



SAR EVALUATION REPORT

Applicant Name:

Samsung Electronics, Co. Ltd.
416, Maetan 3-dong, Yeongtong-gu, Suwon-si
Gyeonggi-do, 443-742
Republic of Korea

Date of Testing:

07/03/2012 – 07/05/2012

Test Site/Location:

PCTEST Lab, Columbia, MD, USA

Document Serial No.:

0Y1207020893.A3L

FCC ID:**A3LSCHI200****APPLICANT:****SAMSUNG ELECTRONICS, CO. LTD.****DUT Type:**

Portable Handset

Application Type:

Class II Permissive Change

FCC Rule Part(s):

CFR §2.1093

Model(s):

SCH-I200

Test Device Serial No.:

Pre-Production [S/N: FCC#1, FCC#3]

Permissive Change(s):

Bluetooth/WIFI Antenna Change

Original Grant Date:

June 22, 2012

Band & Mode	Tx Frequency	Conducted Power [dBm]	SAR		
			1 gm Head (W/kg)	1 gm Body-Worn (W/kg)	1 gm Hotspot (W/kg)
2.4 GHz WLAN	2412 - 2462 MHz	15.33	0.07	0.03	0.03
5.8 GHz WLAN	5745 - 5825 MHz	13.86	0.02	0.00	
5.2 GHz WLAN	5180 - 5240 MHz	13.84	0.06	0.00	
5.3 GHz WLAN	5260 - 5320 MHz	14.06	0.09	0.03	
5.5 GHz WLAN	5500 - 5700 MHz	14.25	0.06	0.02	
Bluetooth	2402 - 2480 MHz	10.84	N/A		

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

The table above shows 2.4 GHz Bluetooth/WIFI and 5GHz WIFI SAR Test data evaluated for this Test Report. Please see RF Exposure Technical Report S/N 0Y1204120455.A3L for SAR Test Data filed for original compliance evaluation.

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

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

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


Randy Ortanez
President

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Tx Frequency
Cell. CDMA/EVDO	824.70 - 848.31 MHz
PCS CDMA/EVDO	1851.25 - 1908.75 MHz
LTE Band 13	782 MHz
2.4 GHz WLAN	2412 - 2462 MHz
5.8 GHz WLAN	5745 - 5825 MHz
5.2 GHz WLAN	5180 - 5240 MHz
5.3 GHz WLAN	5260 - 5320 MHz
5.5 GHz WLAN	5500 - 5700 MHz
Bluetooth	2402 - 2480 MHz

1.2 DUT Antenna Locations

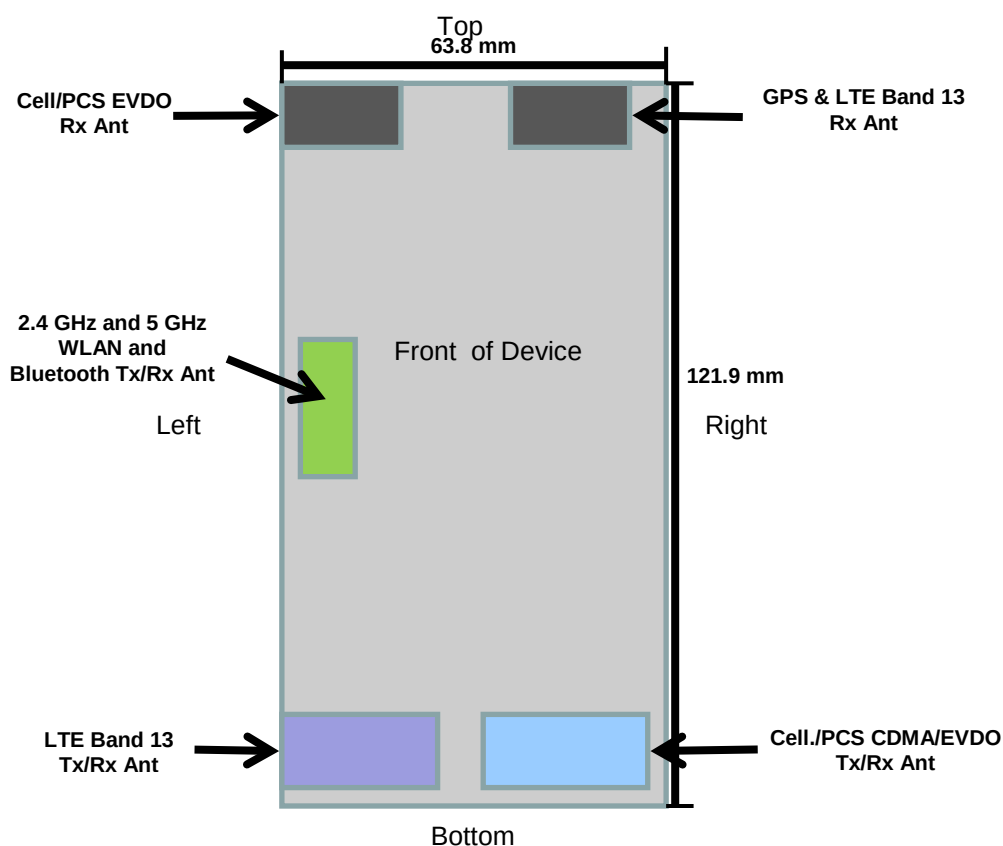


Figure 1-1
DUT Antenna Locations

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Table 1-1
Mobile Hotspot Sides required for SAR Testing per KDB 941225 D06

Mobile Hotspot Sides for SAR Testing						
Mode	Back	Front	Top	Bottom	Right	Left
2.4 GHz WLAN	Yes	Yes	No	No	No	Yes

Note: Particular DUT edges were not required to be evaluated for Wireless Router SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06 guidance, page 2. The antenna document shows the distances between the transmit antennas and the edges of the device. When the wireless router mode is enabled, all 5 GHz bands are disabled. Therefore 5 GHz WIFI is not considered in this section.

1.3 Simultaneous Transmission Analysis

The simultaneous transmission results remain the same as original compliance evaluation due to the SAR values measured for current application were equal to or less than the original measured values. Please see RF Exposure Technical Report S/N 0Y1204120455.A3L filed with the original application for device simultaneous transmission analysis.

1.4 Power Reduction for SAR

Please see RF Exposure Technical Report S/N 0Y1204120455.A3L filed with the original application for power reduction implemented in this device. The power reduction scheme is not applicable to FCC Part 15 transmitter within the DUT. Therefore, it is not included in this report.

1.5 SAR Test Exclusions Applied

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

The maximum RF Conducted Power of Bluetooth Tx is 12.134 mW (See Bluetooth Technical Report Serial No. 0Y1204120461.A3L filed with the original application for a full set of Bluetooth powers).

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

This device supports 20MHz and 40MHz Bandwidths for IEEE 802.11n for 5 GHz WIFI only. 802.11n was not evaluated for SAR since the average output power of 20 MHz and 40 MHz bandwidths was not more than 0.25 dB higher than the average output power of 802.11a.

1.6 Guidance Applied

- FCC OET Bulletin 65 Supplement C [June 2001]
- IEEE 1528-2003
- FCC KDB 941225 (Hotspot)
- FCC KDB 248227 (802.11)
- FCC KDB 648474 (Simultaneous)
- FCC KDB 865664 (5 GHz)

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

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

2.1 SAR Definition

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Equation 2-1).

Equation 2-1
SAR Mathematical Equation

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

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

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

where:

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

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

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3 SAR MEASUREMENT SETUP

3.1 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 3-1
SAR Measurement System



Figure 3-2
Near-Field Probe

Table 3-1
Composition of the Tissue Equivalent Matter

Frequency (MHz)	2450	2450	5200-5800	5200-5800
Tissue	Head	Body	Head	Body
Ingredients (% by weight)				
DGBE	7.99	26.7		
NaCl	0.16	0.1		
Triton X-100	19.97		17.24	
Diethylenglycol monohexylether			17.24	
Polysorbate (Tween) 80				20
Water	71.88	73.2	65.52	80

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DOSIMETRIC ASSESSMENT

4.1 Measurement Procedure

The evaluation was performed using the following procedure:

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head interface and the horizontal grid resolution was 15mm and 15mm for frequencies < 3 GHz in the x and y directions respectively. When applicable, for frequencies above 3 GHz, a 10 mm by 10 mm resolution was used.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1 gram cube evaluation. SAR at this fixed point was measured and used as a reference value.
3. Based on the area scan data, the peak area of the maximum absorption was determined by spline interpolation. Around this point, a volume of 32mm x 32mm x 30mm (fine resolution volume scan, zoom scan) was assessed by measuring at least 5 x 5 x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):
 - a. The data was extrapolated to the surface of the outer-shell of the phantom. The combined distance extrapolated was the combined distance from the center of the dipoles 2.7mm away from the tip of the probe housing plus the 1.2 mm distance between the surface and the lowest measuring point. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).
 - b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.
 - c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.
5. For testing 5 GHz devices, finer resolution zoom scans were performed as specified by FCC SAR Measurement Requirements for 3 – 6 GHz, KDB 865664 publication. The 5 GHz zoom scan requires a minimum volume of 24mm x 24mm x 20mm and 7 x 7 x 11 points.

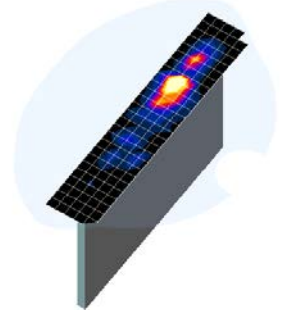


Figure 4-1
Sample SAR Area Scan

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DEFINITION OF REFERENCE POINTS

5.1 EAR REFERENCE POINT

Figure 5-2 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 5-1. 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 5-1). 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].

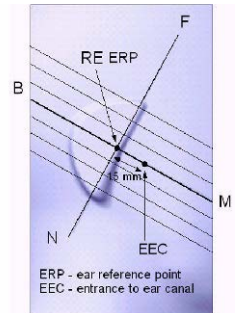


Figure 5-1
Close-Up Side view
of ERP

5.2 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 5-3). 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 5-2
Front, back and side view of SAM Twin Phantom

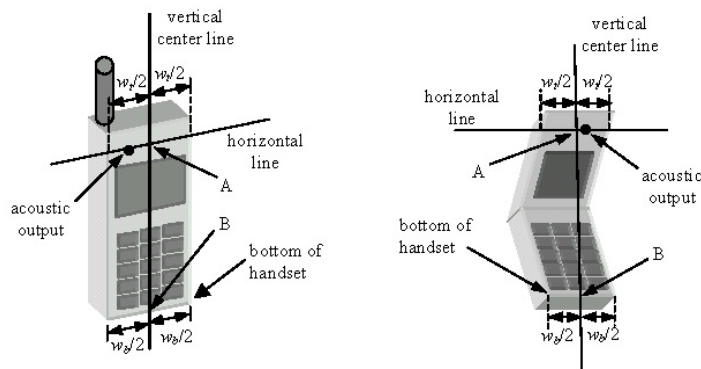


Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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6 TEST CONFIGURATION POSITIONS FOR HANDSETS

6.1 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 $\delta = 0.02$.

6.2 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 6-1), 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.

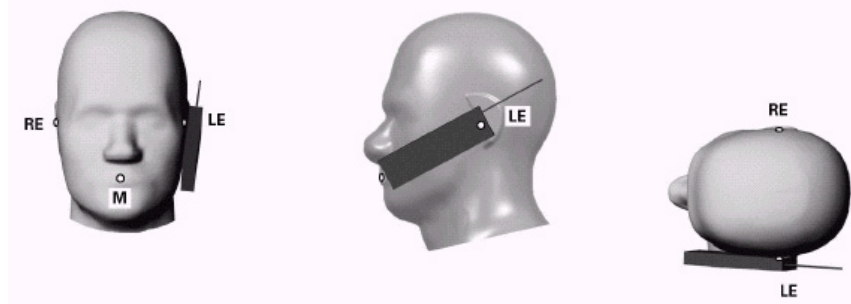


Figure 6-1 Front, Side and Top View of Cheek/Touch Position

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 6-2).

6.3 Positioning for Ear / 15° Tilt

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

1. While maintaining the orientation of the phone, the phone was retracted parallel to the reference plane far enough to enable a rotation of the phone by 15 degree.
2. The phone was then rotated around the horizontal line by 15 degree.
3. While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the phone touches the head. (In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced. The tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head (see Figure 6-2).

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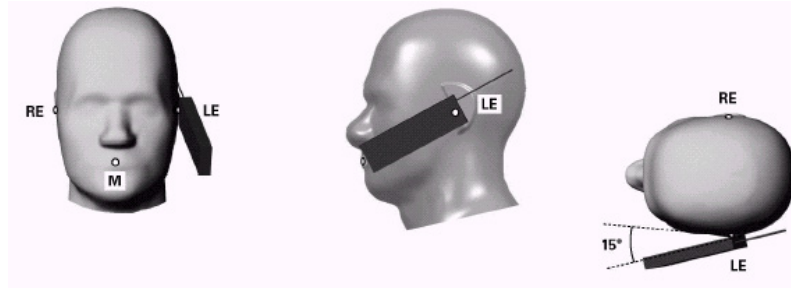


Figure 6-2 Front, Side and Top View of Ear/15° Tilt Position

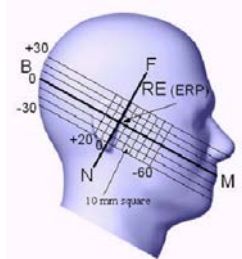


Figure 6-3
Side view w/ relevant markings



Figure 6-4 Body SAR Sample Photo
(Not Actual EUT)

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

Antennas located near the bottom of a phone may require SAR measurements around the mouth and jaw regions of the SAM head phantom. This typically applies to clam-shell style phones that are generally longer in the unfolded normal use positions or to certain older style long rectangular phones.

Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document publication 648474. The SAR required in these regions of SAM should be measured using a flat phantom. **Rectangular shaped phones** should be positioned with its bottom edge positioned from the flat phantom with the same distance provided by the cheek touching position using SAM. The ear reference point (ERP, as defined for SAM) of the phone should be positioned $\frac{1}{2}$ cm from the flat phantom shell. **Clam-shell phones** should be positioned with the hinge against a smooth edge of the flat phantom where the upper half of the phone is unfolded and extended beyond the phantom side wall. The lower half of the phone is secured in the test device holder at a fixed distance below the flat phantom determined by the minimum separation along the lower edge of the phone in the cheek touching position using SAM. Any case with substantial variation in separation distance along the lower edge of a clam shell is discussed with the FCC for best-to-use methodology.

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

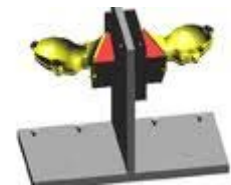


Figure 6-5 Twin SAM
Chin20

6.5 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 6-4). A device with a headset output is tested with a headset connected to the device.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic

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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.

6.6 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. Since this device meets the minimum size requirements, procedures in KDB Publication 941225 D06 were used for SAR testing. See Figure 1-1 for device dimensions.

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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7 EXPOSURE LIMITS

7.1 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.

7.2 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 7-1
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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8.1 SAR Testing with 802.11 Transmitters

Normal network operating configurations are not suitable for measuring the SAR of 802.11 a/b/g/n transmitters. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable. See KDB Publication 248227 for more details.

8.1.1 General Device Setup

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

8.1.2 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.

For 5 GHz, the highest average RF output power channel across the default test channels at the lowest data rate was selected for SAR evaluation in 802.11a. When the adjacent channels are higher in power than the default channels, these “required channels” were considered instead of the default channels for SAR testing. 802.11n modes and higher data rates for 802.11a/n were evaluated only if the respective mode was 0.25 dB or higher than the 802.11a 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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STANDALONE RF CONDUCTED POWERS

9.1 Measured WLAN Conducted Powers

Per manufacturer's change description, the RF conducted powers for WLAN and Bluetooth are not affected by Class II Permissive Changes. Therefore, the WLAN Conducted Powers from original test report remain applicable for current application.

Table 9-1
IEEE 802.11b Average RF Power

Mode	Freq	Channel	802.11b Conducted Power [dBm]			
			Data Rate [Mbps]			
	[MHz]		1	2	5.5	11
802.11b	2412	1	15.33	15.21	15.27	15.36
802.11b	2437	6	15.31	15.25	14.97	14.30
802.11b	2462	11	14.42	14.38	14.45	13.64

Table 9-2
IEEE 802.11g Average RF Power

Mode	Freq	Channel	802.11g Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		6	9	12	18	24	36	48	54
802.11g	2412	1	12.67	12.55	12.70	13.07	12.38	12.28	12.22	12.33
802.11g	2437	6	11.78	11.51	11.50	11.35	11.74	11.72	11.85	1.73
802.11g	2462	11	11.21	11.37	11.96	11.45	11.97	11.27	11.00	11.19

Table 9-3
IEEE 802.11n Average RF Power

Mode	Freq	Channel	802.11n Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		6.5	13	20	26	39	52	58	65
802.11n	2412	1	13.28	13.22	13.33	13.15	13.19	13.26	12.98	13.13
802.11n	2437	6	12.25	12.15	12.07	12.24	12.22	12.17	12.33	12.11
802.11n	2462	11	12.30	12.51	12.36	12.06	12.38	12.26	12.36	11.85

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Table 9-4
IEEE 802.11a Average RF Power

Mode	Freq	Channel	802.11a Conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
	[MHz]									
802.11a	5180	36*	13.64	13.80	13.40	12.90	13.40	13.16	13.38	13.05
802.11a	5200	40	13.72	13.38	13.49	13.80	13.56	13.17	13.90	13.38
802.11a	5220	44	13.67	13.47	13.41	13.60	13.88	13.92	13.43	13.30
802.11a	5240	48*	13.84	13.42	13.50	13.71	13.30	13.46	13.30	13.50
802.11a	5260	52*	14.06	13.77	13.68	13.90	14.02	14.13	13.94	14.27
802.11a	5280	56	13.96	14.20	13.82	13.81	14.07	13.98	13.68	13.61
802.11a	5300	60	13.96	13.86	13.84	13.81	14.13	14.11	13.64	14.11
802.11a	5320	64*	13.90	13.89	13.97	13.89	13.90	13.69	14.15	13.74
802.11a	5500	100	14.25	13.99	13.93	14.02	14.06	13.53	13.60	13.72
802.11a	5520	104*	13.12	13.15	13.37	13.17	13.04	12.80	13.07	12.91
802.11a	5540	108	12.81	12.94	12.62	12.81	12.72	12.86	13.00	12.67
802.11a	5560	112	12.70	12.78	12.72	12.68	12.53	12.48	12.28	12.69
802.11a	5580	116*	12.49	12.53	12.57	12.69	12.60	12.18	12.26	12.69
802.11a	5600	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5620	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5640	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5660	132	11.72	11.97	11.78	11.77	11.94	11.79	11.96	11.95
802.11a	5680	136*	11.78	11.92	11.74	11.63	11.78	11.65	11.81	11.98
802.11a	5700	140	11.69	11.60	11.87	11.94	11.80	11.63	11.73	11.75
802.11a	5745	149*	13.49	13.42	13.57	13.58	13.42	13.33	13.58	13.49
802.11a	5765	153	13.79	13.60	13.58	13.69	13.72	13.64	13.95	13.70
802.11a	5785	157*	13.86	13.55	13.53	13.40	13.65	13.46	13.42	13.49
802.11a	5805	161*	13.72	13.73	13.70	13.97	13.82	13.44	13.67	13.87
802.11a	5825	165	13.64	13.77	13.72	13.73	13.80	13.60	13.71	13.64

Per FCC KDB Publication 443999, transmission on channels which overlap the 5600-5650 MHz is prohibited as a client. This device does not transmit any beacons or initiate any transmissions in 5.3 and 5.5 GHz Band. (*) – indicates default channels per KDB Publication 248227. When the adjacent channels are higher in power then the default channels, these “required channels” are considered instead of the default channels for SAR testing.

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Table 9-5
IEEE 802.11n (20 MHz) Average RF Power

Mode	Freq	Channel	802.11n (20MHz Bandwidth) Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		6.5	13	20	26	39	52	58	65
802.11n	5180	36*	12.96	12.99	12.84	12.69	12.75	12.67	12.82	12.72
802.11n	5200	40	12.83	12.80	13.10	12.92	12.96	12.94	12.83	12.74
802.11n	5220	44	13.14	13.50	13.15	12.91	13.19	12.90	13.11	12.97
802.11n	5240	48*	12.93	13.08	13.02	12.86	13.03	12.85	12.91	12.88
802.11n	5260	52*	13.16	13.23	13.16	13.09	13.04	13.25	13.29	13.09
802.11n	5280	56	13.04	13.04	12.99	12.85	12.99	12.86	12.97	12.90
802.11n	5300	60	13.04	12.94	13.13	12.93	12.67	12.96	13.00	12.94
802.11n	5320	64*	12.84	12.83	12.87	12.74	12.64	12.95	12.74	12.70
802.11n	5500	100	13.13	13.05	13.19	13.21	13.16	13.19	13.11	12.96
802.11n	5520	104*	12.56	12.67	12.64	12.48	12.67	12.56	12.49	12.68
802.11n	5540	108	12.72	12.41	12.56	12.40	12.30	12.49	12.35	12.24
802.11n	5560	112	12.25	12.22	12.18	12.00	12.07	11.96	11.98	12.16
802.11n	5580	116*	12.03	12.29	12.06	11.85	11.92	11.87	12.05	12.17
802.11n	5600	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5620	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5640	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5660	132	11.46	11.41	11.42	11.29	11.19	11.56	11.36	11.31
802.11n	5680	136*	11.42	11.28	11.32	11.34	11.20	11.33	11.37	11.18
802.11n	5700	140	11.48	11.60	11.28	11.29	11.41	11.32	11.46	11.21
802.11n	5745	149*	12.90	12.83	12.84	12.74	12.61	12.78	12.67	12.79
802.11n	5765	153	13.12	13.11	13.22	13.09	13.23	13.18	13.02	13.25
802.11n	5785	157*	12.68	12.94	12.62	12.74	12.42	12.53	12.51	12.62
802.11n	5805	161*	13.06	13.11	12.99	12.87	13.08	13.24	13.08	13.06
802.11n	5825	165	13.15	13.16	13.36	12.93	13.10	13.07	12.96	13.08

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

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Table 9-6
IEEE 802.11n (40 MHz) Average RF Power

Mode	Freq	Channel	802.11n (40MHz Bandwidth) Conducted Power [dBm]							
			Data Rate [Mbps]							
			13.5/15	27/30	40.5/45	54/60	81/90	108/120	121.5/135	135/150
802.11n	5190	38*	13.16	13.21	13.00	13.14	13.14	13.20	13.02	13.21
802.11n	5230	46	13.24	13.20	13.25	13.29	13.24	13.27	13.31	13.30
802.11n	5270	54	12.62	12.64	12.58	12.74	12.72	12.50	12.69	12.68
802.11n	5310	62*	12.68	12.71	12.79	12.83	12.70	12.83	12.80	12.84
802.11n	5510	102*	12.97	12.99	13.07	13.09	13.04	13.04	13.06	13.08
802.11n	5550	110	13.04	13.06	13.18	13.07	13.15	13.09	13.02	13.19
802.11n	5590	118	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5630	126	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5670	134	13.03	13.12	13.15	13.11	13.16	13.08	13.00	13.20
802.11n	5755	151*	13.25	13.28	13.29	13.34	13.35	13.30	13.19	13.10
802.11n	5795	159	13.24	13.20	13.26	13.33	13.29	13.24	13.20	13.32

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

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

- For 2.4 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11b were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11g/n) and data rates were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
- For 5 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11a were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11n for 20 MHz and 40 MHz bandwidths) and data rates were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
- Because 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 for all bands and configurations, SAR testing on other channels was not required.
- SAR was evaluated on the channels and data rates indicated in bold.

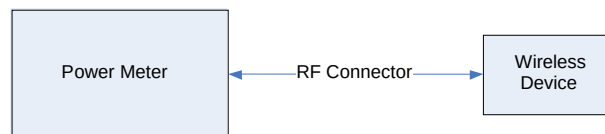


Figure 9-1
Power Measurement Setup

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10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
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
7/5/2012	2450H	22.2	2401	1.803	38.75	1.758	39.298	2.56%	-1.39%
			2450	1.859	38.59	1.800	39.200	3.28%	-1.56%
			2499	1.914	38.34	1.852	39.135	3.35%	-2.03%
			5200	4.458	36.01	4.660	36.000	-4.33%	0.03%
7/3/2012	5200H-5800H	22.9	5240	4.507	35.94	4.700	35.960	-4.11%	-0.06%
			5260	4.545	35.96	4.720	35.940	-3.71%	0.06%
			5500	4.743	35.58	4.965	35.650	-4.47%	-0.20%
			5785	5.029	35.33	5.255	35.315	-4.30%	0.04%
			5800	5.052	35.34	5.270	35.300	-4.14%	0.11%
			2401	1.902	52.31	1.903	52.765	-0.05%	-0.86%
			2450	1.982	52.09	1.950	52.700	1.64%	-1.16%
7/3/2012	2450B	21.8	2499	2.025	51.93	2.019	52.638	0.30%	-1.35%
			5200	5.071	49.94	5.299	49.014	-4.30%	1.89%
			5240	5.135	49.93	5.346	48.933	-3.95%	2.04%
7/5/2012	5200B-5800B	23.1	5260	5.156	49.99	5.369	48.906	-3.97%	2.22%
			5500	5.498	49.29	5.650	48.580	-2.69%	1.46%
			5785	5.892	48.86	5.982	48.242	-1.50%	1.28%
			5800	5.909	48.85	6.000	48.200	-1.52%	1.35%

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 due to rounding.

Probe calibration used within ± 100 MHz of the test frequency in either 5.725 - 5.85 or 5.47-5.725 GHz is acceptable per KDB Publication 865664 since the design of the SAR probe supports the extended frequency, provided the DASY software version recommended is used for the tests, and the expanded calibration uncertainty ($k=2$) is less than or equal to 15% (See SAR probe calibration certificate for this information).

10.2 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 ϵ can be calculated from the below equation (Pournaropoulos and Misra):

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

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

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10.3 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 10-2
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 (%)
2450	Head	07/05/2012	24.9	23.8	0.1000	719	3258	5.64	53.800	56.400	4.83%
5200	Head	07/03/2012	24.6	23.5	0.0181	1057	3589	1.42	79.100	78.453	-0.82%
5500	Head	07/03/2012	24.7	23.6	0.0181	1057	3589	1.46	84.900	80.663	-4.99%
5800	Head	07/03/2012	24.9	23.8	0.0181	1057	3589	1.4	79.500	77.348	-2.71%
2450	Body	07/03/2012	23.6	22.4	0.1000	882	3288	5.1	50.300	51.000	1.39%
5200	Body	07/05/2012	24.7	23.6	0.0170	1057	3589	1.26	73.400	74.118	0.98%
5500	Body	07/05/2012	24.9	23.8	0.0170	1057	3589	1.34	78.900	78.824	-0.10%
5800	Body	07/05/2012	24.9	23.8	0.0170	1057	3589	1.31	74.300	77.059	3.71%

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

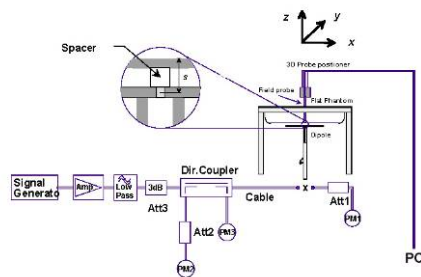


Figure 10-1
System Verification Setup Diagram



Figure 10-2
System Verification Setup Photo

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11 SAR DATA SUMMARY

11.1 Standalone Head SAR Data

Table 11-1
2.4 GHz WIFI Head SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	SAR (1g)
MHz	Ch.									(W/kg)
2412	1	IEEE 802.11b	DSSS	15.33	-0.12	Right	Touch	FCC#3	1	0.050
2412	1	IEEE 802.11b	DSSS	15.33	-0.09	Right	Tilt	FCC#3	1	0.030
2412	1	IEEE 802.11b	DSSS	15.33	-0.09	Left	Touch	FCC#3	1	0.068
2412	1	IEEE 802.11b	DSSS	15.33	-0.20	Left	Tilt	FCC#3	1	0.026
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 11-2
5 GHz WIFI Head SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	SAR (1g)
MHz	Ch.									(W/kg)
5785	157	IEEE 802.11a	OFDM	13.86	0.18	Right	Touch	FCC#1	6	0.017
5785	157	IEEE 802.11a	OFDM	13.86	0.00	Right	Tilt	FCC#1	6	0.000
5785	157	IEEE 802.11a	OFDM	13.86	0.00	Left	Touch	FCC#1	6	0.000
5785	157	IEEE 802.11a	OFDM	13.86	0.00	Left	Tilt	FCC#1	6	0.000
5240	48	IEEE 802.11a	OFDM	13.84	0.14	Right	Touch	FCC#1	6	0.060
5240	48	IEEE 802.11a	OFDM	13.84	0.00	Right	Tilt	FCC#1	6	0.000
5240	48	IEEE 802.11a	OFDM	13.84	0.00	Left	Touch	FCC#1	6	0.000
5240	48	IEEE 802.11a	OFDM	13.84	0.00	Left	Tilt	FCC#1	6	0.000
5260	52	IEEE 802.11a	OFDM	14.06	0.10	Right	Touch	FCC#1	6	0.092
5260	52	IEEE 802.11a	OFDM	14.06	0.00	Right	Tilt	FCC#1	6	0.000
5260	52	IEEE 802.11a	OFDM	14.06	0.00	Left	Touch	FCC#1	6	0.000
5260	52	IEEE 802.11a	OFDM	14.06	0.00	Left	Tilt	FCC#1	6	0.000
5500	100	IEEE 802.11a	OFDM	14.25	0.06	Right	Touch	FCC#1	6	0.063
5500	100	IEEE 802.11a	OFDM	14.25	0.00	Right	Tilt	FCC#1	6	0.000
5500	100	IEEE 802.11a	OFDM	14.25	0.00	Left	Touch	FCC#1	6	0.000
5500	100	IEEE 802.11a	OFDM	14.25	0.00	Left	Tilt	FCC#1	6	0.000
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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11.2 Standalone Body-Worn SAR Data

Table 11-3
WIFI 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)
2412	1	IEEE 802.11b	DSSS	15.33	-0.08	1.0 cm	FCC#3	1	back	0.025
5785	157	IEEE 802.11a	OFDM	13.86	-0.01	1.0 cm	FCC#1	6	back	0.004
5240	48	IEEE 802.11a	OFDM	13.84	-0.01	1.0 cm	FCC#1	6	back	0.002
5260	52	IEEE 802.11a	OFDM	14.06	-0.13	1.0 cm	FCC#1	6	back	0.033
5500	100	IEEE 802.11a	OFDM	14.25	0.15	1.0 cm	FCC#1	6	back	0.016
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Body 1.6 W/kg (mW/g) averaged over 1 gram				

Note: For IEEE 802.11b mode, Hotspot back side SAR Data was also used for supporting body-worn-accessory compliance per FCC KDB Publication 941225 D06.

11.3 Standalone Wireless Router SAR Data

Table 11-4
WIFI Hotspot 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)
2412	1	IEEE 802.11b	DSSS	15.33	-0.08	1.0 cm	FCC#3	1	back	0.025
2412	1	IEEE 802.11b	DSSS	15.33	0.12	1.0 cm	FCC#3	1	front	0.011
2412	1	IEEE 802.11b	DSSS	15.33	0.00	1.0 cm	FCC#3	1	left	0.025
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Body 1.6 W/kg (mW/g) averaged over 1 gram				

11.4 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], IEEE 1528-2003.
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.

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5. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 10 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
6. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.

WLAN Notes:

1. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Meeting Notes for 2.4 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11b. Other IEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
2. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Meeting Notes for 5 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11a. Other IEEE 802.11 modes (including 802.11n for 20 MHz and 40 MHz bandwidths) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
3. Because the maximum extrapolated peak SAR of the zoom scan for the maximum output channel of the lowest data rate is <1.6 W/kg and the 1g averaged SAR is <0.8 W/kg for all bands and configurations, SAR testing on other channels was not required.
4. Per FCC KDB Publication 941225 D06, when the same wireless modes and device transmission configurations are required for body-worn accessories and hotspot mode, it is not necessary to additionally test body-worn accessory SAR for the same device orientation. Therefore, the 2.4 GHz WLAN hotspot data for the back side configuration additionally shows body-worn compliance at the same distance.

Hotspot Notes:

1. Top, bottom and right edges for the 2.4GHz 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).
2. 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 6.6.)

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12 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	85070E	Dielectric Probe Kit	3/8/2012	Annual	3/8/2013	MY44300633
Agilent	8648D	Signal Generator	4/3/2012	Annual	4/3/2013	3629U00687
Agilent	8753E	(30kHz-6GHz) Network Analyzer	4/3/2012	Annual	4/3/2013	US37390350
Agilent	8753E	(30kHz-6GHz) Network Analyzer	4/4/2012	Annual	4/4/2013	JP38020182
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/5/2012	Annual	4/5/2013	MY45470194
Agilent	85047A	S-Parameter Test Set	N/A	N/A	N/A	2904A00579
Amplifier Research	5S1G4	5W, 800MHz-4.2GHz	CBT	N/A	CBT	21910
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	5318
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	5442
Anritsu	ML2438A	Power Meter	2/14/2012	Annual	2/14/2013	1190013
Anritsu	ML2438A	Power Meter	2/14/2012	Annual	2/14/2013	98150041
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	5821
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	8013
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
COMTECH	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M1SSA00-009
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	36934-158	Wall-Mounted Thermometer	1/4/2012	Biennial	1/4/2014	122014497
Control Company	36934-158	Wall-Mounted Thermometer	1/4/2012	Biennial	1/4/2014	122014488
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
Intelligent Weigh	PD-3000	Electronic Balance	3/27/2012	Annual	3/27/2013	11081534
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Rohde & Schwarz	SMI003B	Signal Generator	4/5/2012	Annual	4/5/2013	DE27259
Rohde & Schwarz	NRVD	Dual Channel Power Meter	4/8/2011	Biennial	4/8/2013	101695
Rohde & Schwarz	CMU200	Base Station Simulator	5/22/2012	Annual	5/22/2013	109892
Seekonk	NC-100	Torque Wrench (8" lb)	3/5/2012	Triennial	3/5/2015	N/A
Seekonk	NC-100	Torque Wrench (8" lb)	3/5/2012	Triennial	3/5/2015	N/A
SPEAG	D2450V2	2450 MHz SAR Dipole	8/19/2011	Annual	8/19/2012	719
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/18/2012	Annual	1/18/2013	1272
SPEAG	D5GHZV2	5 GHz SAR Dipole	1/19/2012	Annual	1/19/2013	1057
SPEAG	EX3DV4	SAR Probe	1/27/2012	Annual	1/27/2013	3589
SPEAG	ES3DV3	SAR Probe	2/7/2012	Annual	2/7/2013	3288
SPEAG	D2450V2	2450 MHz SAR Dipole	2/7/2012	Annual	2/7/2013	882
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/15/2012	Annual	2/15/2013	1323
SPEAG	ES3DV3	SAR Probe	2/21/2012	Annual	2/21/2013	3258
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/12/2012	Annual	4/12/2013	1333
Tektronix	RSA-6114A	Real Time Spectrum Analyzer	4/5/2012	Annual	4/5/2013	B010177
VWR	62344-925	Mini-Thermometer	10/24/2011	Biennial	10/24/2013	111886441

Note:

1. CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, attenuator, amplifier, 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.
2. Agilent 85047A S-Parameter Test Set is used as connector plug-in station. Any measurements with this device involved were made by calibrated network analyzer. Therefore no calibration is needed for this device.

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13 MEASUREMENT UNCERTAINTIES

Applicable for frequencies less than 3000 MHz.

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

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

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Applicable for frequencies up to 6 GHz.

a	b	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	IEEE 1528 Sec.	Tol. (± %)	Prob. Dist.	Div.	c _i 1gm	c _i 10 gms	1gm u _i (± %)	10gms u _i (± %)	v _i
Measurement System									
Probe Calibration	E.2.1	6.55	N	1	1.0	1.0	6.6	6.6	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	1.0	1.0	1.3	1.3	∞
Boundary Effect	E.2.3	0.4	N	1	1.0	1.0	0.4	0.4	∞
Linearity	E.2.4	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	E.2.5	5.1	N	1	1.0	1.0	5.1	5.1	∞
Readout Electronics	E.2.6	1.0	N	1	1.0	1.0	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	E.6.3	2.9	R	1.73	1.0	1.0	1.7	1.7	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	1.0	R	1.73	1.0	1.0	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	6.0	N	1	1.0	1.0	6.0	6.0	287
Device Holder Uncertainty	E.4.1	3.32	R	1.73	1.0	1.0	1.9	1.9	∞
Output Power Variation - SAR drift measurement	6.6.2	5.0	R	1.73	1.0	1.0	2.9	2.9	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	4.0	R	1.73	1.0	1.0	2.3	2.3	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - measurement uncertainty	E.3.3	3.8	N	1	0.64	0.43	2.4	1.6	6
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Liquid Permittivity - measurement uncertainty	E.3.3	4.5	N	1	0.60	0.49	2.7	2.2	6
Combined Standard Uncertainty (k=1)							RSS	12.4	12.0
Expanded Uncertainty (95% CONFIDENCE LEVEL)							k=2	24.7	24.0

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

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14 CONCLUSION

14.1 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: A3LSCHI200; Type: Portable Handset; Serial: FCC#3

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

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

$f = 2412 \text{ MHz}$; $\sigma = 1.816 \text{ mho/m}$; $\epsilon_r = 38.714$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 07-05-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.8°C

Probe: ES3DV3 - SN3258; ConvF(4.46, 4.46, 4.46); Calibrated: 2/21/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11b, Right Head, Touch, Ch 01, 1 Mbps

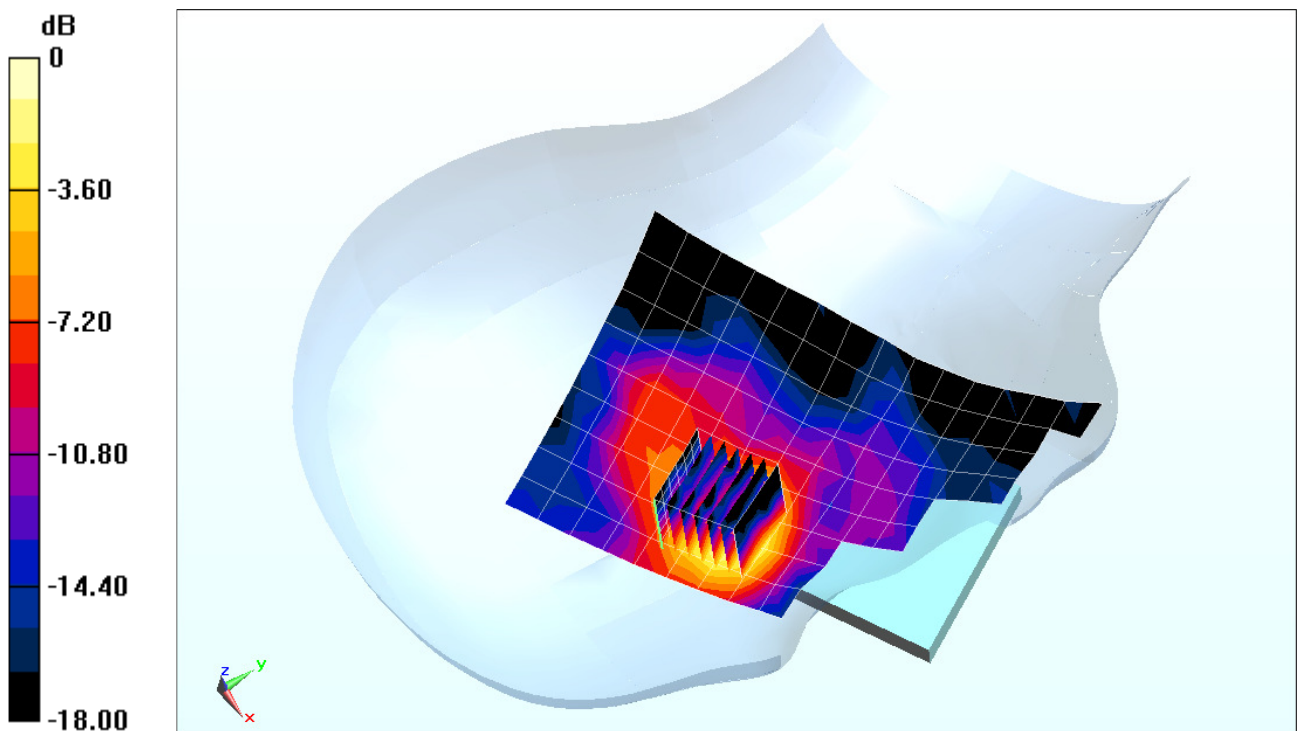
Area Scan (10x17x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 5.578 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 0.101 mW/g

SAR(1 g) = 0.050 mW/g; SAR(10 g) = 0.025 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHI200; Type: Portable Handset; Serial: FCC#3

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

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

$f = 2412 \text{ MHz}$; $\sigma = 1.816 \text{ mho/m}$; $\epsilon_r = 38.714$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 07-05-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.8°C

Probe: ES3DV3 - SN3258; ConvF(4.46, 4.46, 4.46); Calibrated: 2/21/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11b, Right Head, Tilt, Ch 01, 1 Mbps

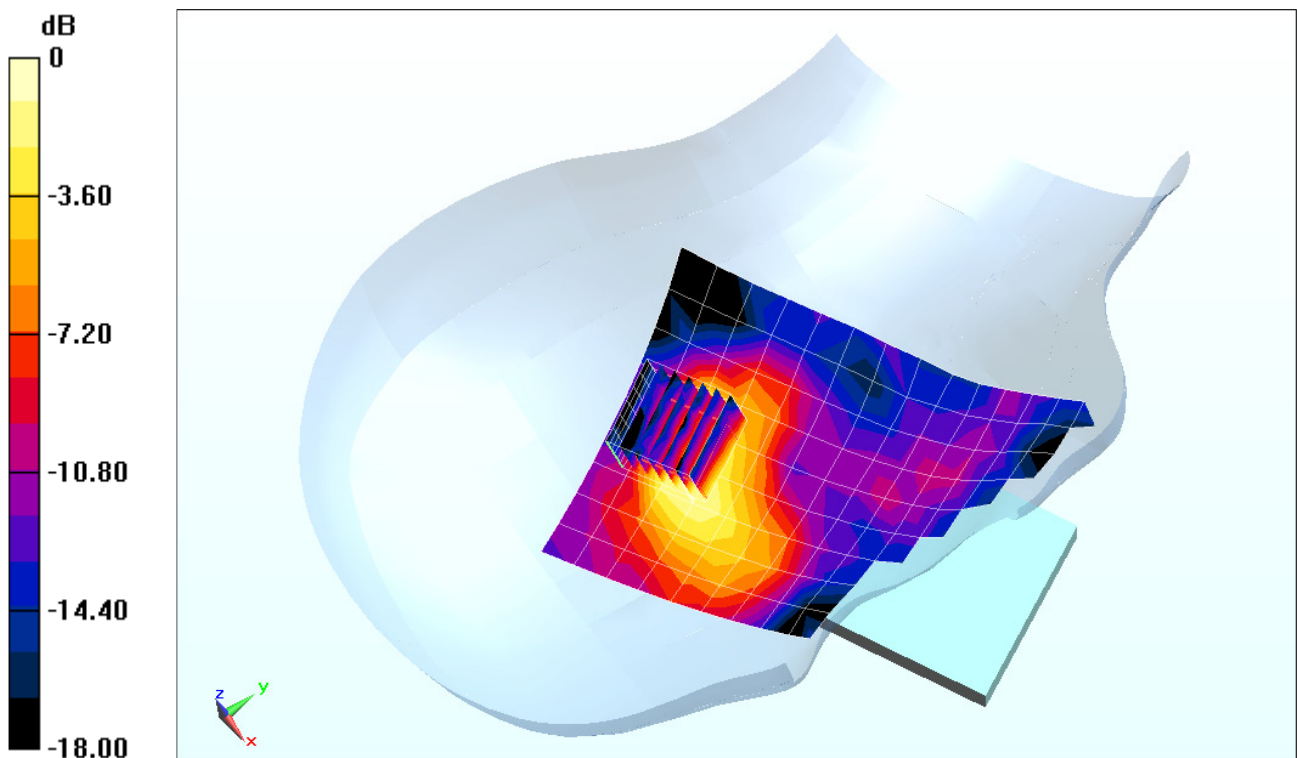
Area Scan (10x17x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 4.289 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 0.056 mW/g

SAR(1 g) = 0.030 mW/g; SAR(10 g) = 0.015 mW/g



0 dB = 0.0390 mW/g = -28.18 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHI200; Type: Portable Handset; Serial: FCC#3

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

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

$f = 2412 \text{ MHz}$; $\sigma = 1.816 \text{ mho/m}$; $\epsilon_r = 38.714$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 07-05-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.8°C

Probe: ES3DV3 - SN3258; ConvF(4.46, 4.46, 4.46); Calibrated: 2/21/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11b, Left Head, Touch, Ch 01, 1 Mbps

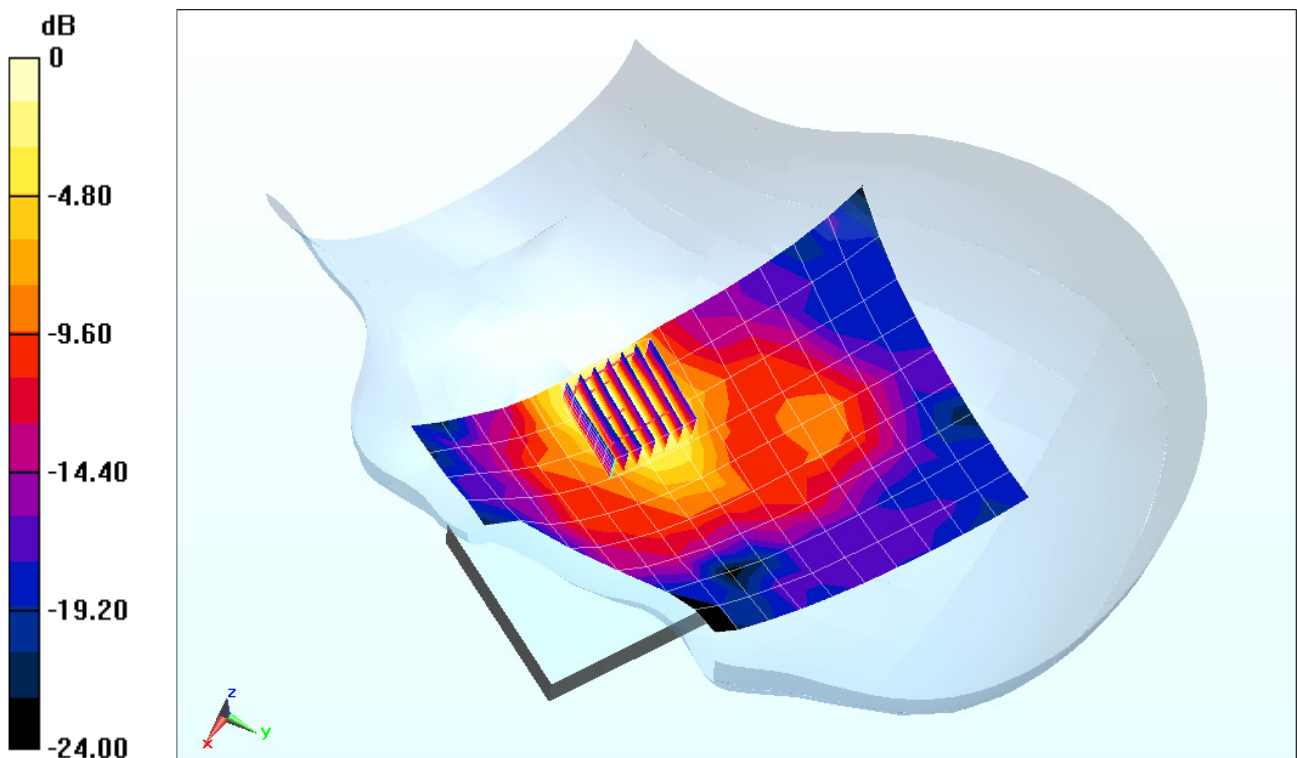
Area Scan (10x15x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 6.585 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 0.174 mW/g

SAR(1 g) = 0.068 mW/g; SAR(10 g) = 0.031 mW/g



0 dB = 0.0795 mW/g = -21.99 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHI200; Type: Portable Handset; Serial: FCC#3

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

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

$f = 2412 \text{ MHz}$; $\sigma = 1.816 \text{ mho/m}$; $\epsilon_r = 38.714$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 07-05-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.8°C

Probe: ES3DV3 - SN3258; ConvF(4.46, 4.46, 4.46); Calibrated: 2/21/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11b, Left Head, Tilt, Ch 01, 1 Mbps

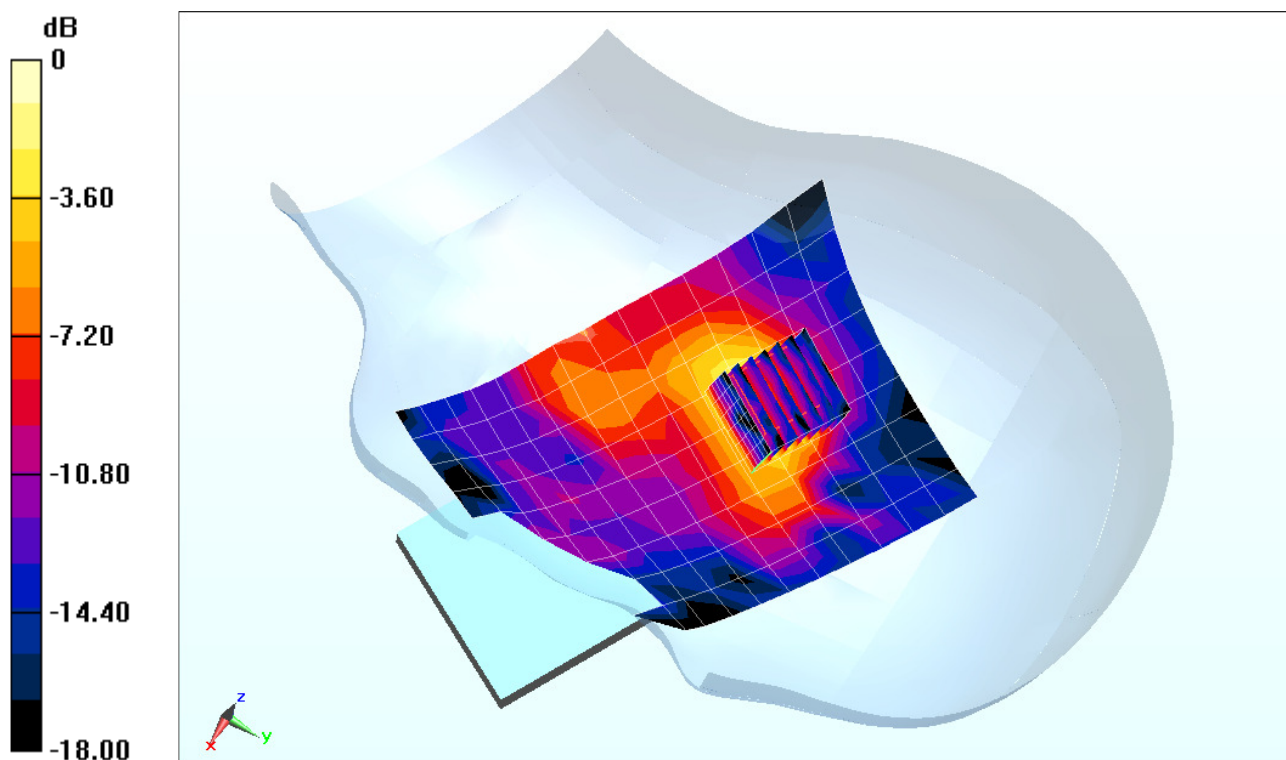
Area Scan (10x15x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 3.697 V/m; Power Drift = -0.20 dB

Peak SAR (extrapolated) = 0.048 mW/g

SAR(1 g) = 0.026 mW/g; SAR(10 g) = 0.013 mW/g



0 dB = 0.0327 mW/g = -29.71 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHI200; Type: Portable Handset; Serial: FCC # 1

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5260 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head; Medium parameters used:

$f = 5260 \text{ MHz}$; $\sigma = 4.545 \text{ mho/m}$; $\epsilon_r = 35.96$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 07-03-2012; Ambient Temp: 24.6°C; Tissue Temp: 23.5°C

Probe: EX3DV4 - SN3589; ConvF(4.36, 4.36, 4.36); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11a 5.3 GHz, Right Head, Touch, Ch 52, 6 Mbps

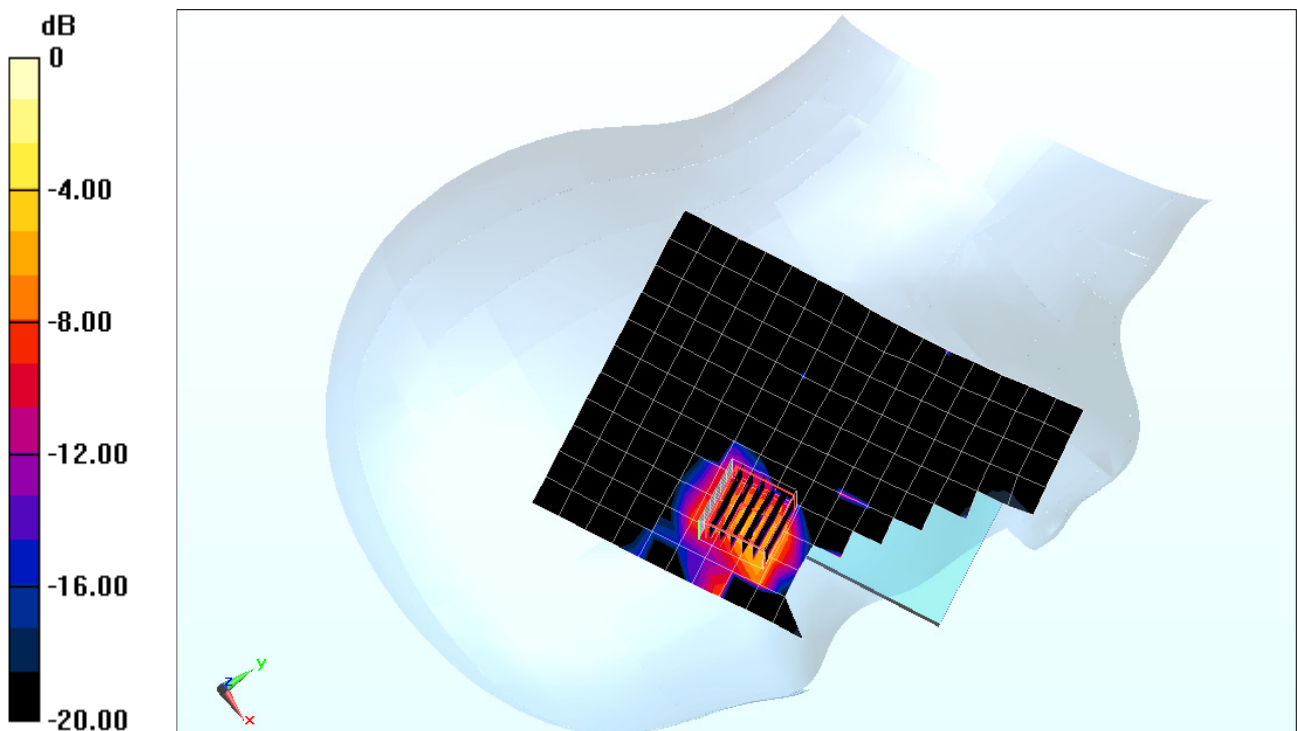
Area Scan (12x16x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Zoom Scan (7x7x12)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 4.894 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.653 mW/g

SAR(1 g) = 0.092 mW/g; SAR(10 g) = 0.031 mW/g



0 dB = 0.190 mW/g = -14.42 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHI200; Type: Portable Handset; Serial: FCC # 1

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5260 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head; Medium parameters used:

$f = 5260 \text{ MHz}$; $\sigma = 4.545 \text{ mho/m}$; $\epsilon_r = 35.96$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 07-03-2012; Ambient Temp: 24.6°C; Tissue Temp: 23.5°C

Probe: EX3DV4 - SN3589; ConvF(4.36, 4.36, 4.36); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11a 5.3 GHz, Right Head, Tilt, Ch 52, 6 Mbps

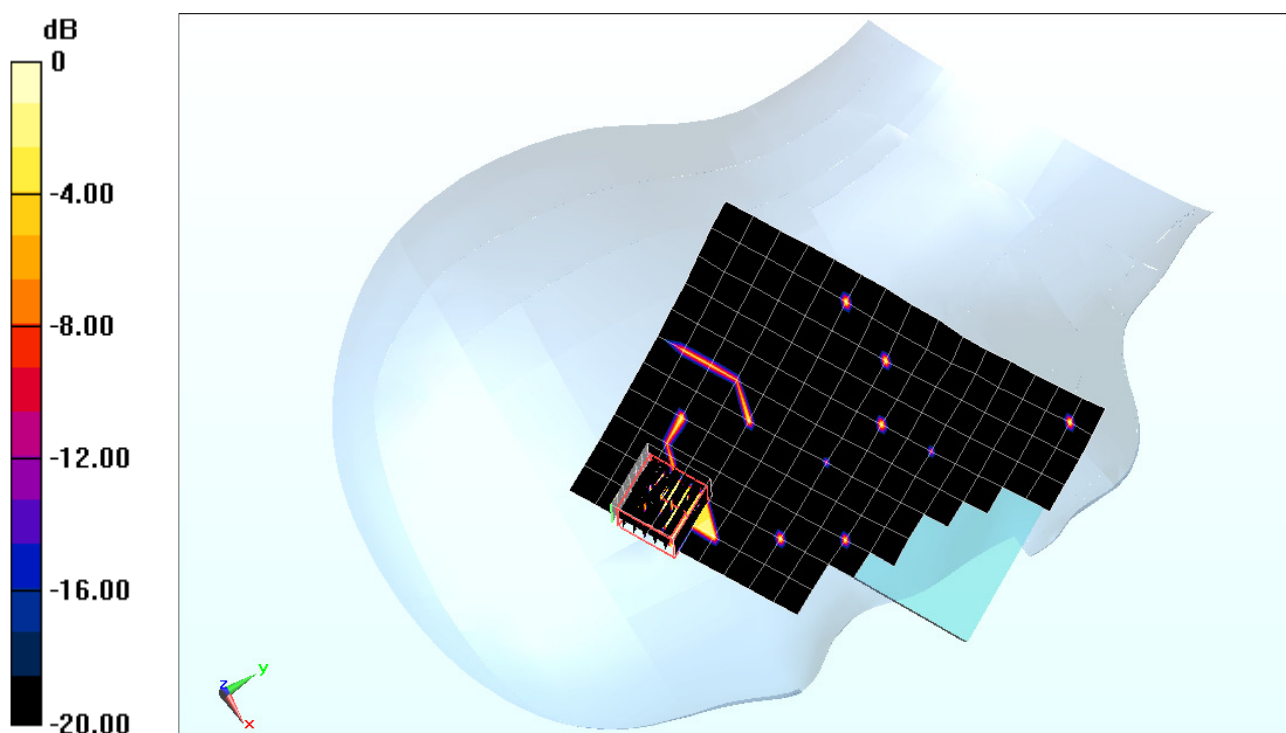
Area Scan (12x16x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Zoom Scan (7x7x12)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.015 mW/g

SAR(1 g) = 6.85e-005 mW/g; SAR(10 g) = 6.72e-006 mW/g



0 dB = 0.0223 mW/g = -33.03 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHI200; Type: Portable Handset; Serial: FCC #1

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5785 \text{ MHz}$; $\sigma = 5.029 \text{ mho/m}$; $\epsilon_r = 35.33$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 07-03-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.8°C

Probe: EX3DV4 - SN3589; ConvF(4.05, 4.05, 4.05); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

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

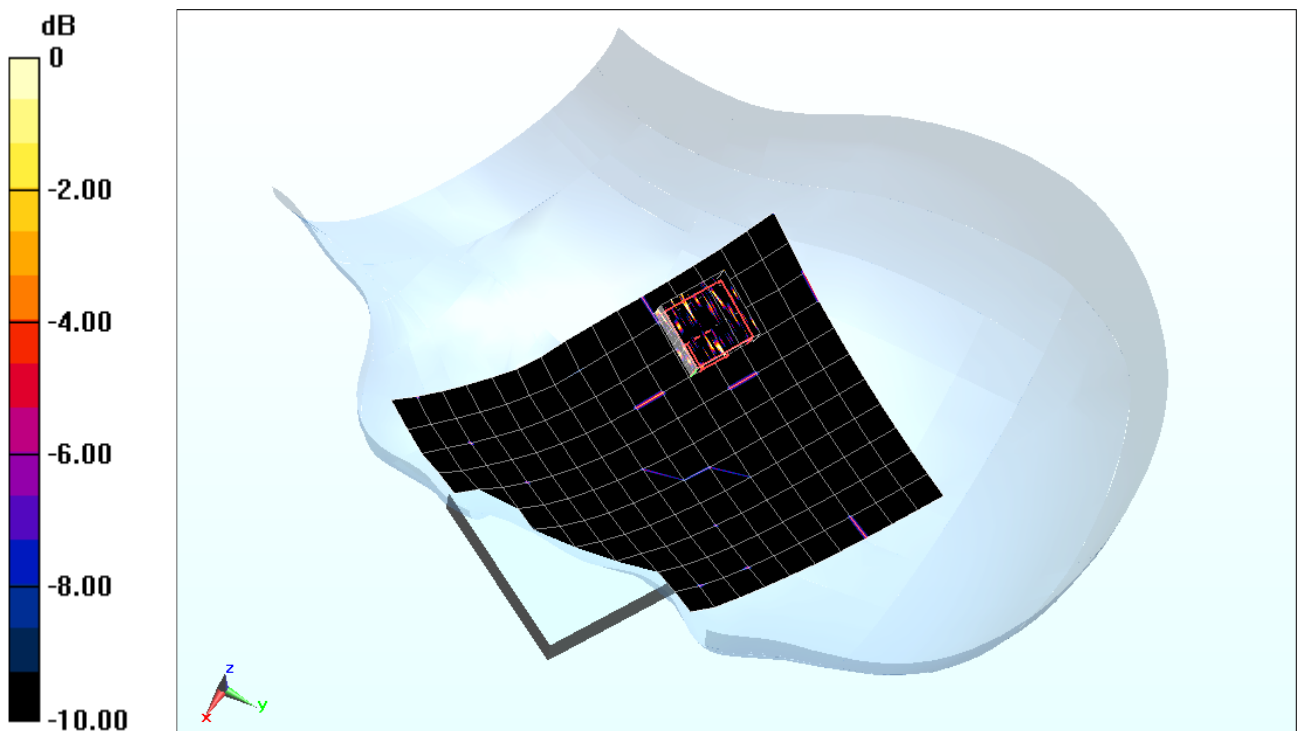
Area Scan (12x16x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Zoom Scan (7x7x12)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.0 dB

Peak SAR (extrapolated) = 0.030 mW/g

SAR(1 g) = 0.000117 mW/g; SAR(10 g) = 1.18e-005 mW/g



0 dB = 0.0420 mW/g = -27.54 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHI200; Type: Portable Handset; Serial: FCC #1

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5500 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head; Medium parameters used:

$f = 5500 \text{ MHz}$; $\sigma = 4.743 \text{ mho/m}$; $\epsilon_r = 35.58$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 07-03-2012; Ambient Temp: 24.7°C; Tissue Temp: 23.6°C

Probe: EX3DV4 - SN3589;ConvF(4.33, 4.33, 4.33); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11a, 5.5 GHz Left Head, Tilt, Ch 100, 6 Mbps

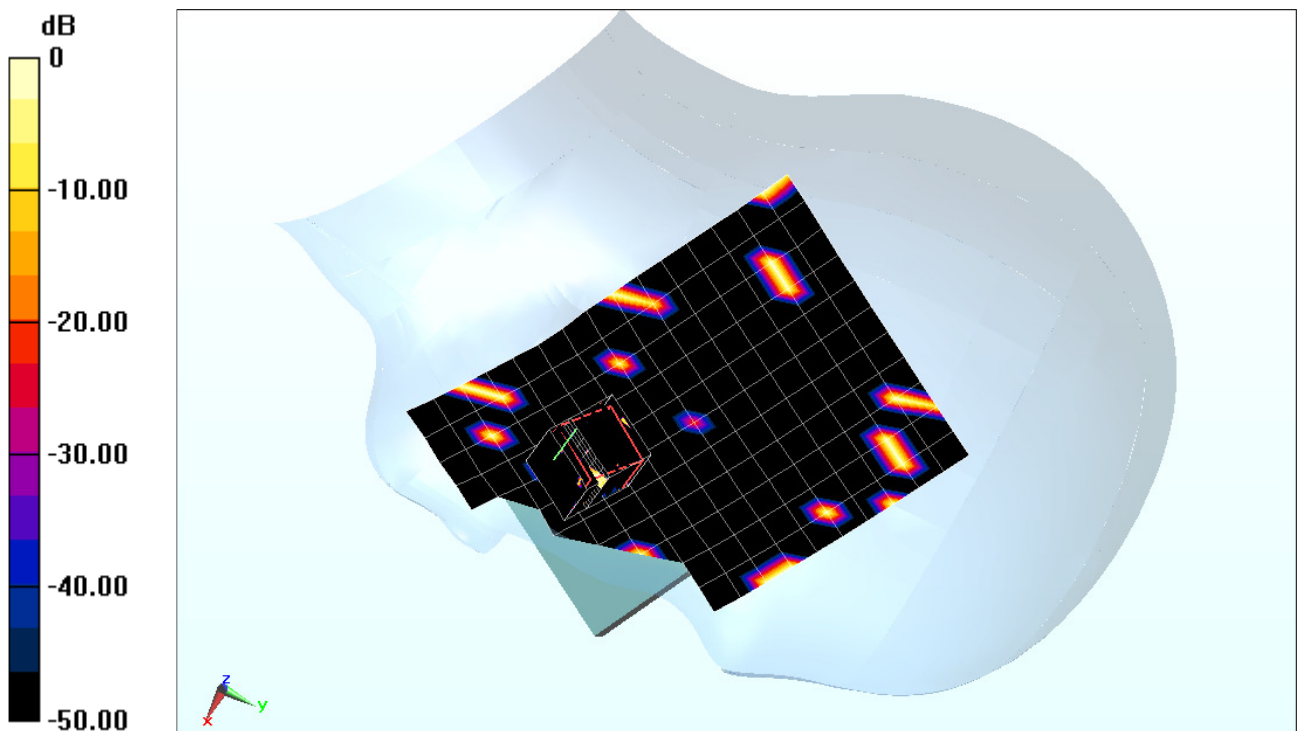
Area Scan (12x16x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Zoom Scan (7x7x12)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.026 mW/g

SAR(1 g) = 0.000112 mW/g; SAR(10 g) = 1.13e-005 mW/g



0 dB = 0.0249 mW/g = -32.08 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHI200; Type: Portable Handset; Serial: FCC#3

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

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

$f = 2412 \text{ MHz}$; $\sigma = 1.92 \text{ mho/m}$; $\epsilon_r = 52.261$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-03-2012; Ambient Temp: 23.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3288; ConvF(4.47, 4.47, 4.47); Calibrated: 2/7/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 4/12/2012

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.4 (4989)

Mode: IEEE 802.11b, Body SAR, Ch 01, 1 Mbps, Back Side

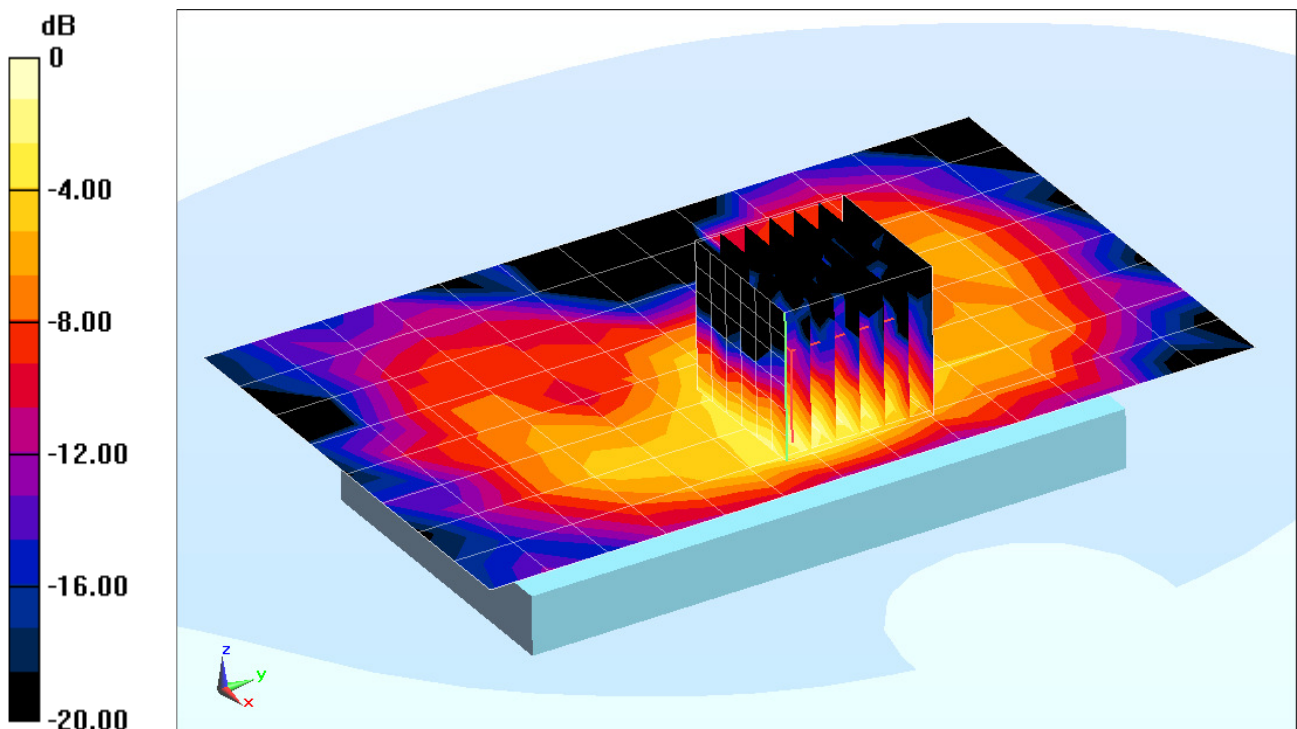
Area Scan (9x14x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 3.855 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.053 mW/g

SAR(1 g) = 0.025 mW/g; SAR(10 g) = 0.012 mW/g



0 dB = 0.0324 mW/g = -29.79 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHI200; Type: Portable Handset; Serial: FCC#3

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

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

$f = 2412 \text{ MHz}$; $\sigma = 1.92 \text{ mho/m}$; $\epsilon_r = 52.261$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-03-2012; Ambient Temp: 23.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3288; ConvF(4.47, 4.47, 4.47); Calibrated: 2/7/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 4/12/2012

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (0);SEMCAD X Version 14.6.4 (4989)

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

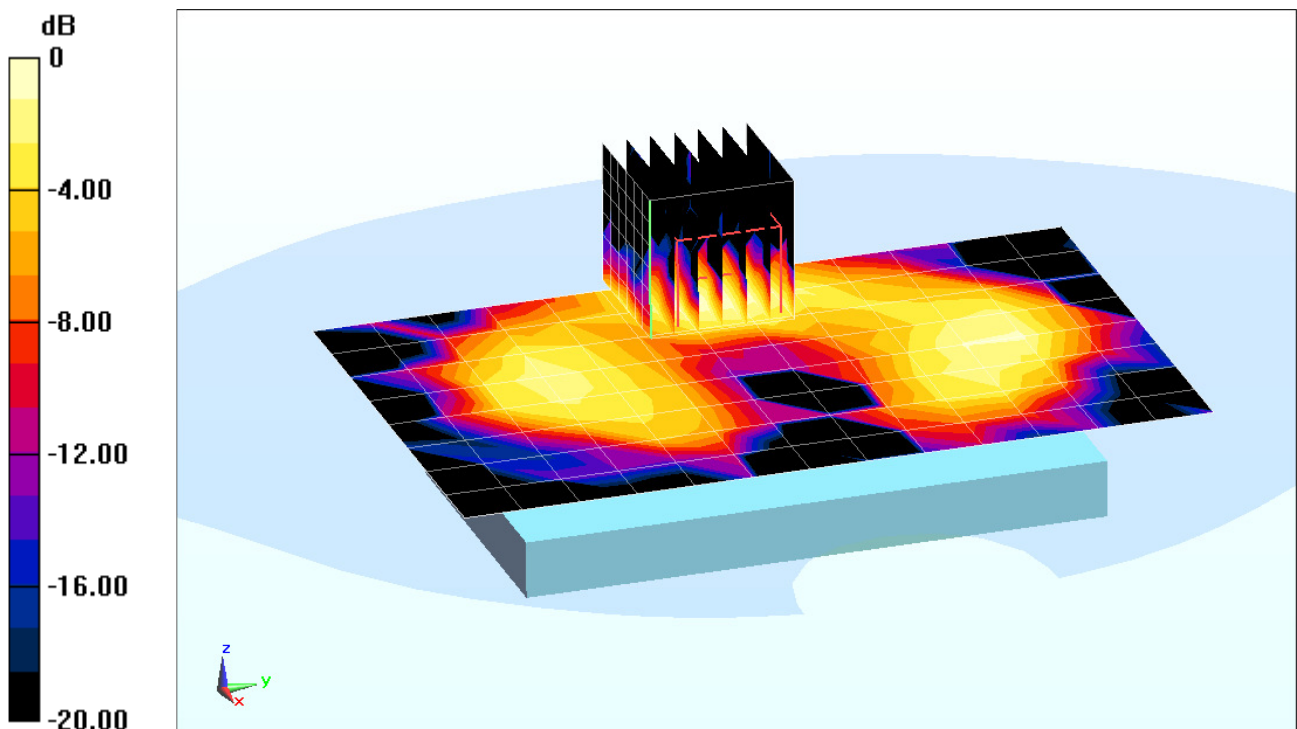
Area Scan (9x14x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 2.647 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.031 mW/g

SAR(1 g) = 0.011 mW/g; SAR(10 g) = 0.00446 mW/g



0 dB = 0.0155 mW/g = -36.19 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHI200; Type: Portable Handset; Serial: FCC#3

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

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

$f = 2412 \text{ MHz}$; $\sigma = 1.92 \text{ mho/m}$; $\epsilon_r = 52.261$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-03-2012; Ambient Temp: 23.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3288; ConvF(4.47, 4.47, 4.47); Calibrated: 2/7/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 4/12/2012

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (0);SEMCAD X Version 14.6.4 (4989)

Mode: IEEE 802.11b, Body SAR, Ch 01, 1 Mbps, Left Edge

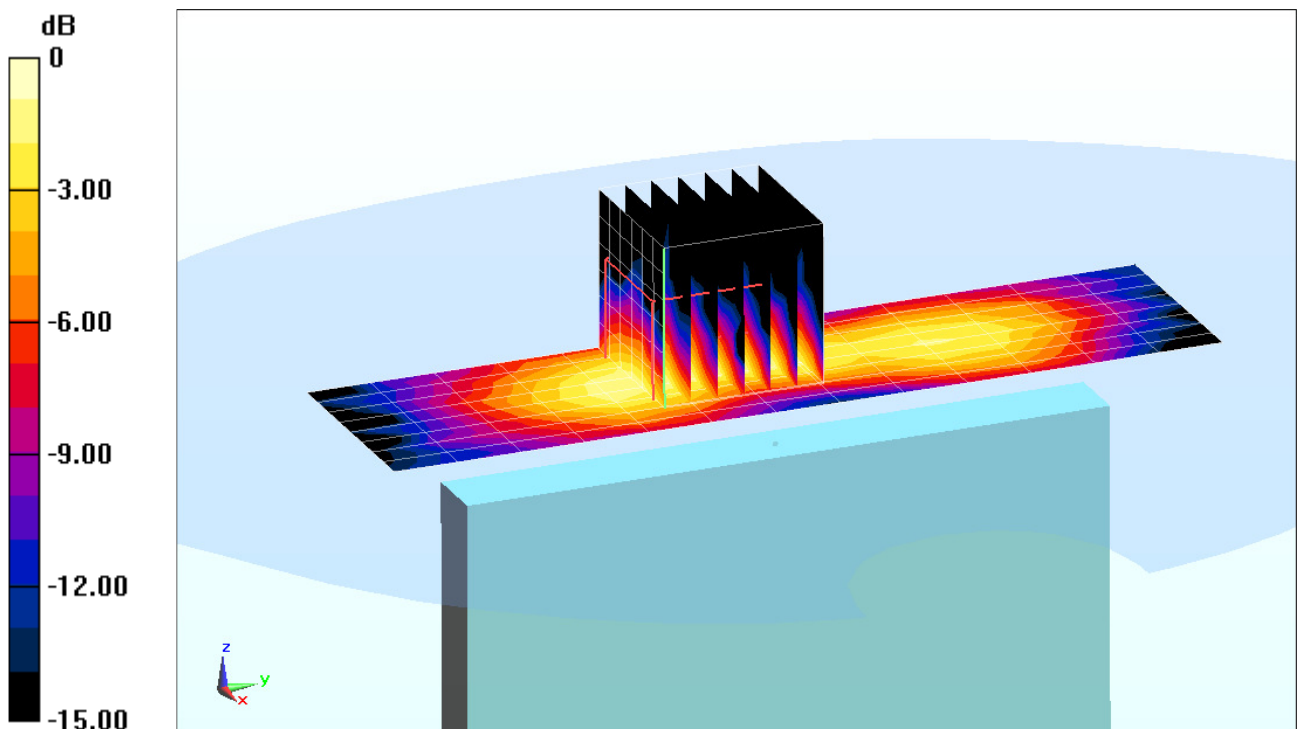
Area Scan (9x14x1): Measurement grid: $dx=5\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 3.970 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.055 mW/g

SAR(1 g) = 0.025 mW/g; SAR(10 g) = 0.011 mW/g



0 dB = 0.0357 mW/g = -28.95 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSCHI200; Type: Portable Handset; Serial: FCC #1

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5260 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body; Medium parameters used:

$f = 5260 \text{ MHz}$; $\sigma = 5.156 \text{ mho/m}$; $\epsilon_r = 49.99$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-05-2012; Ambient Temp: 24.7°C; Tissue Temp: 23.6°C

Probe: EX3DV4 - SN3589; ConvF(3.72, 3.72, 3.72); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11a, 5.3 GHz, Body SAR, Ch 52, 6 Mbps, Back Side

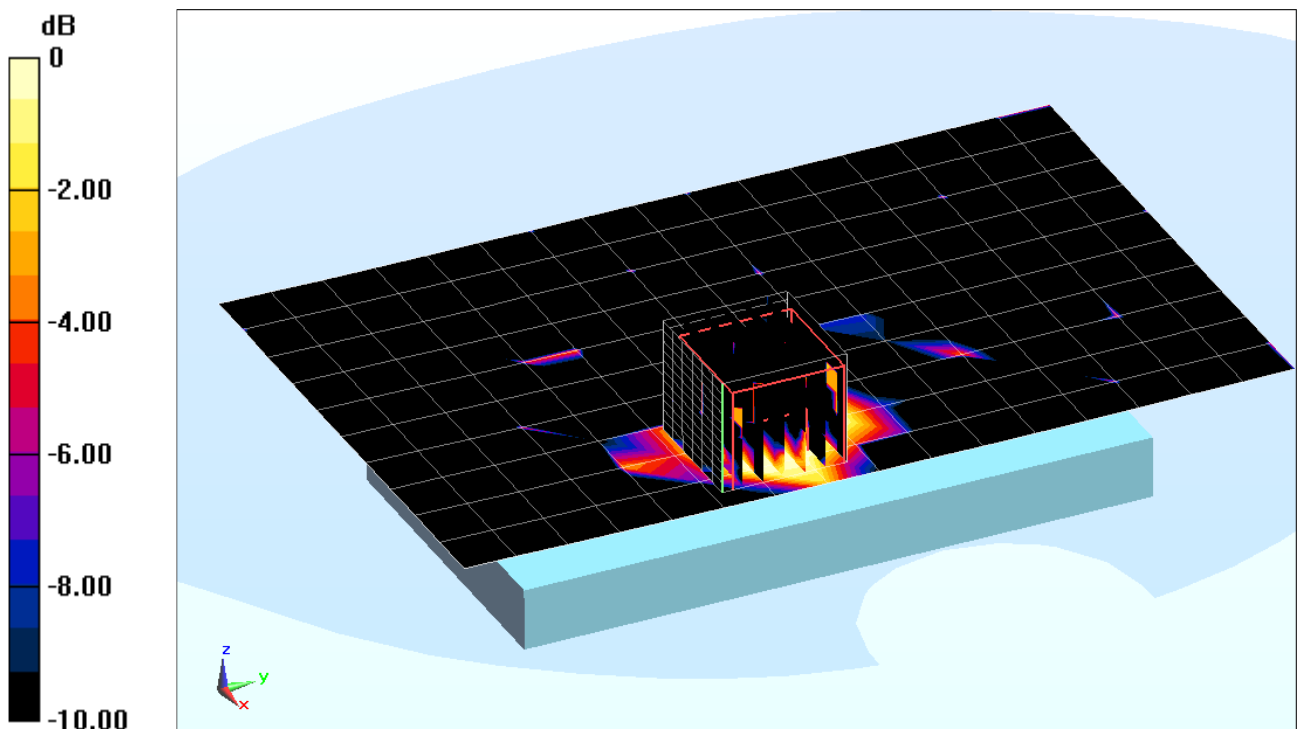
Area Scan (11x17x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Zoom Scan (7x7x12)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Reference Value = 2.269 V/m; Power Drift = -0.125 dB

Peak SAR (extrapolated) = 0.437 mW/g

SAR(1 g) = 0.033 mW/g; SAR(10 g) = 0.00544 mW/g



0 dB = 0.0692 mW/g = -23.20 dB mW/g

APPENDIX B: SYSTEM VERIFICATION

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:

$f = 2450 \text{ MHz}$; $\sigma = 1.859 \text{ mho/m}$; $\epsilon_r = 38.59$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-05-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.8°C

Probe: ES3DV3 - SN3258; ConvF(4.46, 4.46, 4.46); Calibrated: 2/21/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

2450MHz System Verification

Area Scan (6x8x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

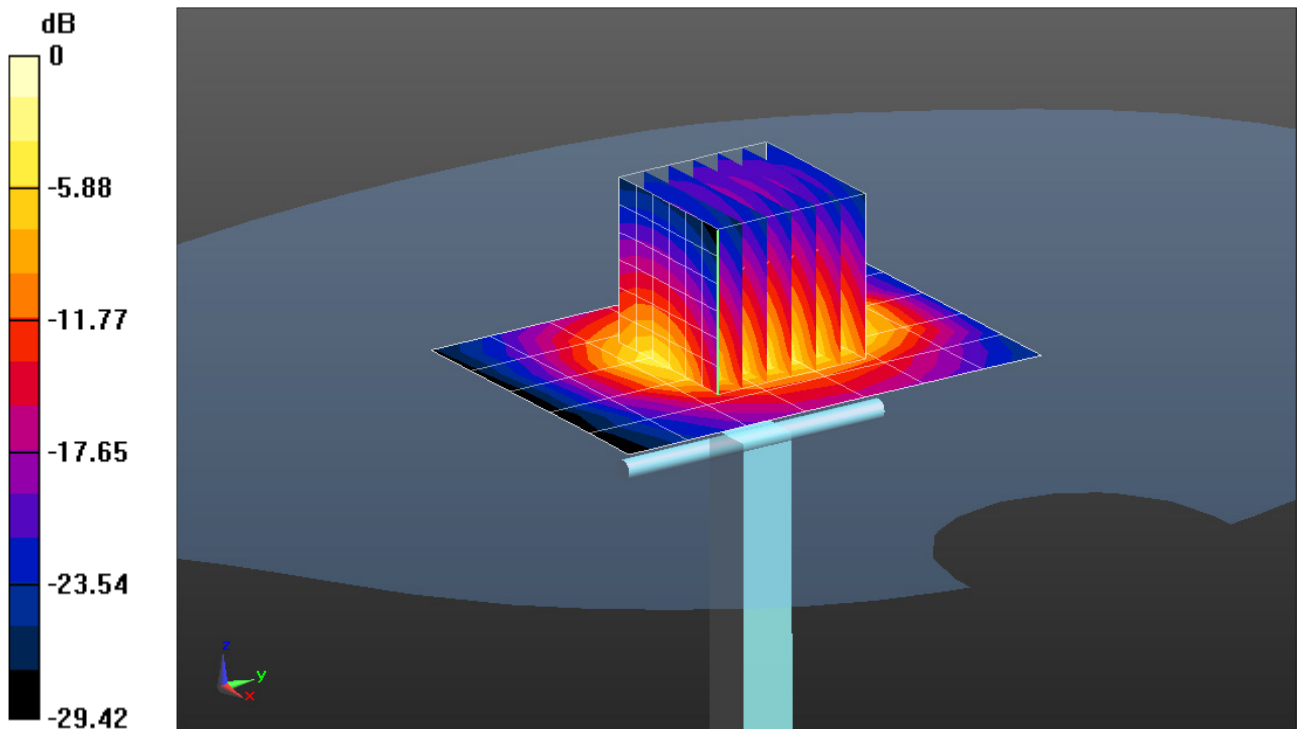
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 11.014 mW/g

SAR(1 g) = 5.64 mW/g; SAR(10 g) = 2.68 mW/g

Deviation = 4.83%



0 dB = 7.57 mW/g = 17.59 dB mW/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:

$f = 2450 \text{ MHz}$; $\sigma = 1.859 \text{ mho/m}$; $\epsilon_r = 38.59$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-05-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.8°C

Probe: ES3DV3 - SN3258; ConvF(4.46, 4.46, 4.46); Calibrated: 2/21/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

2450MHz System Verification

Area Scan (6x8x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

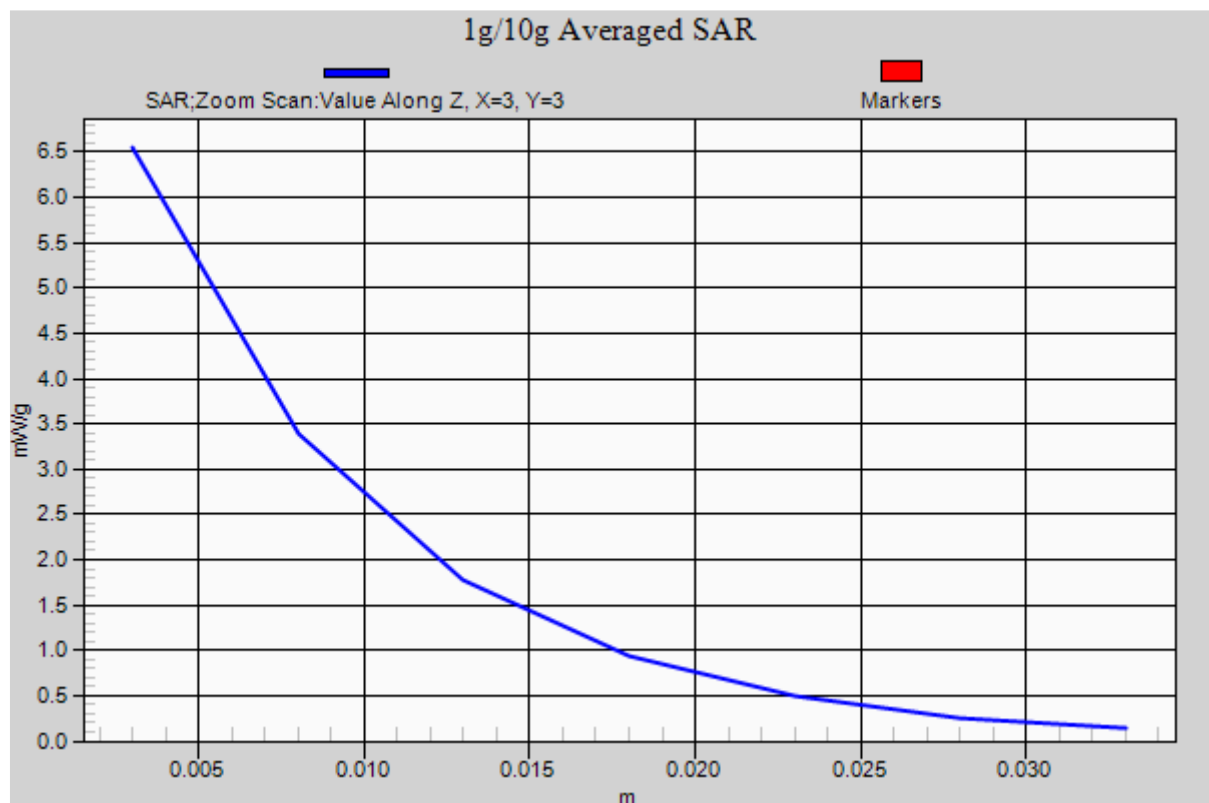
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 11.014 mW/g

SAR(1 g) = 5.64 mW/g; SAR(10 g) = 2.68 mW/g

Deviation = 4.83%



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5200 \text{ MHz}$; $\sigma = 4.458 \text{ mho/m}$; $\epsilon_r = 36.01$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-03-2012; Ambient Temp: 24.6°C; Tissue Temp: 23.5°C

Probe: EX3DV4 - SN3589; ConvF(4.59, 4.59, 4.59); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

5200MHz System Verification

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

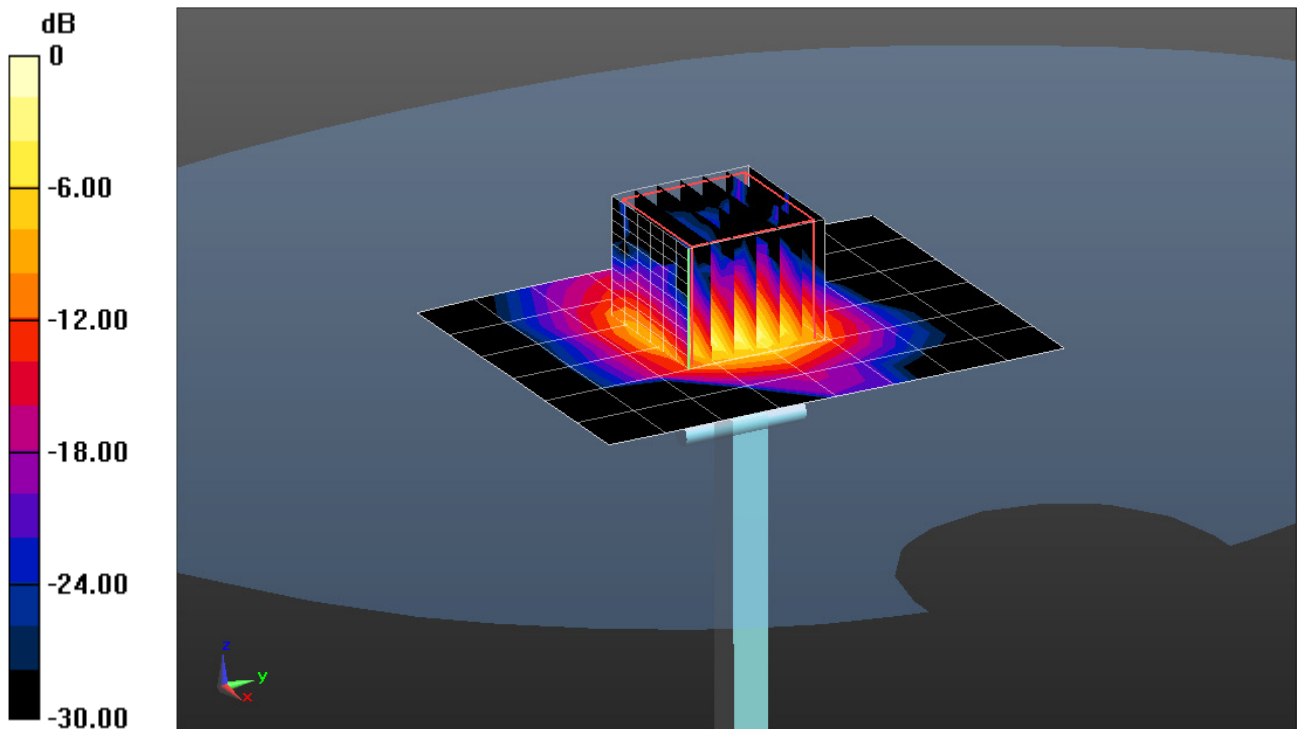
Zoom Scan (7x7x11)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Input Power = 12.58 dBm (18.1 mW)

Peak SAR (extrapolated) = 6.063 mW/g

SAR(1 g) = 1.42 mW/g; SAR(10 g) = 0.389 mW/g

Deviation = -0.82%



0 dB = 2.95 mW/g = 9.40 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5200 \text{ MHz}$; $\sigma = 4.458 \text{ mho/m}$; $\epsilon_r = 36.01$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-03-2012; Ambient Temp: 24.6°C; Tissue Temp: 23.5°C

Probe: EX3DV4 - SN3589; ConvF(4.59, 4.59, 4.59); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

5200MHz System Verification

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

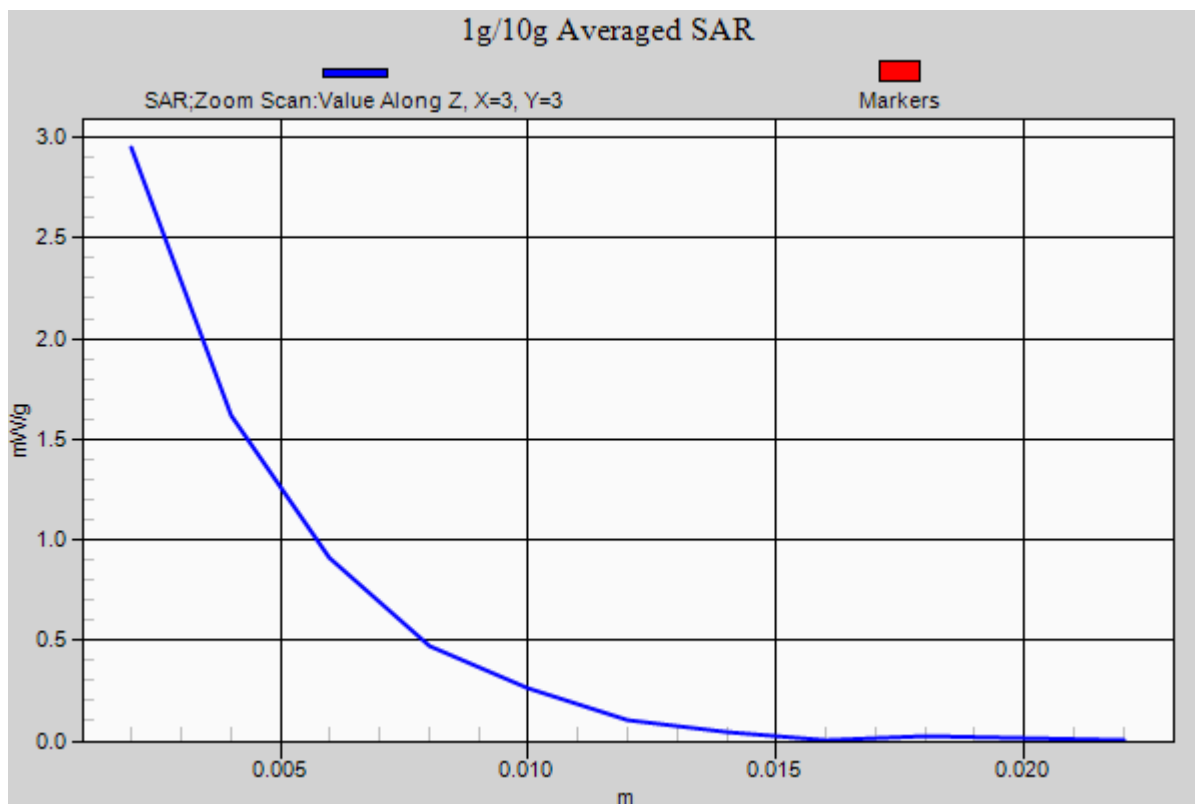
Zoom Scan (7x7x11)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Input Power = 12.58 dBm (18.1 mW)

Peak SAR (extrapolated) = 6.063 mW/g

SAR(1 g) = 1.42 mW/g; SAR(10 g) = 0.389 mW/g

Deviation = -0.82%



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5500 \text{ MHz}$; $\sigma = 4.743 \text{ mho/m}$; $\epsilon_r = 35.58$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-03-2012; Ambient Temp: 24.7°C; Tissue Temp: 23.6°C

Probe: EX3DV4 - SN3589; ConvF(4.33, 4.33, 4.33); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

5500MHz System Verification

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

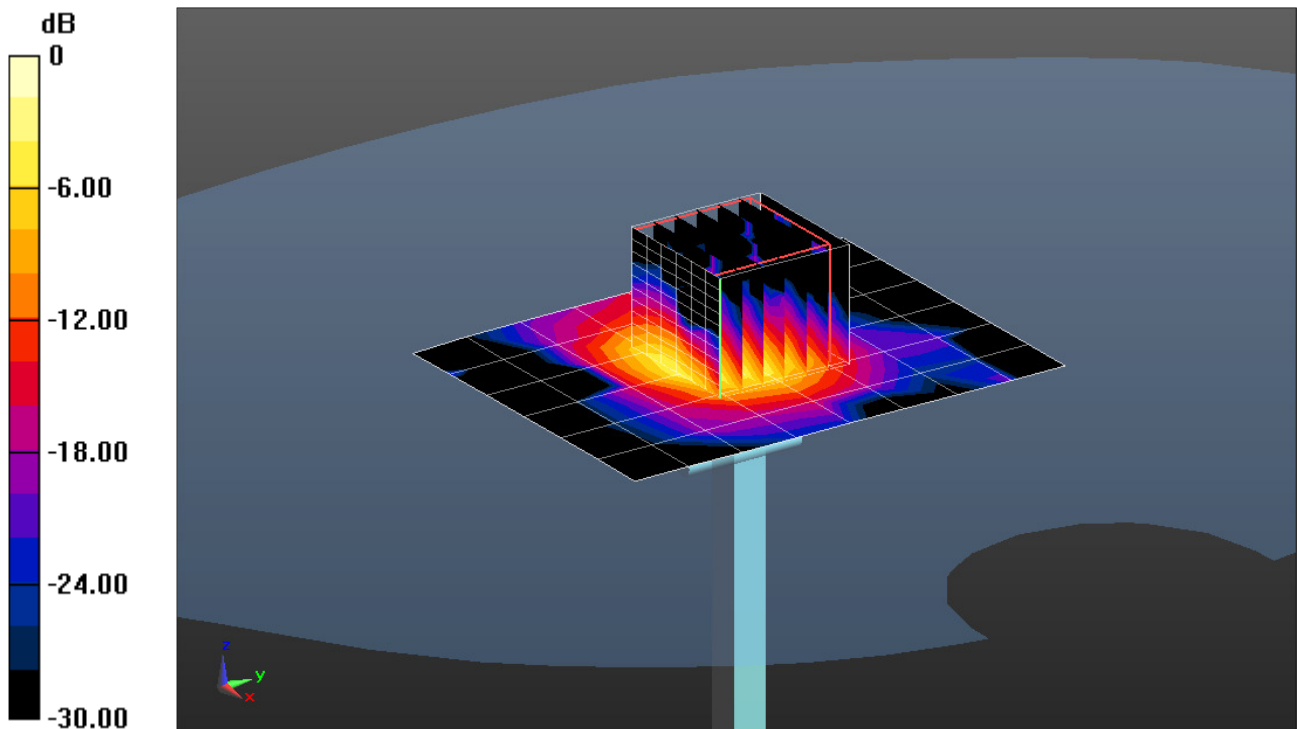
Zoom Scan (7x7x11)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Input Power = 12.58 dBm (18.1 mW)

Peak SAR (extrapolated) = 6.225 mW/g

SAR(1 g) = 1.46 mW/g; SAR(10 g) = 0.379 mW/g

Deviation = -4.99%



0 dB = 2.88 mW/g = 9.19 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5500 \text{ MHz}$; $\sigma = 4.743 \text{ mho/m}$; $\epsilon_r = 35.58$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-03-2012; Ambient Temp: 24.7°C; Tissue Temp: 23.6°C

Probe: EX3DV4 - SN3589; ConvF(4.33, 4.33, 4.33); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5500MHz System Verification

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

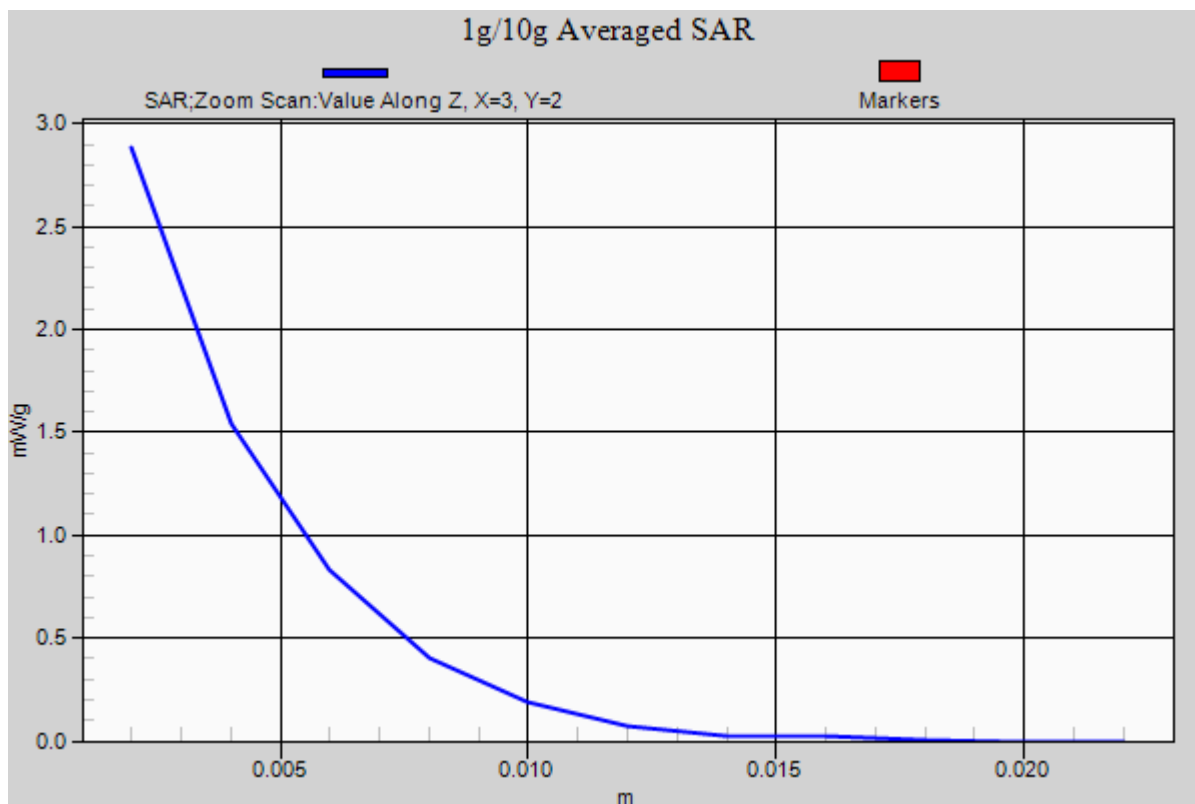
Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Input Power = 12.58 dBm (18.1 mW)

Peak SAR (extrapolated) = 6.225 mW/g

SAR(1 g) = 1.46 mW/g; SAR(10 g) = 0.379 mW/g

Deviation = -4.99%



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5800 \text{ MHz}$; $\sigma = 5.052 \text{ mho/m}$; $\epsilon_r = 35.34$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-03-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.8°C

Probe: EX3DV4 - SN3589; ConvF(4.05, 4.05, 4.05); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5800MHz System Verification

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

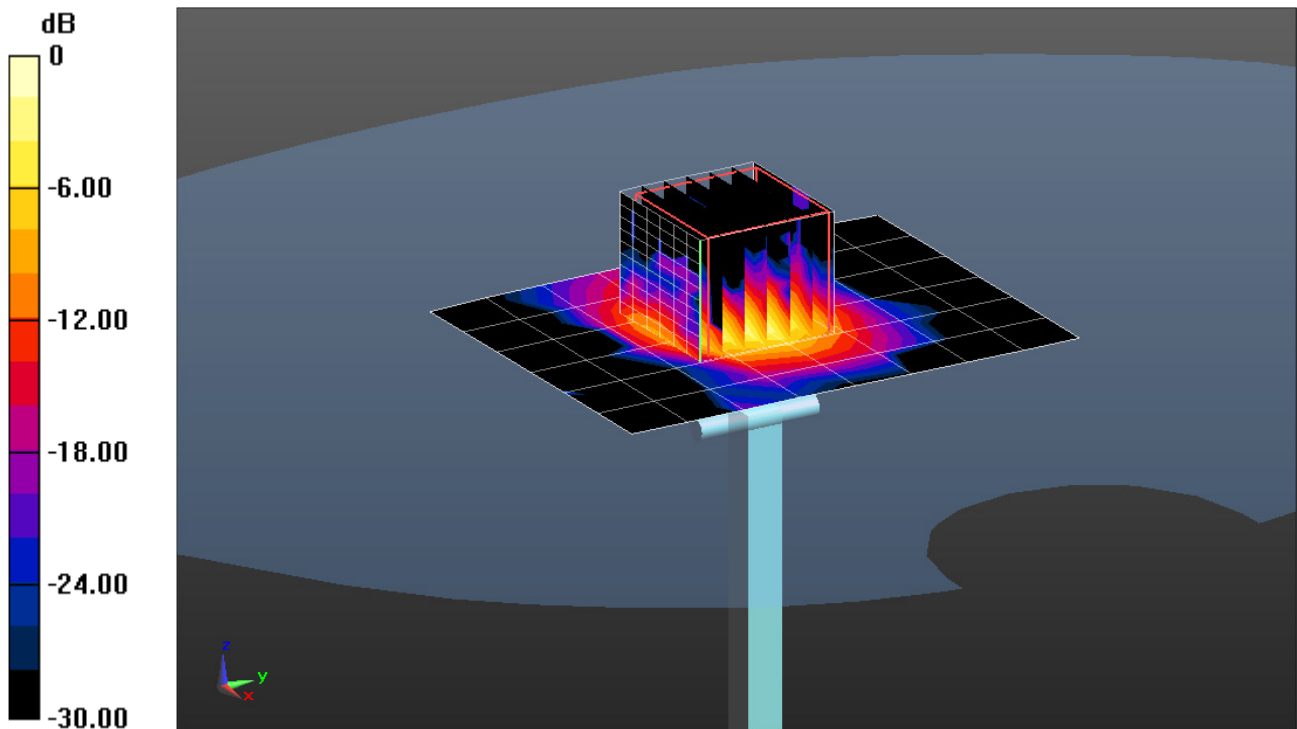
Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Input Power = 12.58 dBm (18.1 mW)

Peak SAR (extrapolated) = 6.442 mW/g

SAR(1 g) = 1.4 mW/g; SAR(10 g) = 0.373 mW/g

Deviation = -2.71%



0 dB = 3.03 mW/g = 9.63 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 5 GHz Head; Medium parameters used:

$f = 5800 \text{ MHz}$; $\sigma = 5.052 \text{ mho/m}$; $\epsilon_r = 35.34$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-03-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.8°C

Probe: EX3DV4 - SN3589; ConvF(4.05, 4.05, 4.05); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5800MHz System Verification

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

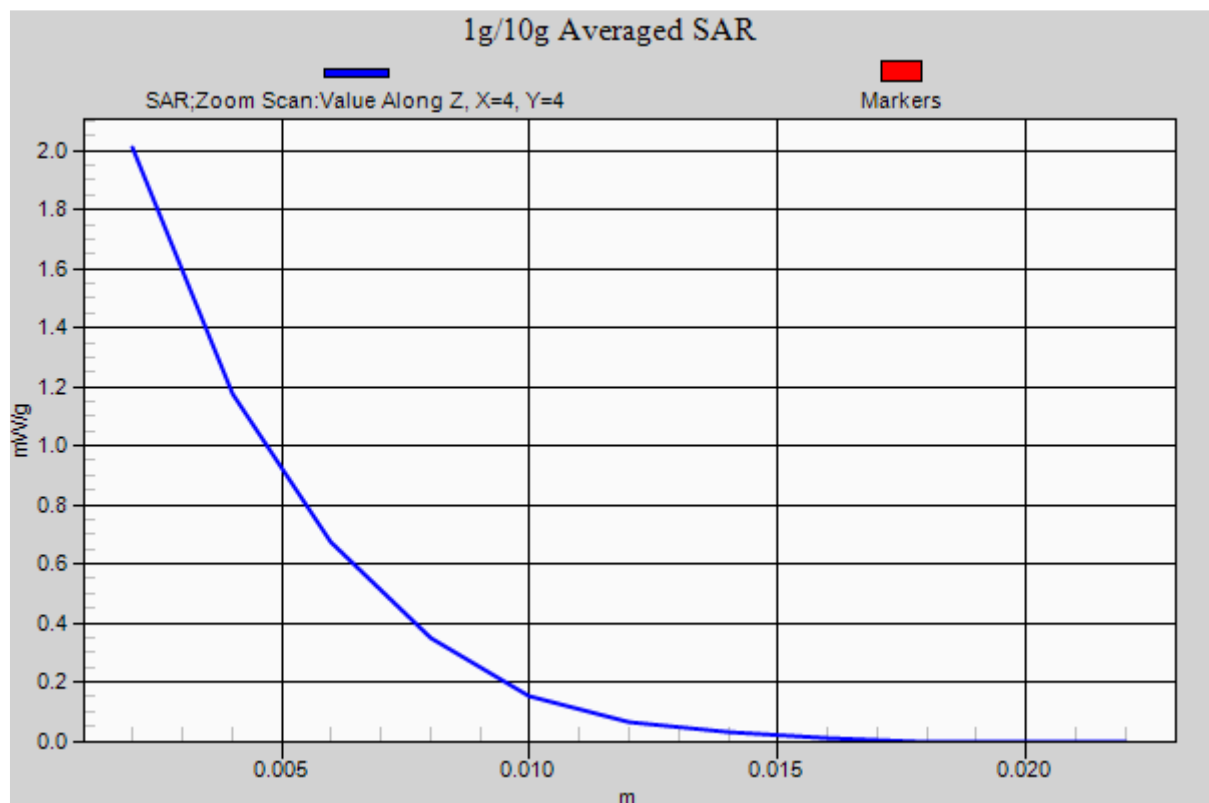
Zoom Scan (7x7x11)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Input Power = 12.58 dBm (18.1 mW)

Peak SAR (extrapolated) = 6.442 mW/g

SAR(1 g) = 1.4 mW/g; SAR(10 g) = 0.373 mW/g

Deviation = -2.71%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 882

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

Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.982 \text{ mho/m}$; $\epsilon_r = 52.09$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-03-2012; Ambient Temp: 23.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3288; ConvF(4.47, 4.47, 4.47); Calibrated: 2/7/2012

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 4/12/2012

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.4 (4989)

2450 MHz System Verification

Area Scan (8x9x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

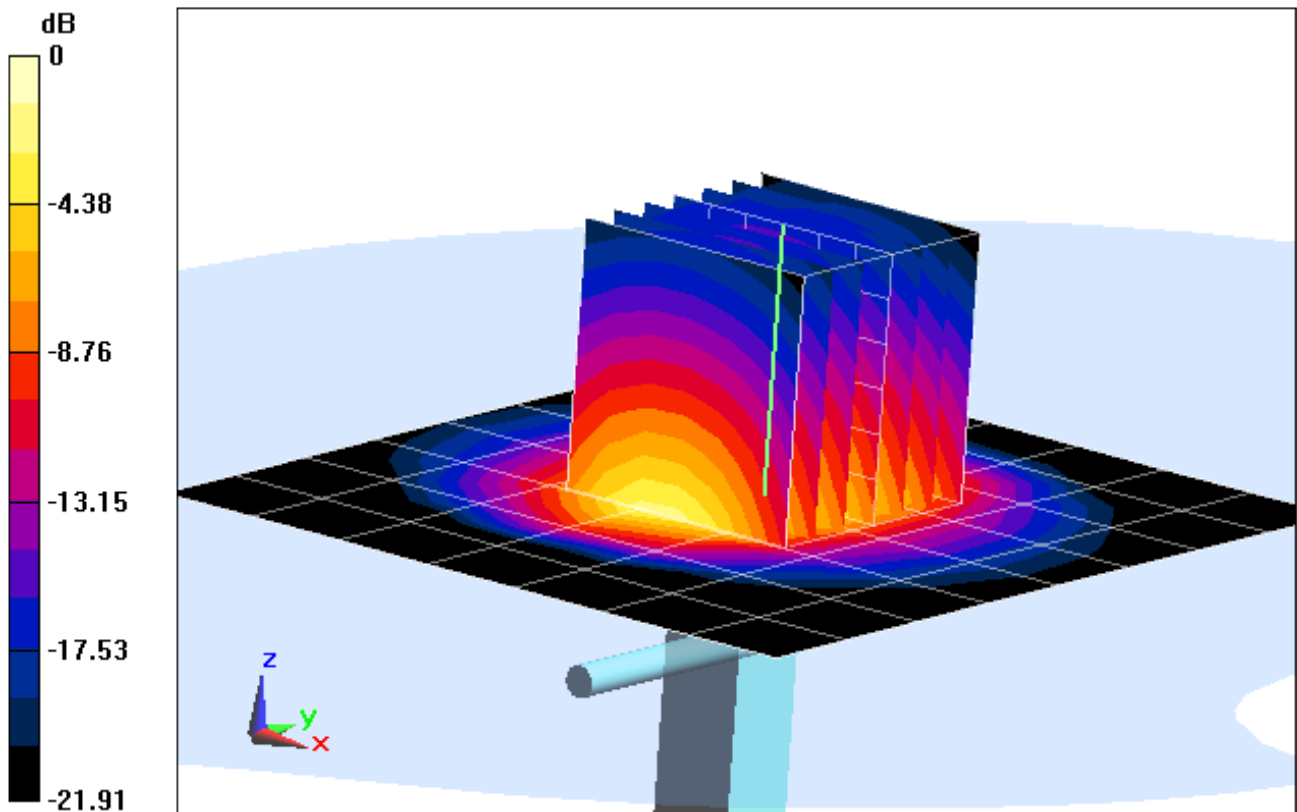
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 10.8600

SAR(1 g) = 5.1 mW/g; SAR(10 g) = 2.35 mW/g

Deviation = 1.39 %



0 dB = 6.570mW/g = 16.35 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 882

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

Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.982 \text{ mho/m}$; $\epsilon_r = 52.09$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-03-2012; Ambient Temp: 23.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3288; ConvF(4.47, 4.47, 4.47); Calibrated: 2/7/2012

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 4/12/2012

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.4 (4989)

2450 MHz System Verification

Area Scan (8x9x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

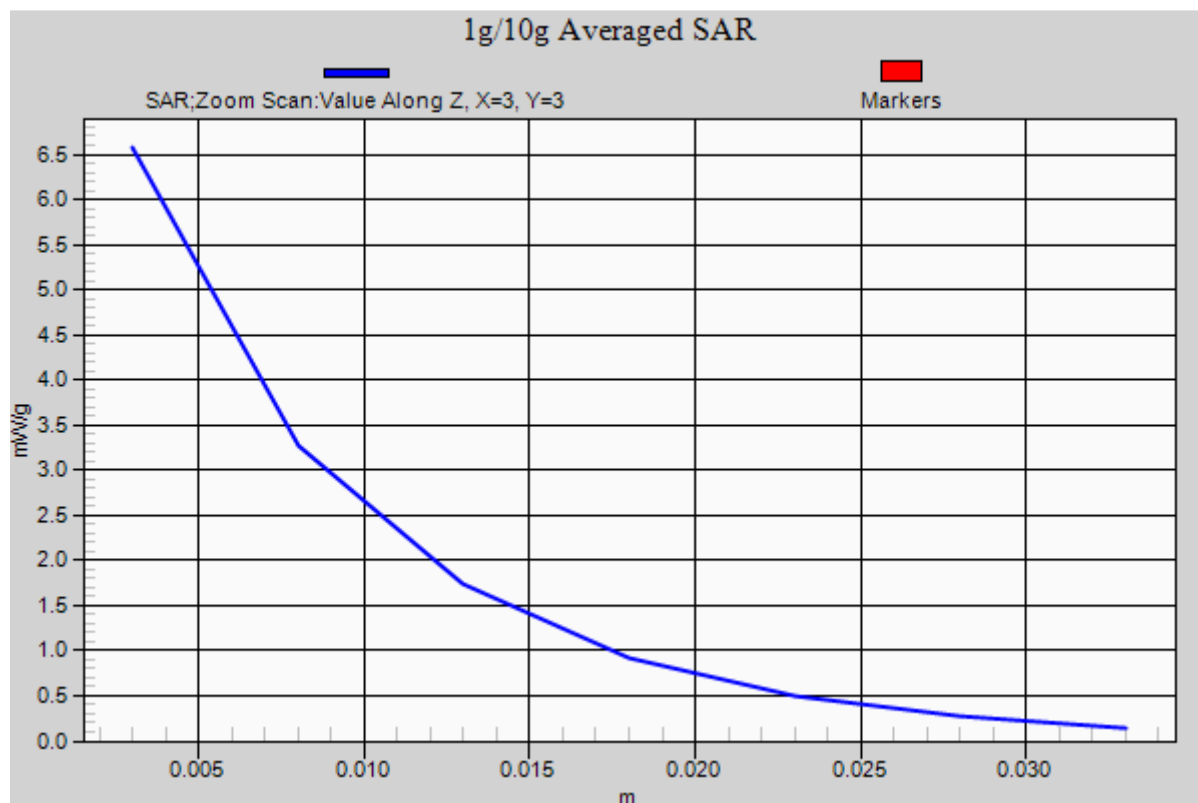
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Input Power = 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 10.8600

SAR(1 g) = 5.1 mW/g; SAR(10 g) = 2.35 mW/g

Deviation = 1.39 %



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 5 GHz Body; Medium parameters used:

$f = 5200 \text{ MHz}$; $\sigma = 5.071 \text{ mho/m}$; $\epsilon_r = 49.94$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-05-2012; Ambient Temp: 24.7°C; Tissue Temp: 23.6°C

Probe: EX3DV4 - SN3589; ConvF(3.92, 3.92, 3.92); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

5200MHz System Verification

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

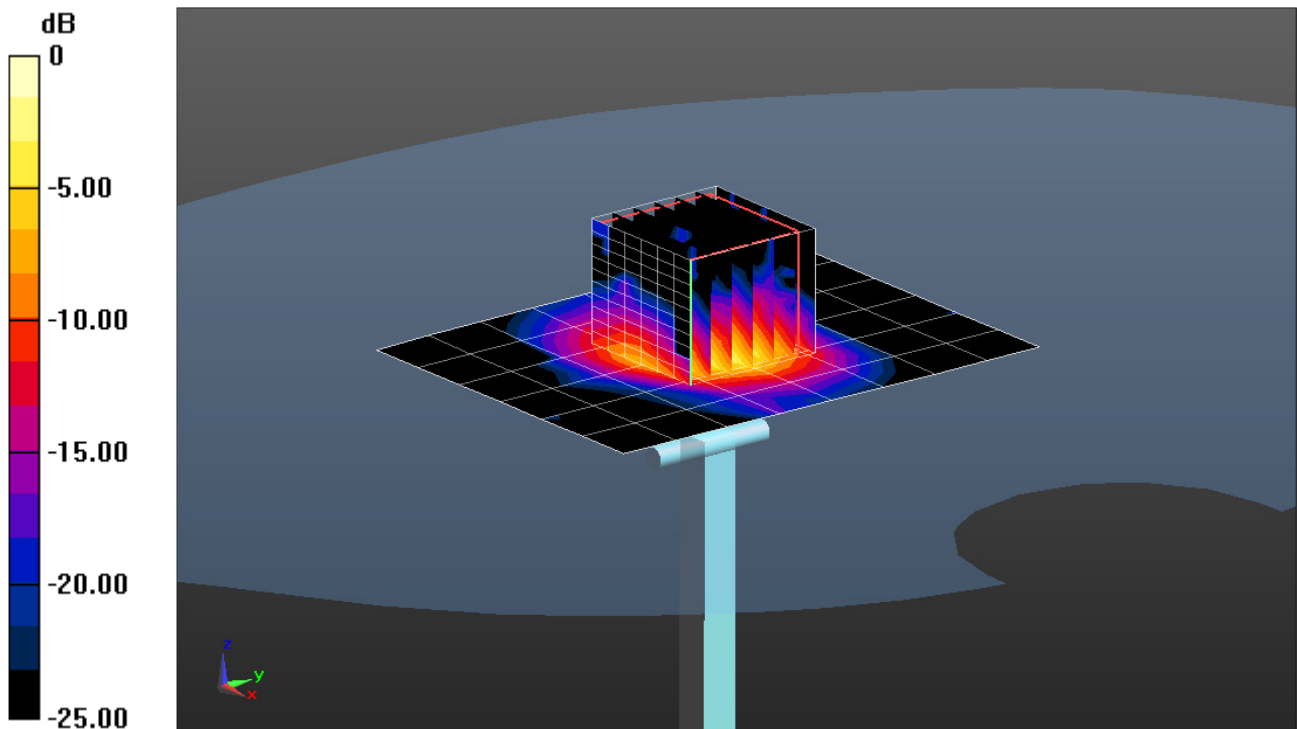
Zoom Scan (7x7x11)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Input Power = 12.3 dBm (17.0 mW)

Peak SAR (extrapolated) = 4.744 mW/g

SAR(1 g) = 1.26 mW/g; SAR(10 g) = 0.340 mW/g

Deviation = 0.98%



0 dB = 2.60 mW/g = 8.30 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 5 GHz Body; Medium parameters used:

$f = 5200 \text{ MHz}$; $\sigma = 5.071 \text{ mho/m}$; $\epsilon_r = 49.94$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-05-2012; Ambient Temp: 24.7°C; Tissue Temp: 23.6°C

Probe: EX3DV4 - SN3589; ConvF(3.92, 3.92, 3.92); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5200MHz System Verification

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

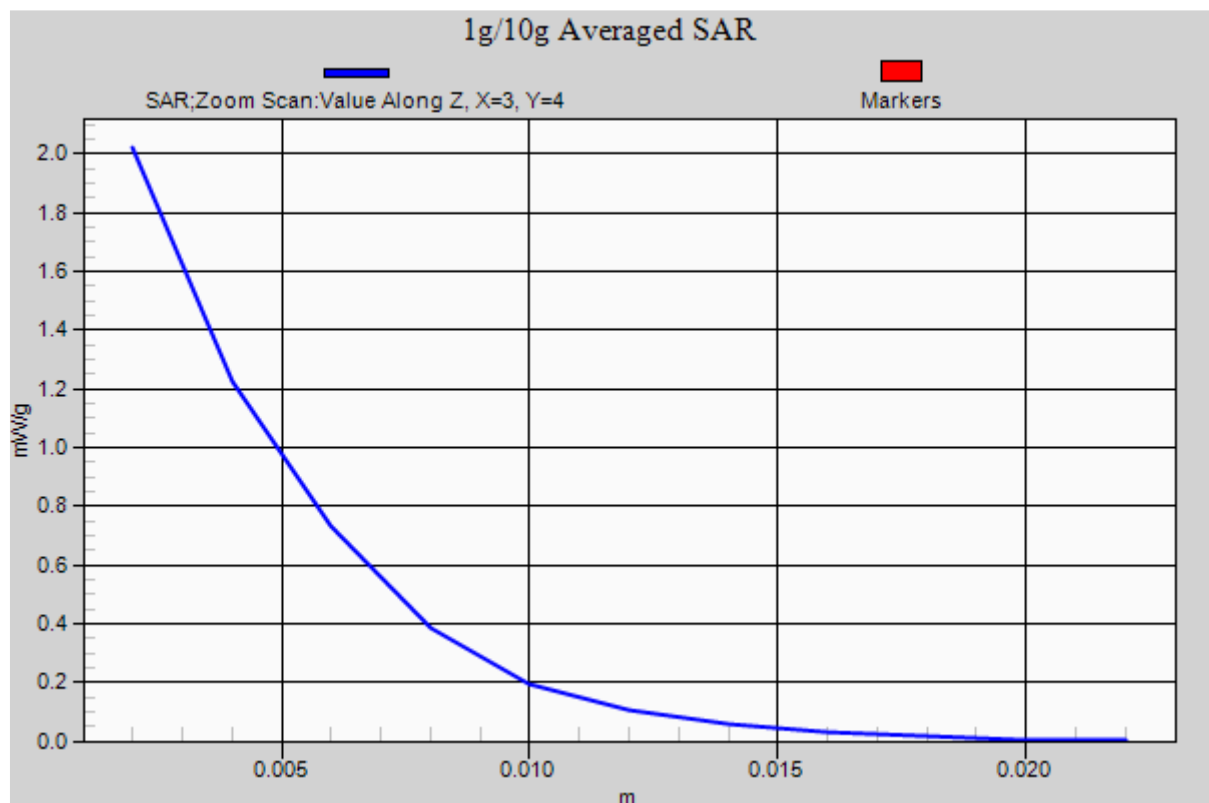
Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Input Power = 12.3 dBm (17.0 mW)

Peak SAR (extrapolated) = 4.744 mW/g

SAR(1 g) = 1.26 mW/g; SAR(10 g) = 0.340 mW/g

Deviation = 0.98%



PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 5500 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used:

$f = 5500 \text{ MHz}$; $\sigma = 5.498 \text{ mho/m}$; $\epsilon_r = 49.29$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-05-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.8°C

Probe: EX3DV4 - SN3589; ConvF(3.4, 3.4, 3.4); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

5500MHz System Verification

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

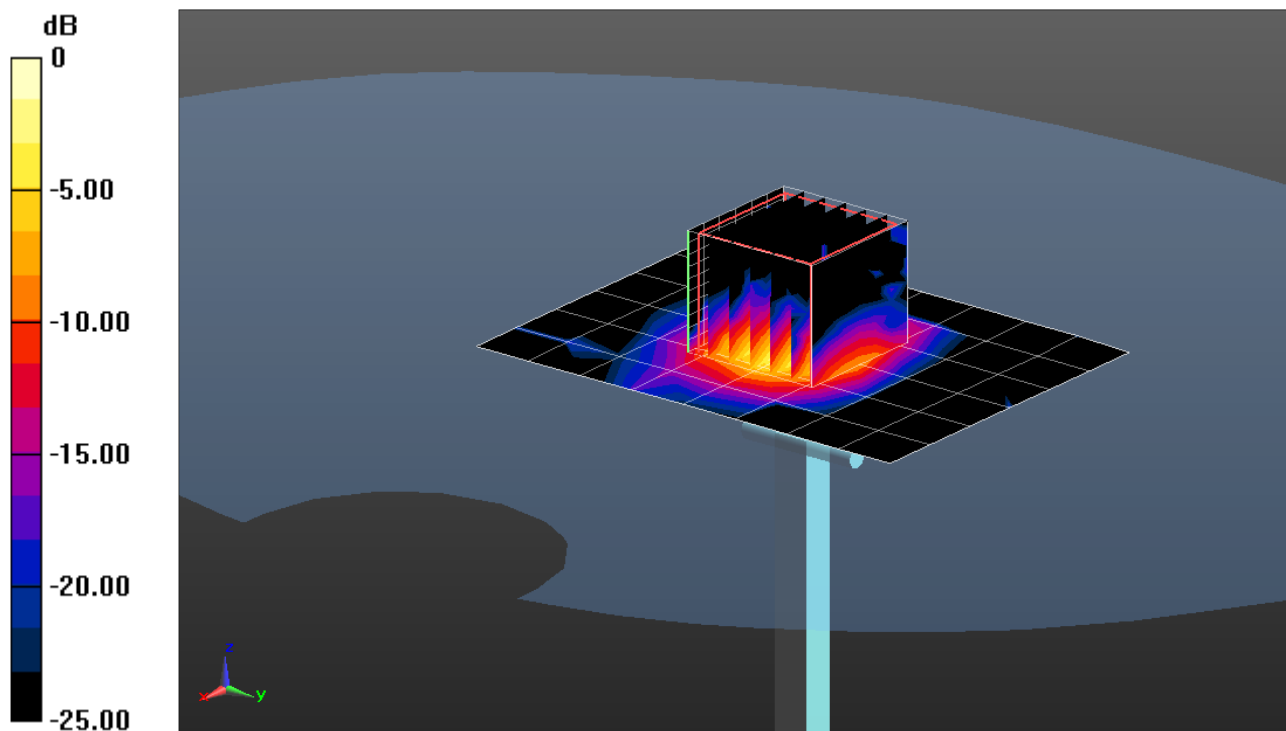
Zoom Scan (7x7x11)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Input Power = 12.3 dBm (17.0 mW)

Peak SAR (extrapolated) = 5.386 mW/g

SAR(1 g) = 1.34 mW/g; SAR(10 g) = 0.349 mW/g

Deviation = -0.10%



0 dB = 2.87 mW/g = 9.16 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 5 GHz Body; Medium parameters used:

$f = 5500 \text{ MHz}$; $\sigma = 5.498 \text{ mho/m}$; $\epsilon_r = 49.29$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-05-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.8°C

Probe: EX3DV4 - SN3589; ConvF(3.4, 3.4, 3.4); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

5500MHz System Verification

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

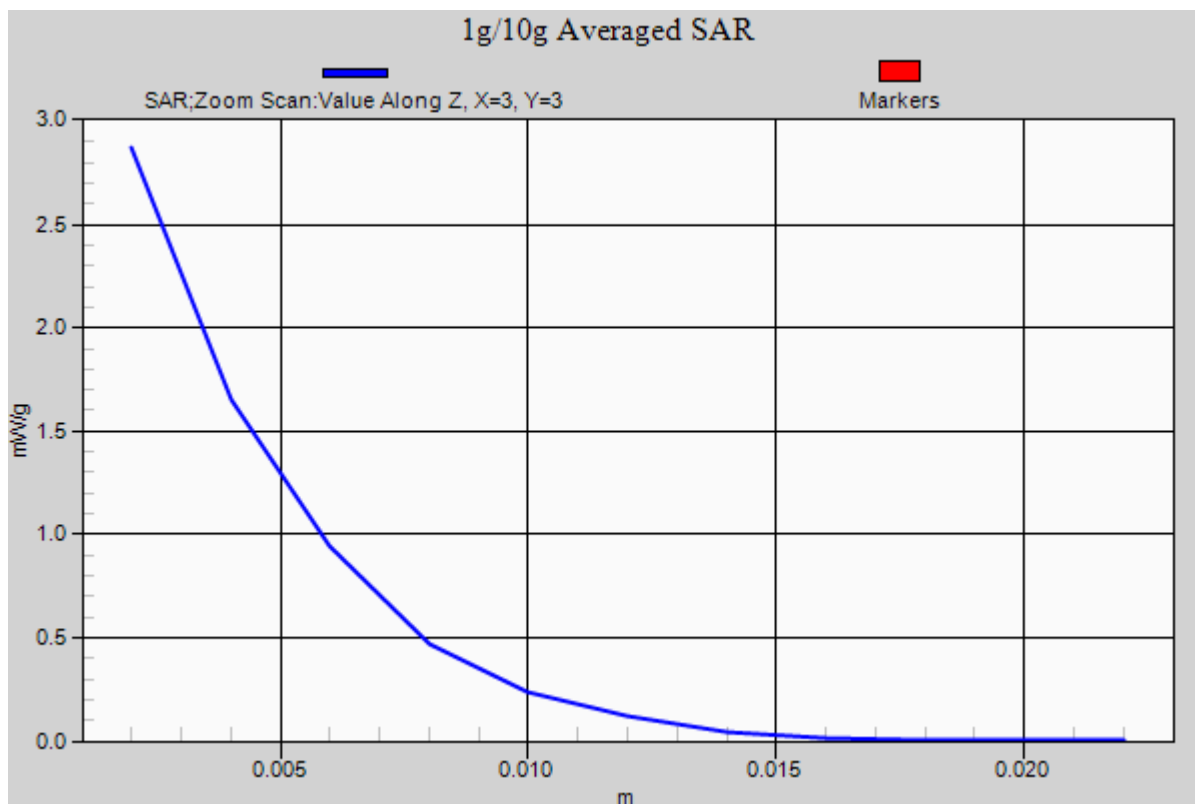
Zoom Scan (7x7x11)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Input Power = 12.3 dBm (17.0 mW)

Peak SAR (extrapolated) = 5.386 mW/g

SAR(1 g) = 1.34 mW/g; SAR(10 g) = 0.349 mW/g

Deviation = -0.10%



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 5 GHz Body; Medium parameters used:

$f = 5800 \text{ MHz}$; $\sigma = 5.909 \text{ mho/m}$; $\epsilon_r = 48.85$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-05-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.8°C

Probe: EX3DV4 - SN3589; ConvF(3.59, 3.59, 3.59); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

5800MHz System Verification

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

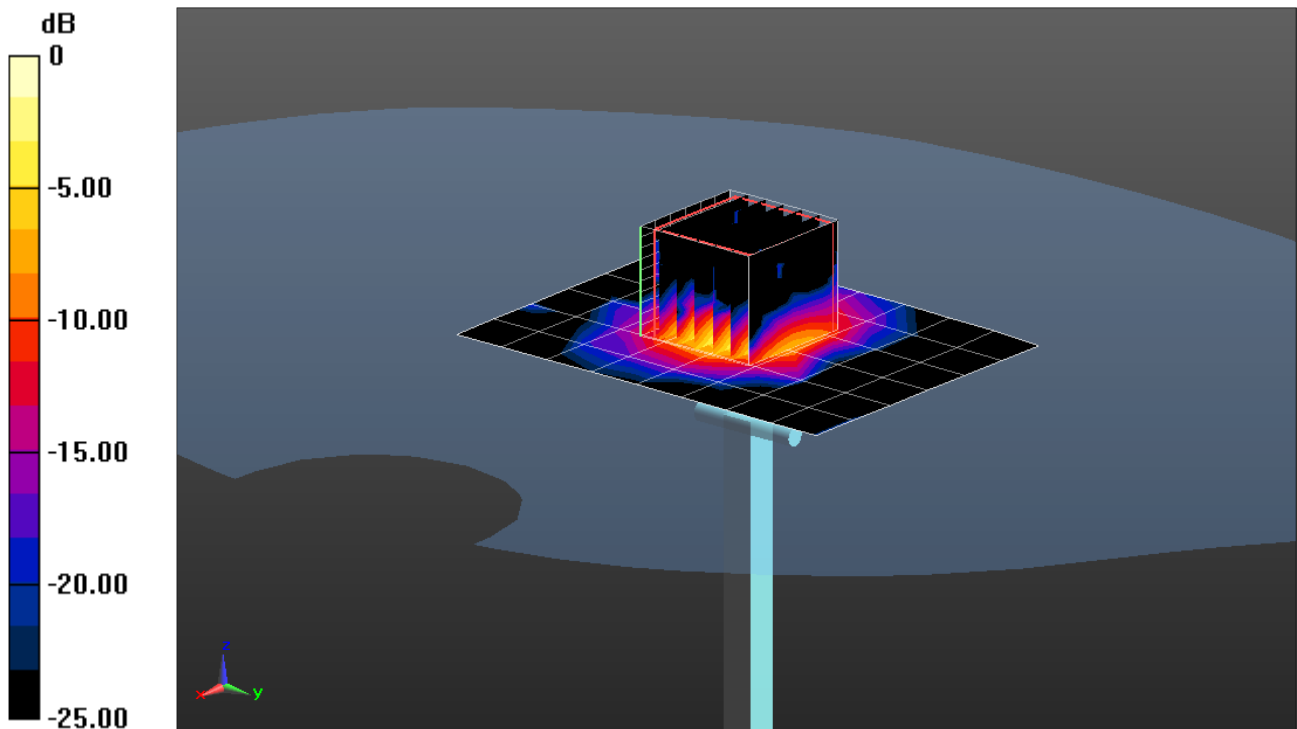
Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Input Power = 12.3 dBm (17.0 mW)

Peak SAR (extrapolated) = 5.796 mW/g

SAR(1 g) = 1.31 mW/g; SAR(10 g) = 0.336 mW/g

Deviation = 3.71%



0 dB = 2.78 mW/g = 8.88 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 5 GHz Body; Medium parameters used:

$f = 5800 \text{ MHz}$; $\sigma = 5.909 \text{ mho/m}$; $\epsilon_r = 48.85$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-05-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.8°C

Probe: EX3DV4 - SN3589; ConvF(3.59, 3.59, 3.59); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

5800MHz System Verification

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

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

Input Power = 12.3 dBm (17.0 mW)

Peak SAR (extrapolated) = 5.796 mW/g

SAR(1 g) = 1.31 mW/g; SAR(10 g) = 0.336 mW/g

Deviation = 3.71%

