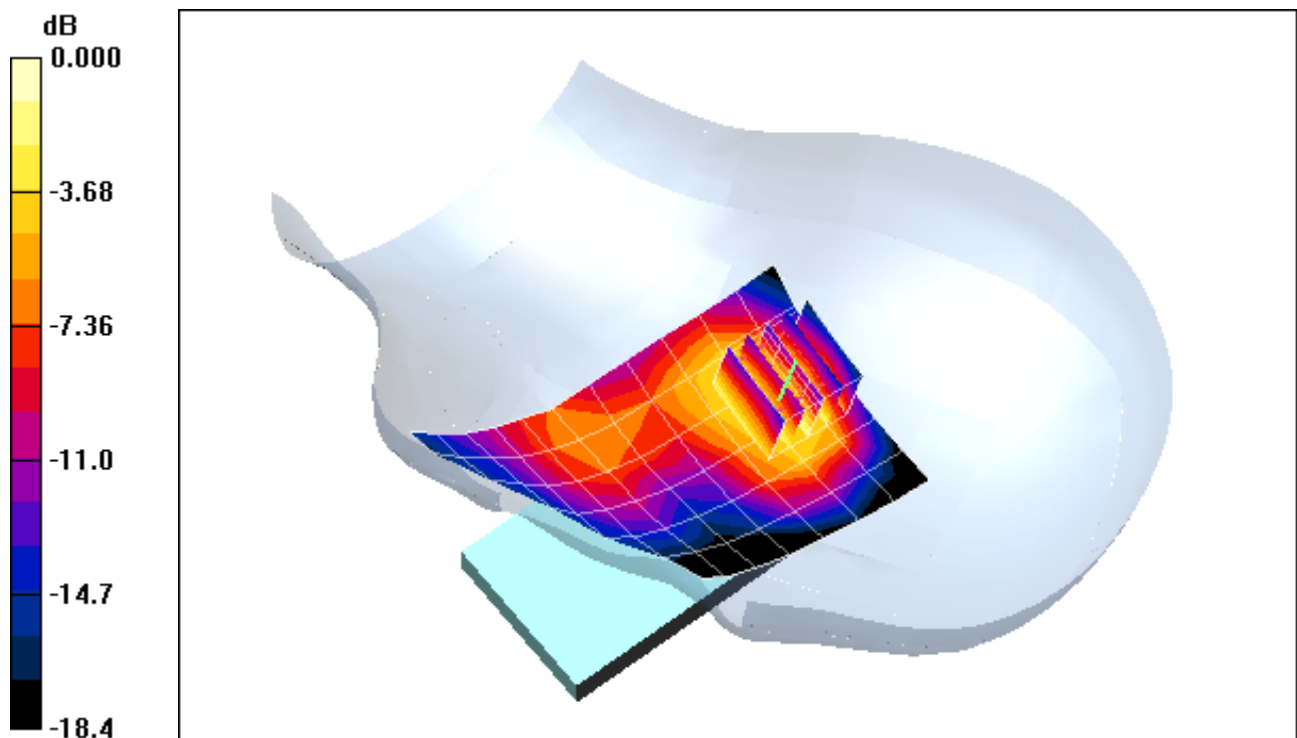
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 11.6 V/m; Power Drift = -0.140 dB

Peak SAR (extrapolated) = 0.242 W/kg

SAR(1 g) = 0.150 mW/g; SAR(10 g) = 0.089 mW/g



0 dB = 0.163mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: WIFI SAR 4

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

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.82 \text{ mho/m}$; $\epsilon_r = 40.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-22-2012; Ambient Temp: 24.5°C; Tissue Temp: 23.3°C

Probe: ES3DV3 - SN3209; ConvF(4.52, 4.52, 4.52); Calibrated: 4/18/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

Mode: IEEE 802.11b, Right Head, Touch, Ch 11, 1 Mbps

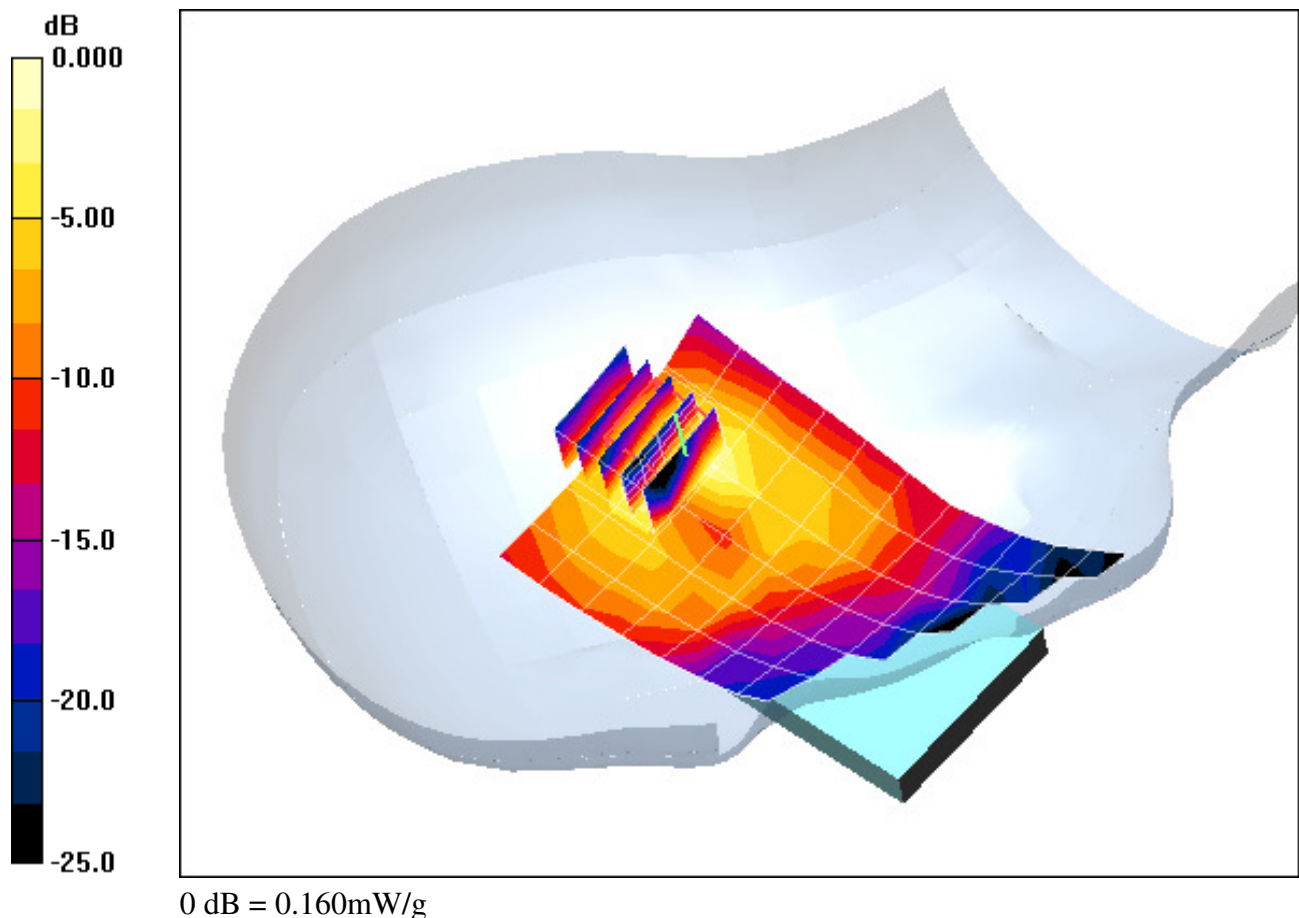
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 8.44 V/m; Power Drift = -0.069 dB

Peak SAR (extrapolated) = 0.304 W/kg

SAR(1 g) = 0.134 mW/g; SAR(10 g) = 0.061 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: WIFI SAR 4

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

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.82 \text{ mho/m}$; $\epsilon_r = 40.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-22-2012; Ambient Temp: 24.5°C; Tissue Temp: 23.3°C

Probe: ES3DV3 - SN3209; ConvF(4.52, 4.52, 4.52); Calibrated: 4/18/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

Mode: IEEE 802.11b, Right Head, Tilt, Ch 11, 1 Mbps

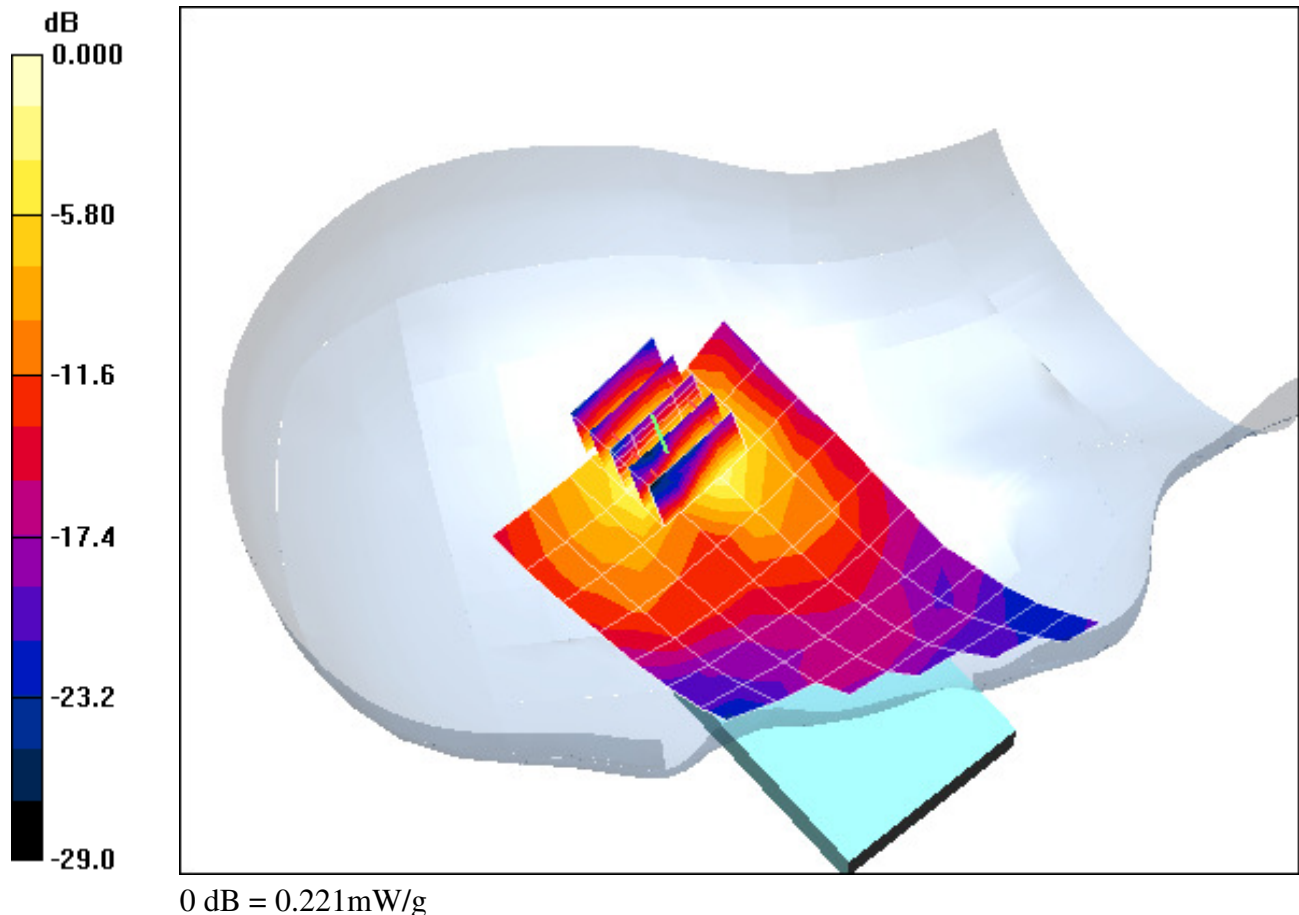
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 9.50 V/m; Power Drift = 0.149 dB

Peak SAR (extrapolated) = 0.385 W/kg

SAR(1 g) = 0.172 mW/g; SAR(10 g) = 0.078 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: WIFI SAR 4

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

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.82 \text{ mho/m}$; $\epsilon_r = 40.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-22-2012; Ambient Temp: 24.5°C; Tissue Temp: 23.3°C

Probe: ES3DV3 - SN3209; ConvF(4.52, 4.52, 4.52); Calibrated: 4/18/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

Mode: IEEE 802.11b, Left Head, Touch, Ch 11, 1 Mbps

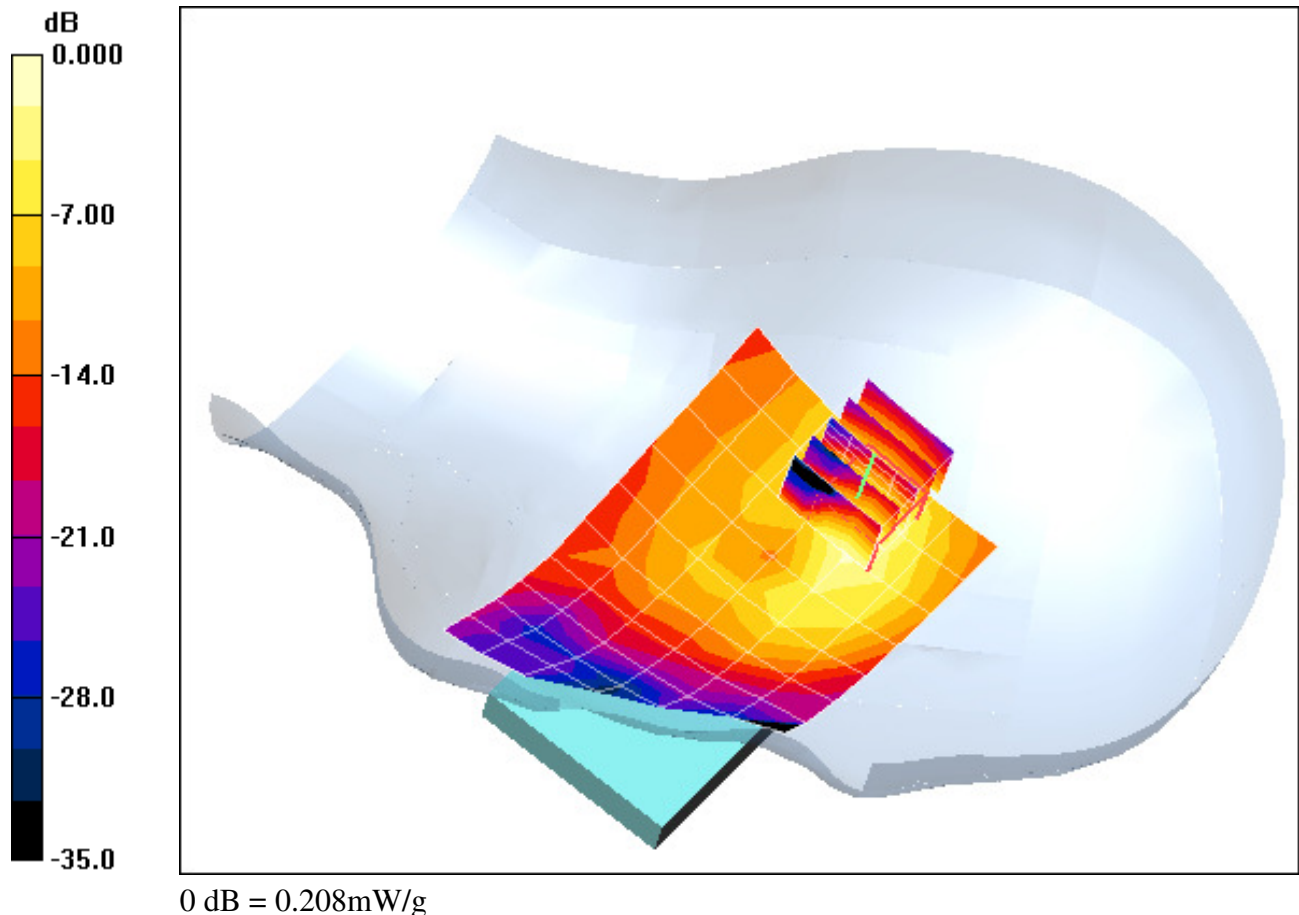
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 8.93 V/m; Power Drift = -0.112 dB

Peak SAR (extrapolated) = 0.340 W/kg

SAR(1 g) = 0.156 mW/g; SAR(10 g) = 0.075 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: WIFI SAR 4

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

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.82 \text{ mho/m}$; $\epsilon_r = 40.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-22-2012; Ambient Temp: 24.5°C; Tissue Temp: 23.3°C

Probe: ES3DV3 - SN3209; ConvF(4.52, 4.52, 4.52); Calibrated: 4/18/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

Mode: IEEE 802.11b, Left Head, Tilt, Ch 11, 1 Mbps

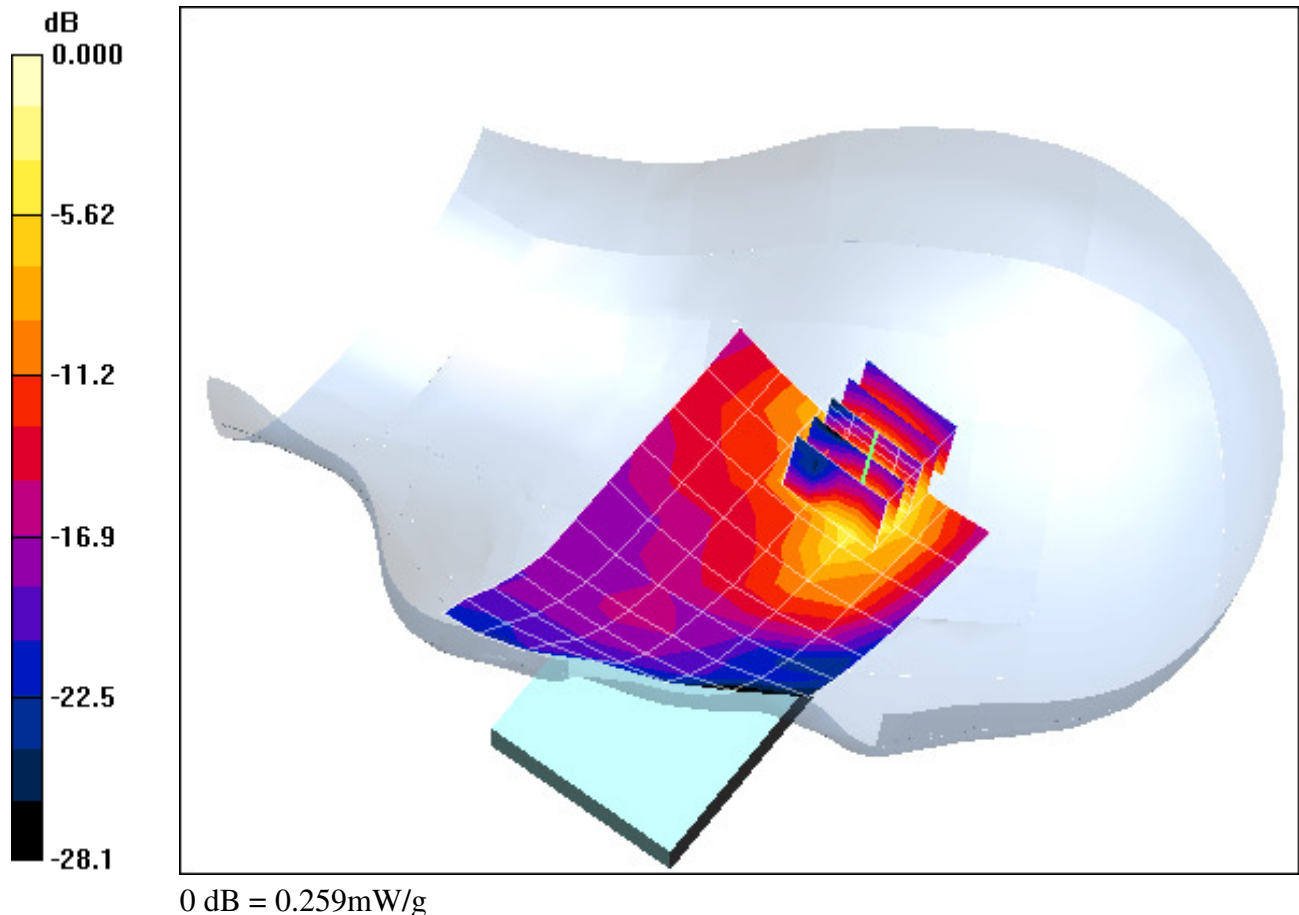
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 10.3 V/m; Power Drift = 0.094 dB

Peak SAR (extrapolated) = 0.443 W/kg

SAR(1 g) = 0.201 mW/g; SAR(10 g) = 0.090 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 824.7 \text{ MHz}$; $\sigma = 0.967 \text{ mho/m}$; $\epsilon_r = 53.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-23-2012; Ambient Temp: 23.2°C; Tissue Temp: 22.4°C

Probe: ES3DV2 - SN3022; ConvF(6.06, 6.06, 6.06); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: Cellular TDSO32, Body SAR, Back side, Low.ch

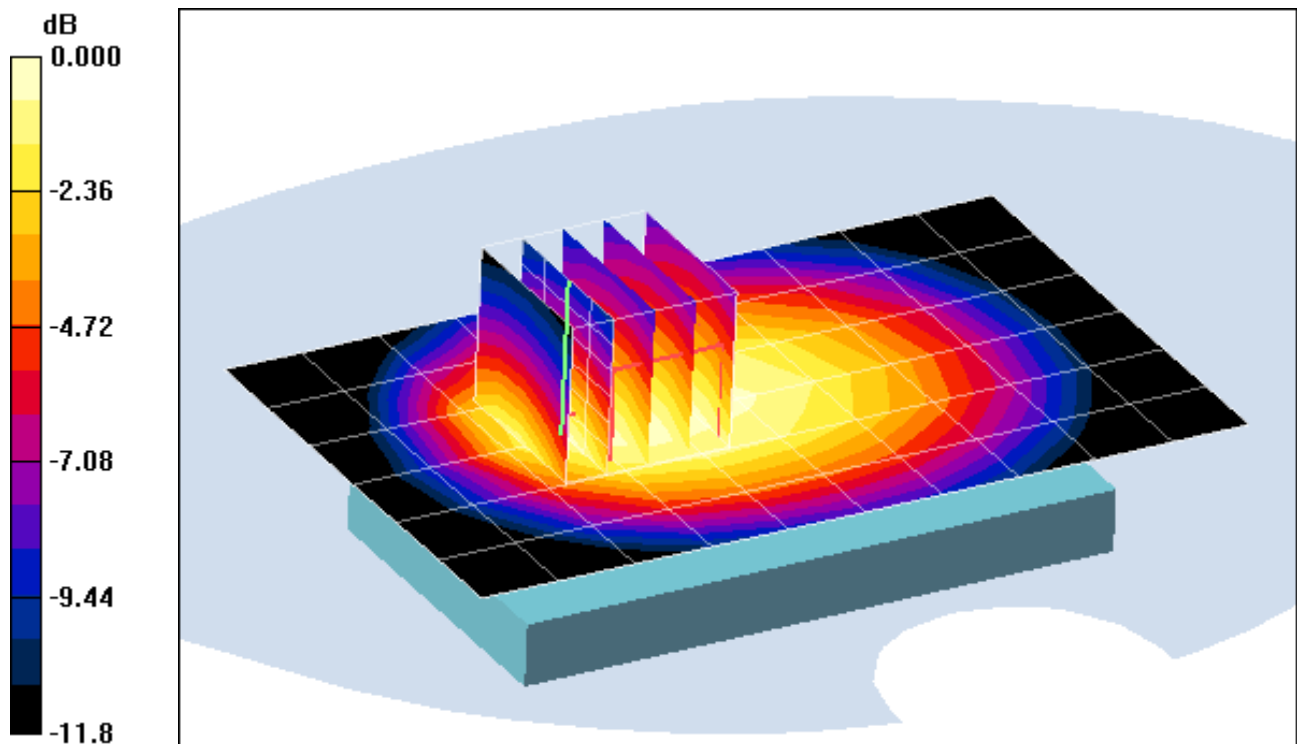
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 24.2 V/m; Power Drift = 0.004 dB

Peak SAR (extrapolated) = 0.683 W/kg

SAR(1 g) = 0.481 mW/g; SAR(10 g) = 0.349 mW/g



0 dB = 0.525mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 824.7 \text{ MHz}$; $\sigma = 0.967 \text{ mho/m}$; $\epsilon_r = 53.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-23-2012; Ambient Temp: 23.2°C; Tissue Temp: 22.4°C

Probe: ES3DV2 - SN3022; ConvF(6.06, 6.06, 6.06); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: Cellular TDSO32, Body SAR, Front side, Low ch

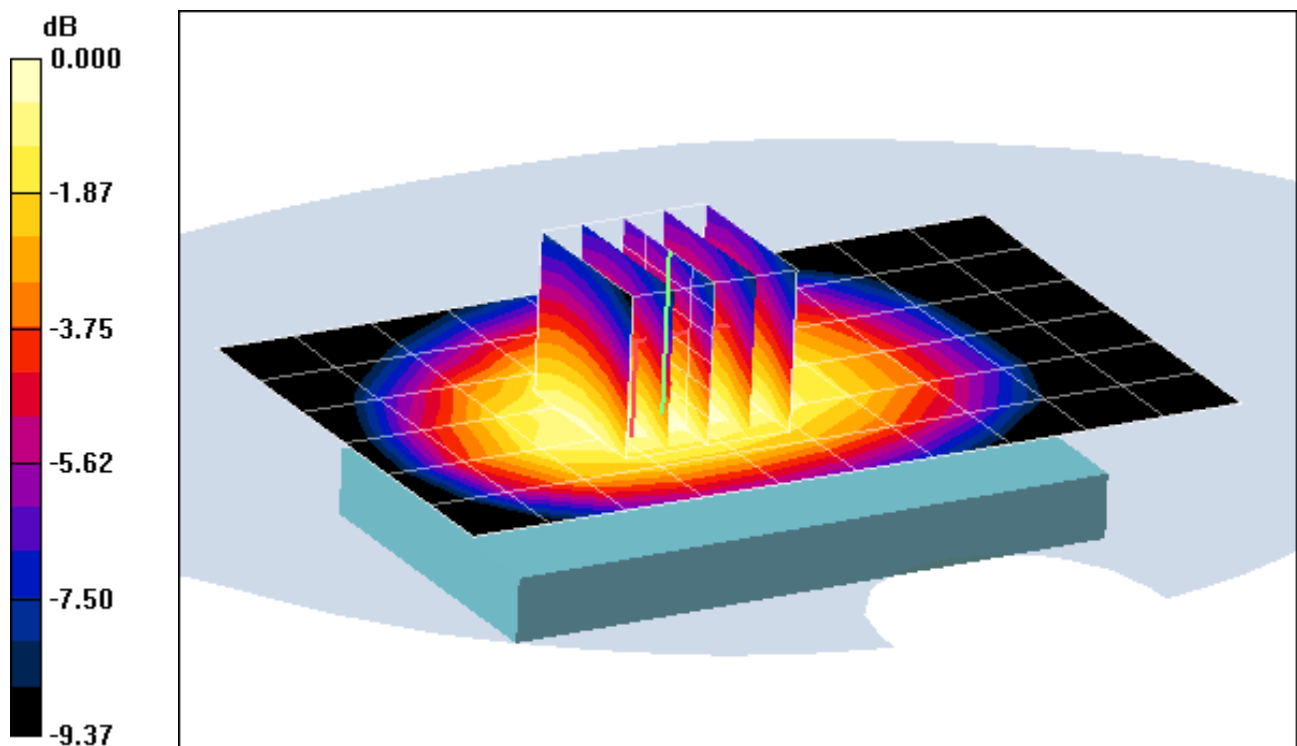
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 16.4 V/m; Power Drift = 0.131 dB

Peak SAR (extrapolated) = 0.298 W/kg

SAR(1 g) = 0.239 mW/g; SAR(10 g) = 0.182 mW/g



0 dB = 0.250mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 824.7 \text{ MHz}$; $\sigma = 0.967 \text{ mho/m}$; $\epsilon_r = 53.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-23-2012; Ambient Temp: 23.2°C; Tissue Temp: 22.4°C

Probe: ES3DV2 - SN3022; ConvF(6.06, 6.06, 6.06); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: Cellular TDSO32, Body SAR, Bottom Edge, Low ch

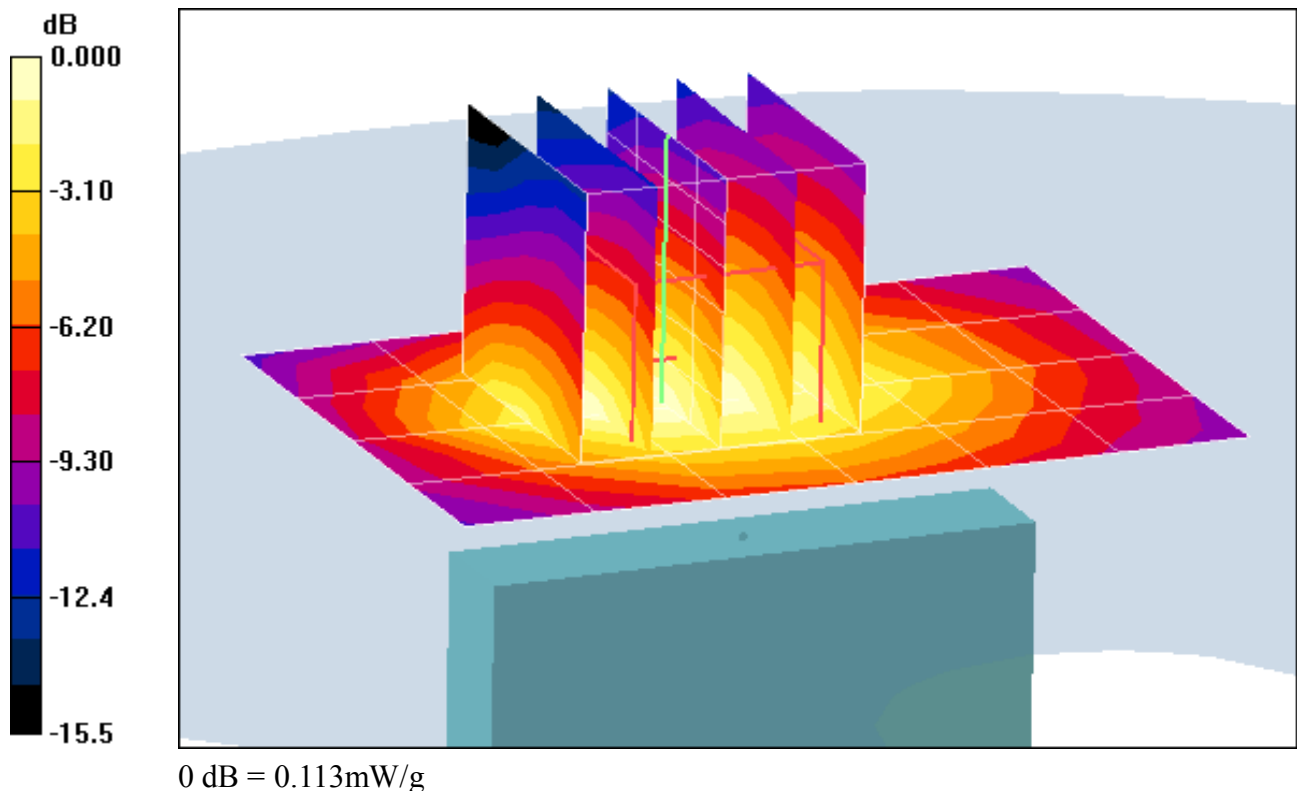
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 11.5 V/m; Power Drift = 0.086 dB

Peak SAR (extrapolated) = 0.184 W/kg

SAR(1 g) = 0.106 mW/g; SAR(10 g) = 0.065 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 824.7 \text{ MHz}$; $\sigma = 0.967 \text{ mho/m}$; $\epsilon_r = 53.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-23-2012; Ambient Temp: 23.2°C; Tissue Temp: 22.4°C

Probe: ES3DV2 - SN3022; ConvF(6.06, 6.06, 6.06); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: Cellular TDSO32, Body SAR, Right Edge, Low ch

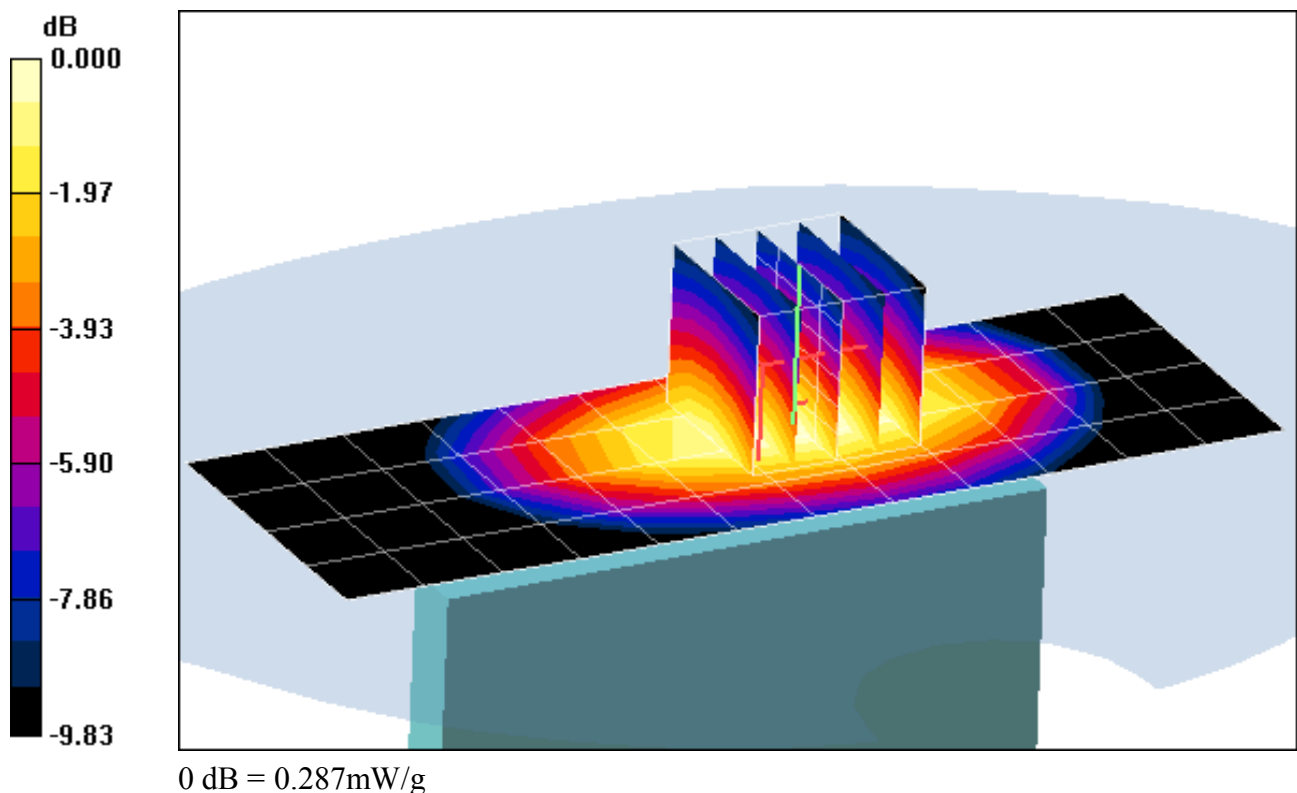
Area Scan (5x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 15.2 V/m; Power Drift = -0.039 dB

Peak SAR (extrapolated) = 0.370 W/kg

SAR(1 g) = 0.267 mW/g; SAR(10 g) = 0.184 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

Communication System: AWS CDMA; Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-28-2012; Ambient Temp: 23.9 °C; Tissue Temp: 22.5 °C

Probe: ES3DV3 - SN3209; ConvF(4.75, 4.75, 4.75); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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: AWS TDSO32, Body SAR, Back side, Mid.ch

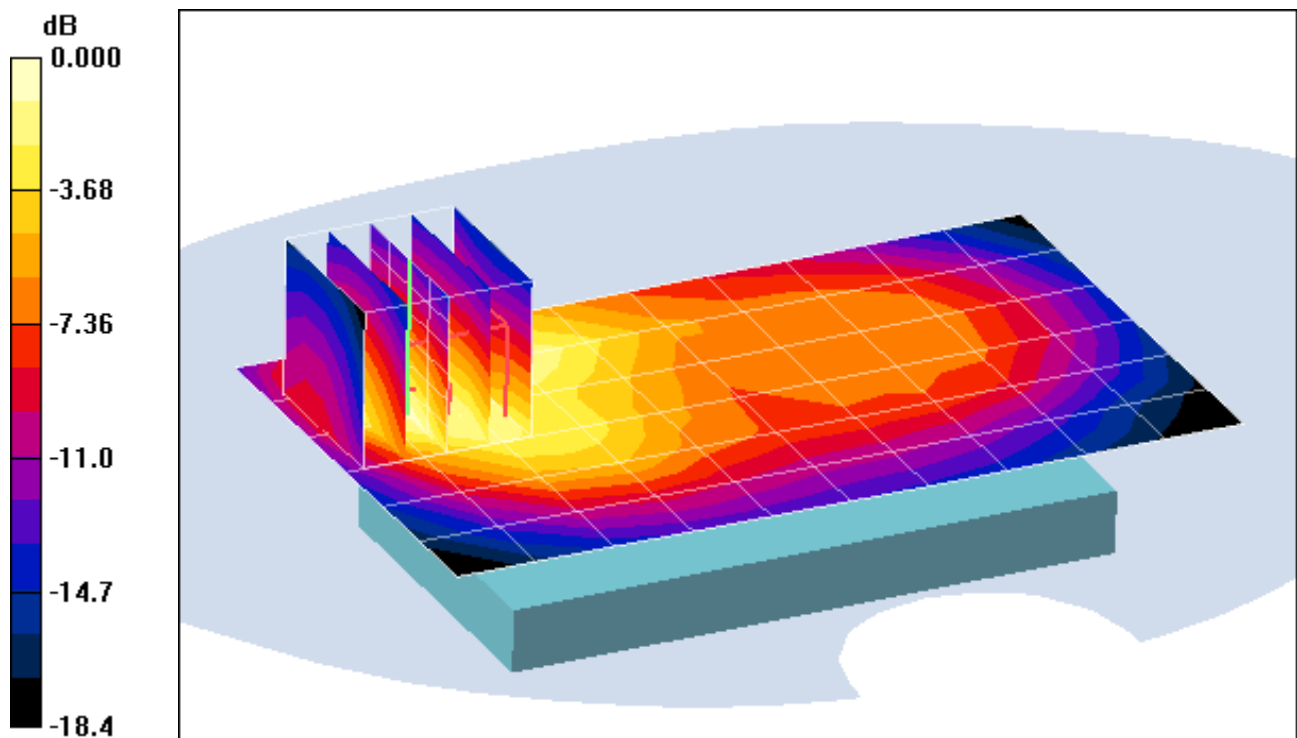
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 23.0 V/m; Power Drift = -0.033 dB

Peak SAR (extrapolated) = 1.18 W/kg

SAR(1 g) = 0.682 mW/g; SAR(10 g) = 0.376 mW/g



0 dB = 0.772mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

Communication System: AWS CDMA; Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-28-2012; Ambient Temp: 23.9 °C; Tissue Temp: 22.5 °C

Probe: ES3DV3 - SN3209; ConvF(4.75, 4.75, 4.75); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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: AWS TDSO32, Body SAR, Front side, Mid.ch

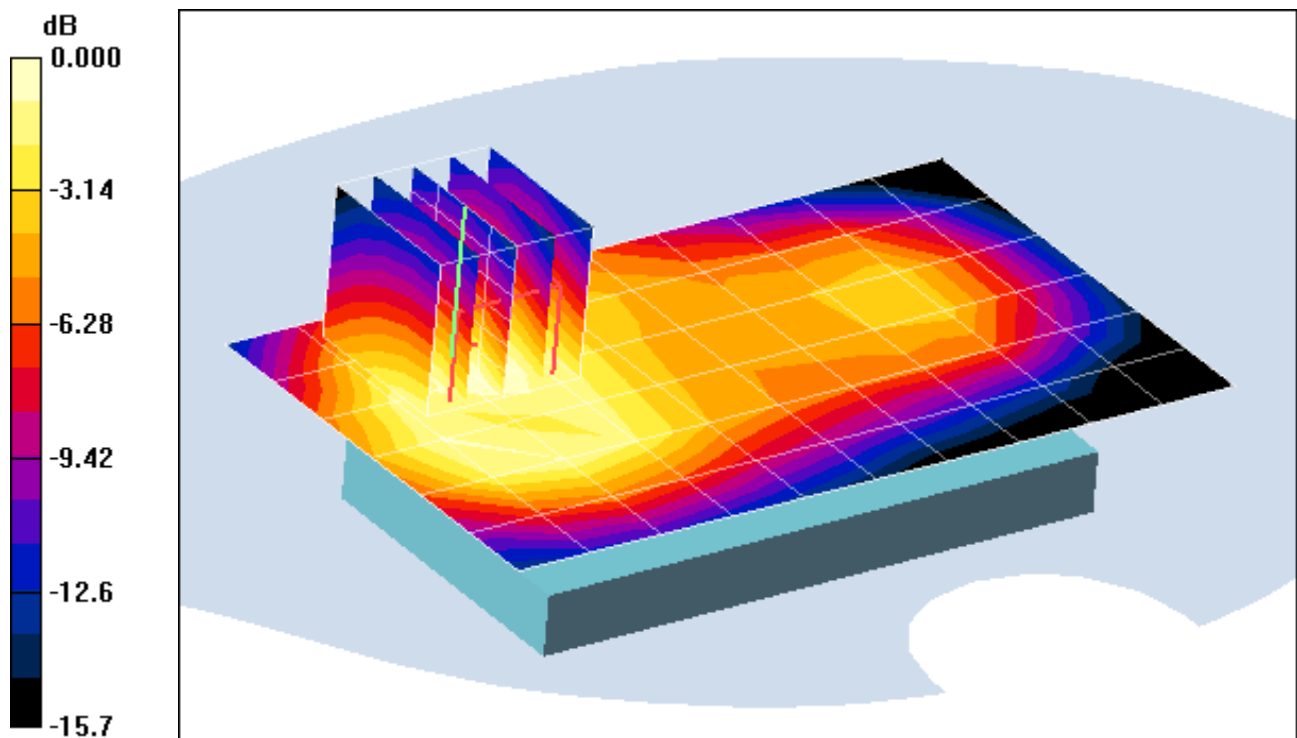
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 15.2 V/m; Power Drift = 0.007 dB

Peak SAR (extrapolated) = 0.466 W/kg

SAR(1 g) = 0.293 mW/g; SAR(10 g) = 0.179 mW/g



0 dB = 0.315mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

Communication System: AWS CDMA; Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-28-2012; Ambient Temp: 23.9 °C; Tissue Temp: 22.5 °C

Probe: ES3DV3 - SN3209; ConvF(4.75, 4.75, 4.75); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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: AWS TDSO32, Body SAR, Bottom Edge, Mid.ch

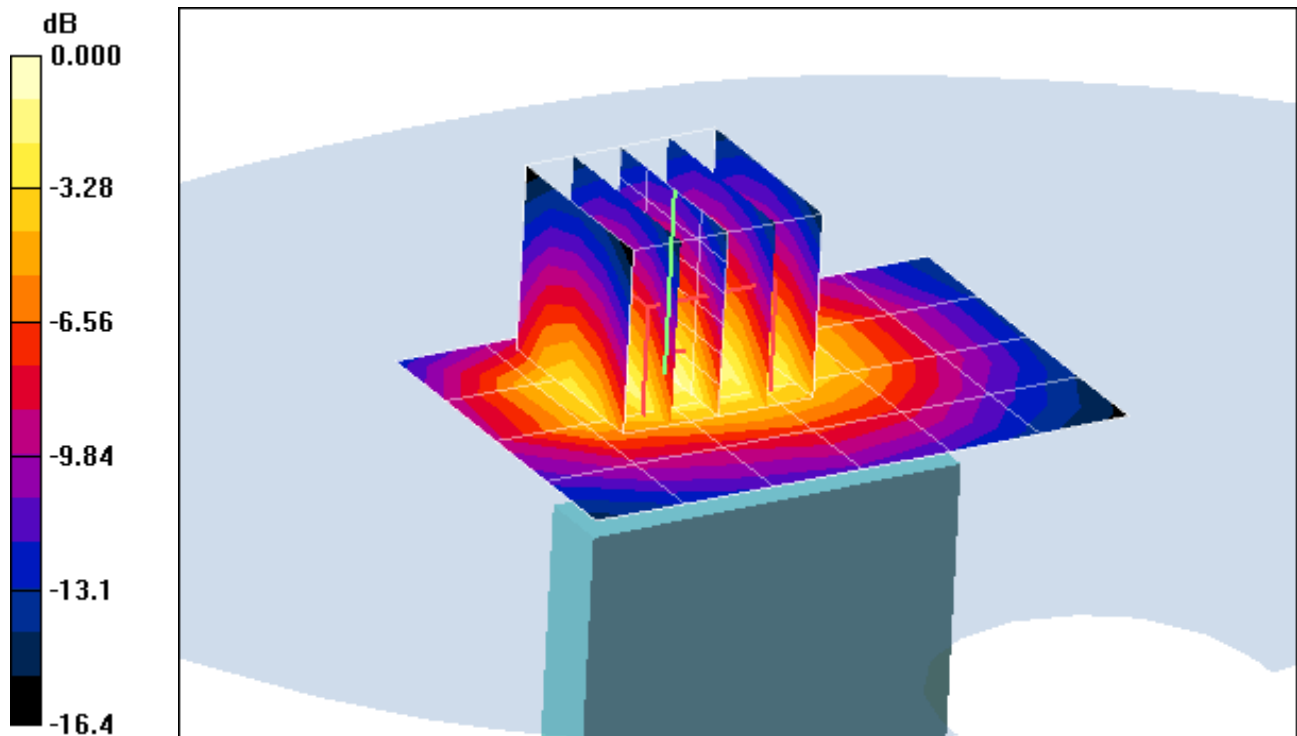
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 21.7 V/m; Power Drift = 0.015 dB

Peak SAR (extrapolated) = 1.04 W/kg

SAR(1 g) = 0.630 mW/g; SAR(10 g) = 0.350 mW/g



0 dB = 0.716mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

Communication System: AWS CDMA; Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-28-2012; Ambient Temp: 23.9 °C; Tissue Temp: 22.5 °C

Probe: ES3DV3 - SN3209; ConvF(4.75, 4.75, 4.75); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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: AWS TDSO32, Body SAR, Rigt Edge, Mid.ch

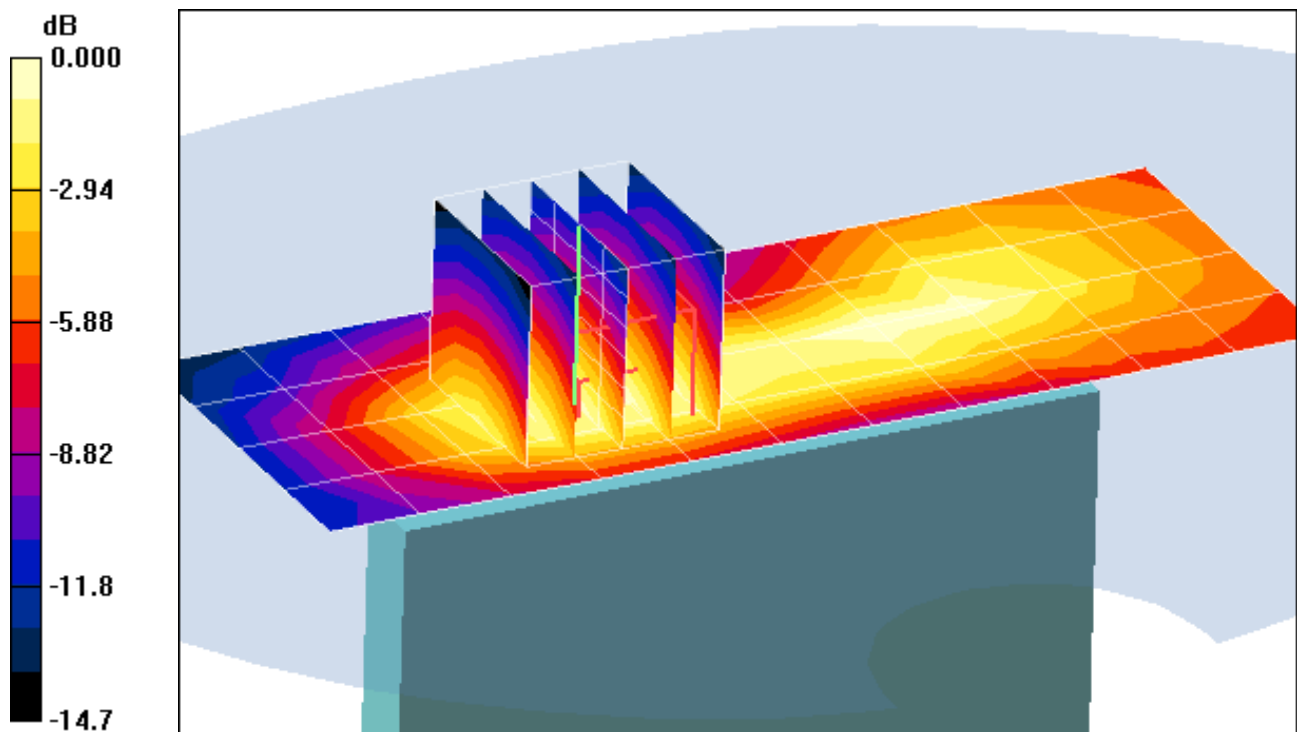
Area Scan (5x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 12.2 V/m; Power Drift = -0.190 dB

Peak SAR (extrapolated) = 0.293 W/kg

SAR(1 g) = 0.184 mW/g; SAR(10 g) = 0.110 mW/g



0 dB = 0.200mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: LTE B4

Communication System: LTE RF; Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-28-2012; Ambient Temp: 23.9 °C; Tissue Temp: 22.5 °C

Probe: ES3DV3 - SN3209; ConvF(4.75, 4.75, 4.75); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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 4 (AWS), Body SAR, Back side
5 MHz BW, Mid.ch, QPSK, 1 RB, 0 RB Offset

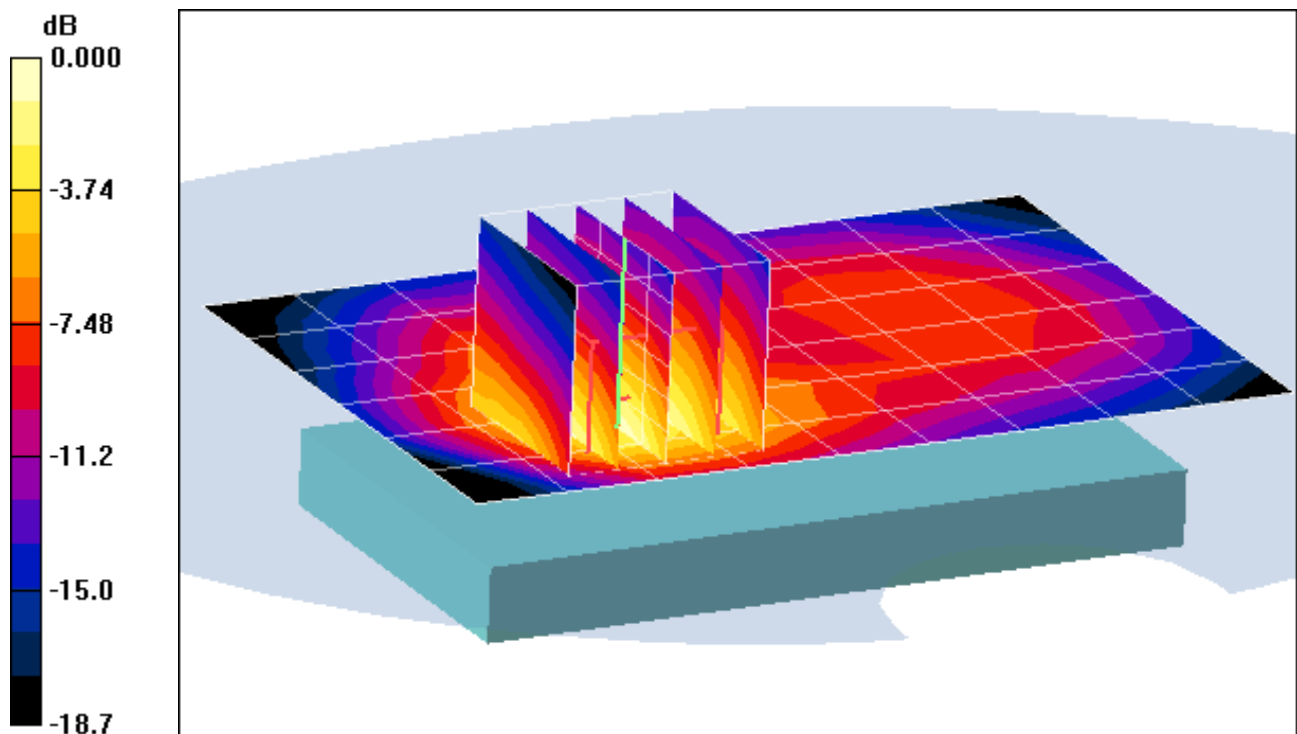
Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 22.2 V/m; Power Drift = -0.100 dB

Peak SAR (extrapolated) = 1.06 W/kg

SAR(1 g) = 0.618 mW/g; SAR(10 g) = 0.351 mW/g



0 dB = 0.680mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: LTE B4

Communication System: LTE RF; Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-28-2012; Ambient Temp: 23.9 °C; Tissue Temp: 22.5 °C

Probe: ES3DV3 - SN3209; ConvF(4.75, 4.75, 4.75); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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 4 (AWS), Body SAR, Front side
5 MHz BW, Mid.ch, QPSK, 1 RB, 0 RB Offset

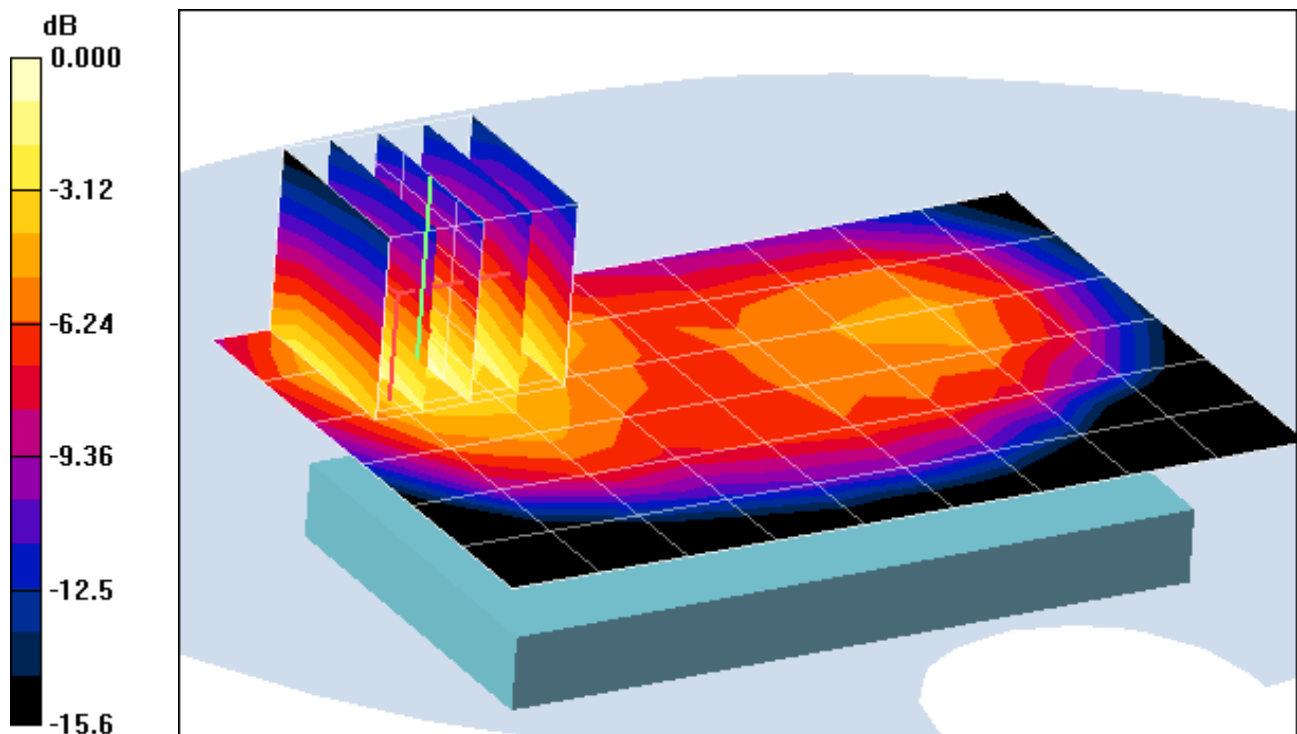
Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 18.9 V/m; Power Drift = -0.001 dB

Peak SAR (extrapolated) = 0.715 W/kg

SAR(1 g) = 0.449 mW/g; SAR(10 g) = 0.268 mW/g



0 dB = 0.488mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: LTE B4

Communication System: LTE RF; Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-28-2012; Ambient Temp: 23.9 °C; Tissue Temp: 22.5 °C

Probe: ES3DV3 - SN3209; ConvF(4.75, 4.75, 4.75); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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 4 (AWS), Body SAR, Bottom Edge

Mid.ch, 5 MHz BW, QPSK, 1 RB, 0 RB Offset

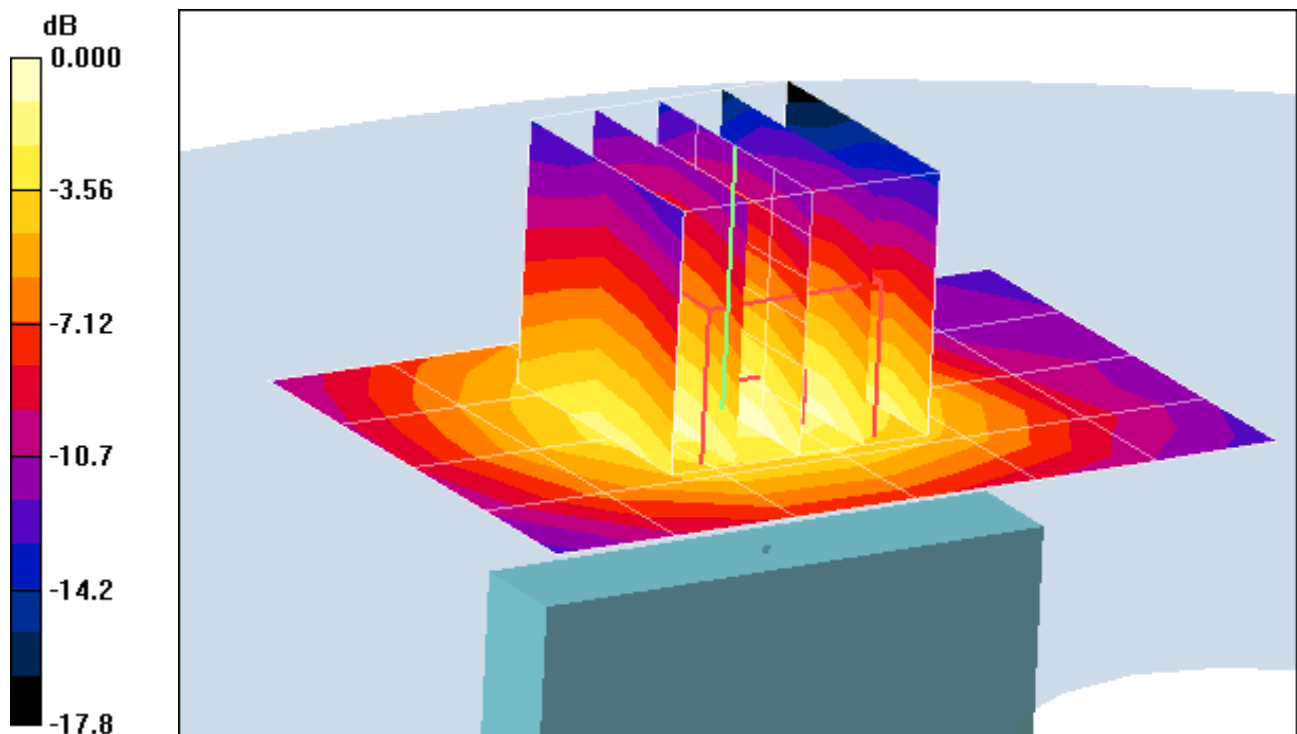
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 13.2 V/m; Power Drift = -0.152 dB

Peak SAR (extrapolated) = 0.312 W/kg

SAR(1 g) = 0.206 mW/g; SAR(10 g) = 0.127 mW/g



0 dB = 0.223mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: LTE B4

Communication System: LTE RF; Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-28-2012; Ambient Temp: 23.9 °C; Tissue Temp: 22.5 °C

Probe: ES3DV3 - SN3209; ConvF(4.75, 4.75, 4.75); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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 4 (AWS), Body SAR, Left Edge

Mid.ch, 5 MHz BW, QPSK, 1 RB, 0 RB Offset

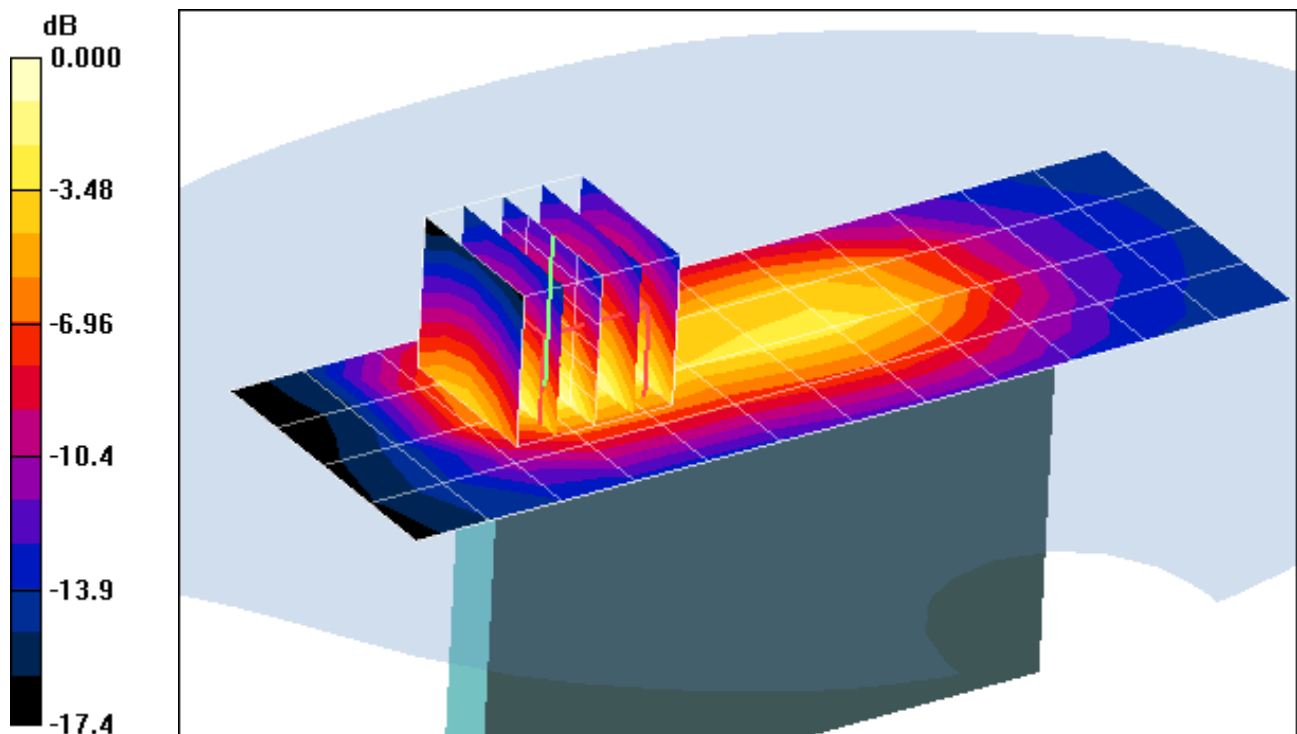
Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 16.2 V/m; Power Drift = -0.210 dB

Peak SAR (extrapolated) = 0.519 W/kg

SAR(1 g) = 0.322 mW/g; SAR(10 g) = 0.186 mW/g



0 dB = 0.358mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.47 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-23-2012; Ambient Temp: 23.3°C; Tissue Temp: 22.0°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

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

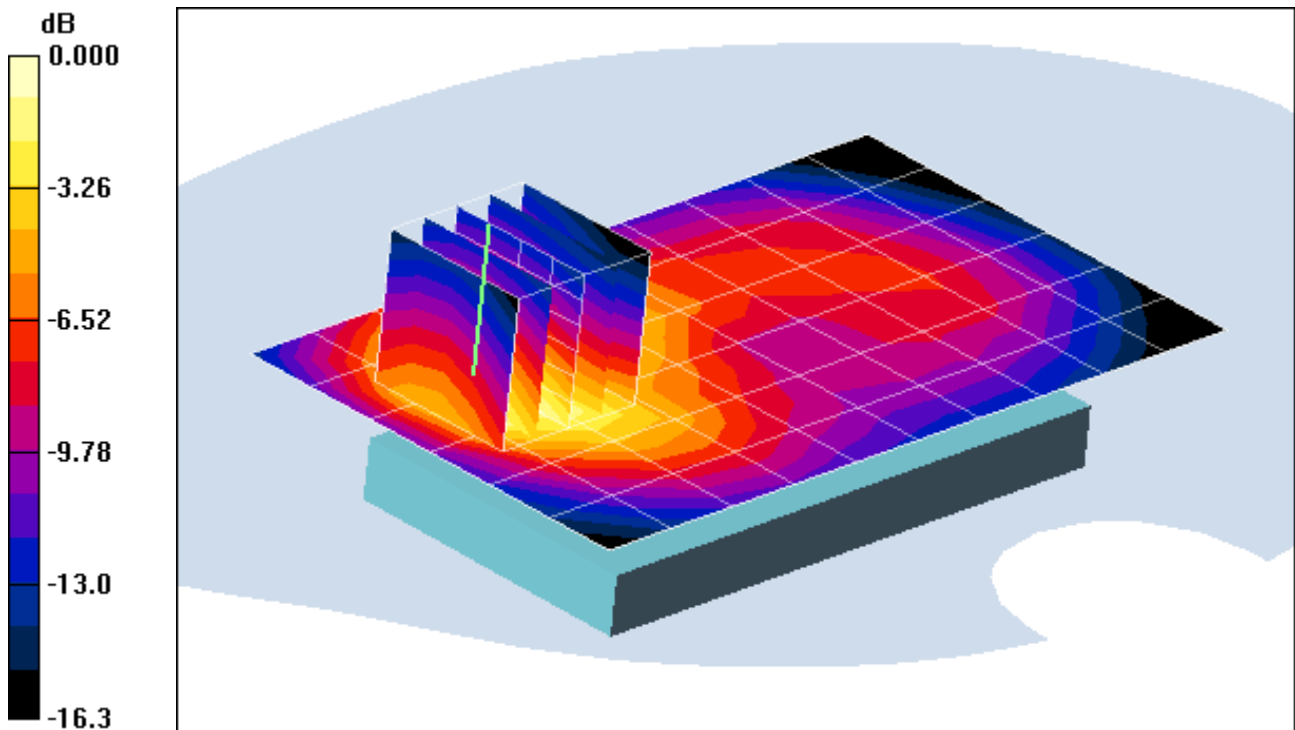
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 21.8 V/m; Power Drift = -0.134 dB

Peak SAR (extrapolated) = 0.962 W/kg

SAR(1 g) = 0.564 mW/g; SAR(10 g) = 0.313 mW/g



0 dB = 0.599mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.47 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-23-2012; Ambient Temp: 23.3°C; Tissue Temp: 22.0°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

Mode: PCS TDSO32, Body SAR, Front side, Mid.ch

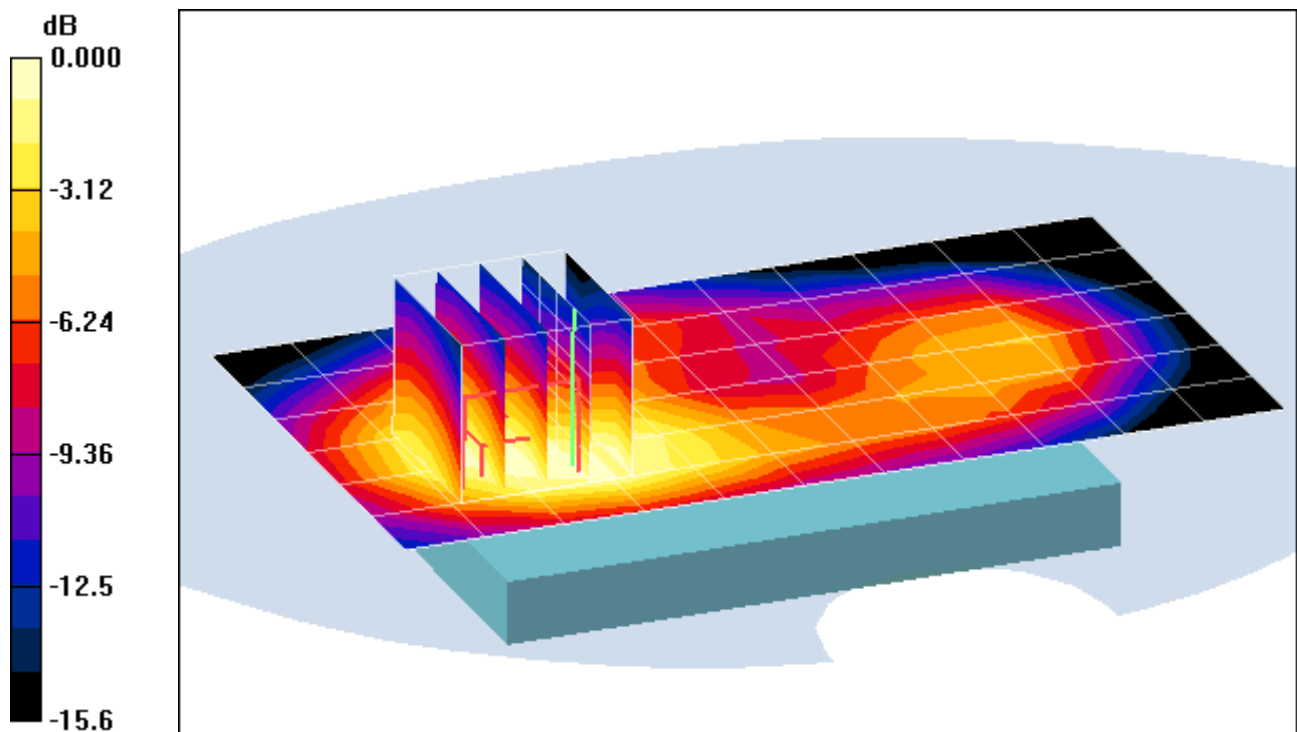
Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 16.6 V/m; Power Drift = 0.093 dB

Peak SAR (extrapolated) = 0.518 W/kg

SAR(1 g) = 0.313 mW/g; SAR(10 g) = 0.190 mW/g



0 dB = 0.339mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.47 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-23-2012; Ambient Temp: 23.3°C; Tissue Temp: 22.0°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

Mode: PCS TDSO32, Body SAR, Bottom side, Mid.ch

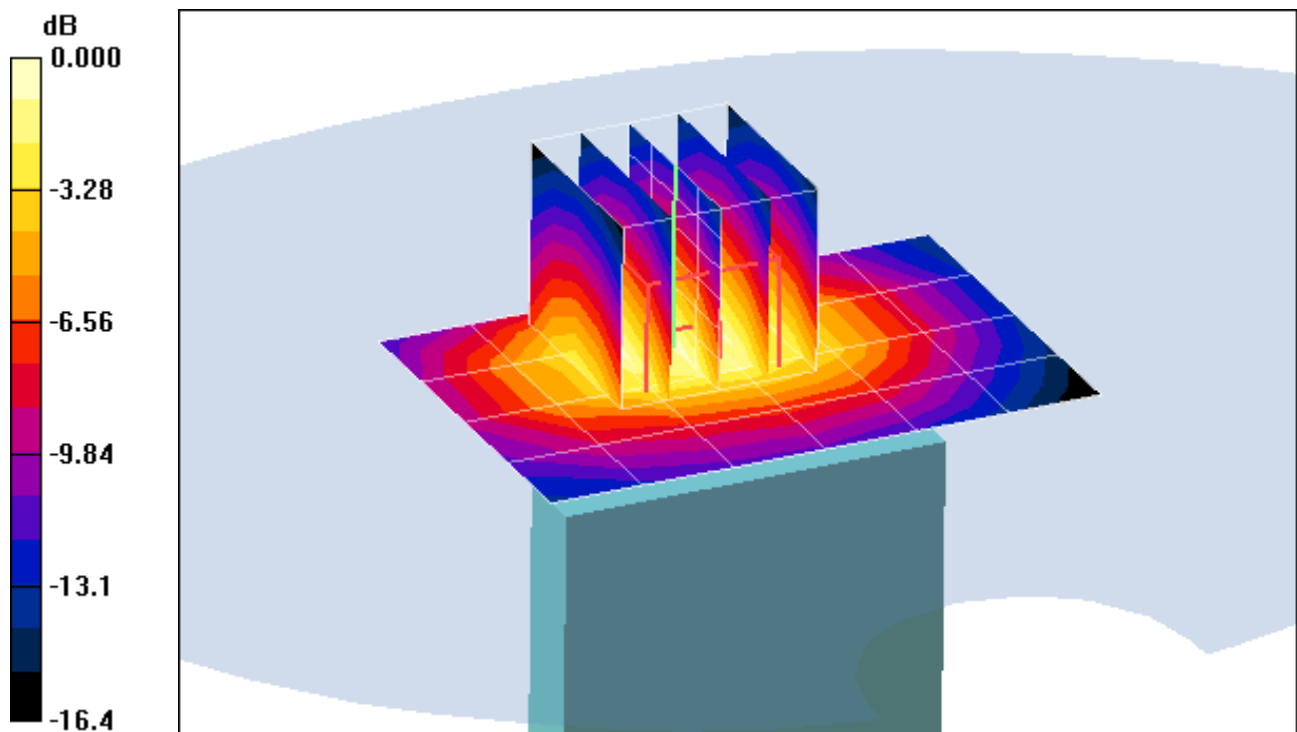
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 5.16 V/m; Power Drift = -0.103 dB

Peak SAR (extrapolated) = 0.921 W/kg

SAR(1 g) = 0.549 mW/g; SAR(10 g) = 0.307 mW/g



0 dB = 0.614mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: 1x #3

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.47 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-23-2012; Ambient Temp: 23.3°C; Tissue Temp: 22.0°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

Mode: PCS TDSO32, Body SAR, Right side, Mid.ch

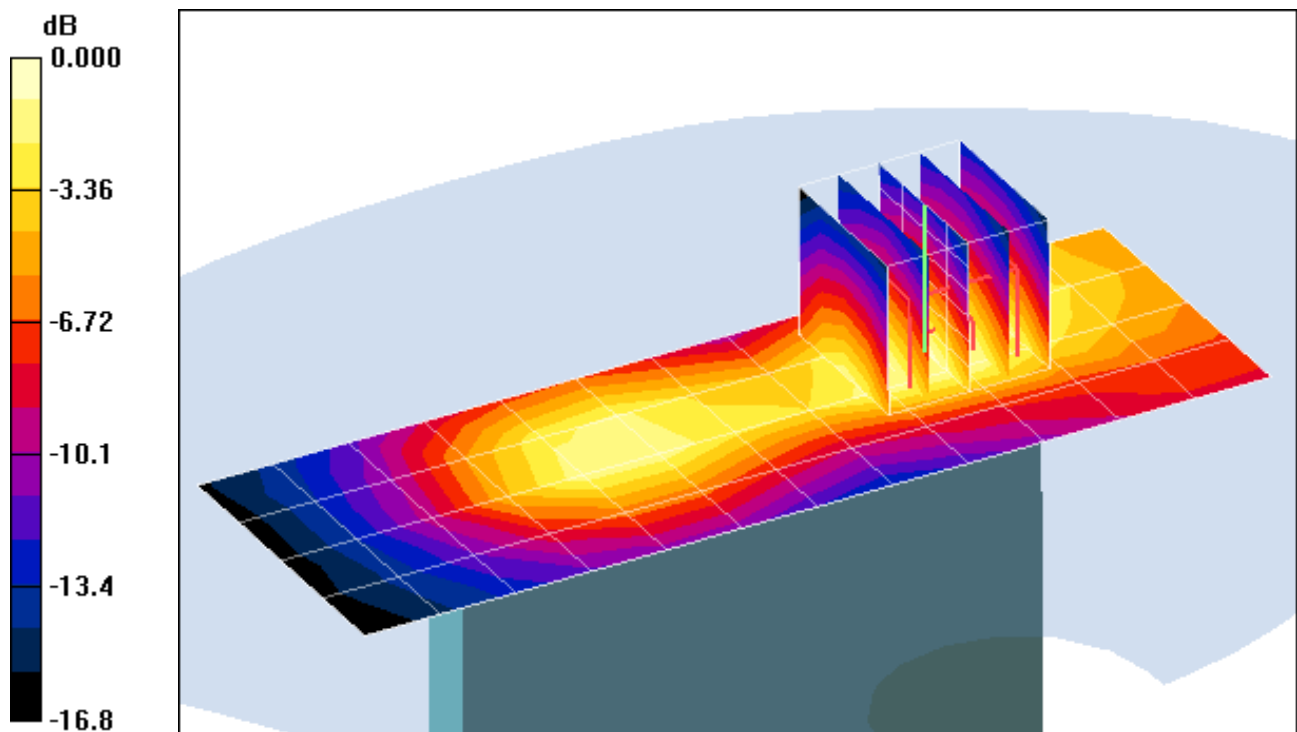
Area Scan (5x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 4.08 V/m; Power Drift = 0.016 dB

Peak SAR (extrapolated) = 0.300 W/kg

SAR(1 g) = 0.179 mW/g; SAR(10 g) = 0.102 mW/g



0 dB = 0.197mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: LTE B2

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 51$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-27-2012; Ambient Temp: 24.0°C; Tissue Temp: 23.2°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

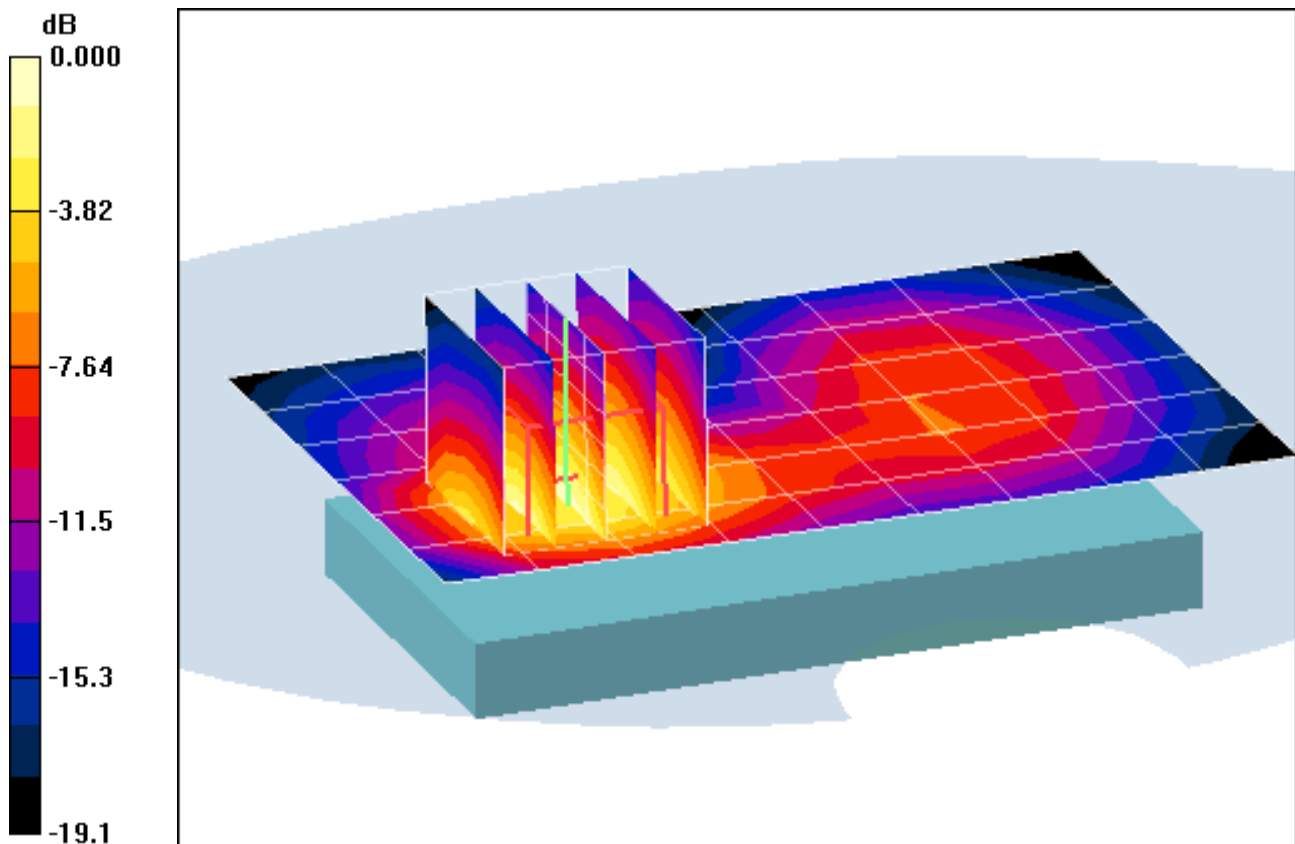
Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 16.2 V/m; Power Drift = 0.012 dB

Peak SAR (extrapolated) = 0.614 W/kg

SAR(1 g) = 0.355 mW/g; SAR(10 g) = 0.197 mW/g



0 dB = 0.389mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: LTE B2

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 51$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-27-2012; Ambient Temp: 24.0°C; Tissue Temp: 23.2°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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 2 (PCS), Body SAR, Front side
5 MHz BW, Mid.ch, QPSK, 1 RB, 24 RB Offset

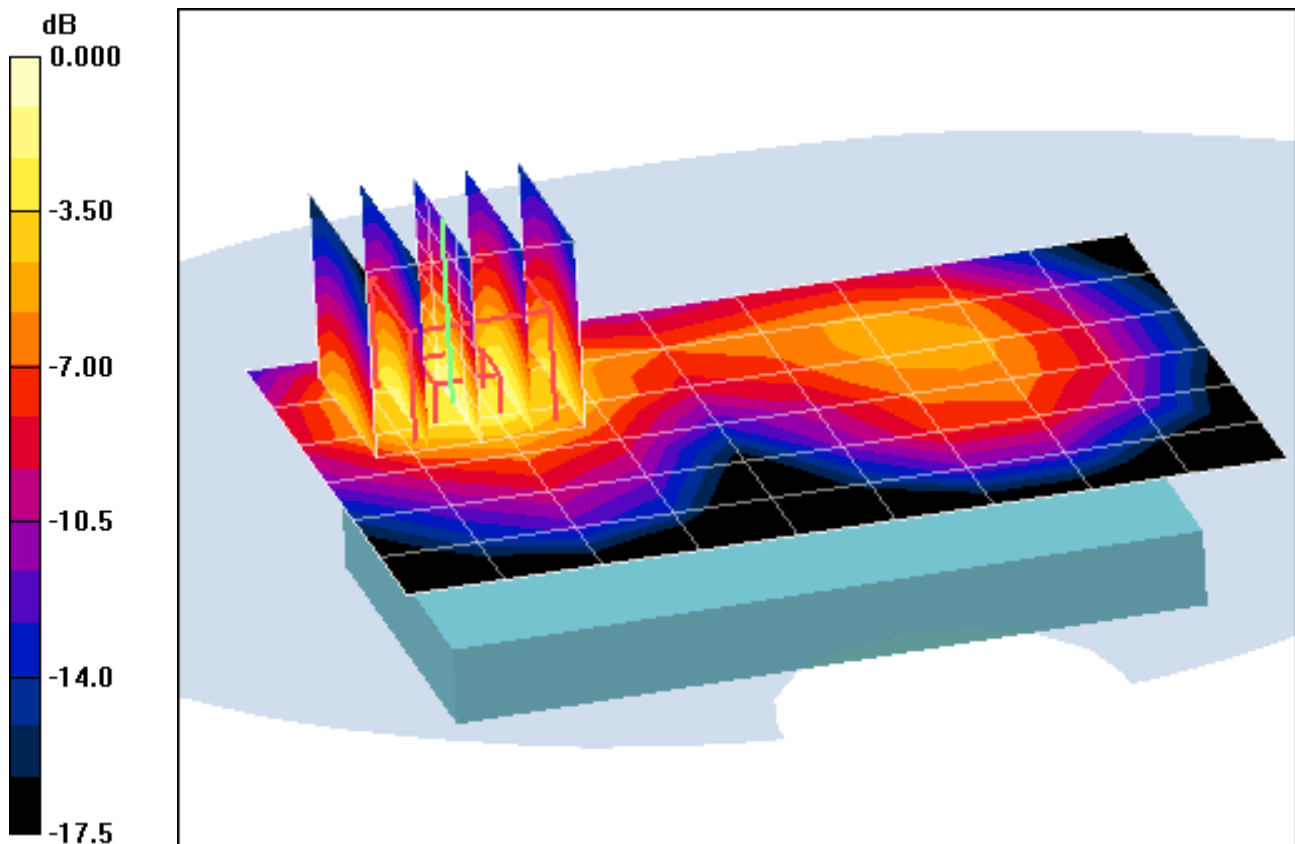
Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 16.8 V/m; Power Drift = -0.092 dB

Peak SAR (extrapolated) = 0.628 W/kg

SAR(1 g) = 0.369 mW/g; SAR(10 g) = 0.207 mW/g



0 dB = 0.413mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: LTE B2

Communication System: LTE PCS 5 Mhz; Frequency: 1852.5 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1852.5 \text{ MHz}$; $\sigma = 1.51 \text{ mho/m}$; $\epsilon_r = 51$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-27-2012; Ambient Temp: 24.0°C; Tissue Temp: 23.2°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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 2 (PCS), Body SAR, Bottom Edge

5 MHz BW, Low.ch, 16 QAM, 1 RB, 0 RB Offset

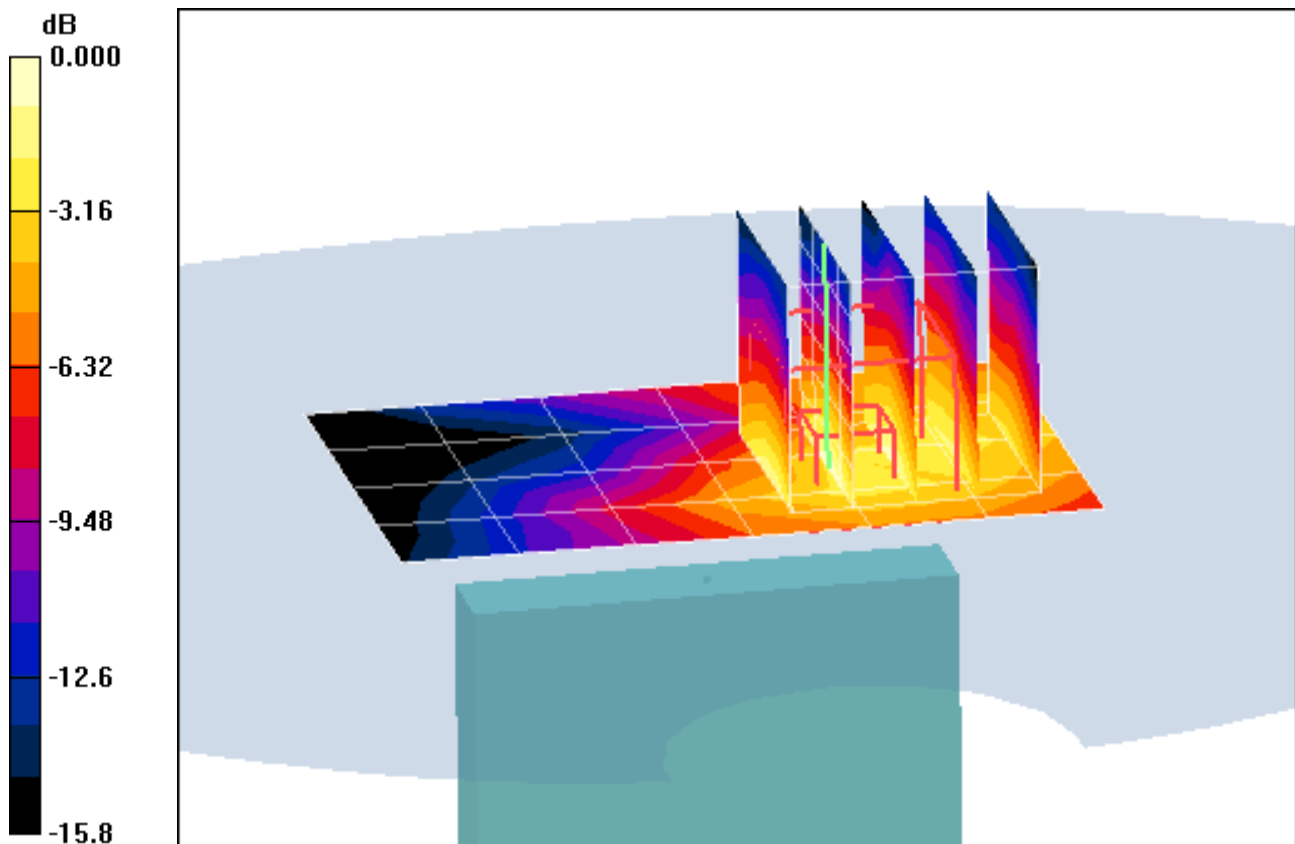
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 5.67 V/m; Power Drift = 0.108 dB

Peak SAR (extrapolated) = 0.086 W/kg

SAR(1 g) = 0.050 mW/g; SAR(10 g) = 0.028 mW/g



0 dB = 0.055mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: LTE B2

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 51$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-27-2012; Ambient Temp: 24.0°C; Tissue Temp: 23.2°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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 2 (PCS), Body SAR, Left Edge
5 MHz BW, Mid.ch, QPSK, 1 RB, 24 RB Offset

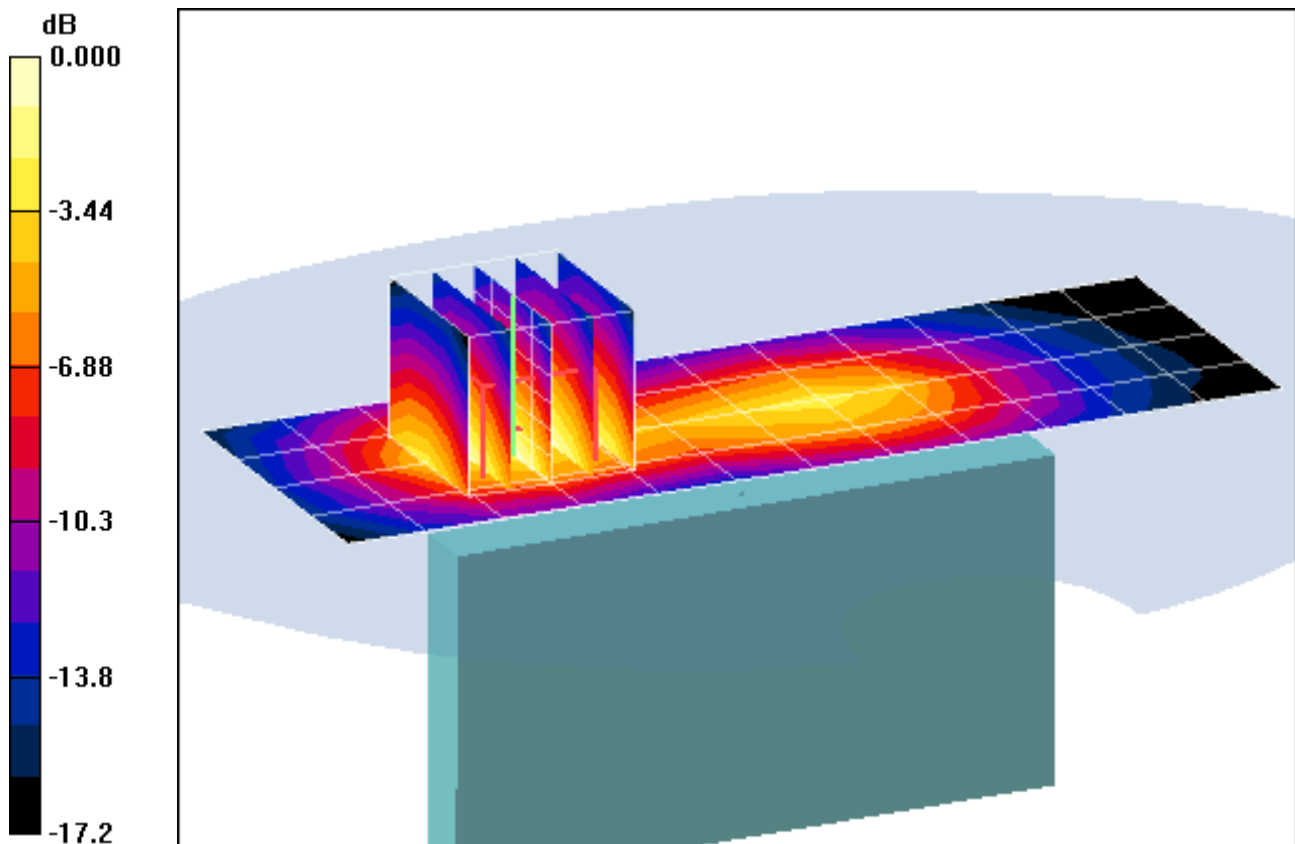
Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 13.7 V/m; Power Drift = -0.045 dB

Peak SAR (extrapolated) = 0.421 W/kg

SAR(1 g) = 0.253 mW/g; SAR(10 g) = 0.144 mW/g



0 dB = 0.278mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: WIFI SAR 4

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

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.97 \text{ mho/m}$; $\epsilon_r = 50.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-22-2012; Ambient Temp: 24.3°C; Tissue Temp: 23.4°C

Probe: ES3DV3 - SN3209; ConvF(4.15, 4.15, 4.15); Calibrated: 4/18/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

Mode: IEEE 802.11b, Body SAR, Ch 11, 1 Mbps, Back Side

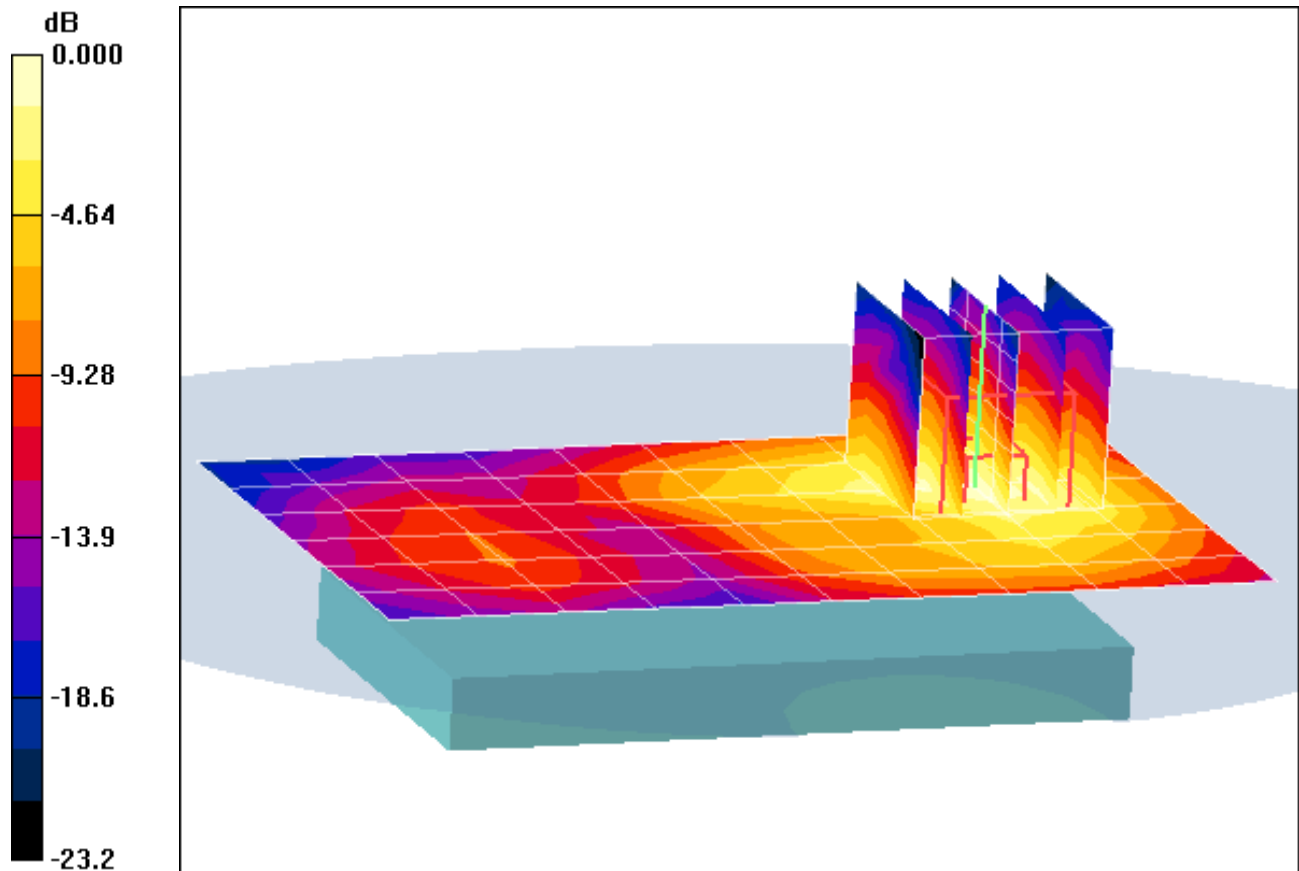
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 9.68 V/m; Power Drift = -0.046 dB

Peak SAR (extrapolated) = 0.346 W/kg

SAR(1 g) = 0.170 mW/g; SAR(10 g) = 0.087 mW/g



0 dB = 0.214mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: WIFI SAR 4

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

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.97 \text{ mho/m}$; $\epsilon_r = 50.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-22-2012; Ambient Temp: 24.3°C; Tissue Temp: 23.4°C

Probe: ES3DV3 - SN3209; ConvF(4.15, 4.15, 4.15); Calibrated: 4/18/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

Mode: IEEE 802.11b, Body SAR, Ch 11, 1 Mbps, Front Side

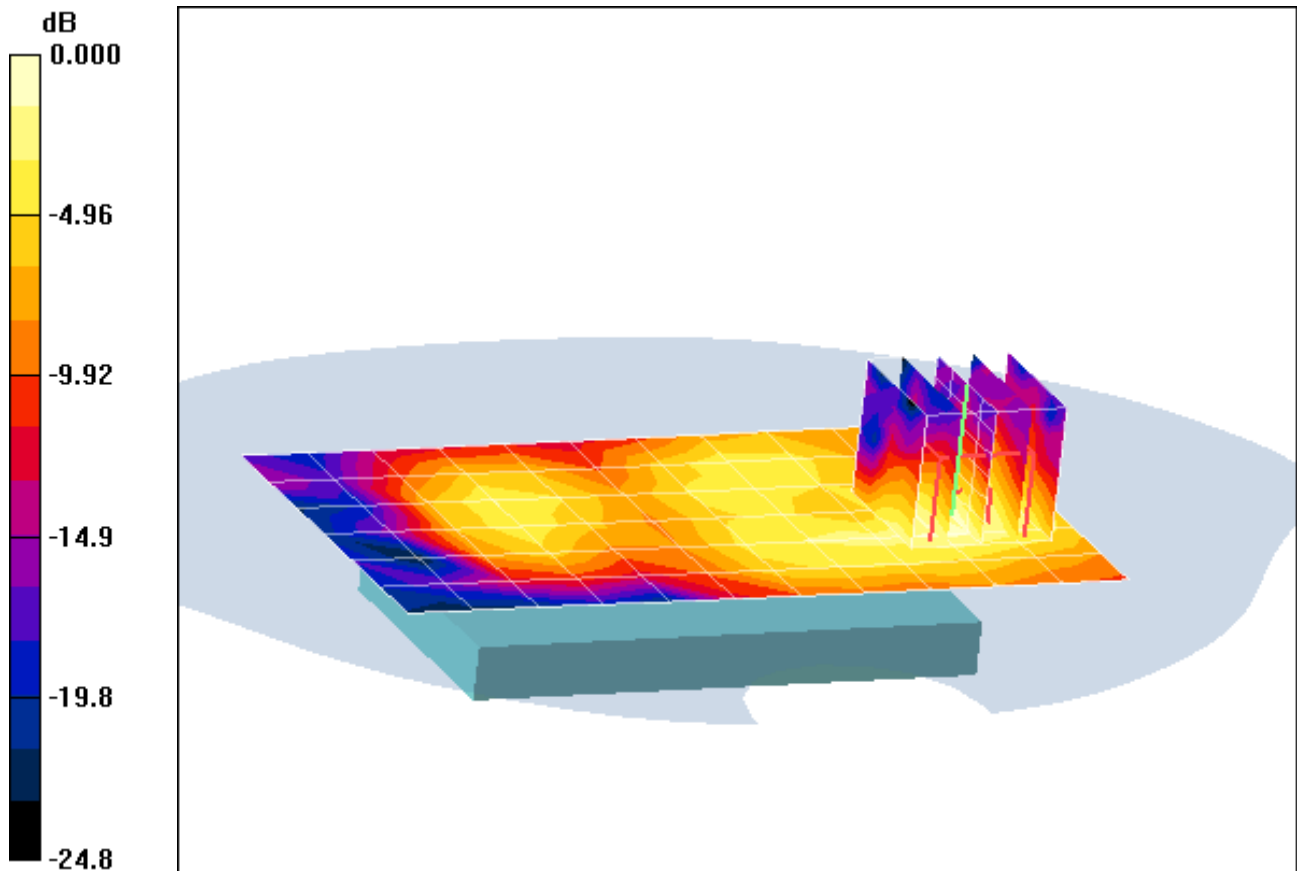
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 4.36 V/m; Power Drift = 0.108 dB

Peak SAR (extrapolated) = 0.080 W/kg

SAR(1 g) = 0.040 mW/g; SAR(10 g) = 0.020 mW/g



0 dB = 0.052mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: WIFI SAR 4

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

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.97 \text{ mho/m}$; $\epsilon_r = 50.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-22-2012; Ambient Temp: 24.3°C; Tissue Temp: 23.4°C

Probe: ES3DV3 - SN3209; ConvF(4.15, 4.15, 4.15); Calibrated: 4/18/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

Mode: IEEE 802.11b, Body SAR, Ch 11, 1 Mbps, Top Edge

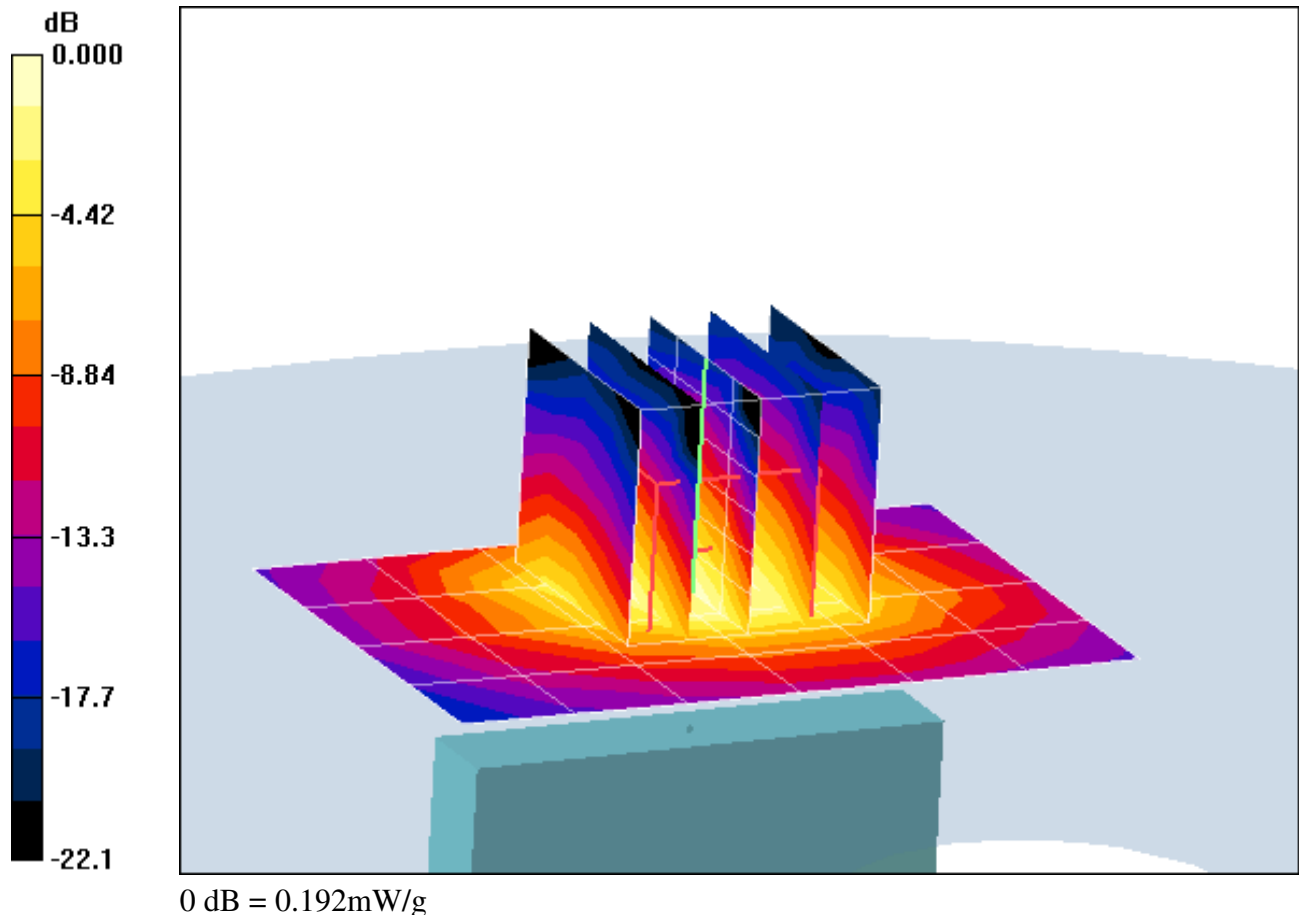
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 8.14 V/m; Power Drift = -0.084 dB

Peak SAR (extrapolated) = 0.313 W/kg

SAR(1 g) = 0.145 mW/g; SAR(10 g) = 0.068 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHR820; Type: Portable Handset; Serial: WIFI SAR 4

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

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.97 \text{ mho/m}$; $\epsilon_r = 50.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-22-2012; Ambient Temp: 24.3°C; Tissue Temp: 23.4°C

Probe: ES3DV3 - SN3209; ConvF(4.15, 4.15, 4.15); Calibrated: 4/18/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

Mode: IEEE 802.11b, Body SAR, Ch 11, 1 Mbps, Left Edge

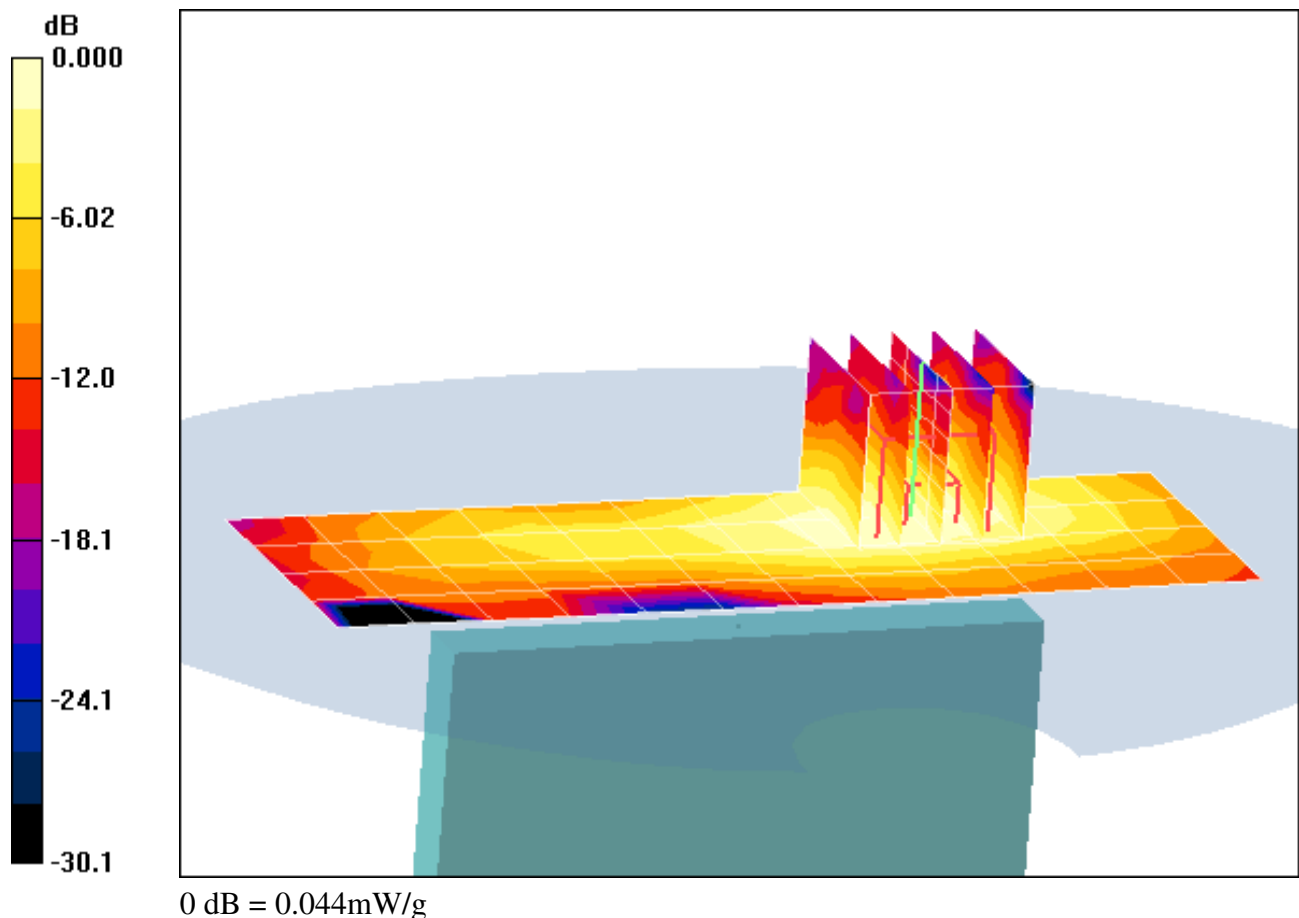
Area Scan (5x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 4.34 V/m; Power Drift = 0.000 dB

Peak SAR (extrapolated) = 0.070 W/kg

SAR(1 g) = 0.036 mW/g; SAR(10 g) = 0.019 mW/g



APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.921 \text{ mho/m}$; $\epsilon_r = 42.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-23-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV2 - SN3022; ConvF(6.05, 6.05, 6.05); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

835MHz System Verification

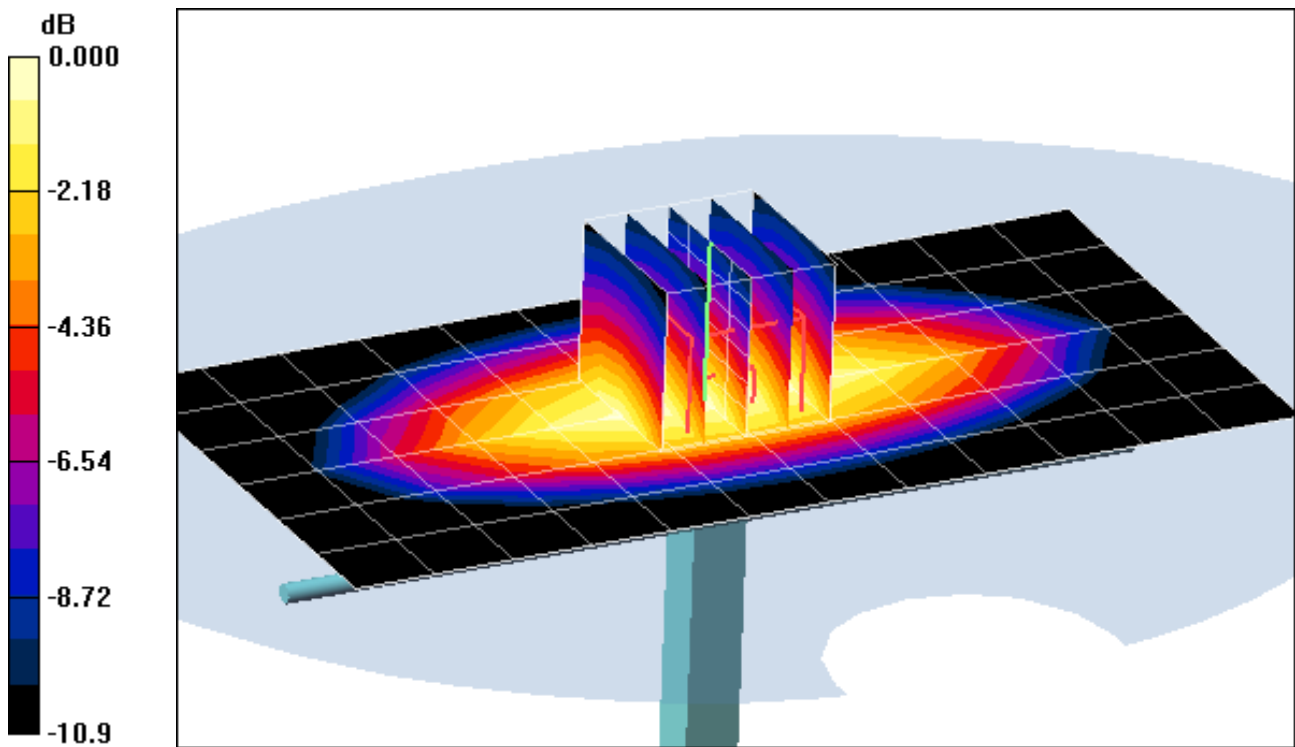
Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 1 mW/g; SAR(10 g) = 0.648 mW/g

Deviation = 5.71%



0 dB = 1.08mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.921 \text{ mho/m}$; $\epsilon_r = 42.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-23-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV2 - SN3022; ConvF(6.05, 6.05, 6.05); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

835MHz System Verification

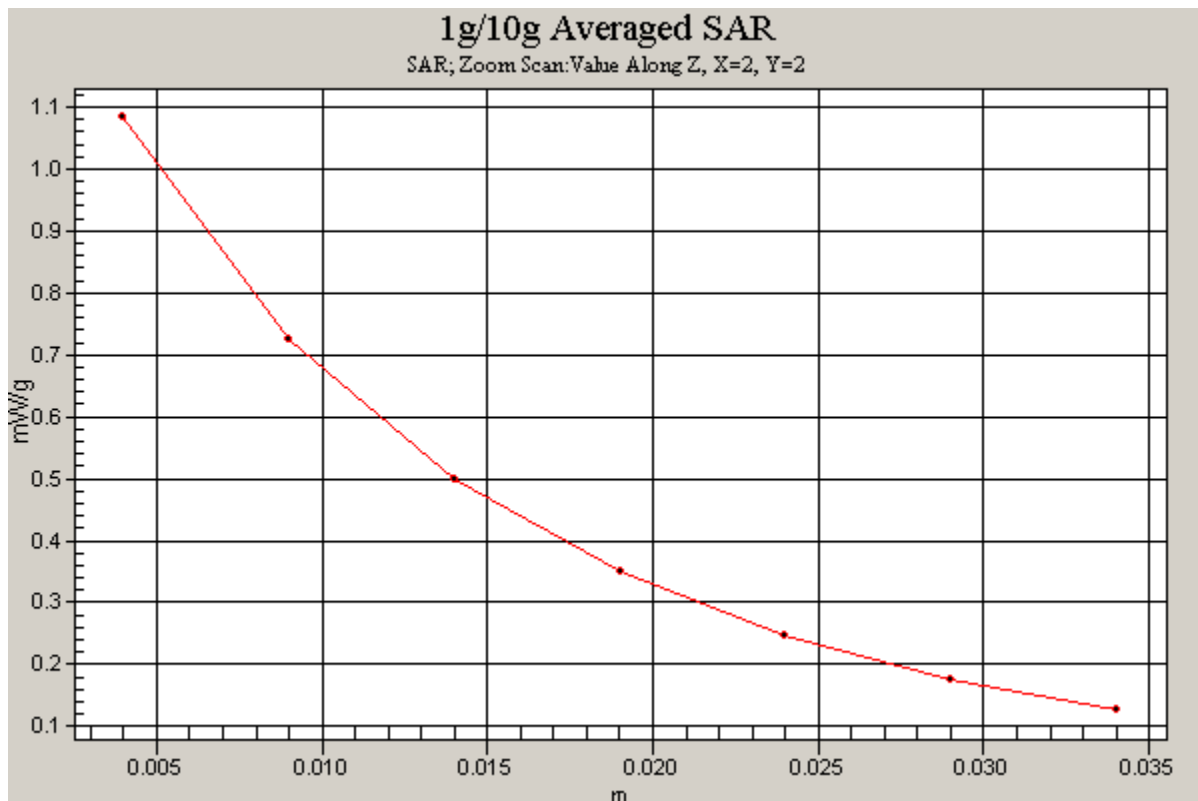
Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 1 mW/g; SAR(10 g) = 0.648 mW/g

Deviation = 5.71%



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:

$f = 1750 \text{ MHz}$; $\sigma = 1.41 \text{ mho/m}$; $\epsilon_r = 40.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-21-2012; Ambient Temp: 24.7 °C; Tissue Temp: 22.5 °C

Probe: ES3DV3 - SN3213; ConvF(5.2, 5.2, 5.2); Calibrated: 3/24/2011

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

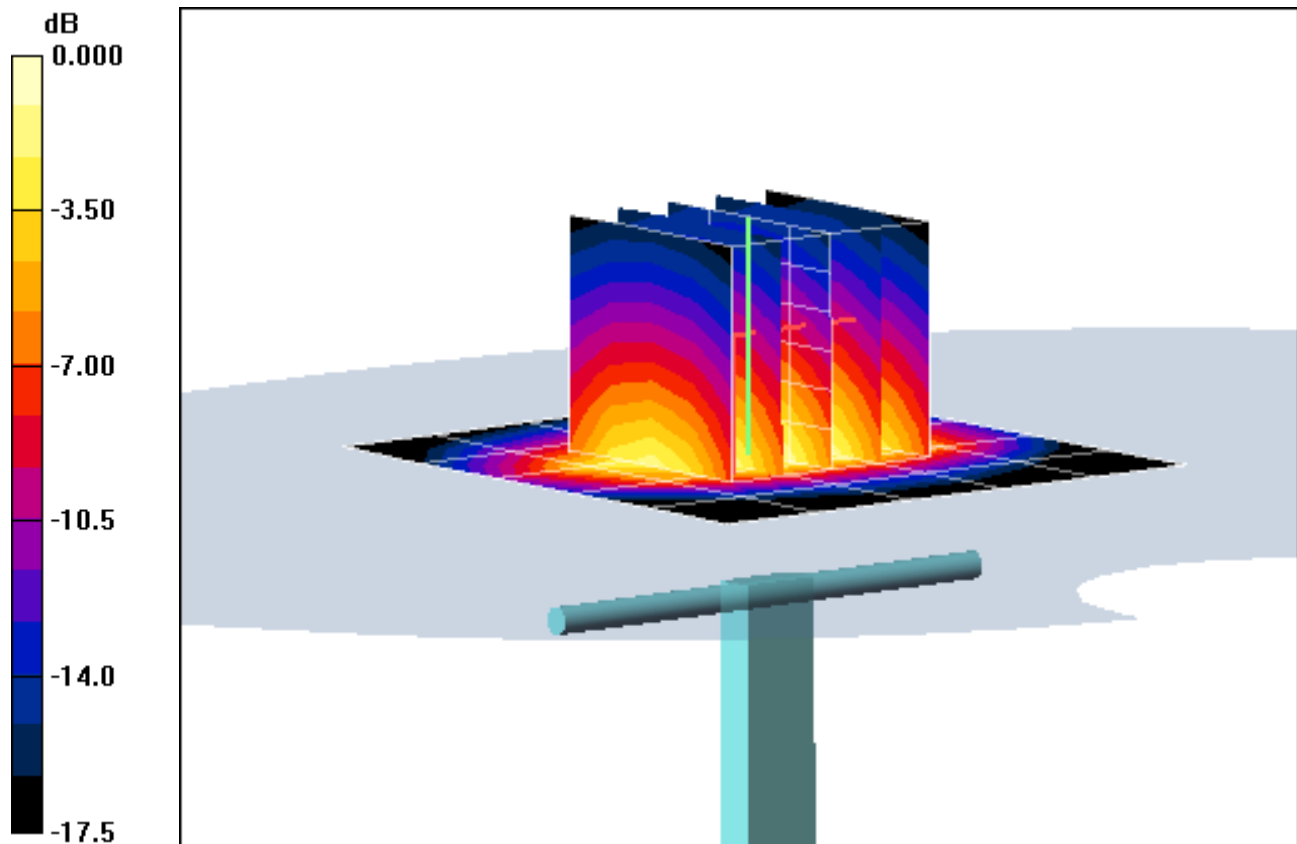
Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 3.61 mW/g; SAR(10 g) = 1.86 mW/g

Deviation = -2.43 %



0 dB = 4.06mW/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:

$f = 1750 \text{ MHz}$; $\sigma = 1.41 \text{ mho/m}$; $\epsilon_r = 40.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-21-2012; Ambient Temp: 24.7 °C; Tissue Temp: 22.5 °C

Probe: ES3DV3 - SN3213; ConvF(5.2, 5.2, 5.2); Calibrated: 3/24/2011

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

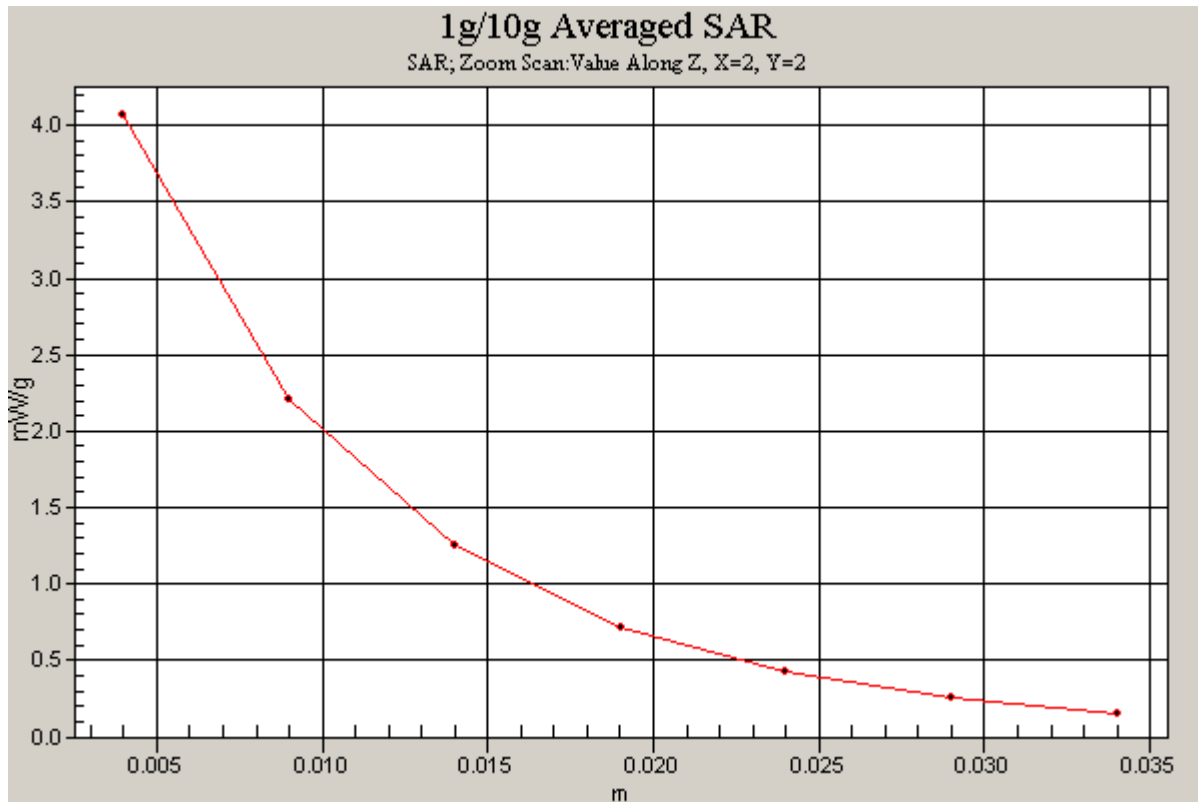
Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 3.61 mW/g; SAR(10 g) = 1.86 mW/g

Deviation = -2.43 %



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:

$f = 1750 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 38.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-28-2012; Ambient Temp: 24.3 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3209; ConvF(5.33, 5.33, 5.33); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

1750 MHz System Verification

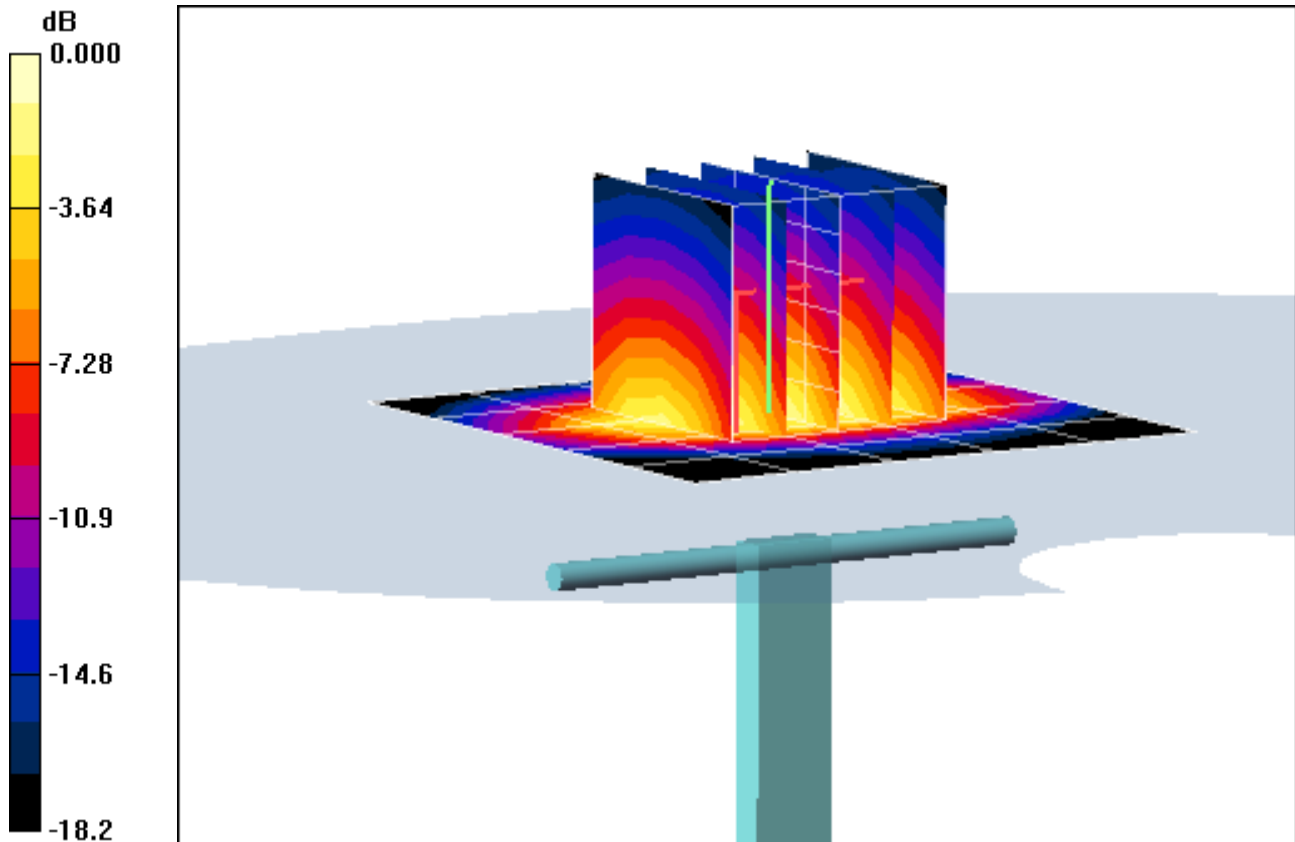
Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 3.67 mW/g; SAR(10 g) = 1.89 mW/g

Deviation = -0.81 %



0 dB = 4.08mW/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:

$f = 1750 \text{ MHz}$; $\sigma = 1.42 \text{ mho/m}$; $\epsilon_r = 38.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-28-2012; Ambient Temp: 24.3 °C; Tissue Temp: 22.4 °C

Probe: ES3DV3 - SN3209; ConvF(5.33, 5.33, 5.33); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

1750 MHz System Verification

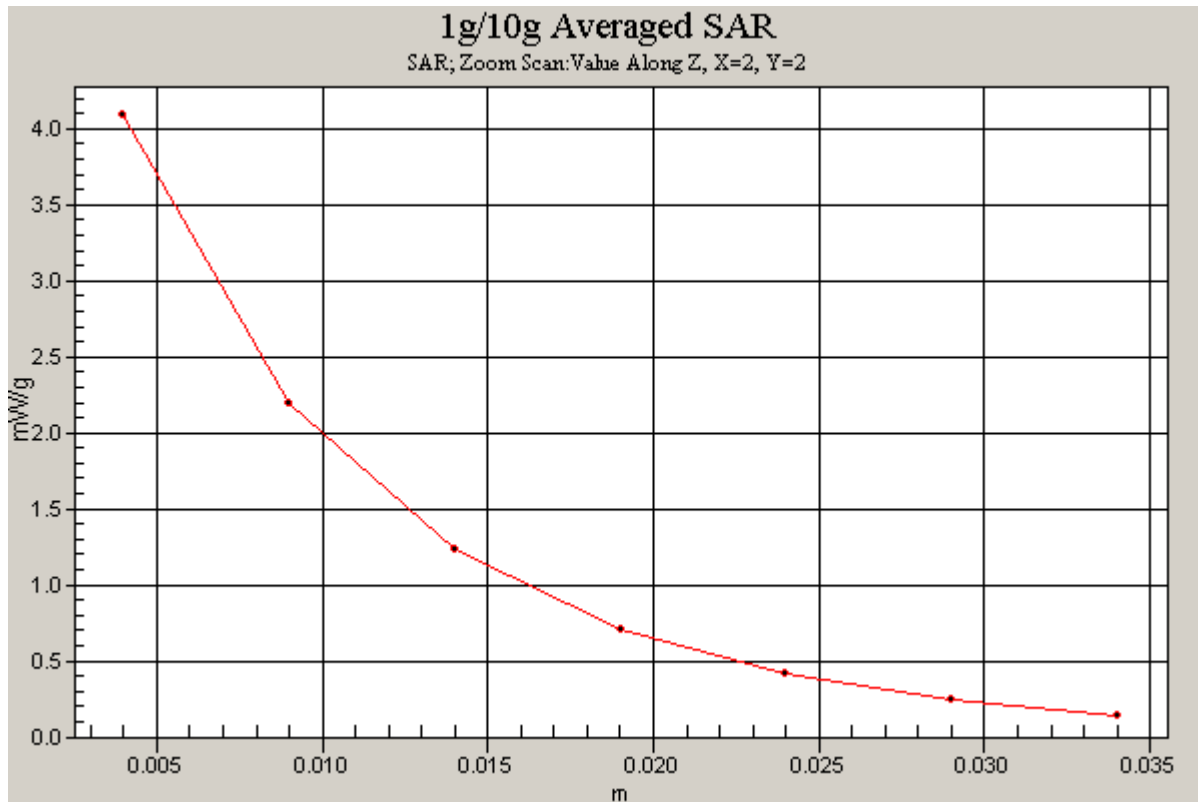
Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 3.67 mW/g; SAR(10 g) = 1.89 mW/g

Deviation = -0.81 %



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.41 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-23-2012; Ambient Temp: 24.5 °C; Tissue Temp: 22.0 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

1900MHz System Verification

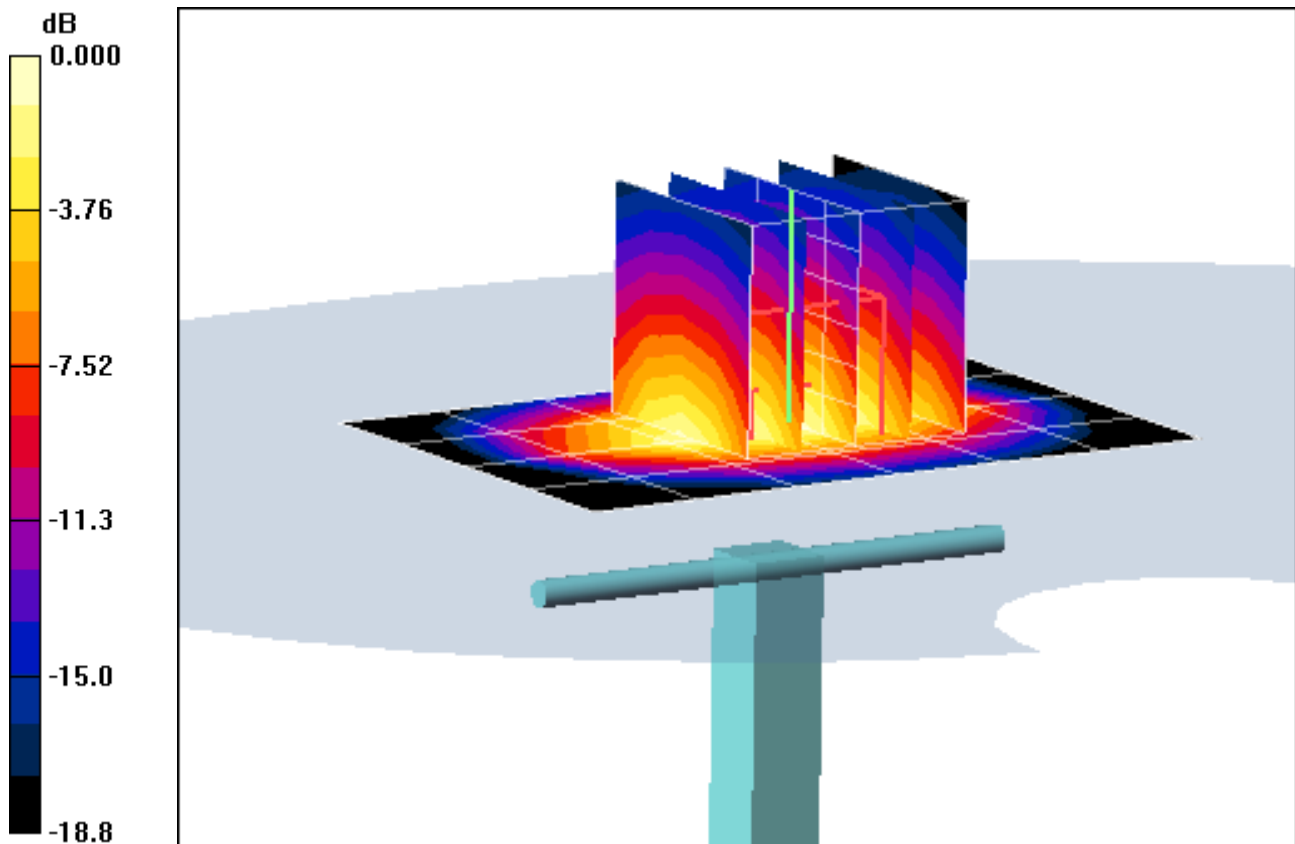
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 3.94 mW/g; SAR(10 g) = 2.01 mW/g

Deviation = -0.25 %



0 dB = 4.36mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.41 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-23-2012; Ambient Temp: 24.5 °C; Tissue Temp: 22.0 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

1900MHz System Verification

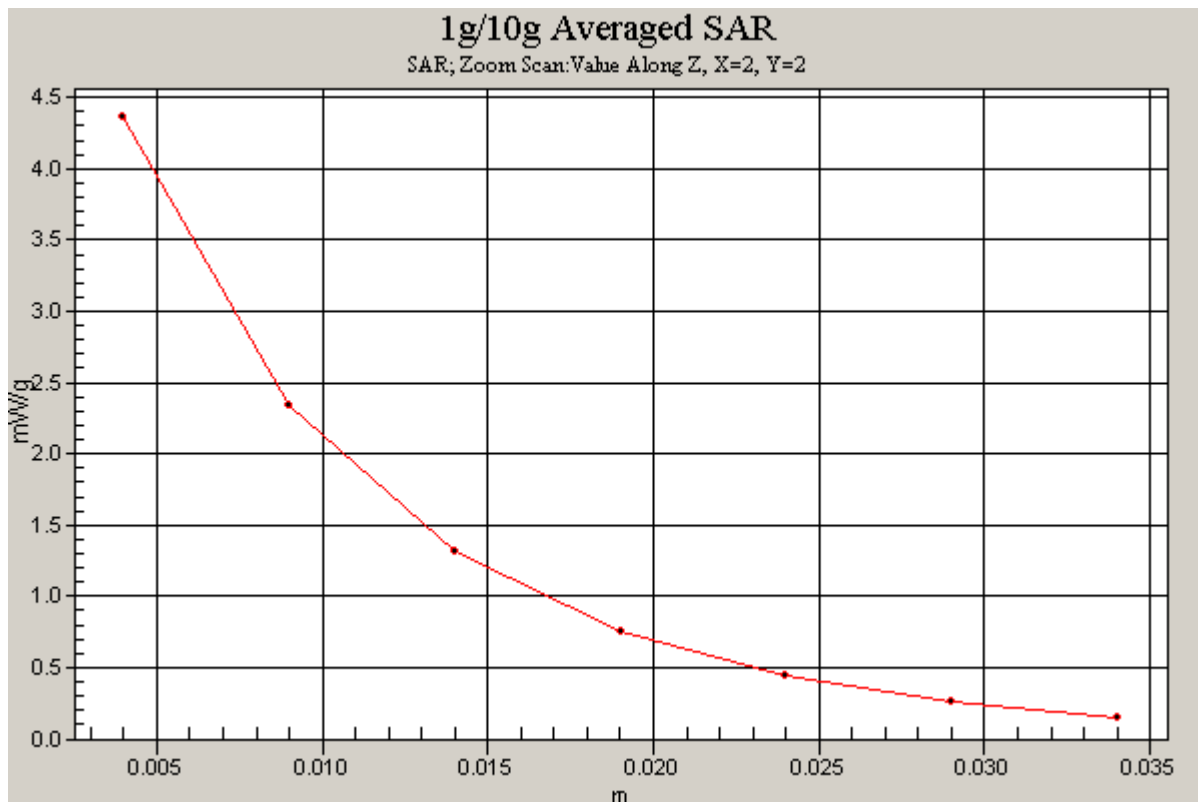
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 3.94 mW/g; SAR(10 g) = 2.01 mW/g

Deviation = -0.25 %



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 2450 Head Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.81 \text{ mho/m}$; $\epsilon_r = 40.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-22-2012; Ambient Temp: 24.5°C; Tissue Temp: 23.3°C

Probe: ES3DV3 - SN3209; ConvF(4.52, 4.52, 4.52); Calibrated: 4/18/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

2450MHz System Verification

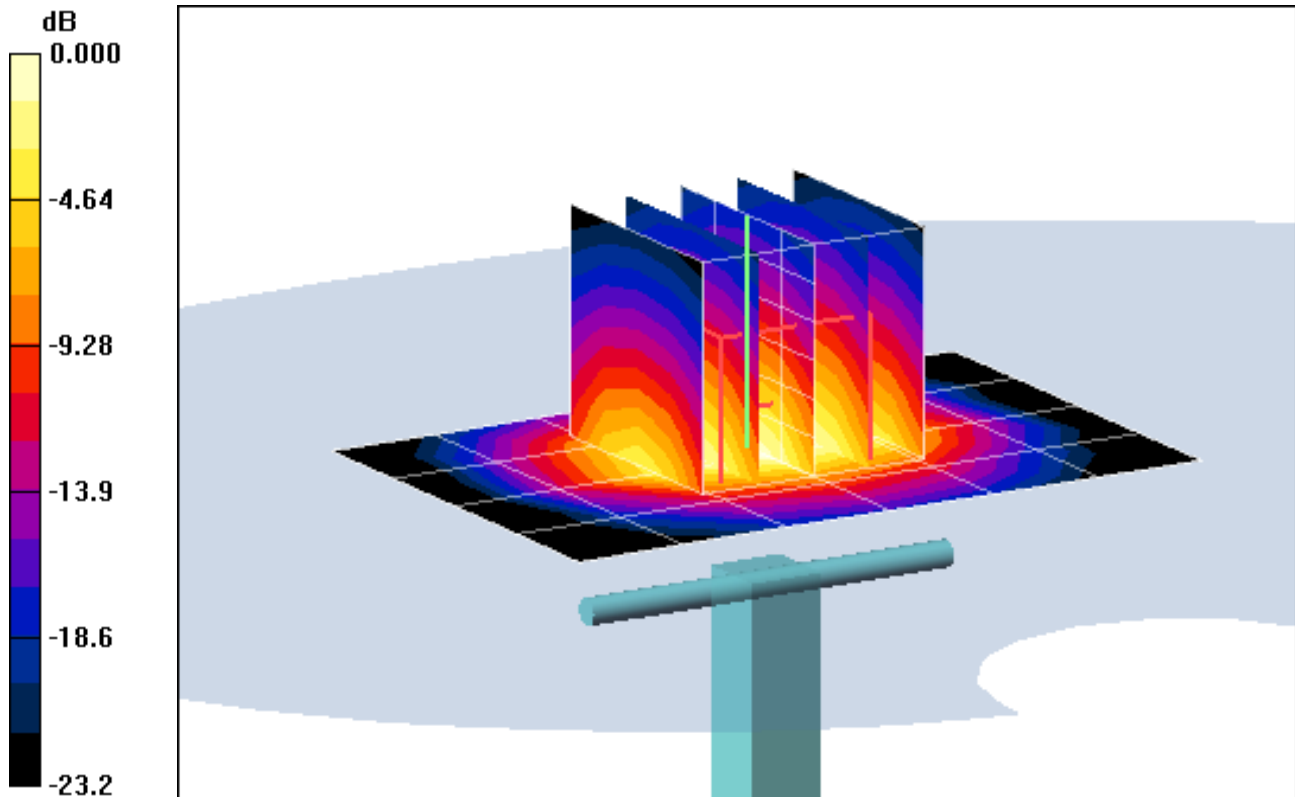
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 16 dBm (40 mW)

SAR(1 g) = 2.16 mW/g; SAR(10 g) = 0.994 mW/g

Deviation = 0.37%



0 dB = 2.86mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 2450 Head Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.81 \text{ mho/m}$; $\epsilon_r = 40.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-22-2012; Ambient Temp: 24.5°C; Tissue Temp: 23.3°C

Probe: ES3DV3 - SN3209; ConvF(4.52, 4.52, 4.52); Calibrated: 4/18/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

2450MHz System Verification

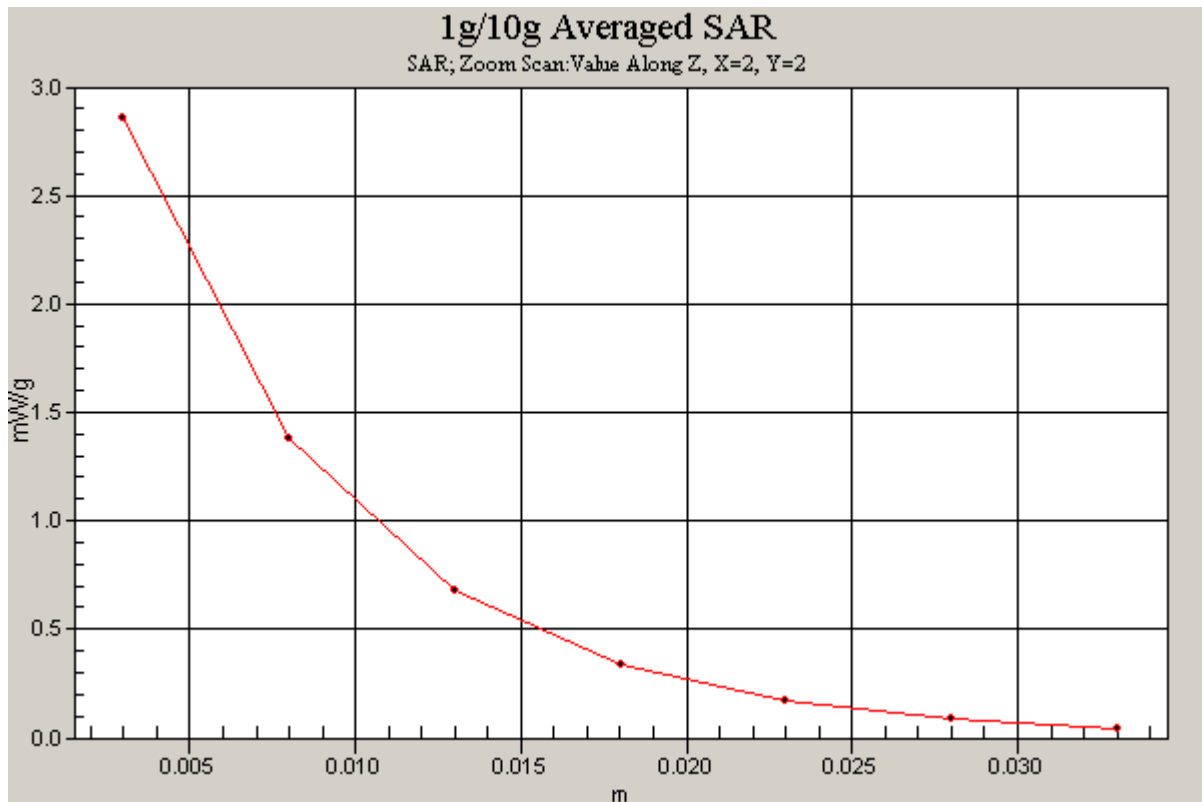
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 16 dBm (40 mW)

SAR(1 g) = 2.16 mW/g; SAR(10 g) = 0.994 mW/g

Deviation = 0.37%



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.972 \text{ mho/m}$; $\epsilon_r = 53.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-23-2012; Ambient Temp: 23.2°C; Tissue Temp: 22.4°C

Probe: ES3DV2 - SN3022; ConvF(6.06, 6.06, 6.06); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

835MHz System Verification

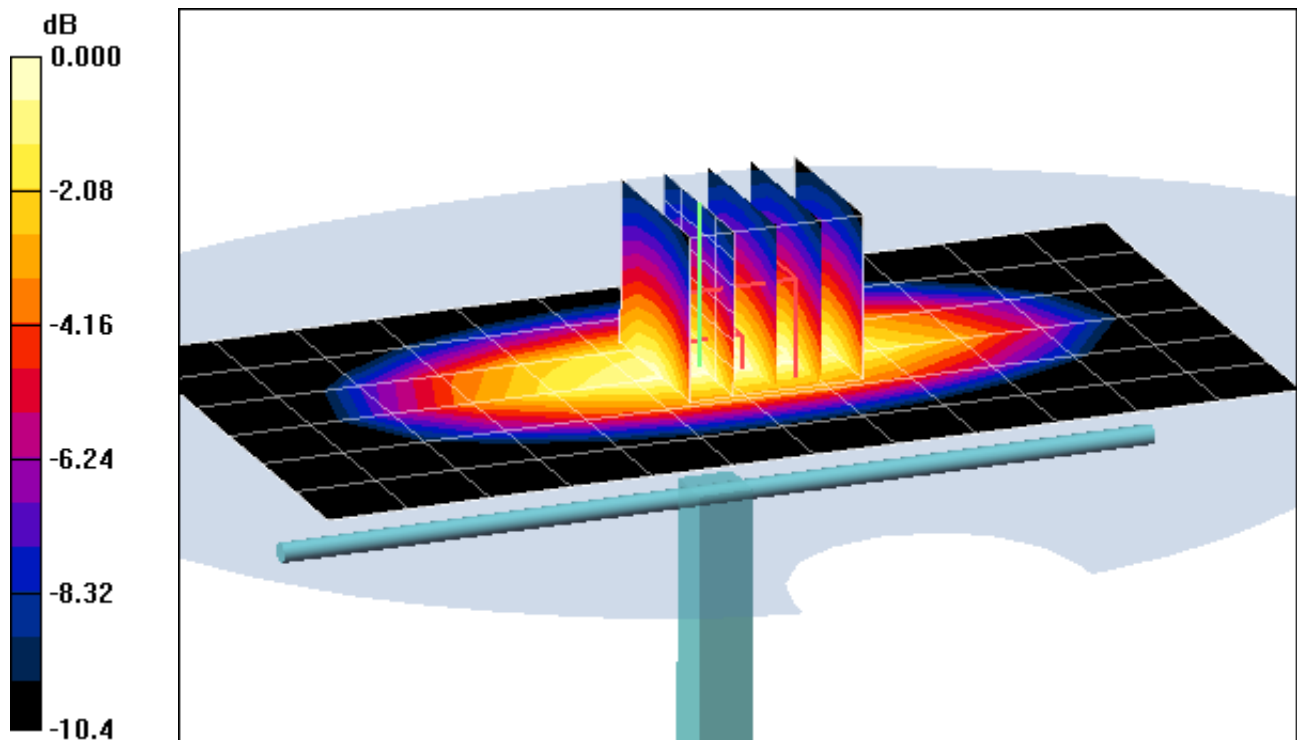
Area Scan (7x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 0.965 mW/g; SAR(10 g) = 0.636 mW/g

Deviation = -0.10%



0 dB = 1.04mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.972 \text{ mho/m}$; $\epsilon_r = 53.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-23-2012; Ambient Temp: 23.2°C; Tissue Temp: 22.4°C

Probe: ES3DV2 - SN3022; ConvF(6.06, 6.06, 6.06); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

835MHz System Verification

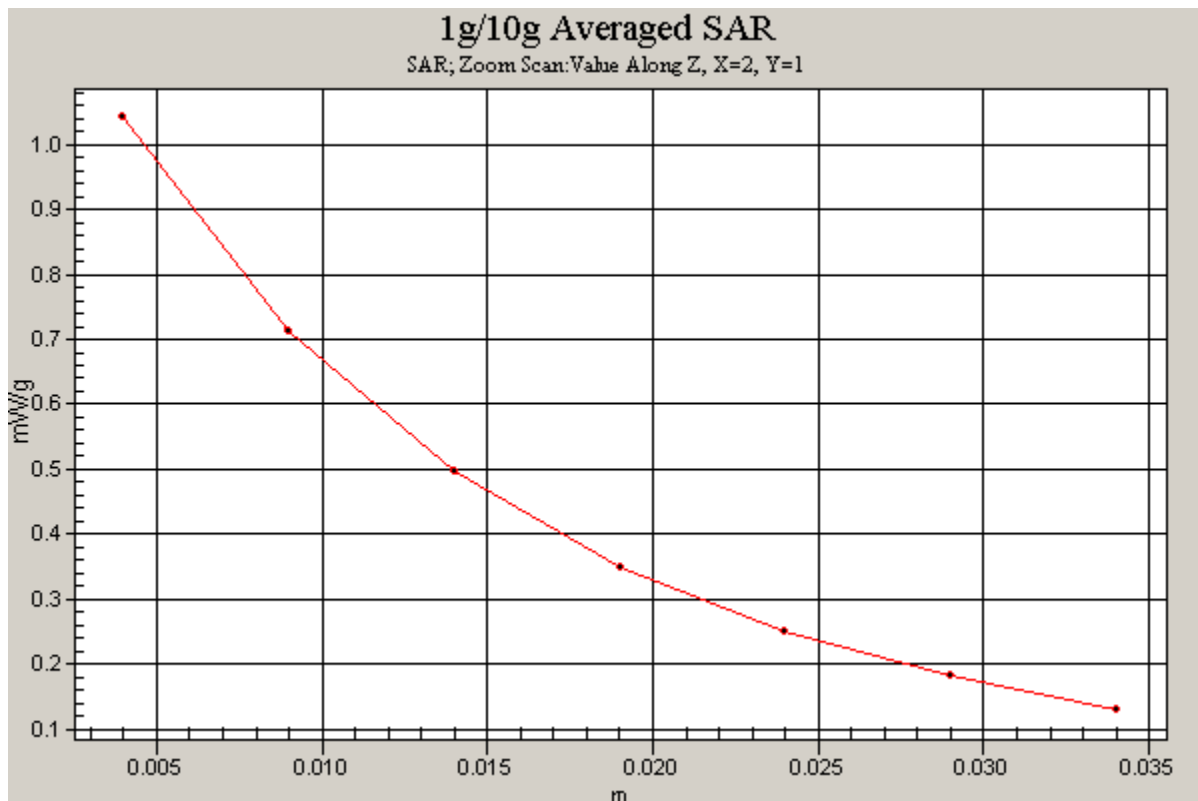
Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 0.965 mW/g; SAR(10 g) = 0.636 mW/g

Deviation = -0.10%



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:

$f = 1750 \text{ MHz}$; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-28-2012; Ambient Temp: 23.9 °C; Tissue Temp: 22.5 °C

Probe: ES3DV3 - SN3209; ConvF(4.75, 4.75, 4.75); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

1750 MHz System Verification

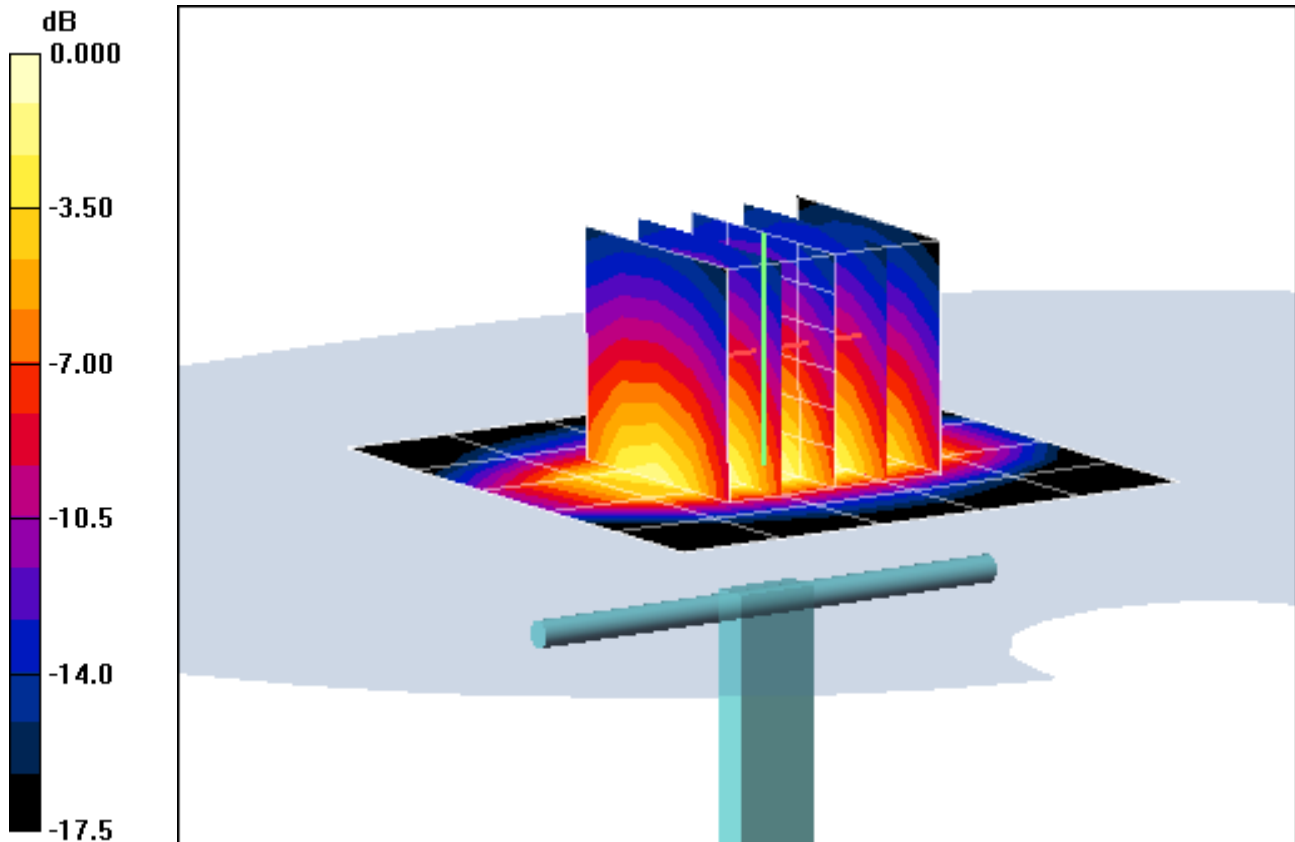
Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 3.98 mW/g; SAR(10 g) = 2.08 mW/g

Deviation = 7.57 %



0 dB = 4.40mW/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:

$f = 1750 \text{ MHz}$; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-28-2012; Ambient Temp: 23.9 °C; Tissue Temp: 22.5 °C

Probe: ES3DV3 - SN3209; ConvF(4.75, 4.75, 4.75); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

1750 MHz System Verification

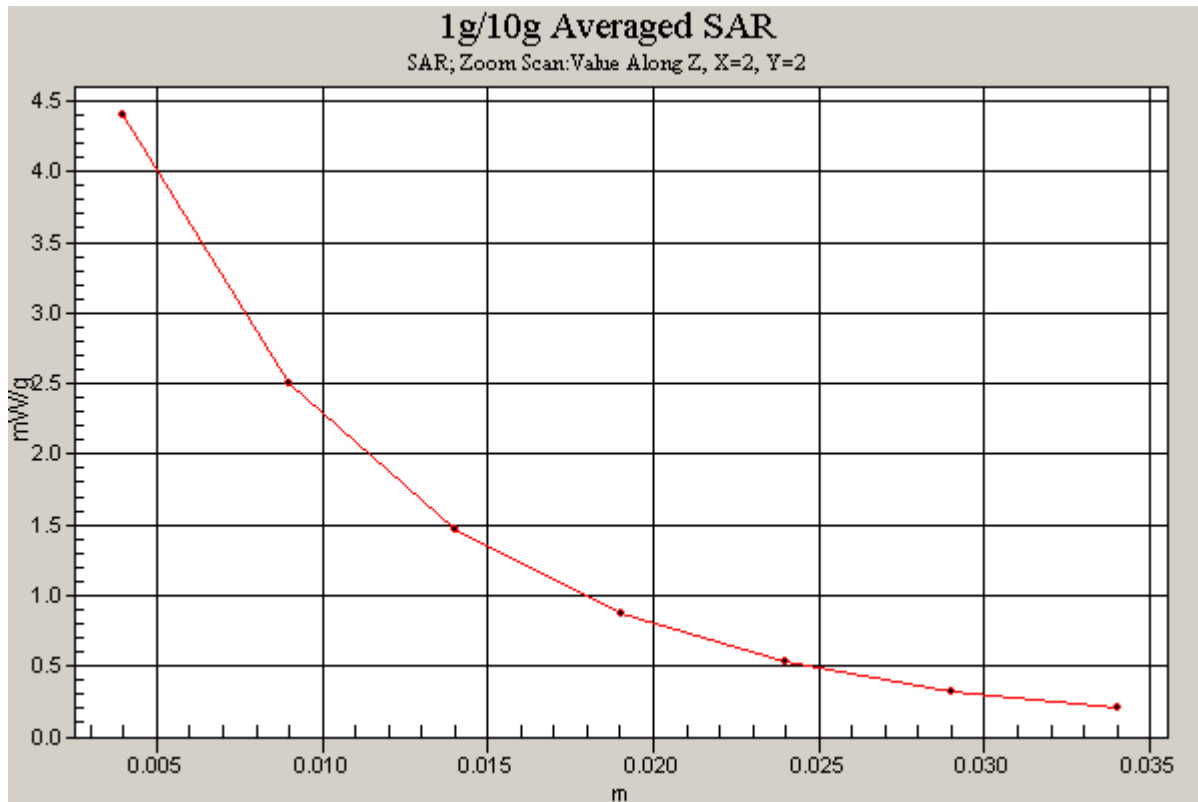
Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 3.98 mW/g; SAR(10 g) = 2.08 mW/g

Deviation = 7.57 %



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.49 \text{ mho/m}$; $\epsilon_r = 51.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-23-2012; Ambient Temp: 23.3°C; Tissue Temp: 22.0°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

1900MHz System Verification

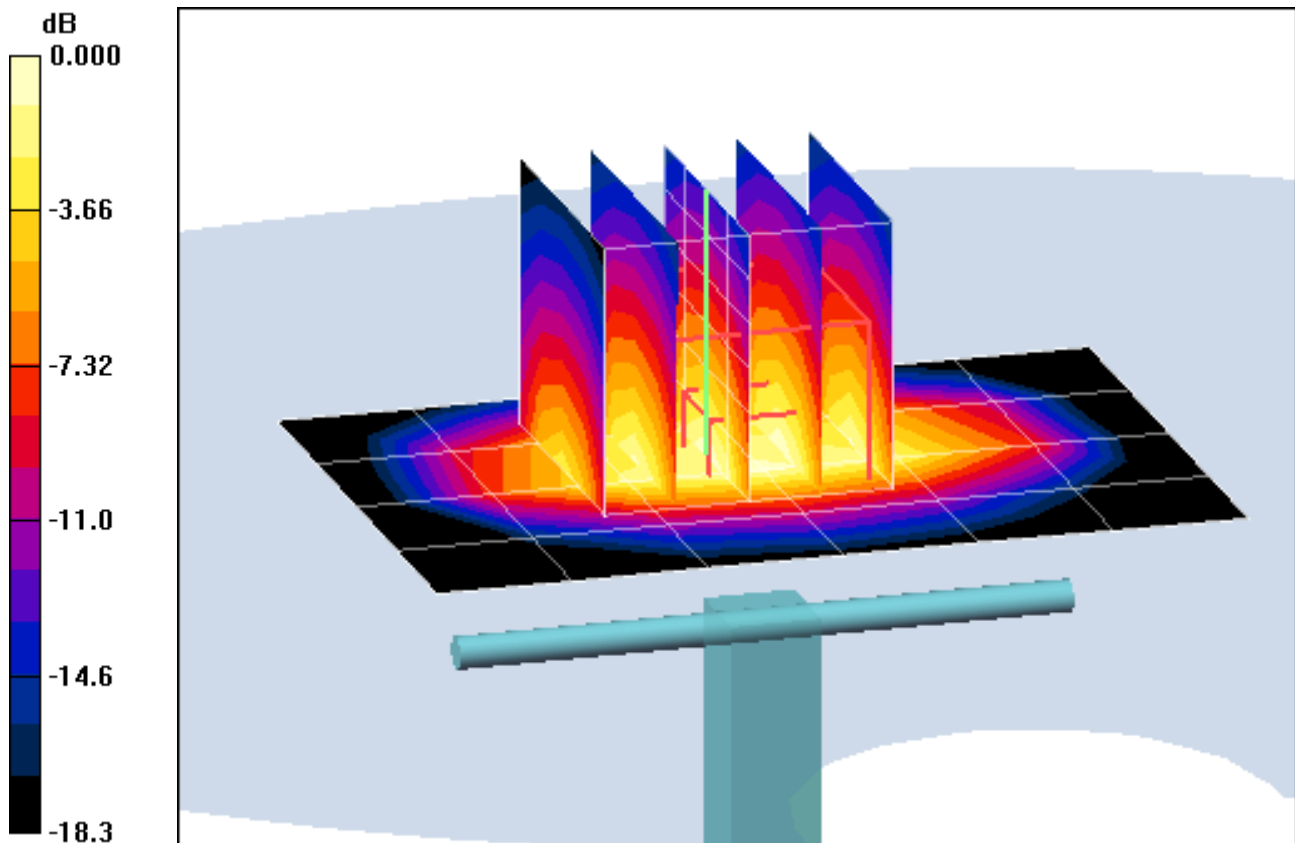
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 4.33 mW/g; SAR(10 g) = 2.26 mW/g

Deviation = 4.59%



0 dB = 4.79mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.49 \text{ mho/m}$; $\epsilon_r = 51.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-23-2012; Ambient Temp: 23.3°C; Tissue Temp: 22.0°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

1900MHz System Verification

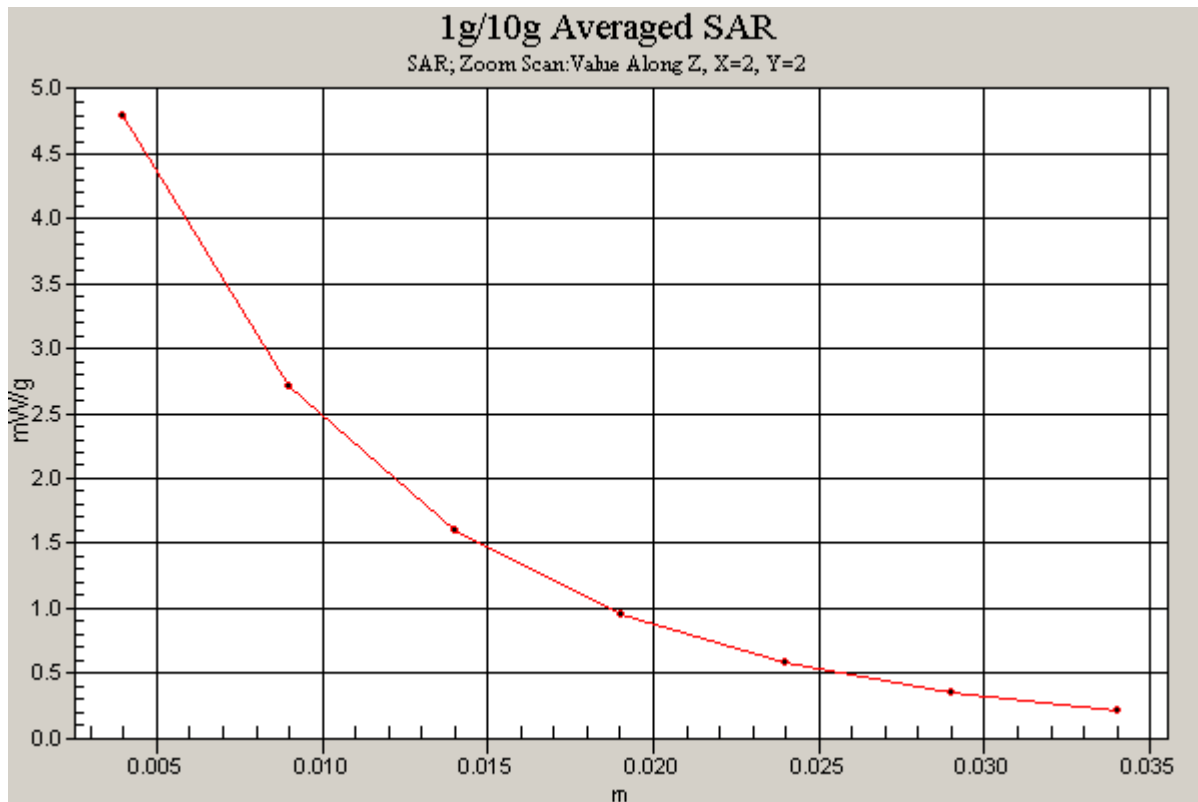
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 4.33 mW/g; SAR(10 g) = 2.26 mW/g

Deviation = 4.59%



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.56 \text{ mho/m}$; $\epsilon_r = 50.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-27-2012; Ambient Temp: 24.0°C; Tissue Temp: 23.2°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

1900MHz System Verification

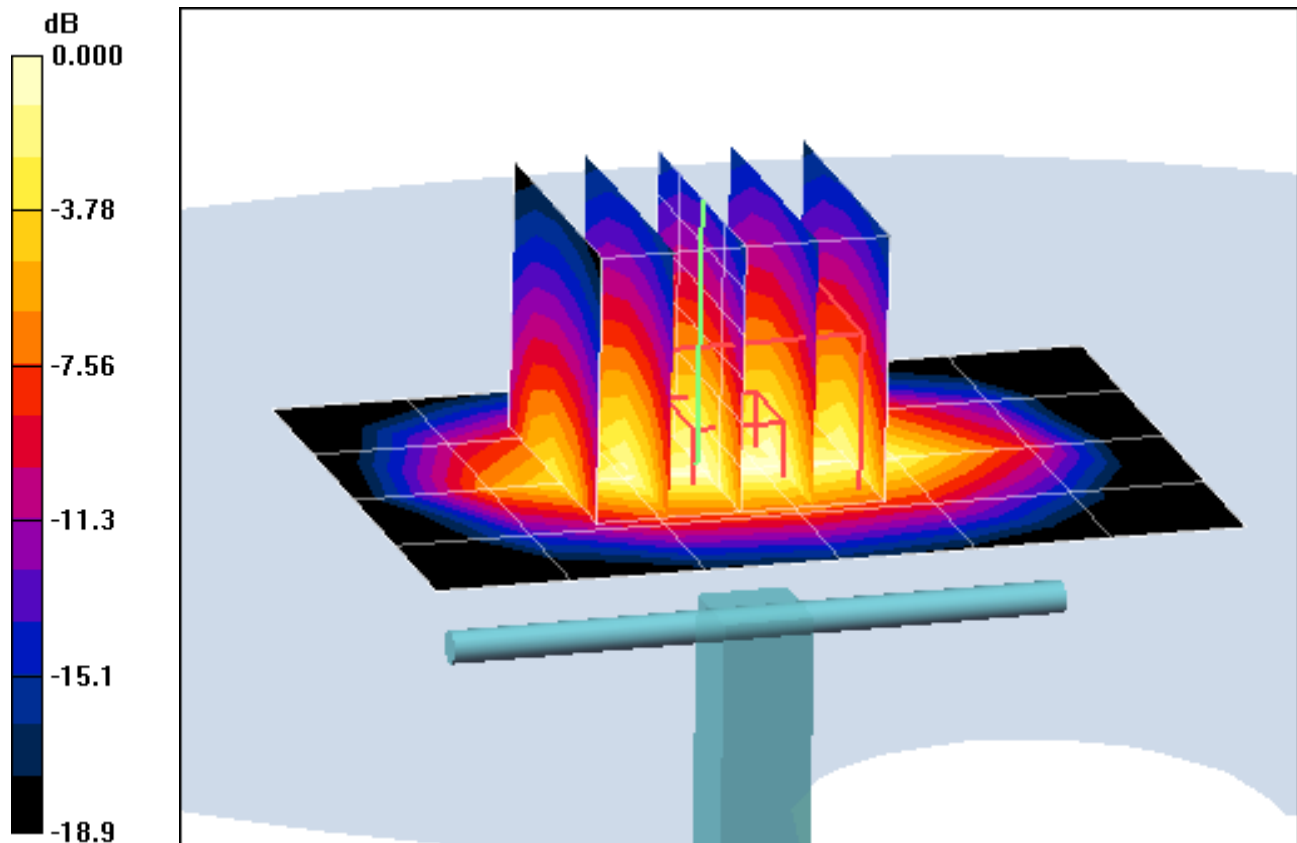
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 4.45 mW/g; SAR(10 g) = 2.29 mW/g

Deviation = 7.49%



0 dB = 4.97mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.56 \text{ mho/m}$; $\epsilon_r = 50.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-27-2012; Ambient Temp: 24.0°C; Tissue Temp: 23.2°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

1900MHz System Verification

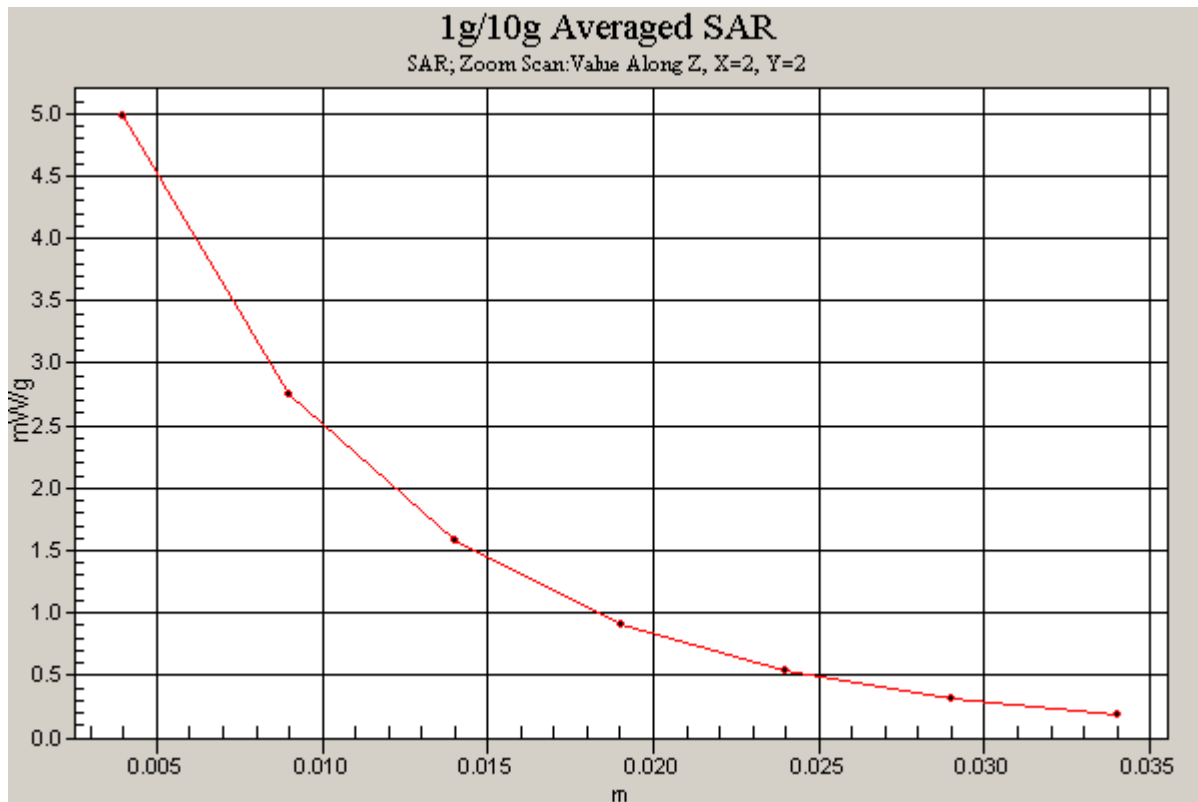
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 4.45 mW/g; SAR(10 g) = 2.29 mW/g

Deviation = 7.49%



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.97 \text{ mho/m}$; $\epsilon_r = 50.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-22-2012; Ambient Temp: 24.3°C; Tissue Temp: 23.4°C

Probe: ES3DV3 - SN3209; ConvF(4.15, 4.15, 4.15); Calibrated: 4/18/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

2450MHz System Verification

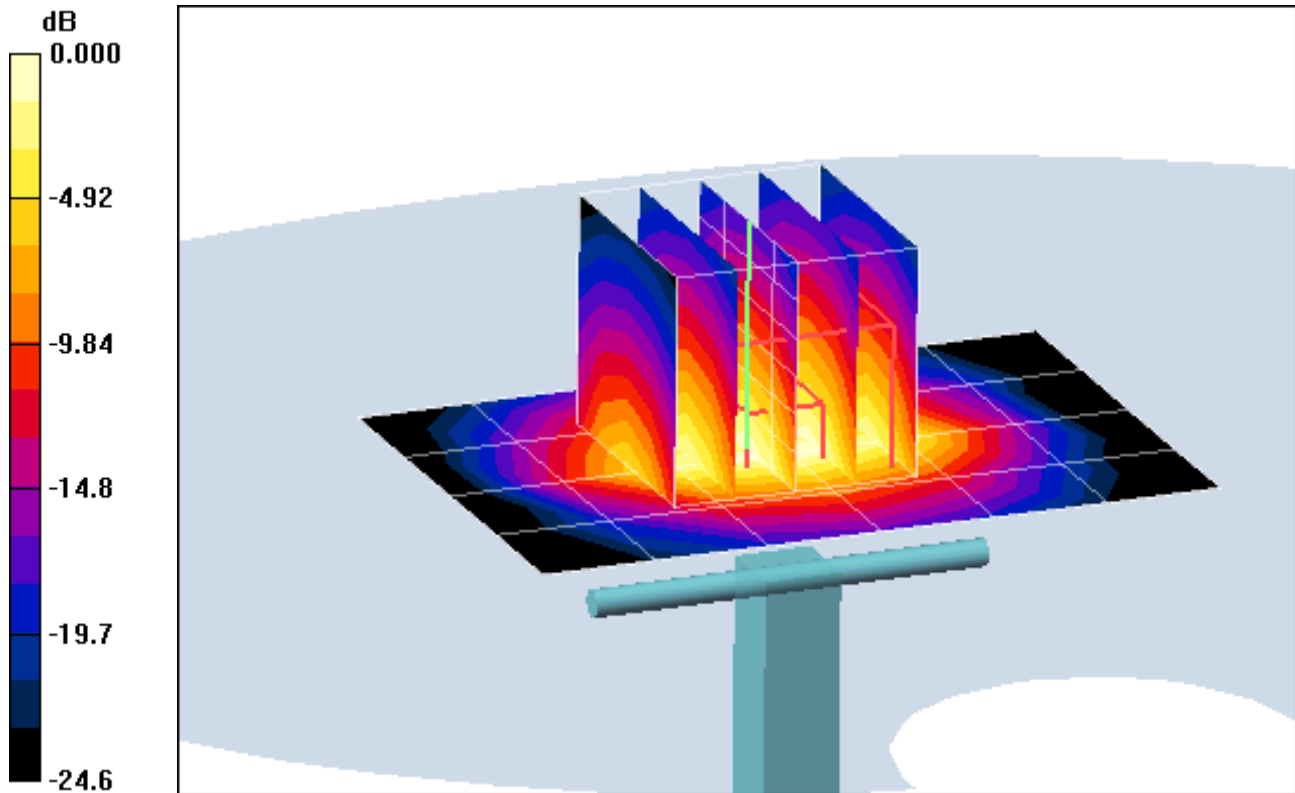
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 16 dBm (40 mW)

SAR(1 g) = 2.19 mW/g; SAR(10 g) = 0.999 mW/g

Deviation = 6.73%



0 dB = 2.86mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.97 \text{ mho/m}$; $\epsilon_r = 50.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-22-2012; Ambient Temp: 24.3°C; Tissue Temp: 23.4°C

Probe: ES3DV3 - SN3209; ConvF(4.15, 4.15, 4.15); Calibrated: 4/18/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

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

2450MHz System Verification

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

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

Input Power = 16 dBm (40 mW)

SAR(1 g) = 2.19 mW/g; SAR(10 g) = 0.999 mW/g

Deviation = 6.73%

