



SAR EVALUATION REPORT

Applicant Name:

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

Date of Testing:

01/26/12 - 02/07/12

Test Site/Location:

PCTEST Lab, Columbia, MD, USA

Document Serial No.:

0Y1201270140.A3L

FCC ID:

A3LSGHI667

APPLICANT:

SAMSUNG ELECTRONICS, CO. LTD.

DUT Type:

Portable Handset

Application Type:

Certification

FCC Rule Part(s):

CFR §2.1093

Model(s):

SGH-i667

Band & Mode	Tx Frequency	Conducted Power [dBm]	SAR		
			1 gm Head (W/kg)	1 gm Body-Worn (W/kg)	1 gm Hotspot (W/kg)
GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	32.66	0.42	0.60	0.60
WCDMA/HSPA 850	826.40 - 846.60 MHz	23.25	0.51	0.69	0.69
GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	30.25	0.41	0.89	0.89
WCDMA/HSPA 1900	1852.4 - 1907.6 MHz	22.24	0.48	0.99	0.99
LTE Band 17	706.5 - 713.5 MHz	23.17	0.08	0.13	0.13
LTE Band 4 (AWS)	1712.5 - 1752.5 MHz	22.92	0.68	0.98	0.98
2.4 GHz WLAN	2412 - 2462 MHz	16.85	0.12	0.08	0.08
Bluetooth	2402 - 2480 MHz	13.34	N/A		
Simultaneous SAR per KDB 690783 D01:			0.76	1.07	1.07

Note: Powers in the above table represent the highest output powers for the SAR test configurations and may not represent the maximum 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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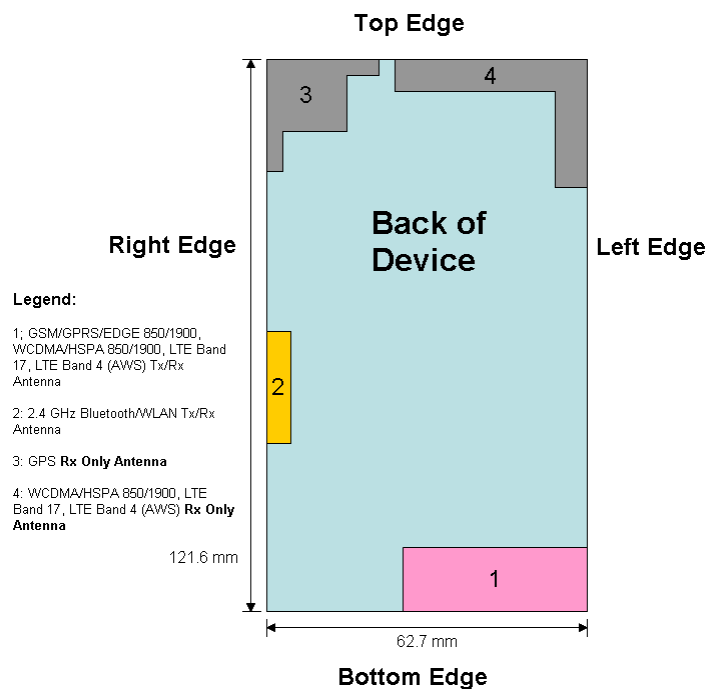
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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Tx Frequency
GSM/GPRS/EDGE 850	824.20 - 848.80 MHz
WCDMA/HSPA 850	826.40 - 846.60 MHz
GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz
WCDMA/HSPA 1900	1852.4 - 1907.6 MHz
LTE Band 17	706.5 - 713.5 MHz
LTE Band 4 (AWS)	1712.5 - 1752.5 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
GPRS 850	Yes	Yes	No	Yes	No	Yes
WCDMA 850	Yes	Yes	No	Yes	No	Yes
GPRS 1900	Yes	Yes	No	Yes	No	Yes
WCDMA 1900	Yes	Yes	No	Yes	No	Yes
LTE Band 17	Yes	Yes	No	Yes	No	Yes
LTE Band 4 (AWS)	Yes	Yes	No	Yes	No	Yes
2.4 GHz WLAN	Yes	Yes	No	No	Yes	No

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 Power Reduction for SAR

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

1.4 FCC Guidance Applied

- FCC OET Supplement C
- IEEE 1528-2003
- FCC KDB 941225 (2G/3G/4G)
- FCC KDB 248227 (802.11)
- April 2011 TCB Workshop Notes

1.5 Samples used for SAR testing

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

Table 1-2
SAR Test Sample Serial Numbers

Mode/Band	Serial Number
GSM/GPRS/EDGE 850/1900	FCC 4
WCDMA/HSPA 850/1900	FCC 5
LTE Band 17	FCC 3
LTE Band 4 (AWS)	FCC 2
2.4 GHz WLAN	FCC 6

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1.6 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.



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) b) procedures.

Table 1-3
Possible Simultaneous Transmission Scenarios Transmission Supported by DUT

No.	Capable Transmit Configurations	Head	Body-Worn Accessory	Hot Spot	Note
		IEEE 1528, Supp C	Supp C	FCC KDB 941225 D06 edges/sides	
1	GSM 850/1900 MHz Voice + WiFi 2.4GHz	Yes	10mm	N/A	
2	850/1900 WCDMA Voice + WiFi 2.4GHz	Yes	10mm	N/A	
3	850/1900 MHz GPRS/EDGE Data + WIFI 2.4 GHz	N/A	N/A	Yes	2G Hotspot
4	850/1900 MHz WCDMA/HSPA Data + WIFI 2.4 GHz	Yes	10mm	Yes	3G Hotspot**
5	700/1750 MHz Band17/4 LTE Data + WIFI 2.4 GHz	Yes*	10mm*	Yes	4G Hotspot
6	All GSM/WCDMA Voice + LTE				Not Supported by H/W
7	All GSM/WCDMA Voice + WIFI + LTE				Not Supported by H/W

(*) = for VOIP 3rd party applications possibly installed and used by end-user

(**) = When the user utilizes multiple services in WCDMA 3G mode it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. WCDMA SAR was tested at maximum power levels and therefore represents the highest measured SAR. Therefore, the WCDMA+WLAN scenario also represents the worst case WCDMA Voice/DATA + WLAN Hotspot scenario.

1.7 SAR Test Exclusions Applied

(A) WIFI/BT Testing

The separation distance between the GSM/GPRS/EDGE, WCDMA/HSPA, LTE antenna and the Bluetooth/WLAN antenna is 36.3 mm.

- Maximum peak RF Conducted Power of Bluetooth Tx is 21.57 mW.
- Maximum peak RF Conducted Power of WLAN 802.11b mode is 90.57 mW.
- Maximum peak RF Conducted Power of WLAN 802.11g mode is 134.90 mW.
- Maximum peak RF Conducted Power of WLAN 802.11n mode is 86.90 mW.

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- Maximum average RF Conducted Power of Bluetooth Tx is 18.56 mW.
- Maximum average RF Conducted Power of WLAN 802.11b mode is 50.12 mW.
- Maximum average RF Conducted Power of WLAN 802.11g mode is 33.11 mW.
- Maximum average RF Conducted Power of WLAN 802.11n mode is 20.28 mW.

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

1. The maximum average RF conducted power for Bluetooth (18.58 mW) is less than 60/f.
2. Bluetooth and 2.4 GHz WLAN share the same antenna path and cannot transmit simultaneously.
3. The maximum peak and average Bluetooth power is less than the respective peak and average output powers in all WLAN modes.
4. The measured WLAN SAR is < 0.4 W/kg for all applicable Bluetooth configurations (Body-Worn).
5. Simultaneous transmission SAR exclusion applies to all applicable configurations involving WLAN or Bluetooth since all simultaneous sums for WLAN are less than 1.6 W/kg.

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.

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

(B) Licensed Transmitter(s)

This model does not support Simultaneous Voice and Data for the licensed transmitter in any modes except in WCDMA that allows Multi-RAB transmissions that share voice and data operations on a single physical channel.

GSM/GPRS/EDGE DTM is not supported. Therefore GSM Voice cannot transmit simultaneously with GPRS/EDGE Data.

Simultaneous Voice and LTE data ("SVLTE") cannot transmit simultaneously since they utilize the same transmission path as illustrated in **Figure 1-2**.

This device is only capable of QPSK HSUPA in the uplink, but is capable of HSPA+ in the downlink. Therefore, no additional SAR tests are required beyond that described for devices with HSUPA in KDB 941225 D01.

LTE SAR for the lower BWs were not tested for SAR 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.

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LTE CHECKLIST PER FCC KDB 941225 D05

KDB 941225 Section	FCC ID	A3LSGHI667		
	Form Factor	Smartphone		
1)	Frequency Range of each LTE transmission band	BAND4 : Tx (1712.50 ~ 1752.50 MHz) BAND17: Tx (706.50 ~ 713.50 MHz)		
2)	Channel Bandwidths	BAND4 : 5.0MHz, 10MHz BAND17 : 5.0MHz, 10MHz		
3)	Channel Numbers and Frequencies (MHz)	Low	Mid	High
	LTE Band 4 and BW 5MHz	1712.5MHz(19975)	1732.5MHz(20175)	1752.5MHz(20375)
	LTE Band 4 and BW 10MHz	1715MHz(20000)	1732.5MHz(20175)	1750MHz(20350)
	LTE Band 17 and BW 5MHz	706.5MHz(23755)	710MHz(23790)	713.5MHz(23825)
	LTE Band 17 and BW 10MHz	709MHz(23780)	710MHz(23790)	711MHz(23800)
4)(a)	UE Category	3		
(b)	Modulations Supported in UL	QPSK, 16QAM		
	LTE Transmitter and Antenna Implementation	GSM/GPRS/EDGE/WCDMA/HSPA/LTE share same transmission path		
5)	Description of LTE Tx and Ant. Implementation	1 Main TX/RX Ant and 1 Diversity RX Ant		
6)	LTE Voice available?	No		
	Hotspot with LTE+WIFI	Yes		
	Hotspot with LTE+WIFI active with 1XVoice sessions?	No		
7)	LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	Yes		
	A-MPR (Additional MPR) disabled for SAR Testing?	Yes		
8)	Conducted power Table provided for 1RB (low and high offset), 50% RB (centered), 100% RB	Yes		
9-10)	Non-LTE US Wireless Operating Modes/Band	RF Output Power	RF Exposure Configurations	
	850 MHz GSM	See page 1		
	1900MHz GSM			
	850 MHz WCDMA			
	1900 MHz WCDMA			
	2.4GHz Wi-Fi			
	2.4GHz Bluetooth			
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/m³)
- E = Total RMS electric field strength (V/m)

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

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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

See next page for 750 MHz Tissue Composition

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Table 4-2
Composition of 750 MHz Head and Body Tissue Equivalent Matter

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

Note: 750MHz liquid recipes are proprietary SPEAG. Since the composition is approximate to the actual liquids utilized, the manufacturer tissue-equivalent liquid data sheets are provided below.

Measurement Certificate / Material Test

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

Measurement Method

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

Target Parameters

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

Test Condition

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

Additional Information

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

Results

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

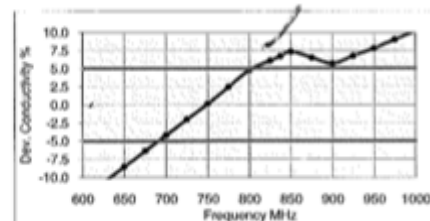
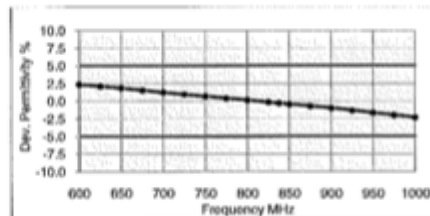


Figure 4-3
750MHz Body Tissue Equivalent Matter

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Measurement Certificate / Material Test

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

Measurement Method

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

Target Parameters

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

Test Condition

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

Additional Information

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

Results

f (MHz)	Measured			Target		Diff. to Target [%]	
	HP-e'	HP-e''	sigma	eps	sigma	Δ-eps	Δ-sigma
600	43.9	23.01	0.77	42.7	0.88	2.7	-12.9
625	43.5	22.75	0.79	42.6	0.88	2.1	-10.5
650	43.1	22.49	0.81	42.5	0.89	1.5	-8.2
675	42.7	22.26	0.84	42.3	0.89	1.0	-5.9
700	42.4	22.03	0.86	42.2	0.89	0.4	-3.5
725	42.0	21.84	0.88	42.1	0.89	-0.1	-1.2
750	41.7	21.65	0.90	41.9	0.89	-0.6	1.1
775	41.4	21.50	0.93	41.8	0.90	-1.1	3.5
800	41.0	21.34	0.95	41.7	0.90	-1.6	5.9
825	40.7	21.19	0.97	41.6	0.91	-2.1	7.3
838	40.5	21.12	0.98	41.5	0.91	-2.4	8.0
850	40.4	21.05	1.00	41.5	0.92	-2.7	8.6
875	40.1	20.91	1.02	41.5	0.94	-3.3	7.9
900	39.8	20.77	1.04	41.5	0.97	-4.0	7.2
925	39.6	20.66	1.06	41.5	0.98	-4.6	8.2
950	39.3	20.55	1.09	41.4	0.99	-5.2	9.2
975	39.0	20.44	1.11	41.4	1.00	-5.8	10.3
1000	38.7	20.32	1.13	41.3	1.01	-6.4	11.4

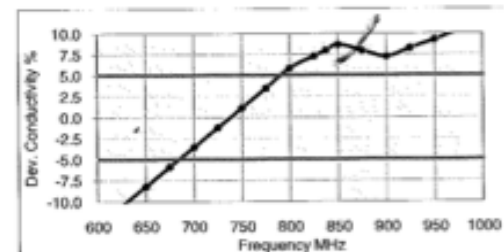
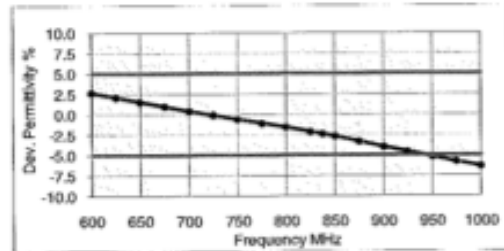


Figure 4-4
750MHz Head Tissue Equivalent Matter

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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 in the x and y directions respectively. 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.

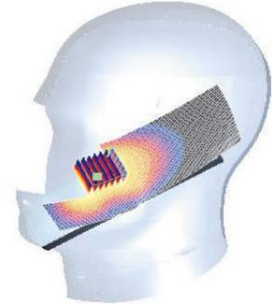


Figure 5-1
Sample SAR Area Scan

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6

DEFINITION OF REFERENCE POINTS

6.1 EAR REFERENCE POINT

Figure 6-1 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 6-1. 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].

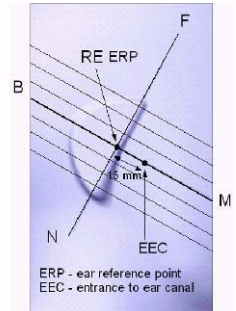


Figure 6-1
Close-Up Side
view of ERP

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

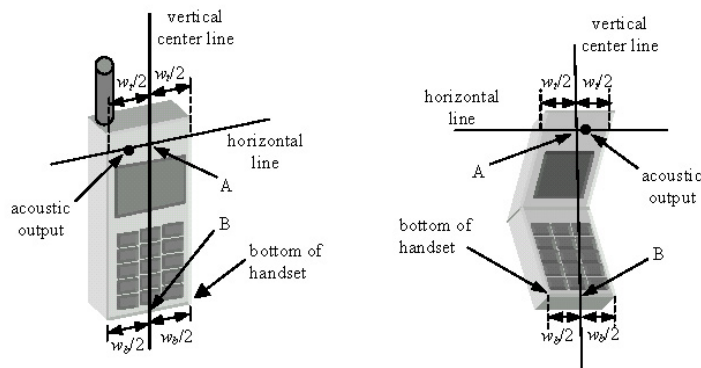


Figure 6-3
Handset Vertical Center & Horizontal Line Reference Points

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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.

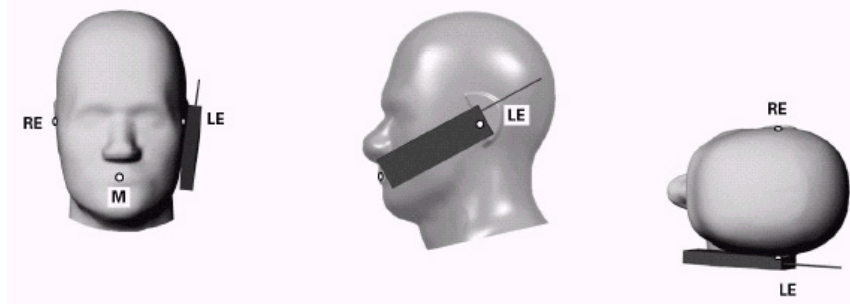


Figure 7-1 Front, Side and Top View of Cheek/Touch Position

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 15degree.
2. The phone was then rotated around the horizontal line by 15 degree.
3. While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the phone touches the head. (In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced. The tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head (see Figure 7-2).

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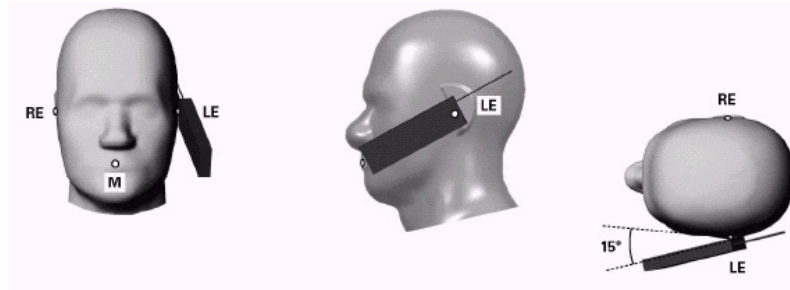


Figure 7-2 Front, Side and Top View of Ear/15° Tilt Position

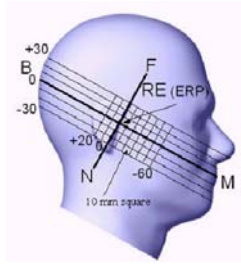


Figure 7-3
Side view w/ relevant markings



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 ½ cm from the flat phantom shell. **Clam-shell phones** should be positioned with the hinge against a smooth edge of the flat phantom where the upper half of the phone is unfolded and extended beyond the phantom side wall. The lower half of the phone is secured in the test device holder at a fixed distance below the flat phantom determined by the minimum separation along the lower edge of the phone in the cheek touching position using SAM. Any case with substantial variation in separation distance along the lower edge of a clam shell is discussed with the FCC for best-to-use methodology.

The 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.

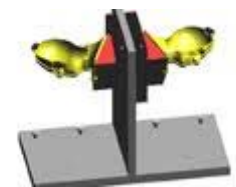


Figure 7-5 Twin SAM
Chin20

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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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 WCDMA

9.2.1 Output Power Verification

Maximum output power is measured on the High, Middle and Low channels for each applicable transmission band according to the general descriptions in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all "1s".

9.2.2 Head SAR Measurements for Handsets

SAR for head exposure configurations is measured using the 12.2 kbps RMC with TPC bits configured to all "1s". SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2 kbps AMR is less than 0.25 dB higher than that measured in 12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2 AMR with a 3.4 kbps SRB (signaling radio bearer) using the exposure configuration that resulted in the highest SAR for that RF channel in the 12.2 kbps RMC mode.

9.2.3 Body SAR Measurements

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits all "1s".

9.2.4 SAR Measurements for Handsets with Rel 5 HSDPA

Body SAR for HSDPA is not required for handsets with HSDPA capabilities when the maximum average output power of each RF channel with HSDPA active is less than 0.25 dB higher than that measured without HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is $\leq 75\%$ of the SAR limit. Otherwise, SAR is measured for HSDPA, using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration measured in 12.2 kbps RMC without HSDPA, on the maximum output channel with the body exposure configuration that resulted in the highest SAR in 12.2 kbps RMC mode for that RF channel.

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The H-set used in FRC for HSDPA should be configured according to the UE category of a test device. The number of HS-DSCH/HSPDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the applicable H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the FRC for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 2 ms to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors of $\beta_c=9$ and $\beta_d=15$, and power offset parameters of $\Delta_{ACK} = \Delta_{NACK} = 5$ and $\Delta_{CQI}=2$ is used. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the FRC.

9.2.5 SAR Measurements for Handsets with Rel 6 HSUPA

Body SAR for HSUPA is not required when the maximum average output of each RF channel with HSUPA/HSDPA active is less than 0.25 dB higher than as measured without HSUPA/HSDPA using 12.2 kbps RMC and maximum SAR for 12.2 kbps RMC is $\leq 75\%$ of the SAR limit. Otherwise SAR is measured on the maximum output channel for the body exposure configuration produced highest SAR in 12.2 kbps RMC for that RF channel, using the additional procedures under "Release 6 HSPA data devices"

Head SAR for VOIP operations under HSPA is not required when maximum average output of each RF channel with HSPA is less than 0.25 dB higher than as measured using 12.2 kbps RMC. Otherwise SAR is measured using same HSPA configuration as used for body SAR.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM ⁽²⁾ (dB)	MPR (dB)	AG ⁽⁴⁾ Index	E-TFCI
1	11/15 ⁽³⁾	15/15 ⁽³⁾	64	11/15 ⁽³⁾	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 ⁽⁴⁾	15/15 ⁽⁴⁾	64	15/15 ⁽⁴⁾	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.
Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.
Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.
Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1.g.
Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

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 0 for MPR targets.

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9.3.2 A-MPR

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

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. When there are less than 3 channels required based on the size of the band and bandwidth of the signal, the channel with the maximum output power was tested.
- 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.
- 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 16QAM 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.
- 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.

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

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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 GSM and HSPA Conducted Powers

10.1.1 GSM Conducted Powers

		Maximum Burst-Averaged Output Power				
		Voice	GPRS/EDGE Data (GMSK)		EDGE Data (8-PSK)	
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot
Cellular	128	32.70	32.80	30.58	25.93	25.60
	190	32.66	32.78	30.55	25.98	25.65
	251	32.95	33.05	30.88	26.06	25.75
PCS	512	30.20	30.20	28.15	24.65	24.54
	661	29.54	29.55	27.40	24.28	24.12
	810	30.25	30.25	28.60	25.20	25.05

		Calculated Maximum Frame-Averaged Output Power				
		Voice	GPRS/EDGE Data (GMSK)		EDGE Data (8-PSK)	
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot
Cellular	128	23.67	23.77	24.56	16.90	19.58
	190	23.63	23.75	24.53	16.95	19.63
	251	23.92	24.02	24.86	17.03	19.73
PCS	512	21.17	21.17	22.13	15.62	18.52
	661	20.51	20.52	21.38	15.25	18.10
	810	21.22	21.22	22.58	16.17	19.03

Note: Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.

The bolded GPRS modes were selected according to the highest frame-averaged output power table according to KDB 941225 D03.

GPRS (GMSK) output powers were measured with CS1 on the base station simulator. EDGE (8-PSK) output powers were measured with MCS7 on the base station simulator

GSM Class: B
GPRS Multislot class: 10 (max 2 Tx Uplink slots)
EDGE Multislot class: 10 (max 2 Tx Uplink slots)
DTM Multislot Class: N/A

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10.1.2 HSPA Conducted Powers

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			PCS Band [dBm]			β_c	β_d	MPR [dB]
			4132	4183	4233	9262	9400	9538			
99	WCDMA	12.2 kbps RMC	23.36	23.25	23.39	22.01	21.57	22.24	-	-	-
99		12.2 kbps AMR	23.39	23.27	23.30	21.93	21.48	22.23	-	-	-
6	HSDPA	Subtest 1	22.81	22.74	22.84	20.94	20.51	20.97	2	15	0
6		Subtest 2	23.00	22.90	22.91	21.03	20.64	21.29	11	15	0
6		Subtest 3	22.53	22.48	22.42	20.51	20.07	20.69	15	8	0.5
6		Subtest 4	22.61	22.50	22.35	20.48	20.06	20.58	15	4	0.5
6	HSUPA	Subtest 1	22.38	22.36	22.54	20.79	20.57	20.92	10	15	0
6		Subtest 2	21.47	21.50	21.44	18.12	17.63	17.78	6	15	2
6		Subtest 3	21.90	21.62	21.91	19.35	19.44	19.39	15	9	1
6		Subtest 4	21.60	22.02	21.35	20.13	19.92	20.18	2	15	2
6		Subtest 5	22.49	22.08	22.22	20.67	20.17	20.21	14	15	0

WCDMA SAR was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.

It is expected by the manufacturer that MPR for some HSPA subtests may be up to 2 dB more than specified by 3GPP, but also as low as 0 dB according to the chipset implementation in this model. Detailed information is included in the operational description explaining how the MPR is applied for this model.



Figure 10-1
Power Measurement Setup

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10.2 LTE Conducted Powers

10.2.1 LTE Band 17

Table 10-1
LTE Band 17 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]
706.5	23755	5	QPSK	1	0	22.96	0	0
706.5	23755	5	QPSK	1	24	23.00	0	0
706.5	23755	5	QPSK	12	6	22.13	1	0-1
706.5	23755	5	QPSK	25	0	22.10	1	0-1
706.5	23755	5	16-QAM	1	0	21.85	1	0-1
706.5	23755	5	16-QAM	1	24	21.94	1	0-1
706.5	23755	5	16-QAM	12	6	21.07	2	0-2
706.5	23755	5	16-QAM	25	0	21.00	2	0-2
710.0	23790	5	QPSK	1	0	23.20	0	0
710.0	23790	5	QPSK	1	24	23.03	0	0
710.0	23790	5	QPSK	12	6	22.11	1	0-1
710.0	23790	5	QPSK	25	0	22.23	1	0-1
710.0	23790	5	16-QAM	1	0	22.21	1	0-1
710.0	23790	5	16-QAM	1	24	22.08	1	0-1
710.0	23790	5	16-QAM	12	6	20.99	2	0-2
710.0	23790	5	16-QAM	25	0	21.36	2	0-2
713.5	23825	5	QPSK	1	0	22.99	0	0
713.5	23825	5	QPSK	1	24	22.77	0	0
713.5	23825	5	QPSK	12	6	21.94	1	0-1
713.5	23825	5	QPSK	25	0	21.92	1	0-1
713.5	23825	5	16-QAM	1	0	21.91	1	0-1
713.5	23825	5	16-QAM	1	24	21.86	1	0-1
713.5	23825	5	16-QAM	12	6	20.91	2	0-2
713.5	23825	5	16-QAM	25	0	21.01	2	0-2

Table 10-2
LTE Band 17 Conducted Powers - 10 MHz Bandwidth

Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	Allowed per 3GPP [dB]
709	23780	10	QPSK	1	0	22.97	0	0
709	23780	10	QPSK	1	49	22.82	0	0
709	23780	10	QPSK	25	12	22.24	1	0-1
709	23780	10	QPSK	50	0	22.08	1	0-1
709	23780	10	16QAM	1	0	21.67	1	0-1
709	23780	10	16QAM	1	49	21.52	1	0-1
709	23780	10	16QAM	25	12	21.70	2	0-2
709	23780	10	16QAM	50	0	21.20	2	0-2
710.0	23790	10	QPSK	1	0	23.17	0	0
710.0	23790	10	QPSK	1	49	22.98	0	0
710.0	23790	10	QPSK	25	12	22.21	1	0-1
710.0	23790	10	QPSK	50	0	22.27	1	0-1
710.0	23790	10	16QAM	1	0	22.07	1	0-1
710.0	23790	10	16QAM	1	49	21.71	1	0-1
710.0	23790	10	16QAM	25	12	21.83	2	0-2
710.0	23790	10	16QAM	50	0	21.41	2	0-2
711	23800	10	QPSK	1	0	23.05	0	0
711	23800	10	QPSK	1	49	22.83	0	0
711	23800	10	QPSK	25	12	22.15	1	0-1
711	23800	10	QPSK	50	0	22.15	1	0-1
711	23800	10	16QAM	1	0	21.61	1	0-1
711	23800	10	16QAM	1	49	21.51	1	0-1
711	23800	10	16QAM	25	12	21.77	2	0-2
711	23800	10	16QAM	50	0	21.39	2	0-2

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10.2.2 LTE Band 4 (AWS)

Table 10-3
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	Low	19975	5	QPSK	1	0	22.98	0	0
1712.5		19975	5	QPSK	1	24	22.97	0	0
1712.5		19975	5	QPSK	12	6	21.80	1	0-1
1712.5		19975	5	QPSK	25	0	22.00	1	0-1
1712.5		19975	5	16-QAM	1	0	22.04	1	0-1
1712.5		19975	5	16-QAM	1	24	21.91	1	0-1
1712.5		19975	5	16-QAM	12	6	20.86	2	0-2
1712.5		19975	5	16-QAM	25	0	21.13	2	0-2
1732.5	Middle	20175	5	QPSK	1	0	22.98	0	0
1732.5		20175	5	QPSK	1	24	22.86	0	0
1732.5		20175	5	QPSK	12	6	21.89	1	0-1
1732.5		20175	5	QPSK	25	0	21.95	1	0-1
1732.5		20175	5	16-QAM	1	0	22.01	1	0-1
1732.5		20175	5	16-QAM	1	24	21.97	1	0-1
1732.5		20175	5	16-QAM	12	6	20.72	2	0-2
1732.5		20175	5	16-QAM	25	0	21.03	2	0-2
1752.5	High	20375	5	QPSK	1	0	22.97	0	0
1752.5		20375	5	QPSK	1	24	22.82	0	0
1752.5		20375	5	QPSK	12	6	21.88	1	0-1
1752.5		20375	5	QPSK	25	0	21.93	1	0-1
1752.5		20375	5	16-QAM	1	0	22.08	1	0-1
1752.5		20375	5	16-QAM	1	24	21.91	1	0-1
1752.5		20375	5	16-QAM	12	6	20.75	2	0-2
1752.5		20375	5	16-QAM	25	0	21.19	2	0-2

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

Frequency [MHz]	Channel		Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	Allowed per 3GPP [dB]
1715	Low	20000	10	QPSK	1	0	22.90	0	0
1715		20000	10	QPSK	1	49	22.92	0	0
1715		20000	10	QPSK	25	12	22.03	1	0-1
1715		20000	10	QPSK	50	0	21.98	1	0-1
1715		20000	10	16QAM	1	0	21.74	1	0-1
1715		20000	10	16QAM	1	49	21.86	1	0-1
1715		20000	10	16QAM	25	12	21.49	2	0-2
1715		20000	10	16QAM	50	0	21.18	2	0-2
1732.5	Middle	20175	10	QPSK	1	0	22.92	0	0
1732.5		20175	10	QPSK	1	49	22.84	0	0
1732.5		20175	10	QPSK	25	12	21.97	1	0-1
1732.5		20175	10	QPSK	50	0	22.01	1	0-1
1732.5		20175	10	16QAM	1	0	21.77	1	0-1
1732.5		20175	10	16QAM	1	49	21.80	1	0-1
1732.5		20175	10	16QAM	25	12	21.48	2	0-2
1732.5		20175	10	16QAM	50	0	21.25	2	0-2
1750	High	20350	10	QPSK	1	0	22.83	0	0
1750		20350	10	QPSK	1	49	22.86	0	0
1750		20350	10	QPSK	25	12	22.02	1	0-1
1750		20350	10	QPSK	50	0	21.97	1	0-1
1750		20350	10	16QAM	1	0	21.88	1	0-1
1750		20350	10	16QAM	1	49	21.81	1	0-1
1750		20350	10	16QAM	25	12	21.50	2	0-2
1750		20350	10	16QAM	50	0	21.17	2	0-2

10.2.3 Required RB Size and RB Offsets for SAR Testing

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. When there are less than 3 channels required based on the size of the band and bandwidth of the signal, the channel with the maximum output power was tested.
- 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.
- 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.

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- 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.



Figure 10-2
Power Measurement Setup

10.3 WLAN Conducted Powers

Table 10-5
IEEE 802.11b Average RF Power

Mode	Freq [MHz]	Channel	Conducted Power [dBm]			
			Data Rate [Mbps]			
			1	2	5.5	11
802.11b	2412	1	16.45	16.39	16.58	16.44
802.11b	2437	6	16.82	16.80	16.94	16.87
802.11b	2462	11	16.85	16.83	17.00	16.95

Table 10-6
IEEE 802.11g Average RF Power

Mode	Freq [MHz]	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11g	2412	1	14.75	14.66	14.62	14.65	14.78	14.77	14.70	14.68
802.11g	2437	6	15.07	14.99	15.08	15.12	14.90	14.93	15.00	14.95
802.11g	2462	11	15.20	15.12	14.88	15.16	15.11	15.07	15.11	15.08

Table 10-7
IEEE 802.11n Average RF Power

Mode	Freq [MHz]	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
			6.5	13	20	26	39	52	58	65
802.11n	2412	1	12.57	12.55	12.64	12.62	12.67	12.65	12.54	12.63
802.11n	2437	6	13.06	13.00	13.04	12.97	12.94	12.91	12.90	12.94
802.11n	2462	11	13.07	13.02	13.00	13.04	13.05	12.99	12.91	13.06

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 underlined data rate and channel above were tested for SAR.

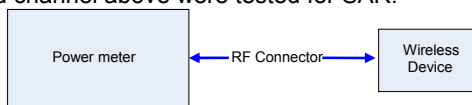


Figure 10-3
Power Measurement Setup

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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
02/01/2012	750H	21.8	680	0.848	44.13	0.885	42.273	-4.18%	4.39%
			695	0.863	43.85	0.886	42.193	-2.60%	3.93%
			710	0.881	43.50	0.887	42.113	-0.68%	3.29%
			725	0.898	43.24	0.888	42.033	1.13%	2.87%
			740	0.905	43.31	0.889	41.953	1.80%	3.23%
01/31/2012	835H	22.3	755	0.915	43.22	0.891	41.876	2.69%	3.21%
			820	0.879	43.16	0.898	41.571	-2.12%	3.82%
			835	0.890	43.06	0.900	41.500	-1.11%	3.76%
02/01/2012	835H	24.1	850	0.895	42.76	0.916	41.500	-2.29%	3.04%
			820	0.856	41.39	0.898	41.571	-4.68%	-0.44%
			835	0.874	41.11	0.900	41.500	-2.89%	-0.94%
01/30/2012	1750H	23.0	850	0.890	41.12	0.916	41.500	-2.84%	-0.92%
			1710	1.355	38.23	1.348	40.136	0.52%	-4.75%
			1750	1.386	38.23	1.370	40.100	1.17%	-4.66%
02/04/2012	1900H	23.1	1790	1.426	38.04	1.394	40.020	2.30%	-4.95%
			1850	1.390	40.62	1.400	40.000	-0.71%	1.55%
			1880	1.420	40.40	1.400	40.000	1.43%	1.00%
02/02/2012	2450H	22.3	1910	1.445	40.31	1.400	40.000	3.21%	0.78%
			2401	1.730	38.73	1.758	39.298	-1.59%	-1.45%
			2450	1.786	38.57	1.800	39.200	-0.78%	-1.61%
01/26/2012	750B	21.9	2499	1.846	38.36	1.852	39.135	-0.32%	-1.98%
			680	0.912	56.91	0.956	56.069	-4.60%	1.50%
			695	0.933	56.86	0.957	55.985	-2.51%	1.56%
			710	0.936	56.58	0.958	55.901	-2.30%	1.21%
			725	0.943	56.66	0.960	55.817	-1.77%	1.51%
01/31/2012	835B	22.3	740	0.957	56.43	0.961	55.733	-0.42%	1.25%
			755	0.973	56.20	0.963	55.649	1.04%	0.99%
			820	0.978	54.12	0.969	55.284	0.93%	-2.11%
01/31/2012	1750B	22.2	835	0.990	54.00	0.970	55.200	2.06%	-2.17%
			850	0.993	53.58	0.988	55.154	0.51%	-2.85%
			1710	1.427	51.58	1.460	53.540	-2.26%	-3.66%
02/07/2012	1900B	22.9	1750	1.465	51.43	1.490	53.430	-1.68%	-3.74%
			1790	1.504	51.27	1.510	53.330	-0.40%	-3.86%
			1850	1.528	51.76	1.520	53.300	0.53%	-2.89%
02/02/2012	2450B	23.0	1880	1.556	51.68	1.520	53.300	2.37%	-3.04%
			1910	1.581	51.65	1.520	53.300	4.01%	-3.10%
			2401	1.969	50.74	1.903	52.765	3.47%	-3.84%
			2450	2.032	50.58	1.950	52.700	4.21%	-4.02%
			2499	2.094	50.39	2.019	52.638	3.71%	-4.27%

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

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

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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):

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

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 (%)
750	Head	02/01/2012	23.7	22.1	0.100	1046	3258	0.81	8.400	8.100	-3.57%
835	Head	01/31/2012	24.9	23.6	0.100	4d026	3258	0.959	9.460	9.590	1.37%
835	Head	02/01/2012	24.7	23.8	0.100	4d026	3258	0.997	9.460	9.970	5.39%
1750	Head	01/30/2012	23.9	22.5	0.100	1051	3258	3.72	37.000	37.200	0.54%
1900	Head	02/04/2012	23.0	21.3	0.040	5d080	3561	1.57	39.900	39.250	-1.63%
2450	Head	02/02/2012	23.2	22.4	0.040	719	3258	2.05	53.800	51.250	-4.74%
750	Body	01/26/2012	24.1	22.7	0.250	1046	3022	2.11	8.835	8.440	-4.09%
835	Body	01/31/2012	23.5	21.6	0.100	4d026	3258	1.02	9.660	10.200	5.59%
1750	Body	01/31/2012	23.1	22.4	0.040	1051	3561	1.44	37.000	36.000	-2.70%
1900	Body	02/07/2012	24.1	22.2	0.100	5d080	3561	4.18	40.900	41.800	2.20%
2450	Body	02/02/2012	24.1	22.5	0.025	719	3561	1.37	51.300	54.800	6.82%

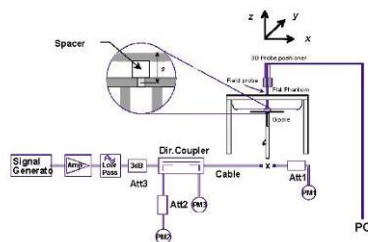


Figure 11-1
System Verification Setup Diagram



Figure 11-2
System Verification Setup Photo

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12 SAR DATA SUMMARY

12.1 Standalone Head SAR Data

Table 12-1
GSM 850 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)
836.60	190	GSM 850	32.66	0.00	Right	Touch	FCC 4	0.355
836.60	190	GSM 850	32.66	-0.10	Right	Tilt	FCC 4	0.264
836.60	190	GSM 850	32.66	-0.04	Left	Touch	FCC 4	0.419
836.60	190	GSM 850	32.66	-0.01	Left	Tilt	FCC 4	0.277
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 12-2
WCDMA 850 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)
836.60	4183	WCDMA 850	23.25	-0.04	Right	Touch	FCC 5	0.466
836.60	4183	WCDMA 850	23.25	0.02	Right	Tilt	FCC 5	0.348
836.60	4183	WCDMA 850	23.25	0.09	Left	Touch	FCC 5	0.508
836.60	4183	WCDMA 850	23.25	0.03	Left	Tilt	FCC 5	0.328
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 12-3
GSM 1900 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)
1909.80	810	GSM 1900	30.25	-0.03	Right	Touch	FCC 4	0.300
1909.80	810	GSM 1900	30.25	0.02	Right	Tilt	FCC 4	0.207
1909.80	810	GSM 1900	30.25	0.15	Left	Touch	FCC 4	0.414
1909.80	810	GSM 1900	30.25	-0.02	Left	Tilt	FCC 4	0.234
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, 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).

Table 12-4
WCDMA 1900 Head SAR Results

MEASUREMENT RESULTS								
FREQUENCY		Mode	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	SAR (1g)
MHz	Ch.							(W/kg)
1907.60	9538	WCDMA 1900	22.24	0.01	Right	Touch	FCC 5	0.373
1907.60	9538	WCDMA 1900	22.24	0.00	Right	Tilt	FCC 5	0.246
1907.60	9538	WCDMA 1900	22.24	-0.14	Left	Touch	FCC 5	0.478
1907.60	9538	WCDMA 1900	22.24	0.10	Left	Tilt	FCC 5	0.281
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, 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).

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Table 12-5
LTE Band 17 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)												
710.00	23790	Mid	LTE Band 17	10	22.21	0.05	1	Right	Touch	QPSK	25	12	FCC 3	0.070
710.00	23790	Mid	LTE Band 17	10	23.17	0.08	0	Right	Touch	QPSK	1	0	FCC 3	0.070
710.00	23790	Mid	LTE Band 17	10	22.98	0.18	0	Right	Touch	QPSK	1	49	FCC 3	0.079
710.00	23790	Mid	LTE Band 17	10	21.83	0.17	1	Right	Touch	16 QAM	25	12	FCC 3	0.061
710.00	23790	Mid	LTE Band 17	10	22.07	-0.16	1	Right	Touch	16 QAM	1	0	FCC 3	0.055
710.00	23790	Mid	LTE Band 17	10	21.71	0.09	1	Right	Touch	16 QAM	1	49	FCC 3	0.062
710.00	23790	Mid	LTE Band 17	10	22.21	0.15	1	Right	Tilt	QPSK	25	12	FCC 3	0.038
710.00	23790	Mid	LTE Band 17	10	23.17	0.10	0	Right	Tilt	QPSK	1	0	FCC 3	0.037
710.00	23790	Mid	LTE Band 17	10	22.98	0.09	0	Right	Tilt	QPSK	1	49	FCC 3	0.045
710.00	23790	Mid	LTE Band 17	10	21.83	0.04	1	Right	Tilt	16 QAM	25	12	FCC 3	0.034
710.00	23790	Mid	LTE Band 17	10	22.07	0.13	1	Right	Tilt	16 QAM	1	0	FCC 3	0.030
710.00	23790	Mid	LTE Band 17	10	21.71	0.12	1	Right	Tilt	16 QAM	1	49	FCC 3	0.035
710.00	23790	Mid	LTE Band 17	10	22.21	0.13	1	Left	Touch	QPSK	25	12	FCC 3	0.071
710.00	23790	Mid	LTE Band 17	10	23.17	0.16	0	Left	Touch	QPSK	1	0	FCC 3	0.071
710.00	23790	Mid	LTE Band 17	10	22.98	0.07	0	Left	Touch	QPSK	1	49	FCC 3	0.082
710.00	23790	Mid	LTE Band 17	10	21.83	0.18	1	Left	Touch	16 QAM	25	12	FCC 3	0.061
710.00	23790	Mid	LTE Band 17	10	22.07	0.12	1	Left	Touch	16 QAM	1	0	FCC 3	0.063
710.00	23790	Mid	LTE Band 17	10	21.71	0.18	1	Left	Touch	16 QAM	1	49	FCC 3	0.072
710.00	23790	Mid	LTE Band 17	10	22.21	0.12	1	Left	Tilt	QPSK	25	12	FCC 3	0.036
710.00	23790	Mid	LTE Band 17	10	23.17	0.13	0	Left	Tilt	QPSK	1	0	FCC 3	0.035
710.00	23790	Mid	LTE Band 17	10	22.98	0.19	0	Left	Tilt	QPSK	1	49	FCC 3	0.042
710.00	23790	Mid	LTE Band 17	10	21.83	0.14	1	Left	Tilt	16 QAM	25	12	FCC 3	0.032
710.00	23790	Mid	LTE Band 17	10	22.07	0.13	1	Left	Tilt	16 QAM	1	0	FCC 3	0.027
710.00	23790	Mid	LTE Band 17	10	21.71	0.13	1	Left	Tilt	16 QAM	1	49	FCC 3	0.033
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Head 1.6 W/kg (mW/g) averaged over 1 gram						
Spatial Peak Uncontrolled Exposure/General Population														

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Table 12-6
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) (W/kg)
MHz	Ch.													
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.97	0.01	1	Right	Touch	QPSK	25	12	FCC 2	0.347
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.92	0.04	0	Right	Touch	QPSK	1	0	FCC 2	0.441
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.84	0.02	0	Right	Touch	QPSK	1	49	FCC 2	0.423
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.48	-0.01	2	Right	Touch	16 QAM	25	12	FCC 2	0.313
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.77	0.02	1	Right	Touch	16 QAM	1	0	FCC 2	0.345
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.80	-0.01	1	Right	Touch	16 QAM	1	49	FCC 2	0.334
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.97	0.01	1	Right	Tilt	QPSK	25	12	FCC 2	0.269
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.92	0.09	0	Right	Tilt	QPSK	1	0	FCC 2	0.344
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.84	-0.01	0	Right	Tilt	QPSK	1	49	FCC 2	0.307
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.48	0.03	2	Right	Tilt	16 QAM	25	12	FCC 2	0.240
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.77	0.21	1	Right	Tilt	16 QAM	1	0	FCC 2	0.266
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.80	0.02	1	Right	Tilt	16 QAM	1	49	FCC 2	0.246
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.97	-0.14	1	Left	Touch	QPSK	25	12	FCC 2	0.521
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.92	-0.21	0	Left	Touch	QPSK	1	0	FCC 2	0.677
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.84	-0.01	0	Left	Touch	QPSK	1	49	FCC 2	0.655
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.48	-0.11	2	Left	Touch	16 QAM	25	12	FCC 2	0.466
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.77	-0.07	1	Left	Touch	16 QAM	1	0	FCC 2	0.528
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.80	-0.01	1	Left	Touch	16 QAM	1	49	FCC 2	0.507
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.97	-0.15	1	Left	Tilt	QPSK	25	12	FCC 2	0.223
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.92	-0.05	0	Left	Tilt	QPSK	1	0	FCC 2	0.315
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.84	-0.09	0	Left	Tilt	QPSK	1	49	FCC 2	0.293
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.48	-0.04	2	Left	Tilt	16 QAM	25	12	FCC 2	0.220
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.77	-0.06	1	Left	Tilt	16 QAM	1	0	FCC 2	0.248
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.80	-0.10	1	Left	Tilt	16 QAM	1	49	FCC 2	0.232
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 12-7
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) (W/kg)
MHz	Ch.									
2462	11	IEEE 802.11b	DSSS	16.85	-0.08	Right	Touch	FCC 6	1	0.121
2462	11	IEEE 802.11b	DSSS	16.85	-0.05	Right	Tilt	FCC 6	1	0.067
2462	11	IEEE 802.11b	DSSS	16.85	-0.15	Left	Touch	FCC 6	1	0.081
2462	11	IEEE 802.11b	DSSS	16.85	-0.02	Left	Tilt	FCC 6	1	0.064
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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12.2 Standalone Body-Worn SAR Data

Table 12-8
GSM/WCDMA Body-Worn SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of Time Slots	Side	SAR (1g) (W/kg)
MHz	Ch.									
836.60	190	GSM 850	GSM	32.66	-0.02	1.0 cm	FCC 4	1	back	0.468
836.60	190	GSM 850	GPRS	30.55	-0.15	1.0 cm	FCC 4	2	back	0.598
836.60	4183	WCDMA 850	RMC	23.25	0.01	1.0 cm	FCC 5	N/A	back	0.686
1850.20	512	GSM 1900	GSM	30.20	-0.03	1.0 cm	FCC 4	1	back	0.545
1880.00	661	GSM 1900	GSM	29.54	-0.02	1.0 cm	FCC 4	1	back	0.527
1909.80	810	GSM 1900	GSM	30.25	-0.05	1.0 cm	FCC 4	1	back	0.817
1850.20	512	GSM 1900	GPRS	28.15	-0.02	1.0 cm	FCC 4	2	back	0.637
1880.00	661	GSM 1900	GPRS	27.40	-0.05	1.0 cm	FCC 4	2	back	0.587
1909.80	810	GSM 1900	GPRS	28.60	-0.03	1.0 cm	FCC 4	2	back	0.893
1852.40	9262	WCDMA 1900	RMC	22.01	-0.04	1.0 cm	FCC 5	N/A	back	0.891
1880.00	9400	WCDMA 1900	RMC	21.57	-0.02	1.0 cm	FCC 5	N/A	back	0.786
1907.60	9538	WCDMA 1900	RMC	22.24	0.06	1.0 cm	FCC 5	N/A	back	0.989
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, 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).

Table 12-9
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)
710.00	23790	Mid	LTE Band 17	10	22.21	-0.04	1	FCC 3	QPSK	25	12	1.0 cm	back	0.117
710.00	23790	Mid	LTE Band 17	10	23.17	-0.01	0	FCC 3	QPSK	1	0	1.0 cm	back	0.121
710.00	23790	Mid	LTE Band 17	10	22.98	-0.01	0	FCC 3	QPSK	1	49	1.0 cm	back	0.130
710.00	23790	Mid	LTE Band 17	10	21.83	0.14	1	FCC 3	16 QAM	25	12	1.0 cm	back	0.107
710.00	23790	Mid	LTE Band 17	10	22.07	0.15	1	FCC 3	16 QAM	1	0	1.0 cm	back	0.096
710.00	23790	Mid	LTE Band 17	10	21.71	0.05	1	FCC 3	16 QAM	1	49	1.0 cm	back	0.104
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.97	0.17	1	FCC 2	QPSK	25	12	1.0 cm	back	0.789
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.92	-0.07	0	FCC 2	QPSK	1	0	1.0 cm	back	0.984
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.84	0.00	0	FCC 2	QPSK	1	49	1.0 cm	back	0.983
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.48	0.01	2	FCC 2	16 QAM	25	12	1.0 cm	back	0.707
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.77	0.02	1	FCC 2	16 QAM	1	0	1.0 cm	back	0.770
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.80	-0.03	1	FCC 2	16 QAM	1	49	1.0 cm	back	0.765
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram						

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Table 12-10
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	16.85	0.01	1.0 cm	FCC 6	1	back	0.083
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 12-11
GSM/WCDMA Hotspot SAR Data

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of GPRS Slots	Side	SAR (1g)
MHz	Ch.									(W/kg)
836.60	190	GSM 850	GPRS	30.55	-0.15	1.0 cm	FCC 4	2	back	0.598
836.60	190	GSM 850	GPRS	30.55	0.04	1.0 cm	FCC 4	2	front	0.507
836.60	190	GSM 850	GPRS	30.55	0.01	1.0 cm	FCC 4	2	bottom	0.144
836.60	190	GSM 850	GPRS	30.55	-0.04	1.0 cm	FCC 4	2	left	0.500
836.60	4183	WCDMA 850	RMC	23.25	0.01	1.0 cm	FCC 5	N/A	back	0.686
836.60	4183	WCDMA 850	RMC	23.25	-0.01	1.0 cm	FCC 5	N/A	front	0.555
836.60	4183	WCDMA 850	RMC	23.25	-0.17	1.0 cm	FCC 5	N/A	bottom	0.142
836.60	4183	WCDMA 850	RMC	23.25	0.00	1.0 cm	FCC 5	N/A	left	0.569
1850.20	512	GSM 1900	GPRS	28.15	-0.02	1.0 cm	FCC 4	2	back	0.637
1880.00	661	GSM 1900	GPRS	27.40	-0.05	1.0 cm	FCC 4	2	back	0.587
1909.80	810	GSM 1900	GPRS	28.60	-0.03	1.0 cm	FCC 4	2	back	0.893
1909.80	810	GSM 1900	GPRS	28.60	-0.08	1.0 cm	FCC 4	2	front	0.524
1909.80	810	GSM 1900	GPRS	28.60	-0.20	1.0 cm	FCC 4	2	bottom	0.735
1909.80	810	GSM 1900	GPRS	28.60	0.09	1.0 cm	FCC 4	2	left	0.212
1852.40	9262	WCDMA 1900	RMC	22.01	-0.04	1.0 cm	FCC 5	N/A	back	0.891
1880.00	9400	WCDMA 1900	RMC	21.57	-0.02	1.0 cm	FCC 5	N/A	back	0.786
1907.60	9538	WCDMA 1900	RMC	22.24	0.06	1.0 cm	FCC 5	N/A	back	0.989
1907.60	9538	WCDMA 1900	RMC	22.24	-0.06	1.0 cm	FCC 5	N/A	front	0.483
1907.60	9538	WCDMA 1900	RMC	22.24	0.17	1.0 cm	FCC 5	N/A	bottom	0.653
1907.60	9538	WCDMA 1900	RMC	22.24	0.03	1.0 cm	FCC 5	N/A	left	0.218
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, 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).

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Table 12-12
LTE Band 17 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)
710.00	23790	Mid	LTE Band 17	10	22.21	-0.04	1	FCC 3	QPSK	25	12	1.0 cm	back	0.117
710.00	23790	Mid	LTE Band 17	10	23.17	-0.01	0	FCC 3	QPSK	1	0	1.0 cm	back	0.121
710.00	23790	Mid	LTE Band 17	10	22.98	-0.01	0	FCC 3	QPSK	1	49	1.0 cm	back	0.130
710.00	23790	Mid	LTE Band 17	10	21.83	0.14	1	FCC 3	16 QAM	25	12	1.0 cm	back	0.107
710.00	23790	Mid	LTE Band 17	10	22.07	0.15	1	FCC 3	16 QAM	1	0	1.0 cm	back	0.096
710.00	23790	Mid	LTE Band 17	10	21.71	0.05	1	FCC 3	16 QAM	1	49	1.0 cm	back	0.104
710.00	23790	Mid	LTE Band 17	10	22.21	-0.01	1	FCC 3	QPSK	25	12	1.0 cm	front	0.092
710.00	23790	Mid	LTE Band 17	10	23.17	0.00	0	FCC 3	QPSK	1	0	1.0 cm	front	0.098
710.00	23790	Mid	LTE Band 17	10	22.98	0.01	0	FCC 3	QPSK	1	49	1.0 cm	front	0.101
710.00	23790	Mid	LTE Band 17	10	21.83	-0.04	1	FCC 3	16 QAM	25	12	1.0 cm	front	0.081
710.00	23790	Mid	LTE Band 17	10	22.07	-0.08	1	FCC 3	16 QAM	1	0	1.0 cm	front	0.076
710.00	23790	Mid	LTE Band 17	10	21.71	-0.12	1	FCC 3	16 QAM	1	49	1.0 cm	front	0.081
710.00	23790	Mid	LTE Band 17	10	22.21	-0.03	1	FCC 3	QPSK	25	12	1.0 cm	bottom	0.025
710.00	23790	Mid	LTE Band 17	10	23.17	0.12	0	FCC 3	QPSK	1	0	1.0 cm	bottom	0.027
710.00	23790	Mid	LTE Band 17	10	22.98	0.00	0	FCC 3	QPSK	1	49	1.0 cm	bottom	0.024
710.00	23790	Mid	LTE Band 17	10	21.83	-0.02	1	FCC 3	16 QAM	25	12	1.0 cm	bottom	0.023
710.00	23790	Mid	LTE Band 17	10	22.07	-0.11	1	FCC 3	16 QAM	1	0	1.0 cm	bottom	0.020
710.00	23790	Mid	LTE Band 17	10	21.71	-0.07	1	FCC 3	16 QAM	1	49	1.0 cm	bottom	0.020
710.00	23790	Mid	LTE Band 17	10	22.21	-0.05	1	FCC 3	QPSK	25	12	1.0 cm	left	0.068
710.00	23790	Mid	LTE Band 17	10	23.17	-0.14	0	FCC 3	QPSK	1	0	1.0 cm	left	0.071
710.00	23790	Mid	LTE Band 17	10	22.98	0.16	0	FCC 3	QPSK	1	49	1.0 cm	left	0.085
710.00	23790	Mid	LTE Band 17	10	21.83	0.06	1	FCC 3	16 QAM	25	12	1.0 cm	left	0.061
710.00	23790	Mid	LTE Band 17	10	22.07	-0.05	1	FCC 3	16 QAM	1	0	1.0 cm	left	0.055
710.00	23790	Mid	LTE Band 17	10	21.71	0.07	1	FCC 3	16 QAM	1	49	1.0 cm	left	0.065
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram						

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Table 12-13
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.	(W/kg)												
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.97	0.17	1	FCC 2	QPSK	25	12	1.0 cm	back	0.789
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.92	-0.07	0	FCC 2	QPSK	1	0	1.0 cm	back	0.984
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.84	0.00	0	FCC 2	QPSK	1	49	1.0 cm	back	0.983
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.48	0.01	2	FCC 2	16 QAM	25	12	1.0 cm	back	0.707
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.77	0.02	1	FCC 2	16 QAM	1	0	1.0 cm	back	0.770
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.80	-0.03	1	FCC 2	16 QAM	1	49	1.0 cm	back	0.765
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.97	-0.04	1	FCC 2	QPSK	25	12	1.0 cm	front	0.496
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.92	0.03	0	FCC 2	QPSK	1	0	1.0 cm	front	0.613
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.84	0.00	0	FCC 2	QPSK	1	49	1.0 cm	front	0.601
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.48	-0.07	2	FCC 2	16 QAM	25	12	1.0 cm	front	0.426
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.77	-0.04	1	FCC 2	16 QAM	1	0	1.0 cm	front	0.566
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.80	0.00	1	FCC 2	16 QAM	1	49	1.0 cm	front	0.566
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.97	-0.22	1	FCC 2	QPSK	25	12	1.0 cm	bottom	0.579
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.92	-0.08	0	FCC 2	QPSK	1	0	1.0 cm	bottom	0.696
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.84	-0.01	0	FCC 2	QPSK	1	49	1.0 cm	bottom	0.728
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.48	-0.06	2	FCC 2	16 QAM	25	12	1.0 cm	bottom	0.450
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.77	-0.06	1	FCC 2	16 QAM	1	0	1.0 cm	bottom	0.598
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.80	-0.10	1	FCC 2	16 QAM	1	49	1.0 cm	bottom	0.621
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.97	0.09	1	FCC 2	QPSK	25	12	1.0 cm	left	0.152
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.92	0.02	0	FCC 2	QPSK	1	0	1.0 cm	left	0.201
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.84	0.07	0	FCC 2	QPSK	1	49	1.0 cm	left	0.180
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.48	-0.05	2	FCC 2	16 QAM	25	12	1.0 cm	left	0.136
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.77	0.18	1	FCC 2	16 QAM	1	0	1.0 cm	left	0.146
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.80	0.14	1	FCC 2	16 QAM	1	49	1.0 cm	left	0.139
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram						

Table 12-14
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	16.85	0.01	1.0 cm	FCC 6	1	back	0.083
2462	11	IEEE 802.11b	DSSS	16.85	-0.19	1.0 cm	FCC 6	1	front	0.044
2462	11	IEEE 802.11b	DSSS	16.85	0.05	1.0 cm	FCC 6	1	right	0.045
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram			

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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. 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 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).
7. 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.
8. Only the primary Tx/Rx antenna was transmitting during testing. The secondary antenna was for receive-only and cannot transmit.

GSM Test Notes:

1. Body-Worn accessory testing is typically associated with voice operations. Therefore body-worn SAR testing was additionally performed in GSM voice mode. GPRS Data mode is covered in the Hotspot SAR Testing at the same test distance
2. Per FCC KDB Publication 941225 D06, when the same wireless modes and device transmission configurations are required for body-worn accessories and hotspot mode (GPRS), 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.
3. Justification for reduced test configurations per KDB Publication 941225 D03: The source-based time-averaged output power was evaluated for all multi-slot operations. In addition to the worst-case reported, all source-based time-averaged powers within 10% of the worst-case were additionally included in the evaluation for data modes.

WCDMA Notes:

1. WCDMA mode in Body SAR was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.
2. 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.

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. General test procedures can be found in Section 9.3.3.

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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. A-MPR was disabled for all SAR tests.
4. 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.
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 tests body-worn accessory SAR for the same device orientation. Therefore, the hotspot data for the back side configuration additionally shows body-worn compliance at the same distance

WLAN Notes:

1. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Meeting Notes for 2.4 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11b. Other IEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
2. 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 tests 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 Edge and Right Edge for the licensed 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 Edge, Bottom Edge, and Left Edge for the WLAN transmitter were not tested since the antenna distance from the edge was greater than 2.5 cm per FCC KDB Publication 941225 D06 (see Section 1.2).
3. 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.)
4. For Hotspot SAR testing, transmission modes were evaluated separately for SAR. SAR evaluation requires a single frequency of measurement for valid measurements using the SAR probe and tissue which are calibrated for specific limited frequency ranges. Therefore, during SAR evaluation it was ensured that the WLAN transmission was disabled by the manufacturer to assess the standalone SAR. WLAN SAR was separately evaluated to account for the WLAN SAR for portable hotspot exposure conditions (see Section 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>	<u>SAR not required:</u> <u>Unlicensed only</u> - when stand-alone 1-g SAR is not required and antenna is ≥ 5 cm from other antennas <u>Licensed & Unlicensed</u> - 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	<u>When there is no simultaneous transmission –</u> - output ≤ 60/f: SAR not required - output > 60/f: stand-alone SAR required <u>When there is simultaneous transmission –</u> <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> <u>When stand-alone SAR is required</u> - 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	<u>SAR required:</u> <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 <u>Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply</u>

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	GSM 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	WCDMA 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.355	0.121	0.476	Head SAR	Right Cheek	0.466	0.121	0.587
	Right Tilt	0.264	0.067	0.331		Right Tilt	0.348	0.067	0.415
	Left Cheek	0.419	0.081	0.500		Left Cheek	0.508	0.081	0.589
	Left Tilt	0.277	0.064	0.341		Left Tilt	0.328	0.064	0.392
Simult Tx	Configuration	GSM 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	WCDMA 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.300	0.121	0.421	Head SAR	Right Cheek	0.373	0.121	0.494
	Right Tilt	0.207	0.067	0.274		Right Tilt	0.246	0.067	0.313
	Left Cheek	0.414	0.081	0.495		Left Cheek	0.478	0.081	0.559
	Left Tilt	0.234	0.064	0.298		Left Tilt	0.281	0.064	0.345
Simult Tx	Configuration	LTE Band 17 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.079	0.121	0.200	Head SAR	Right Cheek	0.441	0.121	0.562
	Right Tilt	0.045	0.067	0.112		Right Tilt	0.344	0.067	0.411
	Left Cheek	0.082	0.081	0.163		Left Cheek	0.677	0.081	0.758
	Left Tilt	0.042	0.064	0.106		Left Tilt	0.315	0.064	0.379

The above tables represent a held to ear voice call or a LTE VoIP call (when hotspot is enabled) potentially simultaneously operating with 2.4 GHz WLAN.

13.4 Body-Worn Simultaneous Transmission Analysis

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

Configuration	Distance	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Back Side	1.0 cm	GSM 850	0.468	0.083	0.551
Back Side	1.0 cm	WCDMA 850	0.686	0.083	0.769
Back Side	1.0 cm	GSM 1900	0.817	0.083	0.900
Back Side	1.0 cm	WCDMA 1900	0.989	0.083	1.072
Back Side	1.0 cm	LTE Band 17	0.130	0.083	0.213
Back Side	1.0 cm	LTE Band 4 (AWS)	0.984	0.083	1.067

The above tables represent a body-worn voice call or a LTE VoIP call (when hotspot is enabled) potentially simultaneously operating with 2.4 GHz WLAN.

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13.5 Hotspot SAR Simultaneous Transmission Analysis

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

Simult Tx	Configuration	GPRS 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	WCDMA 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.598	0.083	0.681	Body SAR	Back	0.686	0.083	0.769
	Front	0.507	0.044	0.551		Front	0.555	0.044	0.599
	Top	-	-	0.000		Top	-	-	0.000
	Bottom	0.144	-	0.144		Bottom	0.142	-	0.142
	Right	-	0.045	0.045		Right	-	0.045	0.045
	Left	0.500	-	0.500		Left	0.569	-	0.569
Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	WCDMA 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.893	0.083	0.976	Body SAR	Back	0.989	0.083	1.072
	Front	0.524	0.044	0.568		Front	0.483	0.044	0.527
	Top	-	-	0.000		Top	-	-	0.000
	Bottom	0.735	-	0.735		Bottom	0.653	-	0.653
	Right	-	0.045	0.045		Right	-	0.045	0.045
	Left	0.212	-	0.212		Left	0.218	-	0.218
Simult Tx	Configuration	LTE Band 17 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.130	0.083	0.213	Body SAR	Back	0.984	0.083	1.067
	Front	0.101	0.044	0.145		Front	0.613	0.044	0.657
	Top	-	-	0.000		Top	-	-	0.000
	Bottom	0.027	-	0.027		Bottom	0.728	-	0.728
	Right	-	0.045	0.045		Right	-	0.045	0.045
	Left	0.085	-	0.085		Left	0.201	-	0.201

The above tables represent a portable hotspot condition

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

Additionally, WCDMA/HSPA hotspot may be active during voice WCDMA mode because, in WCDMA, both voice and data use the same physical channel. When doing multiple services (multi-Radio Access Bearer or multi-RAB), the power control will be based on a physical control channel (dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the WCDMA+WLAN sum also represents the WCDMA Voice + WCDMA/HSPA + WLAN scenario.

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	8648D	(9kHz-4GHz) Signal Generator	10/10/2011	Annual	10/10/2012	3613A00315
Agilent	8753E	(30kHz-6GHz) Network Analyzer	4/21/2011	Annual	4/21/2012	JP38020182
Agilent	E5515C	Wireless Communications Test Set	10/10/2011	Annual	10/10/2012	GB46110872
Agilent	E5515C	Wireless Communications Test Set	10/20/2011	Annual	10/20/2012	GB46310798
Agilent	E5515C	Wireless Communications Test Set	10/14/2011	Annual	10/14/2012	GB41450275
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/8/2011	Annual	4/8/2012	MY45470194
Gigatronics	80701A	(0.05-18GHz) Power Sensor	10/12/2011	Annual	10/12/2012	1833460
Gigatronics	8651A	Universal Power Meter	10/12/2011	Annual	10/12/2012	8650319
Index SAR	IXTL-010	Dielectric Measurement Kit	N/A		N/A	N/A
Index SAR	IXTL-030	30MM TEM line for 6 GHz	N/A		N/A	N/A
Pasternack	PE2208-6	Bidirectional Coupler	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
SPEAG	D1900V2	1900 MHz SAR Dipole	7/22/2011	Annual	7/22/2012	5d080
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	9/16/2011	Annual	9/16/2012	704
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/20/2011	Annual	4/20/2012	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/21/2011	Annual	2/21/2012	649
SPEAG	ES3DV2	SAR Probe	8/25/2011	Annual	8/25/2012	3022
SPEAG	EX3DV4	SAR Probe	7/27/2011	Annual	7/27/2012	3561
Rohde & Schwarz	SMI003B	Signal Generator	4/6/2011	Annual	4/6/2012	DE27259
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/25/2011	Annual	8/25/2012	100976
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	5318
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	5442
Anritsu	ML2438A	Power Meter	2/7/2011	Annual	2/7/2012	1190013
Anritsu	ML2438A	Power Meter	2/7/2011	Annual	2/7/2012	98150041
Agilent	8648D	Signal Generator	4/5/2011	Annual	4/5/2012	3629U00687
Anritsu	ML2438A	Power Meter	10/13/2011	Annual	10/13/2012	1070030
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	5821
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	8013
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	5605
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	2400
Agilent	E5515C	Wireless Communications Test Set	10/14/2011	Annual	10/14/2012	GB43304447
Agilent	E5515C	Wireless Communications Tester	4/21/2011	Annual	4/21/2012	US41140256
Anritsu	MA2411B	Pulse Sensor	10/13/2011	Annual	10/13/2012	1027293
Anritsu	ML2495A	Power Meter	10/13/2011	Annual	10/13/2012	1039008
Amplifier Research	SS1G4	5W, 800MHz-4.2GHz	N/A		N/A	21910
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT		N/A	N/A
Agilent	E5515C	Wireless Communications Test Set	2/8/2011	Annual	2/8/2012	GB45360985
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	10/7/2011	Annual	10/7/2012	103962
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331322
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331323
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331330
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331332
Control Company	61220-416	Long-Stem Thermometer	3/16/2011	Biennial	3/16/2013	111391601
VWR	36934-158	Wall-Mounted Thermometer	1/21/2011	Biennial	1/21/2013	111286445
VWR	36934-158	Wall-Mounted Thermometer	1/21/2011	Biennial	1/21/2013	111286460
VWR	36934-158	Wall-Mounted Thermometer	5/26/2010	Biennial	5/26/2012	101718589
VWR	36934-158	Wall-Mounted Thermometer	1/21/2011	Biennial	1/21/2013	111286454
VWR	36934-158	Wall-Mounted Thermometer	2/26/2010	Biennial	2/26/2012	101536273
SPEAG	ES3DV3	SAR Probe	4/8/2011	Annual	4/8/2012	3258
SPEAG	D1750V2	1750 MHz SAR Dipole	5/24/2011	Annual	5/24/2012	1051
MiniCircuits	SLP-2400+	Low Pass Filter	CBT		N/A	R8979500903
Narda	4772-3	Attenuator (3dB)	CBT		N/A	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT		N/A	120
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/5/2011	Annual	8/5/2012	112347
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT		N/A	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT		N/A	N/A
SPEAG	D750V3	750 MHz Dipole	10/27/2011	Annual	10/27/2012	1046
Anritsu	MT8820C	Radio Communication Tester	11/11/2011	Annual	11/11/2012	6200901190
MiniCircuits	VLf-6000+	Low Pass Filter	CBT		N/A	N/A
MiniCircuits	VLf-6000+	Low Pass Filter	CBT		N/A	N/A
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
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	11/30/2011	Annual	11/30/2012	101699

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

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

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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: A3LSGHI667; Type: Portable Handset; Serial: FCC 3

Communication System: LTE BAND 17; Frequency: 710 MHz; Duty Cycle: 1:1

Medium: 695 Head Medium parameters used:

$f = 710 \text{ MHz}$; $\sigma = 0.881 \text{ mho/m}$; $\epsilon_r = 43.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-01-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3258; ConvF(6.41, 6.41, 6.41); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

**Mode: LTE Band 17, Right Head, Touch, Mid.ch, QPSK,
10 MHz Bandwidth, 1 RB, 49 RB Offset**

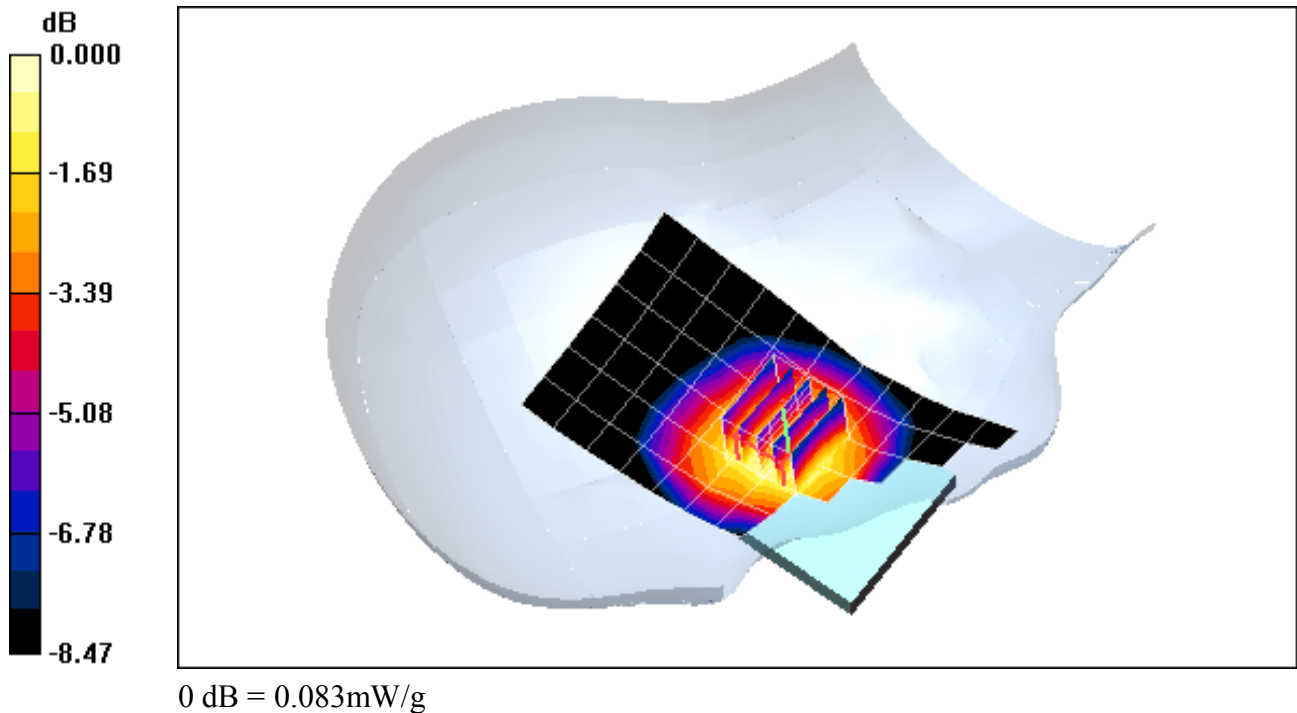
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 10.1 V/m; Power Drift = 0.175 dB

Peak SAR (extrapolated) = 0.098 W/kg

SAR(1 g) = 0.079 mW/g; SAR(10 g) = 0.061 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 3

Communication System: LTE BAND 17; Frequency: 710 MHz; Duty Cycle: 1:1

Medium: 695 Head Medium parameters used:

$f = 710 \text{ MHz}$; $\sigma = 0.881 \text{ mho/m}$; $\epsilon_r = 43.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-01-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3258; ConvF(6.41, 6.41, 6.41); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

**Mode: LTE Band 17, Right Head, Tilt, Mid.ch, QPSK,
10 MHz Bandwidth, 1 RB, 49 RB Offset**

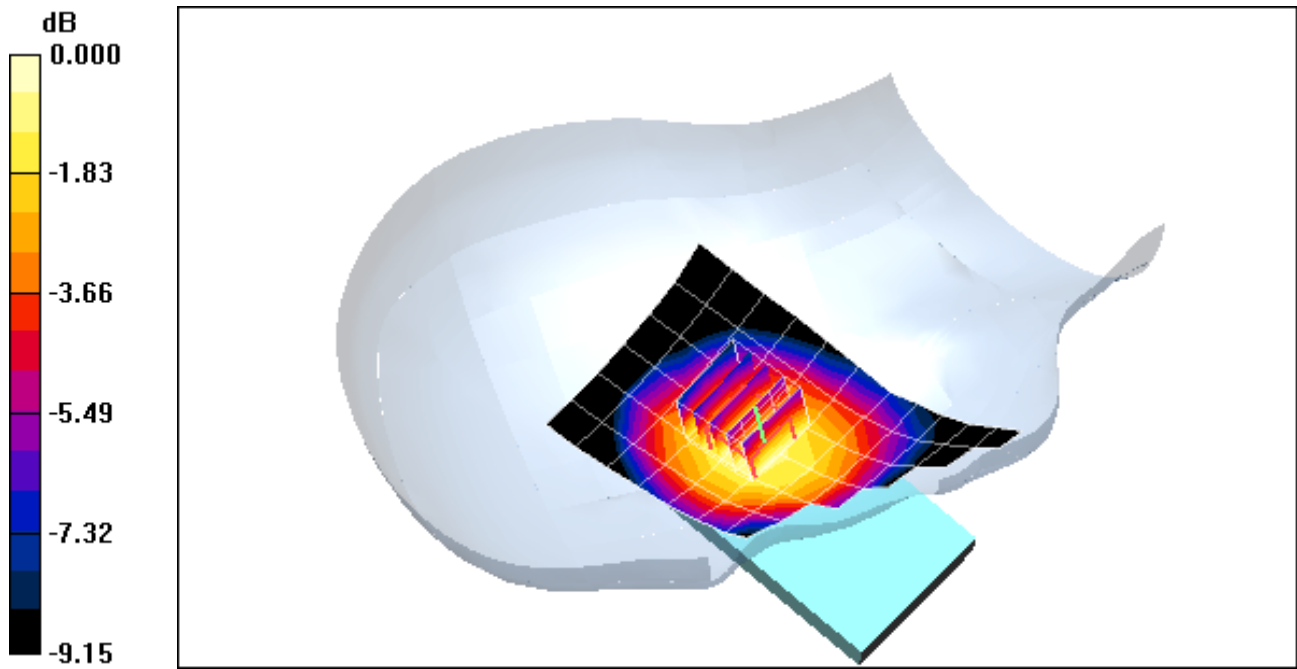
Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 7.61 V/m; Power Drift = 0.090 dB

Peak SAR (extrapolated) = 0.055 W/kg

SAR(1 g) = 0.045 mW/g; SAR(10 g) = 0.035 mW/g



0 dB = 0.047mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 3

Communication System: LTE BAND 17; Frequency: 710 MHz; Duty Cycle: 1:1

Medium: 695 Head Medium parameters used:

$f = 710 \text{ MHz}$; $\sigma = 0.881 \text{ mho/m}$; $\epsilon_r = 43.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-01-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3258; ConvF(6.41, 6.41, 6.41); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

**Mode: LTE Band 17, Left Head, Touch, Mid.ch, QPSK,
10 MHz Bandwidth, 1 RB, 49 RB Offset**

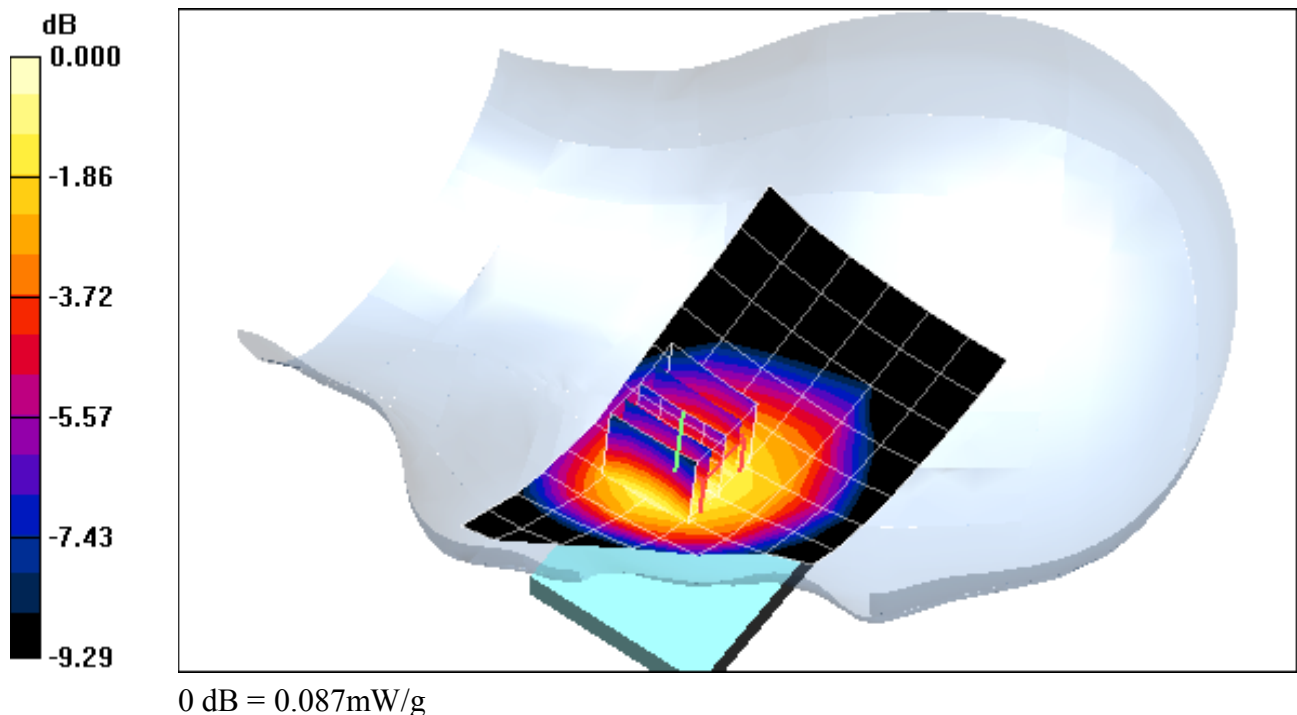
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 10.4 V/m; Power Drift = 0.071 dB

Peak SAR (extrapolated) = 0.106 W/kg

SAR(1 g) = 0.082 mW/g; SAR(10 g) = 0.062 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 3

Communication System: LTE BAND 17; Frequency: 710 MHz; Duty Cycle: 1:1

Medium: 695 Head Medium parameters used:

$f = 710 \text{ MHz}$; $\sigma = 0.881 \text{ mho/m}$; $\epsilon_r = 43.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-01-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3258; ConvF(6.41, 6.41, 6.41); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

**Mode: LTE Band 17, Left Head, Tilt, Mid.ch, QPSK,
10 MHz Bandwidth, 1 RB, 49 RB Offset**

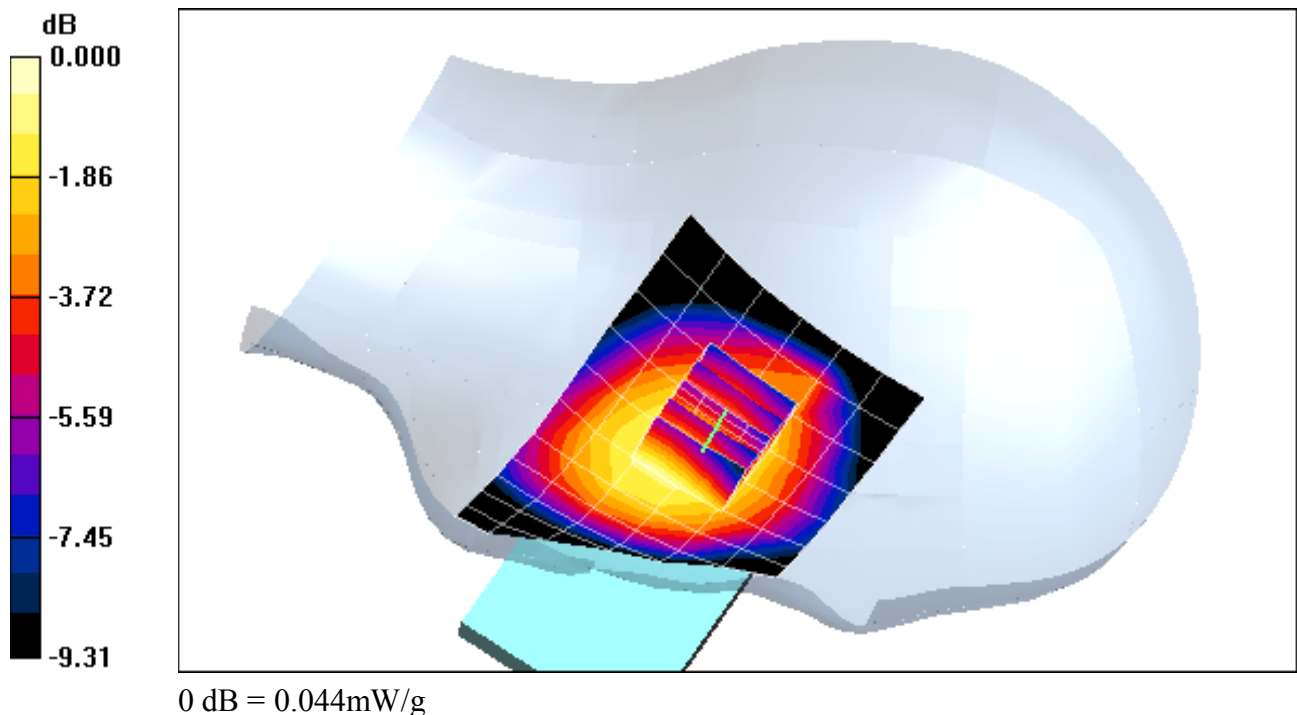
Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 7.31 V/m; Power Drift = 0.185 dB

Peak SAR (extrapolated) = 0.053 W/kg

SAR(1 g) = 0.042 mW/g; SAR(10 g) = 0.032 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 4

Communication System: GSM850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.891 \text{ mho/m}$; $\epsilon_r = 43$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 01-31-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.6°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: GSM 850, Right Head, Touch, Mid.ch

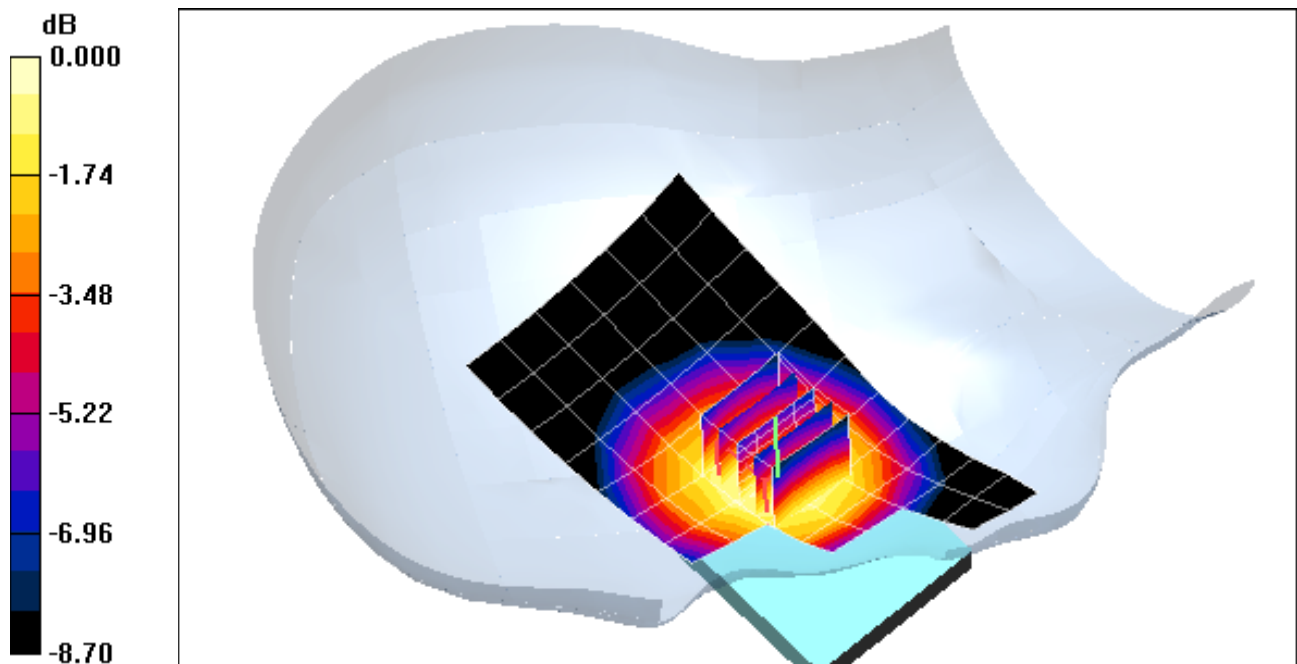
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 20.6 V/m; Power Drift = 0.000 dB

Peak SAR (extrapolated) = 0.448 W/kg

SAR(1 g) = 0.355 mW/g; SAR(10 g) = 0.269 mW/g



0 dB = 0.371mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 4

Communication System: GSM850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.891 \text{ mho/m}$; $\epsilon_r = 43$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 01-31-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.6°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: GSM 850, Right Head, Tilt, Mid.ch

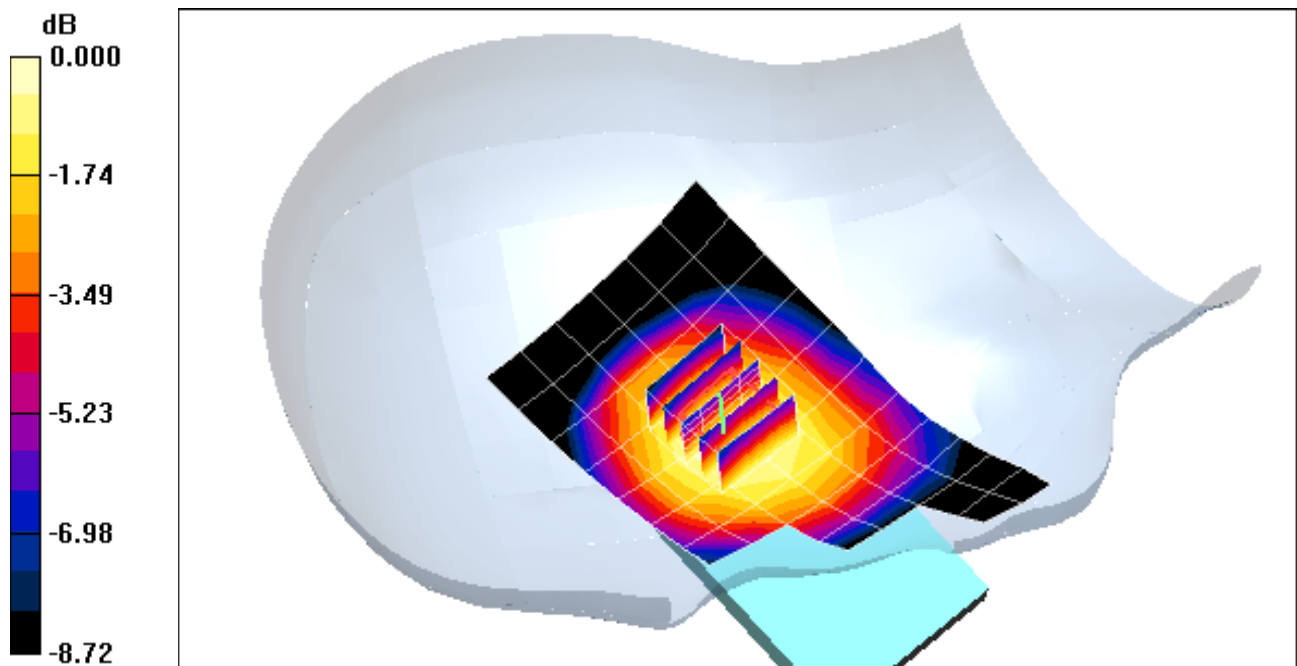
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 17.8 V/m; Power Drift = -0.098 dB

Peak SAR (extrapolated) = 0.330 W/kg

SAR(1 g) = 0.264 mW/g; SAR(10 g) = 0.200 mW/g



0 dB = 0.278mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 4

Communication System: GSM850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.891 \text{ mho/m}$; $\epsilon_r = 43$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 01-31-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.6°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: GSM 850, Left Head, Touch, Mid.ch

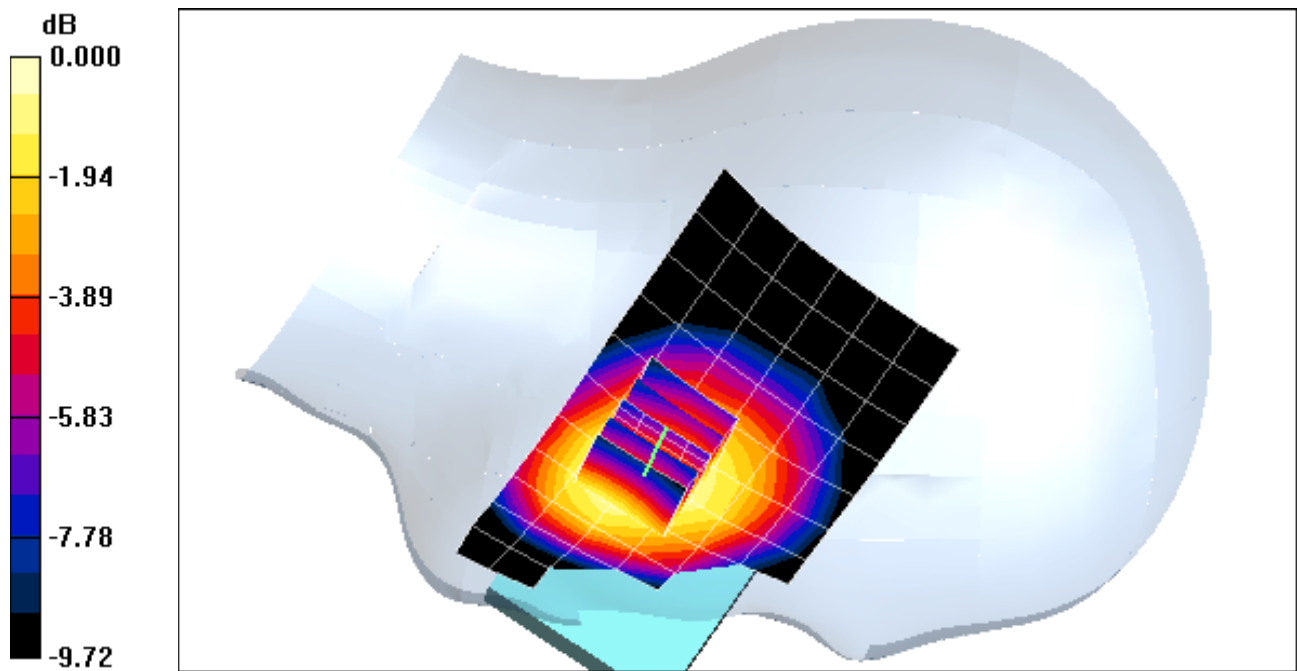
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 22.7 V/m; Power Drift = -0.036 dB

Peak SAR (extrapolated) = 0.557 W/kg

SAR(1 g) = 0.419 mW/g; SAR(10 g) = 0.308 mW/g



0 dB = 0.440mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 4

Communication System: GSM850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.891 \text{ mho/m}$; $\epsilon_r = 43$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 01-31-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.6°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: GSM 850, Left Head, Tilt, Mid.ch

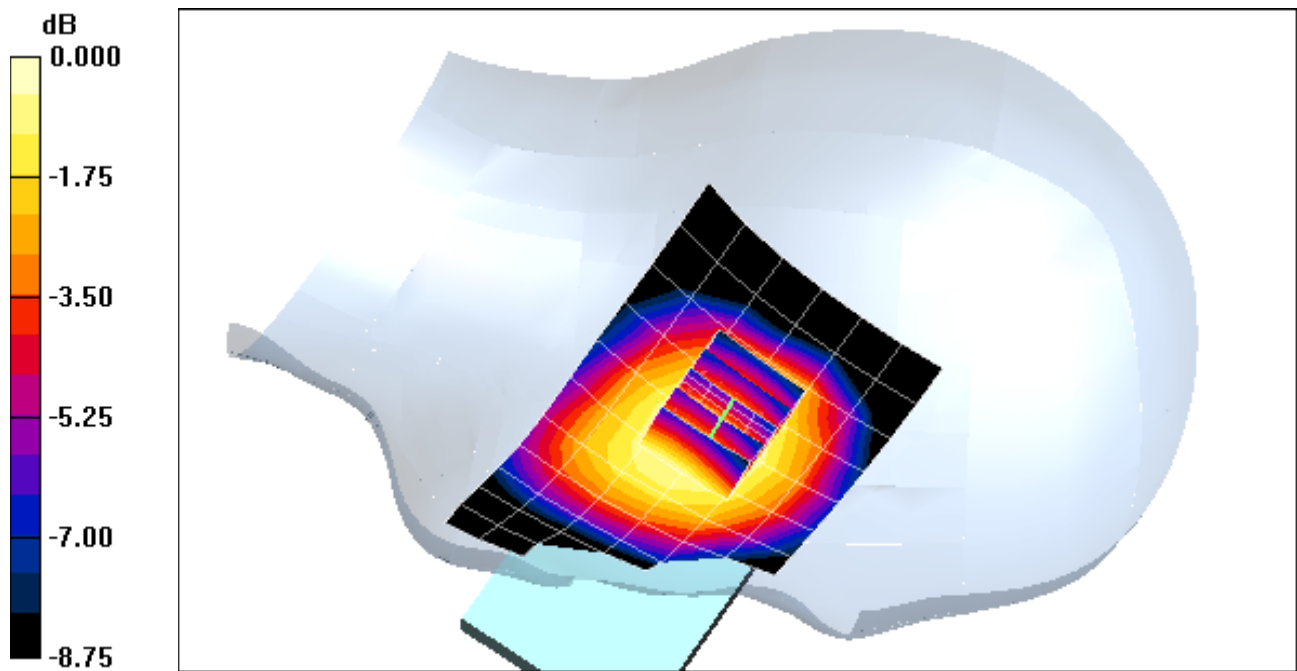
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 18.2 V/m; Power Drift = -0.011 dB

Peak SAR (extrapolated) = 0.347 W/kg

SAR(1 g) = 0.277 mW/g; SAR(10 g) = 0.212 mW/g



0 dB = 0.291mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 5

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.876 \text{ mho/m}$; $\epsilon_r = 41.11$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-01-2012; Ambient Temp: 24.7°C; Tissue Temp: 23.8°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: WCDMA 850, Right Head, Touch, Mid.ch

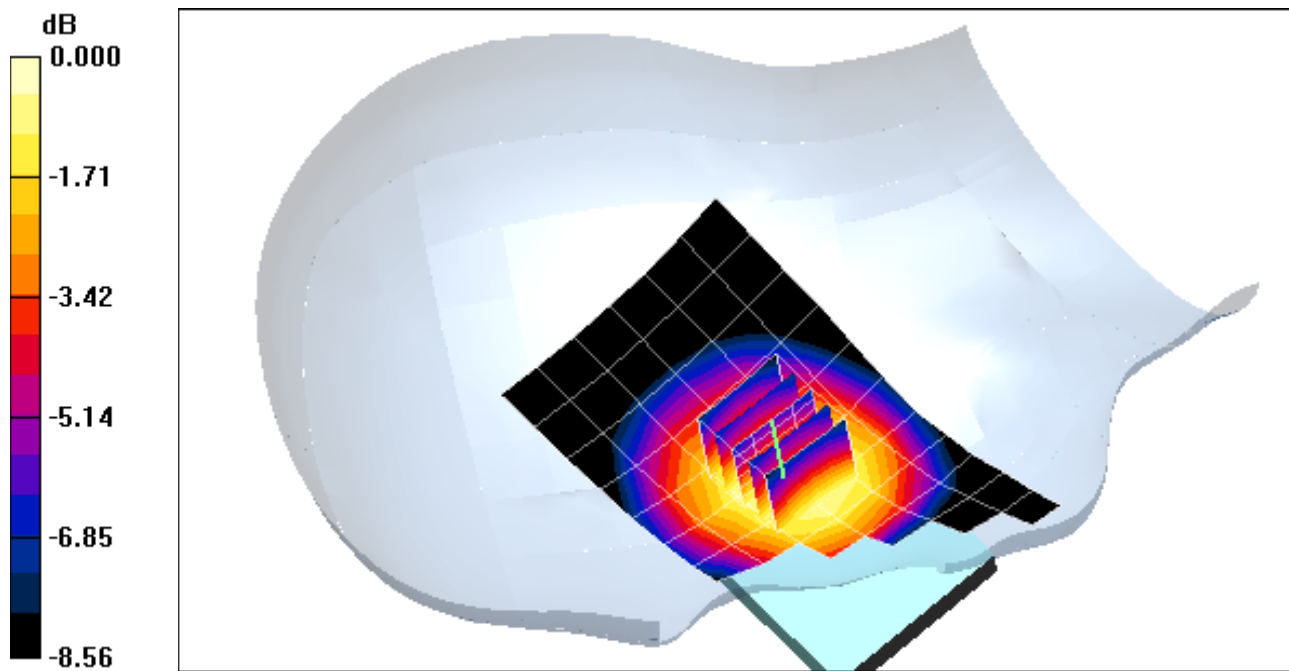
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 23.4 V/m; Power Drift = -0.040 dB

Peak SAR (extrapolated) = 0.585 W/kg

SAR(1 g) = 0.466 mW/g; SAR(10 g) = 0.352 mW/g



0 dB = 0.487mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 5

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.876 \text{ mho/m}$; $\epsilon_r = 41.11$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-01-2012; Ambient Temp: 24.7°C; Tissue Temp: 23.8°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: WCDMA 850, Right Head, Tilt, Mid.ch

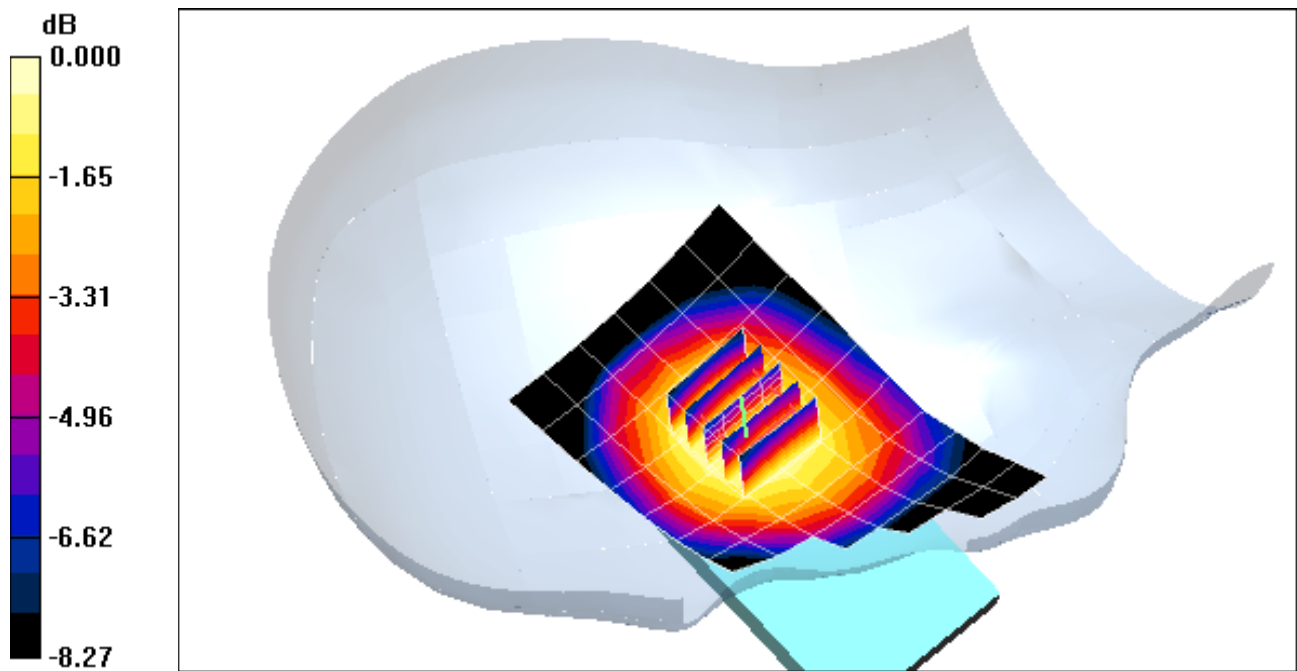
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 20.4 V/m; Power Drift = 0.019 dB

Peak SAR (extrapolated) = 0.436 W/kg

SAR(1 g) = 0.348 mW/g; SAR(10 g) = 0.263 mW/g



0 dB = 0.363mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 5

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.876 \text{ mho/m}$; $\epsilon_r = 41.11$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-01-2012; Ambient Temp: 24.7°C; Tissue Temp: 23.8°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: WCDMA 850, Left Head, Touch, Mid.ch

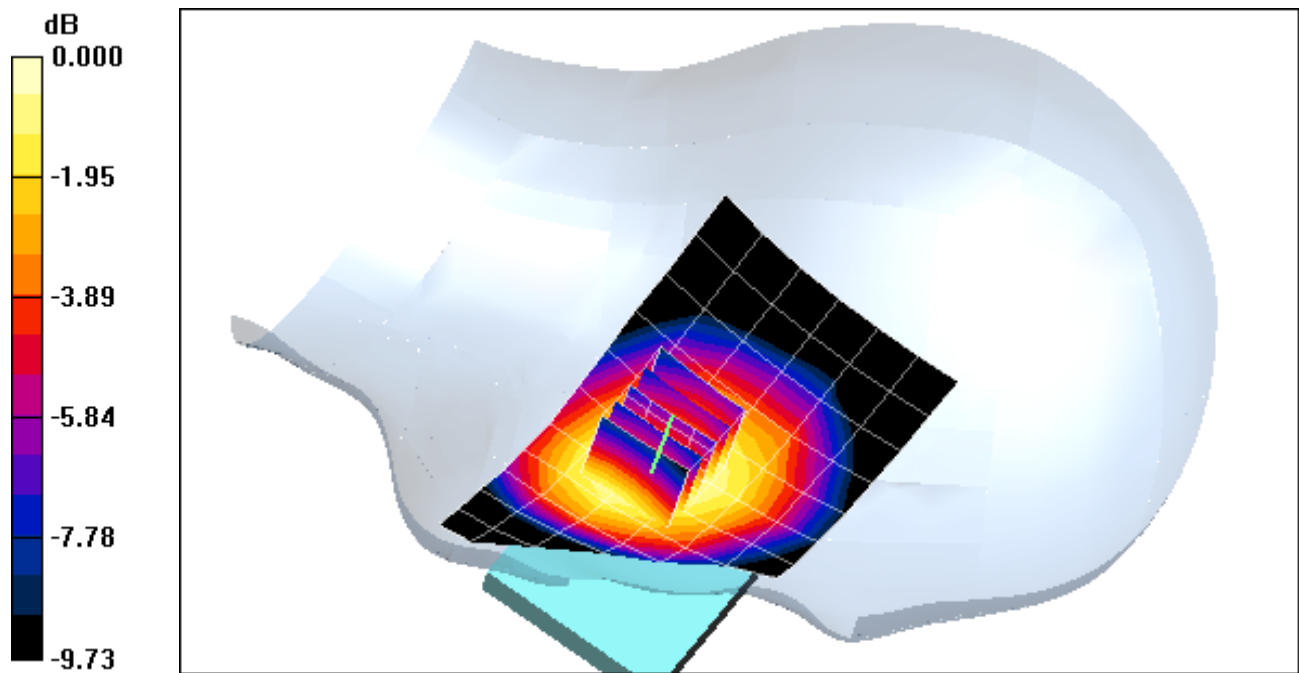
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 24.4 V/m; Power Drift = 0.090 dB

Peak SAR (extrapolated) = 0.659 W/kg

SAR(1 g) = 0.508 mW/g; SAR(10 g) = 0.379 mW/g



0 dB = 0.530mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 5

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.876 \text{ mho/m}$; $\epsilon_r = 41.11$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-01-2012; Ambient Temp: 24.7°C; Tissue Temp: 23.8°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: WCDMA 850, Left Head, Tilt, Mid.ch

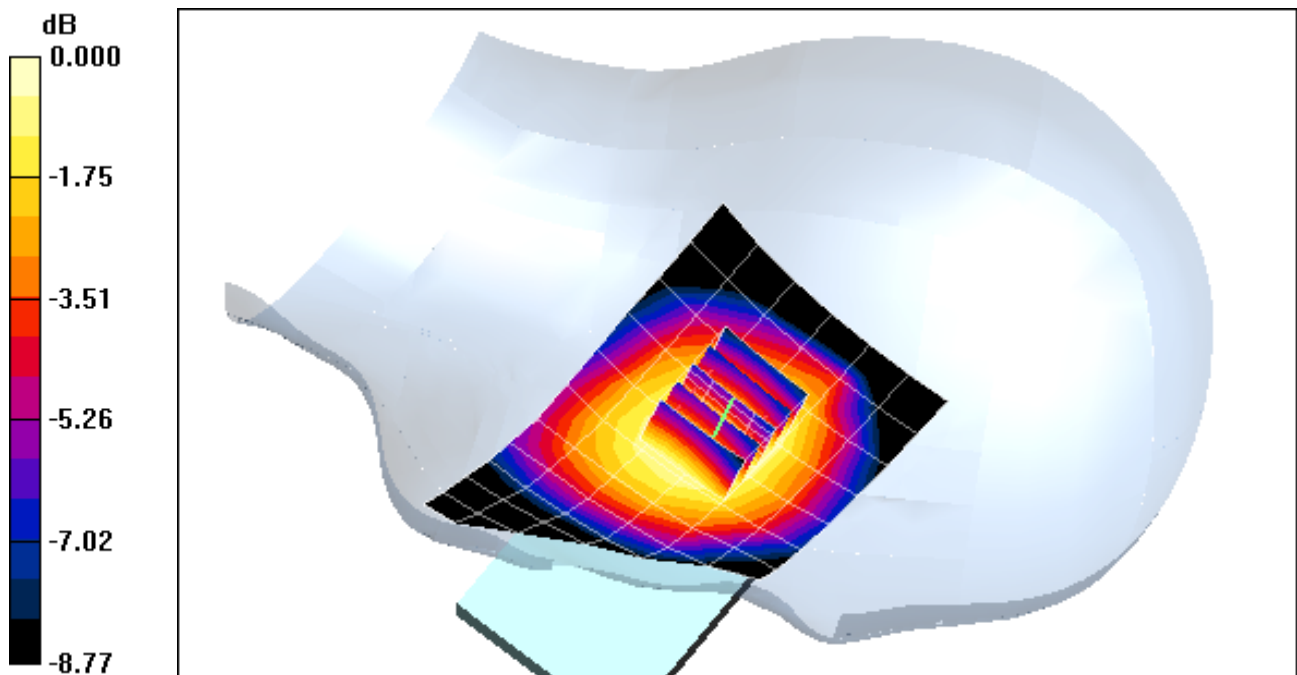
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 19.6 V/m; Power Drift = 0.028 dB

Peak SAR (extrapolated) = 0.413 W/kg

SAR(1 g) = 0.328 mW/g; SAR(10 g) = 0.249 mW/g



0 dB = 0.346mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 2

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

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.37 \text{ mho/m}$; $\epsilon_r = 38.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 01-30-2012; Ambient Temp: 23.9°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3258; ConvF(5.32, 5.32, 5.32); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

**Mode: LTE Band 4 (AWS), Right Head, Touch, Mid.ch, QPSK,
10 MHz Bandwidth, 1 RB, 0 RB Offset**

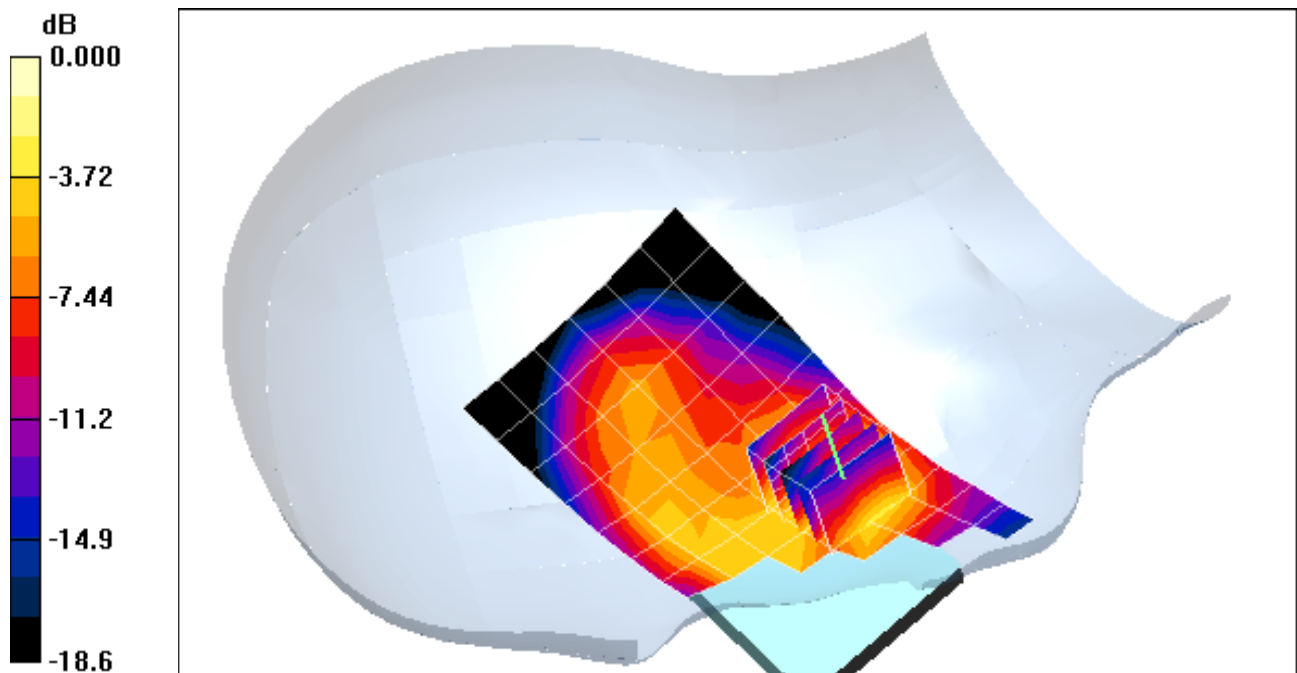
Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 18.5 V/m; Power Drift = 0.042 dB

Peak SAR (extrapolated) = 0.680 W/kg

SAR(1 g) = 0.441 mW/g; SAR(10 g) = 0.265 mW/g



0 dB = 0.477mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 2

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

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.37 \text{ mho/m}$; $\epsilon_r = 38.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 01-30-2012; Ambient Temp: 23.9°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3258; ConvF(5.32, 5.32, 5.32); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

**Mode: LTE Band 4 (AWS), Right Head, Tilt, Mid.ch, QPSK,
10 MHz Bandwidth, 1 RB, 0 RB Offset**

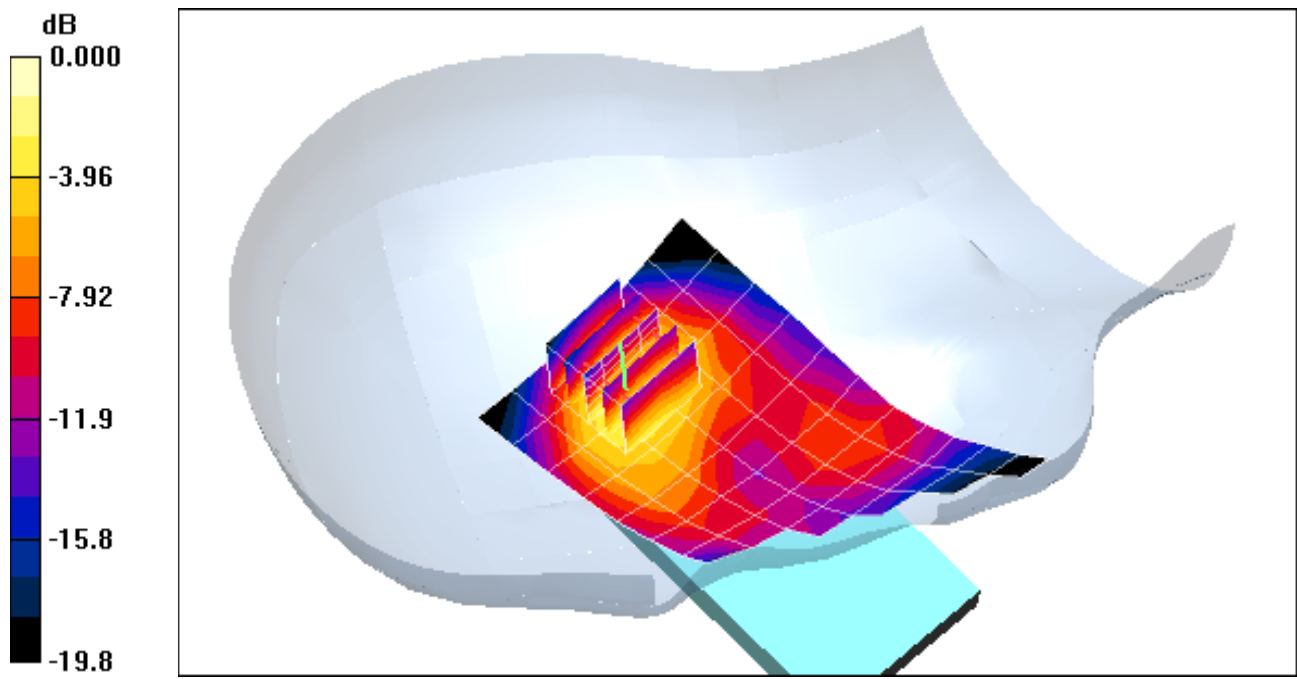
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 17.9 V/m; Power Drift = 0.087 dB

Peak SAR (extrapolated) = 0.561 W/kg

SAR(1 g) = 0.344 mW/g; SAR(10 g) = 0.198 mW/g



0 dB = 0.374mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 2

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

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.37 \text{ mho/m}$; $\epsilon_r = 38.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 01-30-2012; Ambient Temp: 23.9°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3258; ConvF(5.32, 5.32, 5.32); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

**Mode: LTE Band 4 (AWS), Left Head, Touch, Mid.ch, QPSK,
10 MHz Bandwidth, 1 RB, 0 RB Offset**

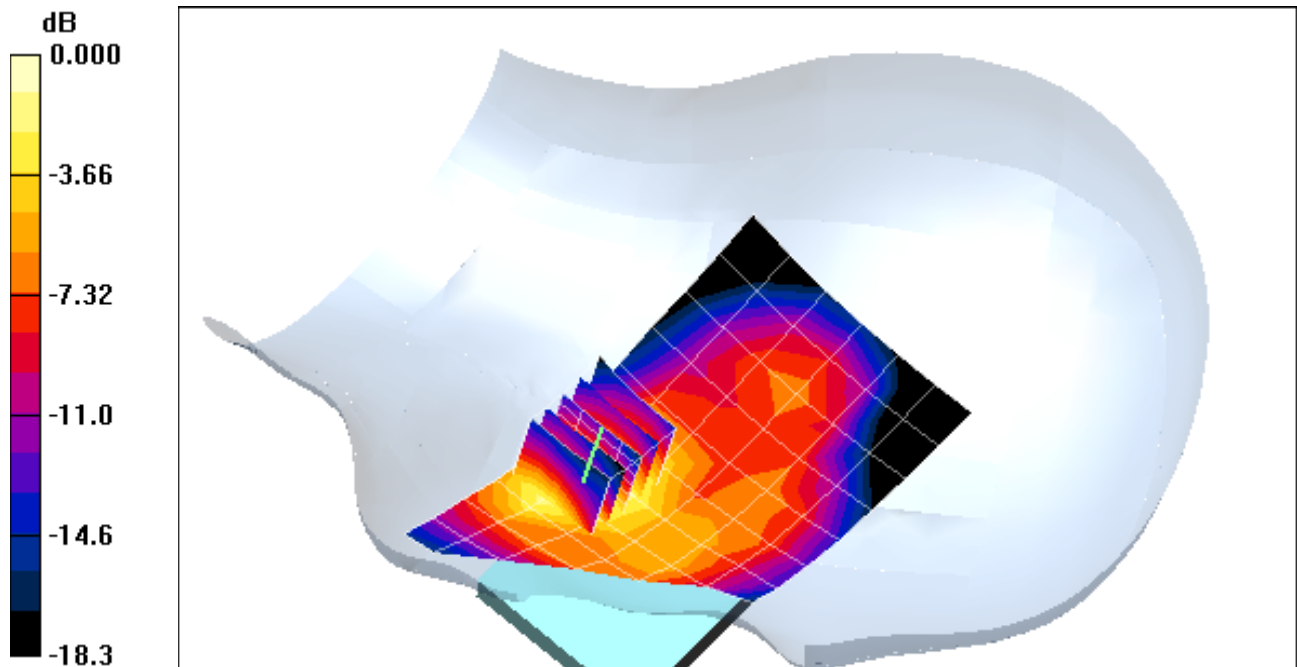
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 24.4 V/m; Power Drift = -0.213 dB

Peak SAR (extrapolated) = 1.11 W/kg

SAR(1 g) = 0.677 mW/g; SAR(10 g) = 0.385 mW/g



0 dB = 0.748mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 2

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

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.37 \text{ mho/m}$; $\epsilon_r = 38.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 01-30-2012; Ambient Temp: 23.9°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3258; ConvF(5.32, 5.32, 5.32); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

**Mode: LTE Band 4 (AWS), Left Head, Tilt, Mid.ch, QPSK,
10 MHz Bandwidth, 1 RB, 0 RB Offset**

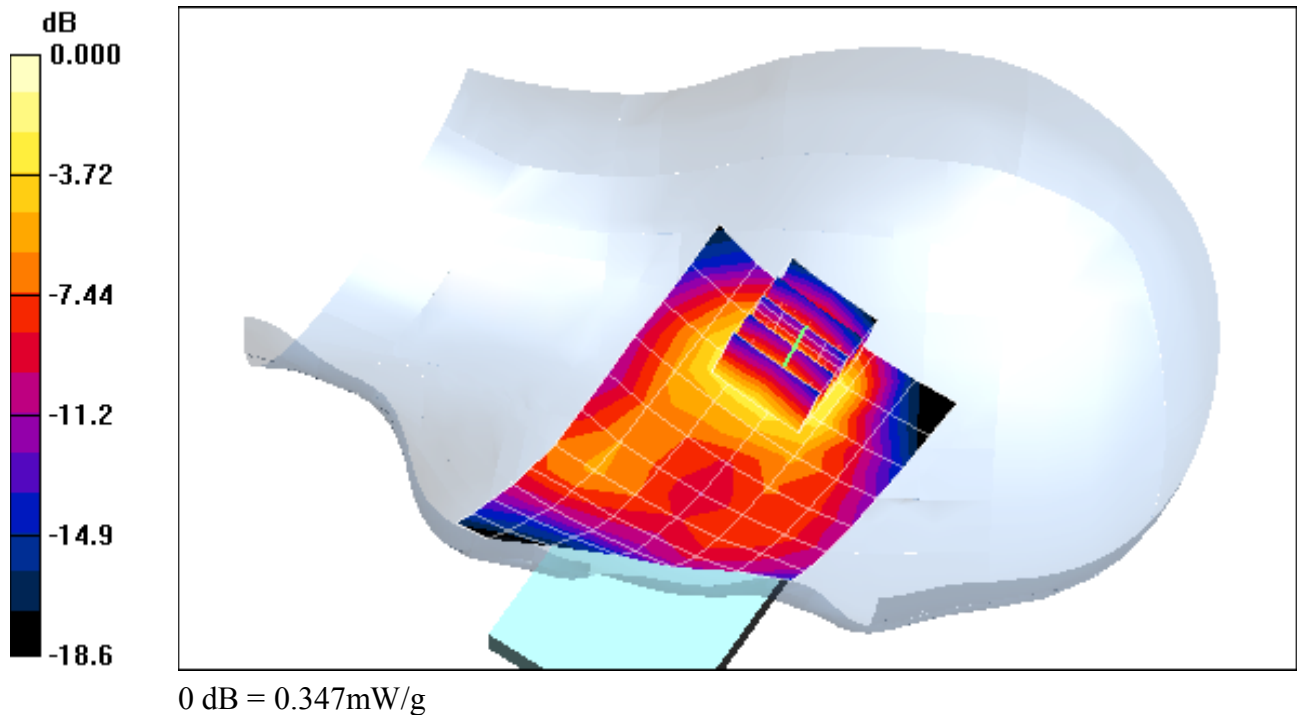
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 15.1 V/m; Power Drift = -0.054 dB

Peak SAR (extrapolated) = 0.524 W/kg

SAR(1 g) = 0.315 mW/g; SAR(10 g) = 0.178 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 4

Communication System: GSM1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

Medium: 1900 Head Medium parameters used:

$f = 1910 \text{ MHz}$; $\sigma = 1.445 \text{ mho/m}$; $\epsilon_r = 40.31$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-04-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.3°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: GSM 1900, Right Head, Touch, High.ch

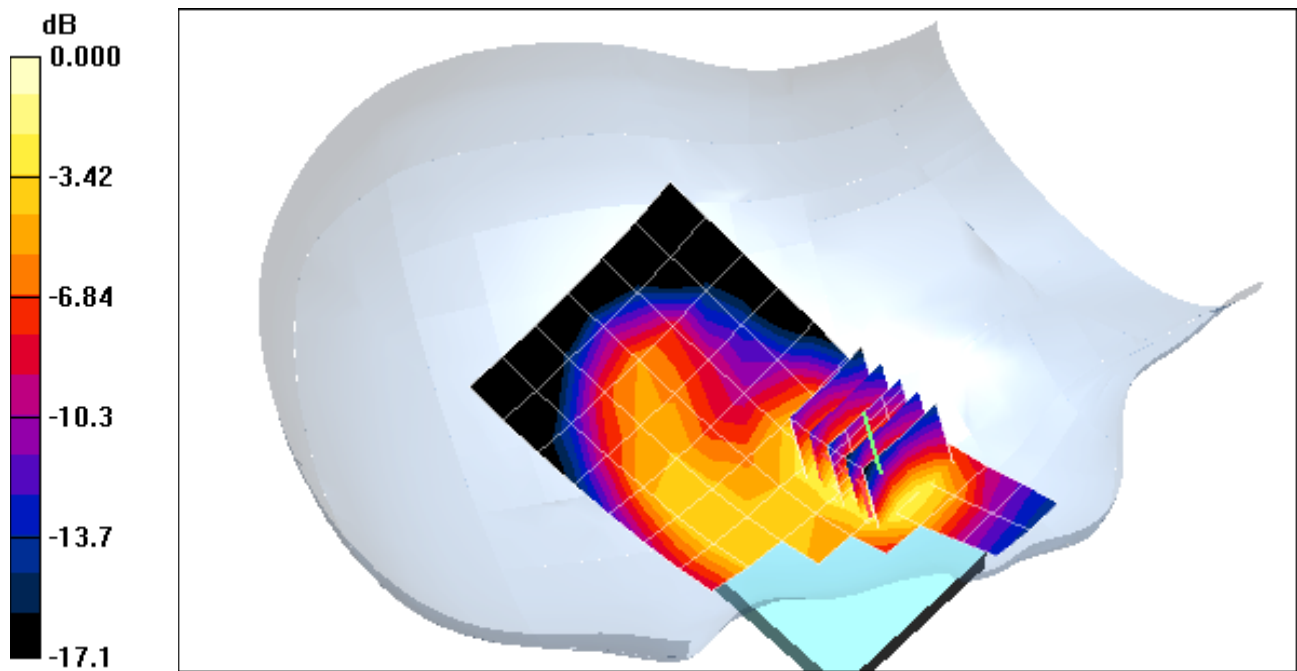
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 13.8 V/m; Power Drift = -0.029 dB

Peak SAR (extrapolated) = 0.463 W/kg

SAR(1 g) = 0.300 mW/g; SAR(10 g) = 0.182 mW/g



0 dB = 0.326mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 4

Communication System: GSM1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

Medium: 1900 Head Medium parameters used:

$f = 1910 \text{ MHz}$; $\sigma = 1.445 \text{ mho/m}$; $\epsilon_r = 40.31$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-04-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.3°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: GSM 1900, Right Head, Tilt, High.ch

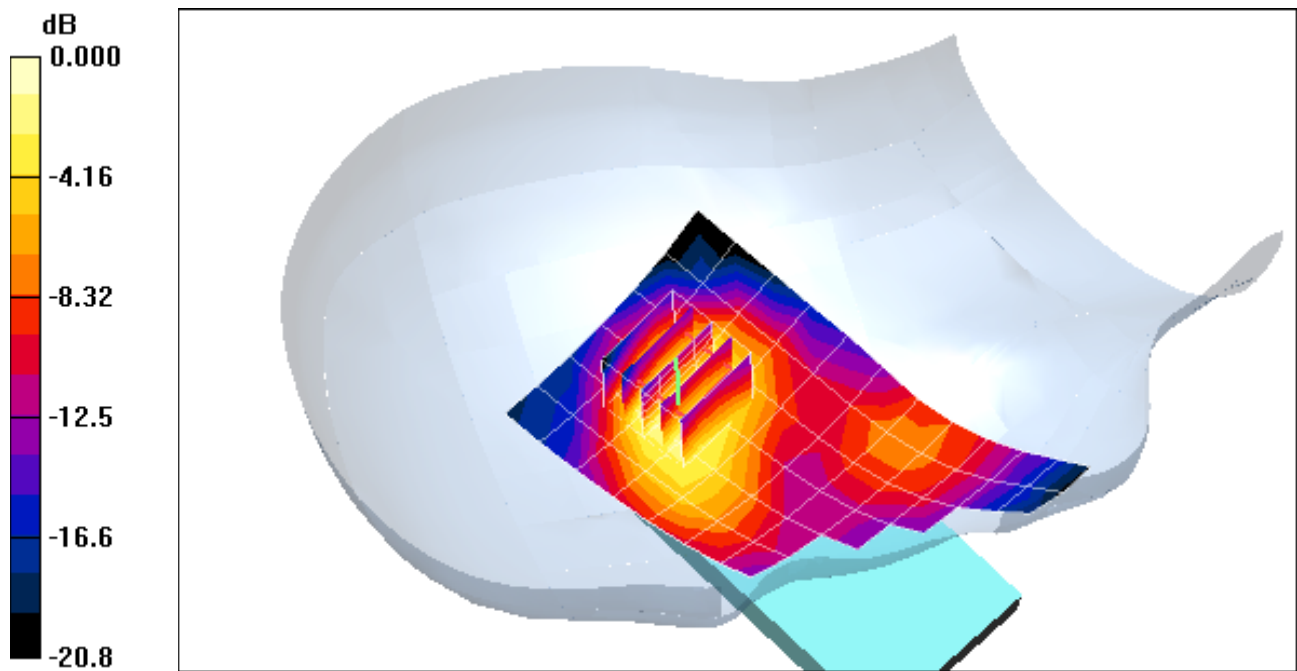
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 12.1 V/m; Power Drift = 0.018 dB

Peak SAR (extrapolated) = 0.357 W/kg

SAR(1 g) = 0.207 mW/g; SAR(10 g) = 0.116 mW/g



0 dB = 0.225mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 4

Communication System: GSM1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

Medium: 1900 Head Medium parameters used:

$f = 1910 \text{ MHz}$; $\sigma = 1.445 \text{ mho/m}$; $\epsilon_r = 40.31$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-04-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.3°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: GSM 1900, Left Head, Touch, High.ch

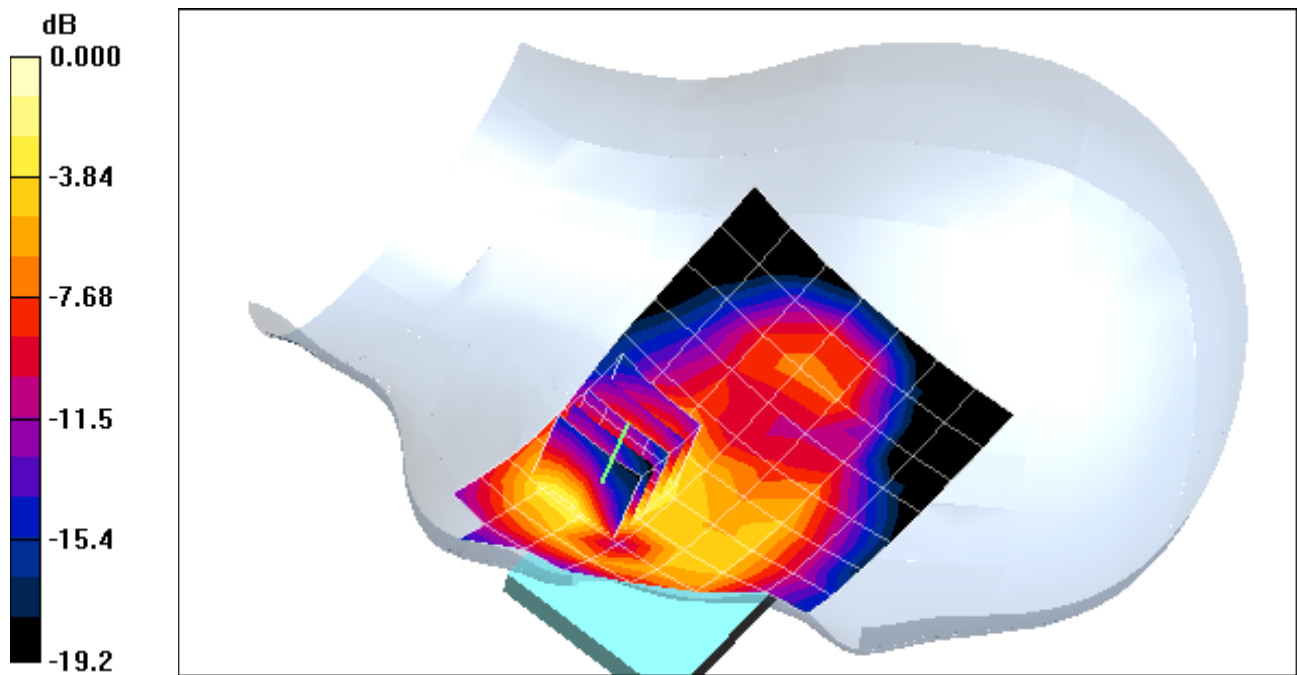
Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 16.7 V/m; Power Drift = 0.147 dB

Peak SAR (extrapolated) = 0.668 W/kg

SAR(1 g) = 0.414 mW/g; SAR(10 g) = 0.234 mW/g



0 dB = 0.466mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 4

Communication System: GSM1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

Medium: 1900 Head Medium parameters used:

$f = 1910 \text{ MHz}$; $\sigma = 1.445 \text{ mho/m}$; $\epsilon_r = 40.31$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-04-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.3°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: GSM 1900, Left Head, Tilt, High.ch

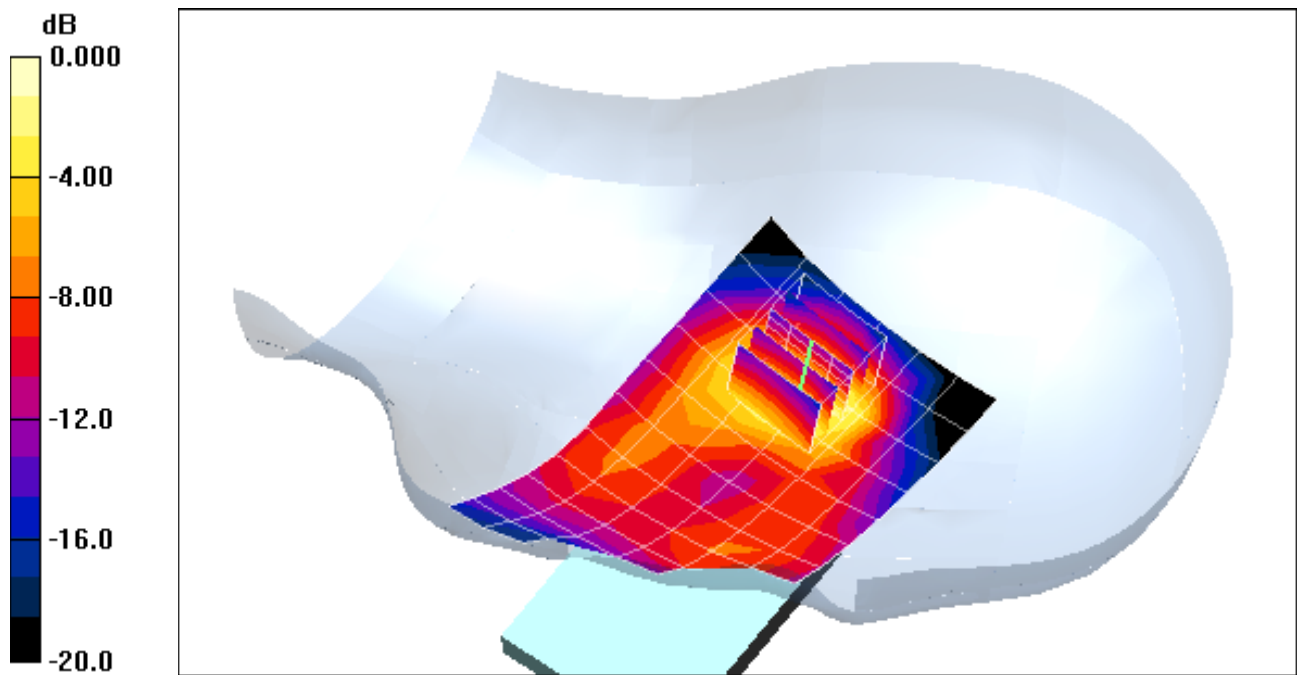
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 12.9 V/m; Power Drift = -0.023 dB

Peak SAR (extrapolated) = 0.401 W/kg

SAR(1 g) = 0.234 mW/g; SAR(10 g) = 0.128 mW/g



0 dB = 0.259mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 5

Communication System: WCDMA1900; Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1907.6 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 40.31$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-04-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.3°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: WCDMA 1900, Right Head, Touch, High.ch

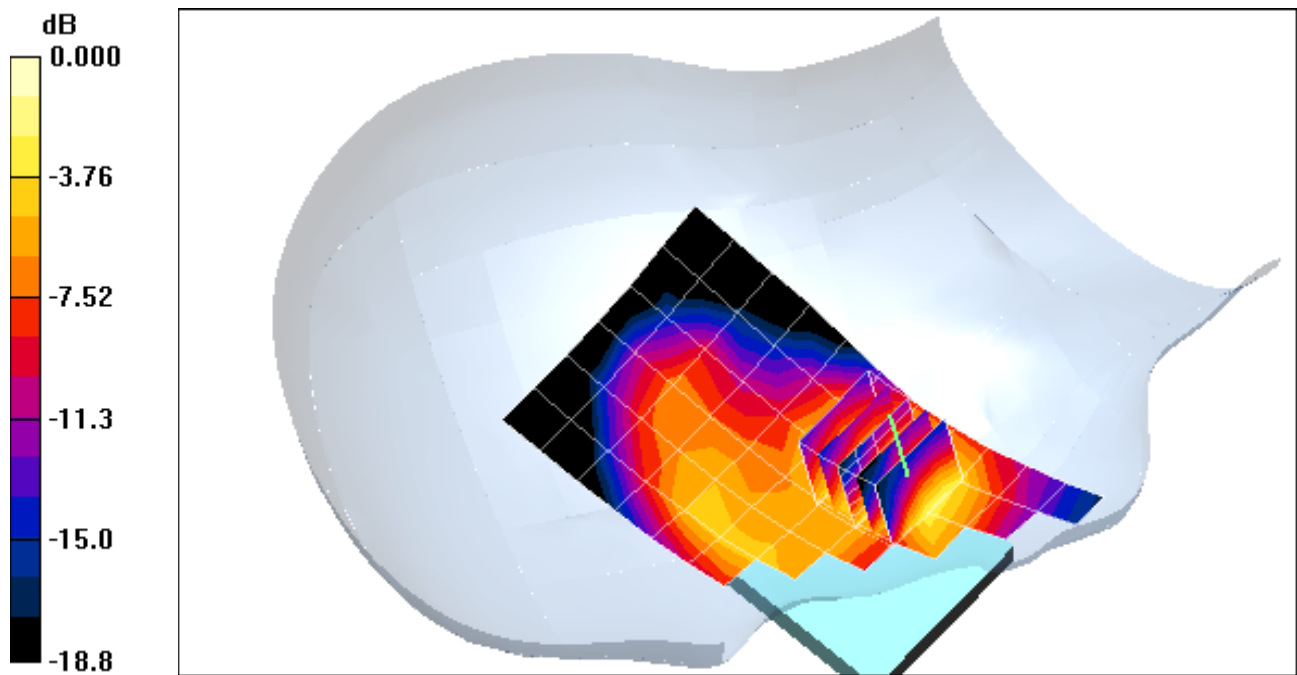
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 15.4 V/m; Power Drift = 0.010 dB

Peak SAR (extrapolated) = 0.596 W/kg

SAR(1 g) = 0.373 mW/g; SAR(10 g) = 0.220 mW/g



0 dB = 0.407mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 5

Communication System: WCDMA1900; Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1907.6 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 40.31$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-04-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.3°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: WCDMA 1900, Right Head, Tilt, High.ch

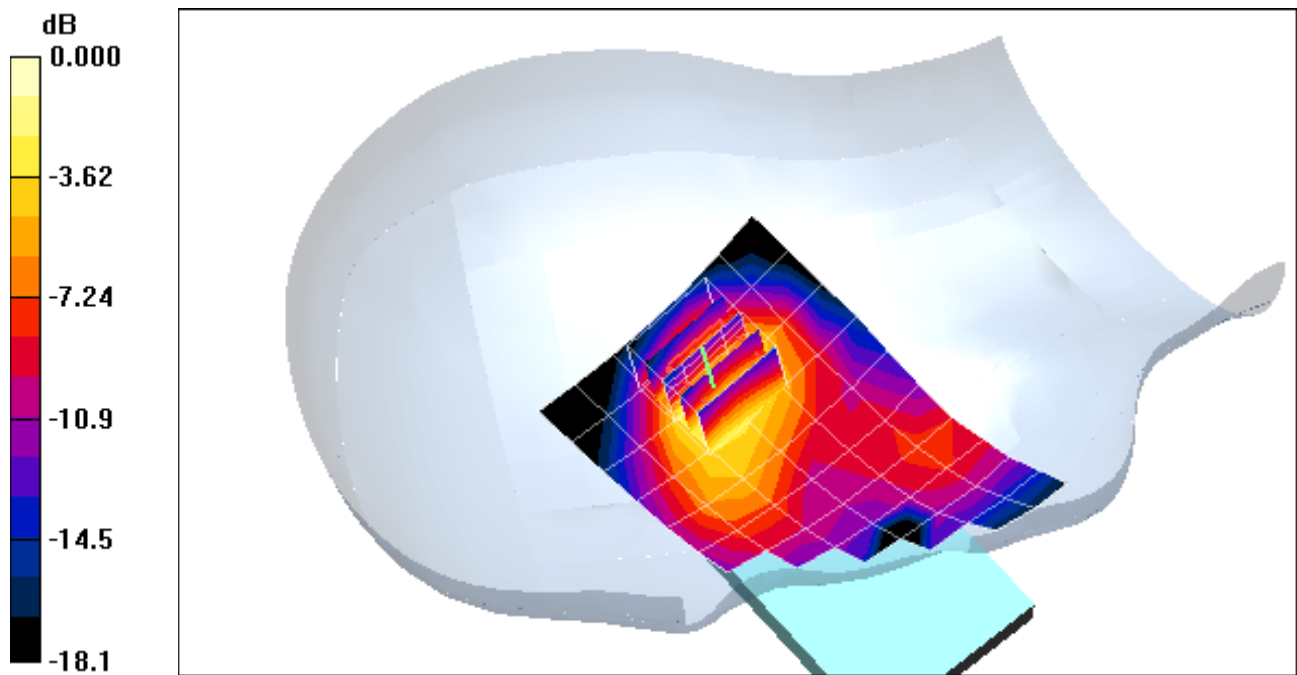
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 13.6 V/m; Power Drift = -0.001 dB

Peak SAR (extrapolated) = 0.420 W/kg

SAR(1 g) = 0.246 mW/g; SAR(10 g) = 0.140 mW/g



0 dB = 0.264mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 5

Communication System: WCDMA1900; Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1907.6 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 40.31$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-04-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.3°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: WCDMA 1900, Left Head, Touch, High.ch

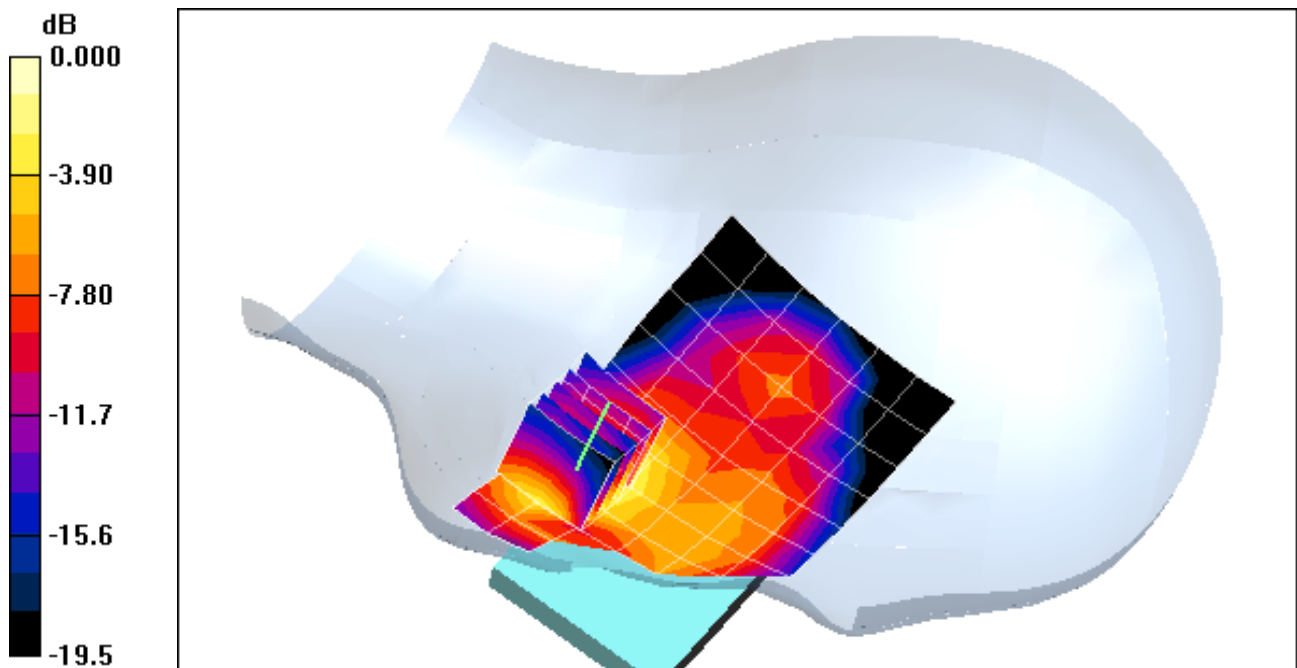
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 18.5 V/m; Power Drift = -0.140 dB

Peak SAR (extrapolated) = 0.780 W/kg

SAR(1 g) = 0.478 mW/g; SAR(10 g) = 0.269 mW/g



0 dB = 0.519mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 5

Communication System: WCDMA1900; Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1907.6 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 40.31$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-04-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.3°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: WCDMA 1900, Left Head, Tilt, High.ch

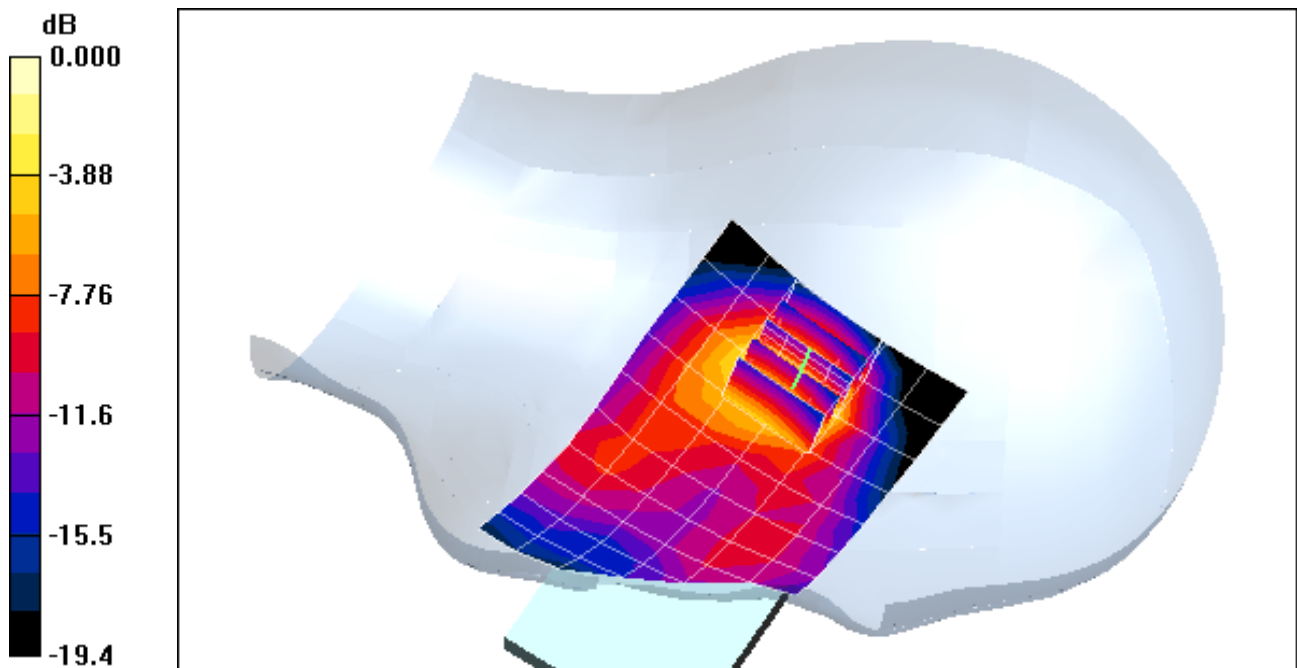
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 14.6 V/m; Power Drift = 0.102 dB

Peak SAR (extrapolated) = 0.484 W/kg

SAR(1 g) = 0.281 mW/g; SAR(10 g) = 0.152 mW/g



0 dB = 0.314mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 6

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

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.8 \text{ mho/m}$; $\epsilon_r = 38.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

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

Probe: ES3DV3 - SN3258; ConvF(4.5, 4.5, 4.5); Calibrated: 4/8/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

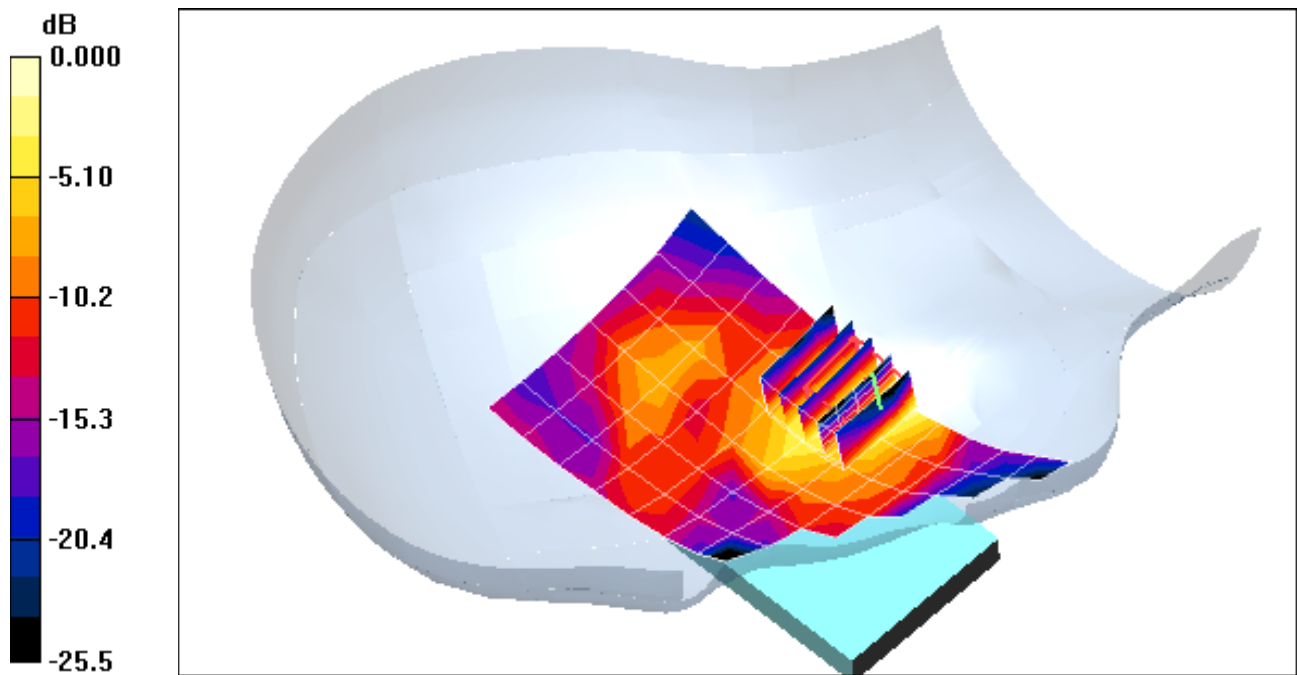
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 8.28 V/m; Power Drift = -0.080 dB

Peak SAR (extrapolated) = 0.273 W/kg

SAR(1 g) = 0.121 mW/g; SAR(10 g) = 0.053 mW/g



0 dB = 0.152mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 6

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

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.8 \text{ mho/m}$; $\epsilon_r = 38.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

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

Probe: ES3DV3 - SN3258; ConvF(4.5, 4.5, 4.5); Calibrated: 4/8/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

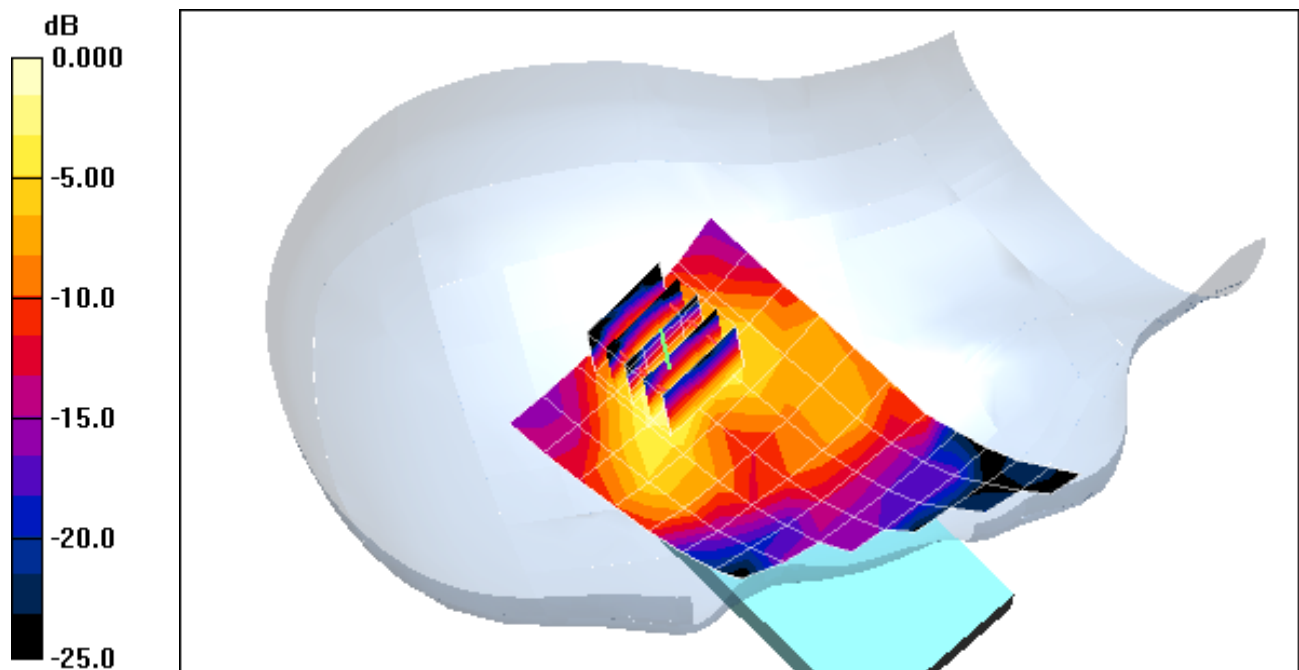
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 5.95 V/m; Power Drift = -0.046 dB

Peak SAR (extrapolated) = 0.131 W/kg

SAR(1 g) = 0.067 mW/g; SAR(10 g) = 0.032 mW/g



0 dB = 0.087mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 6

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

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.8 \text{ mho/m}$; $\epsilon_r = 38.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

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

Probe: ES3DV3 - SN3258; ConvF(4.5, 4.5, 4.5); Calibrated: 4/8/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

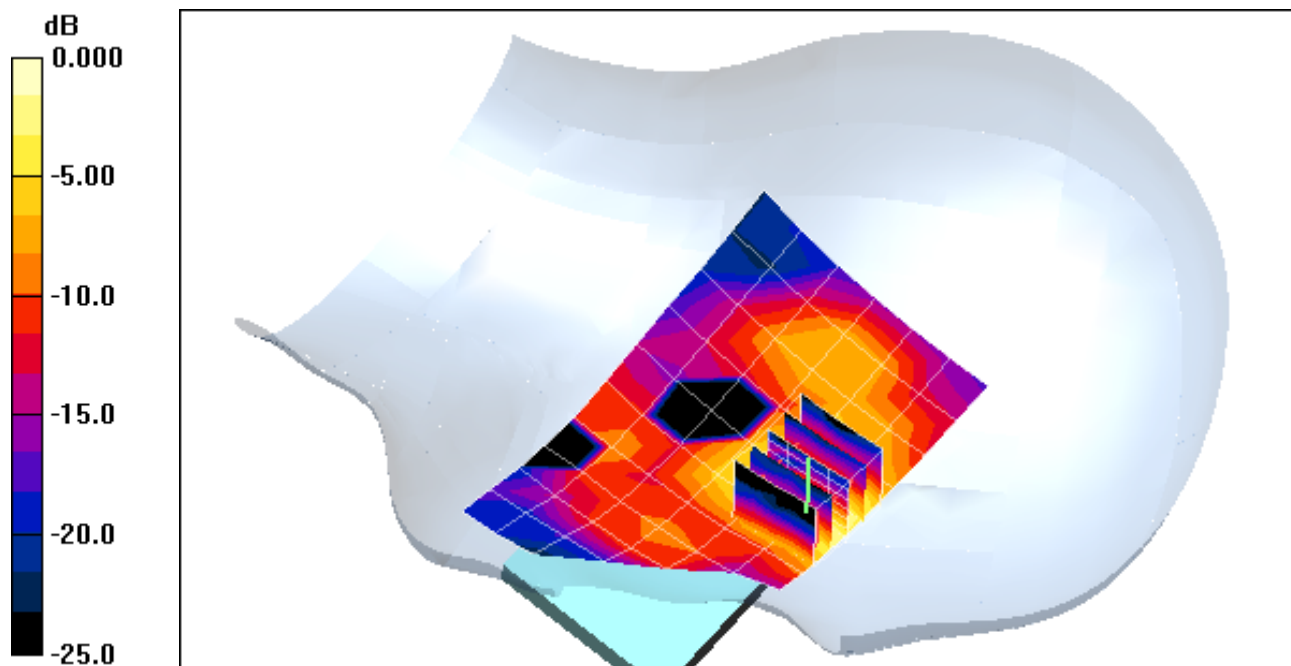
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 6.72 V/m; Power Drift = -0.145 dB

Peak SAR (extrapolated) = 0.166 W/kg

SAR(1 g) = 0.081 mW/g; SAR(10 g) = 0.038 mW/g



0 dB = 0.105mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 6

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

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.8 \text{ mho/m}$; $\epsilon_r = 38.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

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

Probe: ES3DV3 - SN3258; ConvF(4.5, 4.5, 4.5); Calibrated: 4/8/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

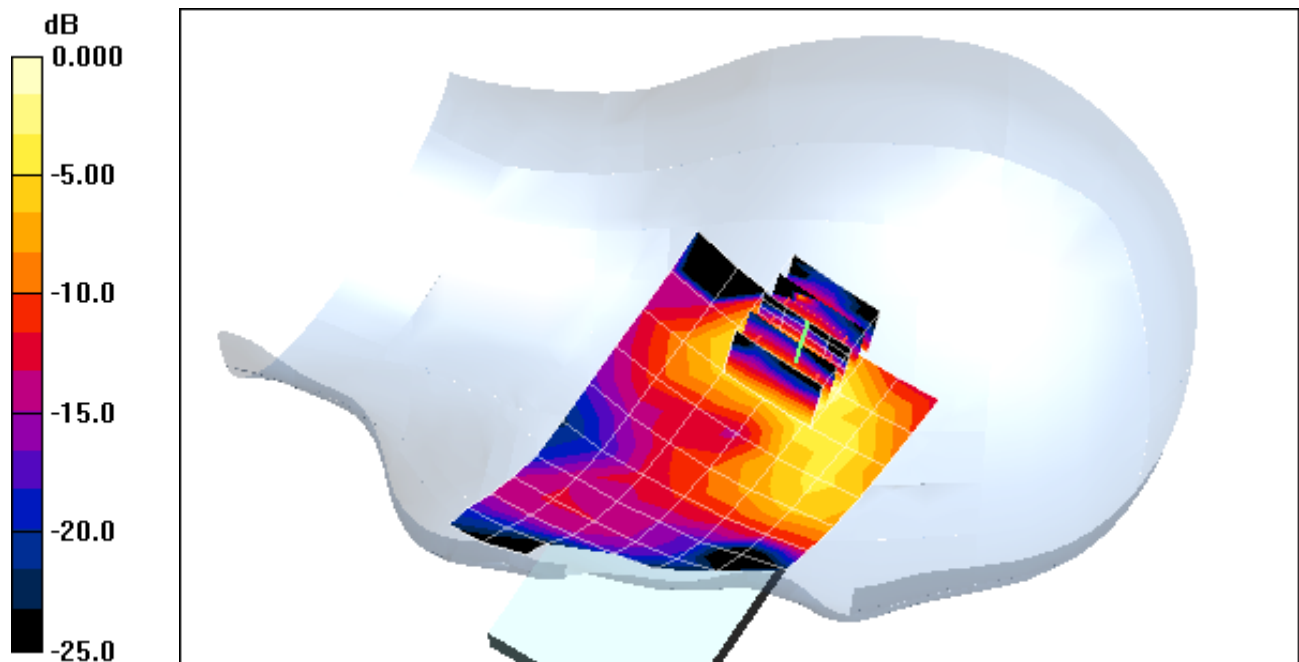
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 6.54 V/m; Power Drift = -0.018 dB

Peak SAR (extrapolated) = 0.123 W/kg

SAR(1 g) = 0.064 mW/g; SAR(10 g) = 0.030 mW/g



0 dB = 0.084mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 3

Communication System: LTE Band 17; Frequency: 710 MHz; Duty Cycle: 1:1

Medium: 695 Body; Medium parameters used:

$f = 710 \text{ MHz}$; $\sigma = 0.936 \text{ mho/m}$; $\epsilon_r = 56.58$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.7°C

Probe: ES3DV2 - SN3022; ConvF(6.11, 6.11, 6.11); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 9/16/2011

Phantom: SAM v5.0 front; Type: SAM v5.0; Serial: TP-1646

Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Mode: LTE Band 17, Body SAR, Back side, Mid.ch, QPSK
10 MHz Bandwidth, 1 RB, 49 RB Offset

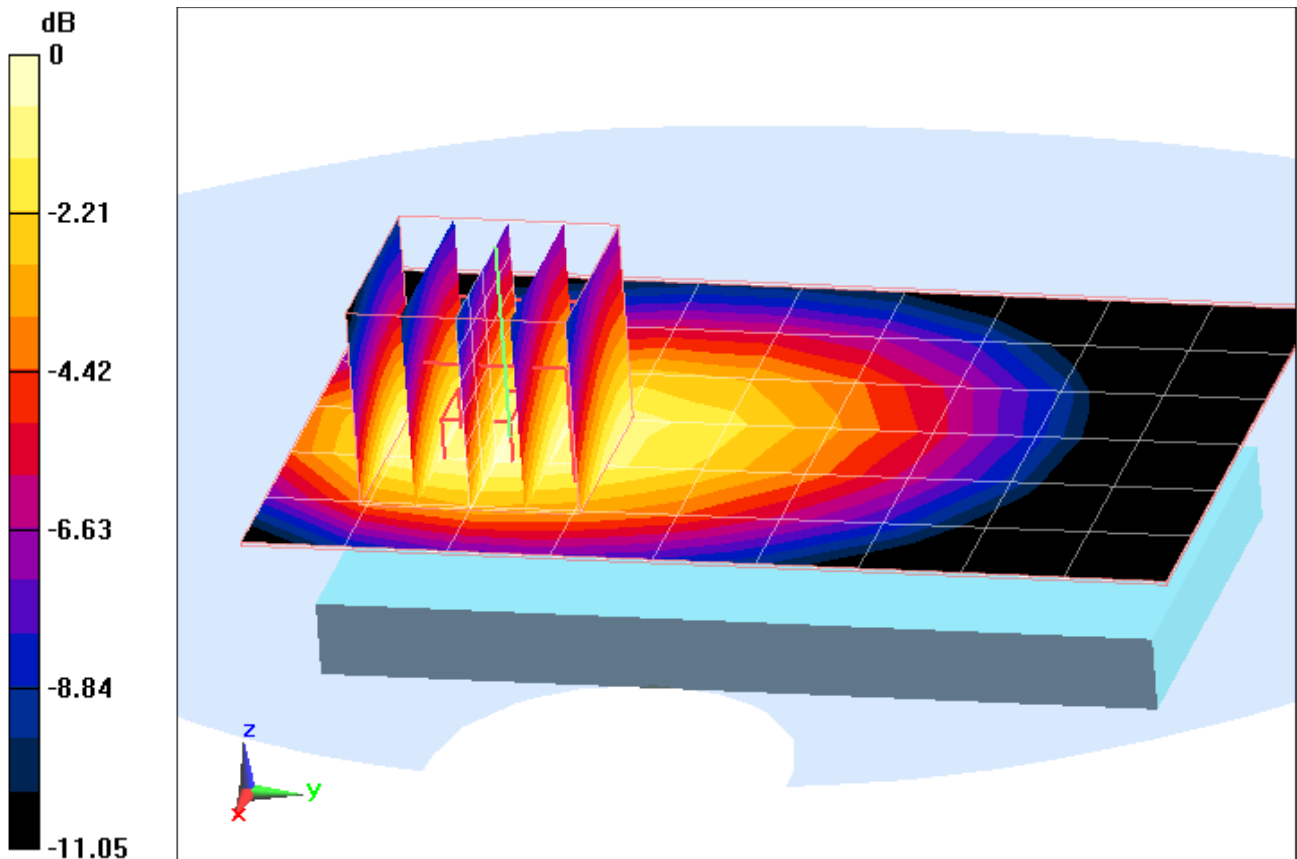
Area Scan (7x10x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 12.041 V/m; Power Drift = -0.0071 dB

Peak SAR (extrapolated) = 0.172 W/kg

SAR(1 g) = 0.130 mW/g; SAR(10 g) = 0.094 mW/g



0 dB = 0.140mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 3

Communication System: LTE Band 17; Frequency: 710 MHz; Duty Cycle: 1:1

Medium: 695 Body; Medium parameters used:

$f = 710 \text{ MHz}$; $\sigma = 0.936 \text{ mho/m}$; $\epsilon_r = 56.58$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.7°C

Probe: ES3DV2 - SN3022; ConvF(6.11, 6.11, 6.11); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 9/16/2011

Phantom: SAM v5.0 front; Type: SAM v5.0; Serial: TP-1646

Measurement SW: DASY52, Version 52.6 (2);SEMCAD X Version 14.4.5 (3634)

Mode: LTE Band 17, Body SAR, Front side, Mid.ch, QPSK
10 MHz Bandwidth, 1 RB, 49 RB Offset

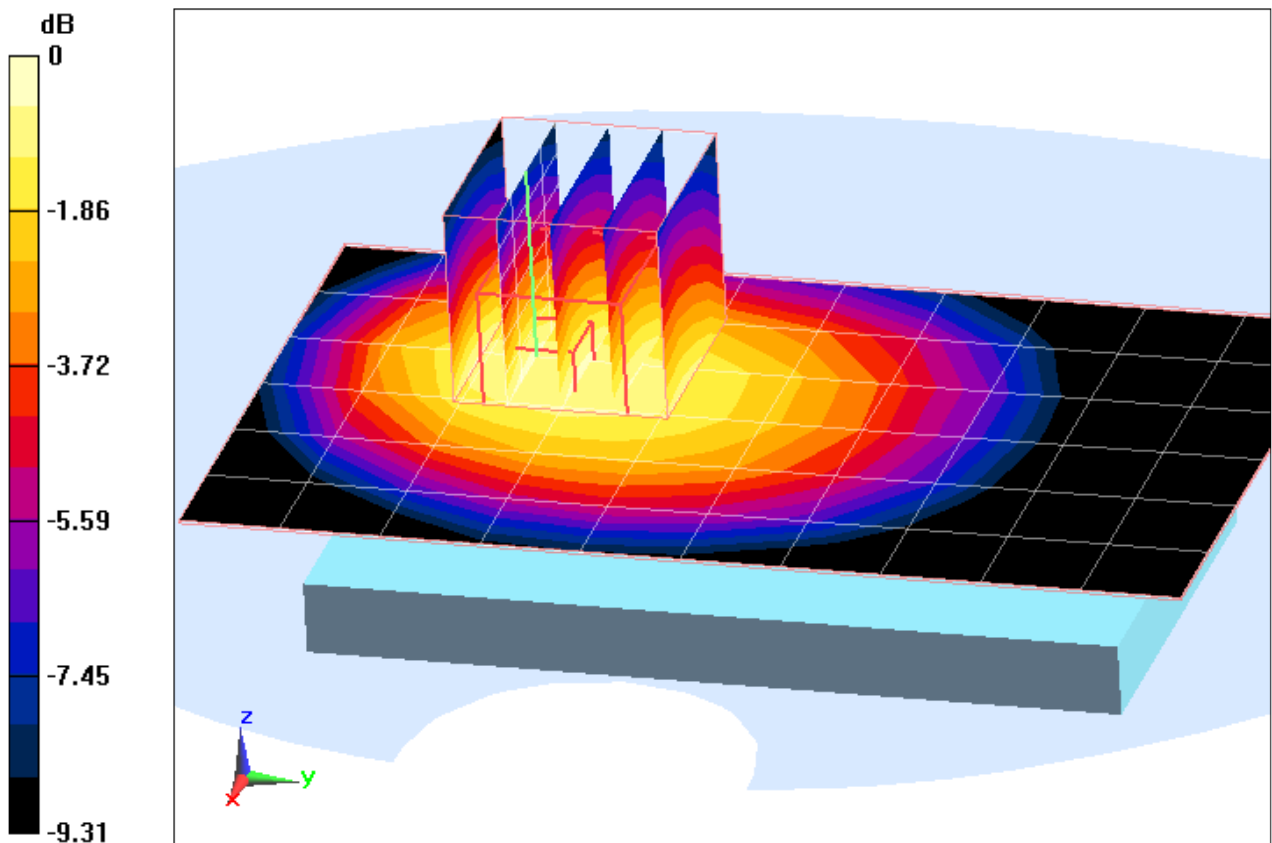
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 10.528 V/m; Power Drift = 0.0095 dB

Peak SAR (extrapolated) = 0.129 W/kg

SAR(1 g) = 0.101 mW/g; SAR(10 g) = 0.075 mW/g



0 dB = 0.110mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 3

Communication System: LTE Band 17; Frequency: 710 MHz; Duty Cycle: 1:1

Medium: 695 Body; Medium parameters used:

$f = 710 \text{ MHz}$; $\sigma = 0.936 \text{ mho/m}$; $\epsilon_r = 56.58$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.7°C

Probe: ES3DV2 - SN3022; ConvF(6.11, 6.11, 6.11); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 9/16/2011

Phantom: SAM v5.0 front; Type: SAM v5.0; Serial: TP-1646

Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Mode: LTE Band 17, Body SAR, Bottom Edge, Mid.ch, QPSK
10 MHz Bandwidth, 1 RB, 0 RB Offset

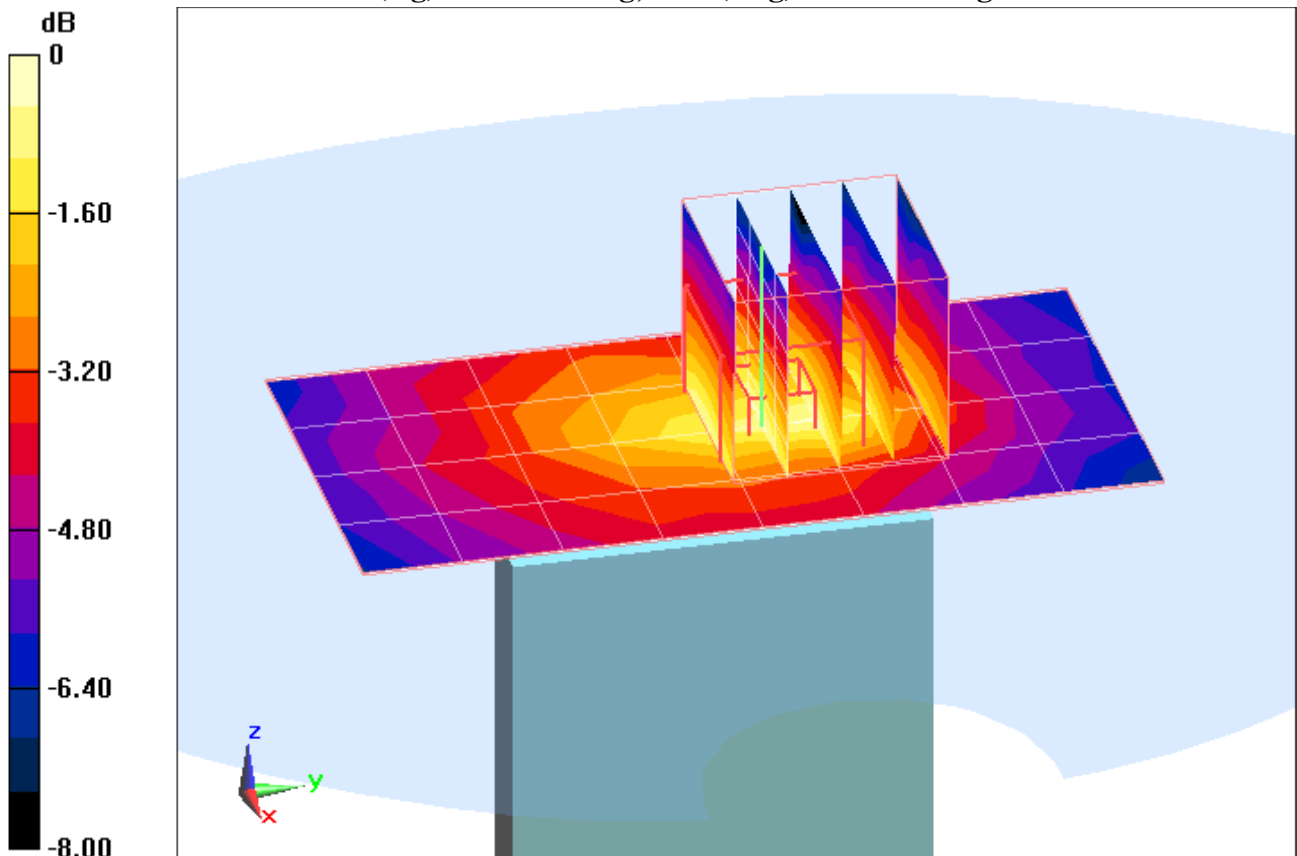
Area Scan (5x9x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 5.351 V/m; Power Drift = 0.122 dB

Peak SAR (extrapolated) = 0.052 W/kg

SAR(1 g) = 0.027 mW/g; SAR(10 g) = 0.015 mW/g



0 dB = 0.030mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 3

Communication System: LTE Band 17; Frequency: 710 MHz; Duty Cycle: 1:1

Medium: 695 Body; Medium parameters used:

$f = 710 \text{ MHz}$; $\sigma = 0.936 \text{ mho/m}$; $\epsilon_r = 56.58$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.7°C

Probe: ES3DV2 - SN3022; ConvF(6.11, 6.11, 6.11); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 9/16/2011

Phantom: SAM v5.0 front; Type: SAM v5.0; Serial: TP-1646

Measurement SW: DASY52, Version 52.6 (2);SEMCAD X Version 14.4.5 (3634)

Mode: LTE Band 17, Body SAR, Left Edge, Mid.ch, QPSK
10 MHz Bandwidth, 1 RB, 49 RB Offset

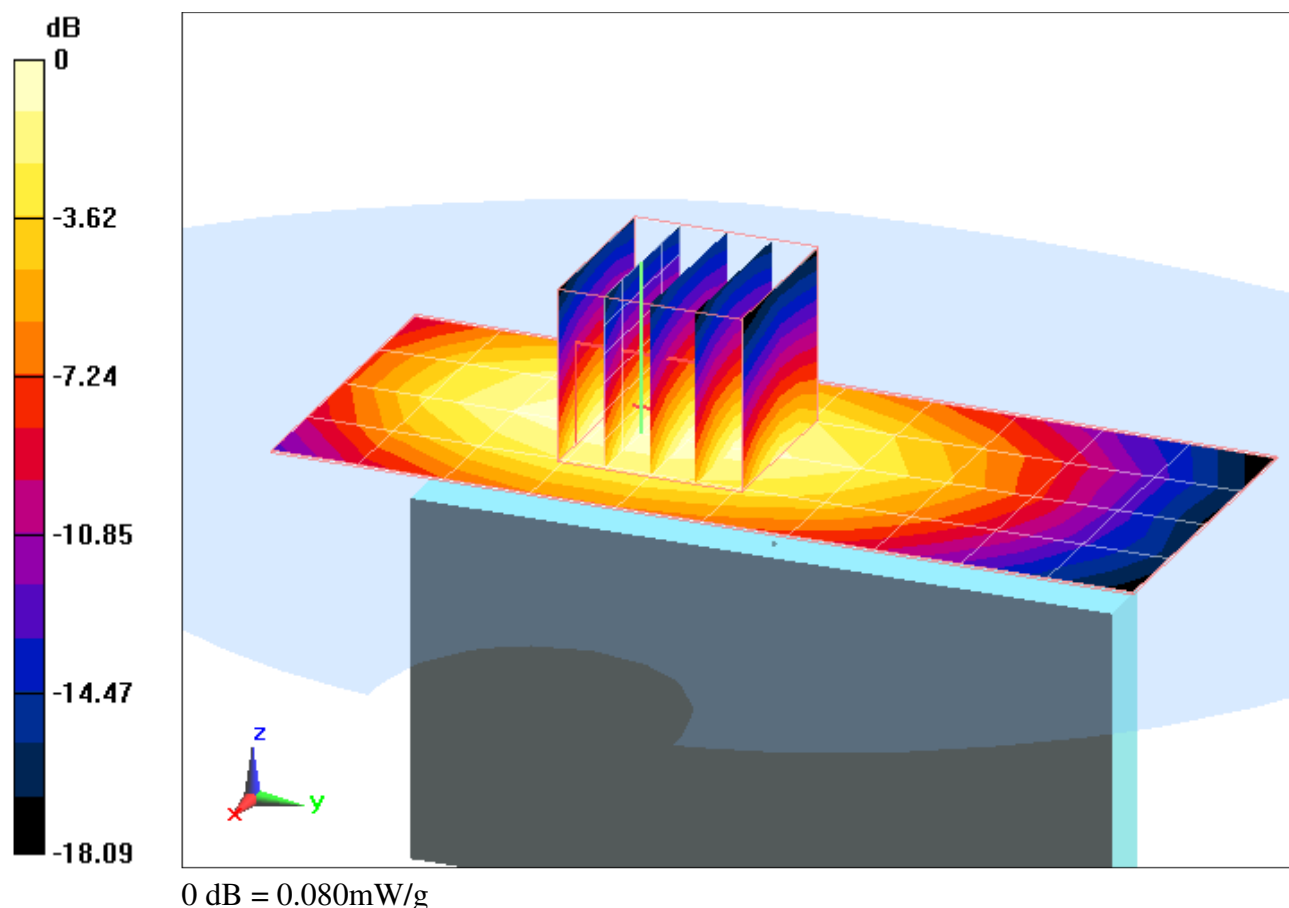
Area Scan (5x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 9.734 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 0.119 W/kg

SAR(1 g) = 0.085 mW/g; SAR(10 g) = 0.059 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 4

Communication System: GSM850 GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 54$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-31-2012; Ambient Temp: 23.5°C; Tissue Temp: 21.6°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: GPRS 850, Body SAR, Back side, Mid.ch, 2 Tx Slots

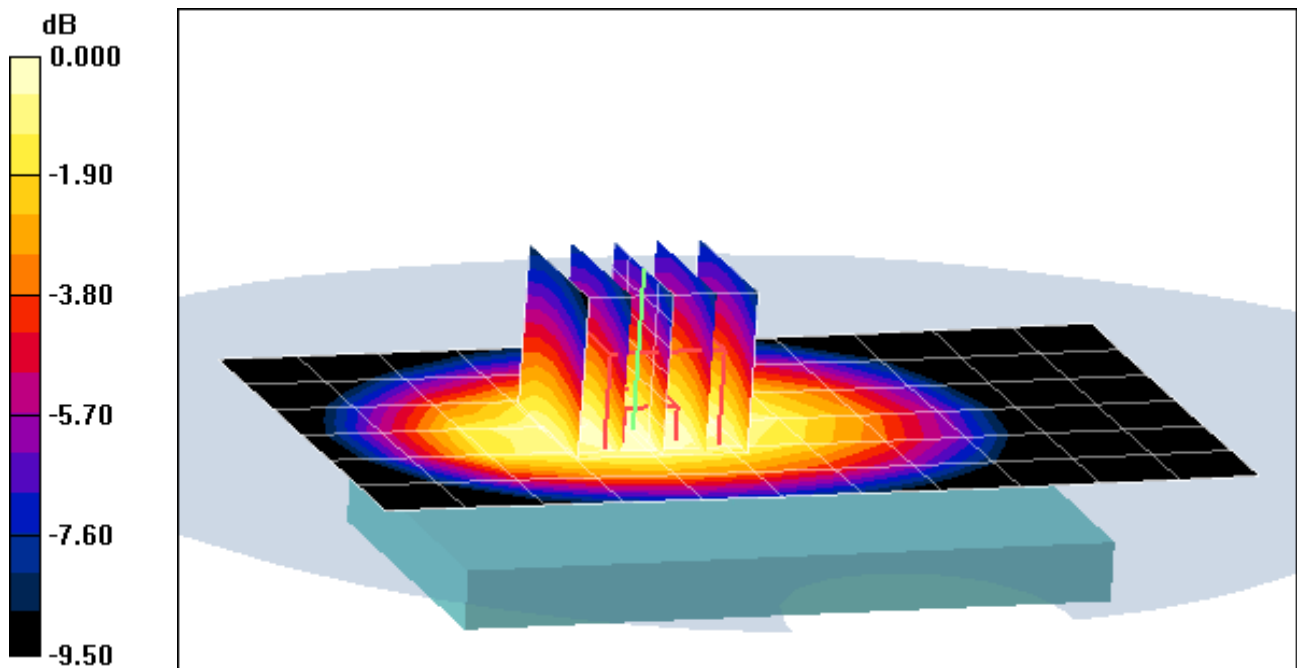
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 25.5 V/m; Power Drift = -0.152 dB

Peak SAR (extrapolated) = 0.784 W/kg

SAR(1 g) = 0.598 mW/g; SAR(10 g) = 0.438 mW/g



0 dB = 0.632mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 4

Communication System: GSM850 GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 54$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-31-2012; Ambient Temp: 23.5°C; Tissue Temp: 21.6°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: GPRS 850, Body SAR, Front side, Mid.ch, 2 Tx Slots

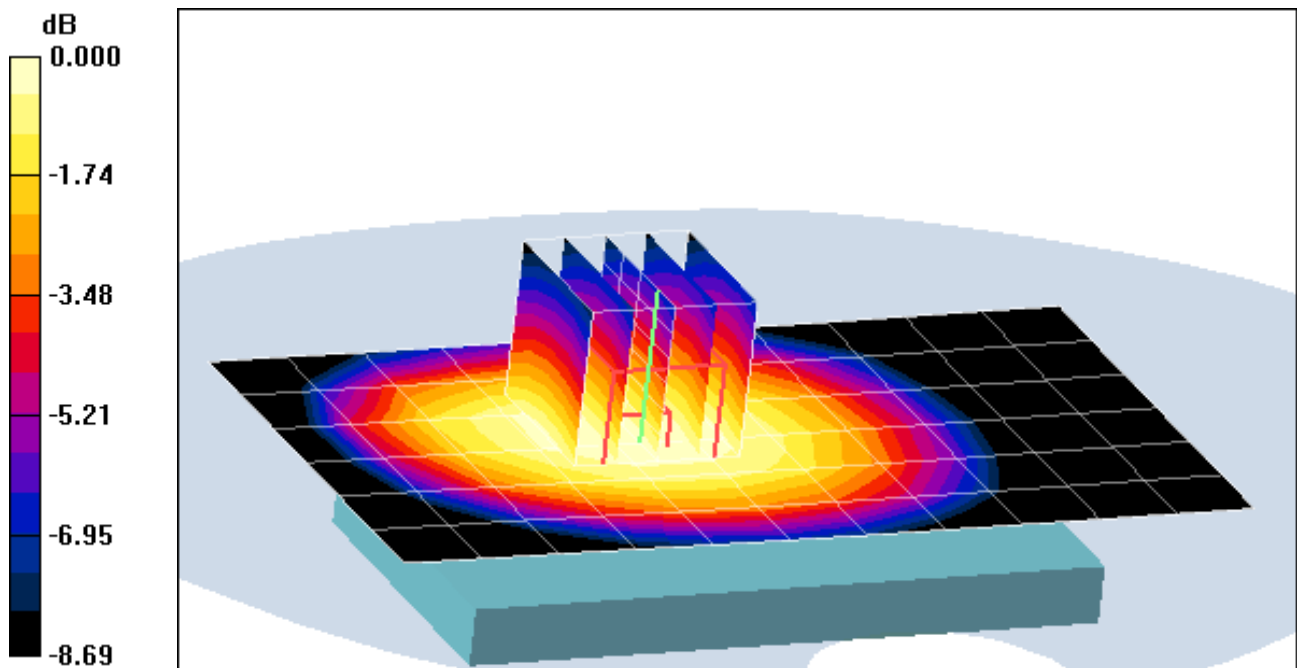
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 23.1 V/m; Power Drift = 0.041 dB

Peak SAR (extrapolated) = 0.645 W/kg

SAR(1 g) = 0.507 mW/g; SAR(10 g) = 0.385 mW/g



0 dB = 0.528mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 4

Communication System: GSM850 GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 54$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-31-2012; Ambient Temp: 23.5°C; Tissue Temp: 21.6°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: GPRS 850, Body SAR, Bottom Edge, Mid.ch, 2 Tx Slots

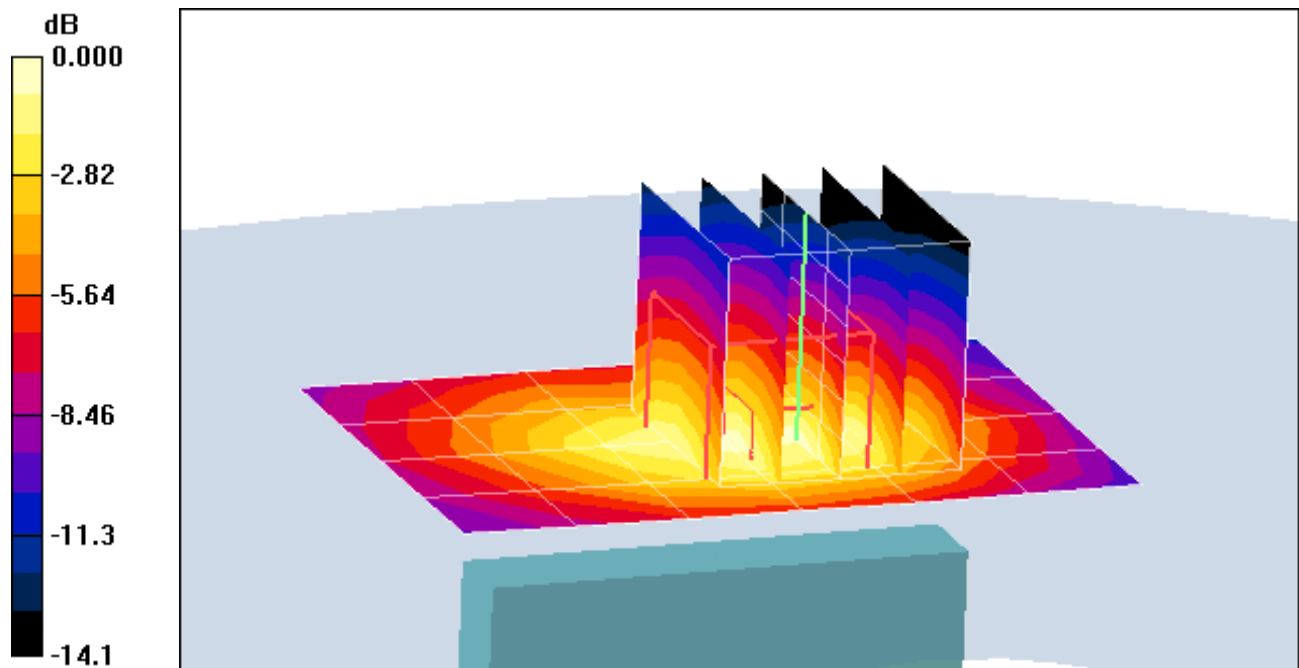
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 12.3 V/m; Power Drift = 0.012 dB

Peak SAR (extrapolated) = 0.270 W/kg

SAR(1 g) = 0.144 mW/g; SAR(10 g) = 0.083 mW/g



0 dB = 0.159mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 4

Communication System: GSM850 GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 54$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-31-2012; Ambient Temp: 23.5°C; Tissue Temp: 21.6°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: GPRS 850, Body SAR, Left Edge, Mid.ch, 2 Tx Slots

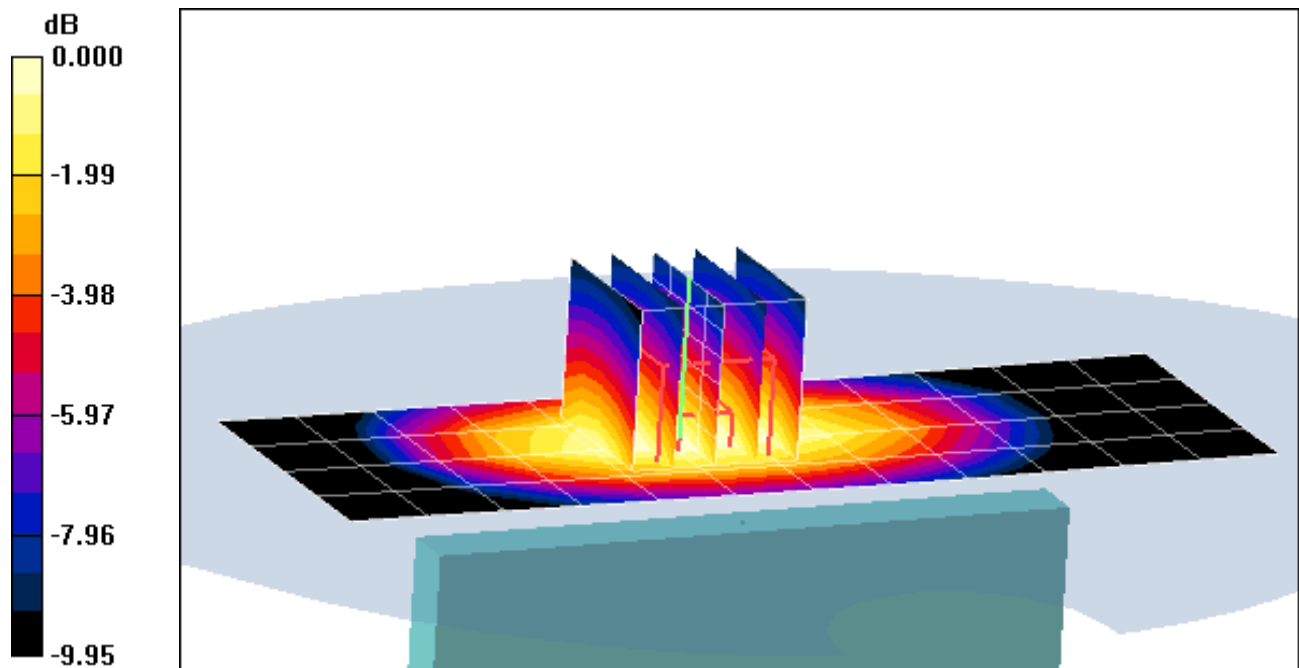
Area Scan (5x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 23.2 V/m; Power Drift = -0.043 dB

Peak SAR (extrapolated) = 0.727 W/kg

SAR(1 g) = 0.500 mW/g; SAR(10 g) = 0.340 mW/g



0 dB = 0.532mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 5

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 54$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-31-2012; Ambient Temp: 23.5°C; Tissue Temp: 21.6°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: WCDMA 850, Body SAR, Back side, Mid.ch

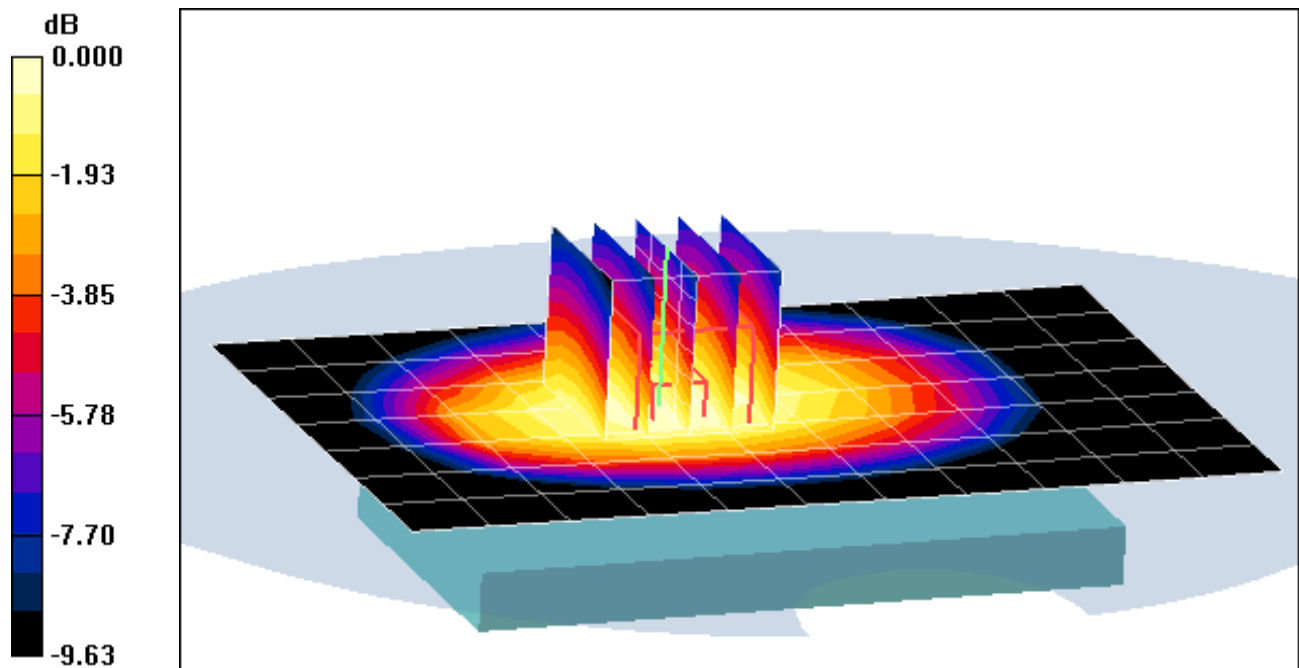
Area Scan (8x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 26.9 V/m; Power Drift = 0.014 dB

Peak SAR (extrapolated) = 0.910 W/kg

SAR(1 g) = 0.686 mW/g; SAR(10 g) = 0.504 mW/g



0 dB = 0.721mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 5

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 54$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-31-2012; Ambient Temp: 23.5°C; Tissue Temp: 21.6°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: WCDMA 850, Body SAR, Front side, Mid.ch

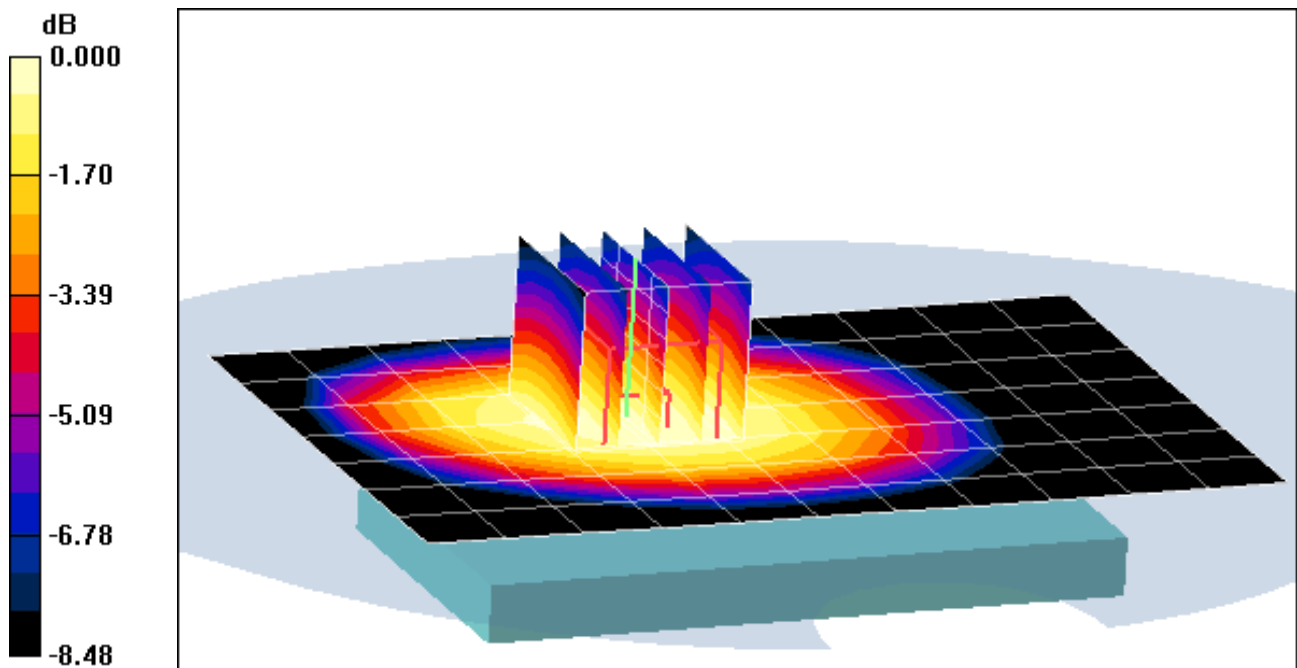
Area Scan (8x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 24.5 V/m; Power Drift = -0.007 dB

Peak SAR (extrapolated) = 0.703 W/kg

SAR(1 g) = 0.555 mW/g; SAR(10 g) = 0.423 mW/g



0 dB = 0.580mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 5

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 54$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-31-2012; Ambient Temp: 23.5°C; Tissue Temp: 21.6°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: WCDMA 850, Body SAR, Bottom Edge, Mid.ch

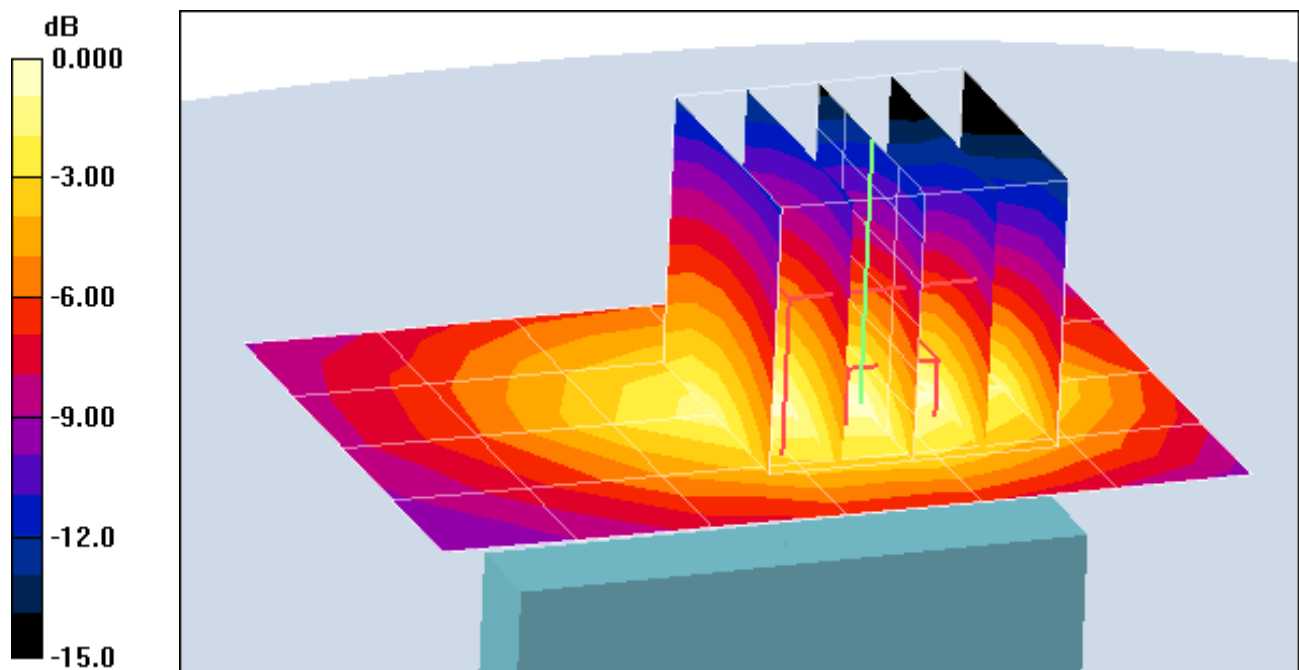
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 12.7 V/m; Power Drift = -0.173 dB

Peak SAR (extrapolated) = 0.272 W/kg

SAR(1 g) = 0.142 mW/g; SAR(10 g) = 0.081 mW/g



0 dB = 0.156mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 5

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 54$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-31-2012; Ambient Temp: 23.5°C; Tissue Temp: 21.6°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: WCDMA 850, Body SAR, Left Edge, Mid.ch

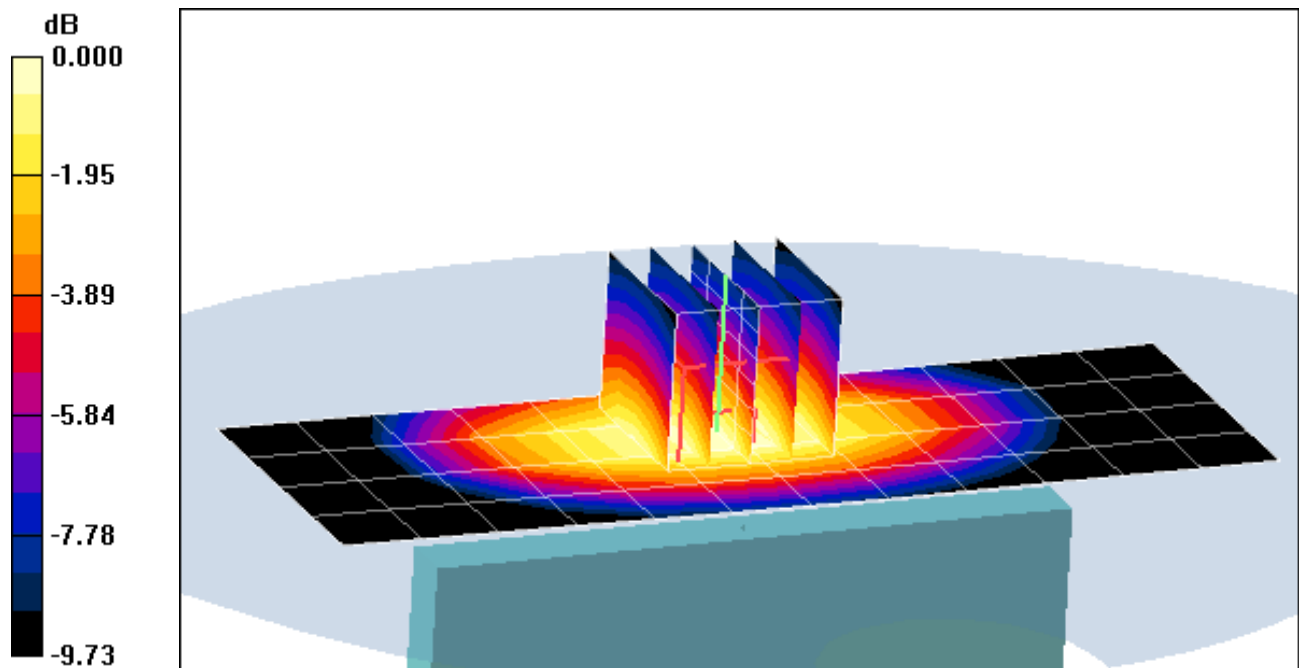
Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 23.8 V/m; Power Drift = -0.004 dB

Peak SAR (extrapolated) = 0.814 W/kg

SAR(1 g) = 0.569 mW/g; SAR(10 g) = 0.388 mW/g



0 dB = 0.609mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC2

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

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.45 \text{ mho/m}$; $\epsilon_r = 51.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-31-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.4°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 4 (AWS), Body SAR, Back side, Mid.ch, QPSK
10 MHz Bandwidth 1 RB, 0 RB Offset

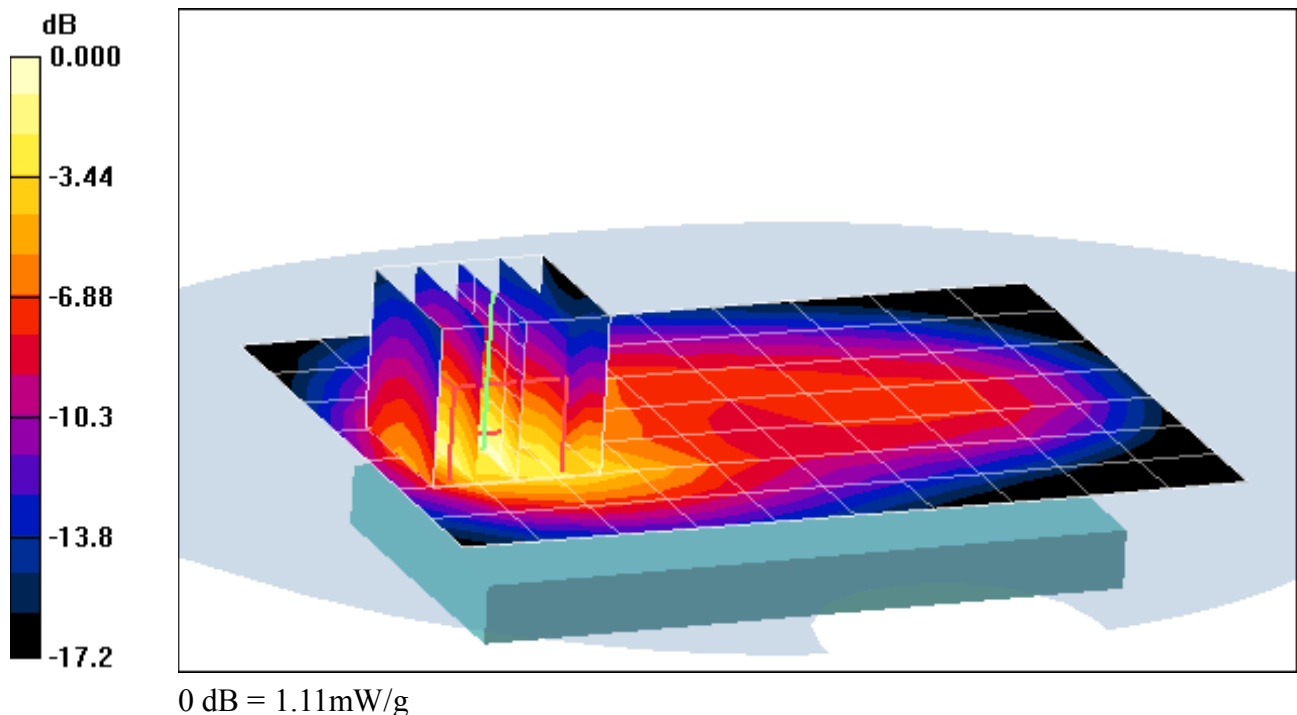
Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 27.9 V/m; Power Drift = -0.071 dB

Peak SAR (extrapolated) = 1.65 W/kg

SAR(1 g) = 0.984 mW/g; SAR(10 g) = 0.527 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC2

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

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.45 \text{ mho/m}$; $\epsilon_r = 51.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-31-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.4°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 4 (AWS), Body SAR, Front side, Mid.ch, QPSK
10 MHz Bandwidth 1 RB, 0 RB Offset

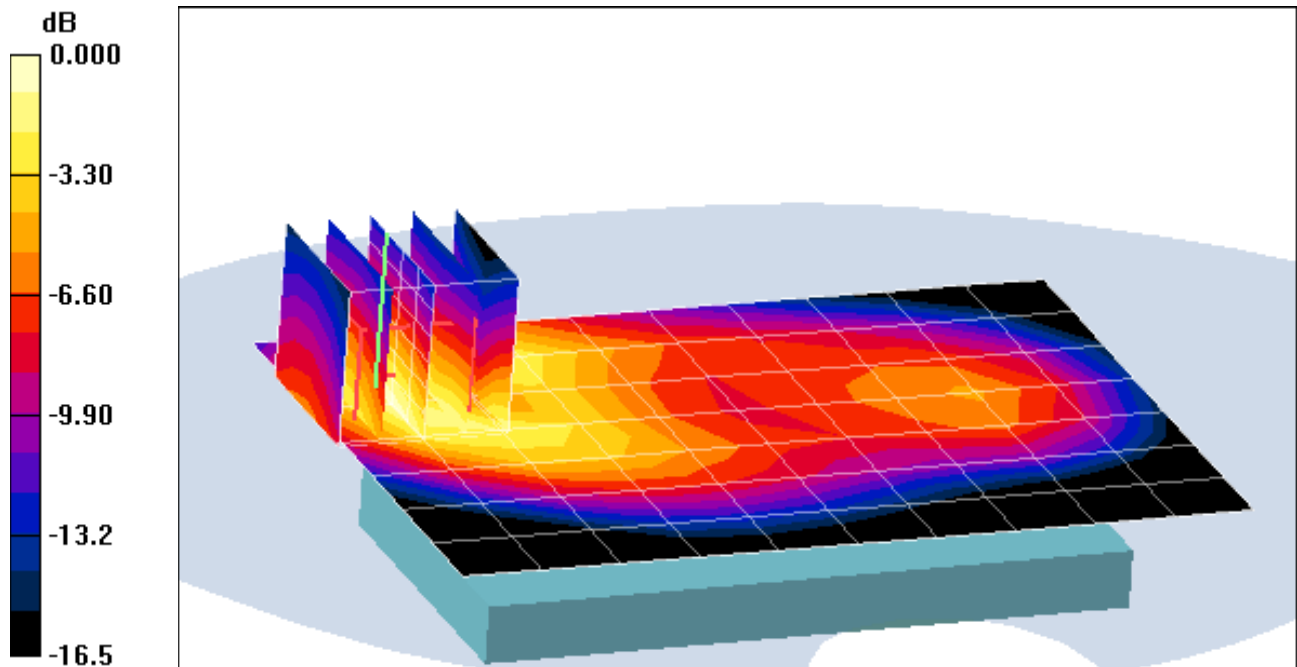
Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 21.9 V/m; Power Drift = 0.030 dB

Peak SAR (extrapolated) = 1.03 W/kg

SAR(1 g) = 0.613 mW/g; SAR(10 g) = 0.345 mW/g



0 dB = 0.690mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC2

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

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.45 \text{ mho/m}$; $\epsilon_r = 51.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-31-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.4°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 4 (AWS), Body SAR, Bottom side, Mid.ch, QPSK
10 MHz Bandwidth 1 RB, 49 RB Offset

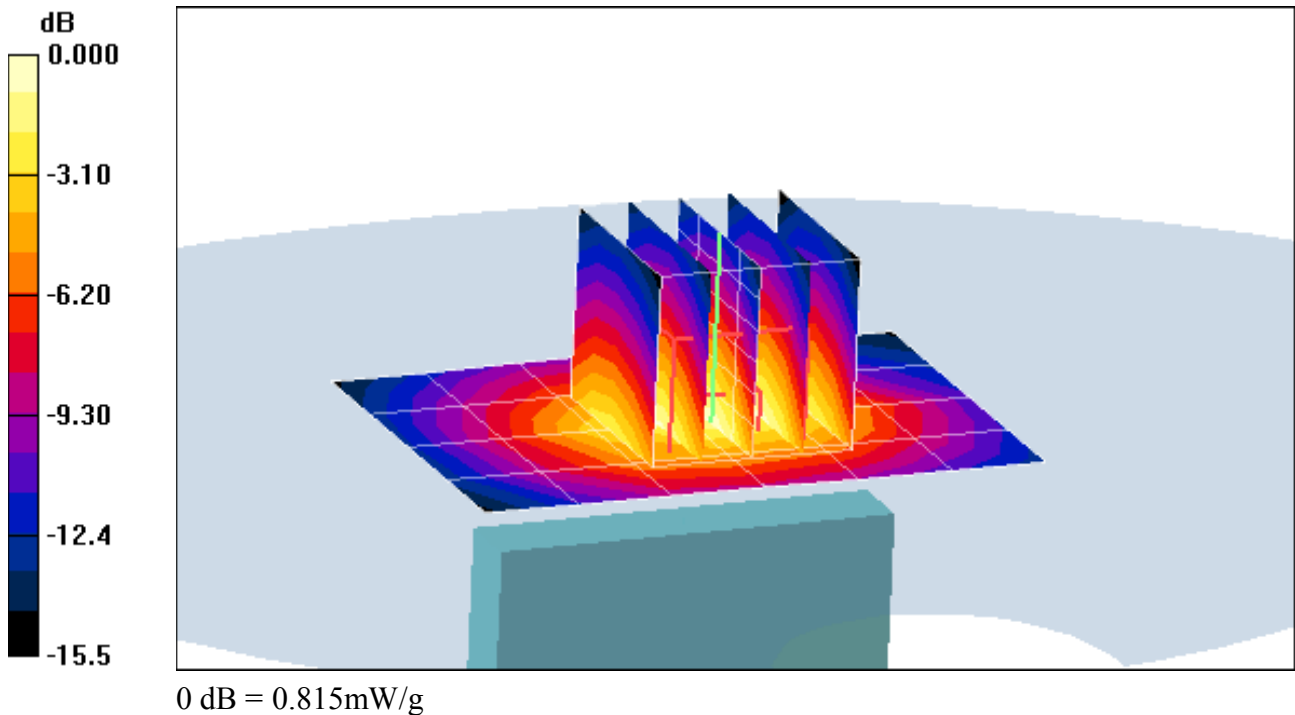
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 23.6 V/m; Power Drift = -0.011 dB

Peak SAR (extrapolated) = 1.19 W/kg

SAR(1 g) = 0.728 mW/g; SAR(10 g) = 0.410 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC2

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

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.45 \text{ mho/m}$; $\epsilon_r = 51.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-31-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.4°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: LTE Band 4 (AWS), Body SAR, Left side, Mid.ch, QPSK
10 MHz Bandwidth 1 RB, 0 RB Offset

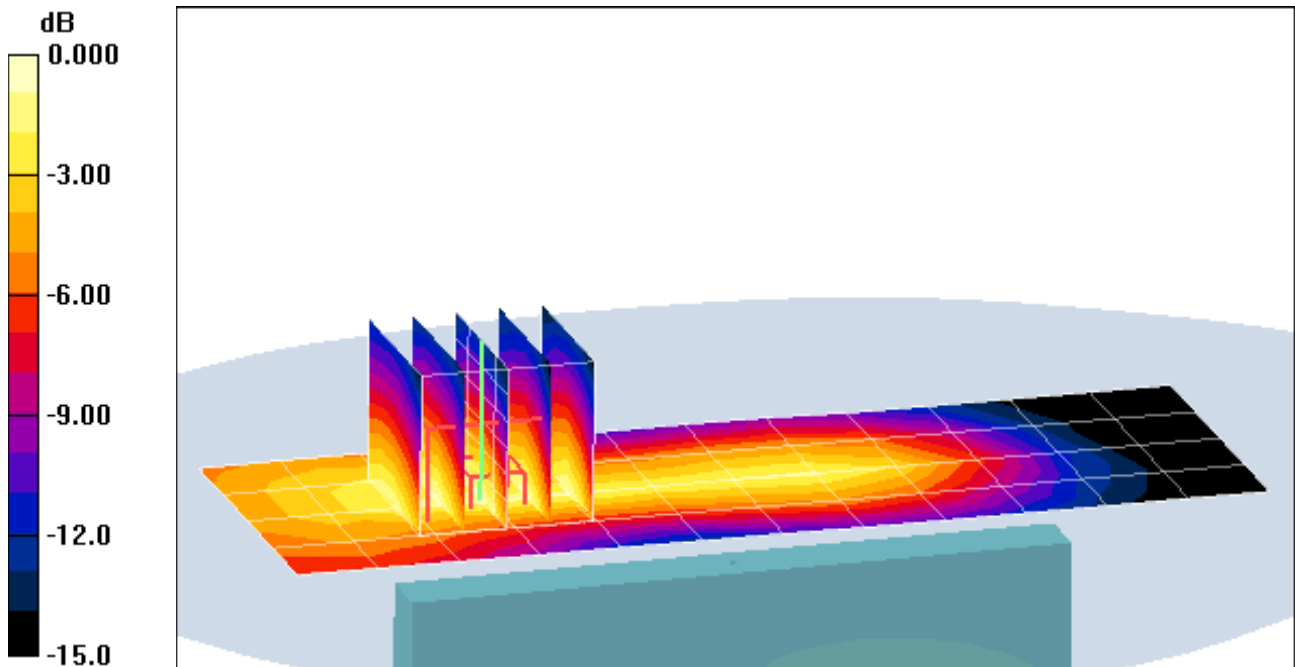
Area Scan (5x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 12.4 V/m; Power Drift = 0.022 dB

Peak SAR (extrapolated) = 0.334 W/kg

SAR(1 g) = 0.201 mW/g; SAR(10 g) = 0.117 mW/g



0 dB = 0.222mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 4

Communication System: GSM1900 GPRS; 2 Tx slots; Frequency: 1909.8 MHz; Duty Cycle: 1:4.15

Medium: 1900 Body Medium parameters used:

$f = 1910 \text{ MHz}$; $\sigma = 1.58 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-07-2011; Ambient Temp: 24.1°C; Tissue Temp: 22.2°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: GPRS 1900, Body SAR, Back side, High.ch, 2 Tx Slots

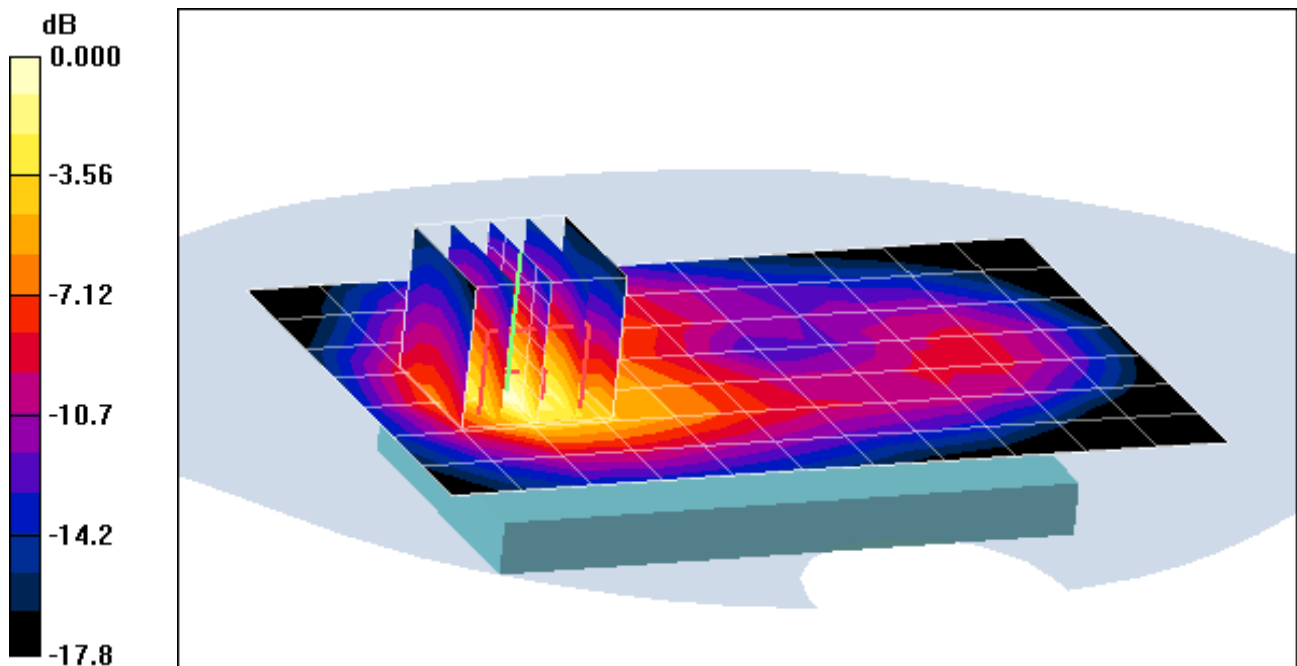
Area Scan (8x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 24.5 V/m; Power Drift = -0.027 dB

Peak SAR (extrapolated) = 1.55 W/kg

SAR(1 g) = 0.893 mW/g; SAR(10 g) = 0.466 mW/g



0 dB = 1.02mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 4

Communication System: GSM1900 GPRS; 2 Tx slots; Frequency: 1909.8 MHz; Duty Cycle: 1:4.15

Medium: 1900 Body Medium parameters used:

$f = 1910 \text{ MHz}$; $\sigma = 1.58 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-07-2011; Ambient Temp: 24.1°C; Tissue Temp: 22.2°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: GPRS 1900, Body SAR, Front side, High.ch, 2 Tx Slots

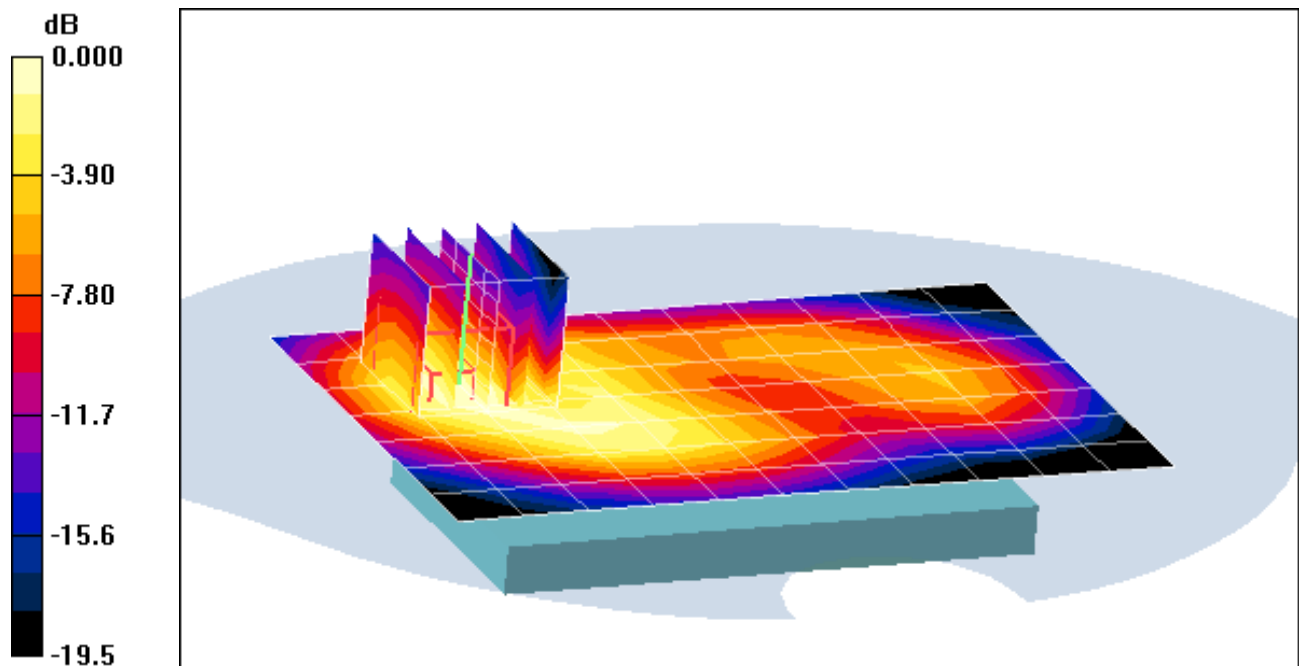
Area Scan (8x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 18.8 V/m; Power Drift = -0.080 dB

Peak SAR (extrapolated) = 0.945 W/kg

SAR(1 g) = 0.524 mW/g; SAR(10 g) = 0.273 mW/g



0 dB = 0.533mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 4

Communication System: GSM1900 GPRS; 2 Tx slots; Frequency: 1909.8 MHz; Duty Cycle: 1:4.15

Medium: 1900 Body Medium parameters used:

$f = 1910 \text{ MHz}$; $\sigma = 1.58 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-07-2011; Ambient Temp: 24.1°C; Tissue Temp: 22.2°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: GPRS 1900, Body SAR, Bottom Edge, High.ch, 2 Tx Slots

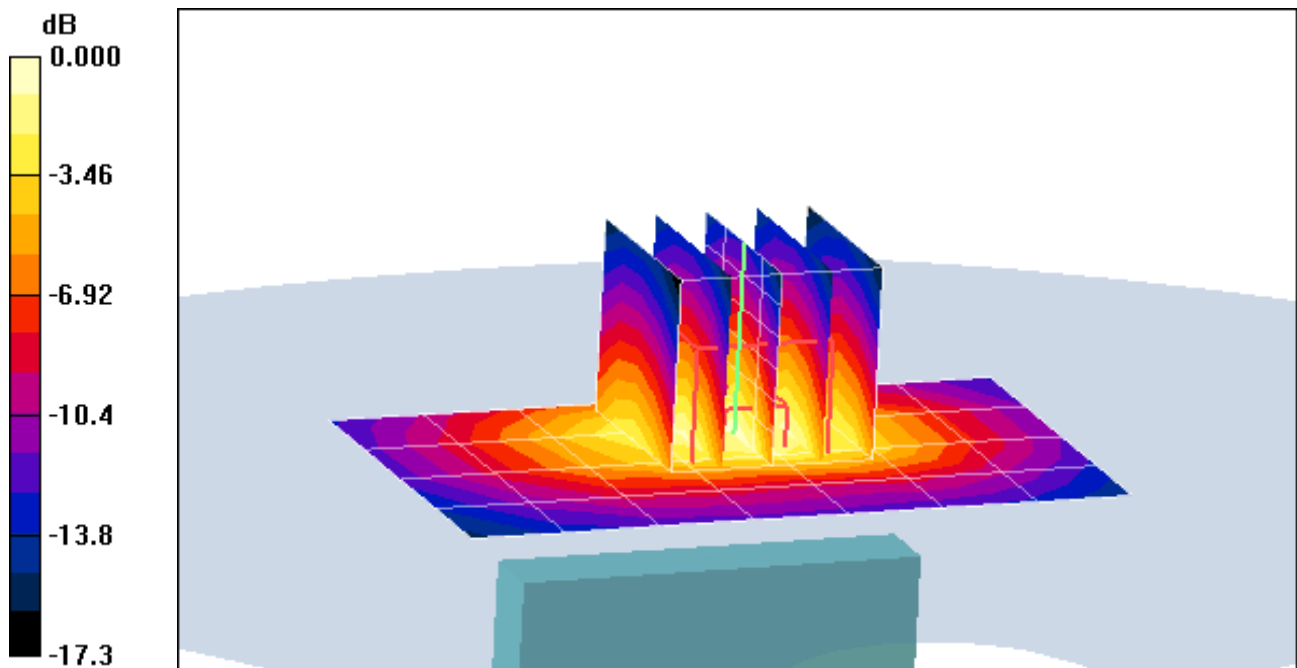
Area Scan (5x8x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 21.1 V/m; Power Drift = -0.196 dB

Peak SAR (extrapolated) = 1.26 W/kg

SAR(1 g) = 0.735 mW/g; SAR(10 g) = 0.396 mW/g



0 dB = 0.825mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 4

Communication System: GSM1900 GPRS; 2 Tx slots; Frequency: 1909.8 MHz; Duty Cycle: 1:4.15

Medium: 1900 Body Medium parameters used:

$f = 1910 \text{ MHz}$; $\sigma = 1.58 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-07-2011; Ambient Temp: 24.1°C; Tissue Temp: 22.2°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: GPRS 1900, Body SAR, Left Edge, High.ch, 2 Tx Slots

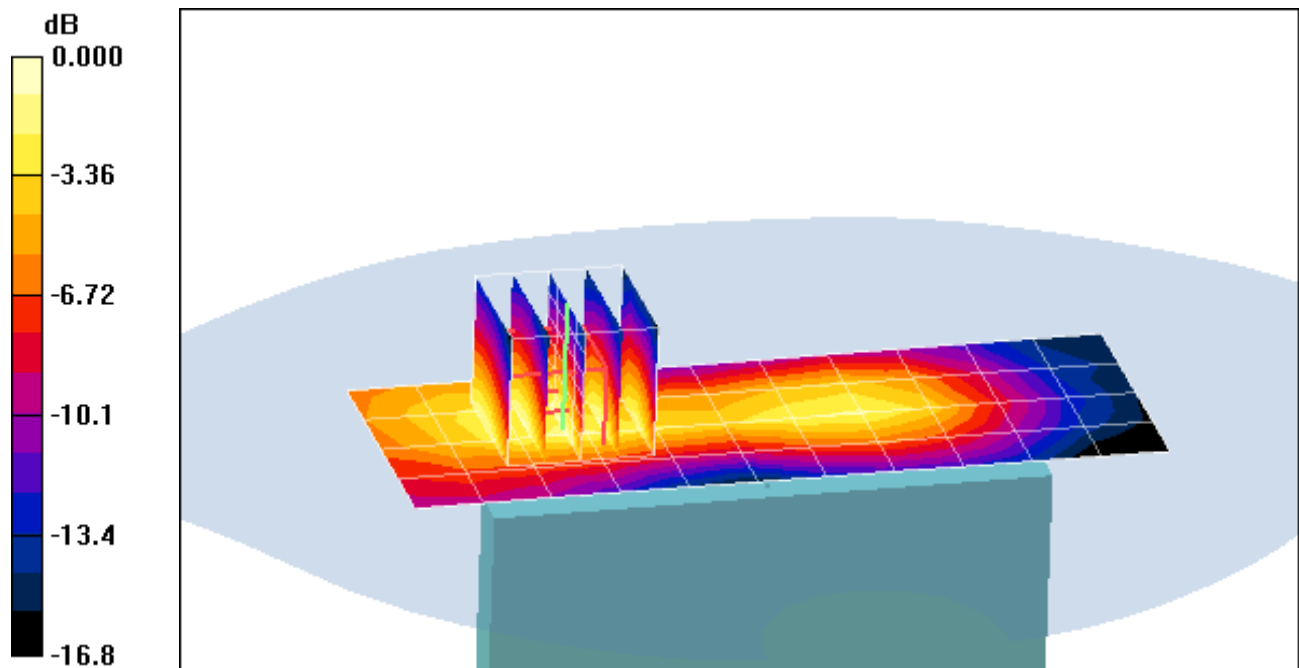
Area Scan (5x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 11.8 V/m; Power Drift = 0.091 dB

Peak SAR (extrapolated) = 0.359 W/kg

SAR(1 g) = 0.212 mW/g; SAR(10 g) = 0.122 mW/g



0 dB = 0.234mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 5

Communication System: WCDMA1900; Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1907.6 \text{ MHz}$; $\sigma = 1.58 \text{ mho/m}$; $\epsilon_r = 51.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-07-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.2°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: WCDMA 1900, Body SAR, Back side, High.ch

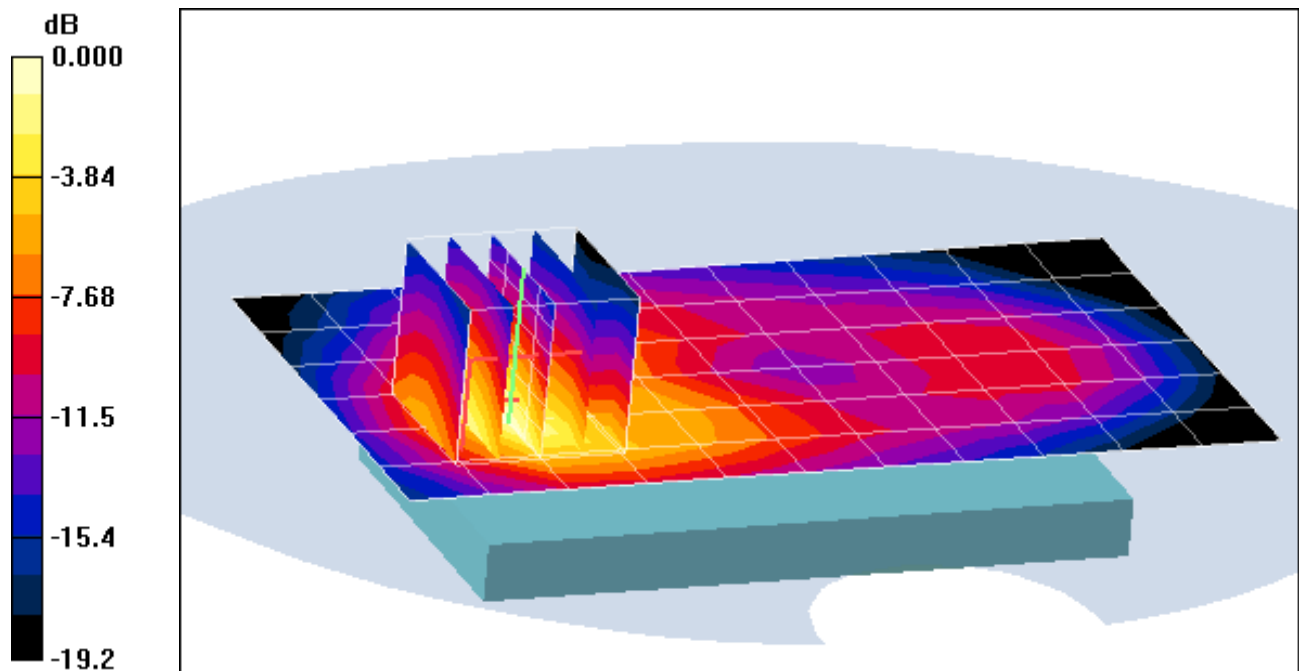
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 26.6 V/m; Power Drift = 0.062 dB

Peak SAR (extrapolated) = 1.76 W/kg

SAR(1 g) = 0.989 mW/g; SAR(10 g) = 0.502 mW/g



0 dB = 1.12mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 5

Communication System: WCDMA1900; Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1907.6 \text{ MHz}$; $\sigma = 1.58 \text{ mho/m}$; $\epsilon_r = 51.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-07-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.2°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: WCDMA 1900, Body SAR, Front side, High.ch

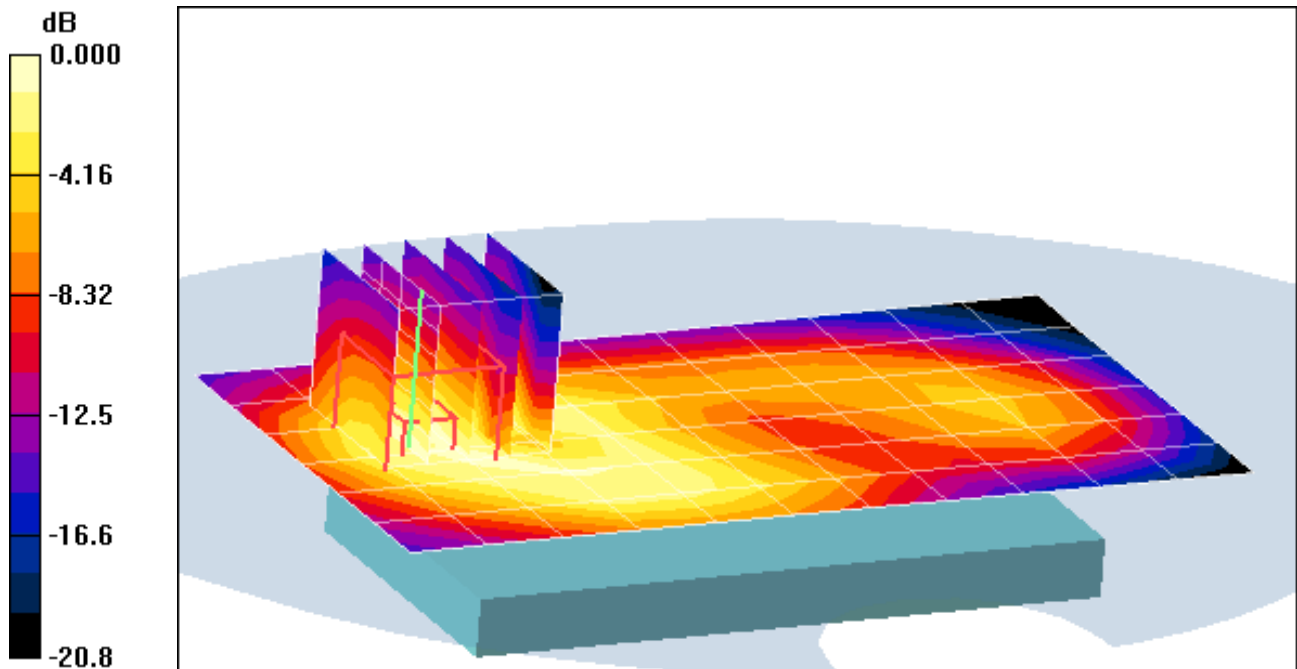
Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 17.3 V/m; Power Drift = -0.060 dB

Peak SAR (extrapolated) = 0.869 W/kg

SAR(1 g) = 0.483 mW/g; SAR(10 g) = 0.254 mW/g



0 dB = 0.523mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 5

Communication System: WCDMA1900; Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1907.6 \text{ MHz}$; $\sigma = 1.58 \text{ mho/m}$; $\epsilon_r = 51.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-07-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.2°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: WCDMA 1900, Body SAR, Bottom Edge, High.ch

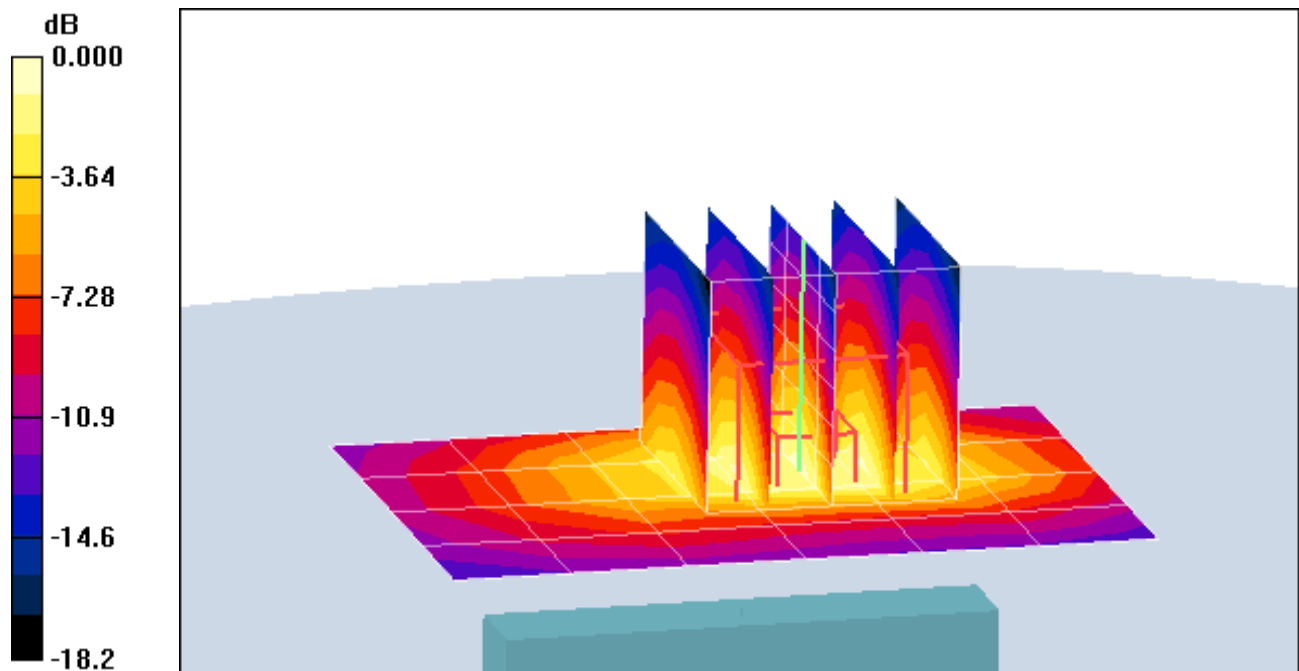
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 18.4 V/m; Power Drift = 0.172 dB

Peak SAR (extrapolated) = 1.13 W/kg

SAR(1 g) = 0.653 mW/g; SAR(10 g) = 0.347 mW/g



0 dB = 0.743mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 5

Communication System: WCDMA1900; Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1907.6 \text{ MHz}$; $\sigma = 1.58 \text{ mho/m}$; $\epsilon_r = 51.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-07-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.2°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: WCDMA 1900, Body SAR, Left Edge, High.ch

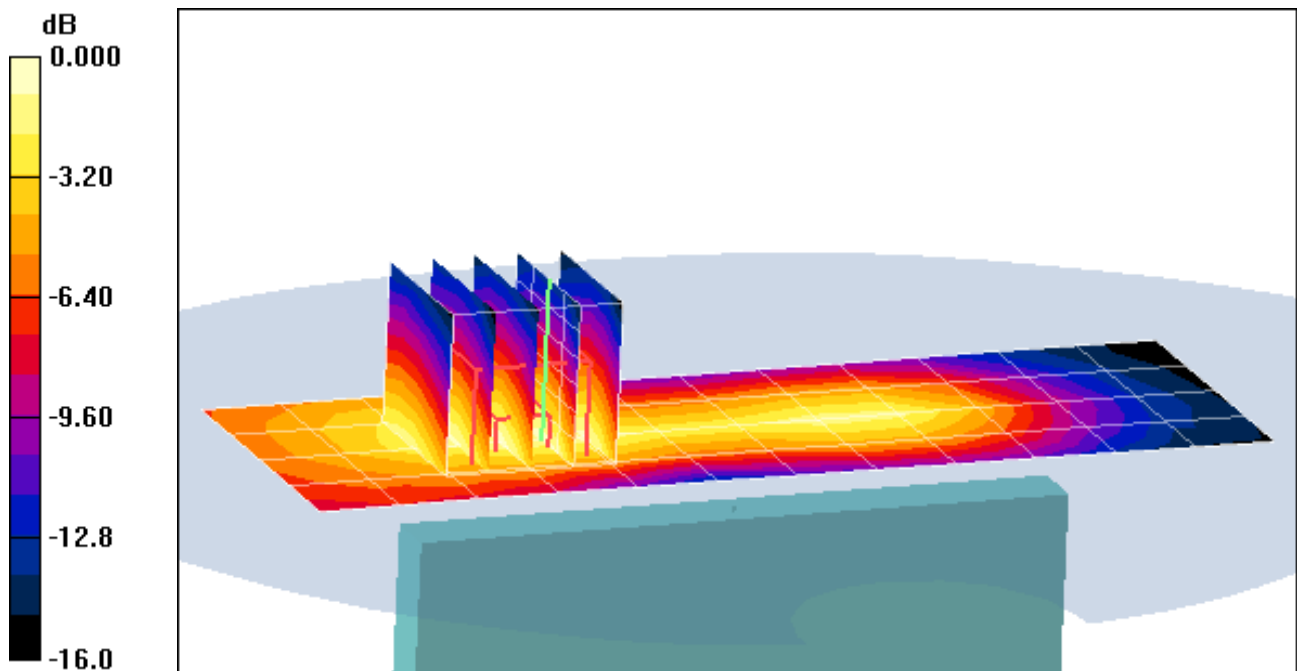
Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 12.2 V/m; Power Drift = 0.028 dB

Peak SAR (extrapolated) = 0.377 W/kg

SAR(1 g) = 0.218 mW/g; SAR(10 g) = 0.126 mW/g



0 dB = 0.238mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 6

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

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 2.05 \text{ mho/m}$; $\epsilon_r = 50.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-02-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3561; ConvF(6.26, 6.26, 6.26); Calibrated: 7/27/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

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

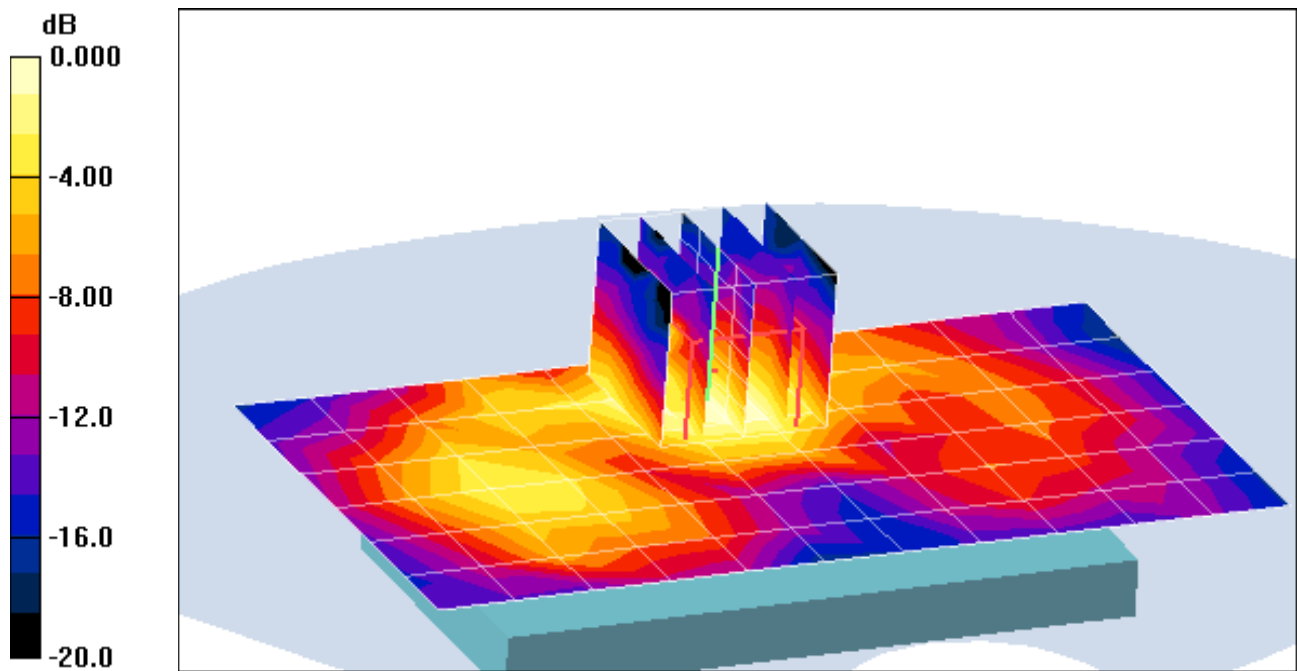
Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 6.32 V/m; Power Drift = 0.007 dB

Peak SAR (extrapolated) = 0.203 W/kg

SAR(1 g) = 0.083 mW/g; SAR(10 g) = 0.042 mW/g



0 dB = 0.104mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 6

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

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 2.05 \text{ mho/m}$; $\epsilon_r = 50.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-12-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3561; ConvF(6.26, 6.26, 6.26); Calibrated: 7/27/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

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

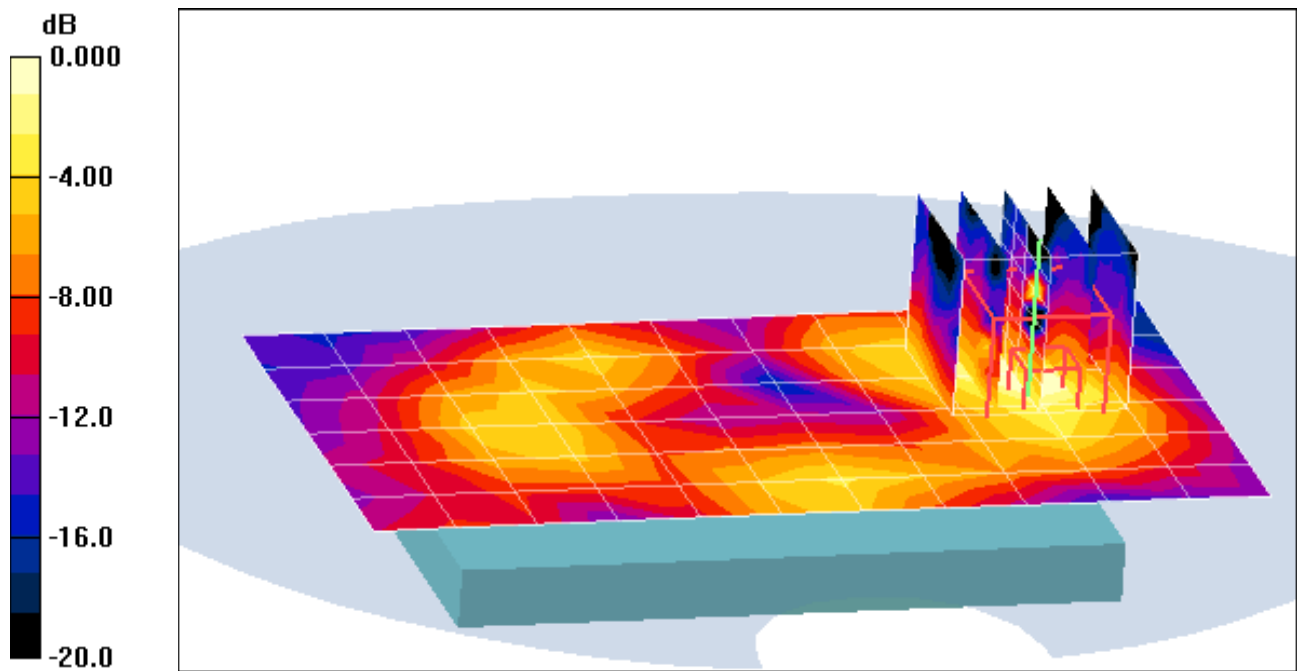
Area Scan (7x12x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 4.33 V/m; Power Drift = -0.188 dB

Peak SAR (extrapolated) = 0.233 W/kg

SAR(1 g) = 0.044 mW/g; SAR(10 g) = 0.014 mW/g



0 dB = 0.096mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSGHI667; Type: Portable Handset; Serial: FCC 6

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

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 2.05 \text{ mho/m}$; $\epsilon_r = 50.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-02-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3561; ConvF(6.26, 6.26, 6.26); Calibrated: 7/27/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

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

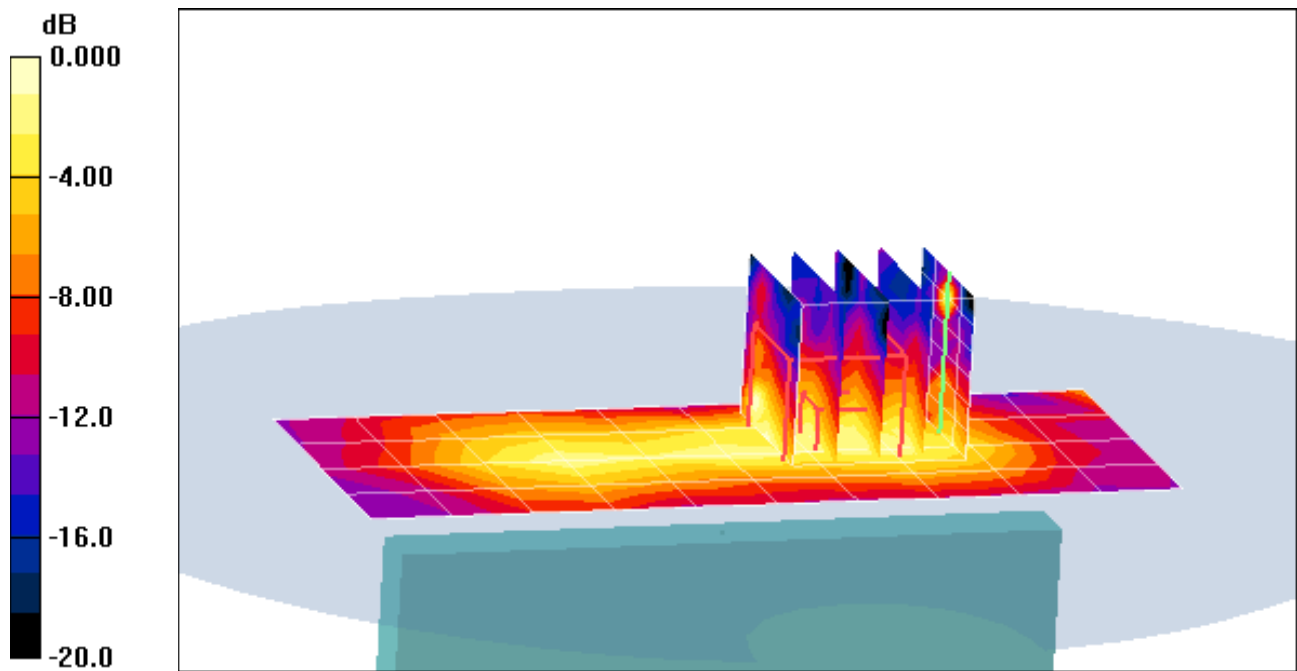
Area Scan (5x11x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 4.81 V/m; Power Drift = 0.045 dB

Peak SAR (extrapolated) = 0.177 W/kg

SAR(1 g) = 0.045 mW/g; SAR(10 g) = 0.017 mW/g



0 dB = 0.076mW/g

APPENDIX B: DIPOLE VALIDATION

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1046

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

Medium: 740 Head Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.912 \text{ mho/m}$; $\epsilon_r = 43.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-01-2012; Ambient Temp: 23.7° C Tissue Temp: 22.1° C

Probe: ES3DV3 - SN3258; ConvF(6.41, 6.41, 6.41); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

750MHz System Verification

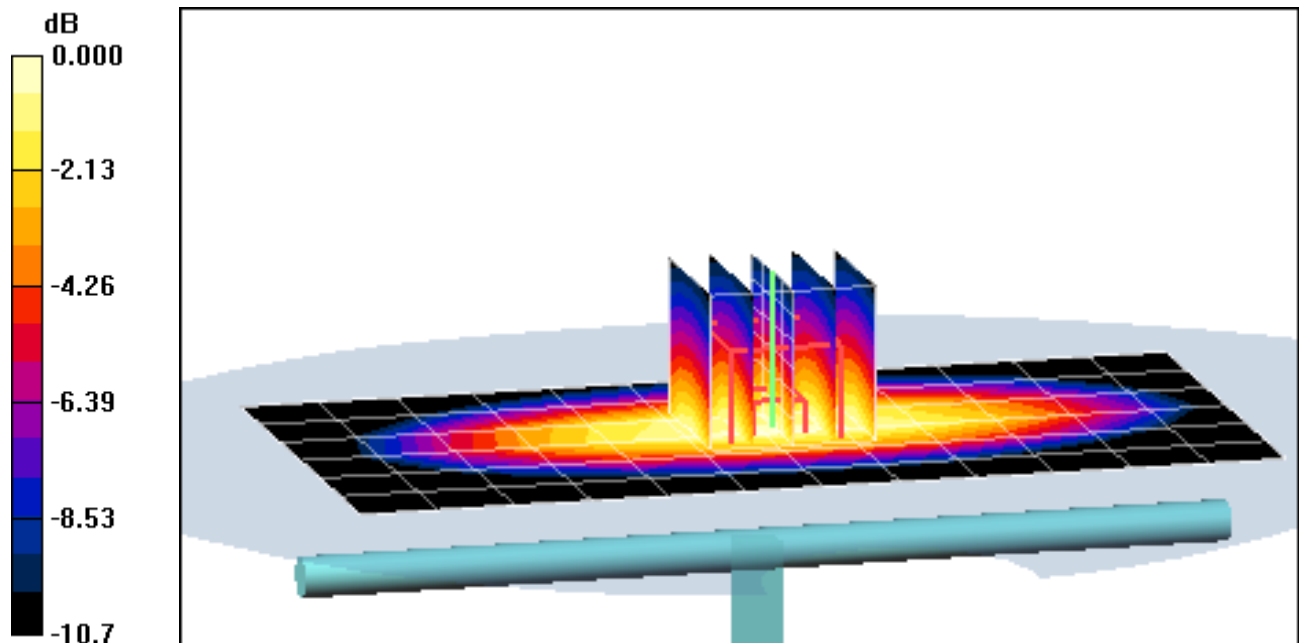
Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 0.810 mW/g; SAR(10 g) = 0.526 mW/g

Deviation = -3.57 %



0 dB = 0.875mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1046

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

Medium: 740 Head Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.912 \text{ mho/m}$; $\epsilon_r = 43.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-01-2012; Ambient Temp: 23.7° C; Tissue Temp: 22.1° C

Probe: ES3DV3 - SN3258; ConvF(6.41, 6.41, 6.41); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

750MHz System Verification

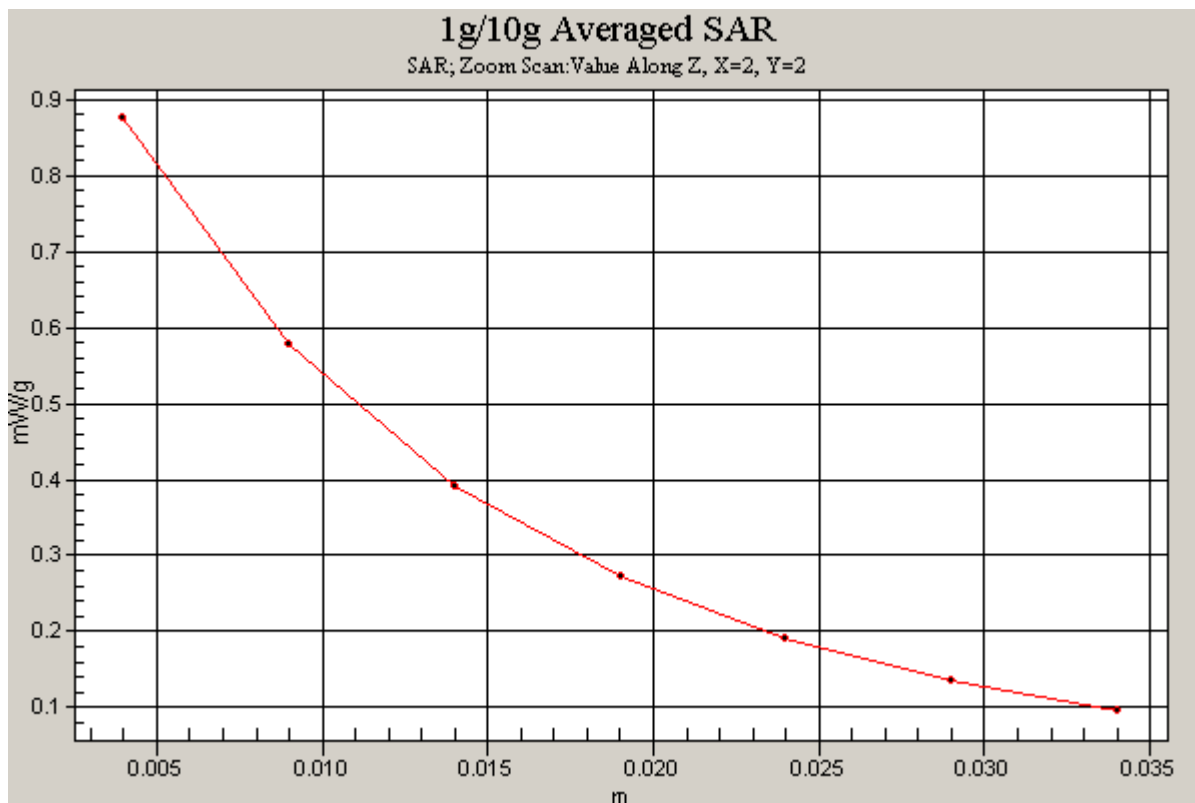
Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 0.810 mW/g; SAR(10 g) = 0.526 mW/g

Deviation = -3.57 %



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:

$f = 835 \text{ MHz}$; $\sigma = 0.89 \text{ mho/m}$; $\epsilon_r = 43.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-31-2012; Ambient Temp: 24.9° C; Tissue Temp: 23.6°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

835MHz System Verification

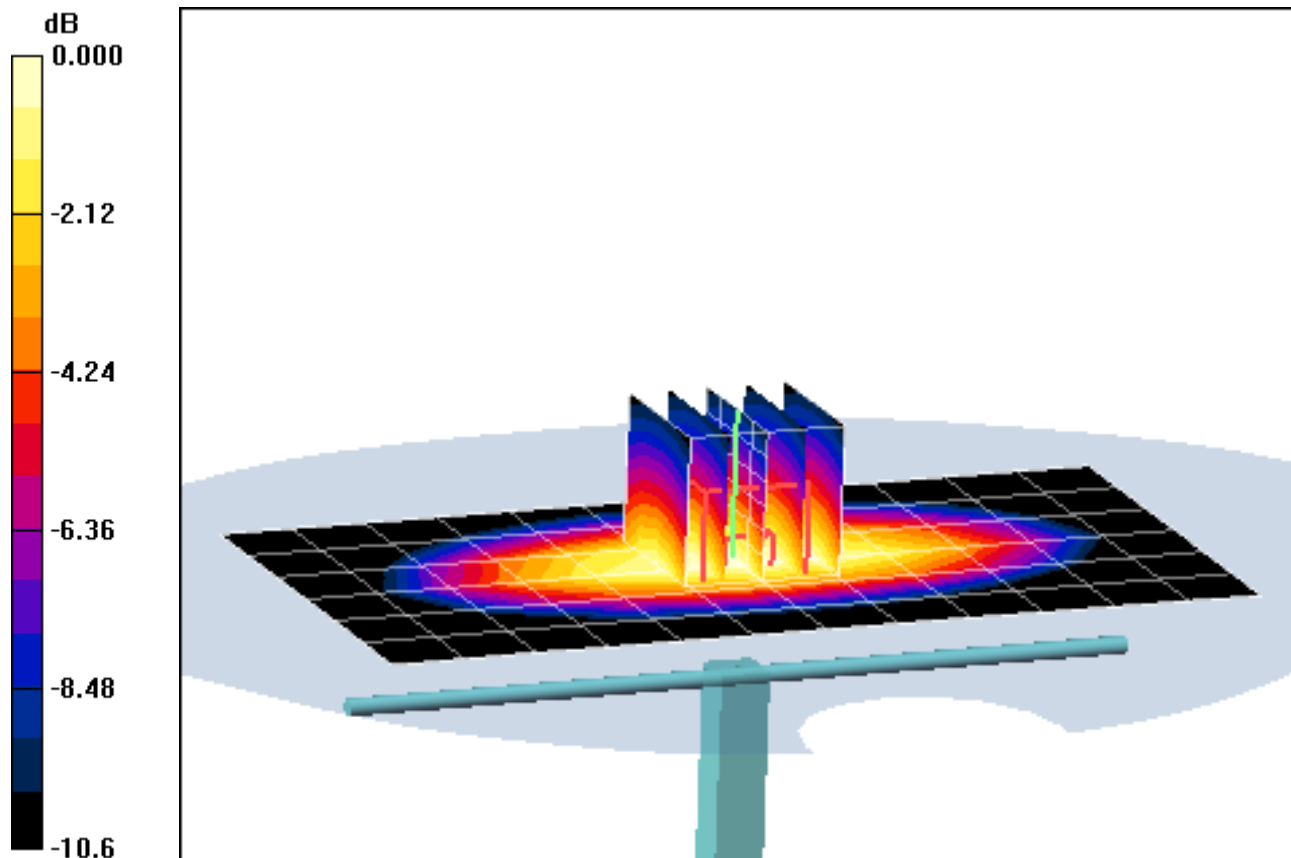
Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 0.959 mW/g; SAR(10 g) = 0.625 mW/g

Deviation = 1.37 %



0 dB = 1.03mW/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:

$f = 835 \text{ MHz}$; $\sigma = 0.89 \text{ mho/m}$; $\epsilon_r = 43.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-31-2012; Ambient Temp: 24.9° C; Tissue Temp: 23.6°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

835MHz System Verification

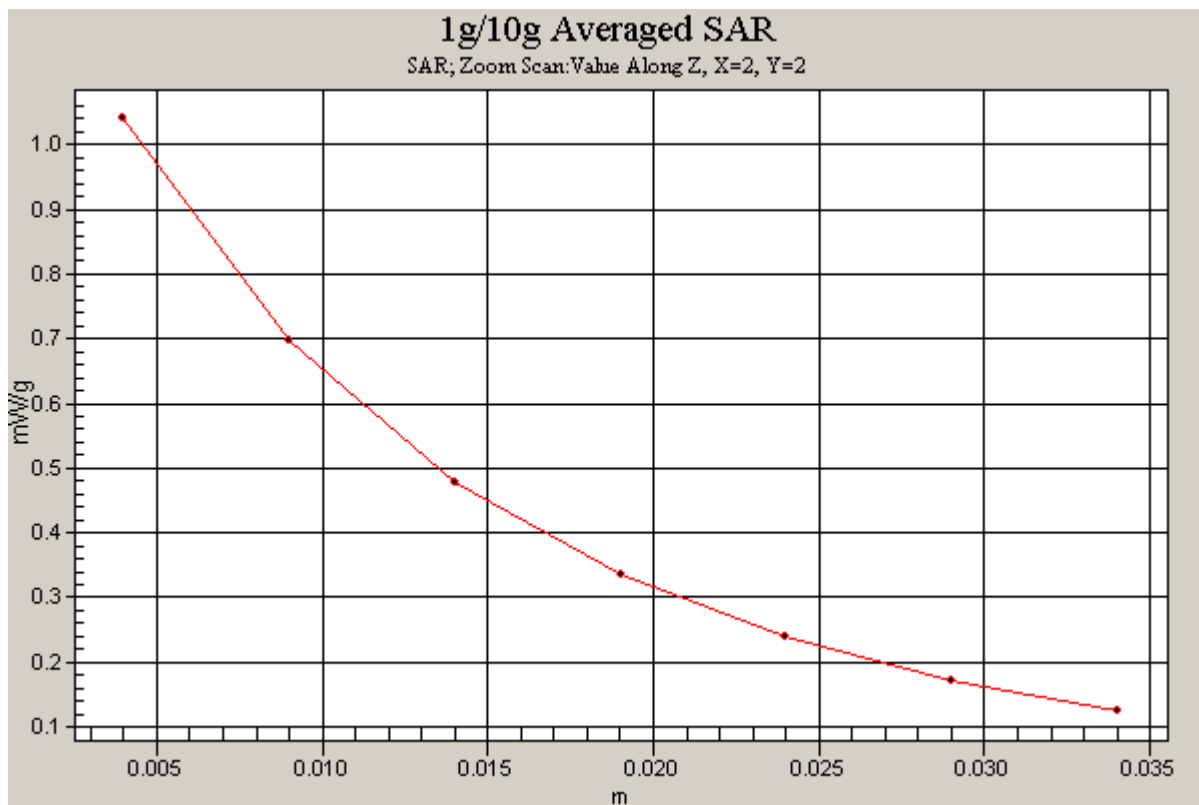
Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 0.959 mW/g; SAR(10 g) = 0.625 mW/g

Deviation = 1.37 %



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.874 \text{ mho/m}$; $\epsilon_r = 41.11$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-01-2012; Ambient Temp: 24.7°C; Tissue Temp: 23.8°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

835MHz System Verification

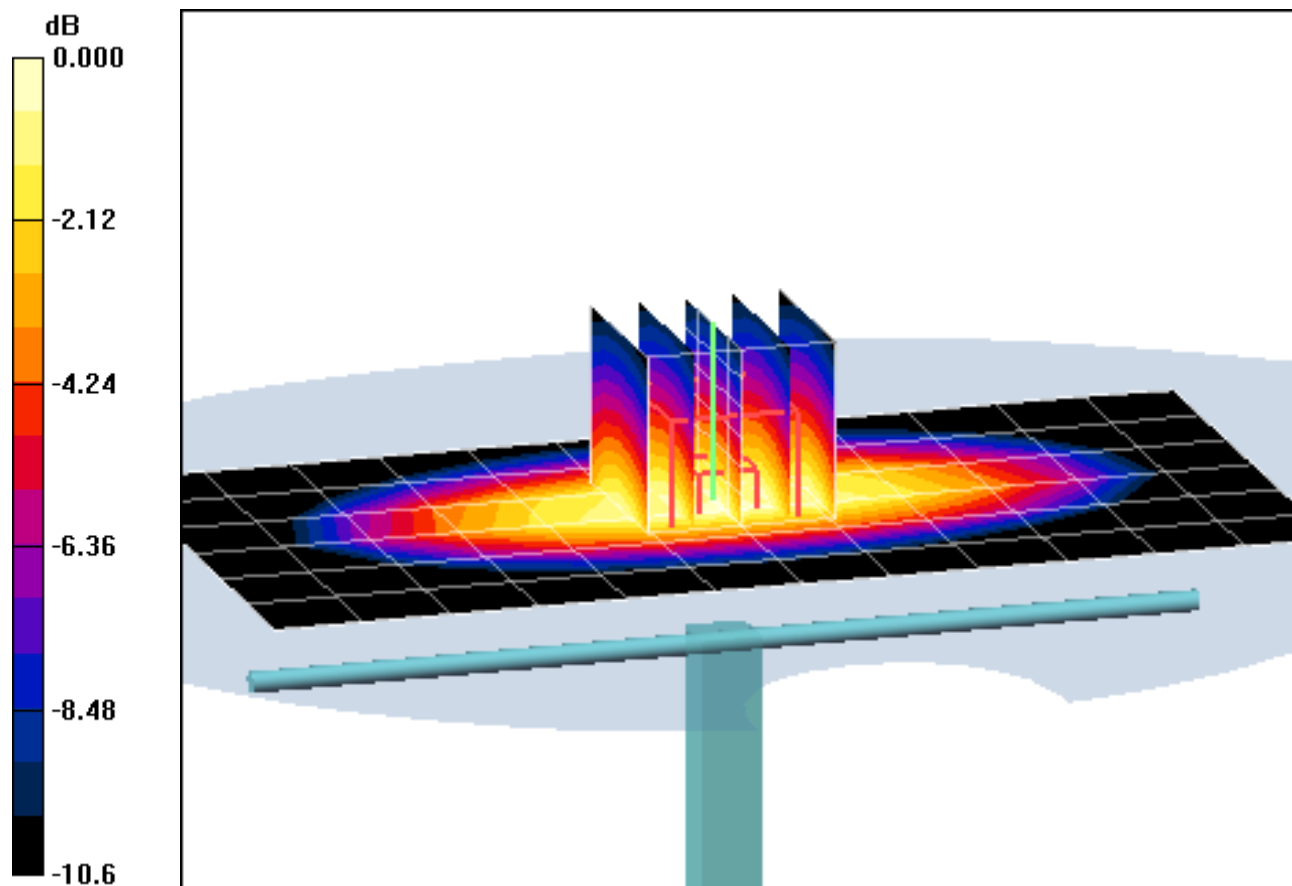
Area Scan (7x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 20.0 dBm (100mW)

SAR(1 g) = 0.997 mW/g; SAR(10 g) = 0.650 mW/g

Deviation = 5.39 %



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:

$f = 835 \text{ MHz}$; $\sigma = 0.874 \text{ mho/m}$; $\epsilon_r = 41.11$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-01-2012; Ambient Temp: 24.7°C; Tissue Temp: 23.8°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

835MHz System Verification

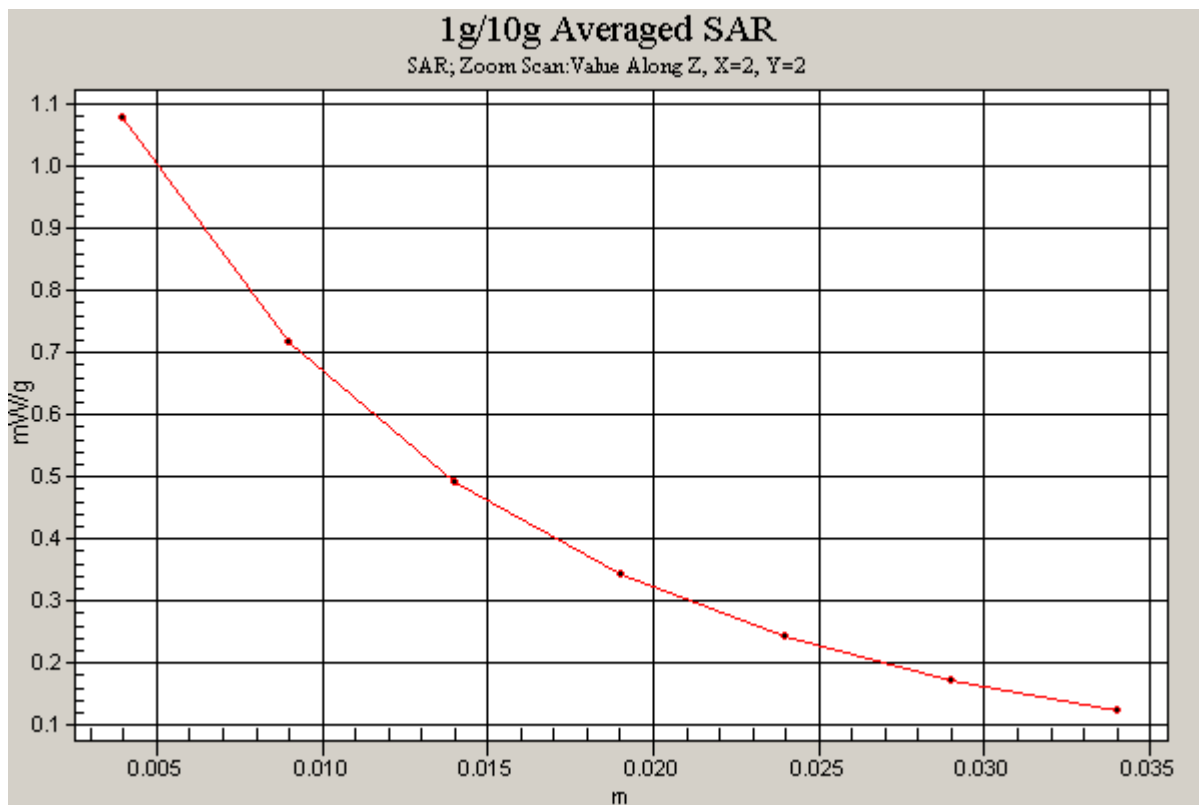
Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100mW)

SAR(1 g) = 0.997 mW/g; SAR(10 g) = 0.650 mW/g

Deviation = 5.39 %



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:

$f = 1750 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 38.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2012; Ambient Temp: 23.9 °C; Tissue Temp: 22.5 °C

Probe: ES3DV3 - SN3258; ConvF(5.32, 5.32, 5.32); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

1750 MHz System Verification

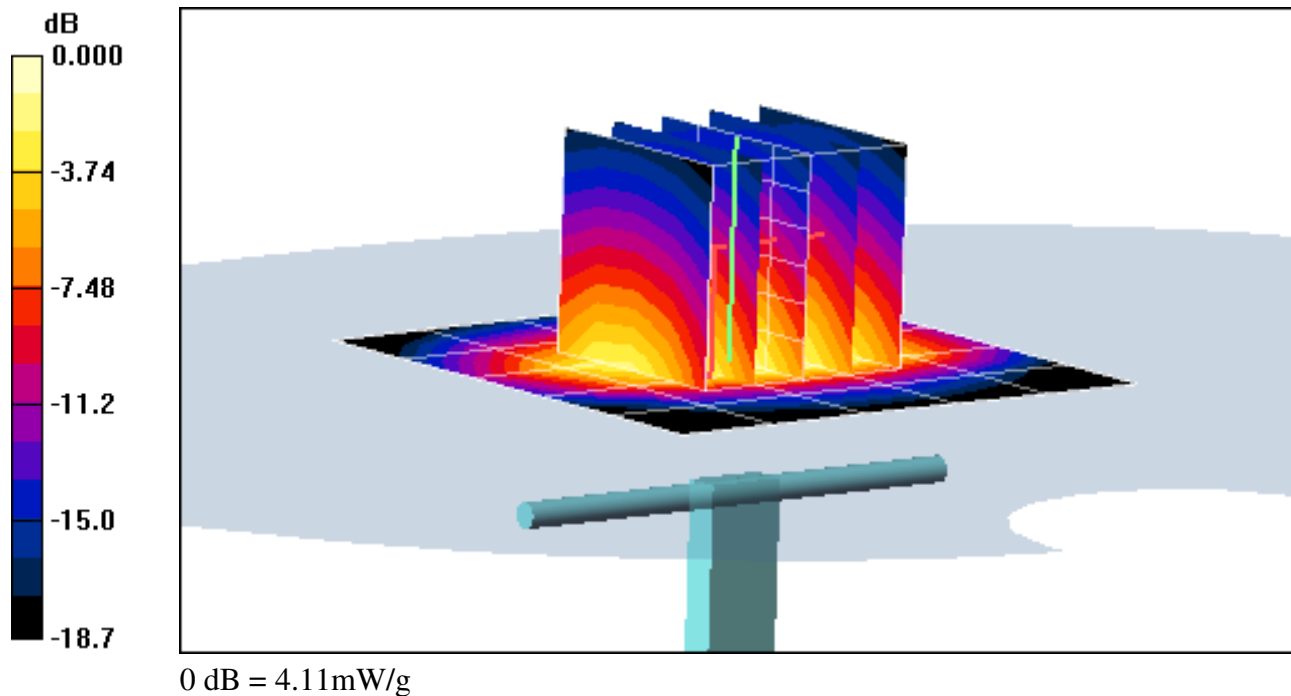
Area Scan (6x6x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 3.72 mW/g; SAR(10 g) = 1.88 mW/g

Deviation = 0.54 %



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1051

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.39 \text{ mho/m}$; $\epsilon_r = 38.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2012; Ambient Temp: 23.9 °C; Tissue Temp: 22.5 °C

Probe: ES3DV3 - SN3258; ConvF(5.32, 5.32, 5.32); Calibrated: 4/8/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

1750 MHz System Verification

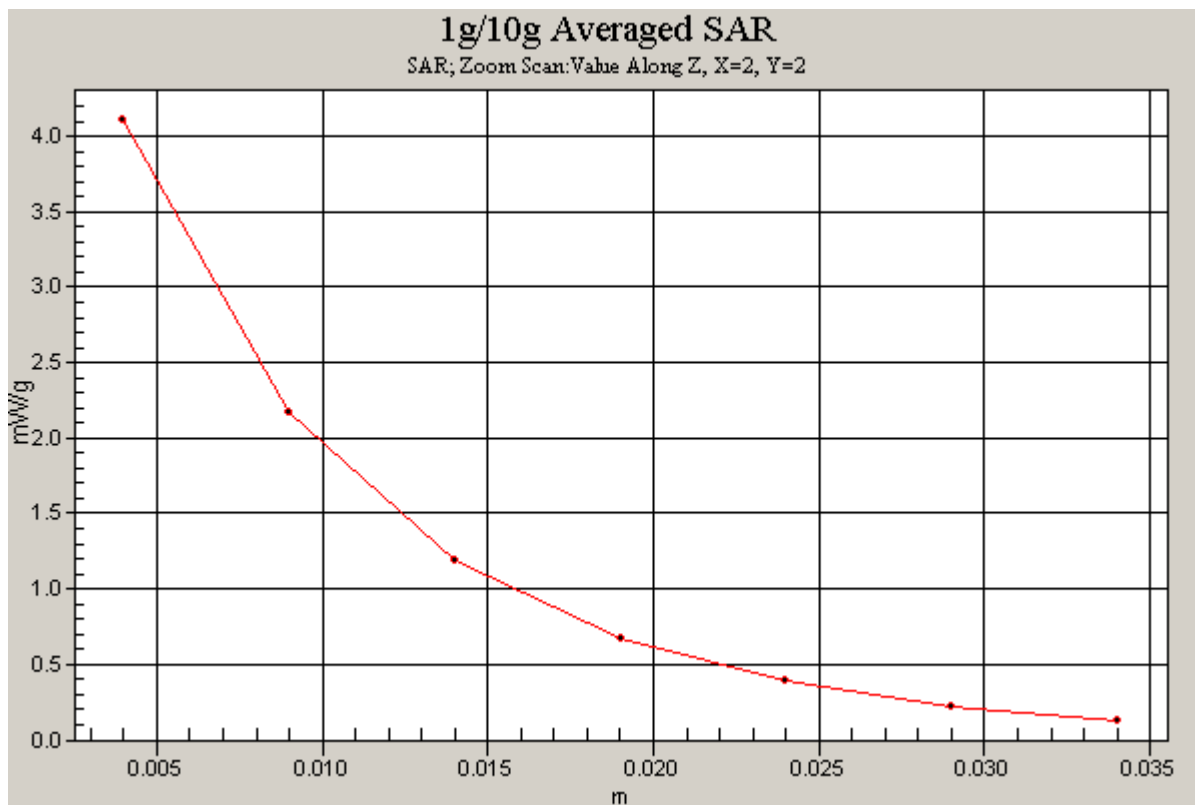
Area Scan (6x6x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 20.0 dBm (100 mW)

SAR(1 g) = 3.72 mW/g; SAR(10 g) = 1.88 mW/g

Deviation = 0.54 %



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 40.34$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-04-2012; Ambient Temp: 23.0° C; Tissue Temp: 21.3°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

1900MHz System Verification

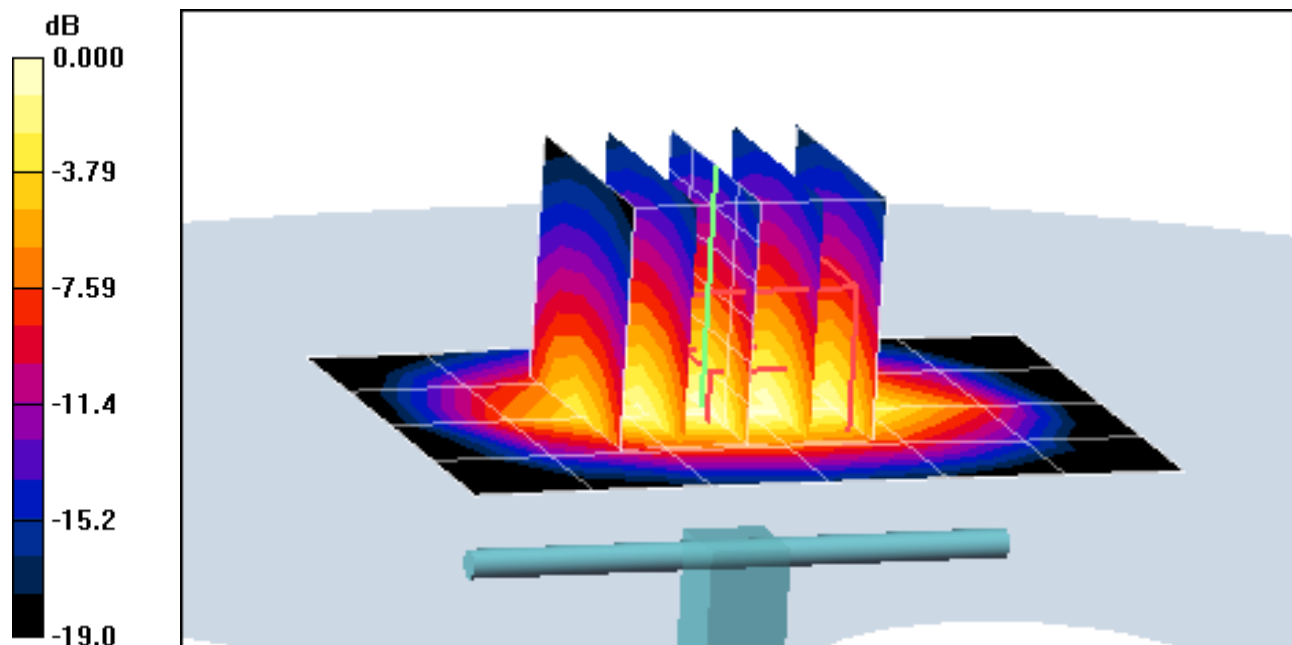
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 16.0 dBm (40 mW)

SAR(1 g) = 1.57 mW/g; SAR(10 g) = 0.796 mW/g

Deviation = -1.63 %



0 dB = 1.72mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 40.34$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-04-2012; Ambient Temp: 23.0° C; Tissue Temp: 21.3°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

1900MHz System Verification

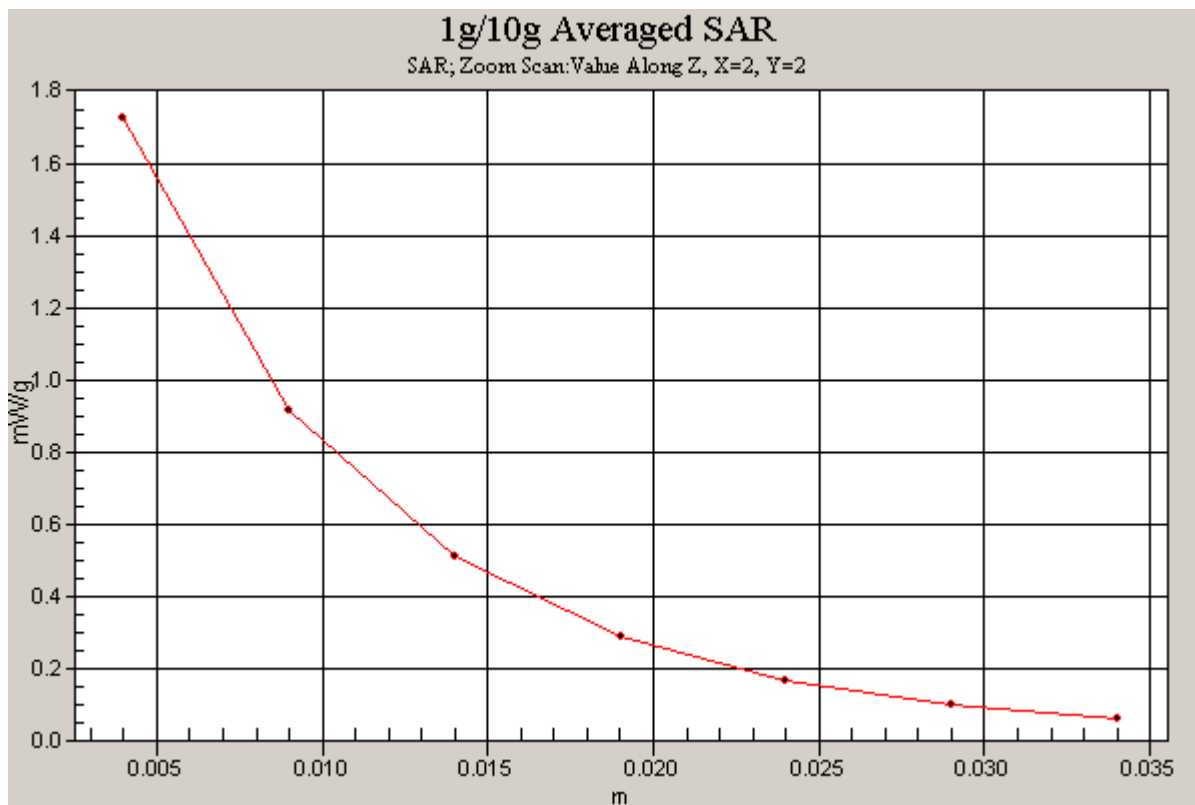
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 16.0 dBm (40 mW)

SAR(1 g) = 1.57 mW/g; SAR(10 g) = 0.796 mW/g

Deviation = -1.63 %



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:

$f = 2450 \text{ MHz}$; $\sigma = 1.79 \text{ mho/m}$; $\epsilon_r = 38.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

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

Probe: ES3DV3 - SN3258; ConvF(4.5, 4.5, 4.5); Calibrated: 4/8/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

2450MHz System Verification

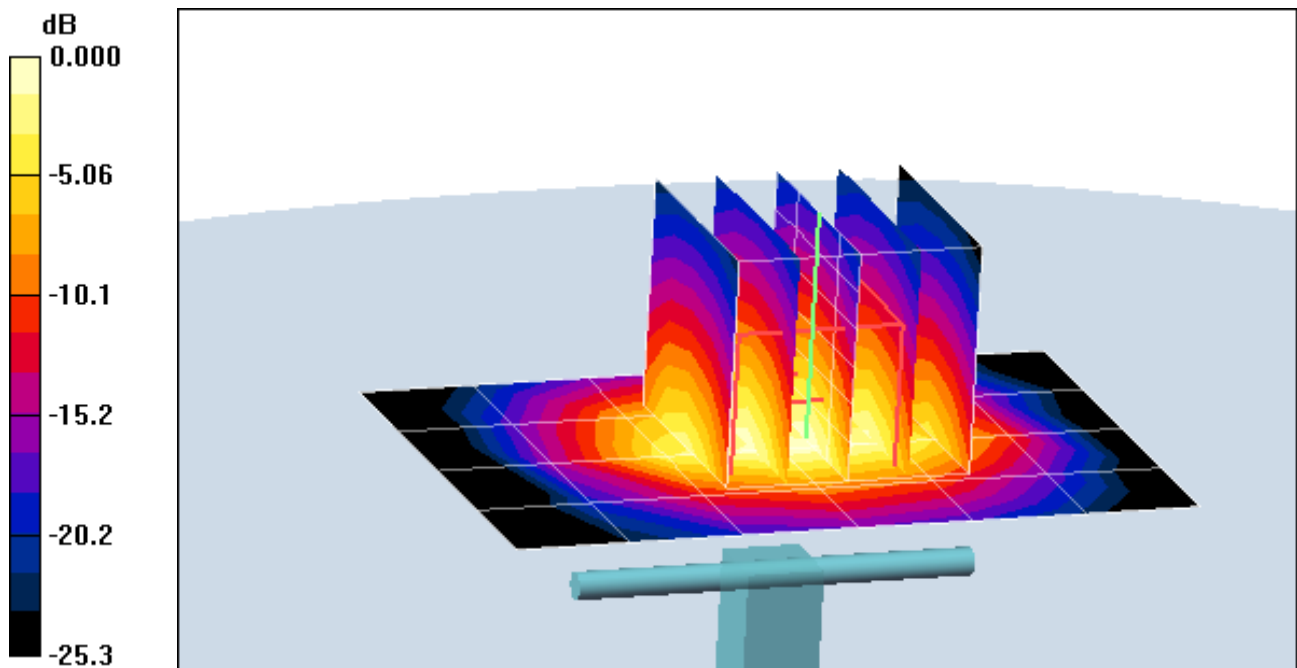
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 16.0 dBm (40 mW)

SAR(1 g) = 2.05 mW/g; SAR(10 g) = 0.926 mW/g

Deviation = -4.74 %



0 dB = 2.70mW/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:

$f = 2450 \text{ MHz}$; $\sigma = 1.79 \text{ mho/m}$; $\epsilon_r = 38.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

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

Probe: ES3DV3 - SN3258; ConvF(4.5, 4.5, 4.5); Calibrated: 4/8/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

2450MHz System Verification

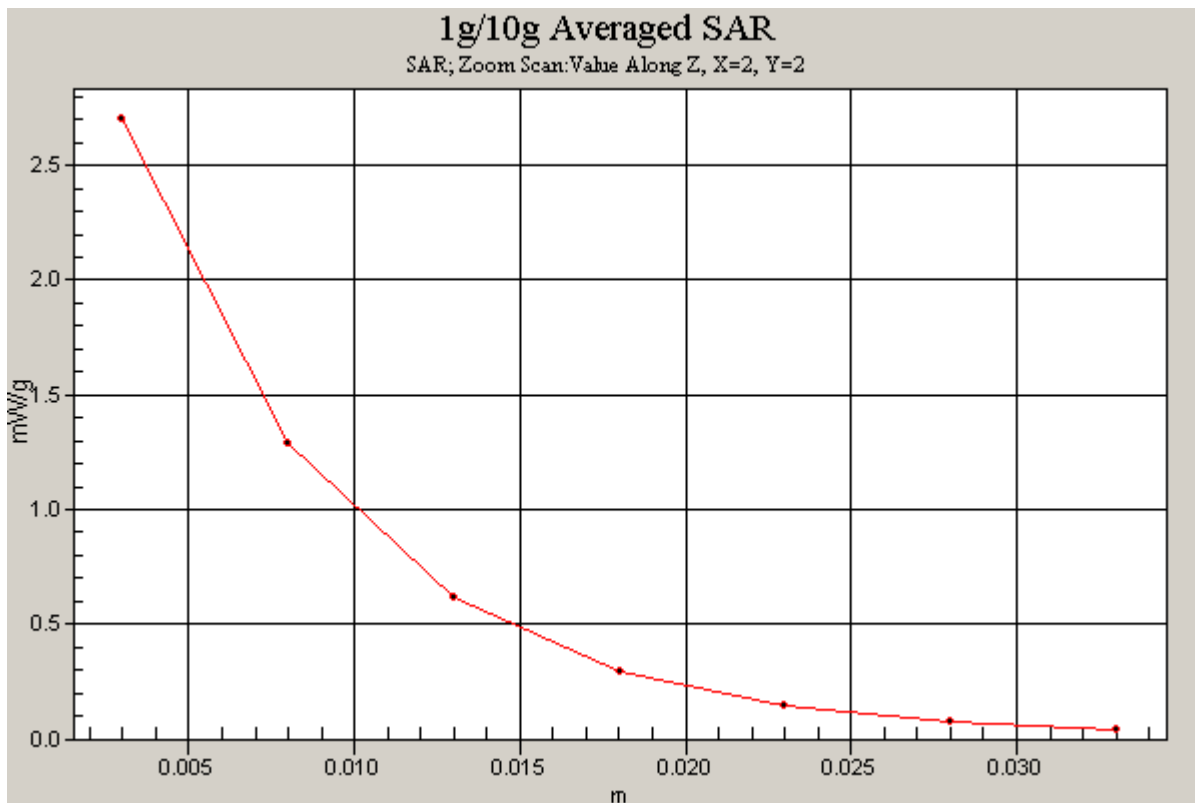
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 16.0 dBm (40 mW)

SAR(1 g) = 2.05 mW/g; SAR(10 g) = 0.926 mW/g

Deviation = -4.74 %



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1046

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

Medium: 740 Body; Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.968 \text{ mho/m}$; $\epsilon_r = 56.277$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-26-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.7°C

Probe: ES3DV2 - SN3022; ConvF(6.11, 6.11, 6.11); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 9/16/2011

Phantom: SAM v5.0 front; Type: SAM v5.0; Serial: TP-1646

Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

750 MHz System Verification

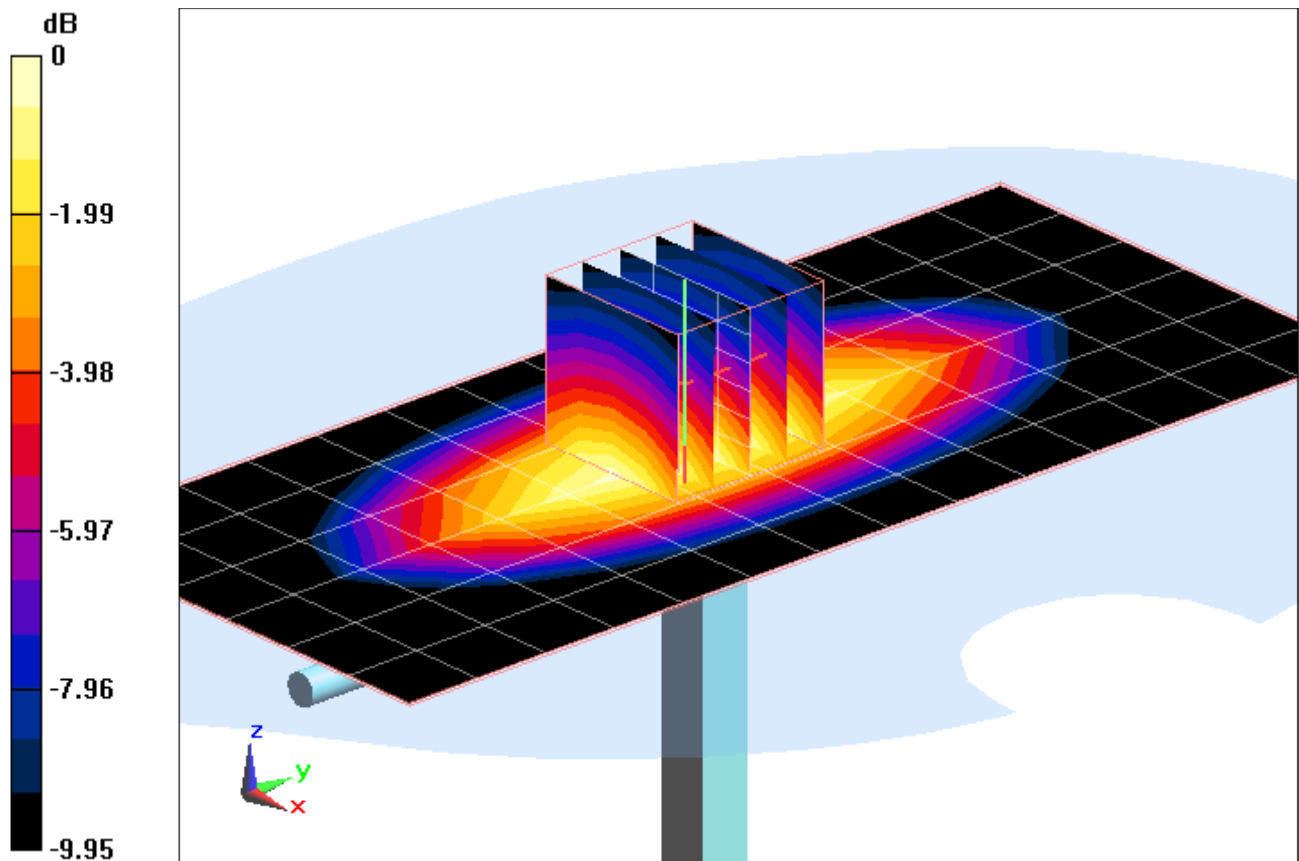
Area Scan (7x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 24 dB (250 mW)

SAR(1 g) = 2.11 mW/g; SAR(10 g) = 1.4 mW/g

Deviation = -4.09%



0 dB = 2.290mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1046

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

Medium: 740 Body; Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.968 \text{ mho/m}$; $\epsilon_r = 56.277$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-26-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.7°C

Probe: ES3DV2 - SN3022; ConvF(6.11, 6.11, 6.11); Calibrated: 8/25/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 9/16/2011

Phantom: SAM v5.0 front; Type: SAM v5.0; Serial: TP-1646

Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

750 MHz System Verification

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm

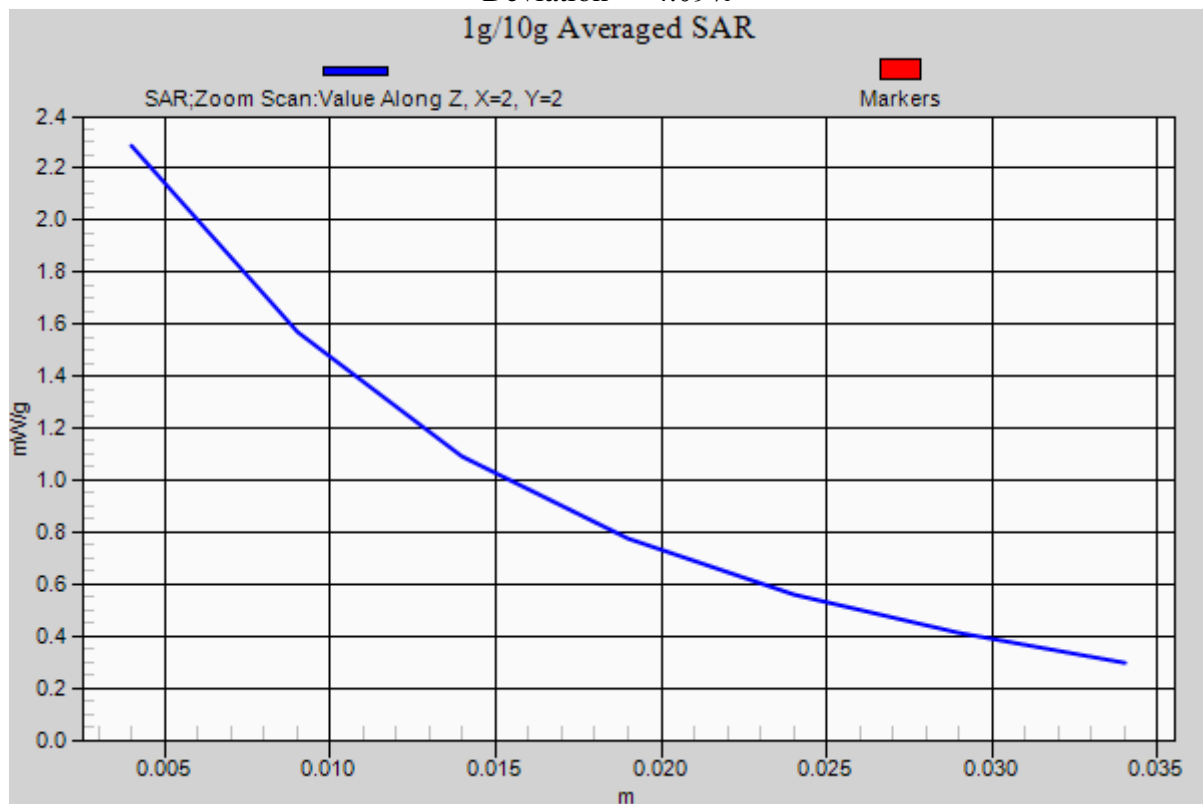
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 24 dB (250 mW)

SAR(1 g) = 2.11 mW/g; SAR(10 g) = 1.4 mW/g

Deviation = -4.09%

1g/10g Averaged SAR



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:

$f = 835 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 54$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space 1.5 cm

Test Date: 01-31-2012; Ambient Temp: 23.5° C; Tissue Temp: 21.6°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

835MHz System Verification

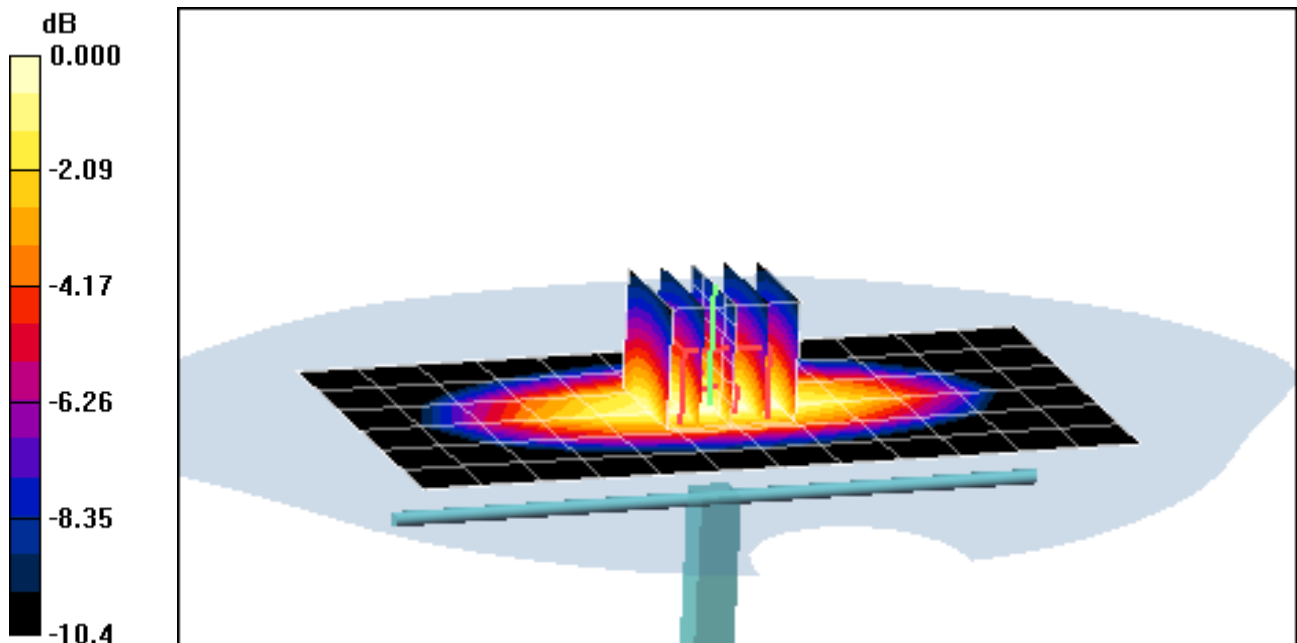
Area Scan (7x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.667 mW/g

Deviation = 5.59 %



0 dB = 1.11mW/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:

$f = 835 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 54$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space 1.5 cm

Test Date: 01-31-2012; Ambient Temp: 23.5° C; Tissue Temp: 21.6°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

835MHz System Verification

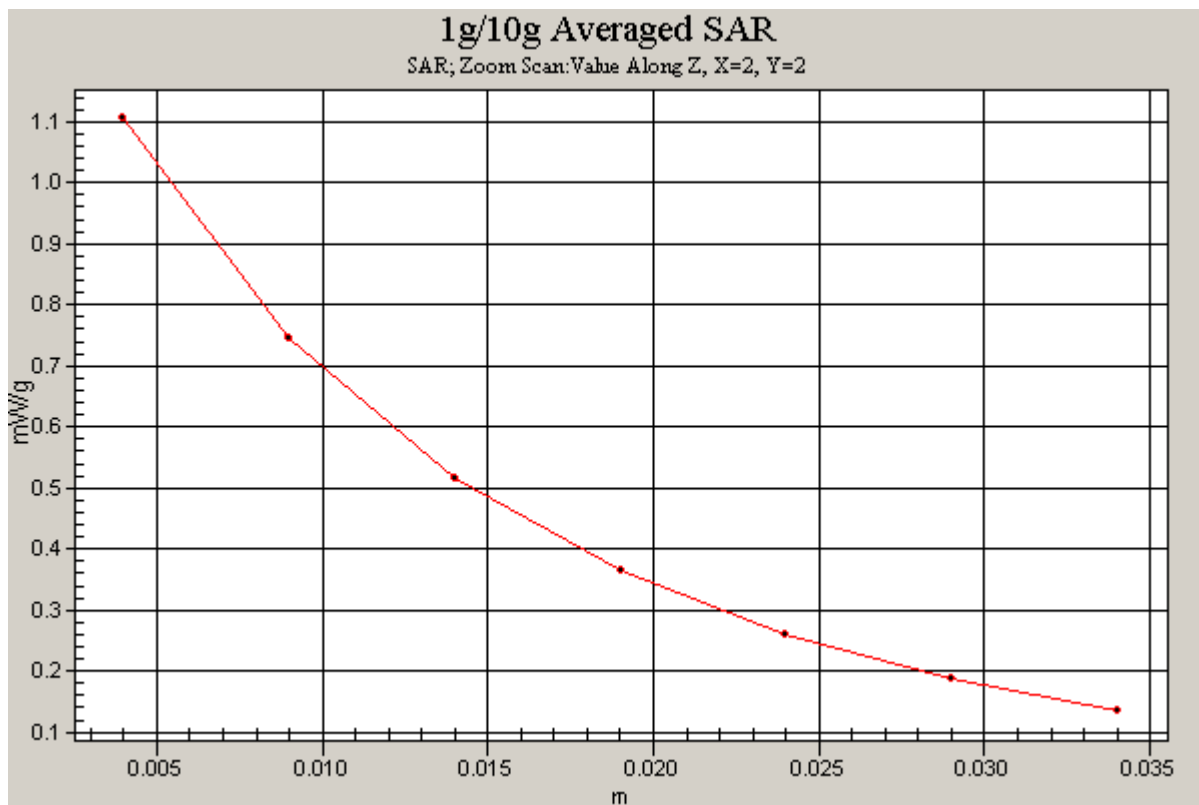
Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20 dBm (100 mW)

SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.667 mW/g

Deviation = 5.59 %



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:

$f = 1750 \text{ MHz}$; $\sigma = 1.47 \text{ mho/m}$; $\epsilon_r = 51.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-31-2012; Ambient Temp: 23.1 °C; Tissue Temp: 22.4 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM 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

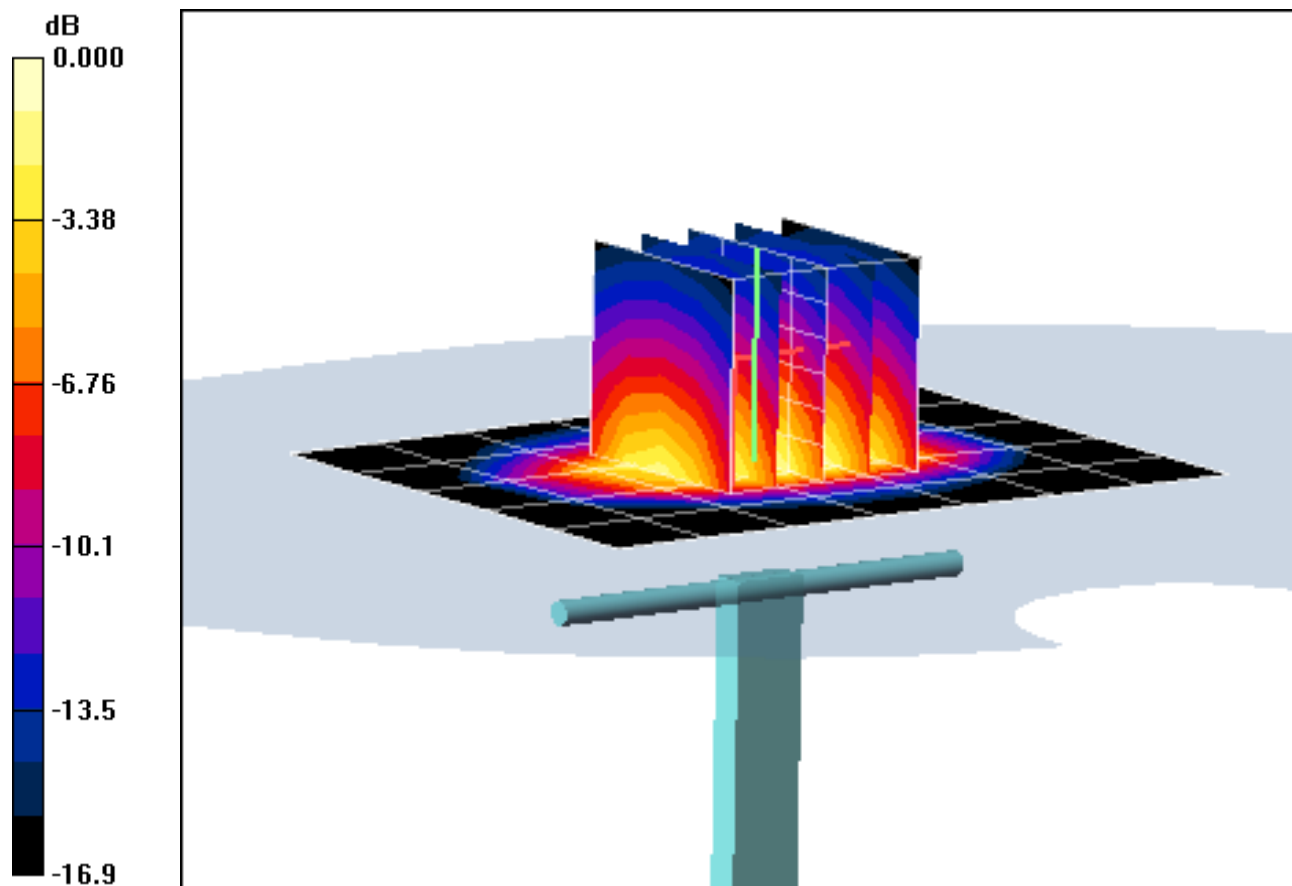
Area Scan (6x8x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 16.0 dBm (40 mW)

SAR(1 g) = 1.44 mW/g; SAR(10 g) = 0.750 mW/g

Deviation = -2.70 %



0 dB = 1.62mW/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:

$f = 1750 \text{ MHz}$; $\sigma = 1.47 \text{ mho/m}$; $\epsilon_r = 51.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-31-2012; Ambient Temp: 23.1 °C; Tissue Temp: 22.4 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Phantom: SAM 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

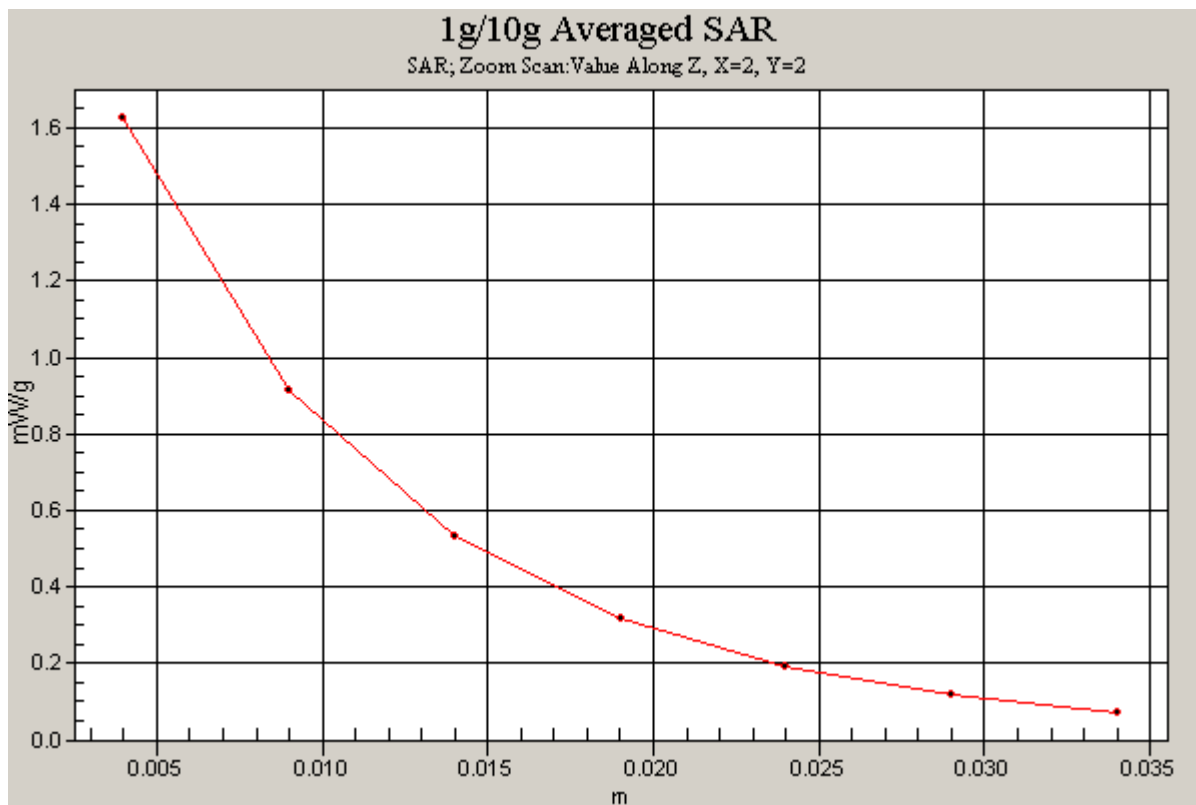
Area Scan (6x8x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 16.0 dBm (40 mW)

SAR(1 g) = 1.44 mW/g; SAR(10 g) = 0.750 mW/g

Deviation = -2.70 %



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.57 \text{ mho/m}$; $\epsilon_r = 51.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-07-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.2°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

1900MHz System Verification

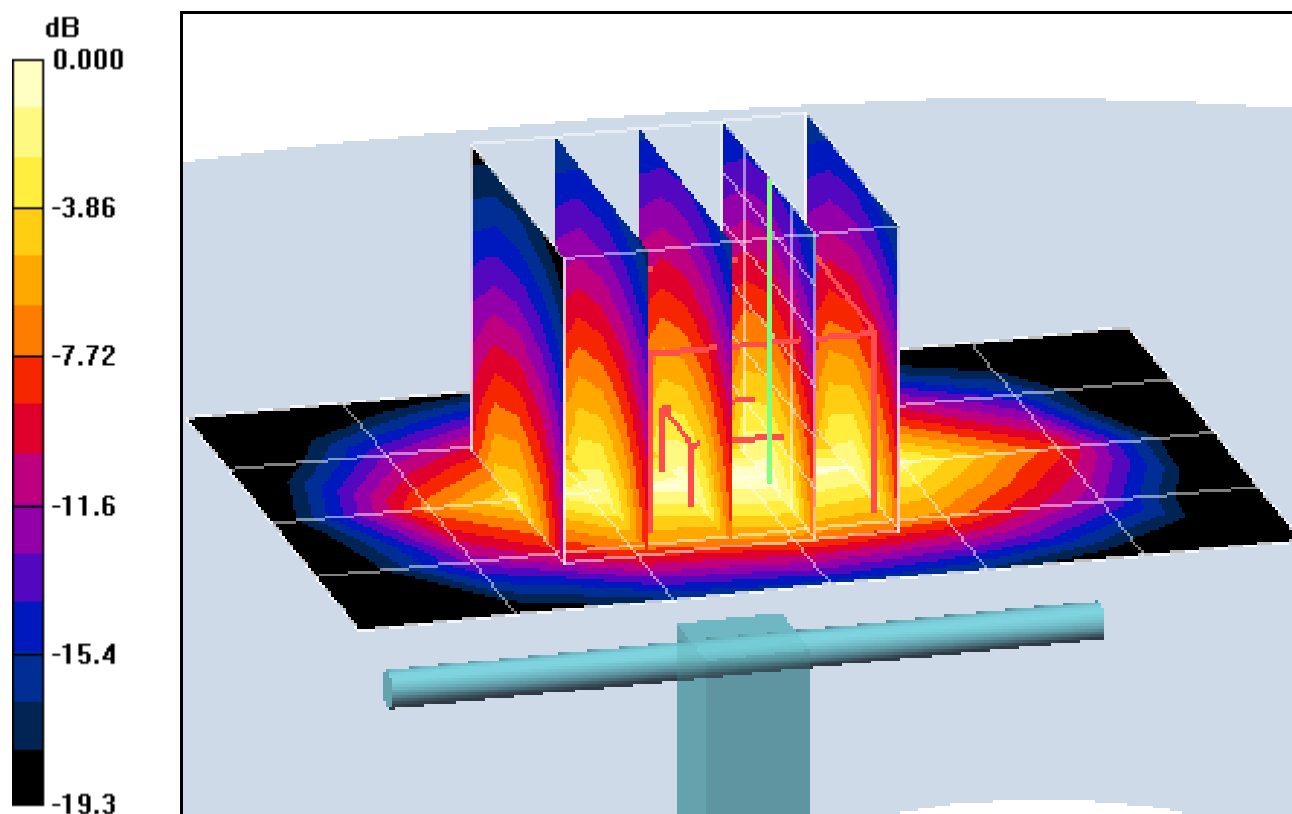
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 20.0 dBm (100mW)

SAR(1 g) = 4.18 mW/g; SAR(10 g) = 2.11 mW/g

Deviation = 2.20 %



0 dB = 4.66mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.57 \text{ mho/m}$; $\epsilon_r = 51.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-07-2012; Ambient Temp: 24.1°C; Tissue Temp: 22.2°C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

1900MHz System Verification

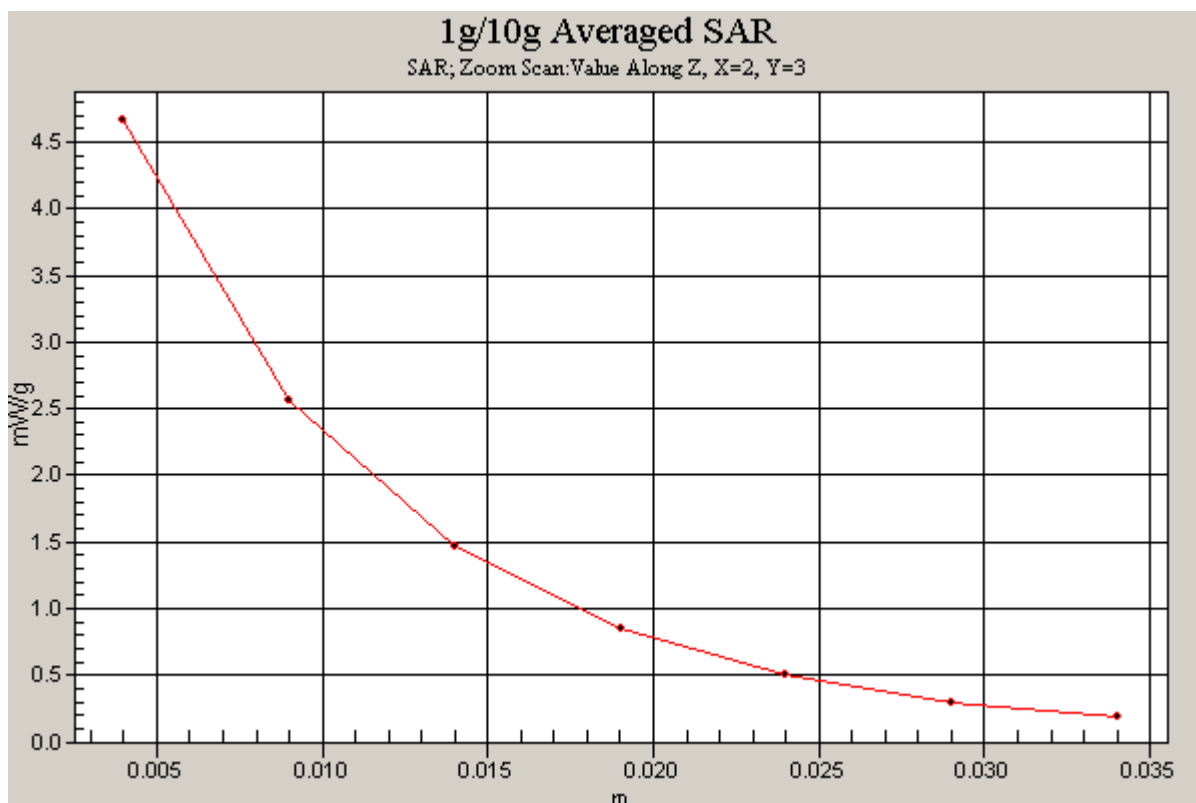
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100mW)

SAR(1 g) = 4.18 mW/g; SAR(10 g) = 2.11 mW/g

Deviation = 2.20 %



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 2.03 \text{ mho/m}$; $\epsilon_r = 50.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-02-2012; Ambient Temp: 24.1 °C; Tissue Temp: 22.5 °C

Probe: EX3DV4 - SN3561; ConvF(6.26, 6.26, 6.26); Calibrated: 7/27/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

2450MHz System Verification

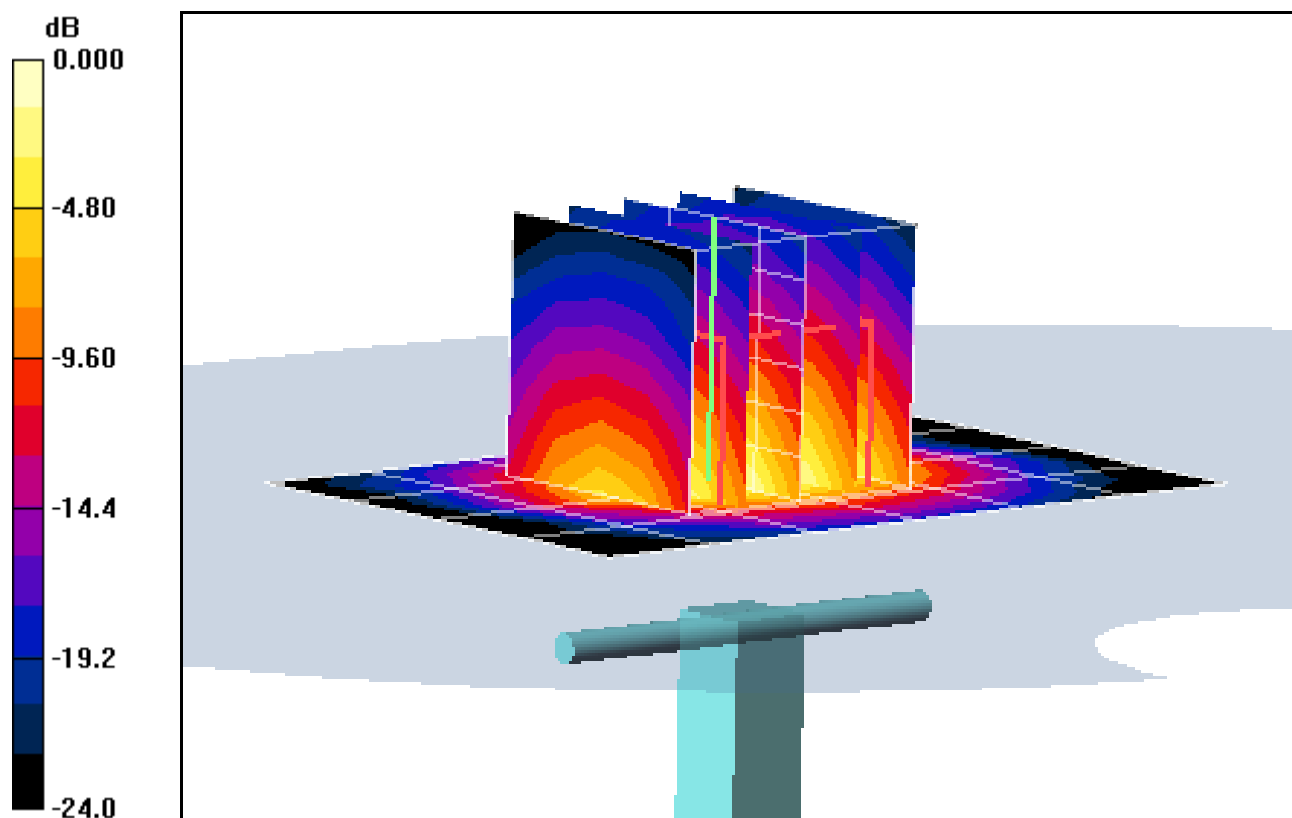
Area Scan (5x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 14.0 dBm (25 mW)

SAR(1 g) = 1.37 mW/g; SAR(10 g) = 0.609 mW/g

Deviation = 6.82 %



0 dB = 1.78mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 2.03 \text{ mho/m}$; $\epsilon_r = 50.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-02-2012; Ambient Temp: 24.1 °C; Tissue Temp: 22.5 °C

Probe: EX3DV4 - SN3561; ConvF(6.26, 6.26, 6.26); Calibrated: 7/27/2011

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

2450MHz System Verification

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

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

Input Power = 14.0 dBm (25 mW)

SAR(1 g) = 1.37 mW/g; SAR(10 g) = 0.609 mW/g

Deviation = 6.82 %

